# PERPETUAL

# TROUBLE SHOOTER'S MANUAL

Reg. U.S. Pat. Off.

## VOLUME V

by

JOHN F. RIDER

Published by

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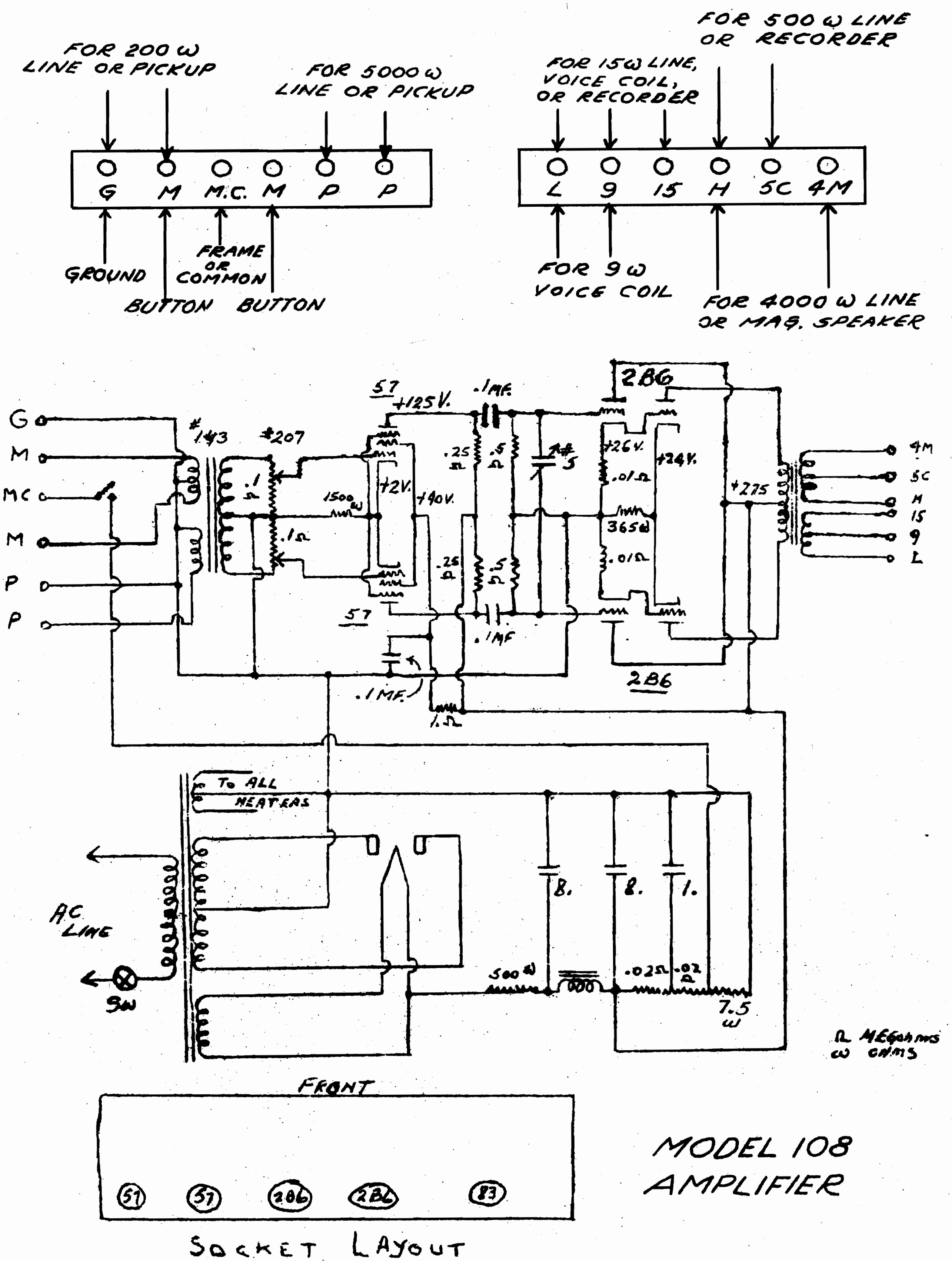
## ACRATEST PRODUCTS

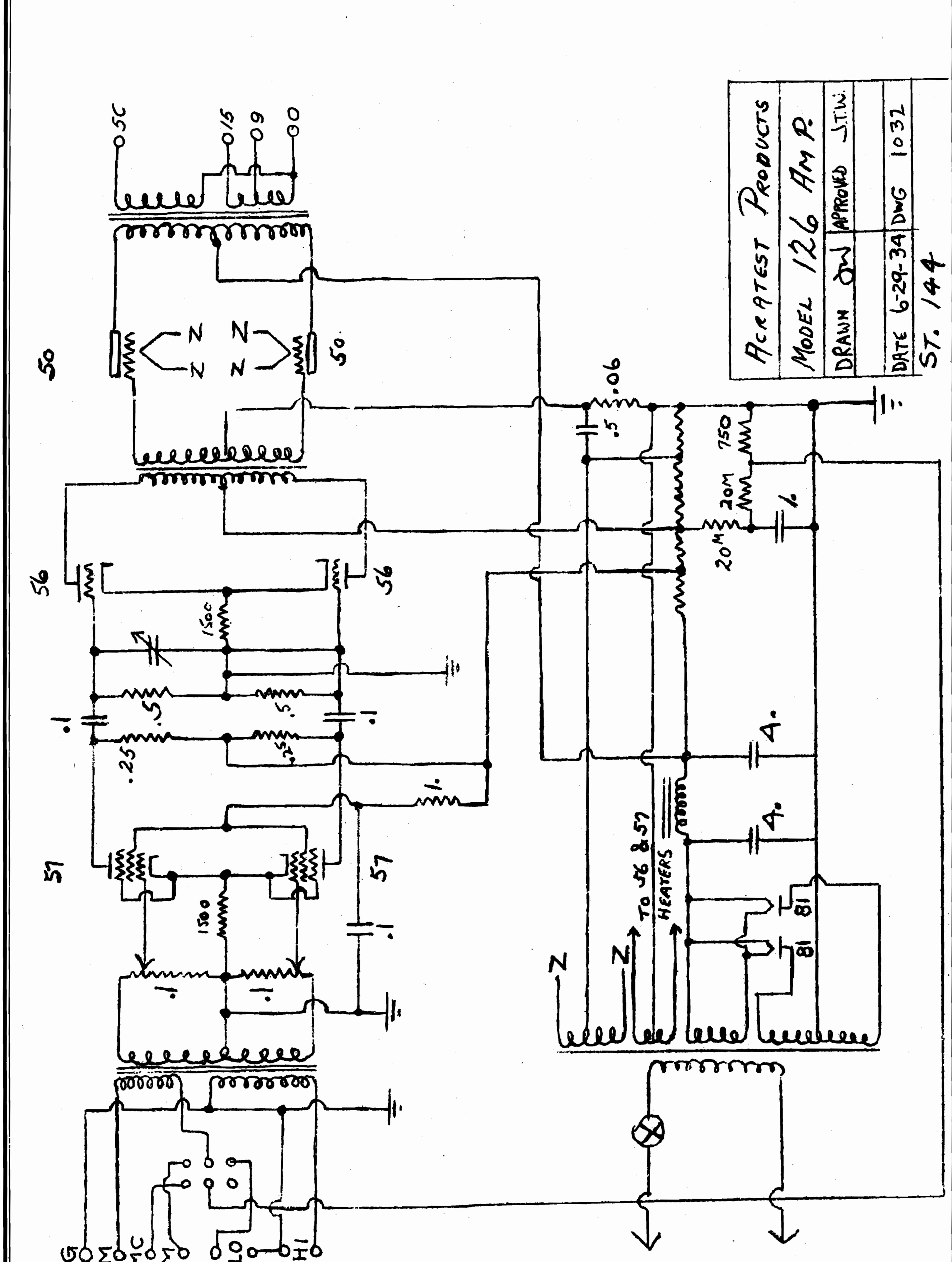
MODEL 108
Schematic
Layout




MODEL 108
AMPLIFIER

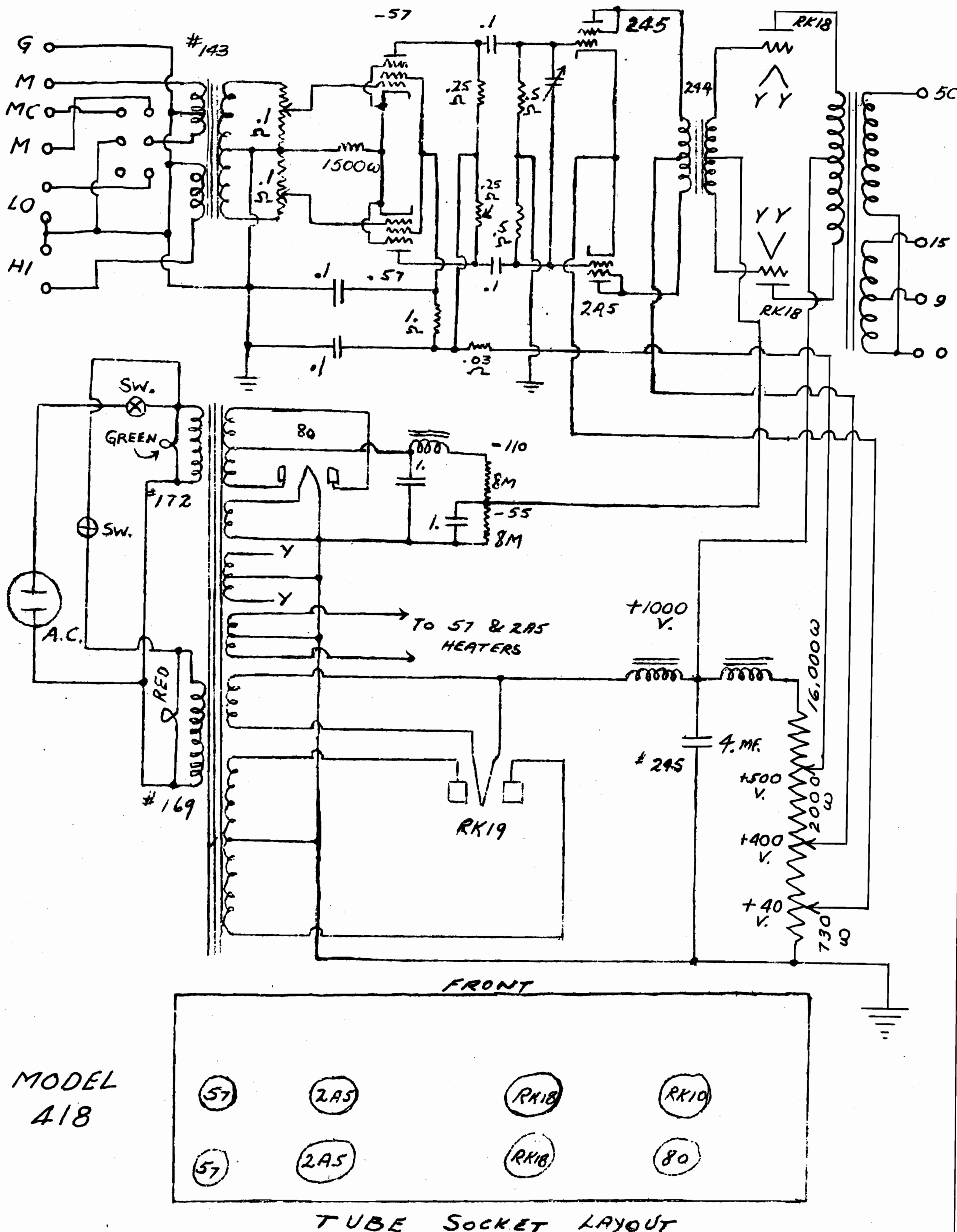
MODEL 126
Schematic

## ACRATEST PRODUCTS



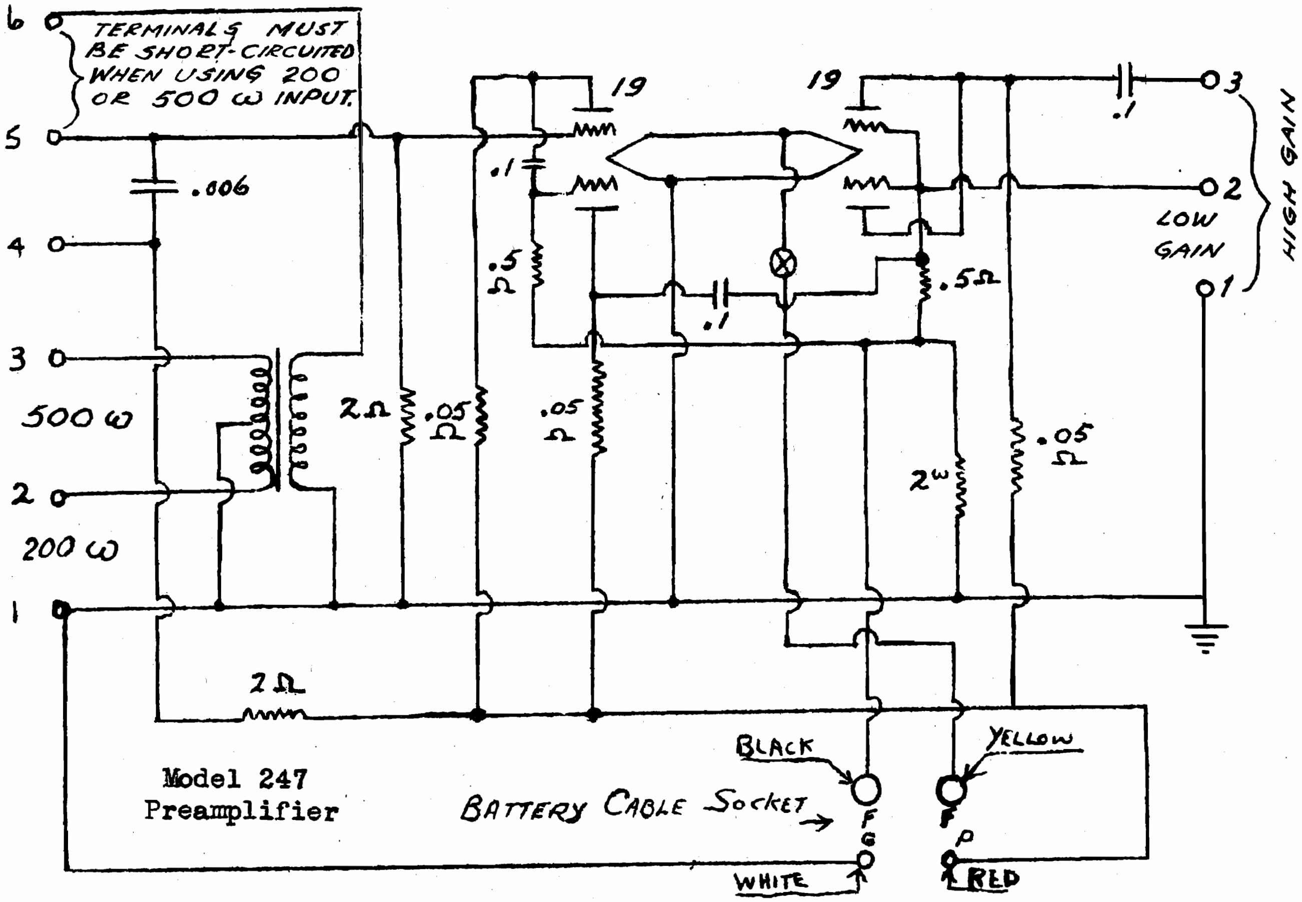
# ACRATEST PRODUCTS

MODEL 418
Schematic
Socket Layout



MODEL 247
MODEL 739
Schematic

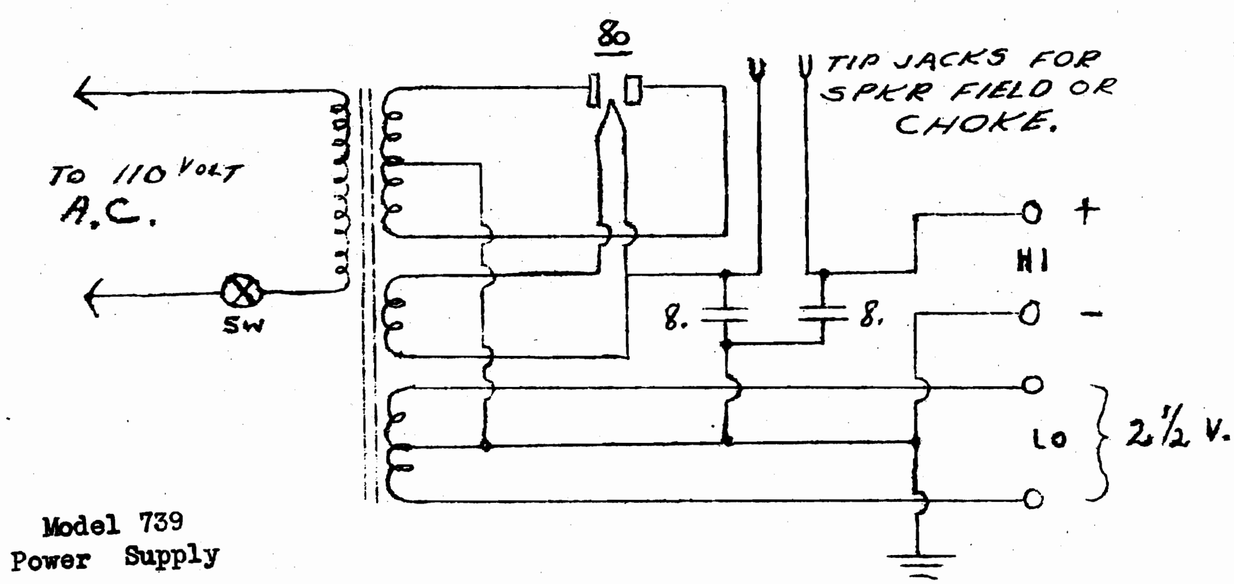
## ACRATEST PRODUCTS




Model 247
Preamplifier

White = external ground, Red = B+90 - 135, Yellow = A + 3v., B-, Black = A-

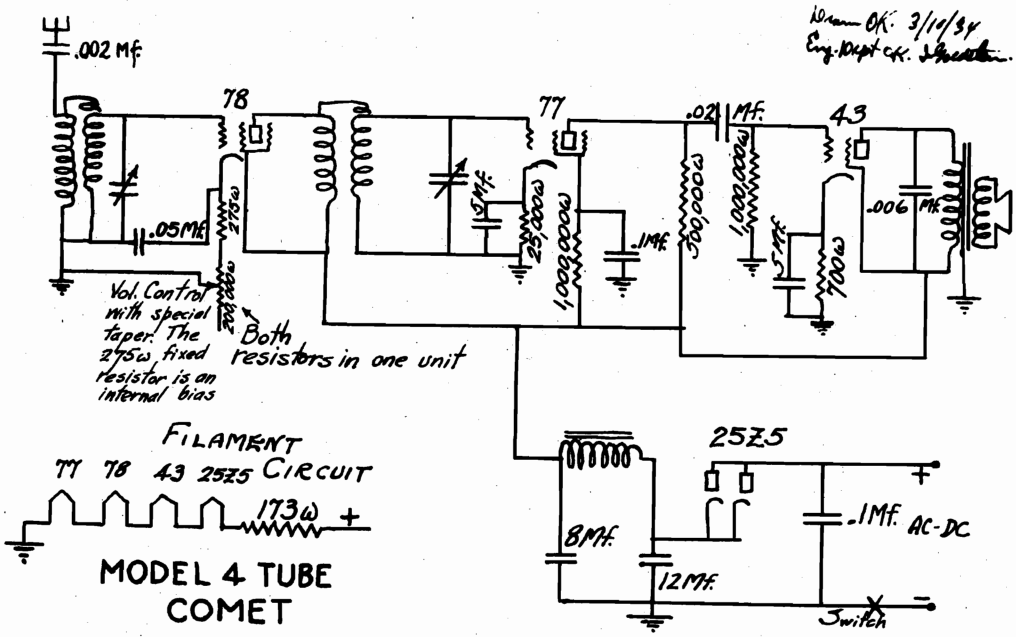
Terminals 1 & 4 = Photo -cell or condenser microphone
" 1 & 5 = Crystal mic., high imp. pickup, or radio tuner



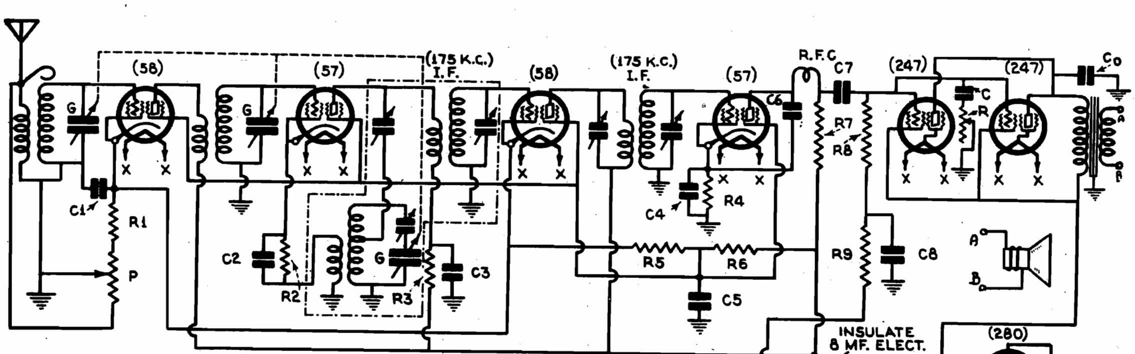

Model 739
Power Supply

# AIR KING PRODUCTS CORP.

MODEL 4 Tube Comet Schematic
MODEL 7 Tube Bdc't Super. Schematic




MODEL 4 TUBE COMET




P — 10,000 OHMS (TAPER)
R1 — 300 "
R2 — 3500 "
R3 — 2000 "
R4 — 40,000 "
R5 — 30,000 " (1 WATT)
R6 — 15,000 " (2 " )
R7 — 0.3 MEG.
R8 — 0.5 "
R9 — 0.25 "
R — 1.0 "

C, Co — .006 MFD.
C1 — 0.1 MFD.
C2 — .002 "
C3 — 0.1 "
C4 — 0.5 "
C5 — 0.25 "
C6 — .0005 "
C7 — .05 "
C8 — 0.1 "
C9 — 8 MFD. } ELECTROLYTIC
C10 — 8 " }
C11 — 0.1 "
G — 3 GANG .000365 MFD.

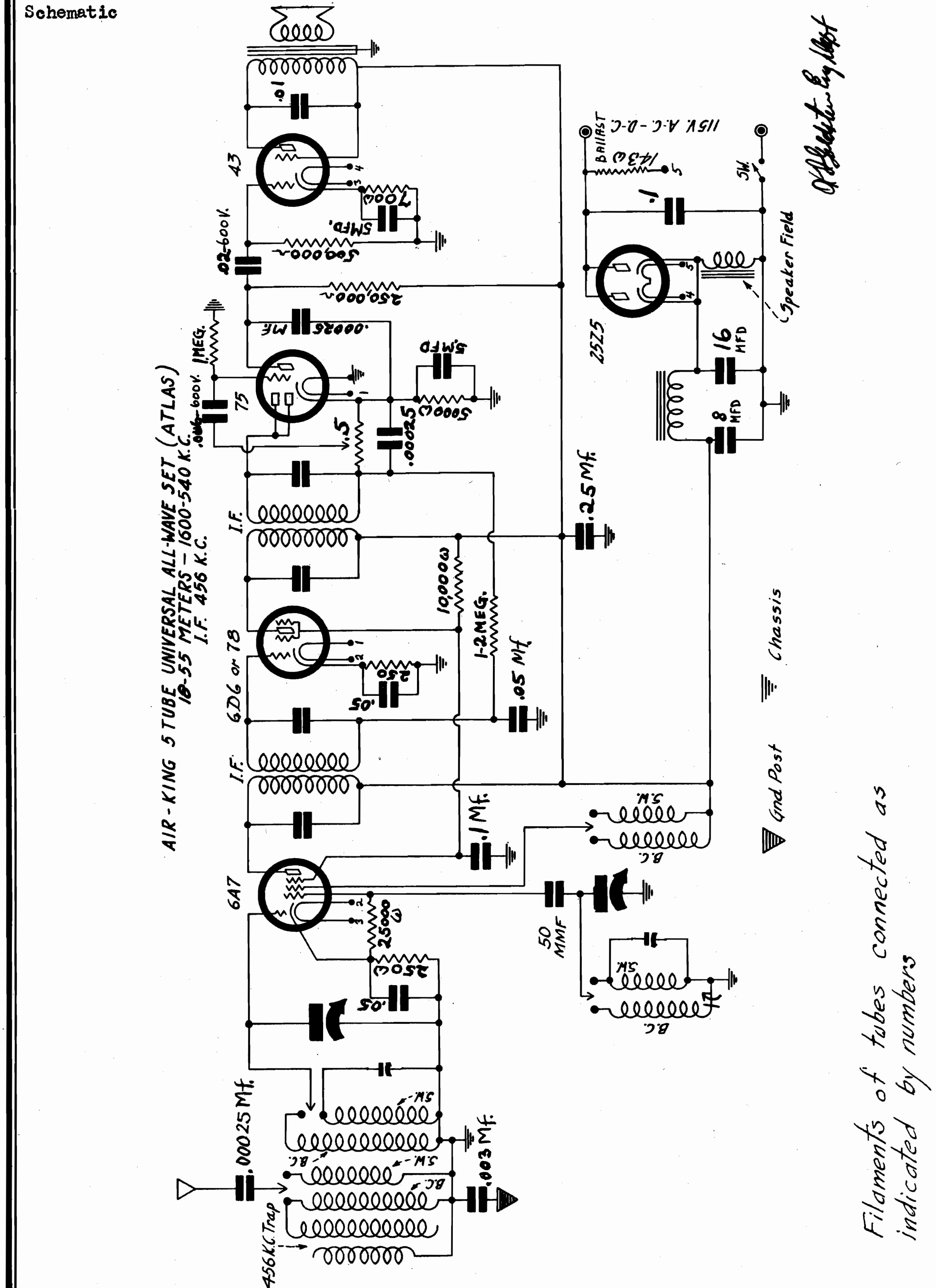
IF PEAK 175 KC.

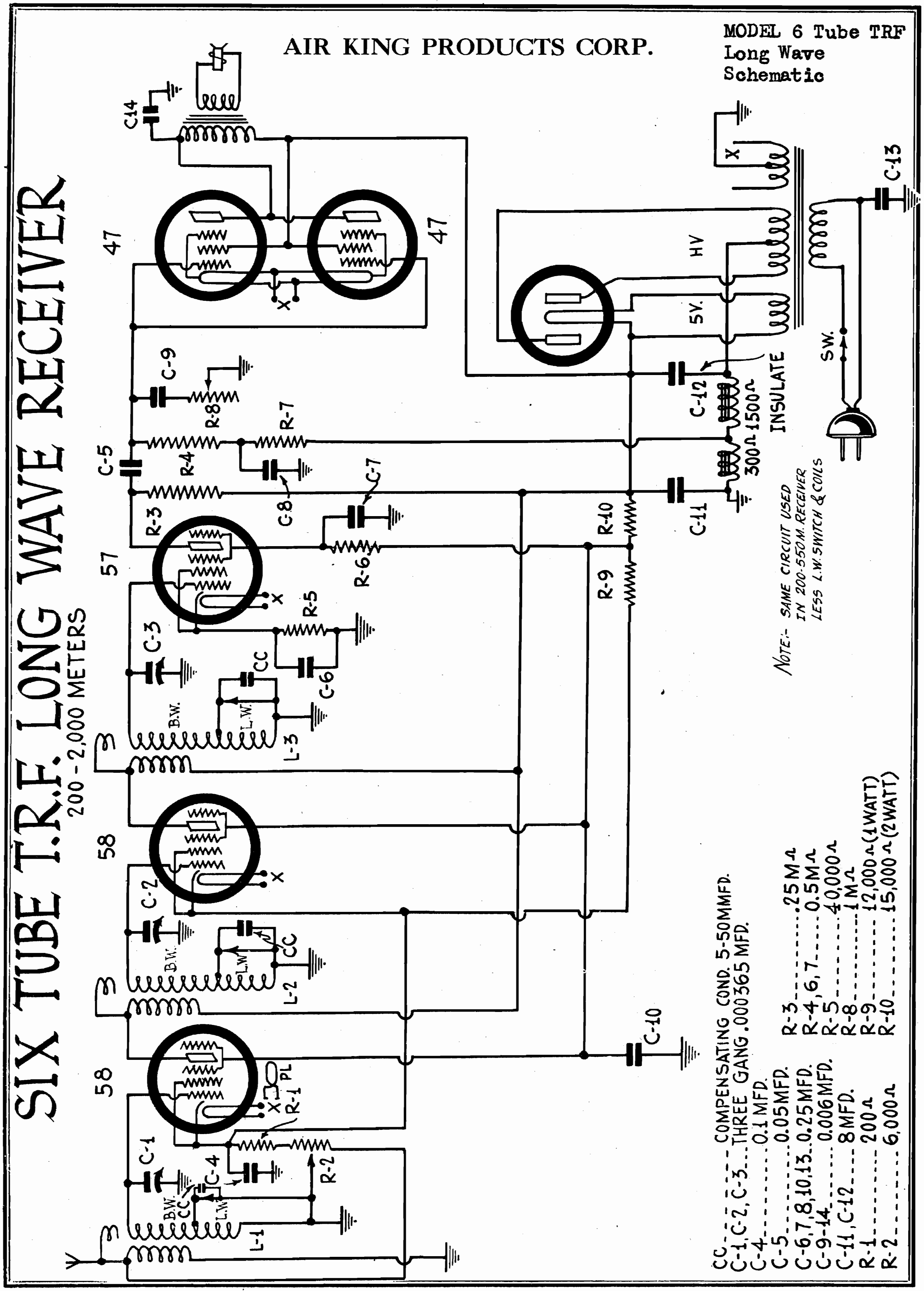
OK Eng. Dept. 8/5/32

7-TUBE BROADCAST "SUPER"

MODEL Atlas 5 Tube
Universal All-Wave
Schematic

AIR KING PRODUCTS CORP.



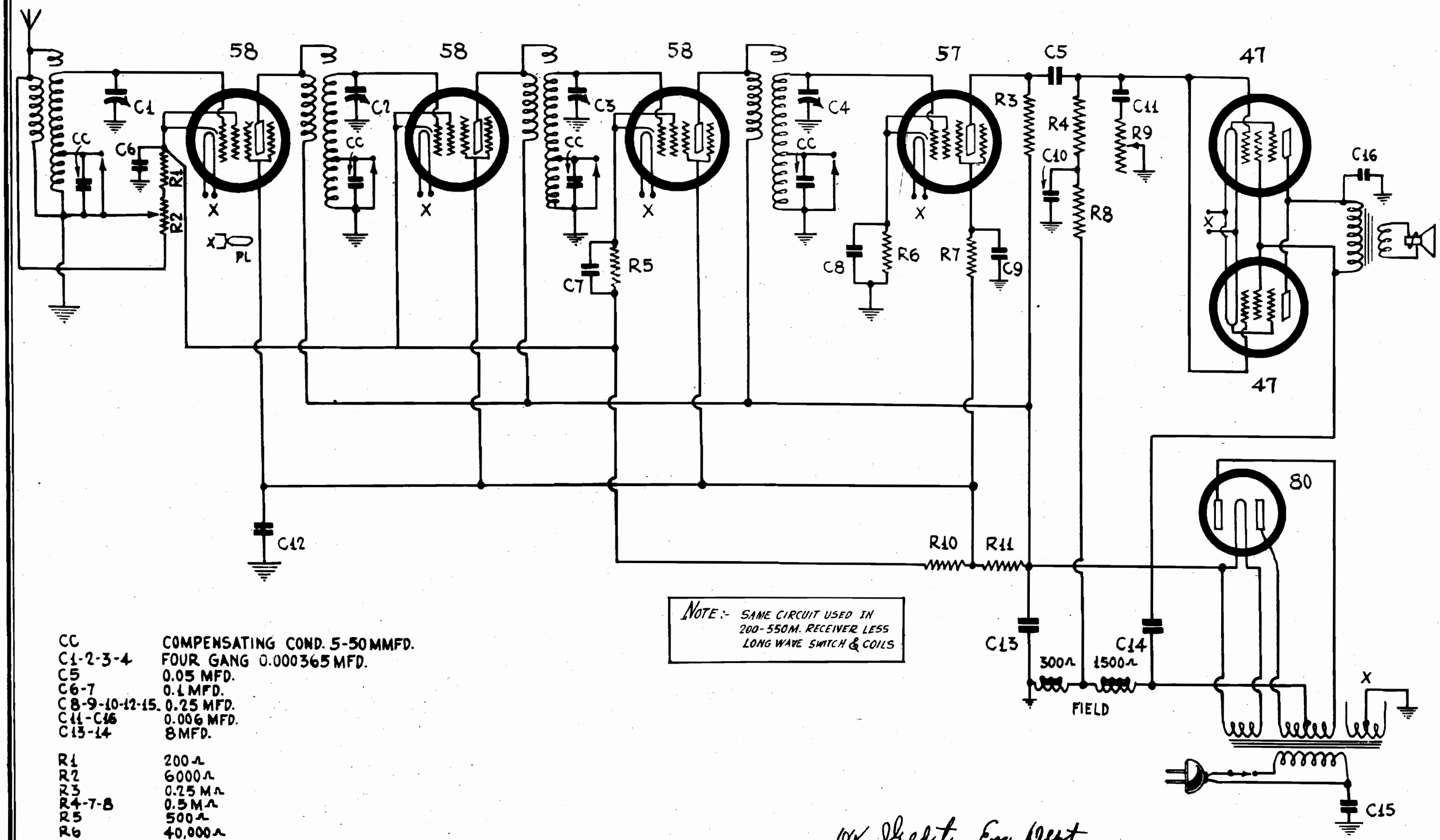

AIR KING PRODUCTS CORP.
MODEL 6 Tube TRF
Long Wave
Schematic
SIX TUBE T.R.F. LONG WAVE RECEIVER
200 - 2,000 METERS
47
47
57
58
58
5Y.
HV
INSULATE
300Ω 1500Ω
SW.
NOTE:- SAME CIRCUIT USED IN 200-550M. RECEIVER LESS L.W. SWITCH & COILS
CC ---- COMPENSATING COND. 5-50MMFD.
C-1, C-2, C-3 ... THREE GANG .000365 MFD.
C-4 ---- 0.1 MFD.
C-5 ---- 0.05 MFD.
C-6,7,8,10,13 .. 0.25 MFD.
C-9-14 ---- 0.006 MFD.
C-11, C-12 ---- 8 MFD.
R-1 ---- 200Ω
R-2 ---- 6,000Ω
R-3 ---- .25 MΩ
R-4,6,7 ---- 0.5 MΩ
R-5 ---- 40,000Ω
R-8 ---- 1 MΩ
R-9 ---- 12,000Ω (1 WATT)
R-10 ---- 15,000Ω (2 WATT)

MODEL 7 Tube TRF
Long Wave
Schematic

# AIR KING PRODUCTS CORP.

## SEVEN TUBE SUPER T.R.F LONG WAVE RECEIVER

200-2000 METERS

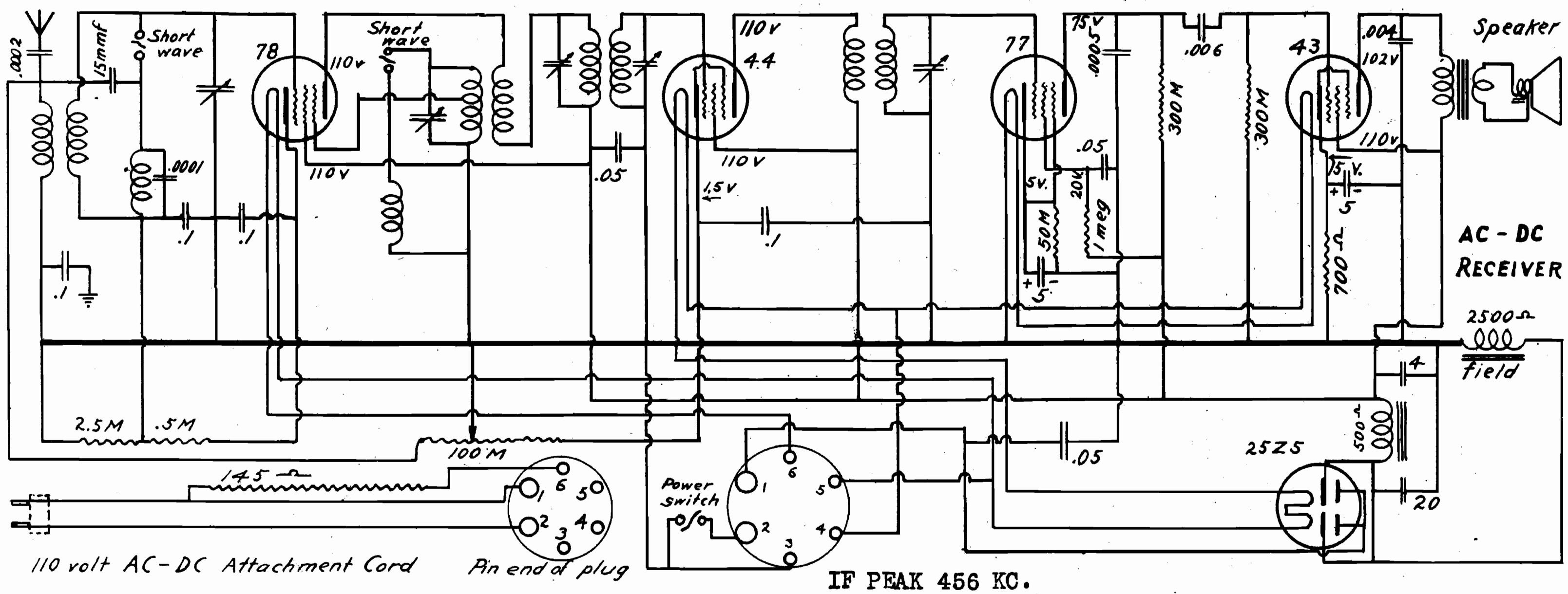



| | |
|---|---|
| CC | COMPENSATING COND. 5-50 MMFD. |
| C1-2-3-4 | FOUR GANG 0.000365 MFD. |
| C5 | 0.05 MFD. |
| C6-7 | 0.1 MFD. |
| C8-9-10-12-15. | 0.25 MFD. |
| C11-C16 | 0.006 MFD. |
| C13-14 | 8 MFD. |
| R1 | 200 Ω |
| R2 | 6000 Ω |
| R3 | 0.25 MΩ |
| R4-7-8 | 0.5 MΩ |
| R5 | 500 Ω |
| R6 | 40,000 Ω |
| R9 | 1 MΩ |
| R10 | 12,000 Ω (1 WATT) |
| R11 | 15,000 Ω (2 WATT) |

OK. J. Geddes[?] Eng. Dept
7/1/32

# ALLIED RADIO CORP.

MODEL F-9501
Schematic
Alignment




IF PEAK 456 KC.

# OPERATING INSTRUCTIONS

## Long and Short Wave

### CAUTION:

This instrument is equipped for operation on 110 volts D. C. or A. C., any frequency from 25 to 133 cycles per second. Before attempting to operate on any other voltage be sure that the proper adaptors are connected and the instructions accompanying them are understood. Special adaptors can be secured from the factory at a slight extra cost. For operating this receiver on automobiles, 32 volt farm light plants and 220 volt A. C. or D. C. ALWAYS plug cord into back of set before plugging into power supply. Cord for 110 volt or 220 volt heats moderately as the cord contains resistance necessary for operation at these voltages. The 20 ft. aerial wire extending from the back of the set should be unwound, laid out along the floor or hung outside a window and is ordinarily all the aerial required. No ground connection should be used. Sometimes results are better if the tip of the antenna wire is connected to a radiator or other ground connection or to an outside aerial.

### TO OPERATE:

Turn left hand knob to right as far as it will go. Wait a few moments for tubes to heat. Turn right hand knob slowly back and forth till a station is heard. Numbers on the dial correspond to kilocycle of station when one zero is added. Adjust this knob carefully to secure best tone and adjust left hand knob to volume desired. When left knob is turned entirely to left a click is heard and power is turned off. When operating on D. C. current and set fails to operate after waiting a reasonable time for tubes to heat up, reverse power supply plug.

### TO RECEIVE SHORT WAVES:

Push handle of switch in rear toward end of cabinet for short wave position. Local police calls, etc., will then be heard at approximately 65 and 100 on the dial, and amateurs, etc., at various other positions. Often local conditions make short wave reception difficult unless the aerial wire is grounded or attached to outside aerial. Reception of short wave requires a good aerial and more careful adjustment of both knobs than is necessary on the broadcast band.

### PHONOGRAPH:

Trace wire from cap of tube in left rear socket to where it solders to bracket in chassis. Note that a black wire connects between the adjacent bracket and chassis. Disconnect black wire at the bracket, inserting small single pole switch between wire and bracket. Solder phonograph pick-up leads to switch terminals.

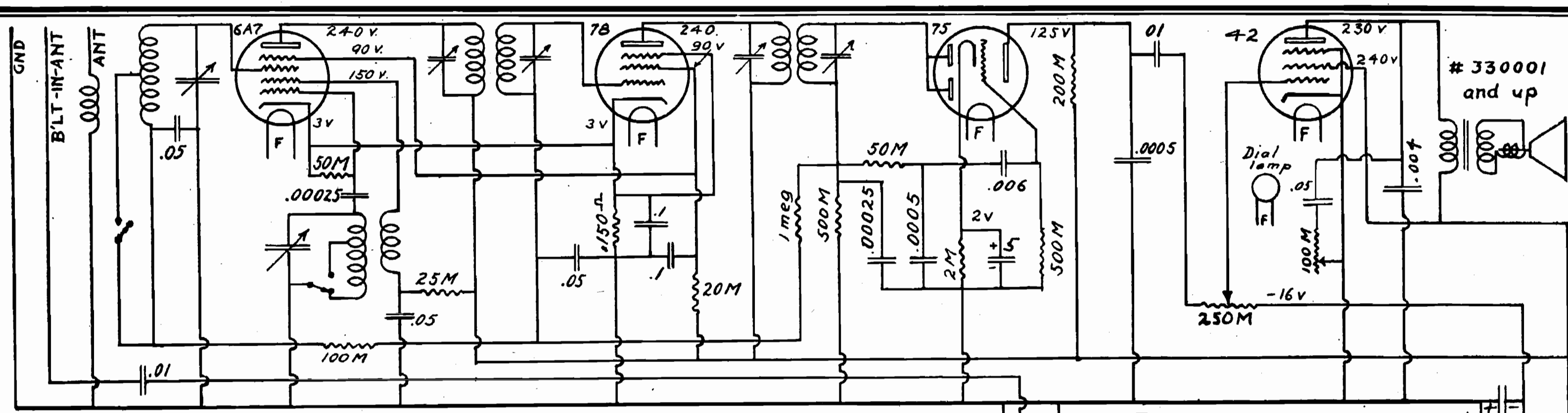
### SERVICE NOTES:

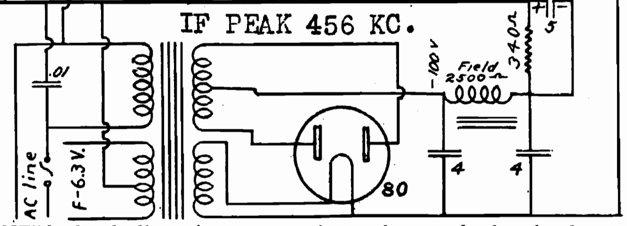
To balance set remove from cabinet. Intermediates are first balanced. Feed a 456 K. C. signal into grid of 78 tube. Adjust double and single trimmers through rear flange of chassis. Next, trim radio frequency coil by first setting tuning condenser to 1400 K. C. on dial, carefully remove from cabinet and attach test oscillator to antenna lead and feed 1400 K. C. signal to antenna coil. Adjust trimmers on tuning condenser to loudest signal.

If used in automobile, antenna stage should be trimmed to car antenna at time of installation.

MODEL F-9505
Schematic, Alignm't
MODEL F-9511
Schematic, Alignm't

# ALLIED RADIO CORP.




**CAUTION:** *Do not attempt to operate on current other than that noted on instrument*

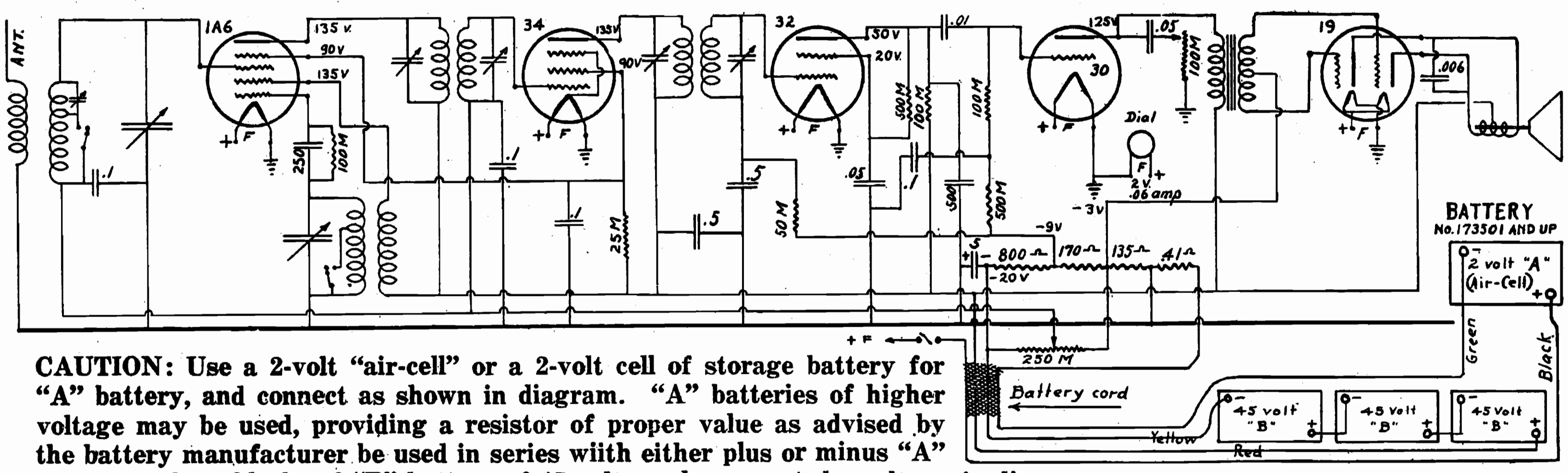
**INSTALLATION:** Twist "ANT" and "BLT-IN-ANT" leads together for operation without aerial. Best results, however, may be had with a good outdoor aerial especially on short wave.

**SHORT WAVE:** Left hand knob, when clear to left, is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

**PHONOGRAPH:** Use single pole toggle switch mounted as near as possible to socket marked "75". Connect one side to green resistor with yellow dot found shunted by .00025 mica condenser and connected to black wire coming from coil can adjacent to 75 tube, connect other side of switch in series with phonograph pickup to ground.

**SERVICE NOTES-** Intermediate stage is carefully phased to 456 K. C. at the factory. Should rephasing be necessary feed 546 K. C. signal into grid cap of 6A7 tube and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400, carefully remove chassis from cabinet, feed 1400 K. C. Signal into "ANT" lead and adjust trimmers on tuning condenser to loudest signal

Model F-9505




**CAUTION: Use a 2-volt "air-cell" or a 2-volt cell of storage battery for "A" battery, and connect as shown in diagram. "A" batteries of higher voltage may be used, providing a resistor of proper value as advised by the battery manufacturer be used in series wiith either plus or minus "A" lead. Use three blocks of "B" battery of 45 volts each, connected as shown in diagram.**

IF PEAK 456 KC.

**INSTALLATION:** A good outdoor aerial will give best results, especially on short wave. No ground wire is usually required.

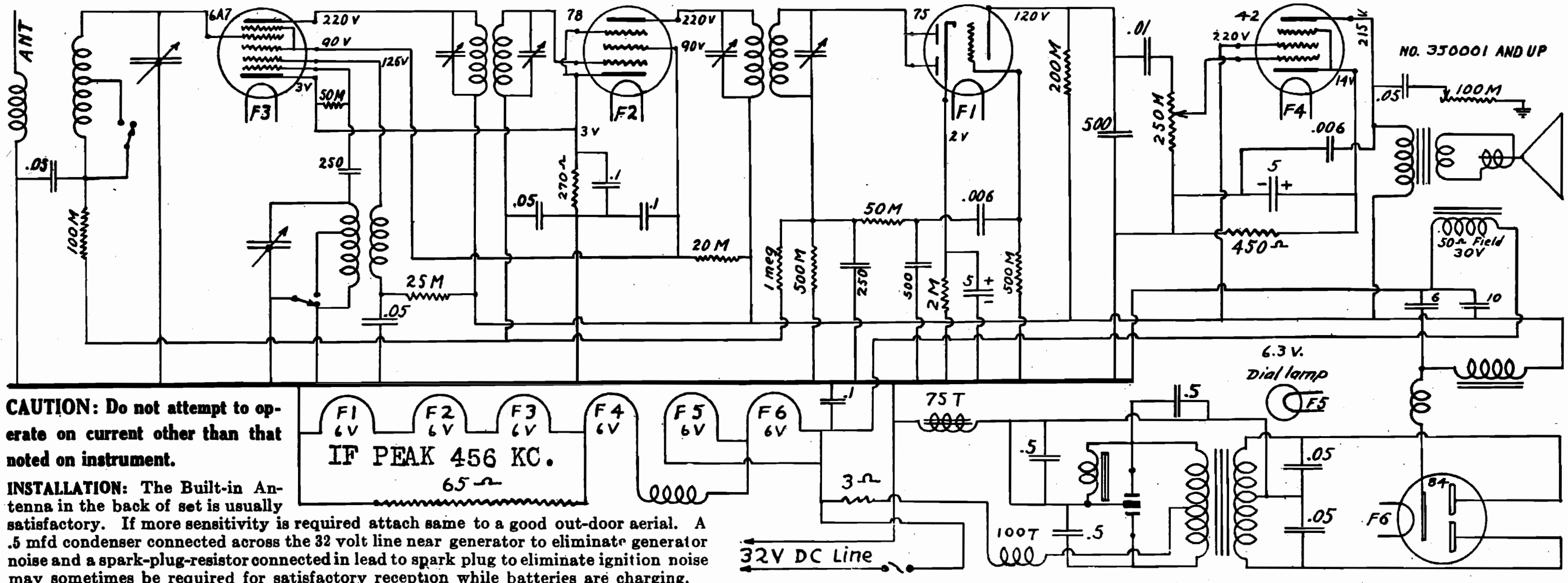
**PHONOGRAPH:** Use single pole toggle switch mounted as near as possible to socket marked "32." Cut black wire coming from bottom of coil can adjacent to this tube and connect across switch. Connect phonograph pickup across switch.

**SERVICE NOTES:** Intermediate stage is carefully phased to 456 k.c. at the factory. Should rephasing be necessary, feed 456 k.c. signal into grid cap of "1A6" tube, and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400 k.c., carefully remove chassis from cabinet, feed 1400 k.c. signal into antenna lead and adjust trimmers on tuning condenser to loudest signal.

Model F-9511

# ALLIED RADIO CORP.

MODEL F-9515
Schematic,Alignm't
MODEL F-9521
Schematic,Alignm't

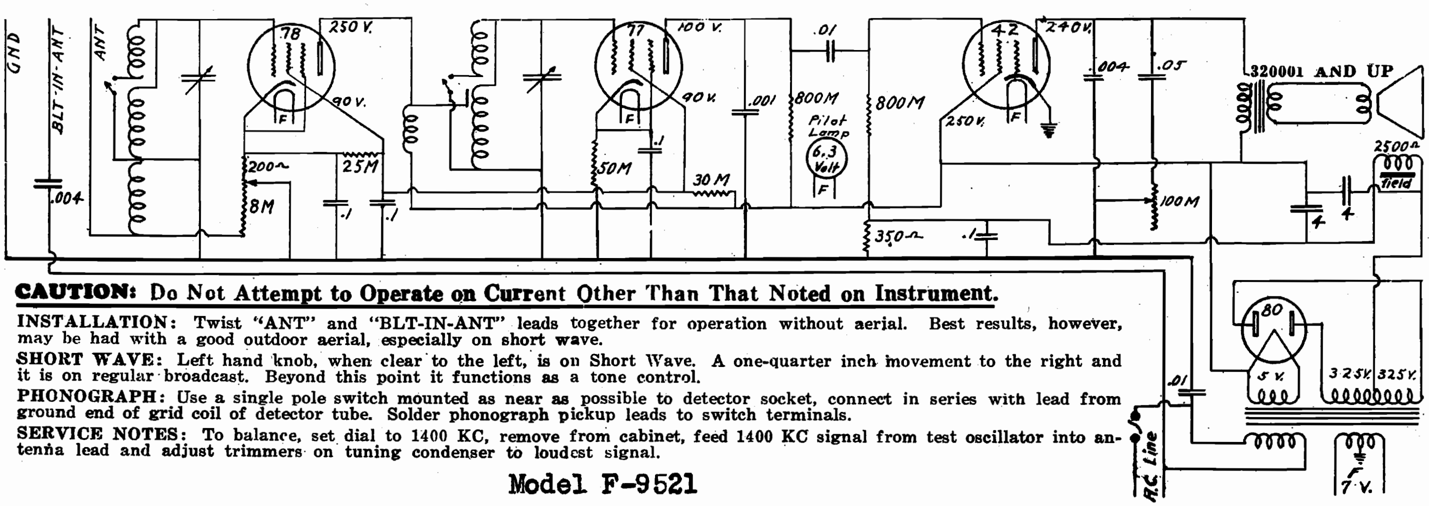



**CAUTION: Do not attempt to operate on current other than that noted on instrument.**

**INSTALLATION:** The Built-in Antenna in the back of set is usually satisfactory. If more sensitivity is required attach same to a good out-door aerial. A .5 mfd condenser connected across the 32 volt line near generator to eliminate generator noise and a spark-plug-resistor connected in lead to spark plug to eliminate ignition noise may sometimes be required for satisfactory reception while batteries are charging.

USE NO GROUND CONNECTION ON SET. **SHORT WAVE:** Left hand knob, when clear to left, is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control **PHONOGRAPH:** Use single pole toggle switch mounted as near as possible to socket marked "75". Connect one side to green resistor with yellow dot found shunted by .00025 mica condenser and connected to black wire coming from coil can adjacent to 75 tube, connect other side of switch in series with phonograph pickup to ground. **SERVICE NOTES-** Intermediate stage is carefully phased to 456 K. C. at the factory. Should rephasing be necessary feed 456 K. C. signal into grid cap of 6A7 tube and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400, carefully remove chassis from cabinet, feed 1400 K. C. Signal into "ANT" lead and adjust trimmers on tuning condenser to loudest signal

## Model F-9515




**CAUTION: Do Not Attempt to Operate on Current Other Than That Noted on Instrument.**

INSTALLATION: Twist "ANT" and "BLT-IN-ANT" leads together for operation without aerial. Best results, however, may be had with a good outdoor aerial, especially on short wave.

SHORT WAVE: Left hand knob, when clear to the left, is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

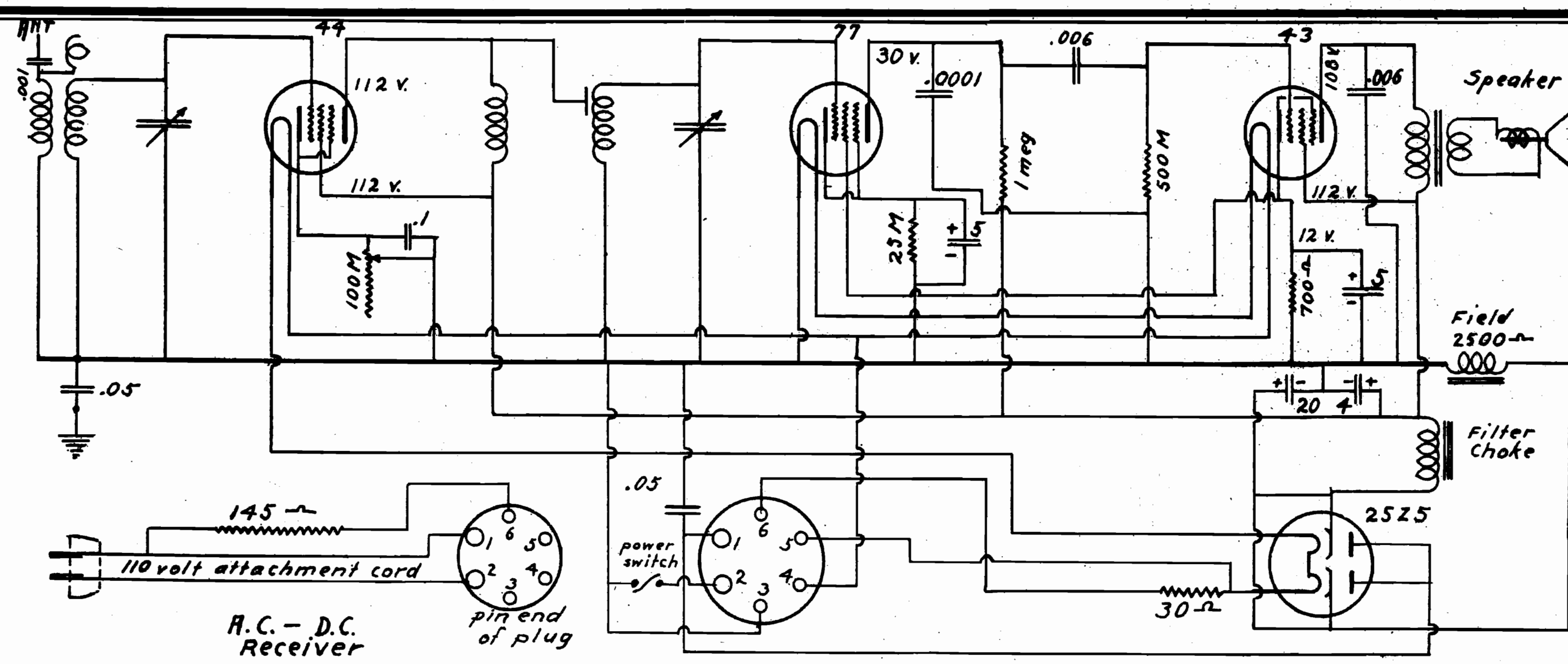
PHONOGRAPH: Use a single pole switch mounted as near as possible to detector socket, connect in series with lead from ground end of grid coil of detector tube. Solder phonograph pickup leads to switch terminals.

SERVICE NOTES: To balance, set dial to 1400 KC, remove from cabinet, feed 1400 KC signal from test oscillator into antenna lead and adjust trimmers on tuning condenser to loudest signal.

## Model F-9521

MODEL F-9525, F-9527
Schematic, Alignment

# ALLIED RADIO CORP.




# OPERATING INSTRUCTIONS

## CAUTION:

This instrument is equipped for operation on 110 volts D. C. or A. C., any frequency from 25 to 133 cycles per second. Before attempting to operate on any other voltage be sure that the proper adaptors are connected and the instructions accompanying them are understood. Special adaptors can be secured from the factory at a slight extra cost, for operating this receiver on automobiles, 32 volt farm light plants and 200 volt A. C. or D. C. ALWAYS plug cord into back of set before plugging into power supply. Cord for 110 volt or 220 volt heats moderately, as the cord contains resistance necessary for operation at these voltages. The 20 ft. aerial wire extending from the back of the set should be unwound, laid out along the floor or hung outside a window and is ordinarily all the aerial required. No ground connection should be used. Sometimes results are better if the tip of the antenna wire is connected to a radiator or other ground connection or to an outside aerial.

## TO OPERATE:

Turn left-hand knob to right as far as it will go. Wait a few moments for tubes to heat. Turn right-hand knob slowly back and forth till a station is heard. Adjust this knob carefully to secure best tone and adjust left-hand knob to volume desired. When left knob is turned entirely to left a click is heard and power is turned off. When operating on D. C. current and set fails to operate after waiting a reasonable time for tubes to heat up, reverse power supply plug.

## PHONOGRAPH:

Connect pick-up leads to single pole toggle switch, which may be mounted in large hole in rear flange of set. Unsolder black wire and 5 mfd condenser from ground lug of coil on under side of chassis and resolder to one side of toggle switch. Solder other side of switch to ground lug of coil.

## SERVICE NOTES:

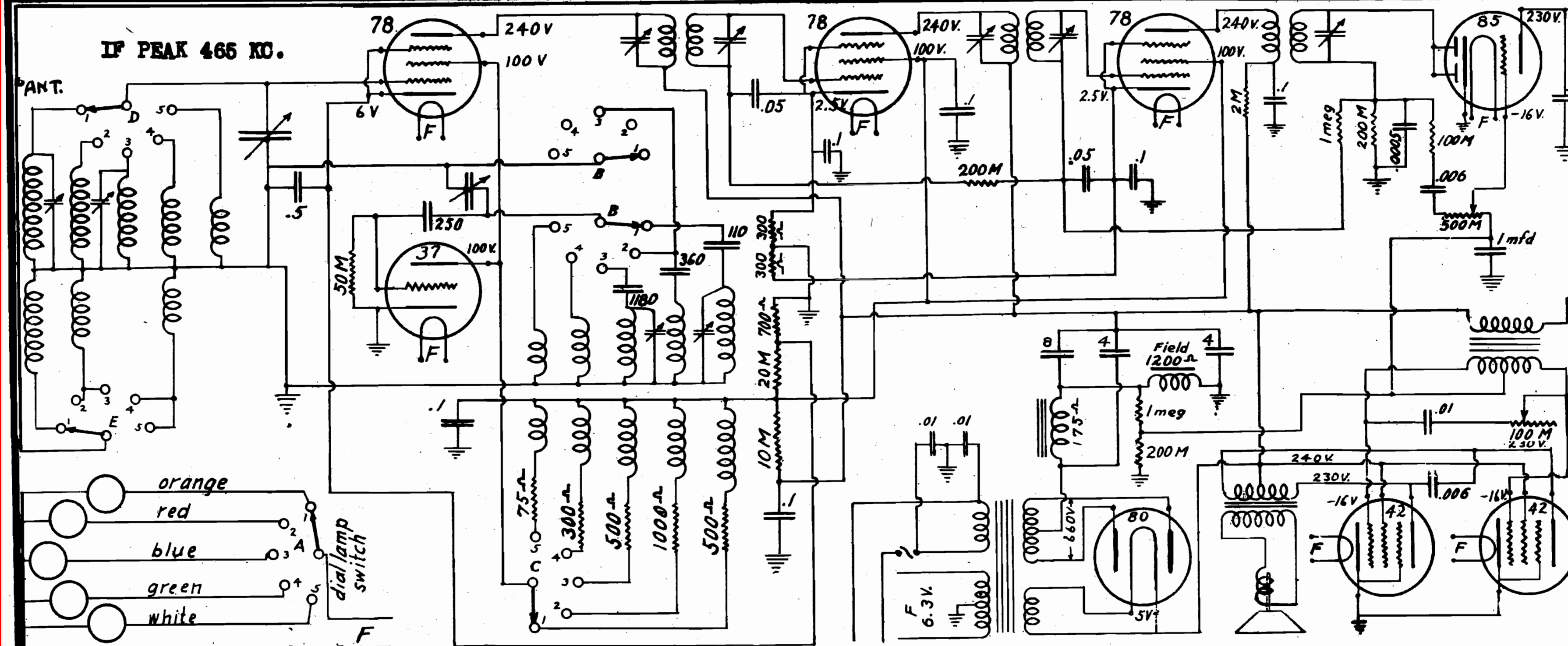
To remove set from cabinet, disconnect from power supply, remove knobs, remove back if compact model, and unscrew the four felt headed screws on bottom of cabinet.

To balance set remove from cabinet, turn tuning condenser plates completely out, attach a test oscillator delivering 1712 K. C. to antenna of set and adjust trimmers on tuning condenser to loudest signal. Change test oscillator signal to 1400 K. C., turn tuning condenser until signal is tuned in and check trimmers again without moving tuning condenser.

If used in automobiles antenna stage should be trimmed to the car antenna at time of installation.

**MODEL F-9531, F-9591**
**Schematic, Alignment**

## ALLIED RADIO CORP.




The built-in aerial at the back of the set usually gives satisfactory sensitivity when stretched around the edge of the floor or along the picture moulding of the room. A good outside aerial connected to the built-in aerial sometimes increases sensitivity. Power noise interferes especially with short-wave reception. If set is located where power noise is prevalent it may be necessary to install an aerial high above the street and use a "transposition" lead-in to the set. Any radio dealer can supply such an aerial kit with full instructions for installing.

### CONTROL KNOBS:

The lower middle knob is for selecting the various frequency bands as indicated on the dial. The upper middle knob is tuning control. The right-hand knob is power switch and volume control and the left-hand knob is tone control.

### PHONOGRAPH:

Mount a single pole toggle switch and two insulated pin jacks in the rear of the chassis near the tube socket marked "85," connect one side of the switch to one pin jack, the remaining pin jack to one outside terminal of the volume control and the remaining switch terminal to the other outside terminal of the volume control. Plug the phonograph pickup leads into the pin jacks.

### SERVICE NOTES:

The intermediate stages are carefully phased to 456 kilocycles at the factory. Should rephasing be necessary, feed a 456 kilocycle signal from a test oscillator to the grid cap of the tube marked "78," located at the rear end of the tuning condenser, then adjust the double trimmers in the top of the coil cans nearest this tube, also the single trimmer in the top of the coil can near the "85" tube, to loudest volume, being sure to keep the oscillator signal at a low volume level. In trimming the frequency bands, first set the dial to the third group of figures from the right-hand end. Trim the "red" band first by adjusting the trimmers on the top of the tuning condenser until a signal of the proper frequency applied to the built-in aerial is heard at its loudest. Next, trim the "orange" band by adjusting the three-plate trimmers, located on the underside of the chassis, to loudest volume with proper signal frequency applied to the antenna. Next, trim the "blue" band by adjusting the two-plate trimmers located adjacent to the three-plate trimmers, to loudest volume with the proper signal frequency applied to the antenna. In trimming the various bands be sure that the band switch is set to the proper band as indicated by the color of the dial lamp. Also, keep the oscillator signal to as low volume level as possible for accuracy.

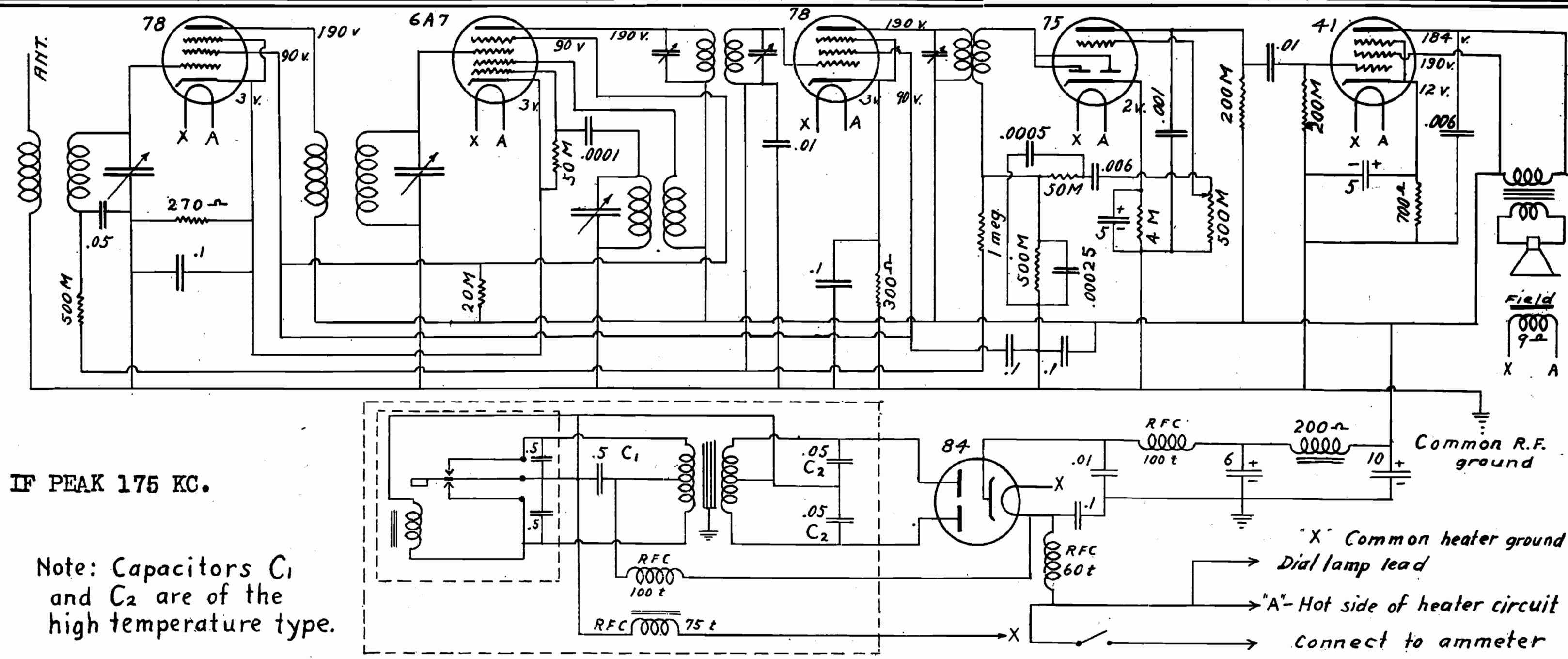
**NOTE:** Should it be necessary to write to the factory for parts or information, always give the serial number of the set as stamped on the back of the chassis.

### SHORT WAVE TIPS:

In listening for short-wave broadcast DON'T forget to consider the difference in time between the location of the broadcaster and the receiver. DON'T expect to hear a station because it is on the air, as many things govern short-wave reception. DON'T get discouraged if reception is poor one night; it may be fine the next. DON'T expect stations to tune broadly; most stations tune sharply. DON'T tune below 10,000 kilocycles (above 30 meters) for distant stations in daylight. DON'T tune above 12,000 kilocycles (below 25 meters) for distant stations after dark. DON'T expect to find stations on all parts of the dial. Short-wave stations are widely separated, except in a few instances. DON'T skim over the dial. It requires some knowledge of tuning to get good results. Tune very slowly. DON'T pass up any weak signal, as it may often be brought in stronger by careful tuning.

**MODEL F-9541**
**Schematic, Alignment**

# ALLIED RADIO CORP.




IF PEAK 175 KC.

Note: Capacitors $C_1$ and $C_2$ are of the high temperature type.

After the set has been unpacked, remove the four screws from bottom of cabinet, remove the front cover by carefully inserting screw driver at either side and exerting slight twisting pressure, slide chassis forward out of cabinet and inspect tubes to make sure if they are completely down in their sockets, after which replace chassis, front of cabinet and four screws as they were originally.

Determine most satisfactory mounting position on bulkhead which should be at the left hand side or directly in front of steering column. Spot the mounting bolt location and drill ½" diameter hole. Insert bolt through hole and assemble washer and nut on engine side. Hang receiver over bolt head and tighten nut.

Attach flexible shafts to control unit by first inserting shaft as far in as possible and then tighten set screws of shaft housing, being careful it is not so tight as to cause shaft to bind in housing.

Mount control unit on steering column in approximately correct position, set pointer to 530 on dial, turn upper control of receiver to extreme clockwise position, carefully place right hand shaft in position on upper receiver control and left hand shaft on lower control and tighten set screws securely.

Adjust control unit position so that shafts leave set with least amount of bend possible and fasten securely in this position. Trial of controls will show best location for smooth operation.

Attach heavy rubber covered lead to ammeter terminal.

Connect pilot light wire from control head to short black wire on set, making connection close to set, and tape up joint. Ground shield by loosening screw under nearest corner of set and connecting wire therefrom to end of shield and tighten up screw.

Disconnect ignition leads from spark plugs, attach one suppressor to top of each plug and reattach the ignition lead to free end of suppressor. Disconnect center wire from distributor head, and substitute distributor suppressor, then plug center wire into free end of suppressor.

Attach generator bypass condenser to generator frame by means of screw holding cut-out. Connect wire from condenser to generator side of cut-out switch.

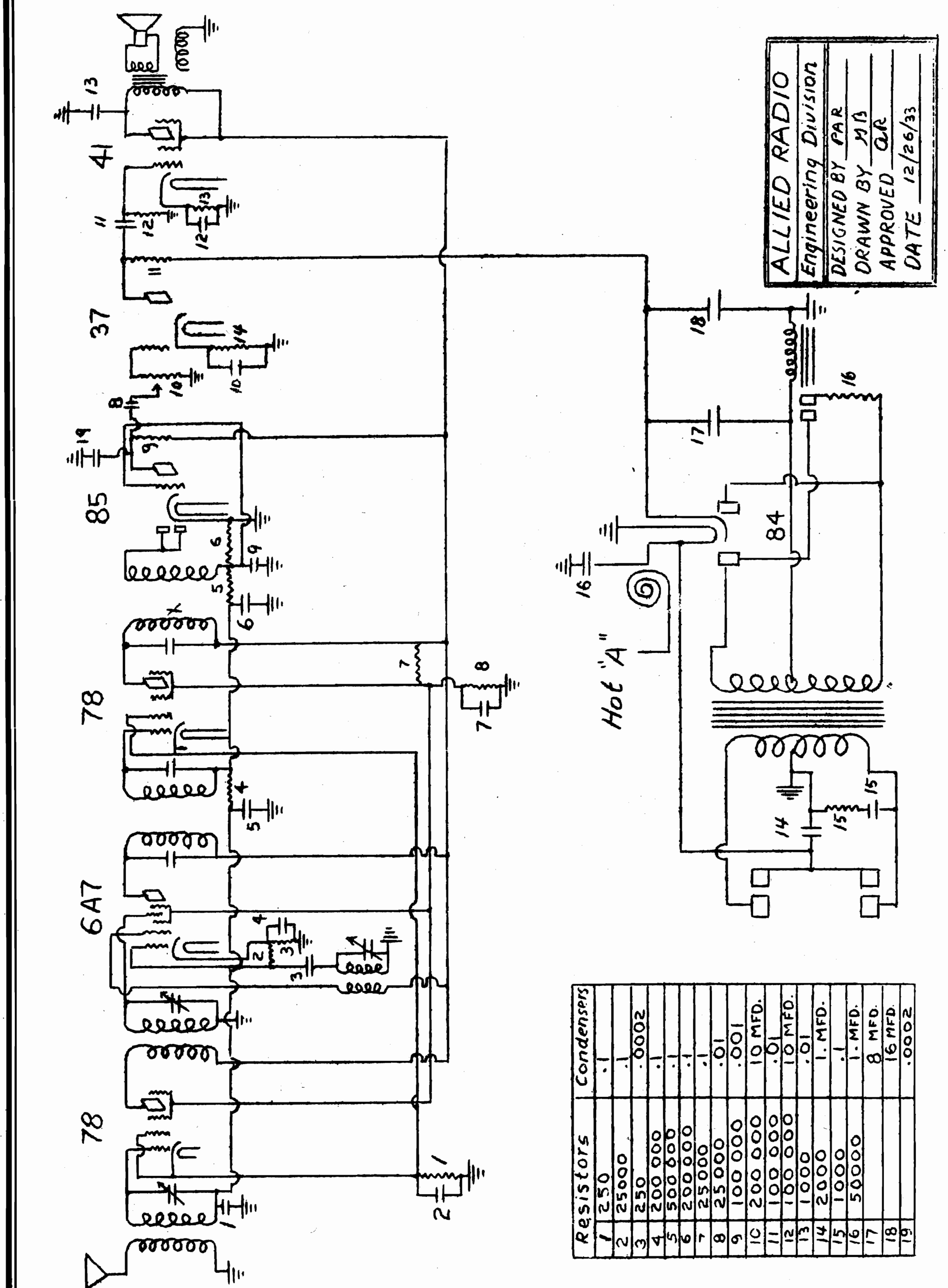
Turn left hand knob on control head to right. If connection directions have been correctly followed, dial should become illuminated immedately and the tubes reach correct operating temperature in approximately 30 seconds.

**Balancing Intermediate Frequency Coils.** These are peaked to 175 K. C. and are trimmed through the top of the tall cans by means of a small screwdriver and a 5-16" socket wrench. Chassis must first be removed from cabinet and signal from test oscillator fed into grid cap of the 6A7 tube.

**Balancing R. F. Coils.** The tuning control must first be attached to tuning condenser shaft with pointer set to 530 when tuning condenser is turned to maximum. Tune in a weak signal at its proper dial marking near 1400 and adjust first and second trimmers on variable from front of chassis for loudest signal. If signal does not come at proper dial setting carefully adjust rear trimmer on variable to shift signal to its proper location and then readjust first and second trimmers. After reinstalling set in car slightly readjust first trimmer through hole in top of cabinet.

# ALLIED RADIO CORP.

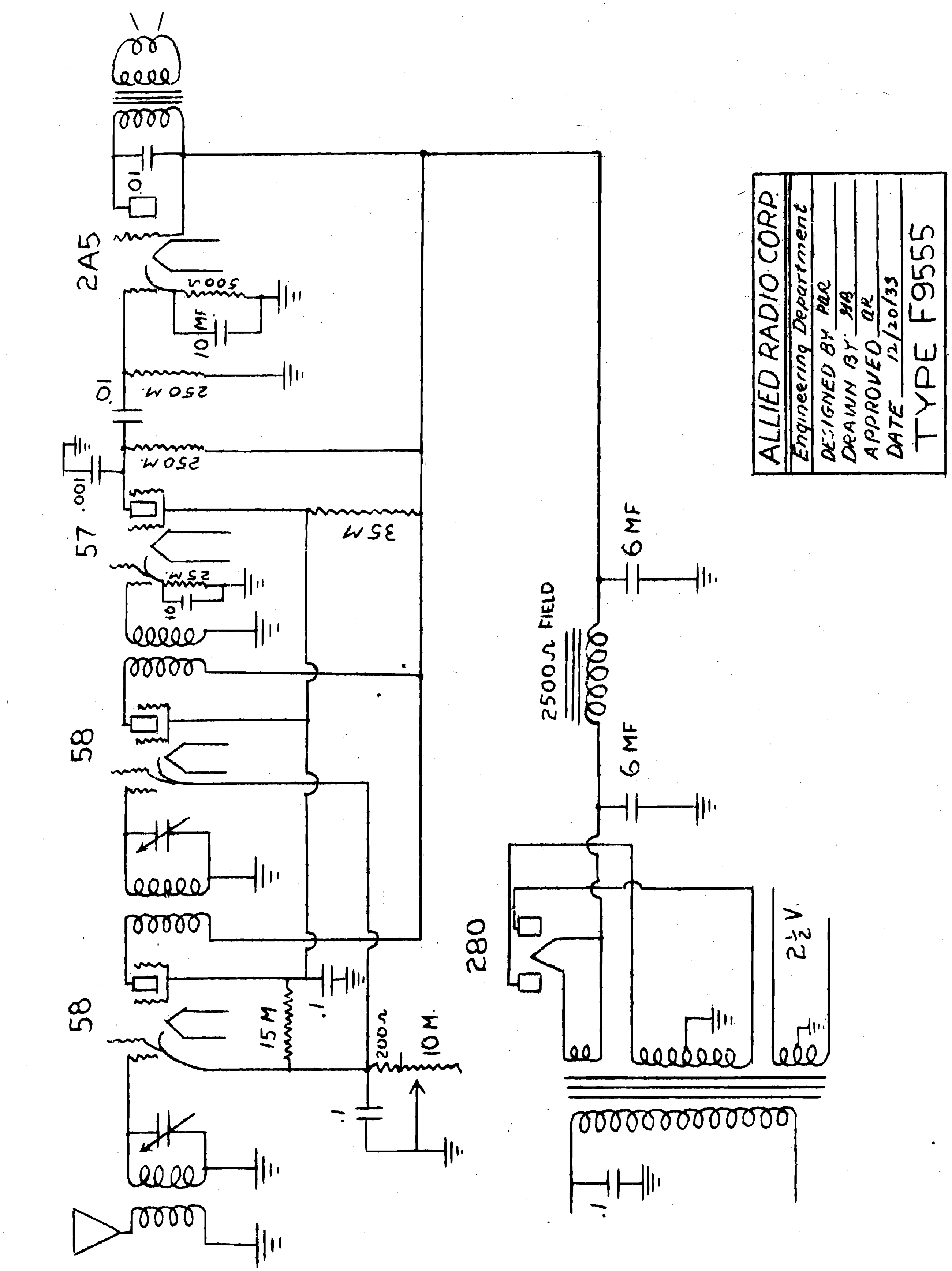
MODEL F-9551
Schematic




| | Resistors | Condensers |
|---|---|---|
| 1 | 250 | .1 |
| 2 | 25000 | .1 |
| 3 | 250 | .0002 |
| 4 | 200 000 | .1 |
| 5 | 500 000 | .1 |
| 6 | 200000 | .1 |
| 7 | 25000 | .1 |
| 8 | 25 000 | .01 |
| 9 | 100 000 | .001 |
| 10 | 200 000 | 10 MFD. |
| 11 | 100 000 | .01 |
| 12 | 100 000 | 10 MFD. |
| 13 | 1000 | .01 |
| 14 | 2000 | 1. MFD. |
| 15 | 1000 | .1 |
| 16 | 50000 | 1. MFD. |
| 17 | | 8 MFD. |
| 18 | | 16 MFD. |
| 19 | | .0002 |

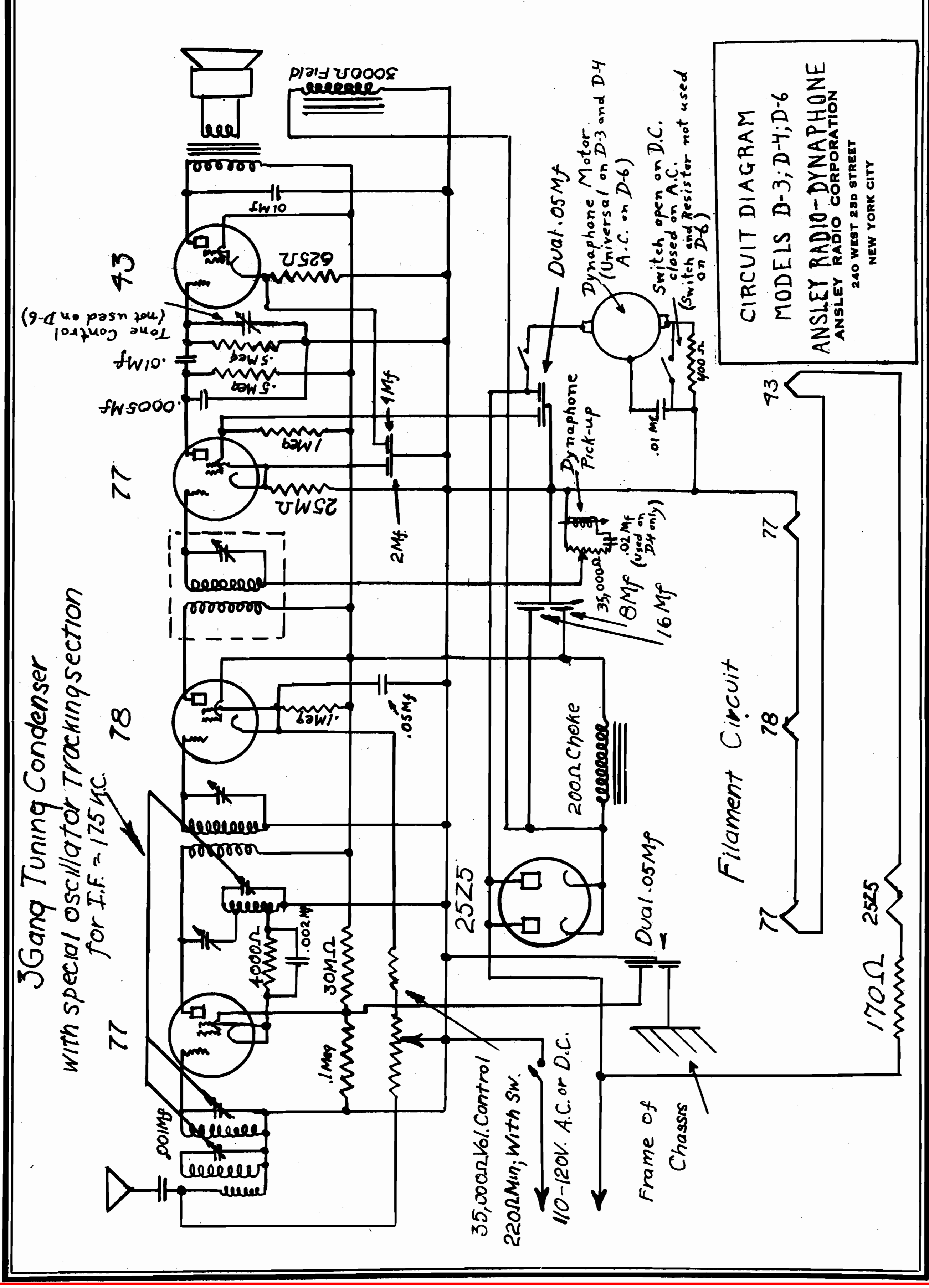
MODEL F-9555
Schematic

# ALLIED RADIO CORP.



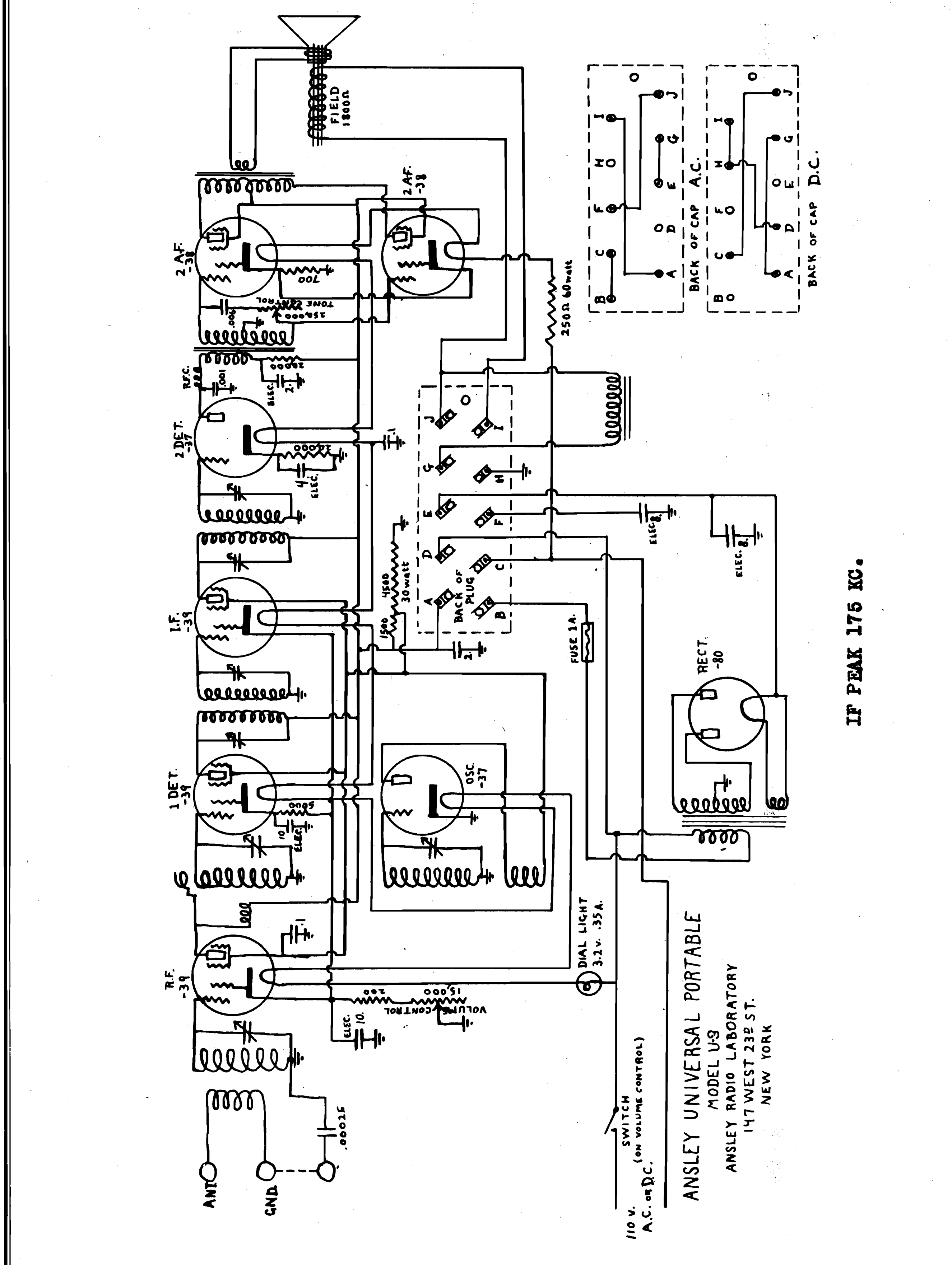
ANSLEY RADIO CORP.

MODEL D-3, D-4, D-6
Schematic



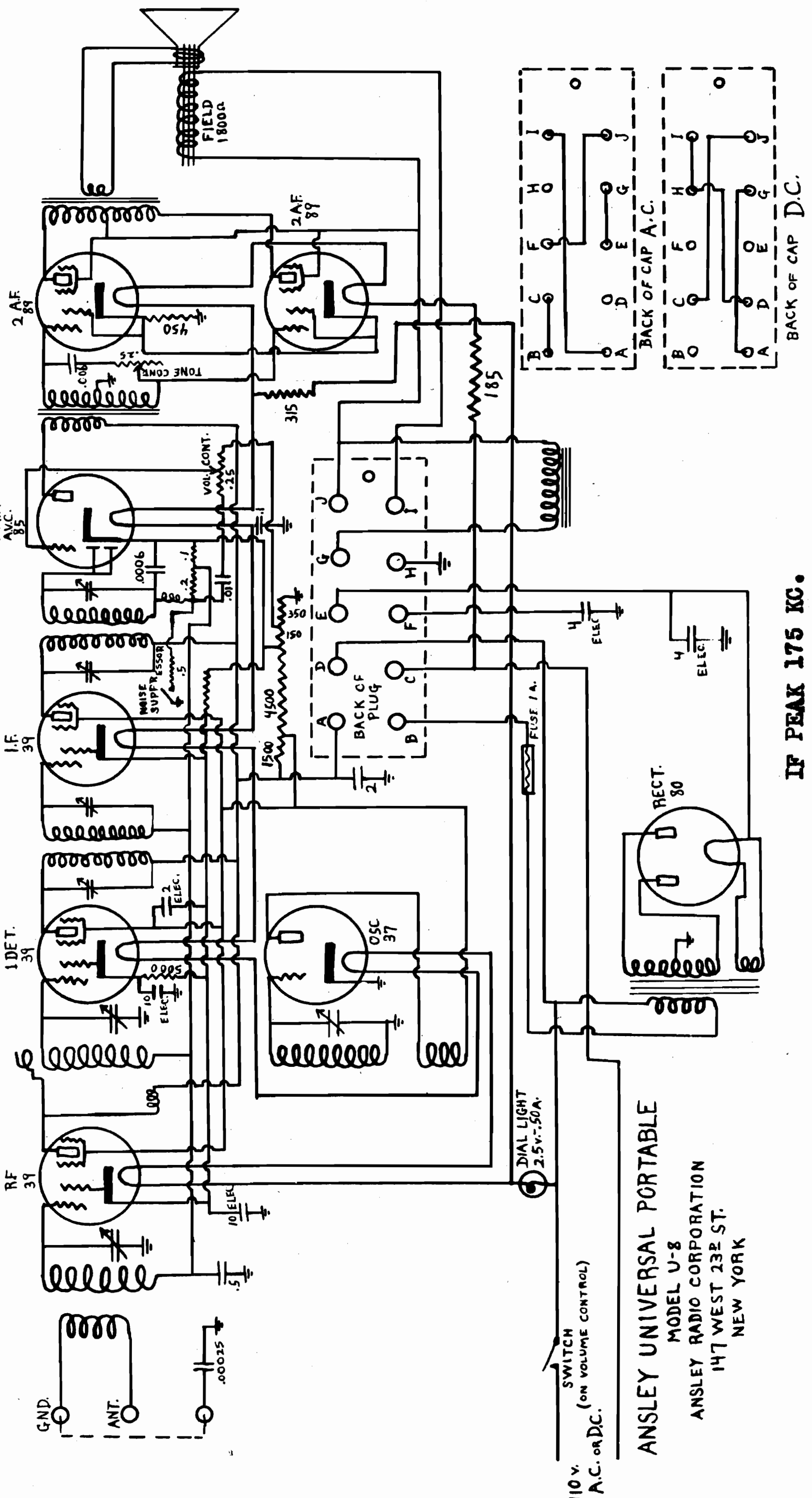
MODEL U-3
Schematic

# ANSLEY RADIO CORP.



**MODEL U-8**
**Schematic**

# ANSLEY RADIO CORP.



ATWATER-KENT MFG. CO.

MODEL 165-Q,525-Q
Socket,Trimmer,Parts

# MODEL 165-Q

| | |
|---|---|
| 26809 | Cabinet, less screen |
| 26679 | Screen |
| 25745 | Name decalcomania |
| 25965 | Tone decalcomania |
| 24278 | Knob (tuning and volume) |
| 25145 | Knob (tone) |
| 25022 | Variable condenser |
| 26727 | Dial assembly |
| 25692 | Volume control, .5 Ʊ |
| 25004 | Volume control bracket |
| 24327 | Shield for T5 |
| 24554 | Shield for T4 includes A5 |
| 36980 | Tone control and police switch |
| 25226 | Shaft and blade |

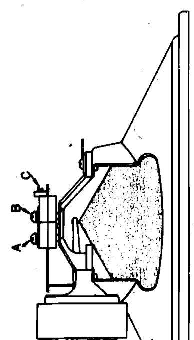
### TRANSFORMER

| Code No. | Part No. | Name of Part |
|---|---|---|
| T1 | 37080 | No. 1 R. F. T. |
| T2 | 37090 | No. 2 R. F. T. |
| T3 | 37110 | Osc. T. |
| T4 | 37180 | No. 1 I. F. T. |
| T5 | 37190 | No. 2 I. F. T. |
| T6 | 37150 | Input T. |

### RESISTORS

| Code No. | Part No. | Name of Part |
|---|---|---|
| R1 | 30340 | Red-blue, .1 Ʊ, 1/3-W. |
| R2 | 30390 | Red-bl'k, 20,000 Ω, 1/3-W. |
| R3 | 30340 | Red-blue, .1 Ʊ, 1/3-W. |
| R4 | 30380 | Red-green, 3,300 Ω, 1/3-W. |
| R5 | 36430 | Blue-yel., 5,000 Ω, 1/3-W. |
| R6 | 30370 | Green, 2 Ʊ, 1/3-W. |
| R7 | 31970 | Red-yel., .25 Ʊ, 1/3-W. |
| R8 | 30340 | Red-blue, .1 Ʊ, 1/3-W. |
| R9 | 30360 | Gray-blue, 1 Ʊ, 1/3-W. |
| R10 | 30320 | Maroon, 10,000 Ω, 1/3-W. |
| R11 | 36240* | Wire wound, 1.03 Ω |

* A No. 37120 resistor (1.03 Ω) is supplied with set for use with 3-V. dry "A" battery.




**Speaker Adjustment:** When adjustment is required, put the set and speaker in operation and tune in a signal. Loosen screw A and tighten B, or vice versa, in order to center the armature in the magnet gap. If the armature is not correctly centered, it may strike against one pole of the magnet and cause chattering. If the speaker overloads or chatters only on a very strong signal, turn screw C anti-clockwise: This tightens the armature movement. (In general it is not advisable to disturb the adjustment of screw C.)

### CONDENSERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| C1 | 31160 | .05 MF, 100-V., NI |
| C2 | 31160 | .05 MF 100-V.. NI |
| C3 | 33930 | 25 MMF, 500-V. |
| C4 | 36950 | 730 MMF. 100-V. |
| C5 | 27630 | .01 MF, 200-V., IND. |
| C6 | 27630 | .01 MF, 200-V., IND. |
| C7 | 27630 | .01 MF, 200-V., IND. |
| C8 | 21160 | 200 MMF, 450-V. |
| C9 | 29890 | .005 MF. 450-V., IND. |
| C10 | 22472 | 7 MF, 200-V. |
| | 34010 | Multiple by-pass, J-15 |

### TRIMMER CONDENSERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| A4 | 24495 | Single I. F. |
| A5 | 31290 | Single I. F. |
| A6 | 33080 | Single I. F. |

### SOCKETS

| Part No. | Name of Part |
|---|---|
| 24494 | 6 prong |
| 24492 | 4 prong |
| 25196 | Speaker |

165-Q SPEAKER No. 37170

525-Q SPEAKER No. 39200

| Part No. | Name of Part |
|---|---|
| 26874 | Cable and plug assembly (525-Q) |
| 26755 | Cable and plug assembly (165-Q) |

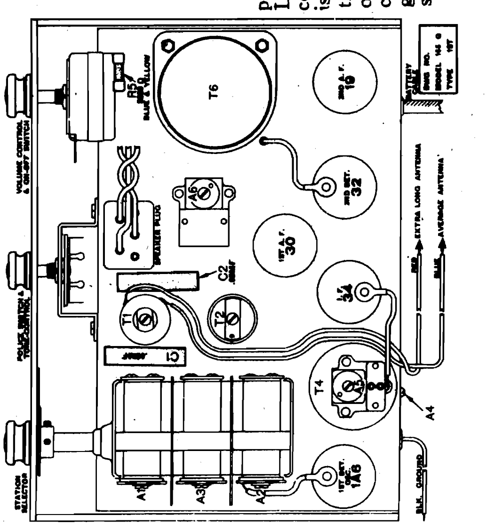
| | |
|---|---|
| 27128 | Magnet |
| 27129 | Magnet clamping plate |
| 8188 | 8/32 hex. nut |
| 9898 | No. 6 lock washer |
| 23318 | No. 2 washer |
| 27138 | Clamping block top |
| 27139 | Clamping block bottom |
| 27141 | Adjusting screw, 6/32 |
| 27142 | Cover plate |
| 27143 | Mounting bracket |
| 27144 | Sound unit assembly, less magnets |
| 27145 | Conehead assembly |
| 27146 | Coil |
| 27147 | Armature |
| 27211 | Mount. brackets, pair (525-Q) |
| 27148 | Spring |
| 27149 | Terminal |

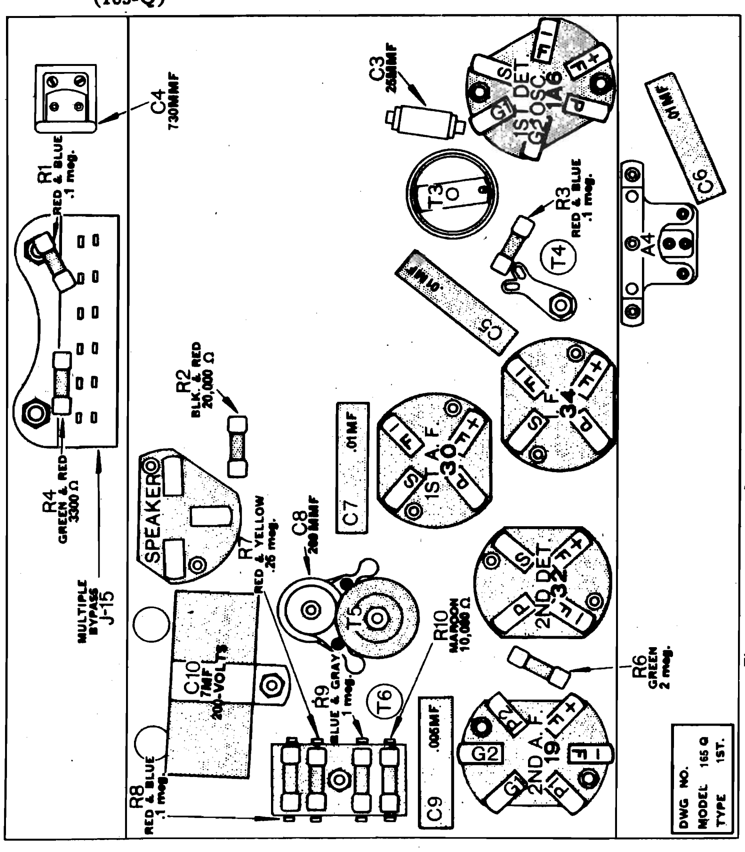
# MODEL 525-Q

(For parts not listed below refer to Model 165-Q parts list)

| Part No. | Name of Part |
|---|---|
| 26565 | Variable condenser assembly |
| 27305 | Knob shaft |
| 37450 | Osc. T (T3) |
| 26719 | Dial light socket |
| 26722 | Battery cable with resistor |
| 26519 | Dial assembly |
| 26721 | Dial lamp (air cell, 2-V., 60 MILS.) |
| 26642 | Base cover |
| 26569 | Knob (tuning and volume) |
| 26571 | Knob (tone) |
| 36250* | Wire wound, 1.15 Ω (R11) |
| 26669 | Shipping container |
| 26545 | Escutcheon nameplate |
| 25691 | Escutcheon window |
| 26718 | Volume control, .5 Ʊ |
| 37490 | Tone control switch |
| 26573 | Shaft and blade |

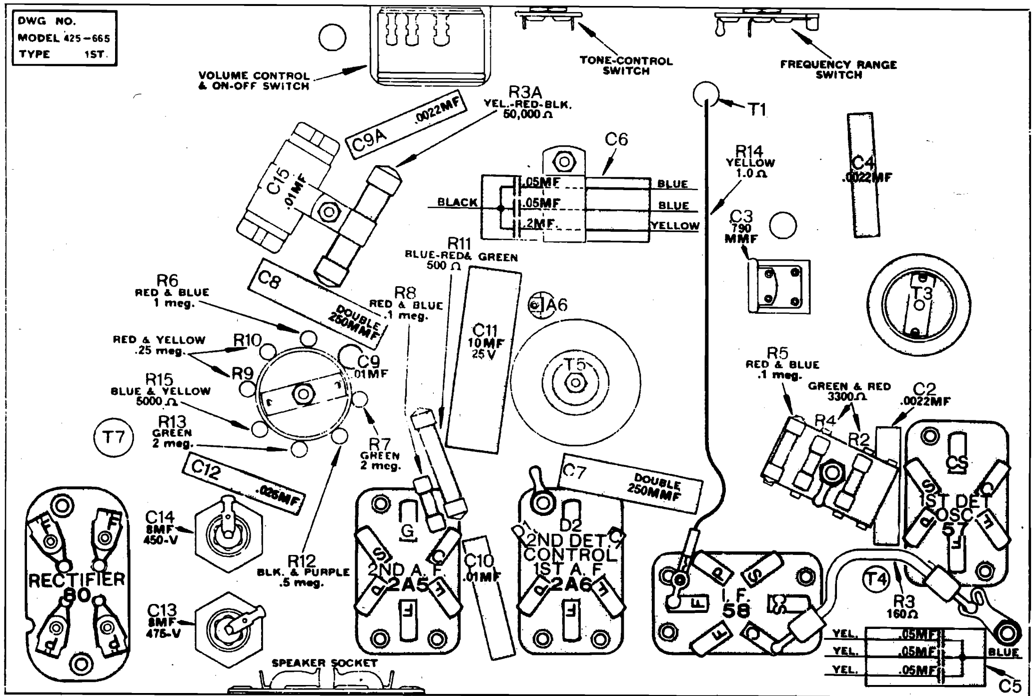
* A No. 37130 resistor (1.15 Ω) is supplied with a 3-V. dry "A" battery.

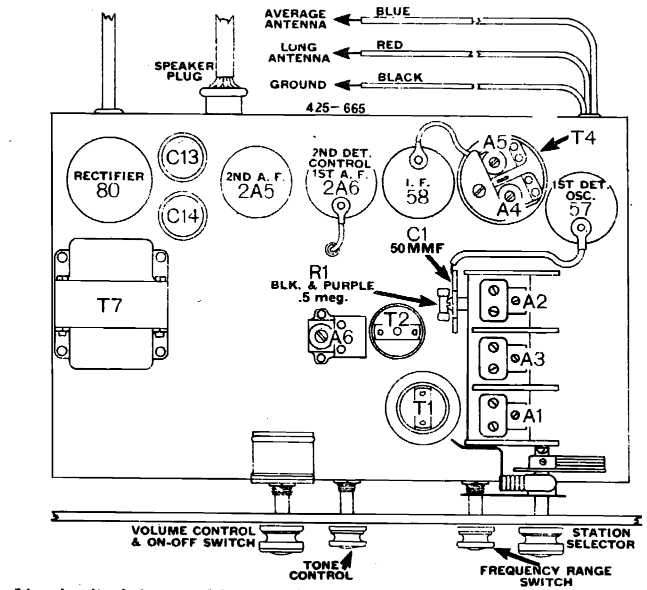


MODEL 425,665
Socket,Trimmer,Parts

ATWATER-KENT MFG. CO.




The circuit of these models is similar to that used in Models 165, 185 and 525.

# MODELS 425 and 665

| Part No. | Name of Part |
|---|---|
| 26177 | Variable condenser assembly |
| 20116 | Knob shaft bracket |
| 17961 | Dial rubber |
| 24122 | Dial gear |
| 25885 | Dial assembly |
| 15404 | Dial lamp, 2.5-V. |
| 25811 | Knob, volume and tuning, 425 |
| 25812 | Knob, tone and range, 425 |
| 25737 | Knob, volume and tuning, 665 |
| 25738 | Knob, tone and range, 665 |
| 26742 | Escutcheon, 425 |
| 26774 | Escutcheon, 665 |
| 30560 | Tone control switch complete |
| 24207 | Shaft and blade |
| 20096 | Shaft key |
| 24079 | Volume control, .5 U |
| 24052 | Volume control bracket |
| 37050 | Range switch |
| 26903 | Shaft and blade |

## TRANSFORMERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| T1 | 37210 | No. 1 R. F. T. |
| T2 | 37220 | No. 2 R. F. T. |
| T3 | 37230 | Osc. T. |
| T4 | 26878 | No. 1 I. F. T. |
| T5 | 37590 | No. 2 I. F. T. |
| T6 | 21672 | Output T. |
| T7 | 25191 | Power T. |

## RESISTORS

| Code No. | Part No. | Name of Part |
|---|---|---|
| R1 | 30350 | Bl'k-purple, .5 U, 1/3-W. |
| R2 | 30380 | Red-green, 3300 Ω, 1/3-W. |
| R3 | 28950 | Flexible, 160 Ω |
| R3A | 34340 | Yel.-red-bl'k, 50,000 Ω, 1½-W. |
| R4 | 30380 | Red-green, 3300 Ω, 1/3-W. |
| R5 | 20980 | Red-blue, .1 U, ½-W. |
| R6 | 30340 | Red-blue, .1 U, 1/3-W. |
| R7 | 30370 | Green, 2 U, 1/3-W. |
| R8 | 30340 | Red-blue, .1 U, 1/3-W. |
| R9 | 31970 | Red-yel., .25 U, 1/3-W. |
| R10 | 31970 | Red-yel., .25 U, 1/3-W. |
| R11 | 32010 | Blue-red-green, 500 Ω, |
| R12 | 30350 | Bl'k-purple, .5 U, 1/3-W. |
| R13 | 30370 | Green, 2 U, 1/3-W. |
| R14 | 31860 | Flexible, 1 Ω |
| R15 | 36430 | Blue-yel., 5000 Ω, 1/3-W. |

## CONDENSERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| C1 | 30260 | 50 MMF, 450-V. |
| C2 | 33660 | .0022 MF, 450-V., IND. |
| C3 | 36020 | 790 MMF, 100-V. |
| C4 | 33660 | .0022 MF, 400-V., IND. |
| C5 | 32410 | .05, .05 and .05 MF, 100-V. |
| C6 | 32390 | .05, .05 and .2 MF, 200-V. |
| C7 | 33630 | 250 MMF (double), 450-V., IND. |
| C8 | 33630 | 250 MMF (double), 450-V., IND. |
| C9 | 27630 | .01 MF, 200-V., IND. |
| C9A | 33660 | .0022 MF, 450-V., IND. |
| C10 | 27630 | .01 MF, 200-V., IND. |
| C11 | 25379 | 10 MF, 25-V., dry electrolytic |
| C12 | 30250 | .025 MF, 450-V., NI |
| C13 | 25168 | 8 MF, 475-V., electrolytic |
| C14 | 26381 | 8 MF. 450-V. (blue) |
| C15 | 23250 | .01 MF, 450-V. |

## TRIMMER CONDENSERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| A4, 5 | 30110 | Double I. F. |
| A6 | 37910 | Single I. F. |

## SOCKETS

| Part No. | Name of Part |
|---|---|
| 22733 | 6 prong |
| 22689 | 4 prong rectifier |
| 21336 | 4 prong speaker |

## MISCELLANEOUS

| Part No. | Name of Part |
|---|---|
| 21877 | No. 1 I. F. T. shield |
| 24327 | No. 2 I. F. T. shield |
| 22683 | Tube shield |
| 24677 | Base cover |
| 26792 | Instruction and log card, F1122 |
| 24725 | Shipping container |

## 425-665 SPEAKER No. 33400

| Part No. | Name of Part |
|---|---|
| 18870 | Field coil, 2000 Ω |
| 21672 | Output T.—(T6) |
| 19465 | Diaphragm |
| 19789 | Cable and plug |
| 15079 | Speaker plug |
| 23657 | Choke (CK1) |

MODEL 217,427,667
Socket,Trimmer,Parts

## ATWATER-KENT MFG. CO.

### 217 SPEAKER No. 36300

| Part No. | Name of Part |
|---|---|
| 21161 | Diaphragm |
| 18870 | Field coil |
| 21672 | Output transformer |
| 24206 | Cone housing |
| 23657 | Choke coil |
| 24064 | Speaker mounting bracket |
| 19469 | Diaphragm holding segment (2 used) |
| 24161 | Diaphragm holding segment (1 used) |

### 427-667 SPEAKER No. 33400

Parts not listed below will be found in Model 217 List.

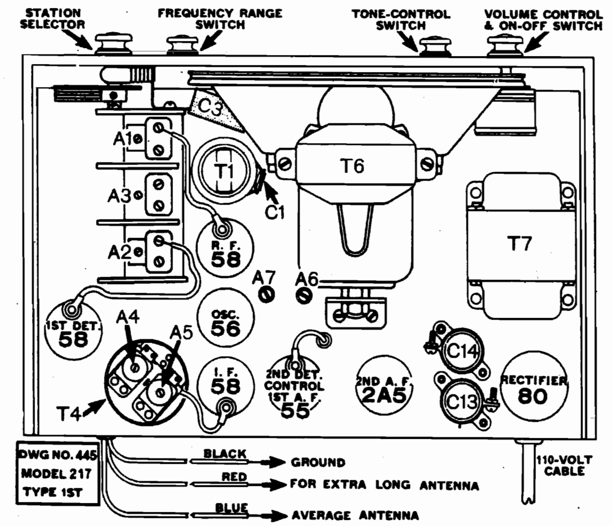
| Part No. | Name of Part |
|---|---|
| 19465 | Diaphragm |
| 19789 | Cable and plug assembly |
| 24705 | Cone housing |
| 19469 | Diaphragm holding segment (3 used) |

## MODEL 667

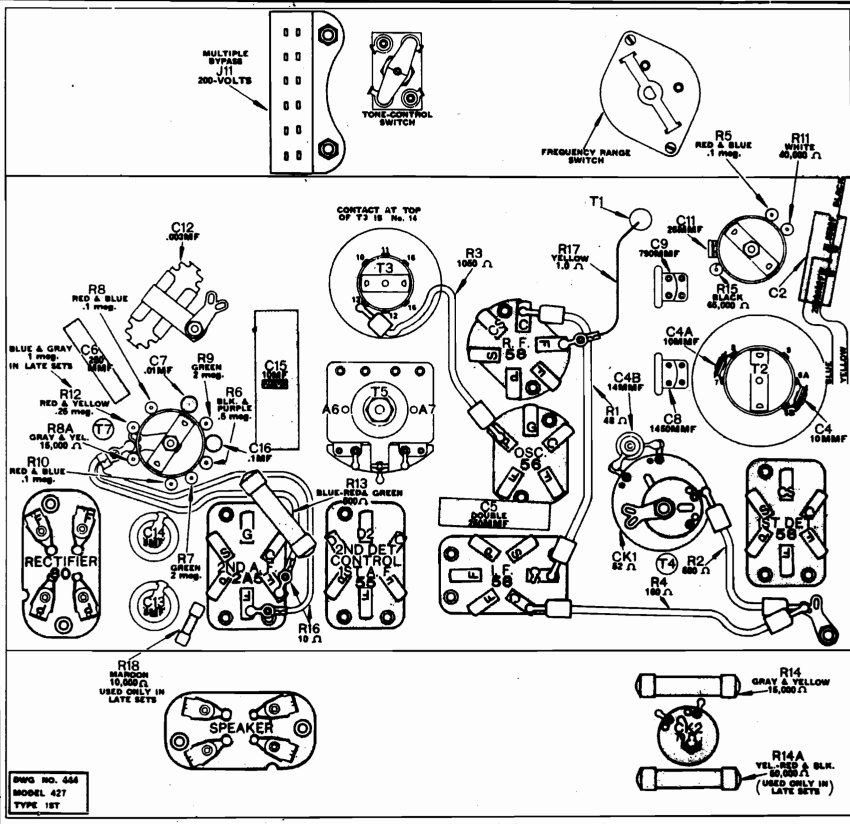
Parts not listed below will be found in Model 217 List.

| Part No. | Name of Part |
|---|---|
| 25864 | Escutcheon name plate |
| 24677 | Bottom cover |
| 25737 | Knob—dial and volume control |
| 25738 | Knob—frequency range and tone |
| 24725 | Shipping container |

## MODELS 217, 427 AND 667




In Models 427 and 667, the speaker is mounted in the cabinet under the chassis. Trimmer condenser A3 is not used in some of these sets. It is important to keep the grid lead to the 55 tube removed from the 2A5 tube.




## MODEL 217

| Part No. | Name of Part |
|---|---|
| 24079 | Volume control, .5 Ʊ |

### TRANSFORMERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| T1 | 34140 | No. 1 R. F. T. |
| T2 | 34150 | No. 2 R. F. T. |
| T3 | 34160 | Oscillator T. |
| T4 | 25841 | No. 1 I. F. T. |
| T5 | 25842 | No. 2 I. F. T. |
| T6 | 21672 | Output T. |
| T7 | 25728 | Power T. |

### RESISTORS

| Code No. | Part No. | Name of Part |
|---|---|---|
| R1 | 19820 | Flexible, 48 Ω |
| R2 | 23780 | Flexible, 550 Ω |
| R3 | 16320 | Flexible, 1050 Ω |
| R4 | 28950 | Flexible, 160 Ω |
| R5 | 20980 | Red-blue, .1 Ʊ, ½-W. |
| R6 | 20930 | Bl'k-purple, .5 Ʊ, ½-W. |
| R7 | 20940 | Green, 2 Ʊ, ½-W. |
| R8 | 20980 | Red-blue, .1 Ʊ, ½-W. |
| R8A | 20960 | Gray-yel., 15,000 Ω, ½-W |
| R9 | 20940 | Green, 2 Ʊ, ½-W. |
| R10 | 20980 | Red-blue, .1 Ʊ, ½-W. |
| R11 | 26160 | White, 40,000 Ω, ½-W. |
| R12 | 20920* | Red-yel., ¼ Ʊ, ½-W. |
| R13 | 32010 | Blue, red, green, 500 Ω, 1-W |
| R14 | 27220 | Gray-yel., 15,000 Ω, 1½-W |
| R14A | 34340 | Yellow, red, black, 50,000 Ω, 1½-W. |
| R15 | 21040 | Black, 65,000 Ω, ½-W. |
| R16 | 17077 | Flexible, 10 Ω |
| R17 | 31860 | 1.0 Ω, yellow, flexible |
| R18 | 30320 | Maroon, 10,000 Ω, 1/3-W. (used only in late sets) |

* R12 is 1.0 Ʊ blue and gray number 30360 in late model sets.

### CONDENSERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| C1 | 34470 | 14 MMF, 500-V. |
| C2 | 34020 | .05 MF and 250 MMF, 200-V. |
| C3 | 31160 | .05 MF, 100-V., NI |
| C4 | 34460 | 10 MMF, 500-V., black |
| C4A | 34460 | 10 MMF, 500-V., black |
| C4B | 34470 | 14 MMF, 500-V. |
| C5 | 33630 | Double 250 MMF, 450-V., IND. |
| C6 | 33620 | 250 MMF, 450-V., IND. |
| C7 | 27630 | .01 MF, 200-V., IND. |
| C8 | 34670 | 1450 MMF, 100-V. |
| C9 | 33920 | 790 MMF, 100-V. |
| C10 | 31530 | .1 MF, 100-V., NI |
| C11 | 33930 | 25 MMF, 500-V. |
| C12 | 32740 | .003, 500-V. |
| C13 | 25168 | 8 MF, 475-V., electrolytic |
| C14 | 25168 | 8 MF, 475-V., electrolytic |
| C15 | 25379 | 10 MF, 25-V., dry electrolytic |
| C16 | 31530 | .1 MF, 100-V., NI |
| | 31340 | Multiple bypass, 200-V. (J11) |

### TRIMMERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| A4, 5 | 30110 | Double I. F. trimmer |
| A6, 7 | 30630 | Double I. F. trimmer |

### CHOKES

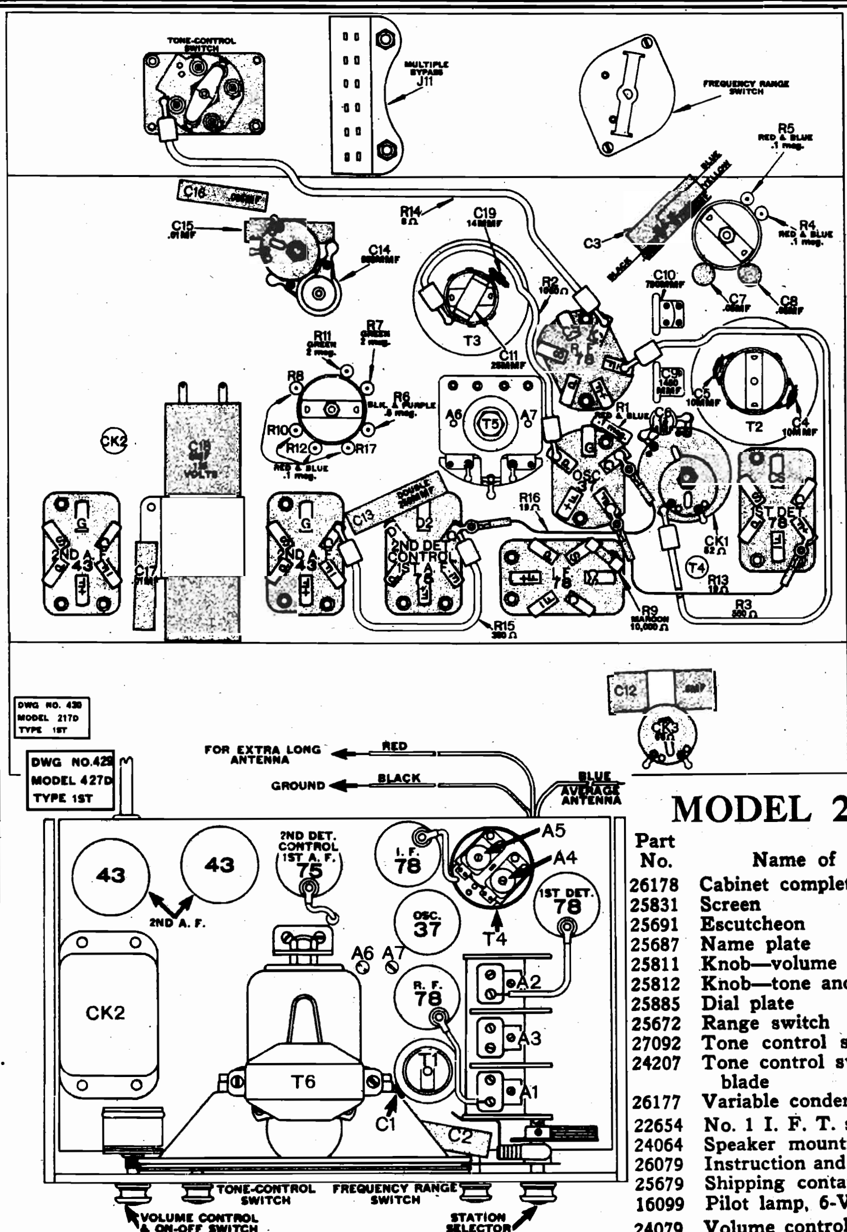
| Code No. | Part No. | Name of Part |
|---|---|---|
| CK1 | 17015 | R. F. plate choke |
| CK2 | 19210 | 1st detector plate choke |
| CK3 | 23657 | Choke coil |

### SOCKETS

| Part No. | Name of Part |
|---|---|
| 24493 | 5 prong |
| 24494 | 6 prong |
| 22733 | 6 prong (4 used) |
| 22689 | 4 prong |

MODEL 217D,427D,667D
Socket,Trimmer,Parts

# ATWATER-KENT MFG. CO.




In Models 427-D and 667-D, the speaker is mounted in the cabinet, under the chassis.

## MODEL 217-D

| Part No. | Name of Part |
|---|---|
| 26178 | Cabinet complete |
| 25831 | Screen |
| 25691 | Escutcheon |
| 25687 | Name plate |
| 25811 | Knob—volume and tuning |
| 25812 | Knob—tone and range switch |
| 25885 | Dial plate |
| 25672 | Range switch |
| 27092 | Tone control switch, complete |
| 24207 | Tone control switch shaft and blade |
| 26177 | Variable condenser assembly |
| 22654 | No. 1 I. F. T. shield cap |
| 24064 | Speaker mounting bracket |
| 26079 | Instruction and log card, F1098 |
| 25679 | Shipping container |
| 16099 | Pilot lamp, 6-V. |
| 24079 | Volume control, .5 Ʊ |

### RESISTORS

| Code No. | Part No. | Name of Part |
|---|---|---|
| R1 | 30340 | Red-blue, .1 Ʊ, 1/3-W. |
| R2 | 16320 | Flexible, 1050 Ω |
| R3 | 23780 | Flexible, 550 Ω |
| R4 | 20980 | Red-blue, .1 Ʊ, ½-W. |
| R5 | 20980 | Red-blue, .1 Ʊ, ½-W. |
| R6 | 20930 | Bl'k-pur., .5 Ʊ, ½-W. |
| R7 | 20940 | Green, 2 Ʊ, ½-W. |
| R8 | 20980 | Red-blue, .1 Ʊ, ½-W. |
| R9 | 30320 | Mar'n. 10,000 Ω, 1/3-W. |
| R10 | 20980 | Red-blue, .1 Ʊ, ½-W. |
| R11 | 20940 | Green, 2 Ʊ, ½-W. |
| R12 | 20980 | Red-blue, .1 Ʊ, ½-W. |
| R13 | 16610 | Flexible, 19 Ω |
| R14 | 26470 | Flexible, 8 Ω |
| R15 | 25840 | Flexible, 300 Ω |
| R16 | 16610 | Flexible, 19 Ω |
| R17 | 20980 | Red-blue, .1 Ʊ, ½-W. |

### CONDENSERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| C1 | 34470 | 14 MMF, 500-V., red |
| C2 | 31160 | .05 MF, 100-V., NI |
| C3 | 34020 | .05 MF and 250 MMF, 200-V., NI |
| C4 | 34460 | 10 MMF, 500-V., black |
| C5 | 34460 | 10 MMF, 500-V., black |
| C6 | 34470 | 14 MMF, 500-V., red |
| C7 | 31160 | .05 MF, 100-V., NI |
| C8 | 31160 | .05 MF, 100-V., NI |
| C9 | 36030 | 1450 MMF, 100-V. |
| C10 | 36020 | 790 MMF, 100-V. |
| C11 | 33930 | 25 MMF, 500-V. |
| C12 | 31510 | .5 MF, 100-V., NI |
| C13 | 33630 | Double 250 MMF, 450-V., IND. |
| C14 | 17440 | 500 MMF, 450-V. |
| C15 | 27630 | .01 MF, 200-V., IND. |
| C16 | 29890 | .005 MF, 450-V., IND. |
| C17 | 32810 | .01 MF, 450-V., NI |
| C18 | 23981 | 8 MF, dry electrolytic, 125-V. |
| C19 | 35980 | 14 MMF, 500-V. |
| | 31340 | Multiple bypass condenser (J11) |

### CHOKES

| Code No. | Part No. | Name of Part |
|---|---|---|
| CK1 | 35180 | R. F. plate choke |
| CK2 | 26411 | Audio filter choke |
| CK3 | 19210 | 1st detector plate filter choke |

### TRIMMERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| A4, 5 | 30110 | Double I. F. trimmer |
| A6, 7 | 30630 | Double I. F. trimmer |

### TRANSFORMERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| T1 | 35410 | No. 1 R. F. T. |
| T2 | 36040 | No. 2 R. F. T. |
| T3 | 35430 | Oscillator T. |
| T4 | 25841 | No. 1 I. F. T. |
| T5 | 25842 | No. 2 I. F. T. |
| T6 | 36190 | Output T. (on speaker) |

### 217-D SPEAKER No. 37500

| Part No. | Name of Part |
|---|---|
| 21161 | Diaphragm |
| 35310 | Field coil (70 Ω) |
| 36190 | Output T. (T6) |

## MODEL 427-D

(For parts not listed below refer to Model 217-D)

| Part No. | Name of Part |
|---|---|
| 25688 | Escutcheon name plate |
| 25691 | Dial window |
| 17816 | Speaker hook |
| 24725 | Shipping container |

### 427-D SPEAKER No. 37600

### 667-D SPEAKER No. 37600

| Part No. | Name of Part |
|---|---|
| 22902 | Cable and plug |

## MODEL 667-D

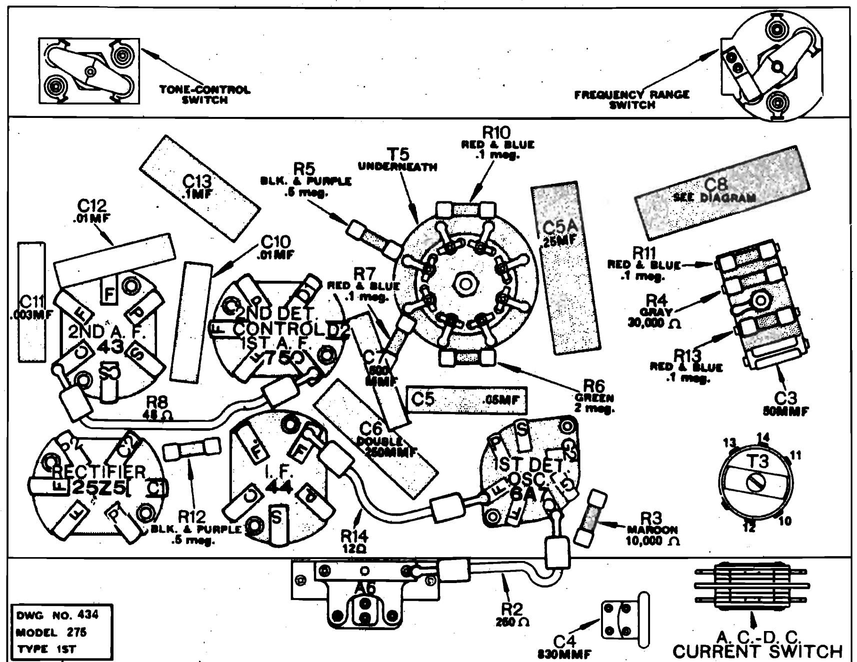
(For parts not listed below refer to Model 217-D)

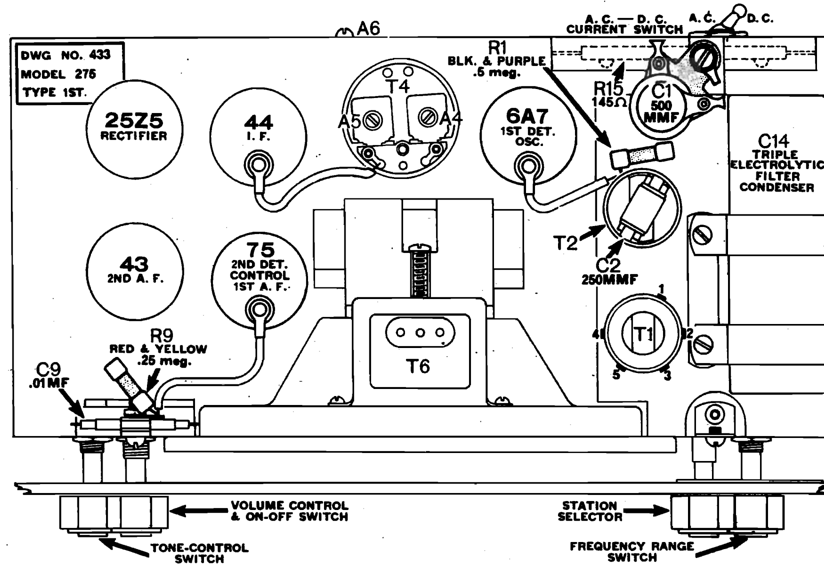
| Part No. | Name of Part |
|---|---|
| 25864 | Escutcheon name plate |
| 25865 | Dial window |
| 17816 | Speaker hook |
| 24725 | Shipping container |
| 25737 | Knob—dial and volume |
| 25738 | Knob—tone and range |

Ω=ohms. Ʊ=megohms. W.=watt.
IND.=inductive. NI=non-inductive.

MODEL 275
Socket, Trimmer
Parts List

ATWATER-KENT MFG. CO.




In some Model 275 sets, the oscillator grid trimmer A3 is not used.

# MODEL 275

| Part No. | Name of Part |
|---|---|
| 25798 | Volume control, .5 U |
| 26443 | Cabinet complete |
| 26444 | Cloth screen |
| 25865 | Escutcheon window |
| 25936 | Escutcheon name plate |
| 25814 | Knob (volume and tuning) |
| 25738 | Knob (tone and range) |
| 26283 | Dial plate |
| 24892 | A. C.-D. C. switch |
| 35560 | Range switch |
| 35630 | Tone control switch |
| 25022 | Variable condenser |

## TRANSFORMERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| T1 | 35450 | No. 1 R. F. T. |
| T2 | 35460 | No. 2 R. F. T. |
| T3 | 35470 | Oscillator T. |
| T4 | 26326 | No. 1 I. F. T. |
| T5 | 35910 | No. 2 I. F. T. |
| T6 | 26501 | Output A. F. T. |

## RESISTORS

| Code No. | Part No. | Name of Part |
|---|---|---|
| R1 | 30350 | Bl'k-pur., .5 U, 1/3-W. |
| R2 | 31830 | Flexible, 250 Ω |
| R3 | 30320 | Mar'n, 10,000 Ω, 1/3-W. |
| R4 | 31840 | Gray, 30,000 Ω, 1/3-W. |
| R5 | 30350 | Bl'k-pur., .5 U, 1/3-W. |
| R6 | 30370 | Green, 2U, 1/3-W. |
| R7 | 30340 | Red-blue, .1 U, 1/3-W. |
| R8 | 19820 | Flexible, 48 Ω |
| R9 | 31970 | Red-yel., .25 U, 1/3-W. |
| R10 | 30340 | Red-blue, .1 U, 1/3-W. |
| R11 | 30340 | Red-blue, .1 U, 1/3-W. |
| R12 | 30350 | Bl'k-pur., .5 U, 1/3-W. |
| R13 | 30340 | Red-blue, .1 U, 1/3-W. |
| R14 | 35820 | Flexible, 12 Ω |
| R15 | 31690 | Iron core, 145 Ω |

## CONDENSERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| C1 | 35590 | 500 MMF, 450-V. |
| C2 | 33670 | 250 MMF, 500-V. |
| C3 | 35840 | 50 MMF, 500-V. |
| C4 | 35990 | 830 MMF, 100-V. |
| C5 | 31160 | .05 MF, 100-V., NI |
| C5A | 35930 | .25 MF, 200-V., NI |
| C6 | 33630 | Double 250 MMF, 450-V., IND. |
| C7 | 28130 | 500 MMF, 450-V., IND. |
| C8 | 35790 | Multiple .05, .05, .05, .03, .1 and .2 MF, 100-V. |
| C9 | 23250 | .01 MF, 450-V. |
| C10 | 27630 | .01 MF, 200-V., IND. |
| C11 | 35760 | .003 MF, 200-V., IND. |
| C12 | 27630 | .01 MF, 200-V., IND. |
| C13 | 26660 | .1 MF, 200-V., NI |
| C14 | 26158 | Triple dry electrolytic 14, 8 and 8 MF |

## TRIMMER CONDENSERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| A4, 5 | 35650 | Double I. F. trimmer |
| A6 | 35610 | Single I. F. trimmer |

## SOCKETS

| Part No. | Name of Part |
|---|---|
| 26111 | Socket (7 prong) |
| 24494 | Socket (6 prong) |
| 24493 | Socket (5 prong) |

## MISCELLANEOUS PARTS

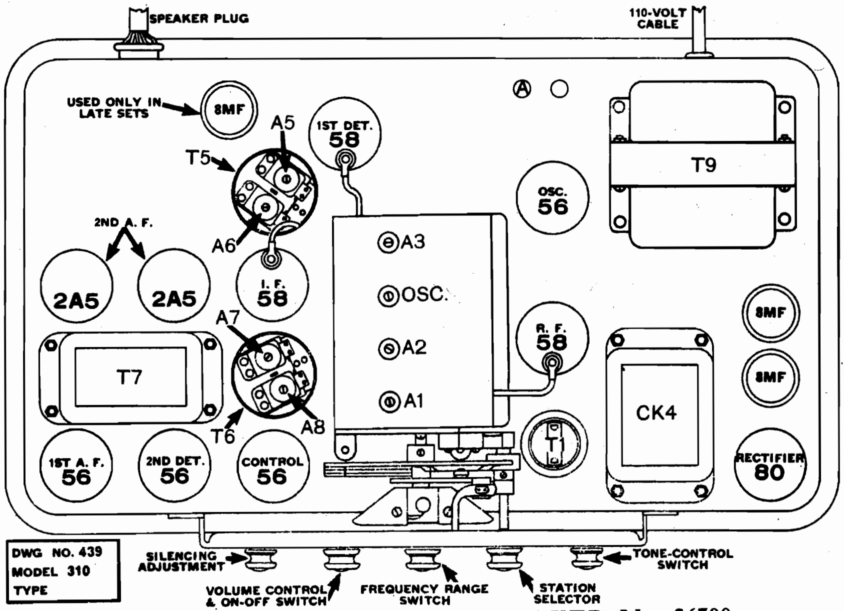
| Part No. | Name of Part |
|---|---|
| 26706 | Vernier shaft |
| 26707 | Vernier cap |
| 26708 | Ball bearing |
| 26709 | Trimmer screw |
| 26711 | Trimmer washer |
| 27133 | Trimmer mica |
| 26323 | T4 shield |
| 21878 | Shield disc |
| 24327 | T5 shield |
| 26137 | T5 shield insulator |
| 24727 | Antenna lead and card |
| 26059 | Instruction and log card, F1097 |
| 26332 | Shipping container |
| 26284 | Dial light socket |
| 16099 | Dial lamp, 6-V. |
| 26451 | Tube shield |
| 26014 | Top shield |
| 26324 | Base cover |
| 26017 | Back plate |

## SPEAKER

| Part No. | Name of Part |
|---|---|
| 26159 | Speaker complete |
| 25603 | Diaphragm assembly |
| 26501 | Output transformer |
| 26502 | Field coil |
| 26503 | Choke coil (CK1) |

**MODEL 310,510**
**Socket,Trimmer,Parts**

# ATWATER-KENT MFG. CO.

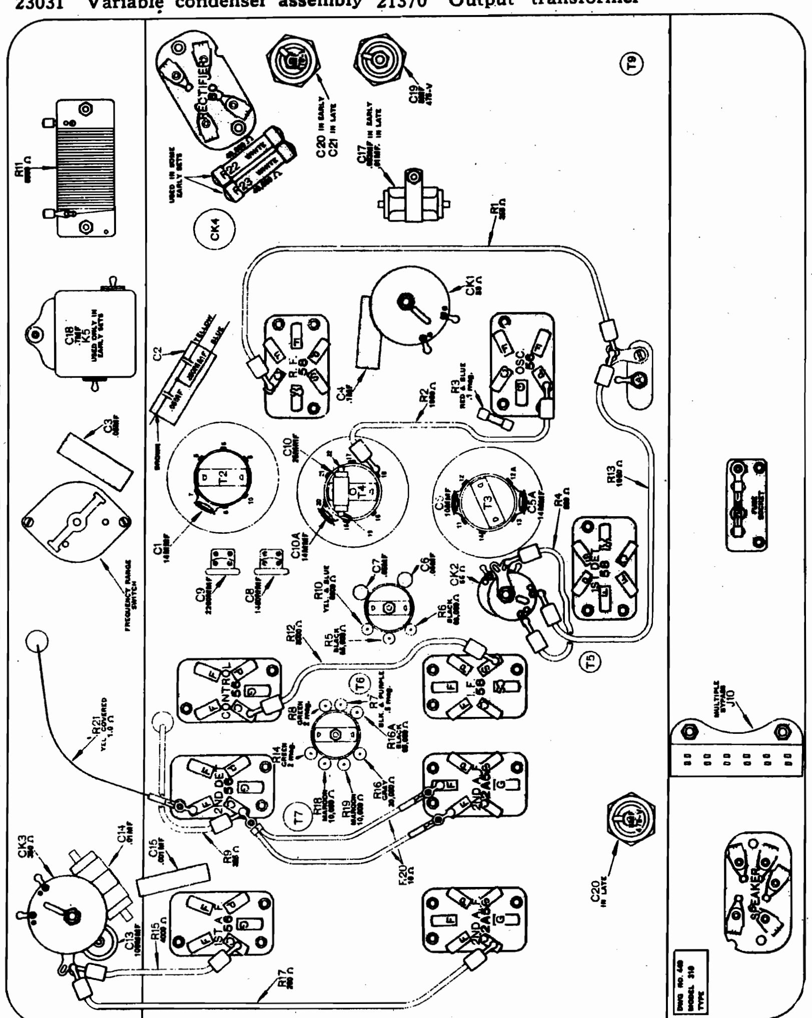



## MODEL 310 and MODEL 510

| Part No. | Name of Part |
|---|---|
| 25798 | Volume control, .5 U |
| 23031 | Variable condenser assembly |

## 310-510 SPEAKER No. 36500

| Part No. | Name of Part |
|---|---|
| 34630 | Field coil (625 Ω) |
| 20737 | Diaphragm |
| 20657 | Cable and plug assembly |
| 21370 | Output transformer |



## TRANSFORMERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| T1 | 34540 | No. 1 R. F. T. |
| T2 | 34550 | No. 2 R. F. T. |
| T3 | 34560 | No. 3 R. F. T. |
| T4 | 34570 | Oscillator T. |
| T5 | 23356 | No. 1 I. F. T. |
| T6 | 23975 | No. 2 I. F. T. |
| T7 | 34980 | Audio input T. |
| T8 | 21370 | Audio output T. |
| T9 | 25875 | Power transformer used in 310 below 7750943* in 510 below 2564911* |
| T9 | 26395 | Power transformer used in 310 above 7750942 in 510 above 2564910 |

* In a few early type sets, the power transformer is a sealed type No. 26154.

## RESISTORS

| Code No. | Part No. | Name of Part |
|---|---|---|
| R1 | 20050 | Flexible, 355 Ω |
| R2 | 16320 | Flexible, 1050 Ω |
| R3 | 30340 | Blue-red, .1 U, 1/3-W. |
| R4 | 23780 | Flexible, 550 Ω |
| R5 | 21040 | Bl'k, 65,000 Ω, ½-W. |
| R6 | 21040 | Bl'k, 65,000 Ω, ½-W. |
| R7 | 20930 | Bl'k-pur., .5 U, ½-W. |
| R8 | 20940 | Green, 2 U, ½-W. |
| R9 | 20050 | Flexible, 355 Ω |
| R10 | 28050 | Yel.-blue, 5000 Ω, ½-W. |
| R11 | 20150 | Flat, wire wound, 8000 Ω |
| R12 | 24340 | Flexible, 8000 Ω |
| R13 | 16320 | Flexible, 1050 Ω |
| R14 | 20940 | Green. 2 U, ½-W. |
| R15 | 24470 | Flexible, 4000 Ω |
| R16 | 20970 | Gray, 30,000 Ω, ½-W. |
| R16A | 21040 | Bl'k, 65,000 Ω, ½-W. |
| R17 | 25950 | Flexible, 200 Ω |
| R18 | 20950 | Maroon, 10,000 Ω, ½-W. |
| R19 | 20950 | Maroon, 10,000 Ω, ½-W. |
| R20 | 17077 | Filament shunt, 10 Ω |
| R21 | 31860 | Flexible, 1.0 Ω |
| R22 | 28750 | White, 40,000 Ω, 1½-W. |
| R23 | 28750 | White, 40,000 Ω, 1½-W. |

## CONDENSERS

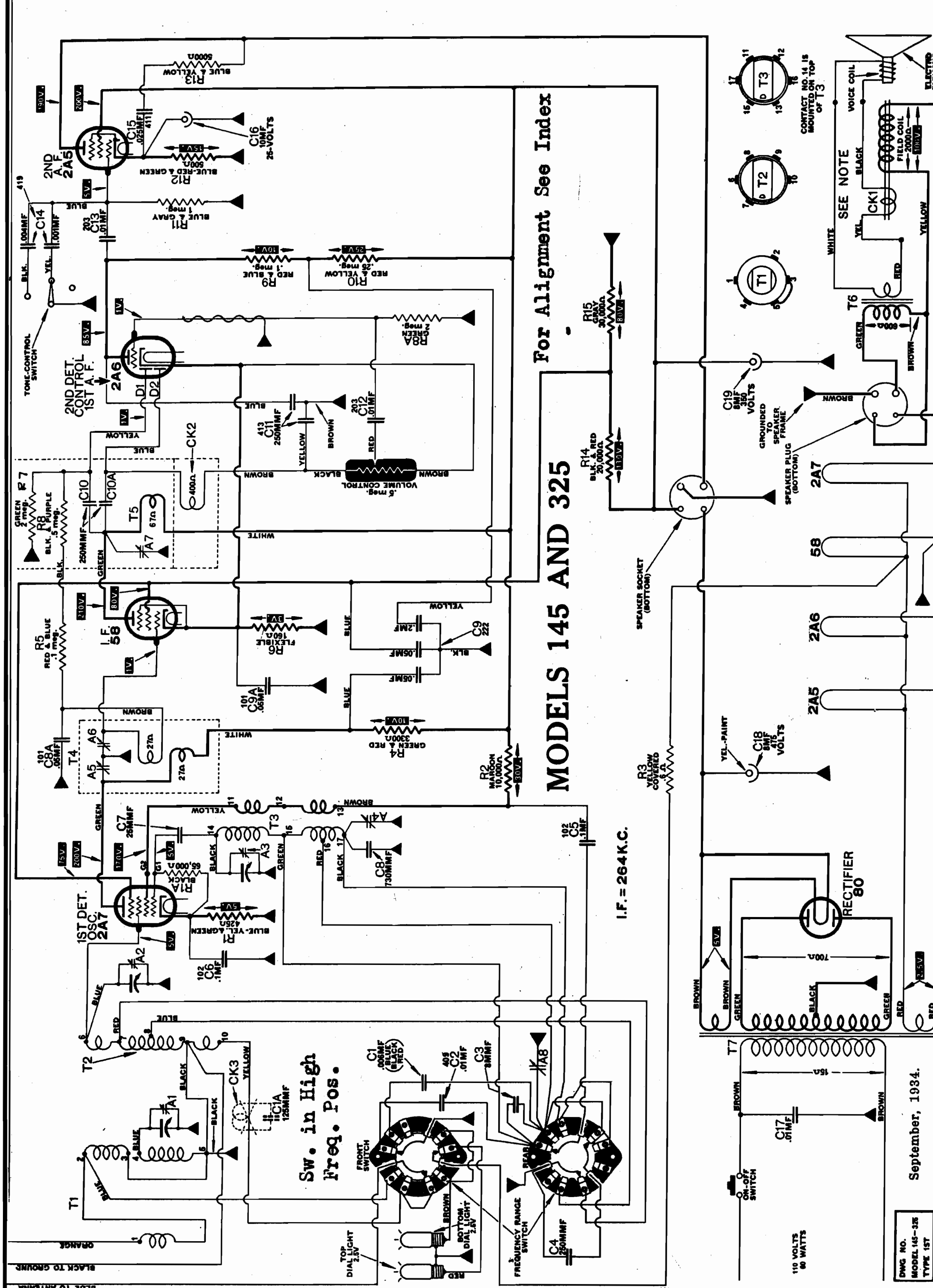
| Code No. | Part No. | Name of Part |
|---|---|---|
| C1 | 36280 | 14 MMF, 500-V. |
| C2 | 34020 | .05 and 250 MMF, 200-V., NI |
| C3 | 31160 | .05 MF, 100-V., NI |
| C4 | 31530 | .1 MF, 100-V., NI |
| C5 | 34460 | 10 MMF, 500-V. |
| C5A | 36280 | 14 MMF, 500-V. |
| C6 | 31160 | .05 MF, 100-V., NI |
| C7 | 31160 | .05 MF, 100-V., NI |
| C8 | 34670 | 1450 MMF, 100-V. |
| C9 | 34680 | 2200 MMF, 100-V. |
| C10 | 33930 | 25 MMF, 500-V. |
| C10A | 35970 | 14 MMF, 500-V. |
| C11 | 33670 | 250 MMF |
| C12 | 33670 | 250 MMF |
| C13 | 22220 | 100 MMF, 450-V. |
| C14 | 23250 | .01 MF, 450-V. |
| C15 | 33640 | .001 MF, 450-V. |
| C16 | 16490 | B-6, 100-V. |
| C17 | 32740 | .003 MF, 500-V. (early) |
| C17 | 23250 | .01 MF, 450-V. (late) |
| C18 | 26620 | .7 MF, 450-V. (K5) |
| C19 | 22538 | 8 MF, 475-V. |
| C20 | 22538 | 8 MF, 475-V. |
| C21 | 22538 | 8 MF, 475-V. |
|  | 30720 | Multiple bypass, 200-V. (J10) |

## CHOKES

| Code No. | Part No. | Name of Part |
|---|---|---|
| CK1 | 17015 | R. F. plate choke |
| CK2 | 19210 | 1st detector choke |
| CK3 | 17390 | 2nd detector plate choke |
| CK4 | 26970 | Filter choke unit used in 310 below 7750943 and 510 below 2564911 |
|  | 36170 | Filter choke unit used in 310 above 7750942 and 510 above 2564910 |

ATWATER-KENT MFG. CO.

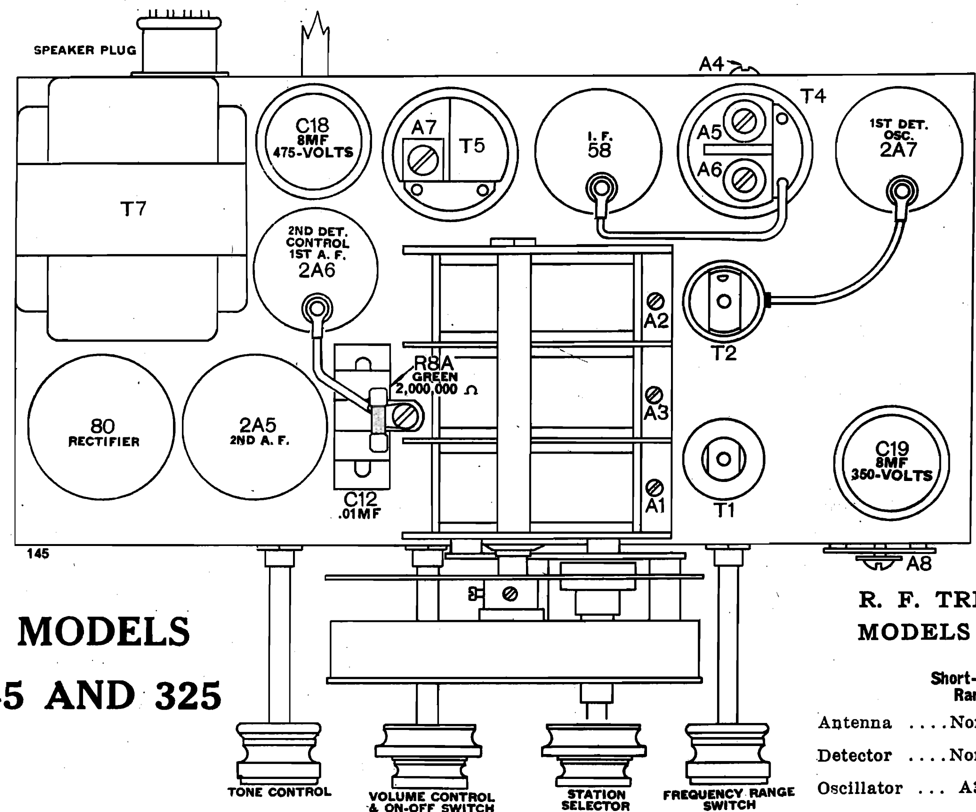
MODEL 145,325
Schematic




In Model 325 the field coil is 1200 Ω and the voltages throughout are slightly higher than shown in diagram. In later sets C4 is not used, the diode circuit is changed and there are some minor changes in the frequency-switch circuit.

MODEL 145,325
Socket,Trimmer,Chassis

ATWATER-KENT MFG. CO.




September, 1934.

# MODELS 145 AND 325

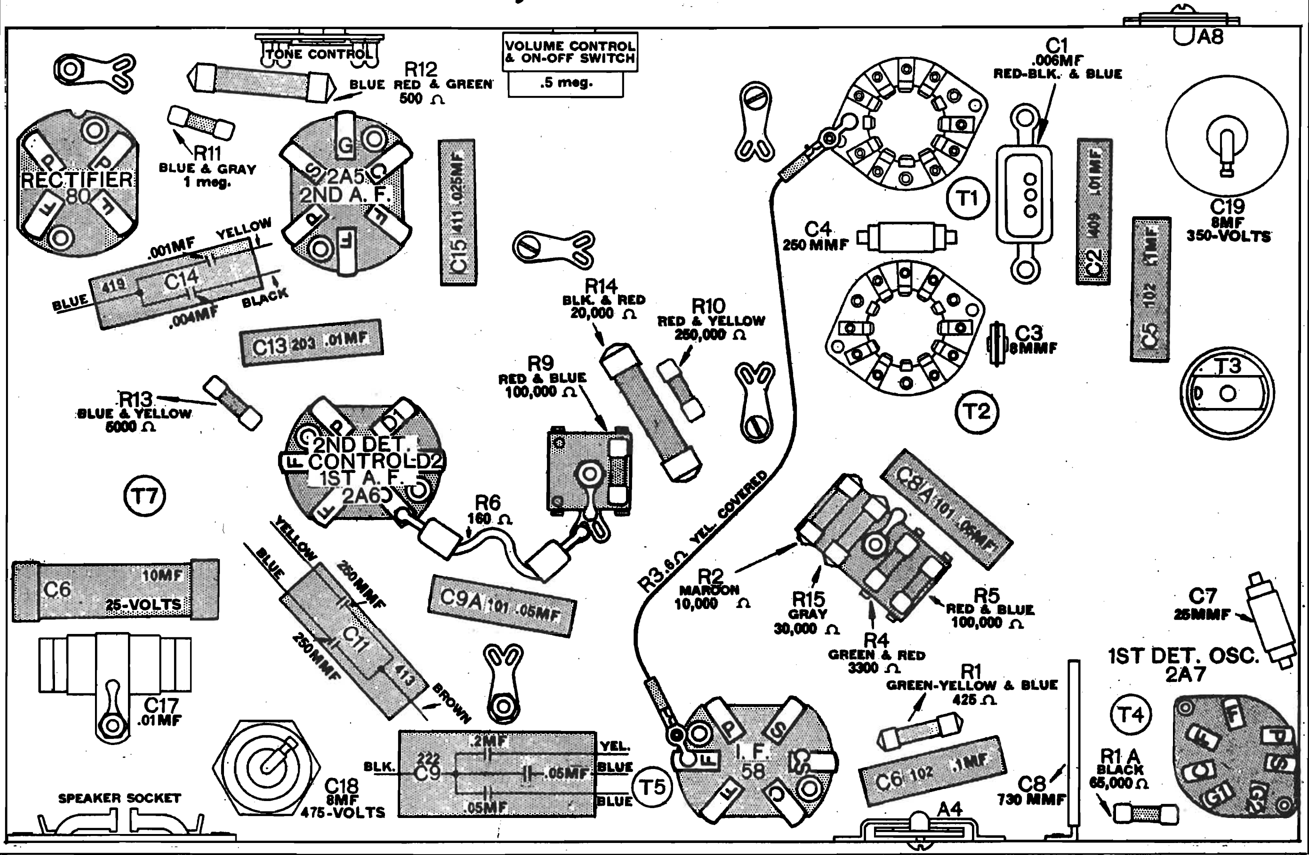
## R. F. TRIMMERS ON MODELS 145 AND 325

| | Short-Wave Range | Police Range | Broadcast Range |
|---|---|---|---|
| Antenna | ....None | None | A1 |
| Detector | ....None | None | A2 |
| Oscillator | ... A3 | None | A8 |
| Tracking | ...None | None | A4 |

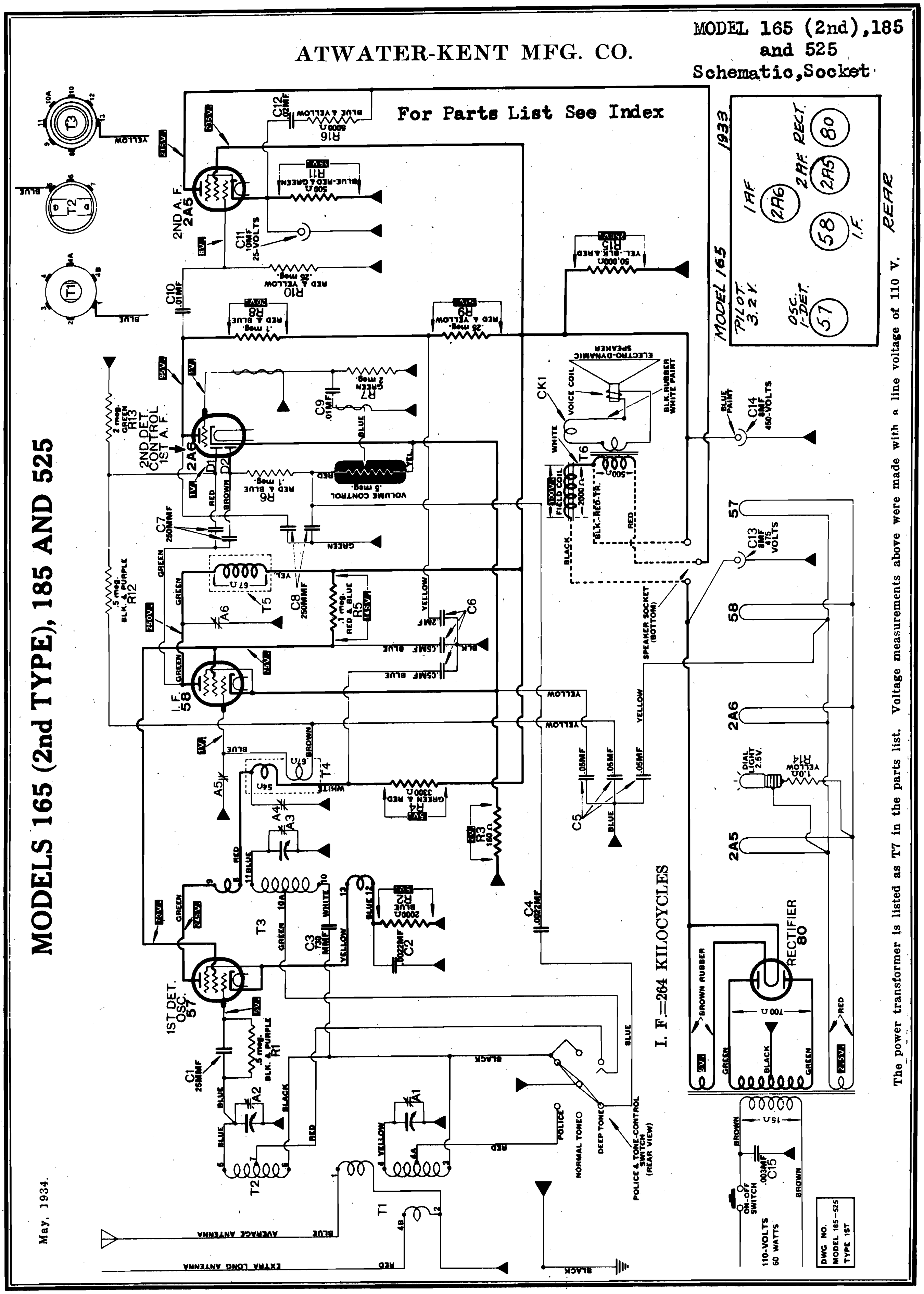
The I. F. frimmers are A5, A6 and A7.

(I. F. = 264 KC.)

For Alignment Data and Parts List, see Index

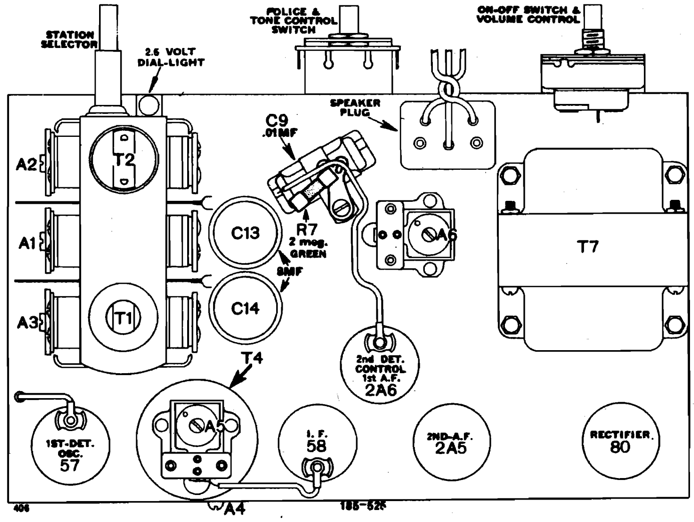


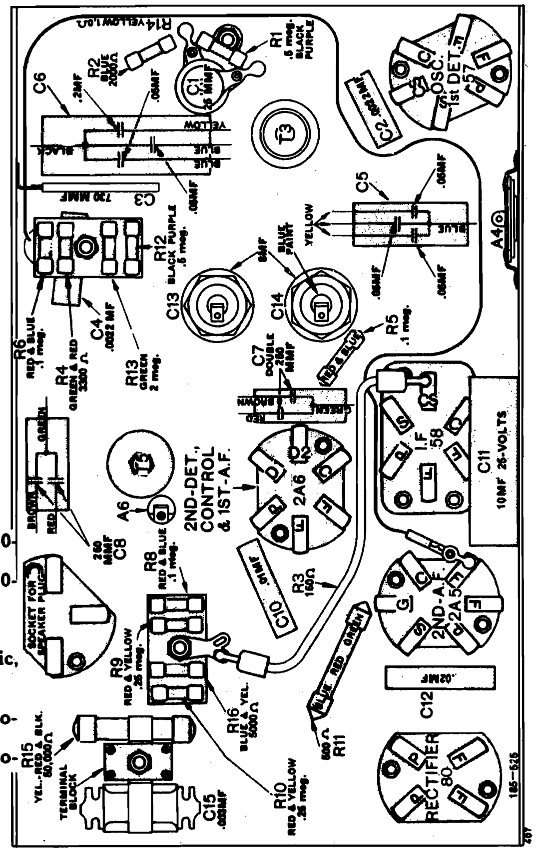
MODEL 165 (2nd),185
and 525
Schematic,Socket



MODEL 165 (2nd), 185 and 525
Socket, Trimmer, Parts

ATWATER-KENT MFG. CO.




## 2nd TYPE MODEL 165

| Part No. | Name of Part |
|---|---|
| 25309 | Cabinet complete |
| 24293 | Volume control, .5 Ʊ |
| 25022 | Variable condenser |
| 25312 | Police and tone control switch complete |
| 25311 | Switch base complete |
| 25226 | Switch shaft and blade |
| 24278 | Knob volume and tuning |
| 25145 | Knob—tone |
| 15404 | Dial lamp, 2.5-V. |

### TRANSFORMERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| T1 | 33820 | No. 1 R. F. T. |
| T2 | 32440 | No. 2 R. F. T. |
| T3 | 32450 | Osc. T. |
| T4 | 32620 | No. 1 I. F. T. |
| T5 | 32630 | No. 2 I. F. T. |
| T6 | 21672 | Output T. |
| T7 | 25191 | Power T. |

### RESISTORS

| Code No. | Part No. | Name of Part |
|---|---|---|
| R1 | 30350 | Bl'k-purple, .5 Ʊ, 1/3-W. |
| R2 | 33250 | Blue, 2000 Ω, 1/3-W. |
| R3 | 28950 | Flexible, 160 Ω |
| R4 | 30380 | Red-green, 3300 Ω, 1/3-W. |
| R5 | 20980 | Red-blue, .1 Ʊ, ½-W. |
| R6 | 30340 | Red-blue, .1 Ʊ, 1/3-W. |
| R7 | 30370 | Green, 2 Ʊ, 1/3-W. |
| R8 | 30340 | Red-blue, .1 Ʊ, 1/3-W. |
| R9 | 31970 | Red-yel., .25 Ʊ, 1/3-W. |
| R10 | 31970 | Red-yel., .25 Ʊ, 1/3-W. |
| R11 | 32010 | Blue-red-green, 500 Ω, 1-W. |
| R12 | 30350 | Bl'k-purple, .5 Ʊ, 1/3-W. |
| R13 | 30370 | Green, 2 Ʊ, 1/3-W. |
| R14 | 31860 | Flexible, 1 Ω |
| R15 | 34340 | Yel.-bl'k-red, 50,000 Ω, 1½-W. |
| R16 | 36430 | Yel.-blue, 5000 Ω, 1/3-W. |

### CONDENSERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| C1 | 33650 | 25 MMF, 500-V. |
| C2 | 33660 | .0022 MF, 450-V., IND. |
| C3 | 25638 | 730 MMF, 100-V. |
| C4 | 33660 | .0022 MF, 450-V., IND. |
| C5 | 32410 | .05, .05 and .05 MF, 100-V., IND. |
| C6 | 32390 | .05, .05 and .2 MF, 200-V., IND. |
| C7 | 33630 | 250 MMF (double), 450-V., IND. |
| C8 | 33630 | 250 MMF (double), 450-V., IND. |
| C9 | 23250 | .01 MF, 450-V. |
| C10 | 27630 | .01 MF, 200-V., IND. |
| C11 | 25379 | 10 MF, dry electrolytic, 25-V. |
| C12 | 33660 | .02 MF, 200-V., IND. |
| C13 | 25168 | 8 MF, 475-V., electrolytic |
| C14 | 26381 | 8 MF, 450-V., electrolytic (blue) |
| C15 | 32740 | .003 MF, 500-V. |

### TRIMMER CONDENSERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| A4 | 24495 | Single I. F. |
| A5 | 24554 | Single I. F. (includes I. F. shield) |
| A6 | 33080 | Single I. F. |

### SOCKETS

| Part No. | Name of Part |
|---|---|
| 25196 | Speaker |
| 24492 | Rectifier |
| 24494 | Small 6 prong (3 used) |
| 22733 | Large 6 prong (1 used) |

### MISCELLANEOUS

| Part No. | Name of Part |
|---|---|
| 25194 | Cloth screen |
| 25213 | Cabinet feet |
| 24323 | Power T. cover (2 used) |
| 24554 | I. F. shield and trimmer, A5 |
| 19566 | 110-V. cable and plug |
| 24549 | Dial assembly |
| 25745 | Name decalcomania |
| 25965 | Tone decalcomania |
| 26706 | Vernier shaft |
| 26707 | Vernier cap |
| 26708 | Ball bearing |
| 26709 | Trimmer screw |
| 26711 | Trimmer washer |
| 27133 | Trimmer mica |
| 22683 | Tube shield |
| 26671 | Instruction and log card, F1109 |
| 25189 | Shipping container |

### 165-185 SPEAKER No. 34100

| Part No. | Name of Part |
|---|---|
| 18870 | Field coil (2000 Ω) |
| 21672 | Output T.—(T6) |
| 21161 | Diaphragm |
| 25179 | Cable and plug |
| 25308 | Speaker plug (3 prong) |
| 23657 | Choke (CK1) |

## MODEL 185

(For parts not listed below refer to Model 165)

| Part No. | Name of Part |
|---|---|
| 26702 | Cabinet |
| 26602 | Screen |
| 25865 | Dial window |
| 26544 | Escutcheon name plate |
| 36580 | Tone control switch complete |
| 25814 | Knob (volume and tuning) |
| 25738 | Knob (tone) |
| 26481 | Tone decalcomania |
| 26618 | Shipping container |

## MODEL 525

(For parts not listed below refer to Model 165)

| Part No. | Name of Part |
|---|---|
| 26565 | Variable condenser |
| 27305 | Knob shaft |
| 26519 | Dial assembly |
| 26569 | Knob (volume and tuning) |
| 26571 | Knob (tone) |
| 26545 | Escutcheon name plate |
| 25691 | Dial window |
| 26564 | Volume control, .5 Ʊ |
| 36590 | Tone control switch complete |
| 26669 | Shipping container |

### 525 SPEAKER No. 38500

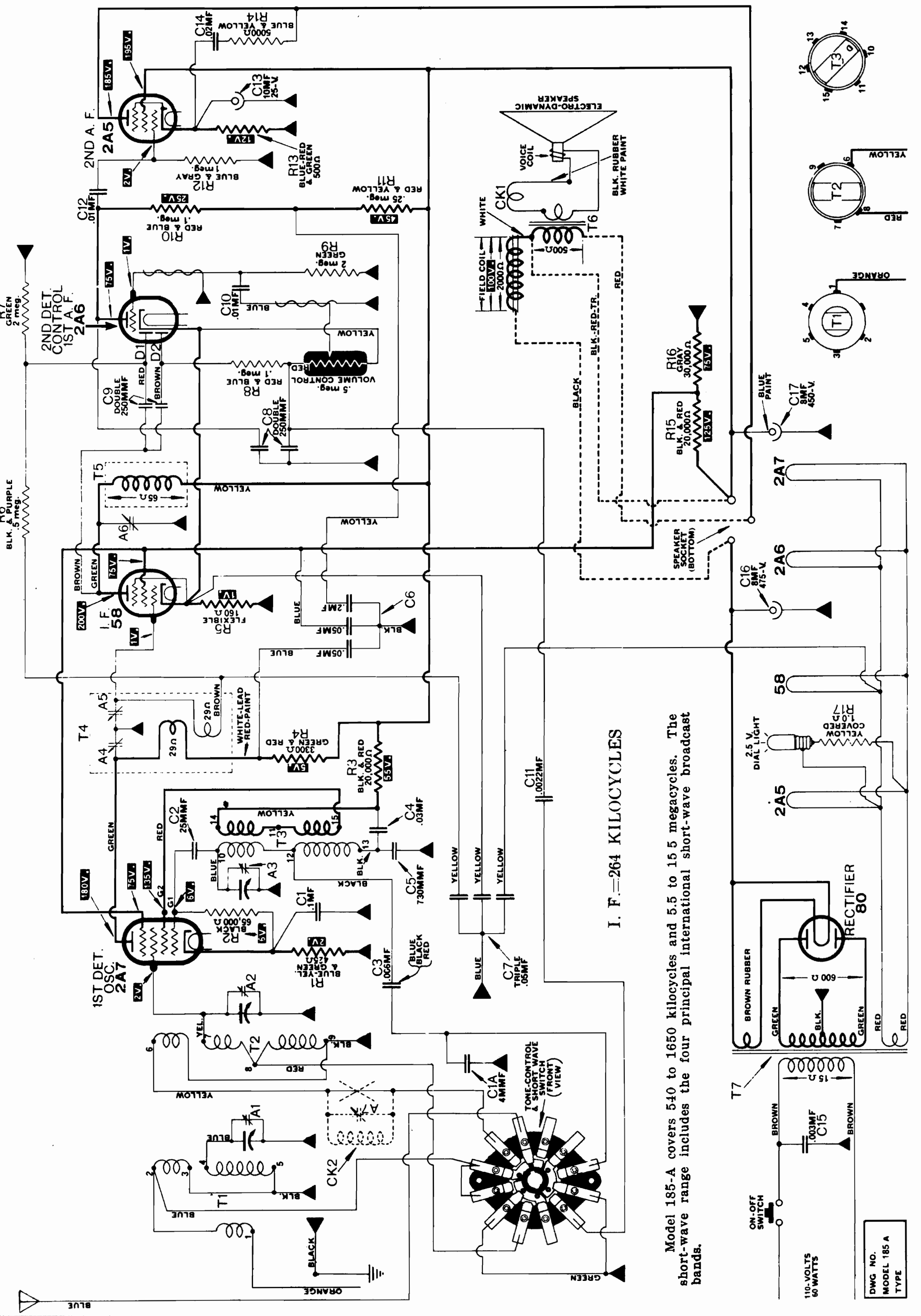
| Part No. | Name of Part |
|---|---|
| 18870 | Field coil (2000 Ω) |
| 21672 | Output T.—(T6) |
| 19465 | Diaphragm |
| 25179 | Cable and plug |
| 25308 | Speaker plug (3 prong) |

Ω = ohms. Ʊ = megohms. IND. = inductive. NI = non-inductive. W. = watt.

# ATWATER-KENT MFG. CO.

**MODEL 185-A**
**Schematic**

## MODEL 185-A




I. F.=264 KILOCYCLES

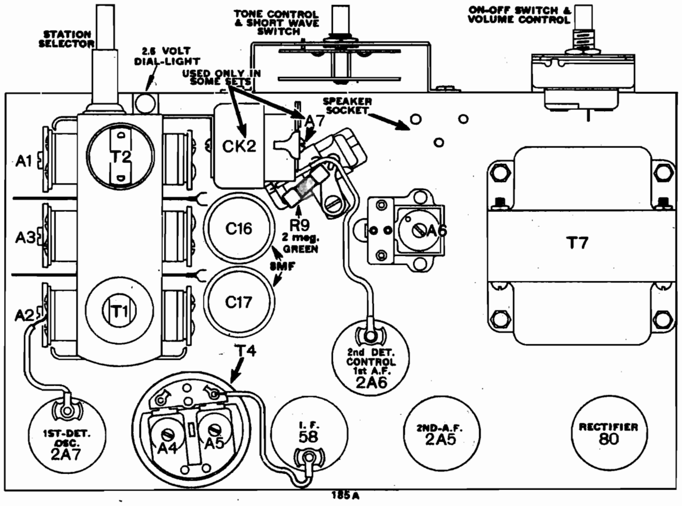
Model 185-A covers 540 to 1650 kilocycles and 5.5 to 15.5 megacycles. The short-wave range includes the four principal international short-wave broadcast bands.

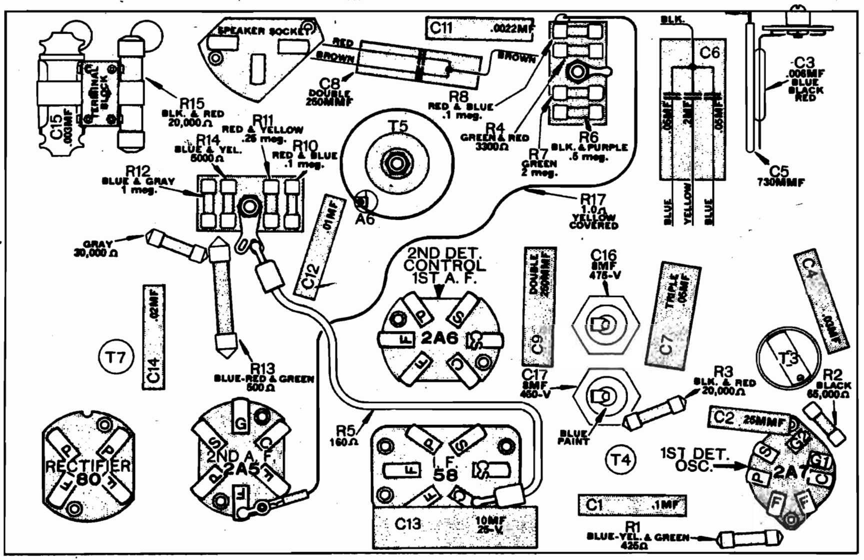
Above voltages were made with a line supply of 110 volts. The trap circuit CK2 and A7 shown in dotted lines is used only in some Model 185-A sets. This trap is tuned to the I. F. frequency.

May, 1934.

MODEL 185-A
Socket, Trimmer, Parts

ATWATER-KENT MFG. CO.




The 30,000 ohm resistor (gray) in the center left-hand side of this chart is R16.

# MODEL 185-A

| Part No. | Name of Part |
|---|---|
| 27218 | Cabinet less screen |
| 26602 | Screen |
| 27186 | Escutcheon name plate |
| 25737 | Knob—tuning and volume |
| 25738 | Knob—tone and range |
| 24293 | Volume control, .5 Ʊ |
| 25022 | Variable condenser assembly |
| 27124 | Tone and range switch complete |
| 27127 | Insulator for above |
| 27122 | Mounting bracket |
| 20093 | Nut |

## TRANSFORMERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| T1 | 38120 | No. 1 R. F. T. |
| T2 | 38130 | No. 2 R. F. T. |
| T3 | 38140 | Oscillator T. |
| T4 | 27196 | No. 1 I. F. T. |
| T5 | 32630 | No. 2 I. F. T. |
| T6 | 21672 | Output T. |
| T7 | 25191 | Power T. |

## RESISTORS

| Code No. | Part No. | Name of Part |
|---|---|---|
| R1 | 37540 | Blue-yel.-green, 425 Ω, ½-W. |
| R2 | 31980 | Bl'k, 65,000 Ω, 1/3-W. |
| R3 | 23120 | Red-bl'k, 20,000 Ω, ½-W. |
| R4 | 30380 | Green-red, 3300 Ω, 1/3-W. |
| R5 | 28950 | Flexible, 160 Ω |
| R6 | 30350 | Bl'k-purple, .5 Ʊ, 1/3-W. |
| R7 | 30370 | Green, 2 Ʊ, 1/3-W. |
| R8 | 30340 | Red-blue, .1 Ʊ, 1/3-W. |
| R9 | 30370 | Green, 2 Ʊ, 1/3-W. |
| R10 | 30340 | Red-blue, .1 Ʊ, 1/3-W. |
| R11 | 31970 | Red-yel., .25 Ʊ, 1/3-W. |
| R12 | 30360 | Blue-gray, 1 Ʊ, 1/3-W. |
| R13 | 32010 | Blue-red-green, 500 Ω, 1-W. |
| R14 | 36430 | Blue-yel., 5000 Ω, 1/3-W. |
| R15 | 28030 | Bl'k-red, 20,000 Ω, 1½-W. |
| R16 | 20970 | Gray, 30,000 Ω, ½-W. |
| R17 | 31860 | Flexible (yel. covered), 1.0 Ω |

## CONDENSERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| C1 | 31530 | .1 MF, 100-V., NI |
| C1A | 38280 | 4 MMF, 500-V. |
| C2 | 38070 | 25 MMF, 500-V. |
| C3 | 25035 | .006 MF, 450-V. |
| C4 | 29530 | .03 MF, 200-V., NI |
| C5 | 38060 | 730 MMF, 100-V. |
| C6 | 32390 | .05, .05, .2 MF, 200-V., IND. |
| C7 | 32410 | Triple .05 MF, 100-V., IND. |
| C8 | 33630 | Double 250 MMF, 450-V., IND. |
| C9 | 33630 | Double 250 MMF, 450-V., IND. |
| C10 | 23250 | .01 MF, 450-V. |
| C11 | 33660 | .0022 MF, 450-V., IND. |
| C12 | 27630 | .01 MF, 200-V., IND. |
| C13 | 25379 | 10 MF, 25-V. (dry electrolytic) |
| C14 | 36420 | .02 MF, 200-V., IND. |
| C15 | 32740 | .003 MF, 500-V. |
| C16 | 25168 | 8 MF, 475-V. (electrolytic) |
| C17 | 26381 | 8 MF, 450-V. (blue) (electrolytic) |

## TRIMMER CONDENSERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| A4, 5 | 32880 | Double I. F. |
| A6 | 33080 | Single I. F. |
| A7 | 38180 | Trap trimmer (used only in some models) |

## CHOKES

| Code No. | Part No. | Name of Part |
|---|---|---|
| CK1 | 23657 | Choke on speaker |
| CK2 | 27324 | Trap choke (used only in some models) |

## SOCKETS

| Part No. | Name of Part |
|---|---|
| 26111 | 7 prong |
| 25196 | Speaker |
| 24492 | Rectifier |
| 24494 | Small 6 prong (2 used) |
| 22733 | Large 6 prong |

## MISCELLANEOUS

| Part No. | Name of Part |
|---|---|
| 27088 | Tone decalcomania |
| 24327 | Shield for T5 |
| 25056 | Shield for T4 |
| 24323 | Power T. cover (2 used) |
| 24327 | Wave trap shield (A7) |
| 27182 | Dial assembly |
| 15404 | Pilot lamp, 2.5-V. |
| 27179 | Tuning tag, F-1135 |
| 27113 | Instruction folder, F-1134 |
| 26618 | Shipping container |

## 185-A SPEAKER No. 34100

| Part No. | Name of Part |
|---|---|
| 18870 | Field coil (2000 Ω) |
| 21672 | Output T. (T6) |
| 21161 | Diaphragm |
| 25179 | Cable and plug |
| 25308 | Speaker plug (3 prong) |
| 23657 | Choke (CK1) |

Ω=ohms. Ʊ=megohms. IND.=inductive.
NI=non-inductive. W.=watt.

ATWATER-KENT MFG. CO.

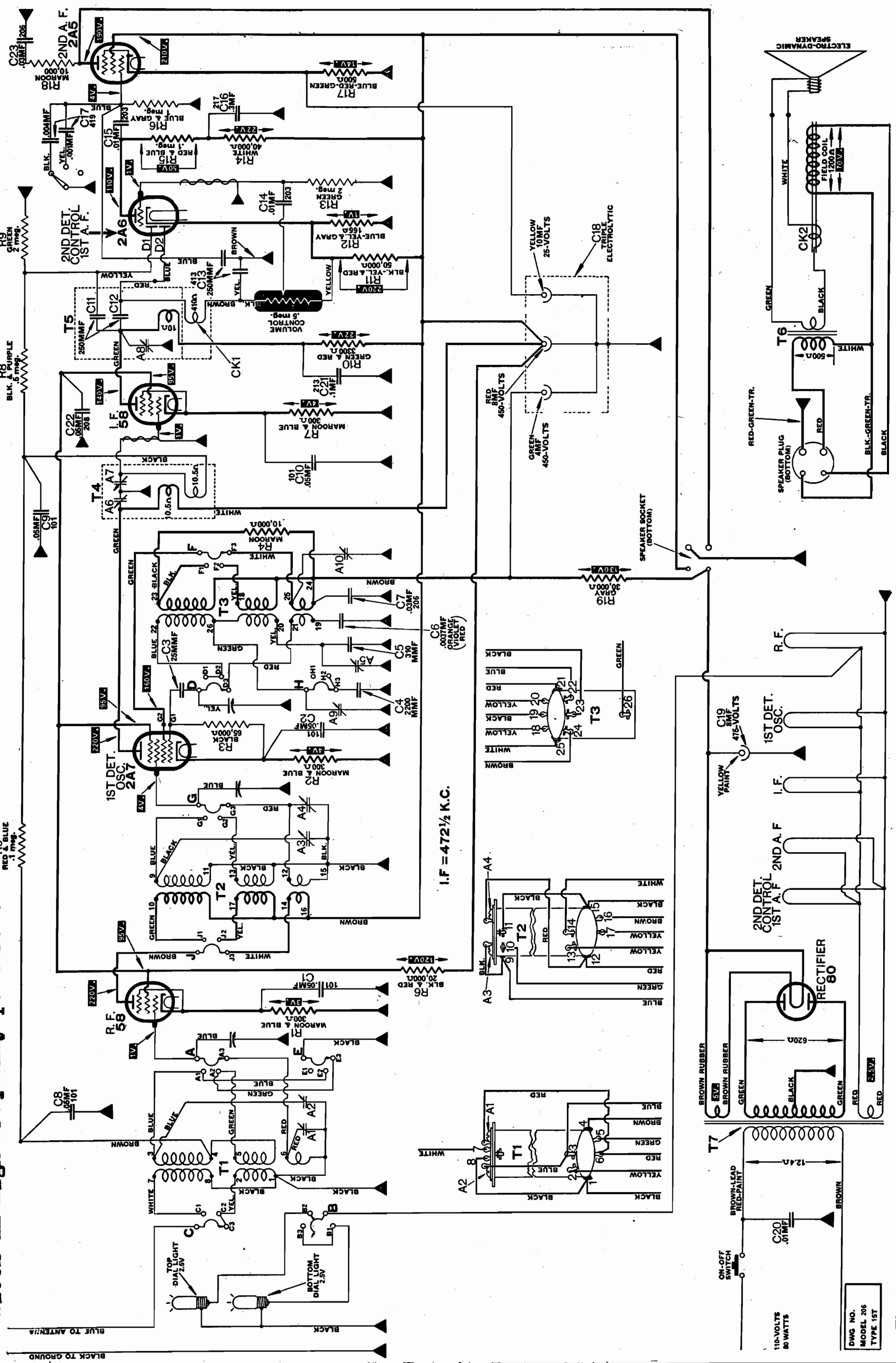
**MODEL 206,376 (1st)**
**Schematic**

**For Alignment See Index**

September, 1934.

# MODELS 206 AND 376 (1st TYPE)

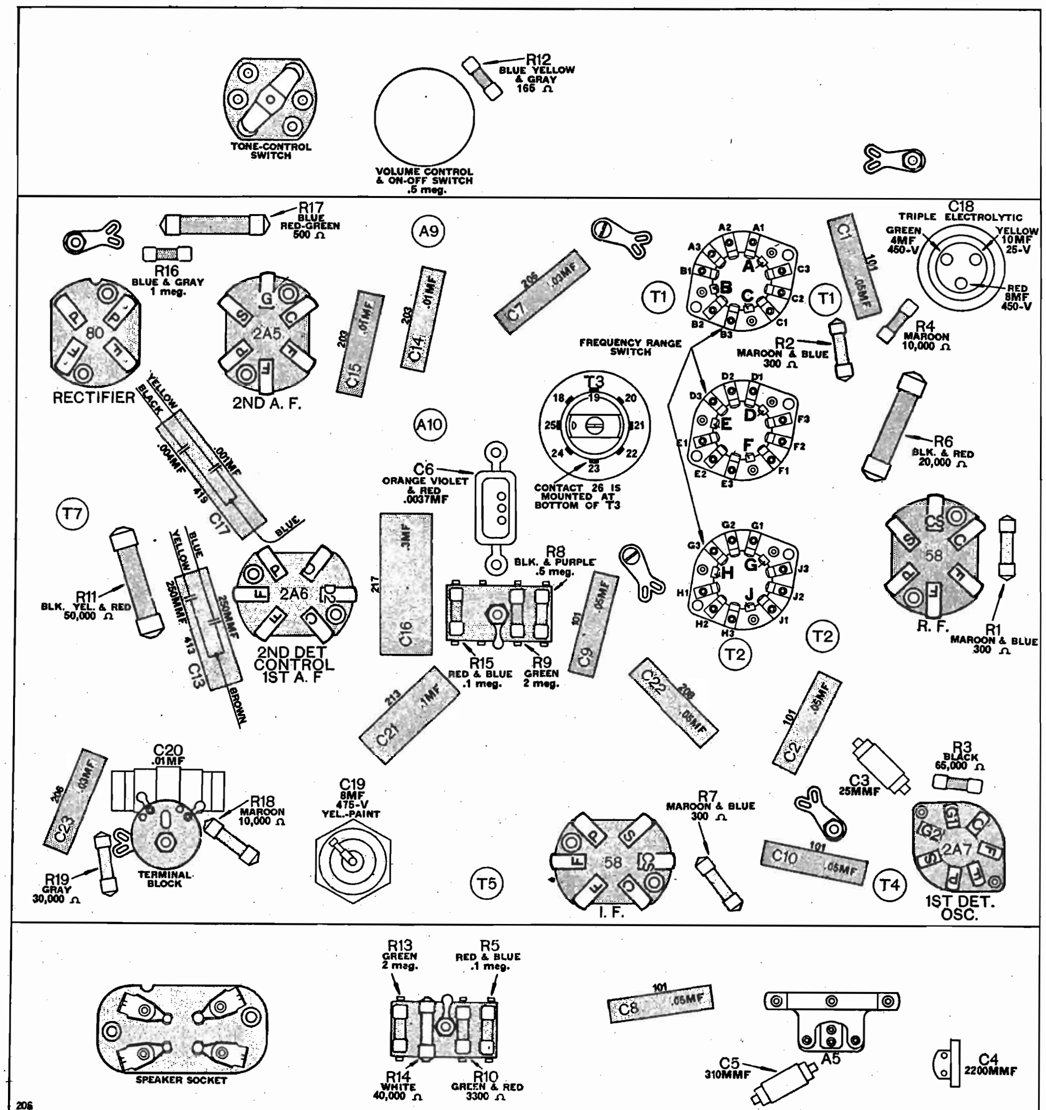
**Switch in High-Frequency position.**

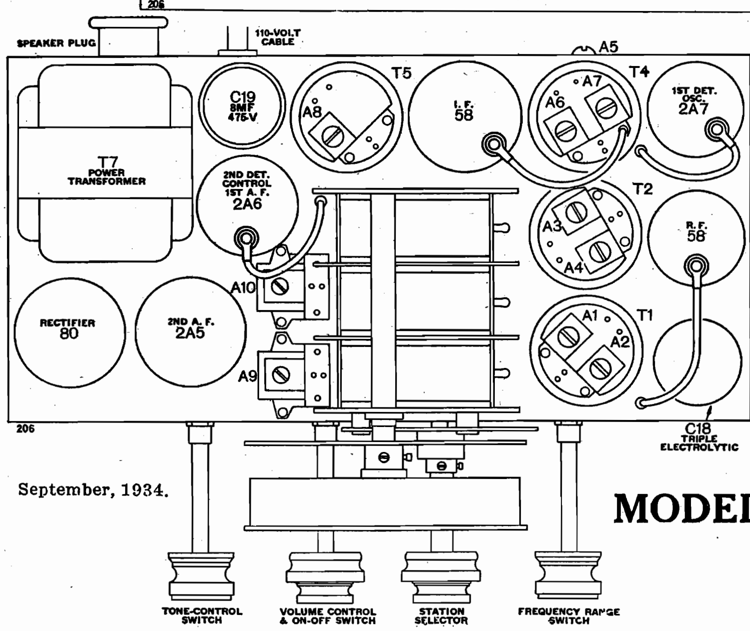


The 1st type of Models 206 and 376 have cylindrical I. F. transformer shields. The 2nd type has square I. F. shields and the circuit is different from that shown above.

MODEL 206,376 (1st)
Socket,Trimmer,Parts

# ATWATER-KENT MFG. CO.




## R. F. TRIMMERS ON MODELS 206 AND 376

| | Short-Wave Range | Police Range | Broadcast Range |
|---|---|---|---|
| R. F. | A1 | None | A2 |
| 1st-Detector | A4 | None | A3 |
| Oscillator | A10 | None | A9 |
| Tracking | None | None | A5 |

The I. F. trimmers are A6, A7 and A8.

For Alignment Data and Parts List, see Index

September, 1934.

# MODELS 206 and 376 (1st TYPE)

# ATWATER-KENT MFG. CO.

**MODEL 206,376,559, 825,944 Parts Lists**

## PARTS LIST

### MODEL 206

28834 Cabinet less screen
27908 Screen
27944 Escutcheon and crystal assem.
27388 Crystal
27432 Var. cond. assem.
27692 Tuning gear
27514 Spacer
27959 Screw
28281 Front and back plate assem.
28594 Tuning shaft assem.
22657 Dial rubber
27574 Dial plate holder
27947 Dial pointer holder
27522 Dial pointer
27685 Dial plate
25377 Bushing under var. cond. assem.
28422 Plate under var. cond. assem.
24323 Power trans. cover
25056 I. F. T. shield (early)
27781 Osc. trans. shield
27543 R. F. T. shield
27887 R. F. T. shield insulator
40090 Pilot light assem.
27676 Pilot lamp, 2.5-V. (frosted)
27602 Range switch
25058 I. F. T. shield cover without hole
25059 I. F. T. shield cover with hole
25601 Rubber grommet
39620 Tone control switch assem.
28192 Shaft and blade for above
27425 Vol. control, .5 Ʊ
27559 Inst. folder, F-1146
27862 Shipping container

#### TRANSFORMERS

T1 40880 No. 1 R. F. T.
T2 41160 No. 2 R. F. T.
T3 41170 Oscillator T.
T4 *28161 No. 1 I. F. T. (EARLY)
T5 *28162 No. 2 I. F. T. (EARLY)
T6 21672 Output trans.
T7 28084 Power trans.

* Early style with cylindrical shield. In later sets No. 1 I. F. T. complete with trimmers and shield is No. 28527, No. 2 I. F. T. is No. 28528.

#### RESISTORS

(See table on page 19.)

#### CONDENSERS

(For tubular condensers see page 18.)
C3 33930 25 MMF, 500-V.
C4 40380 2200 MMF
C5 40390 360 MMF
C6 *27598 3700 MMF
C11 33670 250 MMF, 500-V.
C12 33670 250 MMF, 500-V.
C18 27592 4-8-10 MF
C19 22538 8 MF, 475-V. (yel. paint)
C20 23250 .01 MF, line cond.

* In late sets C6 is No. 27593, 5700 MMF, green, violet and red.

#### TRIMMERS

A1-2 39430 On T1
A3-4 39430 On T2
A5 38890 Rear of chassis on bottom

### MODEL 206 (Contd.)

A6-7 32880 On T4
A8 40610 On T5
A9 40450 Next to A10
A10 39630 Front of chassis alongside of var. cond.

#### CHOKES

CK1 28163 On No. 2 I. F. T.
CK2 25525 On speaker

#### 206 SPEAKER No. 41900

25525 Choke (CK2)
28345 Cable and plug
15079 Plug
21672 Output trans. (T6)
19465 Diaphragm
21260 Field coil (1200 Ω)

### MODEL 376

For parts not listed below refer to Model 206.
28517 Base plate
28531 Escutcheon and crystal
27559 Inst. sheet, F-1146
28756 Shipping container

#### 376 SPEAKER No. 41800

25525 Choke (CK2)
21260 Field coil (1200 Ω)
20737 Diaphragm
20657 Cable and plug
18582 Plug
19469 Segment

### MODEL 559

27287 Var. cond. assem.
25601 Rubber grommet
27301 Washer
22649 Screw
27286 Range switch
27272 Crank arm
35380 Reflector assem.
27958 Front panel assem.
27321 Vol. control, .5 Ʊ
27314 Vol. cont. mtg. bracket
25558 Vol. cont. cover
27289 Tone cont. switch
27317 Mtg. bracket for above
38740 Sensitivity switch assem.
27628 Shaft and blade for above
27472 Antenna jumper
25913 R. F. coil shield
25056 I. F. T. shield
26255 I. F. T. shield insul.
25058 I. F. T. shield cover without hole
25059 I. F. T. shield cover with hole
18534 Fuse
27057 Bottom cover
22683 Tube shield
23743 Aux. tube shield
27334 Tone cont. cond. clamp
27249 Mica for trimmers on strips
17109 Screw for above
17064 Insul. washer for above
27072 Station directory, F-1131
27545 Inst. folder, F-1143
27683 Shipping container

Ω=ohms. Ʊ=megohms.

### MODEL 559 (Contd.)

#### PARTS FOR TUNING ARRANGEMENT

27469 Dial gear
27276 Pointer arm
27254 Dial pointer
27332 Counter shaft gear (lge.)
27333 Idler gear (sml.)
27259 Gear screw
27957 Broadcast pinion gear
28116 Gear frame
27294 Tuning shaft
28016 Tuning bracket
27351 Screw (5/32" dia.)
27293 Detention spring
27298 Shaft spacer
27297 Bracket holding pin

#### TRANSFORMERS

T1 38310 No. 1 R. F. T., broadcast
T2 38340 No. 1 H. F., 1st range
T3 38360 No. 1 H. F., 2nd range
T4 38380 No. 1 H. F., 3rd range
T5 38320 No. 2 R. F. T., broadcast
T6 38330 Oscillator T., broadcast
T7 38350 No. 2 H. F., 1st range
T8 38370 No. 2 H. F., 2nd range
T9 38390 No. 2 H. F., 3rd range
T10 27448 No. 1 I. F. T.
T11 27449 No. 2 I. F. T.
T12 27451 No. 3 I. F. T.
T13 27452 No. 4 I. F. T.
T14 38610 A. F. input trans.
T15 21370 A. F. output trans.
T16 26395 Power trans.

#### RESISTORS

(For tubular resistors see page 19.)
R6 33230 Flexible, 2000 Ω
R7 33210 Flexible, 670 Ω
R17 33210 Flexible, 670 Ω
R21 24340 Flexible, 8000 Ω
R22 24340 Flexible, 8000 Ω
R24 25950 Flexible, 200 Ω
R26 17077 Flexible, 10 Ω
R27 31860 Dial light res., 1.0 Ω

#### CONDENSERS

(For tubular condensers see page 18.)
C6 22220 100 MMF, 450-V.
C7 25661 8 MMF, 500-V.
C8 25661 8 MMF, 500-V.
C9 27391 350 MMF (orange, green and brown)
C10 27389 1250 MMF (green, red and brown)
C11 34470 14 MMF, 500 V. (red paint)
C12 27392 4000 MMF (red, blk. and yel.)
C13 34470 14 MMF, 500-V. (red paint)
C25 39340 125 MMF
C26 39340 125 MMF
C27 35290 125 MMF
C36 23250 .01 MF, line cond., 450-V.
C37 22538 8 MF, 475-V.
C38 22538 8 MF, 475-V.
C39 22538 8 MF, 475-V.

## PARTS LIST

### MODEL 559 (Contd.)

#### CHOKES

CK1 17015 R. F. plate choke
CK2 19210 R. F. plate circuit choke
CK3 19210 1st det. plate circuit choke
CK4 19210 2nd I. F. plate circuit choke
CK5 19210 R. F. 1st I. F. screen choke
CK6 36180 B filter choke

#### TRIMMERS

28770 Single trimmer
32880 Double I. F. trimmer

#### SOCKETS

24494 6 prong (58)
22733 6 prong (2a5-55)
22689 4 prong
21337 5 prong
18449 Fuse

#### 559 SPEAKER No. 36500

34630 Field coil (625 Ω)
20737 Diaphragm
20657 Cable and plug assem.
21370 Output trans.

### MODEL 825

27731 Volume control, .5 Ʊ
28796 Cabinet complete
27902 Cloth screen
25865 Escutcheon window
27983 Escutcheon name plate
26283 Dial plate
24892 A. C.-D. C. switch
41050 Range switch
28805 Shaft and blade
41040 Tone control switch
28797 Shaft and blade
27593 Variable condenser

#### TRANSFORMERS

T1 35450 No. 1 R. F. T.
T2 35460 No. 2 R. F. T.
T3 35470 Oscillator T.
T4 26326 No. 1 I. F. T.
T5 35910 No. 2 I. F. T.
T6 26501 Output A. F. T.

#### RESISTORS

(For tubular resistors see page 19.)
R2 31830 Flexible, 250 Ω
R8 19820 Flexible, 48 Ω
R14 35820 Flexible, 12 Ω
R15 31690 Iron core, 145 Ω

#### CONDENSERS

(For tubular condensers see page 18.)
C1 35590 500 MMF, 450-V., mica
C2 33670 250 MMF, 500-V., mica

### MODEL 825 (Contd.)

C3 35840 50 MMF, 500-V., mica
C4 35990 830 MMF, 100-V., mica
C9 23250 .01 MF, 450-V., paper
C14 26158 Triple dry electrolytic 14, 8 and 8 MF

#### TRIMMER CONDENSERS

A4, 5 35650 Double I. F. trimmer
A6 35610 Single I. F. trimmer

#### SOCKETS

26111 Socket (7 prong)
24494 Socket (6 prong)
24493 Socket (5 prong)

#### MISCELLANEOUS PARTS

26706 Vernier shaft
26707 Vernier cap
26708 Ball bearing
26709 Trimmer screw
26711 Trimmer washer
27133 Trimmer mica
26323 T4 shield
21878 Shield disc
24327 T5 shield
26137 T5 shield insulator
24727 Antenna lead and card
26284 Dial light socket
16099 Dial lamp, 6-V.
26451 Tube shield
26014 Top shield
26324 Base cover
26017 Back plate
27563 Instruction and log card, F1150
27866 Shipping container

#### SPEAKER

26159 Speaker complete
25603 Diaphragm assembly
26501 Output transformer
26502 Field coil
26503 Choke coil (CK1)

### MODEL 944

28773 Cabinet, less screen
27892 Screen
25213 Foot
27487 Escutcheon name plate
27936 Dial window
27935 Dial assembly
27433 Var. cond. assem.
28089 Vernier cap
28091 Ball bearing
28092 Cap spring
28093 Spring retaining screw
28094 Tuning shaft

### MODEL 944 (Contd.)

28095 Trimmer mica
25199 Pilot light socket and resistor
15404 Pilot lamp, 2.5 V.
24323 Power T. cover
28282 Side mounting angle plate
26312 C11 shield
27567 Vol. control, 20,000 Ω
27095 R. F. shield
27597 I. F. coil shield
27724 I. F. coil shield insulator
27631 Tall tube shield
26451 Short tube shield
25059 I. F. T. cover with hole
25029 Four (4) contact terminal block
28075 Eight (8) contact terminal block
27564 Instruction folder, F-1151
27861 Shipping container

#### TRANSFORMERS

T1 38990 No. 1 R. F. T.
T2 39010 Oscillator
T3 27486 No. 1 I. F. T.
T4 21672 Output T.
T5 25191 Power T.

#### RESISTORS

(For tubular resistors see page 19.)
R11 20050 Flexible, 355 Ω
R12 31860 Flexible, 1.0 Ω

#### CONDENSERS

(For tubular condensers see page 18.)
C3 33670 250 MMF, 500-V., mica
C4 35290 125 MMF
C11 22538 8 MF, yel. paint, 475-V.
C12 27584 4 MF, 350-V.
C14 23250 .01 MF, line cond.

#### TRIMMERS

A3 38660 I. F. plate trimmer
A4 36570 2nd detector trimmer
A5 39090 Rear of set

#### CHOKE

CK1 23657 On speaker

#### SOCKETS

24494 6 prong (1st det. and A. F.)
22733 6 prong (2nd det.)
24492 4 prong
25196 Speaker

#### 944 SPEAKER No. 34100

18870 Field coil, 2,000 Ω
21672 Output trans. (T4)
21161 Diaphragm
25179 Cable and plug
25308 Plug (3 prong)
23657 Choke

Ω=ohms. Ʊ=megohms.

# ATWATER-KENT MFG. CO.

## INSTRUCTIONS FOR CONNECTING DOUBLET ANTENNA TO RECEIVER

If the receiver is provided with doublet antenna connections (as on Atwater Kent Models 112, 318, 447, and 559), connect the transmission line as specified in the instructions for the set. (See Fig. 2.) **Do not forget to remove the jumper wire** which is used on these models between the ground terminal and one of the antenna terminals. This jumper is required when using a plain antenna, but is not used with a doublet.

On the Atwater Kent models just mentioned, the frequency-range switch on the set automatically changes the doublet to a plain antenna on the standard broadcast and police bands.

### DOUBLET TRANSFORMER

For receivers which are not provided with doublet antenna connections, **it is necessary to use Atwater Kent Model "DT" Doublet Transformer,** part No. 28083. This transformer is not included in the Atwater Kent Type "D" doublet antenna kit, but can be purchased separately.

The Model "DT" doublet transformer has a convenient mounting bracket to permit mounting on the rear of cabinet. The transformer has four terminals which are clearly marked. The connections are shown in Fig. 3.

Model "DT" transformer has a two-position switch. **For short-wave broadcast reception, turn knob** on this switch so the dot is at "SW" (short wave).

**For standard broadcast reception turn** the knob so dot is at "BC" (broadcast).

### IMPORTANT

**In some cases, depending on local conditions, a better ratio of signal-to-noise may be obtained WITHOUT a ground connection to the receiver. Try it both ways, and if there is less electrical interference without the ground, leave the ground connection off. (Of course, this does not apply to the ground on the lightning arrestor, which must be connected as shown in the illustration.)**

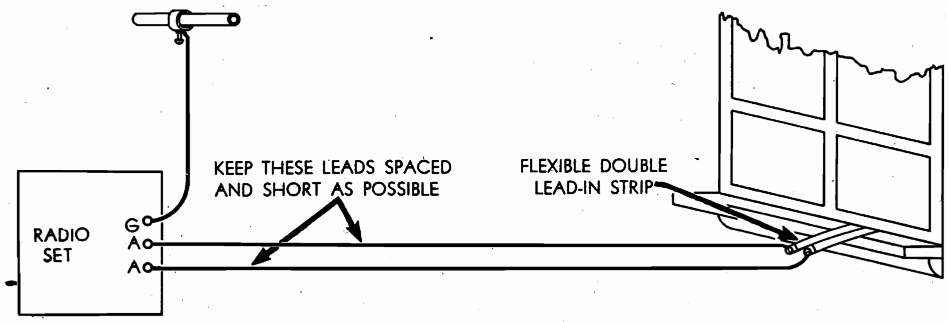



**Fig. 2.** How to connect the doublet transmission leads to receiver that is provided with doublet-antenna terminals, such as Atwater Kent Models 112, 318, 447, and 559. The leads to the set may be twisted for a distance of 2 or 3 feet without loss of signal strength.

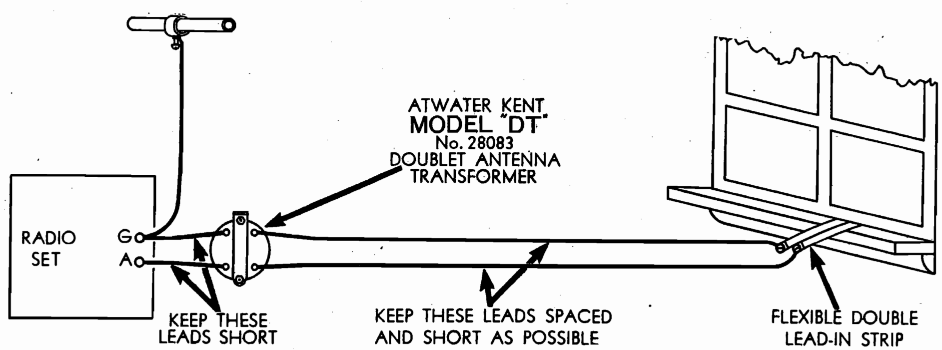
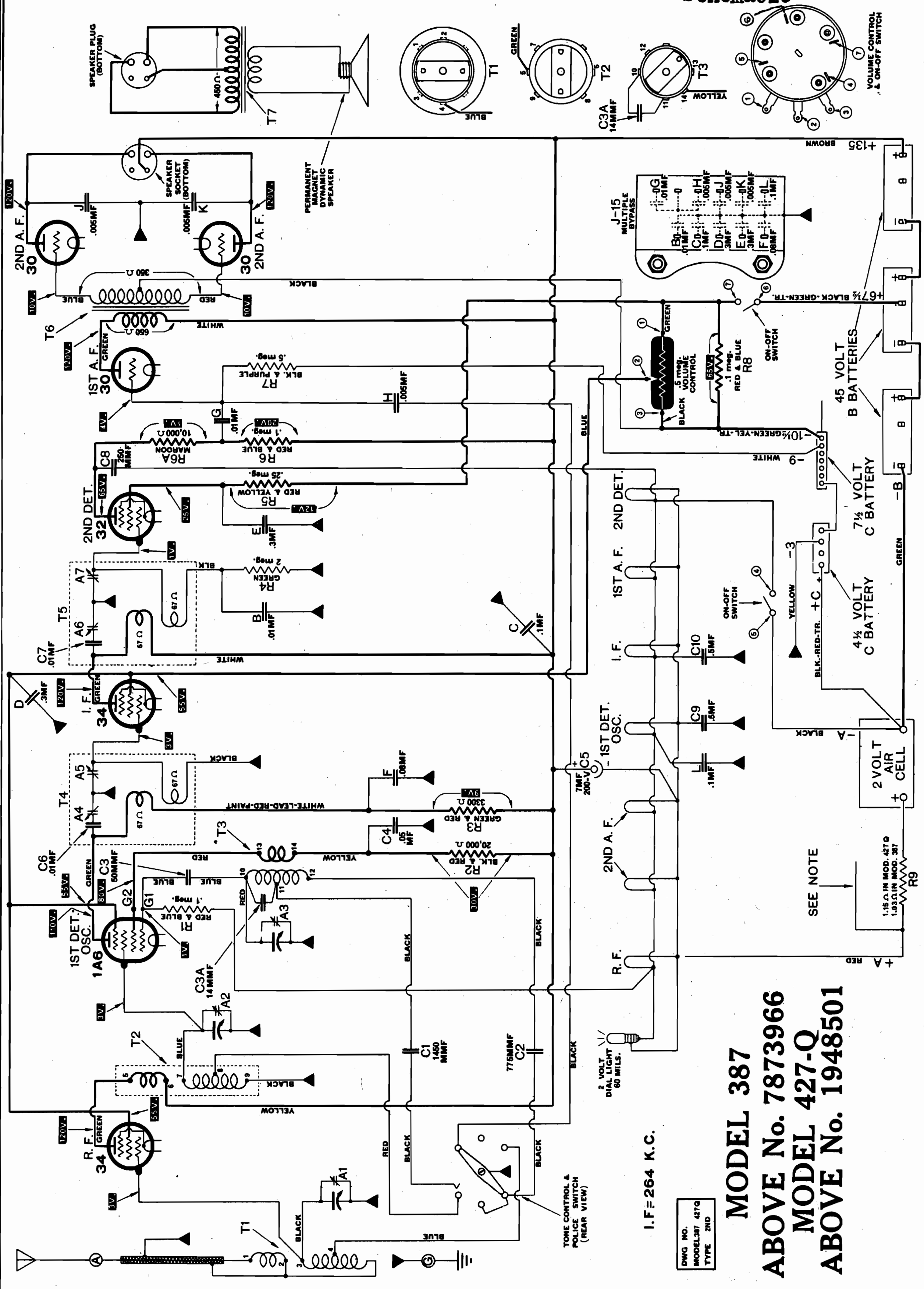



**Fig. 3.** For short-wave sets that are not provided for doublet-antenna connections, it is necessary to use Atwater Kent Model "DT" doublet transformer and connect it as shown in this drawing. The transformer has a bracket for attachment to the rear of cabinet, and a two-position switch to change from short-waves to standard broadcast.

# ATWATER-KENT MFG. CO.

**MODEL 387 Above 7873966**
**MODEL 427Q Above 1948501**
**Schematic**



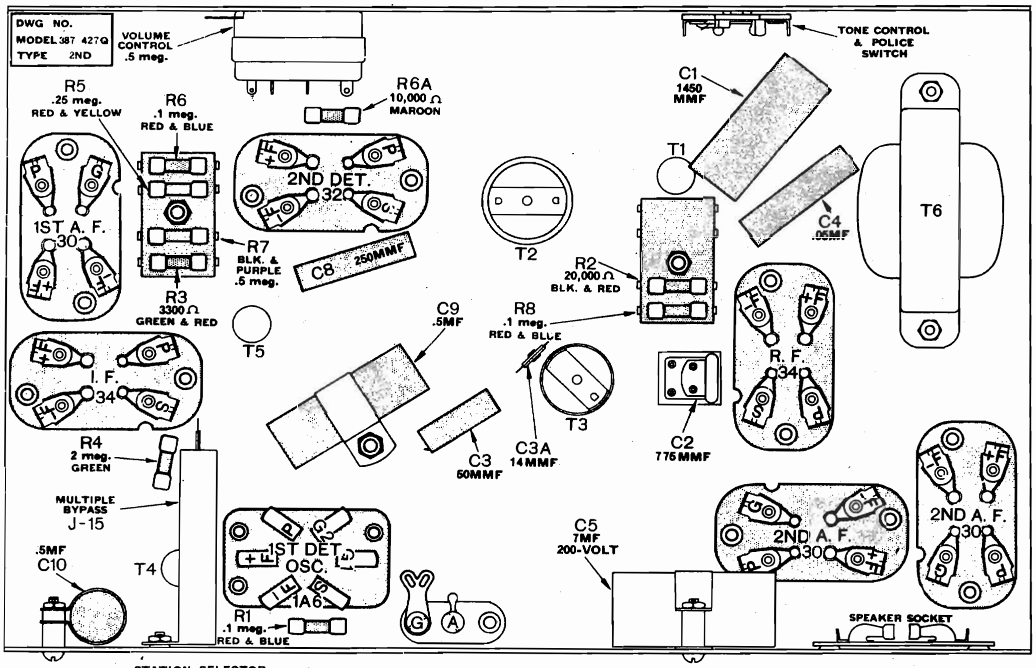

# MODEL 387
# ABOVE No. 7873966
# MODEL 427-Q
# ABOVE No. 1948501

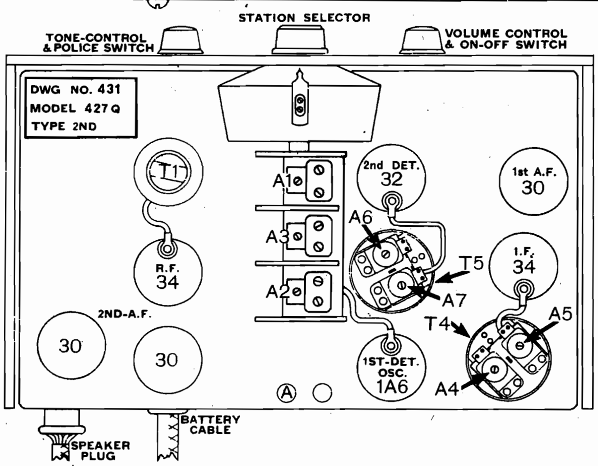
Total "B" voltage at time measurements were made equaled 120 volts. Tube voltages are taken from —F of each tube. Resistor R9 is used with 2-volt air cell, but is not used with 2-volt storage cell. An extra resistor of the same value as R9 is used with a 3-volt dry-cell "A" battery, and is connected in series with R9.

May, 1934.

**MODEL 387 Above 7873966**
**MODEL 427Q Above 1948501**
**Socket, Trimmer, Parts**

# ATWATER-KENT MFG. CO.




This late type of Models 387 and 427-Q differs from the early type by having a police-switch circuit which permits tuning in both police bands.

## 2nd TYPE 387
(Above Serial No. 7873966)

## 2nd TYPE 427-Q
(Above Serial No. 1948501)

| Part No. | Name of Part |
|---|---|
| 27054 | Dial assembly |
| 26721 | Dial lamp (2-V., 60 MILS.) |
| 37830 | Tone control switch complete |
| 26337 | Cabinet complete (387) |
| 26053 | Screen |
| 25686 | Escutcheon |
| 26031 | Knob—volume and tone control |
| 25811 | Knob—dial |
| 26177 | Variable condenser assembly |
| 25692 | Volume control, .5 Ʊ |
| 25704 | Battery cable |
| 23288 | Dial plate |

### TRIMMERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| A4, 5 | 30110 | Double I. F. trimmer |
| A6, 7 | 30110 | Double I. F. trimmer |

### CONDENSERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| C1 | 37840 | 1450 MMF, 100-V. |
| C2 | 30580 | 775 MMF, 100-V. |
| C3 | 35840 | 50 MMF, 500-V. |
| C3A | 36280 | 14 MMF, 500-V. |
| C4 | 26820 | .05 MF, 200-V., NI |
| C5 | 22472 | 7 MF, 200-V., dry electrolytic |
| C6 | 27630 | .01, 200-V. |
| C7 | 27630 | .01, 200-V. |
| C8 | 33620 | 250 MMF, 450-V., NI |
| C9 | 31510 | .5 MF, 100-V., NI |
| C10 | 31510 | .5 MF, 100-V., NI |
| | 34010 | Multiple by-pass (J15) |

### TRANSFORMERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| T1 | 37920 | No. 1 R. F. T. |
| T2 | 37930 | No. 2 R. F. T. |
| T3 | 37940 | Oscillator T. |
| T4 | 26068 | No. 1 I. F. T. |
| T5 | 26068 | No. 2 I. F. T. |
| T6 | 35030 | Input T. |
| T7 | 23701 | Output T. |

### SOCKETS

| Part No. | Name of Part |
|---|---|
| 20237 | 4 prong |
| 22733 | 6 prong |
| 21336 | Speaker (4 prong) |

### RESISTORS

| Code No. | Part No. | Name of Part |
|---|---|---|
| R1 | 30340 | Red-blue, .1 Ʊ, 1/3-W. |
| R2 | 30390 | Bl'k-red, 20,000 Ω, 1/3-W. |
| R3 | 30380 | Red-green, 3300 Ω, 1/3-W. |
| R4 | 30370 | Green, 2 Ʊ, 1/3-W. |
| R5 | 31970 | Red-yel., .25 Ʊ, 1/3-W. |
| R6 | 30340 | Red-blue, .1 Ʊ, 1/3-W. |
| R6A | 30320 | Maroon, 10,000 Ω, 1/3-W. |
| R7 | 30350 | Bl'k-purple, .5 Ʊ, 1/3-W. |
| R8 | 30340 | Red-blue, .1 Ʊ, 1/3-W. |
| R9 | 36250* | Wire wound, 1.15 Ω in 427-Q |
| R9 | 36240† | Wire wound, 1.03 Ω in 387 |

* A No. 37130 resistor (1.15 Ω) is supplied with set for use with a 3-V. dry "A" battery.
† A No. 37120 resistor (1.03 Ω) is supplied with set for use with a 3-V. dry "A" battery.

### MISCELLANEOUS

| Part No. | Name of Part |
|---|---|
| 21877 | I. F. T. shield |
| 22678 | R. F. T. shield |
| 22654 | I. F. T. shield cap |
| 25735 | Battery cable tag, F1082 |
| 25602 | Instruction and log card, F1072 |
| 25804 | Shipping container |
| 15213 | Tube shield |

### 387 SPEAKER No. 31700

| Part No. | Name of Part |
|---|---|
| 19465 | Diaphragm |
| 19918 | Magnet assembly |
| 23701 | Output transformer, less case |
| 23764 | Cable and plug |

### 427-Q SPEAKER No. 36400

| Part No. | Name of Part |
|---|---|
| 23863 | Speaker cable and plug assem. |

Ω=ohms. Ʊ=megohms. IND.=inductive. NI=non-inductive. W.=watt.

# ACTION OF ATWATER KENT Tune ♦ O ♦ Matic

A simple diagram of the Tune-O-Matic is shown on this page. It is NOT necessary to understand the circuit details in order to set up the Tune-O-Matic, but a few notes on the mechanical action are given below for your convenience.

The tuning motor is a shaded-pole induction type. The motor shaft rotates in only one direction, and the required forward and reverse drive for the variable condenser is secured by an ingenious and simple arrangement for tipping the motor, which is pivoted for this purpose. Tipping is accomplished by a solenoid and lever.

The motor drive shaft extends between two rubber-tired wheels, one large, and one small. When the solenoid is not energized, the motor drive shaft rests against the small wheel and the resulting motion drives the variable condenser in the direction from 540 to 1600 K. C. When the solenoid is energized, the motor is tipped so that its drive shaft rests against the large wheel, and the variable condenser is then driven in the direction from 1600 to 540 K. C.

The current that energizes the solenoid is controlled by a switch (mounted above the top rear of the variable condenser). This switch opens at 1600 K. C. and closes at 540 K. C. The switch is operated by a cam on the shaft of the variable condenser.

Eight adjustable discs are mounted on the shaft of the variable condenser, which is extended out in back of the condenser. Each disc has a small insulated sector on the rim. Each disc is held by spring tension to the shaft. Normally, the discs do not move with respect to the shaft, but by holding the front gear of the variable condenser, and using a special wrench which is furnished with Model 511, each disc may be rotated on its shaft so that the insulated sector is in the desired position. Between adjacent disc there is a spacer which is keyed to the shaft. This prevents the movement of any disc other than the one moved with the wrench.

Eight contact fingers are mounted at one side of the discs, each finger contacting with the rim of its corresponding disc.

The electrical action is briefly as follows:

Assume that we have one lead of station "G" plugged in the 4:30 jack and the switch is set to automatic.

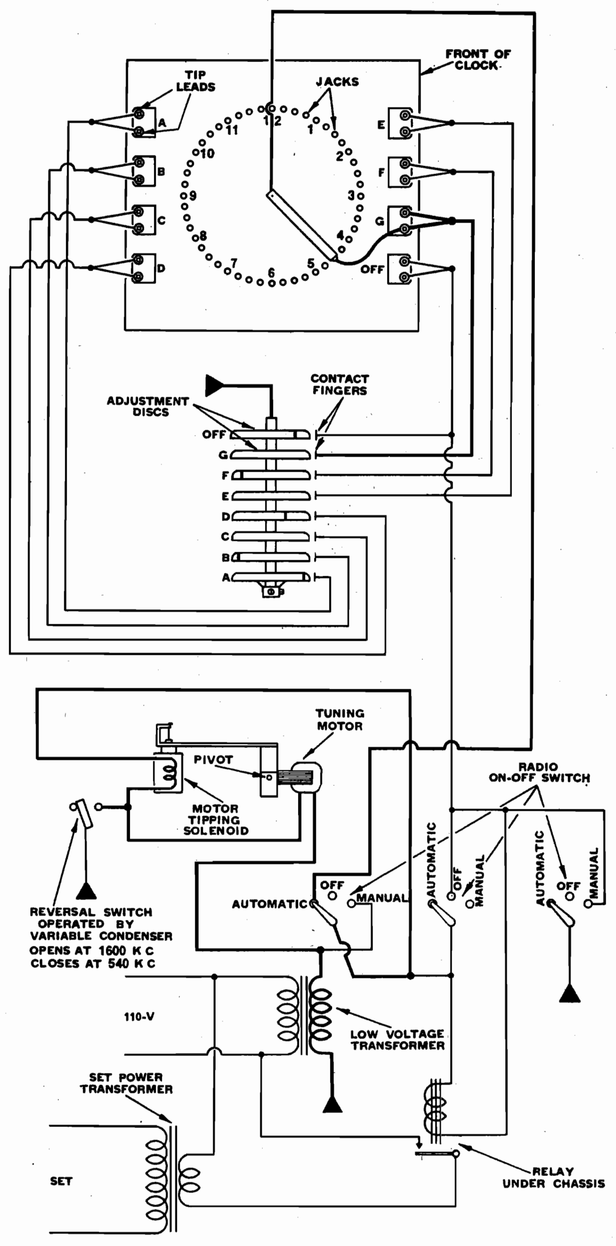
When the contact blade on the rear of the jack panel comes to the 4:30 jack, the electric circuit through the motor and solenoid is completed and the solenoid tips the motor shaft against the large rubber-tired wheel. The motor turns the variable condenser from the automatic-off position, near 1600 K. C., across the dial to the frequency of station "G".

When the motor reaches this point, the insulated sector of disc "G" has come under its contact finger and the circuit, from the finger through the disc to ground, is broken. This cuts the high-impedance relay into the motor circuit and reduces the current through the motor and solenoid to such a low value that the motor stops turning and the solenoid lever comes up, throwing the motor drive shaft against the small rubber-tired wheel which acts as a mechanical brake, bringing the motor to a dead stop on station "G" Simultaneously, the relay has completed the 110-volt circuit to the set power transformer and the set, now tuned to station "G", begins to operate.

Now plug one of the "off" leads into the 4:45 jack. When the contact finger moves off the 4:30 jack, the circuit through the relay is broken, the set is turned off, and the contact finger, now on the 4:45 jack, completes the circuit through the motor and solenoid, driving the condenser to 540 K. C., where a cam on the shaft trips the switch, thus cutting out the solenoid, and the motor tips back against the small rubber-tired wheel, driving the condenser back in the opposite direction to 1600 K. C.

Beyond the 1600 K. C. end of the dial, the cam on the variable condenser shaft again trips the switch, which opens, and the solenoid, being energized, tips the motor shaft against the large wheel, starting the condenser moving back. But at 1600 K. C. the insulated sector of the "off" disc comes under its contact finger, breaking the circuit and stopping the motor. **In the off position, NO CURRENT IS DRAWN BY THE SET;** the only current is the small amount required by the electric clock.

Inspection of the diagram will show that the jack panel is shorted out by the switch when the condenser is moving from 540 to 1600 K. C. For greatest accuracy all tuning is done while the condenser is moving from 1600 to 540 K. C.



MODEL 511 Tun-O-Matic Data

ATWATER-KENT MFG. CO.

# SETTING UP THE Tune♦O♦Matic

The Tune-O-Matic mechanism should be adjusted by the dealer in his store, and not in the customer's house. If the customer indicates his choice of seven different stations, the dealer should adjust the Tune-O-Matic for these seven stations. If the choice is left to the dealer, he should select the seven strongest and most reliable stations. In any case, do not select a weak station, a station with pronounced fading habits, nor a station that has interference; such stations can be received better with manual tuning.

1. Make a list of the seven desired stations, listing them numerically by frequency, and mark the call letters of the seven stations on the station index plates at the front of the clock unit, beginning at the top of the left-hand row and working down the left hand row, then to the top of the right-hand row and working down the right-hand row. The bottom index plate on the right-hand row is marked "OFF". Each celluloid plate has two spring-return tip-jack leads. There are two leads for each of the seven stations and two "off" leads.

2. Remove the small cover at center rear of chassis. This cover is held by two screws and encloses eight adjustment discs and eight corresponding contact fingers. (The disc nearest the front of the set is the "off" disc and it is adjusted at the factory to a point beyond the 1600 K.C. end of the dial.

3. Turn the tone control extreme right (high pitch), and turn the on-off switch to the "manual" position (right). Tune in the first station on the list; we will refer to this as station "A".

4. Without disturbing the tuning, firmly grasp the dial gear at front of variable condenser in one hand and move the **rear** disc, by means of special wrench furnished with set, until the rear contact finger is on the small insulated sector of the rear disc.

The wrench is designed to fit loosely on the rim of the disc in order that it may be moved easily to any desired point on the rim. In using the wrench to move the disc, it is necessary to press against the wrench in such a way that the wrench grips the rim of the disc, and then press slowly but firmly in moving the disc.

If you have not held the dial gear securely while turning the disc, the set may have detuned slightly. (Detuning is most readily noticed when the tone control is set at high pitch). In this case retune the station carefully and readjust the rear disc.

5. Plug one of the top left-hand pair of tip leads into the jack at which the HOUR hand points or has just passed. **Note that the clock is marked in 15-minute intervals, not in minutes.** Turn on the on-off switch to "automatic" (left) and tune off the station. This will cause the set to shut off and start the Tune-O-Matic motor. Allow the automatic mechanism to bring the pointer back to the station, at which point the motor will stop and the set will be turned on. After the tubes have heated and the station comes in, note whether the station is correctly tuned in. If the station is not tuned in correctly, a slight readjustment of the disc in the correct direction is necessary. Again throw the station off tune and repeat the procedure if necessary.

6. Proceed with the 2nd station as outlined in paragraphs numbered 4 and 5, above, but adjust the 2nd disc from the rear and use one of the 2nd pair from the top left row of tip leads to plug into the jack at which the hour hand points.

7. Adjust for the remaining stations in the same way, noting that the adjustment discs and the corresponding pairs of tip leads shown on page 1 of customer's instructions are as follows:

Rear disc................(Station "A").
2nd from rear disc (Station "B").
3rd from rear disc (Station "C").
4th from rear disc (Station "D").
5th from rear disc (Station "E").
6th from rear disc (Station "F").
7th from rear disc (Station "G").
Front disc (OFF). This is set at factory.

## ADDITIONAL AUTOMATIC "OFF" POSITIONS

If more than two automatic "off" positions are required, it is possible to obtain two additional "off" positions by using one of the seven station discs for this purpose.

Use the 2nd disc from the front and adjust it so its insulated sector is in the same position as the front or regular "off" disc. Mark "OFF" on the index plate directly above the regular "off" plate.

This arrangement provides selection of six different stations with four automatic "OFF" positions.

## ADDITIONAL STATION LEADS

If seven good stations are not continuously available, it is necessary to double up on the good stations. Use two adjacent discs for each good station, marking the index plates to correspond.

# INSTALLING ATWATER KENT REMOTE CONTROL ON MODEL 511 Tune♦O♦Matic

The Atwater Kent remote control consists of a small control box with a ten-point switch and illuminated switch dial. Seven of these ten points are used to select the seven different stations for which the Tune-O-Matic has been previously adjusted. There are **two** "off" points (one at each end of the switch movement), and one point marked "time" which restores the set to automatic time operation.

THE SWITCH ON THE CONTROL UNIT MUST BE PLACED IN THE "TIME" POSITION WHEN IT IS DESIRED TO HAVE THE SET TUNE AUTOMATICALLY.

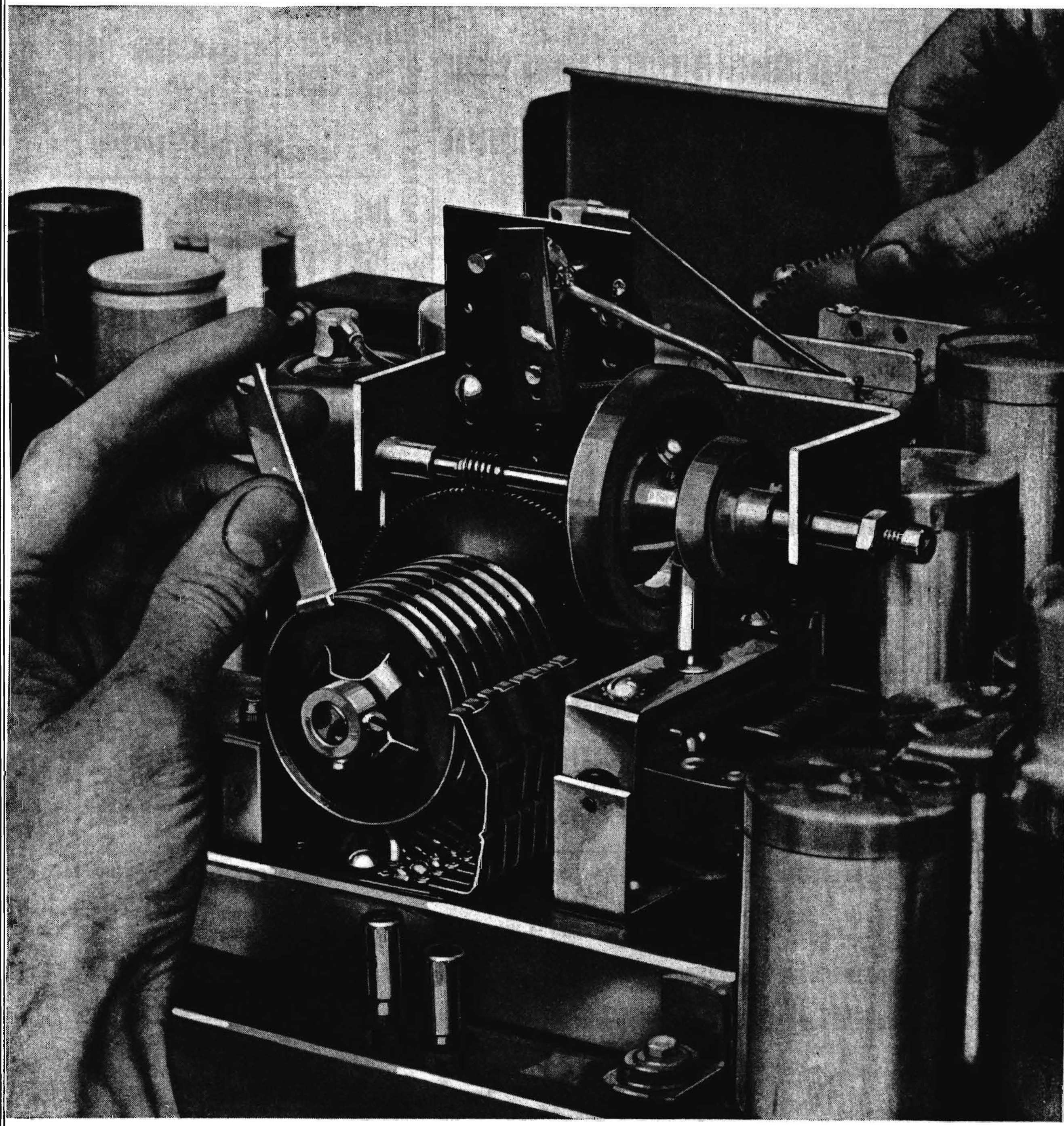
The remote control has 25 feet of cable so the control unit may be placed across the room or in an adjoining room from the set.

The other end of the remote control cable has a multi-prong socket and plug. Attach the socket to the left-rear side of the cabinet by means of the two screws furnished with the unit.

Remove the plug of the Tune-O-Matic clock unit from the socket at top-left of chassis and insert it in the socket which you have just fastened to rear of cabinet. Then insert the plug at end of remote control unit into the socket on top of chassis.

This control unit does not have a volume control, but Model 511 has a super-automatic volume control circuit which ensures constant volume level from one station to another.

# SETTING UP THE Tune • O • Matic



ADJUSTING REAR DISC WITH SET TUNED TO STATION "A"

# ATWATER-KENT MFG. CO.

## TUBULAR FIXED CONDENSERS
(By Part Numbers)

| Part No. | Value | Type† | Voltage | Superseded by | Code No. printed on late type condensers |
|---|---|---|---|---|---|
| 24509 | .01 & .01 | IND. | 200 | 31190 | ... |
| 26550 | .5 | NI | 200 | ..... | 219 |
| 26660 | .1 | NI | 200 | ..... | 213 |
| 26820 | .05 | NI | 200 | ..... | 208 |
| 27234 | .5 | NI | 200 | 26550 | ... |
| 27434 | .008, .03 | IND. | 450 | ..... | 417 |
| 27619 | .008, .02 | IND. | 450 | ..... | 418 |
| 27630 | .01 | IND. | 200 | ..... | 203 |
| 28040 | .005 | IND. | 200 | ..... | 201 |
| 28130 | .0005 | IND. | 450 | ..... | 402 |
| 29030 | .02 | NI | 450 | ..... | 410 |
| 29530 | .03 | NI | 200 | ..... | 206 |
| 29890 | .005 | IND. | 450 | ..... | 408 |
| 29910 | .015 | NI | 450 | ..... | 414 |
| 30240* | 250 MMF | IND. | 450 | 33620 | ... |
| 30250 | .025 | NI | 450 | ..... | 411 |
| 30670 | 250 MMF | IND. | 450 | 33620 | ... |
| 31140 | 250 MMF Double | IND. | 450 | 33630 | ... |
| 31150 | .3 | NI | 100 | ..... | 104 |
| 31160 | .05 | NI | 100 | ..... | 101 |
| 31190 | .01 & .01 | IND. | 200 | ..... | 220 |
| 31330 | 250 MMF Double | IND. | 450 | 33630 | ... |
| 31510 | .5 | NI | 100 | ..... | 105 |
| 31520 | .2 | NI | 100 | ..... | 103 |
| 31530 | .1 | NI | 100 | ..... | 102 |
| 31540 | .001 | IND. | 450 | 33640 | ... |
| 31890 | .05, .05, .5 | IND. | 100 | 31920 | ... |
| 31910 | .1, .1, .2 | IND. | 100 | 31930 | ... |
| 31920 | .05, .05, .5 | IND. | 100 | ..... | 110 |
| 31930 | .1, .1, .2 | IND. | 100 | ..... | 111 |
| 32350 | .05, .05, .2 | IND. | 200 | 32390 | ... |
| 32360 | 05, .05, .05 | IND. | 100 | 32410 | ... |
| 32370 | .0022 | IND. | 450 | 33660 | ... |
| 32390 | .05, .05, .2 | IND. | 200 | ..... | 222 |
| 32410 | .05, .05, .05 | IND. | 100 | ..... | 107 |
| 32420 | .0022 | IND. | 450 | 33660 | ... |
| 32750 | .2, .1 | IND. | 100 | ..... | 106 |
| 32760 | .2, .1 | IND. | 100 | 32750 | ... |
| 32810 | .01 | NI | 450 | ..... | 409 |
| 33620 | 250 MMF | IND. | 450 | ..... | 401 |
| 33630 | 250 MMF Double | IND. | 450 | ..... | 413 |
| 33640 | .001 | IND. | 450 | ..... | 403 |
| 33660 | .0022 | IND. | 450 | ..... | 405 |
| 34020 | .05 & 250 MMF | IND. | 200 | ..... | 221 |
| 35420 | .08 | NI | 200 | ..... | 212 |
| 35760 | .003 | IND. | 450 | ..... | 407 |
| 35780 | .2, .1, .05, .05, .05, .3 | IND. | 100 | 35790 | ... |
| 35790 | .2, .1, .05, .05, .05, .03 | IND | 100 | ..... | 108 |
| 35930 | .25 | NI | 200 | ..... | 215 |
| 36420 | .02 | IND. | 200 | ..... | 205 |
| 36440 | .1, .1, .05 | IND. | 100 | ..... | 109 |
| 36450 | .05, .05, .005, .005 | IND. | 200 | ..... | 223 |
| 36490 | .05 | NI | 450 | ..... | 412 |
| 36650 | .0015 | IND. | 450 | ..... | 404 |
| 36660 | .0025 | IND. | 450 | ..... | 406 |
| 36670 | .007 | IND. | 200 | ..... | 202 |
| 36680 | .015 | IND. | 200 | ..... | 204 |
| 36690 | .04 | NI | 200 | ..... | 207 |
| 36710 | .055 | NI | 200 | ..... | 209 |
| 36720 | .065 | NI | 200 | ..... | 210 |
| 36730 | .07 | NI | 200 | ..... | 211 |
| 36740 | .2 | NI | 200 | ..... | 214 |
| 36750 | .27 | NI | 200 | ..... | 216 |
| 36760 | .3 | NI | 200 | ..... | 217 |
| 36770 | .4 | NI | 200 | ..... | 218 |
| 38160 | .03, .015, .008 | IND. | 450 | ..... | 415 |
| 38260 | .001, .004, .008 | IND. | 450 | ..... | 416 |
| 39650 | .004, .001 | IND. | 450 | ..... | 419 |

† Condensers designated as inductive (IND.) are constructed in such a way that the current must travel through one or more turns of the tin-foil plates in order to reach the ends of the plates. Such condensers have a slight inductive effect and are primarily used as low-frequency bypasses where the effect of this slight inductance is negligible.

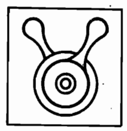
Condensers designated as non-inductive (NI) are constructed in such a way that the current reaches the entire area of the plates without having to pass through any turns of the plates. Non-inductive condensers are used as high-frequency bypasses.

## TUBULAR FIXED CONDENSERS
(By Code Numbers)

| Code No. printed on late type condensers | Part No. | Value | Type† | Voltage |
|---|---|---|---|---|
| 101 | 31160 | .05 | NI | 100 |
| 102 | 31530 | .1 | NI | 100 |
| 103 | 31520 | .2 | NI | 100 |
| 104 | 31150 | .3 | NI | 100 |
| 105 | 31510 | .5 | NI | 100 |
| 106 | 32750 | .2, .1 | IND. | 100 |
| 107 | 32410 | .05, .05, .05 | IND. | 100 |
| 108 | 35790 | .2, .1, .05, .05, .05, .03 | IND. | 100 |
| 109 | 36440 | .1, .1, .05 | IND. | 100 |
| 110 | 31920 | .05, .05, .5 | IND. | 100 |
| 111 | 31930 | .1, .1, .2 | IND. | 100 |
| 201 | 28040 | .005 | IND. | 200 |
| 202 | 36670 | .007 | IND. | 200 |
| 203 | 27630 | .01 | IND. | 200 |
| 204 | 36680 | .015 | IND. | 200 |
| 205 | 36420 | .02 | IND. | 200 |
| 206 | 29530 | .03 | NI | 200 |
| 207 | 36690 | .04 | NI | 200 |
| 208 | 26820 | .05 | NI | 200 |
| 209 | 36710 | .055 | NI | 200 |
| 210 | 36720 | .065 | NI | 200 |
| 211 | 36730 | .07 | NI | 200 |
| 212 | 35420 | .08 | NI | 200 |
| 213 | 26660 | .1 | NI | 200 |
| 214 | 36740 | .2 | NI | 200 |
| 215 | 35930 | .25 | NI | 200 |
| 216 | 36750 | .27 | NI | 200 |
| 217 | 36760 | .3 | NI | 200 |
| 218 | 36770 | .4 | NI | 200 |
| 219 | 26550 | .5 | NI | 200 |
| 220 | 31190 | .01, .01 | IND. | 200 |
| 221 | 34020 | .05, 250 MMF | IND. | 200 |
| 222 | 32390 | .05, .05, .2 | IND. | 200 |
| 223 | 36450 | .05, .05, .005, .005 | IND. | 200 |
| 224 | 27234 | .5 | NI | 200 |
| 401 | 33620 | 250 MMF | IND. | 450 |
| 402 | 28130 | .0005 | IND. | 450 |
| 403 | 33640 | .001 | IND. | 450 |
| 404 | 36650 | .0015 | IND. | 450 |
| 405 | 33660 | .0022 | IND. | 450 |
| 406 | 36660 | .0025 | IND. | 450 |
| 407 | 35760 | .003 | IND. | 450 |
| 408 | 29890 | .005 | IND. | 450 |
| 409 | 32810 | .01 | NI | 450 |
| 410 | 29030 | .02 | NI | 450 |
| 411 | 30250 | .025 | NI | 450 |
| 412 | 36490 | .05 | NI | 450 |
| 413 | 33630 | 250 MMF Double | IND. | 450 |
| 414 | 29910 | .015 | NI | 450 |
| 415 | 38160 | .03, .015, .008 | IND. | 450 |
| 416 | 38260 | .001, .004, .008 | IND. | 450 |
| 417 | 27434 | .008, .03 | IND. | 450 |
| 418 | 27619 | .008, .02 | IND. | 450 |
| 419 | 39650 | .004, .001 | IND. | 450 |

* In models where No. 30240 is used as a diode coupling condenser and mounted inside an I. F. transformer assembly, use No. 33670 (small mica type) for replacement. The No. 33620 condenser, which normally supersedes No. 30240, is too large for mounting inside the I. F. transformer shield.

## SMALL BUTTERFLY CONDENSERS
(500 Volts)
(Illustration is full size)



| Part No. | Color | Angle Between Lugs | Rated Capacity |
|---|---|---|---|
| 25661 | Green | 180° | 8 MMF |
| 34460 | Bl'k | 77° | 10 MMF |
| 34470 | Red | 123° | 14 MMF |
| 36220 | Blue | 123° | 7 MMF |
| 36230 | Blue | 123° | 7 MMF |
| 38280 | Gray | 123° | 4 MMF |

## 1/3, 1/2, 1, and 2 WATT TUBULAR RESISTORS
(When replacing a tubular resistor, use a resistor of the same value and size)


These four illustrations are full size.

| RESISTANCE IN OHMS | IDENTIFYING COLOR | 1/3 WATT SIZE | 1/2 WATT SIZE | 1 WATT SIZE | 2 WATT SIZE |
|---|---|---|---|---|---|
| 165 | Blue, Gray and Yellow | 41330 | — | — | — |
| 200 | Blue, Yellow and Red | — | 37690 | — | — |
| 300 | Maroon and Blue | — | 37530 | — | 31490 |
| 425 | Blue, Yellow and Green | — | 37540 | — | — |
| 500 | Blue, Red and Green | 39790 | — | 32010 | — |
| 1,100 | Black, Red and Blue | 31480 | — | — | — |
| 1,500 | Black and Green | 37710 | — | — | — |
| 2,000 | Blue | 33250 | — | — | — |
| 2,500 | Gray, Red and Green | 39130 | — | — | — |
| 3,300 | Green and Red | 30380 | 26410 | 19346 | — |
| 4,000 | Green and Blue | — | — | 18049 | — |
| 5,000 | Blue and Yellow | 36430 | 28050 | — | — |
| 6,000 | Purple | — | — | 20151 | 28770 |
| 7,500 | Yellow | — | — | 15544 | — |
| 10,000 | Maroon | 30320 | 20950 | 15545 | 27210 |
| 12,500 | Purple and Yellow | — | — | 15941 | — |
| 15,000 | Gray and Yellow | — | 20960 | 22211 | 27220 |
| | Gray and Green | — | — | 21784 | — |
| 20,000 | Black and Red | 30390 | 23120 | 15891 | 28030 |
| 30,000 | Gray | 31840 | 20970 | 15285 | 29710 |
| 40,000 | White | — | 26160 | 16724 | 28750 |
| 50,000 | Black, Yellow and Red | 30330 | — | 22407 | 34340 |
| 65,000 | Black | 31980 | 21040 | 15592 | — |
| 100,000 | Red and Blue | 30340 | 20980 | 16282 | 28760 |
| 150,000 | Black and Yellow | — | — | 28864 | — |
| 250,000 | Red and Yellow | 31970 | 20920 | 19581 | — |
| 500,000 | Black and Purple | 30350 | 20930 | 19649 | — |
| 800,000 | Red and Gray | — | 23130 | 20223 | — |
| 900,000 | Green and Yellow | — | 23170 | — | — |
| 1,000,000 | Blue and Gray | 30360 | 21050 | — | — |
| 2,000,000 | Green | 30370 | 20940 | 15892 | — |

## PARTS NUMBERS OF KNOBS

| Model No. | Vol. Control knob | Station Selector, dial or tuning knob | Tone control knob | Frequency range switch knob | Silencing switch knob |
|---|---|---|---|---|---|
| 112 | 27728§ | 27728§ | 27494§ | 27358§ | 26571‡ |
| 145 | 27496‡ | 24278* / 27498† | 27495§ | 26569§ | ..... |
| 206 | 27496‡ | 24278* / 27498† | 27495§ | 26569§ | ..... |
| 318 | 27728§ | 27728§ | 27494§ | 27358§ | 26571‡ |
| 325 | 27496‡ | 24278* / 27498† | 27495§ | 26569§ | ..... |
| 447 | 27728§ | 27728§ | 27494§ | 27358§ | 26571‡ |
| 511 | 26569§ | 26569§ | 27495§ | 26571‡ | 27495§ |
| 559 | 27728§ | 27728§ | 27494§ | 27358§ | 26571‡ |
| 825 | 27493‡ | 27493‡ | 26571‡ | 26571‡ | ..... |
| 944 | 27493‡ | 27493‡ | ..... | ..... | ..... |

## CABINET PARTS FOR CONSOLE SETS

| | | |
|---|---|---|
| 25925 | Wing nut | ................................ |
| 21142 | Washer | ................................ |
| 27704 | Clamp (small) | ................................ |
| 25742 | Clamp (large) | ................................ |
| 25746 | Clamp bolt | ................................ |

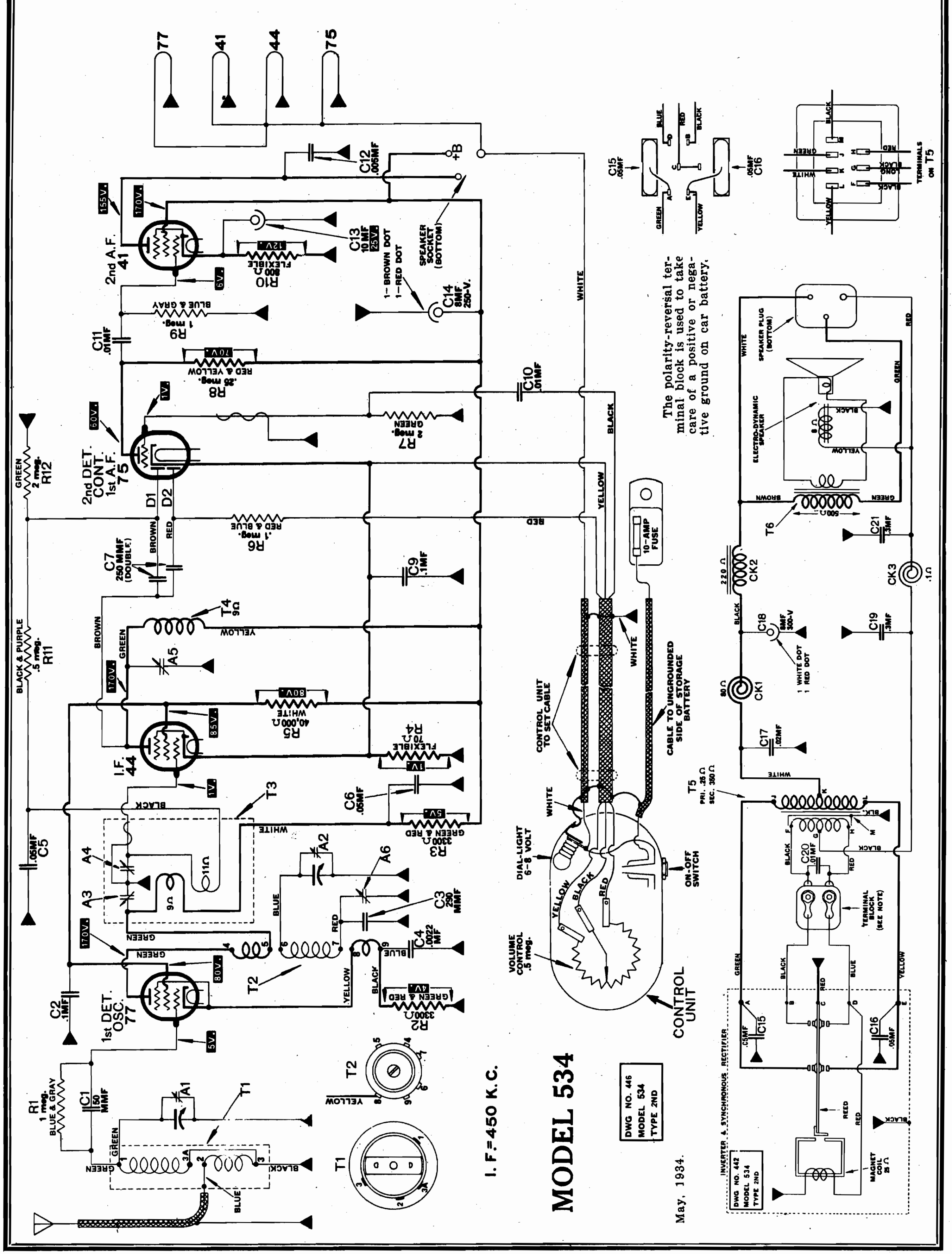
## COMPACT CABINET AND SCREEN NUMBERS

| Model Number | Cabinet Less Screen | Cabinet With Screen | Screen |
|---|---|---|---|
| 135 Z | ..... | 28831 | 27908 |
| 145 | 28839 | ..... | 27906 |
| 206 | 28834 | ..... | 27908 |
| 206-D | 28834 | ..... | 27908 |
| 447 | 28026 | ..... | 27904 |
| 465-Q | ..... | 28832 | 27907 |
| 768-Q | ..... | 28629 | 27904 |
| 825 | ..... | 28796 | 27902 |
| 944 | 28773 | ..... | 27892 |

* No. 24278 single knob (front). † No. 27498 single knob (back). ‡ No. 28114 knob spring, .012 thk. § No. 28115 knob spring, .015 thk.

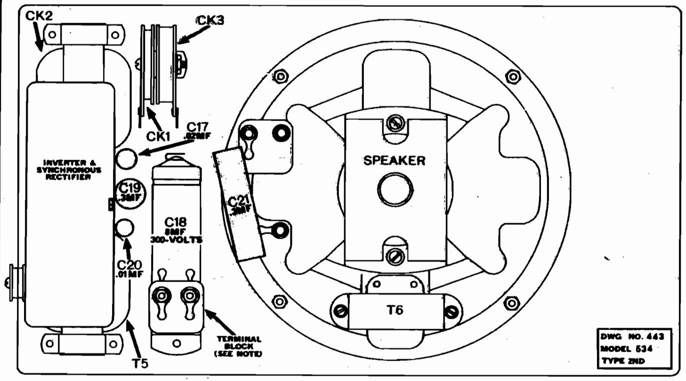
# ATWATER-KENT MFG. CO.

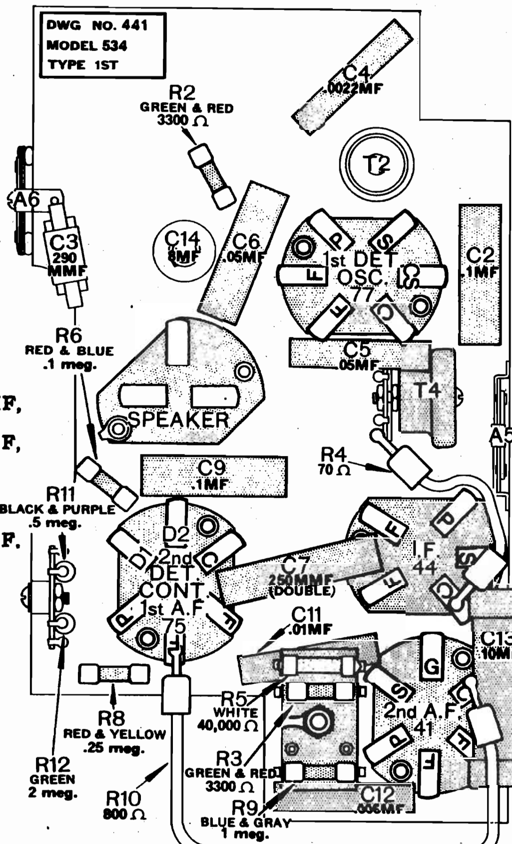
**MODEL 534 (2nd)**
**Schematic**



MODEL 534 (2nd)
Socket, Speaker, Parts
Trimmers

ATWATER-KENT MFG. CO.




# MODEL 534

| Part No. | Name of Part |
|---|---|
| 25655 | Set container |
| 25653 | Container cover |
| 25475 | Wire screen |
| 25482 | Set mounting bolt, 2½" x ⅜" |
| 24486 | Nut, ⅜" |
| 24485 | Lockwasher, ⅜" |
| 21143 | Plug suppressor |
| 21144 | Distributor suppressor |
| 23260 | Generator condenser, 1 MF, 200-V. |
| 23520 | Ignition filter |
| 25609 | Shield for No. 1 R. F. T. |
| 25441 | Shielded grid lead and cap |
| 25287 | Variable condenser assembly |
| 25406 | Station selector clamp |
| 25519 | Antenna cable, 24" |
| 21126 | Control pulley |
| 21127 | Control pulley spring |
| 25851 | Spring centering ring |

## TRANSFORMERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| T1 | 33710 | No. 1 R. F. T. |
| T2 | 33720 | Oscillator T. |
| T3 | 25651 | No. 1 I. F. T. |
| T4 | 33790 | No. 2 I. F. T. |
| T5 | 25371 | Power T. |
| T6 | 25606 | Output T. |

## RESISTORS

| Code No. | Part No. | Name of Part |
|---|---|---|
| R1 | 30360 | Blue-gray, 1 Ʊ, 1/3-W. |
| R2 | 30380 | Red-green, 3300 Ω, 1/3-W. |
| R3 | 30380 | Red-green, 3300 Ω, 1/3-W. |
| R4 | 15820 | Flexible, 70 Ω |
| R5 | 26160 | White, 40,000 Ω, ½-W. |
| R6 | 30340 | Red-blue, .1 Ʊ, 1/3-W. |
| R7 | 30370 | Green, 2 Ʊ, 1/3-W. |
| R8 | 31970 | Red-yellow, ¼ Ʊ, 1/3-W. |
| R9 | 30360 | Blue-gray, 1 Ʊ, 1/3-W. |
| R10 | 20120 | Flexible, 800 Ω |
| R11 | 30350 | Bl'k-purple, .5 Ʊ, 1/3-W. |
| R12 | 30370 | Green, 2 Ʊ, 1/3-W. |

## CONDENSERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| C1 | 30260 | 50 MMF, letter E stamped on washer, 450-V. |
| C2 | 31530 | .1 MF, 100-V., NI |
| C3 | 33680 | 290 MMF, 100-V. |
| C4 | 33660 | .0022 MF, 450-V., IND. |
| C5 | 31160 | .05 MF, 100-V., NI |
| C6 | 26820 | .05 MF, 200-V., NI |
| C7 | 33630 | Double 250 MMF, 450-V., IND. |
| C9 | 31530 | .1 MF, 100-V., NI |
| C10 | 23250 | .01 MF, 450-V. |
| C11 | 27630 | .01 MF, 200-V., IND. |
| C12 | 28040 | .005 MF, 200-V., IND. |
| C13 | 25379 | Dry electrolytic, 10 MF, 25-V. |
| C14 | 25385 | Dry electrolytic, 8 MF, 250-V. |
| C15 | 33070 | .05 MF, 450-V. |
| C16 | 33070 | .05 MF, 450-V. |
| C17 | 29030 | .02 MF, 450-V., NI |
| C18 | 25384 | Dry electrolytic, 8 MF, 300-V. |
| C19 | 31150 | .3 MF, 100-V., NI |
| C20 | 27630 | .01 MF, 200-V., IND. |
| C21 | 31150 | .3 MF, 100-V., NI |

## TRIMMER CONDENSERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| A3, 4 | 32880 | Double I. F. trimmer |
| A5 | 24495 | Single I. F. trimmer |
| A6 | 31870 | Single trimmer |

## CHOKES

| Code No. | Part No. | Name of Part |
|---|---|---|
| CK1 | 17015 | R. F. "B" filter choke |
| CK2 | 33450 | A. F. filter choke |
| CK3 | 23530 | R. F. "A" filter choke |

## SOCKETS

| Part No. | Name of Part |
|---|---|
| 24493 | 5 prong |
| 25196 | 3 prong |
| 24494 | 6 prong |
| 23147 | Fuse |

## POWER UNIT SUPPLY

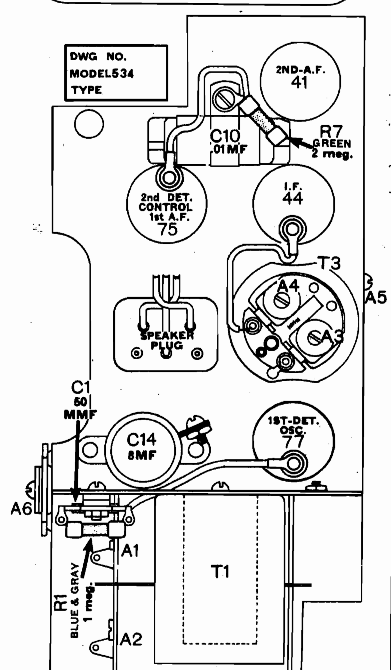
| Part No. | Name of Part |
|---|---|
| 25595 | Vibrator assembly |
| 25563 | Connector card, female |
| 25564 | Connector card and bracket, male |
| 25344 | Insulator (fish paper) |

## MISCELLANEOUS PARTS

| Part No. | Name of Part |
|---|---|
| 21406 | Fuse, 10 amp. |
| 25658 | Shipping container |
| 20976 | Lockswitch key |

## REMOTE CONTROL UNIT

| Part No. | Name of Part |
|---|---|
| 33430 | Remote control unit complete |
| 21496 | Volume control, .5 Ʊ |
| 21325 | Volume control knob |
| 24169 | Dial knob |
| 21491 | Lockswitch |
| 21407 | Dial lamp (6-8 volts, ¼ amp.) |
| 25483 | Remote control unit to set cable, 4' |
| 26179 | Station selector cable, 4' 11" |
| 26181 | Station selector cable sheathing, 4' |
| 25492 | Shielded lead to ungrounded side of battery, 6' 6" |




| | |
|---|---|
| 25266 | Escutcheon |
| 26173 | Dial |

## 534 SPEAKER

| Part No. | Name of Part |
|---|---|
| 25534 | Speaker complete |
| 25603 | Conehead assembly |
| 25605 | Field coil, 8 Ω |
| 25606 | Output transformer (T6) |
| 25403 | Speaker cable and plug |
| 25652 | Cloth cover |

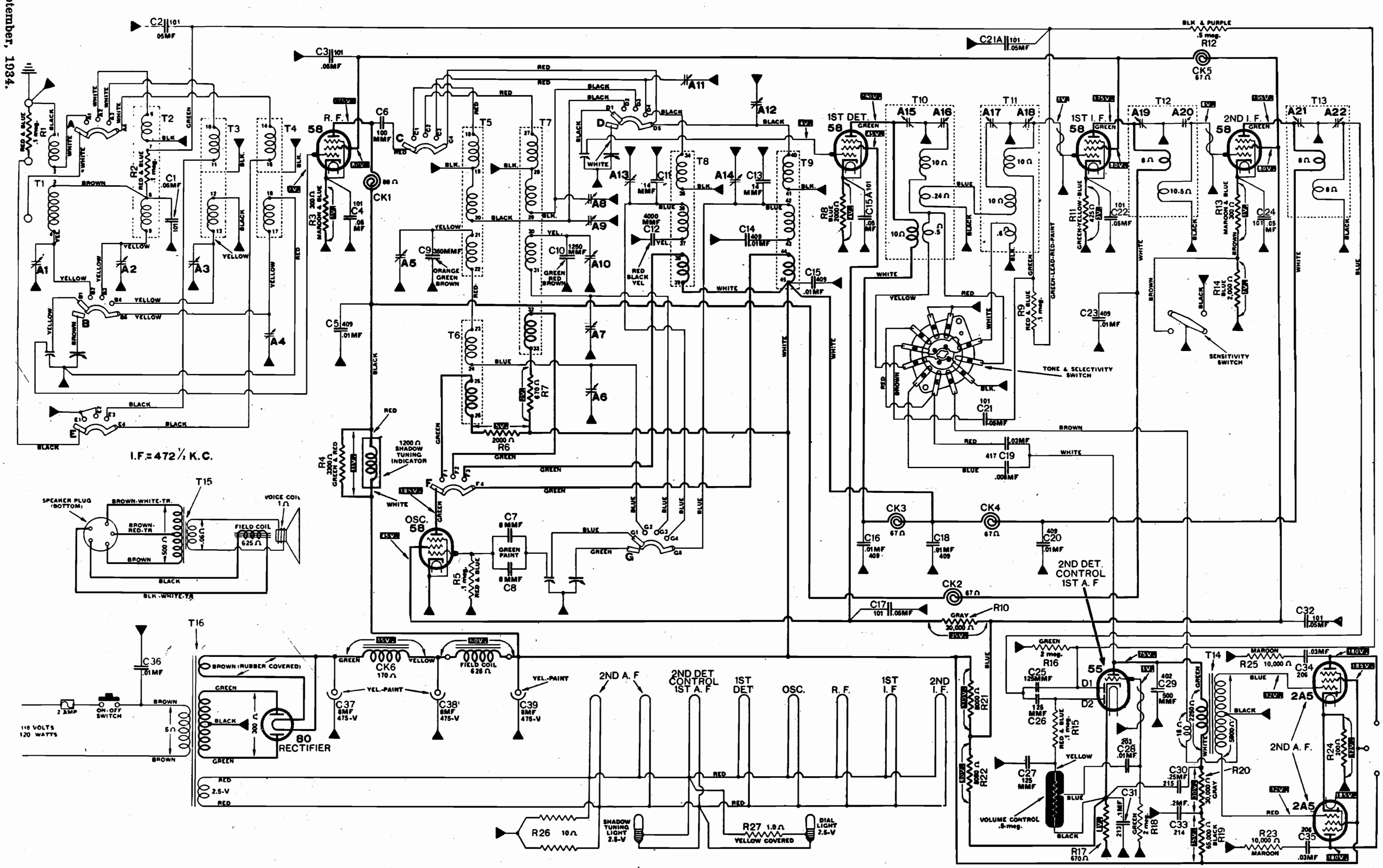
MODEL 559
Schematic

# ATWATER-KENT MFG. CO.

## MODEL 559

Switch in highest frequency position

For Alignment See Index



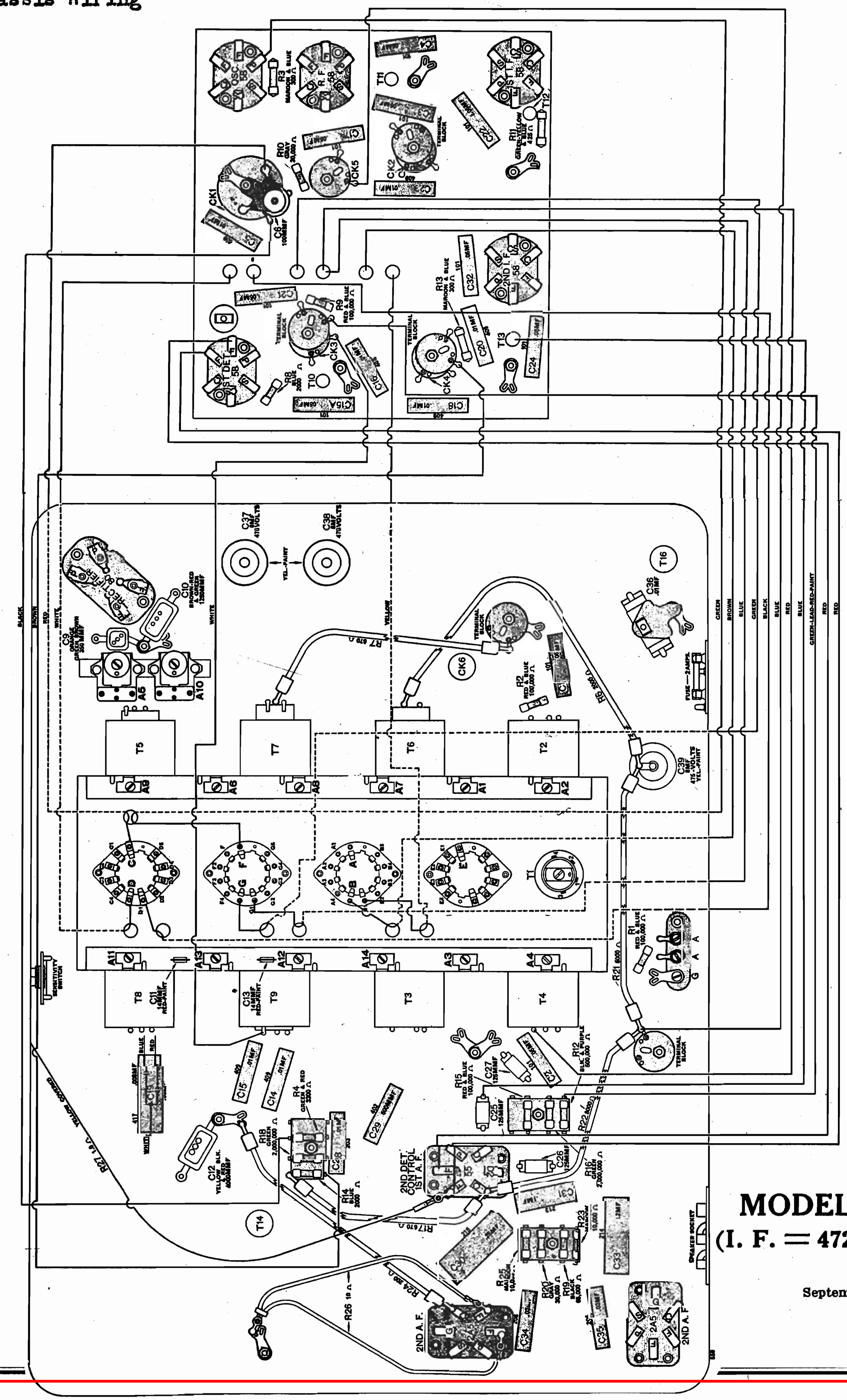

Voltage measurements were made with sensitivity switch at "local." The R. F. and I. F. circuit of Model 112 is the same as Model 559.

September, 1934.

MODEL 559
Chassis Wiring

# ATWATER-KENT MFG. CO.

Switch in highest frequency position




This view shows the connections between the top unit and the main base.

For Alignment Data, Socket Layout and Parts List, See Index

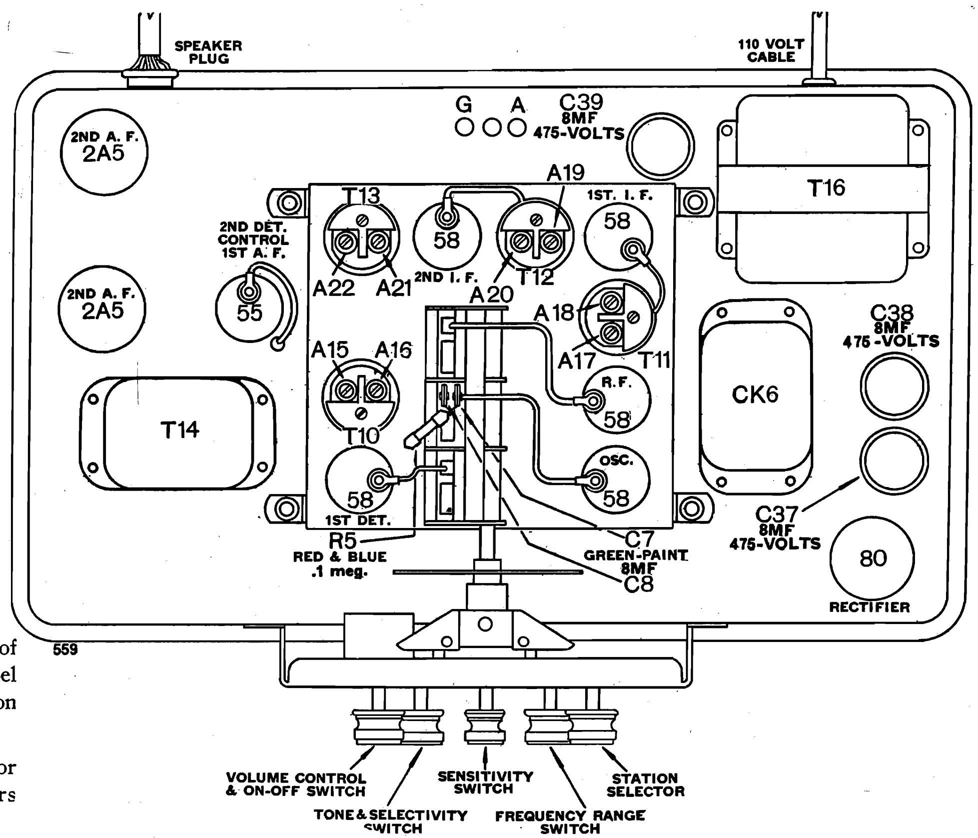
## MODEL 559
(I. F. = 472½ KC.)

September, 1934.

MODEL 559
Socket,Trimmers
Alignment Notes (1)
Balancing Gadget

ATWATER-KENT MFG. CO.

# TOP VIEW MODEL 559




The location of trimmers on Model 112 is the same on Model 559.

Refer below for names of trimmers on these models.

**R. F. TRIMMERS ON MODELS 112 AND 559**

| | 10-18 MC Range | 4-10 MC Range | 1.5-4 MC Range | 540-1600 KC Range |
|---|---|---|---|---|
| R. F. | A4 | A3 | A2 | A1 |
| 1st-Detector | A12 | A11 | A8 | A9 |
| Oscillator | A14 | A13 | A7 | A6 |
| Tracking | None | None | A10 | A5 |

The I. F. trimmers are A15 to A22, inclusive.

# ADJUSTING TRIMMER CONDENSERS

**EQUIPMENT.**

1. OSCILLATOR. The oscillator should extend from the lowest I. F. frequency (125 KC in Atwater Kent sets) to at least 18 MC. The oscillator should have a good attenuator and should be well shielded. If the oscillator is not well shielded, it may be difficult to peak the pre-selector trimmers on some models, owing to pick-up by the 1st-detector grid circuit. In general, it is advisable to connect an .00025MFD fixed condenser in series with the oscillator pick-up lead at the antenna terminal of the set.

2. OUTPUT METER. Use a sensitive output meter and keep the radio volume control turned on full volume. This is necessary to minimize the effect of the automatic-volume-control action of the set which would otherwise prevent sharp peaking of the trimmers.

3. BALANCING UNIT. Build two of the Type "A" balancing units and one of the I. F. coupling units shown on right. These are required for correct adjustment of Atwater Kent super-heterodynes. The Type "B" balancing unit, also described, is used on earlier models of Atwater Kent sets.

4. Use a non-metallic screw driver for adjustment of the trimmers.

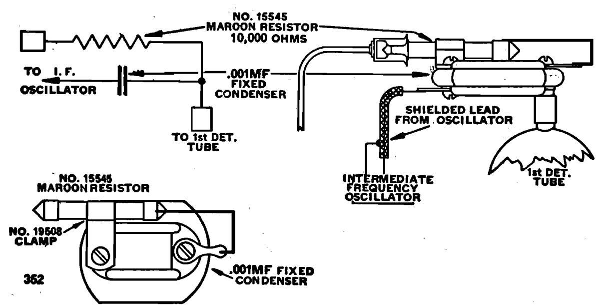



Fig. 1. I. F. Coupling unit.

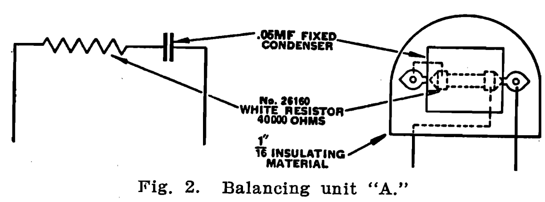



Fig. 2. Balancing unit "A."

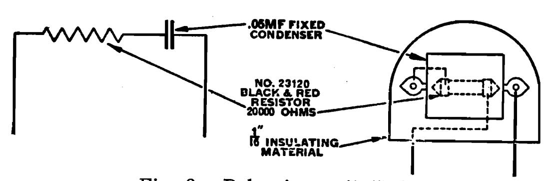



Fig. 3. Balancing unit "B."

MODEL 112,559
Alignment
MODEL 145,325
Alignment
General Alignment

ATWATER-KENT MFG. CO.

## ADJUSTING TRIMMER CONDENSERS (Contd.)

### GENERAL NOTES.

1. Do not make any trimmer adjustments and do not disturb the dial gear or the dial indicator adjustments unless absolutely necessary.

2. With all-wave sets, it is very desirable to use a test oscillator that extends to 18 MC (18,000 KC). If you attempt to use harmonics of a broadcast oscillator, you are likely to use the wrong harmonic and set the trimmers incorrectly.

3. When using a test oscillator, you will experience "double-spot" or image reception, particularly on the highest frequency range of the set. The double-spot point is twice the I. F. frequency below the correct point. For instance, if a set has an I. F. frequency of 472½ kilocycles, and you are tuning in an 18 MC signal, the double-spot or image will be twice 472½ or 945 KC (.94 MC) below 18. In such a case you will hear the signal at 18 MC and also at 17.06 MC. In properly aligned sets of six tubes or more, the image should be weaker than the desired signal.

4. Because of the facts mentioned in paragraphs 2 and 3 above, it is very desirable, wherever possible, first to check the short-wave dial calibration and determine how far, and in what direction, the readings are "off." This should be done on actual reception of short-wave stations of known frequency. This pre-checking will assist you in selecting the correct harmonic (in case you are using a broadcast oscillator), and it will also minimize possibility of confusing the correct signal and the image signal.

5. On oscillator trimmers there may be two different settings at which the signal is received. Always use the *first* of these two positions as you screw the trimmer in from a loose or minimum-capacity position. THIS IS IMPORTANT.

6. On sets with a combined oscillator and 1st-detector tube, tune the set to a quiet point near 1,000 KC while adjusting the I. F. trimmers.

### OSCILLATOR GOVERNS DIAL ACCURACY.

It is essential to understand definitely that in a super-heterodyne the dial calibration depends on the oscillator circuit of the set, providing that the I. F. trimmers are correctly aligned. The pre-selector (R. F. and 1st-detector) trimmers do not affect the dial calibration but simply affect sensitivity.

If the dial calibration of one or more of the frequency ranges of the set is "off", check the oscillator trimmer, the oscillator tracking condenser and tracking trimmer, and the oscillator transformer for the particular range or ranges in question.

The oscillator **trimmer** is used to adjust the **high-frequency** end of the particular range.

The oscillator **tracking condenser** adjusts the **low-frequency** end of the particular range.

In Atwater Kent sets the fixed tracking condenser on the broadcast range (and in some models also on the police range) is shunted with an adjustable tracking trimmer condenser. The adjustable tracking trimmer condenser is not used on the high-frequency ranges.

The adjustment of the trimmers for the high-frequency and low-frequency end of a particular range is slightly interlocking. For example, assume that the broadcast range of a set is off calibration. First turn the tuning knob so the dial pointer is at 1500 KC and, using a 1500 KC signal, peak the broadcast oscillator trimmer. Then turn the set to 560 KC and, using a 560 KC signal, peak the oscillator broadcast tracking trimmer for maximum output. This adjustment will have slightly affected the previous adjustment at 1500 KC so it will be necessary to repeat the adjustment at 1500 KC and also possibly at 560 KC.

If adjustment of the oscillator trimmer and the oscillator tracking trimmer does not correct the dial readings, it may be necessary to replace the fixed oscillator tracking condenser or the oscillator transformer for that particular range.

Naturally, the I. F. trimmers should be checked, and adjusted if necessary, before any attempt is made to align the R. F. or oscillator trimmers.

### GENERAL PROCEDURE.

First check the I. F. trimmers. If reception is satisfactory and the dial calibration is correct on the broadcast range, it is safe to assume that the I. F. trimmers are correctly adjusted.

If the dial calibration is "off" (or the set is weak) on only one range, adjust the trimmers for that range only. If this does not correct the trouble, inspect the resistors, condensers, transformers, and switch contacts associated with that particular range.

In checking a set, do not disturb the position of the wiring any more than necessary.

## MODELS 112 AND 559

### I. F. TRIMMERS.

Connect an I. F. test oscillator to the 1st-detector tube by means of the I. F. coupling unit shown in Fig. 1. Adjust the I. F. oscillator to 472½ KC. Connect a sensitive output meter to the set. Use the weakest possible oscillator signal that will give a reading on the output meter with the radio volume control on full. **Put tone control in 2nd-position from right.**

Put balancing unit A (shown in Fig. 2) across trimmer A21 and peak A22.

Put unit A across A22 and peak A21.

Put unit A across A19 and peak A20.

Put unit A across A20 and peak A19.

Put one unit A across A17 and another unit A across A15; peak A18 and A16.

Put one unit A across A18 and another unit A across A16; peak A17 and A15.

In case of instability while adjusting A21 and A22, place an extra balancing unit A across A18.

Remove the I. F. coupling unit and the balancing units and seal the trimmer screws.

### R. F. TRIMMERS.

Connect an R. F. oscillator to the antenna and ground terminals of the set. Use the weakest possible signal to give a reading on the output meter. Loosen the trimmer screws for the frequency range or ranges that are to be re-adjusted.

*10 to 18 MC range.* Tune oscillator exactly to 18 MC and turn tuning knob of set so indicator is at 18 MC mark. Adjust trimmers A14, A4 and A12 for peak output.

*4 to 10 MC range.* Tune oscillator exactly to 10 MC and turn set to 10 MC mark on the 4 to 10 MC range. Peak trimmers A13, A3 and A11.

*1.5 to 4 MC range.* Tune oscillator to 4 MC and turn set to the 4 MC mark on the 1.5 to 4 MC scale. Peak trimmers A7, A2 and A8. Tune oscillator to 1.5 MC and, with set at 1.5, peak A10. Repeat adjustments on A7 and A10 if necessary.

*Broadcast range.* Tune oscillator and set to 1500 KC. Peak trimmers A6, A1 and A9. Tune oscillator to 560 KC and turn set to the 560 KC mark. Peak A5. Repeat adjustments on A6 at 1500 and A5 at 560 if necessary.

## MODELS 145 AND 325

### I. F. TRIMMERS.

Connect an I. F. test oscillator to the 1st-detector tube by means of the I. F. coupling unit shown in Fig. 1. Adjust the I. F. oscillator to 264 KC. Connect a sensitive output meter to the set. Use the weakest possible oscillator signal that will give a reading on the output meter with the radio volume control on full. Turn the set to a quiet point near 1000 KC.

Peak trimmer A7, A6 and A5. Remove the I. F. coupling unit and seal the trimmer screws.

### DIAL POINTER ADJUSTMENT.

With the variable condenser all the way in, the dial pointer should be set at 535 KC.

### R. F. TRIMMERS.

Connect an R. F. test oscillator to the antenna and ground terminals of set. Use the weakest possible oscillator signal. Loosen the trimmer screws.

*Short-wave range.* Oscillator at 15 MC, and set turned to 15 MC mark, peak trimmer A3

*Police range.* There are no trimmer adjustments for this range.

*Broadcast range.* Oscillator at 1500 KC and dial pointer at 1500 KC mark, peak trimmers A8, A2 and A1. Tune oscillator and set to 560 KC. Peak A4. Repeat adjustments on A8 at 1500 KC and A4 at 560 KC if necessary.

## MODELS 206 AND 376 (1st type)

### I. F. TRIMMERS.

Connect an I. F. test oscillator to the 1st-detector tube by means of the I. F. coupling unit shown in Fig. 1. Adjust the oscillator to 472½ KC. Use the weakest possible signal that will give a reading on the output meter with the radio volume control on full.

Turn the set to a quiet point near 1000 KC.

Peak trimmers A8, A7 and A6 for maximum output. Remove the I. F. coupling unit and seal the I. F. trimmers.

### DIAL POINTER ADJUSTMENT.

With the variable condenser rotor completely meshed, the dial pointer should be set at 535 KC.

### R. F. TRIMMERS.

Connect a suitable R. F. oscillator to the antenna and ground terminals of set.

*Broadcast range.* Oscillator at 1500 KC and dial pointer at 1500 KC mark, adjust trimmers A9, A2 and A3. Tune oscillator and set to 560. Peak A5. Repeat adjustments on A9 at 1500 KC and A5 at 560 KC if necessary.

*Police range.* There are no trimmer adjustments for this range.

*Short-wave range.* With oscillator at 15 MC and set turned to 15 MC, peak trimmers A10, A1 and A4.

## MODELS 318 AND 447

### I. F. TRIMMERS.

Connect an I. F. test oscillator to the 1st-detector tube by means of the I. F. coupling unit shown in Fig. 1. Adjust oscillator to 472½ KC. Connect a sensitive output meter to the set. Use the weakest possible oscillator signal that will give a reading on the output meter with the radio volume control on full.

Put balancing unit A (shown in Fig. 2) across trimmer A19 and peak A20.

Put unit A across A20 and peak A 19.

Put unit A across A17 and peak A18.

Put unit A across A18 and peak A17.

Put unit A across A15 and peak A16.

Put unit A across A16 and peak A15.

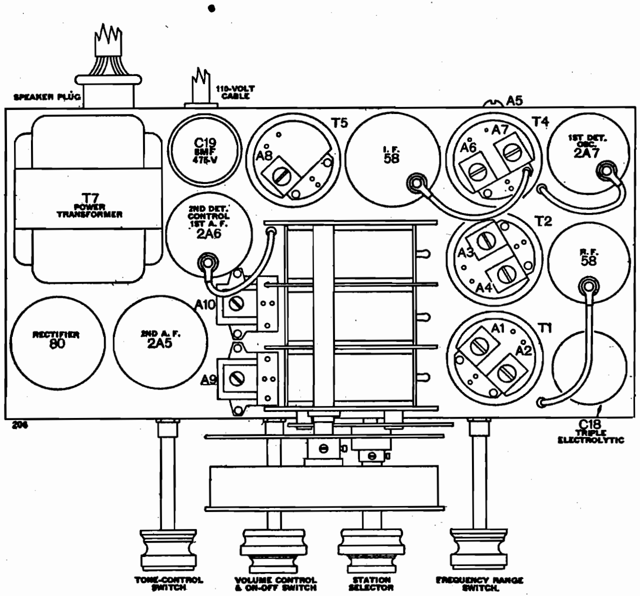
Remove the I. F. coupling unit and balancing unit and seal the I. F. trimmers.

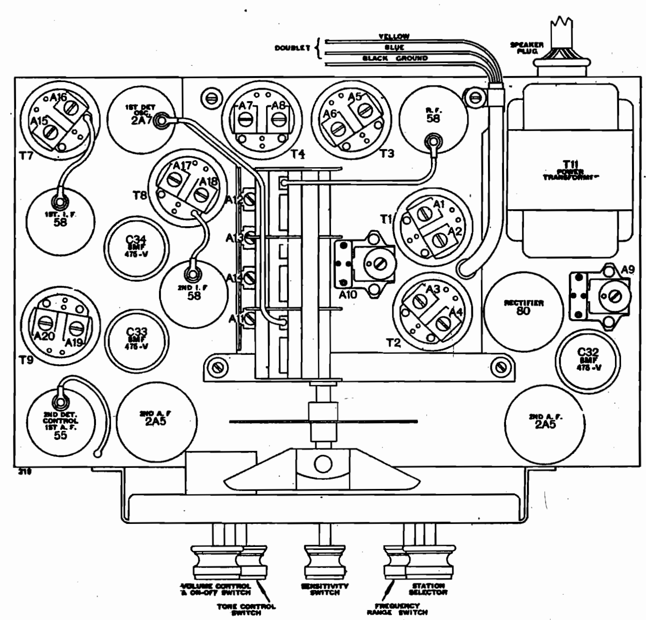
### R. F. TRIMMERS.

Connect an R. F. test oscillator to the antenna and ground terminals of set. Use the weakest possible oscillator signal that will give a reading on the output meter. Loosen the trimmer screws for the frequency range or ranges that are to be re-adjusted.

*12 to 22.5 MC range.* Oscillator at 18 MC, dial pointer at 18 MC, peak trimmers A13, A4 and A8.

*4.6 to 12.2 MC range.* Oscillator at 12 MC, dial pointer at 12 MC, peak trimmers A14, A2 and A6 for maximum output.




### R. F. TRIMMERS ON MODELS 206 AND 376

| | Short-Wave Range | Police Range | Broadcast Range |
|---|---|---|---|
| R. F. | A1 | None | A2 |
| 1st-Detector | A4 | None | A3 |
| Oscillator | A10 | None | A9 |
| Tracking | None | None | A5 |

The I. F. trimmers are A6, A7 and A8.

### R. F. TRIMMERS ON MODELS 318 AND 447

| | 12-22.5 MC Range | 4.6-12.2 MC Range | 1.6-4.6 MC Range | 540-1600 KC Range |
|---|---|---|---|---|
| R. F. | A4 | A2 | A3 | A1 |
| 1st-Detector | A8 | A6 | A7 | A5 |
| Oscillator | A13 | A14 | A12 | A11 |
| Tracking | None | None | A10 | A9 |

The I. F. trimmers are A15 to A20, inclusive.

MODEL 944
Alignment
MODEL 145,325
Parts List

ATWATER-KENT MFG. CO.

## ADJUSTING TRIMMER CONDENSERS (Contd.)

*1.6 to 4.6 MC range.* Oscillator at 4 MC and dial pointer at 4 MC, peak trimmers A12, A3 and A7. Tune oscillator to 1.7 MC, and with dial pointer at 1.7, peak A10. Repeat adjustments on A12 at 4 MC and A10 at 1.7 MC if necessary.

*Broadcast range.* Oscillator at 1500 KC and dial pointer at 1500 KC mark, peak trimmers A11, A1 and A5. Tune oscillator to 560 KC, turn dial pointer to 560 KC mark, and peak A9. Repeat adjustments on A11 at 1500 KC and A9 at 560 KC if necessary.

## MODEL 944

### I. F. TRIMMERS.

Connect an I. F. test oscillator to the 1st-detector by means of the I. F. coupling unit shown in Fig. 1. Adjust the I. F. oscillator to 450 KC. Connect a sensitive output meter to the set. Use the weakest possible oscillator signal that will give a reading on the output meter, with the condenser A5 turned well out in counter-clockwise direction (when facing rear of chassis). Peak the I. F. trimmers A3 and A4 for maximum output. Now turn the regenerative control condenser "in" (clockwise from rear of chassis) until a "squeal" or audio howl indicating oscillation of the I. F. stage, then back off about one-quarter turn, or until the audio howl stops. The adjustments of the I. F. trimmers should again be checked for peak—*i. e.,* the peaking procedure and adjustment of the regenerative condenser should be repeated until maximum output is obtained.

### R. F. TRIMMERS.

Check the dial setting by turning the gang condenser to maximum position and observing, by means of steel scale held vertically over the condenser shaft axis, whether the 540 KC mark on the dial is perpendicular to a line along the top of the condenser frame in back of the dial. Connect an R. F. oscillator to the antenna and ground terminals of the set. Use the weakest possible signal to give a reading on the output meter. Loosen the trimmer screws. Tune the oscillator to 1500 KC and turn the tuning knob of the set to a dial mark half way between 140 and 150 and perpendicular to a line along the top of the condenser frame. (Determined as explained in setting dial at 540 KC.) Peak the trimmers A1 and A2 for maximum output. Retune oscillator and set to 1100 KC and check regenerative condenser A5 adjustment for maximum sensitivity—*i. e.,* one-quarter turn below audio howl. If oscillation occurs at any other point on the dial after the above adjustments, it will be necessary to again turn back a fraction of a turn on the condenser A5.

*Note.*—1st-detector grid clip must be inside of shield can when adjusting the R. F. trimmers.

# PARTS LIST

## MODEL 145

| | |
|---|---|
| 28839 | Cabinet less screen |
| 27906 | Screen |
| 27945 | Escutcheon and crystal assem. |
| 27388 | Crystal |
| 27431 | Var. cond. assem. |
| 27692 | Tuning gear |
| 27574 | Dial plate holder |
| 27947 | Dial pointer holder |
| 27522 | Dial pointer |
| 27535 | Pointer screw |
| 27523 | Dial plate |
| 24323 | Power trans. cover |
| 25056 | I. F. T. shield |
| 27485 | Range switch |
| 19566 | 110 V. cable |
| 40090 | Pilot light assem. |
| 28827 | Dial lamp socket |
| 26526 | Ferrule and bushing |
| 26524 | Spring |
| 22683 | Tube shield |
| 28281 | Front and back plate assem. |
| 28594 | Tuning shaft assem. |
| 22657 | Dial rubber and bushing |
| 25058 | I. F. T. shield cover |
| 25059 | I. F. T. shield cover (hole) |
| 27676 | Pilot lamp, 2.5 V. (frosted) |
| 27425 | Vol. control, .5 Ʊ |
| 39620 | Tone control switch assem. |
| 28192 | Shaft and blade for above |
| 27562 | Inst. sheet, F-1149 |
| 27867 | Shipping container |

### TRANSFORMERS

| | | |
|---|---|---|
| T1 | 39820 | No. 1 R. F. T. |
| T2 | 39830 | No. 2 R. F. T. |

## MODEL 145 (Contd.)

| | | |
|---|---|---|
| T3 | 39840 | Oscillator T. |
| T4 | 27789 | No. 1 I. F. T. |
| T5 | 27791 | No. 2 I. F. T. |
| T6 | 28621 | Output T. |
| T7 | 25191 | Power T. |

### RESISTORS

(For tubular resistors see page 19.)

| | | |
|---|---|---|
| R6 | 28950 | Flexible, 160 Ω |

### CONDENSERS

(For tubular condensers see page 18.)

| | | |
|---|---|---|
| C1 | 25035 | .006 MF, blue, blk. and red |
| C3 | 27650 | 8 MMF |
| C4 | 33670 | 250 MMF, 500-V., mica |
| C7 | 33930 | 25 MMF |
| C8 | 39660 | 730 MMF |
| C10 | 33670 | 250 MMF, 500-V., mica |
| C10A | 33670 | 250 MMF, 500-V., mica |
| C18 | 22538 | 8 MF, 475 V. |
| C19 | 27585 | 8 MF, 350 V. |

### TRIMMERS

| | | |
|---|---|---|
| A4 | 39630 | Rear |
| A5,6 | 32880 | T4 |
| A7 | 36570 | T5 |
| A8 | 38890 | Front |

### CHOKES

| | | |
|---|---|---|
| CK1 | 28623 | On speaker |
| CK2 | 40140 | R. F. choke |

## MODEL 145 (Contd.)

### SOCKETS

| | |
|---|---|
| 24494 | 6 prong |
| 24492 | 4 prong |
| 21336 | Speaker |
| 26111 | 7 prong |

### MODEL 145 SPEAKER

| | |
|---|---|
| 42100 | Complete speaker |
| 28619 | Diaphragm assem. |
| 28621 | Output trans. (T6) |
| 28622 | Field coil |
| 28623 | Choke coil (CK1) |

## MODEL 325

(For parts not listed below refer to Model 145.)

| | |
|---|---|
| 27985 | Bottom plate |
| 27946 | Escutcheon and crystal assem. |
| 28535 | Dial plate |
| 40140 | R. F. choke (CK2) |
| 27865 | Shipping container |

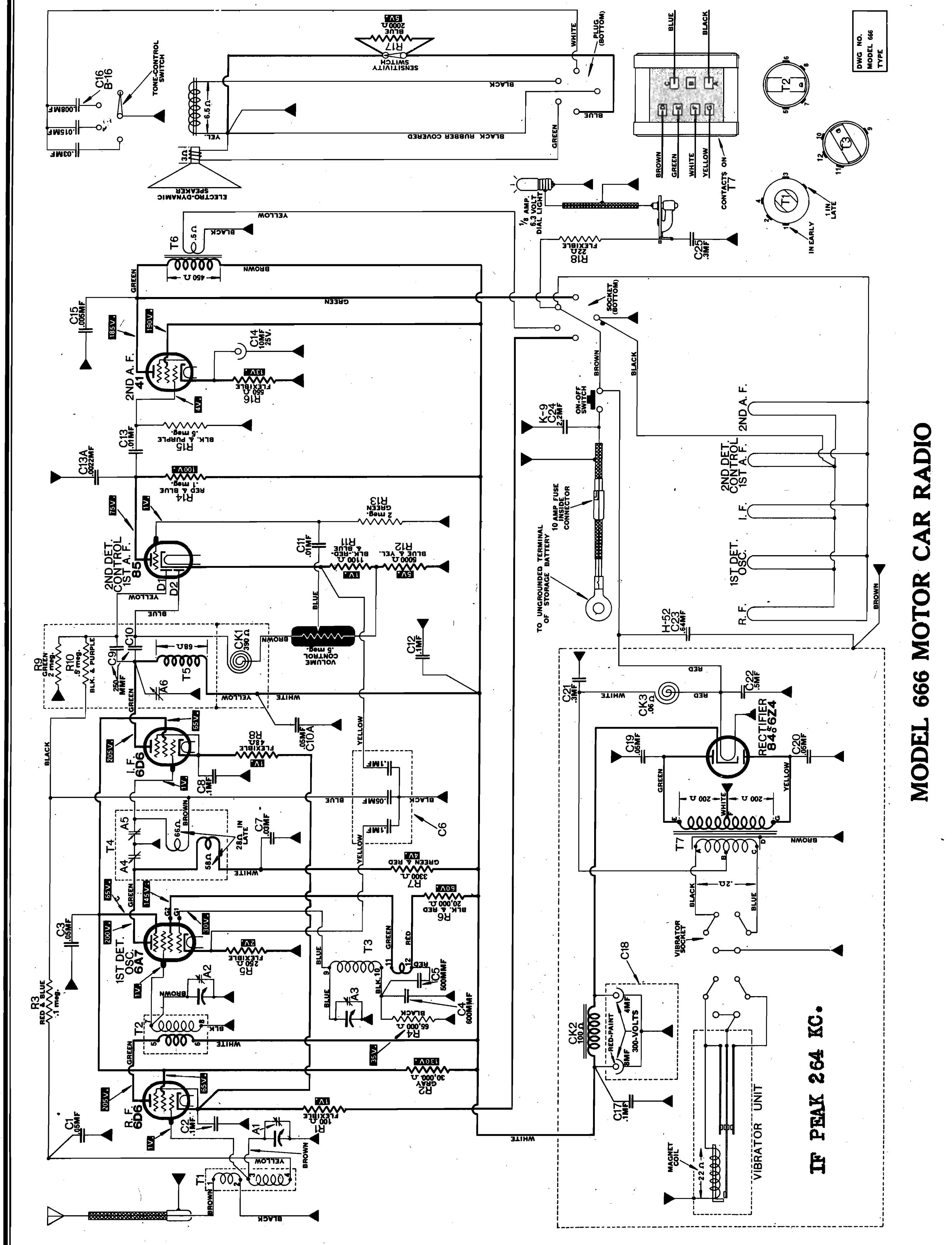
### MODEL 325 SPEAKER 41800

| | |
|---|---|
| 27661 | Cone housing |
| 25525 | Choke (CK1) |
| 21260 | Field coil |
| 20737 | Diaphragm |
| 20657 | Cable and plug assem. |
| 18582 | Plug only |
| 19469 | Segment |

Ω=ohms. Ʊ=megohms.

# ATWATER-KENT MFG. CO.

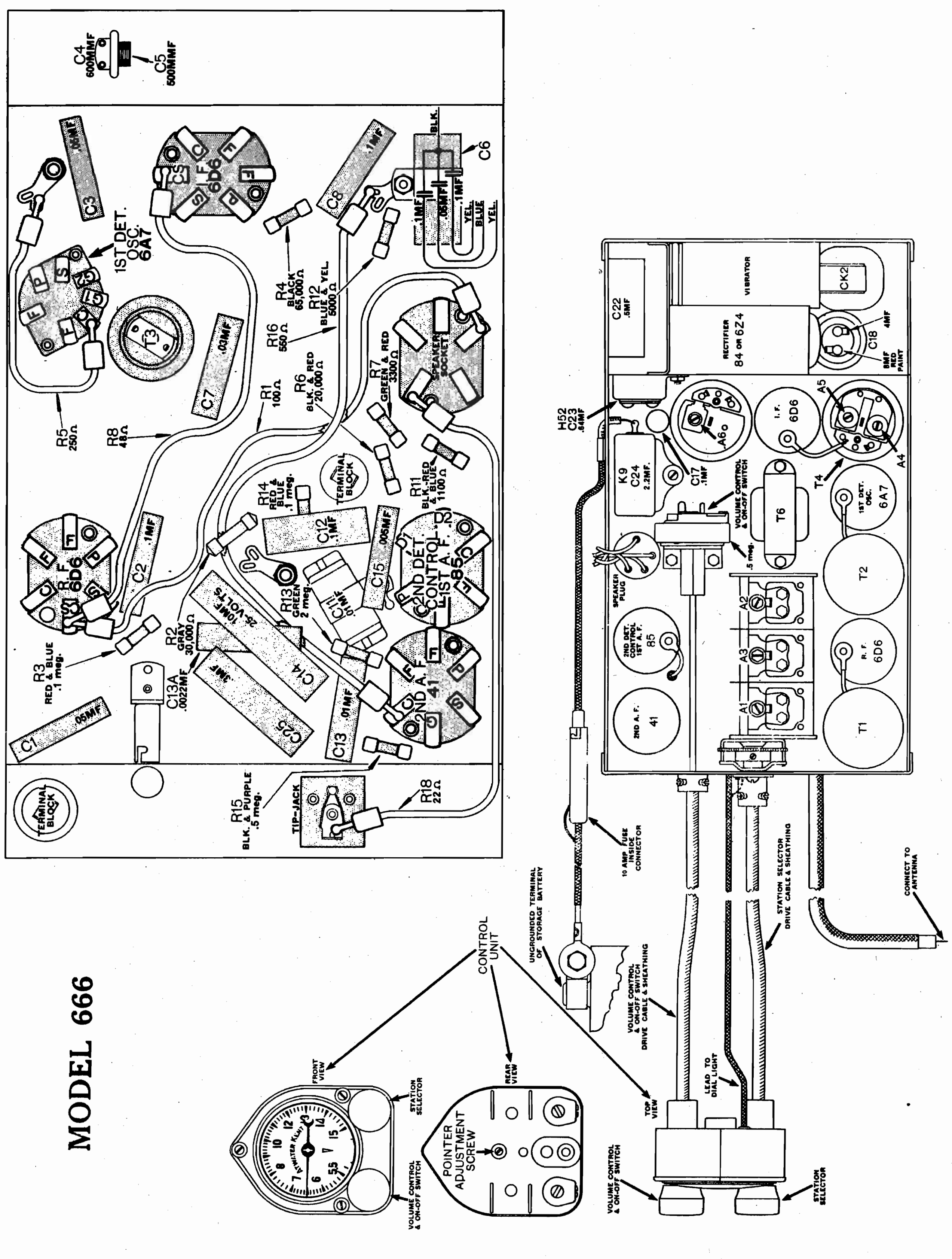
**MODEL 666**
**Schematic**




May, 1934

**MODEL 666**
**Socket, Trimmer**
**Parts Layout**

## ATWATER-KENT MFG. CO.



ATWATER-KENT MFG. CO.

# MODEL 666

| Part No. | Name of Part |
|---|---|
| 27052 | Set container complete, less lid |
| 27033 | Set container lid |
| 26523 | Rubber gasket |
| 26549 | Tuning cable bushing |
| 26036 | Inner plate for above |
| 25482 | Bolt 2½" x ⅜" |
| 24485 | Lockwasher ⅜" |
| 24486 | Nut ⅜" |
| 26462 | Variable condenser assembly |
| 26589 | Shield for No. 1 R. F. T. (early short) |
| 27095 | Shield for No. 1, 2 R. F. T. (late long) |
| 26591 | Shield for No. 2 R. F. T. (early short) |
| 26072 | I. F. T. shield |
| 26505 | Volume control, .5 U |
| 26033 | Volume control bracket |
| 26039 | Coupling |
| 23260‡ | Generator condenser |
| 24540 | Tone control switch complete |
| 22297 | Switch shaft and blade |
| 13664 | Sensitivity switch |
| 26127 | Knob (tone) |
| 26598 | Cloth |
| 26983 | Wire screen |

‡ In late 666 a No. 38270 tubular condenser is supplied.

## TRANSFORMERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| T1* | 38010 | No. 1 R. F. T. (late type) |
| T2* | 38020 | No. 2 R. F. T. (late type) |
| T3 | 37890 | Oscillator T |
| T4* | 27096 | No. 1 I. F. T. (late type) |
| T5 | 26593 | No. 2 I. F. T. |
| T6 | 26982 | Output T. |
| T7 | 26291 | Power T. |

* Below Serial No. 8148331 T1 is part No. 35680, T2 is part No. 35690, T4 is part No. 26592.

## RESISTORS

| | | |
|---|---|---|
| R1 | 20040 | Flexible, 100 Ω |
| R2 | 20970 | Gray, 30,000 Ω, ½-W. |
| R3 | 30340 | Red-blue, .1 U, 1/3-W. |
| R4 | 31980 | Bl'k, 65,000 Ω, 1/3-W. |
| R5 | 31830 | Flexible, 250 Ω |
| R6 | 30390 | Red-bl'k, 20,000 Ω, 1/3-W. |
| R7 | 30380 | Red-green, 3300 Ω, 1/3-W. |
| R8 | 19820 | Flexible, 48 Ω |
| R9 | 30370 | Green, 2 U, 1/3-W. |
| R10 | 30350 | Bl'k-purple, .5 U, 1/3-W. |
| R11 | 31480 | Bl'k-red-blue, 1100 Ω. 1/3-W. |
| R12 | 36430 | Yel.-blue, 5000 Ω. 1/3-W. |
| R13 | 30370 | Green, 2 U, 1/3-W. |
| R14 | 30340 | Red-blue, .1 U, 1/3-W. |
| R15 | 30350 | Bl'k-purple. .5 U, 1/3-W. |
| R16 | 23780 | Flexible, 550 Ω |
| R17 | 33250 | Blue, 2000 Ω, 1/3-W. |
| R18 | 16840 | Flexible, 22 Ω |

## CONDENSERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| C1 | 31160 | .05 MF, 100-V., NI |
| C2 | 31530 | .1 MF, 100-V., NI |
| C3 | 26820 | .05 MF, 200-V., NI |
| C4 | 36460 | 600 MMF, 100-V., |
| C5 | 36510 | 500 MMF, 500-V. |
| C6 | 36440 | .1, .1, .05, 100-V., I |
| C7 | 29530 | .03 MF, 200-V, NI |
| C8 | 31530 | .1 MF, 100-V. |
| C9 | 33670 | 250 MMF, 500-V. |
| C10 | 33670 | 250 MMF, 500-V. |
| C10A | 26820 | .05 MF, 200-V., NI |
| C11 | 23250 | .01 MF, 450-V. |
| C12 | 26660 | .1 MF, 200-V., NI |
| C13 | 32810 | .01, 450-V., NI |
| C13A | 33660 | .0022 MF, 450-V., IND. |
| C14 | 25379 | 10 MF, 25-V. |
| C15 | 28040 | .005 MF, 200-V.. IND. |
| C16* | 30270 | .008, .015, .03 MF (B16) |
| C17 | 26660 | .1 MF, 200-V., NI |
| C18 | 26995 | 4 MF-8 MF, 300-V. |
| C19 | 36490 | .05 MF, 450-V., NI |
| C20 | 36490 | .05 MF, 450-V., NI |
| C21 | 31150 | .3 MF, 100-V., NI |
| C22 | 31510 | .5 MF, 100-V., NI |
| C23 | 36480 | .64 MF, H 52, 200-V. |
| C24 | 37760 | 2.2 MF, 100-V., K9 |
| C25 | 31150 | .3 MF, 100-V., NI |

* In late 666 this condenser is No. 38160, using clamps Nos. 27208 and 27209.

## TRIMMERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| A4, 5 | 32880 | Double I. F. trimmer |
| A6 | 36570 | Single I. F. trimmer |

## CHOKES

| Code No. | Part No. | Name of Part |
|---|---|---|
| CK1 | 26594 | 2nd det. plate choke, 390 Ω |
| CK2 | 27011 | "B" filter choke, 100 Ω |
| CK3 | 36630 | "A" filter choke, .06 Ω |

## SOCKETS

| Part No. | Name of Part |
|---|---|
| 24493 | 5 prong |
| 24494 | 6 prong, 85 and 41 |
| 27023 | 6 prong, R. F. and I. F. |
| 26111 | 7 prong |
| 26572 | Tip jack |

## POWER UNIT ASSEMBLY
(Miscellaneous parts)

| Part No. | Name of Part |
|---|---|
| 26986 | Vibrator socket (6 prong) |
| 26985 | Rectifier socket (5 prong) |
| 27005 | Vibrator |
| 26997 | Container |
| 26761 | Lid for above |
| 25408 | Oval head screw |
| 15648 | Filister head screw |
| 26046 | Mounting bracket (T7) |

## MISCELLANEOUS

| Part No. | Name of Part |
|---|---|
| 27034 | Instruction folder F-1127 |
| 21406 | Fuse 10A |
| 26451 | I. F. tube shield (short) |
| 27042 | 85 tube shield (long) |

## SPEAKER

| Part No. | Name of Part |
|---|---|
| 26851 | Speaker, less cable |
| 26826 | Conehead assembly |
| 26827 | Field coil, 6.5 Ω |
| 26559 | Cable and plug assembly |

## REMOTE CONTROL HEAD
(Same as used on Model 816

**1934 Set Model Specifications**

# ATWATER-KENT MFG. CO.

The last figure in the model number indicates the number of tubes; for instance, Model 165 has 5 tubes; Model 310 has 10 tubes, etc. The letter "Q" indicates battery operation; the letter "D" indicates D. C. operation.

All models listed below have tone control, and all models with exception of 387, 427Q, 165Q and 525Q have automatic volume control. All models have dynamic speakers, with exception of 165Q and 525Q, which have special magnetic speakers.

| Cabinet Description | Model Number | Power Supply | Part No. Complete | Part No. Speaker | Wattage | Shadow Tuning | Silencing Adjustment | Frequency Range | Intermediate Frequency | Tubes: R. F. | 1st Det. | Oscillator | I. F. | 2nd Det. | Control | 1st A. F. | 2nd A. F. | 3rd A. F. | Rectifier |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Compact, arch top | 165 | 110V, 60C | 34000 | 34100 | 60 | NO | NO | 540-1712† | 264 | .. | 57 | | 58 | | 2A6 | | 2A5 | .. | 80 |
| Compact, arch top | 165Q | Battery | 38700 | 37170 | †† | NO | NO | 540-1712† | 264 | .. | 1A6 | | 34 | 32 | .. | 30 | 19 | .. | .. |
| Compact, modern | 185 | 110V, 60C | 38300 | 34100 | 60 | NO | NO | 540-1712† | 264 | .. | 57 | | 58 | | 2A6 | | 2A5 | .. | 80 |
| Compact, modern | 185A | 110V, 60C | 40000 | 34100 | 60 | NO | NO | 540-1700‡‡ | 264 | .. | 2A7 | | 58 | | 2A6 | | 2A5 | .. | 80 |
| Compact, arch top | 217 | 110V, 60C | 35500 | 36300 | 70 | NO | NO | 540-3200 | 264 | 58 | 58 | 56 | 58 | | 55 | | 2A5 | .. | 80 |
| Compact, arch top | 217D | 110V, D.C. | 36900 | 37500 | 45 | NO | NO | 540-3200 | 264 | 78 | 78 | 37 | 78 | | 75 | | 43 (2) | .. | .. |
| Compact, modern | 275 | 110V* | 36200 | 26159 | 50 | NO | NO | 540-1750* | 264 | .. | 6A7 | | 44 | | 75 | | 43 | .. | 25Z5 |
| Console, rounded front | 310 | 110V, 60C | 35900 | 36500 | 120 | YES | YES | 540-3200 | 130 | 58 | 58 | 56 | 58 | 56 | 56 | 56 | 2A5 (2) | .. | 80 |
| Compact, arch top | 387 | Battery | 35200 | 31700 | ** | NO | NO | 550-1500** | 264 | 34 | 1A6 | | 34 | 32 | .. | 30 | 30 (2) | .. | .. |
| Console | 425 | 110V, 60C | 39500 | 33400 | 60 | NO | NO | 540-3200 | 264 | .. | 57 | | 58 | | 2A6 | | 2A5 | .. | 80 |
| Console | 427 | 110V, 60C | 35600 | 33400 | 70 | NO | NO | 540-3200 | 264 | 58 | 58 | 56 | 58 | | 55 | | 2A5 | .. | 80 |
| Console | 427D | 110V, D.C. | 37000 | 37600 | 45 | NO | NO | 540-3200 | 264 | 78 | 78 | 37 | 78 | | 75 | | 43 (2) | .. | .. |
| Console | 427Q | Battery | 35800 | 36400 | ** | NO | NO | 550-1500** | 264 | 34 | 1A6 | | 34 | 32 | | 30 | 30 (2) | .. | .. |
| Console, modern | 510 | 110V, 60C | 36000 | 36500 | 120 | YES | YES | 540-3200 | 130 | 58 | 58 | 56 | 58 | 56 | 56 | 56 | 2A5 (2) | .. | 80 |
| Console | 525 | 110V, 60C | 38400 | 38500 | 60 | NO | NO | 540-1712† | 264 | .. | 57 | | 58 | | 2A6 | | 2A5 | .. | 80 |
| Console | 525Q | Battery | 39100 | 39200 | †† | NO | NO | 540-1712† | 264 | .. | 1A6 | | 34 | 32 | | 30 | 19 | .. | .. |
| Single unit, remote control | 534 | 6V (Auto) | 35100 | 25534 | 4A | NO | NO | 540-1500 | 450 | .. | 77 | | 44 | | 75 | | 41 | .. | .. |
| Console, modern | 665 | 110V, 60C | 39600 | 33400 | 60 | NO | NO | 540-3200 | 264 | .. | 57 | | 58 | | 2A6 | | 2A5 | .. | 80 |
| Single unit, remote control | 666 | 6V (Auto) | 39900 | 26851 | 6A | NO | NO | 540-1500 | 264 | 6D6 | 6A7 | | 6D6 | | 85 | | 41 | .. | 6Z4 |
| Console, modern | 667 | 110V, 60C | 36100 | 33400 | 70 | NO | NO | 540-3200 | 264 | 58 | 58 | 56 | 58 | | 55 | | 2A5 | .. | 80 |
| Console, modern | 667D | 110V, D.C. | 37100 | 37600 | 45 | NO | NO | 540-3200 | 264 | 78 | 78 | 37 | 78 | | 75 | | 43 (2) | .. | .. |
| Console*** | 711J or T | 110V, 60C | 36600 | 36700 | 150 | YES | YES | 540-23MC | 472½ | 58 | 58 | 58 | 58 (2) | | 55 | | 56 (2) | 2A3 (2) | 5Z3 |
| Console, modern | 711R | 110V, 60C | 36800 | 36700 | 150 | YES | YES | 540-23MC | 472½ | 58 | 58 | 58 | 58 (2) | | 55 | | 56 (2) | 2A3 (2) | 5Z3 |
| Console*** | 788J or T | 110V, 60C | 39300 | 39400 | 70 | YES | YES | 540-23MC | 472½ | 58 | 58 | 58 | 58 (2) | | 2A6 | | 2A5 | .. | 80 |
| Console, modern | 788R | 110V, 60C | 39700 | 39400 | 70 | YES | YES | 540-23MC | 472½ | 58 | 58 | 58 | 58 (2) | | 2A6 | | 2A5 | .. | 80 |
| Console | 808A | 110V, 60C | 34600 | 34500 | 70 | YES | NO | 540-20MC | 472½ | 58 | 58 | 58 | 58 (2) | | 2A6 | | 2A5 | .. | 80 |
| Single unit, remote control | 816 | 6V (Auto) | 37400 | 26851 | 5A | NO | NO | 540-1500 | 264 | 39‡ | 6A7 | | 39‡ | | 85 | | 41 (2) | .. | .. |
| Single unit, remote control | 926 | 6V (Auto) | 39000 | 26851 | 6A | NO | NO | 540-1500 | 264 | 39‡ | 6A7 | | 39‡ | | 85 | | 41 (2) | .. | .. |
| Separate speaker, remote control | 936 | 6V (Auto) | 38800 | 38900 | 6A | NO | NO | 540-1500 | 264 | 39‡ | 6A7 | | 39‡ | | 85 | | 41 (2) | .. | .. |

* Model 275 may be used on 110 Volts, 25-60 cycles, or 110 Volts, D. C. It has a police switch to tune in the 2400-kilocycle police band.

† Has police switch to tune in the 2400-kilocycle police band.

** The "B" consumption of Models 387 and 427Q is from 20 to 27 milliamperes depending on signal strength and volume level. (25 milliamperes is average.) Late Models 387 and 427Q have a police switch for both police bands.

†† The "B" consumption of Models 165Q and 525Q is from 16 to 25 milliamperes depending on signal strength and volume level. (22 milliamperes is average.)

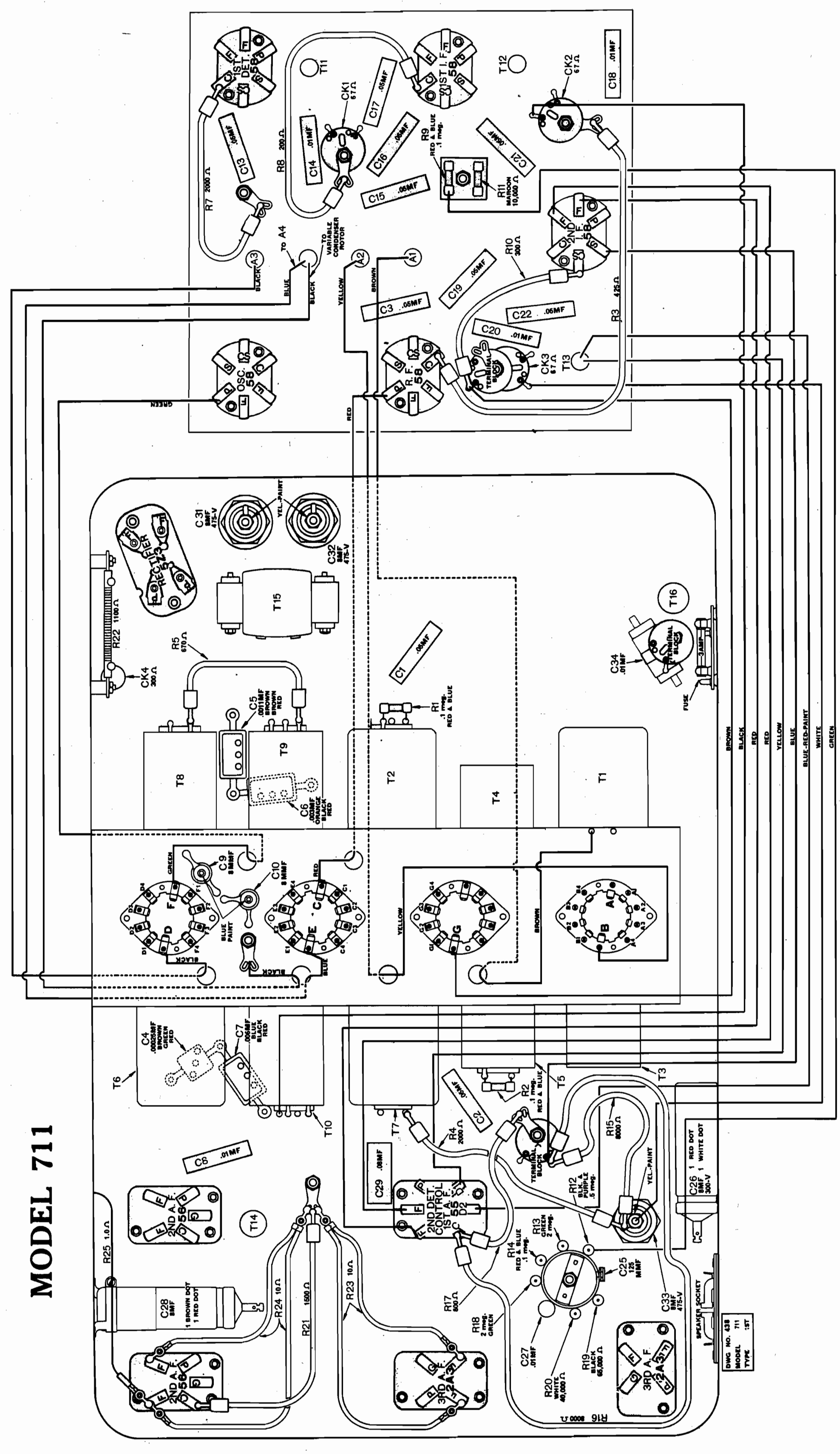
*** The J cabinet is rounded-front. The T cabinet has doors.

‡ Late 816 926 and 936 utilize 6D6 tubes instead of 39 tubes for R. F. and I. F.

‡‡ Model 185A also covers the short-wave range of 5.5 to 15.5 megacycles, which includes the four principal international short-wave broadcast bands.

MODEL 711
Chassis Wiring

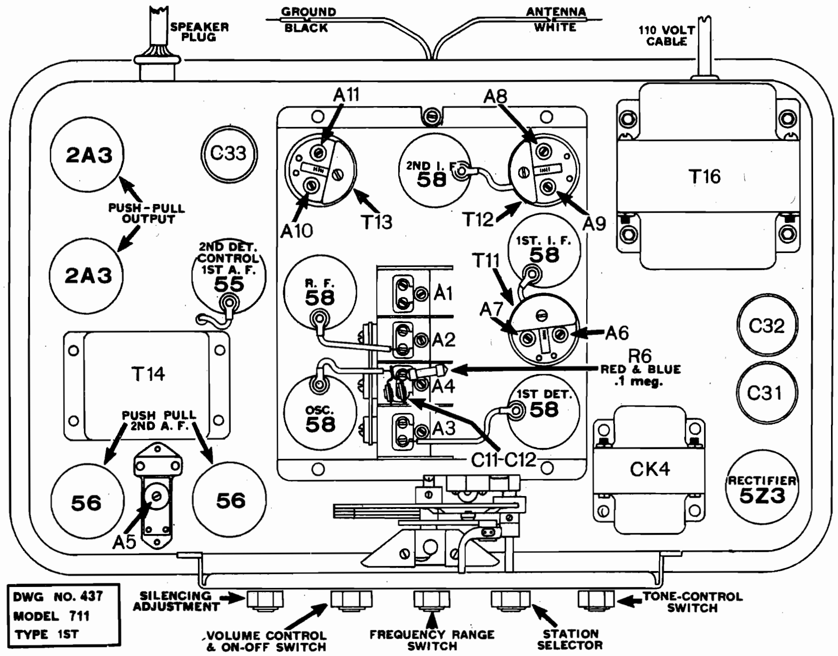
ATWATER-KENT MFG. CO.




This bottom chart shows all connections between the upper tube base and the main base.
In late 711, the R. F. bias resistor R3 is grounded at the front ground lug (near C13) instead of as shown, in order to reduce tendency to oscillation.

MODEL 711
Socket,Trimmers
Parts List

## ATWATER-KENT MFG. CO.




# MODEL 711

| Part No. | Name of Part |
|---|---|
| 26441† | Front panel complete with escutcheon |
| 25923 | Escutcheon |
| 25737 | Knob—volume and station selector (711R) |
| 25738 | Knob—tone and silencing adjustment (711R) |
| 27003† | Knob—range switch (711R) |
| 25145 | Knob—tone and silencing adjustment (711T-J) |
| 25811 | Knob—volume and station selector (711T-J) |
| 27002† | Knob—range switch (711T-J) |
| 25924† | Dial plate |
| 25689 | Shadow tuning indicator |
| 25839 | Range switch |
| 34520 | Tone control switch complete |
| 25846 | Variable condenser assembly |

† The range switch, knob and dial in late Model 711 sets have colored dots. Only the late type knobs, dials and panel assemblies are furnished for service.

| Part No. | Name of Part |
|---|---|
| 25798 | Volume control, .5 Ʊ |
| 26338 | Silent tuning adjustment, 14,000 Ω |

### TRANSFORMERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| T1 | 34830 | No. 1 R. F. T. |
| T2 | 34840 | No. 2 R. F. T. |
| T3 | 34870 | No. 1 H. F., 1st range |
| T4 | 34890 | No. 1 H. F., 2nd range |
| T5 | 34920 | No. 1 H. F., 3rd range |
| T6 | 34850 | No. 3 R. F. T. |
| T7 | 34860 | Oscillator T. |
| T8 | 34880 | No. 2 H. F., 1st range |
| T9 | 34910 | No. 2 H. F., 2nd range |
| T10 | 34930 | No. 2 H. F., 3rd range |
| T11 | 26251 | No. 1 I. F. T. |
| T12 | 25503 | No. 2 I. F. T. |
| T13 | 25503 | No. 3 I. F. T. |
| T14 | 35350 | Audio T. unit |
| T15 | 26207 | Output T. |
| T16 | 26257 | Power T. |

### RESISTORS

| Code No. | Part No. | Name of Part |
|---|---|---|
| R1 | 30340 | Red-blue, .1 Ʊ, 1/3-W. |
| R2 | 30340 | Red-blue, .1 Ʊ, 1/3-W. |
| R3 | 17380 | Flexible, 425 Ω |
| R4 | 33230 | Flexible, 2000 Ω |
| R5 | 33210 | Flexible, 670 Ω |
| R6 | 20980 | Red-blue, .1 Ʊ, ½-W. |
| R7 | 21030 | Flexible, 2000 Ω |
| R8 | 25950 | Flexible, 200 Ω |
| R9 | 30340 | Red-blue, .1 Ʊ, 1/3-W. |
| R10 | 25840 | Flexible, 300 Ω |
| R11 | 30320 | Mar'n, 10,000 Ω, 1/3-W. |
| R12 | 20930 | Bl'k-pur., .5 Ʊ, ½-W. |
| R13 | 20940 | Green, 2 Ʊ, ½-W. |
| R14 | 20980 | Red-blue, .1 Ʊ, ½-W. |
| R15 | 24340 | Flexible, 8000 Ω |
| R16 | 24340 | Flexible, 8000 Ω |
| R17 | 20120 | Flexible, 800 Ω |
| R18 | 20940 | Green, 2 Ʊ, ½-W. |
| R19 | 21041 | Bl'k, 65,000 Ω, ½-W. |
| R20 | 26160 | White, 40,000 Ω, ½-W. |
| R21 | 20380 | Flexible, 1500 Ω |
| R22 | 19180 | Iron core, 1100 Ω |
| R23 | 17077 | Flexible, 10 Ω, white-bl'k tracer |
| R24 | 17077 | Flexible, 10 Ω, white-bl'k tracer |
| R25 | 31860 | Flexible, 1.0 Ω, yellow |

### CONDENSERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| C1 | 31160 | .05 MF, 100-V., NI |
| C2 | 31160 | .05 MF, 100-V., NI |
| C3 | 31160 | .05 MF, 100-V., NI |
| C4 | 25032 | .00025 MF, 450-V. |
| C5 | 25837 | .0011 MF, 450-V. |
| C6 | 25034 | .003 MF, 450-V. |
| C7 | 25035 | .006 MF, 450-V. |
| C8 | 32810 | .01 MF, 450-V. |
| C9 | 36220 | 8 MMF, 500-V. |
| C10 | 36220 | 8 MMF, 500-V. |
| C11 | 25661 | 8 MMF, 500-V. |
| C12 | 25661 | 8 MMF, 500-V. |
| C13 | 31160 | .05 MF, 100-V., NI |
| C14 | 32810 | .01 MF, 450-V., NI |
| C15 | 31160 | .05 MF, 100-V., NI |
| C16 | 31160 | .05 MF, 100-V., NI |
| C17 | 31160 | .05 MF, 100-V., NI |
| C18 | 32810 | .01 MF, 450-V., NI |
| C19 | 31160 | .05 MF, 100-V., NI |
| C20 | 32810 | .01 MF, 450-V., NI |
| C21 | 31160 | .05 MF, 100-V., NI |
| C22 | 31160 | .05 MF, 100-V., NI |
| C23 | 35290 | 125 MMF, 500-V. |
| C24 | 35290 | 125 MMF, 500-V. |
| C25 | 26670 | 125 MMF. 500-V. |
| C26 | 25384 | 8 MF, 300-V. |
| C27 | 27630 | .01 MF, 200-V. |
| C28 | 25385 | 8 MF, 250-V. |
| C29 | 35420 | .08 MF, 200-V., NI |
| C30† | 29690 | Tone control condenser (B15) |
| C31 | 22538 | 8 MF, 475-V. |
| C32 | 22538 | 8 MF, 475-V. |
| C33 | 22538 | 8 MF, 475-V. |
| C34 | 23250 | 01 MF. 450-V. |

† In late sets this condenser is No. 38260.

### CHOKES

| Code No. | Part No. | Name of Part |
|---|---|---|
| CK1 | 19210 | 1st detector plate filter choke |
| CK2 | 19210 | 1st I. F. plate filter choke |
| CK3 | 19210 | 2nd I. F. plate filter choke |
| CK4 | 25894 | Audio filter choke |

### TRIMMER

| Code No. | Part No. | Name of Plate |
|---|---|---|
| A5 | 20190 | Single I. F. trimmer |
| A6, 7 | 32880 | Double I. F. trimmer |
| A8, 9 | 32880 | Double I. F. trimmer |
| A10, 11 | 32880 | Double I. F. trimmer |

### SOCKETS

| Part No. | Name of Part |
|---|---|
| 22733 | 6 prong, lower base |
| 22734 | 5 prong, lower base |
| 22689 | Rectifier socket |
| 22735 | 4 prong, lower base |
| 21336 | Speaker, 4 prong |
| 18449 | Fuse socket |
| 24494 | 6 prong, upper base |

### MISCELLANEOUS

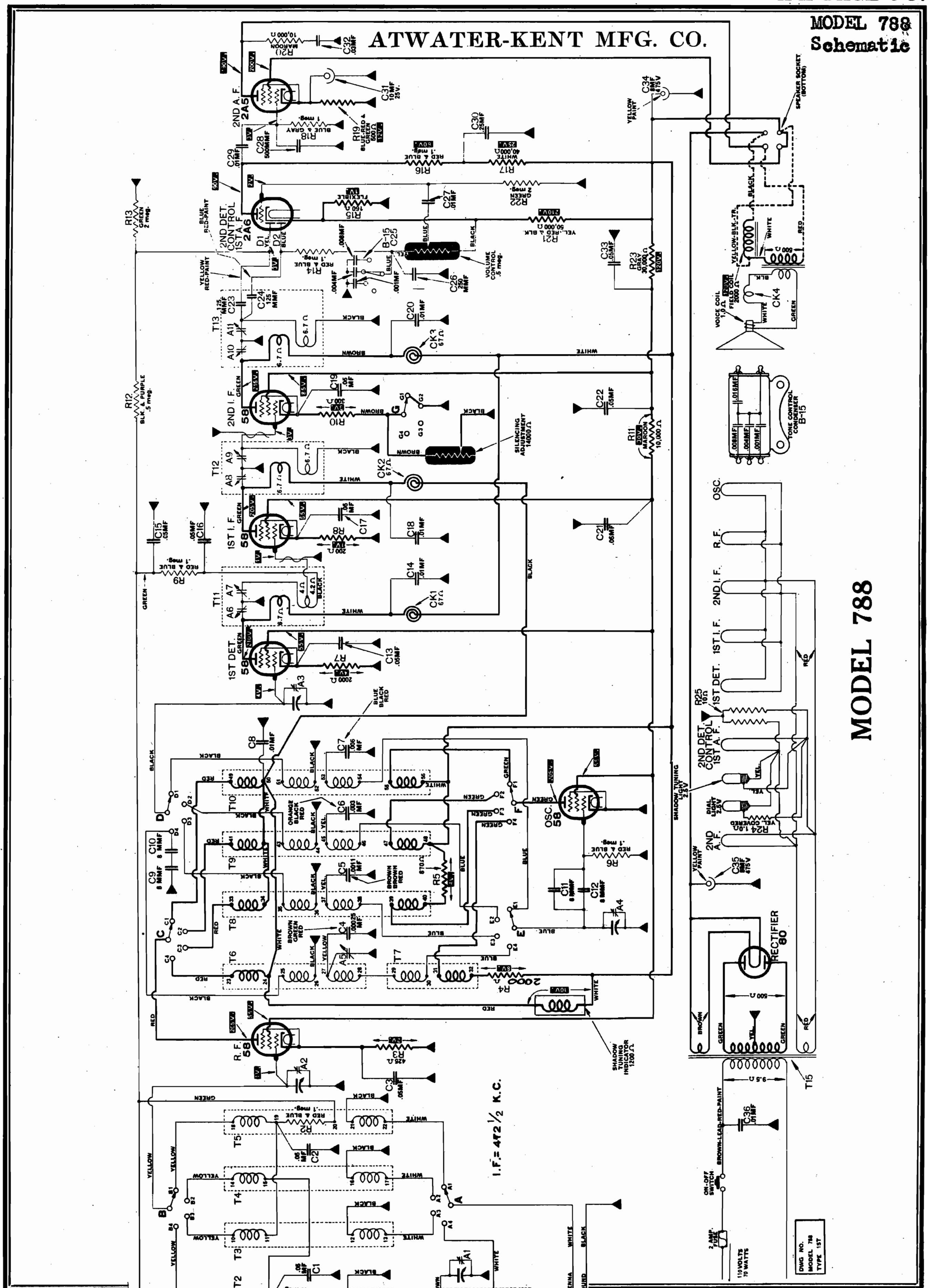
| Part No. | Name of Part |
|---|---|
| 25059 | I. F. T. shield cap (with hole) |
| 25058 | I. F. T. shield cap (without hole) |
| 22865 | Bottom plate |
| 22683 | Tube shield |
| 26255 | I. F. T. shield insulator |
| 25056 | I. F. T. shield |
| 25906 | Filter choke cover |
| 25758 | Power T. cover |
| 26254 | Power T. insulator |
| 35380 | Dial light socket and reflector |
| 15404 | Dial lamp (2.5-V.) |
| 26793 | Instruction folder, F1123 |
| 26237 | Shipping container |
| 26218 | Shields for T1, 2, 6, 7 |
| 26217 | Shields for T8, 9, 10 |
| 26216 | Shields for T3, 4, 5 |
| 27072 | Wave guide, F1131 |
| 23774 | Fuse 3A |
| 26934 | Tuning inst. tag, F1124 |

### 711 SPEAKER No. 36700

| Part No. | Name of Part |
|---|---|
| 26243 | Diaphragm |
| 23668 | Cable and plug |
| 35080 | Field coil (325 Ω) |
| 15079 | Speaker plug |

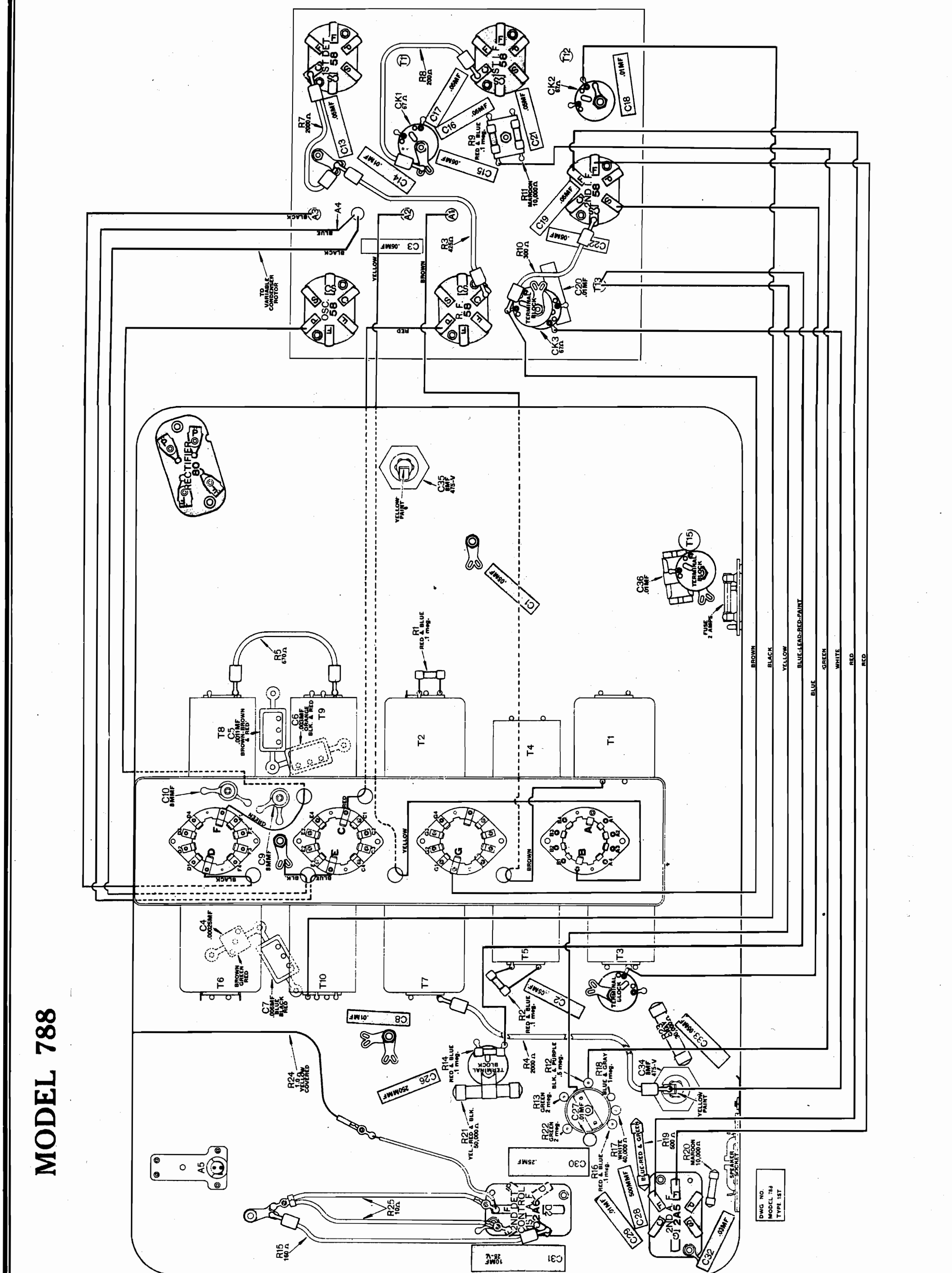
Ω = ohms. Ʊ = megohms. IND. = inductive. NI = non-inductive. W. = watt.

**MODEL 788**
**Schematic**



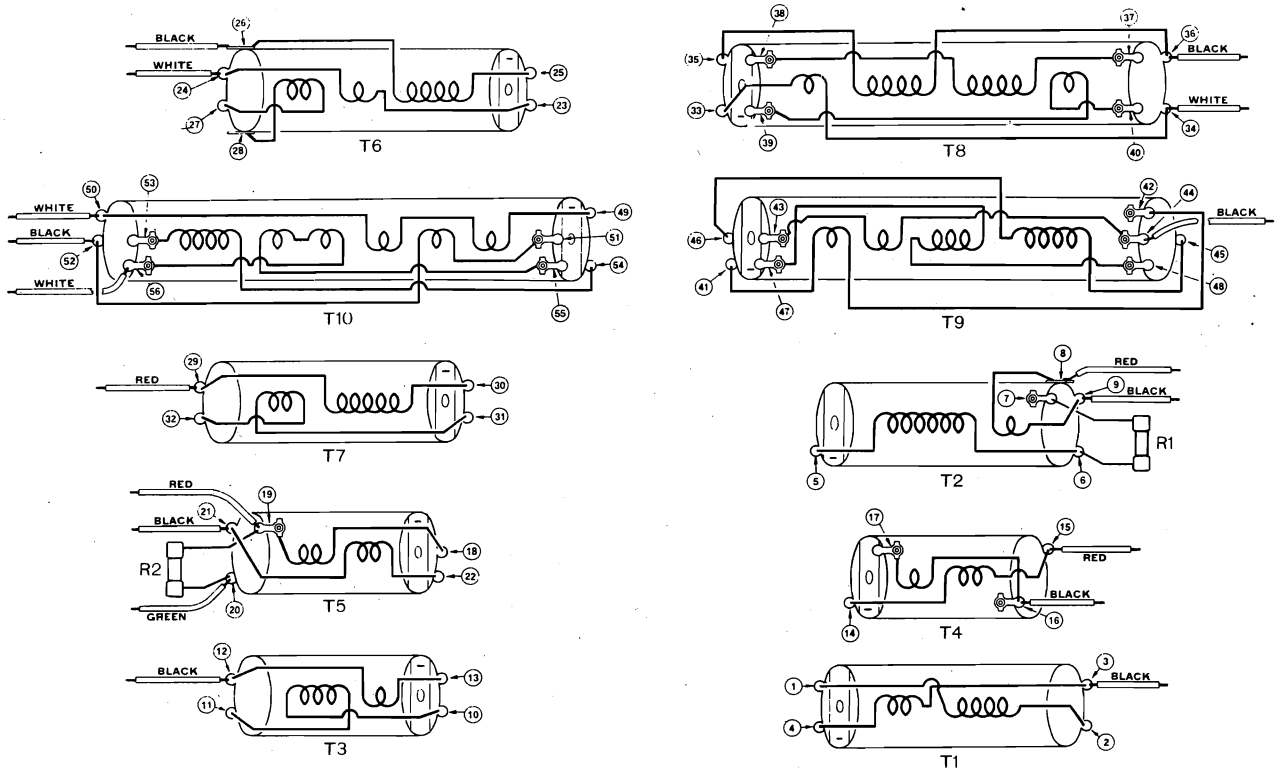
MODEL 788
Chassis Wiring

ATWATER-KENT MFG. CO.

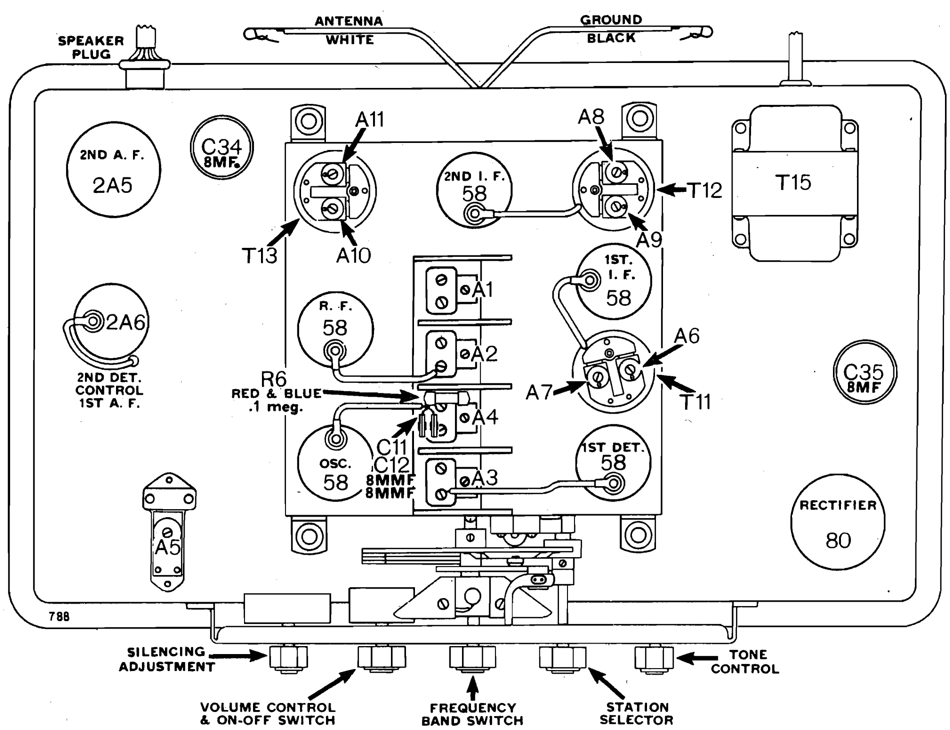


ATWATER-KENT MFG. CO.

# MODELS 711 AND 788 R. F. TRANSFORMERS




# MODEL 788



**MODEL 788**
**Parts List**

# ATWATER-KENT MFG. CO.

## MODEL 788

| Part No. | Name of Part |
|---|---|
| 27238* | Front panel complete with escutcheon |
| 26775 | Escutcheon |
| 25737 | Knob—volume and station selector (788R) |
| 25738 | Knob—tone and silencing adjustment (788R) |
| 27003* | Knob—range switch (788R) |
| 25145 | Knob—tone and silencing adjustment (788R) |
| 25811 | Knob—volume and station selector (788T) |
| 27002* | Knob—range switch (788T) |
| 25924* | Dial plate |
| 25839 | Range switch |
| 25689 | Shadow tuning indicator |
| 27245 | Shadow tuning indicator screen |
| 34520 | Tone control switch complete |
| 26339 | Shaft and blade |
| 25846 | Variable condenser assembly |
| 25798 | Volume control, .5 ℧ |
| 26338 | Silent tuning adjustment, 14,000 Ω |

* The range switch knob and dial in late Model 788 sets have colored dots. Only the late type knobs, dials and panel assemblies are furnished for service.

### TRANSFORMERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| T1 | 34830 | No. 1 R. F. T. |
| T2 | 34840 | No. 2 R. F. T. |
| T3 | 34870 | No. 1 H. F. coil, 1st range |
| T4 | 34890 | No. 1 H. F. coil, 2nd range |
| T5 | 34920 | No. 1 H. F. coil, 3rd range |
| T6 | 34850 | No. 3 R. F. T. |
| T7 | 34860 | Oscillator T. |
| T8 | 34880 | No. 2 H. F. coil, 1st range |
| T9 | 34910 | No. 2 H. F. coil, 2nd range |
| T10 | 34930 | No. 2 H. F. coil, 3rd range |
| T11 | 26251 | No. 1 I. F. T. |
| T12 | 25503 | No. 2 I. F. T. |
| T13 | 25503 | No. 3 I. F. T. |
| T14 | 21672 | Output T. |
| T15 | 25221 | Power T. |

### RESISTORS

| Code No. | Part No. | Name of Part |
|---|---|---|
| R1 | 30340 | Red-blue, .1 ℧, 1/3-W. |
| R2 | 30340 | Red-blue, .1 ℧, 1/3-W. |
| R3 | 17380 | Flexible, 425 Ω |
| R4 | 33230 | Flexible, 2000 Ω |
| R5 | 33210 | Flexible, 670 Ω |
| R6 | 20980 | Red-blue, .1 ℧, ½-W. |
| R7 | 21030 | Flexible, 2030 Ω |
| R8 | 25950 | Flexible, 200 Ω |
| R9 | 30340 | Red-blue, .1 ℧, 1/3-W. |
| R10 | 25840 | Flexible, 300 Ω |
| R11 | 30320 | Mar'n, 10,000 Ω, 1/3-W. |
| R12 | 20930 | Bl'k-purple, .5 ℧, ½-W. |
| R13 | 20940 | Green, 2 ℧, ½-W. |
| R14 | 30340 | Red-blue, .1 ℧, 1/3-W. |
| R15 | 28950 | Flexible, 160 Ω |
| R16 | 20980 | Red-blue, .1 ℧, ½-W. |
| R17 | 26160 | White, 40,000 Ω, ½-W. |
| R18 | 30360 | Blue-gray, 1 ℧, 1/3-W. |
| R19 | 32010 | Blue-red-green, 500 Ω, 1-W. |
| R20 | 20950 | Maroon, 10,000 Ω, ½-W. |
| R21 | 34340 | Yel.-red-bl'k, 50,000 Ω, 1½-W. |
| R22 | 20940 | Green, 2 ℧, ½-W. |
| R23 | 29710 | Gray, 30,000 Ω, 1½-W. |
| R24 | 31860 | Flexible, 1.0 Ω |
| R25 | 17077 | Flexible, 10 Ω |

### CONDENSERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| C1 | 31160 | .05 MF, 100-V., NI |
| C2 | 31160 | .05 MF, 100-V., NI |
| C3 | 31160 | .05 MF, 100-V., NI |
| C4 | 25032 | .00025 MF, 450-V. |
| C5 | 25837 | .0011 MF, 450-V. |
| C6 | 25034 | .003 MF, 450-V. |
| C7 | 25035 | .006 MF, 450-V. |
| C8 | 32810 | .01 MF, 450-V. |
| C9 | 27650 | 8 MMF, 500-V. |
| C10 | 27650 | 8 MMF, 500-V. |
| C11 | 25661 | 8 MMF, 500-V. |
| C12 | 25661 | 8 MMF, 500-V. |
| C13 | 31160 | .05 MF, 100-V., NI |
| C14 | 32810 | .01 MF, 450-V., NI |
| C15 | 31160 | .05 MF, 100-V., NI |
| C16 | 31160 | .05 MF, 100-V., NI |
| C17 | 31160 | .05 MF, 100-V., NI |
| C18 | 32810 | .01 MF, 450-V., NI |
| C19 | 31160 | .05 MF, 100-V., NI |
| C20 | 32810 | .01 MF, 450-V., NI |
| C21 | 31160 | .05 MF, 100-V., NI |
| C22 | 31160 | .05 MF, 100-V., NI |
| C23 | 35290 | 125 MMF, 500-V. |
| C24 | 35290 | 125 MMF, 500-V. |
| C25† | 29690 | .001-.004-.008-.016 MF (B15) |
| C26 | 33620 | 250 MMF, IND. |
| C27 | 27630 | .01 MF, 200-V., NI |
| C28 | 28130 | 500 MMF, 450-V., IND. |
| C29 | 27630 | .01 MF, 200-V., NI |
| C30 | 35930 | .25 MF, 200-V., NI |
| C31 | 25379 | 10 MF, 25-V. |
| C32 | 29530 | .03 MF, 200-V., NI |
| C33 | 31160 | .05 MF, 100-V., NI |
| C34 | 22538 | 8 MF, 475-V. |
| C35 | 22538 | 8 MF, 475-V. |
| C36 | 23250 | .01 MF, 450-V. |

† In late sets this condenser is No. 38260.

### CHOKES

| Code No. | Part No. | Name of Part |
|---|---|---|
| CK1 | 19210 | 1st detector plate filter choke |
| CK2 | 19210 | 1st I. F. plate filter choke |
| CK3 | 19210 | 2nd I. F. plate filter choke |
| CK4 | 25525 | Choke on speaker |

### TRIMMERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| A5 | 20190 | Single I. F. trimmer |
| A6, 7 | 32880 | Double I. F. trimmer |
| A8, 9 | 32880 | Double I. F. trimmer |
| A10, 11 | 32880 | Double I. F. trimmer |

### SOCKETS

| Part No. | Name of Part |
|---|---|
| 22733 | (6 prong) lower base |
| 22689 | Rectifier socket |
| 21336 | Speaker (4 prong) |
| 18449 | Fuse socket |
| 24494 | (6 prong) upper base |

### MISCELLANEOUS

| Part No. | Name of Part |
|---|---|
| 25059 | I. F. T. shield cap (with hole) |
| 25058 | I. F. T. shield cap (without hole) |
| 22865 | Bottom plate |
| 22683 | Tube shield |
| 26255 | I. F. T. shield insulator |
| 18534 | Fuse 2A |
| 25056 | I. F. T. shield |
| 24323 | Power T. cover |
| 25469 | Power T. insulator |
| 35380 | Dial light socket and reflector |
| 26793 | Instruction folder, F-1123 |
| 26237 | Shipping container |
| 27072 | Wave guide, F-1131 |
| 26934 | Tuning inst. tag, F-1124 |

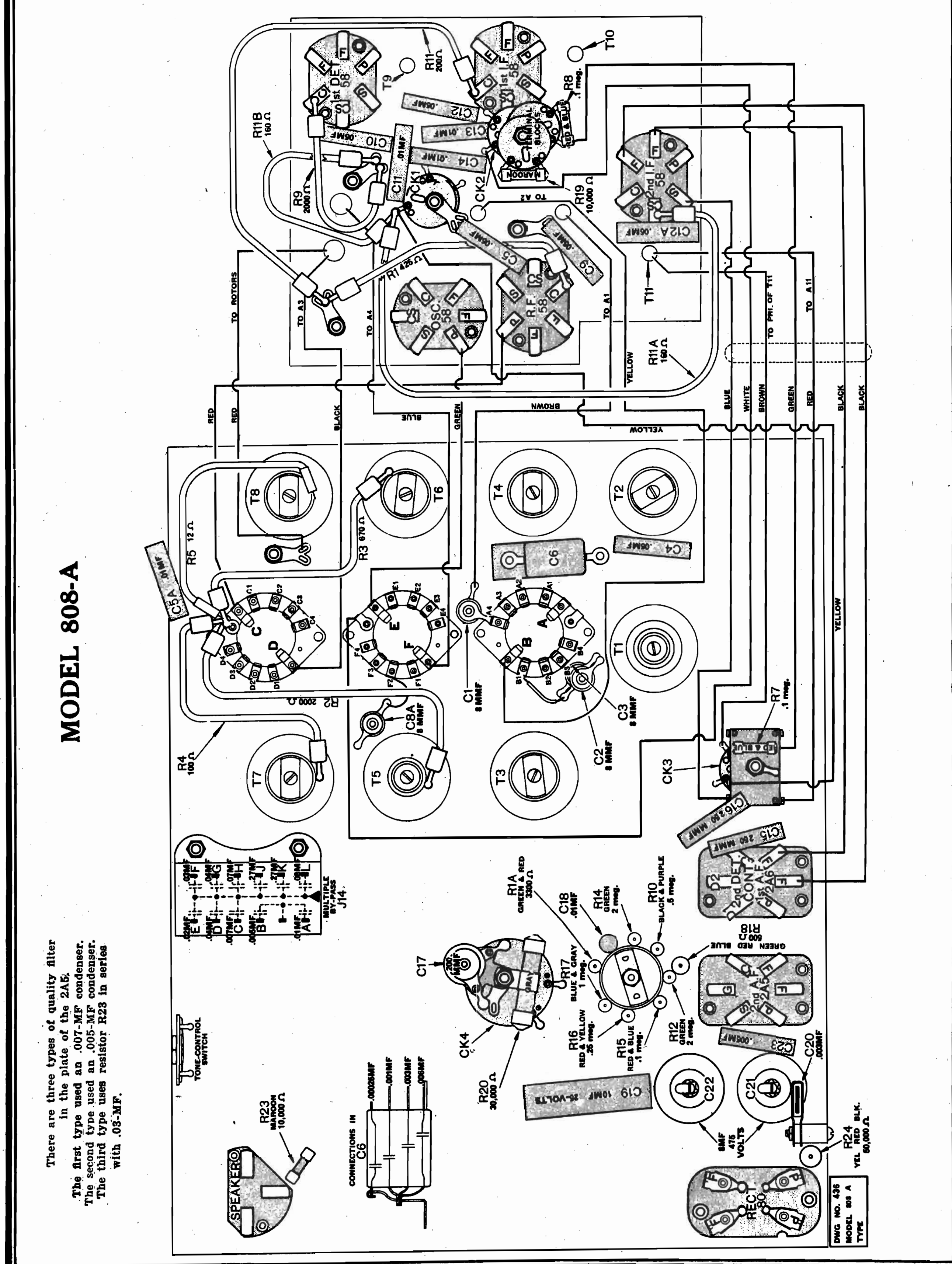
### 788 SPEAKER No. 39400

| Part No. | Name of Part |
|---|---|
| 20737 | Diaphragm |
| 26804 | Cable and plug |
| 18870 | Field coil |
| 15079 | Speaker plug |
| 25525 | Choke (CK4) |

Ω=ohms. ℧=megohms. IND.=inductive. NI=non-inductive. W.=watt.

MODEL 808-A
Chassis Wiring

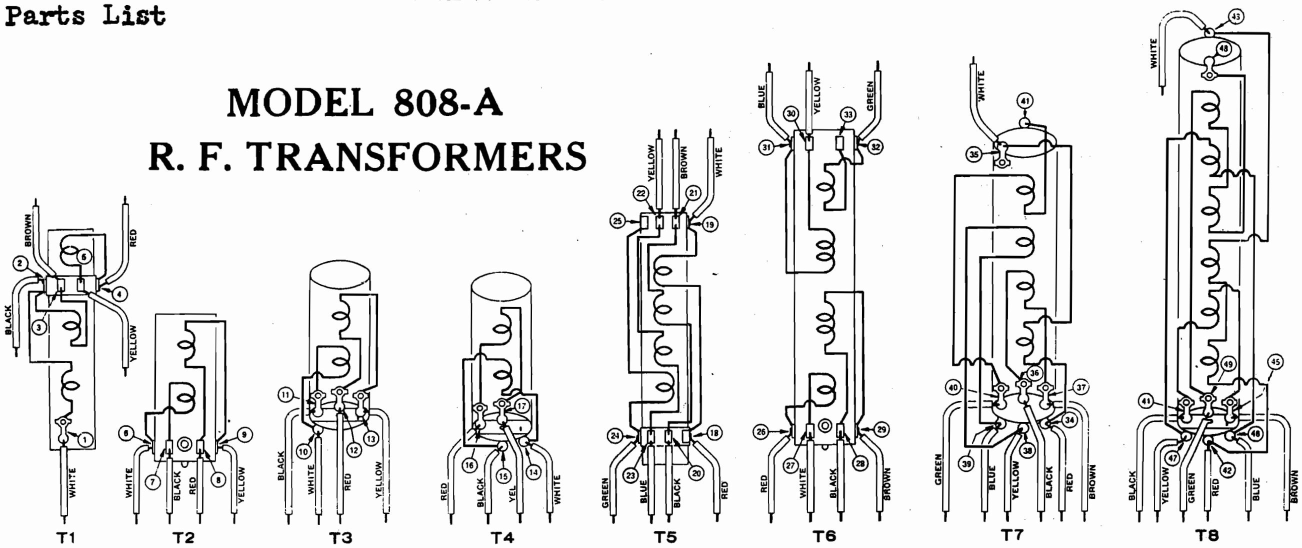
ATWATER-KENT MFG. CO.



MODEL 808-A
R.F.Transformers
Parts List

ATWATER-KENT MFG. CO.

# MODEL 808-A R. F. TRANSFORMERS




May, 1934

## MODEL 808-A

| Part No. | Name of Part |
|---|---|
| 24079 | Volume control, .5 Ʊ |
| 25689 | Shadow tuning indicator |
| 15404 | Shadow tuning lamp, 2.5-V. |
| 25871 | Shadow tuning plate |
| 25736 | Knob—tone and frequency |
| 25811 | Knob—volume and tuning |
| 24889 | Range switch |
| 25023 | Variable condenser assembly |
| 30560 | Tone control switch |
| 24207 | Tone control switch shaft and blade |
| 25144 | Dial plate |
| 25273 | Dial plate assembly |

### TRANSFORMERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| T1 | 32650 | No. 1 broadcast coil |
| T2 | 32670 | No. 1 H. F. coil, 1st range |
| T3 | 32690 | No. 1 H. F. coil, 2nd range |
| T4 | 32720 | No. 1 H. F. coil, 3rd range |
| T5 | 32660 | No. 2 broadcast coil |
| T6 | 32680 | No. 2 H. F. coil, 1st range |
| T7 | 32710 | No. 2 H. F. coil, 2nd range |
| T8 | 32730 | No. 2 H. F. coil, 3rd range |
| T9 | 26135 | No. 1 I. F. T. (tapped secondary) |
| T10 | 25503 | No. 2 I. F. T. (less trimmer) |
| T11 | 25503 | No. 3 I. F. T. (less trimmer) |
| T12 | 21672 | Output T. |
| T13 | 25221 | Power T. |

### RESISTORS

| Code No. | Part No. | Name of Part |
|---|---|---|
| R1 | 17380 | Flexible, 425 Ω |
| R1A | 26410 | Red-green, 3300 Ω, ½-W. |
| R2 | 33230 | Flexible, 2000 Ω |
| R3 | 33210 | Flexible, 670 Ω |
| R4 | 33220 | Flexible, 100 Ω |
| R5 | 33240 | Flexible, 12 Ω |
| R6 | 20980 | Red-blue, .1 Ʊ, ½-W. |
| R7 | 20980 | Red-blue, .1 Ʊ, ½-W. |
| R8 | 20980 | Red-blue, .1 Ʊ, ½-W. |
| R9 | 21030 | Flexible, 2000 Ω |
| R10 | 20930 | Bl'k-purple, .5 Ʊ, ½-W |
| R11 | 25950 | Flexible, 200 Ω |
| R11A | 28950 | Flexible, 160 Ω |
| R11B | 28950 | Flexible, 160 Ω |
| R12 | 20940 | Green, 2 Ʊ, ½-W. |
| R14 | 20940 | Green, 2 Ʊ, ½-W. |
| R15 | 20980 | Red-blue, .1 Ʊ, ½-W. |
| R16 | 20920 | Red-yellow, 250,000 Ω, ½-W. |
| R17 | 30360 | Blue-gray, 1 Ʊ, 1/3-W. |
| R18 | 32010 | Blue-red-green, 500 Ω, 1-W. |
| R19 | 20950 | Maroon, 10,000 Ω, ½-W. |
| R20 | 29710 | Gray, 30,000 Ω, 1½-W. |
| R21 | 17077 | Flexible, 10 Ω |
| R22 | 31860 | Flexible, 1 Ω |
| R23 | 20950 | Maroon, 10,000 Ω, ½-W. |
| R24 | 34340 | Yel.-red-bl'k, 50,000 Ω, 1½-W. |

### CONDENSERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| C1 | 27650 | 8 MMF, 500-V. |
| C2 | 27650 | 8 MMF, 500-V. |
| C3 | 27650 | 8 MMF, 500-V. |
| C4 | 31160 | .05 MF, 100-V., NI |
| C5 | 31160 | .05 MF, 100-V., NI |
| C5A | 32810 | .01 MF, 450-V., NI |
| C6 | 32480 | Tracking cond. assembly |
| C7 | 27650 | 8 MMF, 500-V. |
| C8 | 27650 | 8 MMF, 500-V. |
| C8A | 27650 | 8 MMF, 500-V. |
| C9 | 31160 | .05 MF, 100-V., NI |
| C10 | 31160 | .05 MF, 100-V., NI |
| C11 | 32810 | .01 MF, 450-V., NI |
| C12 | 31160 | .05 MF, 100-V., NI |
| C12A | 31160 | .05 MF, 100-V., NI |
| C13 | 32810 | .01 MF, 450-V., NI |
| C14 | 32810 | .01 MF, 450-V., NI |
| C15 | 33620 | 250 MMF, 450-V. |
| C16 | 33620 | 250 MMF, 450-V. |
| C17 | 21160 | 140-220 MMF, 450-V. |
| C18 | 27630 | .01 MF, 200-V., IND |
| C19 | 25379 | 10 MF, 25-V., dry elec. |
| C20 | 32740 | .003 MF, 500-V. |
| C21 | 22538 | 8 MF, 475-V. |
| C22 | 22538 | 8 MF, 475-V. |
| C23 | 29890 | .005 MF, 450-V., IND. |
| | 33060 | Multiple by-pass cond. |

### CHOKES

| Code No. | Part No. | Name of Part |
|---|---|---|
| CK1 | 19210 | 1st detector plate choke |
| CK2 | 19210 | 1st I. F. plate choke |
| CK3 | 19210 | 2nd I. F. plate choke |
| CK4 | 17015 | 2nd det. plate choke |

### TRIMMER CONDENSERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| A5 | 20190 | Single trimmer |
| | 32880 | Double I. F. trimmer |

### SOCKETS

| Part No. | Name of Part |
|---|---|
| 25196 | Speaker |
| 22689 | Rectifier |
| 22733 | 6 prong, lower base |
| 24494 | 6 prong, upper base |

### MISCELLANEOUS PARTS

| Part No. | Name of Part |
|---|---|
| 22683 | Tube shield |
| 25056 | I. F. shield |
| 25057 | Coil shields |
| 25059 | I. F. shield cover (with hole) |
| 25058 | I. F. shield cover (without hole) |
| 25929 | Inst. and log card, F-1086 |
| 25428 | Shipping container |
| 24323 | Power T. cover |

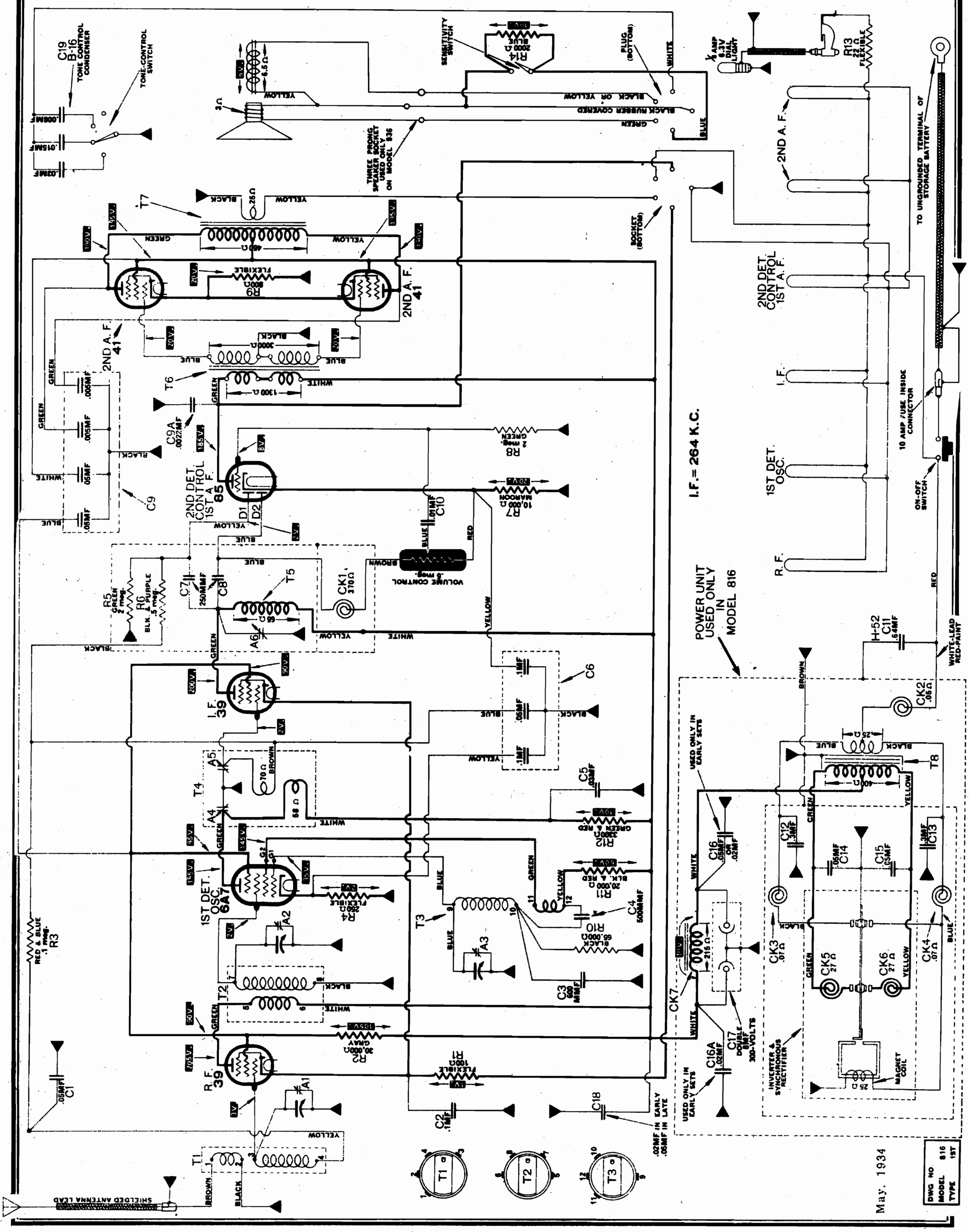
### 808-A SPEAKER No. 34500

| Part No. | Name of Part |
|---|---|
| 20737 | Diaphragm |
| 18870 | Field coil, 2000 Ω |
| 21672 | Output T. (T12) |
| 25405 | Cable and plug |

Ω = ohms. Ʊ = megohms. IND. = inductive.
NI = non-inductive. W. = watt.

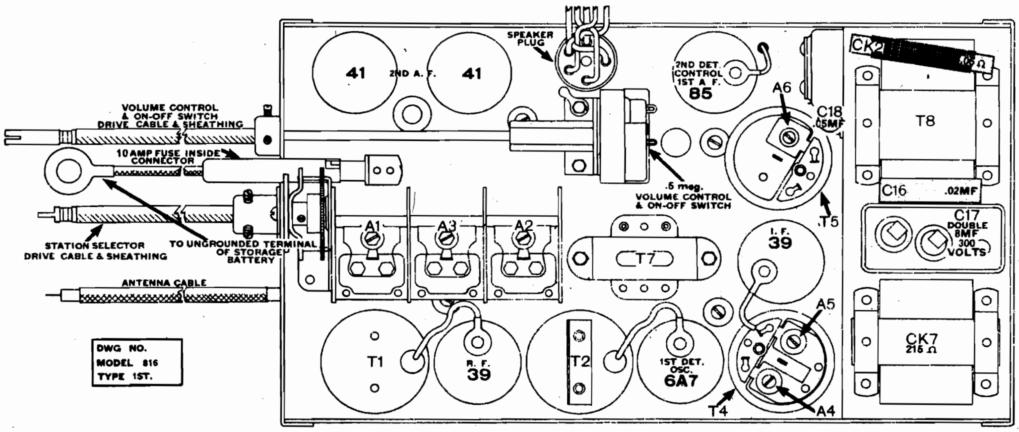
ATWATER-KENT MFG. CO.

MODEL 816,926,936(1st)
Schematic

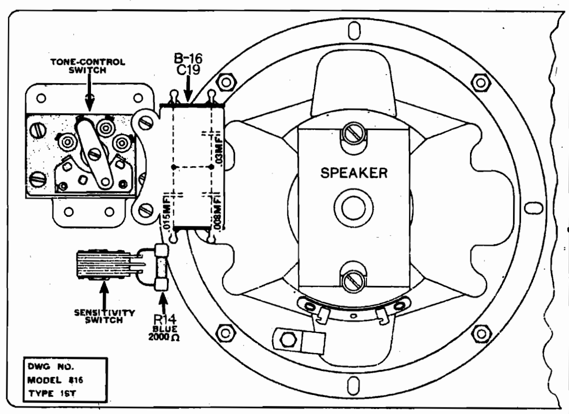


MODEL 816,926,936 (1st)
Socket,Trimmers,Parts,
Power Unit Schematic

ATWATER-KENT MFG. CO.

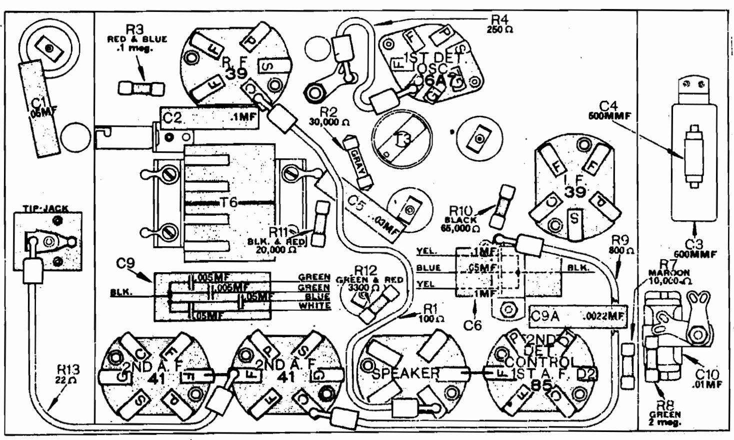



In late type sets, the "A" battery cable is brought out the top side, near the speaker plug.

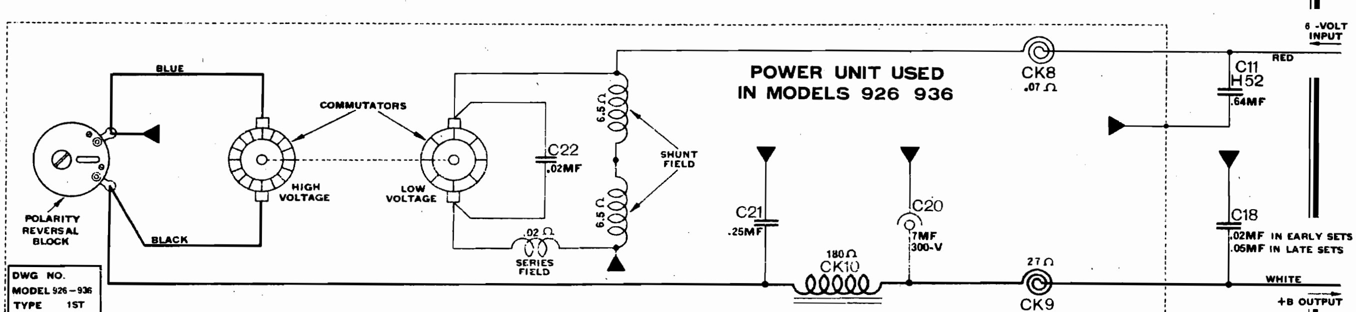



# 1st TYPES OF

# MODELS 816, 926 AND 936




Model 936 has a separate speaker which plugs into a three-prong socket on the inside of lid of set container.



MODEL 816,926,936 (1st)
Parts List

ATWATER-KENT MFG. CO.

# MODEL 816

(Below Serial No. 1121818)

| Part No. | Name of Part |
|---|---|
| 26586* | Set container complete, less lid |
| 26496 | Set container lid (bl'k) |
| 26549 | Tuning cable bushing |
| 26036 | Inner plate for above |
| 26102 | Polarity reversal cover |
| 26096 | Sound insulators (felt) |
| 26452 | Lid mounting bracket |
| 26128 | Thumbscrew |
| 19455 | Mounting washer |
| 26462 | Variable cond. assembly |
| 25478 | Grommet for var. cond. |
| 26072 | Shield for No. 1 I. F. T. |
| 26538 | Insulator for above shield |
| 26589 | Shield for No. 1 R. F. T. |
| 26591 | Shield for No. 2 R. F. T. |
| 25818 | Clamp for No. 36440 cond. |
| 26505 | Volume control, .5 ℧ |
| 26033 | Volume control bracket |
| 26039 | Volume control coupling |
| 24540 | Tone control switch |
| 26127 | Knob for above |
| 13664 | Sensitivity switch |
| 21143 | Plug suppressor |
| 21144 | Distributor suppressor |
| 23260 | Generator cond., 1 MF, 200-V. |

* When ordering cabinet, specify brown or black

## TRANSFORMERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| T1 | 35680 | No. 1 R. F. T. |
| T2 | 35690 | No. 2 R. F. T. |
| T3 | 35710 | Oscillator T. |
| T4 | 26592 | No. 1 I. F. T. |
| T5 | 26593 | No. 2 I. F. T. |
| T6 | 26606 | Audio input T. |
| T7 | 26478 | Audio output T. |
| T8 | 26291 | Power T. |

## RESISTORS

| Code No. | Part No. | Name of Part |
|---|---|---|
| R1 | 20040 | Flexible, 100 Ω |
| R2 | 20970 | Gray, 30,000 Ω, ½-W. |
| R3 | 30340 | Red-blue, .1 ℧, 1/3-W. |
| R4 | 31830 | Flexible, 250 Ω |
| R5 | 30370 | Green, 2 ℧, 1/3-W. |
| R6 | 30350 | Bl'k-purple, .5 ℧, 1/3-W. |
| R7 | 30320 | Mar'n, 10,000 Ω, 1/3-W. |
| R8 | 30370 | Green, 2 ℧, 1/3-W. |
| R9 | 20120 | Flexible, 800 Ω |
| R10 | 31980 | Bl'k, 65,000 Ω, 1/3-W. |
| R11 | 30390 | Red-bl'k, 20,000 Ω, 1/3-W. |
| R12 | 30380 | Red-green, 3300 Ω, 1/3-W. |
| R13 | 16840 | Flexible, 22 Ω |
| R14 | 33250 | Blue, 2000 Ω, 1/3-W. |

## CONDENSERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| C1 | 31160 | .05 MF, 100-V., NI |
| C2 | 31530 | .1 MF, 100-V., NI |
| C3 | 36460 | 600 MMF, 100-V. (mica) |
| C4 | 36510 | 500 MMF, 500-V. (mica) |
| C5 | 29530 | .03 MF, 200-V., NI |
| C6 | 36440 | .1, .05, .1 MF, 100-V., IND. |
| C7 | 33670 | 250 MMF, 500-V. |
| C8 | 33670 | 250 MMF, 500-V. |
| C9 | 36450 | .05, .05, .005, .005 MF, 200-V., IND. |
| C9A | 33660 | 2200 MMF, 450 V., IND. |
| C10 | 23250 | .01 MF, 450-V. |
| C11 | 36480 | .64 MF, H-52, 200-V. |
| C12 | 31150 | .3 MF, 100-V., NI |
| C13 | 31150 | .3 MF, 100-V., NI |
| C14 | 36490 | .05 MF, 450-V., NI |
| C15 | 36490 | .05 MF, 450-V., NI |
| C16* | 36490 | .05 MF 450-V., NI |
| C16A | 29030 | .02 MF, 450-V., NI |
| C17 | 26092 | 8 MF-8 MF, 300-V. (electrolytic) |
| C18** | 36880 | .02 MF, 450-V., NI |
| C19 | 30270 | Tone control cond. (B-16) |

* C16 is .02 MF, 450-V., NI 29030 in some of these sets.
** C18 is .05 MF, 200-V., NI 26820 in later sets.

## TRIMMERS

| Code No. | Part No. | Name of Part |
|---|---|---|
| A4, 5 | 37960 | Double I. F. trimmer |
| A6 | 36570 | Single I. F. trimmer |

## CHOKES

| Code No. | Part No. | Name of Part |
|---|---|---|
| CK1 | 26594 | 2nd detector plate choke |
| CK2 | 36630 | R. F. "A" filter choke |
| CK3 | 36610 | R. F. "A" filter choke |
| CK4 | 36610 | R. F. "A" filter choke |
| CK5 | 36620 | R. F. "B" filter choke |
| CK6 | 36620 | R. F. "B" filter choke |
| CK7 | 25416 | A. F. "B" filter choke |

## POWER UNIT ASSEMBLY

| Part No. | Name of Part |
|---|---|
| 26863 | Vibrator |
| 26854 | Rubber (2) |
| 26855 | Rubber (1) |
| 26061 | Inside vibrator container |
| 26062 | Lid for above |
| 2652' | Grommet |
| 2608. | Tubular condenser clamp |
| 26663 | Middle container body |
| 26091 | Middle container lid |
| 26136 | Vibrator lid insulator |
| 26664 | Outer container body |
| 26665 | Outer container lid |

## SPEAKER

| Part No. | Name of Part |
|---|---|
| 26851 | Speaker less cable |
| 26826 | Cone head assembly |
| 26827 | Field coil, 6.5 Ω |
| 26559 | Speaker cable and plug |

## MISCELLANEOUS PARTS

| Part No. | Name of Part |
|---|---|
| 21878 | Disc shield, No. 2 I. F. T. |
| 26578 | Disc (insul.) for No. 2 I. F. T. |
| 21406 | Fuse, 10 amp. |

## REMOTE CONTROL HEAD

| Part No. | Name of Part |
|---|---|
| 26646 | Remote control head complete with mounting parts (less cables) |
| 26893 | Pointer gear (fibre) |
| 26894 | Spring washer |
| 26108 | Mounting strap and bushing |
| 26884 | Head assembly |
| 26892 | Pointer and shaft |
| 26886 | Screw No. 4—36 x ¼ |
| 26888 | Cork gasket |
| 26889 | Dial assembly |
| 26891 | Diffusing strip |
| 26107 | Mounting bracket |
| 26528 | Screw ¼—20 x ½ |
| 26104 | Assem. vol. cont. cable, 35 in. |
| 26105 | Assembled tuning cable, 31 in. |
| 26109 | Key |
| 26887 | Glass |
| 27118 | Lamp (6-8-V., ⅛A), green |
| 26895 | Gear shaft assembly |
| 26896 | Tuning knob |
| 27312 | Tuning knob spring |
| 26897 | Key knob |
| 26898 | Screw No. 10—32 x ¼ F. H. cup pt. |
| 26899 | Shielded wire (dial lite lead) |
| 26901 | Wire clamp |
| 26531 | Screw ¼—20 x ⅞ |
| 24082 | Wire tip |
| 27059 | Steering column mounting bracket assembly |
| 26107 | Mounting bracket (column type) |
| 26531 | Column clamp screw |
| 26108 | Column clamp |
| 21141 | Lockwasher |
| 26528 | Mounting screw |
| 26943 | Panel mounting bracket assem. |
| 26944 | Mounting bracket (panel type) |
| 26945 | Wing screws |
| 26946 | Flat head screws |
| 26947 | Felt pad |

## EXTRA LENGTH ASSEMBLED CABLES

| Part No. | Name of Part |
|---|---|
| 27114 | Assem. vol. cont. cable, 3½ ft. |
| 27115 | Assembled tuning cable, 3½ ft. |
| 27016 | Assem. vol. cont. cable, 11 ft. |
| 27017 | Assembled tuning cable, 11 ft. |

# MODEL 926

(Below Serial No. 8276401)

Model 926 speaker and chassis is identical to Model 816, but the 926 uses a genemotor power unit

# POWER UNIT MODELS 926 and 936

| Part No. | Name of Part |
|---|---|
| 26093 | Power unit container |
| 26942 | Lid for above |
| 36610 | R F "A" filter choke (CK8) |
| 36620 | R F "B" filter choke (CK9) |
| 22359 | A F "B" filter choke (CK10) |
| 26864 | 7 MF, 300-V., dry electrolytic (C20) |
| 35930 | .25 MF, 200-V., NI (C21) |
| 36420 | .02 MF, 200-V., IND. (C22) |

## GENEMOTOR No. 26734

| Part No. | Name of Part |
|---|---|
| 26964 | Motor end bracket assembly |
| 26965 | Generator end bracket assembly. |
| 26966 | Generator brushes assembly |
| 26967 | Motor brushes assembly |
| 26968 | Field coils and field core assembly |
| 26969 | Field coils set |
| 26971 | Armature |
| 26972 | Ball bearing |
| 26973 | Motor mounting bracket |
| 26974 | Rubber bumpers |
| 26975 | Steel studs 4⅝" x 8/32 thd. |
| 26976 | Hex. iron nuts—cadmium plated |
| 26977 | Ground lug |
| 26978 | 2⅝" long—No. 18 extra flexible bare ground lead |
| 27043 | Field core assembly |
| 27044 | Shunt field (2 leads) |
| 27045 | Shunt and series field (4 leads) |

# MODEL 936

(Below Serial No. 4542201)

Model 936 chassis is identical to Model 816, but the 936 uses a genemotor power unit (listed above), and a separate speaker (listed below).

| Part No. | Name of Part |
|---|---|
| 26806 | Lid |
| 25196 | Socket (3 prong) |
| 26831 | Cable and plug assembly (5 wire) |
| 21963 | Tone control knob |

## 936 SPEAKER No. 38900

| Part No. | Name of Part |
|---|---|
| 26822 | Diaphragm |
| 30710 | Field coil |
| 26823 | Cable and plug assembly (3 wire) |

Ω=ohms. ℧=megohms. IND.=inductive. NI=non-inductive. W.=watt.

1935 Set Model Specifications

ATWATER-KENT MFG. CO.

# DATA FOR CURRENT MODELS

The last figure in the model number indicates the number of tubes; for instance, Model 145 has 5 tubes; Model 511 has 11 tubes, etc. The letter "Q" indicates battery operation; the letter "D" indicates D. C. operation; the letter "Z" indicates 32-volt operation.

All models listed below have tone control, and all models with exception of 465Q and 655Q have automatic volume control. All models have dynamic speakers, with exception of battery sets, which have special magnetic speakers.

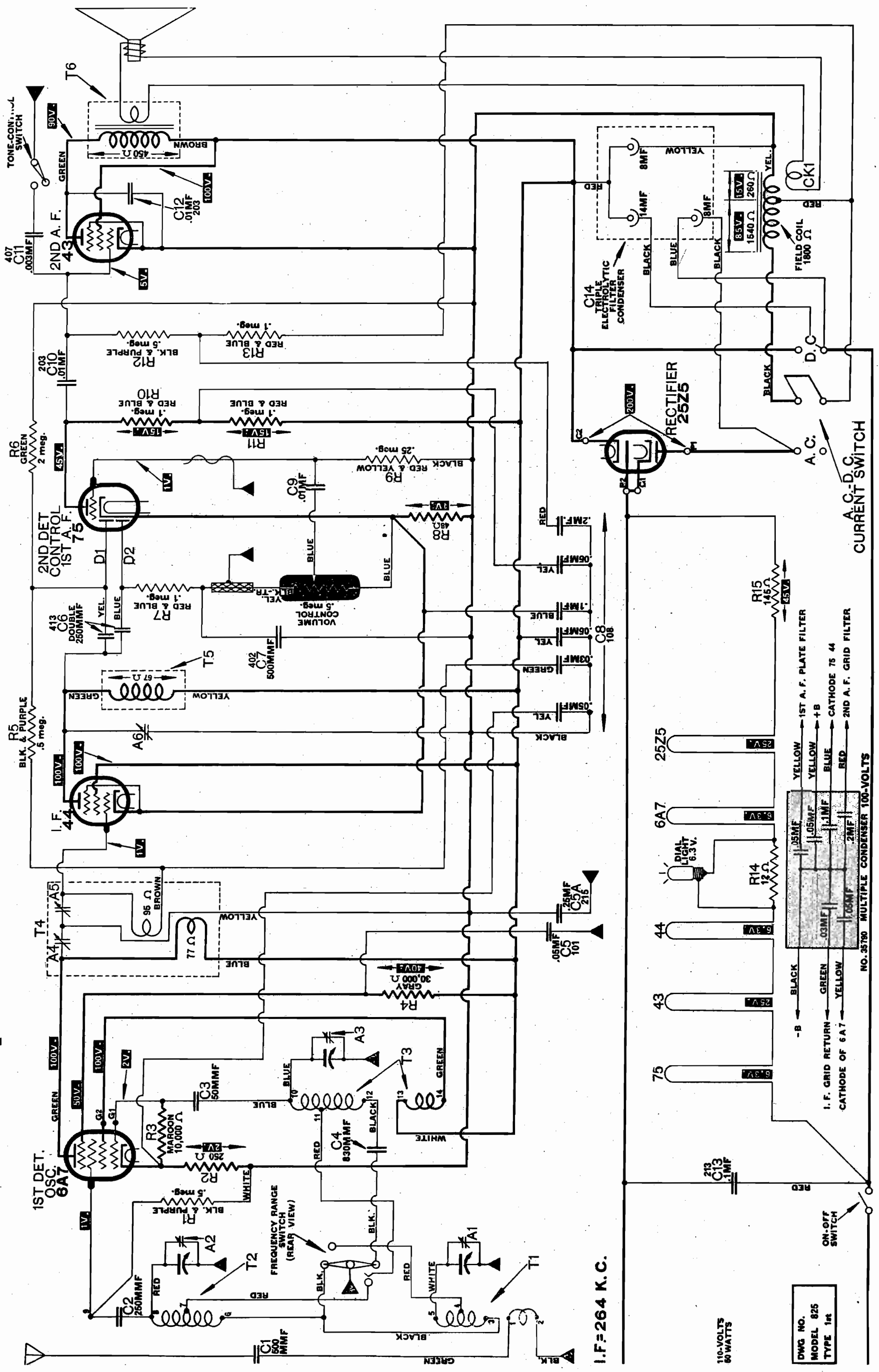
| Model | Type | Cabinet | Power Supply | I. F. Frequency | Part No. Speaker | Line Watts | Output Watts | Shadow Tuning | Silencing Adjustment | Frequency Range | Tubes: R. F. | 1st Det. | Oscillator | I. F. | 2nd Det. | AVC. | 1st A. F. | 2nd A. F. | 3rd A. F. | 4th A. F. | Rectifier |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 112 | All Wave | Console | 110V, 60C | 472½ | 36700 | 150 | 15 | YES | YES | 540-18000 | 58 | 58 | 58 | 58(2) | —2B7— | | | 56 | 56(2) | 2A3(2) | 5Z3 |
| 145 | Standard and Short Wave | Compact | 110V, 60C | 264 | 42100 | 60 | 3.3 | NO | NO | 540-1600<br>1.6-4.8<br>5.3-16 | .. | —2A7— | | 58 | —2A6— | | | 2A5 | .. | .. | 80 |
| 206 | Standard and Short Wave | Compact | 110V, 60C | 472½ | 41900 | 80 | 3.3 | NO | NO | 540-1600<br>1.6-5.0<br>5.7-15.5 | 58 | —2A7— | | 58 | —2A6— | | | 2A5 | .. | .. | 80 |
| 318 | All Wave | Console | 110V, 60C | 472½ | 41600 | 120 | 6.6 | YES | YES | 540-22500 | 58 | —2A7— | | 58(2) | —55— | | | 2A5(2) | .. | .. | 80 |
| 325 | Standard and Short Wave | Console | 110V, 60C | 264 | 41800 | 60 | 3.3 | NO | NO | 540-1600<br>1.6-4.8<br>5.3-16 | .. | —2A7— | | 58 | —2A6— | | | 2A5 | .. | .. | 80 |
| 376 | Standard and Short Wave | Console | 110V, 60C | 472½ | 43700 | 80 | 3.3 | NO | NO | 540-1600<br>1.6-5.0<br>5.7-15.5 | 58 | —2A7— | | 58 | —2A6— | | | 2A5 | .. | .. | 80 |
| 447 | All Wave | Compact | 110V, 60C | 472½ | 41700 | 90 | 3.3 | YES | YES | 540-22500 | 58 | —2A7— | | 58(2) | —2A6— | | | 2A5 | .. | .. | 80 |
| 511* | Standard and Short Wave | Console | 110V, 60C | 472½ | 36700 | 150 | 15 | YES | NO | 540-1600<br>5.5-15.5 | 58 | —2A7— | | 58(2) | —2B7— | | | 56 | 56(2) | 2A3(2) | 5Z3 |
| 559 | All Wave | Console | 110V, 60C | 472½ | 36500 | 120 | 6.6 | YES | YES | 540-18000 | 58 | 58 | 58 | 58(2) | —55— | | | 2A5(2) | .. | .. | 80 |
| 944 | Broadcast | Compact | 110V, 60C | 450 | 34100 | 45 | 2.0 | NO | NO | 540-1720 | .. | —57— | | .. | 57 | .. | .. | 2A5 | .. | .. | 80 |
| 465Q | Standard and Short Wave | Compact | 2V | 264 | 42900 | ** | 1 | NO | NO | 540-1600<br>1.6-4.8<br>5.3-16 | .. | —1C6— | | 34 | 32 | .. | 30 | 19 | .. | .. | .. |
| 655Q | Standard and Short Wave | Console | 2V | 264 | 43200 | ** | 1 | NO | NO | 540-1600<br>1.6-4.8<br>5.3-16 | .. | —1C6— | | 34 | 32 | . | 30 | 19 | .. | .. | .. |
| 768Q | All Wave | Compact | 2V | 472½ | 43100 | †† | 1 | NO | NO | 540-22500 | .. | —1C6— | | 34(2) | -30- | | 32 | 30 | 30(2) | .. | .. |
| 978Q | All Wave | Console | 2V | 472½ | 43200 | †† | 1 | NO | NO | 540-22500 | .. | —1C6— | | 34(2) | -30- | | 32 | 30 | 30(2) | .. | .. |
| 206D | Standard and Short Wave | Compact | 110V, DC | 472½ | 43500 | 45 | 2 | NO | NO | 540-1600<br>1.6-5.0<br>5.7-15.5 | 78 | —6A7— | | 78 | —85— | | | 43(2) | .. | .. | .. |
| 376D | Standard and Short Wave | Console | 110V, DC | 472½ | 43600 | 45 | 2 | NO | NO | 540-1600<br>1.6-5.0<br>5.7-15.5 | 78 | —6A7— | | 78 | —85— | | | 43(2) | .. | .. | .. |
| 135Z | Standard and Short Wave | Compact | 32V | 264 | 42700 | 40 | 2 | NO | NO | 540-1600<br>1.6-4.8<br>5.3-16 | .. | —6A7— | | 78 | —75— | | | 43 | .. | .. | 6Z4 |
| 215Z | Standard and Short Wave | Console | 32V | 264 | 42800 | 40 | 2 | NO | NO | 540-1600<br>1.6-4.8<br>5.3-16 | .. | —6A7— | | 78 | —75— | | | 43 | .. | .. | 6Z4 |
| 825 | AC-DC | Compact | 110V, AC-DC | 264 | 26159 | 50 | 1.0 | NO | NO | 540-1720† | .. | —6A7— | | 39 | —75— | | | 43 | .. | .. | 25Z5 |

* Model 511 has automatic tuning. † Has switch to tune in the 2400 kilocycle police band. ** "B" drain, 22 MA. †† "B" drain, 25 MA.

ATWATER-KENT MFG. CO.

MODEL 825 AC-DC
Schematic

Switch in Broadcast position




# MODEL 825 (A. C.—D. C.)

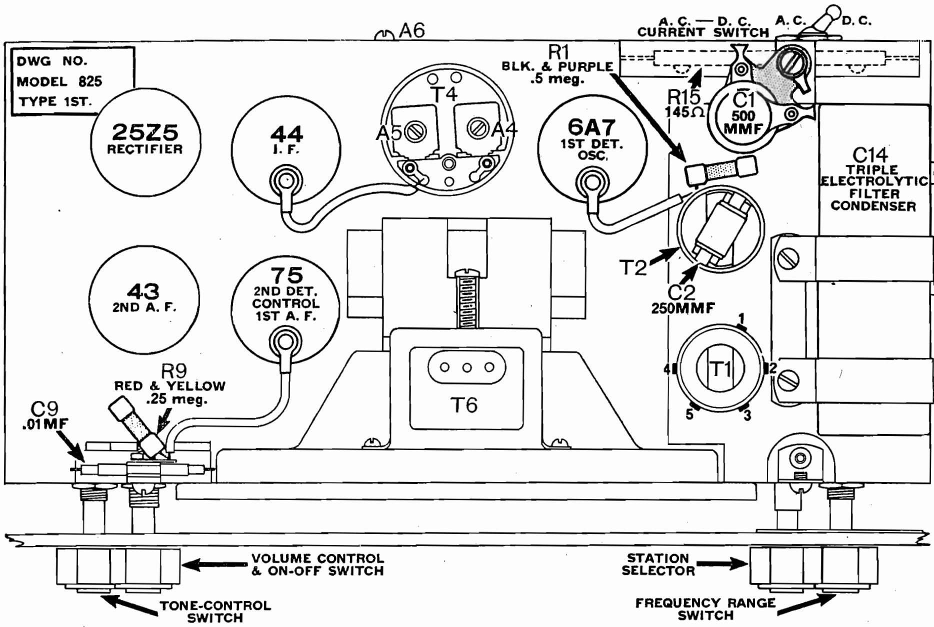
For Alignment Data and Parts List, see Index

September, 1934.

MODEL 825 AC-DC
Socket, Trimmers
Parts Layout

ATWATER-KENT MFG. CO.

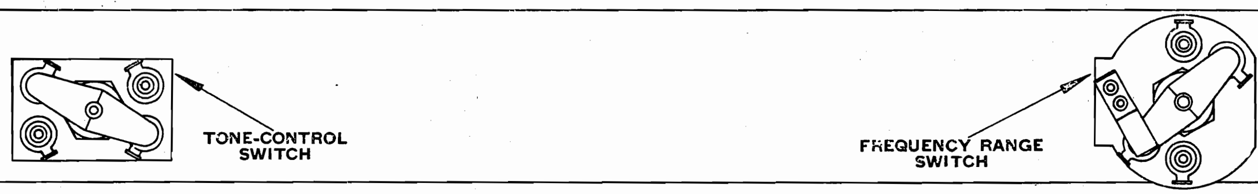
# MODEL 825 (A. C.—D. C.)

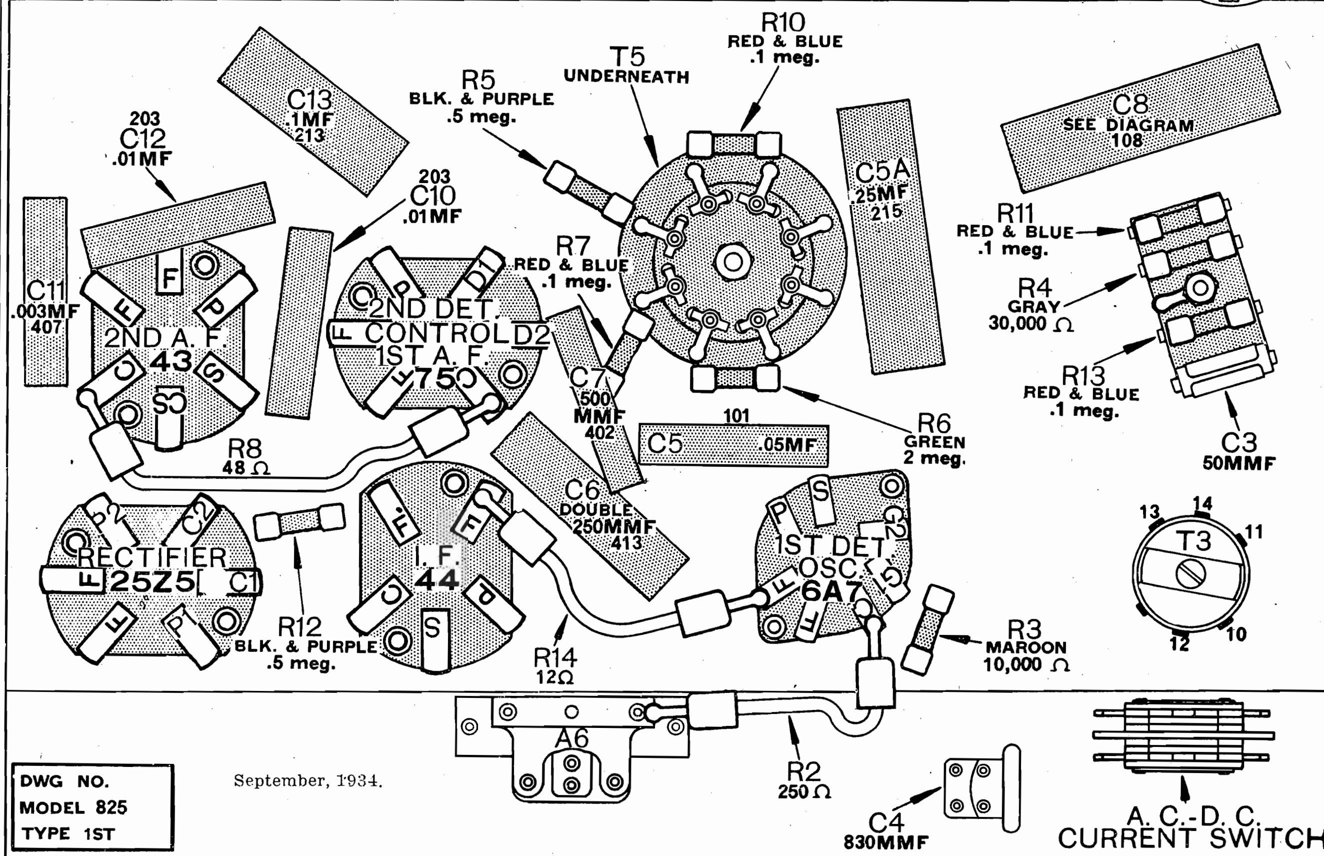



(I. F. = 264 KC.)

Trimmers A1, A2 and A3 are adjusted at 1500 KC.

A4, A5 and A6 are adjusted at 264 KC.



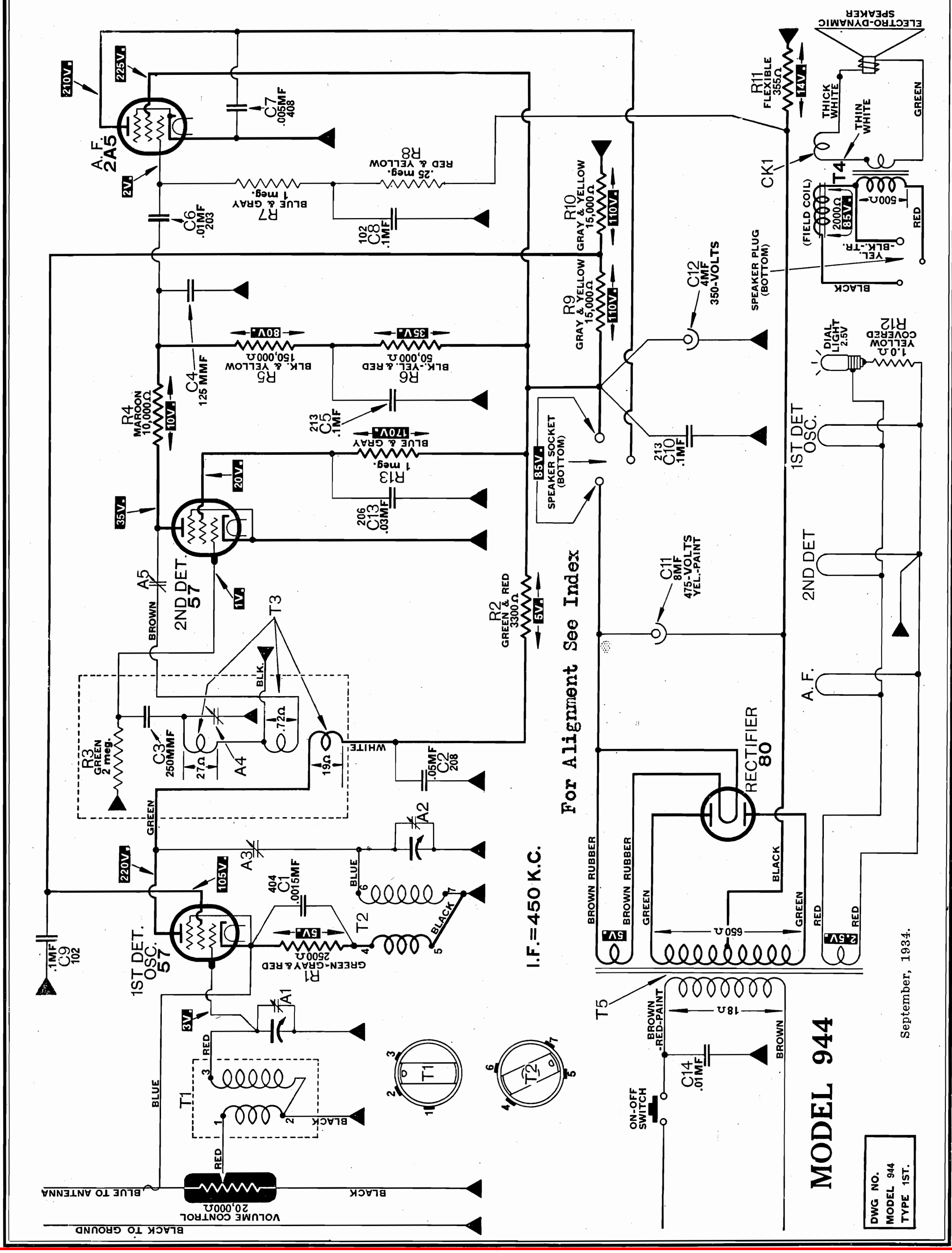




DWG NO.
MODEL 825
TYPE 1ST

September, 1934.

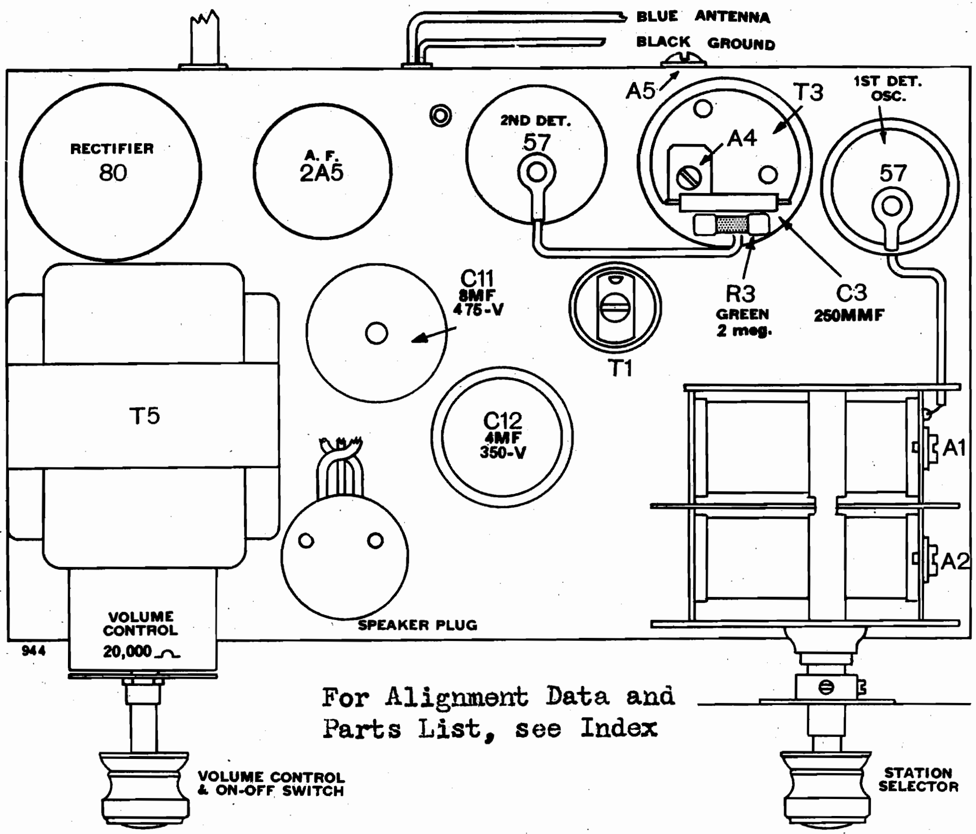
MODEL 944
Schematic

ATWATER-KENT MFG. CO.



MODEL 944
Socket, Trimmers
Parts Layout

## ATWATER-KENT MFG. CO.




Trimmers A1 and A2 are adjusted at 1500 KC.

Trimmers A3 and A4 are adjusted at 450 KC.

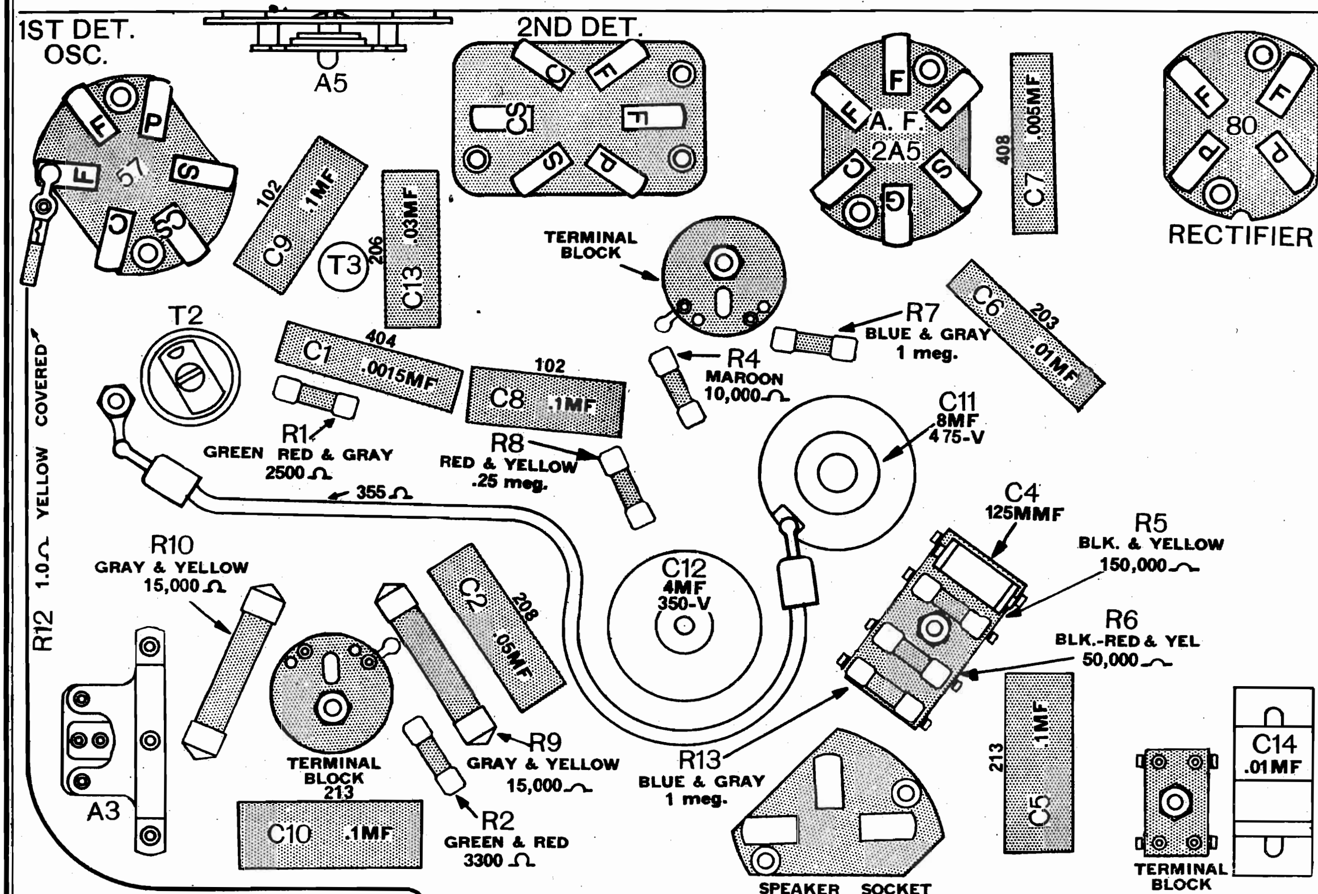
Trimmer A5 controls sensitivity, and is adjusted in accordance with instructions at about 1100 KC.

(I. F. = 450 KC.)

# MODEL 944

For Alignment Data and Parts List, see Index

944
September, 1934.



**MODEL 346, B-6**
**Schematic, Socket**
**Alignment**

# AUDIOLA RADIO CO.

## Six Tube Auto Radio

This receiver is a six tube superheterodyne using the most modern circuit design and tubes. Tubes used are: one 6D6 R.F. Amplifier; one 6A7 combination 1st detector and oscillator; one 6D6 I.F. Amplifier; a 75 diode detector with delayed A.V.C. and one stage audio; one 41 power output tube; and one 84 rectifier tube.

In the installation of this receiver there are a few important fundamental principles to adhere to:

(1) Avoid having any battery wires in close relation to the high voltage spark coil or plug wires.

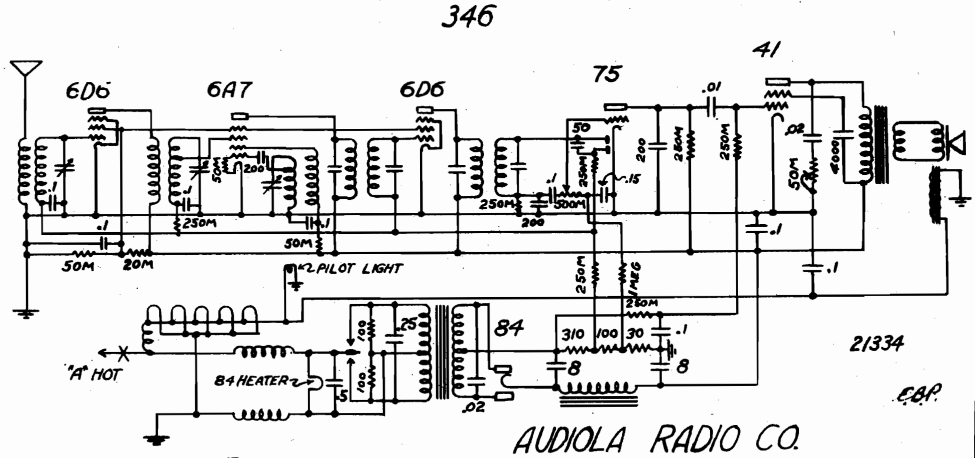
(2) The antenna must be routed over the most quiet location. Interference will often go through the antenna shielding if touching brake, accelerator, or steering column rods. The lead in must be shielded up to the antenna and the shield bonded to the set chassis. In many installations the antenna shield must also be bonded to the chassis of the car where the shield turns up to the top.

(3) If the chassis has to be removed from housing, be certain to tighten the three screws on the bottom when replacing the chassis.

(4) After installation is completed, adjust antenna trimmer on some distant station around 1400 to 1500 K.C. turn in either direction for loudest signal. The antenna trimmer is directly under the serial number on the top of the set. The front cover screws must always be tight.

(5) The gang condenser control (tuning) must run very freely and have not less than 1/32 of an inch end play.

346




IF PEAK 177.5 KC.

SPECIAL INSTRUCTIONS FOR ELIMINATING INTERFERENCE

Shield antenna lead-in and bond the shield to frame at center post. If antenna comes down front post, shield as high as possible and also ground the shield to dash.

In case of antenna pick-up, use heavy "A" choke and double condenser as in diagram #1.

In case of chassis pick-up, separate primary and high tension ignition wires, shield and ground the shield at both ends.

In Chevrolets, it is sometimes necessary to shield the floorboards on the right hand side and ground with floorboard screws.

In Ford V8 shield primary and "A" lead to generator separately and ground shields to spark plug housing brackets as in diagram #2.

In case of floating power, bond center bolt on Audiola set to motor block.

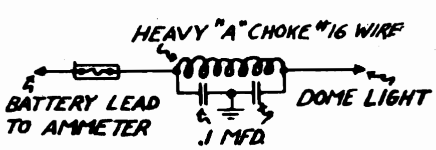
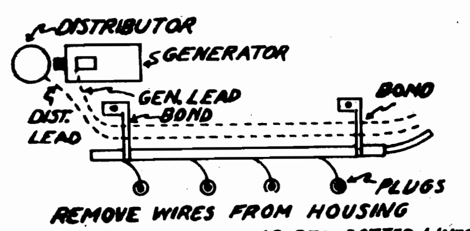



DIAGRAM #1

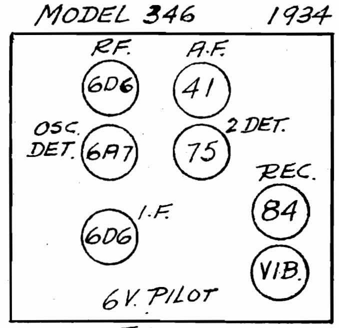



REMOVE WIRES FROM HOUSING TUBE AND SHIELD AS PER DOTTED LINES

DIAGRAM #2

MODEL B-6 IS SAME AS 346, EXCEPT MODEL B-6 HAS NO TONE CONTROL

MODEL 346 1934




FRONT

MODEL 347
Schematic,Socket
Alignment

# AUDIOLA RADIO CO.

## Seven Tube Auto Radio

This receiver is a seven tube superheterodyne using the most modern circuit design and tubes. Tubes used are: one 6D6 R.F. Amplifier; one 6A7 combination 1st detector and oscilator; one 6D6 I.F. Amplifier; an 85 diode detector with delayed A.V.C. and one stage audio; two 41 power output tubes and one 84 rectifier tube.

In the installation of this receiver there are a few important fundamental principles to adhere to:

(1) Avoid having any battery wires in close relation to the high voltage spark coil or plug wires.

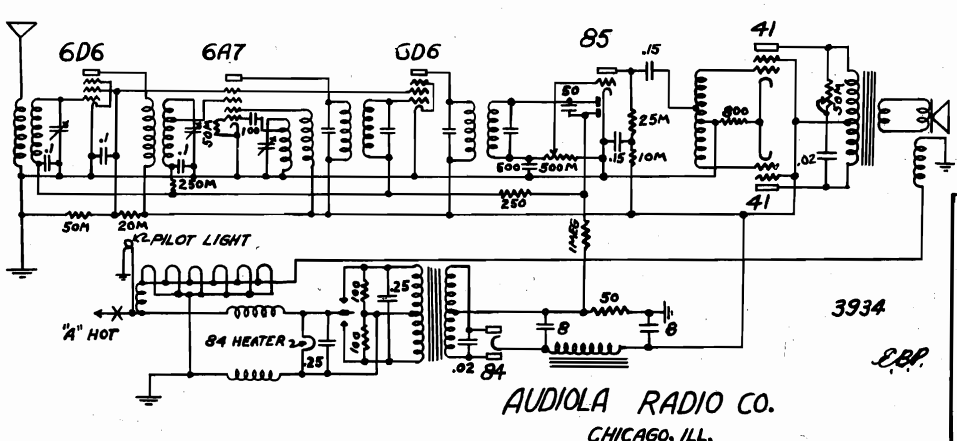
(2) The antenna must be routed over the most quiet location. Interference will often go through the antenna shielding if touching brake, accelerator, or steering column rods. The lead in must be shielded up to the antenna and the shield bonded to the set chassis. In many installations the antenna shield must also be bonded to the chassis of the car where the shield turns up to the top.

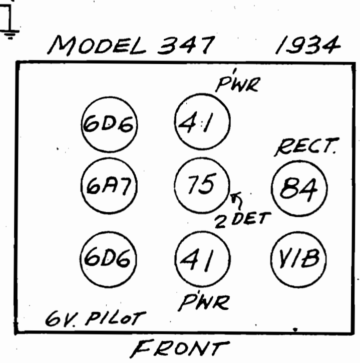
(3) If the chassis has to be removed from housing, be certain to tighten the three screws on the bottom when replacing the chassis.

(4) After installation is completed, adjust antenna trimmer on some distant station around 1400 to 1500 K.C. turn in either direction for loudest signal. The antenna trimmer is directly under the serial number on the top of the set. The front cover screws must always be tight.

(5) The gang condenser control (tuning) must run very freely and have not less than 1/32 of an inch end play.

347




# NO SUPPRESSORS

AudiolA is first to develop an auto radio that eliminates motor noise without the use of spark plug suppressors.

This is an important engineering advancement in the auto radio art. We are pleased to have made this contribution to the radio industry.

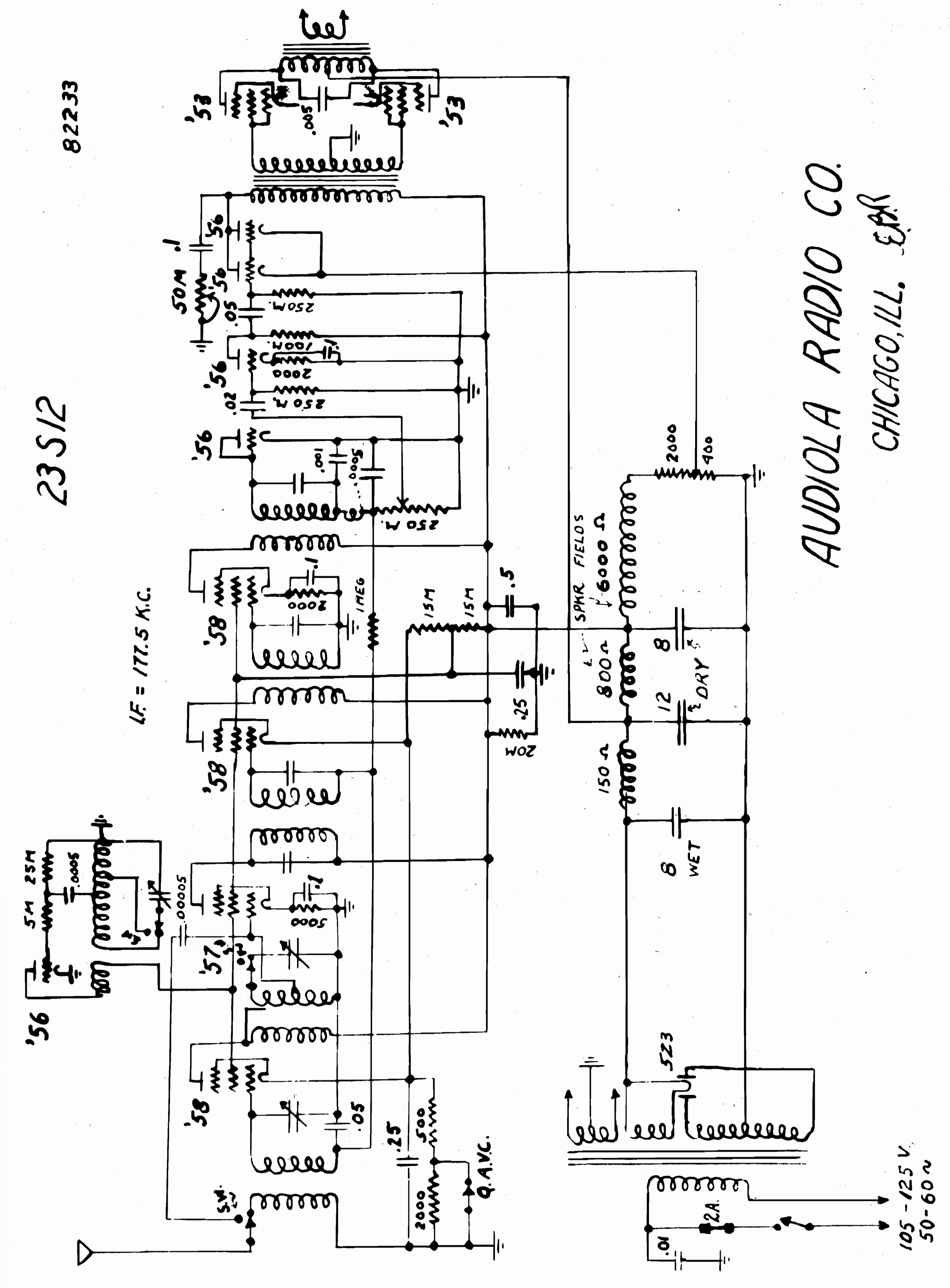
It is important that you understand this new pioneering development.

We have successfully installed the AudiolA auto radio without spark plug suppressors, and eliminated all motor noise and other noise, from every car that we have tried. This has covered almost every make and model of automobile.

For Elimination of Interference data, see Model 346.

AUDIOLA RADIO CO.

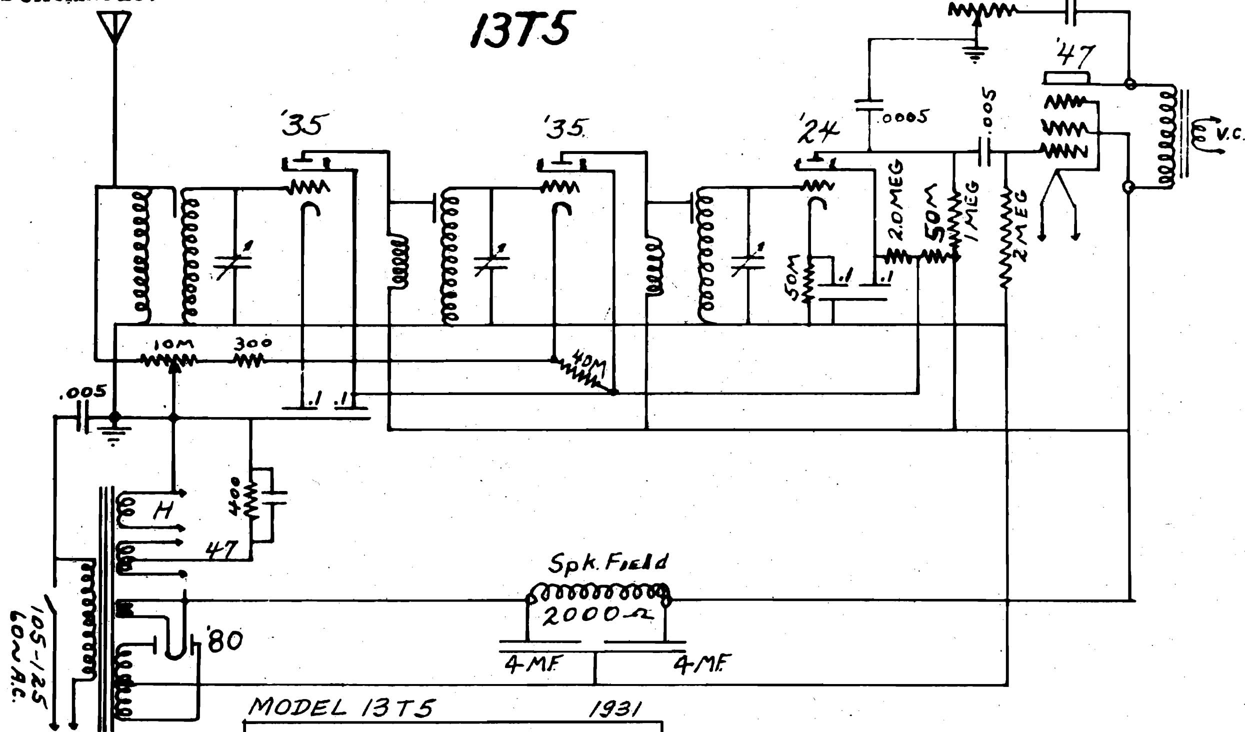
MODEL 23-S-12 (Revised)
Schematic

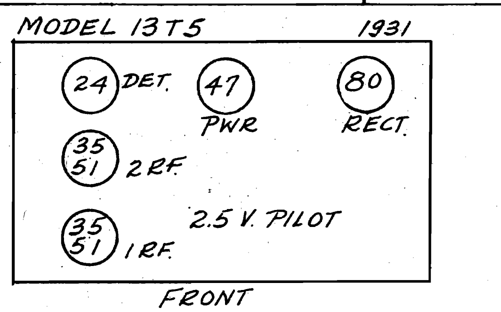


MODEL 13-T-5
Schematic, Socket
MODEL 33-S-5 (Revised)
Schematic.

AUDIOLA RADIO CO.

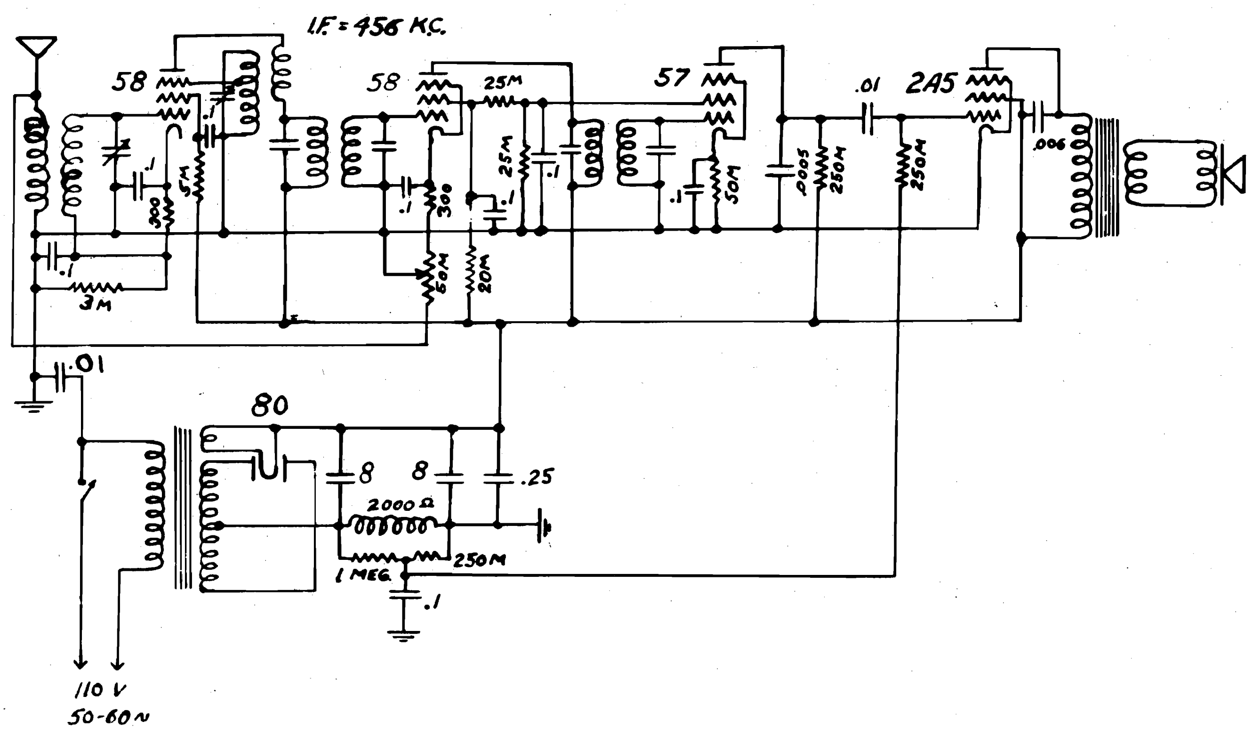
13T5



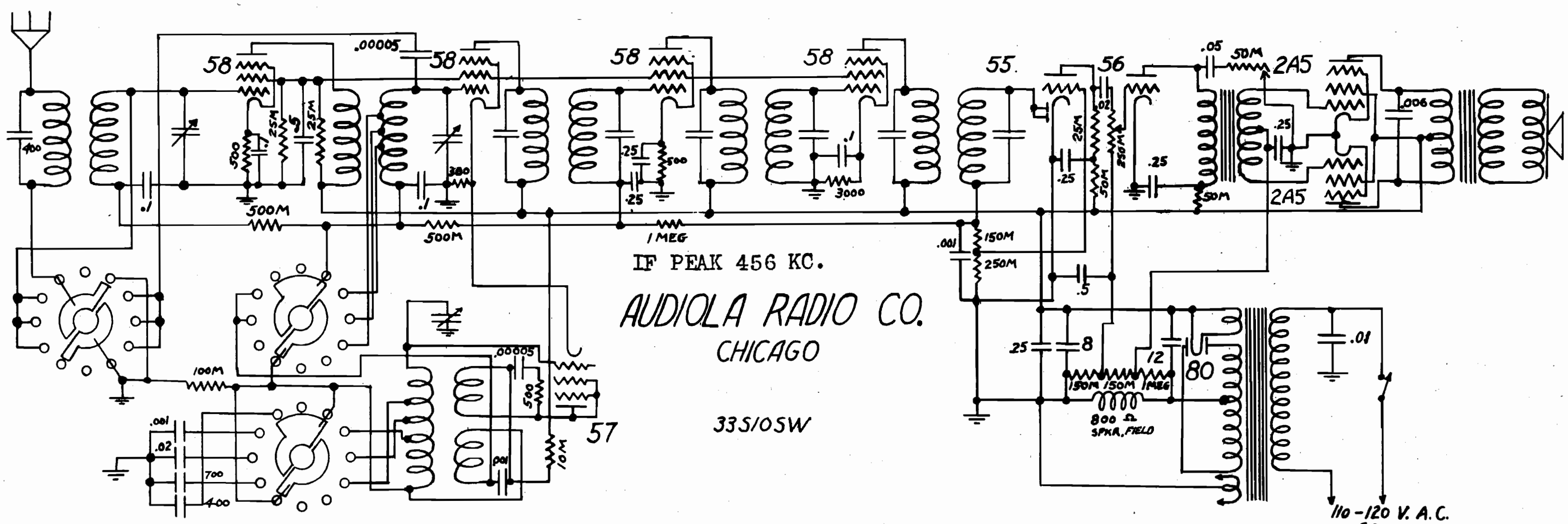

Audiola Radio Co.
Chicago
# 9631

33S5



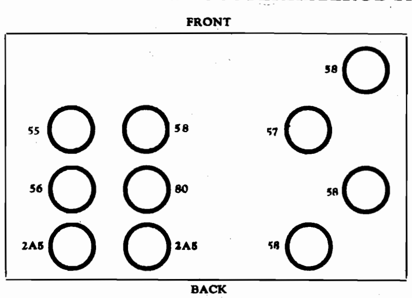
**MODEL 33-S-10 SW**
**Schematic, Socket**
**Alignment**

# AUDIOLA RADIO CO.




INSTRUCTION SHEET– 102333

## 10 TUBE SHORT-WAVE SUPERHETERODYNE




A. C. - 60 CYCLES
105 - 125 VOLTS

RED WIRE - ANTENNA
BLACK WIRE - GROUND

USE GOOD OUTSIDE AERIAL
AND GROUND

10 TUBES REQUIRED
1 - 55
1 - 56
1 - 57
4 - 58
2 - 2A5
1 - 80

FRONT PANEL

STATION SELECTOR

OFF TONE

VOLUME

1 2 3 4
BAND SWITCH

## OPERATING INSTRUCTIONS FOR TEN TUBE SHORT WAVE SUPERHETERODYNE

A drawing is included showing correct placement and type of tubes.

This receiver covers a frequency range of 540 to 20,000 kilocycles (555 to 15 meters) by the use of four overlapping wave bands, each selected by means of the band switch as indicated.

When the band switch is in extreme left position, set covers band No. 1, which is the broadcast band, and subsequent positions cover the other three bands.

Band No. 1 readings may be converted to kilocycles by adding two ciphers (multiplying by 100). Bands Nos. 2, 3, and 4 are calibrated in megacycles and may be converted into kilocycles by adding three ciphers (multiplying by 1000).

Too much emphasis cannot be placed on the desirability of tuning the set extremely slowly when tuning on bands Nos. 2, 3, and 4. Due to extreme sharpness and selectivity in these positions, stations would be otherwise passed by unless the tuning operation is done slowly. The foregoing is especially true when "tuning in" weak and far-distant stations.

Under the right conditions of time, location, and weather, one may reasonably expect to tune in distant or foreign stations. We do not make unsubstantiated claims that it is possible to tune in foreign stations at will.

There is very little "static" in the short wave bands, but due to the extreme sensitivity, all sorts of electrical disturbances may be heard if conditions are not correct. Even the ignition system of a passing car may impair reception. Practice proper handling and tuning of the short wave bands and you will be rewarded with many interesting and entertaining broadcasts.

Always bear in mind the difference in time in different parts of the world when tuning for foreign stations. For example, when it is seven o'clock in the evening in Chicago, it is two o'clock in the morning in most of Europe.

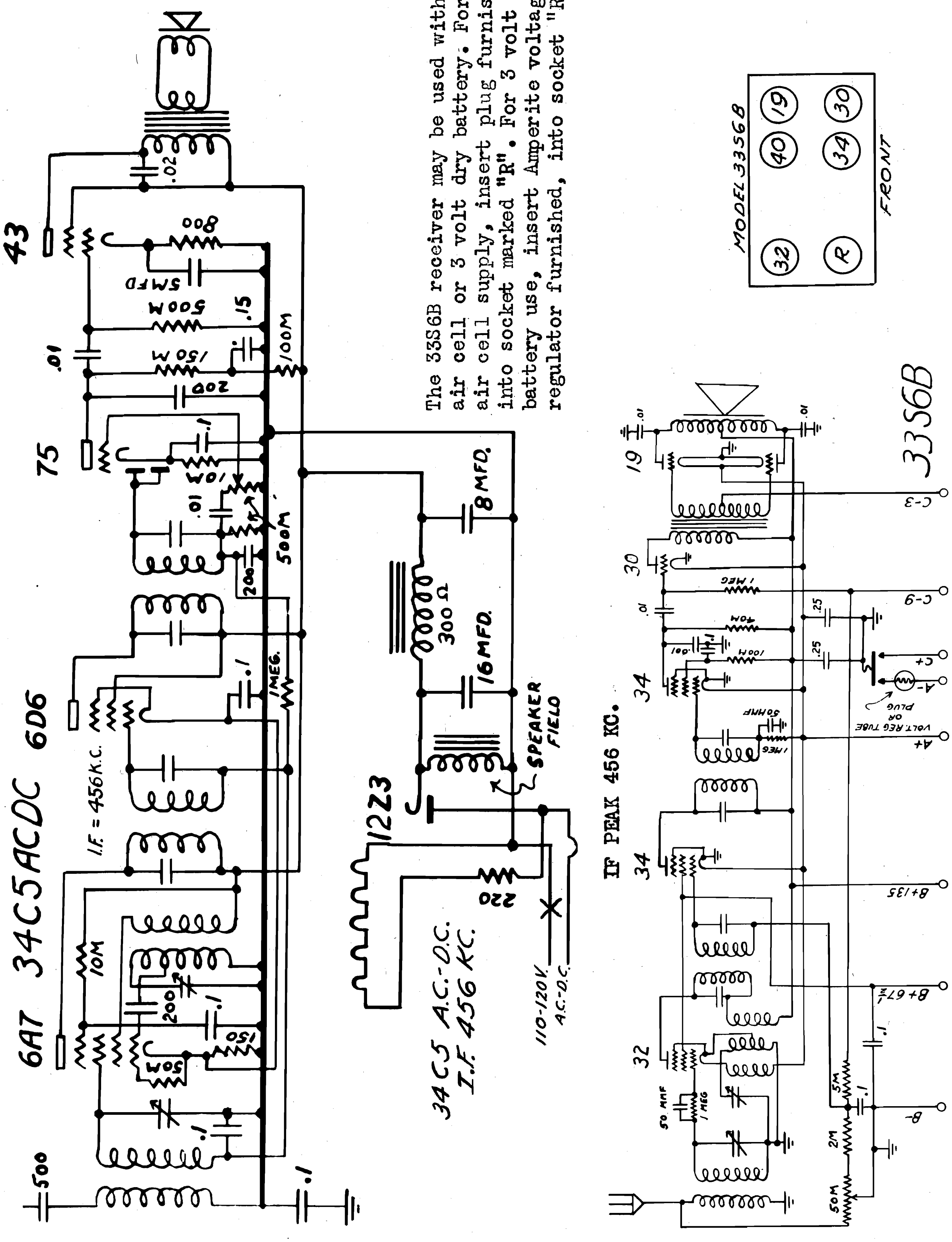
The majority of reliable United States and Canadian short wave broadcasting stations may be found around 6 and 7 (6000 and 7000 kilocycles) on band No. 3, and around 9 and 10 (9000 and 10,000 kilocycles) on band No. 4.

A good aerial and good ground are necessary if the best results are to be secured.

MODEL 33-S-6B
Schematic, Socket
MODEL 34-C-5 AC-DC
Schematic

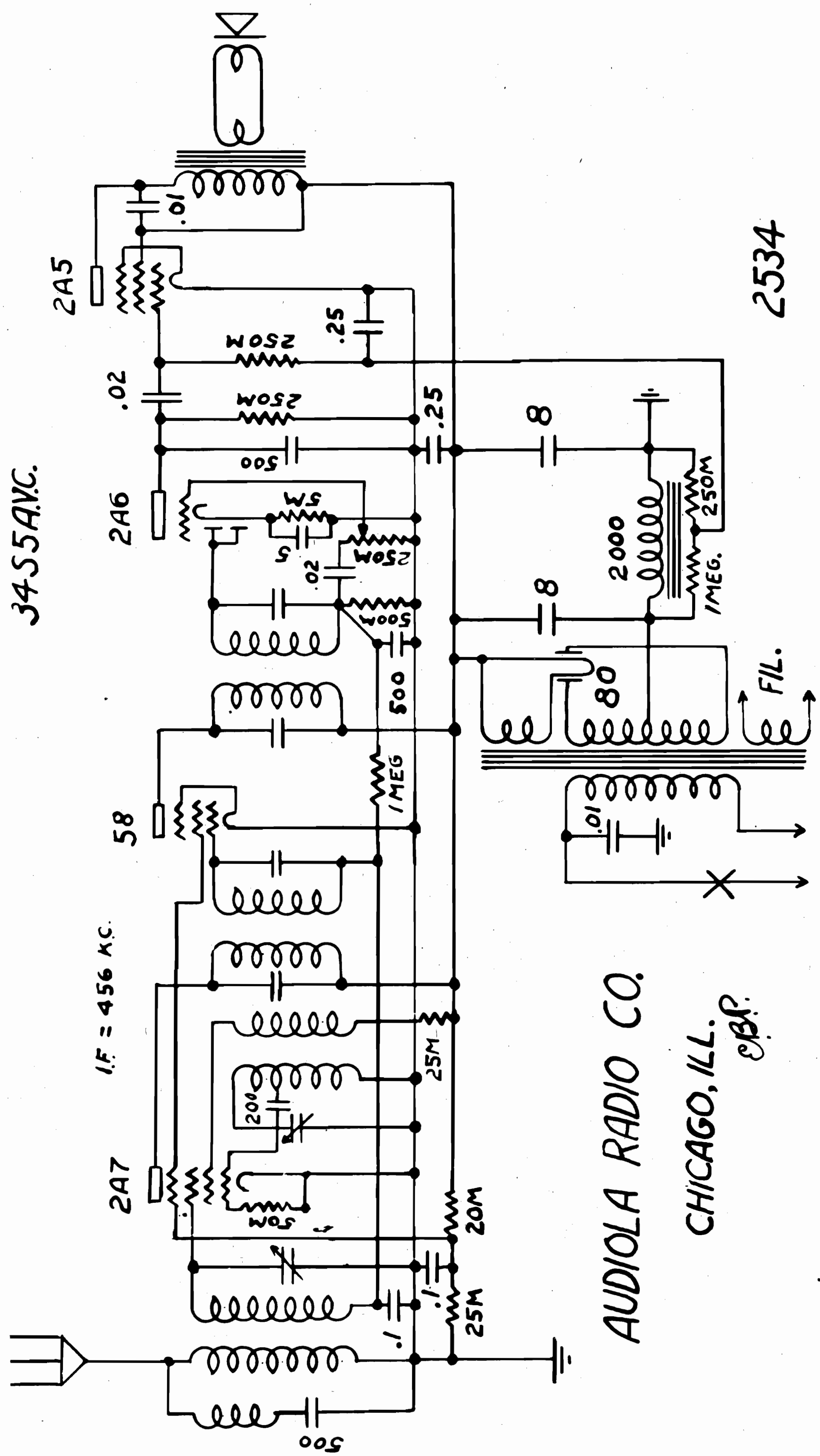
## AUDIOLA RADIO CO.

The 33S6B receiver may be used with air cell or 3 volt dry battery. For air cell supply, insert plug furnished into socket marked "R". For 3 volt battery use, insert Amperite voltage regulator furnished, into socket "R".



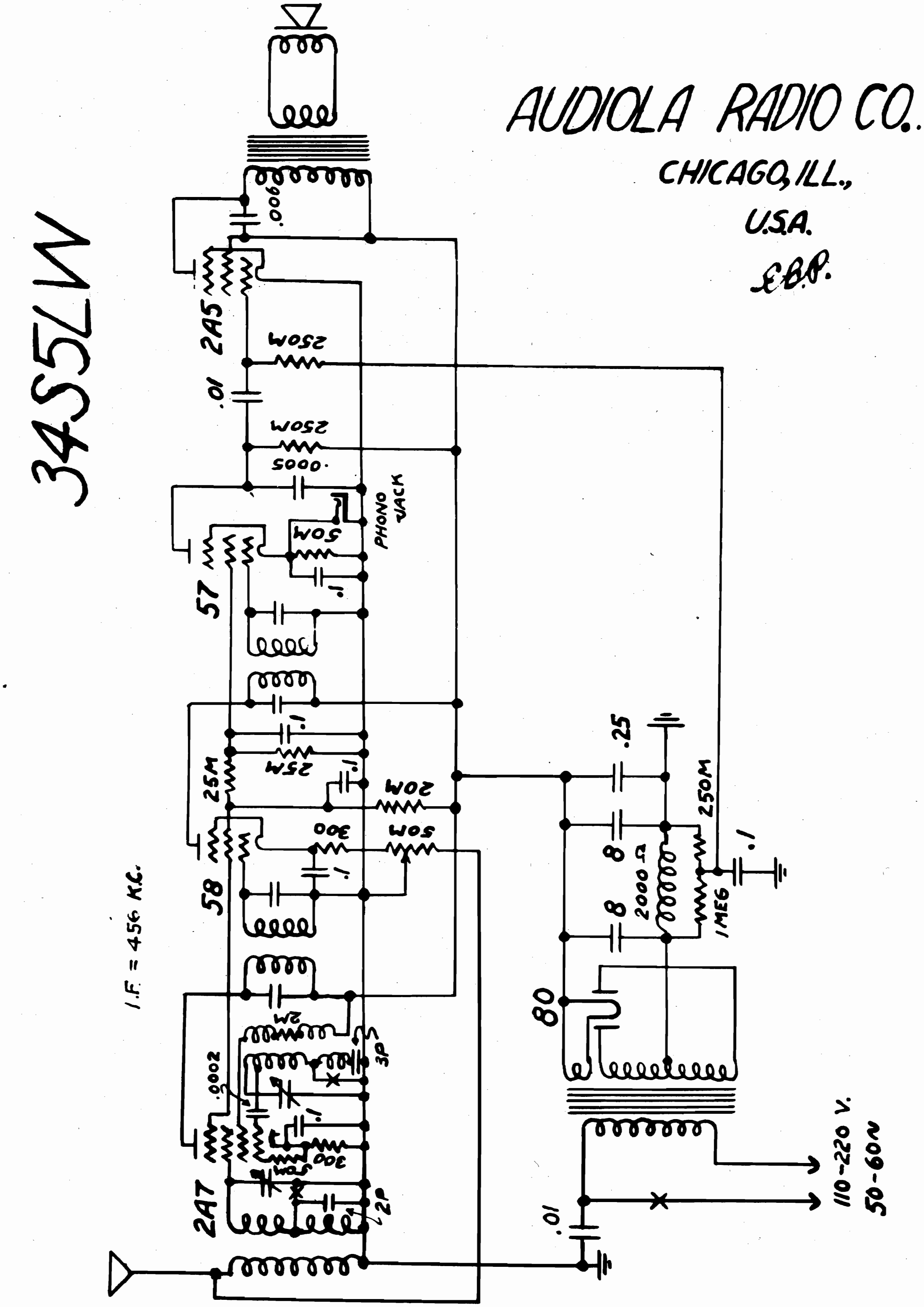
MODEL 34-S-5 AVC
Schematic

# AUDIOLA RADIO CO.



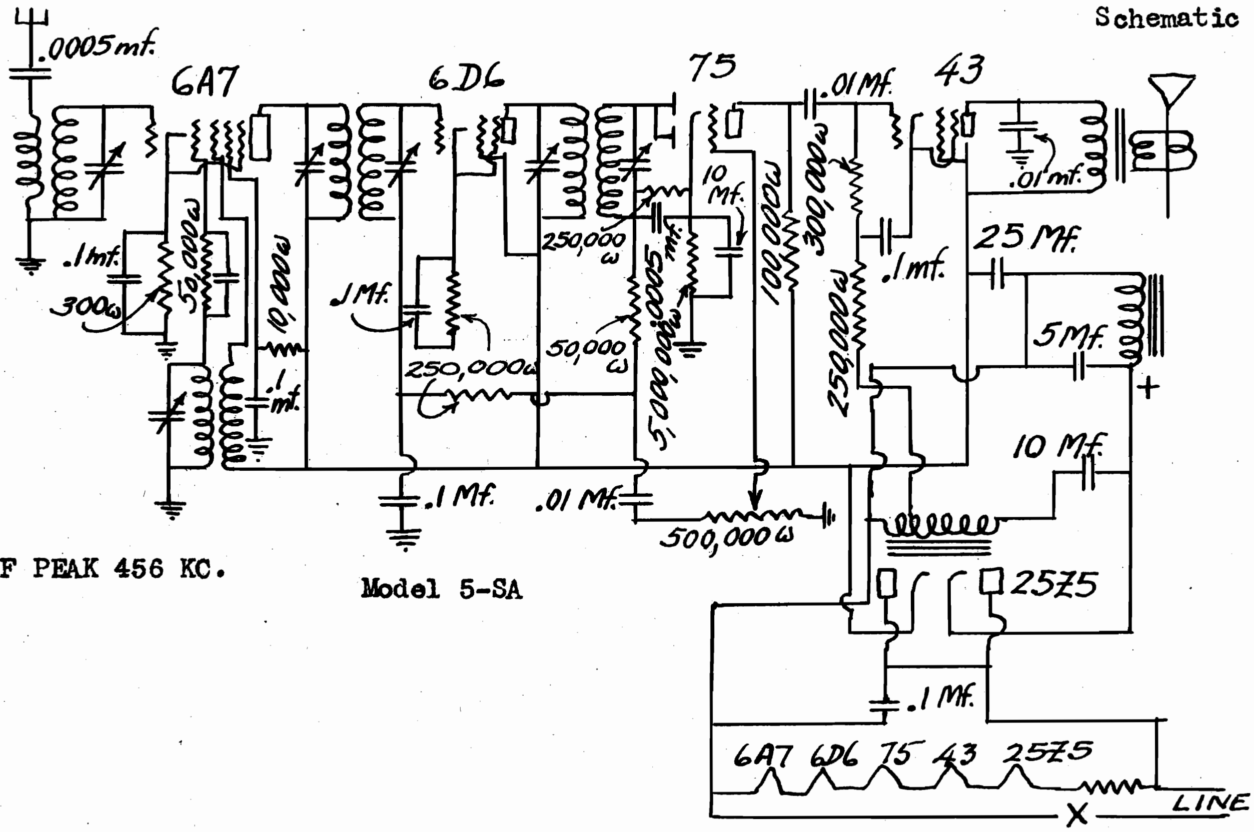
MODEL 34-S5-LW
Schematic

AUDIOLA RADIO CO.



# AUTOCRAT RADIO CORP.

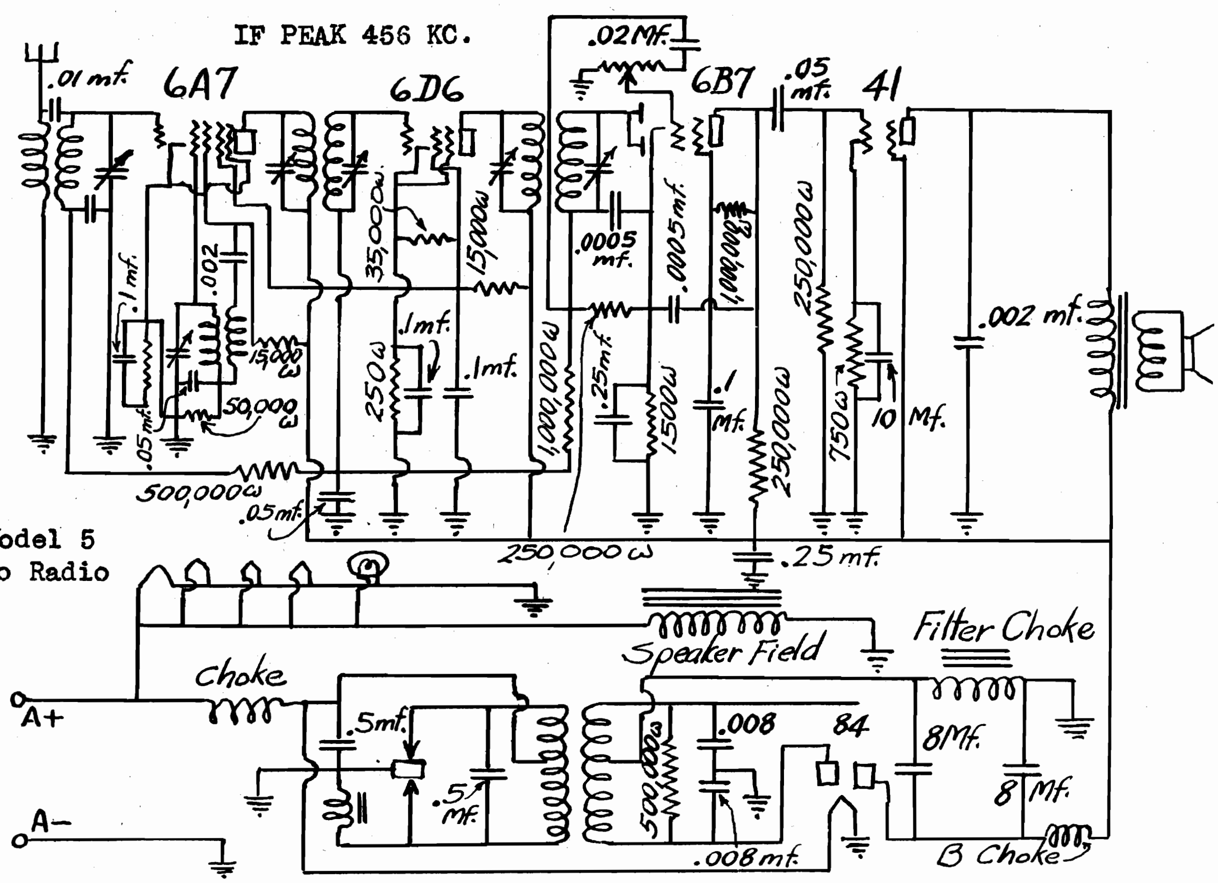
MODEL 5
Schematic
MODEL 5-SA
Schematic



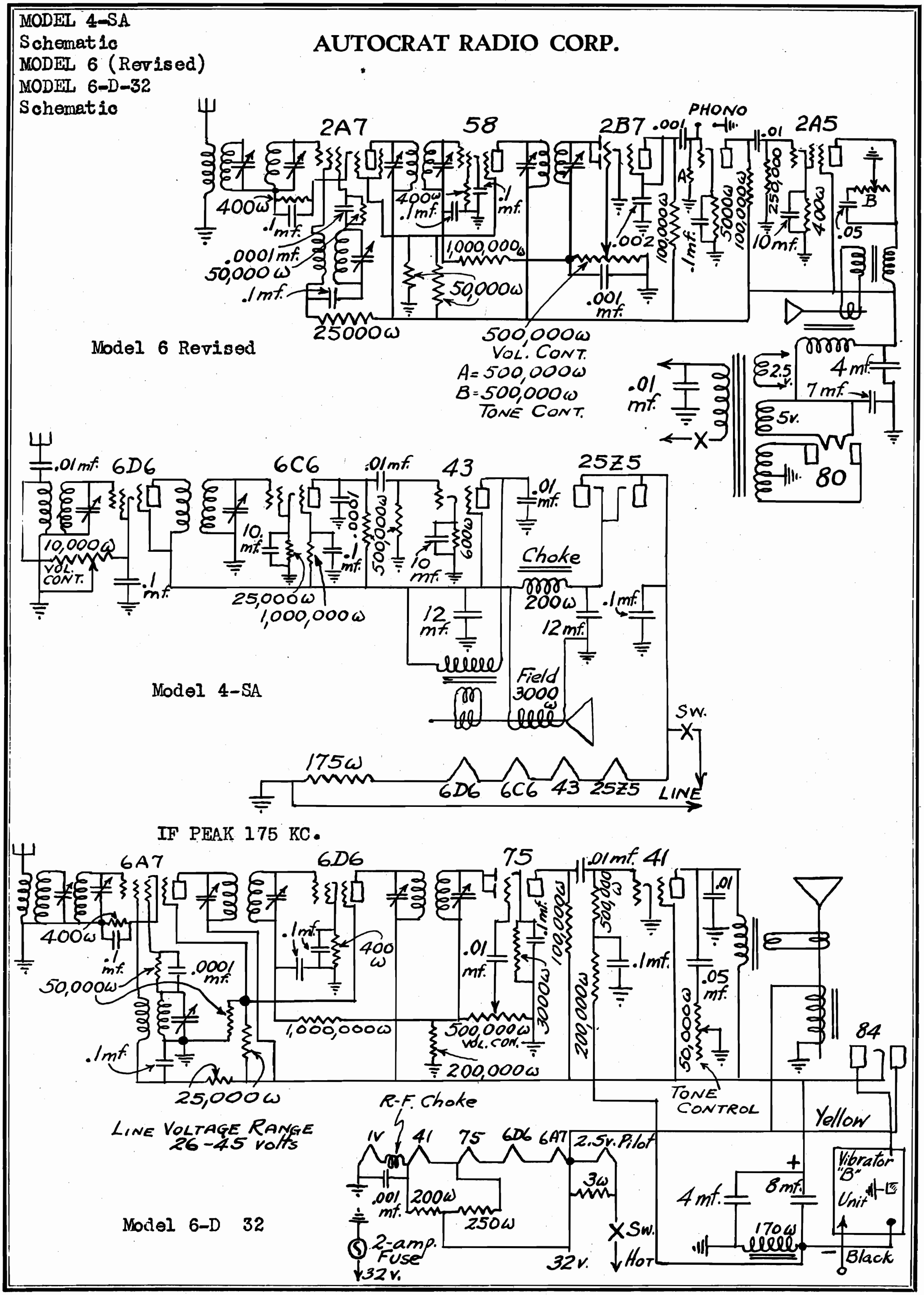

IF PEAK 456 KC.

Model 5-SA

IF PEAK 456 KC.

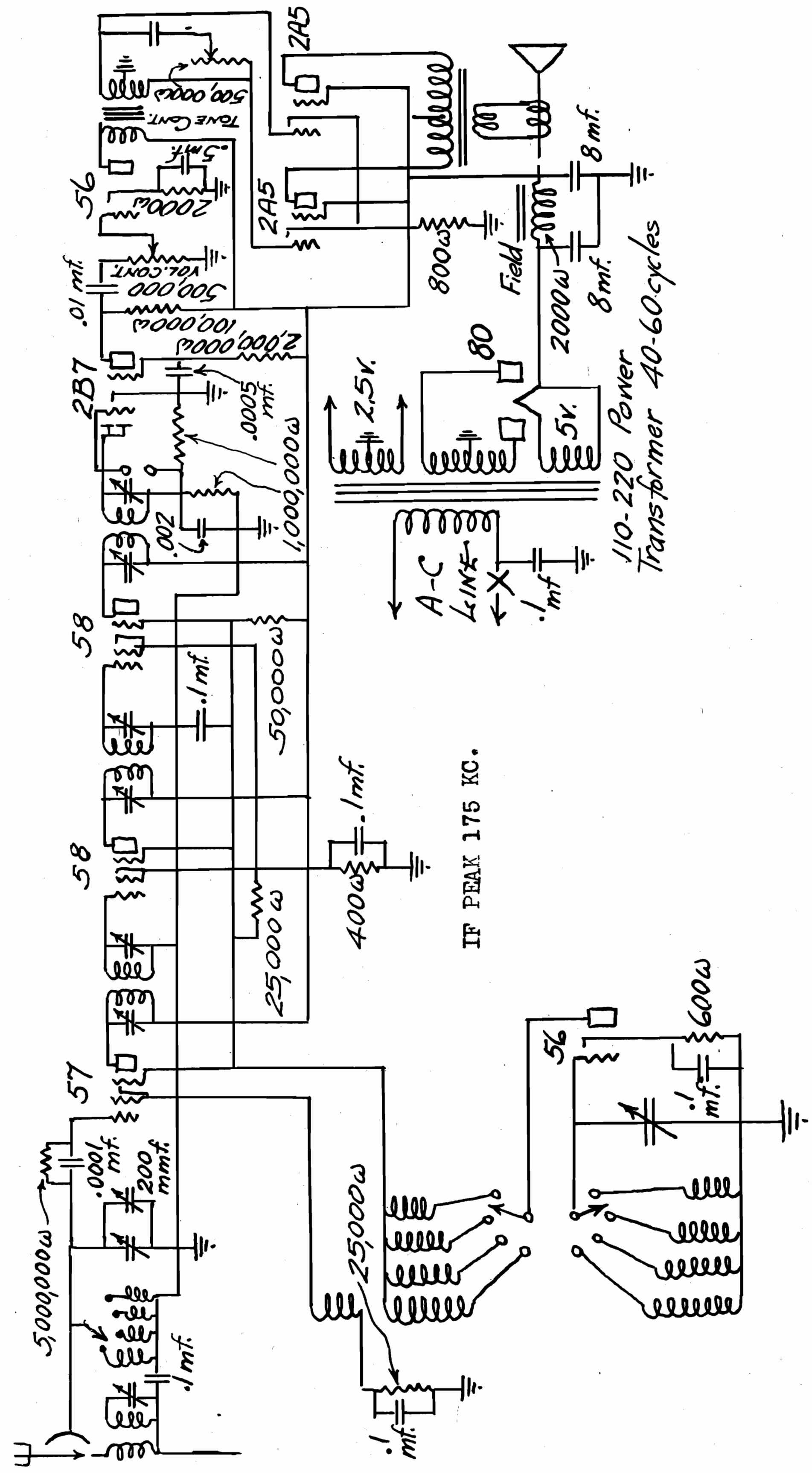



Model 5
Auto Radio


MODEL 4-SA
Schematic
MODEL 6 (Revised)
MODEL 6-D-32
Schematic
AUTOCRAT RADIO CORP.
2A7
58
2B7
PHONO
2A5
400ω
.1mf.
.0001mf.
50,000ω
25000ω
1,000,000ω
50,000ω
500,000ω
VOL. CONT.
A=500,000ω
B=500,000ω
TONE CONT.
.001 mf.
.002
100,000ω
5000ω
250,000
10mf.
400ω
.05
2.5v.
4mf.
7mf.
5v.
80
.01 mf.
Model 6 Revised
6D6
6C6
43
25Z5
.01mf.
10,000ω
VOL. CONT.
10. mf.
25,000ω
1,000,000ω
500,000ω
10 mf.
600ω
Choke
200ω
12 mf.
12mf.
.1mf.
Field
3000ω
Model 4-SA
SW.
175ω
6D6
6C6
43
25Z5
LINE
IF PEAK 175 KC.
6A7
6D6
75
41
.01mf.
400ω
.1 mf.
50,000ω
.0001 mf.
.1mf.
25,000ω
1,000,000ω
500,000ω
VOL. CON.
200,000ω
3000ω
100,000ω
200,000ω
500,000ω
50,000ω
.05 mf.
84
TONE CONTROL
Yellow
LINE VOLTAGE RANGE
26-45 volts
R-F. Choke
1V
41
75
6D6
6A7
2.5v. Pilot
3ω
.001 mf.
200ω
250ω
2-amp. Fuse
32v.
32v.
Sw.
Hot
4mf.
8mf.
170ω
Vibrator "B" Unit
Black
Model 6-D 32

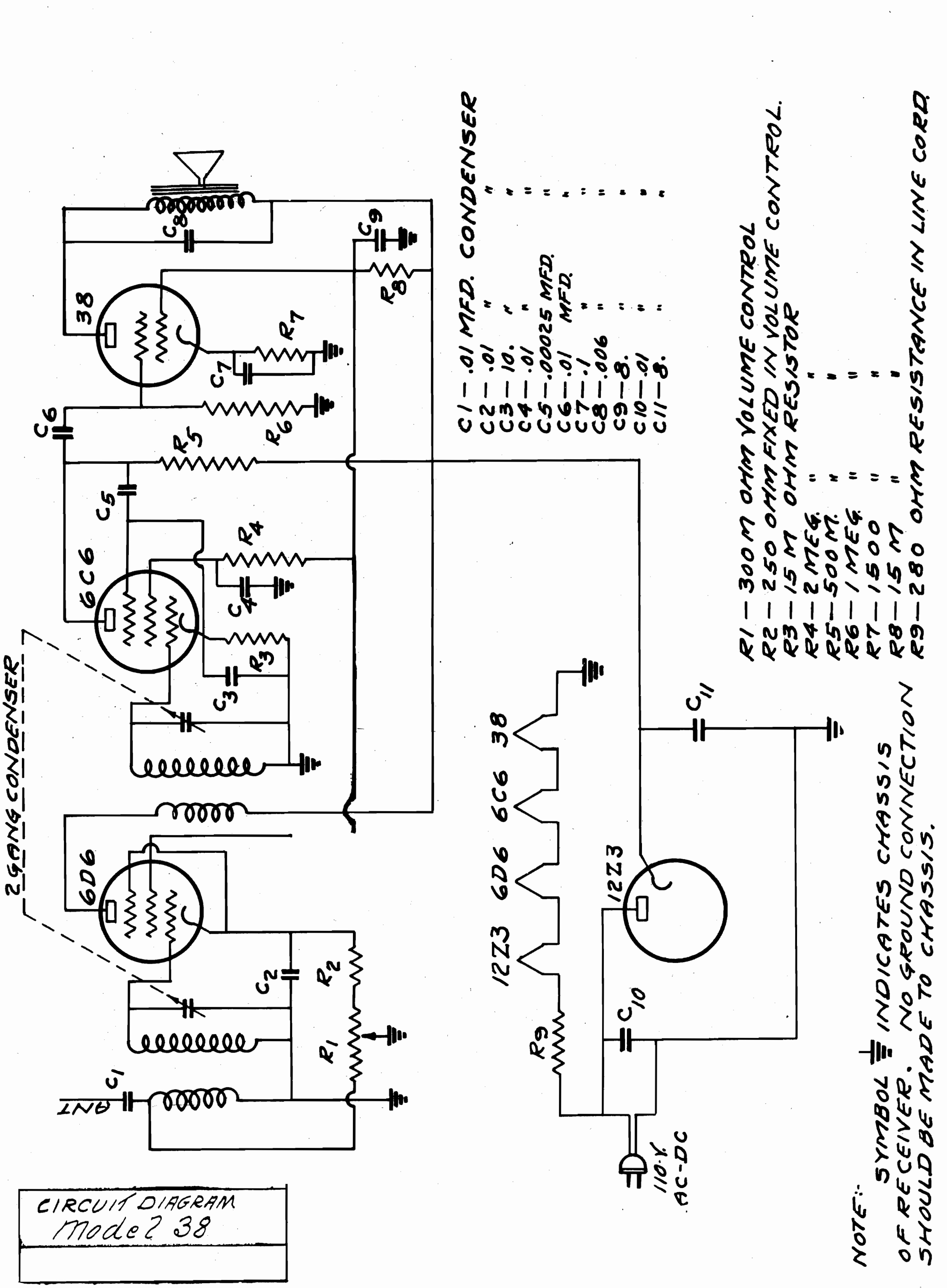
MODEL 90-SL
Schematic

## AUTOCRAT RADIO CORP.



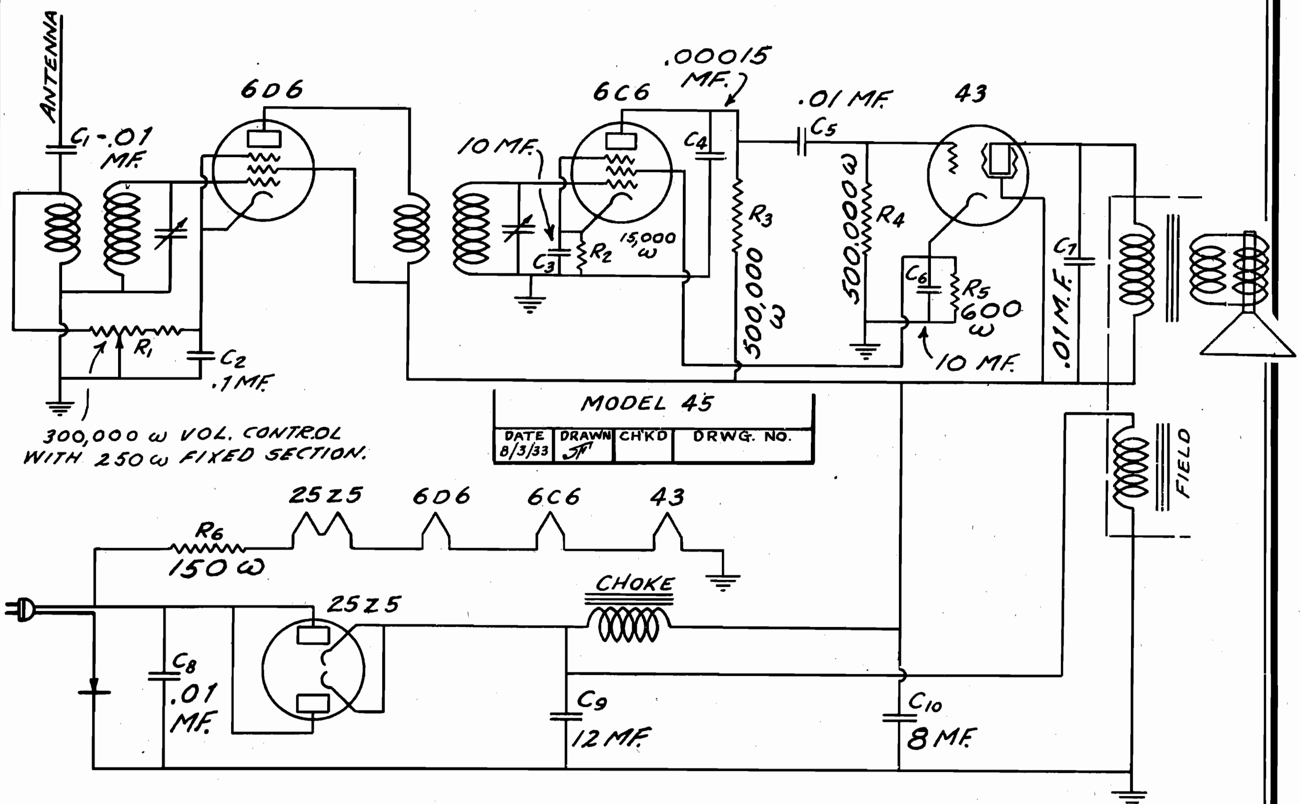
MODEL 38
Schematic

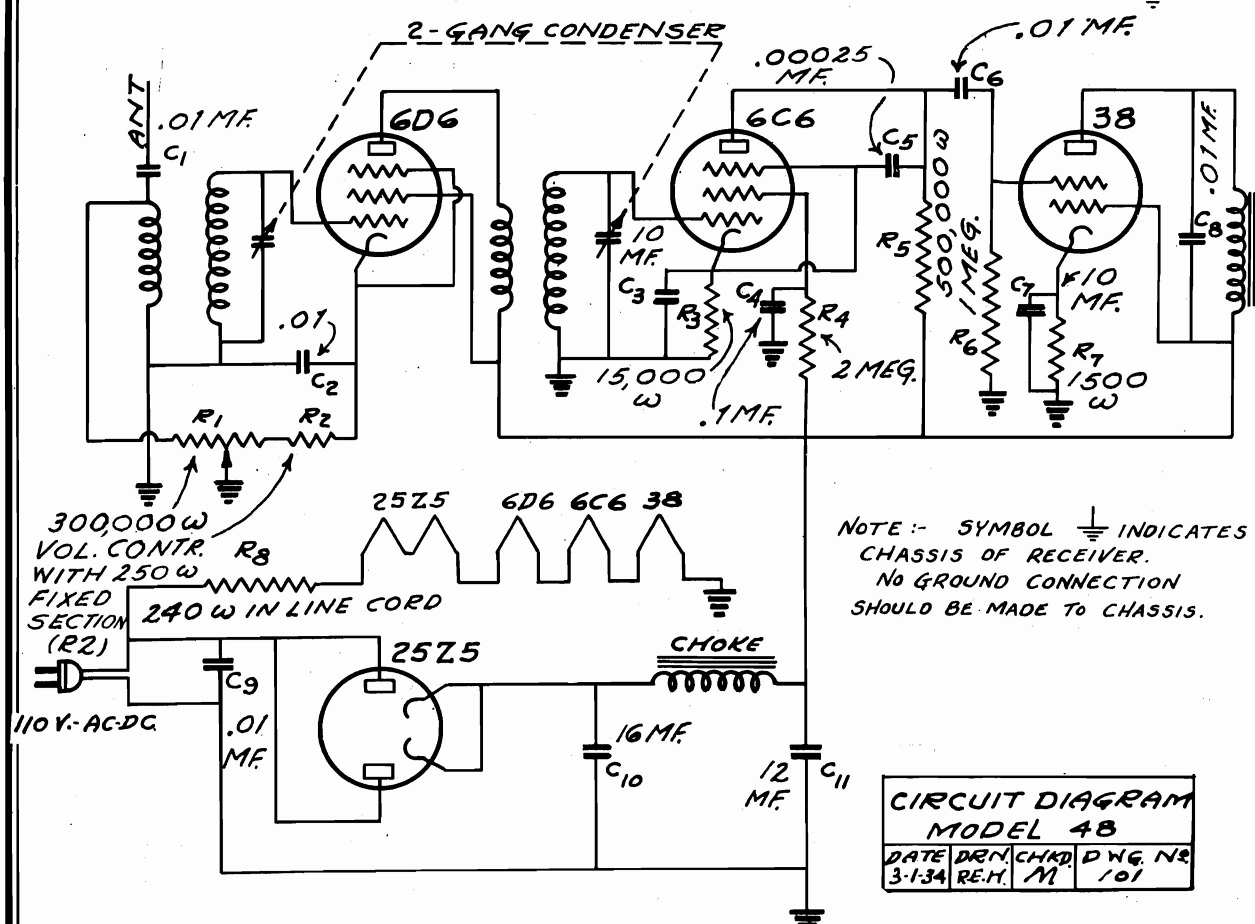
# BALKEIT RADIO CO.



MODEL 45
MODEL 48
Schematics

# BALKEIT RADIO CO.



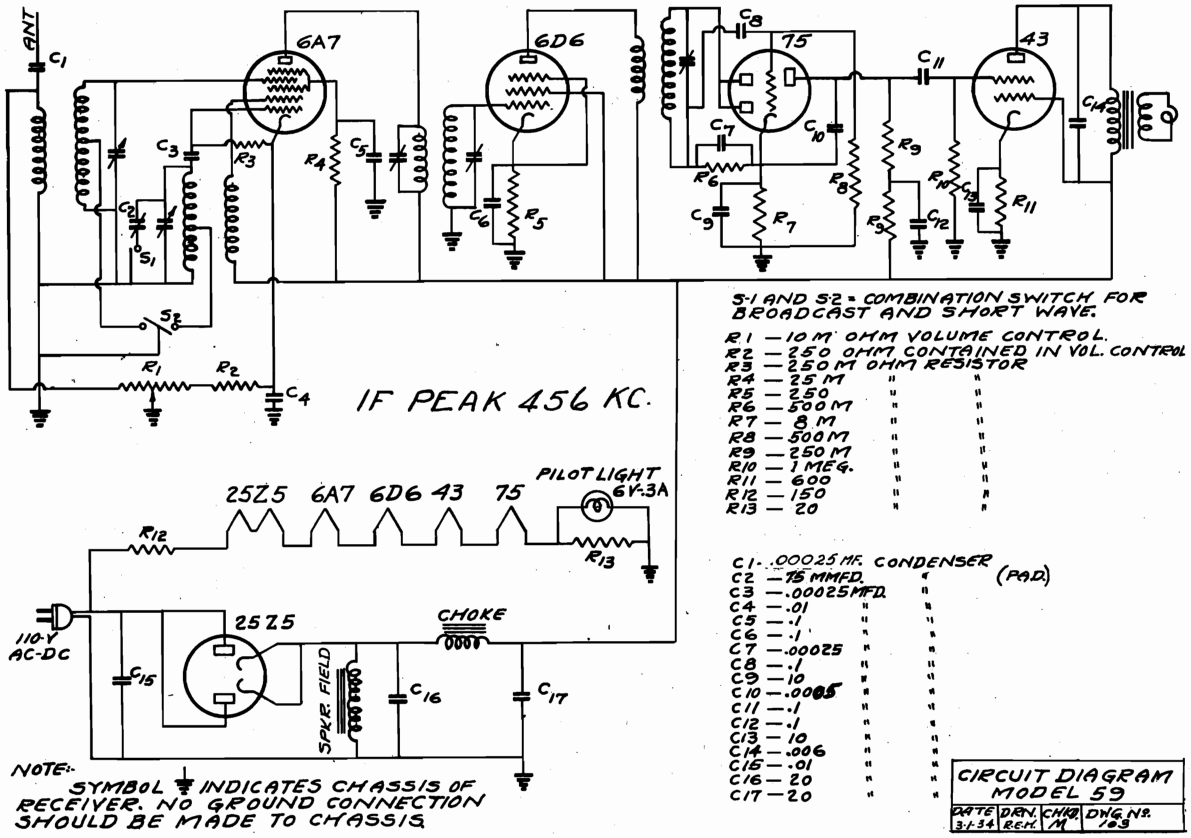




NOTE:- SYMBOL ⏚ INDICATES CHASSIS OF RECEIVER. NO GROUND CONNECTION SHOULD BE MADE TO CHASSIS.

| CIRCUIT DIAGRAM MODEL 48 | | | |
|---|---|---|---|
| DATE 3-1-34 | DRN. RE.H. | CHKD. M | DWG. No. 101 |

# BALKEIT RADIO CO.

MODEL 59
MODEL 69
Schematics

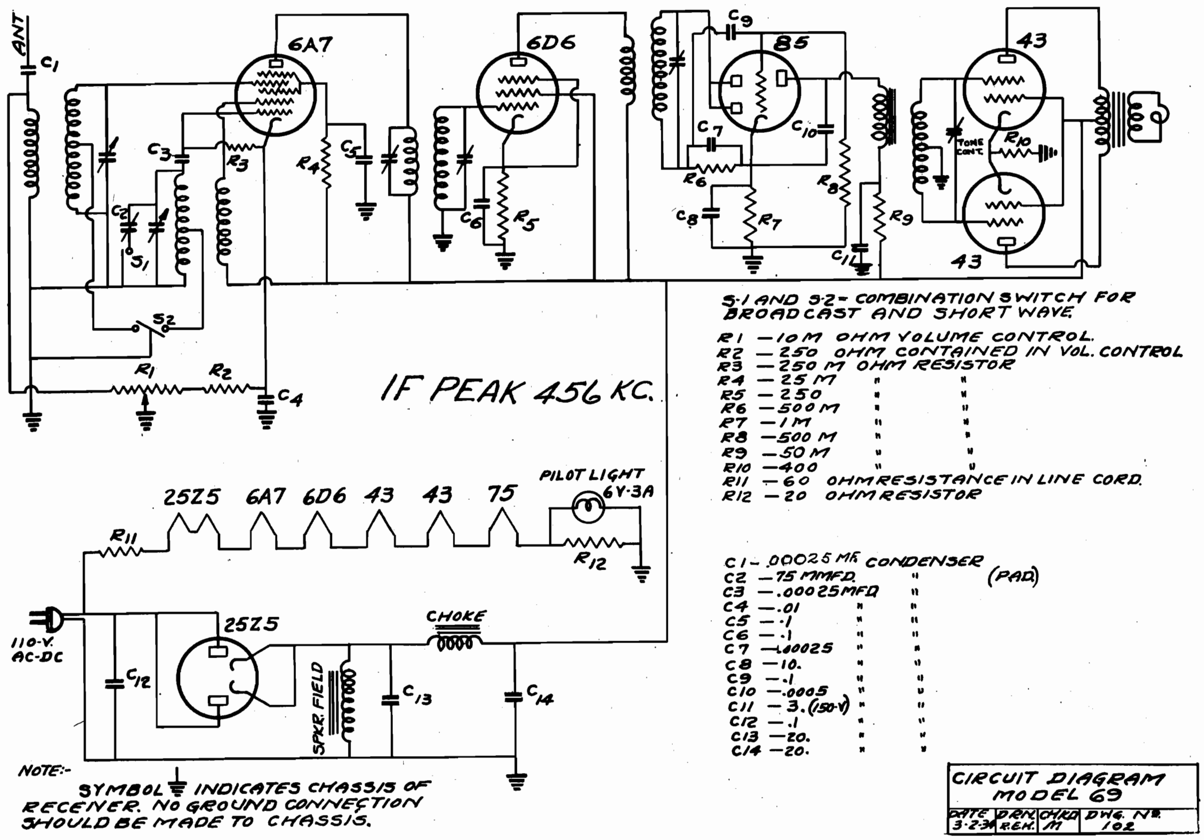



S-1 AND S-2 = COMBINATION SWITCH FOR BROADCAST AND SHORT WAVE.

R1 —10 M OHM VOLUME CONTROL.
R2 —250 OHM CONTAINED IN VOL. CONTROL
R3 —250 M OHM RESISTOR
R4 —25 M " "
R5 —250 " "
R6 —500 M " "
R7 — 8 M " "
R8 —500 M " "
R9 —250 M " "
R10 —1 MEG. " "
R11 —600 " "
R12 —150 " "
R13 — 20 " "

C1 - .00025 MF. CONDENSER
C2 —75 MMFD. " (PAD)
C3 —.00025 MFD. "
C4 —.01 " "
C5 —.1 " "
C6 —.1 " "
C7 —.00025 " "
C8 —.1 " "
C9 —10 " "
C10 —.0005 " "
C11 —.1 " "
C12 —.1 " "
C13 —10 " "
C14 —.006 " "
C15 —.01 " "
C16 —20 " "
C17 —20 " "

| CIRCUIT DIAGRAM MODEL 59 | | | |
|---|---|---|---|
| DATE | DRN. | CHKD. | DWG. NO. |
| 3-1-34 | R.E.H. | M | 103 |




S-1 AND S-2 = COMBINATION SWITCH FOR BROADCAST AND SHORT WAVE.

R1 —10 M OHM VOLUME CONTROL.
R2 —250 OHM CONTAINED IN VOL. CONTROL
R3 —250 M OHM RESISTOR
R4 —25 M " "
R5 —250 " "
R6 —500 M " "
R7 —1 M " "
R8 —500 M " "
R9 —50 M " "
R10 —400 " "
R11 —60 OHM RESISTANCE IN LINE CORD.
R12 —20 OHM RESISTOR

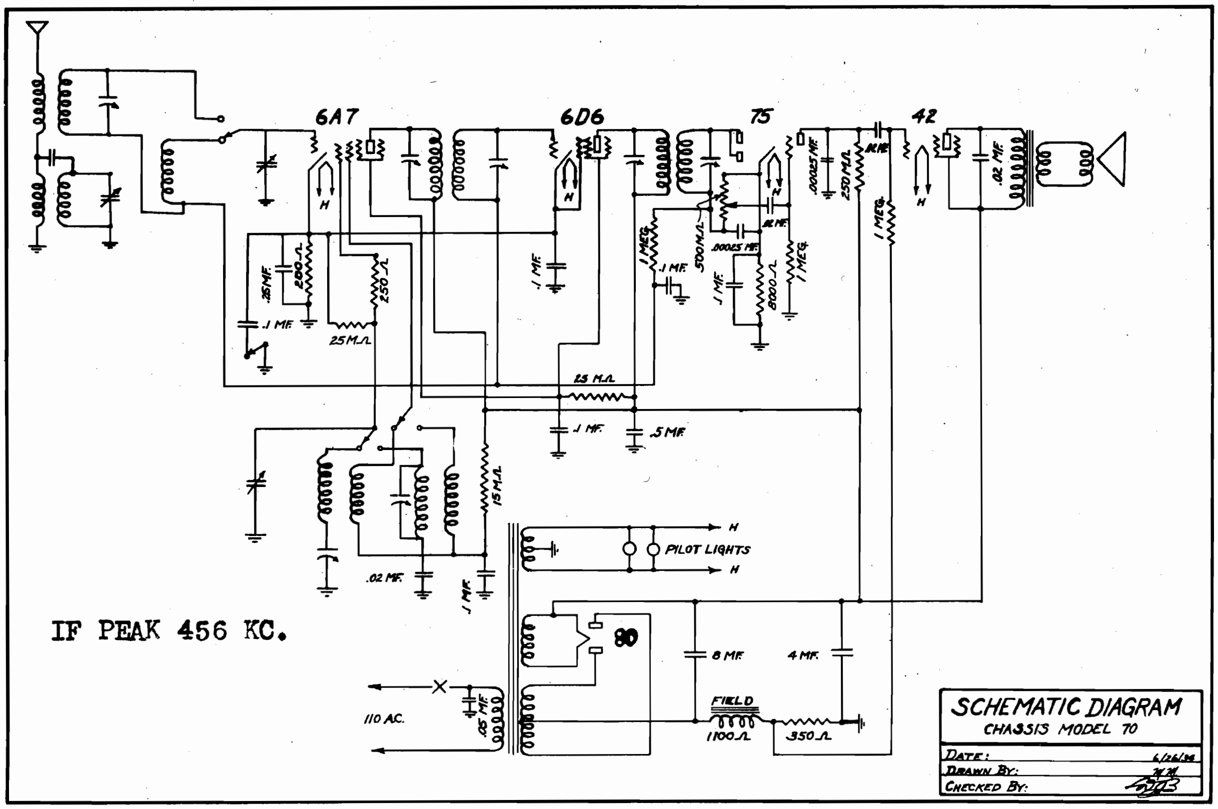
C1 - .00025 MF. CONDENSER
C2 —75 MMFD. " (PAD)
C3 —.00025 MFD. "
C4 —.01 " "
C5 —.1 " "
C6 —.1 " "
C7 —.00025 " "
C8 —10. " "
C9 —.1 " "
C10 —.0005 " "
C11 —3. (150-V) " "
C12 —.1 " "
C13 —20. " "
C14 —20. " "

| CIRCUIT DIAGRAM MODEL 69 | | | |
|---|---|---|---|
| DATE | DRN. | CHKD. | DWG. NO. |
| 3-2-34 | R.E.H. | M | 102 |

**MODEL 60,70**
**Scheratic, Parts**

# BALKEIT RADIO CO.

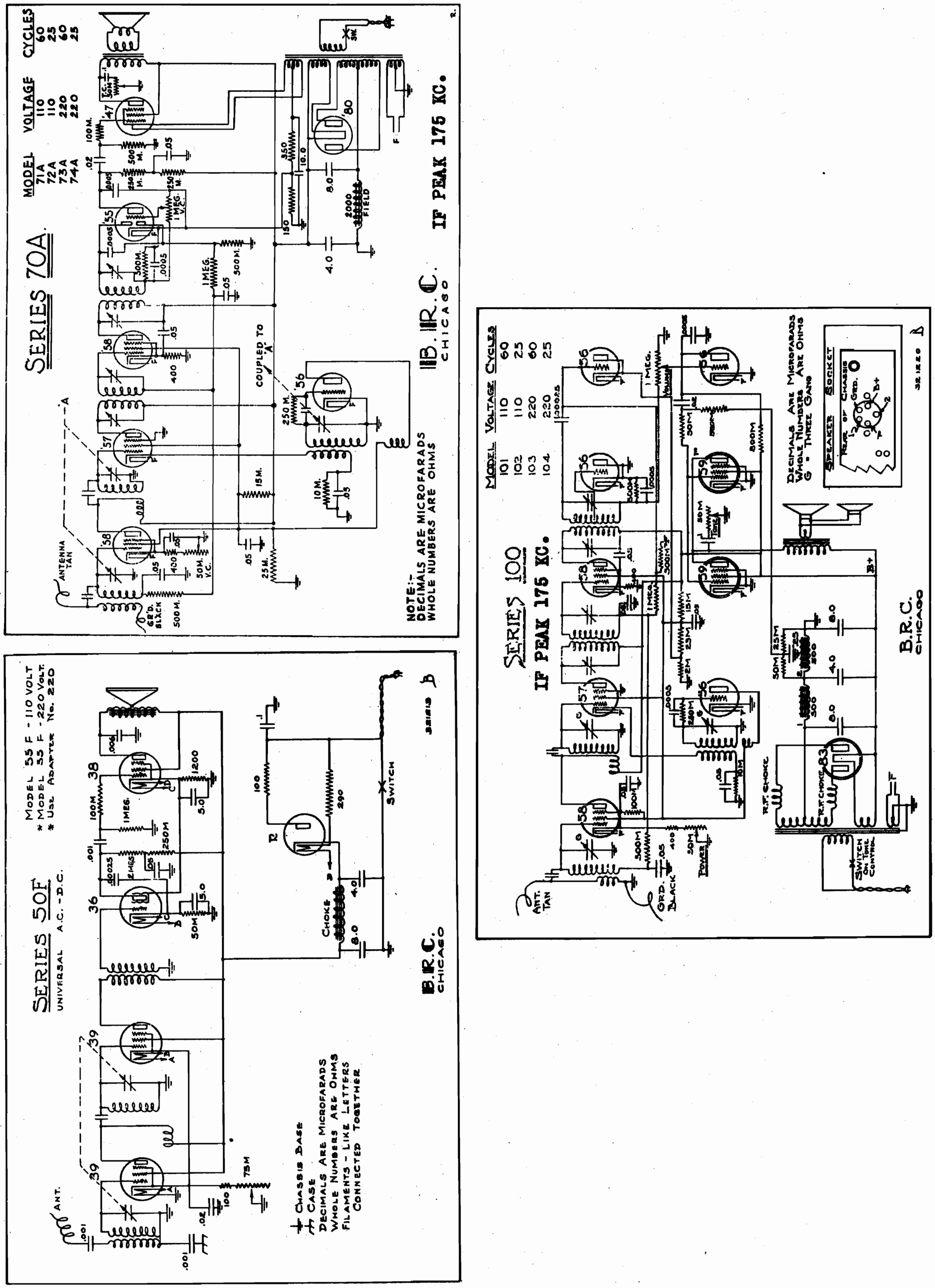
| PART NO. | DESCRIPTION | LIST PRICE |
|---|---|---|
| 701 | FILTER CONDENSER | 2.40 EACH |
| 702 | .1 BY-PASS CONDENSER | .14 " |
| 703 | .05 " " | .14 " |
| 704 | .02 " " | .14 " |
| 705 | .25 " " | .18 " |
| 706 | .5 " " | .35 " |
| 707 | .00025 " " | .20 " |
| 708 | 1-WATT RESISTOR | .20 " |
| 709 | MISCELLANEOUS RESISTORS(SPECIFY VALUES)(SEE DIAGRAM | .20 " |
| 717 | 350 OHM POWER RESISTOR | .30 " |
| 718 | VOLUME CONTROL | 1.25 " |
| 719 | SHORT WAVE AND BROADCAST SWITCH | .75 " |
| 720 | OSCILLATOR COIL 456 KC | .90 " |
| 723 | CORD AND PLUG | .50 " |
| 733 | POWER TRANSFORMER | 4.25 " |
| 738 | 3-GANG CONDENSER | 4.50 " |
| 739 | 1ST I F TRANSFORMER | 2.10 " |
| 740 | 2ND I F TRANSFORMER | 2.10 " |
| 741 | PRE SELECTOR COIL | 1.25 " |
| 745 | PILOT LAMP | .25 " |
| 749 | TRIMMER | .20 " |
| 751 | KNOB (LARGE) | .20 " |
| 751-A | KNOBS | .15 " |
| 754 | PILOT LIGHT SOCKET | .15 " |
| 758 | SPEAKER | 6.00 " |
| 758-A | SPIDER AND VOICE COIL | .40 " |
| 758-B | 6" DIAPHRAM | .30 " |
| 762 | S.W. OSCILLATOR COIL | .60 " |
| 763 | ANTENNA S.W. OSCILLATOR COIL | .60 " |
| 767 | DIAL DRIVE DISC | .60 " |
| 768 | CELLULOID DRIVE DISC | .50 " |
| 769 | DIAL FACE | .60 " |
| 777 | DIAL POINTER | .12 " |
| 779 | CONVEX DIAL CRYSTAL | .30 " |




IF PEAK 456 KC.

# BELMONT RADIO CORP.

MODEL 50-F
MODEL 70-A
MODEL 100
Schematics



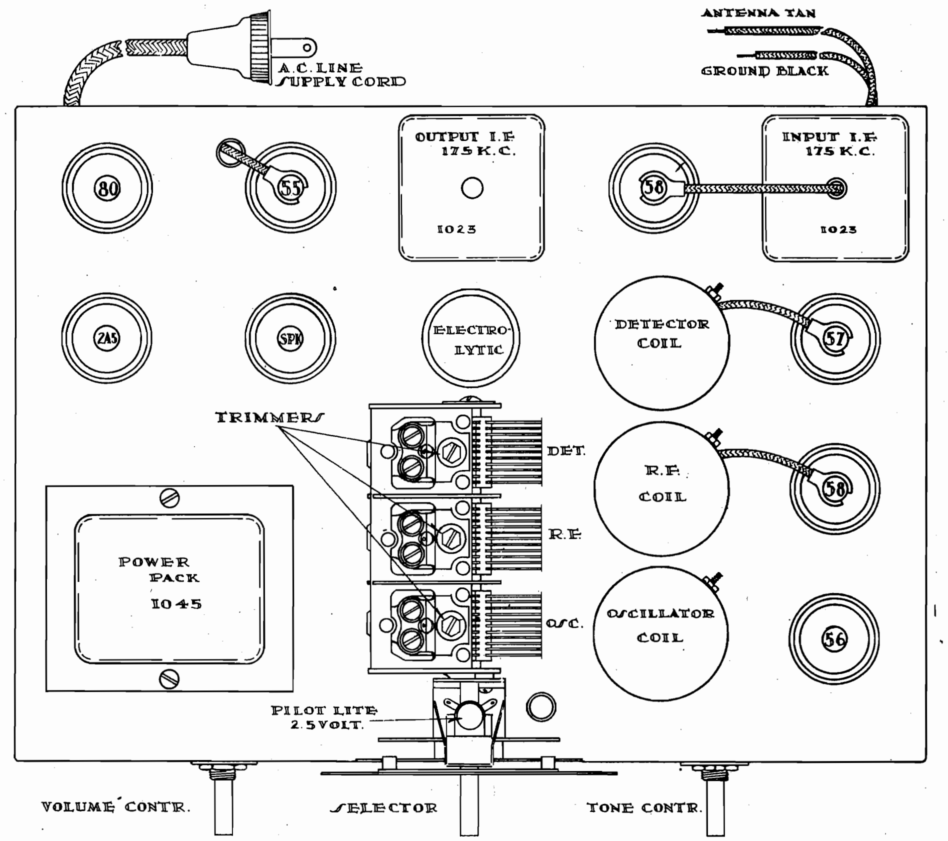
MODEL 71-C
Schematic, Socket
Alignment

# BELMONT RADIO CORP.

## SERVICE NOTES

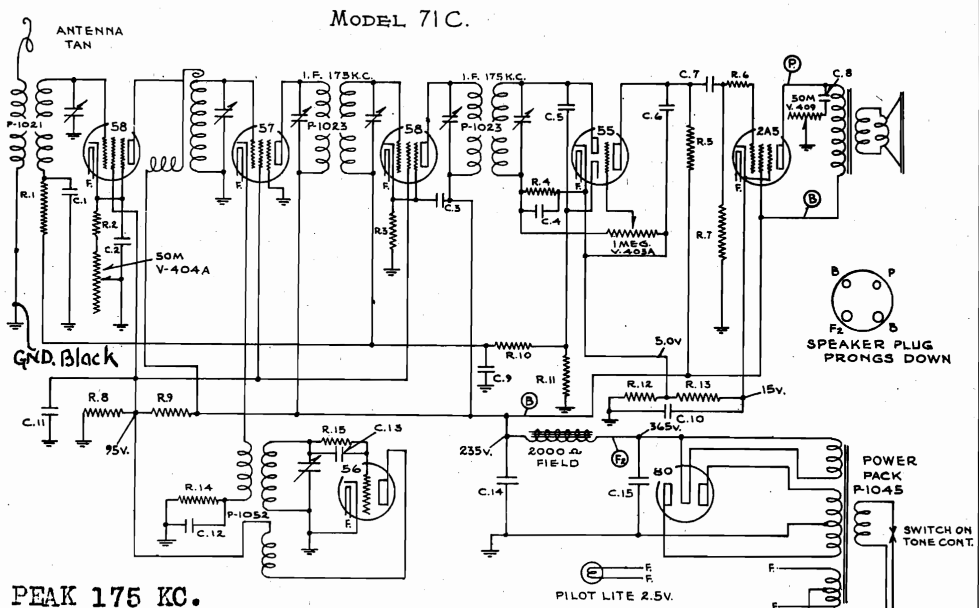
To peak I.F. transformers connect oscillator (set at 175 KC) to grid of 57 first detector and (Black) ground wire. Adjust four trimmers from bottom of chassis (one nut and one screw on each transformer trimmer) to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer).

Connect an oscillator in series with a 200 MMFD condenser to the Tan (Antenna) wire and Black (ground) wire, with the oscillator set at 1720 KC and the variable condenser at its minimum position (extreme right of its rotation) adjust trimmer of oscillator (front) section of variable condenser to resonance. Set oscillator to 1400 KC and rotate variable condenser until signal is tuned in, then adjust ANT. and R.F. trimmers (center and rear sections of condenser) to resonance. Check output at 1200, 1000, 800, and 600 Kilocycles, bend plates of center and rear sections of variable condenser only if necessary.




3J190001 - 3K192013.

MODEL 71C.




IF PEAK 175 KC.

LEGEND

RESISTORS

| Nº | VALUE | Nº | VALUE |
|---|---|---|---|
| R. 1:- | 500M | R. 9:- | 15M * |
| R. 2:- | 400 | R. 10:- | IMEG. |
| R. 3:- | 400 | R. 11:- | 500M |
| R. 4:- | 500M | R. 12:- | 150 * |
| R. 5:- | 250M | R. 13:- | 300 * |
| R. 6:- | 100M | R. 14:- | 10M |
| R. 7:- | 500M | R. 15:- | 250M |
| R. 8:- | 25M * | | |

CONDENSERS

| Nº | VALUE | Nº | VALUE |
|---|---|---|---|
| C. 1:- | .05 | C. 9:- | .05 |
| C. 2:- | .05 | C. 10:- | 12.0MF. * |
| C. 3:- | .05 | C. 11:- | .05 |
| C. 4:- | 500MMF. | C. 12:- | .05 |
| C. 5:- | 500MMF. | C. 13:- | 500MMF. |
| C. 6:- | 500MMF. | C. 14:- | 4.0MF. * |
| C. 7:- | .02 | C. 15:- | 8.0MF. * |
| C. 8:- | .1 | | |

NUMBERS PREFIXED BY "P" OR "V" ARE PARTS.
* R.8, R.9, R.12 & R.13 IN ONE UNIT P-1049
* C.10, C.14, & C.15 " " " P-1047

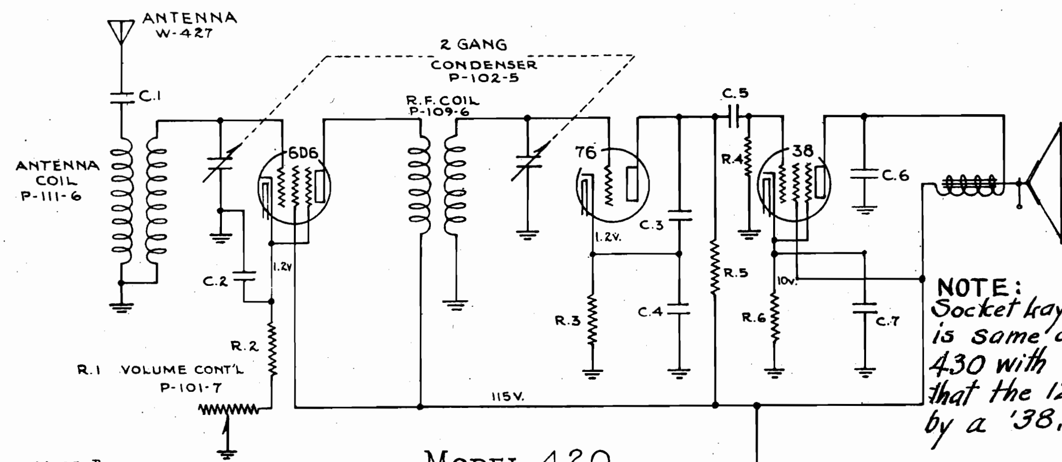
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL, WITH 119 VOLTS A.C. LINE.

33219

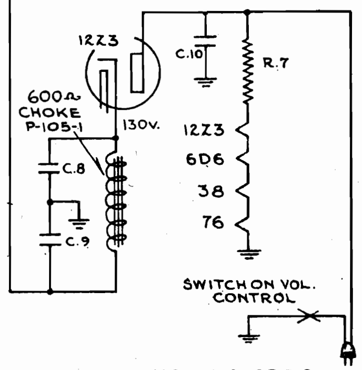
MODEL 430
Schematic, Socket

# BELMONT RADIO CORP.

MODEL 420
Schematic, Socket




NOTE:
*Socket layout of Model 420 is same as that of Model 430 with the exception that the 12A5 is replaced by a '38.*



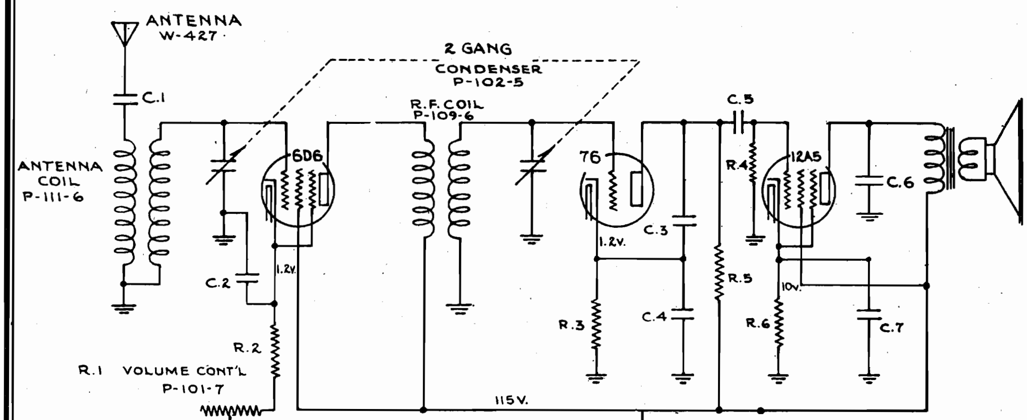

34103

## MODEL 420

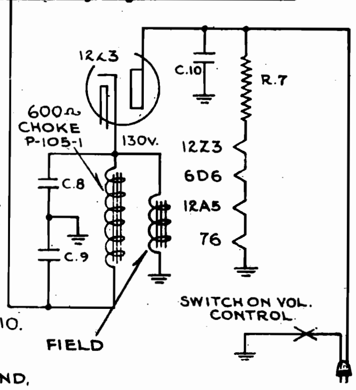
| Nº | VALUE |
|---|---|
| R.1:- | 75M VOL. CONT'L. MAX. R. |
| R.2:- | 100 VOL. CONT'L. MIN. R. |
| R.3:- | 50M ⅓W. 20V. |
| R.4:- | 500M ⅓W. 20V. |
| R.5:- | 250M ⅓W. 50V. |
| R.6:- | 1100 ⅓W. 10V. |
| R.7:- | 260Ω 0.300 AMP. IN CORD |

| Nº | VALUE |
|---|---|
| C.1:- | .0005 MICA |
| C.2:- | .05 X 200V. |
| C.3:- | .001 MICA |
| C.4:- | 8 MFD. |
| C.5:- | .003 X 600V. |
| C.6:- | .005 X 600V. |
| C.7:- | 8 MFD. |
| C.8:- | 8 MFD. |
| C.9:- | 8 MFD. |
| C.10:- | .05 X 400V. |

CONDENSERS IN BY-PASS BLOCK P-145-1:- C.2, C.5, C.6, C.10.
CONDENSERS IN ONE UNIT:- C.4, C.7, C.8, C.9.- P-119-1
NUMBERS PREFIXED BY LETTERS ARE PART NUMBERS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND,
VOLUME ON FULL.




## MODEL 430



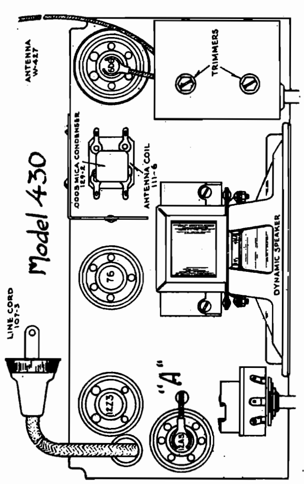

| Nº | VALUE |
|---|---|
| R.1:- | 75M VOL. CONT'L. MAX. R. |
| R.2:- | 100 VOL. CONT'L. MIN. R. |
| R.3:- | 50M ⅓W. 20V. |
| R.4:- | 500M ⅓W. 20V. |
| R.5:- | 250M ⅓W. 50V. |
| R.6:- | 1100 ⅓W. 10V. |
| R.7:- | 260Ω 0.300 AMP. IN CORD |

| Nº | VALUE |
|---|---|
| C.1:- | .0005 MICA |
| C.2:- | .05 X 200V. |
| C.3:- | .001 MICA |
| C.4:- | 5 MFD. |
| C.5:- | .003 X 600V. |
| C.6:- | .005 X 600V. |
| C.7:- | 5 MFD. |
| C.8:- | 8 MFD. |
| C.9:- | 16 MFD. |
| C.10:- | .05 X 400V. |

34103

CONDENSERS IN BY-PASS BLOCK P-145-1:- C.2, C.5, C.6, C.10.
CONDENSERS IN ONE UNIT:- C.4, C.7, C.8, C.9. P-119-3
NUMBERS PREFIXED BY LETTERS ARE PART NUMBERS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND,
VOLUME ON FULL.

*"A" This replaced by a '38 in Model 420.*



MODEL 420,430
Alignment

# BELMONT RADIO CORP.

## SERVICE MANUAL FOUR TUBE T.R.F. RECEIVERS

105-115 Volts Alternating (any cycles) or Direct Current - 40 Watts

530 - 1720 Kilocycles

Both of the above models are four tube T.R.F., two gang receivers, the principle difference being that model 420 is equipped with a permanent magnet speaker and the model 430 with an electro dynamic speaker.

The tube complement of model 420 is as follows:

1 - Type 6D6 - remote cut-off pentode as an R.F. amplifier.
1 - Type 76 - triode as a detector.
1 - Type 38 - pentode as an output tube.
1 - Type 12Z3 - high vacuum rectifier.

The tube complement of model 430 is as follows:

1 - Type 6D6 - remote cut-off pentode as an R.F. amplifier.
1 - Type 76 - triode as a detector.
1 - Type 12A5 - pentode output tube.
1 - Type 12Z3 - high vacuum rectifier.

## SERVICE NOTES

Should it ever become necessary to check alignment or re-align these receivers, the correct procedure is as follows:

Before any adjustments are made, the chassis must be removed from the cabinet. To do this it is necessary to pull off the volume and selector knobs, remove the back of the cabinet and the four screws which fasten the chassis to the base of the cabinet.

FREQUENCY ALIGNMENT:

1. Disconnect antenna wire from lug on antenna coil to which it is attached and connect in its place, in series with a 50 mmfd. condenser, a test oscillator. With this oscillator set at 1400 kilocycles and the R.F. (front trimmer) opened as far as possible, trim the antenna (rear) trimmer to resonance with oscillator (maximum deflection on an output meter connected across the two leads of the PM speaker on the model 420 and across the primary of the speaker input transformer on the model 430).
2. Check tracking at 1200-1000-800-600-530 kilocycles, bending plates only if absolutely necessary.
3. Re-set oscillator to 1712 kilocycles, tuning oscillator by rotating variable condenser for a check to ascertain if receiver tunes to 1712.

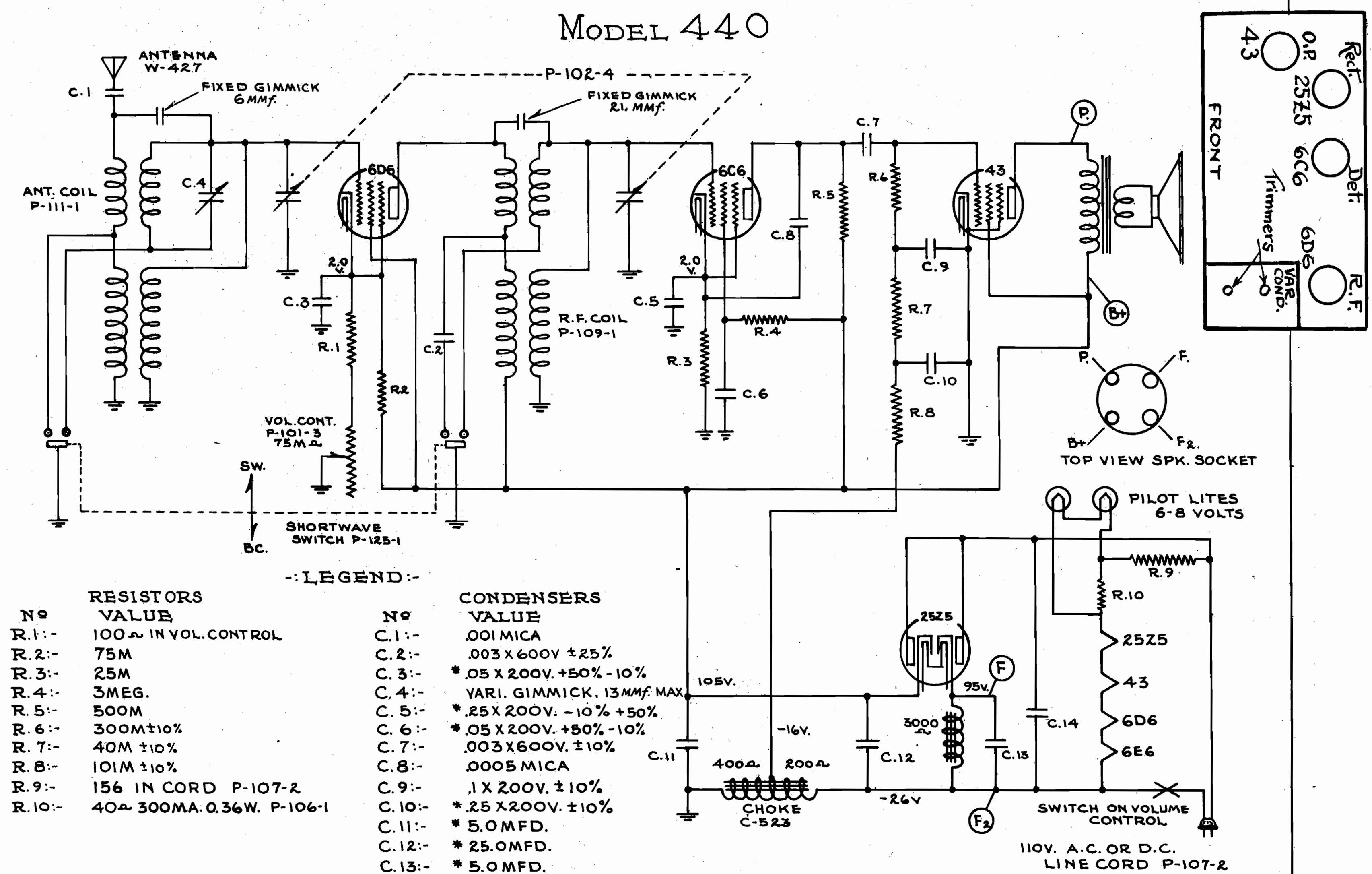
NOTES:

If trouble is experienced in getting receiver tuned down to 1712, look for the following:

That the green grid and black ground wires connected to the antenna coil are well separated from each other and that both the green leads to the grid cap and the antenna are clear of the tube shield (this reduces to a minimum the external capacity of the antenna coil).

MODEL 440
Schematic, Socket

# BELMONT RADIO CORP.




-: LEGEND :-

**RESISTORS**

| Nº | VALUE |
|---|---|
| R.1:- | 100Ω IN VOL. CONTROL |
| R.2:- | 75M |
| R.3:- | 25M |
| R.4:- | 3MEG. |
| R.5:- | 500M |
| R.6:- | 300M ±10% |
| R.7:- | 40M ±10% |
| R.8:- | 101M ±10% |
| R.9:- | 156 IN CORD P-107-2 |
| R.10:- | 40Ω 300MA. 0.36W. P-106-1 |

**CONDENSERS**

| Nº | VALUE |
|---|---|
| C.1:- | .001 MICA |
| C.2:- | .003 X 600V ±25% |
| C.3:- | * .05 X 200V. +50% -10% |
| C.4:- | VARI. GIMMICK. 13 MMf. MAX. |
| C.5:- | * .25 X 200V. -10% +50% |
| C.6:- | * .05 X 200V. +50% -10% |
| C.7:- | .003 X 600V. ±10% |
| C.8:- | .0005 MICA |
| C.9:- | .1 X 200V. ±10% |
| C.10:- | * .25 X 200V. ±10% |
| C.11:- | * 5.0 MFD. |
| C.12:- | * 25.0 MFD. |
| C.13:- | * 5.0 MFD. |
| C.14:- | .1 X 400V. +50% -10% |

NOTE:-* C.3, C.6 IN DUAL CONDENSER UNIT P-1030
C.5, C.10 " " " P-118-2
C.11, C.12, C.13 IN ONE UNIT P-103-1

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND, VOLUME CONTROL ON FULL.
NUMBERS PREFIXED BY LETTERS ARE PARTS.

34301 R.

**MODEL 440**
**Alignment**

# BELMONT RADIO CORP.

105-115 Volts Alternating (any cycles) or Direct Current - 40 Watts.

530-1500 Kilocycles - 1500-4000 Kilocycles

## SERVICE NOTES

Should it be at any time necessary to rebalance this set, the correct procedure is as follows:

BROADCAST BAND ALIGNMENT:

Remove chassis from cabinet by pulling off volume, selector and wave changing switch knobs, removing back and four screws which hold chassis in cabinet, replace knobs and disconnect antenna wire from coil.

1. Set wave changing switch in broadcast position by rotating in clockwise (right) direction.
2. With gang condenser in its minimum capacity position, plates entirely out of mesh, extreme left of its rotation, and with volume control full on, make the following adjustments:
   (a) Connect an oscillator set at 1500 kilocycles in series with a 50 mmfd. condenser to the antenna terminal of the coil (from which antenna lead has been removed) and to ground (chassis), adjust both antenna and R.F. trimmers of the variable condenser to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer).
   (b) Reset oscillator to 1400 kilocycles, adjust variable condenser to pick up oscillator and re-align antenna trimmer (rear section of variable condenser) to resonance.
   (c) Check output at 1200-1000-800-600 kilocycles. Bend plates only at 1200 and 1000 kilocycles to increase output, and then only if necessary. No bending is necessary at 600 or 800 kilocycles.

SHORT WAVE BAND ALIGNMENT:

1. Set wave changing switch in counter-clockwise (left) position.

2. With oscillator adjusted to 3700 kilocycles, adjust the condenser mounted on top of the antenna coil and consisting of a center piece of heavy enameled copper wire about which is wrapped a spiral of a smaller enameled copper wire, with your fingers sliding the spiral to and fro until maximum output is attained, as indicated by maximum deflection on the output meter.
3. Next reset oscillator to 1550 kilocycles and adjust slip coil at the bottom of antenna coil assembly until maximum output is obtained (this coil is wound on a paper tube which has been slipped over the dowel on which the other coils are wound). Seal this slip coil with wax after making adjustment.
4. Now reset oscillator to 3700 kilocycles and readjust the condenser previously adjusted, as explained in 1. On completing this readjustment, seal the adjustment by dropping some wax in the hole of the terminal strip at the top of the antenna coil assembly where the spiral enameled wire passes through the strip. Do not put wax on the spiral wire, as this will change the capacity of this small condenser.

NOTES

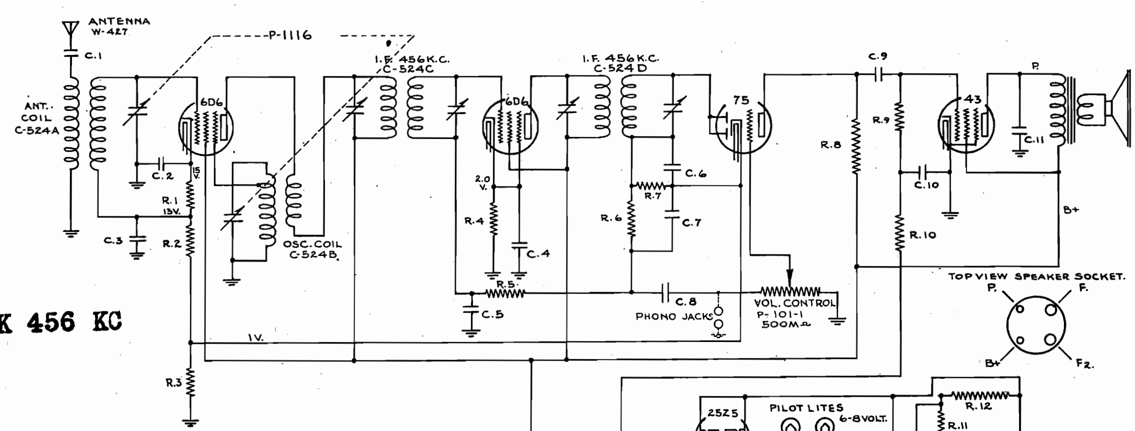
When making these adjustments with the small condenser at the top of the coil and with the slip coil at the bottom of the antenna assembly, keep the receiver tuned to the generator at all times by gently rocking the variable condenser to and fro.

In order to replace pilot lights, it is necessary to remove the chassis. These lamps are connected in series, if one of them burns out the other one will not light. They are 6-8 volt, .15 ampere lamps.

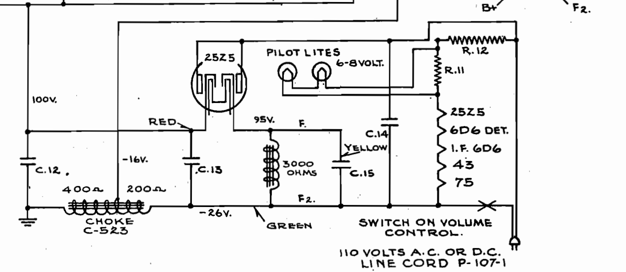
# BELMONT RADIO CORP.

MODEL 540

**MODEL 540**
**Schematic, Socket**
**Alignment, Parts**




IF PEAK 456 KC

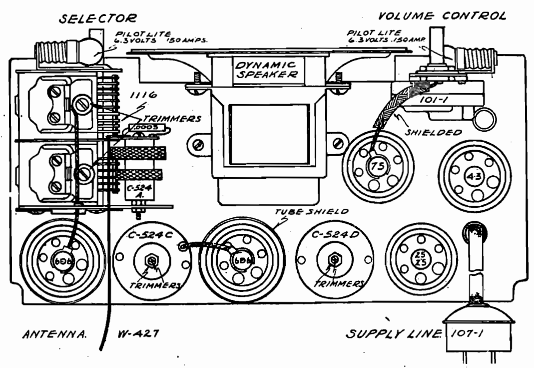



LEGEND

| RESISTORS Nº | VALUE | |
|---|---|---|
| R. 1:- | 300 | * |
| R. 2:- | 2M | * |
| R. 3:- | 180 | * |
| R. 4:- | 250 R-270 | |
| R. 5:- | 250M | |
| R. 6:- | 50M | |
| R. 7:- | 250M | |
| R. 8:- | 100M | |
| R. 9:- | 300M | |
| R. 10:- | 250M | |
| R. 11:- | 40Ω 300M.A. 0.36W. P-106-1 | |
| R. 12:- | 126 IN CORD P107-1 | |

| CONDENSERS Nº | VALUE | |
|---|---|---|
| C. 1:- | .0005 | MICA |
| C. 2:- | .05 | 200V. |
| C. 3:- | .05 | 200V. |
| C. 4:- | .05 | 200V. |
| C. 5:- | .1 | 200V. |
| C. 6:- | .0005 | MICA |
| C. 7:- | .0005 | MICA |
| C. 8:- | .01 | 400V. |
| C. 9:- | .01 | 400V. |
| C. 10:- | .1 | 200V. |
| C. 11:- | .025 | 300 |
| C. 12:- | 5.0 MFD. | C-525D |
| C. 13:- | 25.0 MFD. | * |
| C. 14:- | .1 | 400V. |
| C. 15:- | 5.0 MFD | * |

-: NOTE :-
* R.1, R.2 & R.3 IN ONE UNIT PART NUMBER R-268.
* C. 13 AND C. 15 IN ONE UNIT PART NUMBER C-525-C
NUMBERS PREFIXED BY LETTERS ARE PARTS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL MEASURED ON A. C. CURRENT.




| Part No. | Description |
|---|---|
| 101-1 | Volume Control with Switch |
| 106-1 | 40 Ohm Resistor-10% |
| 107-1 | 126 Ohm Special Cord and Plug |
| C-523 | 600 Ohm Choke |
| C-524A | Antenna Coil |
| C-524B | Oscillator Coil |
| C-524C | Input I.F. Transformer |
| C-524D | Output I.F. Transformer |
| C-525C | 5-25 Mfd. Electrolytic Condenser |
| C-525D | 5 Mfd. Electrolytic Condenser |
| R-268 | 2480 Ohm Resistor |
| R-270 | 250 Ohm Wire Wound Resistor |

## SERVICE NOTES

Should it be at any time necessary to rebalance this set, the correct procedure is as follows:

1. Volume control on full during all alignment.
2. Variable condenser in minimum capacity position, plates open, at start of all aligning.

### I.F. ALIGNMENT

1. To peak I.F. transformers, connect oscillator set at 456 kilocycles to the grid of the 6D6 tube directly in back of the variable condenser and adjust the trimming condensers of the I.F. transformers to resonance (Maximum deflection on an output meter connected across the primary of the speaker input transformer).

   Each I.F. trimmer has two adjustments, one nut and one screw, both of which are adjustable from the top.

### BROADCAST BAND ALIGNMENT

1. Disconnect antenna wire and connect oscillator in series with a 75 mmfd. condenser to the antenna coil. With the variable condenser set at its minimum capacity position, at the extreme right of its rotation, and with an oscillator output adjusted to 1720 kilocycles, adjust trimmer of oscillator section of variable condenser (rear section) to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer). Next adjust the trimmer condenser of the front section of the variable condenser to resonance.
2. Check alignment at 1400-1200-1000-800-600-530 kilocycles, bending the slotted plates of the front section of the variable condenser only if absolutely necessary.

MODEL 575
Schematic,
Alignment

BELMONT RADIO CORP.

# Service Notes

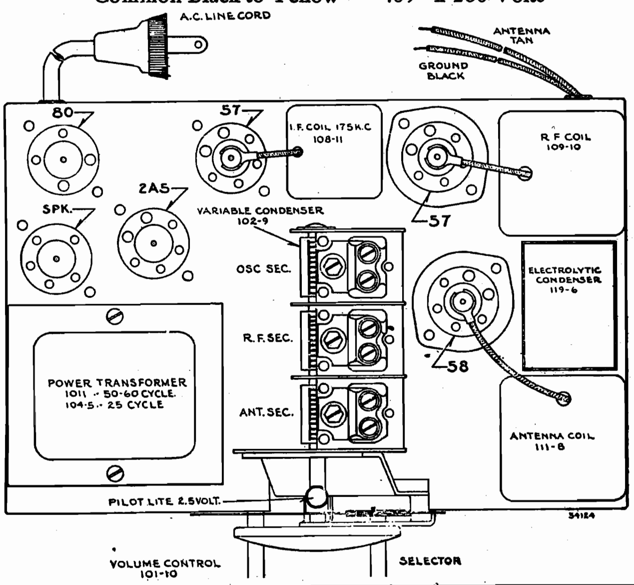
Voltages taken from different points of circuit to chassis are measured with volume control full on, using a voltmeter having a resistance of 1000 ohms per volt. These voltages are indicated on the schematic circuit diagram.

**Part No. 145-2**

| | | |
|---|---|---|
| Common Black to Brown | —.003 | x 600 Volts |
| Common Black to Green | —.1 | x 200 Volts |
| Common Black to Red | —.1 | x 200 Volts |
| Common Black to Orange | —.25 | x 200 Volts |
| Blue to Blue | —.05 | x 400 Volts |

**Part No. 145-3**

| | | |
|---|---|---|
| Common Black to Brown | —.1 | x 200 Volts |
| Common Black to Green | —.05 | x 200 Volts |
| Common Black to Orange | —.05 | x 200 Volts |
| Common Black to Yellow | —.05 | x 200 Volts |




# Aligning I. F. Transformer

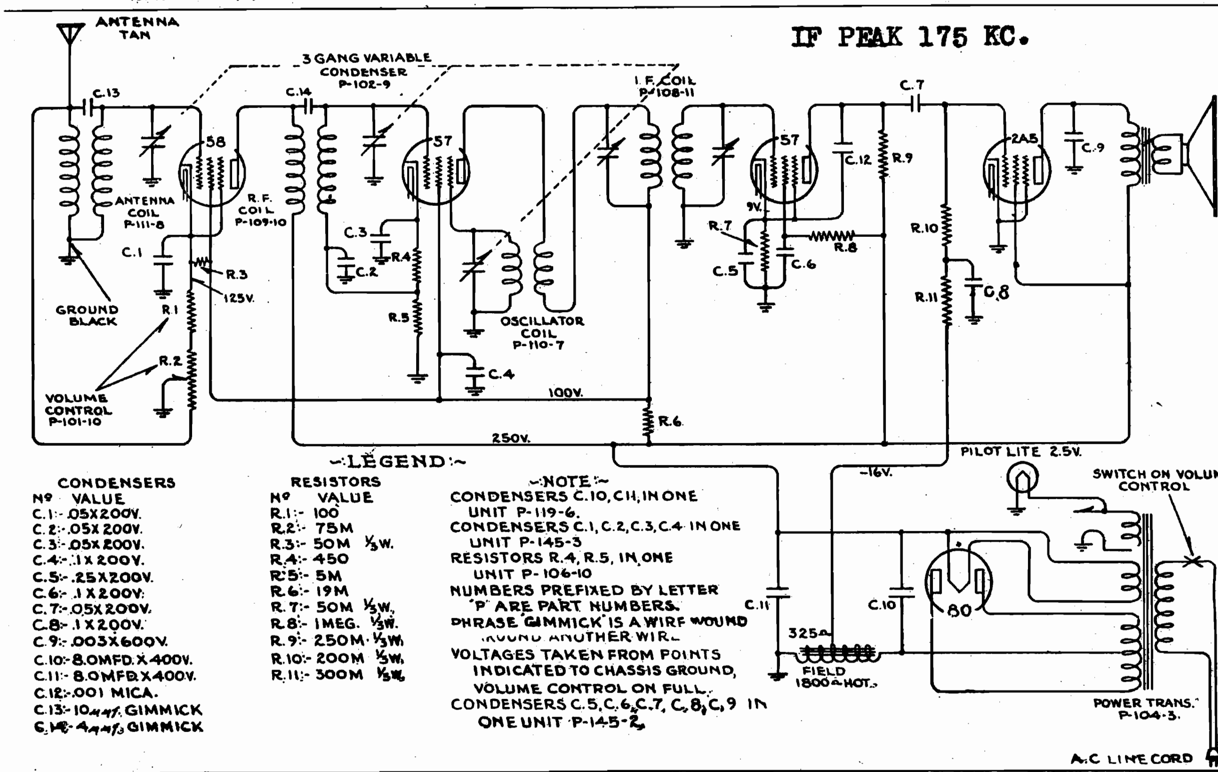
1. With volume control full on, at extreme right of its rotation, and with variable condenser at its maximum capacity position (extreme right of its rotation) make the following adjustments:
   (a) Connect an external oscillator adjusted to 175 kilocycles, in series with a .1 mfd. condenser, to the control grid cap of the type 57 tube located between the R. F. coil (part numbers 109-10) and the I. F. transformer (part number 108-11) and chassis.
   (b) Adjust trimming condensers of I. F. transformer (part number 108-11) to resonance. See top view of chassis. Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or between the plate and screen terminals of the type 2A5 tube, by means of an adapter. Maximum deflection of the meter indicates resonance. Care must be taken to use only enough signal to give a readily readable output, as excessive input will result in overload and a false resonance point.

NOTE: The two trimmer condensers which tune the primary and secondary of the I. F. transformer are adjusted by set screws accessible from the back of the chassis.

# Aligning R. F. and Oscillator Circuits

1. Connect the external oscillator set at 1720 kilocycles and in series with a 200 Mfd. condenser, between the antenna (tan) and ground (black) leads.
   (a) With volume control full on and variable condenser plates in minimum capacity position, plates entirely out of mesh (extreme left of its rotation), adjust trimmer of rear oscillator section of variable condenser to resonance.
   (b) Shift external oscillator frequency from 1720 to 1400 kilocycles, pick up signal by rotating variable condenser and peak R. F. (center) and antenna (front) section trimmers of variable condenser to resonance.
   (c) Check tracking at 1500, 1200, 1000, 800, 600 and 530 kilocycles by changing external oscillator frequency and rotating variable condenser to pick up signal. Adjust slotted end plates of R. F. (center) and antenna (front) sections to increase output, if necessary. DO NOT BEND OSCILLATOR PLATES.

IF PEAK 175 KC. 8-1-34



# BELMONT RADIO CORP.

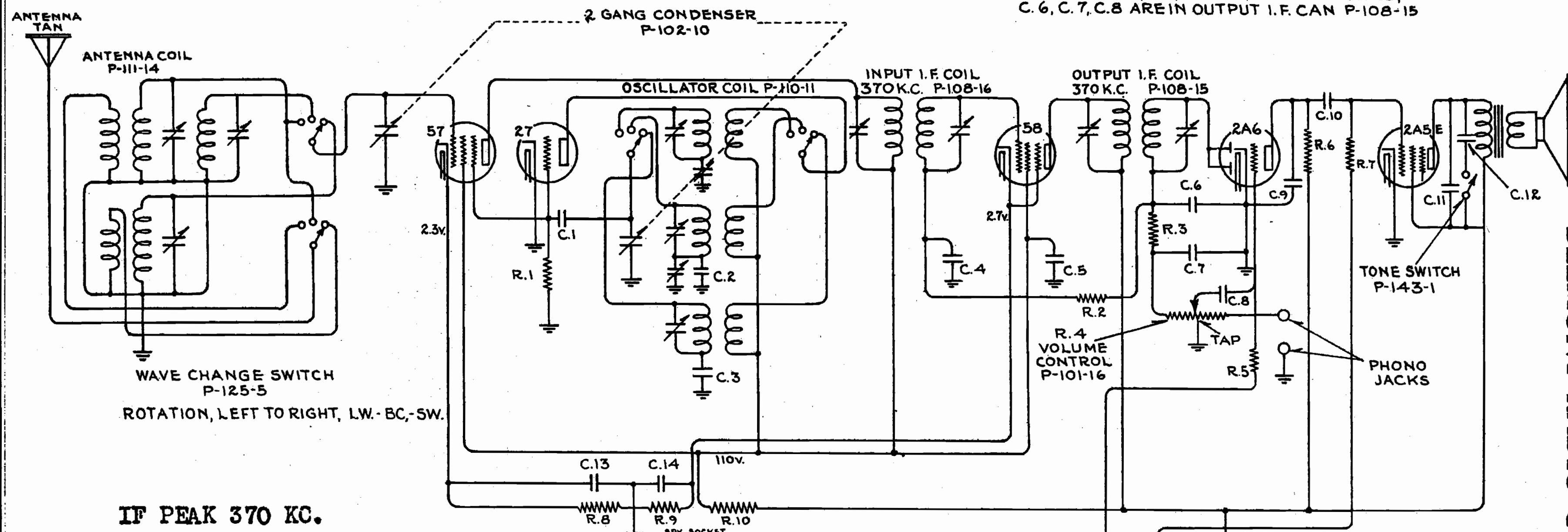
**MODEL 640**
**Schematic, Socket Trimmers**

CHASSIS ARE SOMETIMES EQUIPPED WITH UNIVERSAL TRANSFORMERS FOR OPERATION ON 40 AND 60 CYCLES AND WITH PRIMARY TAPS FOR 108, 125, 150, 220 AND 250 VOLTS (SEE INSTRUCTIONS) AND ALSO SOMETIMES EQUIPPED WITH 25 CYCLE TRANSFORMERS. SPECIAL AND UNIVERSAL PRIMARIES.

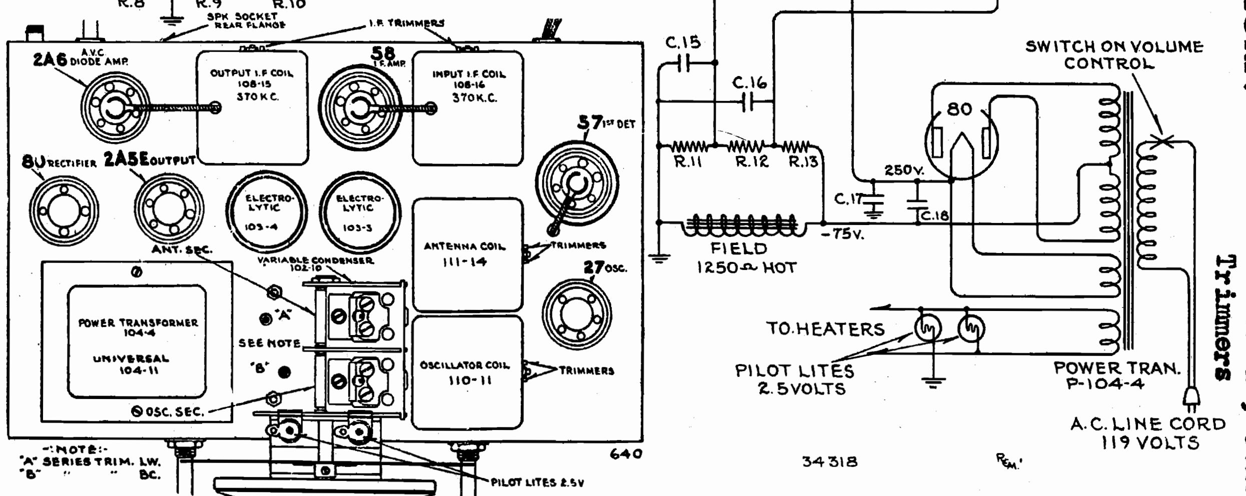
Standard Broadcast Band 200-585 Meters.
Long Wave Band 1000-2150 Meters.
Short Wave Band 19.25-52 Meters.

## MODEL 640

-:NOTE:-
CONDENSERS C.11, C.12 IN DUAL UNIT.
" C.15, C.16 " " "
" C.4, C.14 " " "
RESISTORS R.8, R.9, R.10 IN ONE UNIT. P-106-13
NUMBERS PREFIXED BY LETTER "P" ARE PART Nos
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL.
RESISTORS, R.2, R.3, R.5 AND CONDENSERS, C.6, C.7, C.8 ARE IN OUTPUT I.F. CAN P-108-15




IF PEAK 370 KC.




| CONDENSER Nº | VALUE |
|---|---|
| C.1:- | 50 MICA |
| C.2:- | 490 MICA |
| C.3:- | 6700 MICA |
| C.4:- | .05 X 200V. |
| C.5:- | .05 X 400V. |
| C.6:- | 100 MICA |
| C.7:- | 100 MICA |
| C.8:- | .05 X 200V. |
| C.9:- | .0005 MICA |
| C.10:- | .05 X 400V. |
| C.11:- | .003 X 400V. |
| C.12:- | .02 X 400V. |
| C.13:- | .1 X 200V. |
| C.14:- | .1 X 200V. |
| C.15:- | .25 X 200V. |
| C.16:- | .25 X 200V. |
| C.17:- | 18 MFD. 350V. P-103-3 |
| C.18:- | 16 MFD. 400V. P-103-4 |

| RESISTORS Nº | VALUE | |
|---|---|---|
| R.1:- | 50M | 1/3W. |
| R.2:- | 500M | 1/3W. |
| R.3:- | 50M | 1/3W. |
| R.4:- | 500M EA. SIDE OF TAP | |
| R.5:- | 500M | 1/3W. |
| R.6:- | 250M | 1/3W. |
| R.7:- | 250M | 1/3W. |
| R.8:- | 1000 | |
| R.9:- | 275 | |
| R.10:- | 13M | |
| R.11:- | 25M | 1/3W. |
| R.12:- | 250M | 1/3W. |
| R.13:- | 750M | 1/3W. |

MODEL 640
Alignment

# BELMONT RADIO CORP.

SERVICE NOTES

Voltages taken from different points of the circuit are measured with a voltmeter having a resistance of 1000 ohms per volt and are made between the points indicated and the chassis pan. These voltages are indicated on the circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

## ALIGNMENT:

No aligning adjustments should be made until the set has been thoroughly checked for all other possible causes of trouble, such as poor installations, low line voltages, defective tubes, condensers and resistors.

## ALIGNING I.F. TRANSFORMERS:

1. With volume control full on, at extreme right of its rotation, and with wave changing switch in the long wave position, extreme left of its rotation, and with variable condenser at its minimum capacity position, extreme left of its rotation, plates entirely out of mesh, adjust the I.F. transformers, parts number 108-15 and 108-16, in the following manner:
   (a) Connect an external oscillator which has been adjusted to 370 kilocycles, in series with a .1 mfd. condenser to the control grid cap of the type 57 first detector tube (see diagram and chassis).
   (b) Adjust trimming condensers of both I.F. transformers (parts number 108-15 and 108-16) to resonance. Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between plate and screen terminals of type 2A5E output tube Maximum deflection of the meter indicates resonance. Care should be taken to use only enough signal to give a readily readable output.

   Note: The two adjustments on each transformer are accessible through holes in the transformer cans from the back of the chassis.

## LONG WAVE BAND ALIGNMENT:

1. Shift frequency of external oscillator to 1000 meters and connect in series with a 200 mmfd. condenser to the tan antenna wire and the black ground wire, set wave changing switch to extreme left of its rotation and variable condenser at its minimum capacity position, extreme left of its rotation, plates entirely out of mesh.
   (a) Adjust long wave shunt trimmers of antenna coil, part number 111-14 and oscillator coil, part number 110-11 to resonance (these adjustments are located nearest to the chassis and each of these coils are adjustable from side of the chassis).
   (b) Shift frequency of external oscillator to 2000 meters, rotate variable condenser to pick up signal.
   (c) Adjust series trimmer to resonance. This adjustment is accessible from top of the chassis between the variable condenser and the power transformer and is marked "A" on top view of chassis.

## BROADCAST BAND ALIGNMENT:

1. Set wave changing switch in the broadcast, center, position and re-set external oscillator to 196 meters (1530 kilocycles), set variable condenser at its minimum capacity position, extreme left of its rotation
   (a) Adjust oscillator shunt trimmer, upper adjustment part number 110-11, to resonance.
   (b) Re-set external oscillator to 214 meters (1400 kilocycles), rotate variable condenser to pick up signal, adjust shunt trimmer of antenna coil, upper adjustment part number 111-14, to resonance.
   (c) Re-set external oscillator to 542 meters (550 kilocycles), rotate variable condenser to pick up signal and adjust oscillator series trimmer (between condenser and transformer, marked "B" on diagram) to resonance.

## SHORT WAVE BAND ALIGNMENT:

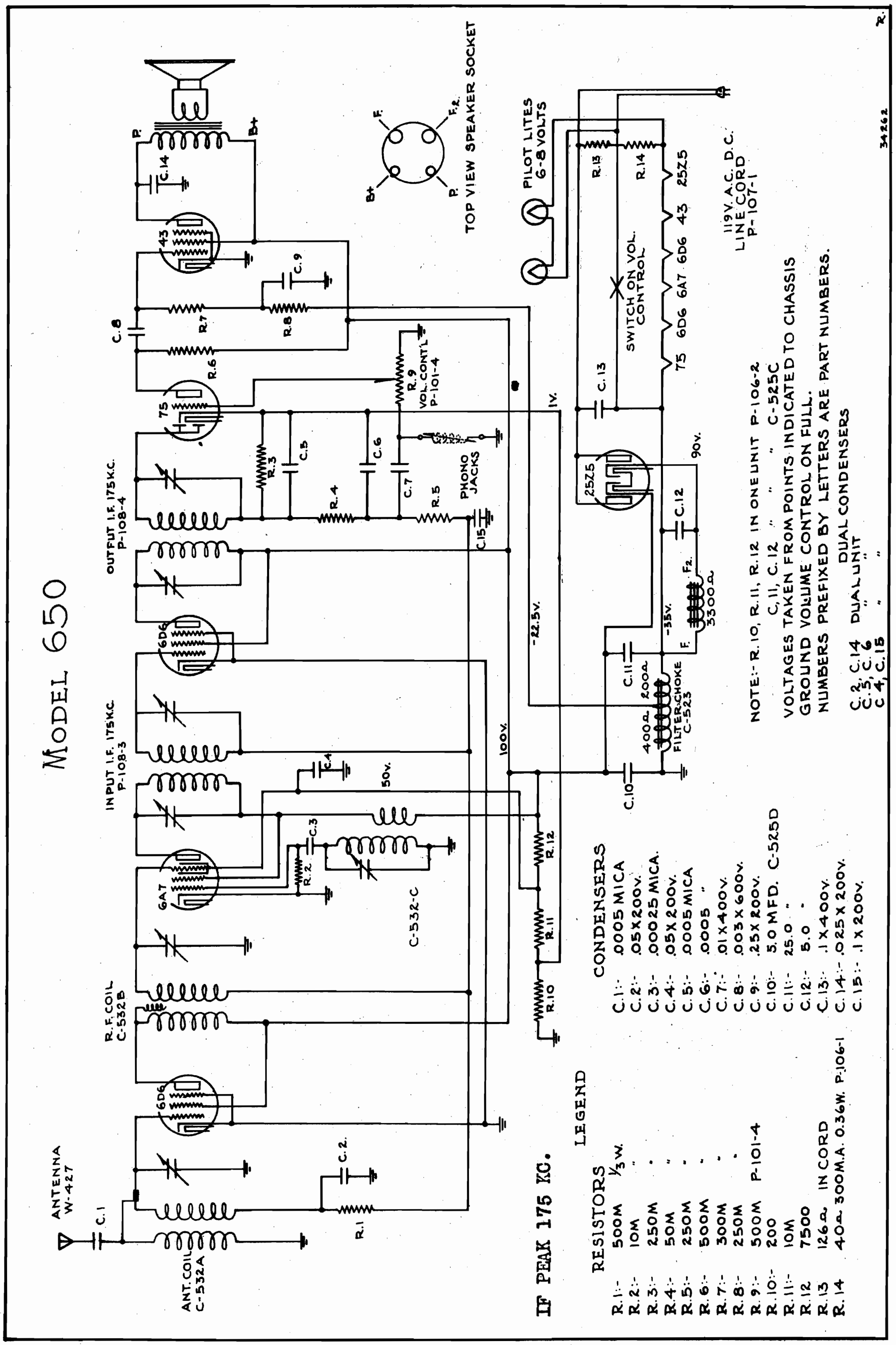
1. Set wave changing switch in the short wave position, extreme right of its rotation, and change external oscillator frequency to 20 meters (15 megacycles), connect oscillator in series with a 300 ohm resistor to tan antenna wire and black ground wire.
   (a) Adjust variable condenser with selector knob so that pointer is opposite the 20 meter calibration on the dial. Adjust center trimmers of oscillator coil, part number110-11 and antenna coil part number 111-14, to resonance. These adjustments are accessible from side of the chassis.

## NOTES:

Should the planetary vernier dial drive mechanism fail to function properly, it will probably be found to be due to a cracked or broken compression spring. This drive may be dis-assembled by removing the two screws which fasten it to the dial bracket. The part number of the compression spring is 112-31, All of the other dial parts are hardened and should cause no trouble.

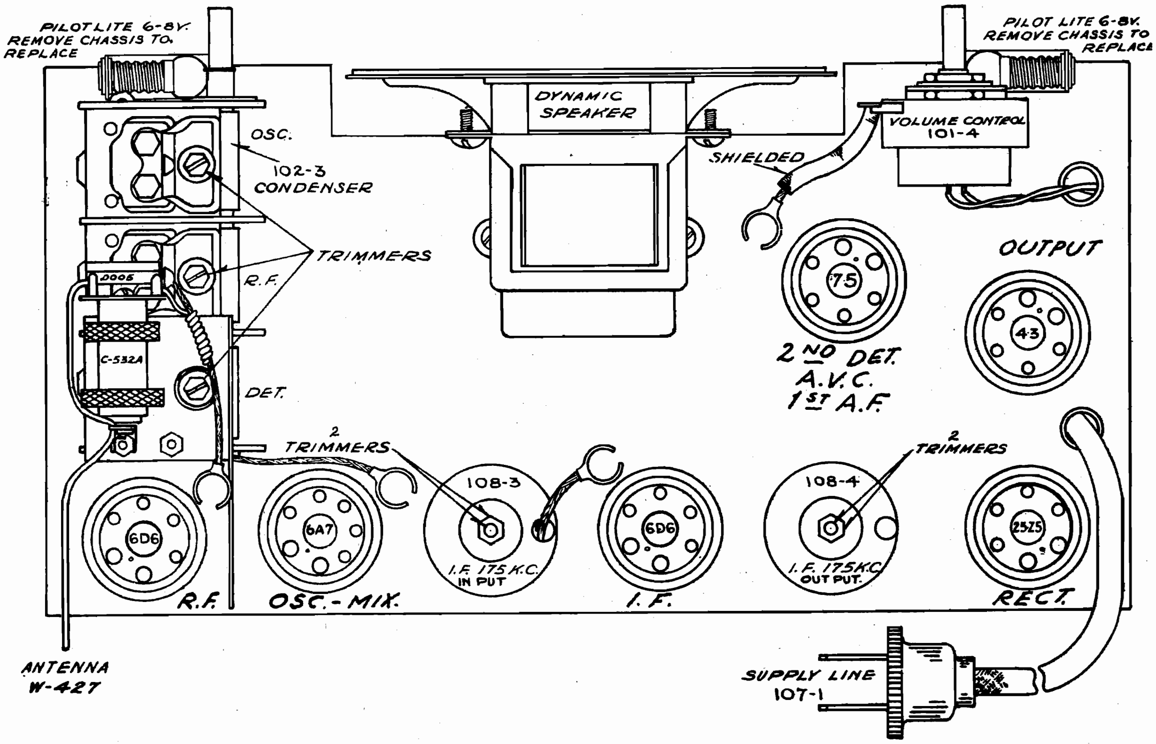
BELMONT RADIO CORP.

MODEL 650
Schematic



MODEL 650
Socket,Alignment

BELMONT RADIO CORP.




Before attempting any adjustment, the chassis must be removed from the cabinet. This is accomplished by pulling off the volume and selector knobs, removing the back and the four screws which fasten the chassis to the cabinet.

I.F. ALIGNMENT:

1. With volume control on full, at the extreme right of its rotation, and with variable condenser at its maximum capacity position (extreme left of its rotation) make the following adjustments:
   (a) Connect an oscillator set at 175 kilocycles in series with a .1 mfd. condenser to the control grid (cap at top of type 6A7 oscillator first detector tube).
   (b) Adjust trimming condensers of both input and output I.F. transformers, parts number 108-3 and 108-4, (see top view of chassis) to resonance. Use as a resonance indicator an output meter connected across the primary of the speaker input transformer. Maximum deflection on the meter indicates resonance.

Note: Each I.F. transformer trimmer has two adjustments, one nut and one screw, both of which are adjustable from the top.

FREQUENCY ALIGNMENT:

1. Disconnect antenna wire from lug on antenna coil to which it is attached and connect to this lug, in series with a 50 mmfd. condenser, an oscillator which has been set at 1720 kilocycles.
2. Adjust trimmer condenser of the oscillator section of variable condenser (the shaft end section) to resonance with oscillator (maximum deflection on an output meter).
3. Change input oscillator to 1400 kilocycles and pick up signal by rotating variable condenser, then adjust trimmers of antenna and R.F. detector sections of variable condenser (center and rear respectively) to resonance with oscillator.
4. Check tracking at 1200-1000-800-600-530 kilocycles by setting oscillator at these frequencies and picking it up by rotating variable condenser. Bend slotted plates of condenser only if necessary.

NOTES:

The pilot lights are connected in series. Should one burn out, the other will not light. To replace them it is necessary to remove chassis from cabinet. The lamps used are 6-8 volts, .15 amperes.

Voltages from chassis to different points are indicated on the schematic circuit diagram and should be measured with a volt meter having a resistance of 1000 ohms per volt.

If receiver fails to function at the low frequencies, the trouble is apt to be a defective 6A7 tube. The remedy of course, is to replace the 6A7. They sometimes fail to oscillate on the lower frequencies.

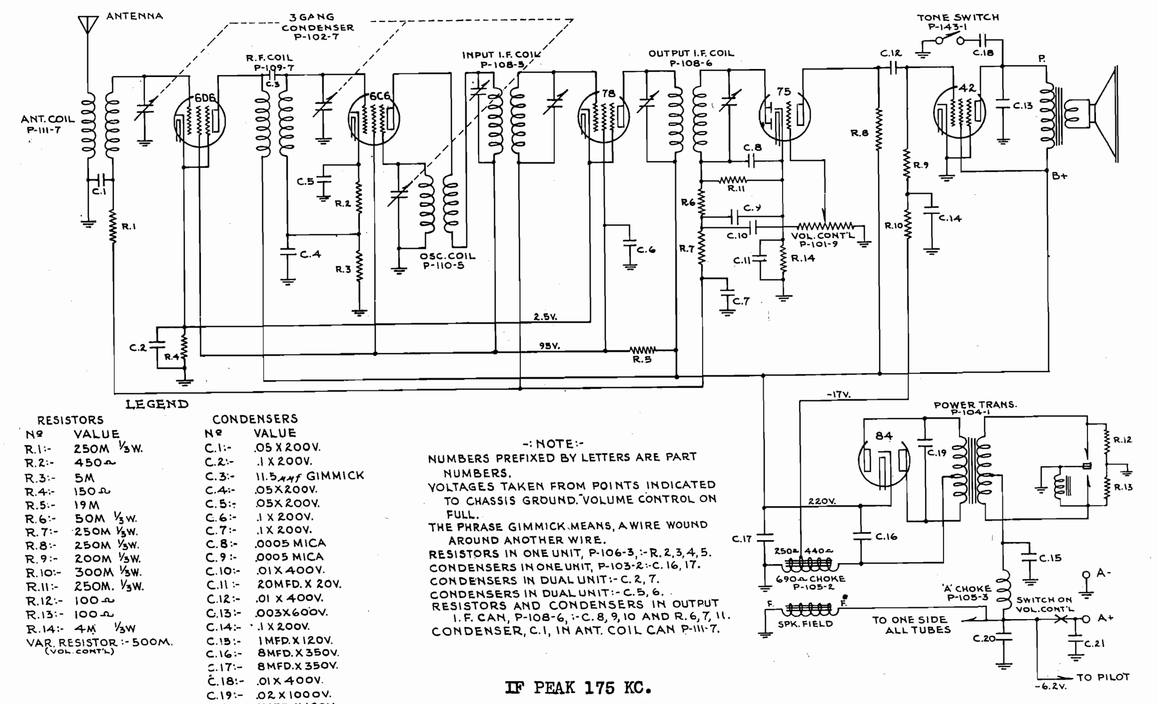
# BELMONT RADIO CORP.

**MODEL 670**
**Schematic**
**Socket, Trimmers**

Vibrators can be reconditioned at a cost of $3.00 each, if the old unit is returned.

All resistors are RMA color coded - specify value and/or resistor number (per schematic diagram) and model number.

## MODEL 670




### LEGEND

**RESISTORS**

| Nº | VALUE |
|---|---|
| R.1:- | 250M ⅓W. |
| R.2:- | 450 ~ |
| R.3:- | 5M |
| R.4:- | 150 Ω |
| R.5:- | 19M |
| R.6:- | 50M ⅓W. |
| R.7:- | 250M ⅓W. |
| R.8:- | 250M ⅓W. |
| R.9:- | 200M ⅓W. |
| R.10:- | 300M ⅓W. |
| R.11:- | 250M. ⅓W. |
| R.12:- | 100 ~ |
| R.13:- | 100 ~ |
| R.14:- | 4M ⅓W |

VAR. RESISTOR :- 500M. (VOL. CONT'L)

**CONDENSERS**

| Nº | VALUE |
|---|---|
| C.1:- | .05 X 200V. |
| C.2:- | .1 X 200V. |
| C.3:- | 11.5 mmf GIMMICK |
| C.4:- | .05 X 200V. |
| C.5:- | .05 X 200V. |
| C.6:- | .1 X 200V. |
| C.7:- | .1 X 200V. |
| C.8:- | .0005 MICA |
| C.9:- | .0005 MICA |
| C.10:- | .01 X 400V. |
| C.11:- | 20 MFD. X 20V. |
| C.12:- | .01 X 400V. |
| C.13:- | .003 X 600V. |
| C.14:- | .1 X 200V. |
| C.15:- | 1 MFD. X 120V. |
| C.16:- | 8 MFD. X 350V. |
| C.17:- | 8 MFD. X 350V. |
| C.18:- | .01 X 400V. |
| C.19:- | .02 X 1000V. |
| C.20:- | 1 MFD. X 120V. |
| C.21:- | .002 MICA. |

-: NOTE :-

NUMBERS PREFIXED BY LETTERS ARE PART NUMBERS.

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL.

THE PHRASE GIMMICK MEANS, A WIRE WOUND AROUND ANOTHER WIRE.

RESISTORS IN ONE UNIT, P-106-3, :- R. 2, 3, 4, 5.

CONDENSERS IN ONE UNIT, P-103-2 :- C. 16, 17.

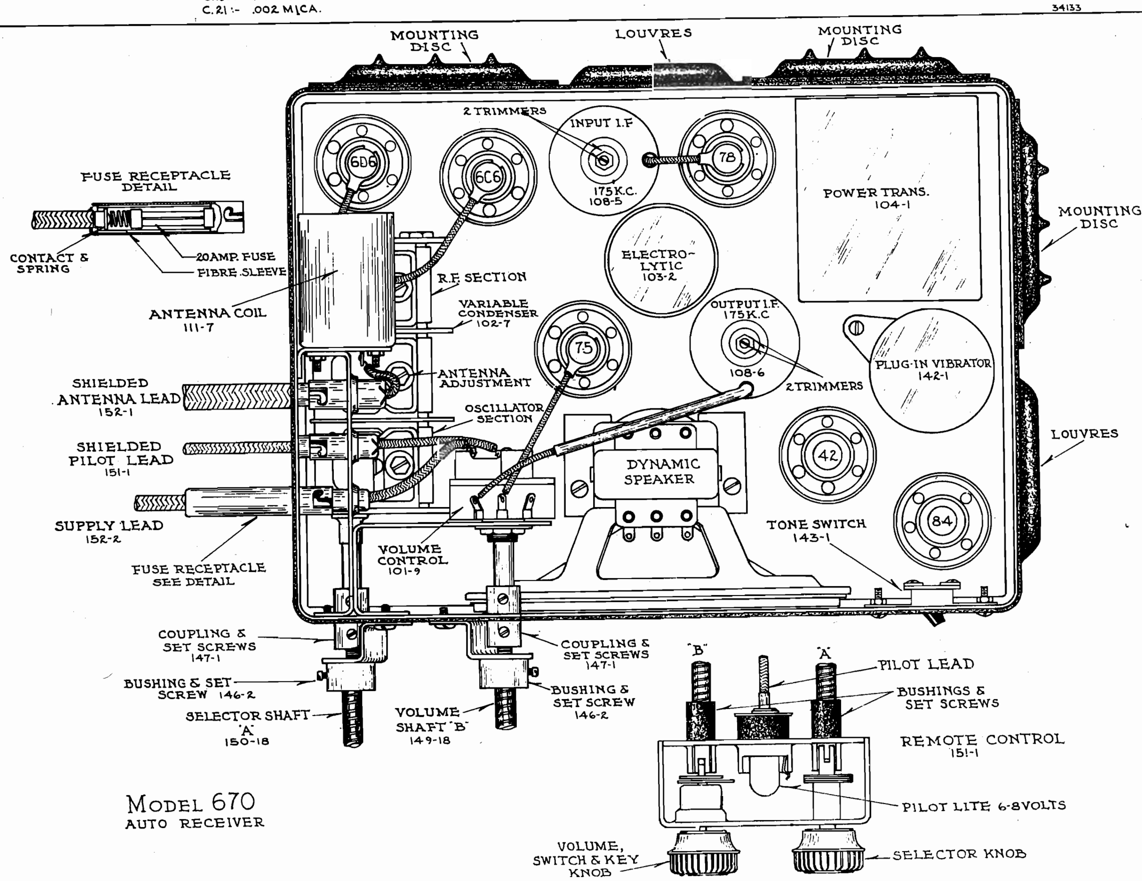
CONDENSERS IN DUAL UNIT :- C. 2, 7.

CONDENSERS IN DUAL UNIT :- C. 5, 6.

RESISTORS AND CONDENSERS IN OUTPUT I. F. CAN, P-108-6, :- C. 8, 9, 10 AND R. 6, 7, 11.

CONDENSER, C.1, IN ANT. COIL CAN P-111-7.

**IF PEAK 175 KC.**




MODEL 670
AUTO RECEIVER

MODEL 670
Alignment
Service Notes

# BELMONT RADIO CORP.

ELIMINATION OF MOTOR NOISE: (Cont'd)

In some few cases, such as Buicks, it is necessary to use screw type suppressors. Cut lead about two inches from distributor and screw one end of suppressor into the wire attached to distributor, screw wire from coil into other end of suppressor.

Generator capacitor, number 148-1, is connected to generator side of cutout. The ground side of capacitor can be fastened to the generator housing under the same screw that holds the relay housing to generator. In some cases, an additional capacitor, number 148-1, (obtainable from your dealer) must be installed between the battery side of ignition coil and the car frame.

If after connecting suppressors and condensers as outlined above there is still motor noise, make the following tests:

Shield high tension leads.

Bond flexible shaft leads, such as free wheeling, which run close to distributor, radiating ignition interference which is picked up by the antenna inside of car.

Cars using wooden floor boards, place a grounded copper screen under toe board.

Excessive gap between distributor rotor and high tension contacts, replace with a special radio rotor arm or build up end with solder and dress end with file so that its original shape is retained. The rotor should not brush or wipe the contacts, but should just clear them.

In some cases, such as V-8 Ford, it is necessary to pull battery and primary leads out of special tube which houses high tension leads, shield and ground these leads. Also on V-8 Fords it is necessary to install a capacitor at primary terminal of coil housing.

Additional suppressors can be obtained from your dealer.

The ignition system of car must be kept in good condition.

Fouled plugs or plugs with improperly adjusted gaps will affect the operation of receiver as well as of the automobile. Burned or poorly adjusted braker points will also impair the performance. It is advisable to advance the generator charging rate in order to compensate for the additional drain of the receiver on car storage battery.

It is sometimes necessary to connect a condenser (148-3) between the hot side of the dome light switch and ground.

BALANCING SET TO ANTENNA:

When this set has been installed and is ready for operation, it may be found necessary (depending on antenna) to balance set to this antenna. This is accomplished as follows:

With the receiver tuned to a very weak station, about 130 to 140 (1300 to 1400 kilocycles) on the dial, adjust the antenna trimmer with a screw driver until maximum volume is attained. To reach the antenna trimmer remove the plug button from the top of the case.

*****************
SERVICE NOTES
*****************

Should it ever be necessary or desirable to re-align this receiver, the proper method is as follows:

Adjustments can be made with the receiver mounted in the cabinet, being necessary only to remove the top cover.

I.F. ALIGNMENT:

1. With variable condenser at its maximum capacity position and with volume control full on, connect in series with a .1 mfd. condenser, an oscillator set at 175 kilocycles to the grid cap of the 6C6 tube.
2. Adjust trimming condensers of both input and output I.F. transformers, parts number 108-5 and 108-6 (see top view of chassis) to resonance with oscillator, as indicated on an output meter connected across the primary terminals of the speaker input transformer. Maximum deflection on the meter indicates resonance

Note: Each I.F. transformer trimmer has two adjustments, one nut and one screw, both of which are adjustable through the top of the can.

FREQUENCY ALIGNMENT:

1. Attach oscillator connected in series with a 200 mmfd. condenser to the antenna lead and with the variable condenser at its minimum capacity position (extreme right of its rotation) and with an oscillator set at 1550 kilocycles, adjust condenser trimmer of oscillator section (shaft end) to resonance.
2. Re-set oscillator to 1400 kilocycles, rotate variable condenser to pick up signal, adjust antenna and R.F. trimmers to resonance.
3. Check alignment at 1200-1000-800-600-530 kilocycles by setting oscillator to these frequencies and picking up signal by rotating condenser.
4. Bend slotted plates of antenna and R.F. sections only if necessary. UNDER NO CIRCUMSTANCES BEND PLATES OF OSCILLATOR SECTION.

NOTES:

Voltages from chassis to different points are indicated on schematic circuit diagram, and should be measured with a volt meter having a resistance of 1000 ohms per volt.

Failure to operate, noisy or weak reception, may be due to defective tubes or poor contact between cap on top of tube and grid clip.

Tubes may be checked by replacing with another tube which is known to be good.

If fuse blows out frequently, and insulating sleeve has been properly placed over fuse, the trouble probably is in the vibrator and vibrator should be replaced.

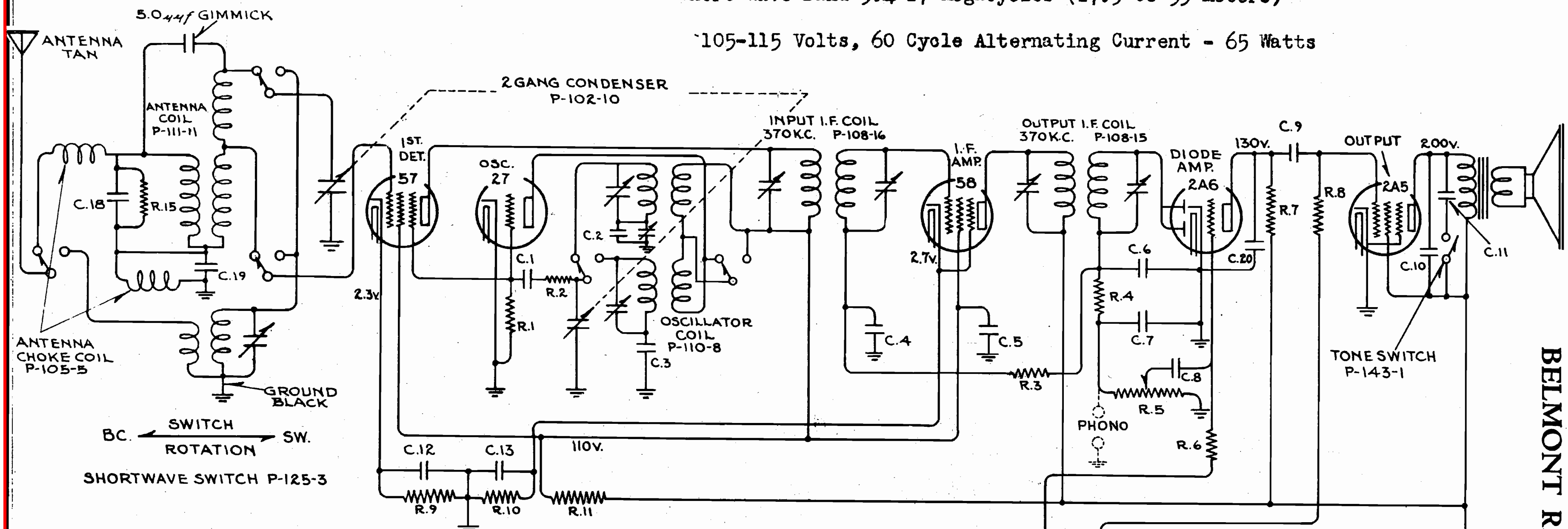
NEVER ATTEMPT TO ADJUST VIBRATOR POINTS.

**MODEL 675**
**Schematic, Socket Trimmers**

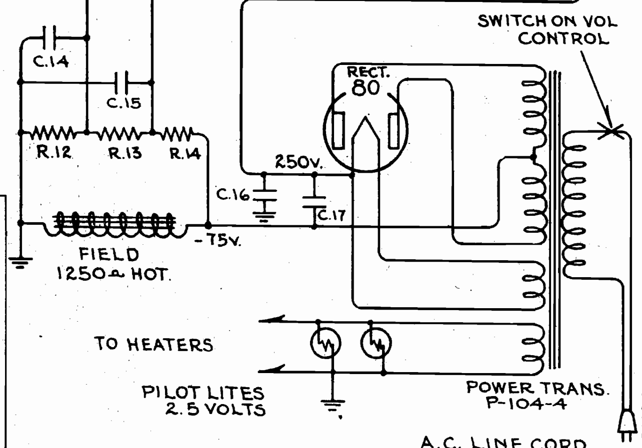
# BELMONT RADIO CORP.

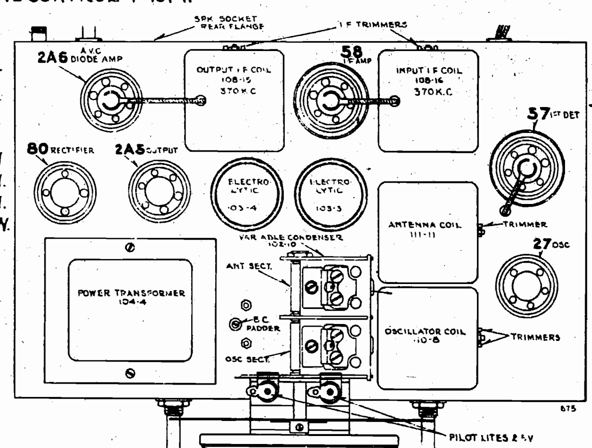
Standard Broadcast Band 530-1720 Kilocycles
Short Wave Band 5.4-17 Megacycles (17.5 to 55 Meters)

105-115 Volts, 60 Cycle Alternating Current - 65 Watts




IF PEAK 370 KC.




CONDENSERS

| Nº | VALUE |
|---|---|
| C.1:- | 50 MICA |
| C.2:- | 490 MICA |
| C.3:- | 5M MICA |
| C.4:- | .05 X 200V. |
| C.5:- | .05 X 400V. |
| C.6:- | 100 MICA |
| C.7:- | 100 MICA |
| C.8:- | .05 X 200V. |
| C.9:- | .05 X 400V. |
| C.10:- | .003 X 400V. |
| C.11:- | .02 X 400V. |
| C.12:- | .1 X 200V. |
| C.13:- | .1 X 200V. |
| C.14:- | .25 X 200V. |
| C.15:- | .25 X 200V. |
| C.16:- | 18 MFD. 350V. P-103-3 |
| C.17:- | 16 MFD 400V. P-103-4 |
| C.18:- | 120 μμf. |
| C.19:- | .01 μμf. |
| C.20:- | .0005 MICA. |

RESISTORS

| Nº | VALUE | |
|---|---|---|
| R.1:- | 50M. | 1/3W. |
| R.2:- | 50 | 1/3W. |
| R.3:- | 500M | 1/3W. |
| R.4:- | 50M | 1/3W. |
| R.5:- | 500M | VOLUME CONTROL P-101-11 |
| R.6:- | 500M | 1/3W. |
| R.7:- | 250M | 1/3W. |
| R.8:- | 250M | 1/3W. |
| R.9:- | 1000 | |
| R.10:- | 275 | |
| R.11:- | 13M | |
| R.12:- | 25M | 1/3W |
| R.13:- | 250M | 1/3W. |
| R.14:- | 750M | 1/3W. |
| R.15:- | 10M | 1/3W. |

-: NOTE :-

CONDENSERS C.10, C.11 IN DUAL UNIT.
" C.14, C.15 " " "
" C.13, C.4 " " "
RESISTORS R.9, R.10, R.11 IN ONE UNIT. P-106-13
NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.

34265

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL
RESISTORS, R.3, 4, & 6, CONDENSERS C.6, 7, & 8 ARE IN OUTPUT I.F. CAN, P-108-15

MODEL 675
Alignment

# BELMONT RADIO CORP.

## SERVICE NOTES

Voltages taken from different points of the circuit are measured with a voltmeter having a resistance of 1000 ohms per volt and are made between the points indicated and the chassis pan. These voltages are indicated on the circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

### ALIGNMENT:

No aligning adjustments should be made until the set has been thoroughly checked for all other possible causes of trouble, such as poor installations, low line voltages, defective tubes, condensers and resistors.

### ALIGNING I.F. TRANSFORMERS:

1. With volume control full on, at the extreme right of its rotation, and with wave selector switch in the broadcast position, extreme left of its rotation, and with variable condenser at its minimum capacity position, extreme left of its rotation, plates entirely out of mesh, adjust the I.F. transformers (parts number 108-15 and 108-16) in the following manner:
   (a) Connect an external oscillator which has been adjusted to 370 kilocycles, in series with a .1 mfd. condenser to the control grid cap of the type 57 first detector tube (see diagram and chassis).
   (b) Adjust trimming condensers of both I.F. transformers (Parts number 108-15 and 108-16) to resonance. Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between plate and screen terminals of type 2A5 output tube. Maximum deflection of the meter indicates resonance. Care should be taken to use only enough signal to give a readily readable output.
   Note: The two adjustments on each transformer are accessible through holes in the transformer cans from the back of the chassis.

### BROADCAST BAND ALIGNMENT:

1. Shift frequency of external oscillator to 535 kilocycles and connect in series with a 200 mmfd. condenser to the tan antenna wire and the black ground wire.
   (a) Set the variable condenser in its maximum capacity position, extreme right of its rotation.
   (b) Adjust the broadcast oscillator series trimmer to resonance with oscillator. This trimmer is located between the gang condenser and the power transformer (see top view).
2. Shift frequency of external oscillator to 1712 kilocycles and set variable condenser in its minimum capacity position, extreme left of its rotation, plates entirely out of mesh.
   (a) Adjust the broadcast oscillator shunt trimmer to resonance. This adjustment is the top adjustment in the oscillator coil can, part number 110-8.

### SHORT WAVE BAND ALIGNMENT:

1. Set the wave changing switch in the short wave position, extreme right of its rotation, and change external oscillator frequency to 15 megacycles.
   (a) Adjust variable condenser with selector knob so that pointer is opposite the 15 megacycle calibration on the dial.
   (b) Adjust the short wave oscillator shunt trimmer to resonance with the signal (use extreme care and make certain that you do not adjust to resonance with the image instead of the signal). This trimmer is the bottom trimmer (closest to the chassis) on the oscillator coil, part number 110-8, and is accessible from the side of the chassis.
   (c) Adjust the short wave antenna trimmer to resonance (single trimmer in antenna can, part number 111-11, accessible from the side of the chassis, between type 27 and 57 tubes).

### NOTES:

Should the planetary vernier dial drive mechanism fail to function properly, it will probably be found to be due to a cracked or broken compression spring. This drive may be dis-assembled by removing the two screws which fasten it to the dial bracket. The part number of the compression spring is 112-31. All of the other dial parts are hardened and should cause no trouble.

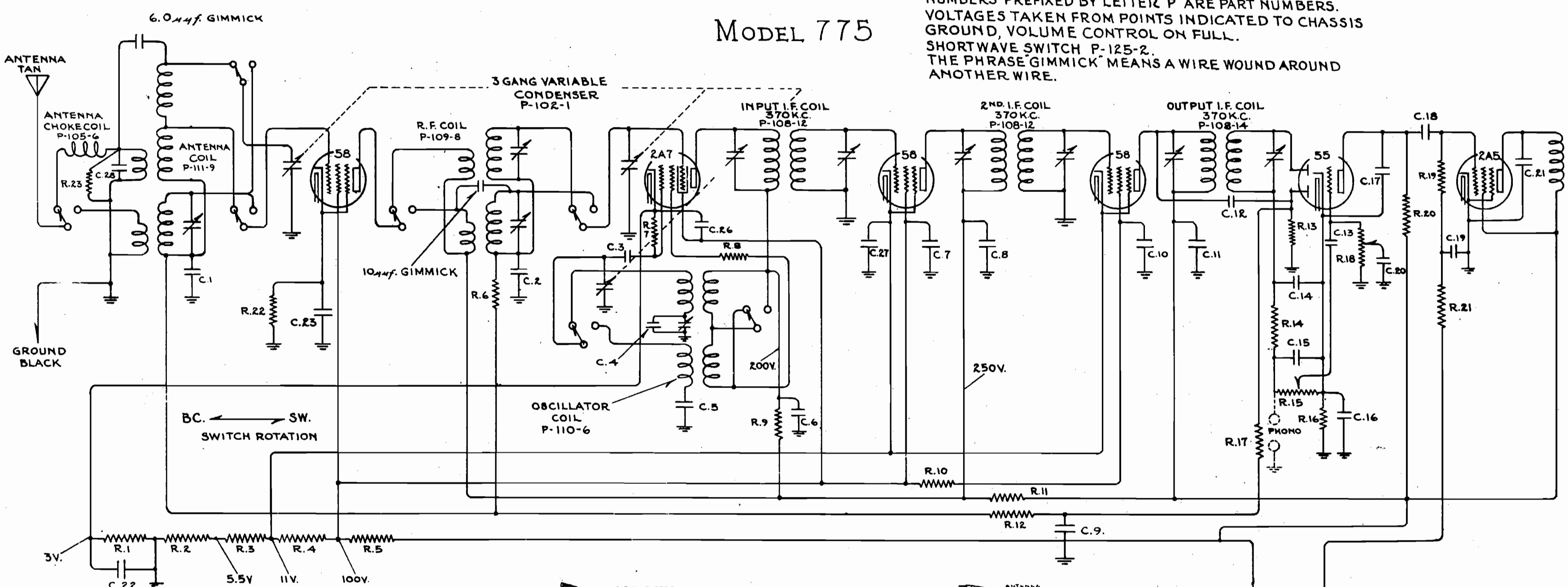
# BELMONT RADIO CORP.

MODEL 775
Schematic, Socket
Trimmers, Parts

IF PEAK 370 KC.

MODEL 775

~NOTE~
CONDENSERS C.8, C.11 ARE IN ONE UNIT P-1064
" C.22, C.23 " " " " P-1059
RESISTORS R.1, R.2, R.3, R.4, R.5 IN ONE UNIT P-106-12
NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND, VOLUME CONTROL ON FULL.
SHORTWAVE SWITCH P-125-2.
THE PHRASE "GIMMICK" MEANS A WIRE WOUND AROUND ANOTHER WIRE.

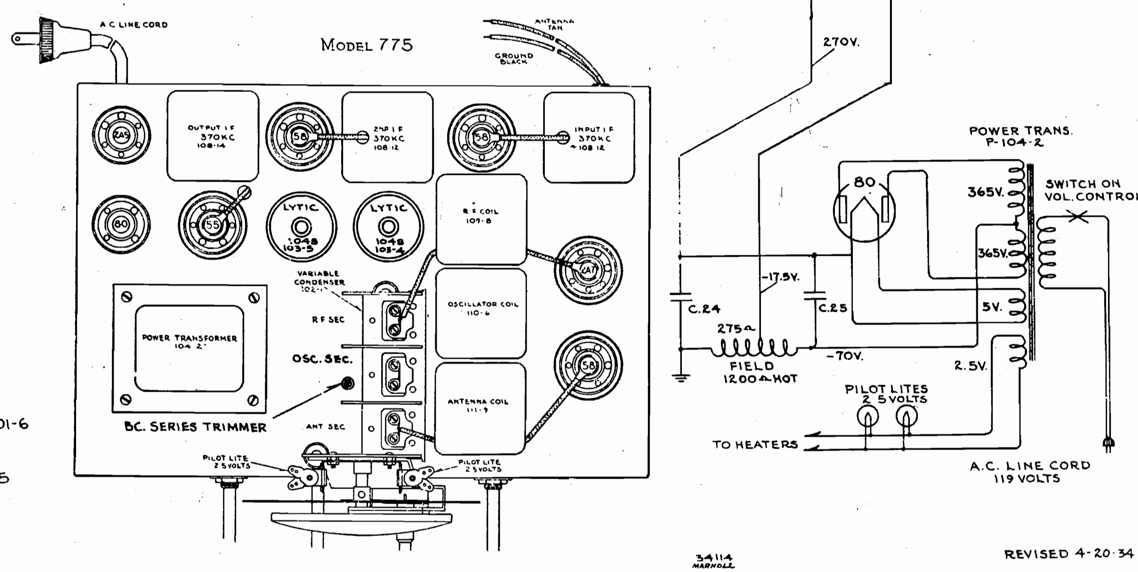



CONDENSERS

| Nº | VALUE |
|---|---|
| C.1:- | .05×200V. |
| C.2:- | .05×200V. |
| C.3:- | .00025 MICA |
| C.4:- | .0006 MICA |
| C.5:- | .003 MICA |
| C.6:- | .05×400V. |
| C.7:- | .25×200V. |
| C.8:- | .1×400V. |
| C.9:- | .01×400V. |
| C.10:- | .1×200V. |
| C.11:- | .1×400V. |
| C.12:- | .00002 MICA |
| C.13:- | .05×200V. |
| C.14:- | .00025 MICA |
| C.15:- | .00025 MICA |
| C.16:- | 20 MFD. 20V. P-119-5 |
| C.17:- | .0005 MICA |
| C.18:- | .05×400V. |
| C.19:- | .25×200V. |
| C.20:- | .01×400V. |
| C.21:- | .01×400V. |
| C.22:- | .1×200V. |
| C.23:- | .1×200V. |
| C.24:- | 16 MFD. 350V. PEAK P-103-4 |
| C.25:- | 8 MFD. 500V. PEAK P-103-5 |
| C.26:- | .05×200V. |
| C.27:- | 1.0×120V. |
| C.28:- | 120μμf. |

RESISTORS

| Nº | VALUE |
|---|---|
| R.1:- | 300Ω |
| R.2:- | 400Ω |
| R.3:- | 300Ω |
| R.4:- | 10MΩ |
| R.5:- | 13MΩ |
| R.6:- | 100M. ⅓W. |
| R.7:- | 50M. ⅓W. |
| R.8:- | 400 ⅓W. |
| R.9:- | 5M. ⅓W. |
| R.10:- | 2M ⅓W. |
| R.11:- | 1M. ⅓W. |
| R.12:- | 100M ⅓W. |
| R.13:- | 1 MEGOHM |
| R.14:- | 50M ⅓W. |
| R.15:- | 500M VOLUME CONTROL P-101-6 |
| R.16:- | 20M ⅓W. |
| R.17:- | 500M ⅓W. |
| R.18:- | 500M TONE CONTROL P-101-5 |
| R.19:- | 250M ⅓W. |
| R.20:- | 250M ⅓W |
| R.21:- | 250M ⅓W. |
| R.22:- | 250Ω ⅓W. |
| R.23:- | 10M ⅓W. |




REVISED 4-20-34

34114

MODEL 775
Alignment

# BELMONT RADIO CORP.

## SERVICE NOTES

Should it ever become necessary or desirable to re-align this receiver, procedure is as follows:

Before making any adjustments, the chassis should be removed from the cabinet. This is accomplished by removing the four bolts which anchor it to the base of the cabinet and removing the knobs from the front of the cabinet, chassis can then be slipped out.

To properly align this receiver, especially the short wave band, it is essential that the oscillator used have good stability and include an attenuator in addition to covering the frequencies required. An output meter must be used to indicate resonance. It may be connected across the primary of the speaker input transformer.

I.F. ALIGNMENT:

1. With volume control full on, at extreme right of its rotation, and with variable condenser at its maximum capacity position (plates entirely in mesh) and with band selector switch in broadcast position, left (counter-clockwise), make the following adjustments:
   (a) Connect an oscillator set at 370 kilocycles in series with a .1 mfd. condenser to the control grid of the first detector (cap at top of 2A7 tube), and connect the ground side of the test oscillator to the ground lead of the set (black wire).
   (b) Adjust trimming condensers of all three I.F. transformers, part number 108-12 input I.F., 108-12 second I.F. and 108-14 output I.F. to resonance.
2. Adjustments are provided on each transformer and are accessible from the back of the chassis (see top view of chassis).

BROADCAST BAND FREQUENCY ALIGNMENT:

1. With volume control full on and the gang condenser set to its minimum capacity:
   (a) Re-set test oscillator to 1712 kilocycles.
   (b) Adjust broadcast oscillator shunt trimmer to resonance. This trimmer is the one nearest the top of the oscillator coil and can assembly, part number 110-6.
   (c) Re-set test oscillator to 1400 kilocycles and shift the test oscillator lead from grid cap of the oscillator tube to the grid cap of the R.F. tube (type 58).
   (d) Tune the gang condenser to resonance with the test signal (1400 k.c.)
   (e) Adjust the R.F. tuned circuit to resonance by bending adjustable condenser plate of the R.F. (rear) section of the gang condenser.
   (f) Shift test oscillator lead to the antenna lead (tan wire) and substitute a 200 mmfd. condenser for the .1 mfd. condenser which is in series with the test lead.
   (g) Adjust the antenna tuned circuit to resonance by bending the adjustable condenser plate of the antenna (front) section of the gang condenser.
   (h) Turn the gang condenser to maximum capacity.
   (i) Adjust the broadcast series trimmer (located to the left of the gang condenser and accessible through the top of the chassis) to resonance with the test oscillator, with the test oscillator set at 535 kilocycles.
   (j) Check alignment at 1400, 1000 and 800 kilocycles, bending plates of the R.F. (rear) and antenna (front) sections of the variable condenser if necessary. DO NOT BEND PLATES OF OSCILLATOR (CENTER) SECTION UNDER ANY CIRCUMSTANCES.

SHORT WAVE BAND FREQUENCY ALIGNMENT:

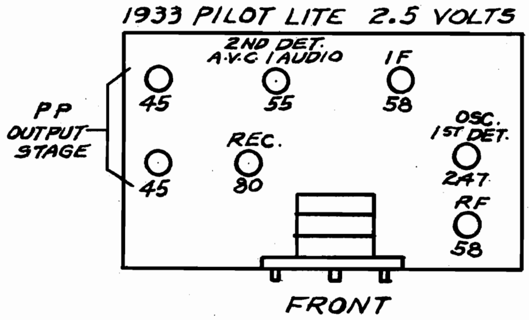
1. Turn the band selector switch to the short wave position, right (clockwise) position.
   (a) Adjust input oscillator to 15 megacycles and attach to grid of first detector (cap at top of 2A7 tube).
   (b) Adjust short wave oscillator shunt trimmer to the oscillator signal. Be careful that you don't adjust it to the image. This adjustment is the one closest to the chassis on the side of the oscillator coil and can assembly, part number 110-6.
   (c) Move the signal generator clip to the grid of the first R.F. tube (type 58).
   (d) Adjust short wave R.F. trimmer to resonance. Adjusting screw is located on side of R.F. coil and can assembly, part number 109-8.
   (e) Connect oscillator in series with a 200 mmfd. condenser to the tan antenna lead and black ground lead and adjust short wave antenna trimmer to resonance (adjustment on side of antenna coil and can assembly, part number 111-9).
   (f) Check sensitivity at 6 megacycles.

NOTES:

Should the planetary vernier dial drive mechanism fail to function properly, it will probably be found to be due to a cracked or broken compression spring. This drive may be dis-assembled by removing the two screws which fasten it to the dial bracket. The part number of the compression spring is 112-31. All of the other dial parts are hardened and should cause no trouble.

MODEL 750
Alignment,Socket

# BELMONT RADIO CORP.




SERVICE MANUAL SEVEN TUBE SUPERHETERODYNE WITH A.V.C. AND SHORT WAVE

105-115 Volts Alternating Current, 50-60 Cycles, 80 Watts. 530-1720 Kilocycles - 1700-4500 Kilocycles.

## SERVICE NOTES

Should it be at any time necessary to rebalance this set, the correct proceedure is as follows:

1. Volume and tone controls on full during all alignment.
2. Squelch switch in "no squelch" position (counter-clockwise (left) rotation) during all alignment.
3. Adjust variable squelch control on rear flange of chassis to maximum counter-clockwise (left) position.
4. Set variable condenser in minimum capacity position (plates open) at the start of all aligning.

## I.F. ALIGNMENT

The intermediate frequency of model 750 is 175 kilocycles, and is aligned as follows:

1. Connect oscillator (set at 175 kilocycles) to I.F. grid (second 58 tube) and adjust both trimmers of second I.F. transformer (underneath chassis) to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer).
2. Connect oscillator output to converter grid (2A7 tube) and adjust both trimmers of first I.F. transformer to resonance. Under no conditions touch the trimmers of the second I.F. transformer after adjusting them (see No. 1).

The four trimmers of the two I.F. transformers are all adjusted from the bottom of the chassis (one nut and one screw adjustment on each I.F. transformer trimmer).

## BROADCAST BAND ALIGNMENT

Wave changing switch in clockwise (right) position.

1. Connect an oscillator in series with a 200 mmfd. condenser to the Tan (antenna) lead and Black (ground) lead. With the oscillator set at 1720 kilocycles and the variable condenser at its minimum position (extreme right of its rotation), adjust trimmer of oscillator (rear) section to resonance.
2. Change oscillator to 1400 kilocycles, rotate variable to this frequency and adjust R.F. and antenna trimmers (center and front trimmers respectively) to resonance. Do not touch the oscillator trimmer.
3. Check tracking at the following points only: 1200-1000-800-600-534 kilocycles. NOTE: This receiver will be slightly out of track at 534 kilocycles - do not bend plates in an attempt to track it at this frequency. Rotor plates of condensers should not be bent, except if absolutely necessary, and then only on the center and front sections.

## SHORT WAVE BAND ALIGNMENT

Wave changing switch in counter-clockwise (left) position.

1. The frequency range of this short wave band is approximately 1700 to 4500 kilocycles.
2. Peak short wave antenna coil to resonance with oscillator set at 1720 kilocycles by slipping primary.
3. Check for sensitivity at the following frequencies only: 1720 and 3700 kilocycles - under no conditions touch trimmers or plates of variable condenser while checking short wave band.

NOTES:

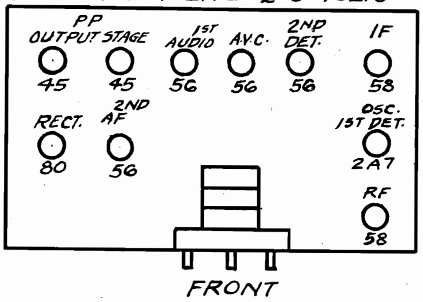
For failure to operate over both bands, check 2A7 tube and connections to and contacts of wave changing switch.

Condenser shaft to which pointer is attached is rotated by means of a celluloid dial attached to the condenser shaft and a bronze friction drive assembly, to which is attached the selector knob. Should this drive ever slip or become rough, it can be adjusted for smooth operation by sliding the bronze washer drive assembly either closer to the variable shaft or farther away from it in the slot in which it is mounted, to insure smooth operation.

**MODEL 1050**
**Alignment, Socket**

## BELMONT RADIO CORP.

1933 PILOT LITE 2.5 VOLTS




SERVICE MANUAL TEN TUBE SUPERHETERODYNE WITH A.V.C., SQUELCH AND SHORT WAVE

105-115 Volts Alternating Current, 50-60 Cycles, 105 Watts. 530-1720 Kilocycles - 1700-4500 Kilocycles.

SERVICE NOTES

Should it be at any time necessary to rebalance this set, the correct proceedure is as follows:

1. Volume and tone controls on full during all alignment.
2. Squelch switch in "no squelch" position (counter-clockwise (left) rotation) during all alignment.
3. Adjust variable squelch control on rear flange of chassis to maximum counter-clockwise (left) position.
4. Set variable condenser in minimum capacity position (plates open) at the start of all aligning.

I.F. ALIGNMENT

The intermediate frequency of model 1050 is 175 kilocycles, and is aligned as follows:

1. Connect oscillator (set at 175 kilocycles) to I.F. grid (second 58 tube) and adjust both trimmers of second I.F. transformer (underneath chassis) to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer).
2. Connect oscillator output to converter grid (2A7 tube) and adjust both trimmers of first I.F. transformer to resonance. Under no conditions touch the trimmers of the second I.F. transformer after adjusting them (see No. 1).

The four trimmers of the two I.F. transformers are all adjusted from the bottom of the chassis (one nut and one screw adjustment on each I.F. transformer trimmer).

BROADCAST BAND ALIGNMENT

Wave changing switch in clockwise (right) position.

1. Connect an oscillator in series with a 200 mmfd. condenser to the Tan (antenna) lead and Black (ground) lead. With the oscillator set at 1720 kilocycles and the variable condenser at its minimum position (extreme right of its rotation), adjust trimmer of oscillator (rear) section to resonance.
2. Change oscillator to 1400 kilocycles, rotate variable to this frequency and adjust R.F. and antenna trimmers (center and front trimmers respectively) to resonance. Do not touch the oscillator trimmer.
3. Check tracking at the following points only: 1200-1000-800-600-534 kilocycles. NOTE: This receiver will be slightly out of track at 534 kilocycles - do not bend plates in an attempt to track it at this frequency. Rotor plates of condensers should not be bent, except if absolutely necessary, and then only on the center and front sections.

SHORT WAVE BAND ALIGNMENT

Wave changing switch in counter-clockwise (left) position.

1. The frequency range of this short wave band is approximately 1700 to 4500 kilocycles.
2. Peak short wave antenna coil to resonance with oscillator set at 1720 kilocycles by slipping primary.
3. Check for sensitivity at the following frequencies only: 1720 and 3700 kilocycles - under no conditions touch trimmers or plates of variable condenser while checking short wave band.

Tun-a-lite. VISUAL TUNING CHECK

The visual tuning indicator (tun-a-lite, tube) is mounted horizontally on the front of the variable condenser assembly and its operation in this respect can be checked as follows:

1. Normally there will be a small continuous glow in the base of the tube when no signal is being received.
2. With a strong oscillator input at 1000 kilocycles, the tun-a-lite should glow to approximately the end of the bulb, varying slightly with different tun-a-lites. If the glow "travel" is short, or none at all, remove the tun-a-lite tube and check its socket connections and contacts. If the tube still fails to indicate satisfactorily, replace the tube.

SQUELCH CHECK

The tun-a-lite tube is also used for noise suppression between stations. Its operation can be checked as follows:

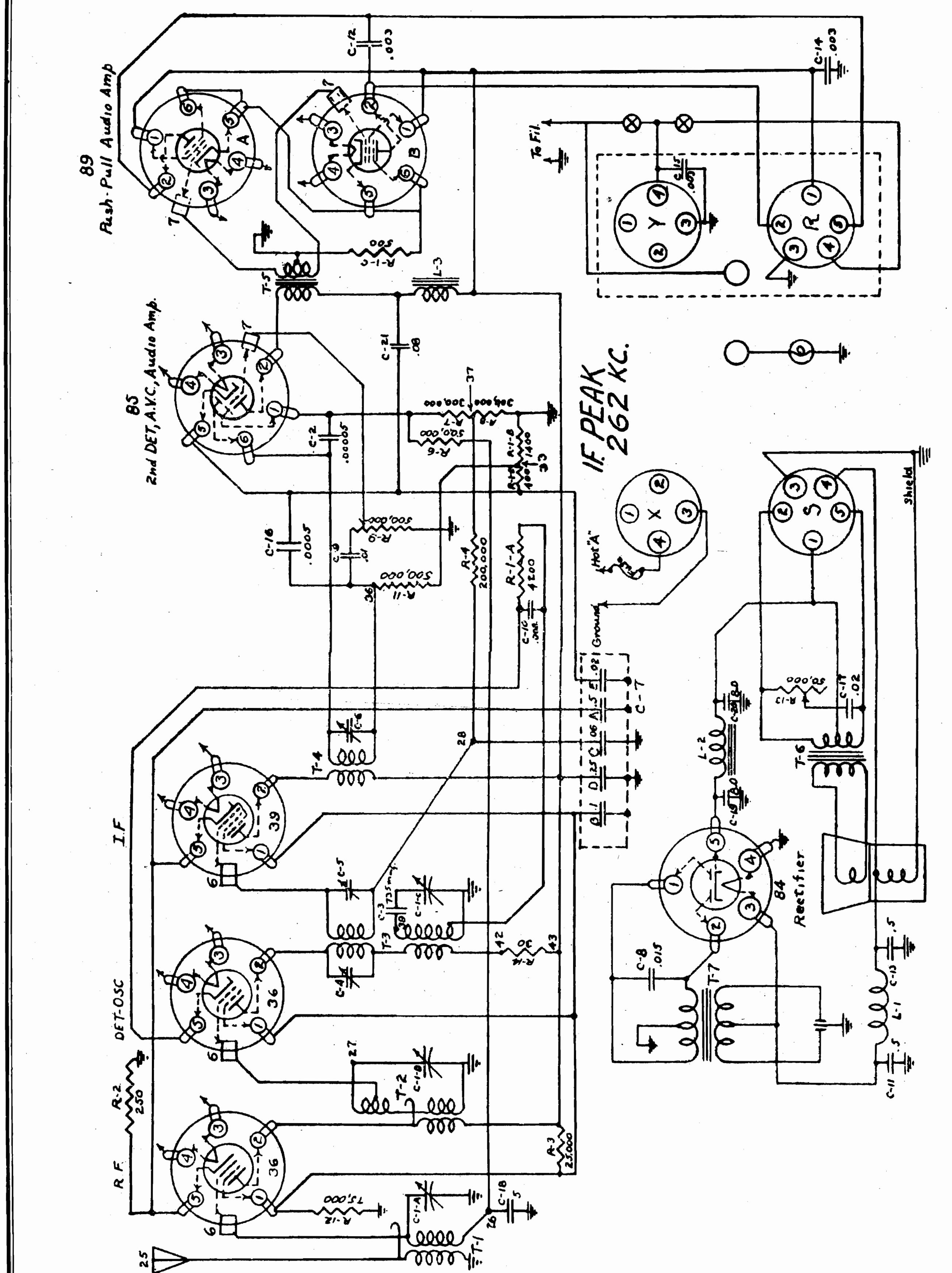
1. Squelch switch adjusted to squelch (clockwise (right) position).
2. Disconnect oscillator, connect antenna, tune set to a position where no signal is received. Noise level at this position should be quite high.
3. Rotate set screw of squelch control on rear flange of chassis, and at some point the noise should cease and the set sound "dead", indicating that the tun-a-lite is squelching and eliminating between station noise.

NOTES: For failure to operate over both bands, check 2A7 tube and connections to and contacts of wave changing switch.

Condenser shaft to which pointer is attached is rotated by means of a celluloid dial attached to the condenser shaft and a bronze friction drive assembly, to which is attached the selector knob. Should this drive ever slip or become rough, it can be adjusted for smooth operation by sliding the bronze washer drive assembly either closer to the variable shaft or farther away from it in the slot in which it is mounted, to insure smooth operation.

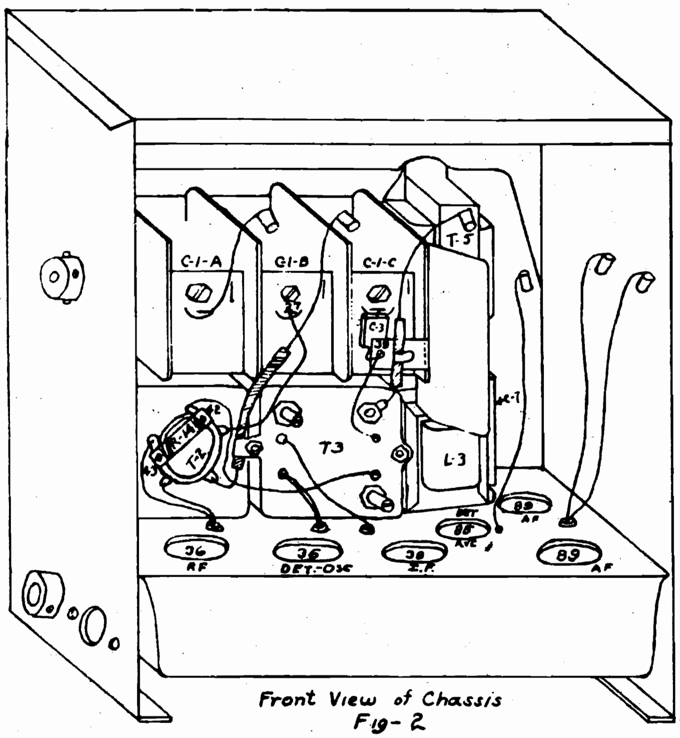
# BUICK MOTOR

MODEL 980393
Schematic



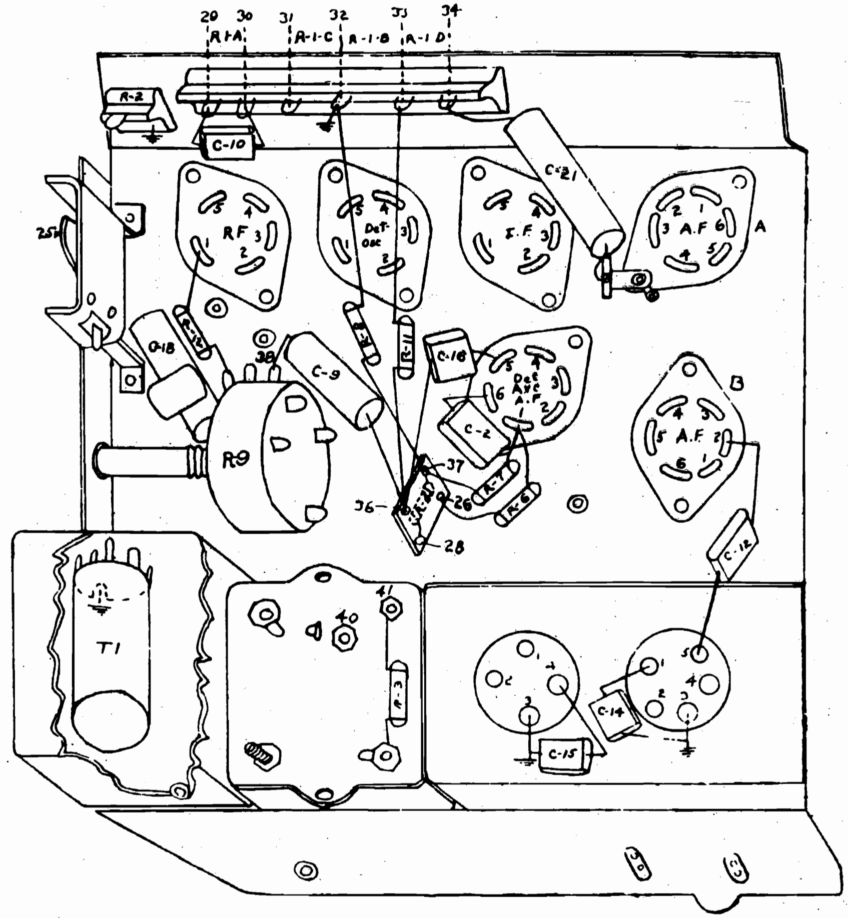
MODEL 980393
Voltage, Trimmers
Socket

# BUICK MOTOR




Front View of Chassis
Fig- 2

Parts Location




| Tube | Screen Contact #1 | Plate Contact #2 | Heater Contact #3 | Heater Contact #4 | Cathode Contact #5 | Gnd. Contact #6 |
|---|---|---|---|---|---|---|
| 236 RF | 85 | 165 | 0 | 6.0 | 2.1 | |
| 236 Osc. | 85 | 165 | 0 | 6.0 | 6.0 | |
| 239 IF | 85 | 165 | 0 | 6.0 | 2.1 | |
| 85 Det. | O-A.V.C. | 125 | 0 | 6.0 | 7.5 | .2 Det. |
| A-89 AF | 165 | 160 | 6.0 | 0 | 30.0 | 30.0 |
| B-89 AF | 165 | 160 | 0 | 6.0 | 30.0 | 30.0 |
| 84 Rect. | 3.5 | 3.5 | 0 | 6.0 | 180 | |

## PEAKING ADJUSTABLE CONDENSERS

The complete Condenser Aligning Kit is now available under part No. 1207804. This kit contains all the small parts which are necessary for the proper aligning of the condensers on the U.M.S., B-O-P, and Chevrolet Radio Receivers.

All of the adjustable condensers, commonly called trimmer condensers, are very accurately adjusted at the factory and will not need any further adjustment unless a coil or I. F. transformer is changed or the adjustments are tampered with in the field.

DO NOT attempt to change the setting of any of the trimmer condensers unless it is definitely known that adjustment is necessary, and an accurate test oscillator and a screw driver (with fibre handle) are available. Using a standard metal screw driver for this purpose will not give accurate adjustment

Proceed as follows:

A. Disconnect the antenna lead-in from the chassis.

B. Ground the antenna terminal on the chassis to the frame of the chassis.

C. Set "test oscillator" to 262 kilocycles. Some oscillators are not equipped with a frequency of 262 K.C. but do have a frequency of 130 K.C. In this case, the second harmonic of 130 K.C., namely 260 K.C., may be used.

D. Connect the output leads of the test oscillator to the grid of the 1st Detector tube and to ground (frame of the chassis) Leave grid cap in place.

E. Connect an output meter across the plates of the type 89 tubes. If the output meter is not protected, place a .1 mfd. condenser in series with the meter.

F. Turn the tuning condenser rotor to minimum capacity (rotor plates out of stator places).

G. Adjust I. F. Trimmers in the following order, in each case leaving the trimmer set for maximum output as shown by the output meter.* (See note

* C-4, Plate circuit of 1st Det.
C-5, Grid circuit of I. F. Amp.
C-6, Diode Input circuit.

* See Fig 2. and 3 for location of condensers.

H. Remove connection grounding the antenna (reverse of instructions under B)

I. Insert the Calibration Block, Part No. 1206418, between the center (2nd R. F.) condenser and the rear of the chassis as follows: Lay the block on the bench with the largest flat side down and the cut-out edge toward the operator. Pick up the block between the first and second fingers of the hand so that the side having the beveled and cut-out edges faces the knuckles of the hand, and the fingers are as close to the beveled corners as is possible. Insert the hand in the case over the center tuning condenser (condenser plates fully closed) and place the Block between the condenser bracket and the chassis back, with the largest face of the Block flat against the back of the chassis. The Block will fit quite tightly and the left side must rest against the shield between the 1st and 2nd R.F. condensers in order to clear the condenser wiper spring.

J. Attach the test oscillator to antenna terminal and ground (frame) of the chassis. (Ant. on test oscillator to Ant. on chassis and ground on test oscillator to frame of chassis.)

K. Set test oscillator at 1400 K.C.

L. Open tuning condenser until it stops against the Calibration Block

M. Place Tube Shield in position around 236 Det.-Osc. tube. Adjust the trimmer condensers on the tuning condenser to maximum output, as measured by the output meter, in the following order:

C-1-C--Oscillator trimmer
C-1-B--2nd R. F. trimmer
C-1-A--1st R. F. trimmer

*NOTE: To insure sharp peaking of all trimmers, set the oscillator output below the point of start of A.V.C. action. Set the output of the oscillator so that it is less than half the maximum output available.

**MODEL 980393**
**Test Data**

# BUICK MOTOR

## LOCATING TROUBLES ISOLATED BY VOLTAGE TESTS

The voltmeter tests of the chassis merely serve to isolate the defect in some particular stage of the circuit. The actual fault must be located, in that stage, by means of a point-to-point check of the resistance values of the defective stage.

NOTE: All tubes should be removed from the chassis before making these tests, unless they are known to be good tubes.

| Description of incorrect voltage | Test from | To | Correct reading (in OHMS) | Part or parts probably causing incorrect voltage |
|---|---|---|---|---|
| A. No filament voltage at any socket | 1. Hot "A" lead | X4 | Zero | Fuse or green lead |
| | 2. Y4 | RF #4 | *Zero | Switch |
| | 3. Y4 | R #4 | Zero | Switch |
| | 4. Y4 | Gnd. | #Open | C-15 |
| | 5. S4 | " | 6 | Speaker field |
| B. No plate voltage at any socket | 1. Rect. #5 | Gnd. | Open | C-19; C-20 |
| | 2. " " | S-1 | 350 | L-2 |
| | 3. R-1 | Gnd. | 100,000 | C-14;C-7-D;C-7-B; R-3; R-12 |
| C. 89 sockets (a) Plate volts | 1. S-1 | S-5 | 425 | Output Trans.Pri. |
| | 2. S-1 | S-2 | 225 | " " " |
| | 3. R-2 | R-5 | Open | C-12 |
| (b) Screen " | 1. R-1 | 89 #1 (A) | Zero | Defective wiring |
| | 2. R-2 | 89 #1 (B) | " | " " |
| (c) Cathode volts | 1. Gnd. | 89 #5 (B) | 500 | R-1-C |
| (d) Suppressor grid volts | 1. Gnd. | 89 #5 (B) | 500 | R-1-C |
| D. 85 Socket (a) Plate volts | 1. R-1 | 85 #2 | 9,500 | L-3;T-5 |
| (b) A.V.C. and Det. plate V. | 1. 34 | Gnd. | 1,800 | R-1-B; R-1-D |
| | 2. 34 | 85 #6 | 500,000 | R-11;T-4;C-9 |
| | 3. 85 #6 | 85 #1 | 1,000,000 | R-7; R-8;R-1-B; R-11;C-2;C-9 |
| (c) Cathode volts | 1. Gnd. | 85 #5 | 1,800 | R-1-B; R-1-D; C-7-E |
| E. 39 IF socket (a) Plate volts | 1. IF #2 | 41 | 52 | T-4 Pri. |
| | 2. 41 | Gnd. | 100,000 | C-1-D; R-3; R-12 |
| (b) Screen volts | 1. IF #1 | 41 | 25,000 | R-3 |
| | 2. IF #1 | Gnd. | 100,000 | R-3; R-12; C-1-D; C-7-B |
| (c) Cathode volts | IF #5 | Gnd. | 250 | R-2; C-7-A |

* Switch on    # Switch off

| Description of incorrect voltage | Test from | To | Correct reading (in ohms) | Part or parts probably causing incorrect voltage |
|---|---|---|---|---|
| F. 36 Osc. socket (a) Plate volts | 1. Osc. #2 | 42 | 36 | T-3 |
| | 2. 42 | 43 | 30 | R-14 |
| (b) Screen volts | 1. Osc. #1 | 41 | 25,000 | R-3 |
| | 2. Osc. #1 | Gnd. | 100,000 | R-3; R-12; C-7-D C-7-B |
| (c) Cathode | 1. Osc. #5 | Gnd. | 4,200 | R-1-A; C-10; T-3 |
| G. 36 F. socket (a) Plate volts | 1. RF #2 | 43 | 75 | T-2 |
| (b) Screen volts | 1. RF #1 | 41 | 25,000 | R-3 |
| | 2. RF #1 | Gnd. | 100,000 | R-3; R-12; C-7-D; C-7-B |
| (c) Cathode | 1. RF #5 | Gnd. | 250 | R-2; C-7-A |
| H. Speaker (a) Weak | S-4 | Gnd. | 6 | Speaker field |
| (b) Distorted | 1. S-1 | S-5 | 200 | T-6 Trans. |
| | 2. S-1 | S-2 | 225 | T-6 Trans. |
| | 3. S-2 | S-5 | 425 | T-6; C-17; R-13 |
| I. Inoperative power unit (a) Vibrator operates | 1. Check 84 tube | | | |
| | 2. Rect. #1 | Rect. #2 | 350 | T-7 Sec; C-8 |
| | 3. Rect. #1 | Gnd. | 175 | T-7 Sec; C-8 |
| | 4. Rect. #5 | Gnd. | Open | C-14; C-20 |
| | 5. Rect. #5 | S-1 | 350 | L-2 |
| (b) Vibrator inoperative | 1. S-4 | Gnd. | 6 | C-11; C-13; Vibrator |
| | 2. S-4 | Rect. #3 | 2 | L-1 |

NOTE--It will be necessary to disconnect one lead of all condensers, which have one terminal grounded, in order to test them accurately.

MODEL 980393
Test Data

BUICK MOTOR

## SPECIAL TESTS

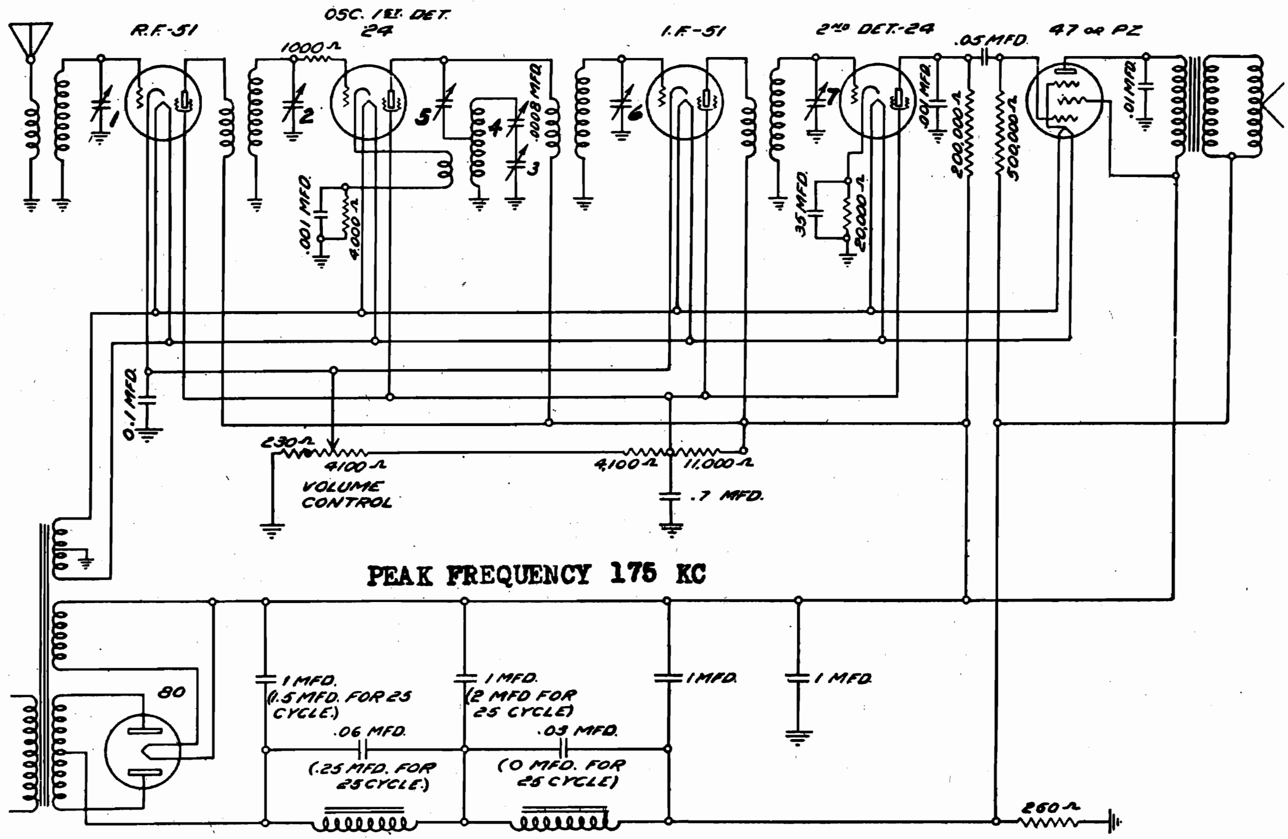
These tests cover all parts of the circuit which are not shown up as defective by the voltage tests

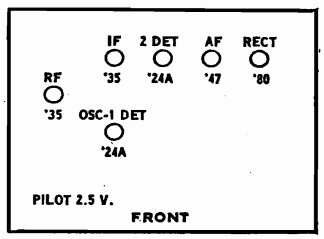
| | Test from | To | Correct resistance in ohms | Probable location of trouble if incorrect reading is obtained |
|---|---|---|---|---|
| 1. | Ground (frame) | 25 | 32 | T-1 Antenna coil Pri |
| 2. | 236 RF #6 | 26 | 6 | T-1 " " Sec |
| 3. | 236 Osc. #6 | 27 | 2.5 | T-2 RF coil Sec. |
| 4. | 236 Osc. #6 | Gnd | 4 | T-2 RF " " |
| 5. | 239 Osc. #6 | 28 | 50 | T-3 IF " " |
| 6. | Ground | 29 | 1 | T-3 Osc. coil |
| 7. | " | 35 | 4 | T-3 " " |
| 8. | 85 Det. #6 | 36 | 28 | T-4 IF coil Sec. |
| 9. | 28 | 37 | 200,000 | R-4 Resistor |
| 10. | 85 Det. #1 | 26 | 500,000 | R-6 |
| 11. | 85 Det. #1 | 37 | 300,000 | R-7 |
| 12. | 37 | Grd. | 300,000 | R-8 |
| 13. | 33 | 36 | 500,000 | R-11 |
| 14. | 85 Det. #7 | Grd. | 0-500,000 | Vol.Control (Rotate) |
| 15. | 89 AF #7 (a) | Grd. | 4,000 | T-5 Input Trans. Sec |
| 16. | 89 AF #7 (b) | Gnd. | 4,500 | T-5 " " " |
| 17. | 36 | 38 | Open | C-9 |
| 18. | 85 Det. #1 | 85 Det. #6 | 1,100.000 | R-11; R-1-B;R-8;R-7 |
| 19. | 39 | (Tuning Cond. (stator plates | Open | C-3 |
| 20. | Voice coil lead | Input trans. lead | 2 | Defective voice coil or Input Trans. Sec. |

NOTE--Disconnect the voice coil lead at one of its terminals on the lower side of the input transformer and test from the end of the disconnected lead to the terminal from which it came

# BULOVA WATCH COMPANY

MODEL 600,601,605,610
Schematic,Voltage
Socket




## READING TAKEN WITH WESTON MODEL 565 ANALYZER

MODEL No. CUSTOMER BY

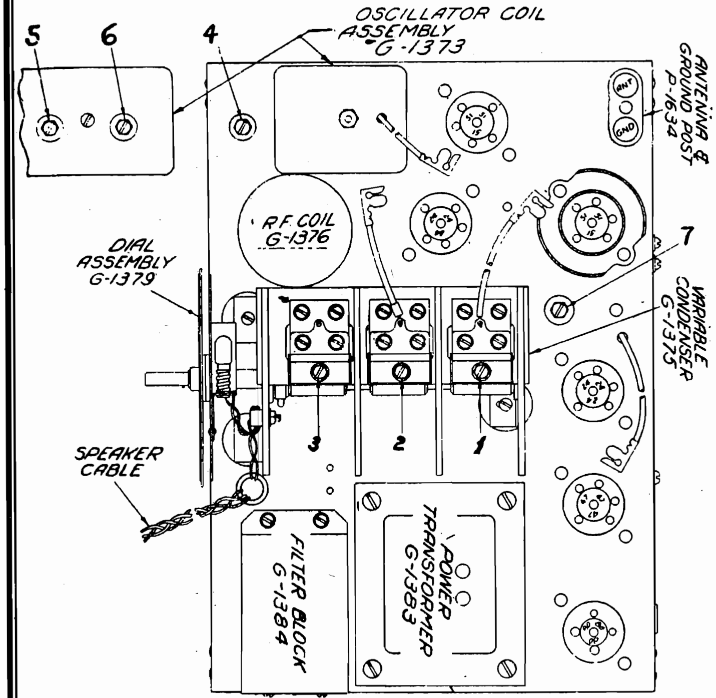
| No. | Stage | Type Tube | "A" Volts | "B" Volts | Cont. Grid Volt | Cath. Volts | S. G. Volts | Ip Norm. |
|---|---|---|---|---|---|---|---|---|
| 1 | R. F. | 51 | 2.15 | 235 | 2.4 | 2.5 | 80. | 5.0 |
| 2 | Autodyne | 24 | 2.15 | 225 | 5.0 | 6.0 | 75. | 3.0 |
| 3 | I. F. | 51 | 2.15 | 230 | 2.4 | 2.5 | 75. | 4.0 |
| 4 | 2nd Det. | 24 | 2.15 | 104 | 10. | 15. | 65. | 0.6 |
| 5 | Audio | 47 | 2.25 | 250 | 16 | 0 | 260 | 30. |
| 6 | Rect. | 80 | 4.4 | | | | | 57.5 |

Line Voltage 115. Order of Test: 1 Rect., 2 Power, 3 Det., Etc.
Volume Control Position, Full On.

NOTE: Since resistance tolerances in the sets are plus or minus 10% and tubes may vary over 20%, your readings may disagree with the above by plus or minus 30%.

MODEL 600,601,605,610
Trimmers,Alignment

## BULOVA WATCH COMPANY




## READJUSTING TRIMMERS

Number 1 is the antenna trimmer.

Number 2 is the gang condenser trimmer tuning the grid of the Super-autodyne.

Number 3 is the gang condenser trimmer tuning the plate (or oscillator of the super-autodyne).

Number 4 is the oscillator padding trimmer.

Number 5 is the Super-autodyne plate trimmer.

Number 6 is the I. F grid trimmer.

Number 7 is the second detector grid trimmer.

To readjust the trimmer, it will be necessary that a good design of 175 k. c. oscillator be employed, and that a dependable broadcast test oscillator be on hand so that stages handling intermediate frequency, and those handling radio frequency can be thoroughly checked. It is advisable to use a bakelite screwdriver when making any of these adjustments.

First, connect the 175 k. c. oscillator output leads from the control grid cap of the super-autodyne tube to ground. Do not remove any of the tubes from the sockets, and it is not necessary to disconnect the grid cap clip from the tube. Reset trimmers numbers 5, 6 and 7 for maximum output. While this test oscillator is working into the intermediate frequency stages, no adjustment of the tuning condenser on the receiver will have any effect, inasmuch as the intermediate frequency stage is fixed tuned.

If your test oscillator is properly designed, it will supply exactly 175 k. c., and when trimmers number 5, 6 and 7 are set for maximum output, they will be correctly adjusted and should be sealed.

Next, disconnect the 175 k. c. test oscillator and connect to the antenna binding post of the receiver, the output lead from your broadcast test oscillator, or tune in a broadcast signal around 1400 k. c., then reset trimmers numbers 2 and 1 respectively for maximum output. This adjustment will track the super-autodyne grid circuit of the R. F. stage.

To check the calibration of the receiver. whether it be high or low, trimmer number 3 should be reset until a station of known nigh frequency is brought in on the correct dial marking with peak volume. If your broadcast test oscillator is accurately calibrated, it might be used in place of the broadcasting station signal. In this adjustment, a broadcast station or test oscillator signal at about 1400 k. c. should be chosen. The setting of the trimmer at 1400 k. c. is more critical than it would be at 600 k. c.; calibration, therefore more accurate.

The next adjustment is important and not easily explained in writing, so pay close attention to the following instruction. We will now balance the oscillator to the r. f. and first detector stages.

Tune the external broadcast test oscillator and the receiver both to 600 k.c., then slowly increase or decrease the capacity of No. 4 (oscillator padding trimmer), at the same time and continuously tuning back and forth across the signal with the receiver tuning condenser gang. The output meter needle will now be swinging up and down in step with the variation in tuning. Watch the peak of this swinging closely and readjust No. 4 trimmer until the swinging needle reaches its highest peak.

Retune the receiver and broadcast test oscillator to 1400 k.c. and re-check trimmer No. 3 to make sure that the adjustment of No. 4 has not thrown the receiver out of calibration. If it has, then readjust No. 3 until the calibration is correct, (as previously explained), and check on trimmers No. 2 and No. 1, to make sure that the adjustment of No. 4 has not reduced the sensitivity.

# Cadillac and La Salle

## MOTOR CAR RADIO

## SERIES 06W ~ 1933-34

CADILLAC MOTOR CAR COMPANY DETROIT, MICHIGAN

## Description

The new 06W Series Auto Radio Receivers are made up in three units: the chassis unit, speaker—"B" eliminator unit and control unit. The control unit is mounted to the instrument panel, while the speaker — "B" eliminator unit and chassis are mounted on the dash. Current to operate the chassis and "B" eliminator is obtained from the automobile storage battery. Two flexible shafts mechanically connect the control unit to the chassis. One of these is for the volume control and switch, while the other is for the tuning mechanism. A roof antenna is used.

In this manual are covered detailed instructions for the installation of each part and information for completing and maintaining the installation. The following tools are required: portable electric drill, screw drivers, pliers, a heavy soldering iron, hack saw, files, small wrenches, and cutters.

*Before making the installation it is suggested that this manual be completely read.*

## Mounting the Chassis

Before mounting the chassis read the articles on "Mounting the Control Unit" and "Attaching the Flexible Drive Shafts." Hold the control unit in position or mount it in place temporarily, so that the position of the flexible shafts can be determined.

The chassis is mounted in back of the dash at the left side, as shown in Fig. 1. It should be mounted in such a way that the tuning condenser flexible drive shaft to the control unit will be in substantially a straight line as shown in Figs. 1 and 2. The chassis is mounted with the anchor bushings in which the flexible shafts go, facing the control unit, and with the cover at the bottom. It is secured to the dash by means of the dash mounting plate, see Fig. 4. In some of the earlier models it will be necessary to move the cut-out box to a higher location in order to mount the chassis.

First drill the three mounting holes required for the dash mounting plate. The location and size of these holes is shown in Fig. 3. A template for drilling these holes is supplied with the set. Three 4" square head mounting bolts are supplied. Take two of these, which will be used for the upper part of the mounting plate and screw on nut "A" (see Fig. 4). The nut should be just far enough away from the head of the bolt to permit the bracket of the mounting plate to slip down as shown in the illustration. Then put on nut "B" and the washer, after which the two bolts can be put through the dash, with the shanks extending into the engine compartment, as shown in Fig. 4. A washer, lockwasher, and nut are then put on these bolts from the front of the dash to hold them in place.

*The distance "X" between nuts "A" and "B" determines how far out the chassis is mounted from the dash. When there is a lot of apparatus in back of the dash, such as wires, tubing, etc., the chassis will have to set out far enough to clear it. However, in practically all models of Cadillac and LaSalle cars, there is no interfering apparatus and therefore the distance "X" will be zero.*

Then put a washer on the third mounting bolt and put this bolt through the lower mounting hole with the head on the engine side of the dash, as shown in the illustration. Put on a washer, lockwasher, and nut "D" and tighten it up. Then put on nut "E" with a washer as shown. Nut "E" should be screwed down until it is about 1/4" from nut "D," when distance "X," as explained above, is zero.

Next secure the dash mounting plate to the chassis box by means of the four chassis mounting screws. The four mounting screws on the broad side of the chassis box are used. As explained above the cover of the box is at the bottom.

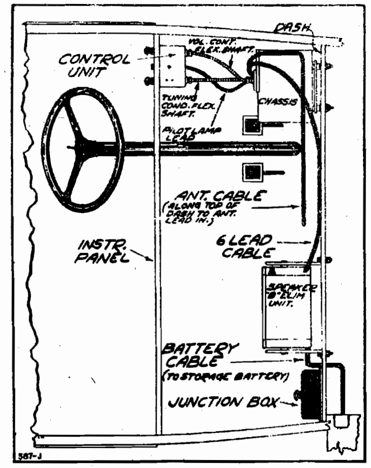



*Fig. 1—General Installation—Top View*

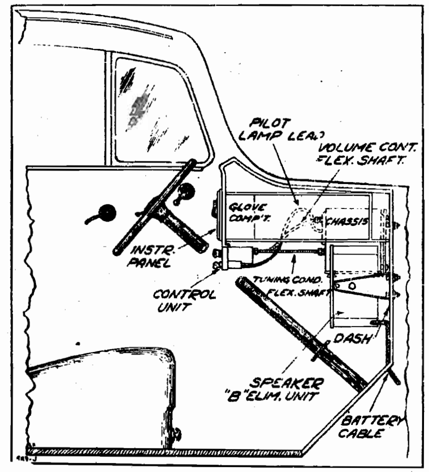



*Fig. 2—General Installation—Side View*

*All the tubes should be in the sockets, the antenna trimmer adjusted (as explained later) and the flexible shafts connected before the chassis is permanently installed.* Complete information on the latter procedure is contained in the article on attaching the flexible drive shafts.

The four mounting screws pass through the four slots in the mounting plate (Fig. 3). After they are in place and tight, the dash mounting plate with chassis attached is slipped over the three mounting bolts. The two upper brackets on the plate slip down in back of nut "A" as shown in Fig. 4 and the slot at the bottom of the plate slips over the shank of the lower mounting bolt in back of nut "E." The plate will then hang with the bottom farther away from the dash than the top. A washer, lockwasher, and nut "F" are then put on the lower mounting bolt. Nut "F" is screwed on until the mounting plate is tight up against the washer in back of nut "E." In this position, the bracket at the top of the mounting plate should butt up against nut "A" and be tight. Also the mounting plate will be approximately parallel with the dash.

## Mounting the Control Unit

The control unit is mounted to the instrument panel as shown in Figs. 1 and 2. In the 1932 and 1933 models there are two holes on the flange at the bottom of the instrument panel on the left side, which line up with the two holes on the mounting lugs of the control unit. In the earlier models, it will be necessary to drill these holes. Two 1/4" holes with centers 4 7/8" apart are required. The best location for these holes is at a point where the tuning condenser flexible drive shaft to the chassis will be in substantially a straight line (see Figs. 1 and 2).

Before mounting the control unit permanently attach the flexible shafts, as explained in the next article, and attach the pilot lamp plate to the bottom of the unit, as explained in the article on "Completing the Wiring Connections."

## Mounting the Speaker-"B" Eliminator

The speaker-"B" eliminator is mounted on the back of the dash by means of two brackets, as shown in Fig. 5. The best location is at the right side of the dash under the glove compartment as shown in Figs. 1 and 2. It should be mounted with the brackets at the side as shown in (A) Fig. 5, and with the inner bracket mounting holes as indicated in (B) Fig. 5. The box is mounted with the tone control knob at the upper left, as shown in Fig. 1. The grilled portion of the box at the front should face the listener.

In some of the older models which have a hot water heater mounted at the right side of the dash, it will be necessary to mount the speaker-"B" eliminator unit at the center of the dash. In those models which have the coil mounted on the dash, it will be necessary to move the coil to the engine compartment, as explained in the article "Suppression of

MODEL 06W
Notes on Mounting

# CADILLAC

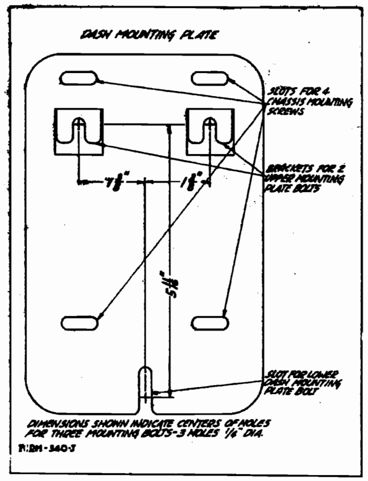



*Fig. 3—Dash Mounting Plate*

Ignition and Generator Noise," before this can be done.

In Fig. 5 (B) is shown how the brackets may be mounted vertically if space does not permit their being mounted horizontally, as is the case in some cars.

After the position of the speaker is decided on, drill the four $\frac{5}{16}$" holes required for the bracket mounting bolts. A template for the mounting holes is supplied with the receiver. The holes are arranged in a rectangle. The centers of the holes, the small dimension are 2½" apart and the long dimension 10" apart. Four ¼" x 3" mounting bolts, nuts and lock washers and two reenforcement plates are provided. The mounting bolts are put through the bracket and the dash with the shanks extending into the engine compartment. The reenforcement plates are then put on, one being used for each bracket, after which the lockwashers and nuts are then put on.

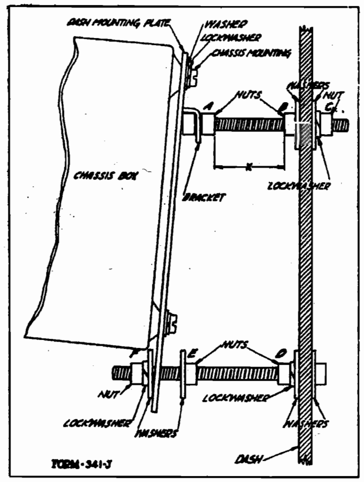



*Fig. 4—Details of Chassis Mounting on Dash*

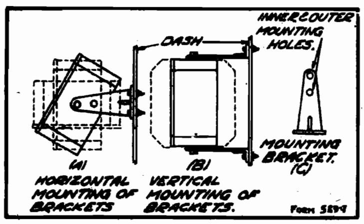



*Fig. 5—Method of Mounting Speaker*

## Attaching the Flexible Drive Shafts

After the chassis is temporarily mounted and the position of the control unit is known, the flexible shafts may be attached. Remove the chassis from the mounting bolts to make the connection.

Two flexible shafts are supplied with the Cadillac and La Salle auto receiver, one 9" and one 12" long. The 9" shaft is the tuning condenser flexible shaft and is put on in substantially a straight line, as shown in Figs. 1 and 2. The 12" shaft is the volume control shaft. This shaft bends upward from the control unit, as shown in Fig. 2.

The distance between the instrument panel and the dash varies in Cadillac and La Salle cars. In some cars the flexible shaft lengths of 9" and 12" supplied with the receiver are too long. For that reason, these shafts (inside portion) are squared for a length of 3" at one end. The shaft may then be cut at any point along the squared portion to whatever length is required. It should be cut with a three-cornered file or the edge of a grinding wheel. *Do not use a hack saw.* The casing, which is 1½" shorter, must be cut to correspond. This should be tinned first at the point to be cut and may then be cut with a hack saw.

After the length and position of the shafts is decided on, remove the chassis and mounting plate from the mounting bolts. As the shafts are already secured at the control unit (if they have not been taken out to cut), it is necessary only to secure them at the chassis end. Before attaching the shafts, see if the set is in working order. Put the 8-prong socket in place on the chassis and operate the set with the cover off.

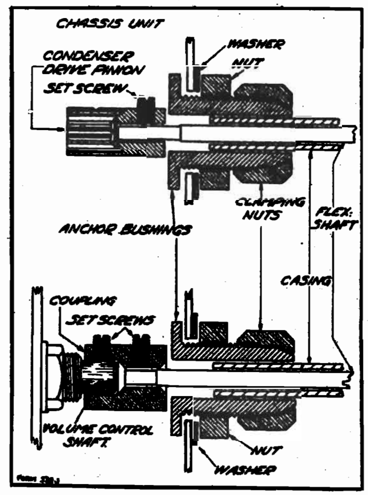



*Fig. 6—Details of Flexible Drive Shaft Connections*

In Fig. 6 is shown a cross-sectional view of the flexible drive shaft connections at the chassis end. First check the centering of the volume control anchor bushing by eye. The center of the bushing should be in a line with the center of the volume control coupling. In case the center of the bushing is not in line or the shaft turns hard, loosen the nut which holds the bushing in place. Then insert the shaft in the coupling and tighten the set screws as explained below. This will center the bushing and the nut may then be tightened.

Next, take the tube cover plate off. This is the large plate held on the chassis box by 5 screws. Extend the volume control flexible shaft and casing several inches through the hole in the anchor bushing of the tube cover plate so that the plate will be on the casing and out of the way. Turn the volume control coupling counter-clockwise until the switch is snapped to the off position. Lock the receiver on the control unit and turn the volume control knob counter-clockwise until it is in the locked position. Then loosen both set screws in the volume control coupling and insert the flexible shaft in the coupling (see Fig. 6). Tighten the outer set screw first on *one of the four flat faces* of the flexible shaft and then tighten the inner set screw. Then again temporarily hang the chassis on the mounting bolts. Next, check the operation of the switch, volume control and lock. The switch should be off when the volume control knob is in the locked position. It may be necessary to loosen the inner set screw and do a slight amount of adjusting until the proper setting is obtained.

Next, slide the tube cover plate into position and fasten it in place by means of the five screws. Then tighten down the clamping nut on the volume control shaft casing but *do not tighten this nut excessively.*

To attach the tuning condenser flexible shaft, first check the centering of the anchor bushing by eye as was explained above. Then extend the tuning condenser flexible shaft into the hole at the center of the tuning condenser drive pinion. With the rotor plates completely in mesh, turn the dial gear in the control unit until it is at the low frequency end stop. The set screw may then be tightened and the clamping nut secured on the casing as was explained above. In some instances, it may be necessary to loosen the set screw of the large gear on the tuning condenser rotor shaft and adjust the setting of this gear in order to get an accurate calibration.

## Antenna

As the Cadillac and LaSalle cars come equipped from the factory with built-in antennas, the antenna portion of the installation is very simple. The lead-in wire from the antenna will be found behind the right cowl pad at the top edge.

If any installations are made in cars which do not have a roof antenna, one will have to be put in. The roof antenna is by far the most satisfactory type and should be used in all cases except in sport models, in which case a plate antenna under the car may be used.

## Completing the Wiring Connections

**Antenna Cable**

Bring the antenna cable of the receiver in the most direct manner possible to the lead-in from the antenna and connect it to the latter. Keep it as high as possible and as far away from any car wiring as possible. Care should be taken not to have the antenna wire come in contact with the shield wires. Ground the pigtail of the antenna cable shield at the antenna end. The pigtail of this shield at the chassis end is grounded.

The shielded antenna lead from the receiver is not long enough to reach to the column at which the antenna lead-in comes down. If motor noise is experienced, cover the exposed portion of the lead-in wire with loom and braided shield from the point where it leaves the column to the point of connection to the antenna lead of the receiver. Connect the two wires together and connect the two shields together, care being taken that no strand of the shield touches the antenna wire.

CADILLAC

**MODEL 06W**
**Schematic, Socket**
**Alignment**

### Battery Cable and Six Lead Cable

As shown in Figs. 1 and 2, the battery cable is brought down the dash, through a hole in the dash and thence over to the battery. It passes through the raised portion of the battery compartment cover.

The lug on the lead marked "positive" is connected to the positive side of the battery and the lug on the negatively marked lead is connected to the negative side of the battery. Ground the pigtail of the shield by screwing the No. 6 Parker Kalon screw through the end of the pigtail and through the hole in the lug which is grounded.

The six-lead cable between the chassis and the speaker—"B" eliminator is usually brought over along the dash as shown in Fig. 1.

### Pilot Lamp

Before the control unit is permanently mounted, complete the pilot lamp connections. The pilot lamp cable is attached to the eight-prong socket. At the end of this cable is the pilot lamp socket and clip, the latter being attached to an angle bracket. This bracket is to be screwed to the pilot lamp plate which will be found in the bag of parts. A 1/4" 6-32 binding head screw, nut and lockwasher are provided for this purpose. The bracket is put on the pilot lamp plate in such a way that the leads will come out at the back of the control unit. The pilot lamp plate is then screwed to the bottom of the control unit by means of the lug on each side of the plate.

## Trying Out the Set and Adjusting

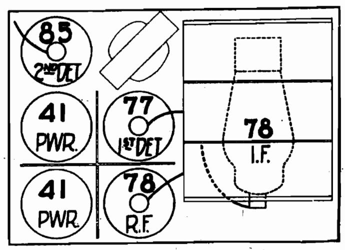



*Fig. 7—Location of Tubes*

After the wiring has all been completed and before the chassis is permanently installed, try out the set and adjust the antenna trimmer condenser.

To adjust the antenna trimmer, tune in a weak signal between 1200 and 1400 KC with the volume control about three-quarters on. On one end of the chassis box is a small metal plate. Remove the two screws which hold this plate in place. Directly under the hole in the chassis box is the antenna trimmer condenser screw. Turn this adjusting screw up or down until maximum output is obtained.

The location of the tubes is shown in Fig. 7.

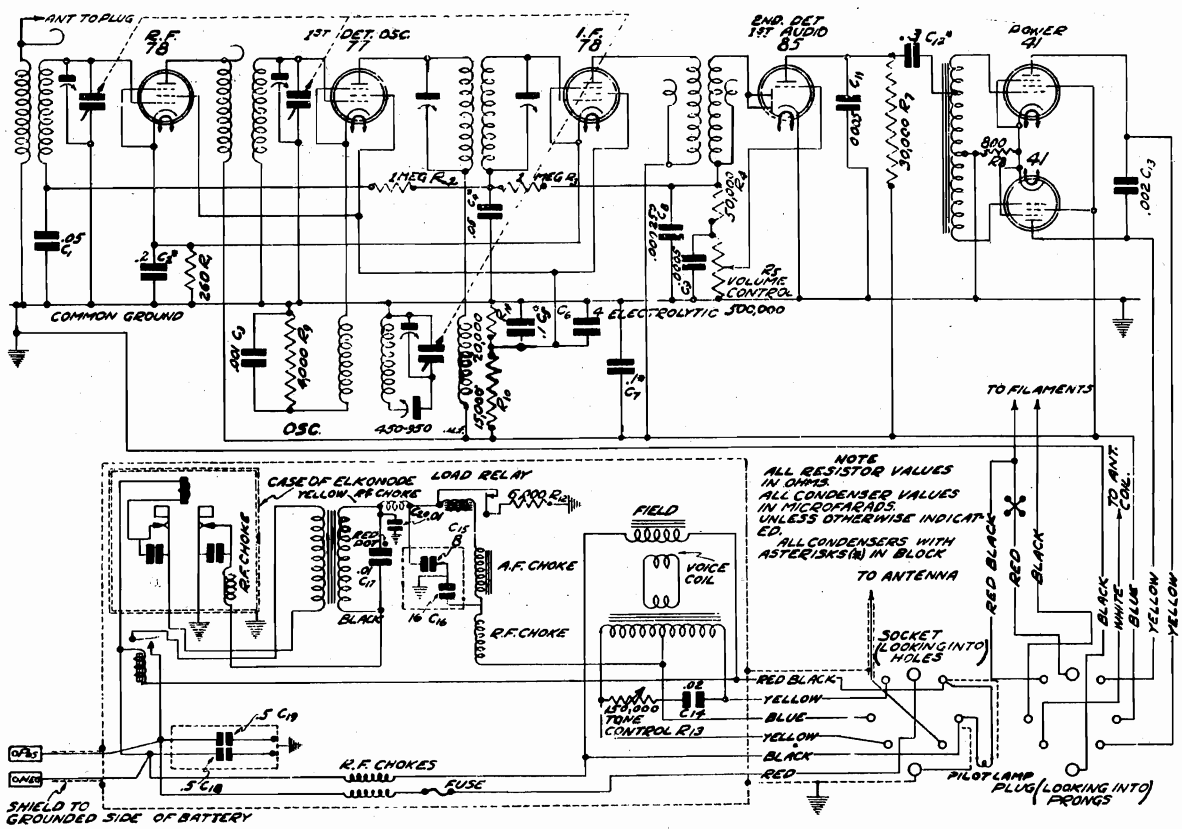



*Fig. 9—Schematic Circuit Diagram*

IF PEAK 262 KC.

MODEL 06W
**Parts List**

CADILLAC

# Replacement Parts for Series 06W Receivers

**"S" Type—Black Finish**

**"R" Type—Maroon Finish**

## CHASSIS PARTS

| Part No. | Description |
|---|---|
| P-1763 | No. 85 Tube Socket |
| P-1761 | No. 77 Tube Socket |
| P-1762 | No. 78 Tube Socket |
| P-1665 | No. 41 Tube Socket |
| P-1760 | 8-Prong Male Plug |
| P-50581 | Tuned Impedance Transformer |
| P-20546 | Pinion Compression Spring |
| P-20544 | Pinion Mtg. Bracket |
| P-20586 | Cond. Drive Pinion |
| P-20585-A | Cond. Drive Gear |
| P-1568-A | Tube Shield Assembly |
| P-10263 | ⅜ Long Tube Bumper (Rubber) |
| P-10210 | ⅝ Long Tube Bumper (Rubber) |
| P-30417 | Volume Control Coupling Unit |
| P-5094 | 2nd I. F. Coil and Can Assembly Complete |
| P-5063 | 1st I. F. and Oscillator Coil and Can Assembly Complete |
| P-5069 | Complete R. F. Coil and Can Assembly |
| P-5064 | Antenna R. F. Transformer only |
| P-5065 | Interstage R. F. Transformer only |
| P-20516 | 6-32 Wing Nuts for Chassis Cover—Black |
| P-20737 | 6-32 Wing Nuts for Chassis Cover—Red |

## Resistors

**(In Chassis)**

| Part No. | Code No. | Resistance | Type |
|---|---|---|---|
| P-B90962 | R1 | 260 ohm | Carbon |
| P-A90948 | R2 | 1 Megohm | Carbon |
| P-A90948 | R3 | 1 Megohm | Carbon |
| P-A90941 | R4 | 50,000 ohm | Carbon |
| P- 91061 | R5 | 500,000 ohm | Volume Control and Switch |
| P-B91047 | R7 | 30,000 ohm | Carbon |
| P-B90964 | R8 | 800 ohm | Carbon |
| P-A90947 | R9 | 4,000 ohm | Carbon |
| P-B91020 | R10 | 15,000 ohm | Carbon |
| P-B90950 | R11 | 20,000 ohm | Carbon |

**(In Speaker—"B" Eliminator)**

| Part No. | Code No. | Resistance | Type |
|---|---|---|---|
| P-98001 | R12 | 6,000 ohm | Vit. Enamel |
| P-91013 | R13 | 150,000 ohm | Tone Control |

## Condensers

**(In Chassis)**

| Part No. | Code No. | Capacity | Voltage | Type |
|---|---|---|---|---|
| P-80946 | C1 | .05 | mfd. 200 V. | Tubular |
| P-80821 | C3 | .001 | mfd. 600 V. | Molded |
| P-80965 | C6 | 4.0 | mfd. 150 V. | Electrolytic |
| P-80919 | C8 | .00025 | mfd. 600 V. | Moulded |
| P-80945 | C9 | .0005 | mfd. 600 V. | Moulded |
| P-80855 | C11 | .0005 | mfd. 600 V. | Moulded |
| P-80808-A | C13 | .002 | mfd. 600 V. | Moulded |
| P-80903-J | C2 | 0.2 mfd. | | Block |
| | C4 | .05 mfd. | | |
| | C5 | 0.1 mfd. | | |
| | C7 | 0.1 mfd. | | |
| | C12 | 0.3 mfd. | | |

| Part No. | Description |
|---|---|
| P-1539 | 600 K. C. Tracking Condenser |
| P-80938 | Three-Gang Variable Condenser |

**(In Speaker—"B" Eliminator)**

| Part No. | Code No. | Capacity | Voltage | Type |
|---|---|---|---|---|
| P-80940 | C14 | .02 | mfd. 400 V. | Tubular |
| P-80939 | C15 | 8.0 | mfd. 225 V. | Electrolytic Block |
| | C16 | 16.0 | mfd. 225 V. | |
| P-80953 | C17 | .01 | mfd. 160 V. | Metal Case |
| P-80941 | C18 | 0.5 | mfd. 15 V. | Metal Case |
| | C19 | 0.5 | mfd. 15 V. | |
| P-80872 | C20 | .01 | mfd. 600 V. | Tubular |

## SPEAKER "B" ELIMINATOR PARTS

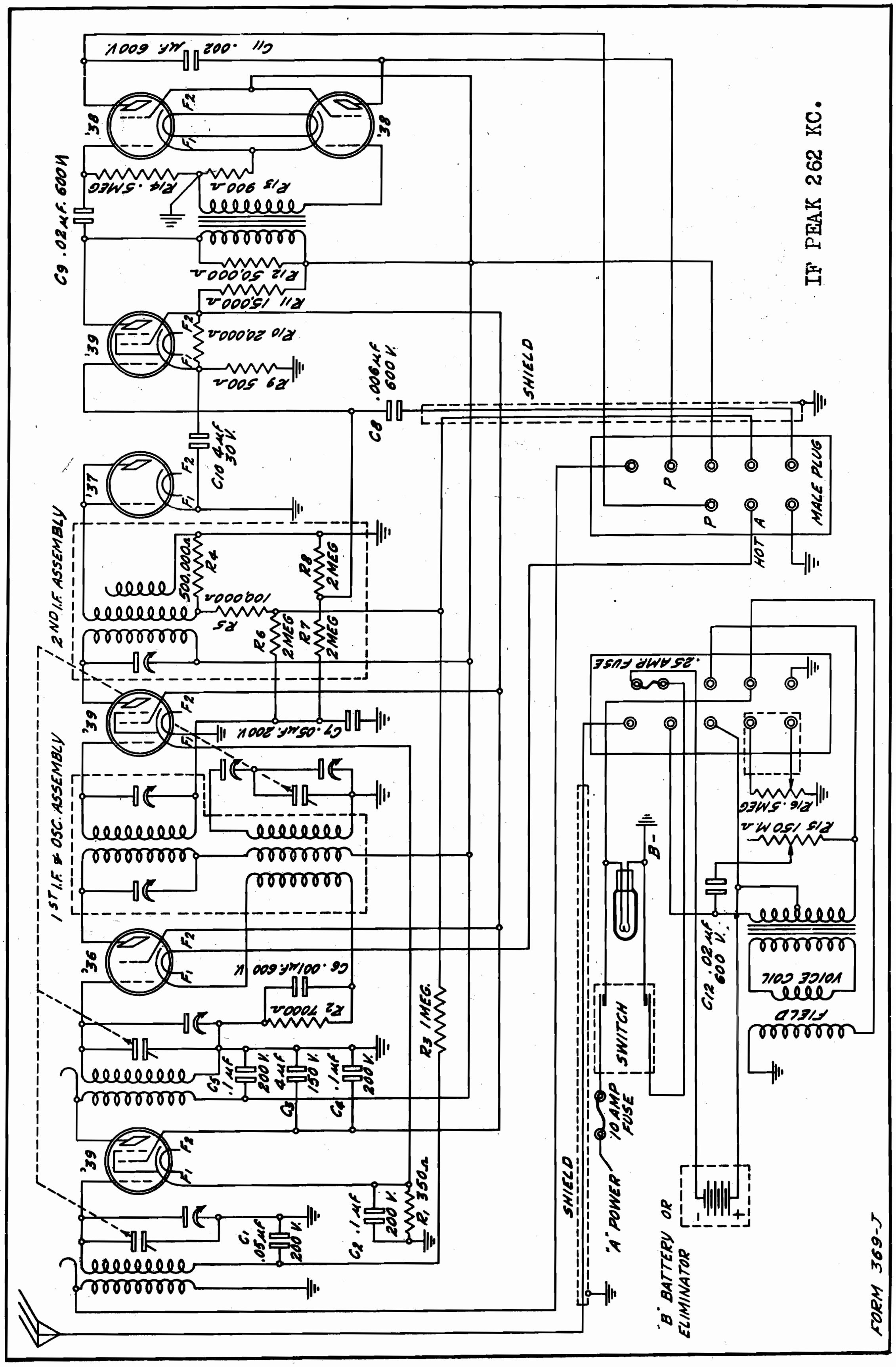
| Part No. | Description |
|---|---|
| P-50582 | Power Transformer Assembly |
| P-50583 | "B" Choke Assembly—Iron Core |
| P-5089 | "B" Choke—Air Core (2 Used) |
| P-5090 | Dual "A" Choke—Air Core |
| P-1765 | Dual Vibrator Elkonode |
| P-1766 | Five-Prong Socket |
| P-1767 | On-Off Relay |
| P-1768 | Automatic Load Relay |
| P-70737 | "A" Cable and Lugs |
| P-70748 | Six-Lead Cable, Antenna Cable, Pilot Lamp Cable and Eight-Prong Socket Assembly, Complete |
| P-1624 | 10 Amp. Fuse—Size No. 3AG Fuse Block |
| P-1771 | 6-Inch Speaker—S Type Set |
| P-1772 | 8-Inch Speaker—R Type Set |
| P-1790 | 5-Lug Terminal Strip |

## CONTROL UNIT PARTS

| Part No. | Description |
|---|---|
| P-20534 | Dial Gear |
| P-20537 | Dial Retaining Washer |
| P-30387-A | Worm Drive Gear |
| P-30378 | Anchor Bushing |
| P-30384 | Anchor Bushing Clamping Nut |
| P-30385 | Anchor Bushing Hex. Nuts |
| P-1848 | Lock Assembly |
| P-30435 | Keys |
| P-20724-A | Lever |
| P-20725 | Ribbon Tension Spring |
| P-1562 | Knobs—S Type Set |
| P-1855 | Knobs—R Type Set |
| P-1610 | Flexible Shaft 9¾ Inch |
| P-1611 | Flexible Shaft 12¾ Inch |
| P-1849 | Dial Strip |
| P-30437 | Volume Control Drive Shaft |
| P-30390 | Drive Shaft |
| P-1563-A | 6-8 Volt Pilot Lamp |
| P-1871 | Pilot Lamp Socket and Clamp |

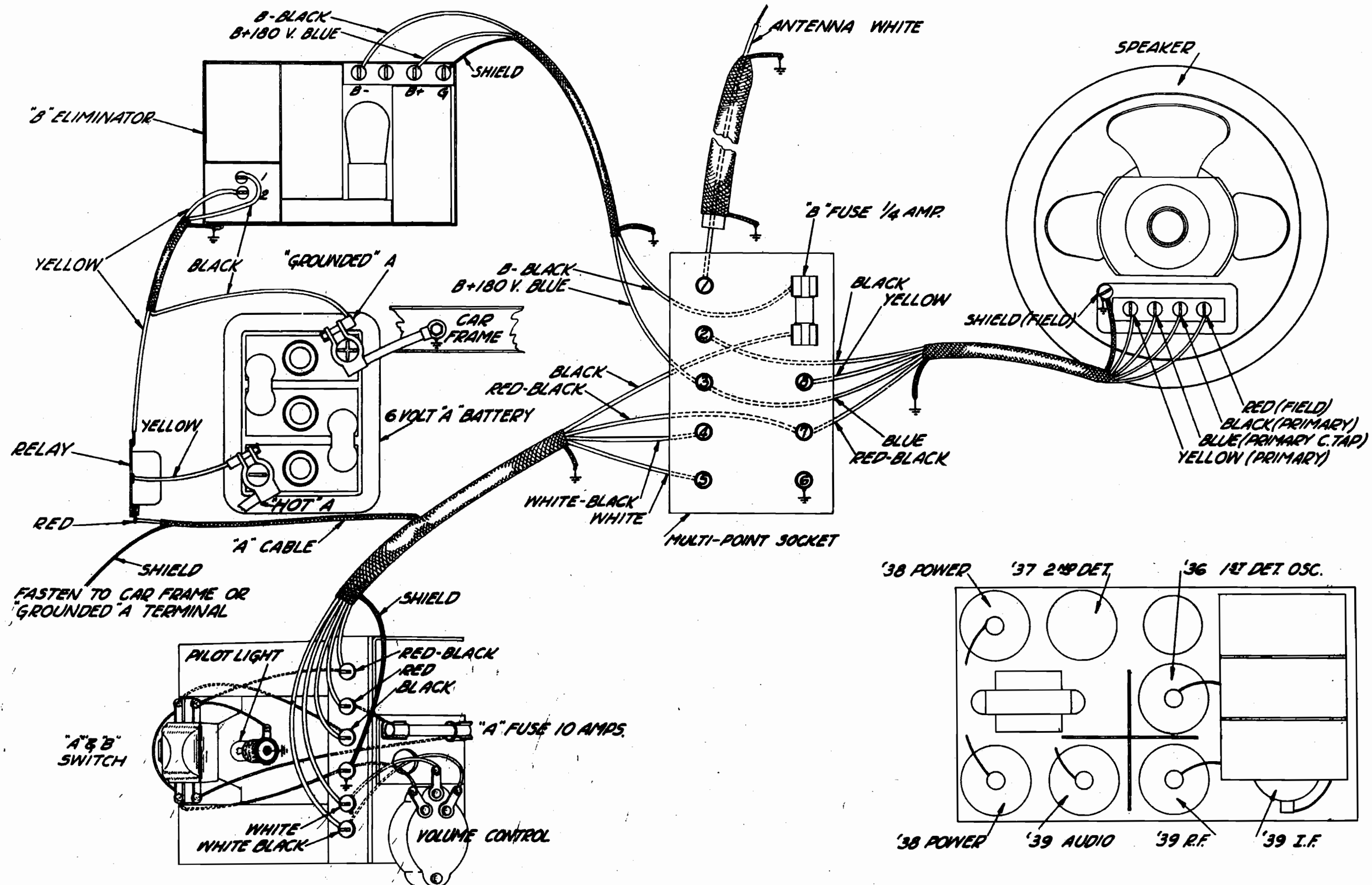
# CADILLAC

MODEL 2721 (072)
Schematic



MODEL 2721 (072)
Voltage, Socket
Assembly Diagram

# CADILLAC




| Type of Tube | Function | Across Heater | Plate to Cathode | Screen to Cathode | Grid to Cathode | Normal Plate MA |
|---|---|---|---|---|---|---|
| '39 | R. F. | 6. | 177 | 80 | 3 | 3.6 |
| '36 | 1st Det. | 6. | 173 | 76 | 7 (1) | .9 (1) |
| '39 | I. F. | 6. | 177 | 80 | 3 | 3.6 |
| '37 | 2nd Det. | 6. | 0 | | 0 | 0 |
| '39 | 1st Audio | 6. | 157 | 77 | 3.7 | 3.0 |
| '38 | Output | 6. | 160 | 162 | 15.5 | 7.5 |

(1) Will vary with dial setting.

NOTE: All bias voltages must be read from cathode to ground.

# CADILLAC

## Power Units

The "A" battery and "B" eliminator or "B" batteries may not be delivering the correct voltages to the set due to a defect in the units themselves, or to a defect in the wiring, connecting plug, or any of the associated apparatus.

CAUTION — In the installation manual it was stated that the voltages should not be read by removing the cable head and reading them at the multi-post socket. The reason for this is that when the lock switch is turned off with the cable head removed the inductive surge caused by the speaker field may burn out the pilot lamp.

Also, as the voltages are not read under load conditions, a true picture is not obtained of the actual operating voltages.

However, the service technician equipped with the proper apparatus can read the voltages at the cable head in accordance with the instructions as given below. By the method as explained, load conditions are simulated, thus permitting actual working voltages to be read.

If "A" or "B" voltages are not read at the multi-post socket, it will be necessary to check the voltages at the unit in question. If the voltages at the "A" battery and "B" eliminator or "B" battery are O. K., then there is an open in the wiring or connections at some point. Disconnect the wiring from the "A" or "B" unit and "ring through" the leads to the cable head with the continuity meter.

In the case of no "B" voltage, take off the cover of the "B" eliminator and see if the tube is lighted. If the tube is not lighted, see if there is voltage at the "A" supply terminal strip. Should there be no voltage at the latter point, it may be due to the fact that the relay is not contacting, thus causing no power to be supplied to the "B" eliminator.

## To Read Power Supply Voltages at Cable Head

Turn off the lock switch and remove the cable head from the chassis.

The following parts are required:

3—Phone tips or prongs taken from an old tube base.

1—Resistor for the "A" circuit as indicated in Fig. 1.

1—Resistor for the "B" circuit as indicated in Fig. 1.

Place these resistors in a wooden box or insulated mounting of some kind, with rubber covered leads extending out of the box. Note that the ground leads of the two resistors are common.

Solder the phone tips to the ends of the three leads.

Then insert the tips in the multi-post socket as shown in Fig. 1.

Turn on the lock switch.

Read the "A" voltage between terminals 6 and 7.

Read the "B" voltage between terminals 3 and 6, using a high resistance voltmeter.

CAUTION—In all of the above procedure great care should be taken not to ground the A+ or B+ to the car frame, chassis, cable, or any other ground.

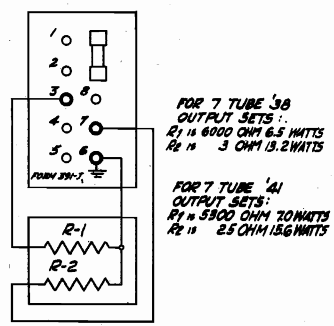



*Fig. 1. Using Resistors for Load*

The above readings are made under load conditions and indicate that proper power is being supplied to the receiver as far as the multi-post socket.

A very handy method of applying these resistors to the multi-point socket is to mount them in an insulated unit or plug with three prongs extending out and arranged in the shape of contacts three, six and seven in the above diagram. This unit could then be plugged in the correct terminals very easily.

## TESTING AND REPAIRING CHASSIS

If all accessories are found, upon test, to be in working order, it will be necessary for the service technician to check the chassis over.

The most convenient place to test and repair a chassis is on a service shop bench. In the case of the auto set, however, it is advisable to do part of the testing in the car, due to the fact that the power units, speaker, control unit and cables are installed in the car and cannot be conveniently taken out for use in testing the receiver. Of course, if a duplicate set of parts are available, then all of the testing can be done on the bench.

## Reading Voltages at Sockets

One of the first checks to be made is that of reading the voltages at the sockets. A good percentage of all the circuits in the chassis are involved, and a radically incorrect reading at any point will give a clue as to where the trouble may lie. In the installation manual and in this supplement there is a voltage chart showing all of the voltages and plate currents.

As stated above, the best place to check the voltages would be on a service shop bench, but as this involves removal of the other units and cables, it will be quickest in most cases to make the readings in the car.

In most cases, it will be necessary to remove the chassis either from its mounting on the steering column or from the mounting plate on the dash in order to satisfactorily check the voltages at the sockets. The procedure is as follows:

Turn off the lock switch.

Take off the cable head by removing the five screws.

Take the chassis off of the mounting and lay it on the floor board, on a board, or on a wood box, wherever is the most convenient. This can be done if sufficient slack was left in the wiring cables at the time of installation.

In some instances, it will be necessary to disconnect the flexible drive shaft and casing at one end in order to get the chassis out far enough. In other cases, it might be advisable to take off the control unit entirely to get the chassis off far enough.

It is advisable to take the chassis out of the box, although this is not absolutely necessary. If the chassis is taken out, an inspection of the wiring and parts can be made. If the chassis is not taken out, a long plug and external socket arrangement, such as is provided with a set analyzer, or the plug as described below, will be necessary.

In either case, re-insert the multi-point plug in the socket. Be sure to push the plug all the way in, to insure contact on all prongs.

Then turn on the lock switch.

CAUTION—If the chassis is taken out of the box, be sure to keep it on a dry wood or other insulated location in the front compartment of the auto. Great care should be taken to prevent an A+ or B+ point on the chassis from coming in contact with a ground, such as the car frame, levers, cable shields, etc.

A thousand-ohm-per-volt meter of 0—250 volt range is required for the plate and screen voltages. Lower ranges will be necessary for the grid and heater voltages. It is not necessary to have a high resistance meter for the heater or "A" battery reading.

Two of the sockets are partially covered under the chassis by the bypass condenser block. If the voltages are read under the chassis, at the bottom of the socket, by means of test leads and prods, it is necessary to make top socket contacts for these two tubes or else use the plug method as described.

A handy method of reading the voltages on an auto set is to make a plug about 5″ long with an old five-prong tube base at the bottom and a five-prong socket at the top. The five lines are then brought out at the top to binding posts or other terminals which can be reached with the tips of the test prods on the leads from a voltmeter. By providing a link in the plate line, screen line, or other lines, as desired, the current flowing in these circuits can be easily read by opening the link and connecting a milliammeter in place of the link. An extension lead should be made for the control grid line.

## Continuity Tests

The auto chassis is very compactly built and when "ringing it through" for servicing, considerable time might be spent in tracing through the wiring. For that reason, we are including in this supplement the complete wiring diagram.

After the chassis has been removed from the box and before making the continuity tests, make a careful inspection of all exposed wiring and soldered connections for opens, grounds, shorts and faulty connections. Then proceed to make continuity tests through the various circuits, using as a guide the wiring diagram, Fig. 3.

Make the continuity tests in an orderly manner, starting with the R. F. and working through the I. F. into the audio system. An exception to this is when there is an indication as to where the trouble is, in which case, time may be saved by starting the tests at the part or circuit in question.

In "ringing through" the various circuits in the chassis, take into consideration the amount of resistance in the circuit and also whether there is an external closed circuit around the one under test. Most service men at the present time use direct reading ohmmeters as continuity meters and in this way check for continuity while at the same time determining the resistance of the circuit. To see whether there is an external closed circuit, reference should be made to the schematic circuit diagram, in the installation manual.

When making continuity tests which are across the electrolytic condensers, the positive test prod must be on the positive lead. This is due to the fact that the anodes of the electrolytic condensers must be kept at a positive potential. If the anode is made negative, the condenser will pass current considerably more readily than if it is positive and the reading will be different than the standard reading which should be obtained.

## Alignment of Tuning Condensers

The condensers are aligned at the factory with signal generators and output meters and the receiver will not, as a general rule, lose its alignment unless mishandled or tampered with. When the tuning condensers are out of alignment, the receiver may tune broadly, it may be low in volume all over the band, or a lack of volume on certain parts of the broadcast band may be noticed.

Broad tuning is most frequently caused by misalignment of the intermediate frequency tuning condensers. It may also be caused by mistracking between the oscillator and R. F. condensers.

MODEL 2721 (072)
Parts List
MODEL 2721,2722
Trimmer Data

# CADILLAC

Lack of volume at certain points of the dial is generally caused by mistracking between the R. F. and oscillator condensers. This occurs generally at the high frequency end and may be corrected by adjustment of the oscillator 1400 K. C. trimmer condenser. In a few instances, lack of volume at certain parts of the dial may be caused by R. F. condenser misalignment. If this occurs at the high frequency end, the condition may be corrected by the adjustment of the R. F. trimmer condensers. If the set is weak at both ends of the dial, mistracking between the R. F. and oscillator condensers is generally the cause and may be corrected by adjustment of both 600 K. C. and 1400 K. C. trimmers, as explained below.

Low volume all over the band is generally due to I. F. condenser misalignment.

CAUTION—We do not recommend that realignment be attempted unless other possible causes of faulty operation have first been investigated and unless the service technician has the proper equipment. Realignment by anyone other than a qualified radio service technician is not advisable, as one not experienced in the work is almost certain to get into difficulty and throw the set completely out of alignment.

A local and accurately calibrated signal generator as well as an output indicating meter are absolutely essential for correct alignment. This signal generator must provide a signal at the broadcast frequencies of 550 to 1500 K.C. and in addition a signal of 262 K.C. for the intermediate frequency. The broadcast band signals of the signal generator must be accurately known, as the dial scale of the receiver is calibrated in kilocycles. The intermediate frequency of the signal generator likewise must be accurate in order to align the I. F. stages at 262 K.C. A non-metallic screwdriver is necessary.

As in the case of reading the voltages at the sockets, the best place to realign the chassis would be on the service shop bench. However, to avoid removal of the other units and cables, realignment may be done in the car, in the front compartment, on a box, wood board, or other insulated location. The chassis must be removed from the box.

The complete procedure for realignment and retracking is as follows:

**Aligning Intermediate Condensers**—First align the intermediate condensers. The adjusting screws of the first I. F. primary and secondary trimmer condensers are on the porcelain base of this assembly at the side of the '39 I. F. socket. The adjusting screw of the second I. F. primary trimmer is reached through the hole near the base of the can of this assembly.

One of the best ways of reading the output is by means of a rectifier type meter. This meter, if of low range is connected across the secondary of the output transformer in the speaker. If it is of high range, it may be connected across the primary of the transformer in series with a large condenser to prevent the flow of D.C. plate current through the

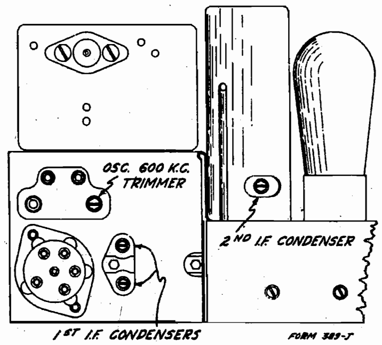



*Fig. 2. Location of Intermediate and 600 K. C. Trimmer Condensers*

meter. In either method of connection, opening the voice coil of the speaker will give a better deflection on the output meter.

First set the signal generator for a signal of exactly 262 K.C. The rotor of the tuning condenser should be completely out to avoid interference from the oscillator. Remove the grid cap from the grid connection of the '36 first detector tube. Connect the antenna lead from the signal generator to the grid of the '36 first detector. Connect the ground lead of the signal generator to the chassis sub-panel or ground at any convenient point.

Attenuate the signal from the signal generator so as to prevent the levelling-off action of the A. V. C. Using the non-metallic screwdriver, adjust the first I. F. primary and secondary trimmer condensers and the second I. F. trimmer condenser adjusting screws until maximum output is indicated on the output meter.

After all three have been adjusted the first time, go over them again and check the setting for maximum output.

If when alignment has been completed, the output is satisfactory at 600 K.C. and 1400 K.C., but is low in the center of the broadcast band, the intermediate condensers have probably been lined up at some frequency other than 262 K.C. Have the frequency of the 262 K.C. signal generator checked and if it is more than 3 K.C. off, either way, it should be re-calibrated.

**Aligning R. F. and Oscillator Condensers**—Before aligning and tracking the oscillator and R. F. condensers, connect the flexible drive shaft to the control unit and to the chassis. As explained in the service manual, the dial scale should be at the low frequency end and stop when the rotor is completely in mesh. Then turn the station selector knob until the dial scale is at 1400 K.C. The tuning condenser will then be correctly set for the 1400 K.C. signal.

Set the signal generator for a signal of exactly 1400 K.C. The signal input from the signal generator should now be made to the antenna lead. Put the grid cap of the '36 first detector tube back in place.

Then adjust the three trimmer condensers on the tuning condenser for maximum output. Adjust the oscillator section trimmer first. (Section farthest from drive gear.)

The next step is to adjust the oscillator 600 K.C. trimmer condenser. The adjusting screw on this condenser will be seen over the '39 I. F. socket. Set the signal generator for a signal of 600 K.C. and turn the tuning condenser rotor until the output meter shows maximum deflection. Then, using the non-metallic screwdriver, adjust the 600 K.C. trimmer condenser screw, rocking the rotor back and forth at the same time, until maximum output is obtained.

Next, set the signal generator for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output. The tuning condenser should then be properly aligned.

## Parts List for No. 072 Series Receivers (38 Output)

### CHASSIS PARTS

| Part No. | Description |
|---|---|
| P-1529 | No. 37 Tube Socket (Long Lug) |
| P-1531 | No. 39 Tube Socket (Long Lug) |
| P-1555 | No. 36 Tube Socket (Short Lug) |
| P-1556 | No. 39 Tube Socket (Short Lug) |
| P-1530 | No. 38 Tube Socket (Long Lug) |
| P-1532 | Multi-Point Plug |
| P-1543 | Multi-Point Socket |
| P-5053 | First I. F. & Oscillator Assembly, Complete with Trimmer Condensers and Can |
| P-5022 | Second I. F. Transformer Assembly, Complete with Trimmer Condenser, Resistors and Can |
| P-5054 | Antenna & Interstage R. F. Transformer, Complete with Can |
| P-5055 | Antenna R. F. Transformer Only |
| P-5056 | Interstage R. F. Transformer Only |
| P-1539 | Oscillator 600 K. C. Tracking Condenser |
| P-1615 | Condenser Drive Gear with Set Screw |
| P-30395 | Drive Pinion Gear with Set Screw |
| P-20544 | Bracket for Pinion Bearing |
| P-20545 | Bearing for Drive Pinion |
| P-1092 | Grid Cap and Wire |
| P-10232 | Long Rubber Bumper for Tubes |
| P-10233 | Short Rubber Bumper for Tubes |
| P-20516 | 6-32 Wing Nuts (for chassis cover) |
| P-20543 | Chassis Box |
| P-20542 | Chassis Box Cover |
| P-50550 | Audio Transformer |

### Resistors

| Part No. | Code No. | Resistance | Type |
|---|---|---|---|
| P-A-90953 | R-1 | 350 ohms | Carbon |
| P-A-90979 | R-2 | 7,000 ohms | Carbon |
| P-A-90948 | R-3 | 1 Megohm | Carbon |
| P-A-90929 | R-4 | 500,000 ohms | Carbon |
| P-A-90912 | R-5 | 100,000 ohms | Carbon |
| P-A-90949 | R-6 | 2 Megohm | Carbon |
| P-A-90949 | R-7 | 2 Megohm | Carbon |
| P-A-90949 | R-8 | 2 Megohm | Carbon |
| P-A-91025 | R-9 | 500 ohms | Carbon |
| P-B-90950 | R-10 | 20,000 ohms | Carbon |
| P-B-91020 | R-11 | 15,000 ohms | Carbon |
| P-A-90941 | R-12 | 50,000 ohms | Carbon |
| P-A-91022 | R-13 | 900 ohms | Carbon |
| P-A-90929 | R-14 | 500,000 ohms | Carbon |
| P- 91013 | R-15 | 0-150,000 ohms | Tone Control |
| P- 91026 | R-16 | 0-500,000 ohms | Volume Control |

### Condensers

| Part No. | Code No. | Capacity | Voltage | Type |
|---|---|---|---|---|
| P-80902-D | C-1 | .05 mfd., | 200 V. | Electrolytic Cond. Block |
| | C-3 | 4.0 mfd., | 150 V. | |
| | C-10 | 4.0 mfd., | 30 V. | |
| P-20909-D | C-2 | .1 mfd., | 200 V. | Bypass Cond. Block |
| | C-4 | .1 mfd., | 200 V. | |
| | C-5 | .1 mfd., | 200 V. | |
| | C-9 | .02 mfd., | 600 V. | |
| | C-7 | .05 mfd., | 200 V. | |
| P-80822 | C-8 | .006 mfd., | 600 V. | Moulded |
| P-80821 | C-6 | .001 mfd., | 600 V. | Moulded |
| P-80808 | C-11 | .002 mfd., | 600 V. | Moulded |
| P-80907 | C-12 | .02 mfd., | 600 V. | Metal Can (In Speaker Case) |
| P-80912-C | Three-Gang Condenser | | | |

### CONTROL UNIT PARTS

| Part No. | Description |
|---|---|
| P-91026 | R-16 Volume Control |
| P-1624 | 10 Ampere Fuse |
| P-1614 | Lock Switch |
| P-1563 | 8 Volt Pilot Lamp |
| P-1562 | Control Knob |
| P-1621 | Pilot Lamp Socket & Cover Assembly |
| P-1618 | Celluloid Dial Strip |
| P-20537 | Dial Retaining Washer |
| P-20534 | Dial Drive Gear |
| P-30390 | Drive Shaft |
| P-30387 | Worm Drive Gear |

### SHIELDED CABLES

| Part No. | Description |
|---|---|
| P-70723 | Shielded Antenna Cable |
| P-70730 | Shielded Control Cable |
| P-70731 | Shielded Speaker Cable |
| P-70732 | Shielded "B" Supply Cable |

# No. 072A Series Receivers (41 Output)

The form 375J Installation Manual and foregoing service supplement cover the 072 Series (38 output) receivers. The copy in general is applicable to the 072A Series (41 output) as the sets differ only in the audio amplifier.

In Fig. 4 is shown the schematic circuit diagram of the 072A set. The schematic circuit diagram of the 072 set is shown in Fig. 1 of the Form 375J Installation Manual. By looking at the two circuits the similarity as well as the points of difference can be noted.

On this page is given an explanation of the parts which are different in the 41 output set, a supplement to the chassis parts list covering the new parts used, and a complete voltage chart for the receiver.

## Differences in 072A Chassis

In comparing the No. 072 Series (38 output) receivers with the No. 072-A Series (41 output) the following parts changes in the chassis have been made:

R-2 changed from 7,000 ohms to 6,000 ohms.

R12 changed from 50,000 ohms to 25,000 ohms.

R-13 changed from 900 ohms to 800 ohms.

R-14, as shown in the old schematic circuit diagram (Fig 1 in the installation manual) is not used in the new receiver.

C-9 is changed from a .02 mfd. condenser to a .25 mfd. condenser.

The No. 38 sockets are changed to No. 41 sockets.

A new audio transformer is used.

No. "B" fuse is used with the No. 072-A series receiver.

## Voltage Chart for 072A Receivers

| *Type of Tube* | *Function* | *Across Heater* | *Plate to Cathode* | *Screen to Cathode* | *Grid to Cathode* | *Normal Plate MA* |
|---|---|---|---|---|---|---|
| '39 | R. F. | 6. | 177 | 80 | 3 | 3.6 |
| '36 | 1st Det. | 6. | 173 | 76 | 6 | .7 |
| '39 | I. F. | 6. | 177 | 80 | 3 | 3.6 |
| '37 | 2nd Det. | 6. | 0 | | 0 | 0 |
| '39 | 1st Audio | 6. | 88 | 88 | 4 | 3.0 |
| '41 | Output | 6. | 159 | 162 | 15 | 9 |

NOTE.—Read bias voltages from cathode to ground.

## Supplementary Parts List for 072A Receivers

### New Parts Used in the 072A (41 Output) Series Receivers

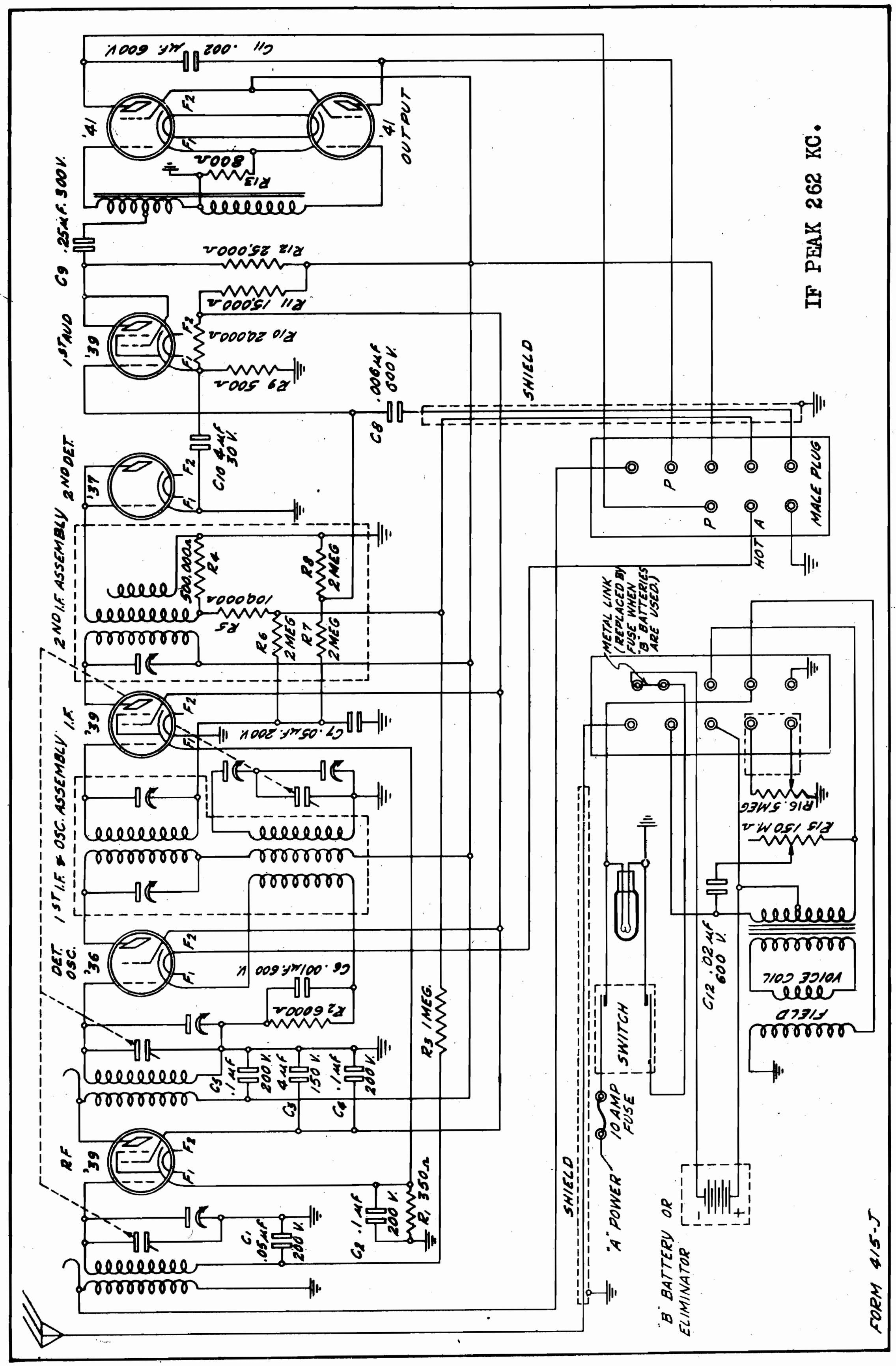
| Part No. | Description |
|---|---|
| P-A-91029 | R-2 — 6,000 ohm Carbon Resistor..... |
| P-A-91038 | R-12—25,000 ohm Carbon Resistor..... |
| P-A-91023 | R-13— 800 ohm Carbon Resistor..... |
| P-50559 | Audio Transformer .................. |
| P-1665 | No. 41 Sockets ...................... |
| P-80903-F | Bypass Cond. Block: C-2 — .1 mfd., 200 V.; C-4 — .1 mfd., 200 V.; C-5 — .1 mfd., 200 V.; C-9 — .25 mfd., 600 V.; C-7 — .05 mfd., 200 V. |

### Parts Shown in 072 List Not Used in 072A Series Receivers

| Part No. | Description |
|---|---|
| P-A-90979 | R-2 — 7,000 ohm Carbon Resistor.... |
| P-A-90941 | R-12— 50,000 ohm Carbon Resistor.... |
| P-A-91022 | R-13— 900 ohm Carbon Resistor.... |
| P-A-90929 | R-14—500,000 ohm Carbon Resistor.... |
| P-50550 | Audio Transformer .................. |
| P-1530 | No. 38 Socket ........................ |
| P-80903-D | Bypass Cond. Block: C-2 — .1 mfd., 200 V.; C-4 — .1 mfd., 200 V.; C-5 — .1 mfd., 200 V.; C-9 — .02 mfd., 600 V.; C-7 — .05 mfd., 200 V. |

**MODEL 2722 (072-A)**
**Schematic**

# CADILLAC



# CADILLAC

**MODEL 2721, 2722**
**Chassis wiring**

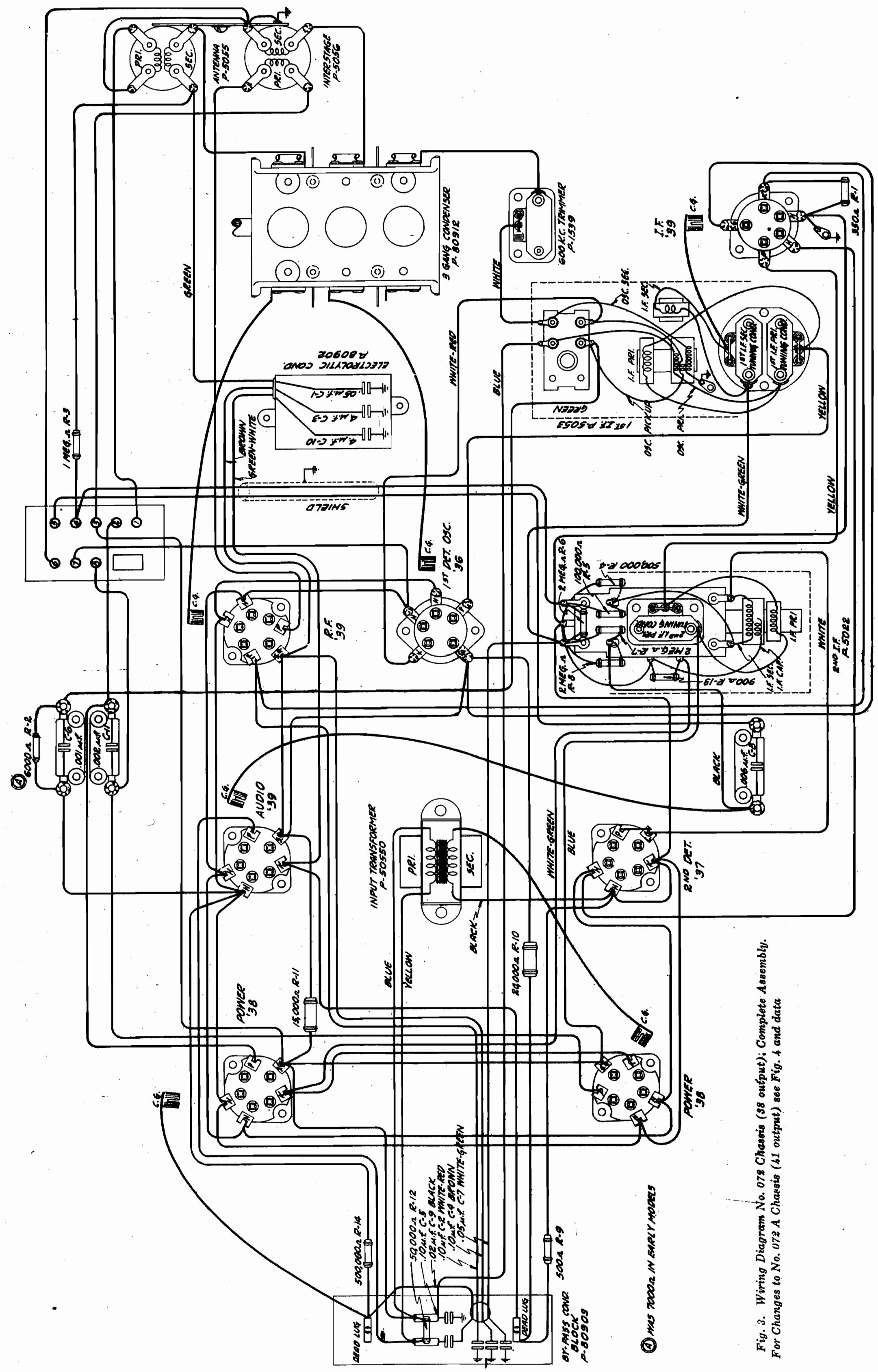
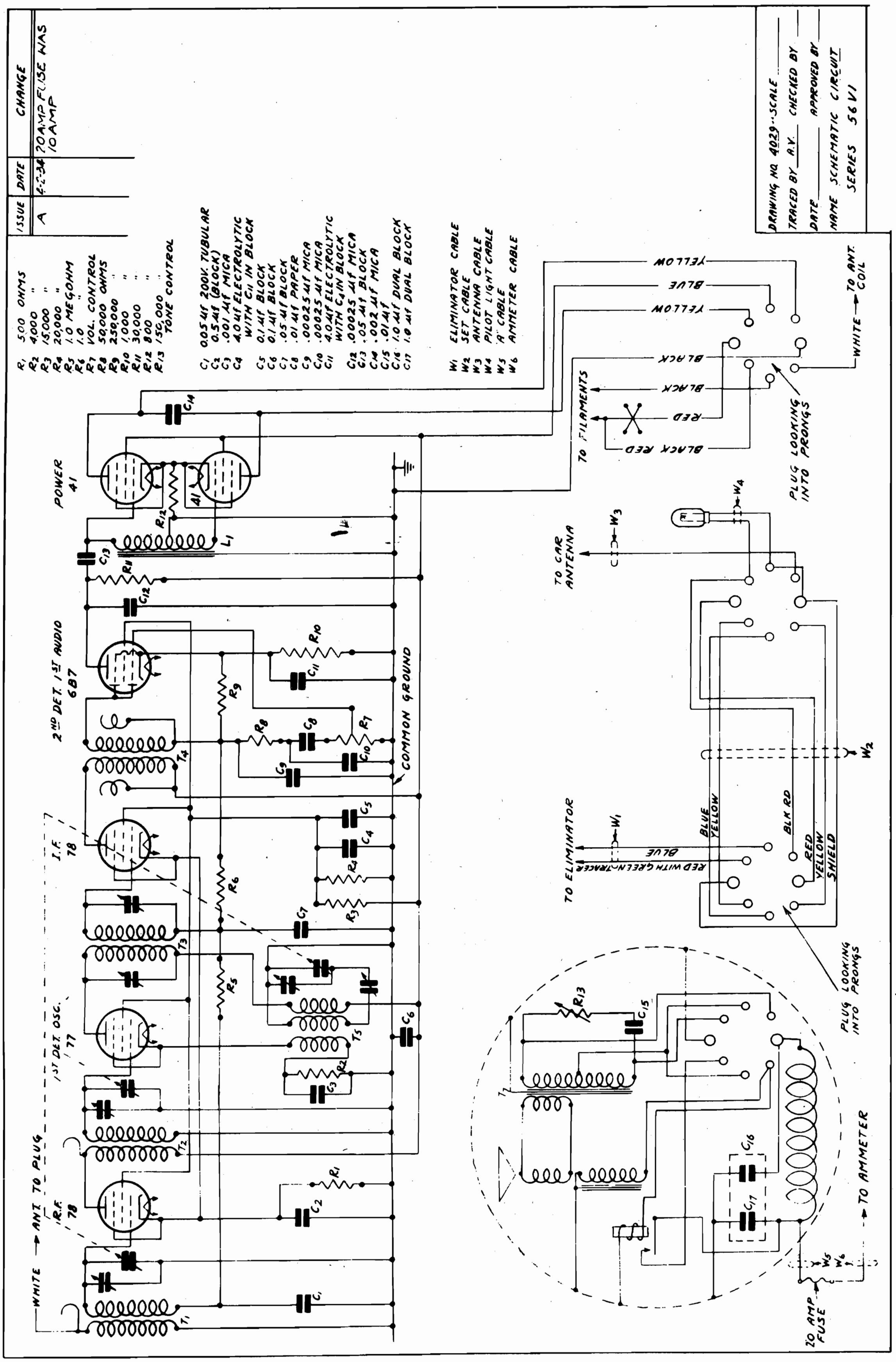



Fig. 3. Wiring Diagram No. 072 Chassis (38 output); Complete Assembly.
For Changes to No. 073 A Chassis (41 output) see Fig. 4 and data

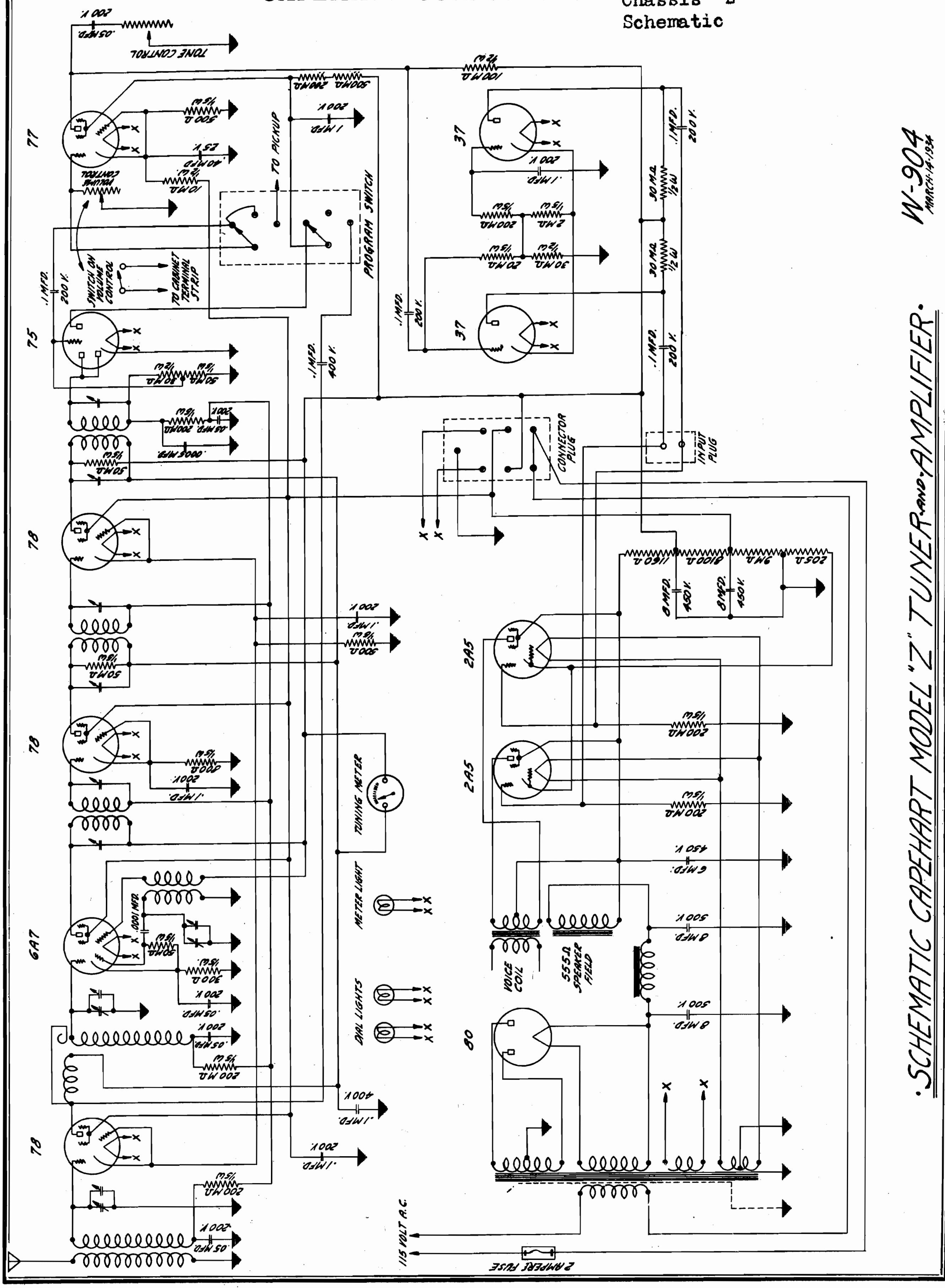
**MODEL 56V1**
**Schematic**

# CADILLAC



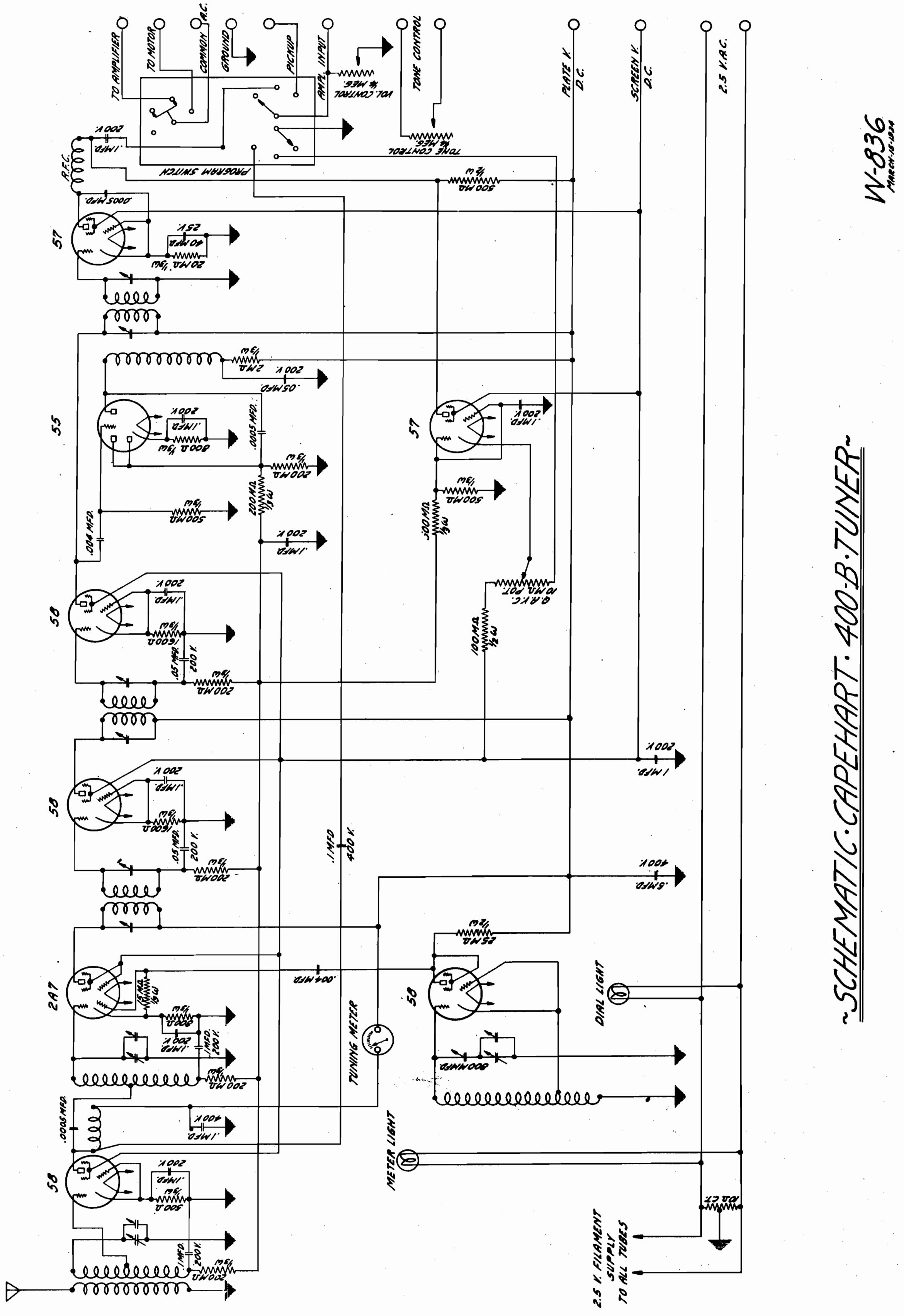
CAPEHART CORPORATION

MODELS 103, 104 Cosmopolitan
Chassis "Z"
Schematic



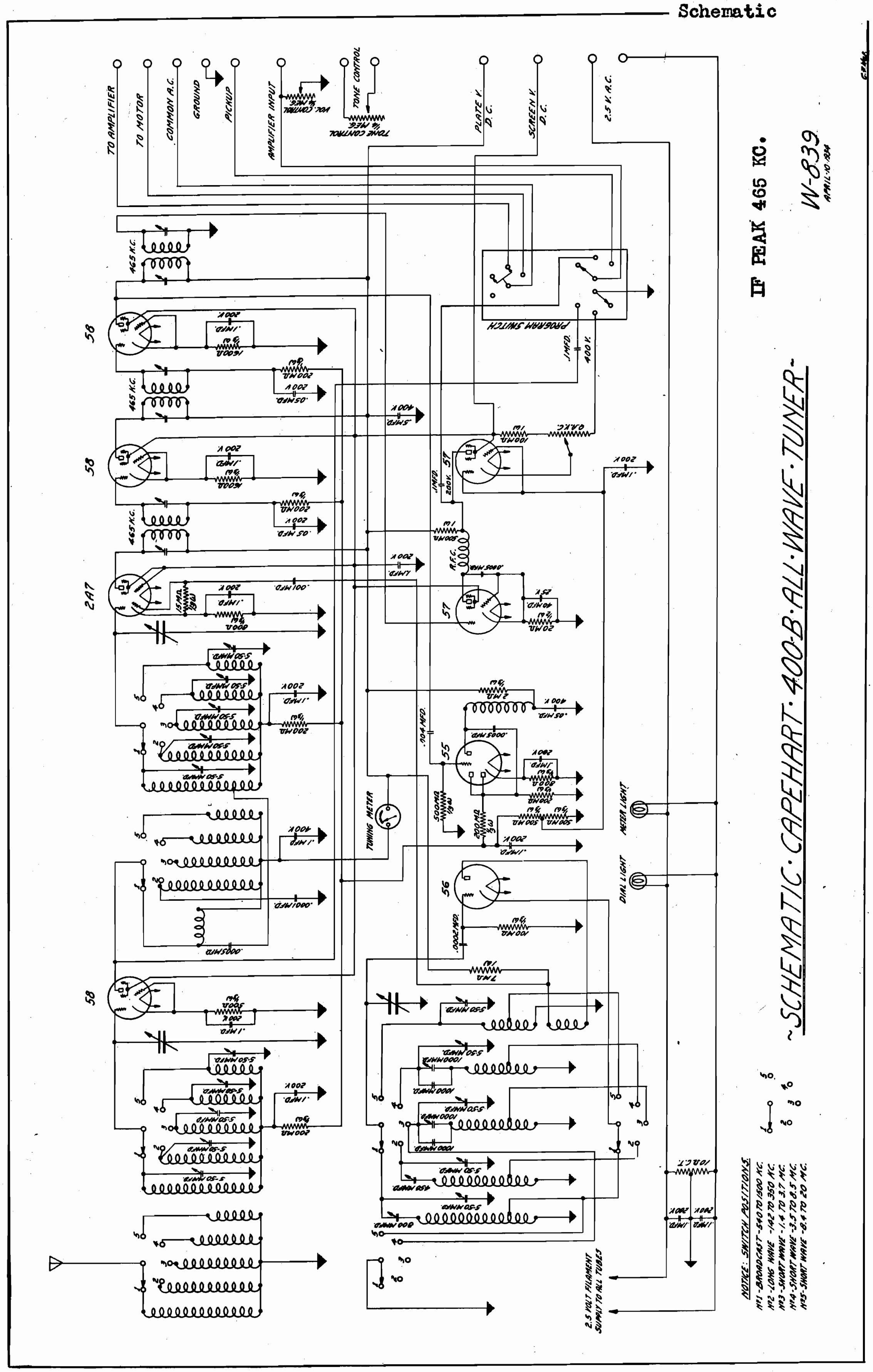
MODELS 400-B, 402-B
404-B Tuner
Schematic

CAPEHART CORPORATION



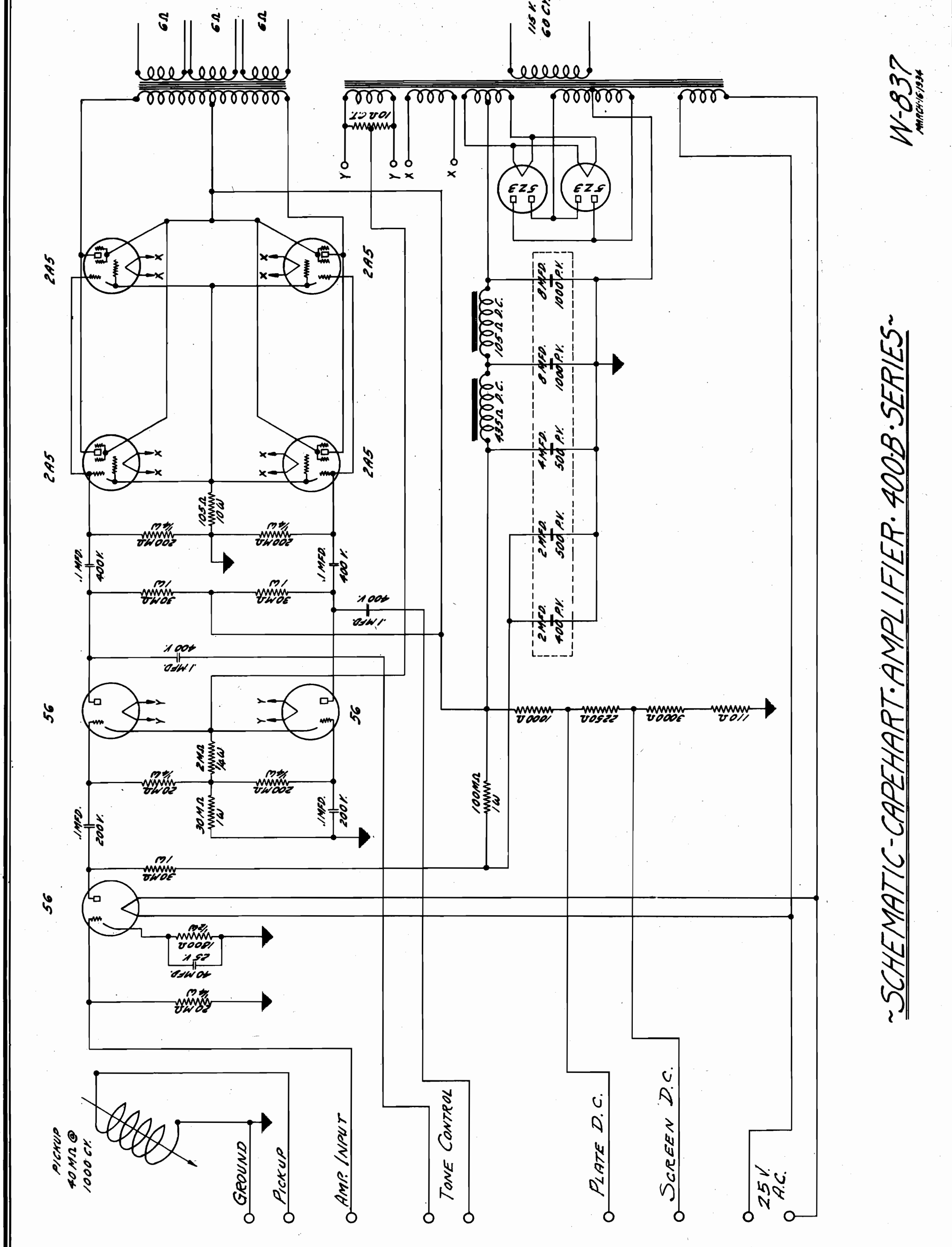
# CAPEHART CORPORATION

MODELS 400-B, 402-B
404-B A.W. Tuner
Schematic



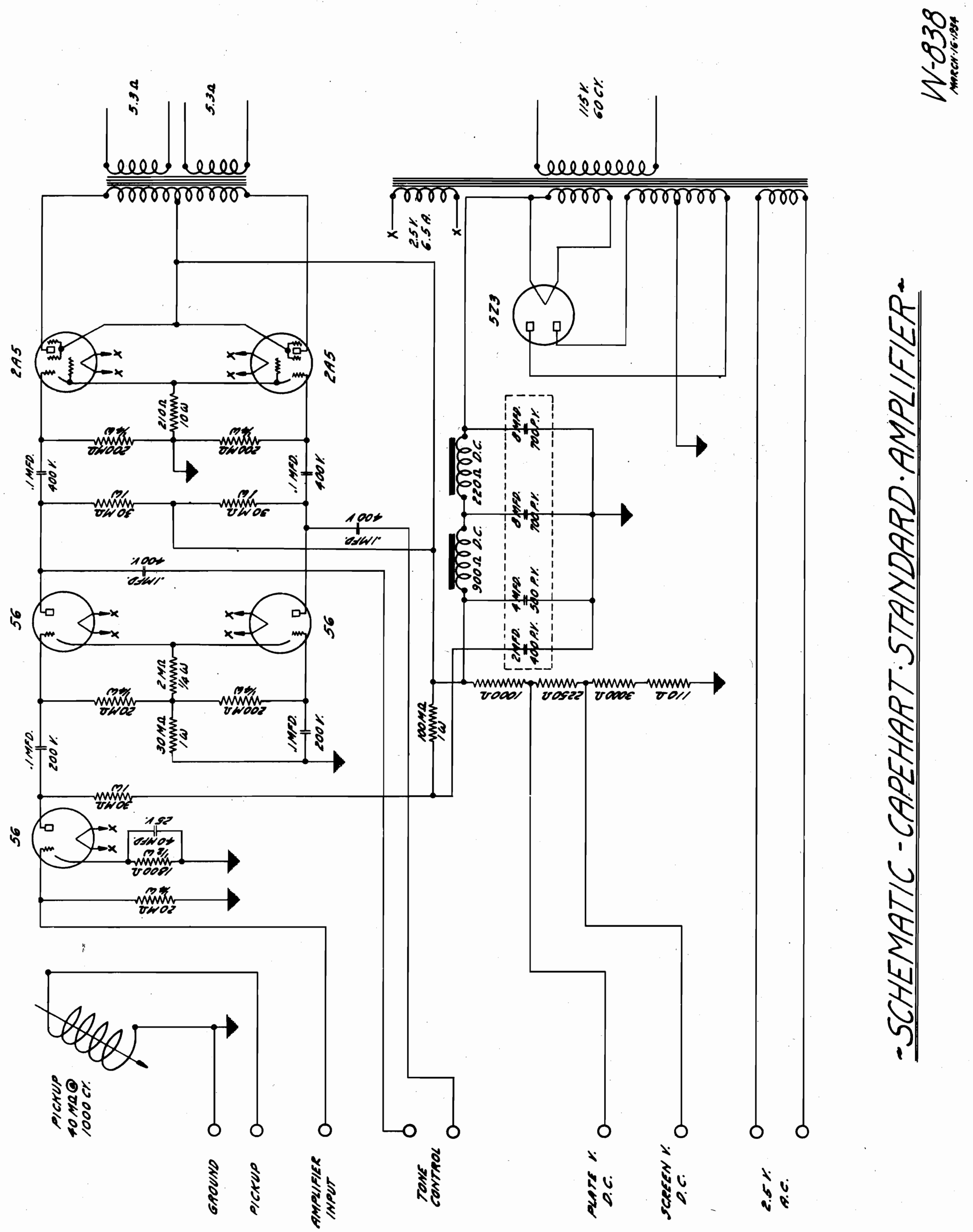
MODELS 400-B, 402-B
404-B Amplifier
Schematic

CAPEHART CORPORATION



# CAPEHART CORPORATION

MODEL "Standard"
Amplifier
Schematic



## GENERAL NOTES ON ALIGNMENT

In the service notes on ALIGNMENT PROCEDURE, directions are to couple the test oscillator to the receiver. Since test oscillators of different makes vary considerably in their design and construction, it is not possible to give specific instructions for coupling any particular test oscillator to the receiver. However, the following general method can be applied with practically any test oscillator.

Most test oscillators have two output leads. One of them is the "hot" lead and the other the ground lead. The ground lead should be connected directly to the receiver chassis, except in the case of AC-DC receivers. The connection then should be made through a .1 mfd condenser since the chassis of such receivers is above ground potential. If the test oscillator has only one lead, this information about the ground lead may be disregarded.

As mentioned in all of the service notes, for IF alignment the test oscillator should be connected through a .1 mfd. condenser directly to the control grid cap of the IF or Translator tubes. It is important to leave the grid clip attached to the cap and to leave the tube shields in place. The oscillator tube of the receiver also should be in its socket.

For RF alignment, whether broadcast or short wave, the "hot" lead of the test oscillator should be coupled to the antenna lead of the receiver. The exact means of coupling will depend upon several factors. Among them are the power of the test oscillator, the sensitivity of the receiver, and the extent to which the receiver is out of alignment. If the test oscillator is quite powerful and the receiver one of high sensitivity, merely placing the test oscillator lead parallel to, and several inches away from the receiver's antenna lead may provide sufficient coupling. In some cases it may be necessary to bring the leads very close to each other, or it may even be necessary to twist the antenna lead and the oscillator lead together for several inches. (Of course, the two leads must be separated by their insulation and not make metallic contact.) As the receiver is brought into alignment, thereby increasing its sensitivity, it will be possible to decrease the amount of coupling between the test oscillator lead and the antenna lead. (Move the leads further apart.) Always use the lowest amount of coupling that still will provide a signal strong enough for working purposes. If the test oscillator has a variable control for its power output, it is better to turn this control to its high position and decrease the signal input to the receiver by decreasing the amount of coupling between the test oscillator and the receiver's antenna lead. This procedure will insure the greatest possible accuracy in alignment.

When adjusting the oscillator trimmer condenser, set the variable condenser to the frequency or condenser position indicated in the Service Notes. Do not change this position while adjusting the trimmer. However, when adjusting the antenna or translator trimmers, the proper method is to continually "rock" the variable condenser a degree or two both sides of the alignment frequency and, at the same time, adjust the trimmer.

## PREVENTING ADJUSTMENT AT THE IMAGE FREQUENCY

When adjusting trimmers for short wave alignment, it sometimes will be found that a peak can be obtained at two different positions of the trimmer. Only one of these peaks is the correct one to use. The other is the image response. The proper procedure follows.

### Oscillator Trimmer:

Screw the oscillator trimmer all the way in (maximum capacity). Then reduce the capacity until a peak is reached. Now continue to reduce the capacity until a second peak is reached. Almost always, this second peak is considerably louder than the first one. The first peak is the image frequency adjustment, and must be avoided.

### Antenna and Translator Trimmers:

Screw the trimmers all the way in and then reduce capacity until a peak is reached. If the capacity is reduced still further, a second peak will be obtained. However, the correct setting is the first one, the one using the greater amount of capacity. Note that this is exactly opposite to the procedure for the oscillator trimmer.

MODEL 150,164,182
Supplementary Data

COLONIAL RADIO CORP.

# SUPPLEMENTARY SERVICE NOTES

## MODELS 150 - 164 - 182

### MODEL 150

Certain improvements have been incorporated in the Model 150 auto receivers since the Instruction Booklets and Service Manuals for this model were printed. For the most part these improvements facilitate removal of the chassis from its case when necessary.

1. The permanently connected shielded antenna lead has been replaced with one using a bayonet and socket type of connection.

2. In order to eliminate the necessity for going through the operation of polarity changing in the field, some of the sets are shipped with the polarity connection correct for positive grounded batteries and others for negative grounded batteries. The shipping cartons are stencilled to indicate the polarity connection of the set.

3. The vibrator unit has been improved and it is suggested that a couple of them be carried in stock to replace any that may break down in service. Defective units should be returned to the Colonial Radio Corp., 254 Rano St., Buffalo, N.Y., for replacement.

4. Any letters appearing after Model 150, on the chassis or carton, have no significance. All changes and improvements were incorporated in all of the chassis before being shipped.

### MODELS 164 AND 182

As mentioned on Page 138 of the Service Manual, drive cable grounding springs (Part #R-10165), were supplied in later production of Model 164 and 182. When these springs are used, it makes no difference whether an insulated or an uninsulated tip drive cable is used for the tuning condenser, and two brass tip cables are supplied when the grounding springs are included in the original package. Accordingly, if the grounding springs are used, all reference to the insulated tip drive cable in the Instruction Leaflets and in previous Service Manuals may be disregarded.

Two types of speakers have been used on the Model 164. They can be told apart by the fact that one type has a patent notice sticker pasted under the output transformer. Should parts of this speaker need replacement, return the entire speaker. The list of replacement parts for the other type speaker follows:

| Part No. | Description | Price |
|---|---|---|
| S-9967-A | Speaker - Complete | $8.28 |
| S-9988-A | Speaker cone and voice coil | 1.38 |
| S-10152 | Speaker field coil | 1.65 |
| S-9994 | Speaker clamping ring | .05 |
| S-9968 | Speaker eyelets | 10 for .03 |
| S-10144-A | Speaker transformer | 1.28 |

Two types of set screws for binding the flexible drive cables and casings have been used in the Model 164 and 182 remote controls. One is a 6/32 X 1/8" screw, Part #R-5386, price - .01. The other is 8/32 X 3/16", Part #R-6498, price - .02. It is suggested that a small stock of both of these screws be carried.

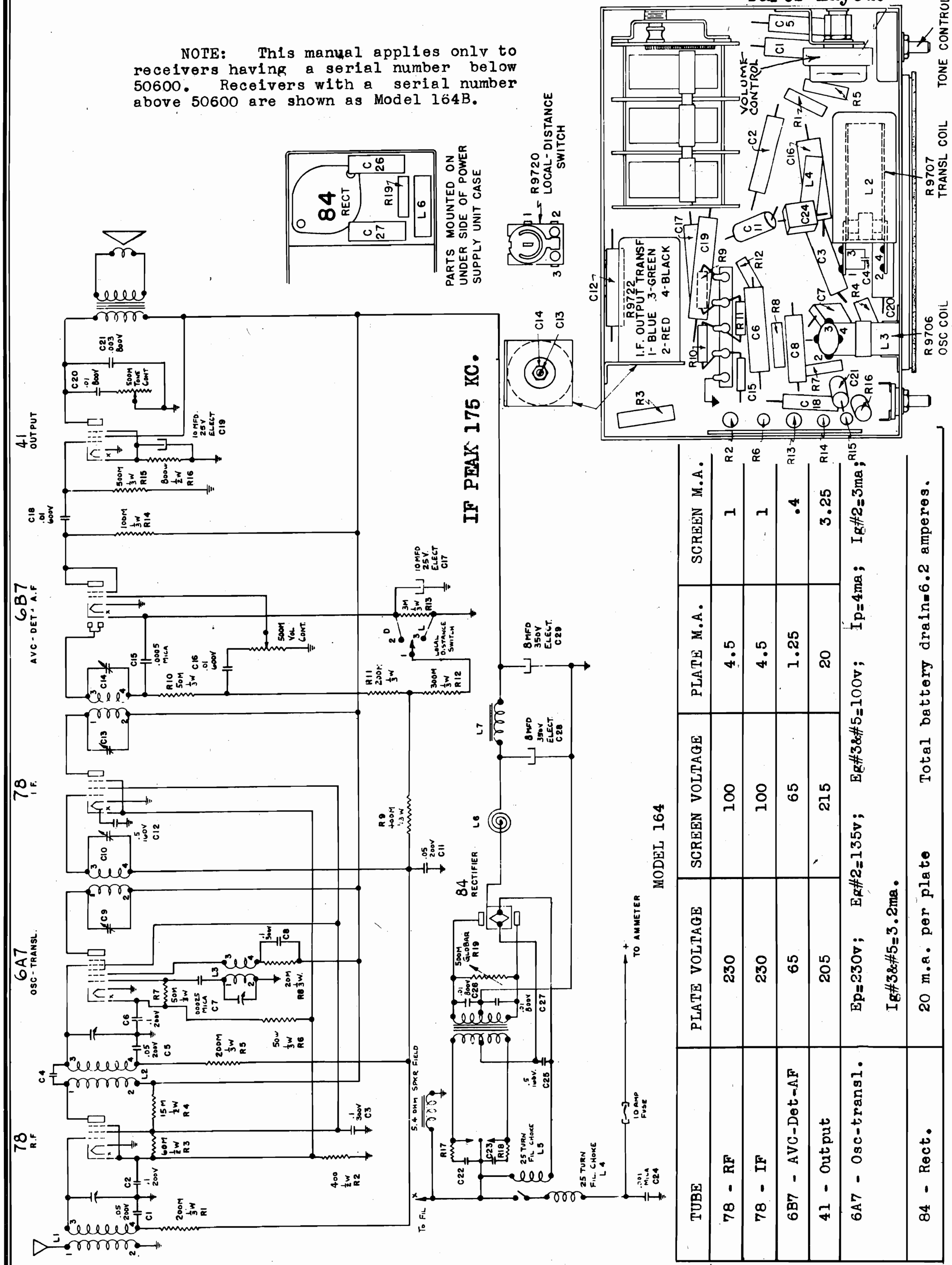
### INTERFERENCE ELIMINATION

Occasionally a car is encountered in which the "dirt" at the ammeter is exceptionally great. To remedy a condition of this sort, solder a .001 mfd mica condenser, (Part #R-6759), from the fuse container shell to a point about an inch away, on the ammeter end of the "A" lead. Wrap tape around the condenser and lead to protect them.

# COLONIAL RADIO CORP.

**MODEL 164**
**Schematic, Voltage**
**Parts Layout**

NOTE: This manual applies only to receivers having a serial number below 50600. Receivers with a serial number above 50600 are shown as Model 164B.




| TUBE | PLATE VOLTAGE | SCREEN VOLTAGE | PLATE M.A. | SCREEN M.A. |
|---|---|---|---|---|
| 78 - RF | 230 | 100 | 4.5 | 1 |
| 78 - IF | 230 | 100 | 4.5 | 1 |
| 6B7 - AVC-Det-AF | 65 | 65 | 1.25 | .4 |
| 41 - Output | 205 | 215 | 20 | 3.25 |
| 6A7 - Osc-transl. | Ep=230v; Eg#2=135v; Eg#3&#5=100v; Ip=4ma; Ig#2=3ma; Ig#3&#5=3.2ma. | | | |
| 84 - Rect. | 20 m.a. per plate | Total battery drain=6.2 amperes. | | |

MODEL 164
Remote Control Data
Alignment Data

# COLONIAL RADIO CORP.

## THE REMOTE CONTROL UNIT

As mentioned in the Instruction Booklet, the flexible drive shaft with the black, insulated tongue at its end, MUST be used for the condenser drive. The insulation is to prevent ignition noise pick up by the cable from being fed into the tuning condenser. Failure to observe these instructions will result in motor noise.

The pilot light switch, in the remote control unit, works coincidentally with the set switch in the chassis. Flickering of the pilot light may be due to poor contact between the phosphor-bronze spring and the rotating drum. Bending of the spring and sandpapering of the drum will correct the condition.

To gain access to the switch, procede as follows:

1. Disconnect the flexible cables from the remote control unit and remove the unit from the steering column.

2. Remove the outer shell from the unit by bending up the tabs.

3. Pull the pointer off of its shaft and then remove the dial.

4. Remove the three flat head screws holding the cover and remove the cover, exposing the mechanism.

The illustration shows how to replace the pointer drive cable. Note that the end of the cable coming from the clamped end of the spring passes OVER the other end of the cable. Also note that when the large pulley is set into place, the spring is diametrically opposite the drive pulley.

When replacing the pointer, turn the Station Selector shaft clockwise to its limit and set the pointer one division to the right of the bottom center line. Then when the shaft is turned all the way counter clockwise, the pointer will stop one division to the left of the center line.

Failure of the set switch and the remote control switch and lock to coincide in their operation will be caused by movement of the cables or of the control unit, after the synchronizing adjustment has been made. To secure simultaneous action of the two switches again, it will be necessary to disconnect the cable, turn the set switch to its "Off" position with a screw driver, turn the Volume Control knob in the control unit to its "Off" position with the key out, and then securely tighten the cable coupling and set screws. If the control unit is not moved then, the operation of the two switches will remain in synchronism.

The pilot light is accessible for replacement when the single screw at the back of the case is removed.

## POWER SUPPLY UNIT

The plate supply unit is of the vibrating reed type with rectifier tube. No attempt should be made to repair the vibrator proper. Return it to your distributor for repair or replacement. The unit can be pulled out of its case when the five terminal screws are loosened.

It is very important that the proper polarity connection be made. For cars with the negative battery terminal grounded, the blue lead should be connected to the terminal nearest the outside of the case. For cars with grounded positive terminal, the positions of the blue and black leads are interchanged so that the black lead is connected to the outside terminal. Failure to observe these instructions will cause damage to the vibrator in a very few minutes of operation.

R17, R18, C22 and C23 are part of the assembly of the vibrator proper. C25, C26, C27, L6 and R19 are all mounted within the power supply case. R19 is a resistor whose value varies with the voltage applied to it. When the receiver is first turned on, the output voltage tends to become very high until the tubes heat sufficiently to draw their normal load. Under this condition, the value of R19 drops to a comparatively low value, loading the transformer sufficiently to prevent damage. As the tubes become heated, tending further to lower the voltage, the resistance of R19 increases greatly so that it no longer constitutes a load on the power supply.

## THE IF TUNING ADJUSTMENTS

When peaking the IF stages, use a low enough output from the test oscillator to render the AVC action inoperative. The screw adjusts the primary tuning condenser;the nut adjusts the secondary, as shown in the illustrations.

## THE RF TUNING ADJUSTMENTS

There are three holes at the back of the chassis through which the condenser trimmers are accessible. The unit nearest the control end of the chassis is the RF unit. The next one is the translator and the last one the oscillator.

Any trouble with oscillation will be due to proximity between grid and plate leads of the RF and IF stages. Moving the leads apart will correct the trouble.

MODEL 164
Vibrator Data
Noise Data

# COLONIAL RADIO CORP.

The following chart will be helpful for making tests of the power supply unit. A continuity meter or ohmmeter may be used.

## VIBRATOR UNIT ONLY

| TEST | PROPER EFFECT | TROUBLE IF IMPROPER EFFECT IS HAD |
|---|---|---|
| Between brass contact adjusting screws. (With piece of paper inserted between contact points.) | Reading | Open transformer primary. |
| Grey lead to either red lead | Approx. 400 ohms | Open or shorted transformer secondary. |
| Blue and black leads, (with paper out.) | Reading | Contact points not making contact. |

## POWER SUPPLY (With Vibrator Disconnected)

| | | |
|---|---|---|
| Fahnstock clip to switch | Reading | Open fuse or open L4 |
| Fahnstock clip to ground (With tubes out of sockets.) | Approx. 5. ohms | Open field coil |
| 84 cathode to ground | Approx. 75 M ohms | If low res. reading, shorted C28 or C29. If no reading, open L6, L7, R2 or R4 |

## REMEDIES FOR UNUSUAL NOISE CONDITIONS

If a condition is met in which the installation of standard suppressor equipment still leaves objectionable noise, proceed as follows:

1. Ground the antenna shield to the case by jamming a Parker-Kalon screw between the shield and the case.

2. Bond the bulkhead to the nearest point on the motor.

3. Disconnect the high tension lead running from the coil to the center of the distributor. Disconnect it both at the coil end and at the distributor end. Turn the ignition switch on and turn the motor over with the hand crank. If clicks are heard as the distributor breaker makes and breaks contact, interference comes from this source.

Additional capacity should NOT be put across the breaker points as it will interfere with the proper operation of the coil. (A condenser, connected across the points, is built into all distributors.) Rewire the entire low tension ignition system, using shielded low tension ignition cable which must be well grounded. Do not run the wiring along side of other wiring, but keep it separate, and if possible, along the car chassis channels.

4. If the trouble still persists, it may be necessary to use shielded high tension cable from the distributor to the coil. The shielding must be well grounded.

5. Very often the interference is fed into the antenna through the dome light wiring. This can be determined by disconnecting the dome light lead from the ammeter. If an improvement results, by-pass the dome light at the point where it enters the corner post.

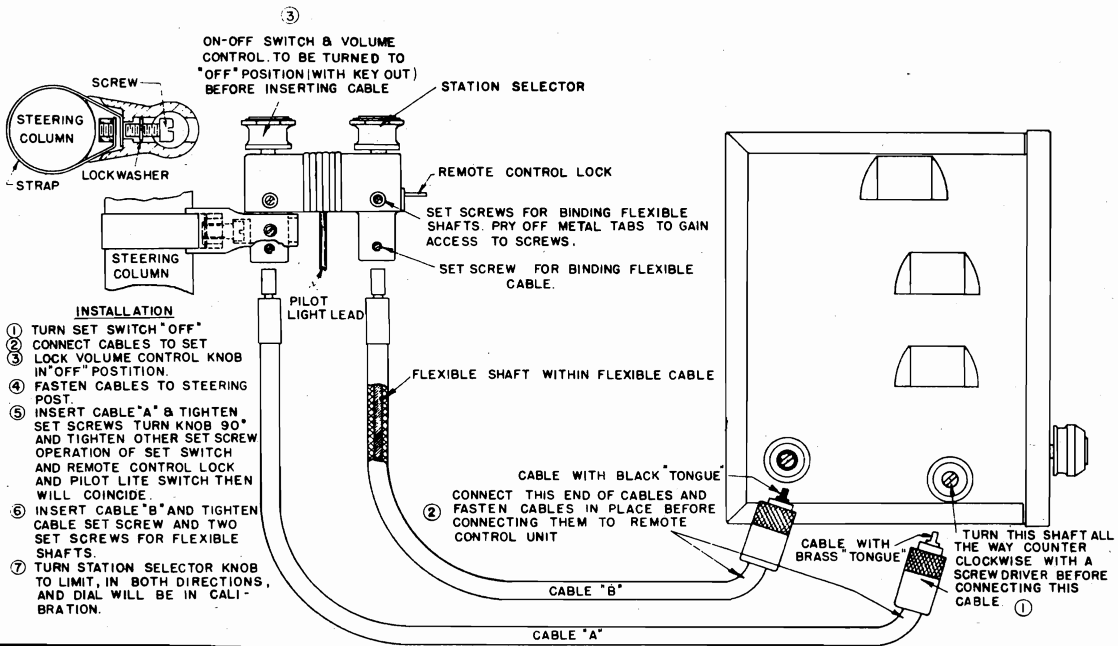
6. Metal windshield tubing, gas and oil lines sometimes have to be bonded to the bulkhead with heavy copper braid.

7. In some cars the high tension coil or leads come very close to the motor side of the floor board. As a result, interference is picked up by the occupant's body and transferred to the car antenna. Trouble of this sort is manifested by noisy reception ONLY when a person is sitting in the car. It can be remedied by tacking a grounded metal plate or screen to the motor side of the floor board, or by placing a grounded screen between the floor matting and the floor board.

It should be understood that it practically never is necessary to apply ALL these remedies. How many of them are needed will depend on the particular car and installation.

MODEL 164
Socket, Assembly, Speaker

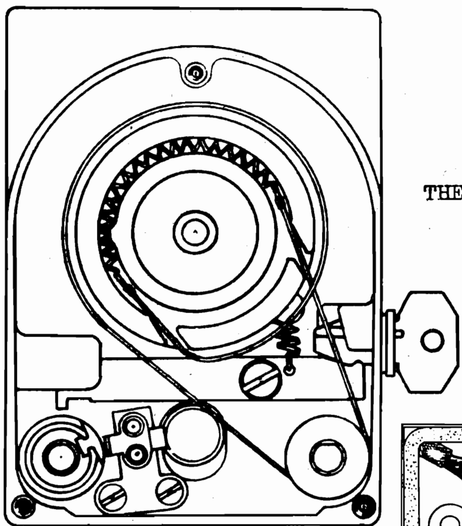
# COLONIAL RADIO CORP.




**INSTALLATION**

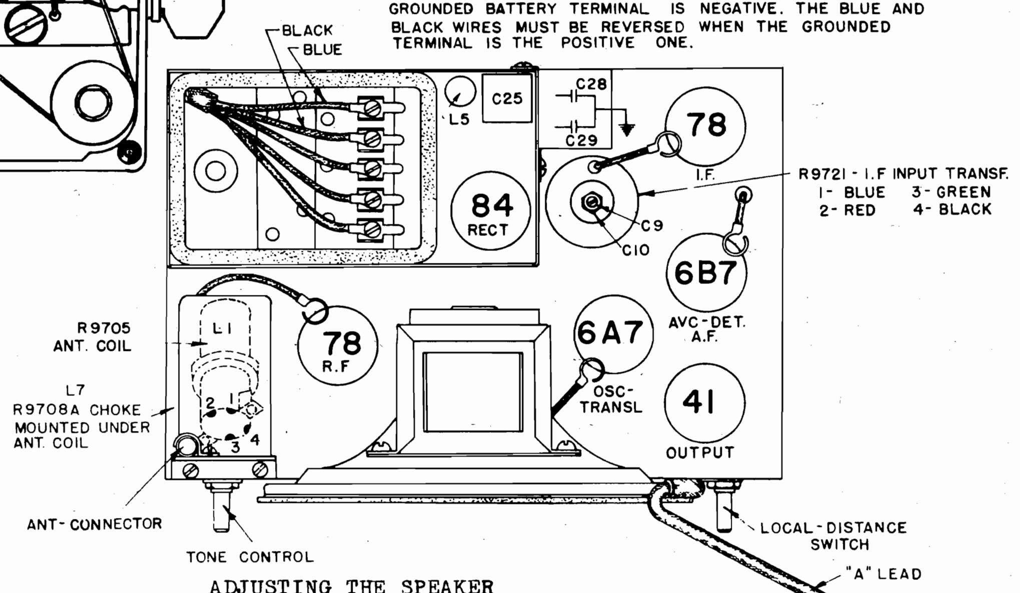
1. TURN SET SWITCH "OFF"
2. CONNECT CABLES TO SET
3. LOCK VOLUME CONTROL KNOB IN "OFF" POSTITION.
4. FASTEN CABLES TO STEERING POST.
5. INSERT CABLE "A" & TIGHTEN SET SCREWS TURN KNOB 90° AND TIGHTEN OTHER SET SCREW OPERATION OF SET SWITCH AND REMOTE CONTROL LOCK AND PILOT LITE SWITCH THEN WILL COINCIDE.
6. INSERT CABLE "B" AND TIGHTEN CABLE SET SCREW AND TWO SET SCREWS FOR FLEXIBLE SHAFTS.
7. TURN STATION SELECTOR KNOB TO LIMIT, IN BOTH DIRECTIONS, AND DIAL WILL BE IN CALIBRATION.

**IMPORTANT**
IF THE REMOTE CONTROL UNIT IS MOVED AFTER THE CABLE ADJUSTMENTS HAVE BEEN MADE, IT WILL BE NECESSARY TO READJUST IN ORDER TO MAINTAIN PROPER CALIBRATION AND OPERATION OF THE PILOT LIGHT, SWITCH AND LOCK.



THE REMOTE CONTROL MECHANISM

THE CONNECTIONS ILLUSTRATED ARE CORRECT ONLY IF THE GROUNDED BATTERY TERMINAL IS NEGATIVE. THE BLUE AND BLACK WIRES MUST BE REVERSED WHEN THE GROUNDED TERMINAL IS THE POSITIVE ONE.




ADJUSTING THE SPEAKER

Should the speaker cone ever need centering, it will be necessary to remove the speaker from the chassis. Two screws, their heads accessible from the under side of the chassis, hold the speaker to the chassis.

Loosen the two nuts and screws that hold the cone spider, insert thin paper spacers between the pole piece and voice coil support, and re-tighten the spider nuts and screws. Then remove the paper spacers.

MODEL 164-B
Above # 50600
Schematic, Parts

COLONIAL RADIO CORP.

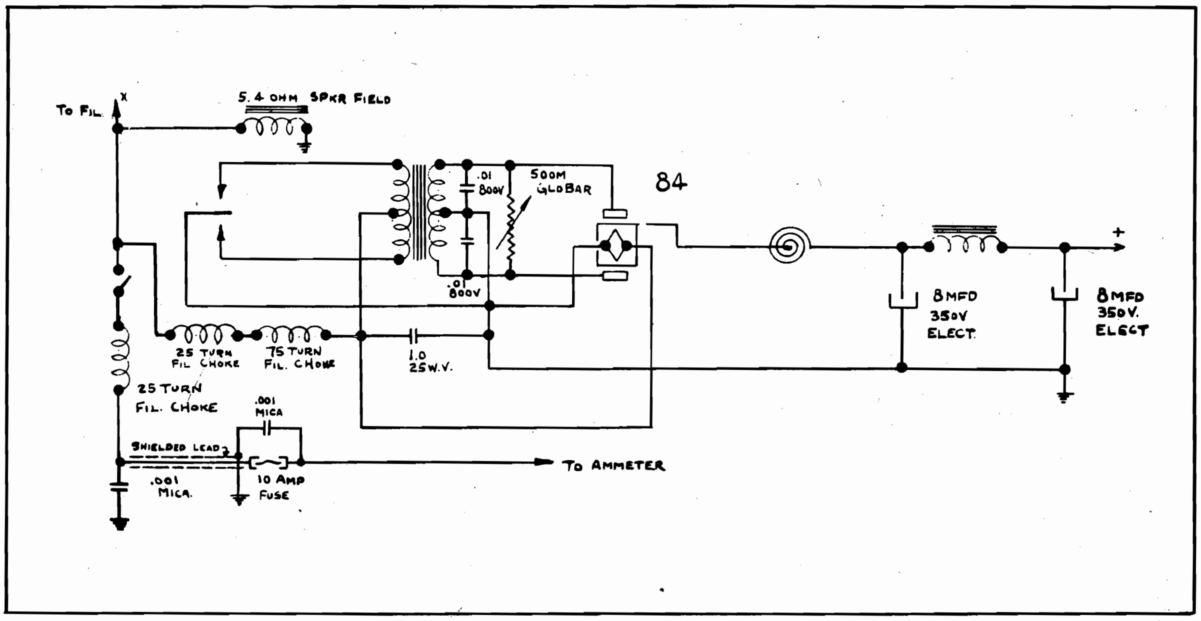
# SERVICE NOTES

## MODEL 164B

This manual applies to receivers having a serial number above 50600.

A different power supply unit is employed in these receivers, using a plug-in type of vibrator, making replacement of it very simple. Its construction is such that no attention need be paid to polarity. Accordingly, provision for changing polarity is omitted from this model.

The schematic of the chassis is the same as that shown in Fig. 76, Page 136, for the Model 164. The revised schematic for the power supply unit is shown in Fig. 82.




| PART NO. | DESCRIPTION |
|---|---|
| R-6381 | Clip - Grid |
| R-6381-AR | Clip - Grid with shielded lead |
| R-9705 | Coil - Antenna |
| R-9706 | Coil - Oscillator |
| R-9707 | Coil - Translator |
| R-9577-A | Condenser - Variable |
| R-9144 | Condenser - 10 Mfd. 25 volt |
| R-9743 | Condenser - Electrolytic, dual 8 Mfd. |
| R-9032 | Condenser - .5 Mfd. 160 volt |
| R-8581 | Condenser - .1 Mfd. 300 volt |
| R-8286 | Condenser - .1 Mfd. 200 volt |
| R-8920 | Condenser - .05 Mfd. 200 volt |
| R-7070 | Condenser - .01 Mfd. 600 volt |
| R-9776 | Condenser - .01 Mfd. 800 volt |
| R-6461 | Condenser - .003 Mfd. 800 volt |
| R-6759 | Condenser - .001 Mfd. Mica |
| R-6760 | Condenser - .0005 Mfd. Mica |
| R-4592 | Condenser - .00025 Mfd. Mica |
| R-8030 | Condenser - 1 Mfd. noise suppressor |
| R-10025 | Condenser - .5 Mfd. noise suppressor |
| R-9711 | Control - Tone |
| R-9710 | Control - Volume |
| R-9717 | Connector - Fuse container |
| R-7688 | Fuse - 10 Amp. |
| R-9733 | Instruction leaflet |
| R-8870-A | Lead - Antenna shielded |
| R-9578-A | Lead - "A", with clip |
| R-7228 | Resistor - 500 M ohms, 1/3 watt carbon |
| R-6710 | Resistor - 400 M ohms, 1/3 watt carbon |
| R-9777 | Resistor - 300 M ohms, 1/3 watt carbon |
| R-6638 | Resistor - 200 M ohms, 1/3 watt |
| R-7586 | Resistor - 100 M ohms, 1/3 watt |
| R-9725 | Resistor - 60 M ohms, 1/2 watt |
| R-6637 | Resistor - 50 M ohms, 1/3 watt |
| R-6640 | Resistor - 20 M ohms, 1/3 watt |
| R-7291 | Resistor - 15 M ohms, 1/2 watt |
| R-8972 | Resistor - 3 M ohms, 1/3 watt |
| R-7441 | Resistor - 800 ohms, 1/2 watt |
| R-6436 | Resistor - 400 ohms, 1/2 watt |
| R-6632 | Resistor - 50 ohms, 1/3 watt |
| R-9745 | Resistor - 500 M Globar (R 19) |
| R-9959 | Ring - Felt (speaker) |
| R-9589-A | Shield - Ant. coil |
| R-9591 | Shield - Translator coil |
| R-9360 | Shield - Tube |
| R-8253 | Socket - 5 Prong |
| R-8092 | Socket - 6 Prong |
| R-8072 | Socket - 7 Prong |
| S-9718-A | Speaker |
| R1-8018 | Suppressor - Spark plug |
| R2-8018 | Suppressor - Distributor |
| R-9720 | Switch - Sensitivity |
| R-9721-A | Transformer - IF input |
| R-9722-A | Transformer - IF output |
| R-9581 | Tube - Rubber, var. cond. mtg. |
| R-9723 | Vibrator |
| R-9044-A | Choke (L4) |
| R-9044-B | Choke (L5) |
| R-9033 | Choke (L6) |
| R-9708-A | Choke (L7) |
| R-9741 | Clip - "A" lead |

# COLONIAL RADIO CORP.

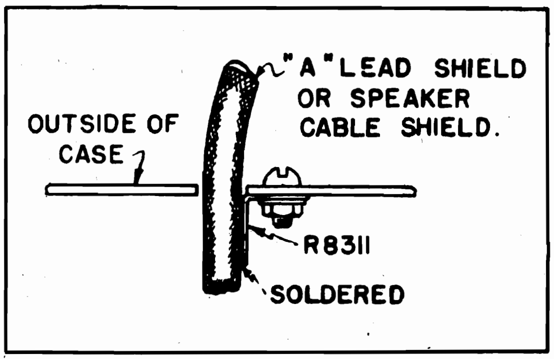
## NOTES ON IGNITION INTERFERENCE ELIMINATION FOR MODELS 164 AND 182

The following changes should entirely eliminate ignition interference in instances where difficulty of this sort has been experienced.

### SHORTENING THE SHIELD GROUNDING PIGTAIL

The Model 164 has a pigtail soldered to the "A" lead shield, with its other end clamped under one of the acorn nuts. The Model 182 has, in addition, a similar pigtail on the speaker cable shield. These pigtails should be removed and a shorter ground provided as follows:

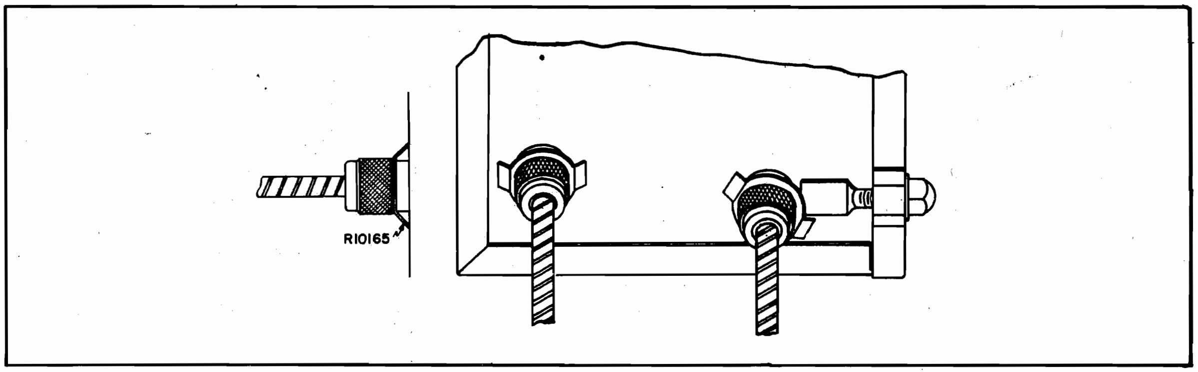
Drill a hole in the case immediately alongside the point where the shields come through the case. Fasten a large soldering lug (R-8311) to the inside of the case by means of a nut and screw passed through the drilled holes and solder the shields to the lugs.




### GROUNDING THE SHIELD CABLES AND ANTENNA

To completely eliminate any pickup by the drive cables, grounding springs (Part R10165) are put between the collar on both flexible cable couplings and the case. It will be necessary to scrape away the paint on the case, under the springs, so that they can make good contact with the case.

In cars having an intense interference field near the antenna shield, further improvement can be had by soldering an Antenna Shield Grounding Clip to the antenna shield. (Part No. R-10166). The clip makes contact with the case at the point where the shield enters the case. Sandpaper the case to insure good contact.




### INSTRUCTIONS FOR SHORTENING THE DRIVE CABLES

1. Remove the split sleeve from the chassis end of the cable casing.

2. Heat the chassis end of the cable until the solder melts, permitting removal of the brass sleeve. Then take the cable out of its casing.

3. Determine the point where the cable is to be cut and clean it thoroughly with fine sandpaper. Tin this point thoroughly.

4. Cut the casing 5/8"shorter than the length desired for the cable. Replace the split sleeve.

5. Put the cable back in the shortened casing. Slide the brass sleeve along the cable to the tinned portion and solder it there. Do not let it bind against the end of the casing. Then cut the cable at the end of the sleeve with a fine toothed hacksaw.

If the cables are cut in the foregoing manner, there can be no difficulty from unravelling of the strands since the soldered sleeve holds them.

COLONIAL RADIO CORP.

# MODEL 182

The COLONIAL Model 182 is a six tube superheterodyne automobile radio receiver. The circuit is shown in block form in Fig. 78 and schematically in Fig. 80.

A 78 RF tube feeds the incoming signal to the 6A7 translator-oscillator. The 175 kc output of this tube is amplified by the pentode portion of the 6F7 tube and then fed to the 6B7. This tube provides AVC, diode detection and, together with the triode portion of the 6F7, furnishes audio amplification for input of the 41 push-pull output stage. The speaker is a separate 8" dynamic. A dynamotor furnishes the plate supply, drawing its power from the car's battery.

## THE AVC AND SENSITIVITY CONTROL CIRCUITS

The 175 kc output of the 6F7 IF stage is impressed between the cathode and diode plates of the 6B7, in series with R12, R13, R14. The diode current flowing causes a voltage drop across these resistors. Only the drop across R12 is used for AVC. Since the grid returns of the 6A7, 78 and 6F7 are connected to R12, the negative bias across it is impressed upon the grids of these tubes. Increases in signal strength are offset by decreases in tube amplification resulting from this increased negative grid bias. The effect is to tend to maintain the output of the 6F7 IF at a constant value.

Residual bias for the tubes is furnished by R2. In addition, the residual bias and therefore the tube amplification is affected by the setting of the Local-Distance switch. When the switch lever is on contact #2, the drop across R15, due to the plate current of the 6B7, bucks the residual from R2, decreasing the total negative bias and increasing tube amplification. In the "Local" position, contact #1, only the residual from R2 is applied to the tube grids.

Be sure the sensitivity control is either FULL clockwise or FULL counter clockwise. If allowed to remain half way between the two positions, R 15 will be shorted, removing the 6B7 bias.

The volume control shunts R12 and R13 for audio frequencies. Accordingly, any desired amount of the audio component across R12 and R13 can be picked off by the moveable arm of the volume control and fed to the control grid of the pentode portion of the 6B7.

When peaking the IF transformers, use a low enough output from the test oscillator to render the AVC action inoperative.

## THE RF TUNING ADJUSTMENTS.

There are three holes at the back of the chassis through which the condenser trimmers are accessible. The unit nearest the control end of the chassis is the RF unit. The next one is the translator and the last one the oscillator.

## THE 6F7 PHASE CHANGER CIRCUIT

In any push-pull circuit, the instantaneous voltage on the grid of one of the tubes must be opposite in polarity to the voltage on the other tube's grid. Ordinarily, this polarity difference or phase change is accomplished by the push-pull input transformer. In the Model 182, it is accomplished as follows:

At some particular instant the polarity of the signal voltage on the 6B7 plate will be negative. This negative voltage is coupled through C18 to the control grid of one of the 41's. This signal voltage on the 6B7 plate also causes a drop (audio frequency) across C17, R16, R10, and C27, with the polarities becoming increasingly negative toward C27. Accordingly, the control grid of the triode portion of the 6F7 is driven in a positive direction by the drop across R10 and C27. This causes the plate current to increase, which is to say that the plate becomes more positive. This positive potential is coupled through C19 to the grid of the other 41 tube. The result, then, is that the grid of one 41 is going in a positive direction while the other is going negative.

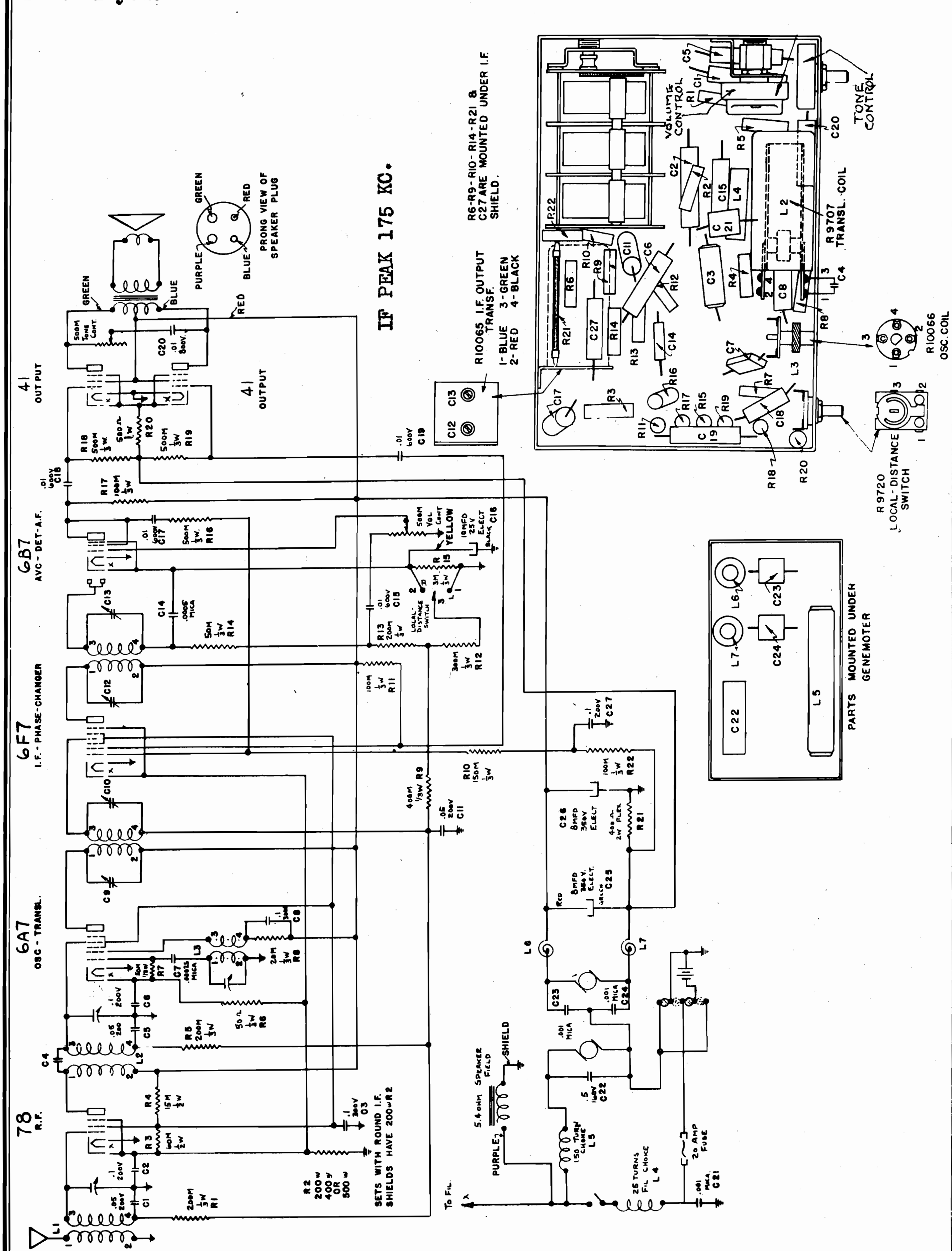
## THE POWER SUPPLY UNIT

The plate supply unit is of the rotating dynamotor type. To remove it, take out the three Parker-Kalon screws at the bottom edge of the dynamotor housing and then take out the two screws holding the metal can type of condenser to the housing. The housing and dynamotor then can be loosened from the chassis. Unsoldering the leads under the dynamotor and removing the four screws that hold the dynamotor to the housing case permits complete removal of the dynamotor. After considerable use, the dynamotor commutator may need cleaning. Use the finest sandpaper. NEVER USE EMERY CLOTH.

If the receiver is set up on the bench, outside of its case, be sure to connect a wire from the speaker cable to the chassis, to complete the speaker field circuit.

**MODEL 182**
**Schematic**
**Parts Layout**

# COLONIAL RADIO CORP.



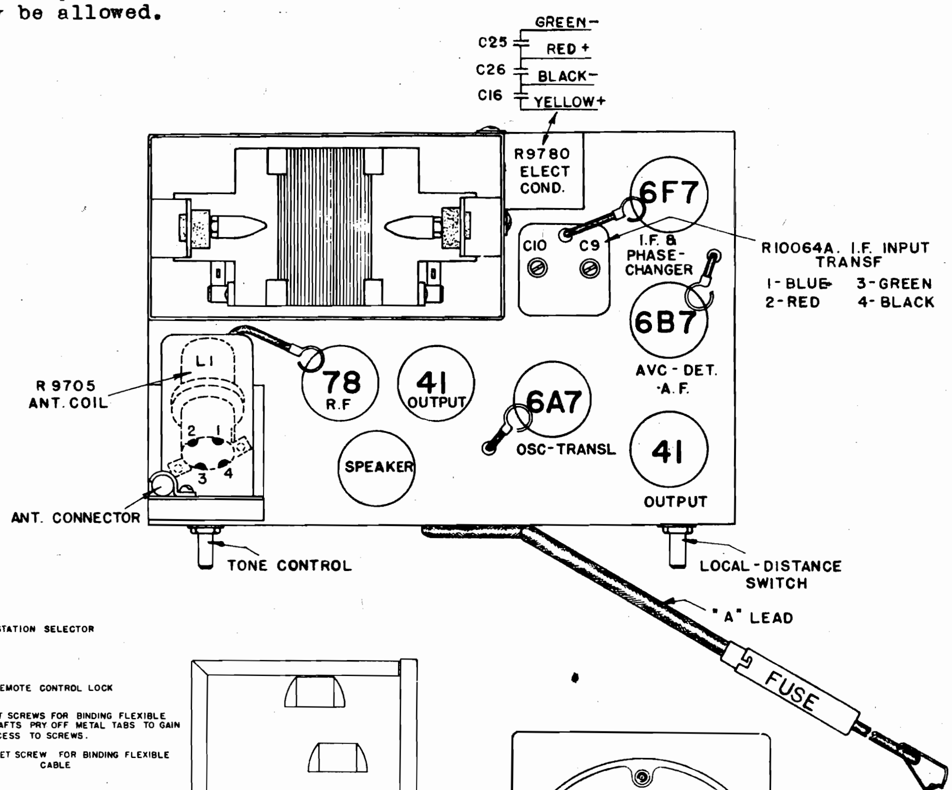
MODEL 182
Voltage, Socket
Trimmer, Assembly

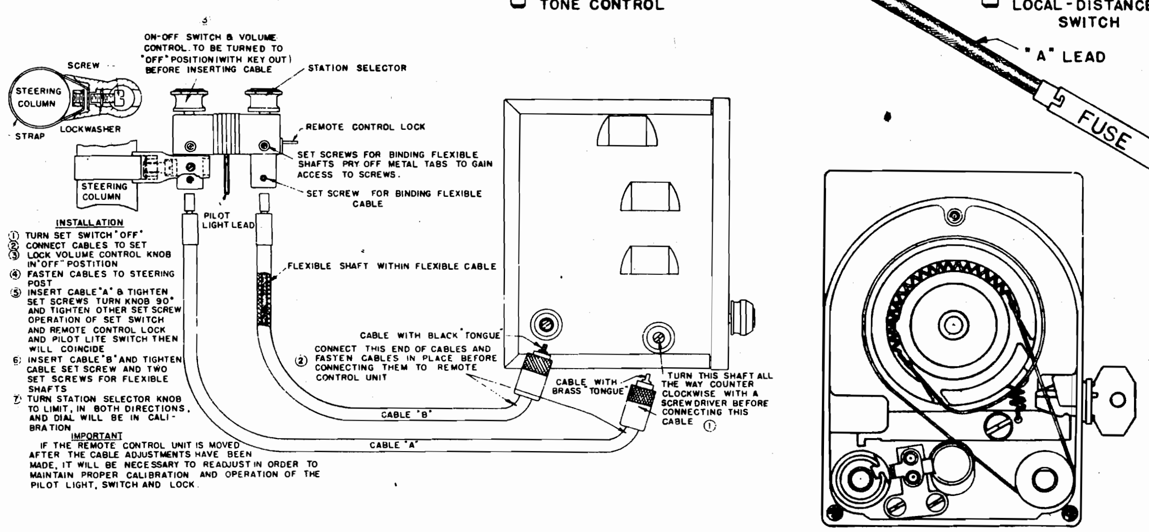
# COLONIAL RADIO CORP.

## TUBE VOLTAGE AND CURRENT CHART

| TUBE | PLATE VOLTAGE | SCREEN VOLTAGE | PLATE M. A. | SCREEN M.A. |
|---|---|---|---|---|
| 78 - RF | 200 | 95 | 8 | 2.25 |
| 6B7 - AVC-Det-AF | 60 | 60 | 1.25 | .3 |
| 41- Output | 205 | 208 | 14 | 2.5 |
| 6A7 - Osc-Transl. | Ep=200v; Eg#2=125v; Eg#3&#5=95v; Ip=3.5ma; Ig#2=3ma; Ig#3&#5=3.5ma; | | | |
| 6F7 - IF & AF | Ep=200v; Eg#2=75v; Eg#3&#5=95v; Ip=5ma. Ig#2=3ma; Ig#3&#5=1ma. | | | |

Care should be used when taking readings with a set analyzer as the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually, touching the finger to grid or plate is sufficient to stop oscillation. If an analyzer is not used, the voltage readings can be taken with a 1000 ohms per volt voltmeter, from the cathode to the respective elements of each tube. Ordinarily, a 20% deviation from the chart value may be allowed.




THE REMOTE CONTROL MECHANISM - MODEL 182

MODEL 182
Remote Control Data
Parts List

# COLONIAL RADIO CORP.

## THE REMOTE CONTROL UNIT

As mentioned in the Instruction Booklet, the flexible drive shaft with the black, insulated tongue at its end, MUST be used for the condenser drive. The insulation is to prevent ignition noise pick up by the cable from being fed into the tuning condenser. Failure to observe these instructions will result in motor noise.

The pilot light switch, in the remote control unit, works coincidentally with the set switch in the chassis. Flickering of the pilot light may be due to poor contact between the phosphor-bronze spring and the rotating drum. Bending of the spring and sandpapering of the drum will correct the condition.

To gain access to the switch, procede as follows:

1. Disconnect the flexible cables from the remote control unit and remove the unit from the steering column.

2. Remove the outer shell from the unit by bending up the tabs.

3. Pull the pointer off of its shaft and then remove the dial.

4. Remove the three flat head screws holding the cover and remove the cover, exposing the mechanism.

The illustration shows how to replace the pointer drive cable. Note that the end of the cable coming from the clamped end of the spring passes OVER the other end of the cable. Also note that when the large pulley is set into place, the spring is diametrically opposite the drive pulley.

When replacing the pointer, turn the Station Selector shaft clockwise to its limit and set the pointer one division to the right of the bottom center line. Then when the shaft is turned all the way counter clockwise, the pointer will stop one division to the left of the center line.

Failure of the set switch and the remote control switch and lock to coincide in their operation will be caused by movement of the cables or of the control unit, after the synchronizing adjustment has been made. To secure simultaneous action of the two switches again, it will be necessary to disconnect the cable, turn the set switch to its "Off" position with a screw driver, turn the Volume Control knob in the control unit to its "Off" position with the key out, and then securely tighten the cable coupling and set screws. If the control unit is not moved then, the operation of the two switches will remain in synchronism.

The pilot light is accessible for replacement when the single screw at the back of the case is removed.

REPLACEMENT PARTS LIST

| | |
|---|---|
| R-6552 | Board - Resistor |
| R-10082 | Book - Instruction |
| R-9588 | Bushing - Rubber, Genemotor mtg. |
| R-9044-A | Choke - L4 |
| R-9757 | Choke - L6 & L7 |
| R-10116-A | Choke - L5 |
| R-9741 | Clip - "A" Lead |
| R-6381 | Clip - Grid |
| R-9705 | Coil - Antenna |
| R-10066 | Coil - Oscillator |
| R-9707 | Coil - Translator |
| R-9577-A | Condenser - Variable |
| R-9780 | Condenser - Triple electrolytic |
| R-8030 | Condenser - 1 Mfd. noise suppressor |
| R-10025 | Condenser - .5 Mfd. noise suppressor |
| R-9032 | Condenser - .5 Mfd. 160 volts |
| R-8286 | Condenser - .1 Mfd. 200 volts |
| R-8581 | Condenser - .1 Mfd. 300 volts |
| R-7354 | Condenser - .05 Mfd. 200 volts |
| R-7070 | Condenser - .01 Mfd. 600 volts |
| R-9776 | Condenser - .01 Mfd. 800 volts |
| R-6759 | Condenser - .001 Mfd. Mica |
| R-6760 | Condenser - .0005 Mfd. Mica |
| R-4592 | Condenser - .00025 Mfd. Mica |
| R-9711 | Control - Tone (500 M ohms) |
| R-9710 | Control - Volume (500 M ohms) |
| R-9717 | Connector - (and fuse container) |
| R-9751 | Fuse - 20 Amp. |
| R-9587 | Genemotor |
| R-9744 | Grommet - "A" lead |
| R-7692 | Knob - Tone & sensitivity controls |
| R-8870-A | Lead - Antenna |
| R-8219 | Nut - Acorn cover |
| R-9719 | Nut - Set mounting |
| R-7228 | Resistor - 500 M ohms, 1/3 watt carbon |
| R-6710 | Resistor - 400 M ohms, 1/3 watt carbon |
| R-9777 | Resistor - 300 M ohms, 1/3 watt carbon |
| R-6638 | Resistor - 200 M ohms, 1/3 watt carbon |
| R-9778 | Resistor - 150 M ohms, 1/3 watt carbon |
| R-7586 | Resistor - 100 M ohms, 1/3 watt carbon |
| R-9725 | Resistor - 60 M ohms, 1/2 watt carbon |
| R-6637 | Resistor - 50 M ohms, 1/3 watt carbon |
| R-6640 | Resistor - 20 M ohms, 1/3 watt carbon |
| R-7291 | Resistor - 15 M ohms, 1/2 watt carbon |
| R-8972 | Resistor - 3 M ohms, 1/3 watt carbon |
| R-10142 | Resistor - 500 ohms, 1/3 watt carbon |
| R-9779 | Resistor - 500 ohms, 1 watt carbon |
| R-6632 | Resistor - 50 ohms, 1/3 watt carbon |
| R-8419 | Resistor - 400 ohms, flexible |
| R-10056 | Screw - Polarity changer |
| R-9589-A | Shield - Antenna coil |
| R-9591 | Shield - Translator coil |
| S-9590-AC | Speaker - Complete |
| S-7776-B | Speaker cone & voice coil |
| S-9767-A | Speaker terminal board |
| S-9770-A | Speaker cable & plug |
| S1-9768-AC | Speaker case |

MODEL 602
Circuit Data

COLONIAL RADIO CORP.

# SERVICE NOTES

## MODEL 602

The COLONIAL Model 602 is a 12 tube, four wave band superheterodyne embodying such features as AVC, sensitivity control, tone control, neon visual tuning indicator, and twin speakers. The circuit is shown in block form in Fig. 85 and schematically in Fig. 86.

A 56 tube is used in the oscillator circuit. A 6A7 serves as an electron coupled translator. Its 175 kc output is amplified by the two 78 IF stages and then fed to the 37 detector, which is used as a diode. Two 37 AF tubes comprise a push-pull input stage to drive the push-pull 2A3H output stage. A 6B7 tube is used in the AVC stage, a 6B7 in the neon visual tuning circuit, and an 83V is the rectifier. The speakers are both moving coil dynamics. One is a 12" and the other an 8".

The incoming signal is fed to the translator control grid through coils L1 and L2 for the broadcast range, L3 for the next range, L4 for the next and L5 for the highest frequency range. L6 is the broadcast oscillator coil. L7 is the oscillator for the next range. L8 is the next, and L9 the one for the highest frequency range. C1 is the broadcast antenna coil trimmer. C3 is the broadcast translator coil trimmer. C2 is the translator trimmer for the first high frequency range. C4 the one for the next range, and C5 is the translator trimmer for the highest frequency range. C6 is the broadcast range oscillator trimmer. C7 is the trimmer for the first high frequency range, C8 the one for the next range, and C9 is the trimmer for the highest frequency oscillator coil. C10 is the padder for the low frequency end of the broadcast range, C11 the one for the next range, C12 for the next and C13 is the padder for the highest frequency oscillator coil.

The location of the coils and condensers is shown in the Service Illustrations. The numbering and lettering corresponds to that used in the Schematic.

### 6B7 TUNING LIGHT CIRCUIT

The 6B7 tuning light circuit is shown schematically in Fig. 83. A portion of the IF signal voltage, that existing across condenser A, is stepped up and impressed on the diode part of the 6B7 by means of the sharply tuned transformer, T, which is wound with Litz wire. The rectified signal current flows through the 1 megohm resistor from point (1) to point (2) so that point (2) is negative with respect to point (1). The control grid of the 6B7 is connected to point (2) and the cathode to point (1). As the signal is tuned in, the voltage across the 1 megohm resistor increases, increasing the negative control grid bias on the 6B7, thereby cutting down its plate current. The reduced plate current means a decreased voltage drop across the 130 M ohm resistor, making available a greater voltage across the neon tuning flasher. When the signal is properly tuned in, the plate current of the 6B7 is sufficiently decreased to permit the neon lamp to light. Until a signal is tuned in, the plate current of the 6B7 causes sufficient drop across the 130 M ohm resistor to prevent the neon bulb from lighting. The sharply tuned transformer insures that voltage is not applied to the diode part of the 6B7 until the station is accurately tuned in.

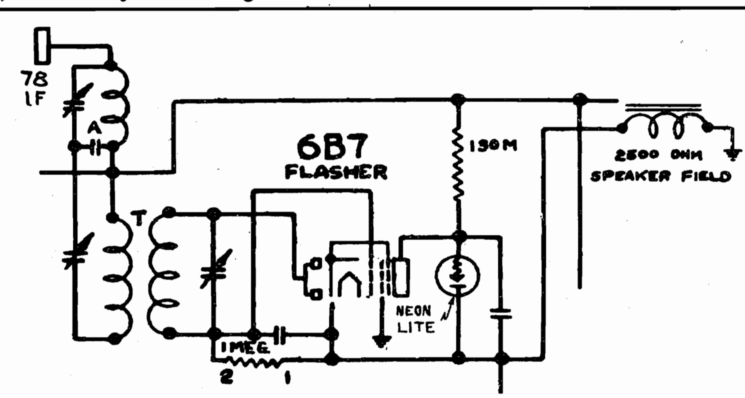



FIG. 83. THE NEON TUNING LIGHT CIRCUIT

# COLONIAL RADIO CORP.

## 6B7 AVC CIRCUIT

The AVC circuit is shown schematically in Fig. 84.

If there were no plate current through the 6B7, its cathode would be negative with respect to diode plate (A) by the amount of the voltage drop across the 2500 ohm speaker field. However, because of the 6B7 plate current and consequent voltage drop across the 50 M ohm resistor, the cathode potential of the 6B7 is raised so that it is approximately 15 volts positive to diode plate (A).

A portion of the IF signal is fed through C1 to diode plate (B). The resulting current, flowing through R1 creates a voltage drop across it with point (1) positive with respect to point (2). This voltage is impressed through R2 onto the control grid of the 6B7. This increased negative control grid bias decreases the plate current and the voltage drop across R3. As a consequence, the cathode bias with respect to ground decreases. This is equivalent to saying that diode plate A becomes positive with respect to the cathode. Current therefore flows from diode plate (A) to the cathode, creating a voltage drop across R4 with point (3) positive with respect to point (4). Since the grid returns of the translator and IF stages are connected to point (4), the voltage drop across R4 is impressed on the control grids of these tubes. This negative bias, which varies in step with the strength of the signal, controls the amplification of these tubes. An increase in signal strength is offset by a decrease in tube amplification so that the output of the IF stage tends to remain at a constant value. Because the cathode is 15 volts positive with respect to diode plate (A) the AVC action is delayed until the received signal is strong enough to cause diode plate (A) to go positive with respect to the cathode. In this way the full sensitivity of the receiver is maintained for stations too weak to give full output from the receiver.

Residual bias for the first IF tube is supplied by the 15 M ohm variable cathode resistor, which serves as a sensitivity control. Set owners should be instructed not to increase the sensitivity any further than necessary for satisfactory reception. Unnecessarily high sensitivity will result in unwanted between-station-noise.

When peaking the IF stages, use a low enough output from the test oscillator to render the AVC action inoperative.

To peak the tuning flasher transformer, tune in a station whose strength is just about sufficient to operate the neon light. Then try retuning it very accurately by ear. If the flasher transformer is off calibration, the light will go out when the station is accurately tuned. With the station accurately tuned in, adjust the transformer tuning condensers until the neon bulb lights.

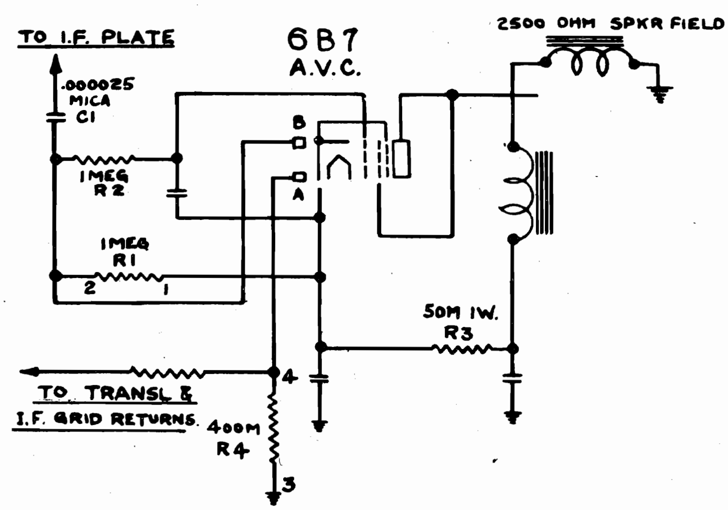



FIG. 84. THE AVC CIRCUIT - MODEL 602

**MODEL 602**
**Schematic**

# COLONIAL RADIO CORP.

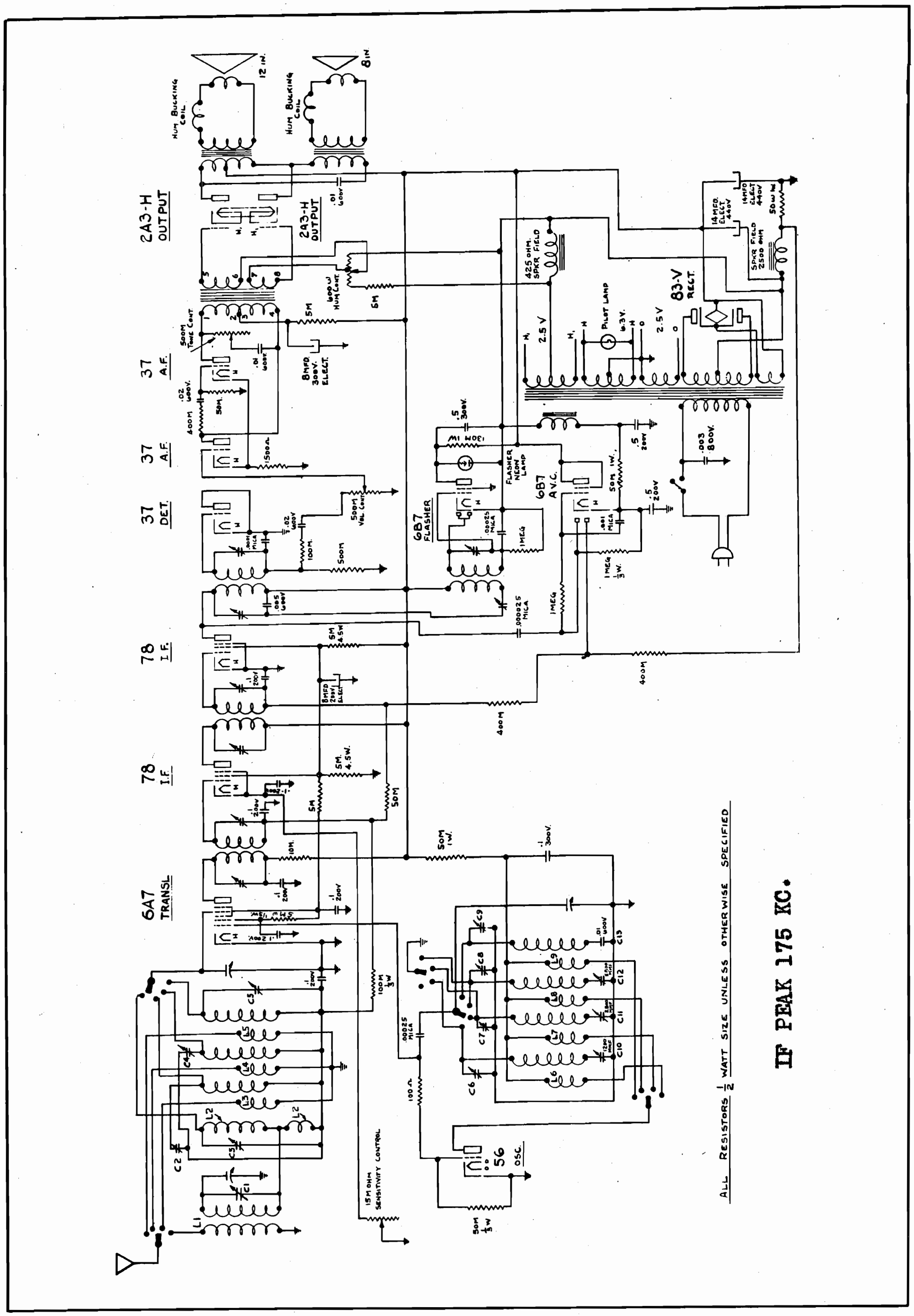
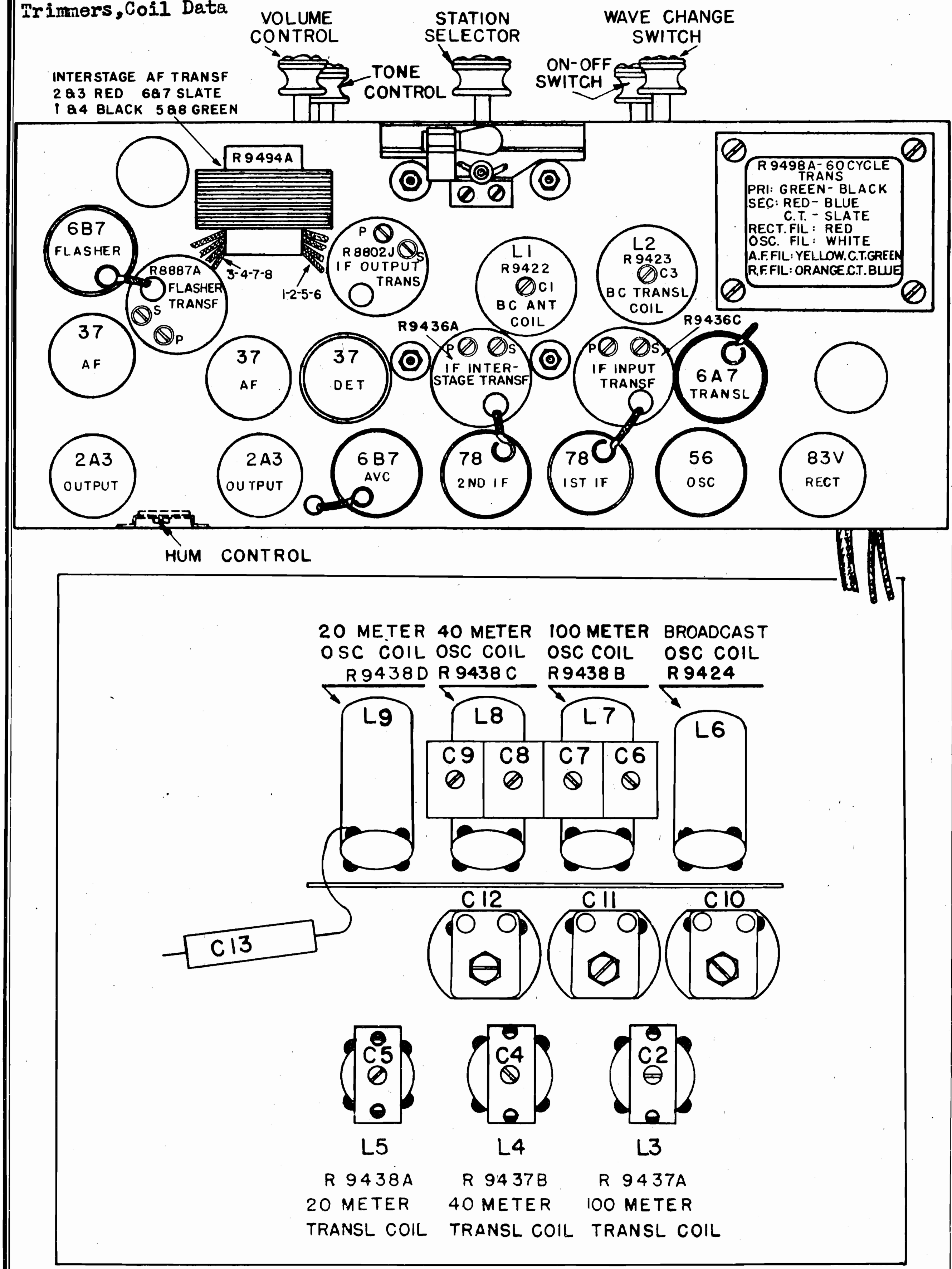



FIG. 86. THE SCHEMATIC - MODEL 602

MODEL 602
Socket Layout
Trimmers, Coil Data

COLONIAL RADIO CORP.



MODEL 602
Voltage, Alignment

COLONIAL RADIO CORP.

## HUM ADJUSTMENT

There is a hum adjustment to be turned with an insulated handle screw-driver, at the rear of the chassis, under the type 2A3H tubes. With the volume control all the way off, turn the hum adjustment to the point of minimum hum. If this point appears to be beyond the end of the control, interchange the positions of the 2A3H tubes. If a balance still cannot be had, the 2A3H tubes must be replaced by ones more nearly matched in their characteristics.

## ALIGNMENT

### BROADCAST

Disconnect the antenna and connect a .00025 mfd. condenser between the sets antenna and ground leads, to take the place of the normal antenna capacity. Adjust the test oscillator to a frequency near the high frequency end of the broadcast range and couple the oscillator to the receiver antenna lead. With the wave switch in the broadcast position, set the dial accurately to the test oscillator's frequency. Then peak C1, C3, and C6.

Retune the test oscillator and the receiver to a frequency near the low frequency end of the broadcast range. Peak C10.

### 100 METER RANGE

Turn the wave switch to the first high frequency range. Adjust the test oscillator to a frequency near the high frequency end of this range. Turn the dial to this frequency and peak C7 and C2. Then change the test oscillator's frequency to the low frequency end of the range and peak C11.

### 40 METER RANGE

Turn the wave switch to the next high frequency range. Adjust the test oscillator to a frequency near the high frequency end of this range. Turn the dial to this frequency and peak C8 and C4. Then change the test oscillator's frequency to the low frequency end of the range and peak C12.

### 20 METER RANGE

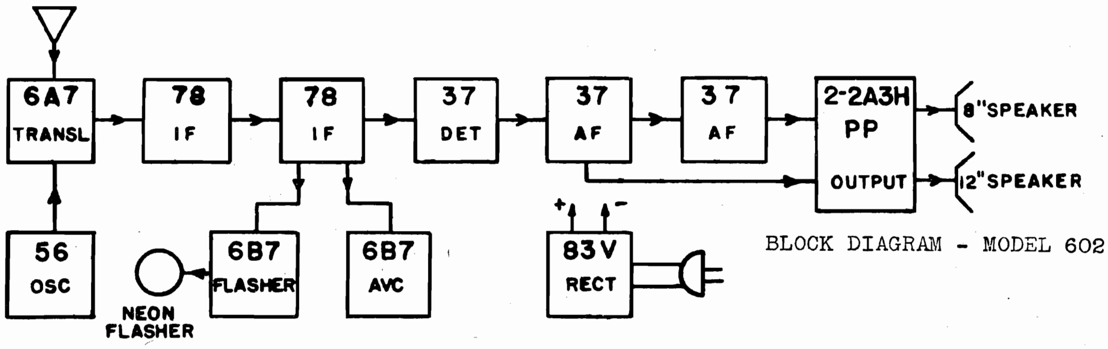
Turn the wave switch to the highest frequency range. Adjust the test oscillator to a frequency near the high frequency end of this range. Turn the dial to this frequency and peak C9 and C5. The padder for this range, C13, is fixed.

| TUBE | PLATE VOLTAGE | SCREEN VOLTAGE | PLATE M. A. | SCREEN M. A. |
|---|---|---|---|---|
| 56 - Osc. | 70 | | 4 | |
| 78 - 1st. IF | 215 | 110 | 8 | 1.5 |
| 78 - 2nd. IF | 215 | 110 | 8 | 1.5 |
| 37 - AF | 165 | | 4 | |
| 37 - AF | 165 | | 4 | |
| 2A3H - Output | 265 | | 60 | |
| 6B7 - AVC | 60 | 60 | 4 | 1 |
| 6B7 - Flasher | 7 - No. sig.<br>90 - With sig. | | | |
| 83V - Rect | DC volts = 350. Plate current = 87ma. per plate. | | | |
| 6A7 - Transl | Ep = 180; Eg#2 = 80; Eg#3 & #5 = 95.<br>Ip = 4ma; Ig#2 = 2ma; Ig #3 & #5 = 4ma. | | | |

Readings taken with 1000 ohms per volt voltmeter, sensitivity control on full, no signal received. Care must be used if measurements are made with an analyzer since the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually, touching the finger to grid or plate is sufficient to stop oscillation. If an analyzer is not used, voltage readings can be made from cathode to the respective elements of each tube. Ordinarily, a 20% deviation from the chart value may be allowed.

MODEL 602
Parts List

# COLONIAL RADIO CORP.




BLOCK DIAGRAM - MODEL 602

| PART NO | DESCRIPTION |
|---|---|
| R9315 | Bezel - Sensitivity control |
| R5509A | Board - Terminal |
| R8297A | Board - Terminal, double |
| R8308A | Board - Terminal, triple |
| R8900B | Board - Terminal, 5 terminals |
| R9341 | Cabinet |
| R9521 | Card - Operating |
| R7011A | Clip - Antenna and ground leads |
| R6381 | Clip - Grid |
| R9422 | Coil - Antenna, broadcast |
| R9423 | Coil - Translator, broadcast |
| R9437A | Coil - Translator, short wave, 100 meter band |
| R9437B | Coil - Translator, short wave, 40 meter band |
| R9438A | Coil - Translator, short wave, 20 meter band |
| R9424 | Coil - Oscillator, broadcast |
| R9438B | Coil - Oscillator, short wave, 100 meter band |
| R9438C | Coil - Oscillator, short wave, 40 meter band |
| R9438D | Coil - Oscillator, short wave, 20 meter band |
| R8776A | Coil - Choke |
| R9414 | Condenser - Variable |
| R9494A | Condenser - Variable, complete with drive assembly and dial |
| R9425 | Condenser - Padding, 700 mmf. |
| R9426 | Condenser - Padding, 1200 mmf. |
| R9427 | Condenser - Trimmer, 4 gang |
| R9428 | Condenser - Trimmer, 25 mmf. |
| R6565 | Condenser - Tuning, IF output trans |
| R8824 | Condenser - IF tuning |
| R7236 | Condenser - 14 mfd. electrolytic |
| R9344 | Condenser - 8 mfd. 300 volts |
| R8748 | Condenser - 8 mfd. 200 volts |
| R8826 | Condenser - .5 mfd. 300 volts |
| R8825 | Condenser - .5 mfd. 200 volts, dual |
| R6138 | Condenser - .1 mfd. 300 volts |
| R6444 | Condenser - .1 mfd. 200 volts |
| R6761 | Condenser - .02 mfd. 600 volts |
| R9429 | Condenser - .01 mfd. 600 volts |
| R7070 | Condenser - .01 mfd. 600 volts |
| R6954 | Condenser - .005 mfd. 600 volts |
| R9431 | Condenser - .0045 mfd. 600 volts |
| R6461 | Condenser - .003 mfd. 800 volts |
| R6933 | Condenser - .002 mfd. 600 volts |
| R6760 | Condenser - .005 mfd. mica |
| R6759 | Condenser - .001 mfd. mica |
| R4592 | Condenser - .00025 mfd. mica |
| R4303 | Condenser - .0001 mfd. mica |
| R8711 | Condenser - .000025 mfd. mica |
| R7240 | Control - Sensitivity |
| R6570 | Control - Tone and volume |
| R7566 | Cord - Extension |
| R9433A | Dial and indicator |
| R9412 | Escutcheon |
| R9442 | Instructions |
| R8520 | Knob - Sensitivity control |
| R9314 | Knob - Large |
| R9312 | Knob - Small |
| R9443 | Knob - Small with dot |
| R2288 | Lamp - Pilot |
| R8830 | Lamp - Neon flasher |
| R5346B | Lead - Antenna |
| R5345D | Lead - Ground |
| R9436 | Transformer - IF input and interstage, coils and core only |
| R9436C | Transformer - IF input, complete less shield |
| R9436A | Transformer - IF interstage, complete less shield |
| R8802 | Transformer - IF output, coils and core only |
| R8802J | Transformer - IF output, complete less shield |
| R8887 | Transformer - Tuning flasher, coils and core only |
| R8687A | Transformer - Tuning flasher, complete less shield |
| R8769A | Transformer - Interstage audio |
| R8778A | Transformer - Power, 60 cycle |
| R5823 | Resistor - 1 megohm, 1/2 watt carbon |
| R7585 | Resistor - 1 megohm, 1/3 watt carbon |
| R6179 | Resistor - 500 M ohm, 1/2 watt carbon |
| R5822 | Resistor - 400 M ohm, 1/2 watt carbon |
| R8828 | Resistor - 130 M ohm, 1 watt carbon |
| R7586 | Resistor - 100 M ohm, 1/3 watt carbon |
| R5819 | Resistor - 100 M ohm, 1/2 watt carbon |
| R4354 | Resistor - 50 M ohm, 1 watt carbon |
| R6637 | Resistor - 50 M ohm, 1/3 watt carbon |
| R6445 | Resistor - 50 M ohm, 1/2 watt carbon |
| R6152 | Resistor - 10 M ohm, 1/2 watt carbon |
| R6510 | Resistor - 5 M ohm, 1/2 watt carbon |
| R7226 | Resistor - 5 M ohm, 1/3 watt carbon |
| R8829 | Resistor - 1500 ohm, 1/2 watt carbon |
| R6976 | Resistor - 100 ohm, 1/2 watt carbon |
| R9081 | Resistor - 50 ohm, 1 watt carbon |
| R9062 | Resistor - 600 ohm, variable hum adjuster |
| R8886 | Resistor - Candohm |
| R9484 | Screw - Sensitivity control bezel mounting |
| R7359 | Screw - Escutcheon |
| R6652A | Shaft - Dial drive assembly |
| R7320 | Shield - Bottom chassis |
| R9415A | Shield - Coil |
| R7235 | Shield - Electrolytic condenser |
| R8803A | Shield - IF transformer |
| R5322 | Shield - Tube top |
| R5323A | Shield - Tube bottom |
| R8366 | Socket - 4 prong |
| R8367 | Socket - 5 prong |
| R8368 | Socket - 6 prong |
| R8369 | Socket - 7 prong |
| S8762C | Speaker - 12", complete |
| S7606A | Speaker 12" cone and voice coil |
| S8792 | Speaker 12" field coil |
| S7416 | Speaker plug |
| S8793A | Speaker 12" transformer |
| S8763C | Speaker - 8", complete |
| S7776C | Speaker 8" cone and voice coil |
| S8569 | Speaker 8" field coil |
| S7414 | Speaker plug |
| S8798AC | Speaker 8" transformer |
| R9411 | Sticker - License tube layout, 60 cycle |
| R6964 | Switch - "Off-On" |
| R9435 | Switch - Wave |

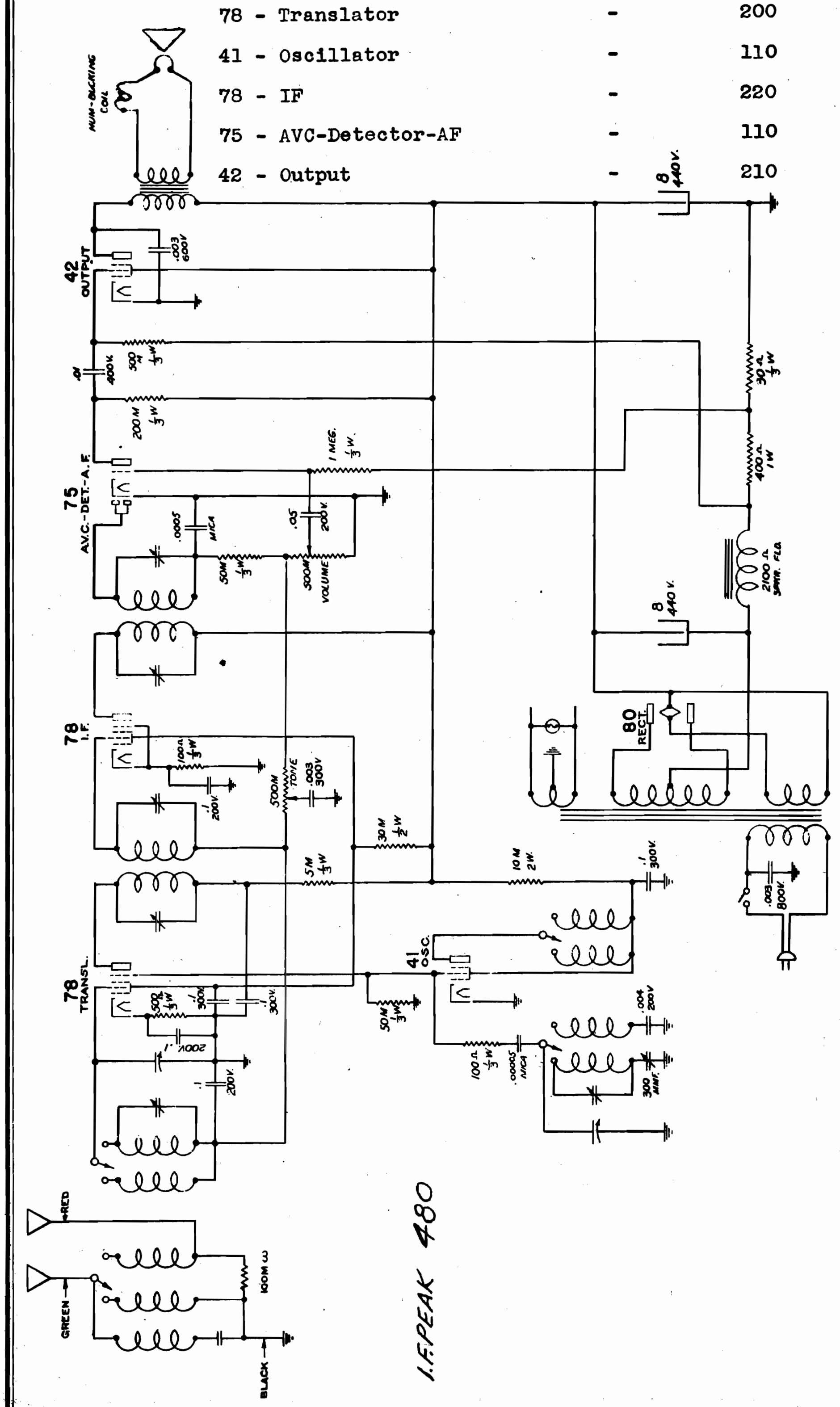
**MODEL 603**
**Voltage Schematic**
**Interference Data**

# COLONIAL RADIO CORP.

## TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

| TUBE | | PLATE | SREEN |
|---|---|---|---|
| 78 - Translator | - | 200 | 90 |
| 41 - Oscillator | - | 110 | 110 |
| 78 - IF | - | 220 | 90 |
| 75 - AVC-Detector-AF | - | 110 | |
| 42 - Output | - | 210 | 220 |

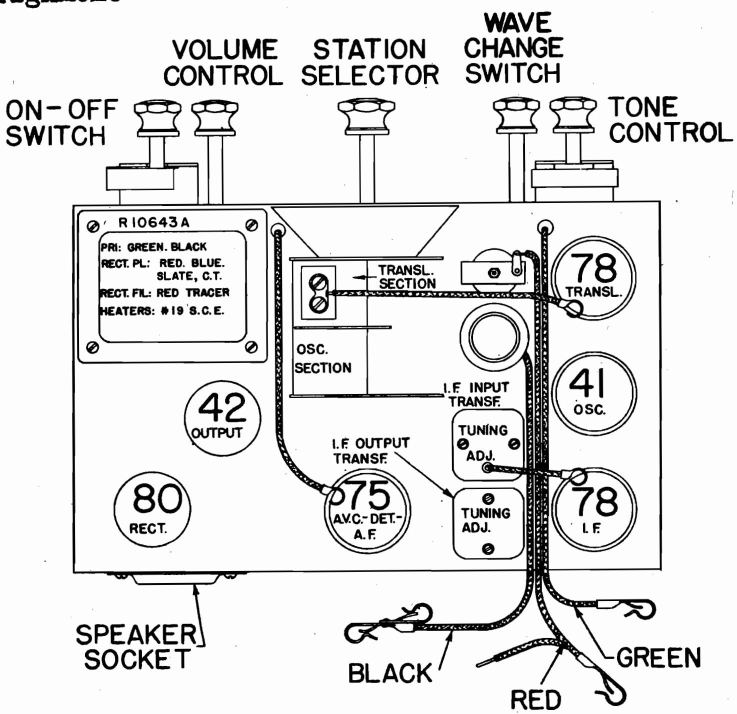


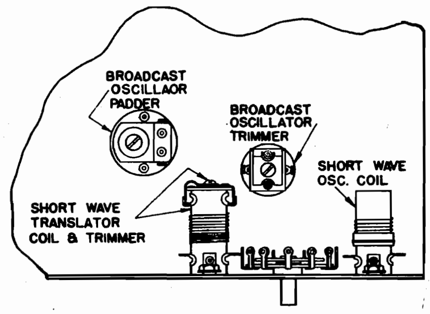

In order to prevent interference from code stations, when the receiver is located near the coast, a wave trap is incorporated in the antenna circuit. Although this trap is shown in the schematic as a coil with a series condenser, actually it consists of two multi-layer coils wound on top of each other with one end of each coil left unconnected. The distributed capacity between the coils is represented by the condenser in the schematic. The design of the coil is such that the combination of distributed capacity and inductance is resonant at about 600 meters, which is the frequency used by ships and also is very near the IF frequency of the receiver.

The voltage drop created across the 500 M ohms of the Volume Control, due to the diode current of the 75 tube, is used for AVC voltage.

MODEL 603
Socket Layout
Trimmers
Alignment

# COLONIAL RADIO CORP.




## ALIGNMENT PROCEDURE

### The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the receiver chassis.

3. Connect the other lead of the test oscillator in series with a .1 mfd. condenser to the grid of the 78 IF tube. Leave the grid clip attached to the cap and the tube shield in place.

4. Set the test oscillator to 480 kc and tune the IF output transformer. The locations of the tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the control grid of the 78 Translator tube and adjust the IF input transformer.

6. Repeat the adjustments to secure greater accuracy.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

### RF Alignment (Broadcast):

1. Couple the test oscillator to the green antenna lead, leaving the antenna connected.

2. Set the test oscillator to 1660 kilocycles.

3. Screw the oscillator padder condenser to approximately three quarters of its maximum capacity.

4. Turn the variable condenser plates all the way out. Then adjust the oscillator trimmer for maximum output.

5. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the translator trimmer, mounted on the variable condenser section nearer the dial, for maximum output.

6. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the padder until maximum output is obtained.

7. Repeat the 1660 kc and 1400 kc adjustments.

Always use as low an output from the test oscillator as possible.

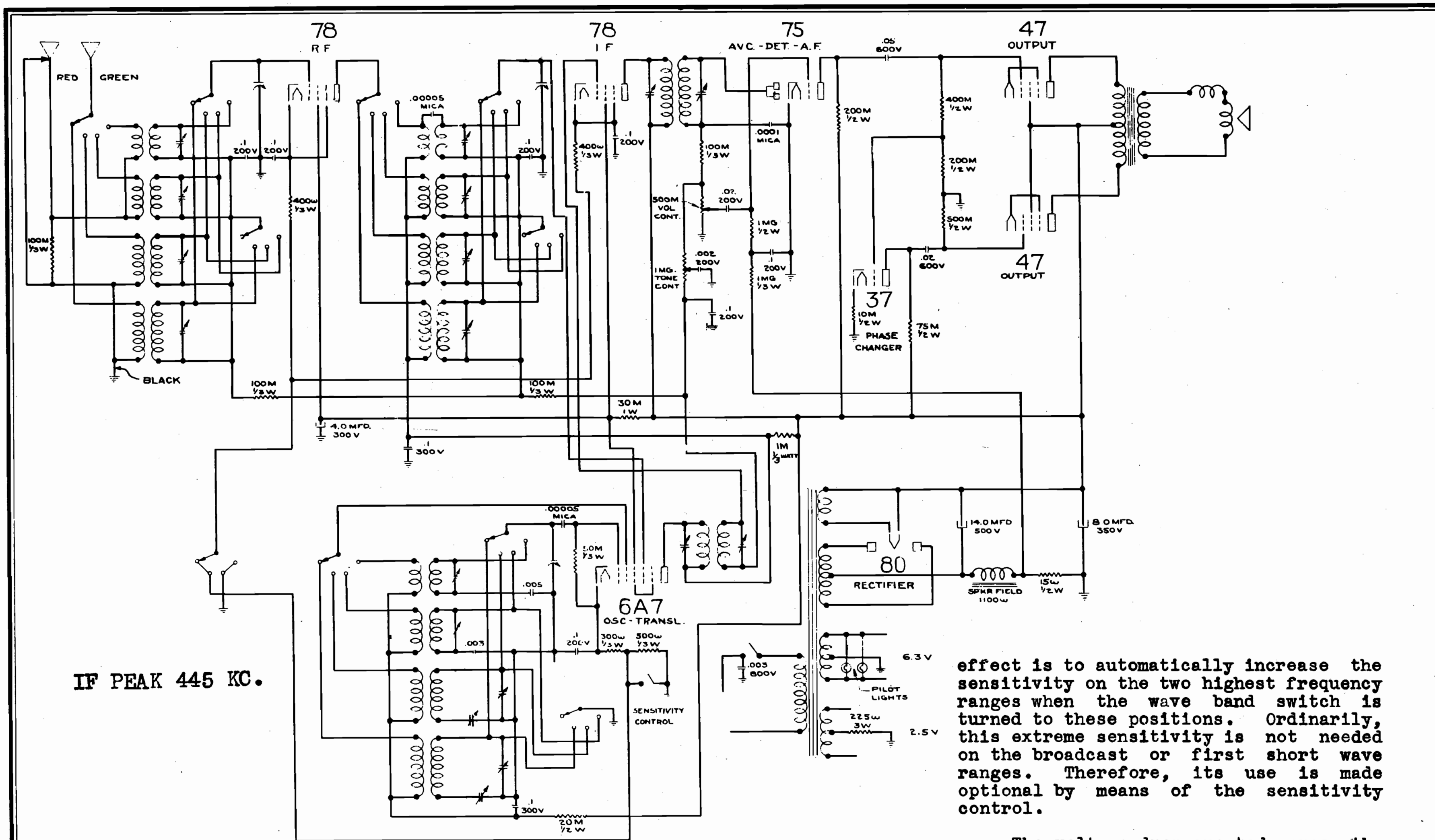
### Short Wave Alignment:

1. Leave the test oscillator coupled to the green antenna lead as for broadcast alignment.

2. Set the test oscillator to 15 megacycles and tune in its signal. Then adjust the trimmer, mounted on the short wave translator coil, for maximum output.

# COLONIAL RADIO CORP.

**MODEL 604**
**Schematic**
**Circuit Data**




IF PEAK 445 KC.

The knob operating the "On - Off" switch also acts as a sensitivity control when it is turned all the way to the right. In this position the 500 ohm resistor in the cathode circuit of the 6A7, is shorted out. When the wave band switch is in either the broadcast or first short wave range positions, the cathodes of the 78 RF and IF tubes are returned to this 500 ohm resistor. Therefore, when this resistor is shorted, the control grid bias on the 6A7 and 78 tubes is reduced, thereby increasing the sensitivity of the receiver. When the wave band switch is in positions "C" or "D", the cathode returns of the 78 tubes are connected to ground instead of to the 500 ohm resistor so that the sensitivity control then only affects the bias of the 6A7 tube. The effect is to automatically increase the sensitivity on the two highest frequency ranges when the wave band switch is turned to these positions. Ordinarily, this extreme sensitivity is not needed on the broadcast or first short wave ranges. Therefore, its use is made optional by means of the sensitivity control.

The voltage drop created across the 500 M ohms of the Volume Control, due to the diode current of the 75 tube, is used for AVC voltage.

The triode portion of the 75 AVC-Detector-AF tube, in conjunction with the 37 Phase Changer tube, acts as a push-pull input stage to the 47 push-pull output stage. The use of the 37 Phase Changer tube eliminates the need for a push-pull input transformer.

MODEL 604
Voltage,Alignment

# COLONIAL RADIO CORP.

**The IF Stages:**

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, through a .1 mfd condenser, to the control grid of the 78 IF tube. The grid clip should be left attached to the cap and the tube shield must be in place.

4. Set the test oscillator to 445 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the control grid cap of the 6A7 tube and tune the IF input transformer.

6. In order to secure greater accuracy repeat the adjustments, starting with the IF output transformer.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

**RF Alignment; Band "A" (Broadcast):**

1. Couple the output of the test oscillator to the antenna lead of the set, with the antenna connected.

2. Set the test oscillator to 1520 kilocycles.

3. Turn the variable condenser plates all the way out. Then adjust the #1 oscillator trimmer for maximum output. The locations of all of the trimmers are shown in the Service Illustrations.

4. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the #1 antenna trimmer and the #1 translator trimmer for maximum output.

5. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the #1 oscillator padder for maximum output.

6. Repeat the 1520 kc and 1400 kc adjustments for greater accuracy.

**Band "B":**

1. Leave the test oscillator coupled to the antenna lead as for broadcast band alignment.

2. Set the test oscillator to 4250 kilocycles.

3. Turn the variable condenser plates all the way out. Then adjust the #2 oscillator trimmer for maximum output.

4. Set the test oscillator to 4000 kc and tune in its signal. Then adjust the #2 antenna trimmer and the #2 translator trimmer for maximum output.

5. If turns have been shifted, repeat the 10 megacycle and the 9 megacycle adjustments, since they will have been affected by shifting of the turns.

**Band "D":**

1. Set the test oscillator to 19 megacycles.

2. Turn the variable condenser plates all the way out. Then adjust the #4 oscillator trimmer for maximum output.

3. Set the test oscillator to 18 megacycles and tune in its signal. Then adjust the #4 antenna trimmer and the #4 translator trimmer for maximum output.

4. Set the test oscillator to 9 megacycles and tune in its signal. If necessary, shift turns on the antenna and translator coils to secure maximum sensitivity. Be sure to cement the turns in place.

5. If turns have been shifted, repeat the 19 megacycle and 18 megacycle adjustments since they will have been affected by shifting of the turns.

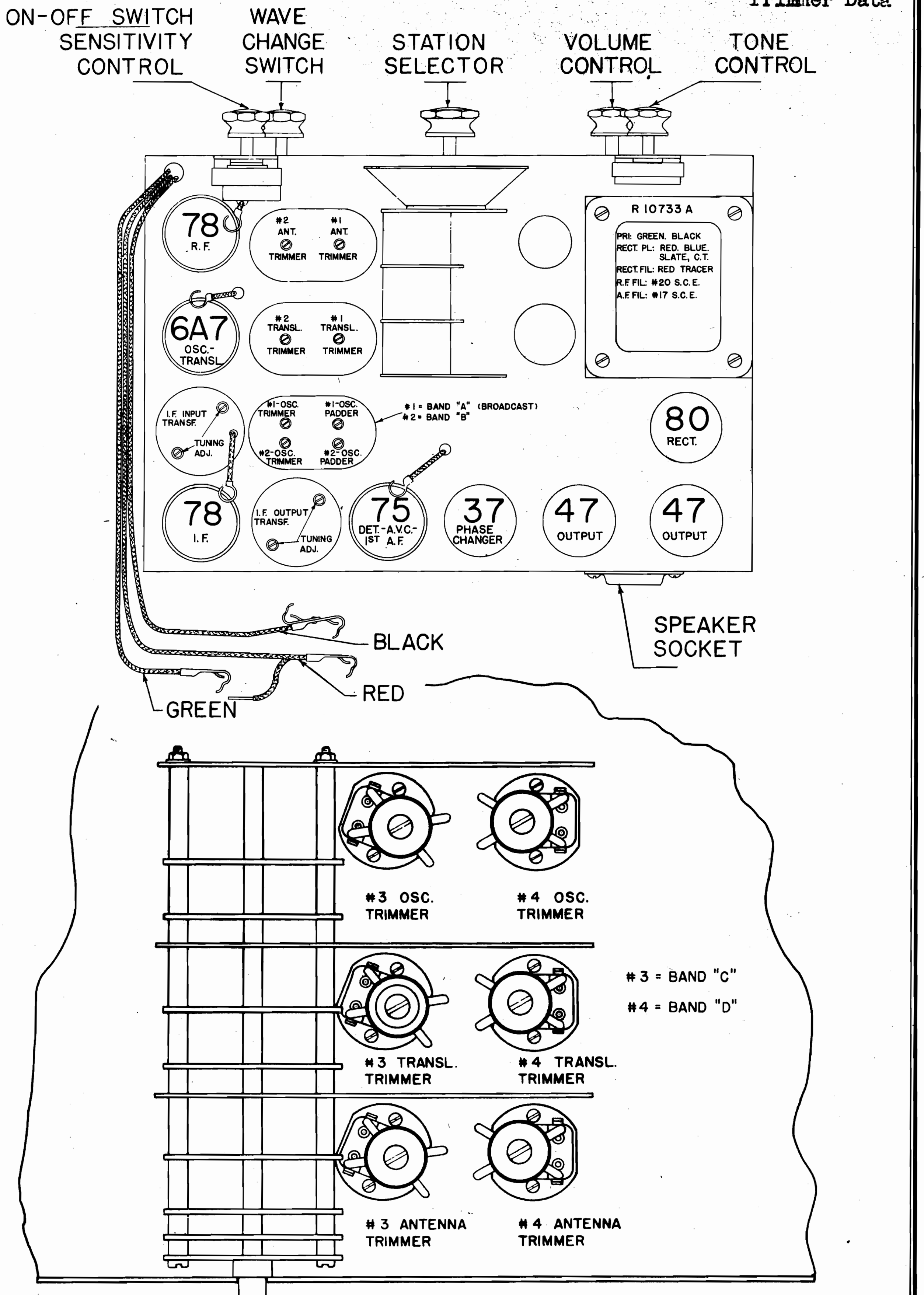
## TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

| TUBE | PLATE | SCREEN | OSC. SECTION PLATE | CATHODE |
|---|---|---|---|---|
| 78 - RF | 220 | 90 | | 3.1 |
| 6A7 - Osc-Transl | 220 | 90 | 160 | 2.6 |
| 78 - IF | 235 | 90 | | 3 |
| 75 - AVC-Det-AF | 75 | | | 0 |
| 37 - Phase Changer | 125 | | | 9 |
| 47 - Output | 230 | 235 | | 16 |

COLONIAL RADIO CORP.

MODEL 604
Socket Layout
Trimmer Data



MODEL 604
Parts List

# COLONIAL RADIO CORP.

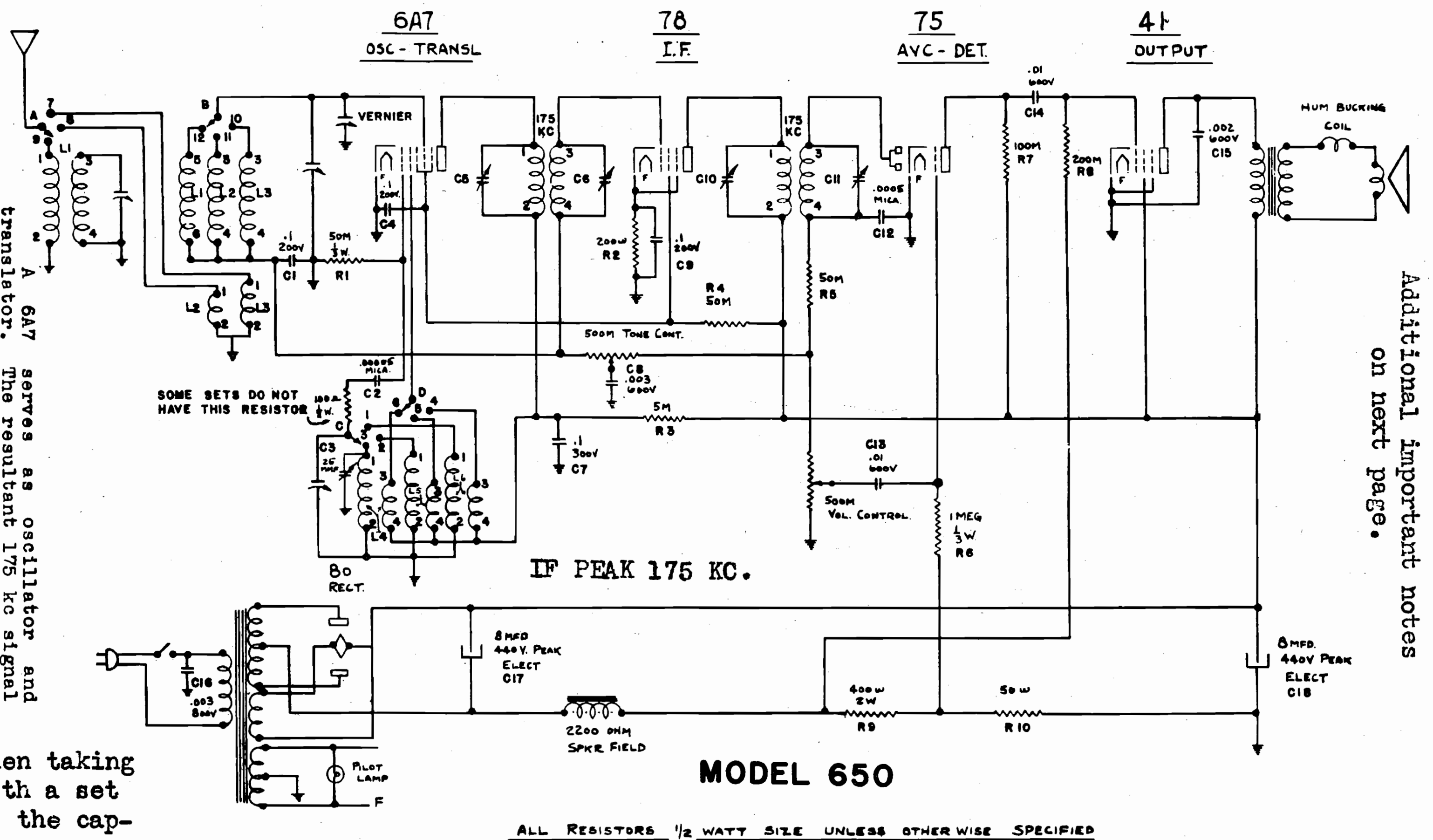
## REPLACEMENT PARTS AND PRICE LIST

| PART NO. | DESCRIPTION | | PRICE |
|---|---|---|---|
| R8297A | Board - Terminal, double | | .04 |
| R8308A | Board - Terminal, triple | | .05 |
| R9446A | Board - Terminal, 4 terminals | | .06 |
| R8900A | Board - Terminal, 5 terminals | | .08 |
| R10741 | Cabinet | | 23.33 |
| R10765 | Card - Operating | | .07 |
| R7011A | Clip - Red and green antenna leads | | .04 |
| R7011B | Clip - Double, black ground lead | | .08 |
| R11043 | Clip - Grid | | .01 |
| R10731 | Coil - Antenna, broadcast | | .68 |
| R10730 | Coil - Oscillator, broadcast | | .35 |
| R10732 | Coil - Translator, broadcast | | .75 |
| R10729 | Coil - Choke | | .19 |
| R6973K | Coil - Antenna, short wave, #2 range | | .82 |
| R10993A | Coil - Antenna, short wave, #3 range | | .56 |
| R10993D | Coil - Antenna, short wave, #4 range | | .56 |
| R6973M | Coil - Oscillator, short wave, #2 range | | .75 |
| R10993C | Coil - Oscillator, short wave, #3 range | | .65 |
| R10993F | Coil - Oscillator, short wave, #4 range | | .64 |
| R6973L | Coil - Translator, short wave, #2 range | | .83 |
| R10993B | Coil - Translator, short wave, #3 range | | .56 |
| R10993E | Coil - Translator, short wave, #4 range | | .42 |
| R10735 | Condenser - Variable | | 4.04 |
| R10735B | Condenser - Variable with drive assembly | | 6.20 |
| R7236 | Condenser - 14 mfd. electrolytic | | 1.47 |
| R8488 | Condenser - 8 mfd. electrolytic | | .99 |
| R9237 | Condenser - 4 mfd. electrolytic | | .87 |
| R9426 | Condenser - Padding, 1200 mmf. | | .49 |
| R10884 | Condenser - 475 mmf. padding | | .36 |
| R10737 | Condenser - Padding, 75 mmf. | | .28 |
| R10197 | Condenser - Trimmer, 25 mmf. | | .15 |
| R10736 | Condenser - Trimmer, double, 35 mmf. | | .26 |
| R6444 | Condenser - .1 mfd. 200 volts | | .17 |
| R6138 | Condenser - .1 mfd. 300 volts | | .20 |
| R9145 | Condenser - .05 mfd. 600 volts | | .22 |
| R6761 | Condenser - .02 mfd. 600 volts | | .18 |
| R6629 | Condenser - .02 mfd. 200 volts | | .16 |
| R6954 | Condenser - .005 mfd. 600 volts | | .17 |
| R10738 | Condenser - .003 mfd. 800 volts in metal case | | .21 |
| R10739 | Condenser - .003 mfd. 600 volts | | .14 |
| R6933 | Condenser - .002 mfd. 600 volts | | .16 |
| R4303 | Condenser - .001 mfd. mica | | .25 |
| R10794 | Condenser - .00005 mfd. mica | | .20 |
| R10740 | Control - Tone, 1 megohm | | .71 |
| R10648 | Control - Volume, 500 M ohms | | .71 |
| R7566 | Cord - AC line | | .56 |
| R10429A | Dial diffusing disk | | .98 |
| R7585 | Resistor - 1 megohm, 1/3 watt carbon | | .18 |
| R5823 | Resistor - 1 megohm, 1/2 watt carbon | | .20 |
| R6179 | Resistor - 500 M ohms, 1/2 watt carbon | | .20 |
| R5822 | Resistor - 400 M ohms, 1/2 watt carbon | | .20 |
| R5830 | Resistor - 200 M ohms, 1/2 watt carbon | | .20 |
| R7586 | Resistor - 100 M ohms, 1/3 watt carbon | | .18 |
| R6210 | Resistor - 75 M ohms, 1/2 watt carbon | | .20 |
| R6637 | Resistor - 50 M ohms, 1/3 watt carbon | | .18 |
| R6689 | Resistor - 30 M ohms, 1 watt carbon | | .20 |
| R5821 | Resistor - 20 M ohms, 1/2 watt carbon | | .20 |
| R6152 | Resistor - 10 M ohms, 1/2 watt carbon | | .20 |
| R6636 | Resistor - 1 M ohms, 1/3 watt carbon | | .18 |
| R10142 | Resistor - 500 ohms, 1/3 watt carbon | | .18 |
| R10078 | Resistor - 400 ohms, 1/3 watt carbon | | .18 |
| R10621 | Resistor - 300 ohms, 1/3 watt carbon | | .18 |
| R10751 | Resistor - 225 ohms, 3 watt, flexible | | .16 |
| R10752 | Resistor - 15 ohms, 1/2 watt, flexible | | .11 |
| R10639 | Ring - Glass clamping | | .02 |
| R10484 | Rubber - Tube, chassis mounting | 10 for | .06 |
| R10488 | Rubber - Washer, chassis mounting | | .05 |
| R10445A | Shaft - Dial drive | | .21 |
| R10753A | Shield - Coil | | .27 |
| R10754A | Shield - Oscillator coil | | .24 |
| R10440 | Shield - Tube top | | .09 |
| R10441 | Shield - Tube cap | | .05 |
| R8395 | Shield - Tube base | | .03 |
| R7235 | Shield - Electrolytic condenser | | .04 |
| R8315 | Socket - 4 prong | | .07 |
| R8253 | Socket - 5 prong | | .08 |
| R8367 | Socket - 5 prong, speaker | | .08 |
| R8092 | Socket - 6 prong | | .09 |
| R8072 | Socket - 7 prong | | .10 |
| S10721A | Speaker - 8" | | 9.97 |
| R10755A | Switch - Wave | | 4.19 |

MODEL 650
Schematic,Voltage
Notes

# COLONIAL RADIO CORP.

Additional important notes on next page.



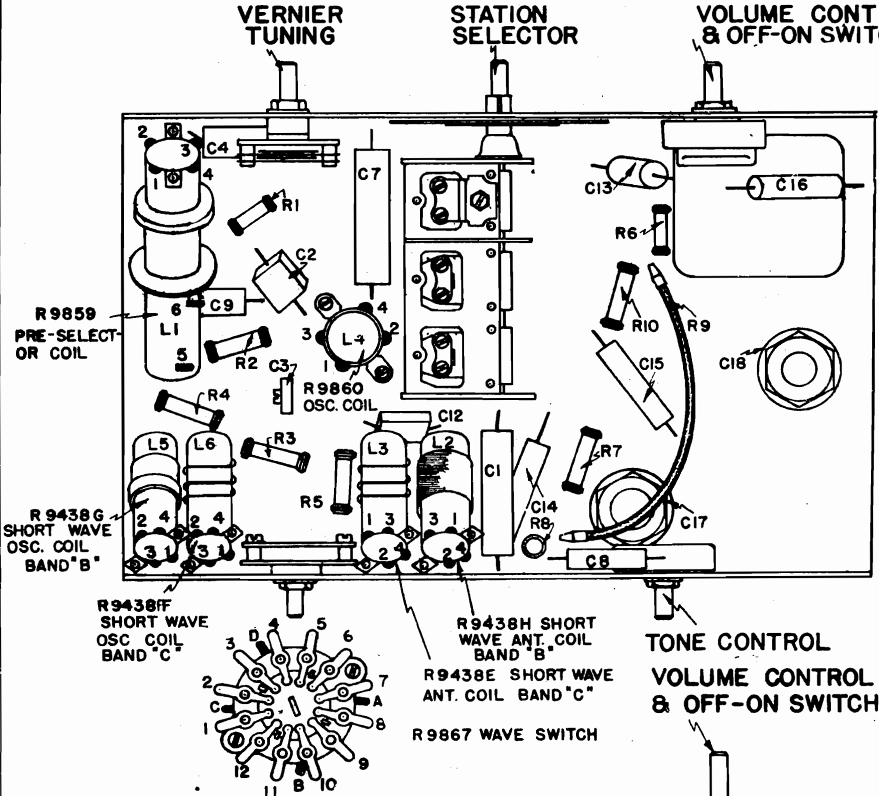

A 6A7 serves as oscillator and translator. The resultant 175 kc signal in its plate circuit is amplified by the 78 IF stage and then coupled to the 75 tube. This tube functions as diode detector, AVC, and 1st audio. Its audio output is fed to the 41 output pentode and then to the dynamic loudspeaker. An 80 rectifier completes the tube complement.

Use care when taking readings with a set analyzer as the capacity of the cables may cause circuits to oscillate, giving rise to erratic readings. Usually touching grid or plate with finger will stop oscillations. If an analyzer is not used, readings should be made with a 1000 ohms per volt voltmeter from cathode to the respective elements of each tube. Ordinarily, a 20% deviation from the chart values may be allowed.

| TUBE | PLATE VOLTAGE | SCREEN VOLTAGE | PLATE M.A. | SCREEN M. A. |
|---|---|---|---|---|
| 78 - IF | 190 | 65 | 4.5 | 1 |
| 75 - AVC-Det-AF | 130 | | .3 | |
| 41 - Output | 175 | 190 | 18.5 | 3 |
| 6A7 - Osc-Transl. | Ep=160v.; Eg#2=160v.; Eg#3&5=65v.; Ip=3m.a.; Ig#2=2.25m.a.; Ig#3&#5=1.7m.a. | | | |
| 80 - Rectifier | Max d.c. voltage=285v. Plate current=17 m.a. per plate | | | |

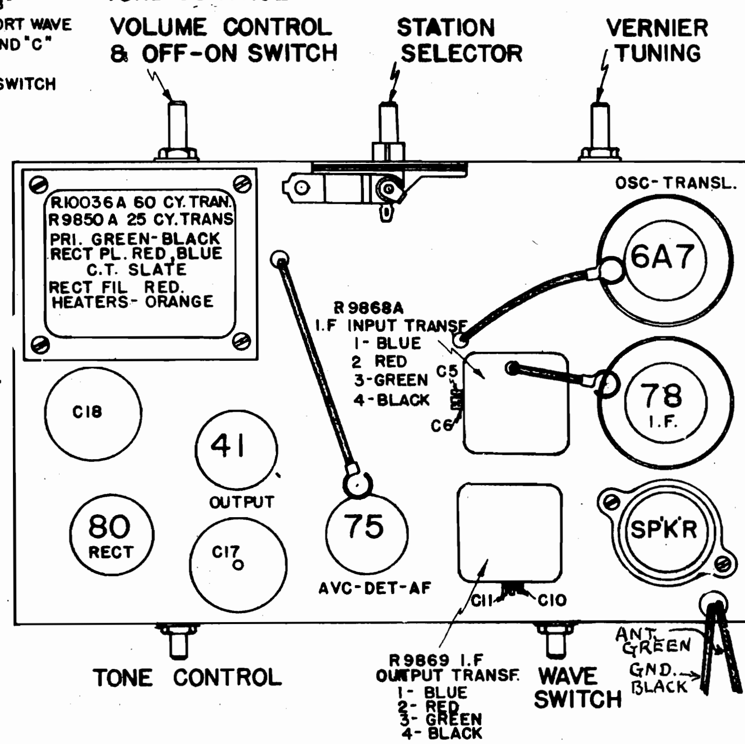
MODEL 650
Parts Layout, Notes
Socket, Trimmers

# COLONIAL RADIO CORP.




A vernier tuning condenser, with its knob on the front panel, is connected across the translator section of the ganged tuning condenser. Through its manipulation, it is possible to bring the circuits into perfect alignment at any frequency setting, thereby greatly increasing the sensitivity and short wave performance of the receiver. When the dot on the vernier knob is at its upper center position, the condenser is set at half capacity. Customers should be instructed to turn the knob either side of this normal position, when tuning, as described in the Instruction Leaflet accompanying the receiver.

| PART NO. | DESCRIPTION |
|---|---|
| R-9859 | Coil - Pre-Selector |
| R-9860 | Coil - Oscillator |
| R-9438E | Coil - Ant. S.W. |
| R-9438F | Coil - Osc. S.W. |
| R-9438G | Coil - Ant. S.W. |
| R-9438H | Coil - Osc. S.W. |
| R-9851 | Condenser - Tuning |
| R-9428 | Condenser - Trimmer |
| D-4758P | Condenser - 8 Mfd. electrolytic |
| R-7236 | Condenser - .4 Mfd. electrolytic |
| R-6444 | Condenser - .1 Mfd. 200 V. |
| R-6138 | Condenser - .1 Mfd. 300 V. |
| R-9429 | Condenser - .01 Mfd. 600 V. |
| R-7681 | Condenser - .003 Mfd. 600 V. |
| R-10096 | Condenser - .003 Mfd. 800 V. |
| R-6933 | Condenser - .002 Mfd. 600 V. |
| R-6760 | Condenser - .0005 Mfd. Mica |
| R-8621 | Condenser - .00005 Mfd. Mica |
| R-9852 | Condenser - Vernier |
| R-9865 | Control - Tone, 500 M ohm |
| R-6571 | Control - Volume, 500 M ohm |
| R-9866 | Pointer - Dial |
| R-7585 | Resistor - 1 Meg. 1/3 watt carbon |
| R-5830 | Resistor - 200 M ohms, 1/2 watt carbon |
| R-5819 | Resistor - 100 M ohms, 1/2 watt carbon |
| R-6445 | Resistor - 50 M ohms, 1/2 watt carbon |
| R-6637 | Resistor - 50 M ohms, 1/3 watt carbon |
| R-6510 | Resistor - 5 M ohms, 1/2 watt carbon |
| R-6276 | Resistor - 200 ohms, 1/2 watt carbon |
| R-9858 | Resistor - 50 ohms, 1/2 watt carbon |
| R-8562 | Resistor - 400 ohms, flexible |

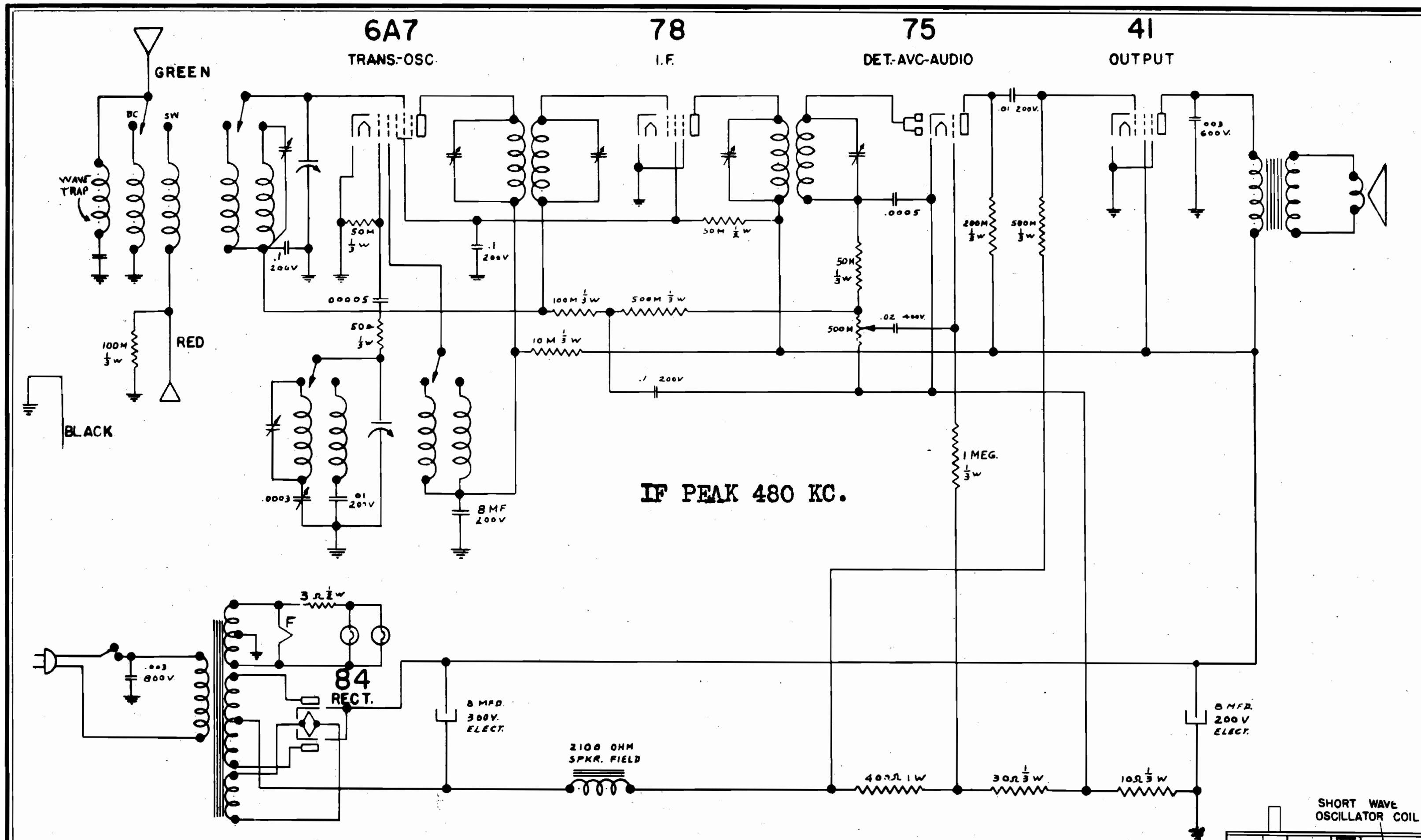



Some of these receivers have a 14 mfd. first filter condenser, others an 8 mfd. one. Either may be used for replacement purpose.

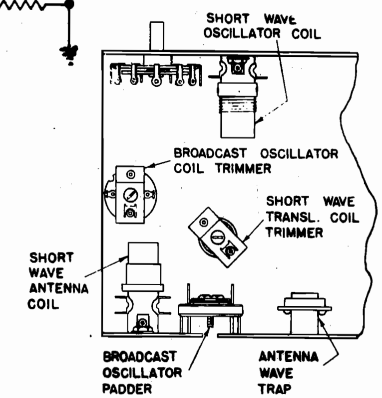
The trimmer condenser on the pre-selector section of the ganged condenser should be adjusted at about 1500 kc. The oscillator trimmer, C3, should be adjusted so that the set is tuned to 2000 kc when the ganged condenser is at its minimum capacity setting. Adjustments should be made with the Vernier at its half capacity setting.

**MODEL 651**
**Schematic, Voltage**
**Trimmer Data**

# COLONIAL RADIO CORP.




IF PEAK 480 KC.




All readings are to be taken between the chassis and the respective element of each tube.

| TUBE | | PLATE | SCREEN | OSCILLATOR SECTION GRID | OSCILLATOR SECTION PLATE | CONTROL GRID |
|---|---|---|---|---|---|---|
| 6A7 - Osc-Transl | - | 140 | 60 | -1.6 | 140 | -.3 |
| 78 - IF | - | 185 | 60 | | | -1.5 |
| 75 - AVC-DET-AF | - | 85 | | | | -.4 |
| 41 - Output | - | 175 | 185 | | | -.45 |

NOTE: All control grid readings are lower than the actual applied voltage due to high series resistance in the circuit.

MODEL 651
Socket Layout
Alignment, Trimmers

# COLONIAL RADIO CORP.

In order to prevent interference from code stations when the receiver is located near the coast, a wave trap is incorporated in the antenna circuit. Although this trap is shown in the schematic as a coil with a series condenser, actually it consists of two multilayer coils wound on top of each other with one end of each coil left unconnected. The distributed capacity between the coils is the condenser shown in the schematic. The design of the coil is such that the combination of distributed capacity and inductance is resonant at about 600 meters which is the frequency used by ships and also very near the IF frequency of the receiver.

**The 75 AVC-Detector-AF Circuit:**

The IF signal existing at the IF output transformer secondary is impressed between the diode plates and the cathode of the 75 tube, in series with the 500 M ohms of the volume control and the 50 M ohm resistor. Diode current flows, creating a voltage drop across these resistances. Only the drop across the volume control resistance is used for AVC voltage. The control grid returns of the 6A7 and 78 tubes are connected through filter resistors to one end of the volume control. This end is negative with respect to the other end of the control so that the voltage drop across it, due to the diode current, is impressed as negative bias on the control grids of the 6A7 and 78 tubes. Any increase in signal strength increases the 75 diode current, increases the voltage drop across the volume control, and so increases the negative bias of the 6A7 and 78 tubes with a resultant decrease in tube amplification. Since increases in signal strength are offset by decreases in tube amplification, the input to the detector tends to remain at a constant value.

Any desired portion of the audio component across the volume control may be picked up by the movable arm of the control and fed through the .02 mfd. condenser to the triode section of the 75 tube. It is there amplified and then coupled to the 41 output tube.

**The IF Stages:**

1. Connect the output meter (low scale) across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the grid of the 78 IF tube, leaving the grid clip attached to the cap.

4. Set the test oscillator to 480 kc and tune the IF output transformer. The locations of the tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the grid of the 6A7 tube and adjust the IF input transformer.

6. Repeat the adjustments to secure greater accuracy.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

**RF Alignment: (Broadcast)**

1. Couple the test oscillator to the green antenna lead, leaving the antenna connected.

2. Set the test oscillator to exactly 1640 kc.

With the variable condenser plates open all the way

3. Turn the dial pointer to exactly 1640 kc and adjust the broadcast oscillator trimmer for maximum output.

4. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the trimmer on the variable condenser for maximum output.

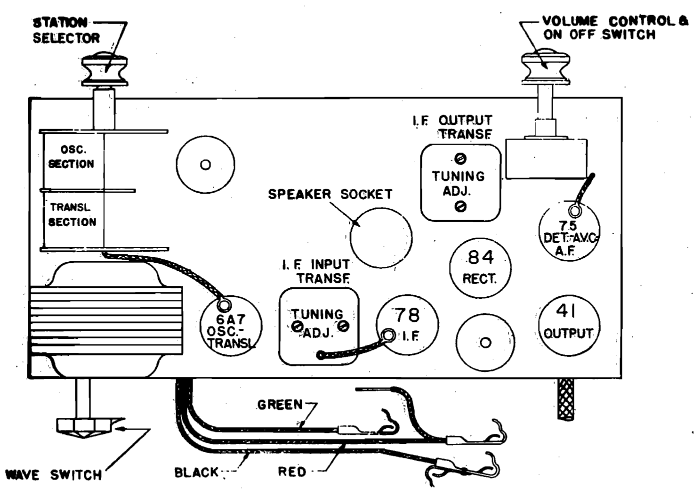
5. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the padder until maximum output is obtained.

6. Since the adjustments are interacting to an extent, it is advisable to repeat the entire operation.

Always use as low an output from the test oscillator as possible.

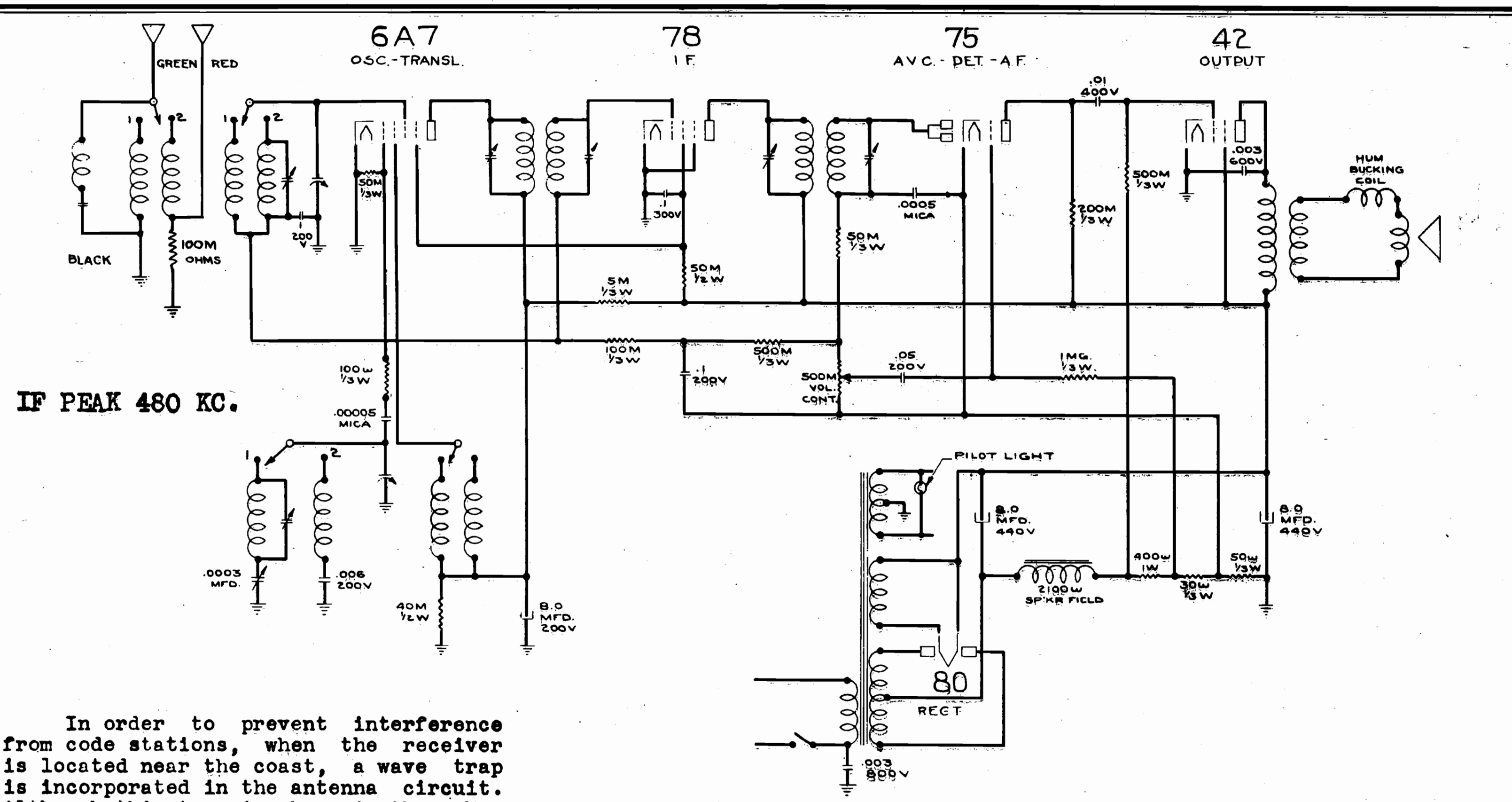
**Short Wave Alignment:**

Set the test oscillator to 15 megacycles and tune in its signal. Then adjust the trimmer on the short wave translator coil for maximum output.



**MODEL 652**
**Schematic**
**Voltage, Data**

# COLONIAL RADIO CORP.




IF PEAK 480 KC.

In order to prevent interference from code stations, when the receiver is located near the coast, a wave trap is incorporated in the antenna circuit. Although this trap is shown in the schematic as a coil with a series condenser, actually it consists of two multi-layer coils wound on top of each other with one end of each coil left unconnected. The distributed capacity between the coils is represented by the condenser in the schematic. The design of the coil is such that the combination of distributed capacity and inductance is resonant at about 600 meters, which is the frequency used by ships and also is very near the IF frequency of the receiver.

The voltage drop created across the 500 M ohms of the Volume Control, due to the diode current of the 75 tube, is used for AVC voltage.

## TUBE VOLTAGE CHART

All measurements are to be taken between the chassis and the respective element of each tube.

| TUBE | | PLATE | SCREEN | OSC.SECTION PLATE |
|---|---|---|---|---|
| 6A7 - Osc-Transl | - | 190 | 70 | 190 |
| 78 - IF | - | 220 | 70 | |
| 75 - AVC-Det-AF | - | 100 | | |
| 42 - Output | - | 210 | 220 | |

MODEL 652
Socket Layout
Trimmer Data
Alignment

# COLONIAL RADIO CORP.

## ALIGNMENT PROCEDURE

### The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the receiver chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the grid of the 78 IF tube. Leave the grid clip attached to the cap and the tube shield in place.

4. Set the test oscillator to 480 kc and tune the IF output transformer. The locations of the tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the grid of the 6A7 tube and adjust the IF input transformer.

6. Repeat the adjustments to secure greater accuracy.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

### RF Alignment (Broadcast):

1. Couple the test oscillator to the green antenna lead, leaving the antenna connected.

2. Set the test oscillator to 1650 kilocycles.

3. Screw the oscillator padder condenser to approximately three quarters of its maximum capacity.

4. Turn the variable condenser plates all the way out. Then adjust the oscillator trimmer for maximum output.

5. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the translator trimmer, mounted on the variable condenser section nearer the dial, for maximum output.

6. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the padder until maximum output is obtained.

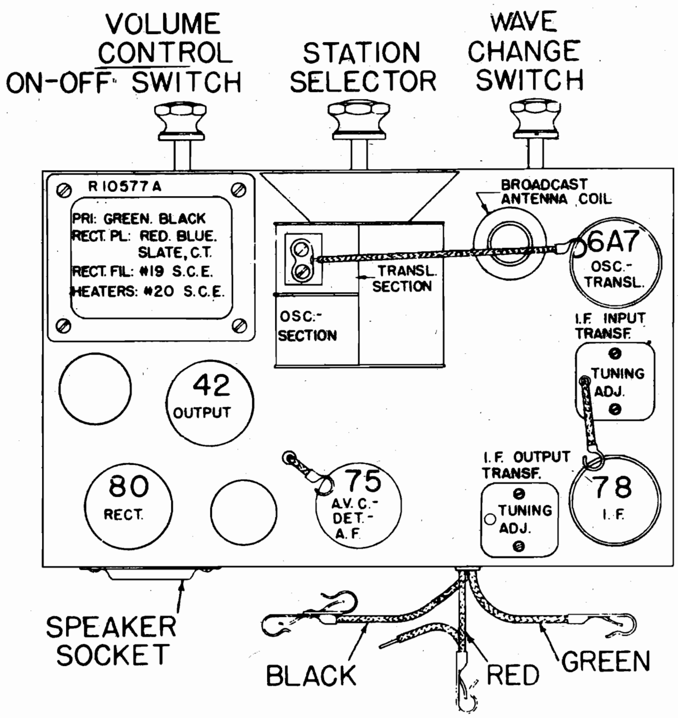
7. Repeat the 1650 kc and 1400 kc adjustments.

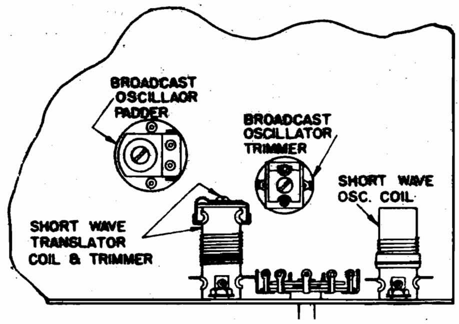
Always use as low an output from the test oscillator as possible.

### Short Wave Alignment:

1. Leave the test oscillator coupled to the green antenna lead as for broadcast alignment.

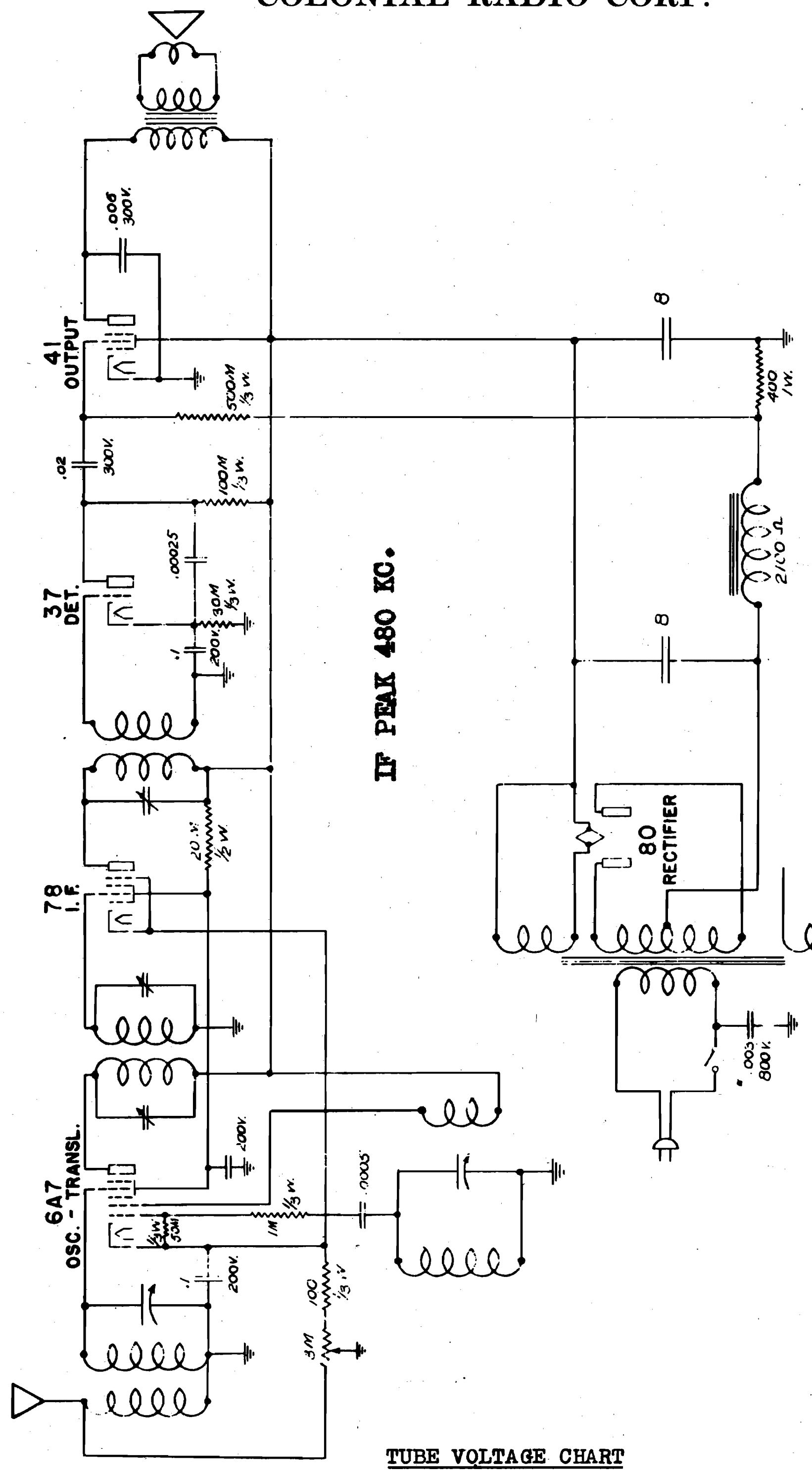
2. Set the test oscillator to 15 megacycles and tune in its signal. Then adjust the trimmer, mounted on the short wave translator coil, for maximum output.



MODEL 653
Schematic,
Voltage

COLONIAL RADIO CORP.



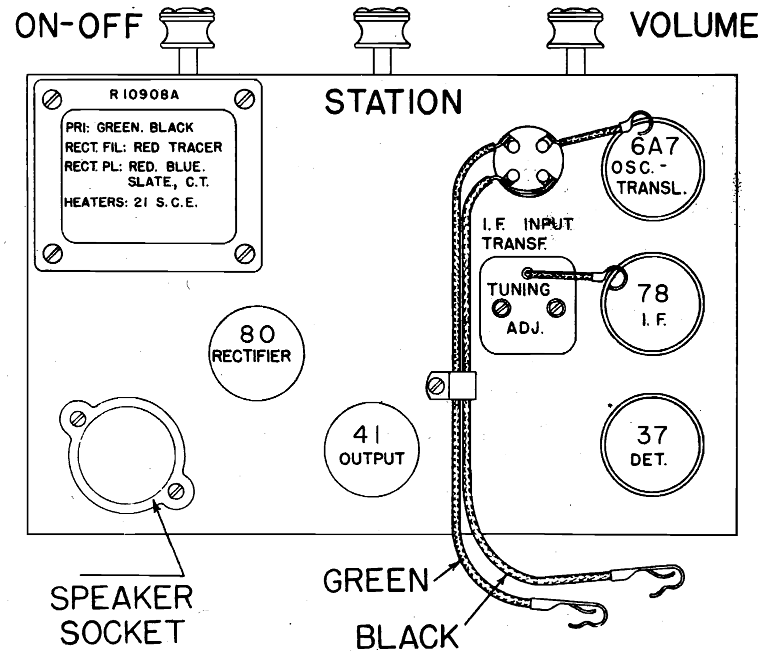

TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

| TUBE | PLATE | SCREEN | OSC.SEC. PLATE | OSC.SEC. GRID | CATHODE |
|---|---|---|---|---|---|
| 6A7 - Osc-Transl - | 200 | 95 | 200 | -.3 | 2.2 |
| 78 - IF - | 200 | 95 | | | 2.2 |
| 37 - Detector - | 62 | | | | 30 |
| 41 - Output - | 190 | 200 | | | 0 |

MODEL 653
Alignment, Socket
Parts List, Trimmers

# COLONIAL RADIO CORP.




## ALIGNMENT PROCEDURE

**The IF Stages:**

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the grid of the 78 IF tube, leaving the grid clip attached to the cap.

4. Set the test oscillator to 480 kc, and adjust the IF output transformer tuning condenser. This condenser is mounted on the IF output transformer terminal board under the chassis, about two inches behind the variable condenser.

5. Change the test oscillator connection to the grid of the 6A7 tube and adjust the IF input transformer. The locations of its tuning adjustments are shown in the Service Illustration.

6. Repeat the adjustments to secure greater accuracy.

**RF Alignment:**

1. Couple the test oscillator to the green antenna lead, leaving the antenna connected.

2. Set the test oscillator to 1750 kilocycles.

3. Turn the variable condenser plates all the way out. Then adjust the trimmer on the oscillator section of the variable condenser for maximum output. The oscillator section is the one furthest from the dial, as shown in the Service Illustration.

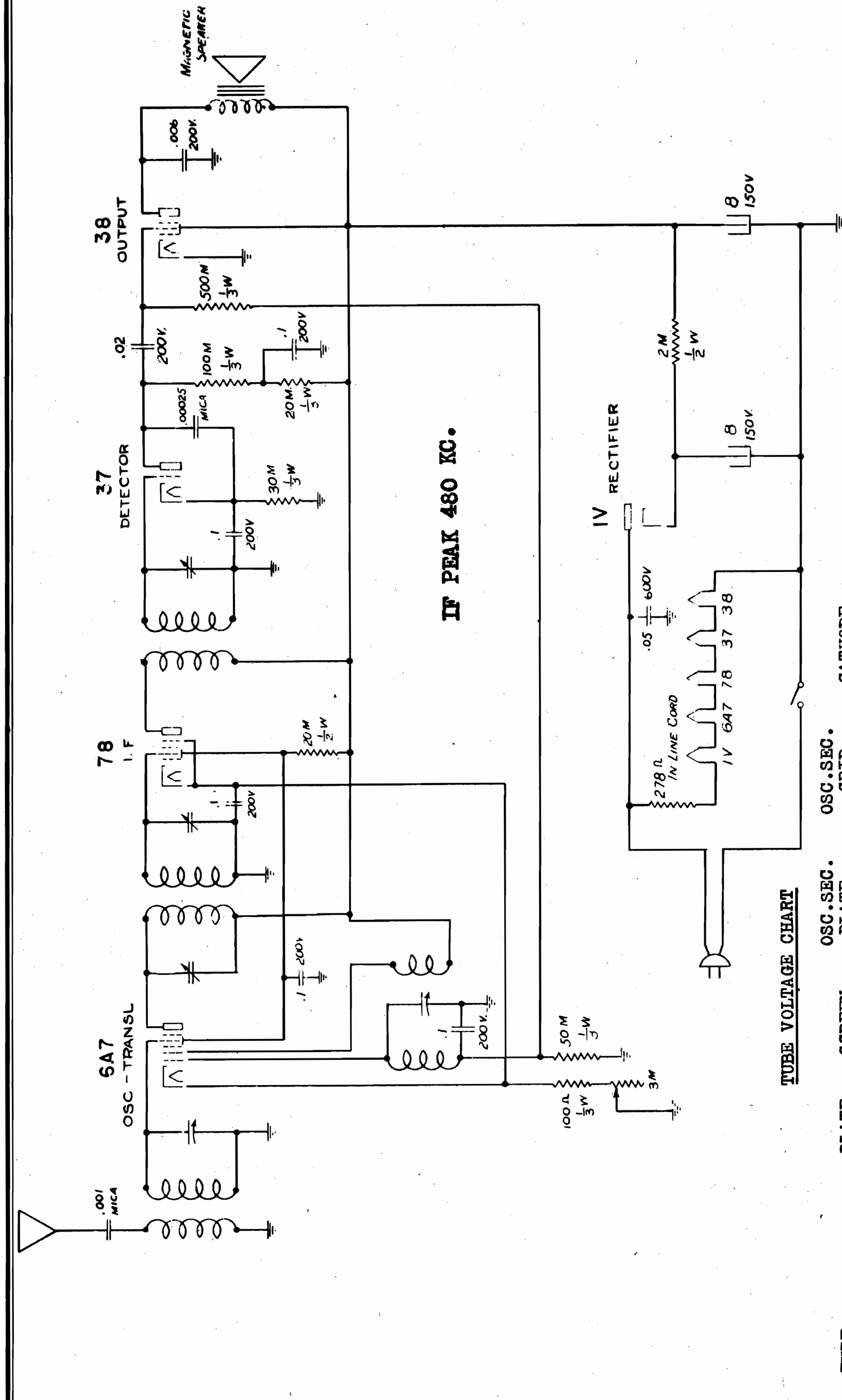
4. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the trimmer on the translator section of the variable condenser for maximum output.

## REPLACEMENT PARTS

| PART NO. | DESCRIPTION |
|---|---|
| R10632 | Coil - Antenna |
| R10633 | Coil - Oscillator |
| R10620 | Condenser - Variable |
| R10197 | Condenser - Second IF, transformer tuning |
| D4758P | Condenser - Electrolytic 8 mfd. |
| R6444 | Condenser - .1 mfd. 200 volts |
| R9818 | Condenser - .02 mfd. 400 volts |
| R10609 | Condenser - .006 mfd. 400 volts |
| R10096 | Condenser - .003 mfd. 800 volts |
| R6760 | Condenser - .0005 mfd. mica |
| R4592 | Condenser - .00025 mfd. mica |
| R7228 | Resistor - 500 M ohms, 1/3 watt carbon |
| R7586 | Resistor - 100 M ohms, 1/3 watt carbon |
| R6637 | Resistor - 50 M ohms, 1/3 watt carbon |
| R6110 | Resistor - 30 M ohms, 1/3 watt carbon |
| R5821 | Resistor - 20 M ohms, 1/2 watt carbon |
| R6636 | Resistor - 1 M ohms, 1/3 watt carbon |
| R6436 | Resistor - 400 ohms, 1/2 watt carbon |
| R8922 | Resistor - 100 ohms, 1/3 watt carbon |
| R10630A | Transformer - IF input |
| R10631A | Transformer - IF output |
| R10908A | Transformer - Power |

# COLONIAL RADIO CORP.

**MODEL 654**
**Schematic**
**Voltage**




## TUBE VOLTAGE CHART

| TUBE | PLATE | SCREEN | OSC.SEC. PLATE | OSC.SEC. GRID | CATHODE |
|---|---|---|---|---|---|
| 6A7 - Osc-Transl - | 100 | 45 | 100 | -.1 | .8 |
| 78 - IF - | 100 | 45 | | | .8 |
| 37 - Detector - | 55 | | | | -3.5 |
| 38 - Output - | 95 | 100 | | | 0 |
| 1V - Rectifier - | | | | | 135 |

All readings are to be taken between the chassis and the respective element of each tube.

**MODEL 654**
**Alignment, Socket**
**Trimmers, Parts**

# COLONIAL RADIO CORP.

The COLONIAL Model 654 is a five tube, broadcast superheterodyne, designed for operation from either AC or DC power supply. The tubes and their functions are:

6A7 - Oscillator-Translator
78 - IF
37 - Detector
38 - Output
1V - Rectifier

Since the tube heaters are in series, if any one tube burns out, none will light. However, it is necessary to replace only the burned out tube. The others then will light. The full line voltage will appear across the heater prongs of a socket in which there is a burned out tube.

## ALIGNMENT PROCEDURE

### The IF Stages:

1. Connect the high scale (about 100 volts) of the output meter across the loud speaker terminals.

2. Connect the ground lead of the test oscillator to the chassis through a .1 mfd. condenser.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the grid of the 78 IF tube, leaving the grid clip attached to the cap.

4. Set the test oscillator to 480 kc. and tune the IF output transformer. This transformer is mounted under the chassis and has a single bakelite base tuning condenser mounted on its terminal board. There is but one tuning adjustment for this transformer, since only the transformer secondary is tuned.

5. Change the test oscillator connection to the grid of the 6A7 tube and adjust the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustration.

6. Repeat the adjustments to secure greater accuracy.

### RF Alignment:

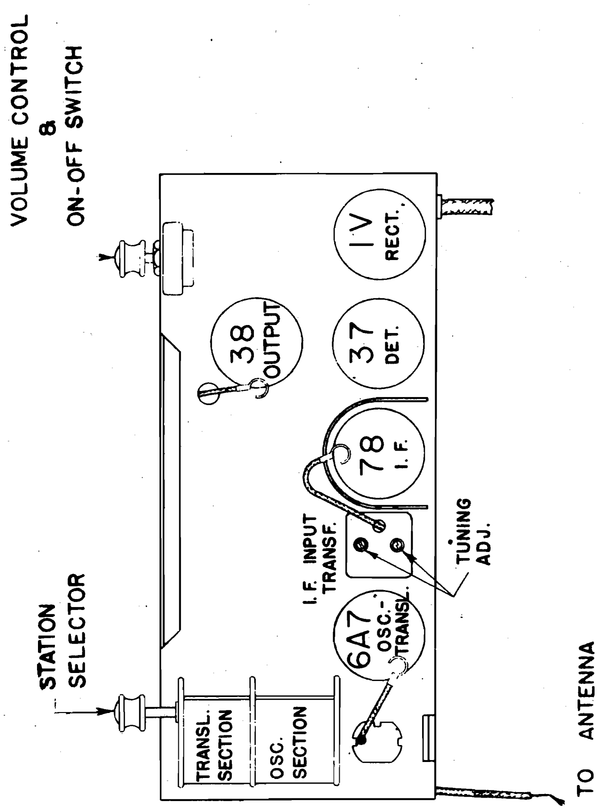
1. Couple the test oscillator to the green antenna lead, leaving the antenna connected.

2. Set the test oscillator to 1750 kilocycles.

3. Turn the variable condenser plates all the way out. Then adjust the trimmer on the oscillator section of the variable condenser for maximum output. The oscillator section is the one furthest from the dial, as shown in the Service Illustration.

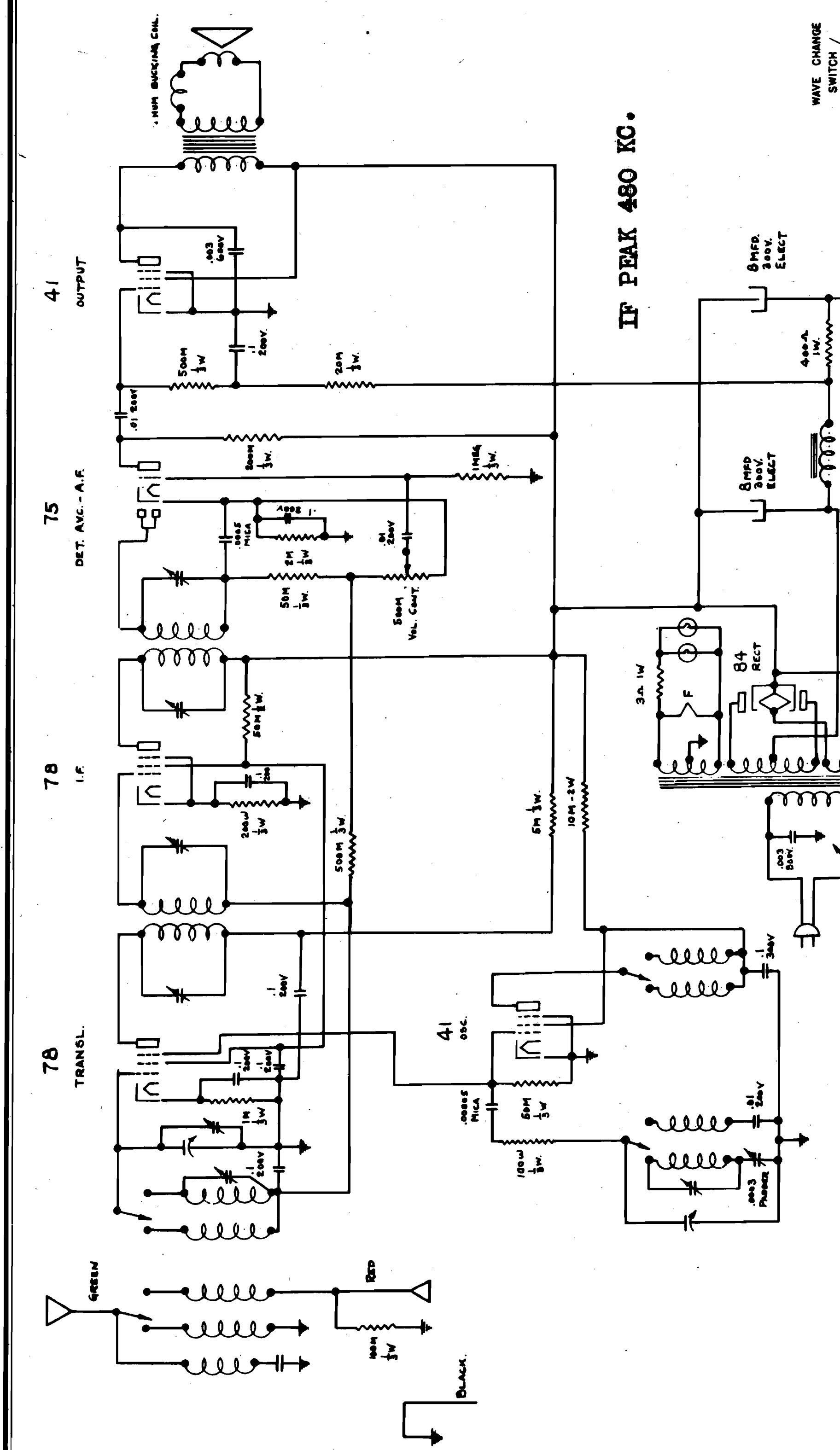
4. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the trimmer on the translator section of the variable condenser for maximum output.

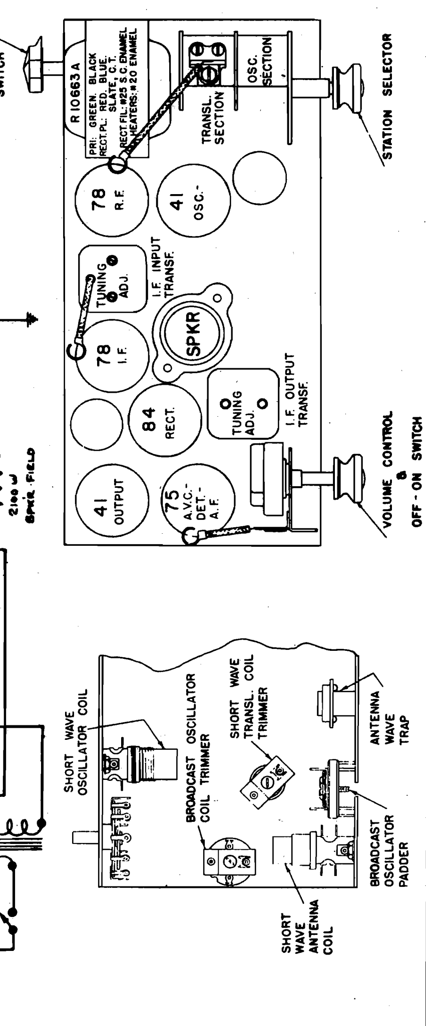
| PART NO. | DESCRIPTION |
|---|---|
| R8297A | Board - Terminal, double |
| R8308A | Board - Terminal, triple |
| R10690 | Cabinet |
| R11043 | Clip - Grid |
| R10632 | Coil - Antenna |
| R10633 | Coil - Oscillator |
| R8960 | Condenser - Variable |
| R10689 | Condenser - Dry electrolytic |
| R10197 | Condenser - Trimmer |
| R6444 | Condenser - .1 mfd. 200 volts |
| R9145 | Condenser - .05 mfd. 600 volts |
| R6629 | Condenser - .02 mfd. 200 volts |
| R10893 | Condenser - .006 mfd. 200 volts |
| R6759 | Condenser - .001 mfd. mica |
| R4592 | Condenser - .00025 mfd. mica |
| R8059 | Control - Volume, 3 M ohms |
| R10685 | Cord - Power supply |
| R10692 | Escutcheon - Station selector |
| R8663 | Escutcheon - Volume control |
| R10691 | Instruction leaflet |
| R8664 | Knob with pointer |
| R7228 | Resistor - 500 M ohms, 1/3 watt carbon |
| R7586 | Resistor - 100 M ohms, 1/3 watt carbon |
| R6637 | Resistor - 50 M ohms, 1/3 watt carbon |
| R6110 | Resistor - 30 M ohms, 1/3 watt carbon |
| R6640 | Resistor - 20 M ohms, 1/3 watt carbon |
| R5821 | Resistor - 20 M ohms, 1/2 watt carbon |
| R6073 | Resistor - 2 M ohms, 1/2 watt carbon |
| R8922 | Resistor - 100 ohms, 1/3 watt carbon |
| R8315 | Socket - 4 prong |
| R8253 | Socket - 5 prong |
| R8092 | Socket - 6 prong |
| R8072 | Socket - 7 prong |
| S10694 | Speaker |
| R10687A | Transformer - IF input |
| R10631A | Transformer - IF output |



# COLONIAL RADIO CORP.

**MODEL 655**
**Schematic, Notes**
**Trimmers, Socket**
**Parts Layout,**




In order to prevent interference from code stations, when the receiver is located near the coast, a wave trap is incorporated in the antenna circuit. Although this trap is shown in the schematic as a coil with a series condenser, actually it consists of two multilayer coils wound on top of each other with one end of each coil left unconnected. The distributed capacity between the coils is represented by the condenser in the schematic. The design of the coil is such that the combination of distributed capacity and inductance is resonant at about 600 meters, which is the frequency used by ships and also is very near the IF frequency of the receiver.

MODEL 655
Voltage
Alignment

# COLONIAL RADIO CORP.

## ALIGNMENT PROCEDURE

### The IF Stages:

1. Connect the output meter (low scale) across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the grid of the 78 IF tube, leaving the grid clip attached to the cap.

4. Set the test oscillator to 480 kc and tune the IF output transformer. The locations of the tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the grid of the 78 translator tube and adjust the IF input transformer.

6. Repeat the adjustments to secure greater accuracy.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

### RF Alignment (Broadcast):

1. Screw the oscillator padding condenser to about three quarters of its maximum capacity.

2. Couple the test oscillator to the green antenna lead, leaving the antenna connected. Set the test oscillator to 1610 kc.

3. Turn the variable condenser plates all the way out. Then adjust the oscillator trimmer for maximum output. Some of these sets have a trimmer on the oscillator section of the variable condenser as well as one mounted on the broadcast oscillator coil. In others, the adjusting screw has been removed from the trimmer on the variable condenser and only the trimmer on the oscillator coil used. It will be found that in sets using both condensers, that maximum output cannot be reached even though one of the trimmers is screwed all the way in, making it necessary to use the other trimmer. In effect, both trimmers are in parallel when the Wave Switch is in the broadcast position.

4. Set the test oscillator to 1400 kc. and tune in its signal. Then adjust the trimmer on the translator section of the variable condenser for maximum output.

5. Set the test oscillator to 600 kc. and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the padder until maximum output is obtained.

6. Since the adjustments are interacting to an extent, it is advisable to repeat the entire operation.

Always use as low an output from the test oscillator as possible.

### Short Wave Alignment:

Set the test oscillator to 15 megacycles and tune in its signal. Then adjust the trimmer on the short wave translator coil for maximum output.

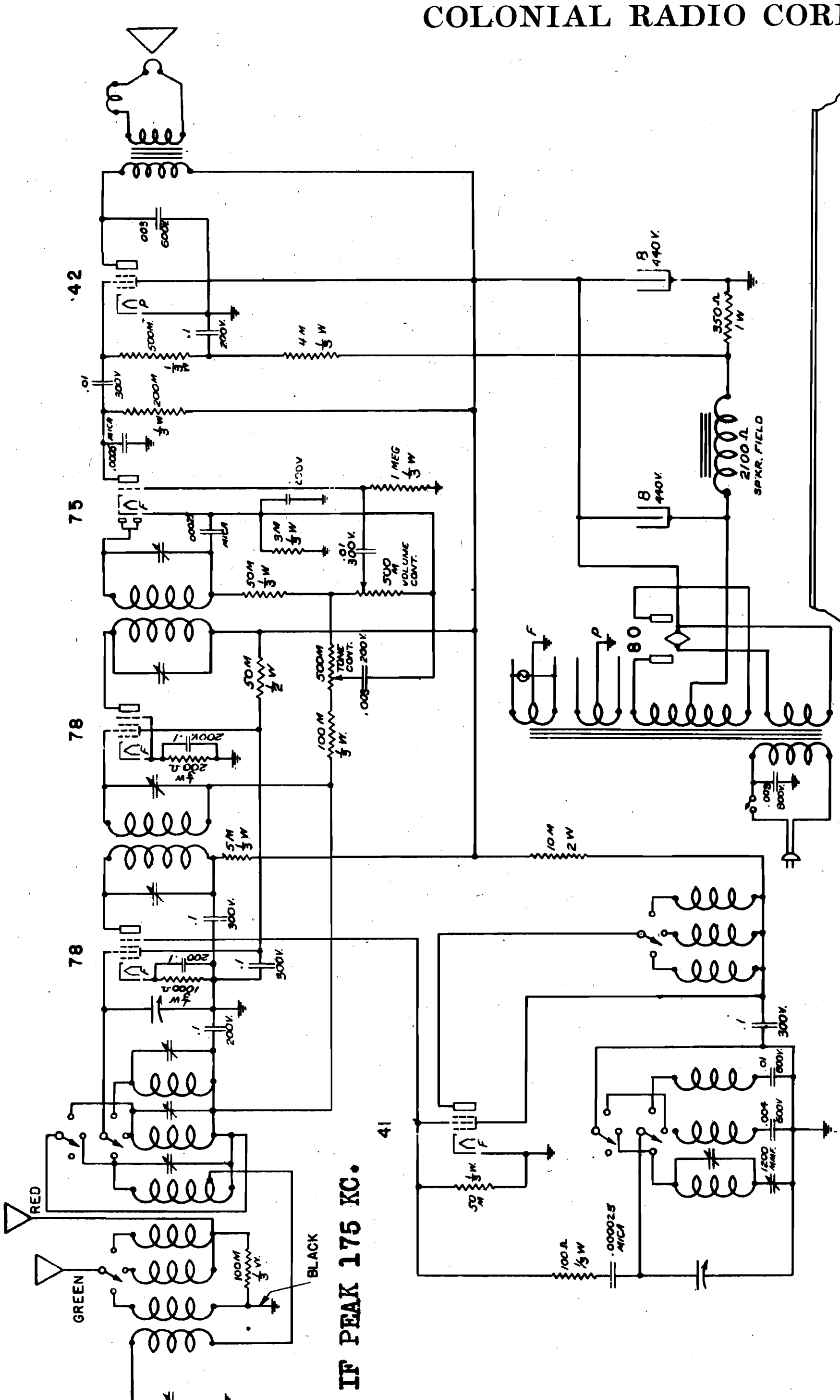
## TUBE VOLTAGE CHART

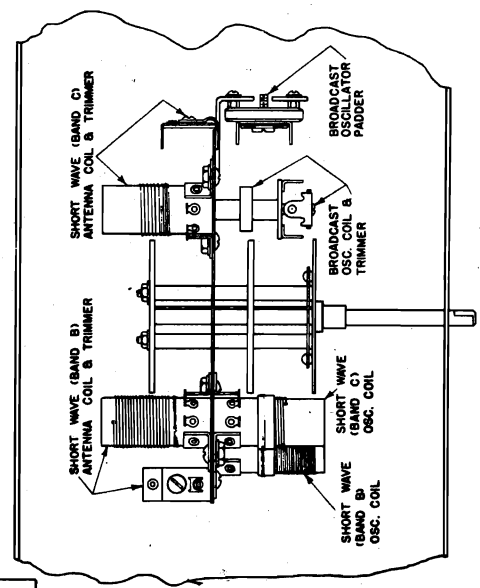
All readings are to be taken between the chassis and the respective element of each tube.

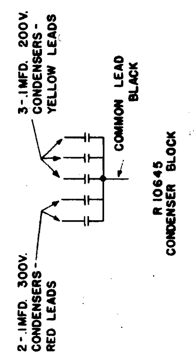
| TUBE | PLATE | SCREEN | CATHODE |
|---|---|---|---|
| 78 - Translator - | 160 | 60 | 2.5 |
| 41 - Oscillator - | 75 | 75 | 0 |
| 78 - IF - | 170 | 60 | 1 |
| 75 - AVC-Det-AF - | 70 | | .6 |
| 41 - Output - | 160 | 170 | 0 |
| 84 - Rectifier - | | | 170 |

# COLONIAL RADIO CORP.

MODEL 656
Schematic, Voltage
Trimmer Data




## TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

| TUBE | | PLATE | SCREEN | CATHODE |
|---|---|---|---|---|
| 78 - Translator | - | 200 | 65 | 3.2 |
| 41 - Oscillator | - | 105 | 105 | |
| 78 - IF | - | 220 | 65 | .5 |
| 75 - AVC-Det-AF | - | 65 | | .75 |
| 42 - Output | - | 210 | 220 | |

MODEL 656
Alignment

# COLONIAL RADIO CORP.

## ALIGNMENT PROCEDURE

### The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd condenser, to the control grid of the 78 IF tube, leaving the grid clip attached to the cap.

4. Set the test oscillator to 175 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the grid of the 78 translator tube and tune the IF input transformer.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

6. Repeat the procedure in order to secure greater accuracy.

### RF Alignment (Broadcast Band):

1. Set the test oscillator to 1650 kilocycles.

2. Couple the output of the oscillator to the antenna lead of the set, with the antenna connected.

3. Turn the variable condenser plates all the way out. With the wave band selecting switch in position "A", tune the oscillator trimmer for maximum output. The position of this trimmer is shown in the Service Illustration.

4. Set the test oscillator to 1400 kc and adjust the antenna and translator trimmers. The antenna trimmer is the one on the variable condenser section nearest the dial. The translator trimmer is accessible through the hole in the top of the translator coil shield as shown in the Service Illustration.

5. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the broadcast oscillator padder for maximum output. The location of this padding condenser is shown in the Service Illustration.

6. Repeat the 1650 kc and 1400 kc operations. Then repeat the 600 kc padding operation.

Always use an output from the test oscillator low enough to render the AVC action inoperative.

### Short Wave (Band "B") Alignment:

1. Leave the test oscillator coupled to the antenna lead as for broadcast alignment.

2. Set the test oscillator to 5000 kc. and tune in its signal. Screw the short wave (Band "B") antenna coil trimmer all the way in (maximum capacity). Then reduce the trimmer capacity until the output reaches a peak. A second peak may be obtained when the trimmer capacity is reduced still further. However, the correct position in which to leave the trimmer is the one using the maximum capacity, that is, with the trimmer condenser plates most nearly in a closed position.

3. Set the test oscillator to 1800 kc. and tune in its signal. If necessary, turns may be shifted on the short wave antenna coil to secure maximum output. If turns are shifted, it will be necessary to repeat the trimmer adjustment at 5000 kc.

### Short Wave (Band "C") Alignment:

1. Leave the test oscillator coupled to the antenna lead as before.

2. Set the test oscillator to 15 megacycles.

3. With the wave band selecting switch in position "C", tune the receiver to 15 megacycles.

4. Screw the short wave (Band "C") antenna coil trimmer all the way in (maximum capacity). Then reduce the trimmer capacity until the output reaches a peak. A second peak may be obtained, when the trimmer capacity is reduced still further. However, the correct position in which to leave the trimmer is the one using the maximum capacity, that is with the trimmer condenser plates most nearly in a closed position.

5. Set the test oscillator to 6 megacycles and tune in its signal. If necessary, turns may be shifted on the short wave (Band "C") antenna coil to secure maximum output. If turns are shifted. it will be necessary to repeat the trimmer adjustment at 15 megacycles.

As mentioned in the instructions for this receiver, either a conventional type antenna or a doublet can be used. If a doublet is used, the wave band selecting switch automatically changes connections on the broadcast band so that the doublet acts as a conventional antenna. Examination of the schematic will reveal that all three sections of the variable condenser are used only when the wave band selecting switch is in the BROADCAST position. In the short wave positions, "B" and "C", the variable condenser section nearest the dial is disconnected.

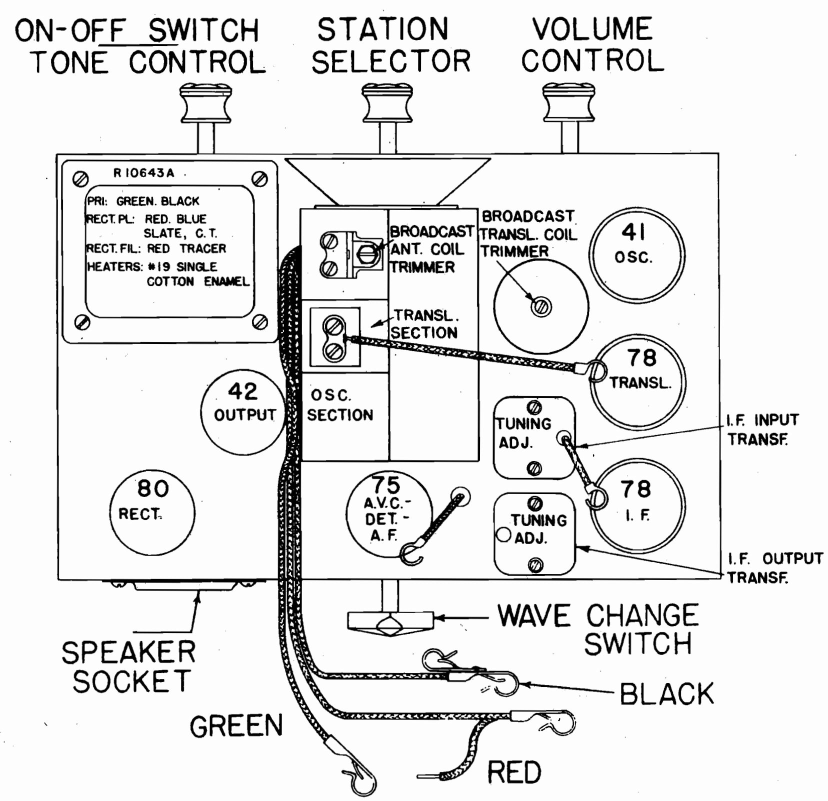
The 500 M ohms of the volume control is used to supply AVC voltage by utilizing the drop across it, due to the diode current of the 75 tube.

MODEL 656
Parts List
Socket Layout
Trimmers

# COLONIAL RADIO CORP.

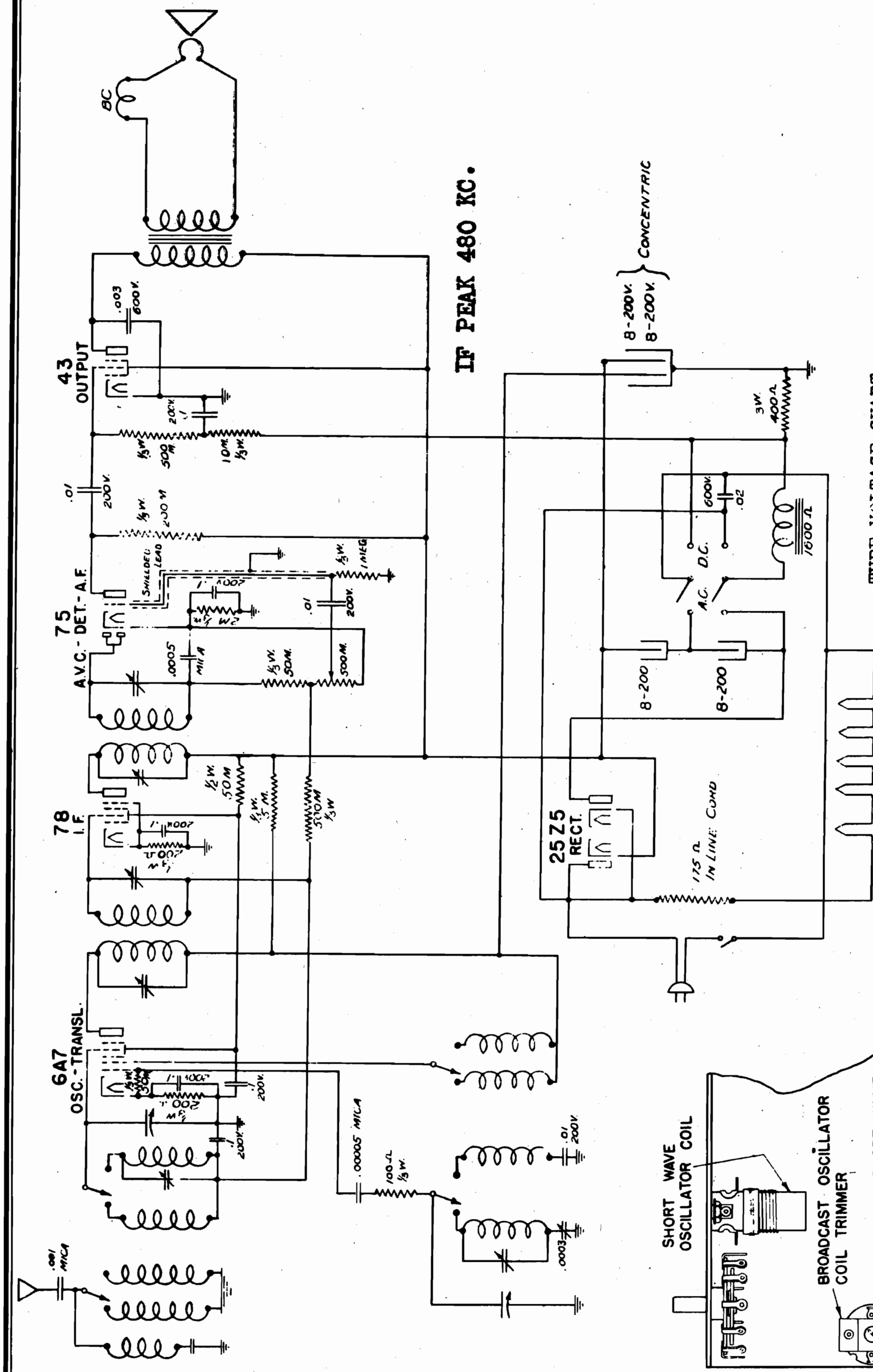
## REPLACEMENT PARTS AND PRICE LIST — MODEL 656

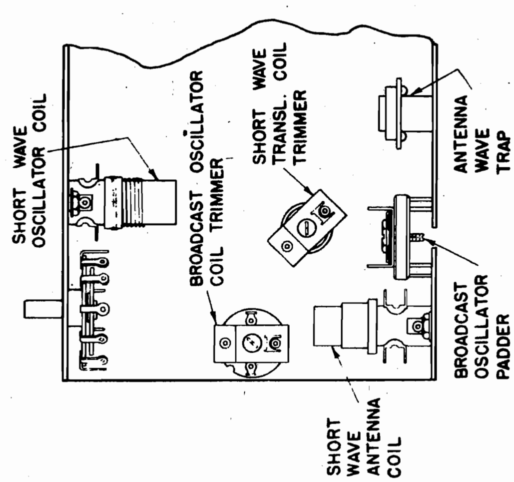
| PART NO. | DESCRIPTION |
|---|---|
| R10638 | Coil - Antenna, broadcast |
| R10883 | Coil - Oscillator, broadcast |
| R10642 | Coil - Translator, broadcast |
| R10926A | Coil - Antenna, short wave, Band "C" |
| R10926B | Coil - Antenna, short wave, Band "B" |
| R10926C | Coil - Oscillator, short wave, Band "C" |
| R10926E | Coil - Oscillator, short wave, Band "B" |
| R11014 | Collar - Stop, wave switch |
| R10644 | Condenser - Variable |
| R10644A | Condenser - Variable, with drive assembly |
| D4758P | Condenser - 8 mfd. electrolytic |
| R9426 | Condenser - Padding, 1200 mmf. |
| R10197 | Condenser - Trimmer, 25 mmf. |
| R10645 | Condenser - Block |
| R6444 | Condenser - .1 mfd. 200 volts |
| R6138 | Condenser - .1 mfd. 300 volts |
| R10647 | Condenser - .01 mfd. 600 volts |
| R6462 | Condenser - .01 mfd. 300 volts |
| R10646 | Condenser - .004 mfd. 600 volts |
| R10096 | Condenser - .003 mfd. 800 volts, in metal case |
| R7681 | Condenser - .003 mfd. 600 volts |
| R10495 | Condenser - .003 mfd. 200 volts |
| R6760 | Condenser - .0005 mfd. mica |
| R8297A | Board - Terminal, double |
| R8308A | Board - Terminal, triple |
| R10658 | Cabinet |
| R10930 | Card - Operating |
| R7011A | Clip - Red and green antenna leads |
| R7011B | Clip - Black ground lead |
| R11043 | Clip - Grid |
| R4592 | Condenser - .00025 mfd. mica |
| R8711 | Condenser - .000025 mfd. mica |
| R10742 | Control - Tone, 500 M ohms with switch |
| R10648 | Control - Volume, 500 M ohms |
| R7585 | Resistor - 1 megohm, 1/3 watt carbon |
| R7228 | Resistor - 500 M ohm, 1/3 watt carbon |
| R6638 | Resistor - 200 M ohm, 1/3 watt carbon |
| R7586 | Resistor - 100 M ohm, 1/3 watt carbon |
| R6637 | Resistor - 50 M ohm, 1/3 watt carbon |
| R6445 | Resistor - 50 M ohm, 1/2 watt carbon |
| R10465 | Resistor - 10 M ohm, 2 watt carbon |
| R7226 | Resistor - 5 M ohm, 1/3 watt carbon |
| R8972 | Resistor - 3 M ohm, 1/3 watt carbon |
| R6636 | Resistor - 1 M ohm, 1/3 watt carbon |
| R10652 | Resistor - 350 ohm, 1 watt carbon |
| R7227 | Resistor - 200 ohm, 1/3 watt carbon |
| R8922 | Resistor - 100 ohm, 1/3 watt carbon |
| R10656B | Transformer - IF input |
| R10657A | Transformer - IF output |
| R10643A | Transformer - Power |
| R8366 | Socket - 4 prong, speaker |
| R8315 | Socket - 4 prong |
| R8092 | Socket - 6 prong |
| R10549 | Socket - Pilot light |
| R10702 | Speaker |
| R10655A | Switch - Wave |



MODEL 657
Schematic,Voltage
Trimmers

# COLONIAL RADIO CORP.




## TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

| TUBE | PLATE | SCREEN | OSC.SEC. PLATE | OSC.SEC. GRID |
|---|---|---|---|---|
| 6A7 - Osc-Transl | 115 | 40 | 115 | -2.4 |
| 78 - IF | 135 | 40 | | |
| 75 - AVC-Det-AF | 105 | | | |
| 43 - Output | 125 | 135 | | |

MODEL 657
Alignment

# COLONIAL RADIO CORP.

In order to prevent interference from code stations, when the receiver is located near the coast, a wave trap is incorporated in the antenna circuit. Although this trap is shown in the schematic as a coil with a series condenser, actually it consists of two multilayer coils wound on top of each other with one end of each coil left unconnected. The distributed capacity between the coils is represented by the condenser in the schematic. The design of the coil is such that the combination of distributed capacity and inductance is resonant at about 600 meters, which is the frequency used by ships and also is very near the IF frequency of the receiver.

## The 75 AVC-Detector-AF Circuit:

The IF signal existing at the IF output transformer secondary is impressed between the diode plates and the cathode of the 75 tube, in series with the 500 M ohms of the Volume Control and the 50 M ohm resistor. Diode current flows, creating a voltage drop across these resistances. Only the drop across the Volume Control resistance is used for AVC voltage. The control grid returns of the 6A7 and 78 tubes are connected through filter resistances to one end of the Volume Control. This end is negative with respect to the other end of the control so that the voltage drop across it, due to the diode current, is impressed as negative bias on the control grids of the 6A7 and 78 tubes. Any increase in signal strength increases the 75 diode current, increases the voltage drop across the Volume Control, and so increases the negative bias of the 6A7 and 78 tubes with resultant decrease in tube amplification. Since increases in signal strength are offset by decreases in tube amplification, the input to the detector tends to remain at a constant value.

Any desired portion of the audio component across the Volume Control may be picked off by the movable arm of the control and fed through the .01 mfd. condenser to the triode section of the 75 tube. It is there amplified and then coupled to the 43 output tube.

## ALIGNMENT PROCEDURE

### The IF Stages:

1. Connect the output meter (low scale) across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the grid of the 78 IF tube, leaving the grid clip attached to the cap.

4. Set the test oscillator to 480 kc and tune the IF output transformer. The locations of the tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the grid of the 6A7 tube and adjust the IF input transformer.

6. Repeat the adjustments to secure greater accuracy.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

### RF Alignment (Broadcast):

1. Couple the test oscillator to the green antenna lead, leaving the antenna connected.

2. Set the test oscillator to 1660 kilocycles.

3. Turn the variable condenser plates all the way out. Then adjust the oscillator trimmer for maximum output. Some of these sets have a trimmer on the oscillator section of the variable condenser as well as one mounted on the broadcast oscillator coil. In others, the adjusting screw has been removed from the trimmer on the variable condenser and only the trimmer on the oscillator coil used. It will be found that in sets using both condensers, that maximum output cannot be reached even though one of the trimmers is screwed all the way in, making it necessary to use the other trimmer. In effect, both trimmers are in parallel when the Wave Switch is in the broadcast position.

4. Set the test oscillator to 1400 kc. and tune in its signal. Then adjust the trimmer on the translator section of the variable condenser for maximum output.

5. Set the test oscillator to 600 kc. and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the padder until maximum output is obtained.

6. Since the adjustments are interacting to an extent, it is advisable to repeat the entire operation.

Always use as low an output from the test oscillator as possible.

### Short Wave Alignment:

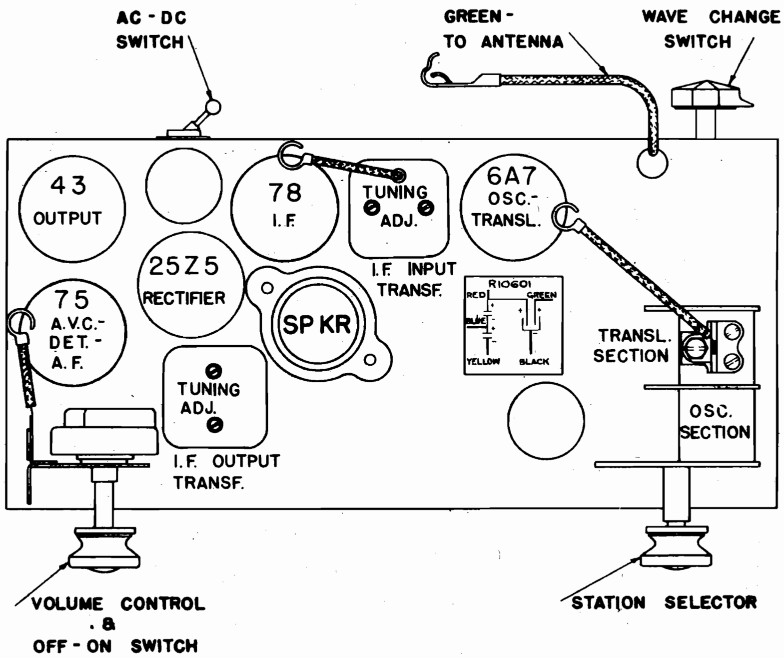
Set the test oscillator to 15 megacycles and tune in its signal. Then adjust the trimmer on the short wave translator coil for maximum output.

## HUM BALANCE

There is an Isolantite base condenser mounted under the chassis immediately below the volume control. This condenser is used to minimize hum. With the set detuned and the volume control on full, adjust this condenser until the point affording minimum hum is found.

MODEL 657
Socket Layout
Trimmers
Parts List

# COLONIAL RADIO CORP.

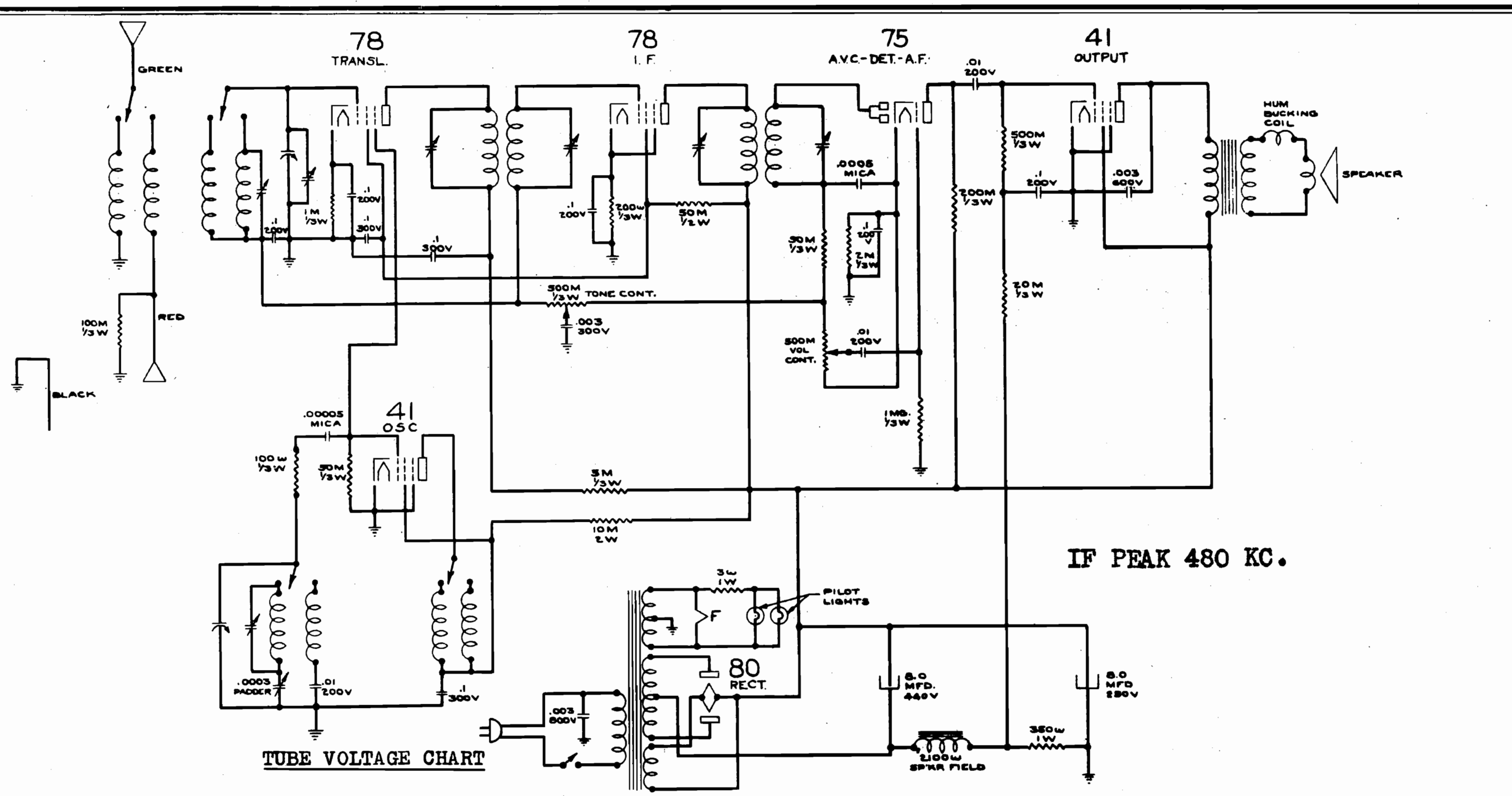



## REPLACEMENT PARTS AND PRICE LIST

| PART NO. | DESCRIPTION | PRICE |
|---|---|---|
| R8297A | Board - Terminal, double | .04 |
| R8308A | Board - Terminal, triple | .05 |
| R10859 | Cabinet | 5.58 |
| R7011A | Clip - Antenna and ground leads | .04 |
| R11043 | Clip - Grid | .01 |
| R10198 | Coil - Antenna | .56 |
| R10199 | Coil - Oscillator | .35 |
| R9565 | Coil - Antenna wave trap | .36 |
| R9829D | Coil - Antenna, short wave | .73 |
| R9829C | Coil - Oscillator, short wave | 1.01 |
| R10605 | Condenser - Variable | 2.82 |
| R10605A | Condenser - Variable, with pilot light bracket assembly | 3.42 |
| R10601 | Condenser - Electrolytic, dry, block | 3.89 |
| R10197 | Condenser - Trimmer, 25 mmf. | .15 |
| R9975 | Condenser - Padding, 325 mmf. | .37 |
| R6444 | Condenser - .1 mfd. 200 volts | .17 |
| R8301 | Condenser - .1 mfd. dual, 200 volts | .32 |
| R6761 | Condenser - .02 mfd. 600 volts | .18 |
| R8432 | Condenser - .01 mfd. 200 volts | .16 |
| R7681 | Condenser - .003 mfd. 600 volts | .16 |
| R6759 | Condenser - .001 mfd. mica | .25 |
| R6760 | Condenser - .0005 mfd. mica | .20 |
| R8621 | Condenser - .00005 mfd. mica | .20 |
| R7585 | Resistor - 1 megohm, 1/3 watt carbon | .18 |
| R7228 | Resistor - 500 M ohms, 1/3 watt carbon | .18 |
| R6638 | Resistor - 200 M ohms, 1/3 watt carbon | .18 |
| R6637 | Resistor - 50 M ohms, 1/3 watt carbon | .18 |
| R6445 | Resistor - 50 M ohms, 1/2 watt carbon | .20 |
| R7587 | Resistor - 10 M ohms, 1/3 watt carbon | .18 |
| R7226 | Resistor - 5 M ohms, 1/3 watt carbon | .18 |
| R6634 | Resistor - 2 M ohms, 1/3 watt carbon | .18 |
| R7227 | Resistor - 200 ohms, 1/3 watt carbon | .18 |
| R8922 | Resistor - 100 ohms, 1/3 watt carbon | .18 |
| R8562 | Resistor - 400 ohms, 3 watt, flexible | .21 |
| R9360 | Shield - Tube | .09 |
| R8366 | Socket - 4 prong | .07 |
| R8092 | Socket - 6 prong | .09 |
| R8072 | Socket - 7 prong | .10 |
| R8445 | Socket - Pilot light | .19 |
| R10600A | Speaker | 5.37 |
| R8076 | Switch - AC-DC | .93 |
| R10207 | Switch - Wave | .59 |
| R10208A | Transformer - IF input | 1.51 |
| R10209 | Transformer - IF output | 1.49 |

MODEL 658
Schematic, Voltage

# COLONIAL RADIO CORP.




IF PEAK 480 KC.

## TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

| TUBE | | PLATE | SCREEN | CATHODE |
|---|---|---|---|---|
| 78 - Translator | - | 200 | 85 | 3 |
| 41 - Oscillator | - | 100 | 100 | 0 |
| 78 - IF | - | 220 | 85 | .6 |
| 75 - AVC-Det-AF | - | 85 | | .4 |
| 41 - Output | - | 215 | 220 | 0 |

The voltage drop created across the 500 M ohms of the volume control, due to the diode current of the 75 tube, is used for AVC voltage.

## POWER TRANSFORMER COLOR CODE

PRIMARY: Green. Black.

RECTIFIER PLATE: Red. Blue. Slate, center tap.

RECTIFIER FILAMENT: #19 single cotton enamel with red tracer.

HEATERS: #19 single cotton enamel.

MODEL 658
Alignment, Trimmers
Socket Layout

# COLONIAL RADIO CORP.

## ALIGNMENT PROCEDURE

### The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the receiver chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the grid of the 78 IF tube. Leave the grid clip attached to the cap and the tube shield in place.

4. Set the test oscillator to 480 kc and tune the IF output transformer. The locations of the tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the control grid of the 78 translator tube and adjust the IF input transformer.

6. Repeat the adjustments to secure greater accuracy.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

### RF Alignment (Broadcast):

1. Couple the test oscillator to the green antenna lead, leaving the antenna connected.

2. Set the test oscillator to 1660 kilocycles.

3. Screw the oscillator padder condenser to approximately three quarters of its maximum capacity.

4. Turn the variable condenser plates all the way out. Then adjust the oscillator trimmer for maximum output.

5. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the translator trimmer, mounted on the variable condenser section nearer the dial, for maximum output.

6. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the padder until maximum output is obtained.

7. Repeat the 1660 kc and 1400 kc adjustments.

Always use as low an output from the test oscillator as possible.

### Short Wave Alignment:

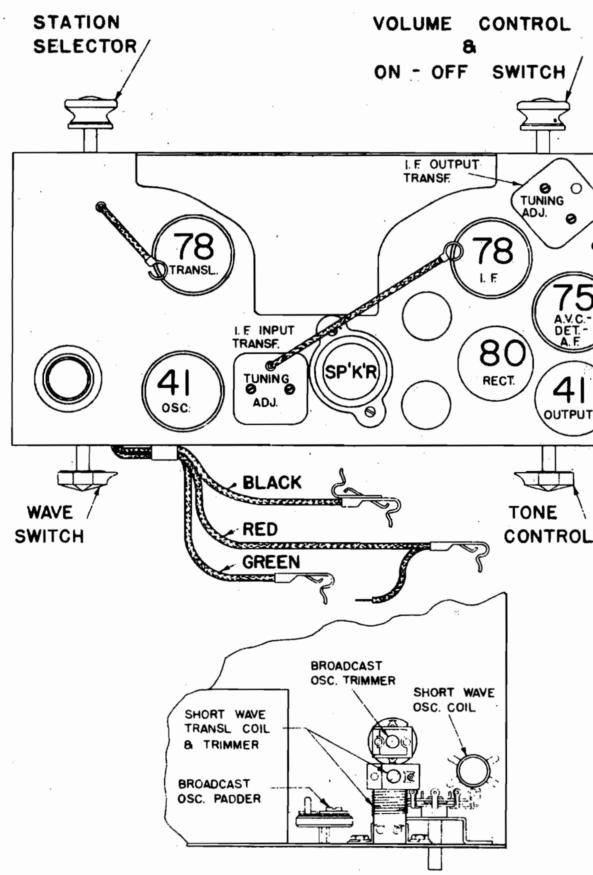
1. Leave the test oscillator coupled to the green antenna lead as for broadcast alignment.

2. Set the test oscillator to 16 megacycles and tune in its signal. Then adjust the trimmer condenser, mounted on the short wave translator coil, for maximum output.

In order to reduce the distributed capacity and thereby extend the high frequency limit of the receiver, the grid and plate leads to the oscillator coil and oscillator socket must be kept out in the open and as far removed from the metal of the chassis as possible.

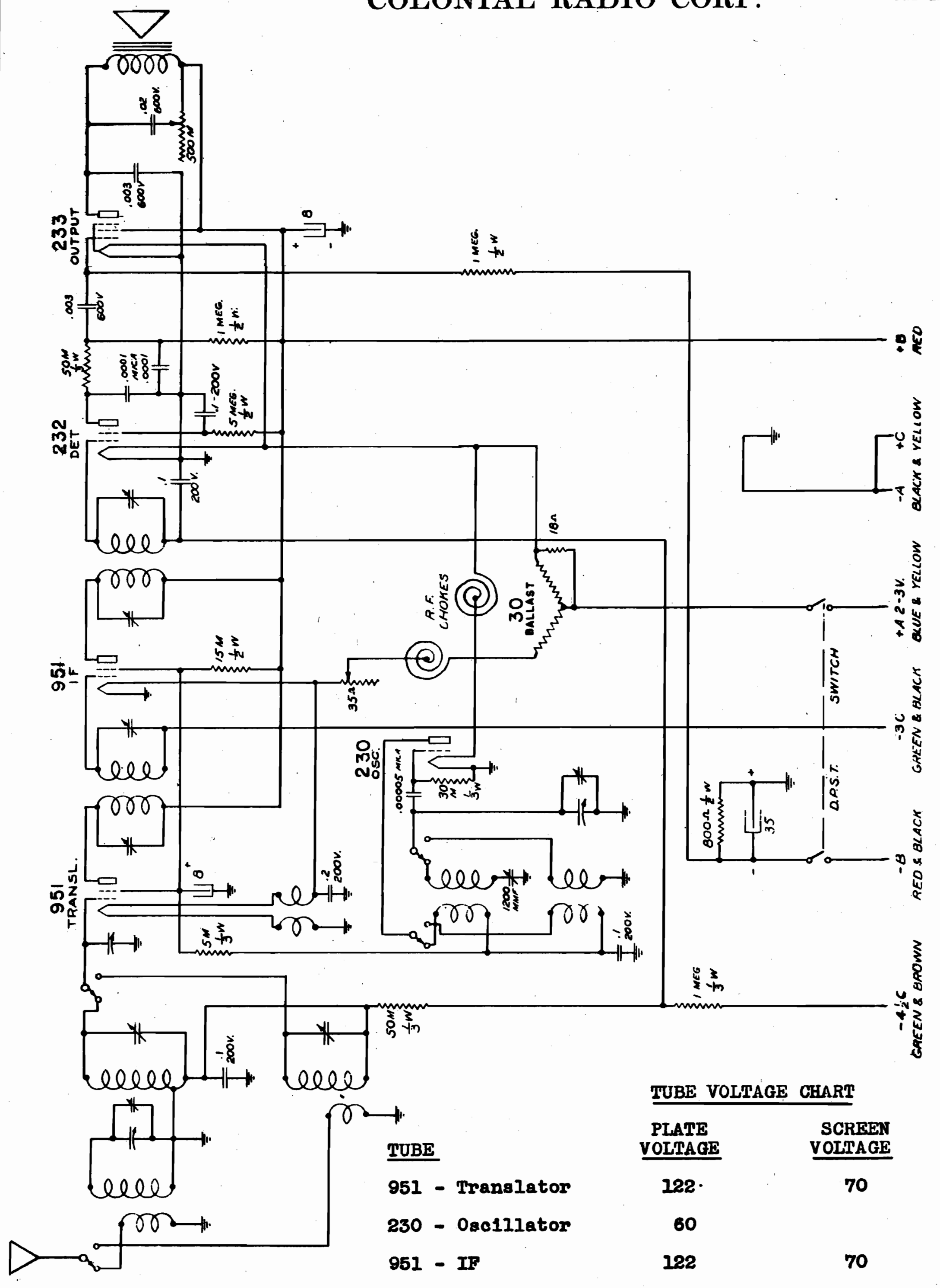
## TUBE REPLACEMENT

There are two wood screws inside the cabinet, at the upper rear corners. These are used to secure the cabinet top, for shipping purposes only. They can be easily removed if the rear panel of the cabinet is taken off. Once removed, they need not be replaced. To remove the cabinet top then, for tube replacement, take out the single screw at the top center of the rear panel and push the top up and off.



**MODEL 659**
**Schematic, Voltage**

# COLONIAL RADIO CORP.




IF PEAK 480 KC.

TUBE VOLTAGE CHART

| TUBE | PLATE VOLTAGE | SCREEN VOLTAGE | CONTROL GRID VOLTAGE |
|---|---|---|---|
| 951 - Translator | 122 | 70 | -.1 |
| 230 - Oscillator | 60 | | -.6 |
| 951 - IF | 122 | 70 | -.8 |
| 232 - Detector | 22.5* | 5* | -.1 |
| 233 - Output | 115 | 122 | -.1 |

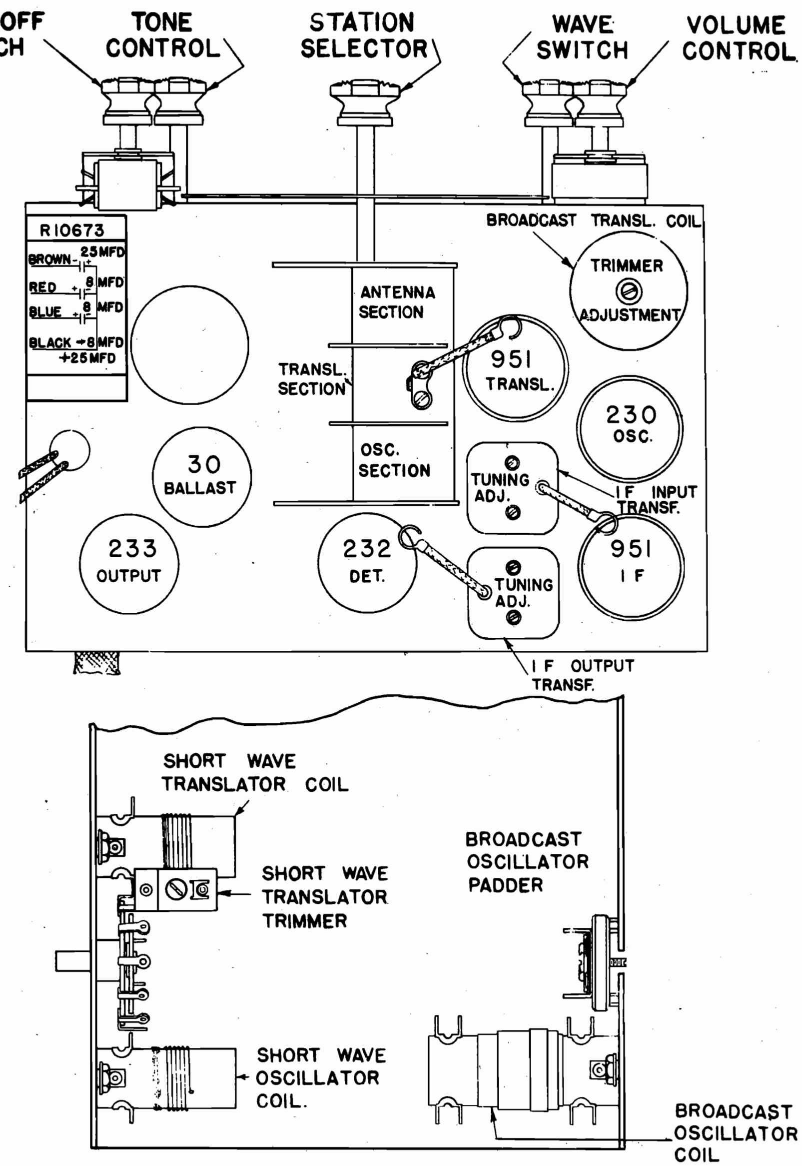
NOTE: All control grid readings are lower than the actual applied voltage due to high series resistance in the circuit.

* - Indicates low reading due to high series resistance in circuit.

All readings are to be taken between the chassis and the respective element of each tube.

**MODEL 659**
**Alignment, Parts**
**Socket, Trimmers**

# COLONIAL RADIO CORP.




## ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the output meter across the loud speaker terminals. The high scale (about 100 volts) of the meter should be used.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the control grid of the IF tube, leaving the grid clip attached to the cap.

4. Set the test oscillator to 480 kc. and tune the IF output transformer. The locations of the tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the grid of the translator tube and tune the IF input transformer.

6. Repeat the adjustments to secure greater accuracy.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

RF Alignment: (Broadcast)

1. Set the test oscillator to exactly 1600 kc.

2. Couple the output of the oscillator to the antenna lead of the set, with the antenna connected.

3. Turn the dial pointer to exactly 1600 kc. and adjust the oscillator trimmer for maximum output. The oscillator trimmer is on the variable condenser section furthest from the dial. Condenser plates are at minimum capacity

4. Set the test oscillator to 1400 kc. and tune in its signal. Then adjust the translator and antenna trimmers for maximum output. The translator trimmer is accessible through the hole in the top of the translator coil shield as shown in the Service Illustration. The antenna trimmer is the one on the variable condenser section nearest the dial.

5. Set the test oscillator to 600 kc. and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the padder until maximum output is obtained.

6. Repeat the 1600 kc. and 1400 kc. adjustments.

Short Wave Alignment:

1. Set the test oscillator to 15 megacycles and tune in its signal.

2. Adjust the short wave translator trimmer for maximum output.

3. If necessary, shift the end turns (enamelled wire) of the short wave translator coil to secure accurate alignment and maximum output. Do this at 6000 kc.

4. Re-adjust the translator trimmer at 15 megacycles.

## REPLACEMENT PARTS AND PRICE LIST

| PART NO. | DESCRIPTION |
|---|---|
| R8363 | Resistor - 5 megohms, 1/2 watt carbon |
| R5823 | Resistor - 1 megohm, 1/2 watt carbon |
| R7585 | Resistor - 1 megohm, 1/3 watt carbon |
| R6637 | Resistor - 50 M ohms, 1/3 watt carbon |
| R6110 | Resistor - 30 M ohms, 1/3 watt carbon |
| R7291 | Resistor - 15 M ohms, 1/2 watt carbon |
| R7226 | Resistor - 5 M ohms, 1/3 watt carbon |
| R7441 | Resistor - 800 ohms, 1/2 watt carbon |
| R10598 | Resistor - 18 ohms, 1/2 watt, flexible |
| R10670 | Coil - Antenna, broadcast |
| R10674 | Coil - Oscillator, broadcast |
| R10671 | Coil - Translator, broadcast |
| R10931A | Coil - Antenna, short wave |
| R10931B | Coil - Oscillator, short wave |
| R10672 | Condenser - Variable |
| R10672B | Condenser - Variable, complete with dial and drive assembly |
| R10673 | Condenser - Electrolytic, block |
| R9426 | Condenser - Padding |
| R10197 | Condenser - Trimmer |
| R6380 | Condenser - .2 mfd. 200 volts |
| R6444 | Condenser - .1 mfd. 200 volts |
| R6761 | Condenser - .02 mfd. 600 volts |
| R7681 | Condenser - .003 mfd. 600 volts |
| R4303 | Condenser - .0001 mfd. mica |
| R8621 | Condenser - .00005 mfd. mica |
| R10716A | Transformer - IF input |
| R10717 | Transformer - IF output |

CROSLEY RADIO CORP.

# Model 103

## Specifications

Model 103 is a five tube superheterodyne designed for operation from a six volt automobile storage battery. The "B" voltage is furnished by a Crosley Syncronode. The intermediate frequency used is 181.5 kc.

## Tubes and Voltage Limits

The following are the tubes and voltages measured with the receiver in operating condition but with no signal to the antenna, and with a battery voltage of 6.3 volts. All voltages are measured from tube contact to chassis with a 300 volt D. C. voltmeter (1000 ohms per volt).

| Tube | Position | Plate | Screen Grid | Cathode | Supp. Grid | Filament |
|---|---|---|---|---|---|---|
| 78 | R. F. Amplifier | 210 | 100 | 2 | 2 | 6.3 |
| 78 | Oscillator Modulator | 210 | 100 | 28 | 0 | 6.3 |
| 6B7 | I. F. Amplifier and Diode Detector | 210 | 100 | 2.5 | | 6.3 |
| 78 | Audio Amplifier | 50 | 20 | 2.0 | 2 | 6.3 |
| 41 | Output | 195 | 210 | 16.0 | | 6.3 |

**Voltage limits are plus or minus 15% of values given.**

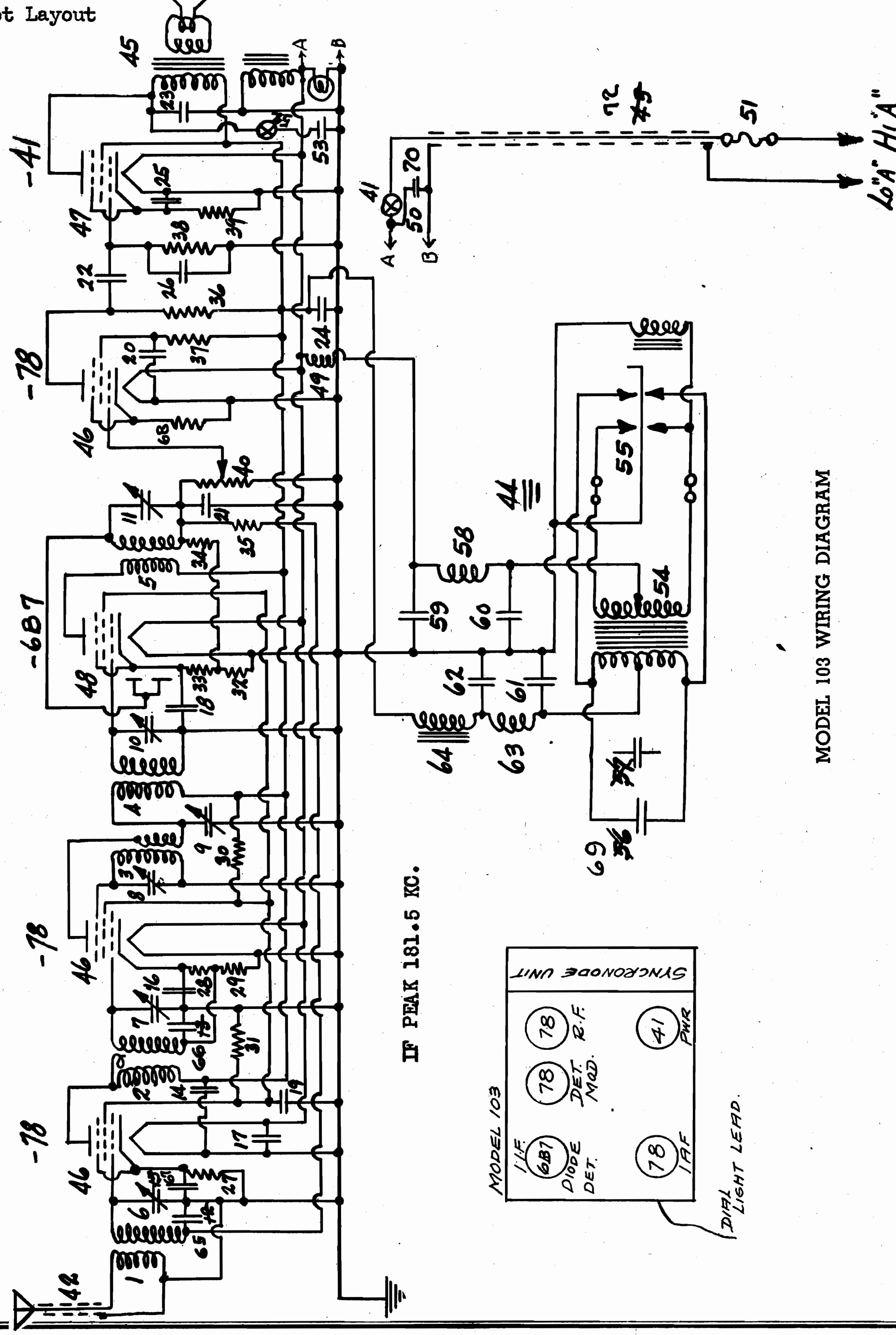
## PARTS LIST—MODEL 103

**INSTRUCTIONS FOR ORDERING**—Give part number, description of part, and serial number of receiver on which part is to be used. If article wanted is not listed separately, then that part of complete assembly containing this article should be ordered. Goods shipped on open account to Crosley Wholesale Distributors only. Cash must accompany Dealer and Consumer orders. Prices are subject to the usual trade discounts, and are subject to change without notice.

| Qty. | Part No. | Description | Item | List Each |
|---|---|---|---|---|
| | | **RECEIVER CHASSIS** | | |
| 1 | G48-28807 | Seven Prong Socket 6B7 | 48 | .10 |
| 1 | G22-28807 | Six Prong Socket 41 | 47 | .10 |
| 3 | G39-28807 | Six Prong Socket 78 | 46 | .10 |
| 1 | W-27981 | Tube Shield Base | | .05 |
| 1 | W-27328 | Tube Shield | | .10 |
| 1 | G21-24995 | Antenna Coil | 1 | .40 |
| 1 | G25-24996 | Oscillator Coil | 3 | .40 |
| 1 | G7-25968 | Radio Frequency Coil | 2 | .50 |
| 1 | G1-25444 | I. F. Transformer (1st) | 4 | .75 |
| 1 | G3-25445 | I. F. Transformer (2nd) | 5 | .75 |
| 4 | W-25200 | Coil Socket | | .05 |
| 3 | W-25024 | Coil Shield (Large) | | .10 |
| 1 | W-25025 | Coil Shield (Small) | | .10 |
| 1 | G1-29551 | Coil Shield Assembly | | .15 |
| 1 | W-29263 | Coil Bracket | | .05 |
| 5 | W-24360 | Insulating Washer | | .05 |
| 5 | W-21541B | Coil Retaining Ring | | .05 |
| 1 | L-29783 | Variable Condenser Gang | 6, 7, 8 | 3.25 |
| 1 | G1-29302 | Coupling Assembly | | .40 |
| 1 | W-30436 | Volume Control & Switch | 40, 41 | 1.10 |
| 2 | G2-25948 | I. F. Trimmer Condenser | 9, 11 | .30 |
| 1 | W-25008 | I. F. Condenser Blade | 10 | .05 |
| 1 | W-25584 | Mica | | .05 |
| 1 | R-80 | Screw | | .05 |
| 1 | W-26069B | Adjusting Nut | | .05 |
| 1 | W-24865 | Washer | | .05 |
| 1 | W-25450B | Insulating Washer | | .05 |
| 1 | W-25007B | Insulating Washer | | .05 |
| 1 | W-25446 | Bakelite Washer | | .05 |
| 1 | O-4 | Flat Washer | | .05 |
| 1 | M-20 | Rivet | | .05 |
| 1 | G4-28067 | "A" Choke | 49 | .35 |
| 2 | 21454 | Resistor 1 megohm | 34, 35 | .15 |
| 1 | 23785 | Resistor 500,000 ohm | 37 | .15 |
| 1 | 21875 | Resistor 100,000 ohm | 36 | .15 |
| 2 | 22514 | Resistor 750 ohm | 39, 68 | .15 |
| 1 | W-30127 | Resistor 450 ohm | 28 | .15 |
| 1 | W-21237 | Resistor 60,000 ohm | 31 | .15 |
| 1 | W-25357 | Resistor 75 ohm | 33 | .10 |
| 1 | W-21455 | Resistor 300,000 ohm | 38 | .15 |
| 1 | 31094 | Resistor 4,500 ohm | 71 | .15 |
| 2 | W-21964 | Resistor 165 ohm | 27, 32 | .15 |
| 1 | 23616 | Resistor 15,000 ohm | 30 | .15 |
| 1 | W-26571 | Condenser .005 Mfd | 21 | .15 |
| 1 | W-23142 | Condenser .02 Mfd | 22 | .20 |
| 1 | W-30419 | Condenser 8-8 Mfd | 24, 25 | 1.40 |
| 1 | W-23635 | Condenser .06 Mfd | 23 | .20 |
| 2 | W-20389 | Condenser .00005 Mfd | 26, 70 | .25 |
| 1 | W-23615 | Condenser .05 Mfd | 14 | .15 |
| 1 | W-25438 | Condenser .1-.1 Mfd | 19, 20 | .25 |
| 2 | W-24049A | Condenser .1 Mfd | 17, 18 | .15 |
| 4 | W-27203 | Condenser .02 Mfd | 16, 65, 66, 67 | .15 |
| | | **MODEL 409 SYNCRONODE** | 44 | |
| 1 | L-30424 | Cover | | .50 |
| 1 | C-30455 | Chassis | | .50 |
| 1 | L-29160 | Vibrator Assembly | 55 | 4.50 |
| 1 | G2-28067 | "A" Choke Assembly | 58 | .35 |
| 1 | G7-28065 | Power Transformer | 54 | 2.25 |
| 1 | G1-24234 | R. F. Choke Assembly | 63 | .15 |
| 1 | G7-28069 | Filter Choke | 64 | 1.45 |
| 1 | W-29808 | Condenser 12 Mfd | 62 | 1.35 |
| | | **MODEL 409 SYNCRONODE** | | |
| 1 | W-30367 | Condenser .25 Mfd | 60 | .30 |
| 1 | W-30366 | Condenser .5 Mfd | 59 | .50 |
| 1 | W-23142 | Condenser .02 Mfd. (400 v.) | 61 | .20 |
| 1 | W-30984 | Condenser .02 Mfd. (800 v.) | 69 | .30 |
| 4 | W-29314 | Rubber Sleeve (to Mount Sync.) | | .05 |
| 1 | W-20264 | Terminal Board | | .15 |
| | | **MODEL 353-3C SPEAKER** | 45 | |
| 1 | G2-29529 | Cone Assembly | | 2.50 |
| 1 | W-29777 | Field Coil | | 1.00 |
| 1 | G4-24628 | Transformer Assembly | | 1.40 |
| | | **MISCELLANEOUS** | | |
| 1 | L-30452 | Receiver Case | | .65 |
| 1 | C-30450 | Cover | | .25 |
| 1 | C-30451 | Bottom | | .25 |
| 1 | L-28034 | Remote Control | | 4.11 |
| 1 | W-28102A | Clamp Spring | | .15 |
| 8 | W-20070 | Suppressor (Spark Plug) | | .50 |
| 1 | W-20071 | Suppressor (Dist. Head) | | .50 |
| 3 | W-29754 | Elim. Condenser | | .45 |
| 1 | W-25784 | Tennaflex | | 1.50 |
| 1 | W-29323 | Mounting Bolt | | .10 |
| 1 | W-29324 | Mounting Washer | | .05 |
| 1 | 7961 | Mntg. Shakeproof Washer | | .05 |
| 1 | W-29325 | Mounting Nut | | .05 |
| 2 | W-30739 | No. 8x½ P. K. Screw (Top & Bottom) | | .05 |
| 4 | W-30739 | No. 8x½ P. K. Screw (Chassis to case) | | .05 |
| 30 | W-31050 | No. 8x¼ P. K. Screw (Case) | | .05 |
| 4 | W-31070 | 6-32x½ Screw (Speaker) | | .05 |
| 4 | W-24074 | Elastic Stop Nut (Speaker) | | .05 |
| 4 | O-6 | Flat Washer (Speaker) | | .05 |
| 3 | W-20800 | Shakeproof Washer (Spr.) | | .05 |
| 1 | W-4562 | Solder Lug (Speaker) | | .05 |
| 1 | G1-25891 | Antenna Wire | | .75 |
| 1 | W-28010 | Antenna Wire Shield | 42 | .25 |
| 1 | W-31100 | "A" Cable & Fuse Assem. | 72 | .55 |
| 1 | W-31102 | Fuse Carrier only | | .10 |
| 1 | W-20106 | Fuse Carrier Cap | | .05 |
| 1 | W-20110 | Spring | | .05 |
| 2 | W-20107 | Washer | | .05 |
| 1 | W-31103 | 10 Ampere Fuse | | .10 |
| 66" | W-31101 | Wire | | .03 Ft. |
| 1 | W-31076 | Lug | | .05 |
| 1 | W-26156A | Switch | 52 | .30 |
| 1 | W-23191 | Condenser .01 Mfd | 53 | .25 |
| 1 | W-29298 | Grill Cloth | | .15 |
| 1 | B-29309 | Mounting Plate | | .20 |
| | | **REMOTE CONTROL** | | |
| 1 | G8-25868 | Drive Shaft Assem. (V. C.) | | 1.65 |
| 1 | G9-25868 | Drive Shaft Assem. (Dial) | | 1.55 |
| 1 | G1-28035 | Strap Assembly | | .15 |
| 1 | W-28029B | Column Bracket | | .20 |
| 1 | G4-26317 | Bracket Assem. | | .30 |
| 1 | W-29316A | Gear Dial | | .30 |
| 1 | W-4907 | Spring Washer | | .05 |
| 1 | G5-23472 | Knob | | .10 |
| 1 | G1-28036 | Key Knob | | .20 |
| 1 | B-26307D | Housing | | .50 |
| 1 | W-28025C | Cover | | .30 |

MODEL 103
Schematic
Socket Layout

CROSLEY RADIO CORP.



MODEL 169
Voltage, Parts List

CROSLEY RADIO CORP.

# Model 169

## Specifications

Model 169 is a four-tube superheterodyne designed for operation from AC electric circuits. It uses an intermediate frequency of 456 kc.

## Tubes And Voltage Limits

The following are the tubes and voltages measured with the receiver in operating condition but with no signal to the antenna circuit, and with a line voltage of 117.5 volts (235 for a 220 volt receiver). All voltages, except filament, are measured from tube contact to chassis with a 500 volt (1000 ohms per volt) DC voltmeter. Filament voltages are measured with a low range AC voltmeter.

| Tube | Position | Plate | Screen Grid | Cathode | Supp. Grid | Filament |
|---|---|---|---|---|---|---|
| 58 | Oscillator-modulator | 165 | 82 | 22 | 0 | 2.5 |
| 6F7 | I. F. Detector | 165 | 82 | 2 | 0 | 2.5 |
| 2A5 | Output | 158 | 165 | 10 | | 2.5 |
| 80 | Rectifier | 295 | | | | 4.9 |

**Voltage limits are plus or minus 10% of values given.**

## PARTS LIST—MODEL 169

**INSTRUCTIONS FOR ORDERING—Give part number, description of part, and serial number of receiver on which part is to be used. If article wanted is not listed separately, then that part of complete assembly containing this article should be ordered. Goods shipped on open account to Crosley Wholesale Distributors only. Cash must accompany Dealer and Consumer orders. Prices are subject to the usual trade discounts, and are subject to change without notice.**

* Figures in 2nd last column refer to parts shown in diagram.

| Qty. | Part No. | Description | * | List Price Each |
|---|---|---|---|---|
| 1 | G20-24995 | Antenna Coil | 2 | .65 |
| 1 | G17-24996 | Oscillator Coil | 3 | .80 |
| 1 | G7-25444 | First I. F. Transformer | 4 | .60 |
| 1 | G9-25445 | Second I. F. Transformer | 5 | .50 |
| 1 | W25024 | Coil Shield (Large) | | .10 |
| 3 | W25025 | Coil Shield (Small) | | .10 |
| 4 | W25200 | Coil Socket | | .05 |
| 2 | W26891 | Insulating Washer | | .05 |
| 2 | W24360 | Insulating Washer | | .05 |
| 4 | W21541B | Coil Retaining Ring | | .05 |
| 1 | W28959 | Wave Change Switch | 40 | .80 |
| 1 | W27425 | Variable Condenser Gang | 6 | 2.75 |
| 1 | G1-27812 | Dial Light Assem. | 43 | .20 |
| 1 | G5-25050 | Dial Assem. | | .40 |
| 1 | G2-25948 | Variable I. F. Condenser (1st I. F. Pri.) | 7 | .30 |
| 1 | G10-25948 | Variable I. F. Condenser (2nd I. F. Sec.) | 9 | .15 |
| 1 | W27548 | Adjustable I. F. Cond. Blade (1st I. F. Sec.) | 8 | .05 |
| 1 | W25584 | Mica | | .05 |
| 1 | R-80 | Screw | | .05 |
| 1 | W26069B | Adjusting Nut | | .05 |
| 1 | W24865 | Metal Washer | | .05 |
| 1 | W25450B | Insulating Washer | | .05 |
| 1 | W25007B | Insulating Washer | | .05 |
| 1 | W25446 | Bakelite Washer (Large) | | .05 |
| 1 | 0-4 | Washer | | .05 |
| 1 | M-20 | Rivet | | .05 |
| 1 | W20264 | A G. Terminal | 1 | .15 |
| 1 | G24-27456 | Socket -58 | 32 | .10 |
| 1 | G49-27456 | Socket -6F7 | 33 | .10 |
| 1 | G43-27456 | Socket -2A5 | 34 | .10 |

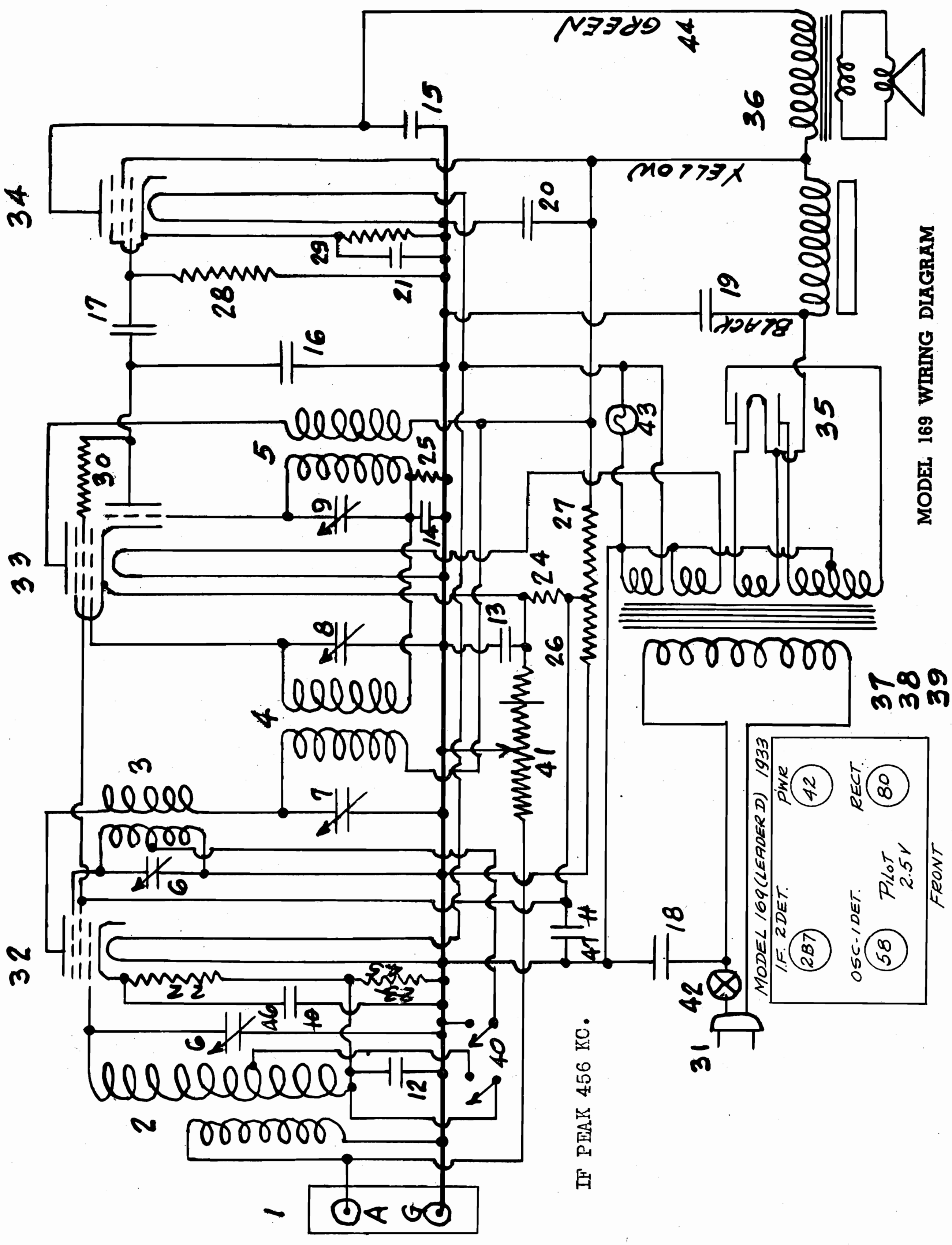
| Qty. | Part No. | Description | * | List Price Each |
|---|---|---|---|---|
| 1 | G6-27456 | Socket -80 | 35 | .10 |
| 2 | W-26010 | Tube Shield Base | | .05 |
| 1 | W-27328 | Tube Shield (6F7) | | .10 |
| 1 | B-26009 | Tube Shield (58) | | .10 |
| 1 | B-21491 | AC Cable & Plug | 31 | .25 |
| 1 | W31009A | Speaker Cable | 44 | .25 |
| 1 | W26573B | Volume Control & Switch | 41-42 | 1.00 |
| 2 | G1-23472 | Knobs | | .10 |
| 1 | G1-28500 | Power Transf. 110 volt, 60 cy. | 37 | 2.25 |
| 1 | G2-28500 | Power Transf. 110 volt, 25 cy. | 38 | 3.00 |
| 1 | G3-28500 | Power Transf. 220 volt, 25 cy. | 39 | 3.25 |
| | | **FILTER & BYPASS CONDENSERS** | | |
| 1 | W27204 | Condenser .02-.02 Mfd. | 12-13 | .25 |
| 1 | W24049 | Condenser .1 Mfd. | 14 | .15 |
| 1 | W23191 | Condenser .01 Mfd. | 15 | .25 |
| 1 | W25537 | Condenser .001-.03 Mfd. | 16-17 | .30 |
| 1 | W29592 | Condenser .003 Mfd. | 18 | .20 |
| 2 | W27203 | Condenser .02 Mfd. | 46-47 | .15 |
| 1 | W29150 | Condenser 6 -7 -8 Mfd. | 19-20 21 | 2.90 |
| | | **RESISTORS** | | |
| 1 | W25937 | Resistor 275 ohm | 22 | .15 |
| 1 | 24990 | Resistor 25,000 ohm | 24 | .20 |
| 1 | 21454 | Resistor 1 megohm | 25 | .15 |
| 1 | W28471 | Resistor 25000-8500 ohm | 26-27 | .45 |
| 2 | 23785 | Resistor 500,000 ohm | 28-30 | .15 |
| 1 | W25521 | Resistor 450 ohm | 29 | .15 |
| 1 | 31094 | Resistor 4500 ohm | 45 | .15 |

### SPEAKER PARTS * 36

| | Magnavox 342-2M Spec. 1300 | Jensen 342-2J Spec. 2617 | | |
|---|---|---|---|---|
| 1 | 28761 | 29434 | Cone & Voice Coil Assem. | 2.00 |
| 1 | 28763 | 29436 | Field Coil | 1.10 |
| 1 | 28764 | 29437 | Transformer | 1.25 |

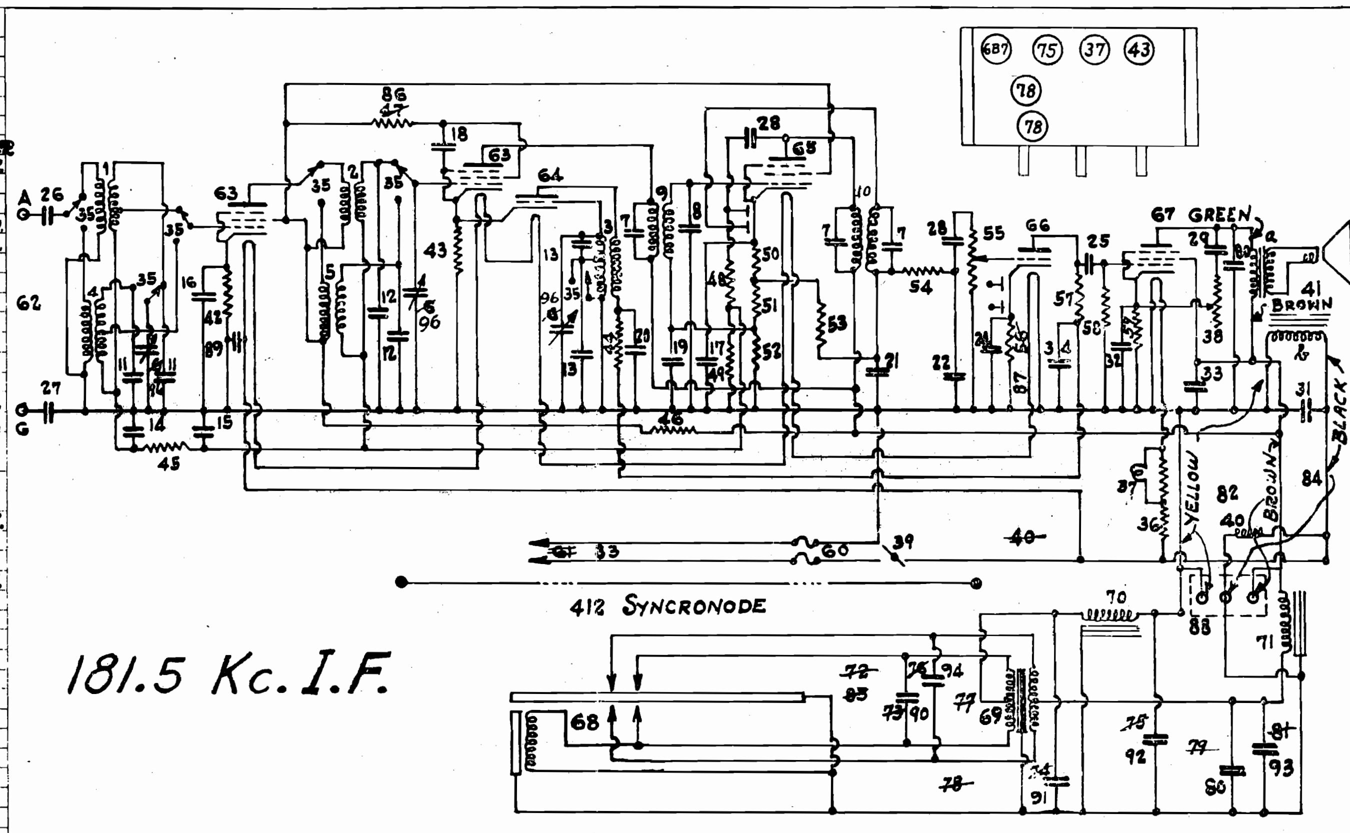
MODEL 169
Schematic
Socket Layout

CROSLEY RADIO CORP.



# CROSLEY RADIO CORP.

**MODEL 119**
**Schematic, Socket Parts List**




| | | |
|---|---|---|
| 1 | G7-24995 | Lo.F. ANT. TRANS. |
| 2 | G2-25968 | Lo.F. R.F. TRANS. |
| 3 | G18-24996 | OSCILLATOR COIL |
| 4 | G14-24995 | HI.F. ANT. TRANS. |
| 5 | G8-25968 | HI.F. R.F. TRANS. |
| 6 | ~~[illegible]~~ | ~~VARIABLE COND.~~ |
| 7 | ~~G1-25940~~ | ~~I.F. TUNING CONDENSER~~ |
| 8 | W-25008A | I.F. TUNING CONDENSER |
| 9 | G1-25444 | 1ST I.F. TRANS. |
| 10 | G6-25444 | 2ND I.F. TRANS. |
| 11 | G1-29699 | ANT. TRANS. TRIM. COND. |
| 12 | G1-29699 | R.F. TRANS. TRIM. COND. |
| 13 | G1-29699 | OSC. COIL TRIM. COND. |
| 14 | W-27204 | 0.02 MFD. 200V. |
| 15 | | 0.02 MFD. 200V. |
| 16 | W-27204 | 0.02 MFD. 200V. |
| 17 | | 0.02 MFD. 200V. |
| 18 | W-27203 | 0.02 MFD. 200V. |
| 19 | W-27203 | 0.02 MFD. 200V. |
| 20 | W-27203 | 0.02 MFD. 200V. |
| 21 | W-26152A | 0.00015 MFD. 400V. |
| 22 | | 0.0001 MFD. 400V. |
| 23 | W-23142 | 0.02 MFD. 400V. |
| 24 | W-24784 | 0.25 MFD. 200V. |
| 25 | W-23615 | 0.05 MFD. 400V. |
| 26 | W-23635 | 0.006 MFD. 400V. |
| 27 | W-27688 | 0.1 MFD. 400V. |
| 28 | W-27540 | 0.0005 MFD. 400V. |
| 29 | W-25517A | 0.05 MFD. 400V. |
| 30 | | 0.008 MFD. 400V. |
| 31 | W-24049 | 0.1 MFD. 200V. |
| 32 | W-30568A | 8 MFD. 25V. |
| 33 | | 18 MFD. 250V. |
| 34 | | 8 MFD. 250V. |
| 35 | B-30569-C | 6P. D.T. SWITCH |
| 36 | W-30574 | 12Ω/W. 18Ω |
| 37 | W-4099 B | 6.3V. DIAL LIGHT |
| 38 | W-25594B | TONE CONTROL |
| 39 | | S.P.S.T. SWITCH |
| 40 | G3-28067 | FILTER CHOKE |
| 41 | 30591 A | 338-3R SPEAKER |
| 42 | W-25937 | 275Ω |
| 43 | W-30127 | 450Ω |
| 44 | 21876 | 10,000Ω |
| 45 | 23785 | 500,000Ω |
| 46 | W-23013 | 2000Ω |
| 47 | ~~26690~~ | ~~4500~~ |
| 48 | 26577 | 3 MEG. |
| 49 | 26577 | 3 MEG. |
| 50 | W-21964 | 165Ω |
| 51 | W-21964 | 165Ω |
| 52 | W-25937 | 275Ω |
| 53 | 21454 | 1 MEG. |
| 54 | 23785 | 500,000Ω |
| 55 | W-25666B | LEVEL CONTROL |
| 56 | ~~26690~~ | ~~4500Ω~~ |
| 57 | 21455 | 300,000Ω |
| 58 | 23785 | 500,000Ω |
| 59 | W-23907 | 750Ω |
| 60 | W-7983-A | 3 AMP. FUSE |
| 61 | ~~B-21491-A~~ | ~~CORD & PLUG~~ |
| 62 | G7-26719 | ANT.-GND. TERM. |

| | | |
|---|---|---|
| 95 | G20-25948 | I.F. TUNING CONDENSER |
| 96 | G10-33002 | VARIABLE CONDENSER |
| 97 | | |
| 98 | | |
| 63 | G39-27456 | 78 SOCKET |
| 64 | G12-27456 | 37 SOCKET |
| 65 | G48-27456 | 6B7 SOCKET |
| 66 | G41-27456 | 75 SOCKET |
| 67 | G30-27456 | 43 SOCKET |
| 68 | L-28949 | VIBRATOR ASSEM. |
| 69 | G2-28065 | POWER TRANS. |
| 70 | G5-28168 | 'A' FILTER CHOKE |
| 71 | G2-28069 | 'B' FILTER CHOKE |
| 72 | ~~W-28066B~~ | ~~0.01 MFD. 600V.A.C.~~ |
| 73 | ~~W-29012~~ | ~~2.5 MFD. 80V.~~ |
| 74 | | ~~12 MFD. 40V.~~ |
| 75 | ~~W-28682~~ | ~~0.1 MFD. 200V.~~ |
| 76 | ~~W-28622~~ | ~~0.1 MFD. 200V.~~ |
| 77 | | ~~0.1 MFD. 200V.~~ |
| 78 | ~~W-23012-A~~ | ~~40Ω~~ |

| | | |
|---|---|---|
| 99 | | |
| 100 | | |
| 101 | | |
| 102 | | |
| 79 | ~~W-28682~~ | ~~0.1 MFD. 200V.~~ |
| 80 | W-28978-B | 12 MFD. 150V. |
| 81 | ~~W-30367~~ | ~~0.25 MFD. 160V.~~ |
| 82 | W-28980 | 'A'+B SUPPLY CABLE |
| 83 | B-30375-A | CORD + PLUG |
| 84 | W-31007 | SPEAKER CABLE |
| 85 | ~~W-29810 A~~ | ~~.01 MFD. 300V.A.C.~~ |
| 86 | 31094 | 4500Ω |
| 87 | 31094 | 4500Ω |
| 88 | G2-31128 | SYN. TERM. BOARD |
| 89 | W-20707 | .0005 MFD. MICA |
| 90 | W-31404 | .5 MFD. 300V. |
| 91 | W-31403-A | .12 MFD. 40V. |
| 92 | W-30366 | .5 MFD. |
| 93 | W-30366 | .5 MFD. |
| 94 | W-29810 | .01 MFD. 800V.A.C. |

| | | | |
|---|---|---|---|
| A | ITEM 61 REPLACED BY 83 | 8-29-33 | S-392 |
| B | ITEM 56 MARKED 300,000Ω THRU ERROR | 9-20-33 | 3505 |
| C | ITEM 84 ADDED. ITEM 41 WAS 30591 | 10-11-33 | 3518 |
| D | ITEM 72 REPLACED BY 85 ITEM 35 CHANGED TO "B" | | 3519 |
| E | ITEM 47 REPLACED BY 86 ITEM 56 REPLACED BY 87 | 10-24-33 | 3523 |
| F | ITEM 88 ADDED | 11-7-33 | 3529 |
| G | ITEM 89 ADDED | 11-21-33 | 3536 |
| H | 401 SYNCRONODE REPLACED WITH 412 | | S-457 |
| J | POSITION OF ITEM 40 CHANGED | 12-21-33 | S-465 |
| K | ITEM 94 ADDED | 1-17-34 | S-478 |
| L | ITEM 80 CHG'D. TO "B" ITEMS 32-33-34-31 CHG'D. TO "A" | 4-11-34 | S-526 |
| M | ITEM 7 REPLACED BY ITEM 95 | 4-17-34 | S-530 |
| N | ITEM 6 REPLACED BY ITEM 96 | 4/8/34 | 3596 |

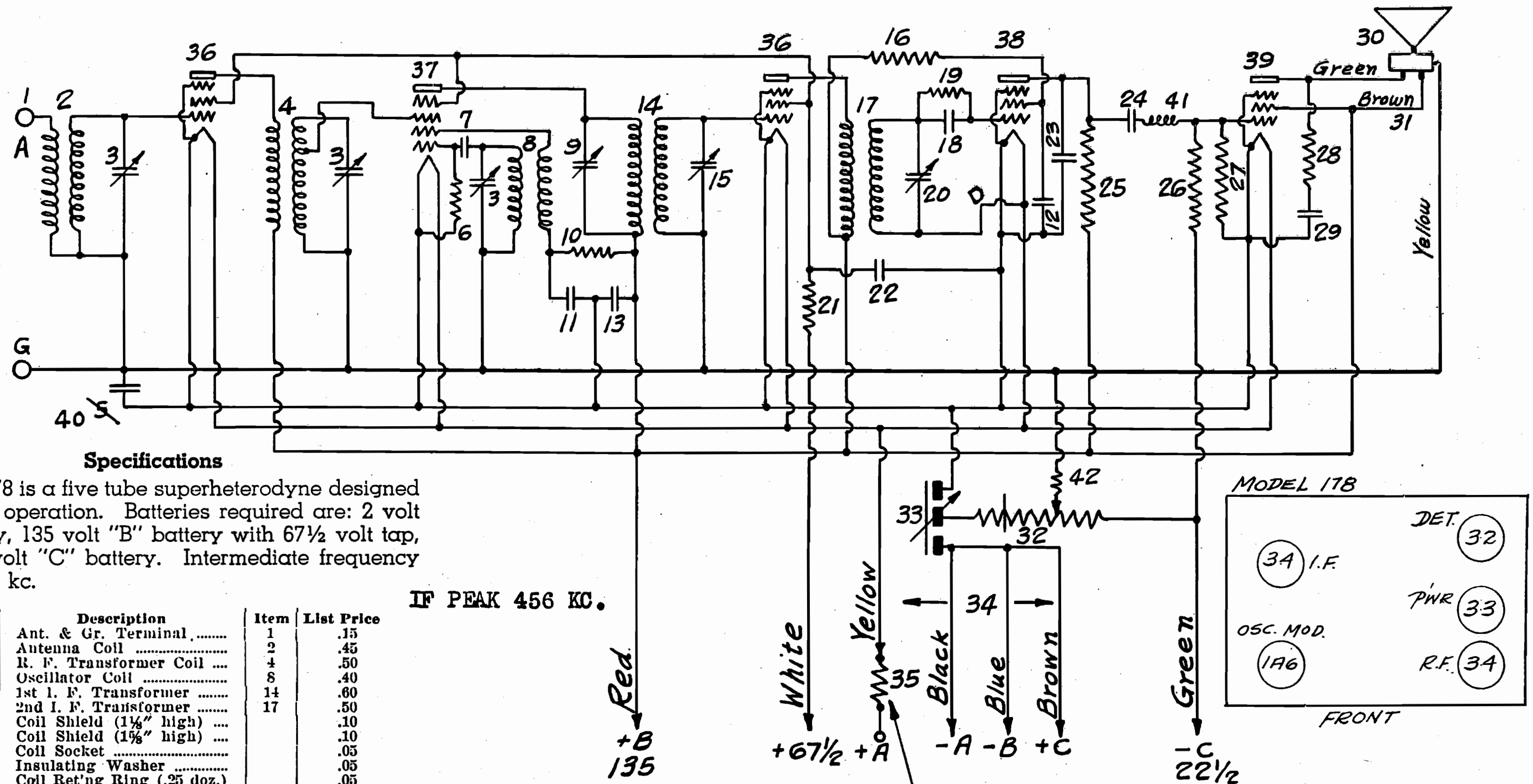
THE CROSLEY RADIO CORPORATION, CINCINNATI, OHIO

119 WIRING DIAGRAM

| APPROVED | DATE | DWG. NO. |
|---|---|---|
| 8-18-33 | 8-12-33 | B-30570 |

**MODEL 178**
**Schematic, Voltage**
**Parts List, Socket**

# CROSLEY RADIO CORP.




**IF PEAK 456 KC.**

**MODEL 178 WIRING DIAGRAM**

### Specifications

Model 178 is a five tube superheterodyne designed for battery operation. Batteries required are: 2 volt "A" battery, 135 volt "B" battery with 67½ volt tap, and 22½ volt "C" battery. Intermediate frequency used is 456 kc.

| Part No. | Description | Item | List Price |
|---|---|---|---|
| LW20264 | Ant. & Gr. Terminal | 1 | .15 |
| G10-24995 | Antenna Coil | 2 | .45 |
| G8-25968 | R. F. Transformer Coil | 4 | .50 |
| G13-24996 | Oscillator Coil | 8 | .40 |
| G7-25444 | 1st I. F. Transformer | 14 | .60 |
| G9-25445 | 2nd I. F. Transformer | 17 | .50 |
| W25025A | Coil Shield (1⅛" high) | | .10 |
| W25024A | Coil Shield (1⅝" high) | | .10 |
| W25200 | Coil Socket | | .05 |
| W24300 | Insulating Washer | | .05 |
| W21541B | Coil Ret'ng Ring (.25 doz.) | | .05 |
| B28974 | Tuning Condenser gang | 3 | 3.25 |
| G11-25050 | Dial Drive Assembly | | .30 |
| G2-25048 | I. F. Tuning Condenser | 9 | .30 |
| W27548 | I. F. Tuning Cond. Blade | 15 | .05 |
| W25584 | Mica Insulator | | .05 |
| R80 | Screw | | .05 |
| W26009B | Adjusting Nut | | .05 |
| W24865 | Metal Washer (Round) | | .05 |
| W25450B | Insulating Washer (Small) | | .05 |
| W25007B | Insulating Washer (Small) | | .05 |
| W25446 | Bakelite Washer (Large) | | .05 |
| O4 | Washer | | .05 |
| M20 | Rivet | | .05 |
| G13-25048 | I. F. Tuning Condenser | 20 | .15 |
| G31-27456 | -34 Socket | 36 | .10 |
| G55-27456 | -1A6 Socket | 37 | .10 |
| G10-27456 | 32 Socket | 38 | .10 |
| G36-27456 | 33 Socket | 39 | .10 |
| W20973A | Tube Shield Base | | .05 |
| W26974B | Tube Shield | | .10 |
| B30542A | Battery Cable | 34 | .70 |
| W27933 | Speaker Cable | 31 | .10 |
| W27030B | Vol. Control & Switch | 32-33 | 1.10 |
| G1-24234 | R. F. Choke | 41 | .30 |
| G1-23472 | Knobs | | .10 |
| B27818 | Bottom | | .20 |

**FILTER & BY PASS CONDENSERS**

| | | | |
|---|---|---|---|
| W5382 | 0.00025 Mfd. Cond. | 7-18 | .15 |
| W25438 | 0.1-0.1 Mfd. 200 V. Cond. | 11-12 | .25 |
| W24784 | 0.25 Mfd. 200 V. Cond. | 13 | .20 |
| W30321 | 1.0 Mfd. 160 V. Cond. | 22 | .55 |
| W25537 | 0.001-0.03 Mfd. 400 V. Cond. | 23-24 | .30 |
| W26559 | 0.006 Mfd. 200 V. Cond | 29 | .15 |
| W30366 | 0.5 Mfd. 160 V. Cond. | 40 | .50 |

**RESISTORS**

| | | | |
|---|---|---|---|
| W21875 | 100,000 Ohm Resistor | 6-42 | .15 |
| W22196 | 20,000 Ohm Resistor | 10 | .15 |
| W21454 | 1 Megohm Resistor | 16-26 | .15 |
| W26577 | 3 Megohm Resistor | 19-27 | .15 |
| W21452 | 1,100 Ohm Resistor | 21 | .15 |
| W23403 | 150,000 Ohm Resistor | 25 | .15 |
| W24814 | 7,000 Ohm Resistor | 28 | .20 |
| G2-23300 | 53 Ohm (Air Cell) Resistor | 35 | .15 |
| 336-3B | Speaker | | 5.33 |

| Tube | Position and Use | Voltages Plate | Screen Grid | Grid | Filament |
|---|---|---|---|---|---|
| 34 | RF Amplifier | 135 | 67.5 | 4.0 | 2.0 |
| 1A6 | Oscillator | 95 | 5 | | |
| | Modulator | 135 | 67.5 | 4.0 | 2.0 |
| 34 | IF Amplifier | 135 | 67.5 | 4.0 | 2.0 |
| 32 | Detector | 50 | 15 | 0 | 2.0 |
| 33 | Output | 135 | 135 | 8.0 | 2.0 |

Voltage limits are plus or minus 10% of values given.

MODEL 179
Voltage, Parts List

CROSLEY RADIO CORP.

# Model 179

## Specifications

Model 179 is a seven tube superheterodyne designed for operation from AC electric circuits. The intermediate frequency used is 181.5 kc.

## Tubes and Voltage Limits

The following are the tubes and voltages measured from tube contact to chassis with the receiver in operating condition but with no signal to the antenna circuit, and with a line voltage of 117.5 volts (235 volts for 220 volt receivers). All voltages, except filament, are measured with a 500 volt (1000 ohms per volt) DC voltmeter. Filament voltages are measured with a low range AC voltmeter.

| Tube | Position and Use | Voltages | | | | |
|---|---|---|---|---|---|---|
| | | Plate | Screen Grid | Cathode | Supp. Grid | Filament |
| 58 | RF Amplifier | 260 | 125 | 3 | 3 | 2.5 |
| 58 | Oscillator-modulator | 260 | 125 | 34 | 0 | 2.5 |
| 58 | IF Amplifier | 260 | 125 | 4 | 4 | 2.5 |
| 56 | Diode detector | 0 | | 0 | | 2.5 |
| 56 | AF Amplifier | 50 | | 4 | | 2.5 |
| 2A5 | Output | 250 | 260 | 16.5 | | 2.5 |
| 80 | Rectifier | 355 | | | | |

Voltage limits are plus or minus 10% of values given.

## PARTS LIST—MODEL 179

**INSTRUCTIONS FOR ORDERING—Give part number, description of part, and serial number of receiver on which part is to be used. If article wanted is not listed separately, then that part of complete assembly containing this article should be ordered. Goods shipped on open account to Crosley Wholesale Distributors only. Cash must accompany Dealer and Consumer orders. Prices are subject to the usual trade discounts, and are subject to change without notice.**

* Figures in 2nd last column refer to parts shown in diagram on page 18.

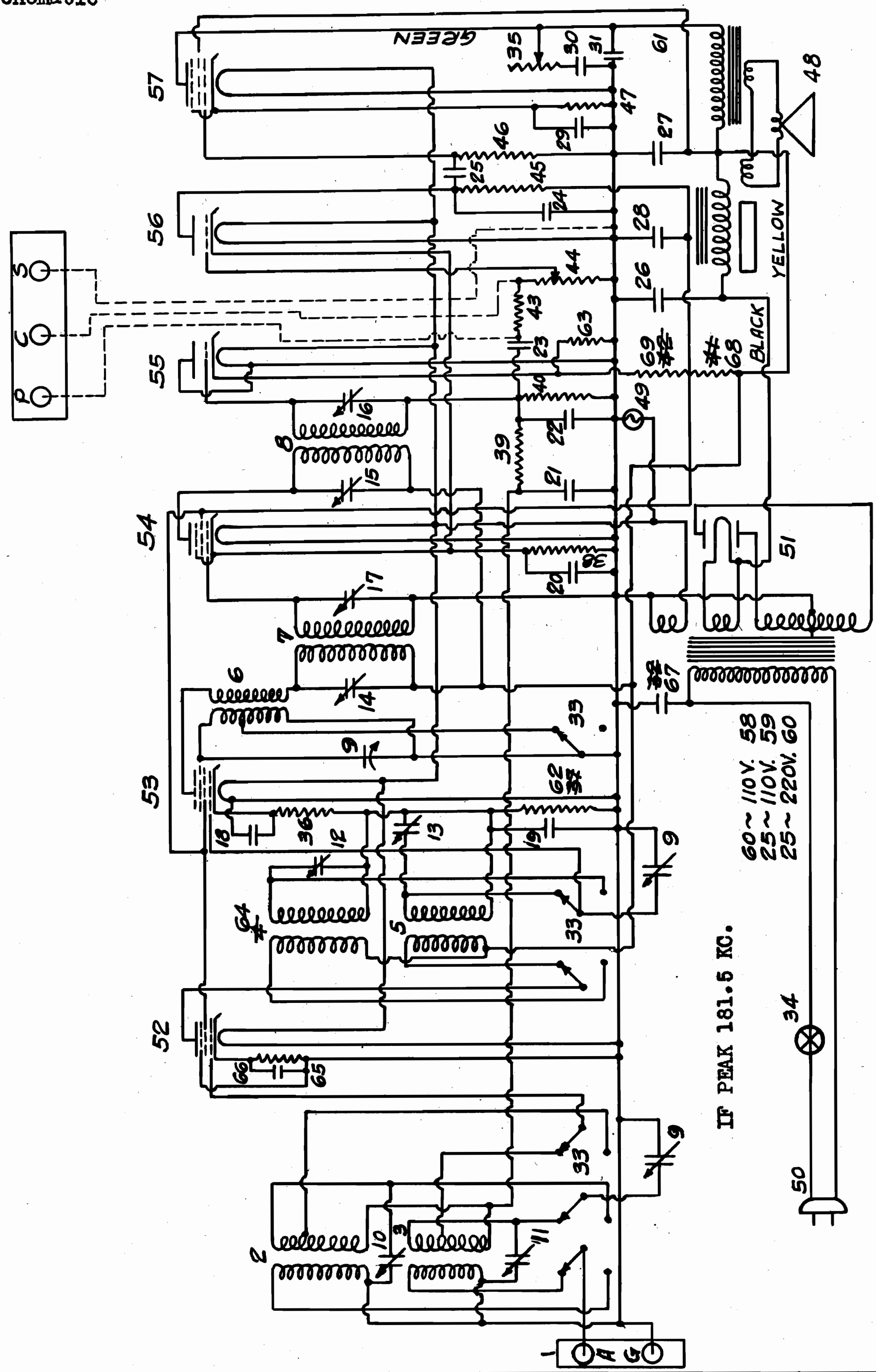
| Qty. | Part No. | Description | * Item | List Each |
|---|---|---|---|---|
| 1 | G7-24995 | Low F Antenna Coil | 2 | .60 |
| 1 | G14-24995 | Hi F Antenna Coil | 3 | .45 |
| 2 | G1-29699 | Ant. R. F. Coil Trimmer Cond. | 10-11 12-13 | .20 |
| 1 | G9-25968 | Low F. R. F. Coil | 64 | .50 |
| 1 | G5-25968 | Hi F. R. F. Coil | 5 | .55 |
| 1 | G21-24996 | Oscillator Coil | 6 | .60 |
| 1 | G1-25444 | 1st I. F. Trans. Coil | 7 | .75 |
| 1 | G1-25948 | 1st I. F. Prim. 2nd I. F. Prim. 2nd I. F. Sec. Trimmer Cond. Assem. | 14-15 16 | .60 |
| 1 | W25008A | 1st I. F. Sec. Trimmer Cond. Blade | 17 | .05 |
| 1 | R80 | Screw | | .05 |
| 1 | W26069B | Adjusting Nut | | .05 |
| 1 | W24865 | Metal Washer (round) | | .05 |
| 1 | W25446 | Bakelite Washer (large) | | .05 |
| 1 | W25450B | Insulating Washer (small) | | .05 |
| 1 | W25007 | Insulating Washer (small) | | .05 |
| 1 | M20 | Rivet | | .05 |
| 1 | W25584 | Mica Insulator | | .05 |
| 1 | G6-25444 | 2nd I. F. Trans. Coil | 8 | .80 |
| 7 | W25200 | Coil Sockets | | .05 |
| 5 | W25024A | Coil Shield (1⅝″ high) | | .05 |
| 3 | W25025A | Coil Shield (1⅛″ high) | | .10 |
| 7 | W21541B | Retainer Ring (.25 doz.) | | .05 |
| 4 | W24360 | Square Hole Ins. Washer | | .05 |
| 3 | W26891 | Semi-Cir. Hole Ins. Wash. | | .05 |
| 1 | C30704 | Var. Tun. Cond Gang | 9 | 3.50 |
| 1 | G3-27134 | Dial Light Socket Assem. | | .15 |
| 1 | G25-25751 | Dial Assembly | | .90 |
| 1 | B29787 | Dial Cover (celluloid) | | .30 |
| 1 | B30569B | 6 P. D. T. Switch | 33 | 1.90 |
| 1 | LW-20264 | Ant.-Gnd. Terminal | 1 | .15 |
| 1 | G6-27456 | -80 Socket | 51 | .10 |
| 3 | G24-27456 | -58 Socket | 52-53 54 | .10 |
| 2 | G18-27456 | -56 Socket | 55-56 | .10 |
| 1 | G43-27456 | 2A5 Socket | 57 | .10 |
| 3 | W26010 | Tube Shield Base | | .05 |
| 3 | B26009C | Tube Shield | | .10 |
| 1 | B31335A | Tube & Cond. Shield | | .20 |
| 1 | B21491A | Cable & Plug | 50 | .50 |
| 1 | W25594B | Tone Control & Switch | 34-35 | 1.10 |
| 1 | W25666B | Level Control (volume) | 44 | .90 |
| 4 | G1-23472 | Knob | | .10 |
| 1 | W31157A | Knob (Moderne) | | .10 |
| 3 | W31585A | Knob (Moderne) | | .10 |
| 1 | W31463 | Escutcheon | | .25 |
| 3 | S27 | Escutch. Screws (.25 doz.) | | .05 |
| 1 | W31009 | Speaker Cord | 61 | .15 |
| | | **POWER TRANSFORMERS** | | |
| 1 | G17-23559 | Power Trans. 60 Cy. 110 V. | 58 | 3.25 |
| | G18-23559 | Power Trans. 25 Cy. 110 V. | 59 | 4.75 |
| | G19-23559 | Power Trans. 25-60 Cy. 220 V. | 60 | 4.75 |
| | | **FILTER & BYPASS CONDENSERS** | | |
| 2 | W27204 | .02-.02 Mfd. 200 Volt | 18-19 20-21 | .25 |
| 1 | W25969A | .00017-.03 Mfd. 400 Volt | 22-23 | .25 |
| 1 | W25537A | .001-.03 Mfd. 400 Volt | 24 25 | .30 |
| 1 | W26194B | 12. Mfd. 475 Volt | 26 | 1.25 |
| 1 | W29150A | 7.-6.-8. Mfd. 450-400-25 Volt | 27-28 29 | 2.60 |
| 1 | W25517A | .05-.008 Mfd. 400 Volt | 30-31 | .30 |
| 1 | W27203 | .02 Mfd. 200 Volt | 66 | .15 |
| 1 | W30805 | .01 Mfd. 400 Volt | 67 | .20 |
| | | **Resistors** | | |
| 3 | W25937 | 275 Ohms | 36-38 65 | .15 |
| 1 | W26577 | 3 Megohm | 39 | .15 |
| 1 | W21454 | 1 Megohm | 40 | .15 |
| 2 | W23785 | 500000 Ohm | 43-46 | .15 |
| 1 | W23403 | 150000 Ohm | 45 | .15 |
| 1 | W25521 | 450 Ohm | 47 | .15 |
| 1 | W31094 | 4500 Ohm | 62 | .15 |
| 1 | W30127 | 450 Ohm | 63 | .15 |
| 1 | W28471 | 8500-2500 Ohms (Canddem) | 68-69 | .45 |
| 1 | C30719A | Chassis Bottom | | .50 |

**312-4 MAGNAVOX SPEAKER SPEC. 939**

| Qty. | Part No. | Description | * Item | List Each |
|---|---|---|---|---|
| 1 | 27307 | Cone & Voice Coil Assem. | | 3.00 |
| 1 | 29197 | Field Coil | | 1.75 |
| 1 | 29199 | Transformer | | 1.75 |

MODEL 179
Schematic

CROSLEY RADIO CORP.




MODEL 179 WIRING DIAGRAM

**MODEL 180**
**Voltage, Parts List**

## CROSLEY RADIO CORP.

# Model 180

### Specifications

Model 180 is a ten tube superheterodyne designed for operation from AC electric circuits. It uses an intermediate frequency of 181.5 kc.

### Tubes and Voltage Limits

The following are the tubes and voltages measured from tube contact to chassis with the receiver in operating condition but with no signal to the antenna circuit, and with a line voltage of 117.5 volts (235 for 220 volt receivers). All voltages, except filament, are measured with a 500 volt (1000 ohms per volt) d. c. voltmeter. Filament voltages are measured with a low range a. c. voltmeter.

| Tube | Position and Use | Voltages: Plate | Screen Grid | Cathode | Filament |
|---|---|---|---|---|---|
| 58 | Modulator | 270 | 112 | 5.5 | 2.5 |
| 58 | RF Amplifier | 270 | 112 | 3.5 | 2.5 |
| 56 | Oscillator | 50 | | 5.5 | 2.5 |
| 58 | IF Amplifier | 270 | 112 | 3.7 | 2.5 |
| 56 | Diode | 0 | | 0 | 2.5 |
| 56 | AF Amplifier | 50 | | 3.0 | 2.5 |
| 56 | Phase Inverter | 50 | | 3.0 | 2.5 |
| Two 2A5 | Output | 260 | 270 | 17.5 | 2.5 |
| 80 | Rectifier | 360 | | | 4.8 |

All voltage limits are plus or minus 10% of values given.

## PARTS LIST—MODEL 180

**INSTRUCTIONS FOR ORDERING—Give part number, description of part, and serial number of receiver on which part is to be used. If article wanted is not listed separately, then that part of complete assembly containing this article should be ordered. Goods shipped on open account to Crosley Wholesale Distributors only. Cash must accompany Dealer and Consumer orders. Prices are subject to the usual trade discounts, and are subject to change without notice.**

*Figures in 2nd last column refer to parts shown in diagram

| Qty. | Part No. | Description | * Item | List Price |
|---|---|---|---|---|
| 1 | LW20264 | Antenna & Ground Terminal | 1 | .15 |
| 1 | G14-24995 | Antenna Coil (High Freq.) | 2 | .45 |
| 1 | G7-24995 | Antenna Coil (Low Freq. Broadcast) | 3 | .60 |
| 1 | G5-25968 | Interstage Coil (H. F.) | 7 | .50 |
| 1 | G9-25968 | Interstage Coil (Low F. Broad.) | 8 | .50 |
| 1 | G18-24996 | Oscillator Coil | 9 | .40 |
| 1 | G5-24065 | 1st I. F. Transformer | 18 | .90 |
| 1 | G10-24065 | Diode Feeding Transformer | 19 | 1.00 |
| 1 | G3-31267 | Coil Shield Assembly | | .15 |
| 3 | W25200 | Coil Sockets | | .05 |
| 2 | W25024A | Coil Shield (1⅝″ high) | | .10 |
| 1 | W25025A | Coil Shield (1⅛″ high) | | .10 |
| 5 | W21541B | Retainer Rings (.25 doz.) | | .05 |
| 3 | W26891 | Insulating Washer (Semi-Cir. Hole) | | .05 |
| 2 | W24360 | Insulating Washer (Square Hole) | | .05 |
| 1 | B30569C | 6 P. D. T. Switch | 4 | 1.90 |
| 1 | C31356 | Var. Cond. Gang | 5-6 | 4.00 |
| 1 | G25-25751 | Dial Drive Assembly | | .90 |
| 1 | G3-27134 | Dial Light Bracket | | .15 |
| 1 | W28878A | Condenser Shield Assembly | | .10 |
| 1 | G15-25948 | I. F. Tuning Condenser | 76 | .40 |
| 1 | G3-25948 | I. F. Tuning Condenser | 17 | .40 |
| 3 | G24-27456 | 58 Socket | 55-56 57 | .10 |
| 4 | G18-27456 | 56 Socket | 58-59 60-61 | .10 |
| 2 | G43-27456 | 2A5 Socket | 62-63 | .10 |
| 1 | G6-27456 | 80 Socket | 64 | .10 |
| 5 | W26010 | Tube Shield Base | | .05 |
| 3 | B26009C | Tube Shield (58 tube) | | .10 |
| 2 | W26231B | Tube Shield (56 tube) | | .10 |
| 1 | B21491B | Cord & Plug | 54 | .50 |
| 1 | W25666B | Volume Control | 26 | .90 |
| 1 | W25594B | Tone Control & Switch | 41-42 | 1.10 |
| 1 | G1-24628 | Filter Choke | 48 | 1.25 |
| 3 | W22300 | Knob | | .15 |
| 1 | W24556 | Knob | | .15 |

| Qty. | Part No. | Description | * Item | List Pr |
|---|---|---|---|---|
| 3 | W31585B | Knob (Moderne) | | .10 |
| 1 | W31157B | Knob (Moderne) | | .10 |
| 1 | C23613B | Bottom | | .10 |
| 1 | C28477D | Back | | .30 |
| 1 | C26200G | Tube & Condenser Shield | | .30 |
| 1 | W31942 | Speaker Cable | 69 | .35 |
| | | **POWER TRANSFORMER** | | |
| 1 | G33-25669 | Power Trans. 110 V. 60 Cy. | 51 | 6.00 |
| | G34 25669 | Power Trans. 110 V. 25 Cy. | 52 | 9.00 |
| | G35-25669 | Power Trans. 220 V. 25 to 60 Cy. | 53 | 9.00 |
| | | **FILTER & BY PASS CONDENSERS** | | |
| 1 | W25438 | 0.1-0.1 Mfd. 200 Volt | 13-14 | .25 |
| 1 | W27932 | 0.0001 Mfd. 200 Volt | 20 | .15 |
| 1 | W26559 | 0.006 Mfd. 200 Volt | 23 | .15 |
| 2 | W23615 | 0.05 Mfd. 400 Volt | 31-35 | .15 |
| 1 | W26571 | 0.005 Mfd. 200 Volt | 43 | .15 |
| 3 | W27203 | 0.02 Mfd. 200 Volt | 66 74-75 | .15 |
| 1 | W31052 | 0.05-0.004 Mfd. 400 Volt | 72-73 | .25 |
| 1 | B30059A | 8.-8.-8. Mfd. 250, 450, 450 V. | 45-46 47 | 3.00 |
| 1 | W26194B | 12. Mfd. 475 Volt | 49 | 1.25 |
| | | **RESISTORS** | | |
| 1 | W23403 | 150000 Ohm | 71 | .15 |
| 2 | W25937 | 275 Ohm | 12-70 | .15 |
| 1 | W21965 | 375 Ohm | 15 | .15 |
| 1 | W21454 | 1 Megohm | 21 | .15 |
| 4 | W21455 | 300000 Ohm | 22-23 36-37 | .15 |
| 1 | W26577 | 3 Megohm | 24 | .15 |
| 1 | W28589 | 350 Ohm | 25 | .15 |
| 1 | W31361 | 11000-7000 Ohm | 28-29 | .45 |
| 1 | W21453 | 40000 Ohm | 33 | .15 |
| 1 | W22873 | 220 Ohm | 34 | .15 |
| 1 | W31093 | 2700 Ohm | 37 | .15 |
| 1 | W21237A | 60000 Ohm | 38 | .15 |
| 1 | W4921C | 10000 Ohm | 65 | .25 |
| 1 | W26578 | 5 Megohm | 68 | .15 |

**SPEAKER PARTS (8″ Speaker)**

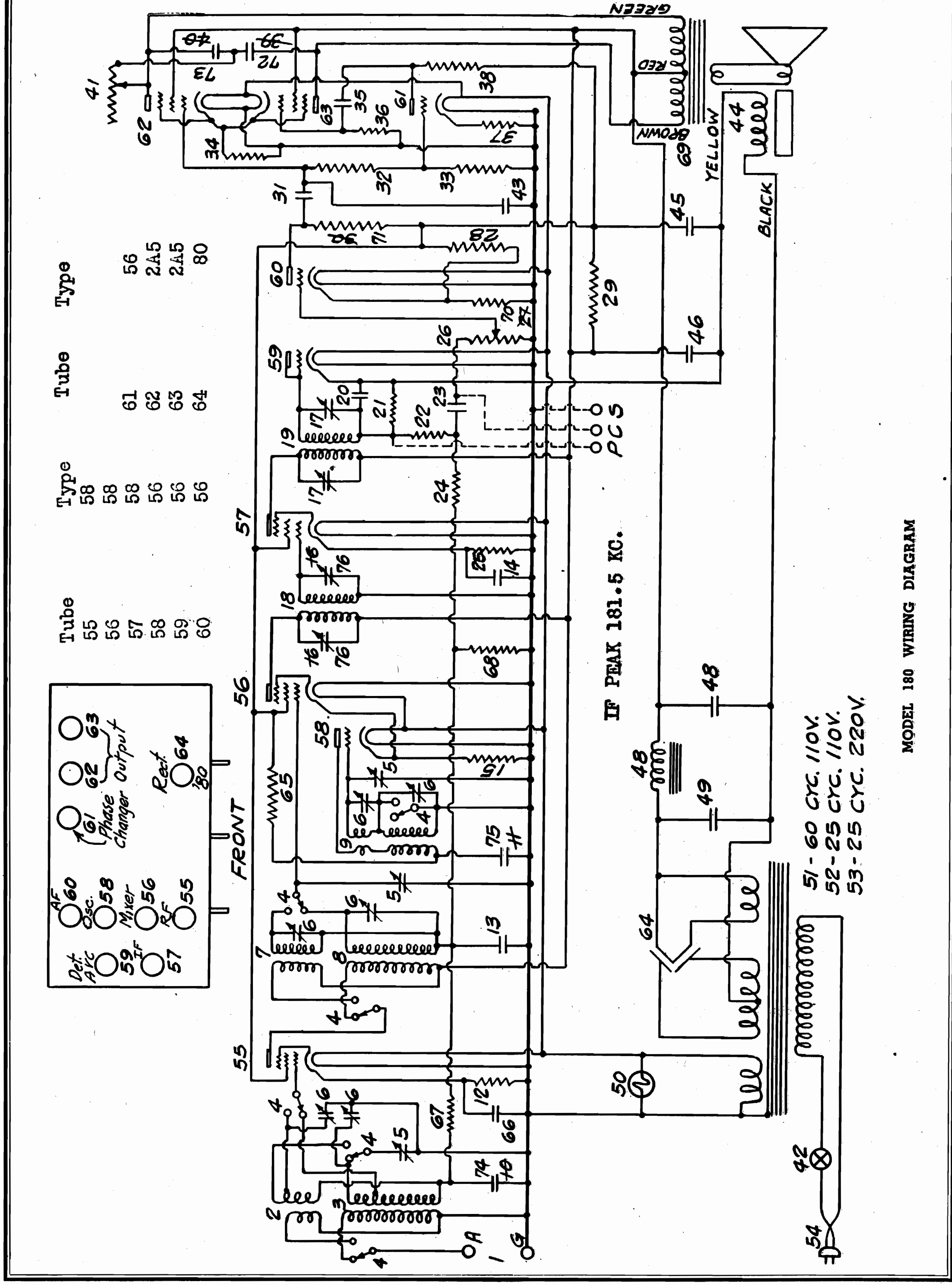
| | Magnavox 317-4M Spec. 1104 | Rola 317-4R | | |
|---|---|---|---|---|
| 1 | 27307 | 31090 | Cone & Voice Coil Assembly | 3.00 |
| 1 | 27797 | 31091 | Field Coil | 2.15 |
| 1 | 27798 | 31092 | Transformer | 1.65 |

**SPEAKER PARTS (10″ Speaker)**

| | Magnavox 317-5M Spec. 935 | Rola 317-5R | | |
|---|---|---|---|---|
| 1 | 27661 | 31086 | Cone & Voice Coil Assembly | 3.65 |
| 1 | 27797 | 31087 | Field Coil | 2.15 |
| 1 | 29658 | 31088 | Transformer | 1.65 |

MODEL 180
Schematic, Socket

CROSLEY RADIO CORP.



CROSLEY RADIO CORP.

# Model 181

### Specifications

Model 181 is a six tube superheterodyne designed for operation from AC electric circuits. The intermediate frequency used is 456 kc.

### Tubes and Voltage Limits

The following are the tubes and voltages measured from tube contact to chassis with the receiver in operating condition but with no signal to the antenna circuit, and with a line voltage of 117.5 volts (235 volts for 220 volt receivers). All voltages, except filament, are measured with a 500 volt (1000 ohms per volt) DC voltmeter. Filament voltages are measured with a low range AC voltmeter.

| Tube | Position and Use | Voltages | | | | |
|---|---|---|---|---|---|---|
| | | Plate | Screen Grid | Cathode | Supp. Grid | Filament |
| 2A7 | Oscillator | 165 | | -9.5 | | |
| | Modulator | 240 | 110 | 2.5 | | 2.45 |
| 58 | IF Amplifier | 236 | 110 | 0 | | 2.45 |
| 56 | Diode Detector and AVC | | | | | 2.45 |
| 58 | AF Amplifier | 52 | 27 | 0 | | 2.45 |
| 2A5 | Output | 222 | 240 | 0 | | 2.45 |
| 80 | Rectifier | 330 | | | | 4.8 |

Chassis to B- 93 volts.

Bias voltages are obtained by a resistor divider shunting the speaker field which is in B- circuit, from rectifier to chassis.

IF Amplifier bias (Grid to B-) 28 volts.
AF Amplifier bias (Grid to B-) 12 volts.
Output bias (Grid to B-) 18 volts.

## PARTS LIST—MODEL 181

**INSTRUCTIONS FOR ORDERING—Give part number, description of part, and serial number of receiver on which part is to be used. If article wanted is not listed separately, then that part of complete assembly containing this article should be ordered. Goods shipped on open account to Crosley Wholesale Distributors only. Cash must accompany Dealer and Consumer orders. Prices are subject to the usual trade discounts, and are subject to change without notice.**

* Figures in 2nd last column refer to parts shown in diagram on page 18.

| Qty. | Part No. | Description | * Item | List Each |
|---|---|---|---|---|
| 1 | G23-24995 | Antenna Coil | 1 | .60 |
| 1 | G28-24996 | Oscillator Coil | 2 | .65 |
| 2 | G7-29699 | Ant. and Oscillator Coil, Trimmer Condenser | 11, 12 | .30 |
| 1 | G2-30795 | First I. F. Transformer | 5 | .55 |
| 1 | G2-30795 | Second I. F. Transformer | 62 | .55 |
| 2 | W30027 | Coil Shield | | .15 |
| 2 | W30802 | Coil Shield | | .15 |
| 4 | W25200 | Coil Socket | | .05 |
| 4 | W30026 | Retainer Ring | | .05 |
| 2 | W30845 | Insulating Washer | | .05 |
| 2 | W30877 | Insulating Washer | | .05 |
| 1 | W30744A | No. 3 P. D. T. Change Sw. | 4 | .85 |
| 1 | B30769A | Variable Tuning Condenser Assm. | 3 | 2.35 |
| 1 | G4-27812 | Dial Light Socket | | .20 |
| 1 | G9-25050 | Dial Assembly | | .30 |
| 1 | G1-30070 | V. C. Dial Assembly | | .30 |
| 2 | G14-25948 | I. F. Condenser | 7,8 | .30 |
| 1 | W25008 | Condenser Blade | 57 | .05 |
| 1 | R80 | Screw | | .05 |
| 1 | W26069B | Adjusting Nut | | .05 |
| 1 | W24865 | Metal Washer | | .05 |
| 1 | W25450B | Insulating Washer | | .05 |
| 1 | W25007 | Insulating Washer | | .05 |
| 1 | W25446 | Bakelite Washer | | .05 |
| 1 | O-4 | Flat Washer | | .05 |
| 1 | M-20 | Rivet | | .05 |
| 1 | G1-26719 | A. G. Terminal | 10 | .15 |
| 2 | G5-24234 | R. F. Choke Assm. | 56, 64 | .45 |
| 1 | G56-27975 | 2A7 Socket | 51 | .10 |
| 2 | G24-27975 | 58 Socket | 52 | .10 |
| 1 | G43-27975 | 2A5 Socket | 53 | .10 |
| 1 | G18-27975 | 56 Socket | 54 | .10 |
| 1 | G6-27975 | 80 Socket | 55 | .10 |
| 4 | W27981 | Tube Shield Base | | .05 |
| 1 | W26231B | Tube Shield | | .10 |
| 1 | W27328A | Tube Shield | | .10 |
| 2 | B26009C | Tube Shield | | .10 |
| 1 | B30375 | AC Cord and Plug | 42 | .45 |
| 1 | W30836 | Tone Control and Switch | 39, 40 | 1.10 |
| 1 | W30610C | Level Control (volume) | 29 | .70 |

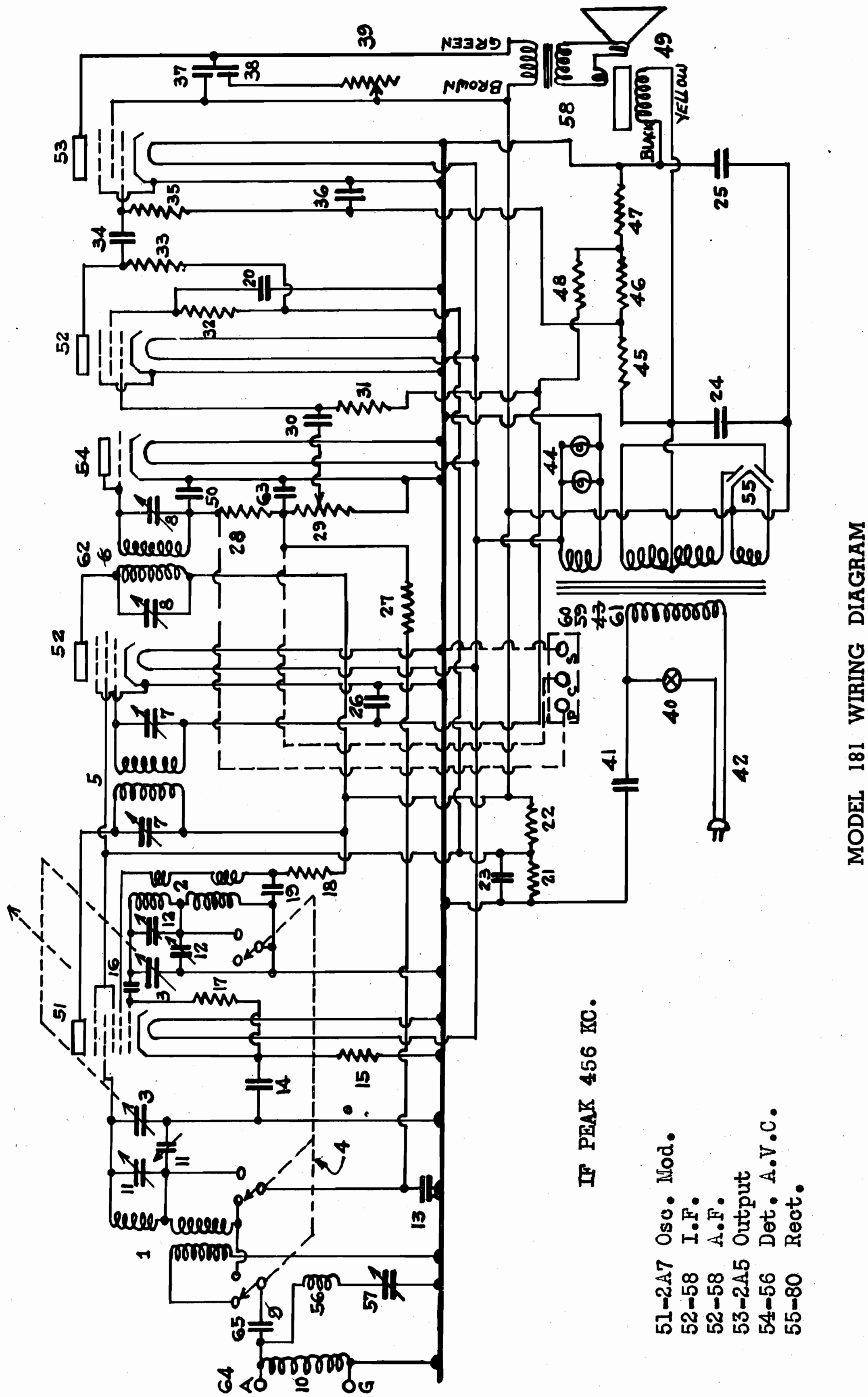
| Qty. | Part No. | Description | * Item | List Each |
|---|---|---|---|---|
| 2 | W31225 | Knobs (large) | | .10 |
| 2 | W31224 | Knobs (small) | | .10 |
| 2 | W30463 | Escutcheons | | .25 |
| 6 | S-27 | Escutcheon Screws | | .05 |
| 1 | W31007 | 4 Lead Speaker Cord | 58 | .15 |
| | | **POWER TRANSFORMERS** | | |
| 1 | G4-30745 | Power Trans. 110 V. 60 Cy. | 61 | 3.50 |
| 1 | G2-30745 | Power Trans. 110 V. 25 Cy. | 59 | 4.75 |
| 1 | G3-30745 | Power Trans. 220 V. | 60 | 4.75 |
| | | **FILTER & BY PASS CONDENSERS** | | |
| 1 | W30325 | 0.003 Mfd. 200 Volt | 9 | .20 |
| 1 | W27204 | .02-.02 Mfd. 200 Volt | 13, 14 | .25 |
| 1 | W30741 | .00025 Mfd. 1000 Volt | 16 | .15 |
| 1 | W25474 | .1-.1 Mfd. 400 Volt | 19, 20 | .40 |
| 1 | W30059A | 8.-8.-8. Mfd. 250 V.-450 V.-450 V. | 23, 24 25 | 3.00 |
| 1 | W24049 | .1 Mfd. 200 Volt | 26 | .15 |
| 2 | W27203 | .02 Mfd. 200 Volt | 30, 34 | .15 |
| 1 | W30321 | 1. Mfd. 160 Volt | 36 | .55 |
| 1 | W25517 | .008-.05 Mfd. 400 Volt | 37, 38 | .30 |
| 1 | W30805 | .01 Mfd. 400 Volt | 41 | .20 |
| 2 | W27932 | .0001 Mfd. 200 Volt | 50, 63 | .15 |
| 1 | W26571 | .05 Mfd. 200 Volt | 65 | .15 |
| | | **RESISTORS** | | |
| 1 | W25937 | 275 Ohms | 15 | .12 |
| 3 | W21875 | 100000 Ohms | 17, 33 46 | .15 |
| 1 | W5370A | 20000 Ohms | 18 | .24 |
| 1 | W25970 | 15000-10000 Ohms | 21, 22 | .40 |
| 1 | W26577 | 3 Megohm | 27 | .15 |
| 1 | W21237A | 60000 Ohms | 28 | .15 |
| 1 | W21454 | 1 Megohm | 31 | .15 |
| 4 | W23785 | 500000 Ohms | 32, 35 45, 48 | .15 |
| 1 | W22196 | 20000 Ohms | 47 | .15 |

### SPEAKER PARTS

| Magnavox 354-4M Spec. 952 | Crosley 354-4C | | |
|---|---|---|---|
| 27307 | G1-31184 | Cone Assem. | 3.00 |
| 27455 | W31445 | Field Coil | 1.50 |
| 27461 | G8-24628 | Transformer | 1.25 |

MODEL 181
Schematic

# CROSLEY RADIO CORP.




MODEL 181 WIRING DIAGRAM

# CROSLEY RADIO CORP.

**MODEL 182**
**Parts List**

## Specifications

Model 182 is a five tube superheterodyne designed for operation from AC or DC electric circuits. The intermediate frequency used is 456 kc.

## Tubes and Voltage Limits

The following are the tubes and voltages measured from tube contact to negative line (B -) with the receiver in operating condition but with no signal to the antenna circuit (antenna coiled up), and with a line voltage of 117.5 volts, 60 cycle a. c. All voltages except filament, are measured with a 500 volt (1000 ohms per volt) d. c. voltmeter. Filament voltages are measured with a low range AC voltmeter.

## PARTS LIST—MODEL 182

**INSTRUCTIONS FOR ORDERING**—Give part number, description of part, and serial number of receiver on which part is to be used. If article wanted is not listed separately, then that part of complete assembly containing this article should be ordered. Goods shipped on open account to Crosley Wholesale Distributors only. Cash must accompany Dealer and Consumer orders. Prices are subject to the usual trade discounts, and are subject to change without notice.

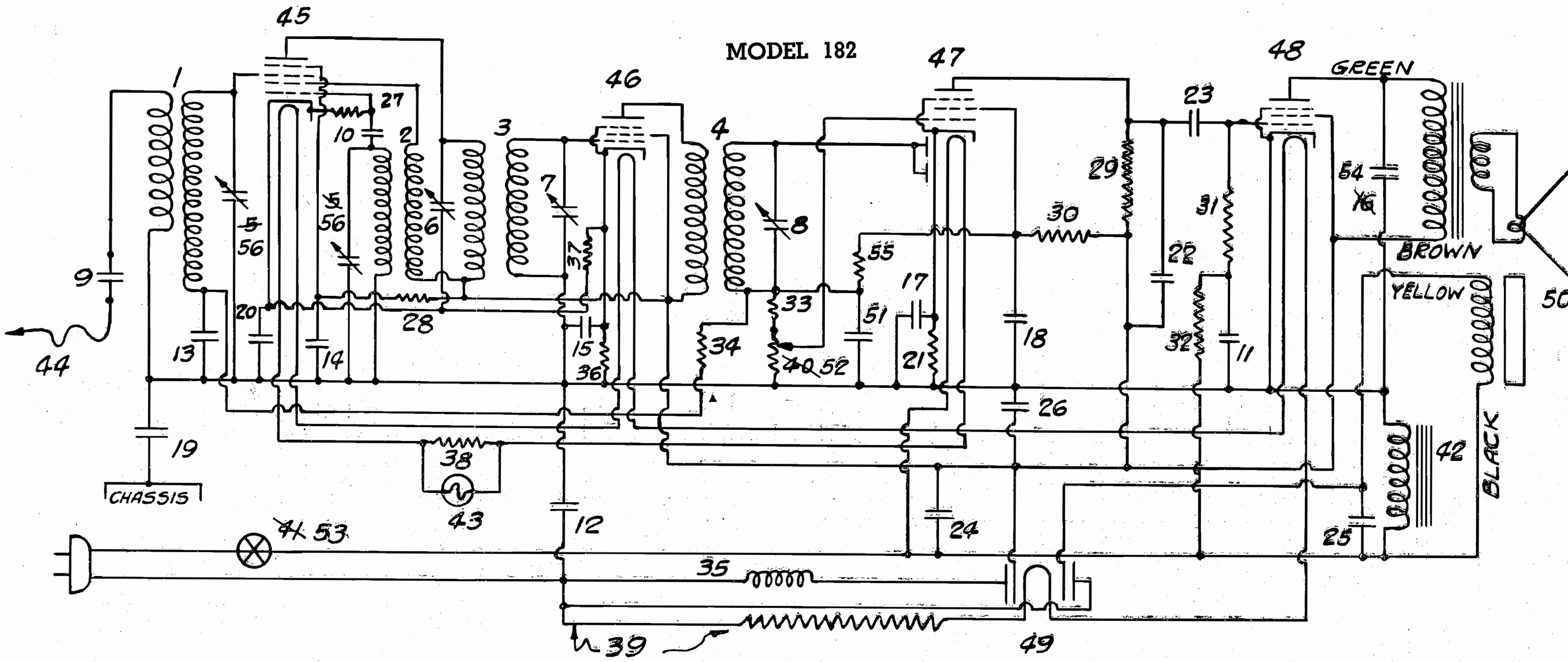
* Figures in 2nd last column refer to parts shown in diagram on page 18.

| Qty. | Part No. | Description | * Item | List Each |
|---|---|---|---|---|
| 1 | G24-24995 | Antenna Coil | 1 | .45 |
| 1 | G20-24996 | Oscillator Coil | 2 | .40 |
| 1 | B31582A | Tuning Condenser Gang | 56 | 2.50 |
| 1 | W20537B | Condenser Cover | | .05 |
| 1 | G2-30795 | 1st I. F. Transformer | 3 | .55 |
| 1 | G14-25948 | I. F. Trimmer Condensers | 6-7 | .30 |
| 1 | G10-25445 | 2nd I. F. Transformer | 4 | .40 |
| 1 | G9-25948 | Trimmer Condenser | 8 | .35 |
| 3 | W25025A | Coil Shield | | .10 |
| 1 | W30802 | Coil Shield | | .15 |
| 4 | W25200A | Coil Socket | | .05 |
| 1 | W30026 | Retainer Ring | | .05 |
| 3 | W21541B | Retainer Ring | | .05 |
| 1 | W30877A | Insulating Washer | | .05 |
| 3 | W24360 | Insulating Washer | | .05 |
| 1 | W31204 | Level Control & Switch | 52-53 | .90 |
| 1 | G2-27812 | Dial Light Bracket Assem. | | .15 |
| 1 | G47-27975 | 6A7 Socket | 45 | .10 |
| 1 | G39-27975 | 78 Socket | 46 | .10 |
| 1 | G48-27975 | 6B7 Socket | 47 | .10 |
| 1 | G30-27975 | 43 Socket | 48 | .10 |
| 1 | G51-27975 | 25Z5 Socket | 49 | .10 |
| 2 | W31210 | Tube Shield Ring | | .05 |
| 2 | W31212 | Tube Shield Half | | .05 |
| 2 | W31213 | Tube Shield Half (with slot) | | .05 |
| 4 | W31211 | Tube Shield Clip | | .05 |
| 1 | B30957B | 120 Ohm Resistance Cable (A. C. Cord & Plug) | 39 | .80 |
| 1 | W29784B | Antenna Roll | 44 | .30 |
| 1 | G1-28859 | Filter Choke | 42 | 1.15 |
| 1 | G1-24234 | A. F. Choke | 35 | .30 |
| | | **FILTER & BY-PASS CONDENSERS** | | |
| 1 | W30325 | 0.003 Mfd 200 Volt | 9 | .20 |
| 1 | W26571 | 0.0005 Mfd. 400 Volt | 10 | .15 |

| Qty. | Part No. | Description | * Item | List Each |
|---|---|---|---|---|
| 1 | W24784 | 0.25 Mfd. 200 Volt | 11 | .20 |
| 1 | W30324 | 0.02-0.02 Mfd. 400 Volt | 12-13 | .30 |
| 1 | W27204 | 0.02-0.02 Mfd. 200 Volt | 14-15 | .25 |
| 1 | W25438 | 0.1-0.1 Mfd. 200 Volt | 18-19 | .25 |
| 1 | W27203 | 0.02 Mfd. 200 Volt | 20 | .15 |
| 1 | W30322 | 0.00017-0.006 Mfd. 200 Volt | 22-23 | .30 |
| 1 | W7847A | 0.0001 Mfd | 51 | .15 |
| 1 | W31219 | 0.023 Mfd. 200 Volt | 54 | .15 |
| 1 | W26870A | 6. Mfd. 25 Volt | 17 | .65 |
| 1 | W30962 | 25.-8. Mfd. 125 Volt | 24-25 | 2.00 |
| 1 | W30963 | 16. Mfd. 110 Volt | 26 | 1.25 |
| | | **RESISTORS** | | |
| 1 | W27503 | 1400 Ohms | 21 | .15 |
| 2 | W21237A | 60000 Ohms | 27-33 | .15 |
| 1 | W21453 | 40000 Ohms | 28 | .15 |
| 1 | W23403 | 150000 Ohms | 29 | .15 |
| 2 | W23785 | 500000 Ohms | 30-31 | .15 |
| 1 | W21455 | 300000 Ohms | 32 | .15 |
| 1 | W21454 | 1 Megohm | 34 | .15 |
| 1 | W21964 | 165 Ohm | 36 | .15 |
| 1 | W25357 | 75 Ohm | 37 | .10 |
| 1 | W30539 | 26.7 Ohm | 38 | .20 |
| 1 | W26577 | 3 Megohm | 55 | .15 |
| | | **SPEAKER PARTS** | | |
| 1 | G1-29529 | Cone & Voice Coil Assem. | | 2.00 |
| 1 | 31214 | Field Coil | | 1.25 |
| 1 | G6-29535 | Transformer | | 1.10 |
| | W28735 | Black Knob | | .10 |
| | W28736 | Green Knob | | .10 |
| | W30028 | Brown Knob | | .10 |
| | W31500 | Wooden Knob | | .10 |
| | W31812 | Dial Pointer | | .05 |
| | W28608 | Bottom | | .25 |

MODEL 182
Schematic, Voltage

# CROSLEY RADIO CORP.




I. F. PEAK
456-K.C.

| Tube | Position and Use | Plate | Screen Grid | Control Grid (Voltages) | Cathode | Supp. Grid | Fila-ment |
|---|---|---|---|---|---|---|---|
| 6A7 | Oscillator | 120 | | —8 | | | |
| | Modulator | 120 | 50 | | 3 | | 6.5 |
| 78 | IF Amplifier | 120 | 120 | | 2.5 | 2.5 | 6.5 |
| 6B7 | Diode and AF Amplifier | 20 | 30 | | 3 | 3 | 6.5 |
| 43 | Output | 115 | 120 | *—20 | 0 | | 25.1 |
| 25Z5 | Rectifier | | | | 120 | | 25.1 |

Voltage limits are plus or minus 15% of values given.
On DC operation, voltages are approximately 90% of those given above.
* Output bias voltage is obtained by using drop across filter choke which is 20 volts.

45-6A7 OSC-MIX.
46-78 I.F.
47-6B7 DET. AF. AVC.
48-43 OUTPUT
49-25Z5 RECT.

**MODEL 184**
**Voltage, Part s List**

CROSLEY RADIO CORP.

# Model 184

## Specifications

Model 184 is a four-tube superheterodyne designed for operation from AC electric circuits. It uses an intermediate frequency of 456 kc.

## Tubes and Voltage Limits

The following are the tubes and voltages measured with the receiver in operating condition but with no signal to the antenna circuit, and with a line voltage of 117.5 volts (235 for a 220 volt receiver). All voltages, except filament, are measured from tube contact to chassis with a 500 volt (1000 ohms per volt) DC voltmeter. Filament voltages are measured with a low range AC voltmeter.

| Tube | Position | Plate | Screen Grid | Cathode | Supp. Grid | Filament |
|---|---|---|---|---|---|---|
| 58 | Oscillator-modulator | 165 | 82 | 22 | 0 | 2.5 |
| 6F7 | I. F. & Detector | 165 | 82 | 2 | 0 | 2.5 |
| 2A5 | Output | 158 | 165 | 10 | | 2.5 |
| 80 | Rectifier | 295 | | | | 4.9 |

Voltage limits are plus or minus 10% of values given.

## PARTS LIST—MODEL 184

**INSTRUCTIONS FOR ORDERING—Give part number, description of part, and serial number of receiver on which part is to be used. If article wanted is not listed separately, then that part of complete assembly containing this article should be ordered. Goods shipped on open account to Crosley Wholesale Distributors only. Cash must accompany Dealer and Consumer orders. Prices are subject to the usual trade discounts, and are subject to change without notice.**

* Figures in 2nd last column refer to parts shown in diagram on page 18.

| Qty. | Part No. | Description | * | List Price |
|---|---|---|---|---|
| 1 | W20264 | Ant.-Grd. Terminal | 1 | .15 |
| 1 | G28-24995 | Antenna Coil | 44 | .65 |
| 1 | G12-24996 | Oscillator Coil | 3 | .40 |
| 1 | G7-25444 | 1st I. F. Transformer | 4 | .60 |
| 1 | G9-25445 | 2nd I. F. Transformer | 5 | .50 |
| 1 | W25024 | Coil Shield (Large) | | .10 |
| 3 | W25025 | Coil Shield (Small) | | .10 |
| 4 | W25200 | Coil Socket | | .05 |
| 4 | W26891 | Insulating Washer | | .05 |
| 4 | W21541B | Coil Retaining Ring | | .05 |
| 1 | B31784 | Variable Condenser Gang | | 2.75 |
| 1 | G15-25050 | Dial Assem. | | .40 |
| 1 | G2-25948 | 1st I. F. Prim. Trim. Cond. | 7 | .30 |
| 1 | G10-25948 | 2nd I. F. Prim. Trim. Cond. | 9 | .15 |
| 1 | W27548 | 1st I. F. Sec. Trim. Cond. (Adjustable Blade Only) | 8 | .05 |
| 1 | W25584 | Mica | | .05 |
| 1 | R80 | Screw | | .05 |
| 1 | W26069B | Adjusting Nut | | .05 |
| 1 | W24865 | Metal Washer | | .05 |
| 1 | W25450B | Insulating Washer | | .05 |
| 1 | W25007B | Insulating Washer | | .05 |
| 1 | W25446 | Bakelite Washer (Large) | | .05 |
| 1 | O4 | Washer | | .05 |
| 1 | M20 | Rivet | | .05 |
| 1 | G24-27456 | Socket -58 | 32 | .10 |
| 1 | G49-27456 | Socket 6-F-7 | 33 | .10 |
| 1 | G43-27456 | Socket 2-A-5 | 34 | .10 |
| 1 | G6-27456 | Socket -80 | 35 | .10 |
| 2 | W26010 | Tube Shield Base | | .05 |

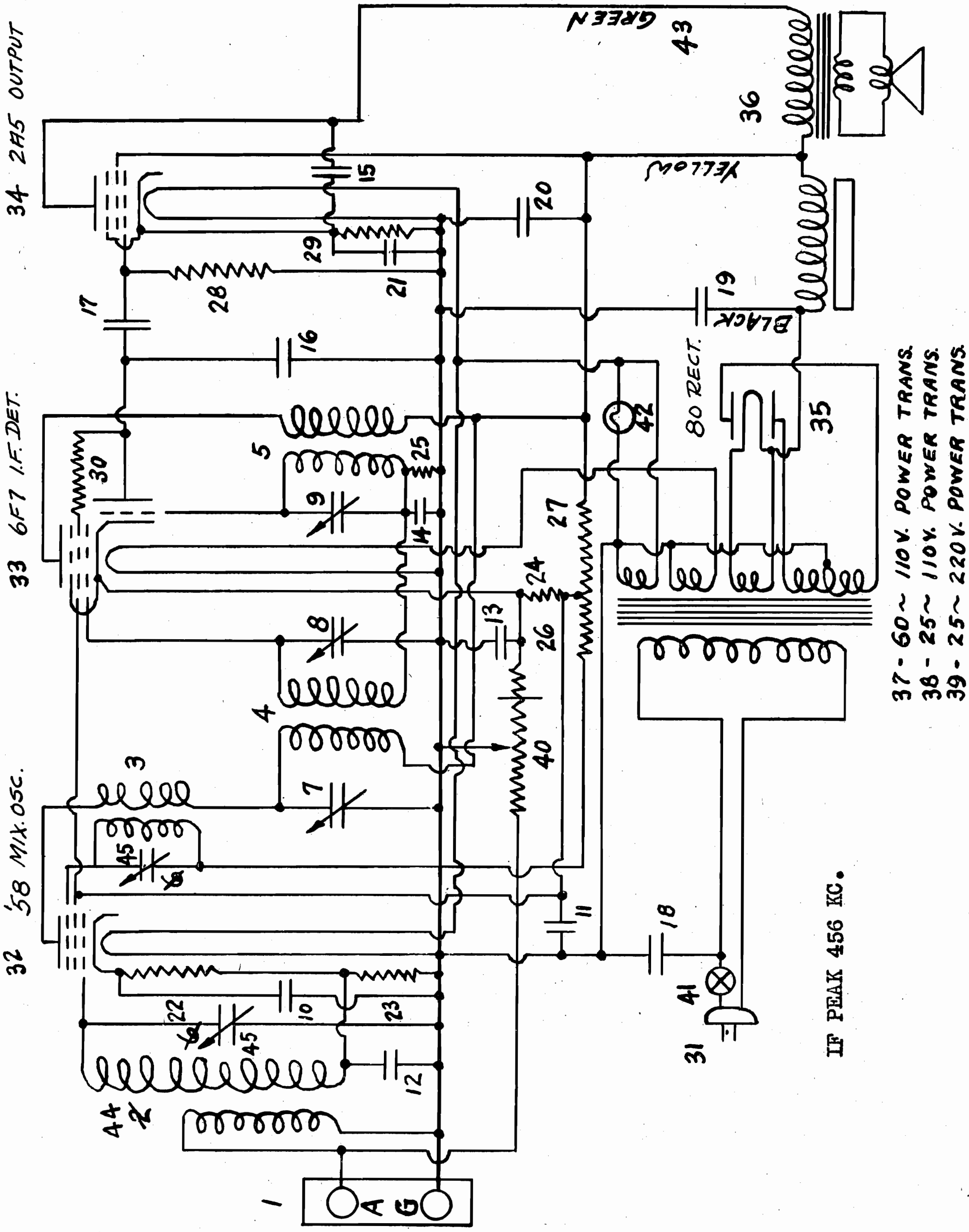
| Qty. | Part No. | Description | * | List Pr |
|---|---|---|---|---|
| 1 | W27328A | Tube Shield (6F7) | | .10 |
| 1 | B26009C | Tube Shield (58) | | .10 |
| 1 | B21491B | A. C. Cable & Plug | 31 | .25 |
| 1 | W31009 | Speaker Cable | 43 | .25 |
| 1 | W26573B | Volume Control & Switch | 40-41 | 1.00 |
| 2 | G1-23472 | Knobs | | .10 |
| 1 | G1-28500 | Power Trans. 110 V. 60 Cy. | 37 | 2.25 |
| | G2-28500 | Power Trans. 110 V. 25 Cy. | 38 | 3.00 |
| | G3-28500 | Power Transformer 220 V. | 39 | 3.25 |
| | | **FILTER & BY PASS CONDENSERS** | | |
| 1 | W27204 | .02-.02 Mfd. 200 V. Cond. | 12-13 | .25 |
| 1 | W24049A | .1 Mfd. 200 V. Condenser | 14 | .15 |
| 1 | W23191A | .01 Mfd. 400 V. Condenser | 15 | .25 |
| 1 | W25537A | .001-.03 Mfd. 400 V. Cond. | 16-17 | .30 |
| 1 | W29592A | .003 Mfd. 400 V. Condenser | 18 | .20 |
| 2 | W27203 | .02 Mfd. 200 V. Condenser | 10-11 | .15 |
| 1 | W29150A | 7.-6.-8. Mfd. 450-400-25 V. Filter Condenser | 21 | 2.90 |
| | | **RESISTORS** | | |
| 1 | W25937 | 275 Ohm Resistor | 22 | .15 |
| 1 | W31094 | 4500 Ohm Resistor | 23 | .15 |
| 1 | W24990 | 25000 Ohm Resistor | 24 | .20 |
| 1 | W21454 | 1 Megohm | 25 | .15 |
| 1 | W28471 | 25000-8500 Ohm Resistor | 26-27 | .45 |
| 2 | W23785 | 500000 Ohm Resistor | 28-30 | .15 |
| 1 | W25521 | 450 Ohm Resistor | 29 | .15 |

## SPEAKER PARTS * 36

| Qty. | Magnavox 324-2M Spec. 1300 | Jensen 342-2J Spec. 2617 | Description | List Price |
|---|---|---|---|---|
| 1 | 28761 | 29434 | Cone & Voice Coil Assem. | 2.00 |
| 1 | 28763 | 29436 | Field Coil | 1.10 |
| 1 | 28764 | 29437 | Transformer | 1.25 |

**MODEL 184**
**Schematic**

CROSLEY RADIO CORP.

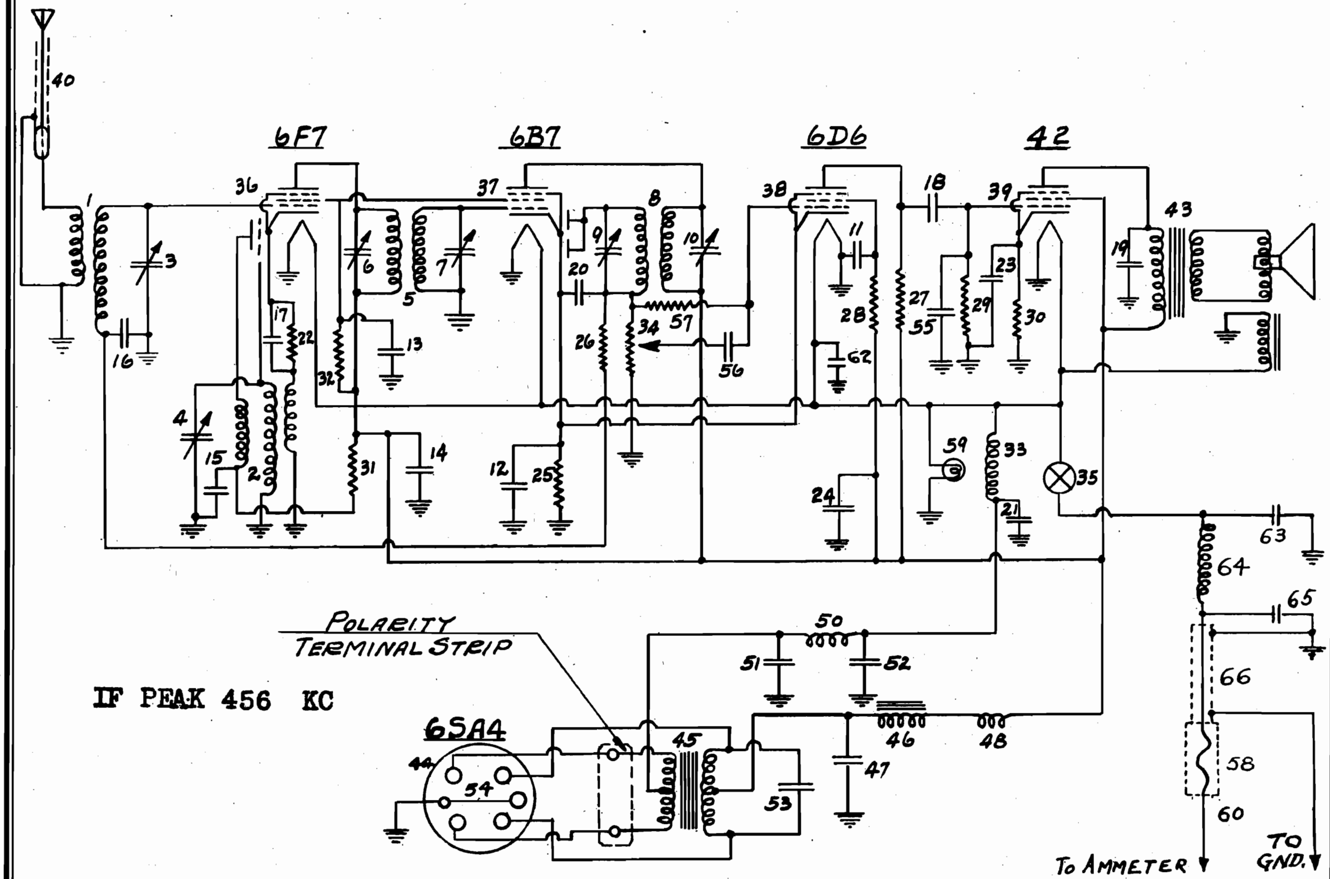



IF PEAK 456 KC.

MODEL 184 WIRING DIAGRAM

# CROSLEY RADIO CORP.

**MODEL 4A1**
**Schematic, Parts List**




* Figures in 2nd last column refer to parts shown in wiring diagram of Model 4A1

| Qty. | Part No. | Description | * Item | List Each |
|---|---|---|---|---|
| 1 | G9-32000 | Antenna Coil | 1 | .60 |
| 1 | G8-32002 | Osc. Coil | | .45 |
| 1 | W32728 | Washer (Ant. Coil Shield Base) | | .05 |
| 1 | W30802 | Coil Shield (Ant.) | | .15 |
| 1 | W30026 | Retaining Ring (Ant.) | | .05 |
| 1 | W25200 | Coil Socket (Osc.) | | .05 |
| 1 | W25025A | Coil Shield (Osc.) | | .10 |
| 1 | W26891 | Insulating Washer (Osc.) | | .05 |
| 1 | W21541B | Retaining Ring (Osc.) | | .05 |
| 1 | L32698 | Variable tuning Cond. Gang | 3-4 | 5.50 |
| 1 | G7-32004 | Ist I. F. Trans. Coil and Tuning Condensers | 5-6-7 | 1.85 |
| 1 | G8-32004 | 2nd I. F. Trans. Coil and Tuning Condensers | 8-9-10 | 1.75 |
| 1 | W32712B | Level Control and Power Switch | 34-35 | 1.10 |
| 1 | W32739A | Level Control Bracket | | .10 |
| 1 | G49-27975 | 6F7 Socket | 36 | .10 |
| 1 | G48-27975 | 6B7 Socket | 37 | .10 |
| 1 | G75-27975 | 6D6 Socket | 38 | .10 |
| 1 | G25-27975 | 42 Socket | 39 | .10 |
| 1 | G81-27975 | 6SA4 Socket | 54 | .10 |
| 1 | LB32037 | 6SA4 Syncrotube | 44 | 5.00 |
| 2 | W27981A | Tube Shield Base | | .05 |
| 2 | W30964 | Tube Shield (6B7 & 6F7) | 36-37 | .10 |
| 1 | G1-32769 | Power Transformer | 45 | 2.75 |
| 1 | G11-24628 | "B" Filter Choke | 46 | 1.10 |
| 1 | G1-32755 | R. F. "B" Choke | 48 | .15 |
| 1 | G6-28067 | R. F. "A" Choke | 50 | .30 |
| 1 | G4-28067 | "A" Choke | 33 | .35 |
| 1 | B32783 | Antenna Lead | 40 | .45 |
| 1 | G1-25891 | Antenna Wire | | .90 |
| 1 | G5-31701 | "A" Cable Assem. | 60 | .25 |
| 1 | G7-31701 | "A" Lead Assem. & Choke Assem. | 61 | 1.40 |
| 1 | W32757 | 12 Amp. Fuse | 58 | .10 |
| | | **BY-PASS & FILTER CONDENSERS** | | |
| 1 | W32711A | 0.1-0.1-0.05-0.05 Mfd. 200 Volt | 11-12 13-14 | 1.00 |
| 3 | W32780A | 0.05 Mfd. 400 Volt | 15-18 56 | .15 |
| 1 | W32779A | 0.02 Mfd. 200 Volt | 16 | .15 |

| Qty. | Part No. | Description | * Item | List Each | |
|---|---|---|---|---|---|
| 2 | W32781A | 0.1 Mfd. 200 Volt | 17-62 | .15 | |
| 1 | W32782A | 0.01 Mfd. 400 Volt | 19 | .15 | |
| 3 | W32741 | .0005 Mfd. (Mica) | 20-21 55 | .15 | |
| 2 | W30366 | 05 Mfd. 160 Volt | 51-52 | .50 | |
| 1 | W32762 | 0.005 Mfd. 1000 Volt | 53 | .65 | |
| 1 | W30419A | 8.-8. Mfd. 25 Volt-250 Volt | 23-24 | 1.80 | |
| 1 | W32759 | 8. Mfd. 300 Volt | 47 | 1.50 | |
| | | **RESISTORS** | | | |
| 1 | W21452 | 1100 Ohms | 22 | .15 | |
| 1 | W28589 | 350 Ohms | 25 | .10 | |
| 2 | 21454 | 1 Megohm | 26-57 | .15 | |
| 1 | 21875 | 100000 Ohms | 27 | .15 | |
| 2 | 23785 | 500000 Ohms | 28-29 | .15 | |
| 1 | W25521 | 450 Ohms | 30 | .15 | |
| 2 | 32331 | 55000 Ohms (½ Watt) | 31-32 | .15 | |
| | | **CASE** | | | |
| 1 | L32730 | Case | | 1.70 | |
| 1 | B32714A | Bottom Cover | | .25 | |
| 1 | B32720B | Top Cover | | .25 | |
| 1 | W32717A | Control Window | | .10 | |
| 1 | B32718A | Control Window Cover | | .30 | |
| 1 | W32724 | Knob | | .10 | |
| 1 | W32725A | Knob (Key) | | .20 | |
| 1 | W32723A | Mounting Bracket (Front) | | .10 | |
| 1 | C32742 | Mounting Bracket (Rear or Bulkhaed) | | | |
| 1 | W32787A | 3" Mounting Bolt | | .05 | |
| | | | | Doz. | Ea. |
| 1 | W32788 | 7/16 Washer | | .10 | .05 |
| 1 | W32789 | 7/16 x 14 Thr. Nut | | .15 | .05 |
| 5 | W32734 | 5/16 x 24 Hex. Hd. Mtg. Bolt | | .10 | .05 |
| 5 | W24235 | 5/16 Shakeproof Washer | | .10 | .05 |
| 1 | W6849 | 5/16 Washer (Black Oxide) | | .10 | .05 |
| 4 | W6133 | 5/16 x ¾ Washer | | .15 | .05 |
| 1 | W12131 | 7/16 Std. Lockwasher | | .15 | .05 |
| 1 | W33436 | ¼-20 x ¾ Rd. Hd. Screw | | .15 | .05 |
| | W31625A | Distributor Suppressor | | .40 | |
| | W33165 | Spark Plug Suppressor | | .40 | |
| | W29754B | .5 Mfd. Cond. (Eliminator) | | .45 | |
| 1 | 33-B | Speaker | 43 | 4.00 | |

MODEL 4A1
Alignment,Voltage

CROSLEY RADIO CORP.

## Alignment Procedure . . .

To align the receiver at intermediate frequency it is necessary that there be available a suitable modulated oscillator capable of adjustment to 456 Kc. with good accuracy. This oscillator should have an attenuator so that the strength of the oscillator output can be adjusted. Connect the high side of the output of the modulated oscillator, which has been adjusted to 456 Kc. to the control grid connection on the top of the 6F7 tube through an .02 mfd. series condenser. The low side of the oscillator is to be connected to the receiver chassis. Set the output of the oscillator to a convenient level and adjust the I. F. transformer condensers for maximum signal output. To make this adjustment it is necessary that a standard 5/16″ (across flat) hexagon socket wrench be used for the upper condenser, and a small screw driver fitting inside of the nut hole for adjustment of the lower condenser. Always make this I. F. adjustment very carefully and go over the adjustment several times to be sure that the peak has been reached. To align a receiver at broadcast radio frequency, it is necessary that an adjustable oscillator having frequencies of 1400 and 600 Kc. together with a suitable attenuator and dummy antenna be available. Set the oscillator at 1400 Kc. and connect the high side of the oscillator to the receiver antenna terminal through a .0002 mfd. (dummy antenna) condenser. Turn the tuning control of the receiver to 140 on the dial. Now adjust the oscillator shunt trimmer which is located on the front section of the gang condenser until the signal is heard best. Without changing the gang condenser setting, adjust the antenna trimmer located on the rear section of the gang condenser. It is necessary that these adjustments be gone over several times until no further improvements can be made. Always work with the weakest possible signal from the modulated oscillator for best accuracy. Now rotate the dial until it reads 60 and set the modulated oscillator at approximately 600 Kc. The approximate sensitivity of the receiver may be checked here and it is possible that by slight bending of the gang condenser plates some improvement may be made. It is very essential, however, that this bending of plates be done with extreme care and by someone who is experienced in this operation.

## Automatic Volume Control Circuit . . .

Diode voltage is developed across resistor 34 which is the level control. This voltage is fed back through isolating resistor, part No. 26, to the grid return of the antenna coil, part No. 1, thereby exerting automatic volume control voltage on the pentode section of the 6F7 oscillator modulator. No AVC voltage is impressed on the 6B7 I. F. amplifier because in so doing serious distortion might result. AVC voltage is also impressed on the 6D6 A. F. amplifier by means of coupling resistor 57.

## Method of Biasing . . .

Both the pentode and triode section of the 6F7 oscillator modulator obtain their bias from the cathode resistor, part No. 22. The 6B7 I. F. amplifier section obtains its bias from the cathode resistor, part No. 25. Bias for the 6D6 A. F. amplifier is also obtained from resistor No. 25, while the bias for the output type 42 is obtained from resistor part No. 30.

## Analysis of Signal Channel . . .

The signal enters at the antenna lead-in terminal through the bayonet socket and then goes to the antenna coil, part No. 1. There is optionally offered a wave trap to be used with this receiver when it is operated in the neighborhood of commercial code stations using frequencies in the region of 456. This wave trap prevents these code stations from riding on through and being amplified by the intermediate frequency amplifier. The signal is tuned by the rear section of the gang condenser, part No. 3, and then impressed on the pentode grid of the 6F7. The 6F7 triode section is equipped with a conventional oscillator circuit tuned by the front section of the gang condenser, part No. 4. The oscillator output is impressed on the cathode of the 6F7 through a pickup coil. The output therefore of the 6F7 pentode section is intermediate frequency which is impressed on the first I. F. transformer, part No. 5. This I. F. transformer is double tuned. The signal is then fed to the grid of the pentode section of the 6B7 I. F. amplifier which tube has a double tuned output I. F. transformer, part No. 8, in its plate circuit. This amplified output is impressed on the two diodes of the 6B7 in parallel and diode voltage is developed across level control, part No. 34. The DC component of this voltage is fed forward through resistor 57 to the grid of the 6D6 A. F. amplifier, but the audio frequency component is fed from the level control contact arm through coupling condenser 56 to the grid of the 6D6 A. F. amplifier. In this way a bias depending on the strength of the signal is impressed on the grid of the 6D6 A. F. amplifier while the actual audio frequency voltage is determined by the setting of the level control. The amplified audio frequency output of the 6D6 is fed through coupling condenser No. 18 to the grid of the 42 output tube and is then amplified and fed to the speaker part No. 43. Condenser No. 19 serves to keep the impedance of the output system more nearly constant.

| Type | Where Used | Ef | Ep | Eg | Ek | Esg | Eposc | Esup |
|---|---|---|---|---|---|---|---|---|
| 6F7 | Osc. Mod. | 6.0 | 230 | 0 | 8 | 100 | 60 | — |
| 6B7 | I.F. and Diode | 6.0 | 230 | 0 | 3 | 100 | — | — |
| 6D6 | A.F. | 6.0 | 60 | 0 | 3 | 25 | — | 3 |
| 42 | Output | 6.0 | 220 | 0 | 16 | 230 | — | — |

All voltages are plus or minus 10% and measured to chassis with 500 volt 1000 ohm per volt voltmeter. Battery voltage 6 volts.

CROSLEY RADIO CORP.

MODEL Fiver Jr.(5M3)
Voltage, Notes
Alignment

## General Description . . .

Chassis 5M3 is used in the Fiver Jr. It is a low-priced but highly efficient 5-tube superheterodyne receiver covering the frequency range of 535-1750 Kc. The intermediate frequency is 456 Kc.

## Tubes Used and Their Function . . .

The tubes used are 6D6 oscillator modulator, 6D6 I. F. amplifier, 76 detector, 42 output, and 80 rectifier.

The tube voltages are shown in the table below:

| Type | Where Used | Ef | Ep | Eg | Ek | Esg | Esup |
|---|---|---|---|---|---|---|---|
| 6D6 | Osc-Mod. | 6.3 | 235 | 29 | 32 | 120 | 0 |
| 6D6 | I. F. | 6.3 | 235 | 0 | 3 | 120 | 3 |
| 76 | Detector | 6.3 | 80 | 0 | 10 | — | — |
| 42 | Output | 6.3 | 225 | 0 | 18 | 235 | — |
| 80 | Rectifier | 4.9 | — | — | 310 | — | |

All voltages are measured to chassis voltages and are plus or minus 10%. All DC are voltages measured to chassis at 117.5 volt line with 1000 ohms per volt, 250-volt voltmeter. Power demand 50 watts, 110 volts, 60 cycles.

## Method of Biasing . . .

Referring to the circuit diagram, it will be seen that the 6D6 oscillator modulator tube has a more or less complex biasing system. This is because resistor No. 22 in the cathode circuit creates a bias for the input section of the tube, while resistors 22 and 23 in series create the bias for the suppressor grid oscillator section. The 6D6 I. F. amplifier obtains its bias from the volume control, part No. 40. There is a fixed limiting resistance in this volume control so that at the full volume position there is still the bias indicated in the voltage chart, and as the volume is reduced, the bias on the 6D6 I. F. amplifier increases. The 76 detector obtains its bias from the cathode resistor, part No. 24, while the 42 output tube obtains its bias from its cathode resistor, part No. 29.

## Volume Control Circuit . . .

As explained above, as the volume control is backed off of the maximum sensitivity position, cathode bias is inserted in the 6D6 I. F. amplifier circuit. At the same time, resistor 40, being connected across the antenna and ground, tends to short circuit the antenna circuit. Thus, reduction in sensitivity is obtained simultaneously by reducing the gain in the I. F. amplifier and reducing the effectiveness of the antenna.

## Analysis of Signal Channel . . .

Starting with the antenna, the signal is fed through the antenna coil, part No. 2, and tuned by the radio frequency section of the gang condenser, part No. 6. The signal is then impressed on the control grid of the 6D6 oscillator modulator. This tube is so connected that the combination cathode, suppressor grid, and plate of the 6D6 tube form a conventional triode oscillator. The oscillator frequency is determined by the setting of the gang condenser oscillator section, part No. 6, in conjunction with oscillator coil, part No. 3. The plate shape of the oscillator section of the gang condenser is such that a constant I. F. frequency of 456 Kc. is present at the primary terminals of the first I. F. transformer, part No. 4. This I. F. transformer is double tuned and the I. F. signal is then impressed on the grid of the 6D6 I. F. amplifier. The amplified output of this tube is impressed on the second I. F. transformer, part No. 5, which is single tuned, with condenser part No. 9. To prevent overload being serious in the 76 detector circuit, resistor No. 25 is used so that when grid current is drawn the bias on the tube increases very rapidly. In the plate circuit of the 76 detector there is present in addition to the normal DC plate current, both intermediate frequency and audio frequency. The intermediate frequency is bypassed by condenser No. 16, while the audio frequency is passed on to the output tube grid through condenser No. 17. The grid circuit of the output tube is completed through resistor No. 28. The amplified audio output of the type 40 tube is, of course, fed to the speaker in the usual manner.

## Power Supply System . . .

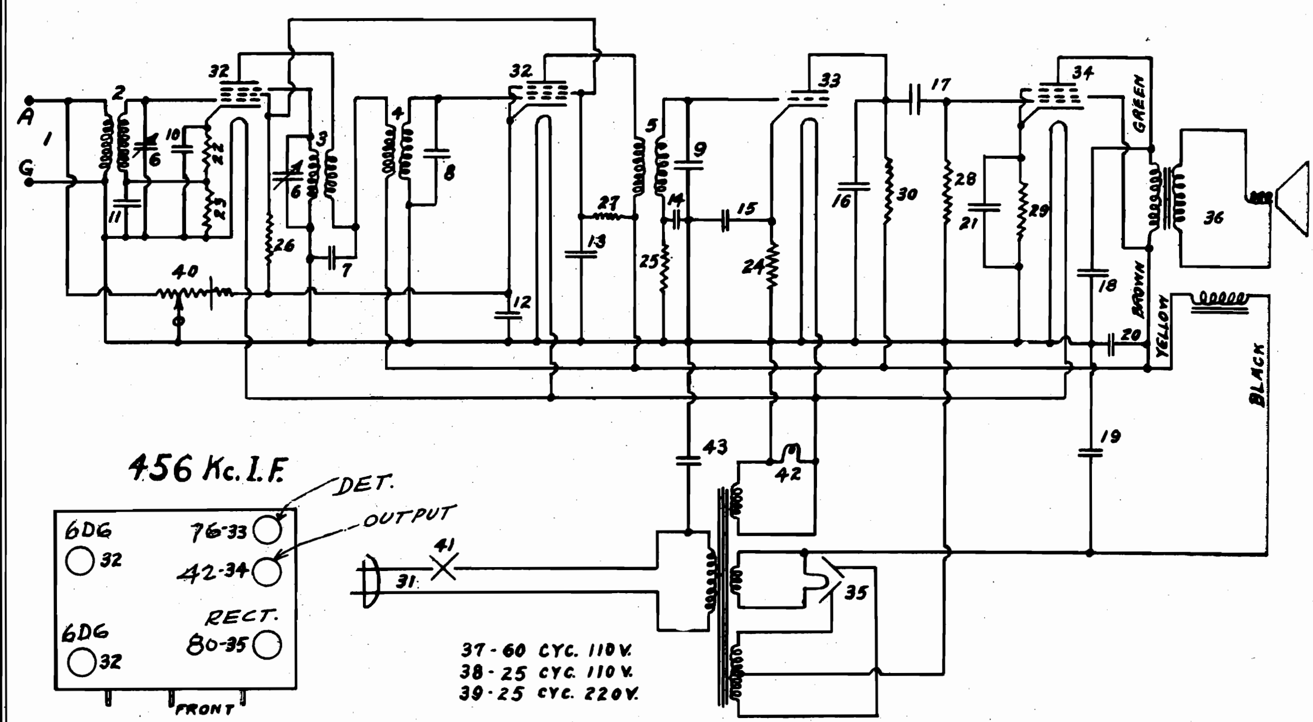
The power supply system consists of a transformer, part No. 37, for 110-volts, 60 cycles, part No. 38 for 110-volt 25 cycles, and part No. 39 for 220 volts, a type 80 rectifier tube, electrolytic condenser part No. 19, the speaker field as a filter choke, and electrolytic condenser part No. 20.

## Alignment Procedure . . .

To align the I. F. amplifier, it is necessary that there be available a suitable modulated oscillator capable of adjustment to 456 Kc. with good accuracy. This oscillator should have an attenuator, so that the strength of the oscillator output can be adjusted. Connect the high side of the output of the modulated oscillator, which has been adjusted to 456 Kc. to the control grid connection on the top of the 6D6 oscillator modulator tube through an .02 Mfd. series condenser. The low side of the oscillator is to be connected to the receiver chassis. Set the output of the oscillator to a convenient level and adjust the three I. F. tuning condensers located on the top of the chassis for maximum signal output. To make this adjustment, it is necessary that a standard ¼" (across flats) hexagon socket wrench be used. The wrench is preferably insulated. Always make these adjustments very carefully and go over

MODEL Fiver Jr.(5M3)
Schematic, Socket
Parts List

## CROSLEY RADIO CORP.




them several times to be sure that the peak has been reached.

To align the receiver at radio frequency it is necessary that an adjustable oscillator having frequencies of 1400 and 600 Kc. together with a suitable attenuator and dummy antenna be available. Set the modulated oscillator to 1400 Kc. and connect the high side of the oscillator to the receiver antenna terminal through a .0001 (dummy antenna) condenser and the low side to receiver chassis. Now, with dial set at 140, adjust the gang condenser oscillator trimmer, which is in the rear section of the gang until the signal is heard best. Then adjust the R. F. trimmer, which is in the front section of the gang condenser, for maximum signal. The set is now aligned at 1400 Kc. and by setting the modulated oscillator to 600 Kc., the set may be rechecked at this point. It will be sometimes found that a slight bending of the gang condenser plate will help the sensitivity at 600 Kc. This operation should be done very carefully so that no short circuiting of the condenser plates result.

## PARTS LIST—MODEL 5M3

* Figures in 2nd last column refer to parts shown in wiring diagram of Model 5M3

| Qty. | Part No. | Description | * Item | List Each |
|---|---|---|---|---|
| 1 | G7-32000 | Antenna Coil | 2 | .35 |
| 1 | G6-32002 | Osc. Coil | 3 | .40 |
| 1 | G3-32004 | 1st I. F. Trans. Coil | 4 | .55 |
| 1 | G4-32004 | 2nd I. F. Trans. Coil | 5 | .55 |
| 4 | W25200 | Coil Socket | | .05 |
| 2 | W25024A | Coil Shield | | .10 |
| 2 | W25025A | Coil Shield | | .10 |
| 4 | W26891 | Insulating Washer | | .05 |
| 4 | W21541B | Retaining Ring | | .05 |
| 1 | G3-33001 | Tuning Condenser Gang | 44 | 2.25 |
| 1 | G19-25050 | Dial Assem. | | .35 |
| 1 | G12-27812 | Dial Light Brkt Assm. | | .20 |
| 1 | G2-25948 | 1st I. F. Primary Tuning Cond. | 7 | .30 |
| 1 | W27548 | 1st I. F. Sec. Tuning Cond. Adj. Blade | 8 | .05 |
| 1 | W25008A | 2nd I. F. Sec. Tuning Cond. Adj. Blade | 9 | .05 |
| 2 | W31472 | First Blade | | .05 |
| 2 | W25584 | Mica Insulator | | .05 |
| 2 | W26069B | Adjusting Nut | | .05 |
| 2 | W25446 | Bakelite Washer | | .05 |
| 2 | W24865 | Metal Washer | | .05 |
| 2 | W25450B | Insulating Washer | | .05 |
| 2 | W25007B | Insulating Washer | | .05 |
| 2 | O-4 | Flat Washer | | .05 |
| 2 | M-20 | Rivet (.120x7/32) Tubular | | .05 |
| 2 | R80 | 4-36x¾ Rd. Hd. Mach. Screw | | .05 |
| 1 | W26573B | Vol. Control & Line Switch | 40-41 | 1.10 |
| 2 | G75-27456 | 6D6 Socket | 32 | .10 |
| 1 | G80-27456 | 76 Socket | 33 | .10 |

| Qty. | Part No. | Description | * Item | List Ea |
|---|---|---|---|---|
| 1 | G25-27456 | 42 Socket | 34 | .10 |
| 1 | G6-27456 | 80 Socket | 35 | .10 |
| 2 | W26010 | Tube Shield Base (6D6) | | .10 |
| 2 | B26009C | Tube Shield | | .05 |
| 1 | B21491C | Cable & Plug | 31 | .50 |
| 1 | G5-28500 | Power Trans. 60 cy. 110 V. | 37 | 3.00 |
| | G6-28500 | Power Trans. 25 cy. 110 V. | 38 | 4.00 |
| | G7-28500 | Power Trans. 25 cy. 220 V. | 39 | 4.00 |
| 1 | LW-20264 | Ant.-Gnd. Terminal | 1 | .15 |
| | | **FILTER & BY-PASS CONDENSERS** | | |
| 1 | W25537A | 0.001-0.03 Mfd. 400 V.-400 V. | 16-17 | .30 |
| 1 | W23191A | 0.01 Mfd. 400 V. | 18 | .25 |
| 1 | W30805 | 0.01 Mfd. 400 V. | 43 | .20 |
| 1 | W28622 | 0.1-0.1 Mfd. 200 V.-200 V. | 45-46 | .25 |
| 2 | W28623 | 0.02-0.02 Mfd. 200 V.-200 V. | 47-48 49-50 | .25 |
| 1 | W29150B | 8.-6.-12. Mfd. 450 V.-450 V.-25 V. | 19-20 21 | 2.60 |
| | | **RESISTORS** | | |
| 1 | W25937 | 275 Ohm | 22 | .15 |
| 1 | 31094 | 4500 Ohm | 23 | .15 |
| 1 | 21237A | 60000 Ohm | 24 | .15 |
| 1 | 21454 | 1 Megohm | 25 | .15 |
| 1 | W27120 | 25000-8500 Ohm | 26-27 | .40 |
| 1 | 23785 | 500000 Ohm | 28 | .15 |
| 1 | W23907 | 750 Ohm | 29 | .20 |
| 1 | 21455 | 300000 Ohm | 30 | .15 |
| 2 | W32352 | Knob | | .10 |

MODEL Deluxe Fiver-L-B (Chassis 5V1) Voltage, Data, Parts List

CROSLEY RADIO CORP.

## General Description . . .

Chassis 5V1 is used in the DeLuxe Fiver and DeLuxe Fiver Lowboy. It is a 5-tube 3-gang automatic volume control dual band receiver. The frequency bands are 535 to 1720 Kc. and 1650 to 4500 Kc. The intermediate frequency is 181.5 Kc., the use of which insures adequate selectivity.

## Tubes Used and Their Function . . .

The tubes used are 6A7 oscillator-modulator, 6D6 I. F. amplifier, 6B7 diode and audio frequency amplifier, 42 output, and 80 rectifier. The tube voltages are shown in the table below:

| Type | Where Used | Ef | Ep | Eg | Ek | Esup | Eg-osc | Ep-osc |
|---|---|---|---|---|---|---|---|---|
| 6A7 | Osc-Mod. | 6.5 | 240 | 0 | 3 | 0 | -15 | 125 |
| 6D6 | I. F. | 6.5 | 240 | -3.5 | 0 | 0 | — | — |
| 6B7 | Diode-AF | 6.5 | 30 | -3.5 | 0 | — | — | — |
| 42 | Output | 6.5 | 230 | -18 | 0 | — | — | — |
| 80 | Rectifier | 5.1 | — | — | 240 | — | — | — |

All voltages are plus or minus 10%. All DC voltages are measured to chassis at 117.5 line with 1000 ohms per volt 250-volt voltmeter. Power demand is 50 watts at 110 volts 60 cycles.

## Method of Biasing . . .

Referring to the circuit diagram, it will be seen that the input section of the 6A7 oscillator modulator obtains its bias from the cathode resistor, part No. 30, while the oscillator section of the same tube gets its bias from the grid leak and condenser combination, in which part No. 31 is the grid leak and part No. 12 is the grid condenser. Bias for the remainder of the tubes is obtained from the voltage divider network connected across the speaker field, which also is the filter choke. Resistors 41, 42 and 43 form its voltage divider network, and the bias voltage applied to the 6D6 I. F. amplifier is that voltage drop across resistor 41. The audio frequency amplifier section of the 6B7 tube obtains its bias from the drop across resistor 41. The grid circuit is completed through volume control part No. 29. The output tube bias is the drop across the combined resistors 41 and 42, completed, of course, through resistors 39 and 56.

## Automatic Volume Control Circuit . . .

Automatic volume control voltage is generated across resistor 34 and is fed back through filter resistor 33 to the 6A7 control grid via the switch and second secondary in the preselector system. No automatic volume control is exerted on the I. F. amplifier stage, which is the 6D6, because in so doing there is a serious danger of introducing distortion.

## Analysis of Signal Channel . . .

The signal enters at the antenna terminal and when the switch is thrown to the broadcast position flows through the antenna coil primary. In the first secondary circuit it is tuned by means of one section of the gang condenser, part No. 5, and then due to the inductive coupling between the first secondary and the second secondary, signal is fed over to this latter coil where it is tuned by another section of the gang condenser, part No. 5. This signal is impressed on the grid of the oscillator modulator tube. The oscillator section of this tube is tuned by the specially-shaped third section of the gang condenser, part No. 5, in conjunction with oscillator coil, part No. 2. The frequency of the oscillator is such that a constant intermediate frequency of 181.5 kilocycles is present in the plate circuit of the first detector or oscillator-modulator tube. This intermediate frequency signal is fed to the first I. F. transformer, part No. 3, which transformer is double tuned. The signal is then fed to the grid of the 6D6 I. F. amplifier and then the amplified output is fed to the second I. F. transformer. part No. 4, which transformer is also double tuned. The I. F. signal is then impressed on the diode plates in parallel. In this stage there is developed across resistor 34 a DC diode voltage, an audio frequency voltage, and some intermediate frequency. The audio frequency and intermediate frequency signals pass through coupling condenser, part No. 20, but the filter resistor, part No. 35, excludes most of the intermediate frequency so that mostly audio frequency is present across resistor 29, the volume control. This audio frequency is then amplified through the pentode section of the 6B7 tube and the amplified audio output is fed through coupling condenser 18 to the grid of the output tube type 42. The output of the type 42 tube is fed to the speaker in the conventional manner. Resistor 56 in the grid circuit of the output tube acts as a further filter for whatever intermediate frequency might still be present and also tends to suppress distortion at extremely loud volume. Condenser part No. 16 is connected across the speaker transformer and tends to hold the impedance of the speaker load more constant at the higher audio frequencies.

For the high frequency band the signal channel is slightly different in that the first section of the preselector is not used. Instead the signal is fed directly over to the second secondary through coupling condenser part No. 10. The switch is now connected into the tap on the second secondary so that part of this secondary acts as an antenna primary and the balance as the high fre-

## PARTS LIST—MODEL 5V1

* Figures in 2nd last column refer to parts shown in wiring diagram of Model 5V1

| | | FILTER & BY-PASS CONDENSERS | | |
|---|---|---|---|---|
| 1 | B30059C | 8.-8.-8 Mfd. 250 V. 450 V. 450 V. | 23-24 25 | 3.00 |
| 2 | W30321A | 1. Mfd. 160 V. | 14-68 | .55 |
| 1 | W27668 | 0.0001 Mfd. | 10 | .15 |
| 1 | W26571 | 0.0005 Mfd. 400 V. | 12 | .15 |
| 1 | W30323 | 0.01 Mfd. 200 V | 16 | .15 |
| 1 | W25537A | 0.001-0.03 Mfd. 400 V.-400 V. | 17-18 | .30 |
| 1 | W30322A | 0.00017-0.006 Mfd. 200 V. 200 V. | 19-20 | .30 |
| 1 | W30805 | 0.01 Mfd. 400 V. | 55 | .20 |
| 2 | W28621 | 0.02 Mfd. 200 V. | 60-61 | .15 |
| 1 | W29271A | 0.02-0.02 Mfd. 400 V. 400 V. | 63-64 | .25 |

| | | RESISTORS | | |
|---|---|---|---|---|
| 1 | W25937 | 275 Ohms | 30 | .15 |
| 1 | 21237A | 60000 Ohms | 31 | .15 |
| 1 | 21876 | 10000 Ohms | 32 | .15 |
| 1 | 26577 | 3 Megohm | 33 | .15 |
| 4 | 23785 | 500000 Ohms | 34-36 38-43 | .15 |
| 2 | 21455 | 300000 Ohms | 35-56 | .15 |
| 2 | 21875 | 100000 Ohms | 37-42 | .15 |
| 1 | W31883 | 8500-25000 Ohms | 39-40 | .55 |
| 1 | 24990 | 25000 Ohms | 41 | .20 |
| 1 | W23013 | 2000 Ohms | 69 | .15 |
| 3 | W32352 | Knobs | | .10 |

MODEL Deluxe Fiver,L-B
(Chassis 5V1)
Schematic,Alignment
Socket Layout

CROSLEY RADIO CORP.

quency secondary. The oscillator coil is tapped in the usual manner simply to reduce inductance.

## Power Supply System . . .

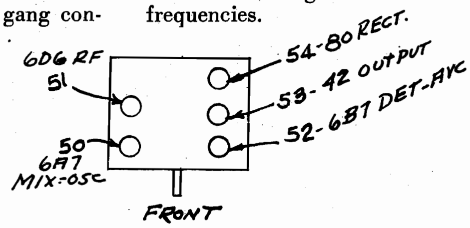
The power supply system consists of a transformer part No. 45 for 110 volts 60-cycle, part No. 46 for 110 volts 25-cycle, part No. 47 for for 220 volts, a rectifier tube type 80, the speaker field as the filter choke, and filter condensers parts 24 and 25. In this circuit the filter choke is included in the negative leg of the power supply system, because in so doing it is possible to use the drop across the filter choke for biasing, and eliminates the use of a large bypass condenser on the cathode of the output tube, type 42. At the same time, better audio quality for the lower notes is obtained than with the ordinary bypass condenser circuit.

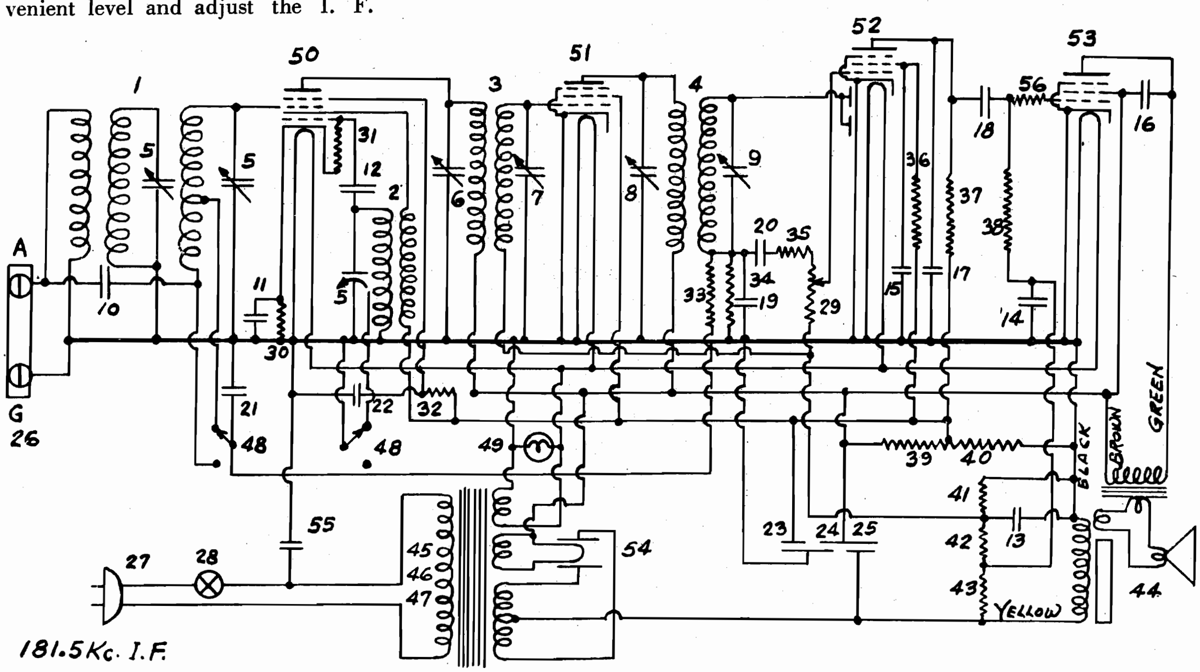
## Alignment Procedure . . .

To align the I. F. amplifier, it is necessary that there be available a suitable modulated oscillator capable of adjustment to 181.5 Kc. with good accuracy. This oscillator should have an attenuator so that strength of the oscillator output can be adjusted. Connect the high side of the output of the modulated oscillator, which has been adjusted to 181.5 Kc. to the control grid connection on the top of the 6A7 tube, through an .02 Mfd. series condenser. The low side of the oscillator is to be connected to the receiver chassis. Set the output of the oscillator to a convenient level and adjust the I. F. transformer condensers, three of which are located on top of the chassis and one in the rear of the chassis, for maximum signal output. To make this adjustment, it is necessary that a standard ¼″ (across flats) hexagon socket wrench be used. This wrench should be insulated. Always make these I. F. adjustments very carefully and go over the adjustments several times to be sure that the peak has been reached.

To align the receiver at broadcast frequencies it is necessary that an adjustable oscillator having frequencies of 1400 and 600 Kc. together with a suitable attenuator and dummy antenna be available. Set the oscillator to 1400 Kc. and connect the high side of the oscillator to the receiver antenna terminal through a .0001 (dummy antenna) condenser. Turn the tuning control of the receiver to 140 on the dial. Now adjust the oscillator trimmer on the gang condenser (the oscillator section is in the rear of the gang) until the signal is heard best. Without changing the gang condenser setting, adjust the remaining two sections of the gang condenser. The gang condenser adjustment may be accomplished with an ordinary screwdriver. It is necessary that these adjustments be gone over several times until no further improvement can be made. Always work with the weakest possible signal from the modulated oscillator for best accuracy. The performance of the receiver may now be checked at 600 Kc. by setting the modulated oscillator to 600 Kc. and the receiver dial to that point around 60, which gives best reception. Sometimes it is possible to make a slight improvement in the performance at this point by bending some of the gang condenser plates slightly. This operation should be done very carefully so that no short circuiting of the condenser plates results.

The receiver may be checked in the higher frequency band if a modulated oscillator, capable of covering frequencies of 1700 to 4000 is available. It is not necessary, however, to align the receiver at these frequencies because if the receiver is properly aligned at broadcast frequencies it will be in alignment at the higher frequencies.



CROSLEY RADIO CORP.

MODEL 50,50 LB (5H1)
Voltage,Data

## General Description . . .

Chassis 5H1 is used in the Model Fifty and Model Fifty Lowboy. It is a 5-tube short wave and broadcast chassis employing the latest superheterodyne circuit, in which has been incorporated a high efficiency tuned radio frequency stage for both short wave and broadcast. The frequency ranges covered are 535 to 1750 Kc., which is the normal broadcast band and the lower frequency police band, and 5700 to 15500 Kc., which is the short wave or high frequency band. The intermediate frequency is 456 Kc. and while there is only one intermediate frequency stage, adequate selectivity is obtained through the use of very high efficiency I.F. transformers, in addition to the three-gang condenser.

## Tubes Used and Their Function . . .

The tubes used are 6F7 radio frequency amplifier and audio frequency amplifier, 6A7 oscillator, modulator, 6B7 intermediate frequency amplifier and diode detector, 42 output tube and type 80 rectifier. The tube voltages are shown in the table below:

| Type | Where Used | Ef | Ep | Eg | Ek | Esg | Esup | Epl | Egl |
|---|---|---|---|---|---|---|---|---|---|
| 6F7 | R.F.-A.F. | 6.5 | 250 | —3.5 | 0 | 125 | — | 35 | —3.5 |
| 6A7 | Osc.-Mod. | 6.5 | 250 | —3.5 | 0 | 125 | — | 190 | —15.0 |
| 6B7 | I.F.-Diode | 6.5 | 250 | —3.5 | 0 | 125 | — | | |
| 42 | Output | 6.5 | 230 | —18 | 0 | 250 | | | |
| 80 | Rectifier | 5.1 | | | | | | | |

All voltages are plus or minus 10%. All D.C. voltages measured to chassis at 117.5 volt line with 1000 ohms per volt, 250-volt voltmeter. Power demand 50 watts, 110 volts, 60 cycles.

## Method of Biasing . . .

Referring to the circuit diagram attached, it will be seen that the bias for the pentode section of the 6F7 tube is obtained from the drop across resistor No. 52. Resistors Nos. 52, 53 and 54 form a voltage divider network across the speaker field, which field also acts as a filter choke. The tap between resistors Nos. 52 and 53 may be followed through resistors Nos. 48 and 47 and thence to the grid return of the 6F7 pentode section. The cathode of the 6F7 returns to the ground, as does also the lower end of resistor No. 52, therefore the drop across resistor No. 52 is impressed on the grid of the pentode section of the 6F7 tube. The grid of the pentode section of the 6F7 returns, of course, through the band change switch. The same condition exists for the grid section of the 6A7 tube. The 6A7 also obtains its bias from the drop across resistor No. 52 but in this case this voltage is fed through resistor No. 48 only and then to the grid return of the 6A7 tube. The oscillator section of the 6A7 obtains its bias, of course, from the grid leak and condenser combination, resistor No. 56 being the low frequency grid leak and resistor No. 57 being the high frequency grid leak. The bias for the pentode section of the 6B7 tube is also obtained from the voltage drop across resistor No. 52 but in this case this voltage is not fed through any filter resistor. Now returning to the triode section of the 6F7, which section is an audio amplifier, it will be found that the bias for this section is also obtained from the drop across resistor No. 52 and through volume control part No. 70. The bias for the output tube type 42, must be greater than that for the other tubes and it is generated due to the drop across resistors 52 and 53 in series and is fed through the grid leak, part No. 51.

## Automatic Volume Control Circuit . . .

Automatic volume control voltage is developed in the diode circuit across resistors 35, 47 and 48. Since resistor 48 returns to the junction between resistors 52 and 53, a delay voltage is supplied and this voltage is equal to the drop across resistor 52. The audio frequency diode resistor is part No. 49 and it will be noted that it returns directly to ground which is the same point that the low potential end of resistor 52 returns. Automatic volume control is exerted on the 6F7 pentode section which is the radio frequency stage. While the full diode voltage is that drop across resistors 35, 47 and 48 in series, only the voltage across 47 and 48 is impressed on the radio frequency amplifier. In a similar manner automatic volume control is exerted on the 6A7 control grid and this voltage is obtained from the drop across resistor 48. No automatic volume control is exerted on the intermediate frequency amplifier stage, which is the 6B7, because in so doing there is serious danger of introducing distortion.

## Analysis of Signal Channel . . .

Starting with the antenna, the signal enters switch contacts, part No. 21, at which point, depending upon the position of the switch, it will flow either to the broadcast or short wave antenna coil primary, parts Nos. 1 and 2 respectively. Tuning is accomplished by the first section of the gang condenser, part No. 20, connected in the secondary circuit of the antenna coil. The signal is then impressed on the radio frequency pentode grid of the 6F7 tube and is amplified by the tube. The output of the 6F7 tube goes into the primary of the inter-stage radio frequency transformer, part Number 3 or 4, depending on whether the switch is connected to the low or high frequency position. The secondaries of the interstage coils are again tuned by another section of the gang condenser, part No. 20, and the signal is then impressed on the control grid of the 6A7 oscillator modulator tube. The oscillator section of the 6A7 tube uses the oscillator coils 5 and 6 for the low

MODEL 50,50 LB (5H1)

Alignment,Notes

# CROSLEY RADIO CORP.

and high frequency bands respectively, and the oscillator is tuned by the third section of the gang condenser, part No. 20. In this tube the frequency of the signal is changed from radio frequency to 456 Kc., the intermediate frequency. The signal passes from the plate of the 6A7 tube to the first intermediate frequency transformer, part No. 7, and the primary and secondary of this transformer are both tuned to obtain maximum selectivity. The output of the secondary of the transformer is impressed on the control grid of the 6B7 tube in which the intermediate frequency signal is amplified and fed to the second intermediate frequency transformer, part No. 10, which transformer is also tuned in both the primary and secondary circuits. The signal is now impressed directly on the audio frequency diode, in the 6B7 tube and through condenser No. 27 on the automatic control diode of the same tube. In the audio frequency diode the signal is converted from intermediate frequency to audio frequency which audio frequency is present across resistor 49 and condensor 46. There is also a direct current voltage and some intermediate frequency also present here. The audio frequency signal is separated from the direct current voltage by condenser 45 and whatever intermediate frequency there may be left in this circuit is filtered by resistor 50 and the remaining pure audio frequency voltage is impressed across volume control, part No. 70. Adusting the position of the arm of this volume control applies greater or less audio frequency voltage on the grid of the triode section of the 6F7. This triode is used as an audio frequency amplifier. The plate of this tube is connected to the audio coupling resistor, part No. 58, and the audio frequency voltage is coupled to the grid of the output tube, type 42, through condenser 32. The grid circuit of the output tube is completed through resistor 51. The amplified audio output is impressed across the speaker transformer in the speaker assembly, part No. 59.

## Power Supply System . . .

The power supply system consists of a transformer, part No. 67, for 110-volt 60-cycle, part No. 68 for 110-volt 25-cycle, and part No. 69 for 220-volt 25-60 cycle, a rectifier tube type 80, the speaker field as a filter choke, wet electrolytic condenser part No. 39, and dry electrolytic condenser part No. 38. In this particular circuit the filter choke is included in the negative leg of the power supply system, because in so doing it is possible to use the drop across the filter choke for biasing, and eliminate the use of a large bypass condenser on the cathode of the output tube, type 42. At the same time, better audio quality for the lower notes is obtained than with the ordinary bypass condenser circuit.

## Alignment Procedure . . .

To align the I. F. amplifier it is necessary that there be available a suitable modulated oscillator capable of adjustment to 456 Kc. with good accuracy. This oscillator should have an attenuator so that the strength of the oscillator output can be adjusted. Connect the high side of the output of the modulated oscillator which has been adjusted to 456 Kc. to the control grid connection on the top of the 6A7 tube through an .02 mfd. series condenser. The low side of the oscillator to be connected to the receiver chassis. Set the output of the oscillator to a convenient level and adjust the I. F. transformer condensers for maximum signal output. To make this adjustment it is necessary that a standard 5/16 inch (across flats) hexagon socket wrench be used for the upper condenser, and a small screwdriver fitting inside of the nut hole for adjustment of the lower condenser. Always make this I.F. adjustment very carefully and go over your adjustment several times to be sure that the peak has been reached.

To align the receiver at broadcast radio frequency it is necessary that an adjustable oscillator having frequencies of 1400 and 600 Kc., together with a suitable attenuator and dummy antenna, be available. Set the oscillator at 1400 Kc., and connect the high side of the oscillator to the receiver antenna terminal through a .0002 (dummy antenna) condenser. Turn the tuning control of the receiver to 140 on the dial. Now adjust the oscillator broadcast shunt trimmer indicated on the diagram attached and located under the chassis until the signal is heard best. Without changing the gang condenser setting, adjust the antenna and radio frequency broadcast trimmers for maximum signal. It is necessary that these adjustments be gone over several times until no further improvements can be made. Always work with the weakest possible signal from the modulated oscillator for best accuracy. Now rotate the dial until it reads 60 and set the modulated oscillator to approximately 600 Kc. Adjust the modulated oscillator carefully until maximum response is obtained. Now readjust the oscillator series trimmer located on the side of the chassis as shown on the diagram attached for maximum signal. It is sometimes advisable to move the main dial back and forth slightly about 60 on the dial during the course of this adjustment if a still greater signal is obtainable.

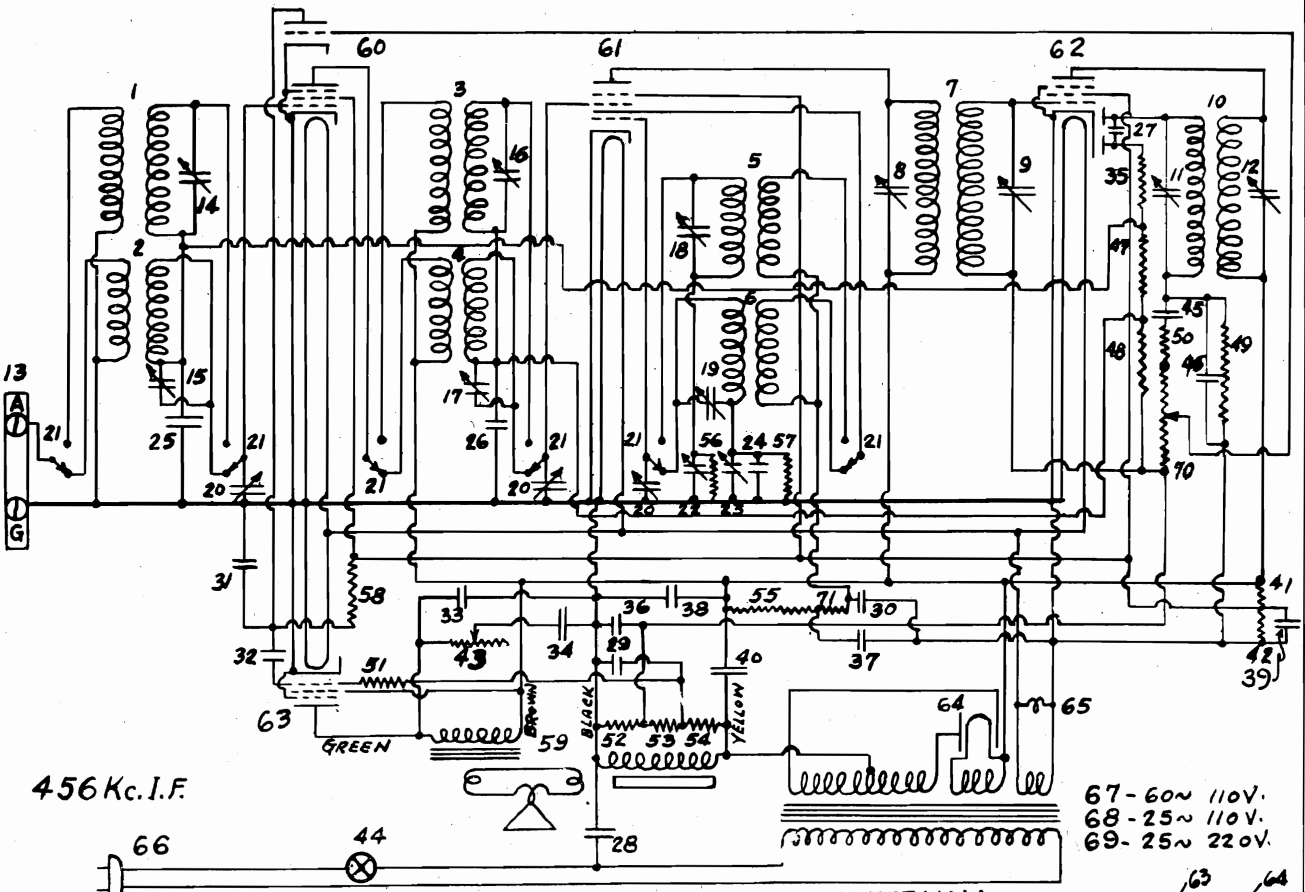
To align the set in the high frequency or short wave band, it is necessary that a modulated oscillator be available for frequencies of 6000 and 15000 Kc. The procedure for this band is similar to the broadcast band except that a 750 ohm midget carbon resistor is used for the dummy antenna instead of the .0002 condenser. Set the modulated oscillator to 15,000 Kc. and the receiver dial to 15. Adust the oscillator shunt trimmer for the high frequency band to maximum signal. Now adjust the antenna and interstage R.F. trimmers for maximum signal, making sure to go over the adjustment several times so that no further improvement can be made. Now set the modulated oscillator to approximately 6000 Kc. and the receiver dial to 6. Readjust the modulated oscillator slightly for maximum signal and then adjust the oscillator series trimmer for the high frequency band for best signal, making whatever slight adjustments in the tuning control are necessary to bring in maximum signal.

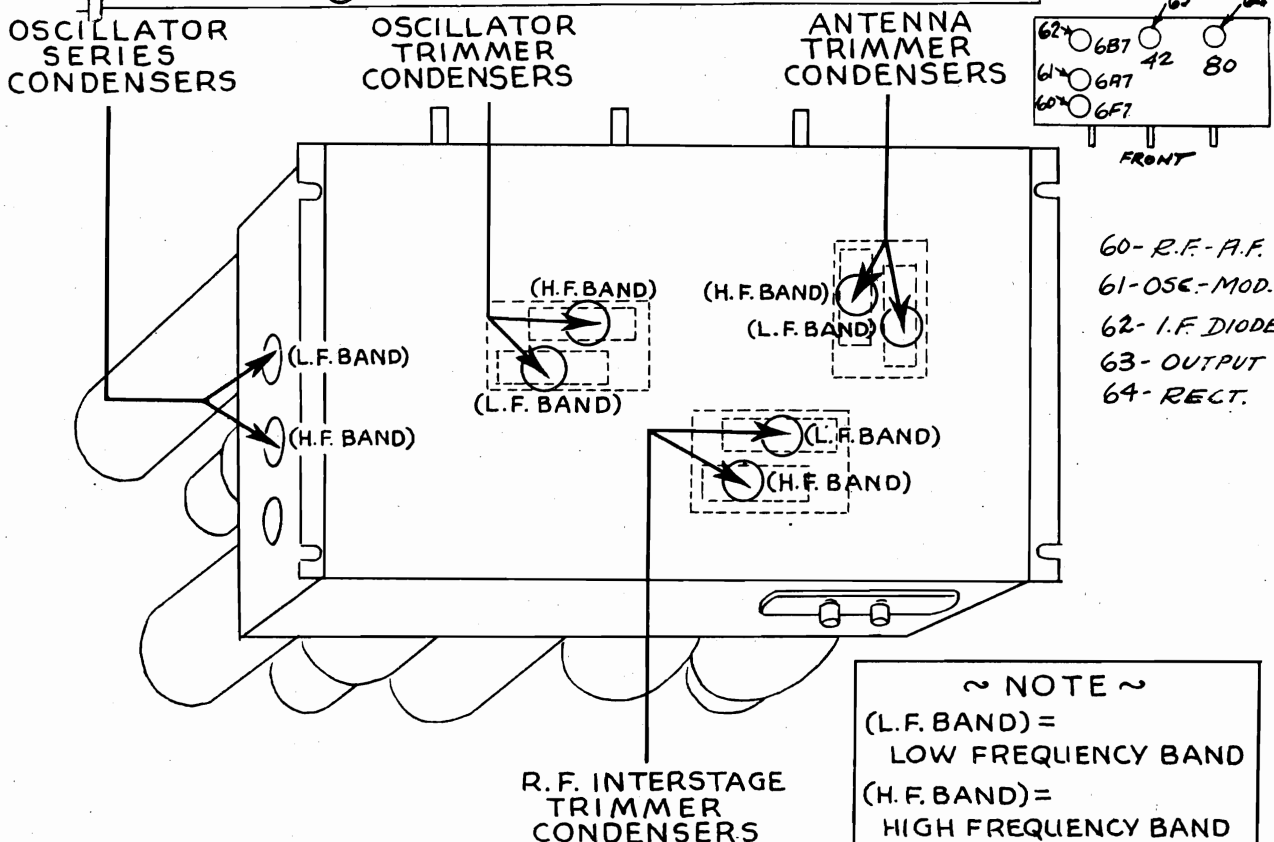
## Tuning Receiver In High Frequency Band . . .

Due to the tremendously greater number of transmitter channels covered in the high frequency band, the receiver is endowed with a much greater apparent selectivity. For this reason, if the receiver is tuned carelessly, many high frequency stations will be missed or passed over without hearing them. It is very necessary that the receiver be tuned slowly and that extreme care be exercised in final adjustment of the receiver to the center of the carrier after a high frequency station is received.

MODEL 50,50 LB (5H1)
Schematic,Trimmers

# CROSLEY RADIO CORP.




~ NOTE ~
(L.F. BAND) = LOW FREQUENCY BAND
(H.F. BAND) = HIGH FREQUENCY BAND

MODEL 50,(5H1),51,(5C2)
Parts List

# CROSLEY RADIO CORP.

**INSTRUCTIONS FOR ORDERING—Give part number, description of part, and serial number of receiver on which part is to be used. If article wanted is not listed separately, then that part of complete assembly containing this article should be ordered. Goods shipped on open account to Crosley Wholesale Distributors only. Cash must accompany Dealer and Consumer orders. Prices are subject to the usual trade discounts, and are subject to change without notice.**

## PARTS LIST—MODEL 5C2

* Figures in 2nd last column refer to parts shown in wiring diagram of Model 5C2

| Qty. | Part No. | Description | * Item | List Each |
|---|---|---|---|---|
| 1 | G1-32000 | Antenna Coil | 2 | 1.10 |
| 1 | G2-32003 | 1st I. F. Trans. Coil | 53 | .70 |
| 1 | G1-32003 | Diode Feeding Trans. | 52 | .80 |
| 2 | W25200A | Coil Socket | | .05 |
| 2 | W25024A | Coil Shield | | .10 |
| 2 | W21541B | Retainer Ring | | .05 |
| 2 | W26891 | Insulating Washer | | .05 |
| 1 | G5-33002 | Variable Tuning Condenser Gang | 62 | 3.75 |
| 1 | W31812 | Dial Pointer | | .05 |
| 1 | G2-27817 | Dial Light Bracket Assm. | | .15 |
| 1 | G3-33006 | 1st I. F. Prim. & Sec. Trimmer Cond. | 58-59 | .30 |
| 1 | G4-33006 | 2nd I. F. Prim. & Sec. Trimmer Cond. | 60-61 | .50 |
| 1 | W32242 | Vol. Control & Line Switch | 50-51 | 1.00 |
| or | W31204 | Vol. Control & Line Switch | 16-15 | 1.00 |
| 1 | G49-27975 | 6F7 Socket | 44 | .10 |
| 1 | G39-27975 | 78 Socket | 45 | .10 |
| 1 | G48-27975 | 6B7 Socket | 46 | .10 |
| 1 | G30-27975 | 43 Socket | 47 | .10 |
| 1 | G51-27975 | 25Z5 Socket | 48 | .10 |
| 2 | W32360 | Tube Shield Base | | .05 |
| 2 | W31212 | Tube Shield (Half) | | .05 |
| 2 | W31213 | Tube Shield (Slotted Half) | | .05 |
| 2 | W31210 | Tube Shield Ring | | .05 |
| 1 | B30957B | Resistor Cable & Plug (120 Ohms) | 19 | .70 |
| 1 | W31765 | Antenna | 1 | .20 |
| 1 | G2-28859 | Filter Choke | 41 | 1.25 |
| | | **FILTER & BY-PASS CONDENSERS** | | |
| 1 | W31992 | 10.-8.-25.-16. Mfd. 25 V.-125 V.-125 V.-100 V. | 37-38 39-40 | 3.50 |
| 1 | W30325 | 0.003 Mfd. 200 V. | 25 | .20 |
| 1 | W25516 | 0.25-0.25 Mfd. 200 V.-200 V. | 30-31 | .40 |
| 1 | W27668 | 0.0001 Mfd. | 32 | .15 |
| 1 | W30322A | 0.00017-0.006 Mfd. 200 V.-200 V. | 34-35 | .30 |

| Qty. | Part No. | Description | * Item | List Ea |
|---|---|---|---|---|
| 1 | W30323 | 0.01 Mfd. 200 V. | 36 | .15 |
| 1 | W28621 | 0.02 Mfd. 200 V. | 63 | .15 |
| 1 | W28623 | 0.02-0.02 Mfd. 200 V.-200 V. | 64-65 | .25 |
| 1 | W29271A | 0.02-0.02 Mfd. 400 V.-400 V. | 66-67 | .25 |
| 1 | W29910A | 0.25 Mfd. 200 V. | 68 | .20 |
| | | **RESISTORS** | | |
| 1 | W28589 | 350 Ohms | 6 | .10 |
| 1 | W27503 | 1400 Ohms | 7 | .10 |
| 1 | W24537 | 60 Ohms | 8 | .10 |
| 1 | W30539 | 26.7 Ohms | 9 | .20 |
| 1 | 21237A | 60000 Ohms | 10 | .15 |
| 1 | 21454 | 1 Megohm | 11 | .15 |
| 1 | 26578 | 5 Megohm | 12 | .15 |
| 2 | 23785 | 500000 Ohms | 13-17 | .15 |
| 1 | 23403 | 150000 Ohms | 14 | .15 |
| 1 | 21455 | 300000 Ohms | 18 | .15 |
| 1 | W22514 | 750 Ohms | 56 | .15 |
| 1 | 24990 | 25000 Ohms | 57 | .20 |
| | | **CABINET AND SPEAKER** | | |
| | 4D | Cabinet Assembly | | 5.47 |
| 1 | W33139 | Dial Plate | | .15 |
| 1 | W33140 | Vol. Control Plate | | .15 |
| 1 | W28723 | Bull's Eye | | .05 |
| 1 | W29023 | Bezel | | .05 |
| 1 | W33164 | Grille Cloth | | .10 |
| 1 | B33167A | Baffle | | .10 |
| 1 | W33168 | Back Cover | | .50 |
| 1 | W33143 | Knob | | .10 |
| 1 | W33144 | Knob | | .10 |
| 1 | G5-31692 | Speaker & Plate Assm. | | 4.50 |
| 1 | G1-29529 | Cone & Voice Coil | | 2.00 |
| 1 | G6-29535 | Transformer | | 1.10 |
| 1 | W31214 | Field Coil | | 1.25 |
| 4 | W28742 | Speaker Mounting Screws (Chrome) | | .05 |

## PARTS LIST—MODEL 5H1

* Figures in 2nd last column refer to parts shown in wiring diagram of Model 5H1

| Qty. | Part No. | Description | * Item | List Each |
|---|---|---|---|---|
| 1 | G3-32000 | Antenna Coil (Low Freq.) | 1 | .45 |
| 1 | G1-32002 | Antenna Coil (High Freq.) | 73 | .50 |
| 1 | G2-32001 | R. F. Coil (L. F.) | 3 | .55 |
| 1 | G1-32001 | R. F. Coil (H. F.) | 4 | .15 |
| 1 | G2-32002 | Osc. Coil (L. F.) | 5 | .40 |
| 1 | G1-32002 | Osc. Coil (H. F.) | 6 | .50 |
| 1 | G9-32004 | 1st I. F. Trans. and Trimmer Condensers | 7-8 9 | 1.60 |
| 1 | G10-32004 | 2nd I. F. Trans. and Trimmer Condensers | 10-11 12 | 1.60 |
| 1 | G10-33009 | L. F. & H. F. Ant. Trimmer Condensers | 14-15 | .35 |
| 1 | G9-33009 | L. F. & H. F. R. F. Trimmer Cond. | 16-17 | .30 |
| 1 | G8-33009 | L. F. Osc. Trimmer Cond. | 18 | .25 |
| 1 | G2-33007 | L. F. & H. F. Osc. Series Trimmer Cond. | 22-23 | 1.25 |
| 1 | G7-33002 | Variable Tuning Condenser Gang | 74 | 4.00 |
| 1 | G20-25050 | Dial Assm. | | .60 |
| 6 | W25200 | Coil Shield Socket | | .05 |
| 3 | W30802 | Coil Shield | | .15 |
| 2 | W25025A | Coil Shield | | .10 |
| 1 | W25024A | Coil Shield | | .10 |
| 3 | W26891 | Insulating Washer (L. F. and R. F. & Osc. Coils) | 1-3 5 | .05 |
| 3 | W21541B | Retaining Ring | 1-3-5 | .05 |
| 3 | W30026 | Retaining Ring | 2-4-6 | .05 |
| 1 | G13-27812 | Dial Light Bracket Assm. | | .20 |
| 1 | W25594B | Tone Control & Line Switch | 43-44 | 1.10 |
| 1 | W25666B | Level Control (Volume) | 70 | .90 |
| 1 | B32285 | 6 Pole D. T. Switch | 21 | 1.30 |
| 1 | B30375A | Cord & Plug | 66 | .45 |
| 1 | G16-26719 | Ant.-Gnd. Terminal | 75 | .15 |
| 1 | G49-27456 | 6F7 Socket | 60 | .10 |
| 1 | G47-27456 | 6A7 Socket | 61 | .10 |
| 1 | G48-27456 | 6B7 Socket | 62 | .10 |
| 1 | G25-27456 | 42 Socket | 63 | .10 |
| 1 | G6-27456 | 80 Socket | 64 | .10 |
| 3 | W26010 | Tube Shield Base | | .05 |
| 3 | W27328A | Tube Shield (6F7, 6A7, 6B7) | | .10 |

| Qty. | Part No. | Description | * Item | List Ea |
|---|---|---|---|---|
| 1 | G6-30745 | Power Trans. 60 cy. 110 V. | 67 | 3.75 |
| | G7-30745 | Power Trans. 25 cy. 110 V. | 68 | 5.25 |
| | G-830745 | Power Trans. 25 cy. 220 V. | 69 | 5.25 |
| | | **FILTER & BY-PASS CONDENSERS** | | |
| 1 | W29097C | 8.-8.-8. Mfd. 450 V.-450 V.-250 V. | 37-38 39 | 2.85 |
| 1 | W26194B | 12. Mfd. 475 V. | 40 | 1.25 |
| 1 | W30321A | 1. Mfd. 160 V. | 29 | .55 |
| 1 | W32304 | 0.0014 Mfd. 300 V. | 24 | .30 |
| 1 | W32380 | 0.05 Mfd. 200 V. | 25 | .20 |
| 1 | W32379 | 0.02 Mfd. 200 V. | 26 | .15 |
| 1 | W27540 | 0.0005 Mfd. 400 V. | 27 | .15 |
| 1 | W30805 | 0.01 Mfd. 400 V. | 28 | .20 |
| 1 | W32378 | 0.01 Mfd. 400 V. | 30 | .15 |
| 1 | W25537A | 0.001-0.03 Mfd. 400 V.-400 V. | 31-32 | .30 |
| 1 | W25517 | 0.008-0.05 Mfd. 400 V.-400 V. | 33-34 | .30 |
| 1 | W24784 | 0.25 Mfd. 200 V. | 36 | .20 |
| 1 | W30322 | 0.006-0.00017 Mfd. 200 V.-200 V. | 45-46 | .30 |
| | | **RESISTORS** | | |
| 2 | 26577 | 3 Megohm | 35-48 | .15 |
| 2 | 21454 | 1 Megohm | 47-49 | .15 |
| 1 | W31883 | 8500-25000 Ohm | 41-42 | .55 |
| 3 | 23785 | 500000 Ohm | 50-51 54 | .15 |
| 1 | 21875 | 100000 Ohm | 53 | .15 |
| 1 | 21876 | 10000 Ohm | 55 | .15 |
| 1 | 21237A | 60000 Ohm | 56 | .15 |
| 1 | 21453 | 40000 Ohm | 57 | .15 |
| 1 | 23403 | 150000 Ohm | 58 | .15 |
| 1 | 24814 | 7000 Ohm | 71 | .20 |
| 1 | 24990 | 25000 Ohm | 72 | .20 |
| 1 | W31007A | Speaker Cord (4 Wire) | | .25 |
| 3 | W32352 | Knob | | .10 |
| 1 | W32353 | Knob | | .10 |
| 1 | W31463 | Escutcheon | | .25 |
| 3 | S-27 | Escutcheon Screws (.10 doz.) | | .05 |

MODEL 51 (5C2)
Voltage Data

CROSLEY RADIO CORP.

## General Description . . .

Chassis 5C2 is used in the Model 51. It is a 5-tube AC-DC superheterodyne receiver employing a 3-gang condenser, Automatic Volume Control and electro-dynamic speaker. The frequency range is 535-1750 Kc. The intermediate frequency is 181.5. Use of this low intermediate frequency assures very good selectivity.

## Tubes Used and Their Function . . .

The tubes used are 6F7, Oscillator-modulator, 78 I. F. amplifier, 6B7 diode and audio frequency amplifier, 43 output, and 25Z5 rectifier. The tube voltages are shown in the table below:

| Type | Where Used | Ef | Ep | Eg | Ek | Esg | Esup | Ep-osc |
|---|---|---|---|---|---|---|---|---|
| 6F7 | Osc-Mod. | 6.5 | 100 | 0 | 5 | 100 | — | 100 |
| 78 | I. F. | 6.5 | 100 | 0 | 3 | 100 | 3 | — |
| 6B7 | Diode-AF | 6.5 | 15 | 0 | 1 | 15 | — | — |
| 43 | Output | 27 | 96 | -20 | 0 | 100 | — | — |
| 25Z5 | Rectifier | 27 | — | — | 100 | — | — | — |

All voltages are plus or minus 10%. All DC voltages are measured to –B at 117.5 volt line with 1000 ohms per volt, 250-volt voltmeter. Power demand 50 watts, 110 volts, 60 cycles. Voltages on other frequencies and DC will vary slightly from the above table.

## Method of Biasing . . .

Referring to the circuit diagram it will be seen that the 6F7 Pentode section obtains its bias from the cathode resistor part No. 5. The oscillator section obtains the major portion of its bias from the grid leak and condenser combination in which part No. 55 is the grid leak and 54 the grid condenser. The 78 I. F. amplifier obtains its bias from the cathode resistor, part No. 6. Bias for the 6B7 audio amplifier is obtained from cathode resistor part No. 7. The effect of this circuit is that a slight bucking bias is applied to the diode section, but a very weak signal soon overcomes this bias and the diode then acts as though there were no bias resistor. The pentode audio amplifier section, however, makes use of this initial bias in resistor No. 7 and after signal is applied, depending on the strength of the signal, a varying amount of bias will be applied to accommodate the signal from the AVC circuit. Bias for the output tube, type 43, is obtained from the drop across the filter choke, part No. 41. and whatever hum component there is remaining is filtered through resistor 18 and bypass condenser 30.

## Automatic Volume Control Circuit . . .

Automatic volume control voltage is developed in the diode circuit across resistor 10 in series with volume control, parts No. 15 or 50. This voltage is fed back through filter resistor No. 11 to the control grid return of the 6F7 modulator section. No automatic volume control is exerted on the intermediate frequency amplifier, type 78 tube, because in so doing there is a serious danger of introducing distortion.

## Analysis of Signal Channel . . .

Starting with the antenna, part No. 1, which is a self-attached reel of wire in the case of this receiver, the signal flows through condenser part No. 25. The purpose of this condenser is to insulate the antenna from the balance of the set, so that if it should touch any devices having voltage on them, neither the receiver nor the device will be burned out. The signal then feeds into the primary of the first preselector coil and is transferred to the first secondary and tuned with one section of the gang condenser, part No. 20. This first secondary coil is coupled inductively to the second secondary coil, which coil is tuned by another section of the gang condenser part No. 20. The output of this double-tuned preselector circuit is fed to the grid of the 6F7 modulator section. The oscillator section of the 6F7 is tuned with the third section of the gang condenser, part No. 20, in conjunction with coil part No. 2, all of these coils bearing the same part number, since they are mounted on one continuous core. The shape of the oscillator section of the gang condenser is such that a constant intermediate frequency of 181.5 is generated when the signal is applied and this intermediate frequency is present across the primary of the first I. F. transformer, part No. 53. This I. F. transformer is double tuned by condensers 21 and 22 respectively, and the signal is then applied to the grid of the 78 I. F. amplifier. The amplified I. F. output is then fed to the second I. F. transformer, part No. 52, which transformer is also double tuned. This then goes to the diode plates connected in parallel. As mentioned above, the diode resistor is a combination of fixed resistor part No. 10 and the volume control part No. 15 or 50. All of the diode voltage developed is used for automatic volume control, while only that portion of the combination DC diode voltage and audio frequency voltage across the volume control is fed to the grid of the 6B7 audio frequency amplifier. Due to the fact that some intermediate frequency is present in this circuit, and it is necessary to eliminate it, this is done in the plate circuit of the 6B7 amplifier with bypass condenser, part No. 34. The audio frequency voltage is fed over to the grid of the type 43 output tube thru coupling condenser 35, while the grid circuit of this tube is completed thru resistors 17 and 18. The amplified output of this tube is, of course, fed to the speaker in the usual manner. A very important part of the audio frequency amplifier

MODEL 51 (5C2)
Schematic, Alignment

CROSLEY RADIO CORP.

is resistor, part No. 13, connected between plate of the type 43 output tube and the screen of the type 6B7 audio amplifier. Naturally some audio frequency is fed through this resistor, as well as the direct current voltage which supplies the screen. However, at the screen of the 6B7 is located a bypass condenser, part No. 33, so that the higher audio frequencies do not affect the screen of this tube, while the lower audio frequencies are not bypassed, and the effect, therefore, is a regenerative one so far as the lower audio frequencies are concerned. The result of this circuit is that in spite of the very small proportions of the cabinet and speaker a desirable amount of lower notes are reproduced by the set.

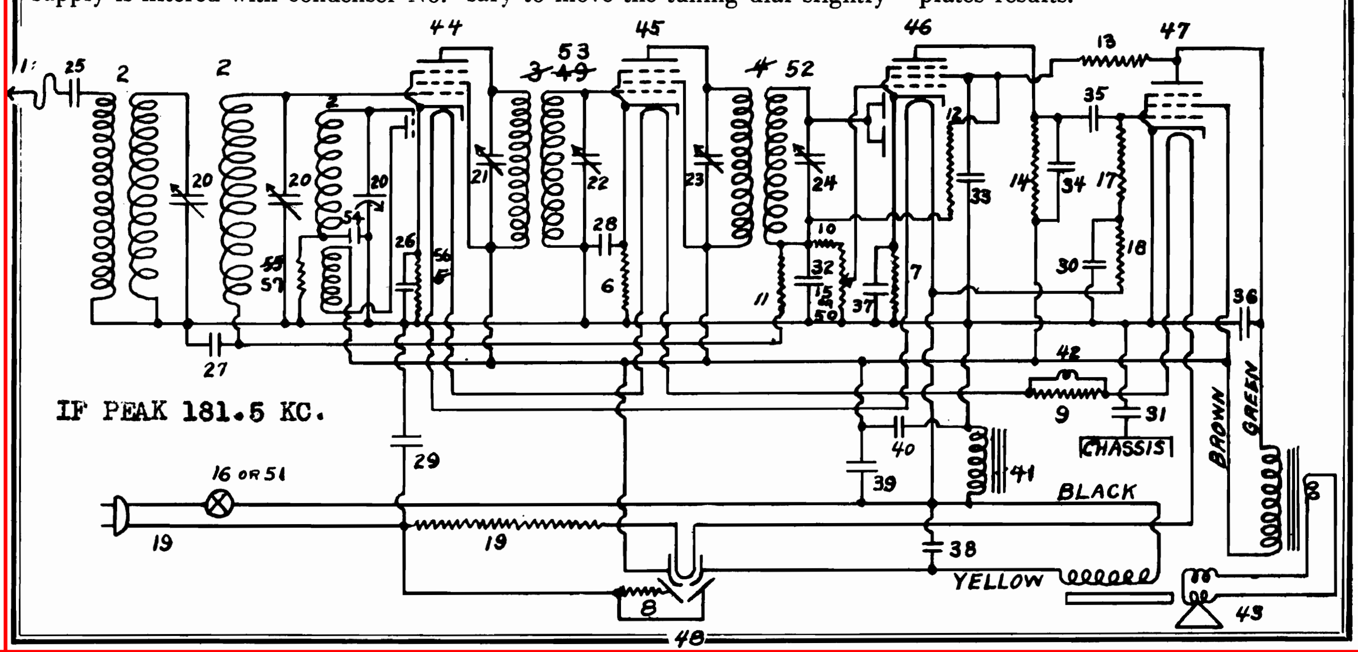
## Power Supply System . . .

Since this is an AC-DC receiver, no power transformer is used. To supply the filament of the tubes a series resistor, part No. 19, is used to drop the voltage to the required amount, while the plate voltage supply is obtained from the 25Z5 rectifier. This rectifier has two plates and two cathodes, all of which are separated from each other. It is therefore possible to use one plate and cathode to supply the plates of the remaining tubes and the other plate and cathode to supply the speaker field. In so doing much smoother operation is obtained and less hum results. The speaker field supply is filtered with condenser No. 38. The signal plate supply is filtered with condensers No. 39 and 40, in conjunction with choke, part No. 41.

## Alignment Procedure . . .

To align the I. F. amplifier, it is necessary that there be available a suitable modulated oscillator capable of adjustment to 181.5 Kc. with good accuracy. This oscillator should have an attenuator, so that strength of the oscillator output can be regulated. Connect the high side of the output of the modulated oscillator, which has been adjusted to 181.5 Kc. to the receiver antenna wire, as close to where it enters the cabinet as possible, through an .02 Mfd. series condenser. The low side of the oscillator is to be connected to the receiver chassis. It will be found that the best way to make this connection to the antenna wire is with a sharp, pointed prod, so that the insulation on the antenna wire is not permanently damaged. The unused dead end portion of the antenna wire should be rolled up on its reel. With the oscillator set to a convenient level, adjust the four I. F. transformer tuning condenser adjustment nuts available through the front flange of the chassis for maximum signal output. To make these adjustments, it is necessary that a standard 1/4" (across flats) hexagon socket wrench be used for the adjustment nut. The wrench should be insulated. It may be necessary to move the tuning dial slightly for best results. Always make these I. F. adjustments very carefully and go over the adjustments several times to be sure that the peak has been reached.

To align the receiver at broadcast frequency, it is necessary that an adjustable oscillator, having frequencies of 1400 and 600 Kc. together with a suitable attenuator and dummy antenna be available. Set the oscillator at 1400 Kc. and turn the tuning control of the receiver to 140 on the dial. Connect the high side of the oscillator to the receiver antenna through a .0001 Mfd. (dummy antenna) condenser. Now adjust the oscillator section trimmer on the gang condenser (the oscillator section is the rear-most section of the gang) until the signal is heard best. Then adjust the remaining two R. F. trimmers on top of the gang condenser for best signal. It is necessary that these adjustments be gone over several times until no further improvement can be made. Always work with the weakest possible signal from the modulated oscillator for best accuracy. The set is now aligned at 1400 Kc. and by adjusting the modulated oscillator to 600, the set may be rechecked at this point. It will sometimes be found that a slight bending of the gang condenser plates will help the sensitivity at 600 Kc. This operation should be done with extreme care, however, so that no short circuiting of the condenser plates results.



MODEL Dual Sixty (6V2)
Dual Sixty LB
Voltage, Data

CROSLEY RADIO CORP.

# CHASSIS 6V2

## General Description . . .

Chassis 6V2 is used in the Dual Sixty and Dual Sixty Lowboy. It is a 6-tube 3-gang automatic volume control dual range receiver. The chassis has a continuously variable tone control. The frequency bands covered are 535 to 1700, and 1650 to 4500 Kc. The intermediate frequency is 181.5 Kc., the use of which insures adequate selectivity.

## Tubes Used and Their Function . . .

The tubes used are type 58 R. F. amplifier, type 2A7 oscillator modulator, type 58 I. F. amplifier, type 55 diode and A. F. amplifier, type 2A5 output, and type 80 rectifier.

The tube voltages are shown in the table below:

| Type | Where Used | Ef | Ep | Eg | Ek | Esg | Ep-osc | Eg-osc |
|---|---|---|---|---|---|---|---|---|
| 58 | R. F. | 2.5 | 225 | 0 | 3 | 120 | — | — |
| 2A7 | Osc.-Mod. | 2.5 | 225 | 0 | 3.5 | 120 | 175 | -15 |
| 58 | I. F. | 2.5 | 225 | -4 | 0 | 120 | — | — |
| 55 | Diode-AF | 2.5 | 40 | -4 | 0 | — | — | — |
| 2A5 | Output | 2.5 | 210 | -18 | 0 | 225 | — | — |
| 80 | Rectifier | 4.9 | 330AC | — | 225 | — | — | — |

All voltages are plus or minus 10%. All DC voltages are measured to chassis at 117.5 line with 1000 ohms per volt, 250-volt voltmeter. Power demand is 60 watts at 110 volts 60 cycles.

## Method of Biasing . . .

Referring to the circuit diagram, it will be seen that the bias for the R.F. tube is obtained from the cathode bias resistor, part No. 29. The bias for the input section of the type 2A7 oscillator modulator is obtained from cathode bias resistor, part No. 30, while the oscillator section obtains its bias from the grid leak and condenser combination in which part No. 15 is the grid condenser and part No. 35 the grid leak. The remainder of the tubes are shunt biased. The bias voltages are obtained from a voltage divider network connected across the speaker field, which field acts as a filter choke connected in the negative leg of the power supply. Referring to the diagram, it will be seen that the grid return of the I.F. amplifier tube, type 58, is connected to the junction point between resistors 34 and 46.

The other side of resistor 46 returns to ground so that the voltage drop across resistor 46 is the bias on the I.F. amplifier grid. This same bias voltage is used for the type 55 audio amplifier section, but in this case it is fed through volume control part No. 42. In the case of the output tube, type 2A5, the voltage developed across resistors 34 and 46 is fed through resistor 40 to the grid of this tube.

## Automatic Volume Control Circuit . . .

In the broadcast band automatic volume control is exerted on the 58 R.F. amplifier, but in the high frequency band automatic volume control is used on the 2A7 oscillator modulator. The automatic volume control voltage is developed across resistor 36 and fed back to filter resistor, part No. 37, directly to the grid return of the high frequency antenna coil, part No. 4, and then to a switch contact in the secondary circuit of the broadcast antenna coil. When the switch is thrown to the broadcast band (down in the circuit diagram) the automatic volume control voltage goes through the switch, part No. 45, to the grid of the R.F. amplifier through the antenna coil secondary, part No. 2. With the switch thrown in the high frequency position (up in the circuit diagram), the automatic volume control voltage is fed through the secondary of the high frequency antenna coil, part No. 4, and then to the switch, part No. 45, to the grid of the oscillator modulator tube, type 2A7.

## Analysis of Signal Channel . . .

The signal enters at the antenna terminal and depending on the position of the switch, part No. 45, is transferred either to the broadcast antenna coil or the high frequency antenna coil, parts No. 2 and No. 4 respectively. In the broadcast band the signal is tuned with one section of the gang condenser, part No. 8, and fed to the grid of the 58 R. F. amplifier. The broadcast antenna coil is tapped, as indicated in the diagram, for the purpose of improving the image ratio. The effect of this tap is to produce an unsymmetrical selectivity characteristic, so that at the point of the normal image response, approximately 360 Kc. higher, this unsymmetrical selectivity curve tends to attenuate the image signal very materially. The amplified R.F. output of this tube is fed to the interstage transformer, part No. 3, the secondary of this transformer being tuned by another section of the gang condenser, part No. 8. The signal then goes to the control grid of the 2A7 oscillator modulator. The oscillator section of this tube is tuned by the third section of the gang condenser, which has specially-shaped plates, also indicated as part No. 8. The frequency of the oscillator is such that a constant intermediate frequency of 181.5 Kc. is present in the plate circuit of the 2A7 oscillator modulator tube. The I.F. output of the oscillator modulator tube is impressed on the first I.F. transformer, part No. 6, which transformer is double tuned. The output of this transformer is impressed on the grid of the type 58 I.F. amplifier. The amplified output of the type 58 I.F. amplifier is impressed on the second I.F. transformer, part No. 7, which transformer is also double-tuned. The I.F. signal is then impressed on the diode plates of the type 55 tube connected in parallel. In this stage there is developed across resistor 36, a DC diode voltage, an audio fre-

MODEL Dual Sixty (6V2)
Alignment, Trimmers

CROSLEY RADIO CORP.

quency voltage, and some intermediate frequency. The audio and intermediate frequency signals pass through the coupling condenser, part No. 19 but the filter resistor, part No. 38, excludes most of the intermediate frequency remaining so that only audio frequency is present across the volume control, part No. 42. The audio frequency is amplified through the triode section of the 55 and then fed through coupling condenser 21 to the grid of the type 2A5 output tube. The slight amount of intermediate frequency remaining at this point is filtered through bypass condenser No. 20. The power audio output of the 2A5 is then fed to the speaker in a conventional manner. Condenser 22 is permanently connected across the speaker to hold its impedance at a more nearly constant value at higher audio frequency, while condenser 23 and variable resistor 43 form a tone control combination.

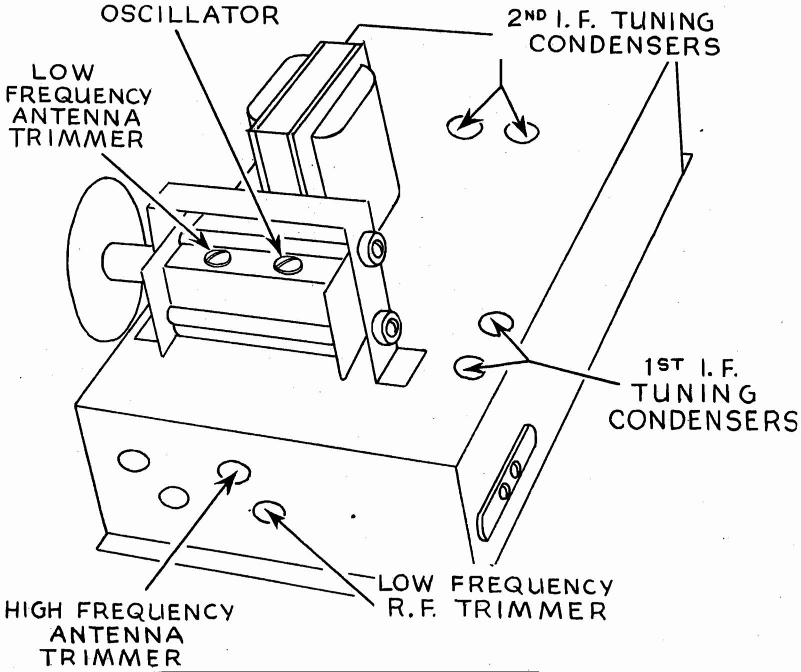
## Power Supply System . . .

The power supply system consists of a transformer, part No. 51, for 110 volts, 60 cycles, part No. 52 for 110 volts 25 cycles, and part No. 53 for 220 volts, a type 80 rectifier tube, the speaker field as the filter choke, and the electrolytic filter condensers, part Nos. 25 and 26. In this circuit the filter choke (speaker field) is included in the negative leg of the power supply system, because in so doing it is posible to use the drop across the filter choke for biasing, and eliminate the use of a large bypass condenser in the cathode of the output tube, type 2A5. At the same time, better audio quality for the lower notes is obtained than with ordinary bypass condenser circuits.

## Alignment Procedure . . .

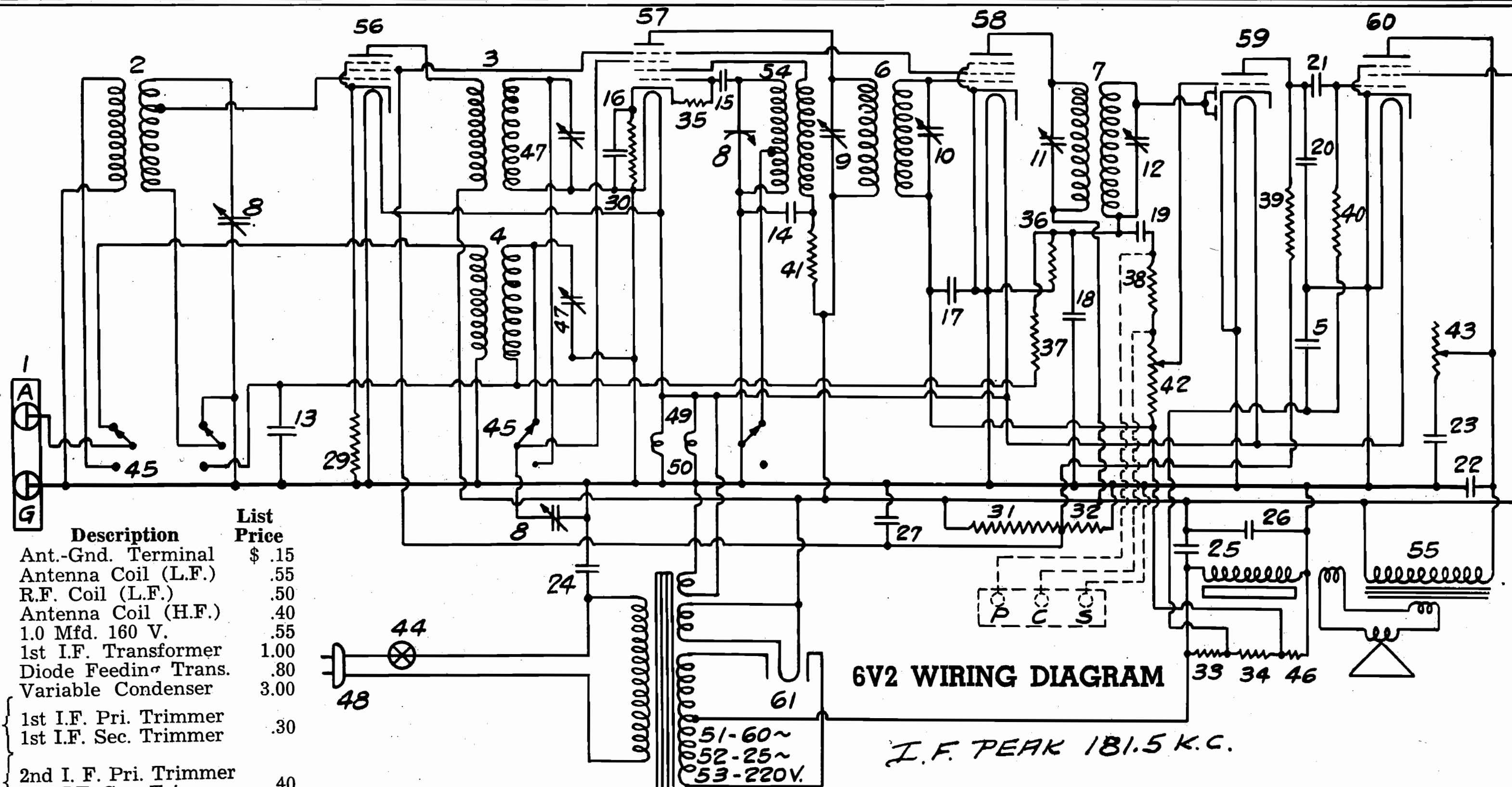
To align the I.F. amplifier, it is necessary that there be available a suitable modulated oscillator capable of adjustment to 181.5 Kc. with good accuracy. This oscillator should have an attenuator so that the strength of the oscillator output can be adjusted. Connect the high side of the output of the modulated oscillator which has been adjusted to 181.5 Kc. to the control grid connection on the top of the 2A7 tube, through an .02 Mfd. series condenser. The low side of the oscillator is to be connected to the receiver chassis. Set the output of the oscillator to a convenient level and adjust the I.F. transformer tuning condenser, all four of which are accessible from the top of the chassis for maximum signal output. To make this adjustment it is necessary that a standard ¼″ (across flats) hexagon socket wrench be used. The wrench is preferably insulated. Always make these I.F. adjustments very carefully and go over the adjustments several times to be sure that the peak has been reached. To align the receiver at broadcast frequencies, it is necessary that an adjustable oscillator having frequencies of 1400 and 600 Kc., together with a suitable attenuator and dummy antenna be available. Set the oscillator to 1400 Kc. and connect the high side of the oscillator to the receiver antenna terminal through a .0002 Mfd. (dummy antenna) condenser. Turn the tuning control of the receiver to 140 on the dial and adjust the oscillator trimmer on the top of the gang condenser as indicated in the diagram until the signal is heard best. Without changing the gang condenser setting, adjust the R.F. trimmer, which is also on top of the gang, and the antenna trimmer for the broadcast band, located as indicated in the diagram on the side of the chassis, for maximum signal. It is necessary that these adjustments be gone over several times until no further improvement can be made. Always work with the weakest possible signal from this modulated oscillator for best accuracy. The performance of the receiver may now be checked at 600 Kc. by setting the modulated oscillator to 600 and the receiver to that point around 60 which gives best reception. Sometimes it is possible to make a slight improvement in the performance at this point by bending some of the gang condenser plates slightly. This operation should be done very carefully so that no short circuiting of the condenser plates results.

To align the receiver in the higher frequency band it is necessary that a modulated oscillator, capable of adjustment to frequencies of 1700 and 4000 Kc. be available. Set the oscillator to 4000 Kc. and throw the wave change switch to the high frequency band. Adjust the receiver in the neighborhood of 4.0 on the dial until maximum signal is heard. Now adjust the short wave antenna trimmer located on the side of the chassis as indicated in the diagram for best signal. The receiver may now be rechecked at 1700 Kc. by setting the oscillator at 1700 and the receiver dial at 1.7.



MODEL Dual Sixty (6V2)
Dual Sixty LB
Schematic, Parts List

CROSLEY RADIO CORP.




| * Item | Part No. | Description | List Price |
|---|---|---|---|
| 1 | G1-26719 | Ant.-Gnd. Terminal | $ .15 |
| 2 | G30-24995 | Antenna Coil (L.F.) | .55 |
| 3 | G10-25968 | R.F. Coil (L.F.) | .50 |
| 4 | G31-24995 | Antenna Coil (H.F.) | .40 |
| 5 | W-30321 | 1.0 Mfd. 160 V. | .55 |
| 6 | G4-30795 | 1st I.F. Transformer | 1.00 |
| 7 | G6-25444 | Diode Feeding Trans. | .80 |
| 8 | B-31877 | Variable Condenser | 3.00 |
| 9 | G14-25948 | 1st I.F. Pri. Trimmer | .30 |
| 10 | | 1st I.F. Sec. Trimmer | |
| 11 | G3-25948 | 2nd I. F. Pri. Trimmer | .40 |
| 12 | | 2nd I.F. Sec. Trimmer | |
| 13 | W-30324 | 0.02 Mfd. 400 V. | .30 |
| 14 | | 0.02 Mfd. 400 V. | |
| 15 | W-26571 | 0.0005 Mfd. 400 V. | .15 |
| 16 | W-27203 | 0.02 Mfd. 200 V. | .15 |
| 17 | W-24784 | 0.05 Mfd. 200 V. | .20 |
| 18 | W-30322A | 0.00017 Mfd. 200 V. | .30 |
| 19 | | 0.006 Mfd. 200 V. | |
| 20 | W-22537A | 0.001 Mfd. 400 V. | .30 |
| 21 | | 0.03 Mfd. 600 V. | |
| 22 | W-31052 | 0.004 Mfd. 400 V. | .35 |
| 23 | | 0.05 Mfd. 400 V. | |
| 24 | W-30805 | 0.01 Mfd. 400 V. | .20 |
| 25 | B-30059-B | 8 Mfd. 450 V. | 3.00 |
| 26 | | 8 Mfd. 450 V. | |
| 27 | | 8 Mfd. 250 V. | |
| 28 | | | |
| 29 | W-25937 | 275 Ohms | .15 |
| 30 | W-25937 | 275 Ohms | .15 |
| 31 | W-31883 | 3500 Ohms | .50 |
| 32 | | 25,000 Ohms | |
| 33 | 23785 | 500,000 Ohms | .15 |
| 34 | 21875 | 100,000 Ohms | .15 |
| 35 | 21237-A | 60,000 Ohms | .15 |
| 36 | 23785 | 500,000 Ohms | .15 |
| 37 | 26577 | 3 Meg. | .15 |
| 38 | 23785 | 500,000 Ohms | .15 |
| 39 | 23403 | 150,000 Ohms | .15 |
| 40 | 23785 | 500,000 Ohms | .15 |
| 41 | 21876 | 10,000 Ohms | .15 |
| 42 | W-30610-D | Level Control | .70 |
| 43 | W-30836 | Tone Control | 1.10 |
| 44 | | S. P. S. T. Switch | |
| 45 | B-31878 | 4 P. D. T. Switch | 1.00 |
| 46 | 22199-A | 25,000 Ohms | .15 |
| 47 | G7-29699 | R.F. Trimmer Cond. | .30 |
| 48 | B-30375-A | Cord & Plug | .45 |
| 49 | W-22221 | 2.5 V. Dial Light | .10 |
| 50 | W-22221 | 2.5 V. Dial Light | .10 |
| 51 | G4-30745 | 60 Cy. Power Trans. | 3.50 |
| 52 | G2-30745 | 25 Cy. Power Trans. | 4.75 |
| 53 | G3-30745 | 220 V. Power Trans. | 4.75 |
| 54 | G33-24996 | Oscillator Coil | .60 |
| 55 | 354-4 | Speaker | 6.67 |
| 56 | G24-27975 | 58 Socket | .10 |
| 57 | G56-27975 | 2A7 Socket | .10 |
| 58 | G24-27975 | 58 Socket | .10 |
| 59 | G29-27975 | 55 Socket | .10 |
| 60 | G43-27975 | 2A5 Socket | .10 |
| 61 | G6-27975 | 80 Socket | .10 |

MODEL Sixty-One (6H2)
Sixty-One LB
Voltage,Notes

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# CHASSIS 6H2

## General Description . . .

Chassis 6H2 is used in the Model Sixty-one and Model Sixty-one Lowboy. It is a 6 tube short wave and broadcast chassis employing the latest superheterodyne circuit, in which has been incorporated a high efficiency tuned radio frequency stage for both short wave and broadcast. The frequency ranges covered are 535 to 1750 Kc., which is the normal broadcast band and the lower frequency police band, and 5700 to 15500 Kc., which is the short wave or high frequency band. The intermediate frequency is 456 Kc. and while there is only one intermediate frequency stage, adequate selectivity is obtained through the use of very high efficiency I.F. transformers, in addition to the three-gang condenser.

## Tubes Used and Their Function . . .

The tubes used are 6D6 radio frequency amplifier, 6A7 oscillator modulator, 6B7 intermediate frequency amplifier and diode detector, 76 audio frequency amplifier, 42 output tube and type 80 rectifier. The tube voltages are shown in the table below:

| Type | Where Used | Ef | Ep | Eg | Ek | Esg | Esup | Epl | Egl |
|---|---|---|---|---|---|---|---|---|---|
| 6D6 | R.F. | 6.5 | 250 | 0 | –3.5 | 125 | — | — | — |
| 6A7 | Osc.-Mod. | 6.5 | 250 | 0 | –3.5 | 125 | — | 190 | –15.0 |
| 6B7 | I.F.-Diode | 6.5 | 250 | 0 | –3.5 | 125 | — | — | — |
| 76 | A.F. | 6.5 | 35 | 0 | –3.5 | — | — | — | — |
| 42 | Output | 6.5 | 230 | –18 | 0 | 250 | — | — | — |
| 80 | Rectifier | 5.1 | | | | | | | |

All voltages are plus or minus 10%. All D.C. voltages measured to chassis at 117.5 volt line with 1000 ohms per volt, 250-volt voltmeter. Power demand 60 watts, 110 volts, 60 cycles.

## Method of Biasing . . .

Referring to the circuit diagram attached it will be seen that the bias for the 6D6 R.F. tube is obtained from the drop across cathode resistor No. 45. The input section of the 6A7 also obtains its bias from the drop across cathode resistor No. 41. The oscillator section of the 6A7 obtains its bias, of course, from the grid leak and condenser combination, resistor No. 42 being the grid leak. The bias for the pentode section of the 6B7 tube is also obtained from the voltage drop across resistor No. 45 but is not fed through the filter resistor. The 76 audio amplifier bias is also obtained from the drop across resistor No. 45. The bias for the output tube type 42, due to the drop across resistor 54, is fed through the grid leak, part No. 50.

## Automatic Volume Control Circuit . . .

Automatic volume control voltage is developed in the diode circuit across resistors 44 and 46. A delay voltage is supplied and this voltage is equal to the drop across resistor 45. The audio frequency diode resistor is part No. 47 and it will be noted that it returns directly to resistor 45. Automatic volume control is exerted on the 6D6 which is the radio frequency stage. While the full diode voltage is that drop across resistors 44 and 46 in series, only the voltage across 46 is impressed on the radio frequency amplifier. In a similar manner automatic volume control is exerted on the 6A7 control grid and this voltage is obtained from the drop across resistor 46. No automatic volume control is exerted on the intermediate frequency amplifier stage, which is the 6B7, because in so doing there is serious danger of introducing distortion.

## Analysis of Signal Channel . . .

The signal enters at terminals A1, A2, and G. These three terminals are provided to permit the use of a doublet antenna with transposed lead-in and no ground if desired. With such an antenna, the two lead-in wires are connected to A1 and A2 and the strap between A2 and G is open circuited. If it is desired to operate the receiver with simply a conventional antenna and ground, connect A2 and G together and to the ground wire. The conventional antenna is connected to the A1 terminal.

The signal enters switch contacts, part No. 74, at which point, depending upon the position of the switch, it will flow either to the broadcast or short wave antenna coil primary, parts Nos. 2 and 3 respectively. Tuning is accomplished by the first section of the gang condenser, part No. 10, connected in the secondary circuit of the antenna coil. The signal is then impressed on the 6D6 tube and is amplified. The output of the 6D6 tube goes into the primary of the inter-stage radio frequency transformer, part Nos. 4 or 5, depending on whether the switch is connected to the low or high frequency position. The secondaries of the interstage coils are again tuned by another section of the gang condenser, part No. 10, and the signal is then impressed on the control grid of the 6A7 oscillator modulator tube. The oscillator section of the 6A7 tube uses the oscillator coils 6 and 7 for the low and high frequency bands respectively, and the oscillator is tuned by the third section of the gang condenser, part No. 10. In this tube the frequency of the signal is changed from radio frequency to 456 Kc., the intermediate frequency. The signal passes from the plate of the 6A7 tube to the first intermediate frequency transformer, part No. 8, and the primary and secondary of this transformer are both tuned to obtain maximum selectivity. The output of the secondary of the transformer is impressed on the control grid of the 6B7 tube in which the intermediate frequency signal is amplified and fed to the second intermediate frequency transformer, part No. 9, which transformer is also tuned in both the pri-

MODEL Sixty-One (6H2)
Sixty-One LB
Alignment, Trimmers

CROSLEY RADIO CORP.

mary and secondary circuits. The signal is now impressed directly on the audio frequency diode, in the 6B7 tube and through condenser No. 40 on the automatic control diode of the same tube. In the audio frequency diode the signal is converted from intermediate frequency to audio frequency which audio frequency is present across resistor 47 and condenser 26. There is also a direct current voltage and some intermediate frequency present here. The audio frequency signal is separated from the direct current voltage by condenser 27 and whatever intermediate frequency there may be left in this circuit is filtered by resistor 48 and the remaining pure audio frequency voltage is impressed across volume control, part No. 58. Adjusting the position of the arm of this volume control applies greater or less audio frequency voltage on the grid of the 76. This triode is used as an audio frequency amplifier. The plate of this tube is connected to the audio coupling resistor, part No. 49, and the audio frequency voltage is coupled to the grid of the output tube, type 42, through condenser 29. The grid circuit of the output tube is completed through resistor 50. The amplified audio output is impressed across the speaker transformer in the speaker assembly, part No. 70.

## Power Supply System . . .

The power supply system consists of a transformer, part No. 71, for 110-volt 60-cycle, part No. 72 for 110-vole 25-cycle, and part No. 73 for 220-volt 25-60 cycle, a rectifier tube type 80, the speaker field as a filter choke, wet electrolytic condenser part No. 36, and dry electrolytic condenser Part No. 37. In this particular circuit the filter choke is included in the negative leg of the power supply system, because in so doing it is possible to use the drop across the filter choke for biasing, and eliminate the use of a large bypass condenser on the cathode of the output tube, type 42. At the same time, better audio quality for the lower notes is obtained than with the ordinary bypass condenser circuit.

## Alignment Procedure . . .

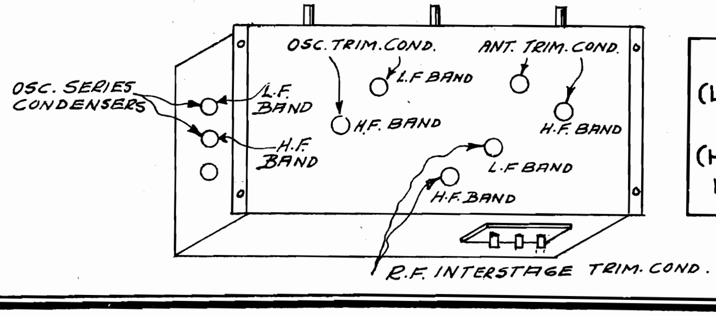
To align the I. F. amplifier it is necessary that there be available a suitable modulated oscillator capable of adjustment to 456 Kc. with good accuracy. This oscillator should have an attenuator so that the strength of the oscillator output can be adjusted. Connect the high side of the output of the modulated oscillator which has been adjusted to 465 Kc. to the control grid connection on the top of the 6A7 tube through an .02 mfd. series condenser. The low side of the oscillator to be connected to the receiver chassis. Set the output of the oscillator to a convenient level and adjust the I. F. transformer condensers for maximum signal output. To make this adjustment for I.F. transformers in a round shield it is necessary that a standard 5/16 inch (across flats) hexagon socket wrench be used for the upper condenser, and a small screwdriver fitting inside of the nut hole for adjustment of the lower condenser. A screwdriver only will adjust the I.F. transformers in a square shield. Always make this I.F. adjustment very carefully and go over your adjustment several times to be sure that the peak has been reached.

To align the receiver at broadcast radio frequency it is necessary that an adjustable oscillator having frequencies of 1400 and 600 Kc., together with a suitable attenuator and dummy antenna, be available. Set the oscillator at 1400 Kc., and connect the high side of the oscillator to the receiver antenna terminal through a .0002 mfd. (dummy antenna) condenser. Turn the tuning control of the receiver to 140 on the dial. Now adjust the oscillator broadcast shunt trimmer indicated on the diagram and located under the chassis until the signal is heard best. Without changing the gang condenser setting, adjust the antenna and radio frequency broadcast trimmers for maximum signal. It is necessary that these adjustments be gone over several times until no further improvements can be made. Always work with the weakest possible signal from the modulated oscillator for best accuracy. Now rotate the dial until it reads 60 and set the modulated oscillator to approximately 600 Kc. Adjust the modulated oscillator carefully until maximum response is obtained. Now adjust the oscillator series trimmer located on the side of the chassis as shown on the diagram attached for maximum signal. It is sometimes advisable to move the main dial back and forth slightly about 60 on the dial during the course of this adjustment if a still greater signal is obtainable.

To align the set in the high frequency or short wave band, it is necessary that a modulated oscillator be available for frequencies of 6000 and 15000 Kc. The procedure for this band is similar to the broadcast band except that a 750 ohm midget carbon resistor is used for the dummy antenna instead of the .0002 condenser. Set the modulated oscillator to 15,000 Kc. and the dial to 15. Adjust the oscillator H.F. shunt trimmer until the signal is heard best. Now adjust the antenna and interstage H.F. trimmers for maximum signal, making sure to go over the adjustment several times so that no further improvement can be made. Now set the modulated oscillator to approximately 6000 Kc. and the receiver dial to 6. Readjust the modulated oscillator slightly for maximum signal and then adjust the oscillator series trimmer for the high frequency band for best signal, making whatever slight adjustments in the tuning control are necessary to bring in maximum signal.

## Tuning Receiver In High Frequency Band . . .

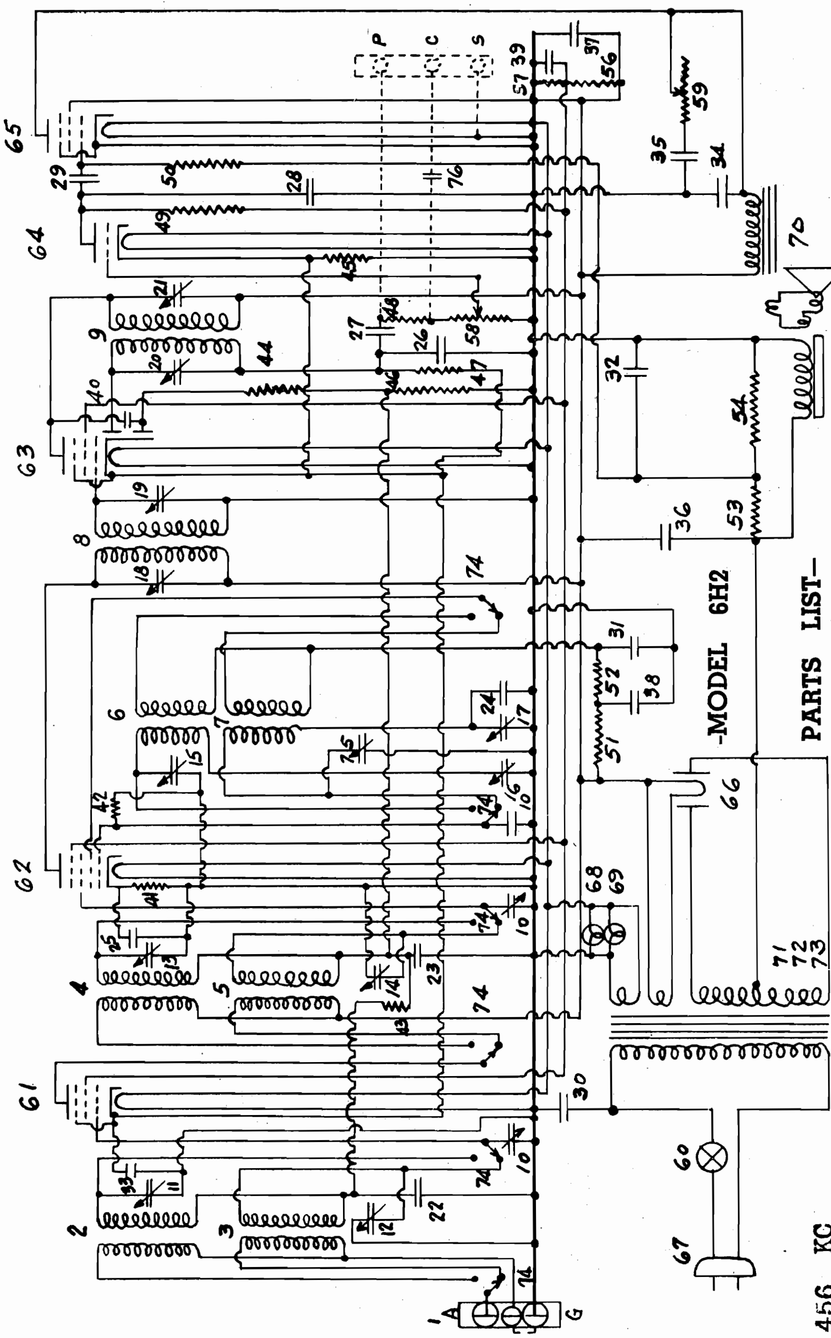
Due to the tremendously greater number of transmitter channels covered in the high frequency band, the receiver is endowed with a much greater apparent selectivity. For this reason, if the receiver is tuned carelessly, many high frequency stations will be missed or passed over without hearing them. It is very necessary that the receiver be tuned slowly and that extreme care be exercised in final adjustment of the receiver to the center of the carrier after a high frequency station is received.




~ NOTE ~
(L.F. BAND) = LOW FREQUENCY BAND
(H.F. BAND) = HIGH FREQUENCY BAND

MODEL Sixty-One (6H2)
Sixty-One LB
Schematic, Parts List
Socket Layout

# CROSLEY RADIO CORP.




IF PEAK 456 KC

## PARTS LIST—

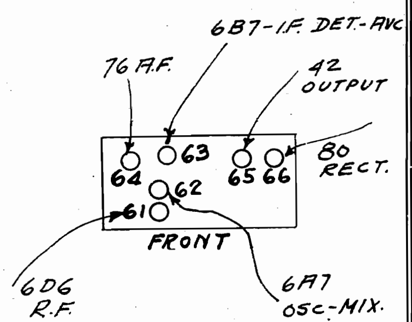
| Qty. | Part No. | Description | * Item | List Each |
|---|---|---|---|---|
| 1 | G3-32000 | Antenna Coil (Low Freq.) | 2 | .45 |
| 1 | G1-32002 | Antenna Coil (High Freq.) | 3 | .50 |
| 1 | G2-32001 | R. F. Trans. Coil (L. F.) | 4 | .55 |
| 1 | G1-32001 | R. F. Trans. Coil (H. F.) | 5 | .65 |
| 1 | G2-32002 | Oscillator Coil (L. F.) | 6 | .40 |
| 1 | G1-32002 | Osc. Coil (H. F.) | 7 | .50 |
| 1 | G9-32004 | 1st I. F. Trans. (With Trimmers | 8-18 19 | 1.60 |
| 1 | G10-32004 | 2nd I. F. Trans. (With Trimmers | 9-20 21 | 1.60 |

| Qty. | Part No. | Description | * Item | List Each |
|---|---|---|---|---|
| 1 | B30375A | Cable & Plug | 67 | .45 |
| 1 | W28552 | Level Control (Volume) (3 Megohms) | 58 | .75 |
| 2 | G4-27134 | Dial Light Brkt Assm. | | .20 |
| 1 | W25594B | Tone Control (80000 Ohm) & Line Switch | 59-60 | 1.10 |

| | | RESISTORS | | |
|---|---|---|---|---|
| 1 | W28589 | 350 Ohms (Flexible) | 41 | .10 |
| 1 | 21453 | 40000 Ohms | 42 | .15 |
| 4 | 23785 | 500000 Ohms | 43-48 50-53 | .15 |
| 2 | 26577 | 3 Megohms | 44-46 | .15 |
| 1 | W27504 | 100 Ohms (Flexible) | 45 | .10 |
| 1 | 21454 | 1 Megohm | 47 | .15 |
| 1 | 23403 | 150000 Ohms | 49 | .15 |
| 1 | 21876 | 10000 Ohms | 51 | .15 |
| 1 | 24814 | 7000 Ohms | 52 | .20 |
| 1 | 33474 | 120000 Ohms | 54 | .15 |
| 1 | W31883 | 8500-25000 Ohms | 56-57 | .55 |
| 3 | W32352 | Knob | | .10 |
| 1 | W32353 | Knob | | .10 |
| 1 | W31007A | Speaker Cord (4 Lead) | | .25 |
| 1 | W32219A | Dial Glass | | .10 |
| 1 | W32220A | Dial Glass Retainer | | .05 |
| 1 | B32190C | Escutcheon | | .90 |
| 1 | W33106A | Escutcheon Gasket | | .05 |
| 4 | D28 | Escutcheon Screws (.10 doz) | | .05 |

| | | FILTER & BY-PASS CONDENSERS | | |
|---|---|---|---|---|
| 1 | W29097C | 8.-8.-8. Mfd. 450 V.-450 V.-250 V. | 37-38 39 | 2.85 |
| 1 | W26194B | 12. Mfd. 475 V. | 36 | 1.25 |
| 1 | W30321 | 1. Mfd. 160 V. | 32 | .55 |
| 3 | W32379 | 0.02 Mfd. 200 V. | 22-23 25 | .15 |
| 1 | W32304 | 0.0014 Mfd. | 24 | .30 |
| 1 | W30322A | 0.00017-0.006 Mfd. 200 V.-200 V. | 26-27 | .30 |
| 1 | W25537A | 0.001-0.03 Mfd. 400 V.-400 V. | 28-29 | .30 |
| 1 | W30805 | 0.01 Mfd. 400 V. | 30 | .20 |
| 1 | W32378 | 0.01 Mfd. 400 V. | 31 | .15 |
| 1 | W24784 | 0.25 Mfd. 200 V. | 33 | .20 |
| 1 | W25517 | 0.008-0.05 Mfd. 400 V.-400 V. | 34-35 | .30 |
| 1 | W27540 | 0.0005 Mfd. 400 V. | 40 | .15 |

* Figures in 2nd last column refer to parts shown in wiring diagram of Model 6H2



CROSLEY RADIO CORP.

# CHASSIS 7H2

## General Description . . .

Chassis 7H2 is used in the Model 72 and 72 Lowboy. It is a seven-tube short wave and broadcast chassis employing the latest super-heterodyne circuit, in which has been incorporated a high efficiency tuned radio frequency stage for both short wave and broadcast. The frequency ranges covered are 535 to 1750 Kc., which is the regular broadcast band and lower frequency police band, and 5700 to 15500 Kc. which is the short wave or high frequency band. The intermediate frequency is 456 Kc. Two stages of I. F. are used to assure adequate selectivity. A special friction type 80:1 drive is used to make tuning as smooth and easy as possible. Instead of the customary tuning knob, a special fishing-reel type of crank is provided so that the tuning can be spun quickly from one end of the dial to the other. With the high ratio drive employed, this would be quite laborious if a conventional knob were used for tuning.

## Tubes Used and Their Function . . .

The tubes used are type 58 R. F. amplifier, type 2A7 oscillator modulator, type 58 first I. F. amplifier, type 58 second I.F. amplifier, type 2B7 diode detector and audio amplifier, type 2A5 output tube and type 80 rectifier. The tube voltages are shown in the table below:

| Type | Where Used | Ef | Ep | Eg | Ek | Esg | Ep-osc. |
|---|---|---|---|---|---|---|---|
| 58 | RF | 2.5 | 225 | 0 | 3 | 100 | |
| 2A7 | Osc. Mod. | 2.5 | 225 | 0 | 3 | 100 | 150 |
| 58 | 1st IF | 2.5 | 225 | 0 | 4.5 | 100 | |
| 58 | 2nd IF | 2.5 | 225 | 0 | 4.5 | 100 | |
| 2B7 | Diode AF | 2.5 | 50 | 0.5 | 0 | 22 | |
| 2A5 | Output | 2.5 | 215 | 2.0 | 0 | 225 | |
| 80 | Rectifier | 4.9 | — | — | 225 | — | |

Voltage Across Speaker Field, — 120.

All d. c. voltages are plus or minus ten percent. All voltages measured to chassis at 117.5 volt line with 1000 ohms per volt, 500-volt voltmeter. Power demand 75 watts at 110 volts 60-cycle.

## Method of Biasing . . .

Referring to the circuit diagram attached, it will be seen that the bias for the first type 58 tube is obtained from the resistor, part No. 78, in the cathode circuit of this tube. Bias for the type 2A7 is obtained in a similar manner from cathode resistor, part No. 19. The oscillator section of the 2A7 obtains its bias, of course, from the grid leak and condenser combination, resistor 20 being for the broadcast or low frequency band and resistor 23 for the short wave or high frequency band. Bias for both I. F. tubes is obtained in the broadcast band from cathode resistor, part No. 34. In the high frequency band it is desired that the sensitivity of the set be improved, so bias resistor No. 31 is connected in shunt to resistor No. 34 so that the I. F. amplification is thereby increased when the set is switched to the short wave or high frequency band. The result of this circuit arrangement is that the set has substantially the same sensitivity in both broadcast and short wave bands, in spite of the fact that the radio frequency coils in the short wave band cannot possibly be as efficient as they are in the broadcast band. The next two tubes employ shunt instead of self biasing. Resistors 55, 56 and 57 form a voltage divider network connected across the speaker field, which also is the filter choke. The most negative point of this voltage divider network is the end of resistor 57 which connects to the speaker field, while the positive end of the network is that end of resistor 55 which connects to the type 2B7 and 2A5 cathodes. It will therefore be seen that the negative grid bias for the type 2B7 audio frequency amplifier section is obtained at the junction point between resistors 55 and 56. The voltage obtained at this point has some hum present and it is therefore necesary that it be fed through the hum filter resistor, part No. 43, and thence through the grid circuit completing resistor, part No. 41, to the type 2B7 grid. Bias for the output tube, type 2A5 is obtained at the junction point between resistors 56 and 57 and fed through the grid circuit completing resistor to the grid of the 2A5 output tube. It is therefore seen that the bias fed to the output tube is necessarily larger than that fed to the 2B7, since it is the drop across two resistors, while that fed to the 2B7 is the drop across only one resistor.

## Automatic Volume Control Circuit . . .

Automatic volume control is developed in the diode circuit across volume control resistor, part No. 39. This voltage is picked off at the junction between resistor 38 and the volume control, part No. 39, and fed through isolating resistor, part No. 75, to the grid return circuit of the 2A7 tube. The same point is also fed to the grid return of the first type 58 I.F. amplifier. From this point there is connected an additional isolating resistor, part No. 27, and from there to the type 58 R.F. amplifier grid return. No automatic volume control is exerted on the second intermediate frequency amplifier type 58 tube because in so doing there is serious danger of introducing distortion.

## Analysis of Signal Channel . . .

Starting with the antenna, the signal enters switch contact indicated as part No. 1, and depending on

MODEL 72,72 LB (7H2)
Alignment

CROSLEY RADIO CORP.

which position the switch happens to be in, flows either to the short wave antenna coil primary or to the broadcast antenna coil primary, parts No. 2 and No. 3 respectively. It is to be noted that a resistor, part No. 77, is connected across the broadcast antenna coil primary for the purpose of securing better alignment. The secondary of the antenna coil is tuned with a section of the gang condenser, part No. 14, and the signal is then impressed on the grid of the type 58 R.F. amplifier. The amplified output of the tube follows through the switch and into the primary of broadcast or high frequency interstage coil, depending on the switch position. The output of the secondary of the interstage coil is tuned with another section of the gang condenser, part No. 14, and fed to the control grid of the type 2A7 modulator oscillator tube. The oscillator section of this tube is automatically connected at the same time the switch is thrown so that the frequency of the oscillator is controlled by the third section of the gang condenser, part No. 14, so as to give a constant intermediate frequency of 456 Kc. in the plate circuit of the type 2A7 modulator oscillator. This intermediate frequency is now fed into the primary of the first I.F. transformer, part No. 29, and thence to the secondary of the same transformer. This transformer is tuned in both primary and secondary circuits to obtain maximum selectivity. The output of transformer No. 29 is fed to the first type 58 I.F. amplifier and the output of this tube then goes to the second I.F. transformer, part No. 33, which I.F. transformer is also double tuned. The signal then follows to the grid of the second type 58 I.F. amplifier whose output is in turn fed to the primary of a single tuned diode type I.F. transformer, part No. 35. The tuned secondary circuit of the diode transformer feeds the two diode plates of the type 2B7 connected in parallel. The diode resistor is a combination of part No. 38 and volume control No. 39 connected in series, but only that portion of the diode voltage developed across part No. 39 is used. The reason for this connection is that smoother action is obtained without regeneration. Both audio frequency and direct current are present across resistor No. 39 and, to separate out the direct current, condenser, part No. 40, is used to couple the audio frequency over to the grid of the type 2B7 audio frequency amplifier. Resistor No. 41 completes the grid circuit of this tube. The amplified audio frequency in the plate circuit of the 2B7 is fed through coupling condenser, part No. 47 into the grid of the type 2A5 output tube, which grid circuit is completed with resistor No. 48. The plate circuit of the output tube is connected to the speaker transformer in the customary manner. Condenser No. 50 is used to match the impedance of the output tube and speaker more closely at higher audio friequencies, while condenser No. 51 and variable resistor No. 52 form the tone control.

## Power Supply System . . .

The power supply system consists of a transformer, part No. 63, for 110-volt 60-cycle, part No. 64 for other uses, a rectifier tube type 80, the speaker field as a filter choke, wet electrolytic condenser, part No. 60, and dry electrolytic condenser, part No. 8. In this particular circuit the filter choke is included in the negative leg of the power supply system, because in so doing it is possible to use the drop across the filter choke for biasing, and eliminate the use of a large bypass condenser in the cathode of the output tube, type 2A5. At the same time better audio quality for the lower notes is obtained than with the ordinary bypass condenser circuit. The Universal transformer, part No. 64, is a special transformer originally developed for export use, but because of its enthusiastic reception it has been incorporated in this chassis. The primary of the transformer is equipped with four voltage taps clearly marked so that the set can be made to operate from 90 to 265 volts in four steps. The transformer operates on any frequency from 25 to 100 cycles.

## Alignment Procedure . . .

To align the I.F. amplifier it is necessary that there be available a suitable modulated oscillator capable of adustment to 456 Kc. with good accuracy. This oscillator should have an attenuator so that the strength of the oscillator output can be regulated. Be sure that the band change switch is thrown to the low frequency or broadcast band position. Connect the high side of the output of the modulated oscillator, which has been adjusted to 456 Kc. to the control grid connection on the top of the 2A7 tube through an .02 Mfd. series condenser. The low side of the oscillator is to be connected to the receiver chassis. Set the output of the oscillator to a convenient level and adjust the I.F. transformer condensers for maximum signal output. The first and second I.F. transformer tuning condensers are located on the left-hand side of the chassis, while the diode tuning condenser is located under the chassis as indicated in the diagram attached. To make these adjustments. it is necessary that a standard 1/4" (across flats) hexagon socket wrench be used for the adjustment nut. The wrench is preferably insulated. Always make this I.F. adjustment very carefully and go over the adjustments several times to be sure that the peak has been reached.

To align the receiver at broadcast frequency, it is necessary that an adjustable oscillator having frequencies of 1400 and 600 Kc., together with a suitable attenuator and dummy antenna be available. Set the oscillator at 1400 Kc. and connect the high side of the oscillator to the receiver antenna terminal through a .0002 (dummy antenna) condenser. Turn the tuning control of the receiver to 140 on the dial. Now adjust the oscillator broadcast shunt trimmer, indicated on the diagram as "oscillator trimmer condenser L.F. band" and located under the chassis, until the signal is heard best. Without changing the gang condenser setting, adjust the antenna and radio frequency broadcast trimmers, also located under the chassis and indicated in the diagram attached for maximum signal. It is necessary that these adjustments be gone over several times until no further improvement can be made. Always work with the weakest possible signal from the modulated oscillator for best accuracy. Now rotate the dial until it reads 60 and set the modulated oscillator to approximately 600 Kc. Adjust the modulated oscillator carefully until maximum response is heard. Now adjust the oscillator series trimmer for the low frequency band located under the chassis as shown in the diagram for maximum signal. It is sometimes advisable to move the main dial back and forth slightly about 60 on the dial during the course of this adustment if a still greater signal is obtainable.

MODEL 72,72 LB (7H2)
Alignment, Parts List

## CROSLEY RADIO CORP.

To align the set in the high frequency or short wave band, it is necessary that a modulated oscillator be available for frequencies of 6000 and 15000 Kc. The procedure for this band is similar to the broadcast band, except that a 750 ohm midget carbon resistor is used for the dummy antenna instead of the .0002 condenser. Set the modulated oscillator to 15000 Kc. and the receiver dial to 15. Adjust the oscillator trimmer condenser under the chassis to maximum signal. Now adjust the antenna and interstage trimmers for maximum signal, making sure to go over the adjustment several times so that no further improvement can be made. Now set the modulated oscillator to approximately 6000 Kc. and the receiver to 6. Readjust the modulated oscillator slightly for maximum signal and then adjust the high frequency band oscillator series trimmer for best signal, making whatever slight readjustments in the tuning control are necessary to bring in maximum signal.

### Tuning Receiver In High Frequency Band . . .

Due to the tremendously greater number of transmitter channels covered in the high frequency band, the receiver is endowed with a much greater apparent selectivity. For this reason, if the receiver is tuned carelessly, many high frequency stations will be missed or passed over without hearing them. It is very necessary that the receiver be tuned slowly and that extreme care be exercised in final adjustment of the receiver to the center of the carrier after a high frequency station is located and received.

**INSTRUCTIONS FOR ORDERING—Give part number, description of part, and serial number of receiver on which part is to be used. If article wanted is not listed separately, then that part of complete assembly containing this article should be ordered. Goods shipped on open account to Crosley Wholesale Distributors only. Cash must accompany Dealer and Consumer orders. Prices are subject to the usual trade discounts, and are subject to change without notice.**

## PARTS LIST—MODEL 7H2

* Figures in 2nd last column refer to parts shown in wiring diagram of Model 7H2

| Qty. | Part No. | Description | * Item | List Each |
|---|---|---|---|---|
| 1 | G1-32002 | Antenna Coil (H. F.) | 81 | .50 |
| 1 | G3-32000 | Antenna Coil (L. F.) | 3 | .45 |
| 1 | G1-32001 | R. F. Coil (H. F.) | 11 | .65 |
| 1 | G2-32001 | R. F. Coil (L. F.) | 12 | .55 |
| 1 | G2-32002 | Osc. Coil (L. F.) | 16 | .40 |
| 1 | G1-32002 | Osc. Coil (H. F.) | 17 | .50 |
| 1 | G1-32004 | 1st I. F. Trans. | 29 | .50 |
| 1 | G1-32004 | 2nd I. F. Trans. | 33 | .50 |
| 1 | G2-32004 | 3rd I. F. Trans. (Diode) | 35 | .50 |
| 1 | W31386 | Coil Shield Bracket | | .05 |
| 6 | W25200 | Coil Socket | | .05 |
| 3 | W30802 | Coil Shield | | .15 |
| 2 | W25025A | Coil Shield | | .10 |
| 1 | W25024A | Coil Shield | | .10 |
| 3 | G1-24064 | Coil Shield | 29-33 35 | .15 |
| 6 | W26891 | Insulating Washer | | .05 |
| 3 | W21541B | Retaining Ring | 3-12 16 | .05 |
| 3 | W30026 | Retaining Ring | 81-11 17 | .05 |
| 1 | G1-33008 | Ant. Tuning Condenser | 86 | .35 |
| 1 | G1-33008 | R. F. Tuning Condenser | 87 | .35 |
| 1 | G2-33009 | Osc. Tuning Condenser | 80 | .30 |
| 1 | G7-33006 | I. F. Condenser | 88-89 | 1.25 |
| 2 | G6-33006 | 1st & 2nd I. F. Condensers | 90-91 | .90 |
| 1 | G1-33005 | 3rd I. F. Condenser | 92 | .25 |
| 1 | G13-33002 | Variable Tuning Condenser Gang | 82 | 4.00 |
| 1 | G1-32086 | Dial Drive Assm. | | 2.75 |
| 2 | G4-27134 | Dial Light Bracket Assm. | 61 | .20 |
| 2 | W32128A | Light Diffuser | | .10 |
| 2 | W32244 | Light Diffuser Retainer | | .05 |
| 1 | B32147A | 7 Pole D. T. Switch | 1 | 1.35 |
| 1 | W32062 | Level (Volume) Control (1 Meg.) | 39 | .80 |
| 1 | W32063 | Tone Control & Switch | 52-53 | 1.20 |
| 1 | G16-26719 | Ant.-Gnd. Terminal | 93 | .15 |
| 1 | G5-30745 | Power Trans. 60 cy. 110 V. | 63 | 3.75 |
| | G36-25669 | Power Trans. 25 cy. 110-220 V. | 64-65 | 9.00 |
| 3 | G24-27975 | 58 Socket | 67-69 70 | .10 |
| 1 | G56-27975 | 2A7 Socket | 68 | .10 |
| 1 | G46-27975 | 2B7 Socket | 71 | .10 |
| 1 | G43-27975 | 2A5 Socket | 72 | .10 |
| 1 | G6-27975 | 80 Socket | 73 | .10 |
| 5 | W21981 | Tube Shield Base | | .05 |

| Qty. | Part No. | Description | * Item | List Ea |
|---|---|---|---|---|
| 3 | B26009 | Tube Shield (58 Tube) | | .10 |
| 2 | W28632 | Tube Shield (2A7-2B7) | | .10 |
| 1 | B21491A | Cord & Plug | 66 | .50 |
| | | **FILTER & BY-PASS CONDENSERS** | | |
| 1 | W26194B | 12. Mfd. 475 V. Condenser | 60 | 1.25 |
| 1 | W29097C | 8.-8.-8. Mfd. 450 V.-450 V.-250 V. Condenser | 8-9 10 | 2.85 |
| 1 | W32380 | 0.05 Mfd. 200 V. Condenser | 18 | .20 |
| 1 | W25435 | 0.003 Mfd. 400 V. | 24 | .15 |
| 3 | W24049 | 0.1 Mfd. 200 V. | 30-42 44 | .15 |
| 1 | W27932 | 0.0001 Mfd. 200 V. | 37 | .15 |
| 1 | W27216 | 0.05 Mfd. 200 V. | 47 | .15 |
| 1 | W30321 | 1.0 Mfd. 160 V. | 49 | .55 |
| 1 | W31052 | 0.004-0.05 Mfd. 400 V.-400 V. | 50-51 | .30 |
| 1 | W30805 | 0.01 Mfd. 400 V. | 62 | .20 |
| 1 | W32304 | 0.0014 Mfd. | 74 | .30 |
| 2 | W28621 | 0.02 Mfd. 200 V. | 83-85 | .15 |
| 1 | W28619 | 0.006 Mfd. 200 V. | 84 | .15 |
| 1 | W32379 | 0.02 Mfd. 200 V. | 6 | .15 |
| | | **RESISTORS** | | |
| 2 | W25937 | 275 Ohm | 19-78 | .15 |
| 1 | W21237A | 60000 Ohm | 20 | .15 |
| 1 | W21453 | 40000 Ohm | 23 | .15 |
| 2 | W21876 | 10000 Ohm | 25-26 | .15 |
| 1 | W21455 | 300000 Ohm | 27 | .15 |
| 2 | W22514 | 750 Ohm | 31-34 | .15 |
| 2 | W23403 | 150000 Ohm | 38-56 | .15 |
| 3 | W21454 | 1 Megohm | 41-43 57 | .15 |
| 2 | W23785 | 500000 Ohm | 45-48 | .15 |
| 1 | W21875 | 100000 Ohm | 46 | .15 |
| 1 | W22831 | 15000 Ohm | 55 | .15 |
| 1 | W31361 | 7000-11000 Ohms | 58-59 | .45 |
| 1 | W26577 | 3 Megohm | 75 | .15 |
| 1 | W31094 | 4500 Ohm | 77 | .15 |
| 1 | W31007A | Speaker Cord (4 Lead) | 76 | .25 |
| 3 | W32352 | Knob | | .10 |
| 1 | G1-32067 | Crank Assm. | | .50 |
| 1 | W32127A | Dial Glass | | .10 |
| 1 | W32126A | Dial Glass Retainer | | .05 |
| 1 | B32125B | Escutcheon | | 1.00 |
| 1 | W23880A | Thumb Screw | | .05 |
| 1 | B32172 | Tube & Cond. Shield | | .10 |
| 1 | C32149 | Bottom | | .25 |

MODEL 72,72 LB (7H2)
Schematic, Trimmers
Socket Layout

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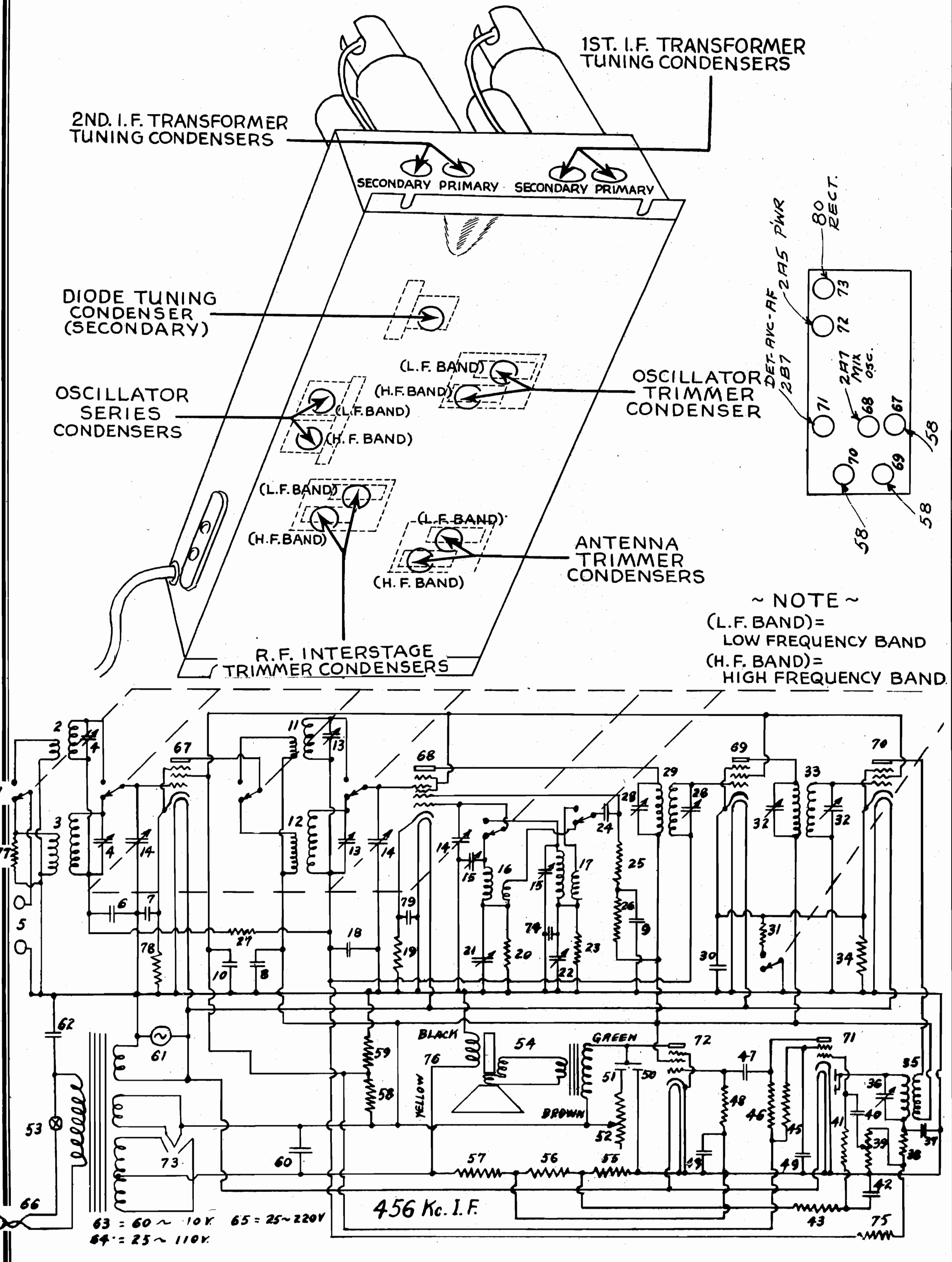

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# CHASSIS 7H3

## General Description . . .

Chassis 7H3 is used in the Models 72 and 72 Lowboy. It is a 7-tube, short-wave and broadcast chassis, employing the latest superheterodyne circuit in which has been incorporated a high efficiency tuned radio frequency stage for both short wave and broadcast. The major difference bewteen chassis 7H3 and its predecessor, chassis 7H2, lies in the addition of a broad A.V.C. Circuit to chassis 7H3 and the further use of A.V.C. on the first audio amplifier. The frequency ranges covered are 535 to 1735 Kc., which is the regular broadcast band and the lower frequency police band, and 5700 to 15,500 Kc., which is the short wave or high frequency band. The intermediate frequency is 456 Kc. Two stages of I.F. are used to assure adequate selectivity. A special friction-type 80-1 drive is used to make tuning as smooth and easy as possible. Instead of the customary tuning knob, a special fishing reel type of crank is provided so that the tuning can be spun quickly from one end of the dial to the other. With the high ratio drive employed, this would be quite laborious if a conventional knob were used for tuning.

## Tubes Used and Their Function . . .

The tubes used are—type 6D6 R.F. amplifier, type 6A7 oscillator modulator, type 6B7 first I.F. amplifier and AVC Diode, type 6D6 second I.F. amplifier, type 6F7 A.F. Diode and AVC A.F. amplifier, type 42 output, and type 80 rectifier. The tube voltages are shown in the table below:

| Type | Where Used | Ef | Ep | Eg | Ek | Esg | Ep-Osc |
|---|---|---|---|---|---|---|---|
| 6D6 | R.F. | 6.5 | 225 | — | 0 | 100 | — |
| 6A7 | Osc.-Mod. | 6.5 | 225 | — | (10LF) (0HF) | 100 | 150 |
| 6B7 | 1st I.F. & A.V.C. Diode | 6.5 | 225 | 0.3 | 0 | 100 | — |
| 6D6 | 2nd I.F. | 6.5 | 225 | — | 2.0 | 100 | — |
| 6F7 | Diode & I.F. | 6.5 | 30 | .5 | 0 | 22 | — |
| 42 | Output | 6.5 | 215 | 2.0 | 0 | 225 | — |
| 80 | Rectifier | 4.9 | — | — | 225 | — | — |

105 volts across speaker field.

All DC voltages are plus or minus 10%. All DC voltages are measured to chassis at 117.5 volt line, with 1000 ohms per volt, 500 volt voltmeter. Power demand is 75 watts at 110 volts 60 cycles.

## Method of Biasing . . .

Referring to the circuit diagram it will be seen that the 6D6 R.F. amplifier obtains its bias from the voltage drop across resistor 55. Resistors 55, 56 and 57 form a voltage divider network connected in shunt with the speaker field, which field is in the negative leg of the power supply system. The most positive point of the network is where resistor 55 is connected to chassis, and the most negative point on the network is where resistor 57 connects to the center tap on the power transformer secondary. The grid return of the 6D6 R.F. amplifier follows through isolating resistor part No. 27, and thence through a second group of resistors, parts Nos. 75, 78, 80, down to the junction point between resistors 55 and 56. The 6A7 input section obtains its bias through isolating resistor No. 7 and then through resistor 80 to the same point, namely the junction between resistors 55 and 56. The oscillator section of the 6A7 obtains its bias from the usual grid leak and condenser arrangement in which part No. 20 is the grid leak for the low frequency band and part No. 23 for the high frequency band. Bias for the 6B7 first amplifier, is obtained from the drop across resistor 55, while the bias for the 6D6 second I.F. amplifier is obtained at the same point but through resistors 75, 78 and 80. The 6F7 pentode section, which is used as an audio amplifier, obtains its fixed bias from resistor 55, but there is also a varying bias, depending on the signal strength applied due to the diode voltage drop across the level control, part No. 39. In this case, resistors 65 and 41 form a voltage divider network so that the diode voltage developed is split up in their ratio. The type 42 output tube obtains its bias from the combined drop across resistors 55 and 56 in series, this circuit being completed through grid resistor No. 48.

## Automatic Volume Control Circuit . . .

Automatic Volume Control voltage is generated in the diode of the 6B7 first I.F. amplifier. This diode is fed from the second I.F. transformer and the A.V.C. voltage is developed across resistors 78 and 80, after the signal voltage has become sufficiently large to overcome the initial bias across resistor 55. Automatic volume control voltage is fed both forward and back in the circuit of this 7H3 receiver. The full voltage is fed to the 6D6 R.F. amplifier through isolating resistor 75 and 27, while that part of the voltage developed across resistor 80 only is fed through isolating resistor No. 7 to the 6A7 input grid. The 6B7 pentode section does not have any AVC exerted on it because if this were done some distortion might result. The 6D6 second I.F. amplifier has the full voltage exerted on it through isolating resistor 75. It will be noted that in this stage the AVC voltage is sent forward instead of back through the circuit. The first audio amplifier, type 6F7 also has AVC exerted on it. In this case, the grid and plate of the 6F7 triode section are used as a diode and diode voltage is developed across resistors 38 and 39 in series. Resistors 65 and 41 form a voltage divider network so that a portion of this diode voltage is fed onto the input grid of the 6F7 pentode section.

MODEL 72,72 LB (7H3)
Alignment, Data

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## Analysis of Signal Channel . . .

The signal enters at the terminals A1, A2 and G. These three terminals are provided to permit the use of a doublet antenna with transposed lead-ins and no ground connection, if desired. With such an antenna the two lead-in wires are connected to A1 and A2, and the wire strapped between A2 and G is open-circuited. If it is desired to operate the receiver with simply a conventional antenna and ground, connect A2 and G together and to the ground wire. The conventional antenna is connected to the A1 terminal.

The signal flows either to the short wave antenna coil primary or to the broadcast antenna coil primary, parts No. 2 and No. 3 respectively. It is to be noted that a resistor, part No. 77, is connected across the broadcast antenna coil primary for the purpose of securing better alignment. The secondary of the antenna coil is tuned with a section of the gang condenser, part No. 14, and the signal is then impressed on the grid of the type 6D6 R. F. amplifier. The amplified output of the tube follows through the switch and into the primary of broadcast or high frequency interstage coil. The output of the secondary of the interstage coil is tuned with another section of the gang condenser, part No. 14, and fed to the control grid of the type 6A7 modulator oscillator tube. The oscillator section of this tube is automatically connected at the same time the switch is thrown so that the frequency of the oscillator is controlled by the third section of the gang condenser, part No. 14, so as to give a constant intermediate frequency of 456 Kc. in the plate circuit of the type 6A7 modulator oscillator. This intermediate frequency is now fed into the primary of the first I. F. transformer, part No. 29, and thence to the secondary of the same transformer. This transformer is tuned in both primary and secondary circuits to obtain maximum selectivity. The output of transformer No. 29 is fed to the type 6B7 first I. F. amplifier and the output of this tube then goes to the second I. F. transformer, part No. 33, which I. F. transformer is also double tuned. The signal then follows to the grid of the type 6D6 second I. F. amplifier whose output is in turn fed to the primary of a double tuned diode type I. F. transformer, part No. 35. The tuned secondary circuit of the diode transformer feeds the triode grid and plate of the type 6F7 connected in parallel. The diode resistor is a combination of part No. 38 and volume control No. 39 connected in series, but only that portion of the diode voltage developed across part No. 39 is used. The reason for this connection is that smoother action is obtained without regeneration. Both audio frequency and direct current are present across resistor No. 39. Condenser, part No. 40, is used to couple the audio frequency over to the pentode grid of the type 6F7 audio frequency amplifier. Resistor No. 41 completes the grid circuit of this tube. The amplified audio frequency in the plate circuit of the 6F7 is fed through coupling condenser, part No. 47 into the grid of the type 42 output tube, which grid circuit is completed with resistor No. 48. The plate circuit of the output tube is connected to the speaker transformer in the customary manner. Condenser No. 50 is used to match the impedance of the output tube and speaker more closely at higher audio frequencies, while condenser No. 51 and variable resistor No. 52 form the tone control.

## Power Supply System . . .

The power supply system consists of a transformer, part No. 63, for 110-volt 60-cycle, part No. 64 for other uses, a rectifier tube type 80, the speaker field as a filter choke, wet electrolytic condenser, part No. 60, and dry electrolytic condenser, part No. 8. In this particular circuit the filter choke is included in the negative leg of the power supply system, because in so doing it is possible to use the drop across the filter choke for biasing, and eliminate the use of a large bypass condenser in the cathode of the output tube, type 42. At the same time better audio quality for the lower notes is obtained than with the ordinary bypass condenser circuit. The Universal transformer, part No. 64, is a special transformer originally developed for export use, but because of its enthusiastic reception it has been incorporated in this chassis. The primary of the transformer is equipped with four voltage taps clearly marked so that the set can be made to operate from 90 to 265 volts in four steps. The transformer operates on any frequency from 25 to 100 cycles.

## Alignment Procedure . . .

To align the I. F. amplifier it is necessary that there be available a suitable modulated oscillator capable of adjustment to 456 Kc. with good accuracy. This oscillator should have an attenuator so that the strength of the oscillator output can be regulated. Be sure that the band change switch is thrown to the low frequency or broadcast band position. Connect the high side of the output of the modulated oscillator, which has been adjusted to 456 Kc. to the control grid connection on the top of the 6A7 tube through an .02 Mfd. series condenser. The low side of the oscillator is to be connected to the receiver chassis. Set the output of the oscillator to a convenient level and adjust the I. F. transformer condensers for maximum signal output. The first and second I. F. transformer tuning condensers are located on the left-hand side of the chassis, while the diode transformer tuning condensers are located on the top of the tall I. F. transformer as indicated in the diagram attached. To make these adjustments, it is necessary that a standard 1/4" (across flats) hexagon socket wrench be used for the adjustment nuts and a small screw driver for the slot. The tools are preferably insulated. Always make these I. F. adjustments very carefully and go over the adjustments several times to be sure that the peak has been reached.

To align the receiver at broadcast frequency, it is necessary that an adjustable oscillator having frequencies of 1400 and 600 Kc., together with a suitable attenuator and dummy antenna be available. Set the oscillator at 1400 Kc. and connect the high side of the oscillator to the A1 receiver antenna terminal through a .0002 (dummy antenna) condenser. Be sure that there is a connection between A2 and G. Turn the tuning control of the receiver to 140 on the dial. Now adjust the oscillator broadcast shunt trimmer, indicated on the diagram as "oscillator trimmer condenser L. F. band" and located under the chassis, until the signal is heard best. Without changing the gang condenser setting, adjust the antenna and radio frequency broadcast trimmers, also located under the chassis and indicated in the diagram attached for maximum signal. It is necessary that these adjustments be gone over several times until no further improvement can be made. Always work with the weakest possible signal from the modulated oscillator for best accuracy. Now rotate the dial until it reads 60 and set the modulated oscillator to approximately 600 Kc. Adjust the modulated oscillator carefully until maximum response is heard. Now adjust the oscillator series trimmer for the low frequency band located

**MODEL 72,72 LB (7H3)**
**Schematic, Trimmers**
**Socket Layout**

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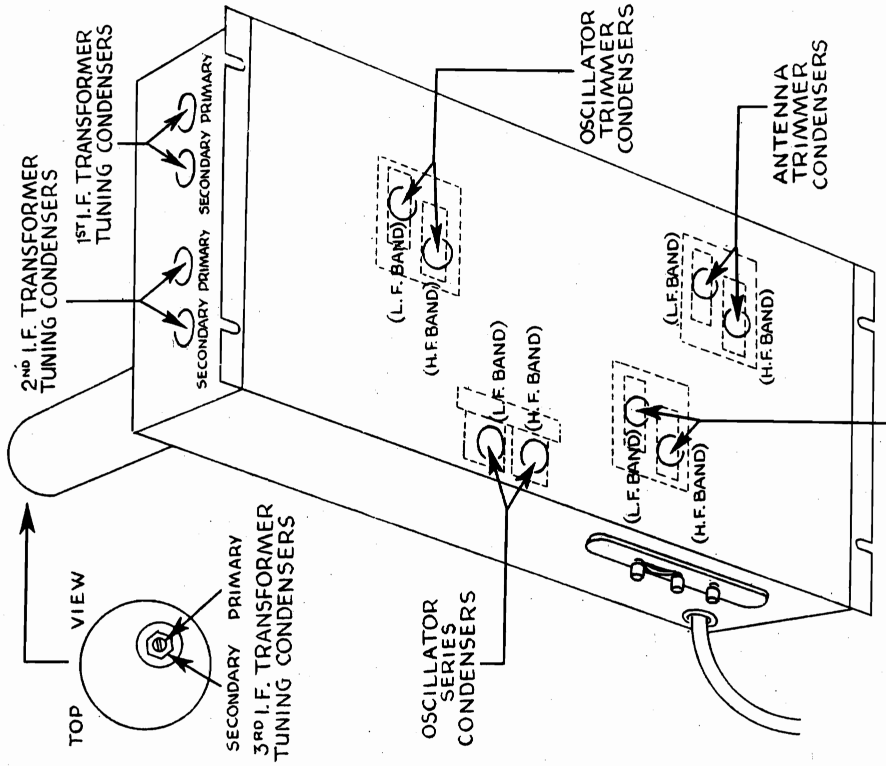
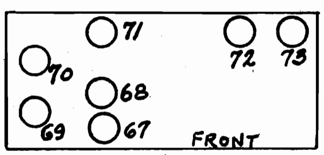
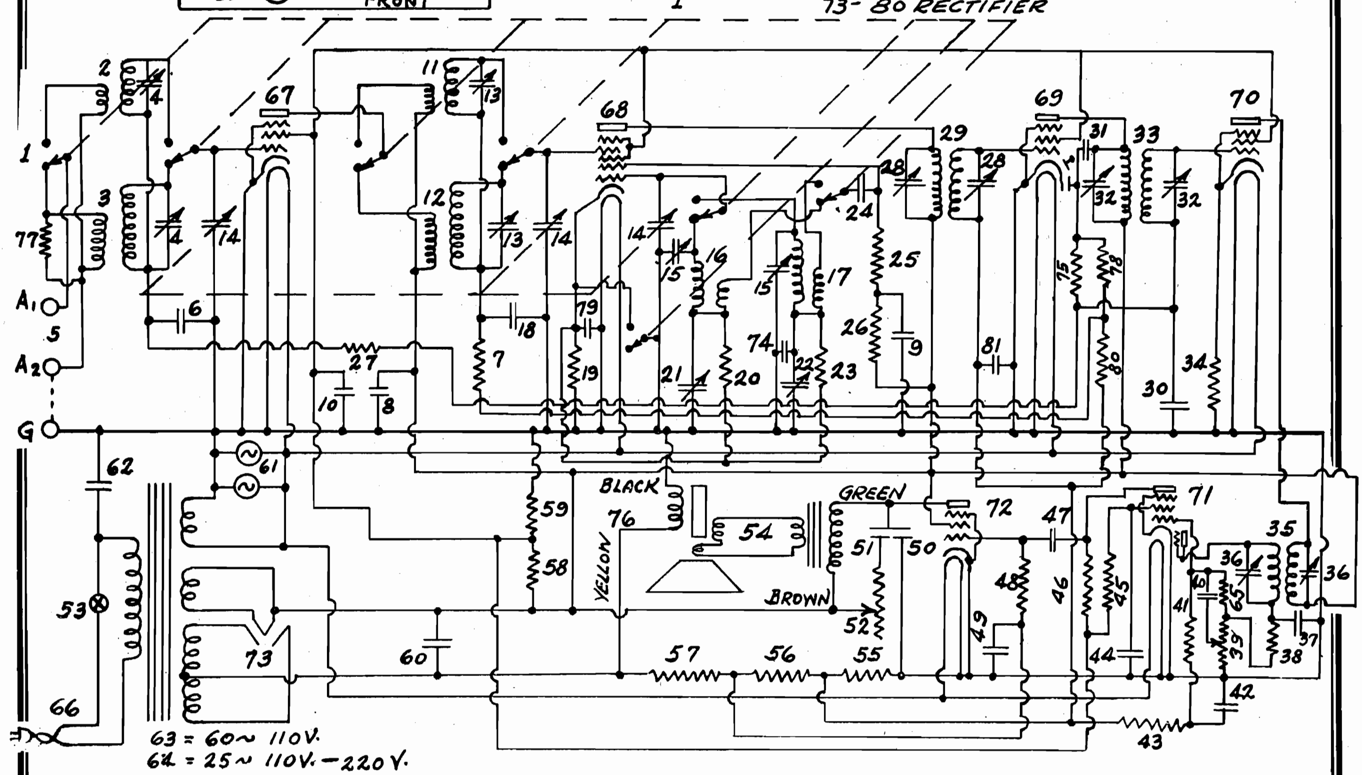



~ NOTE ~
(L.F. BAND)= LOW FREQUENCY BAND
(H.F. BAND)= HIGH FREQUENCY BAND




456 Kc. I.F.

67- 6D6
68- 6A7 OSC.
69- 6B7 I.F. AND DIODE
70- 6D6
71- DIODE AND 1st A.F.
72- 42 OUTPUT
73- 80 RECTIFIER




63 = 60~ 110V.
64 = 25~ 110V.—220V.

MODEL 72,72 LB (7H3)
Parts List

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under the chassis as shown in the diagram for maximum signal. It is sometimes advisable to move the main dial back and forth slightly about 60 on the dial during the course of this adjustment if a still greater signal is obtainable.

To align the set in the high frequency or short wave band, it is necessary that a modulated oscillator be available for frequencies of 6000 and 15000 Kc. The procedure for this band is similar to the broadcast band, except that a 750 ohm midget carbon resistor is used for the dummy antenna instead of the .0002 condenser. Set the modulated oscillator to 15000 Kc. and the receiver dial to 15. Adjust the oscillator trimmer condenser under the chassis to maximum signal. Now adjust the antenna and interstage trimmers for maximum signal, making sure to go over the adjustment several times so that no further improvement can be made. Now set the modulated oscillator to approximately 6000 Kc. and the receiver to 6. Readjust the modulated oscillator slightly for maximum signal and then adjust the high frequency band oscillator series trimmers for best signal, making whatever slight readjustments in the tuning control are necessary to bring in maximum signal.

## Tuning Receiver In High Frequency Band . . .

Due to the tremendously greater number of transmitter channels covered in the high frequency band, the receiver is endowed with a much greater apparent selectivity. For this reason, if the receiver is tuned carelessly, many high frequency stations will be missed or passed over without hearing them. It is very necessary that the receiver be tuned slowly and that extreme care be exercised in final adjustment of the receiver to the center of the carrier after a high frequency station is located and receiver.

## PARTS LIST—MODEL 7H3

* Figures in 2nd last column refer to parts shown in wiring diagram of Model 7H3

| Qty. | Part No. | Description | * Item | List Each |
|---|---|---|---|---|
| 1 | G1-32002 | Antenna Coil (H. F.) .......... | 2 | .50 |
| 1 | G3-32000 | Antenna Coil (L. F.) .......... | 3 | .45 |
| 1 | G1-32001 | R. F. Coil (H. F.) ............... | 11 | .65 |
| 1 | G2-32001 | R. F. Coil (L. F.) ............... | 12 | .55 |
| 1 | G2-32002 | Osc. Coil (L. F.) ............... | 16 | .40 |
| 1 | G1-32002 | Osc. Coil (H. F.) ............... | 17 | .50 |
| 1 | G1-32004 | 1st I. F. Trans. .................. | 29 | .50 |
| 1 | G1-32004 | 2nd I. F. Trans. .................. | 33 | .50 |
| 1 | G6-32004 | 3rd I. F. Trans. (Diode) & Trimmer Condensers .... | 35-36 | 1.90 |
| 1 | W31386 | Coil Shield Bracket ............. | | .05 |
| 6 | W25200 | Coil Sockets ............................. | | .05 |
| 3 | W30802 | Coil Shield ............................... | | .15 |
| 2 | W25025A | Coil Shield ............................... | | .10 |
| 1 | W25024A | Coil Shield ............................... | | .10 |
| 2 | G1-24064 | Coil Shield ............................... | 29-33 | .15 |
| 5 | W26891 | Insulating Washer ............... | | .05 |
| 3 | W21541B | Retaining Ring ................... | 3-12-16 | .05 |
| 3 | W30026 | Retaining Ring ................... | 11-2-17 | .05 |
| 1 | G1-33008 | Ant. Trimmer Condenser | 4 | .35 |
| 1 | G1-33008 | R. F. Trimmer Condenser | 13 | .35 |
| 1 | G14-33009 | Osc. Trimmer Condenser | 15 | .30 |
| 1 | G12-33006 | L. F. & H. F. Osc. Trimmer Cond. (Series) ............... | 21-22 | 1.00 |
| 1 | G6-33006 | 1st I. F. Trimmer Cond. .... | 28 | .90 |
| 1 | G6-33006 | 2nd I. F. Trimmer Cond. .... | 32 | .90 |
| 1 | G18-33002 | Variable Tuning Condenser Gang ................................. | 14 | 4.00 |
| 1 | G1-32086 | Dial Drive Assm. ................. | | 2.75 |
| 2 | G4-27134 | Dial Light Brkt Assm. ........ | 61 | .20 |
| 2 | W32128A | Light Diffuser ........................ | | .10 |
| 2 | W32244 | Light Diffuser Retainer .... | | .05 |
| 2 | G75-27975 | 6D6 Socket (R. F. & 2nd I. F.) .................................. | 67-70 | .10 |
| 1 | G47-27975 | 6A7 Socket (Osc.) .................. | 68 | .10 |
| 1 | G48-27975 | 6B7 Socket (I. F. & Diode) | 69 | .10 |
| 1 | G49-27975 | 6F7 Socket (Diode & 1st A. F. .................................. | 71 | .10 |
| 1 | G25-27975 | 42 Socket (Output) ............. | 72 | .10 |
| 1 | G6-27975 | 80 Socket (Rectifier) ........... | 73 | .10 |
| 5 | W27981 | Tube Shield Base .................. | | .05 |
| 3 | W28632 | Tube Shield (6A7-6B7-6F7) | | .10 |
| 2 | B26009 | Tube Shield (6D6 Tube) .... | | .10 |
| 1 | G9-30745 | Power Transformer 60 cy. 110 V. ................................ | 63 | 4.25 |
| | G39-25669 | Power Transformer 25 cy. 110-220 V. ........................ | 64 | 9.00 |
| 1 | B32147A | 7 P. D. T. Switch ............... | 1 | 1.35 |
| 1 | G16-26719 | Ant.-Gnd. Terminal ............. | 5 | .15 |
| 1 | W32062 | Level Control (Volume) 1 Megohm ............................ | 39 | .80 |

| Qty. | Part No. | Description | * Item | List Ea |
|---|---|---|---|---|
| 1 | W32063 | Tone Control & Line Switch | 52-53 | 1.20 |
| 1 | B21491A | Cord & Plug ........................... | 66 | .50 |
| | | **FILTER & BY-PASS CONDENSERS** | | |
| 1 | W29097C | 8.-8.-8. Mfd. 450 V.-450 V.-250 V. ..................................... | 8-9 10 | 2.85 |
| 1 | W26194B | 12. Mfd. 475 V. ..................... | 60 | 1.25 |
| 1 | W30321 | 1. Mfd. 160 V. ....................... | 49 | .55 |
| 1 | W32379 | 0.02 Mfd. 200 V ..................... | 6 | .15 |
| 1 | W32380 | 0.05 Mfd. 200 V. ................... | 18 | .20 |
| 1 | W25435 | 0.003 Mfd. 400 V. ................. | 24 | .15 |
| 2 | W27216 | 0.05 Mfd. 200 V. ................... | 30-47 | .15 |
| 1 | W31937 | 0.0001 Mfd. ............................ | 31 | .15 |
| 1 | W27932 | 0.0001 Mfd. 200 V. ............... | 37 | .15 |
| 1 | W28619 | 0.006 Mfd. 200 V. ................. | 40 | .15 |
| 2 | W24049 | 0.1 Mfd. 200 V. ..................... | 42-44 | .15 |
| 1 | W31052 | 0.004-0.05 Mfd. 400 V.-400 V. | 50-51 | .30 |
| 1 | W30805 | 0.01 Mfd. 400 V. ................... | 62 | .20 |
| 1 | W32304 | 0.0014 Mfd. ............................ | 74 | .30 |
| | | **RESISTORS** | | |
| 3 | 26577 | 3 Megohm ............................. | 7-41-75 | .15 |
| 1 | W27503 | 1400 Ohm ............................. | 19 | .10 |
| 1 | 21237A | 60000 Ohm ........................... | 20 | .15 |
| 1 | 21453 | 40000 Ohm ........................... | 23 | .15 |
| 1 | 21876 | 10000 Ohm ........................... | 25-26 | .15 |
| 1 | 21455 | 300000 Ohm ......................... | 27 | .15 |
| 1 | W25937 | 275 Ohm ............................... | 34 | .15 |
| 1 | 23403 | 150000 Ohm. ......................... | 38 | .15 |
| 3 | 21454 | 1 Megohm ............................. | 43-57 78 | .15 |
| 2 | 23785 | 500000 Ohm ......................... | 45-48 | .15 |
| 1 | 21875 | 100000 Ohms ....................... | 46 | .15 |
| 1 | 33390 | 30000 Ohms ......................... | 55 | .15 |
| 1 | 23403 | 150000 Ohms ....................... | 56 | .15 |
| 1 | W31361 | 7000-11000 Ohms ................. | 58-59 | .40 |
| 1 | 26578 | 5 Megohm ............................. | 65 | .15 |
| 1 | 31094 | 4500 Ohms ........................... | 77 | .15 |
| 1 | W31007A | Speaker Cord ........................ | 76 | .25 |
| 1 | W32127A | Dial Glass ............................... | | .10 |
| 1 | W32126A | Dial Glass Retainer ............. | | .05 |
| 1 | B32125B | Escutcheon ............................. | | 1.00 |
| 3 | W32352 | Knob ....................................... | | .10 |
| 1 | G1-32067 | Crank Assm. .......................... | | .50 |
| 1 | B32172 | Tube & Cond. Shield ......... | | .10 |
| 1 | W23880A | Thumb Screw ........................ | | .05 |
| 1 | C32149 | Bottom .................................... | | .25 |

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MODEL 80AW, 80AW LB (8H1)
Voltage, Data

# TECHNICAL DATA PERTAINING TO CHASSIS 8H1

## General Description . . .

Chassis 8H1 is used in the Model 80-AW and Model 80-AW Lowboy. It is an 8-tube all-wave receiver, covering the band of 540-24000 Kc., in four steps. Other features are an 80 to 1 ratio drive mechanism with special fishing reel type of control, airplane type dial, push-pull pentode output, doublet antenna terminals, and tone control. Two stages of double-tuned I. F. amplification, making a total of six tuned I. F. circuits are used to insure adequate selectivity. A tuned radio frequency stage is used in all frequency bands. The automatic volume control is of the broad type to obtain smoothest possible operation.

## Tubes Used and Their Function . . .

The tubes used are type 6D6 R. F. amplifier, type 6A7 oscillator modulator, type 6D6 first I. F. amplifier, type 6B7, second I. F. amplifier, AVC diode and AF diode, type 6F7 first AF pentode amplifier, and triode phase inverter, two type 42 push-pull output and type 80 rectifier. The normal tube voltages are as indicated in the table below:

| Type | Where Used | Ef | Ep | Eg | Ek SW-BC | Esg | Epx | Egx |
|---|---|---|---|---|---|---|---|---|
| 6D6 | R.F. | 6.3 | 250 | 0 | 3 | 100 | — | — |
| 6A7 | Osc.-Mod. | 6.3 | 250 | 0 | 3 | 100 | 220 | 0 to –10 |
| 6D6 | 1st I. F. | 6.3 | 250 | 0 | 7-21 | 100 | — | — |
| 6B7 | 2nd I. F. and Diode | 6.3 | 250 | 0 | 3 | 100 | — | — |
| 6F7 | A.F. and Phase Inv. | 6.3 | 140 | 0 | 4 | 35 | 70 | 0 |
| 42 | Output | 6.3 | 240 | 0 | 16 | 250 | — | — |
| 80 | Rectifier | 5.0 | — | — | 350 | — | — | — |

All voltages are plus or minus 10%. All DC voltages are measured with 117.5 volts AC line and with a 500-volt 1000-ohms-per-volt DC voltmeter. Power demand is 100 watts.

## Method of Biasing . . .

The type 6D6 R. F. amplifier obtains its normal bias from the cathode resistor, part No. 39. The bias for the input section of the 6A7 oscillator modulator is obtained from the cathode resistor, part No. 40. The oscillator bias is obtained from the grid leak and condenser combination in which part No. 29 is the grid leak and part 50 the grid condenser. The type 6D6 first I. F. amplifier obtains its bias from the cathode resistor, part No. 41, for all bands except No. 4, the broadcast band. When the switch is thrown to the band No. 4 position, auxiliary resistor, part No. 95, is inserted in series with part No. 41. It is the purpose of this auxilary resistor to reduce the gain of the receiver at broadcast frequencies, because if full sensitivity were used the receiver would be entirely too sensitive in the broadcast band. The bias for the 6B7 second I. F. amplifier input section, is obtained from the cathode resistor, part No. 42, which resistor also furnishes the delay voltage for the AVC system. The variable mu pentode AF amplifier and phase inverter, type 6F7, obtains its bias from resistor No. 36, while the output tubes obtain their bias from the resistor No. 43.

## Automatic Volume Control Circuit . . .

The automatic volume control diode in the 6B7 is fed from the plate of this tube through coupling condenser, part No. 51. Diode voltage is developed across resistors 32 and 33 after the signal has become sufficiently strong to overcome the initial bias generated in resistor 42. The voltage across resistor 32 is that part which is used for AVC purposes. Following the circuit diagram, it will be seen that the AVC voltage flows through isolating resistor No. 27 to the grid return of the high frequency interstage coil, part No. 8, and then to the input grid of the 6A7 oscillator modulator. In the other three bands, the AVC voltage is fed through the additional isolating resistor, part No. 26, to the grid return and then to the input grid of the 6A7. AVC voltage is also fed from resistor 27 through isolating resistor 24 to the grid return of the highest frequency antenna coil, part No. 4, and then to the grid of the 6D6 R. F. amplifier. For the other bands the AVC voltage is fed through additional resistor 25 to the grid returns. At this point AVC voltage is also fed to the grid return of the 6D6 first I. F. amplifier. This receiver also has AVC on the audio system, but this AVC voltage is obtained from the audio diode, which diode is also in the 6B7 tube. In this case, the diode is fed from the secondary of the last I. F. transformer, part No. 20, and diode voltage is developed across resistors 28, 46 and 34 in series. That portion across resistors 34 and 46 is fed to the input grid of the pentode section of the 6F7 tube. This voltage will vary in magnitude, depending on the setting of the level control, part No. 46, but there is always a residual amount which is that voltage developed across resistor 34.

## Analysis of Signal Channel . . .

The signal enters at the terminals A1, A2 and G. These three terminals are provided so that it is possible to use either a doublet or a conventional type of antenna with the receiver. When a doublet antenna is used, connect the two lead-in wires to A1 and A2 respectively, and a ground may or may not be connected to the G terminal, as desired. With this connection it is important that the strap between A2 and G termin-

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als be removed. In using a conventional type of antenna be sure that the strap is connected between terminals A2 and G. Connect the ground wire to either the A2 or G terminal and the antenna wire to the A1 terminal.

The path of the signal then depends on the position of switch No. 14. It will be seen that the signal may be made to enter antenna coil primaries, part Nos. 1, 2, 3 and 4, for bands Nos. 4, 3, 2 and 1, respectively. The shunting resistor, part No. 23, across the broadcast antenna coil primary is for the purpose of producing better alignment. Each secondary is provided with a trimmer condenser, and the output of the secondary goes through the section of the switch indicated in the wiring diagram just above the gang condenser, part No. 13. The remaining coils not in use are short circuited by another section of the switch. It will also be seen that still another section of the switch is used to insert an additional bias resistor, part No. 95, in series, with part No. 41, so that the receiver operates with higher bias on the I. F. amplifier, type 6D6, when the switch is thrown to the broadcast band No. 4. After tuning with a section of the gang condenser, part No. 13, the signal is impressed on the grid of the 6D6 R. F. amplifier and the amplified output of this tube then goes through another section of switch 14 to the primaries of the interstage coils designated as parts 5, 6, 7 and 8. Separate trimmer condensers are there provided for each of the secondaries and the signal flows through switch 14 to the grid of the 6A7 oscillator modulator tube after tuning with a section of the gang condenser, part No. 13. An additional section of the band change switch is used to short-circuit the coils not in use. The oscillator coils are designated as parts 9, 10, 11 and 12 respectively, they being provided with separate shunt trimmers for all bands and separate series trimmers for tracking in all bands except the highest frequency band No. 1, in which case the series condenser is fixed. Both the primary and secondary of the oscillator coils are switched with separate sections of the band change switch, and the unused secondaries are short-circuited with another section. In the 6A7 oscillator modulator the signal is converted into the I. F. frequency of 456 Kc., and then fed to the primary of the first I. F. transformer, part No. 18. Here it is double-tuned and fed to the grid of the first I. F. amplifier, type 6D6. The output of this tube goes to the second double-tuned I. F. transformer, No. 19, and then to the grid of the second I. F. amplifier, type 6B7. The output transformer for this tube, part No. 20, is double tuned. The voltage developed across the primary of this transformer is fed to one of the diodes through coupling condenser part No. 51 for AVC purposes. In this way the AVC channel is not quite as sharp as the signal channel and a very desirable stabilizing effect is produced. The tuned secondary output is fed to the other diode in the 6B7 tube and diode voltage is developed across the series combination of resistors 28, 46 and 34, of which part No. 46 is the level control. Since resistor 34 is bypassed there is no audio or intermediate frequency present across this resistor, it being used only for the purpose of furnishing a residual bias to the AF amplifier section of the 6F7 tube. To insure stability, that portion of the voltage across resistor 28 is not used. The audio voltage across part No. 46, however, is fed directly to the grid of the 6F7 pentode section. The audio frequency voltage is amplified and the amplified output of the 6F7 pentode section is present across resistor 35. It is fed through coupling condenser 64 to the grid of one of the type 42 output tubes. The grid circuit of this tube is completed through resistors 38 and 31 in series but that portion of the audio frequency voltage present across resistor 31 only is fed to the triode section of the 6F7. The output of this triode section is present across resistor 37. The characteristics of the tube and circuit constant are so adjusted that the voltage across resistor 35 and the voltage across resistor 37 are equal to each other but 180 degrees out of phase, so that when the output of the triode section is fed to the grid of the second push-pull output type 42 amplifier, which grid circuit is completed through resistor 38, the output stage functions as a normal push-pull amplifier. The power output of the type 42 tubes is fed to the speaker transformer in the speaker assembly, part No. 77, in the conventional manner. Condenser 66 across the plates of the two output tubes serves to keep the impedance more constant at all frequencies, while the combination of rheostat 47 and condensers 65 and 92 make up the tone control.

## Power Supply System . . .

80, for 110-volt 60-cycle, and part

The power supply system is made up of a power transformer, part No. No. 81 for other voltages and frequencies, a type 80 rectifier tube, first filter condenser part No. 67, filter choke part No. 79, second filter condenser part No. 68, second filter choke made up of the speaker field in assembly 77 and the third filter condenser part No. 69. This power supply system is conventional and requires no further explanation.

## Alignment Procedure . . .

To align the I. F. amplifier it is necessary that there be available a suitable modulated oscillator capable of adjustment to 456 Kc. with good accuracy. This oscillator should have an attenuator so that the strength of the oscillator output can be regulated. Be sure that the band change switch is thrown to the high frequency or No. 1 band position. Connect the high side of the output of the modulated oscillator, which has been adjusted to 456 Kc. to the control grid connection on the top of the 6A7 tube through an .02 Mfd. series condenser. The low side of the oscillator is to be connected to the receiver chassis. Set the output of the oscillator to a convenient level and adjust the I. F. transformer condensers for maximum signal output. These I. F. transformer condensers are accessible on the top of the three tall I. F. transformer cans. To make these adjustments it is necessary that a standard 5/16″ (across flats) hexagon socket wrench be used for the upper condensers, and a small screwdriver fitting inside of the nut hole for the adjustment of the lower condenser. Always make these I. F. adjustments very carefully and go over them several times to be sure that the peak has been reached.

To align the receiver at broadcast frequencies, it is necessary that an adjustable oscillator having the frequencies of 1400 and 600 Kc. together with a suitable attenuator and dummy antenna be available. Set the oscillator at 1400 Kc. and connect the high side of the oscillator to the receiver antenna terminal through a .0002 (dummy antenna) condenser. Turn the tuning control of the receiver to 140 on the dial and throw the band change switch to range No. 4. Now adjust the oscillator broadcast shunt trimmer on the end of the coil assembly in the topmost front position as indicated on the diagram until the signal is heard best. Without changing the gang condenser setting, adjust the antenna and radio frequency broadcast trimmers in this same top row for maximum signal. Sometimes it is advisable to readjust the dial slightly because the oscilla-

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tor is somewhat affected by the R. F. adjustment. It is necessary that these adjustments be gone over several times until no further improvement can be made. Always work with the weakest possible signal from the modulated oscillator for best accuracy. Now rotate the dial until it reads 60 and set the modulated oscillator to approximately 600 Kc. Adjust the modulated oscillator carefully until maximum response is heard. Now adjust the oscillator series trimmer condenser for the broadcast band, located in the third hole from the front on the chassis end flange, indicated in the diagram, until maximum response is heard. It is sometimes advisable to move the main dial back and forth slightly about 60 on the dial during the course of this adjustment if a still greater signal is obtainable.

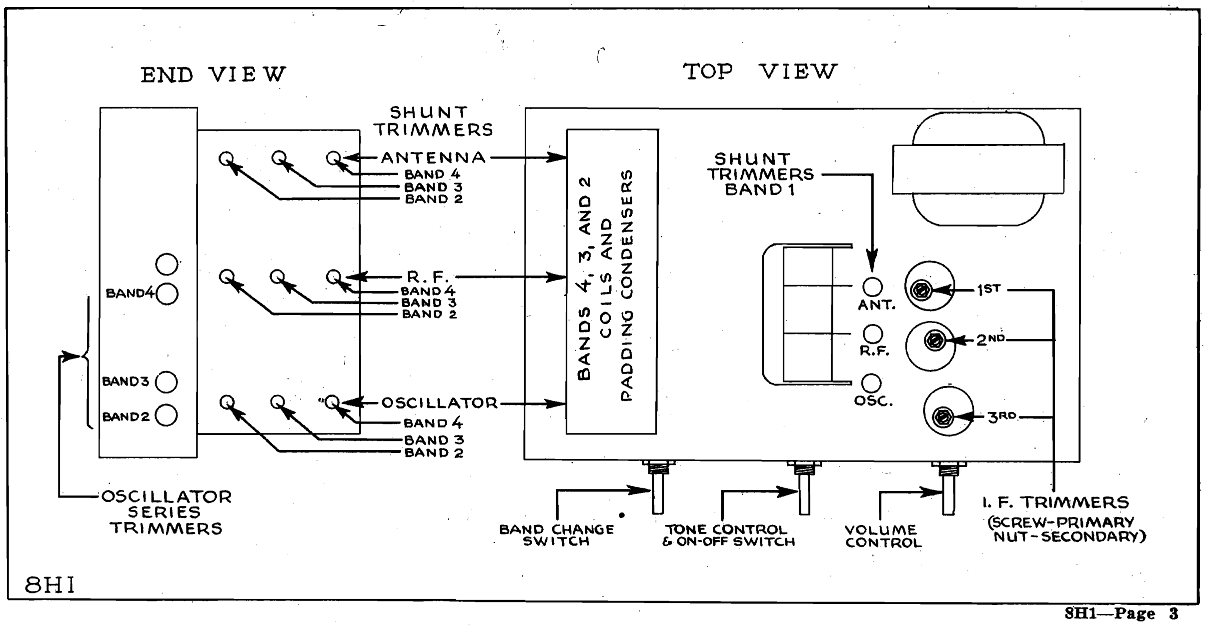
The same procedure is used for the remaining three bands except that the dummy antenna condenser is replaced by a 750-ohm midget carbon resistor. The shunt padding condensers for band No. 3 are located in the middle row on the end of the coil assembly, while the series padding condenser for band No. 3 is the second from the front on the receiver end flange. To align the receiver in band No. 3 it is necessary that a modulated oscillator and suitable attenuator be available, with frequencies of 1700 and 4000 Kc. Set the dial at 4 and the modulated oscillator to 4000 Kc. Adjust the oscillator shunt trimmer, which is the front condenser on the coil shield assembly in the middle row for maximum signal. Then adjust the remaining two condensers in the middle row for maximum signal, making what slight adjustments may be necessary if the oscillator is slightly detuned by the R. F. adjustment. Then set the modulated oscillator to approximately 1700 Kc., and the receiver dial to 1.7. Adjust the modulated oscillator slightly until the signal is heard best and then adjust the oscillator series trimmer located on the receiver end flange (the second from the front) for maximum signal. Make whatever slight readjustments are necessary in the dial to bring this signal in best.

To align the receiver in band No. 2, the bottom row of trimmer condensers on the coil shield assembly are used. An oscillator capable of adjustment to 4500 and 10,000 Kc. is necessary. Set the oscillator at approximately 10,000 and the receiver dial to 10. Adjust the oscillator shunt trimmer condenser, which is the front condenser in the lower row, for maximum signal. Then adjust the remaining two condensers in the lower row, making whatever slight readjustment of the dial is necessary to bring the signal in best. Set the dial of the receiver to 4.5 and the modulated oscillator to 4500 Kc. Now adjust the oscillator series trimmer condenser for this band, which is the frontmost one on the receiver on the chassis end flange, for maximum signal, making whatever slight dial readjustments are necessary.

The aligning condensers for band No. 1 are located directly under and to the right of the gang condenser. To align the receiver in this band, it is necessary that a modulated oscillator and attenuator for a frequency of 22,000 Kc. be available. Set the modulated oscillator to 22,000 Kc. and the receiver dial to 22. Adjust the oscillator shunt trimmer, which is the frontmost of the three trimmer condensers available from the top of the chassis, for maximum signal. Now adjust the remaining two trimmer condensers also available from the top of the chassis, and make whatever slight dial adjustments are necessary to bring the signal in best. There is no series trimmer condenser for this band but the alignment may be checked by setting the modulated oscillator to approximately 11,000 Kc. and tuning it in on the receiver dial. It should come in at about 11 on the dial.

## Tuning Receiver In High Frequency Band . . .

Due to the tremendously greater number of transmitter channels covered in the high frequency band, the receiver is endowed with a much greater apparent selectivity. For this reason, if the receiver is tuned carelessly, many high frequency stations will be missed or passed over without hearing them. It is very necessary that the receiver be tuned slowly and that extreme care be exercised in final adjustment of the receiver to the center of the carrier after a high frequency station is located and received.



# MODEL 80AW, 80AW LB
## Schematic (8H1)
## Socket Layout
## Parts List

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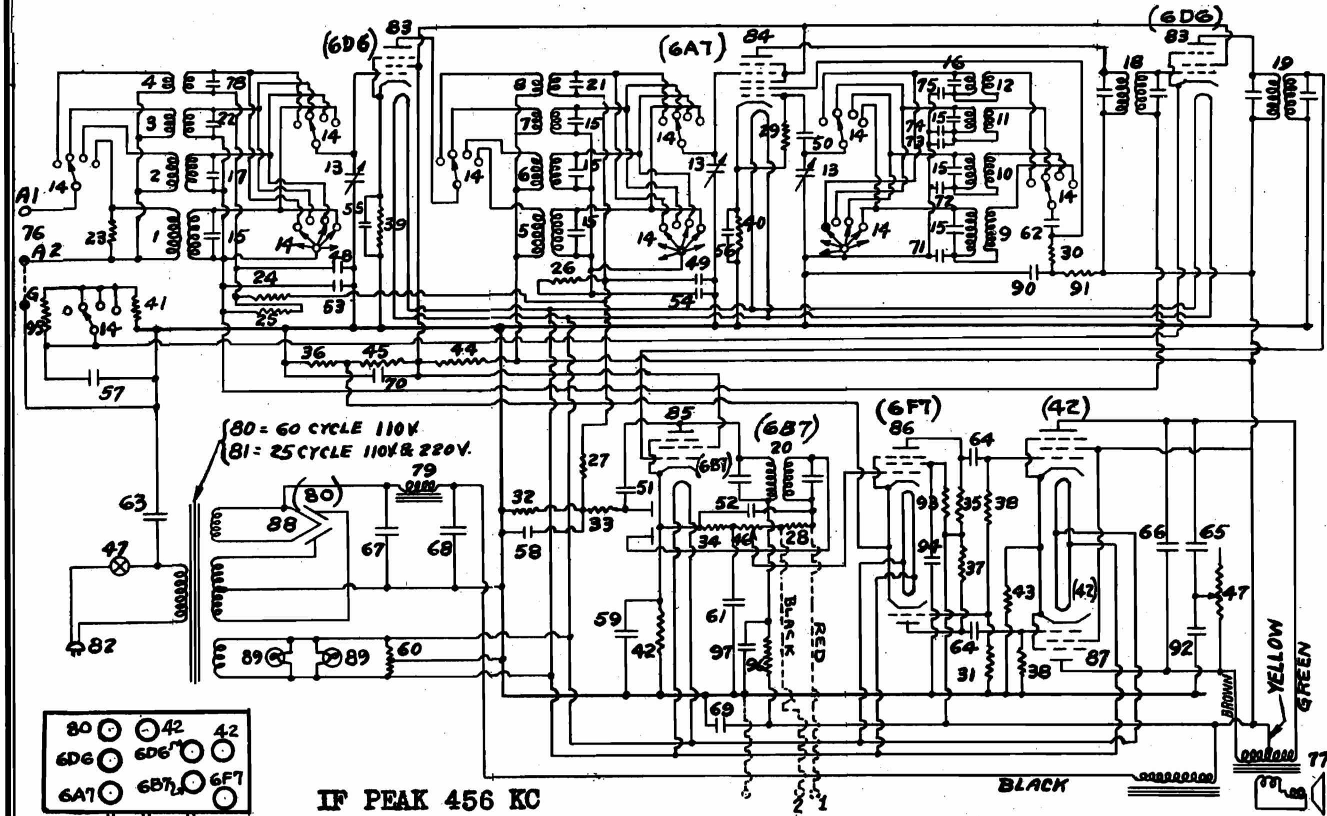



*Figures in 2nd last column refer to parts shown in wiring diagram of Model 8H1

| Qty. | Part No. | Description | * Item | List Each |
|---|---|---|---|---|
| 1 | G3-32000 | Antenna Coil (Broadcast) .. | 1 | .45 |
| 1 | G4-32000 | Ant. Coil (1500-4000 Kc.) | 2 | .40 |
| 1 | G5-32000 | Ant. Coil (4000-10000 Kc.) | 3 | .60 |
| 1 | G6-32000 | Ant. C. (10000-24000 Kc.) | 4 | .55 |
| 1 | G2-32001 | Inter. Coil (Broadcast) ........ | 5 | .55 |
| 1 | G8-32001 | Inter. Coil (1500-4000 Kc.) | 6 | .50 |
| 1 | G3-32001 | In. Coil (4000-10000 Kc.) | 7 | .60 |
| 1 | G4-32001 | In. Coil (10000-24000 Kc.) | 8 | .60 |
| 1 | G2-32002 | Osc. Coil (Broadcast) .......... | 9 | .40 |
| 1 | G3-32002 | Osc. Coil (1500-4000 Kc.) | 10 | .40 |
| 1 | G4-32002 | Os. Coil (4000-10000 Kc.) | 11 | .50 |
| 1 | G5-32002 | Os. C. (10000-24000 Kc.) | 12 | .55 |
| 1 | W33378 | Level Control (Volume) | 46 | .75 |
| 1 | W32063 | Tone Control & Line Switch | 47 | 1.20 |
| 1 | G16-26719 | Ant. Gnd. Terminal ............. | 76 | .15 |
| 1 | B21491C | A. C. Cord & Plug ........... | 82 | .50 |
| 2 | G75-27975 | Socket 6D6 ........................... | 83 | .10 |
| 1 | G2-33070 | Socket 6A7 ........................... | 84 | .10 |
| 1 | G48-27975 | Socket 6B7 ........................... | 85 | .10 |
| 1 | G49-27975 | Socket 6F7 ........................... | 86 | .10 |
| 2 | G25-27975 | Socket 42 ............................. | 87 | .10 |
| 1 | G6-27975 | Socket 80 ............................. | 88 | .10 |
| 1 | W33072 | Socket Cushion.............. | 84 | .05 |
| 2 | W33071 | Washer........................... | 84 | .05 |
| 1 | W33073 | Tube Shield Base........ | 84 | .10 |
| 2 | W28632A | Tube Shield................. | 84-85 | .10 |
| 2 | B26009D | Tube Shield ........................... | 83 | .10 |
| 3 | W27981A | Tube Shiled Base .................. | 83-85 | .05 |
| 2 | W32744 | Socket Insulator........ | 86-87 | .05 |
| 1 | G37-25669 | Power Trans. 60 Cy. 110 V. | 80 | 6.50 |
| | G38-25669 | Power Trans. 25 Cy. 110-120 Volt ............................ | 81 | 9.00 |
| 1 | G1-24628 | Filter Choke ........................ | 79 | 1.25 |
| 1 | G12-32004 | 1st Tuned I. F. Trans..... | 18 | 1.90 |
| 1 | G5-32004 | 2nd Tuned I. F. Traas.... | 19 | 1.90 |
| 1 | G6-32004 | 3rd Tuned I. F. Trans. ....... | 20 | 1.90 |
| | G7-33009 | Parallel Padding Cond. | 15 | .15 |
| | G5-33009 | Parallel Padding Cond. | 17 | .15 |
| | G17-33009 | Parallel Padding Condenser | 100 | .15 |
| | G2-33008 | Parallel Padding Condenser | 99 | .15 |
| | G11-33009 | Parallel Padding Cond. | 21 | .15 |
| | G6-33009 | Parallel Padding Cond. | 16 | .15 |
| | G2-33006 | Padding Condenser ...... | 72-73 | 1.90 |
| | G14-33006 | Padding Condenser ............. | 98 | .45 |
| 1 | B32196B | Band Change Switch...... | 14 | 2.50 |
| 1 | G18-32002 | Tuning Condenser Gang .... | 13 | 4.00 |

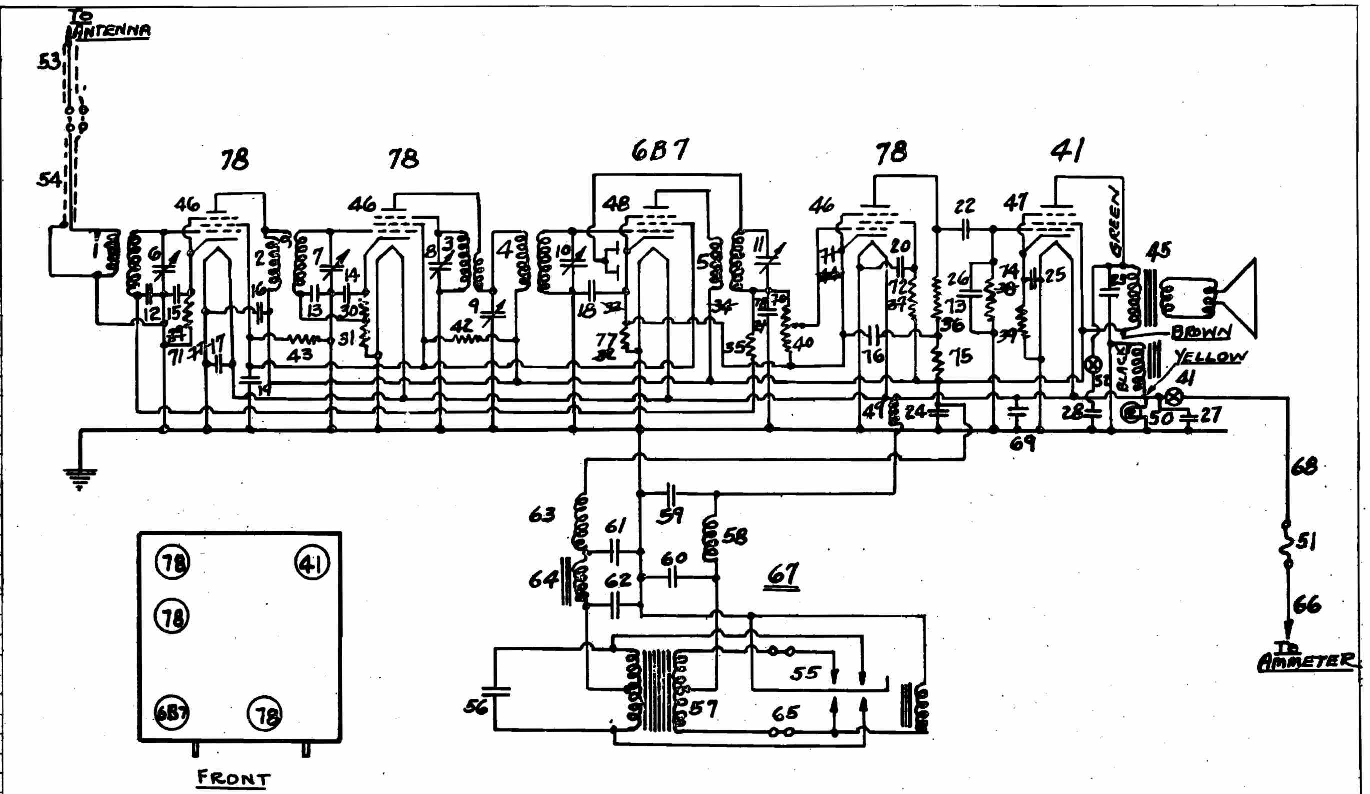
| Qty. | Part No. | Description | * Item | List |
|---|---|---|---|---|
| | | **FILTER & BY-PASS CONDENSERS** | | |
| | W26194B | 12 M.F.D. 475 VOLT | 67 | 1.25 |
| 1 | W29097C | 8.-8.-8. Mfd. 450-450-250 Volts ........................................ | 68-69 70 | 2.85 |
| 1 | W32258 | 8. Mfd. 300 Volts........... | 90 | 1.20 |
| 1 | W30321 | 1. Mfd. 160 Volts.................... | 61 | .55 |
| 1 | W32278 | 0.001 Mfd.......................... | 48-49 | .30 |
| 2 | W30741 | 0.00025 Mfd. ............................ | 50 | .15 |
| 1 | W32226 | 0.0005 Mfd......................... | 51 | .15 |
| 1 | W31937 | 0.0001 Mfd .............................. | 52 | .15 |
| 1 | W32379 | 0.02 Mfd. 200 Volt ................ | 53-54 | .15 |
| 2 | W28621 | 0.02 Mfd. 200 Volt ................ | 55-56 57-58 59 | .15 |
| 5 | W23635 | 0.006 Mfd. ................................ | 62 | .20 |
| 1 | W23191A | 0.01 Mfd. 400 Volt ............... | 63-97 | .25 |
| 2 | W23615 | 0.05 Mfd. 400 Volt ............... | 64 | .15 |
| 1 | W31052 | 0.05-0.004 Mfd. 400-400 Volt | 65-66 | .30 |
| 1 | W32279 | 0.00085 Mfd.................... | 74 | .20 |
| 1 | W32332A | 0.000791 Mfd................. | 75 | .30 |
| 1 | W30270 | 0.001 Mfd. ............................. | 92 | .15 |
| 1 | W28142 | 0.02 Mfd. 400 Volt ................ | 94 | .20 |
| | | **RESISTORS** | | |
| 1 | 21455 | 4500 Ohms ............................ | 23 | .15 |
| 1 | 31094 | 300000 Ohms ........................ | 24-25 26-27 | .15 |
| 4 3 | 23785 | 500000 Ohms ........................ | 28-38 93 | .15 |
| 1 | 21875 | 100000 Ohms ........................ | 29 | .15 |
| 2 | 24814 | 7000 Ohms ............................ | 30-91 | .20 |
| 2 | 21237A | 60000 Ohms .......................... | 31-35 | .15 |
| 2 | 26577 | 3 Megohms .......................... | 32-33 | .15 |
| 1 | 21876 | 10000 Ohms .......................... | 34 | .15 |
| 2 | W30127 | 450 Ohms (Flexible) ........... | 36-42 | .15 |
| 1 | 23403 | 150000 Ohms ........................ | 37 | .15 |
| 2 | W25937 | 275 Ohms (Flex.) .............. | 39-40 | .15 |
| 2 | W22514 | 750 Ohms (Flex.) ................ | 41-96 | .15 |
| 1 | W22873 | 220 Ohms ............................. | 43 | .15 |
| 1 | W32301 | 10000-15000 Ohms ........... | 44-45 | .45 |
| 1 | W32337 | 10-10 Ohms ..................... | 60 | .25 |
| 1 | 22831 | 15000 Ohms .......................... | 95 | .15 |

# CROSLEY RADIO CORP.

## MODEL 5A1
## Schematic, Socket Parts List

| | | |
|---|---|---|
| 1 | G6-24995 | ANTENNA COIL |
| 2 | G7-28968 | R-F-COIL |
| 3 | G25-24996 | OSCILLATOR COIL |
| 4 | G1-25444 | 1ST I-F-COIL |
| 5 | G3-25445 | 2ND I-F-COIL |
| 6 | L-29783 | ANT. TUNING COND. |
| 7 | | R-F. TUNING COND. |
| 8 | | OSC. TUNING COND. |
| 9 | G2-25948 | I-F-PRI-TUNING COND. |
| 10 | W-25008-A | I-F-SEC. TUNING COND. |
| 11 | G2-25948 | DIODE TRANS. TUN. COND. |
| 12 | W-27203 | 0-02 MFD. 200V |
| 13 | W-27203 | 0-02 MFD. 200V. |
| 14 | W-27203 | 0-02 MFD 200V |
| 15 | W-27203 | 0-02 MFD. 200V. |
| 16 | W-23615 | 0-05 MFD. 400V |
| 17 | W-24049 A | 0-1 MFD. 200V |
| 18 | W-24049 A | 0-1 MFD. 200V |
| 19 | W-25438 | 0-1 MFD. 200V |
| 20 | | 0-1 MFD. 200V |
| 21 | ~~W-26571~~ | ~~0-0008 MFD. 200V.~~ |
| 22 | W-23142 | 0-02 MFD. 400V |
| 23 | W-23191-A | 0-01 MFD. 400V |
| 24 | W-30419-A | 8 MFD. 250V |
| 25 | | 8 MFD. 25V |
| 26 | W-20389 | .00005 (MICA) |
| 27 | W-20389 | .00005 (MICA) |
| 28 | W-23191-A | 0-01 MFD. 400V. |
| 29 | ~~W-21464~~ | ~~160 Ω~~ |
| 30 | W-30127 | 450 Ω |
| 31 | W-27086 | 6400 Ω |
| 32 | W-25937 | 275 Ω |
| 33 | W-28357 | 75 Ω |
| 34 | 21454 | 1-MEG |
| 35 | 21454 | 1-MEG |
| 36 | ~~21875~~ | ~~100,000 Ω~~ |
| 37 | ~~20785~~ | ~~500,000 Ω~~ |
| 38 | ~~21455~~ | ~~300,000 Ω~~ |
| 39 | W-23907 | 750 Ω |
| 40 | W-30436 | LEVEL CONTROL |
| 41 | | S.P.S.T. SWITCH |
| 42 | W-26525 B | 15000 Ω |
| 43 | | 25000 Ω |
| 44 | ~~W-22614~~ | ~~750 Ω~~ |
| 45 | | 353-3 SPEAKER |
| 46 | 539-28807 | 78 SOCKET |
| 47 | 528-28807 | 41 SOCKET |
| 48 | 548-28807 | 6B7 SOCKET |
| 49 | 54-28067 | "A" CHOKE |
| 50 | W-4099A | 6V. DIAL LIGHT |
| 51 | W-31163 | 10 AMP "A" FUSE |
| 52 | W-26156-A | S.P.S.T. SWITCH |
| 53 | D-31296A | ANTENNA LEAD |
| 54 | W-31702 | ANTENNA LEAD CONNECTOR |
| 55 | W-29160 | VIBRATOR ASSEM. |
| 56 | W-31632 | 0-01 MFD. 1000.V. |
| 57 | G1-31618 | POWER TRANS. |
| 58 | 2-28067 | "A" CHOKE |
| 59 | W-30366 | 0-5 MFD 160V. |
| 60 | W-30368 | 0-5 MFD. 160V |
| 61 | W-23142 | 0-02 MFD. 400V. |
| 62 | W-31631-B | 12 MFD. 300V. |

| | | | | | |
|---|---|---|---|---|---|
| 63 | G1-24234 | R.F. CHOKE ASSEM. | 79 | | |
| 64 | G10-24628 | FILTER CHOKE ASSEM. | 80 | | |
| 65 | G11-26719 | POLARITY REVERSING TERM. BD. | 81 | | |
| 66 | G1-31701 | "A" CABLE ASSEM. | 82 | | |
| 57 | L-31629 | 413 SYNCRONODE | 83 | | |
| 68 | G2-31701 | "A" CABLE ASSEM | 84 | | |
| 69 | W-20389 | .0005 MFD (MICA) | 85 | | |
| 70 | ~~W-20389~~ | ~~.0005 MFD. 200V~~ | 86 | | |
| 71 | W-21452 | 1100 Ω | 87 | | |
| 72 | 21454 | 1 MEGOHM | 88 | | |
| 73 | 23403 | 150,000 Ω | 89 | | |
| 74 | 23785 | 500,000 Ω | 90 | | |
| 75 | 81287-A | 60,000 Ω | 91 | | |
| 76 | W-23615 | .05 MFD 400 VOLTS | 92 | | |
| 77 | W-28889 | 350 Ω | 93 | | |
| 78 | W-32607 | .0005 MFD 200V. | 94 | | |




181.5 Kc I.F

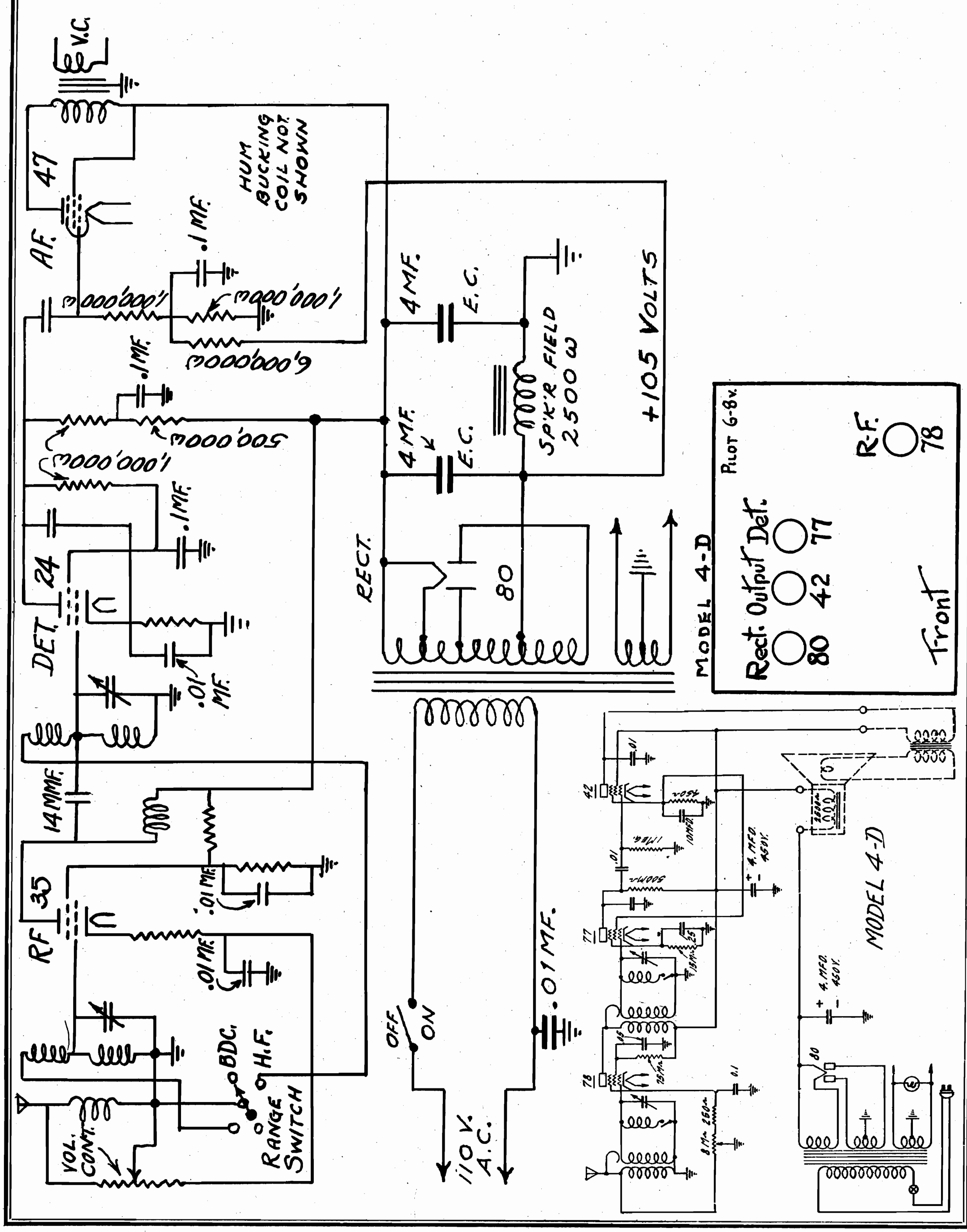
| | RECORD OF CHANGES | Change No. |
|---|---|---|
| A | ITEM 69 ADDED. ITEM 62 CHGD TO "A" 2-2-34<br>ITEM 21 REPLACED BY ITEM 78 2-7-34 CGF | 3559 |
| B | ITEMS 42 & 43 CHANGED TO "A" 2-19-34 | 3563 |
| C | ITEMS 29-36 37-38 & 44 DELETED 3-9-34<br>ITEMS 71-72-73 74-75-76 & 77 ADDED | 3570 |
| D | ITEM 62 CHG'D TO "B" 4-11-34 | 3526 |
| E | ITEMS 42 & 43 TO "B"<br>ITEM 70 REPLACED WITH ITEM 78 | 3585 |

THE CROSLEY RADIO CORPORATION, CINCINNATI, OHIO

| | | | |
|---|---|---|---|
| 5A1 | | WIRING DIAGRAM | |
| APPROVED CG FELIX | DATE 1-24-33 | SCHAEFER | DWG. NO. B-31760 |

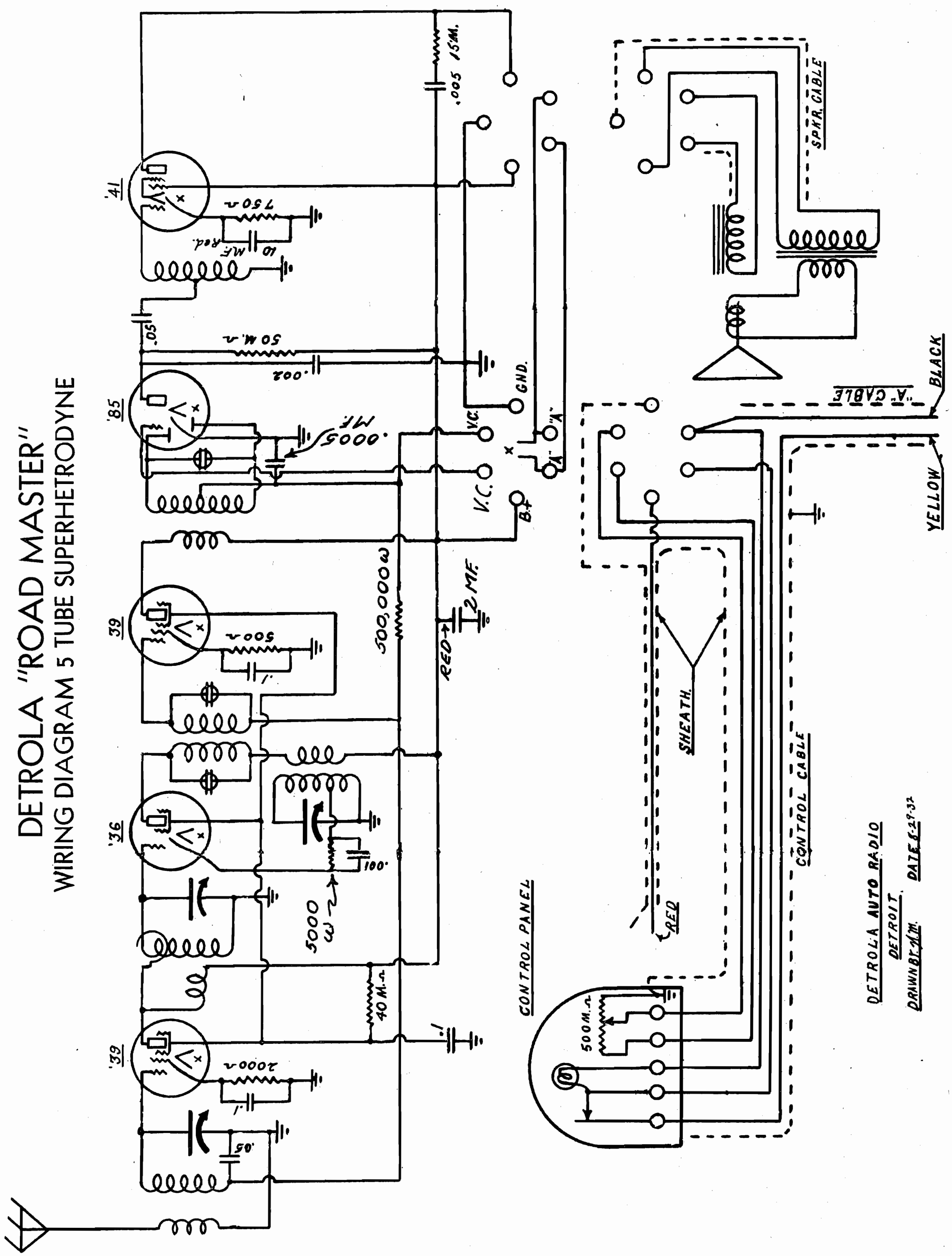
# DETROLA RADIO CORP.

MODEL 4 Tube TRF '32
Schematic
MODEL 4-D
Schematic, Socket



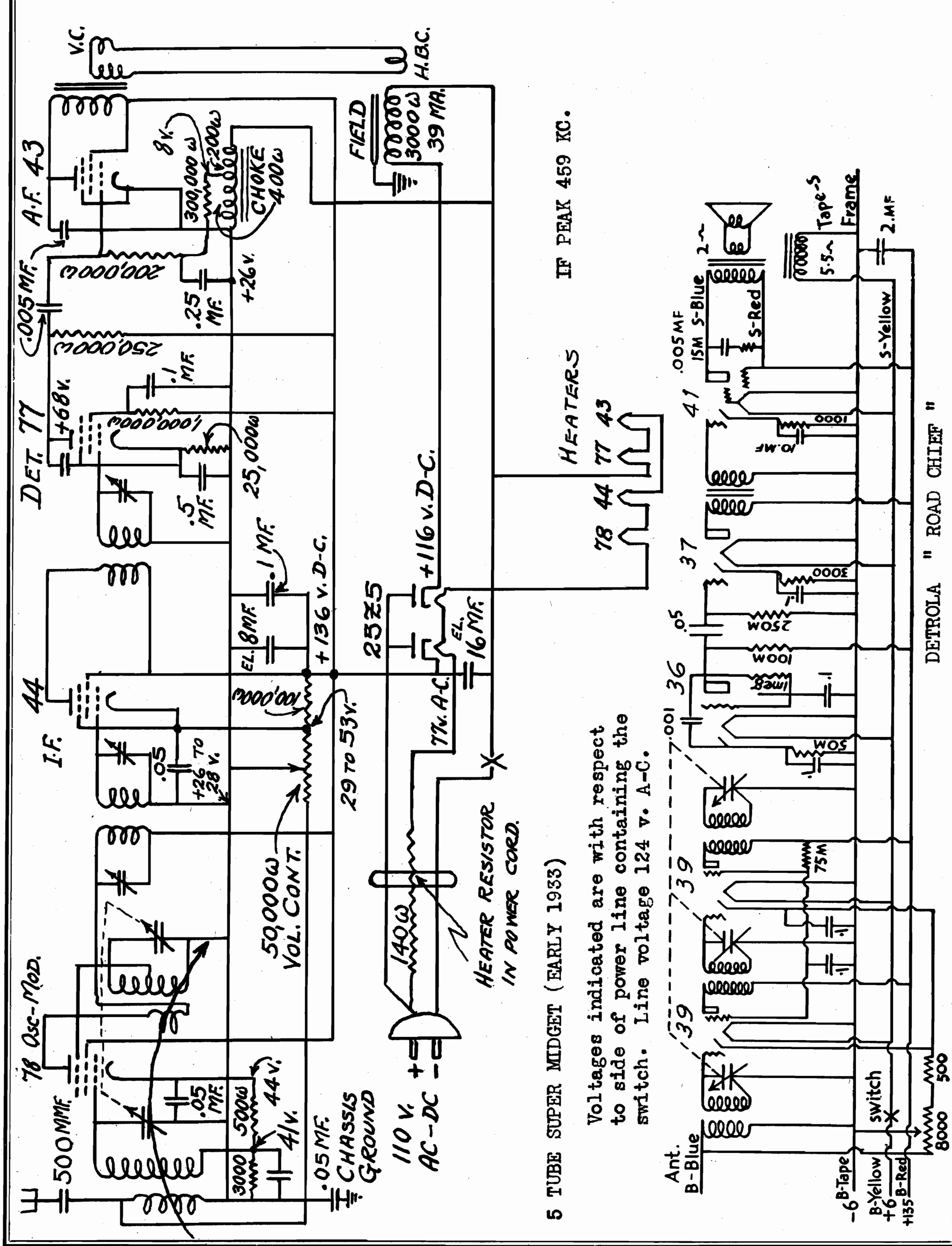
MODEL "Roadmaster"
Schematic

## DETROLA RADIO CORP.



DETROLA RADIO CORP.

MODEL 5 Tube Super Midget Schematic
MODEL "Roadchief" Schematic



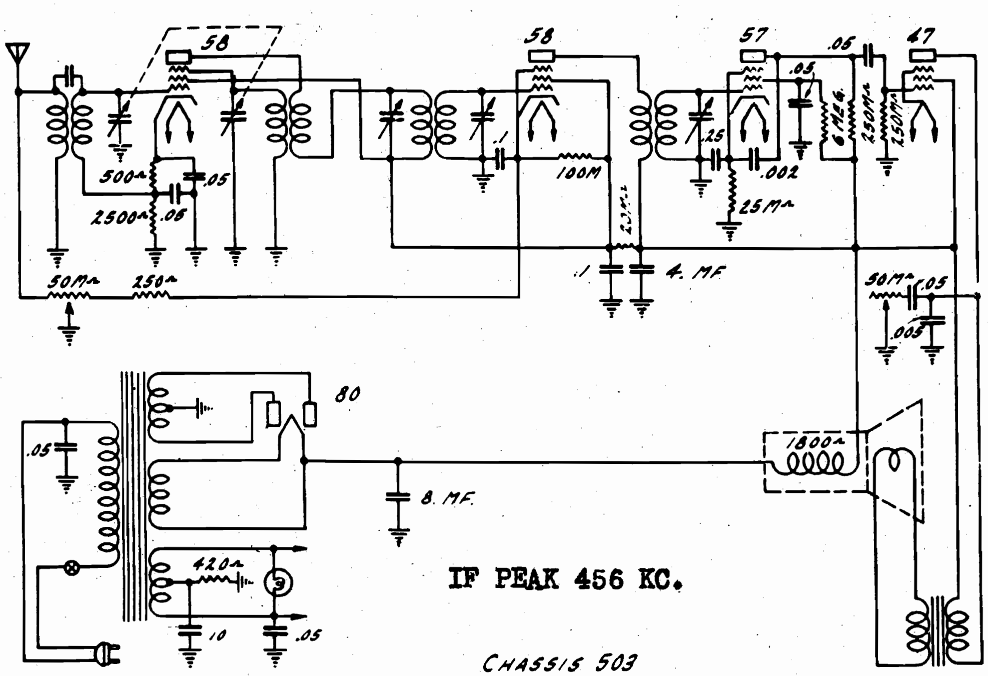

5 TUBE SUPER MIDGET (EARLY 1933)

Voltages indicated are with respect to side of power line containing the switch. Line voltage 124 v. A-C.

**MODEL 503**
**Schematic, Voltage**
**Alignment**

# DETROLA RADIO CORP.

SCHEMATIC DIAGRAM OF MODEL 503 RADIO




VOLTAGE TABLE. Line Voltage 115 v. 60 cyc.

| TUBE | | Grid | Plate | Screen | Filament |
|---|---|---|---|---|---|
| 58 | Osc-Det | -2.5 | 60 | 60 | 2.5 |
| 58 | IF | -2.0 | 250 | 75 | 2.5 |
| 57 | 2 Det. | -3.5 | 75 | 6 | 2.5 |
| 47 | Output | -5.0 | 210 | 225 | 2.5 |
| 80 | Rect. Fil.to Gnd. 325 volts. | | | | 5.0 |

PROCEDURE FOR ALIGNMENT:

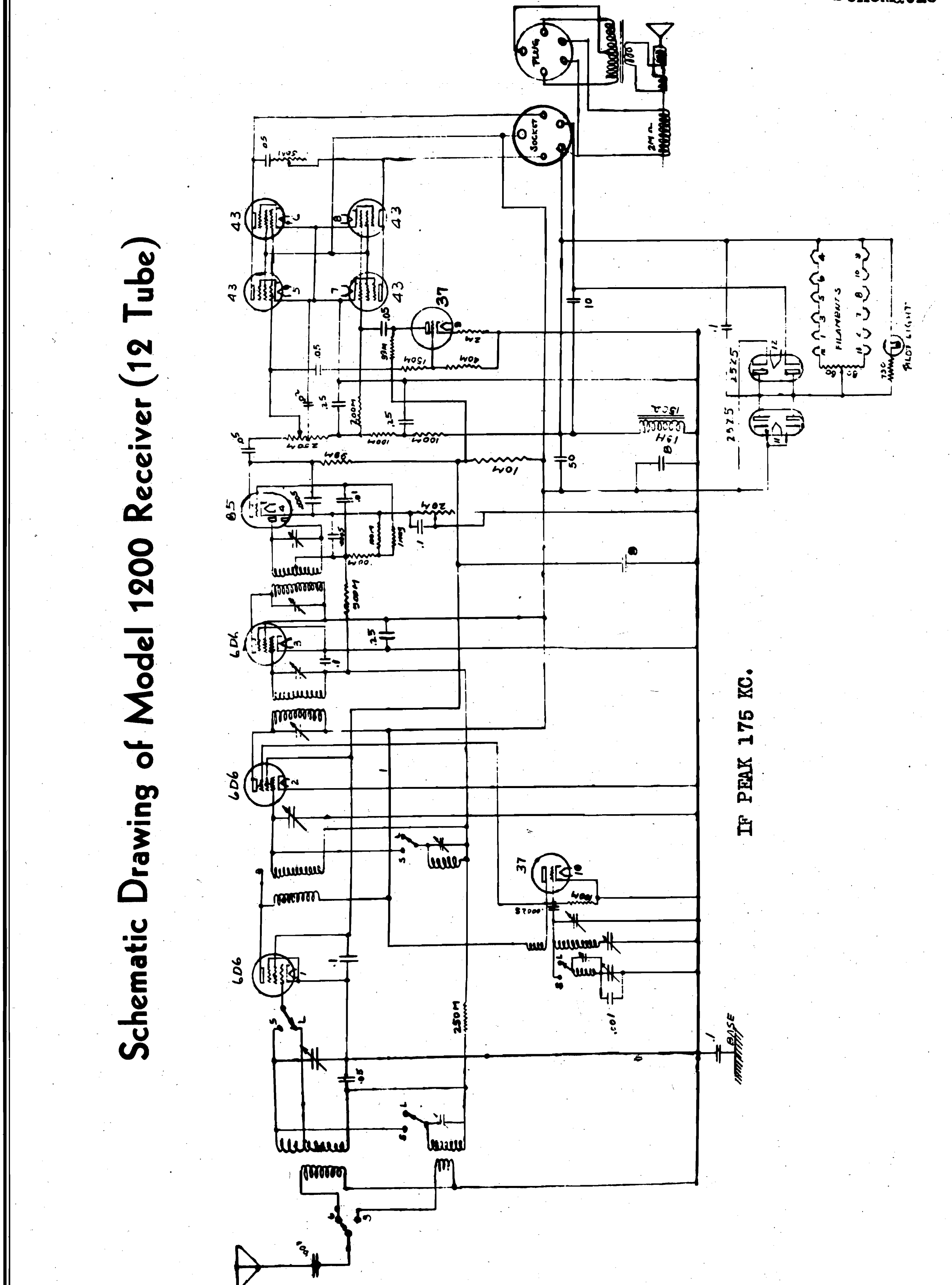
Apply a modulated 456-kc. signal to modulator grid and align the four dual trimmers in the top of the I-F. cans for maximum output from the set.

Apply a 600 kc. signal at the antenna and track the oscillator by varying the nut adjustment on the oscillator padding condenser until maximum response is obtained, by rotating the dial. Disregard calibration when making this adjustment.

At all steps in the above procedure the output should be kept only as high as is necessary for good alignment, but the output should be lowered <u>always</u> by decreasing the input to the receiver, <u>never</u> by reducing the setting of the volume control. This control should be set at maximum throughout any adjustments of the R-F. or I-F. circuits. Use a suitable output meter across the voice coil of the speaker for indicating the correct adjustment for maximum response.

DETROLA RADIO CORP.

**MODEL 1200**
**Schematic**



**MODEL 1200**
**Voltage**
**Alignment**

# DETROLA RADIO CORP.

1. Apply a modulated 175 Kilocycle signal to the grid of the modulator (1st detector) tube and align the four dual trimmer adjustments in the top of the IF transformer cans for maximum output from the receiver.

2. With the band switch knob in the 530-1500 Kilocycle or clockwise position, and the tuning dial set to 1400 Kilocycles, apply a 1400 Kilocycle signal at the antenna and adjust the three trimmer screws on the gana condenser for maximum output from the receiver.

3. Apply a 600 Kilocycle signal at the antenna and track the oscillator by varying the nut adjustment on the oscillator padding condenser and returning the dial until maximum response is obtained. This adjustment should be made disregarding calibration.

4. With the band switch in the short wave or counter-clockwise position and the dial set to 3.6 Megacycles, apply a 3600 Kilocycle signal at the antenna and align the three trimmers in the top of the short wave coil cans for maximum response.

5. Apply a 1600 Kilocycle signal at the antenna and track the oscillator as at 600 Kilocycles in the broadcast band by adjusting the slotted screw adjustment on the oscillator padding condenser.

Suitable harmonies of a broadcast oscillator may be used for alignment purposes in the short wave band.

At all steps in the aligning procedure, the output should be kept only as high as is necessary for good alignment but the output should always be lowered by decreasing the input to the receiver, never by reducing the volume control setting. The volume control should be at maximum setting during any adjustments of the RF and IF circuits. A suitable output meter should be connected across the speaker voice coil to indicate the correct adjustment for maximum response.

## TABLE OF VOLTAGES

Line Voltage - 115 Volts - 60 Cycles AC
Interchannel Noise Suppressor Set for Maximum Sensitivity

| Position | Tube | Plate | Screen | Cathode |
|---|---|---|---|---|
| RF | 6D6 | 100 | 60 | 0 |
| MOD | 6D6 | 100 | 60 | 0 |
| OSC | 37 | 100 | | 0 |
| IF | 6D6 | 100 | 100 | 0 |
| DET | 85 | 20 | | 0 |
| PHASE REVERSER | 37 | 20 | | 1-2V |
| OUTPUT | 43 | | 100 | 0 |

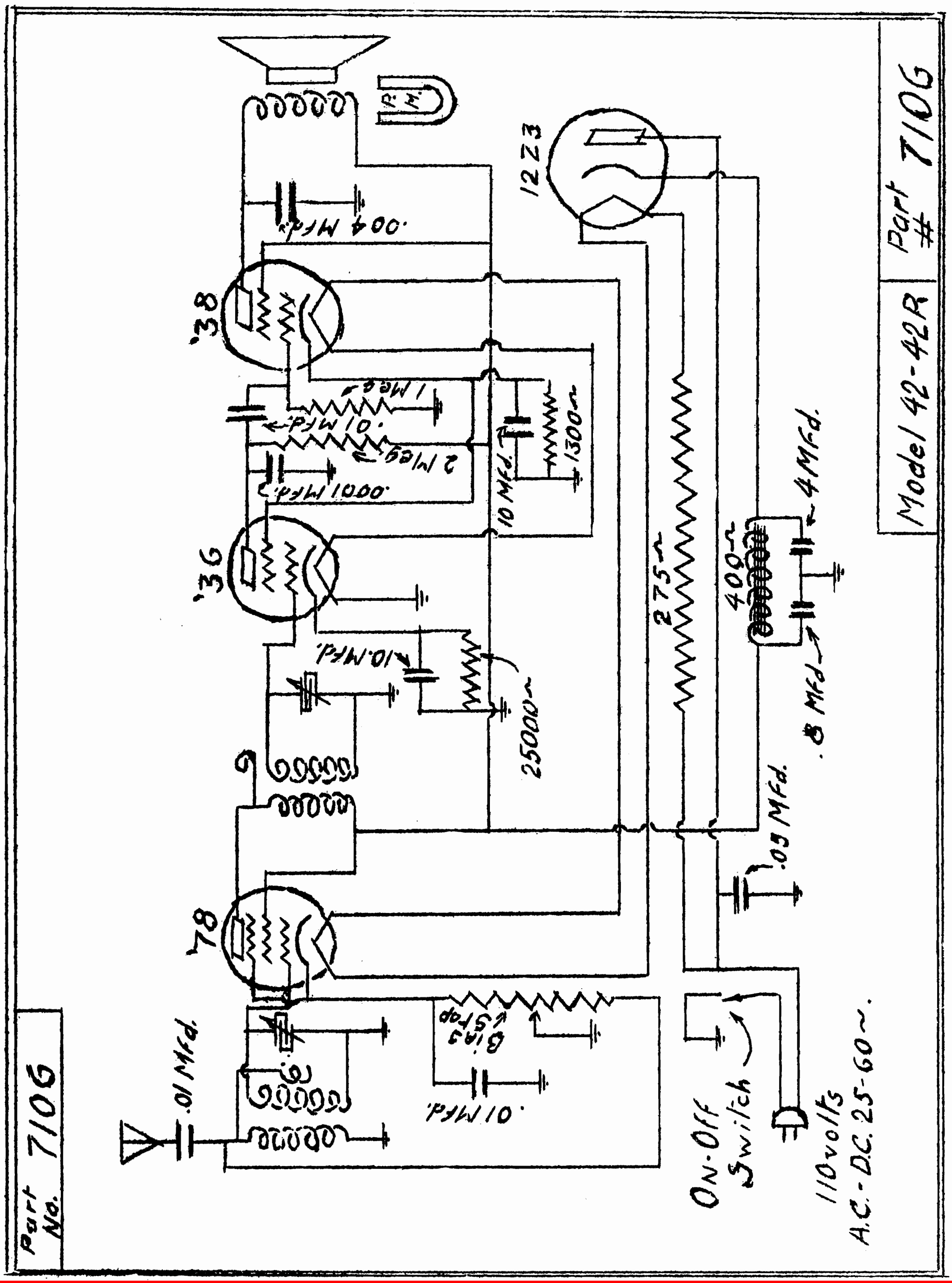
Above voltage's measured with 0-250 V--1000 ohm per volt DC Voltmeter
Drop ACROSS CHOKE - 18 Volts
Drop ACROSS SPEAKER FIELD -
When operated on 115 Volts DC or 25 cycle AC the above voltages will be slightly lower.

## FILAMENT VOLTAGES

| | | | | |
|---|---|---|---|---|
| 25Z5 | - | 25 Volts | - | AC or DC |
| 43 | - | 25 " | - | AC " DC |
| 6D6 | - | 6.3 " | - | AC " DC |
| 37 | - | 6.3 " | - | AC " DC |
| 85 | - | 6.3 Volts | - | AC " DC |

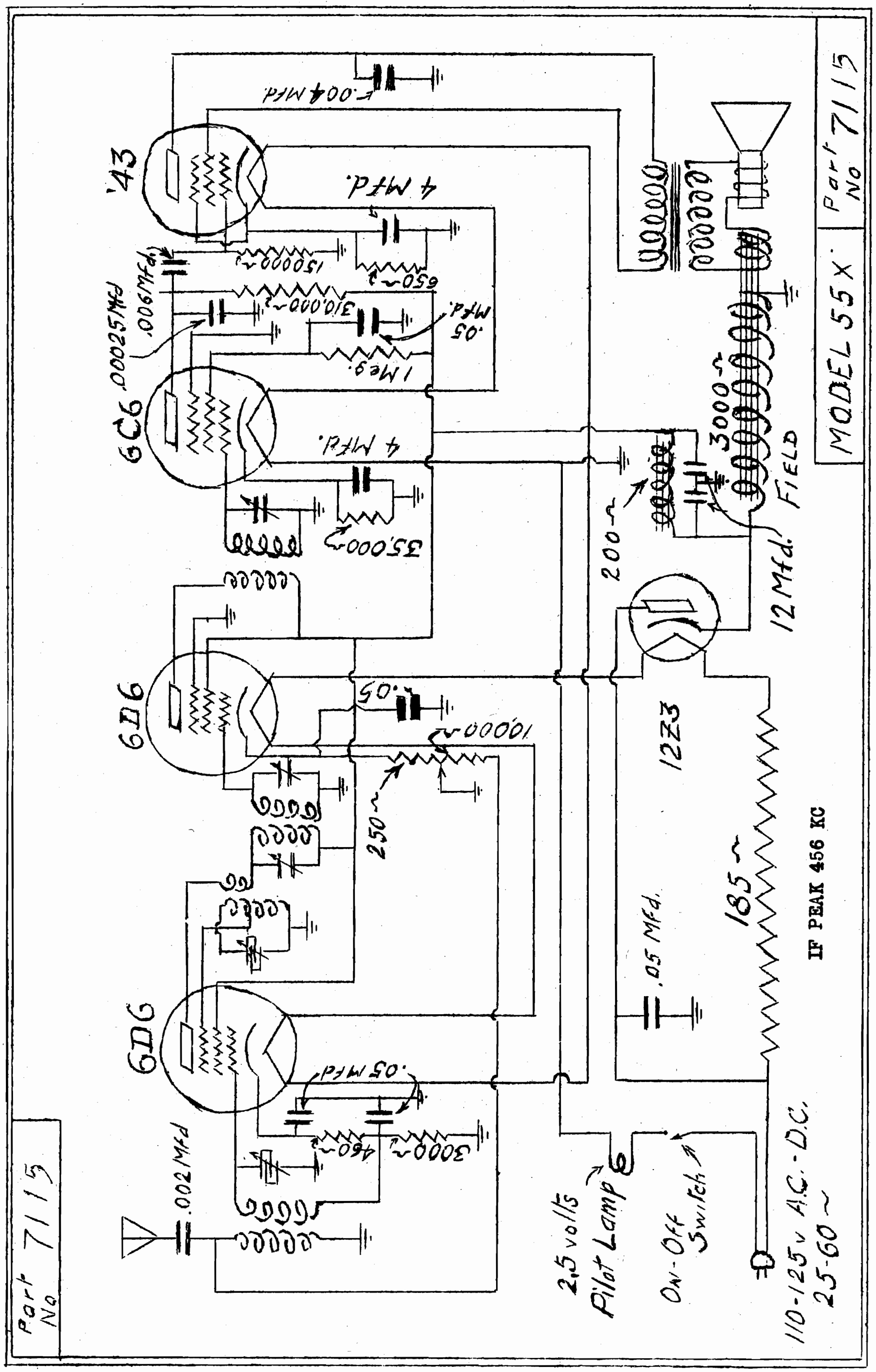
MODEL 42,42-R
Schematic

# DEWALD RADIO



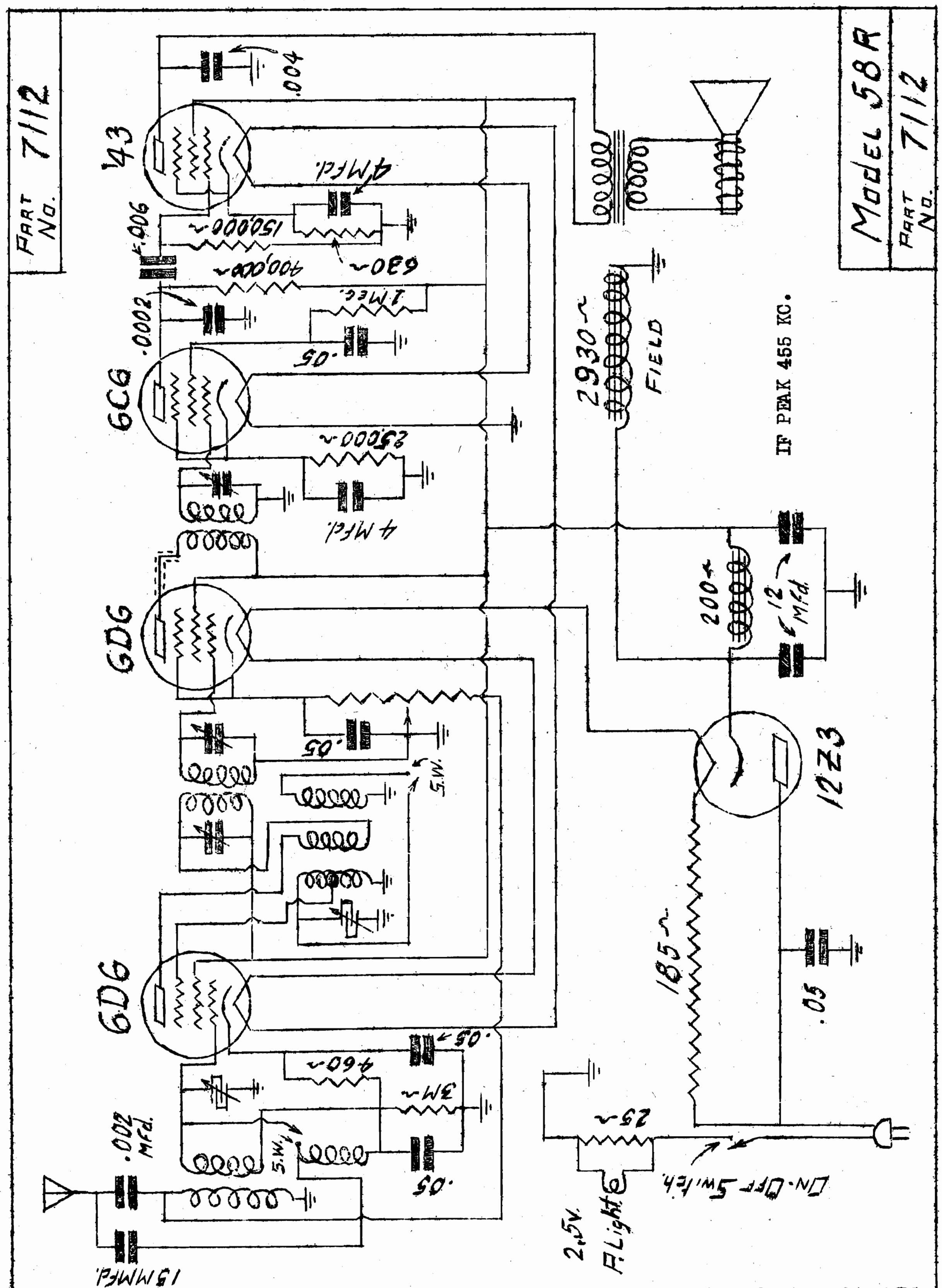
MODEL 55-X
Schematic

# DEWALD RADIO



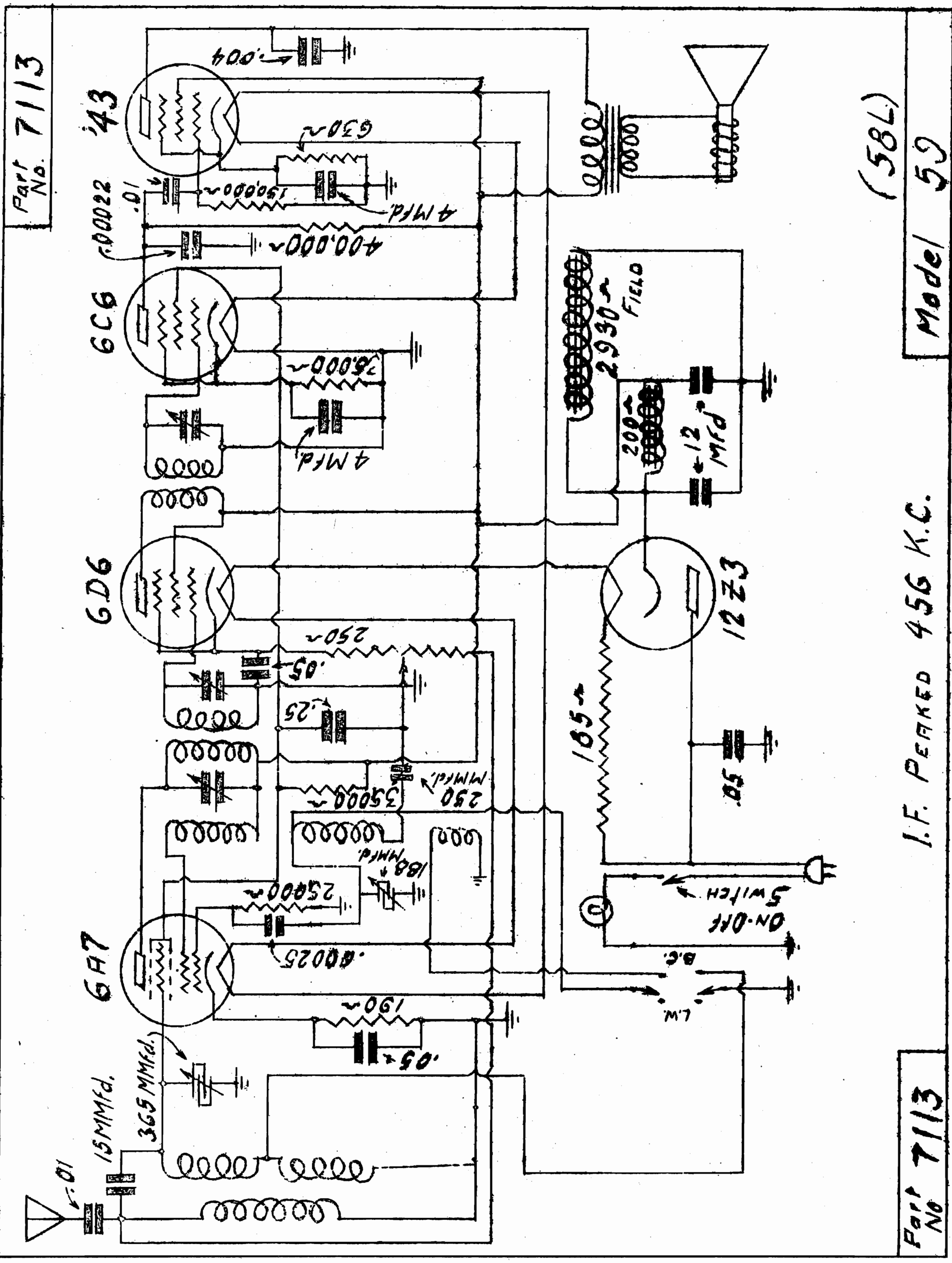
MODEL 58-R
Schematic

# DEWALD RADIO



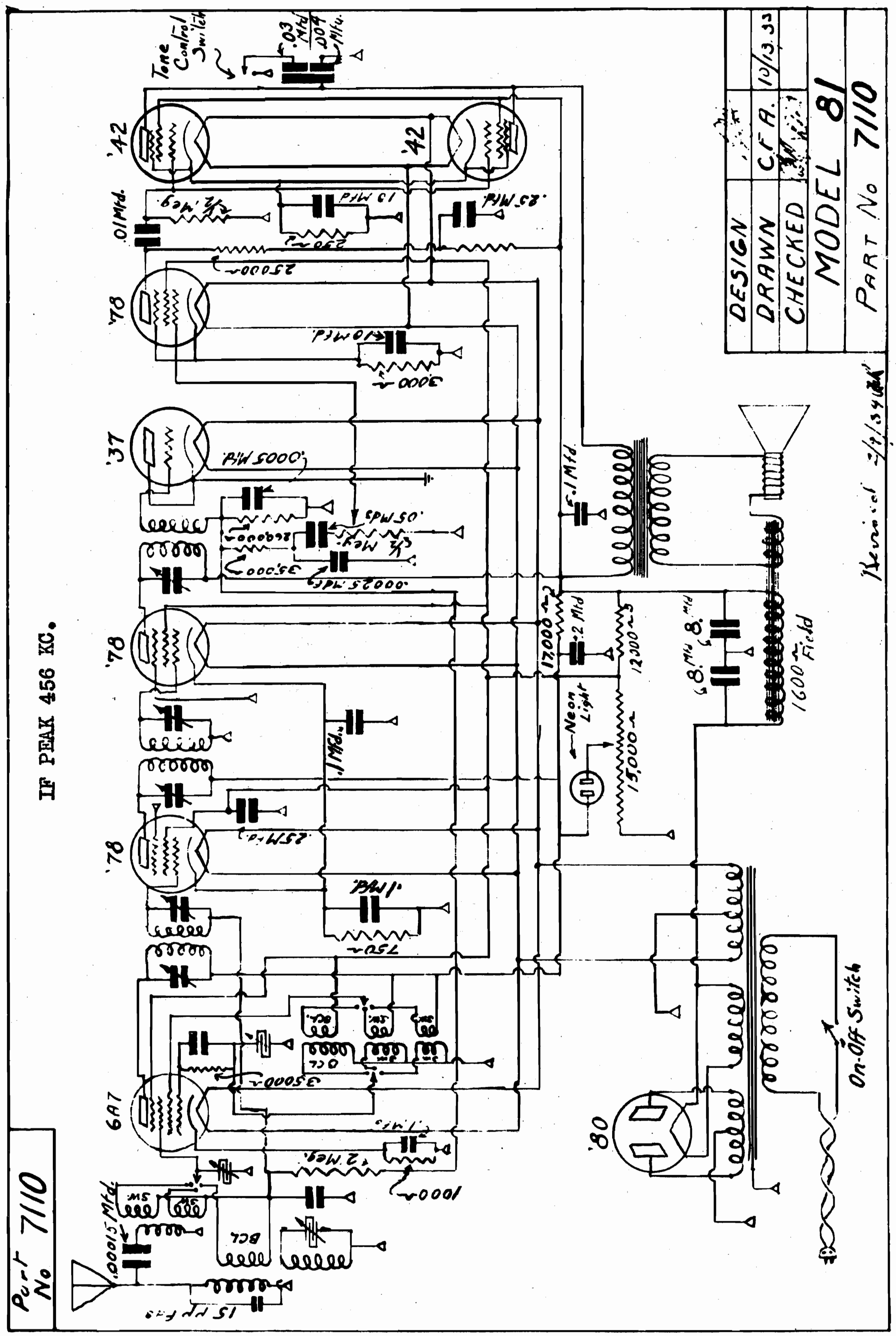
MODEL 58-L, 59
Schematic

## DEWALD RADIO



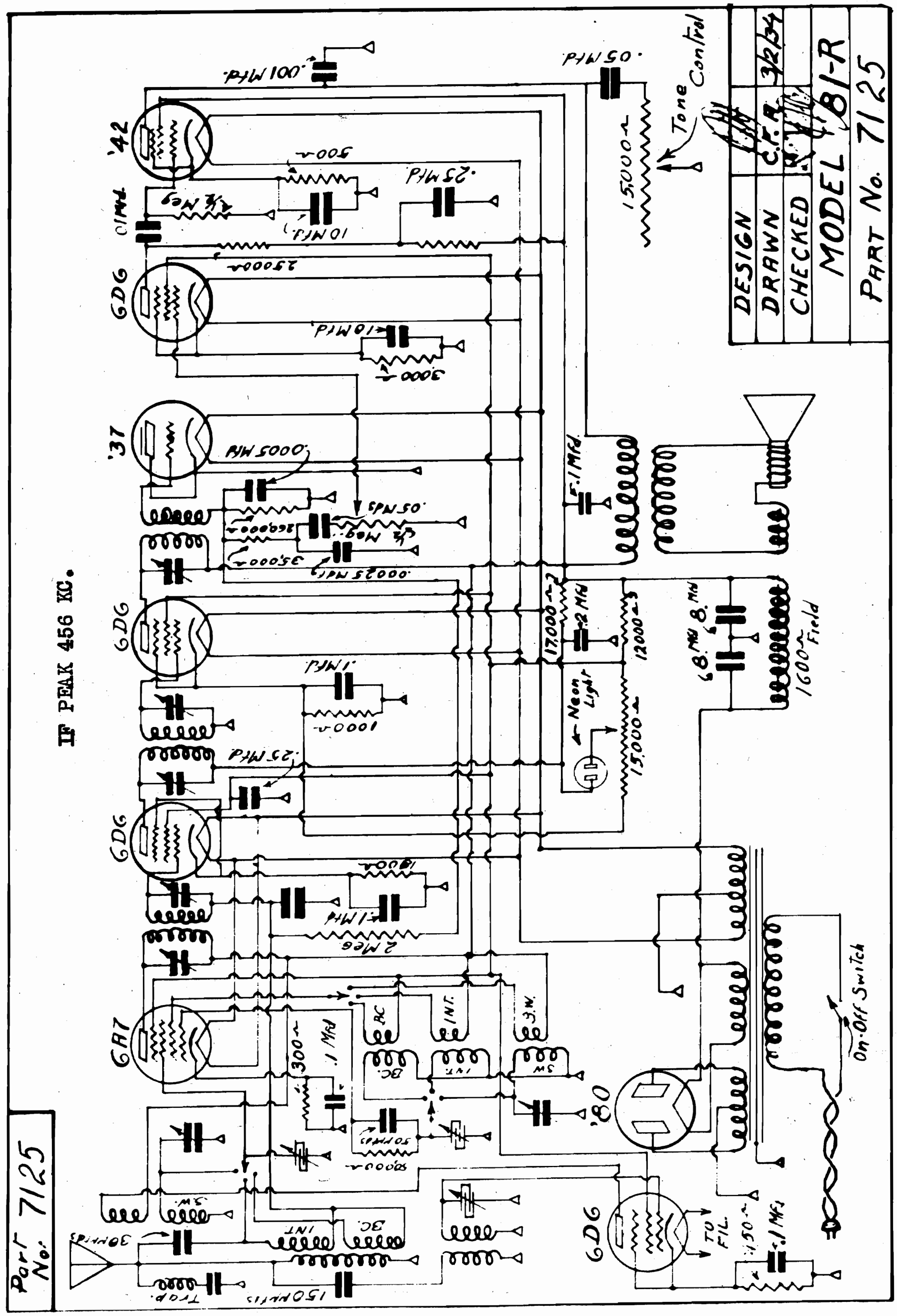
**MODEL 81**
**Schematic**

# DEWALD RADIO



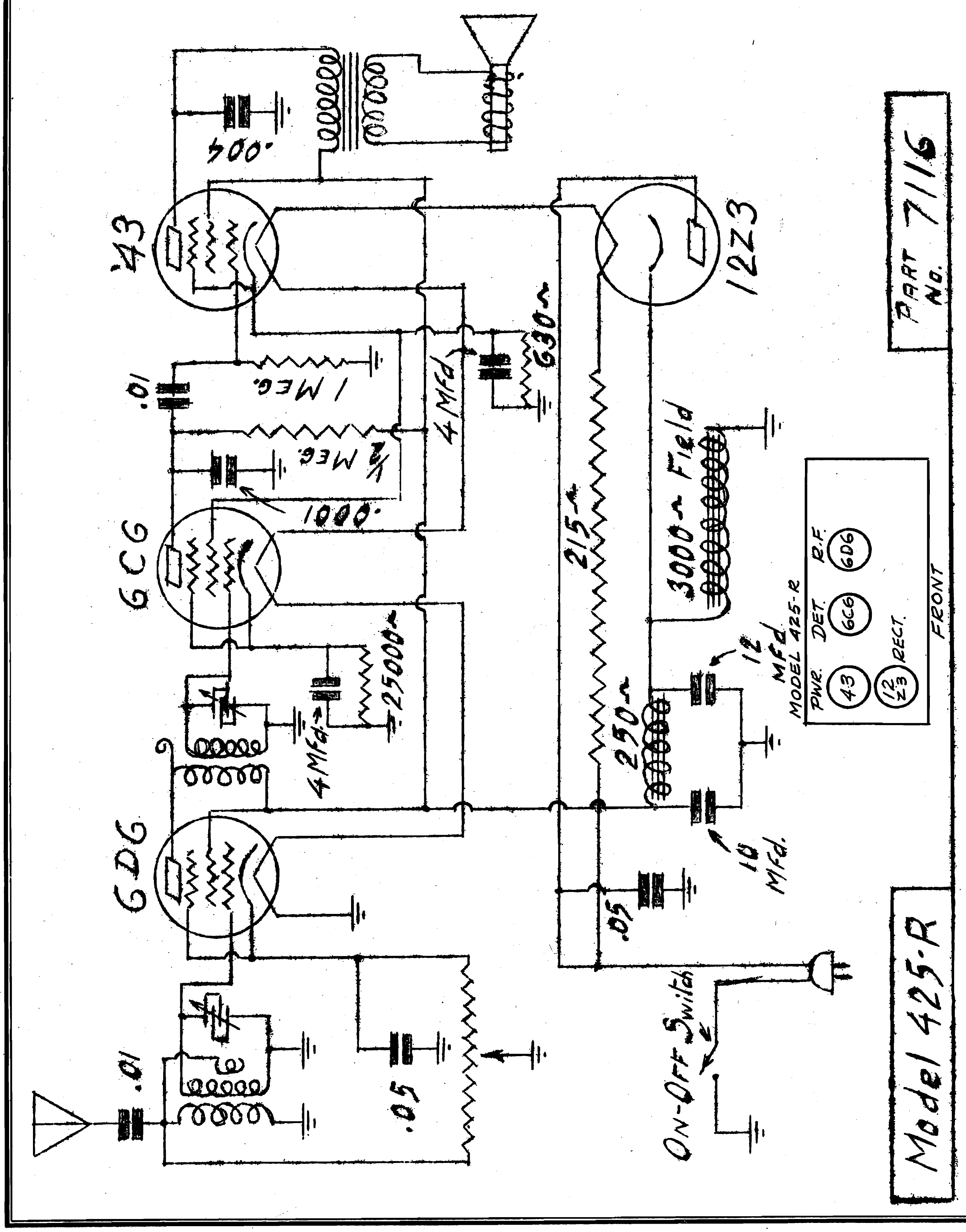
MODEL 81-R
Schematic

# DEWALD RADIO



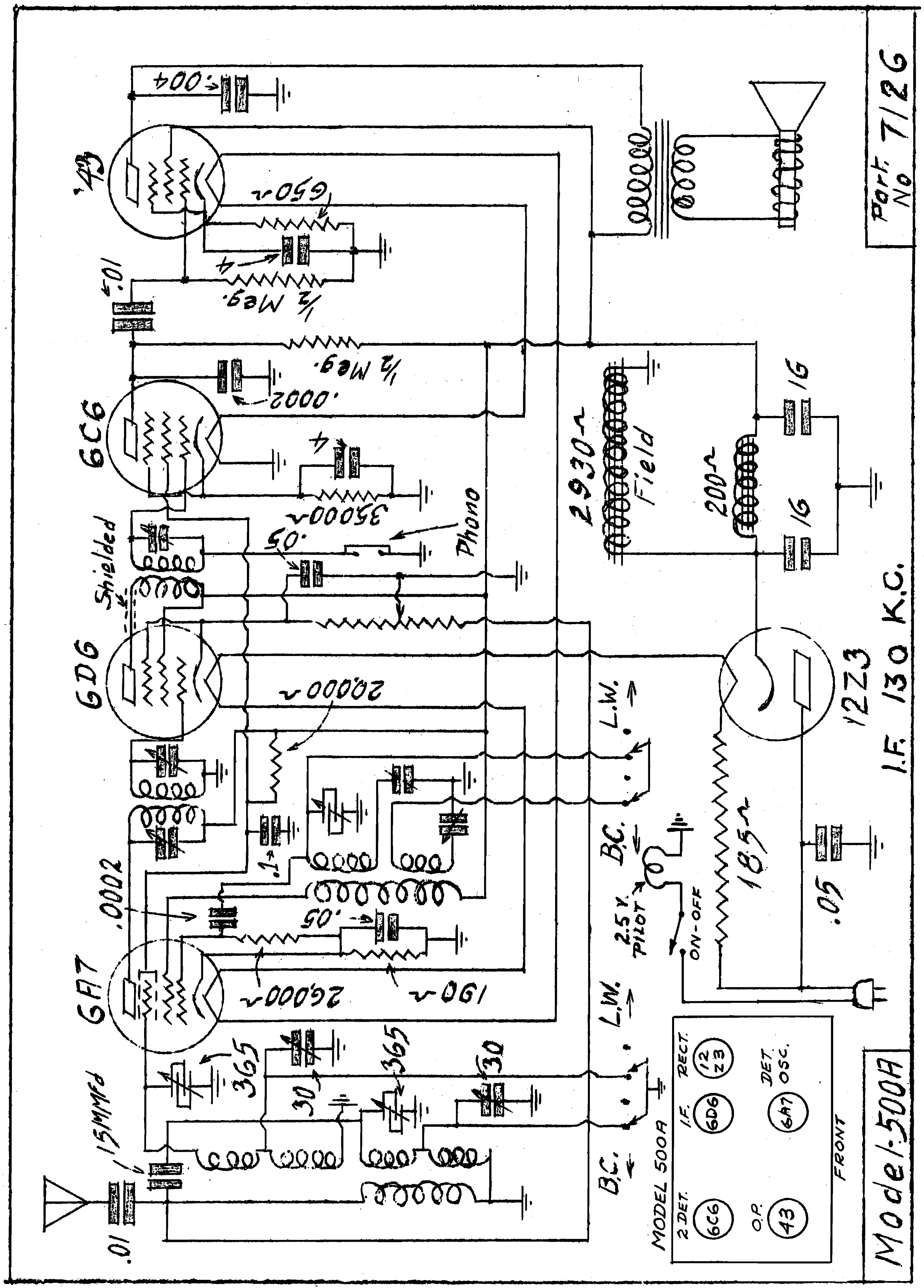
MODEL 425-R,440
Schematic,
Socket Layout

# DEWALD RADIO



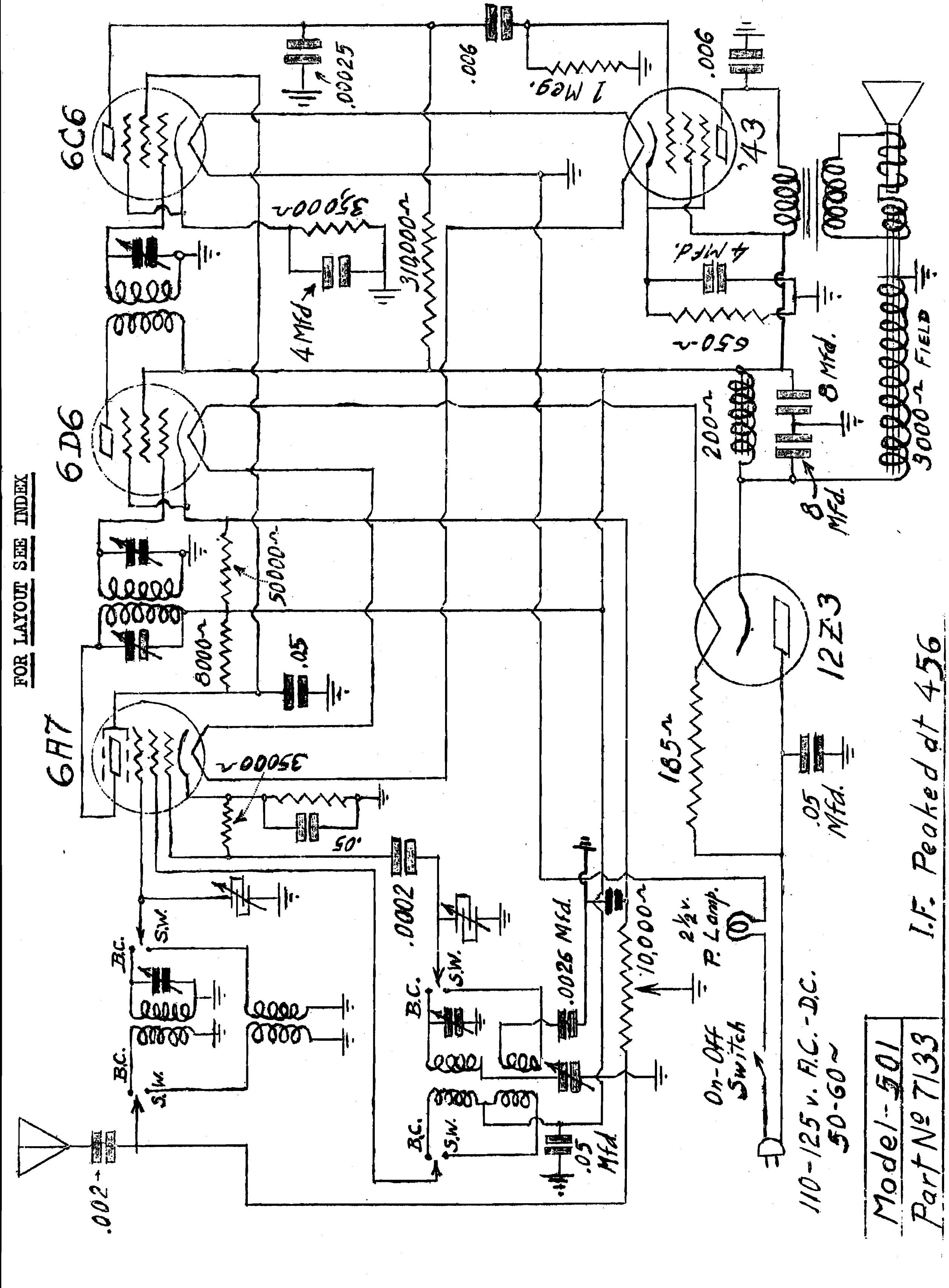
MODEL 500-A
Schematic
Socket Layout

## DEWALD RADIO



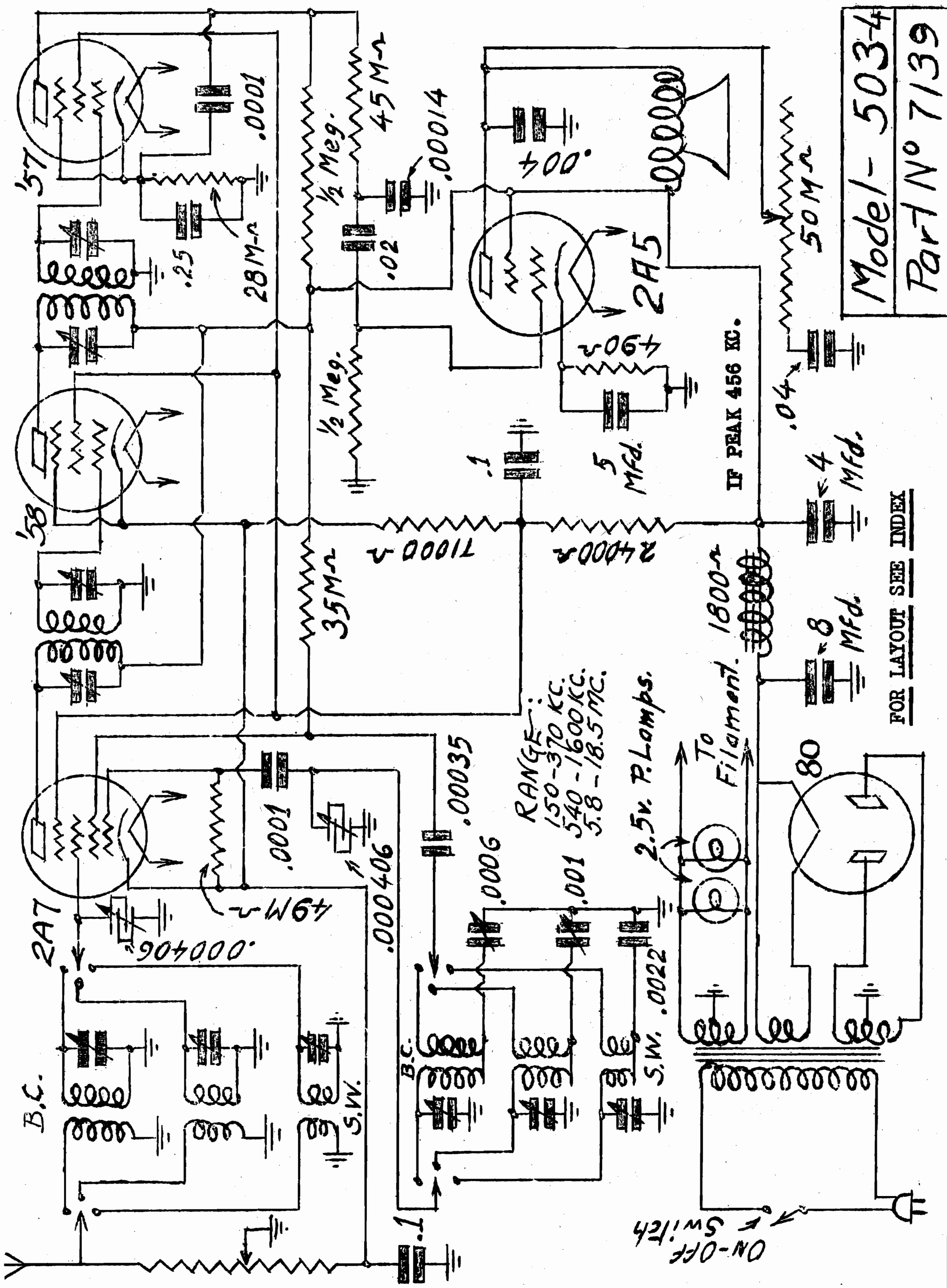
MODEL 501
Schematic

DEWALD RADIO



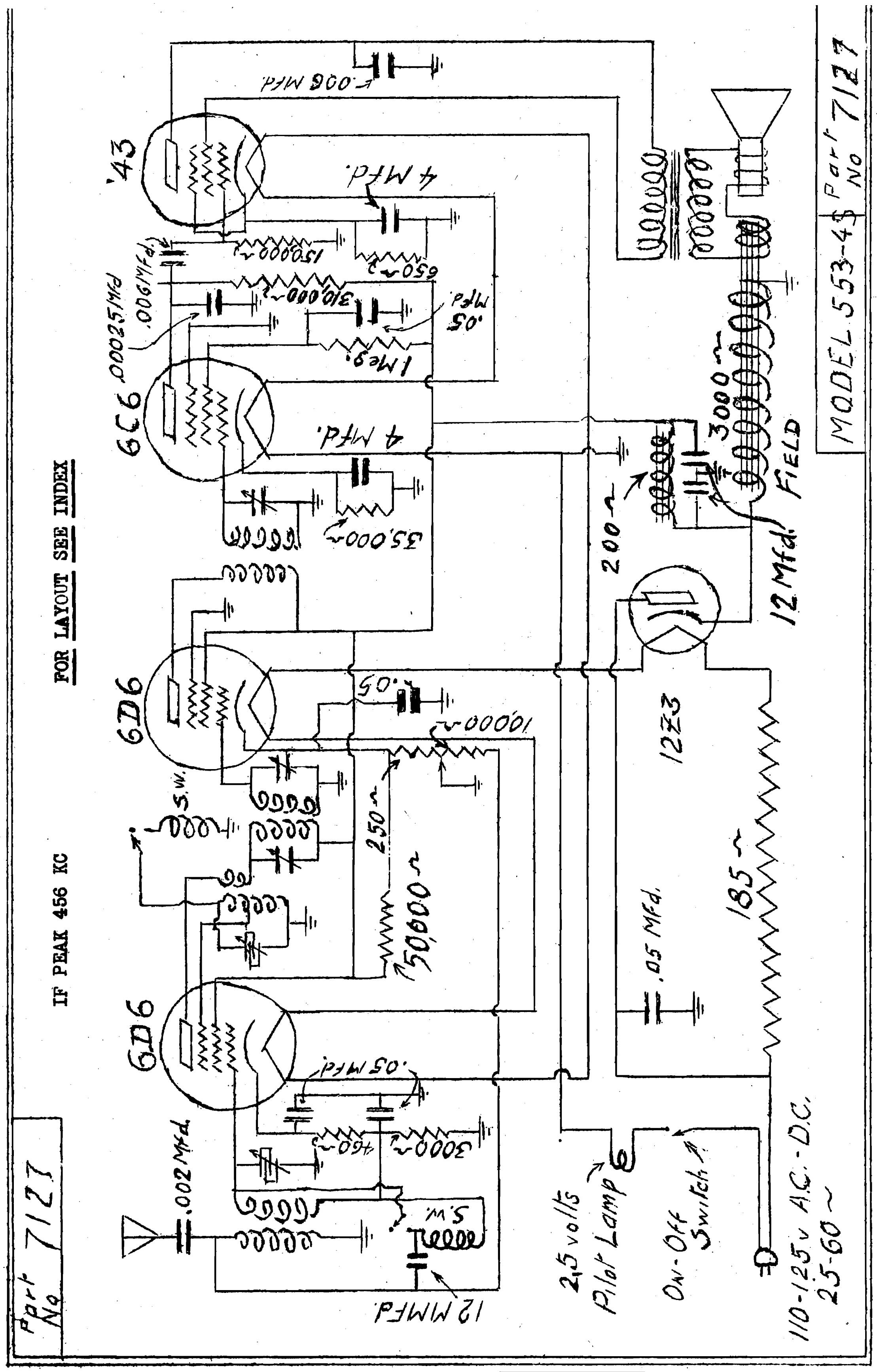
MODEL 503-4
Schematic

DEWALD RADIO



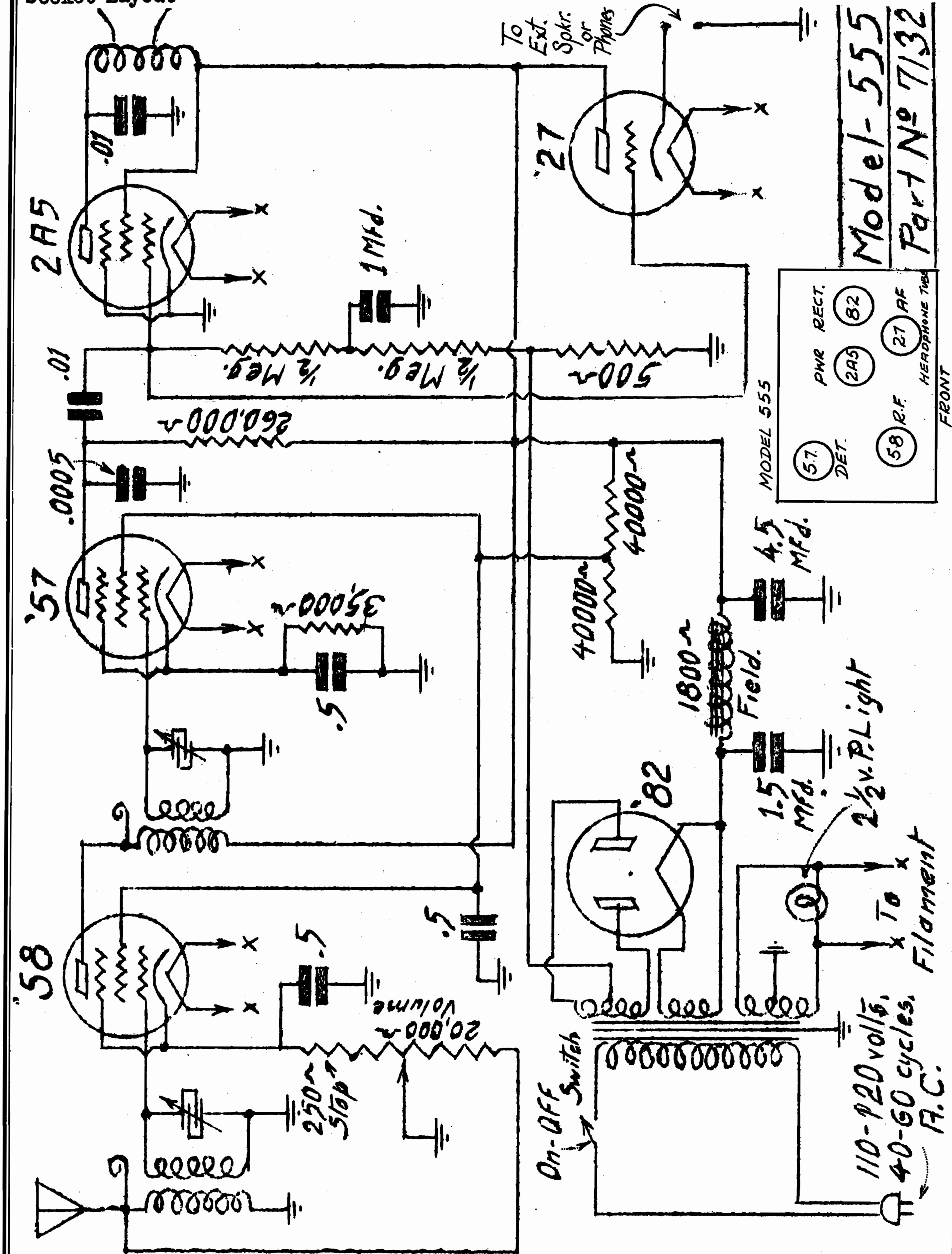
MODEL 553-4S
Schematic

# DEWALD RADIO



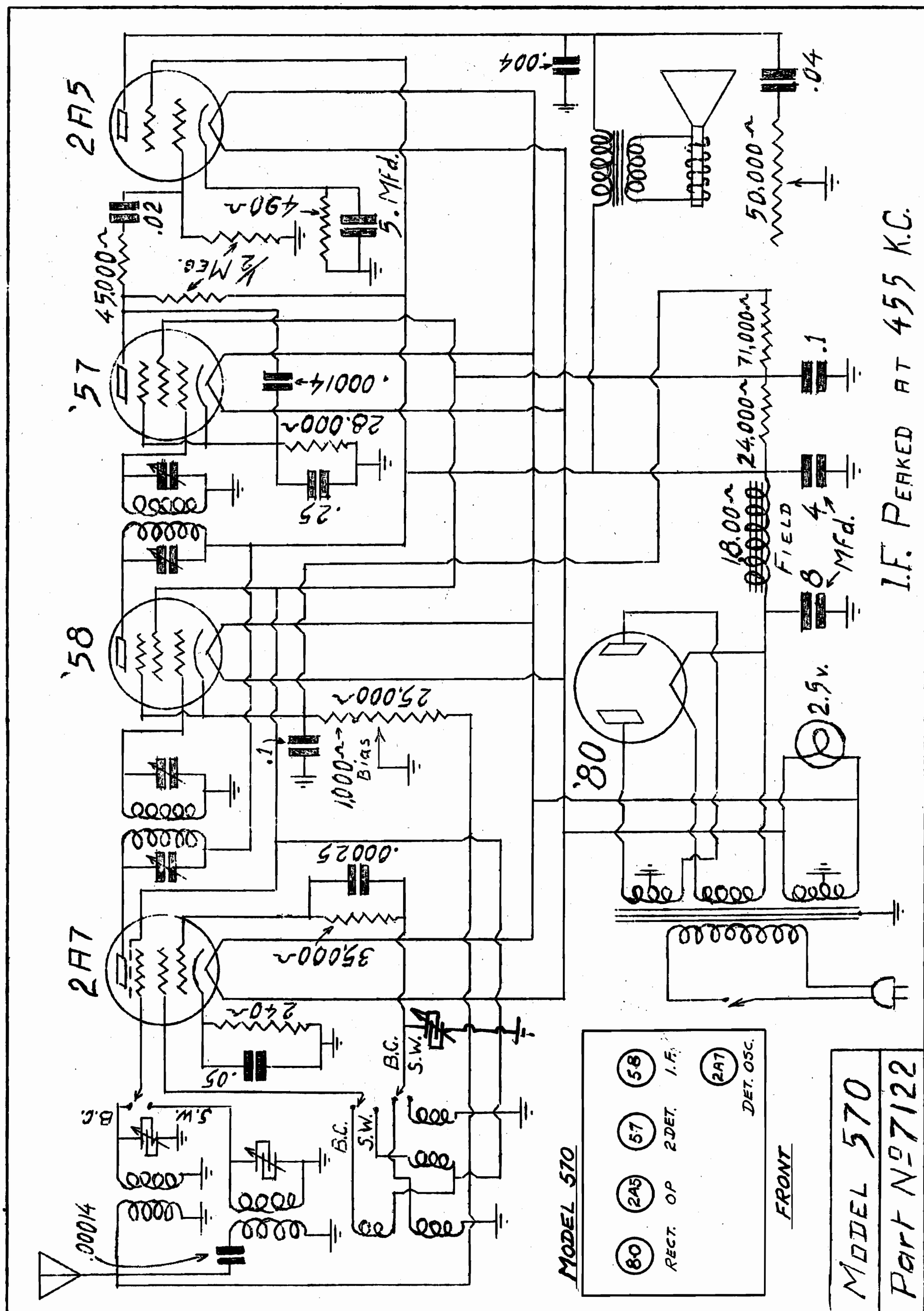
**MODEL 555**
**Schematic**
**Socket Layout**

## DEWALD RADIO



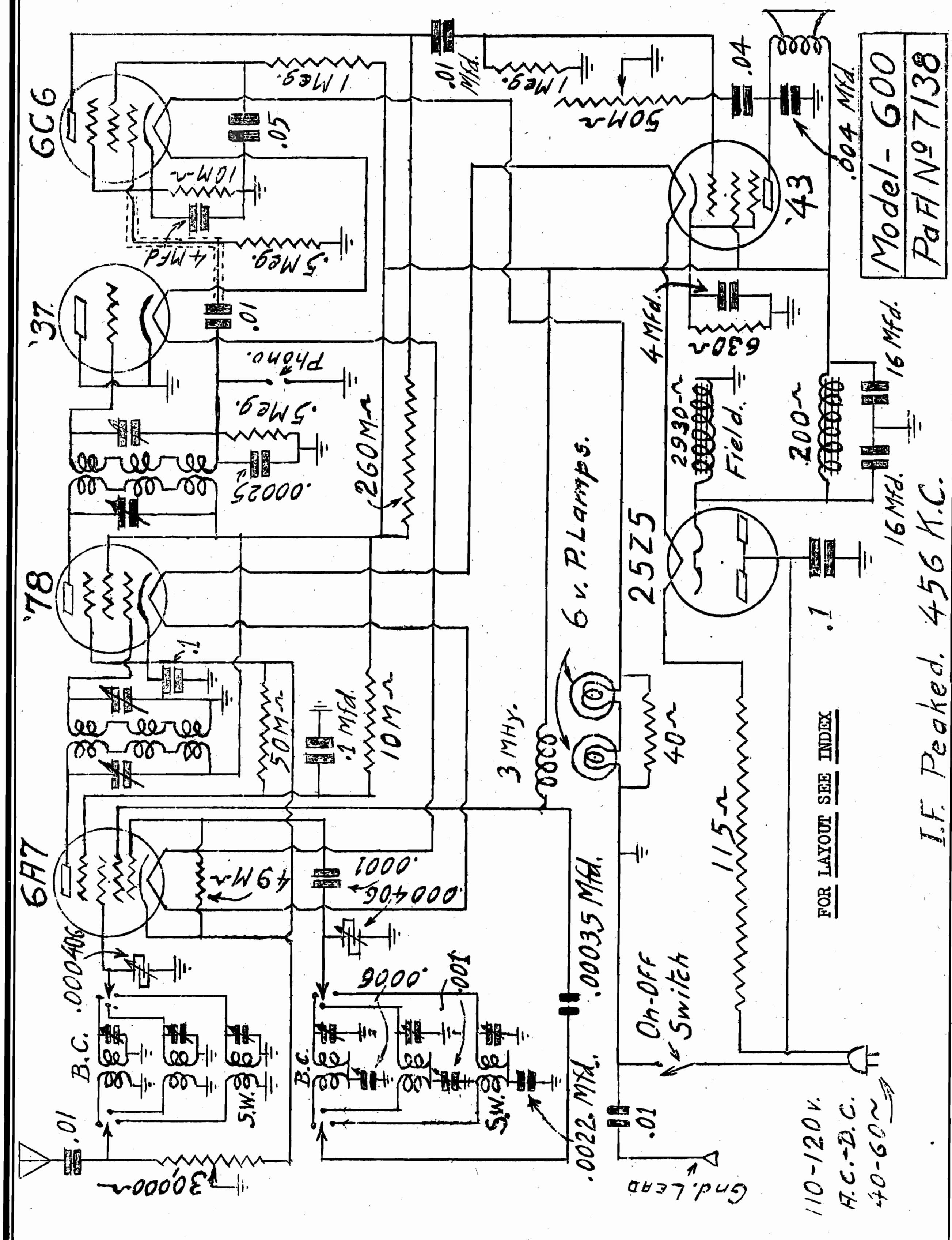
# DEWALD RADIO

MODEL 570
Schematic
Socket Layout



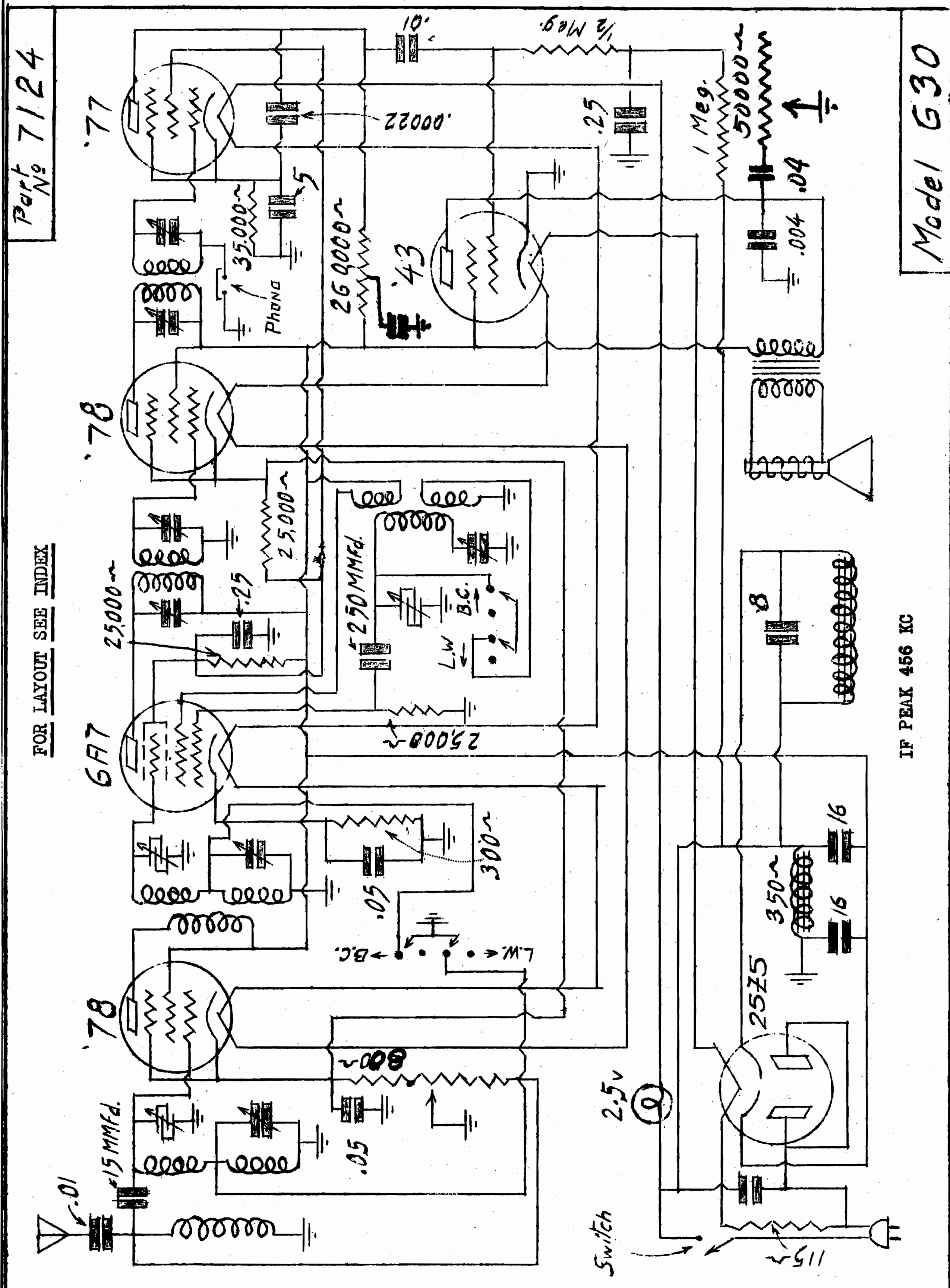
MODEL 600
Schematic

DEWALD RADIO



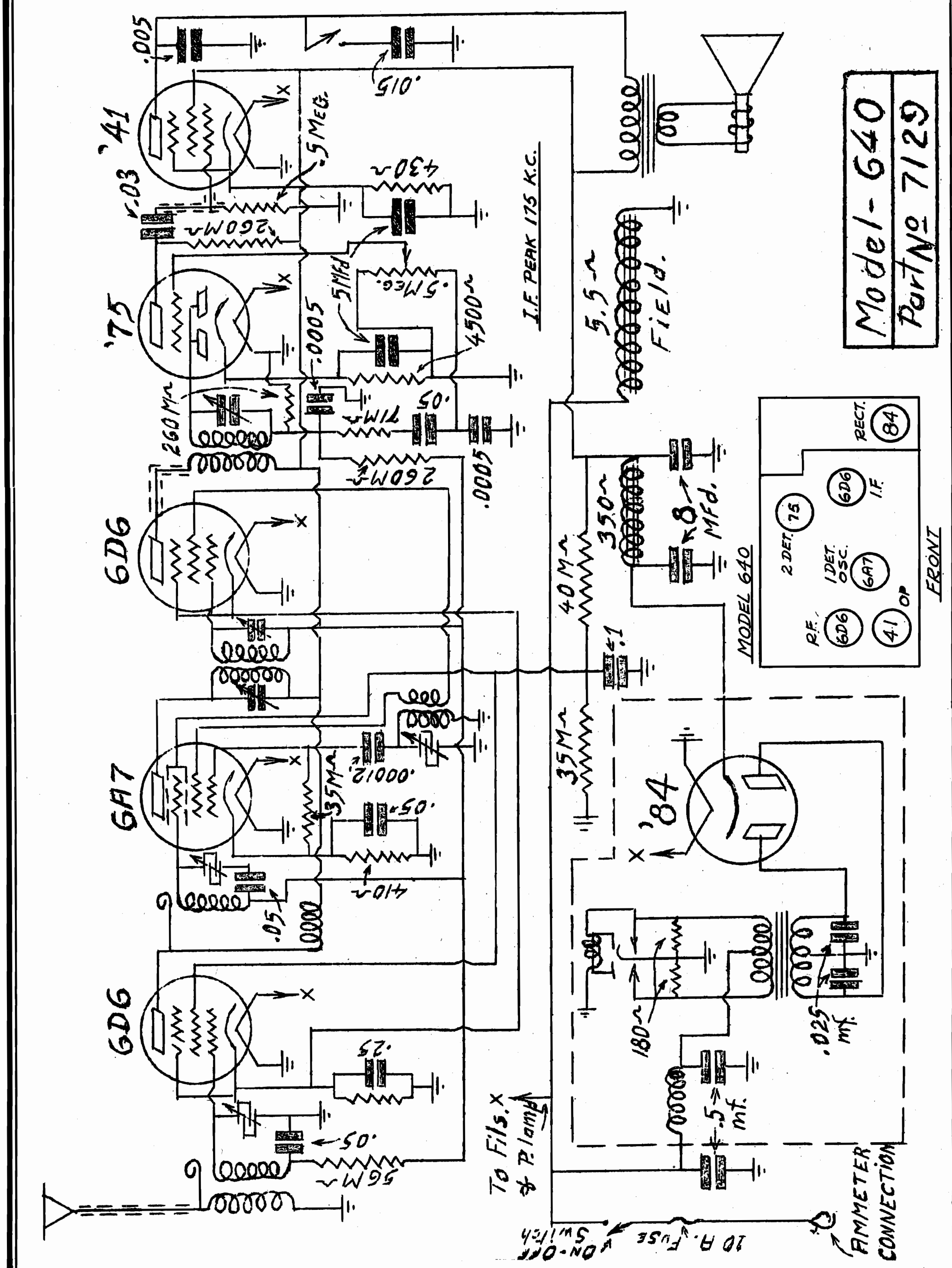
# DEWALD RADIO

MODEL 630
Schematic



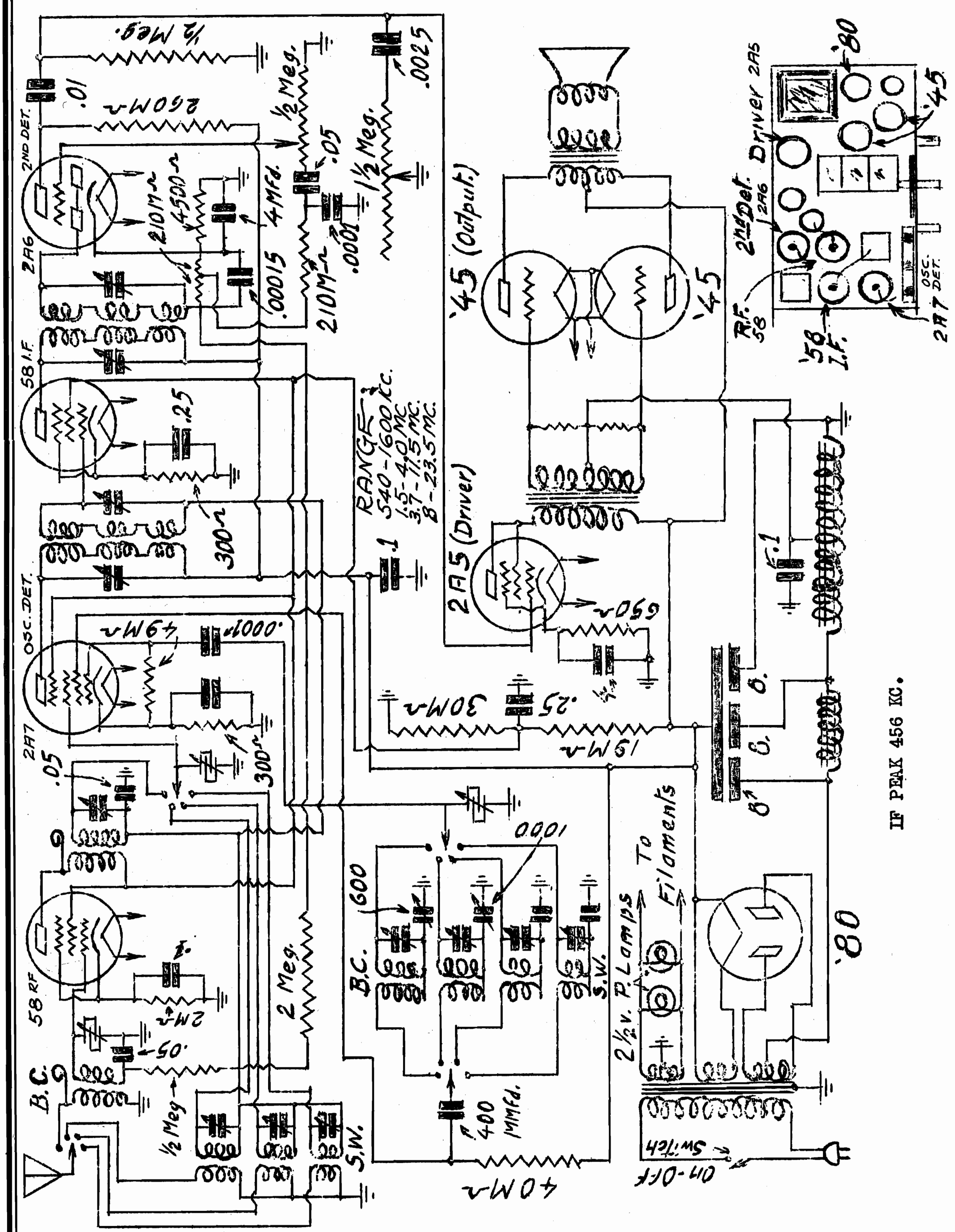
MODEL 640
Schematic
Socket Layout

# DEWALD RADIO



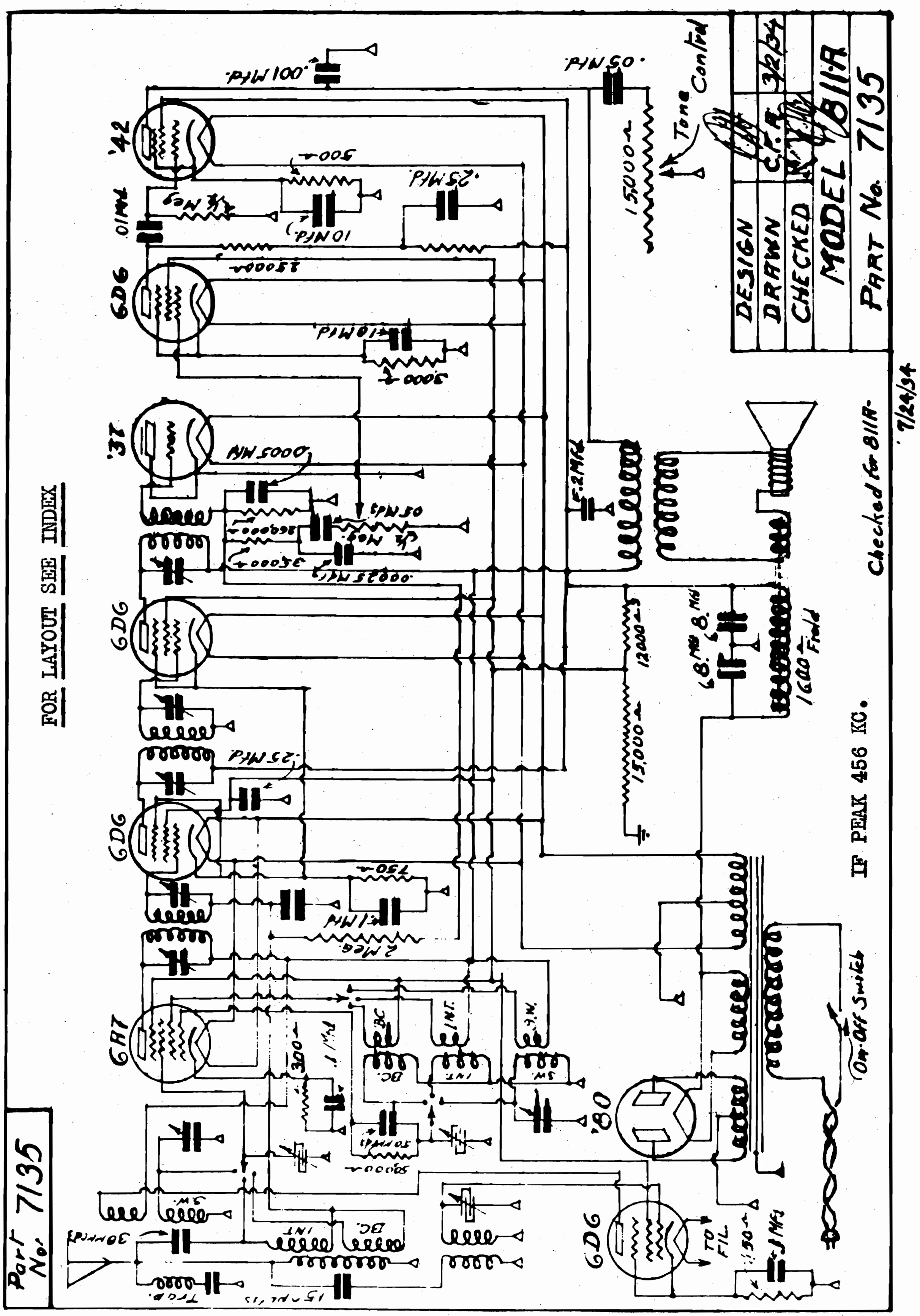
MODEL 802
Schematic

# DEWALD RADIO



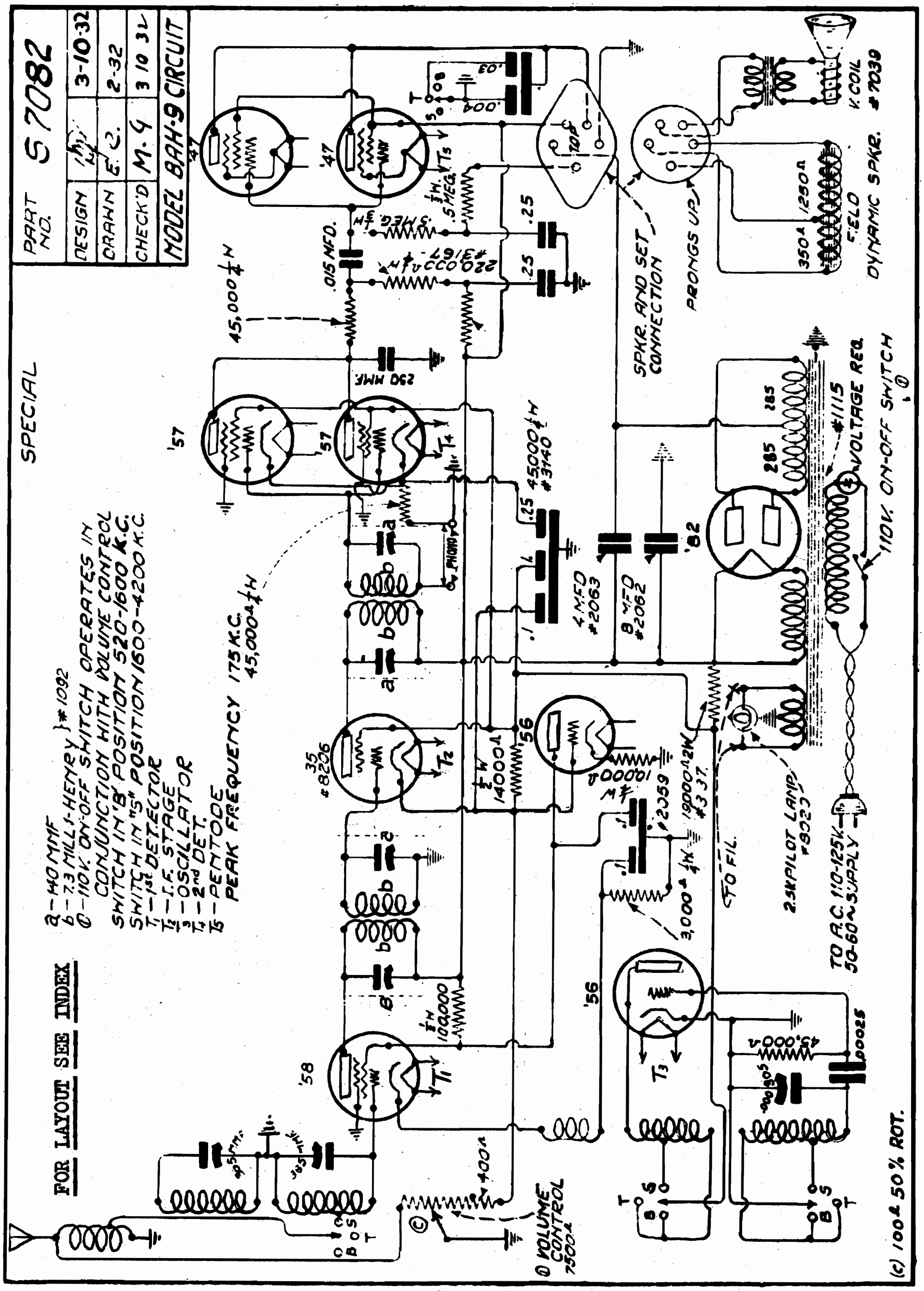
**MODEL 811-A**
**Schematic**

# DEWALD RADIO



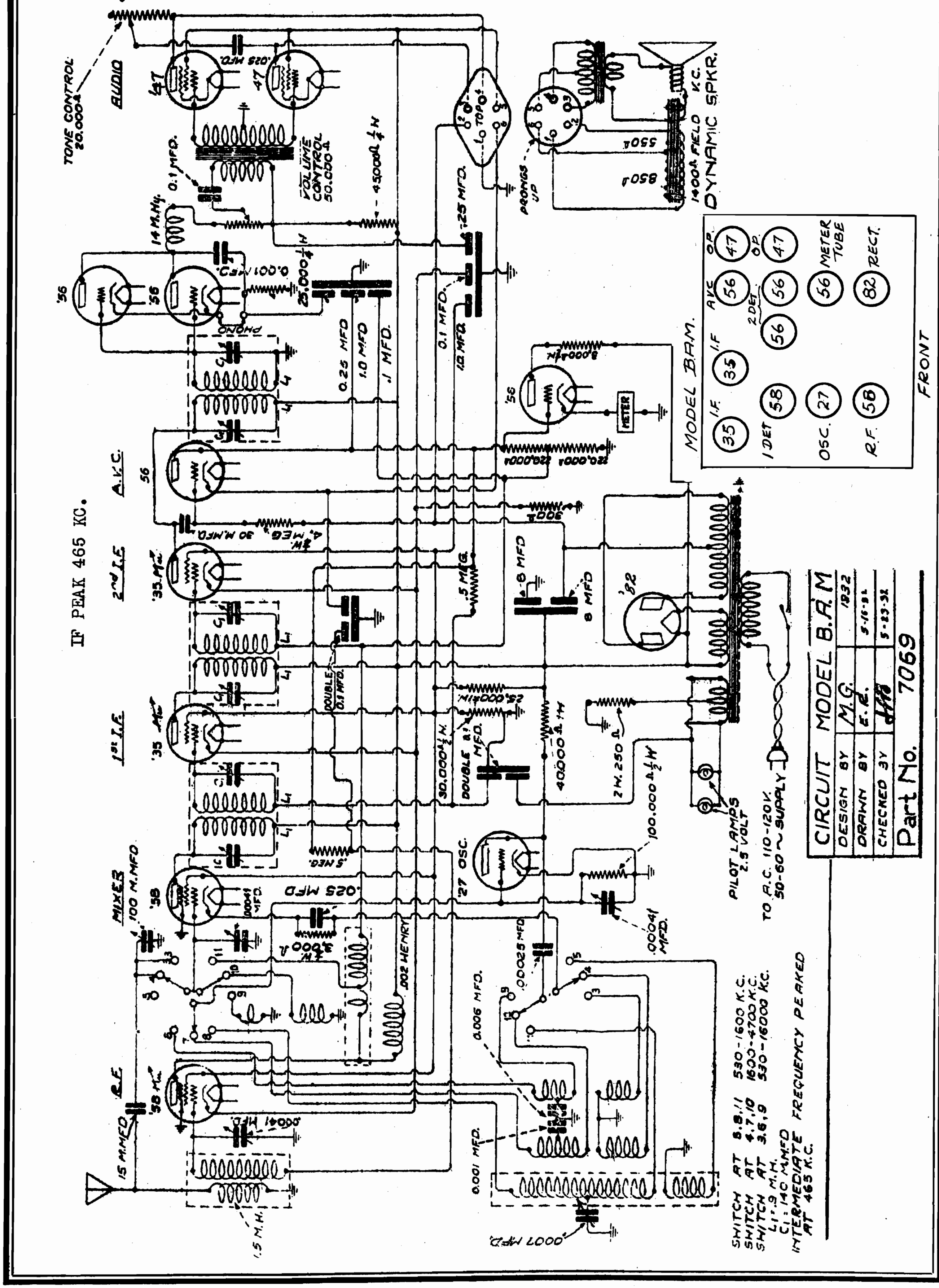
MODEL B-A-H-9
Schematic

DEWALD RADIO



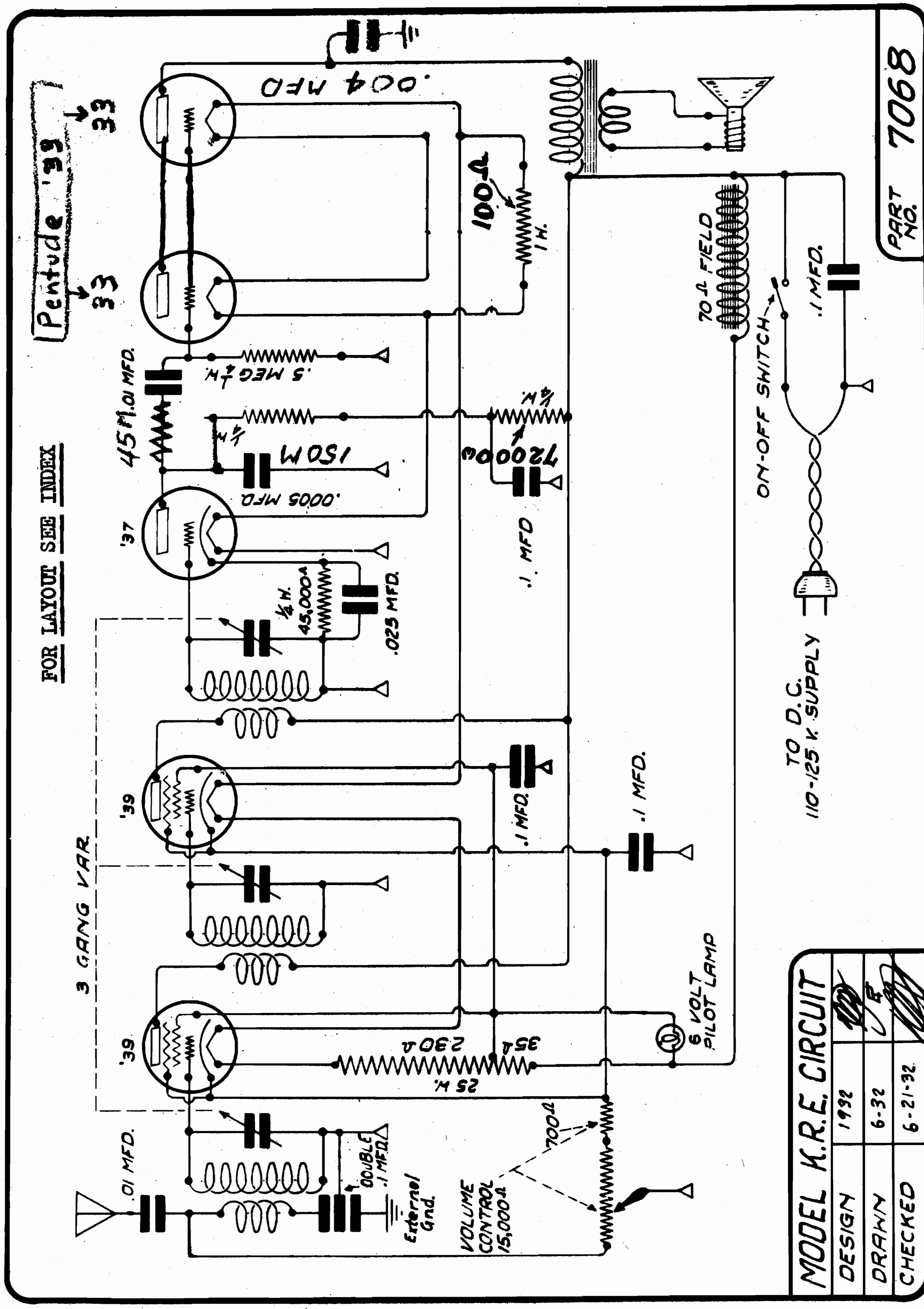
MODEL B-A-M
Schematic
Socket Layout

## DEWALD RADIO



**MODEL K-R-E**
**Schematic**

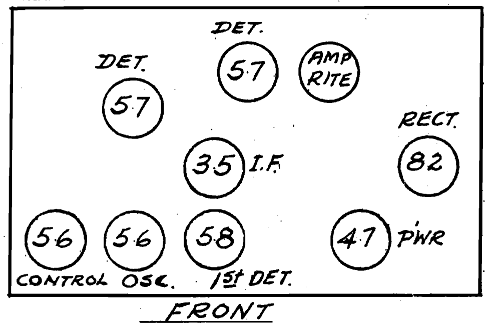
# DEWALD RADIO



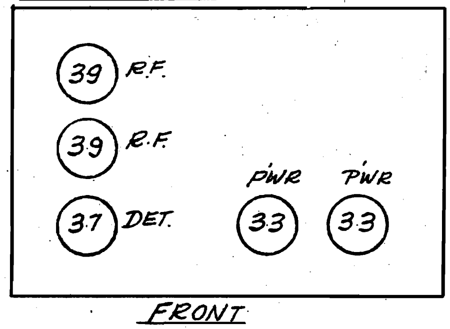
**MODEL BAH-9, KRE, 501
503-4, 553-4-S,
600-A, 601-A, 630,
811-A
Socket Layouts**

# DEWALD RADIO

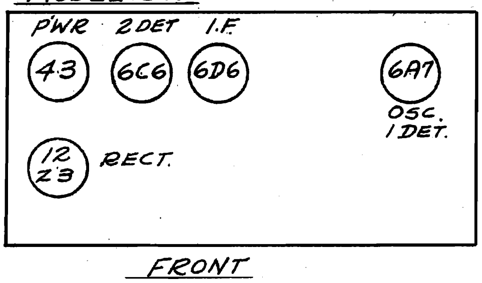
MODEL BAH-9



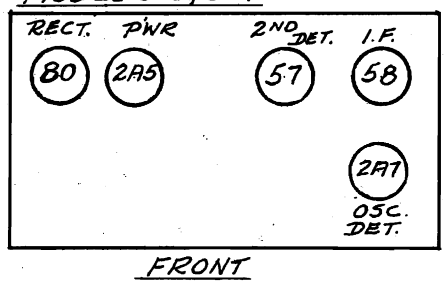

MODEL K.R.E.



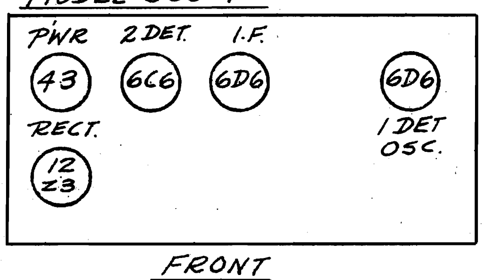

MODEL 501



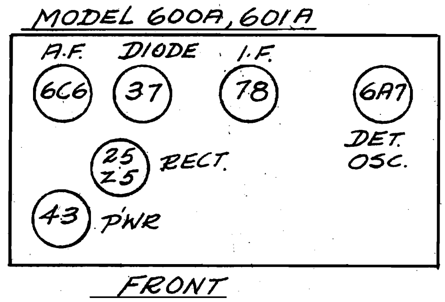

MODEL 503, 504



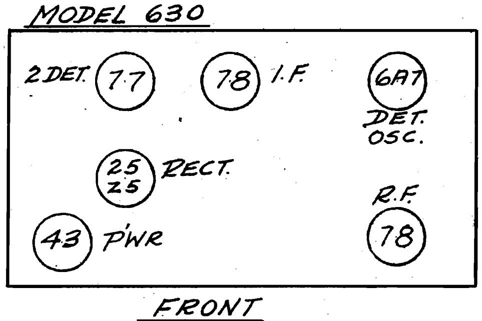

MODEL 553-4-S



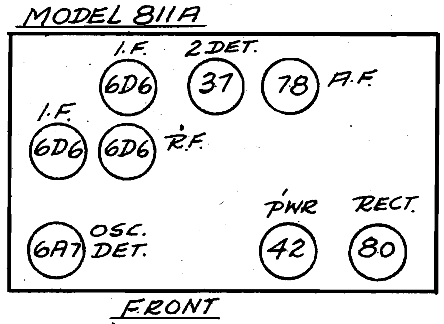

MODEL 600A, 601A




MODEL 630

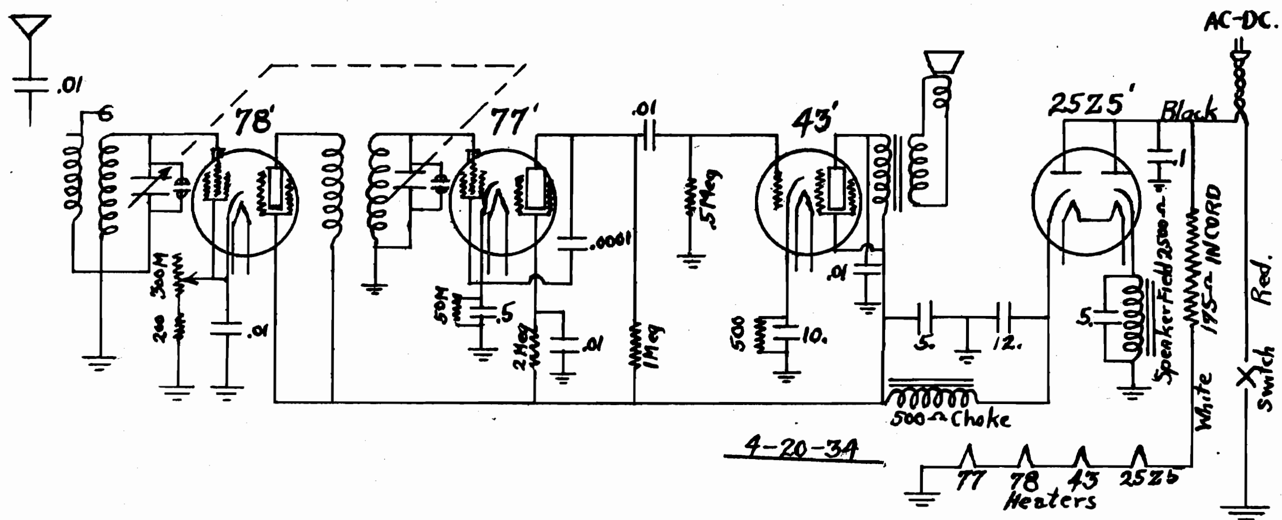



MODEL 811A



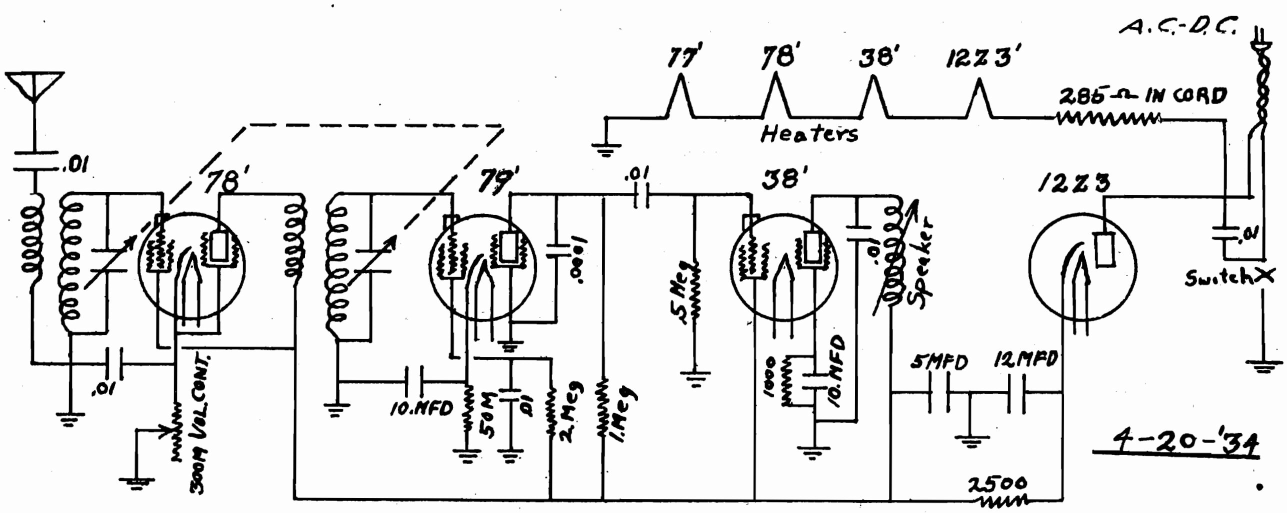
ECHOPHONE RADIO CORP.

MODEL 111
MODEL 128
Schematic, Data




Model 128

To balance set, first remove chassis from cabinet; second, tune condenser to about 1720 kc and align trimmer condenser on detector stage, then do same to antenna stage until loudest noise level is obtained.



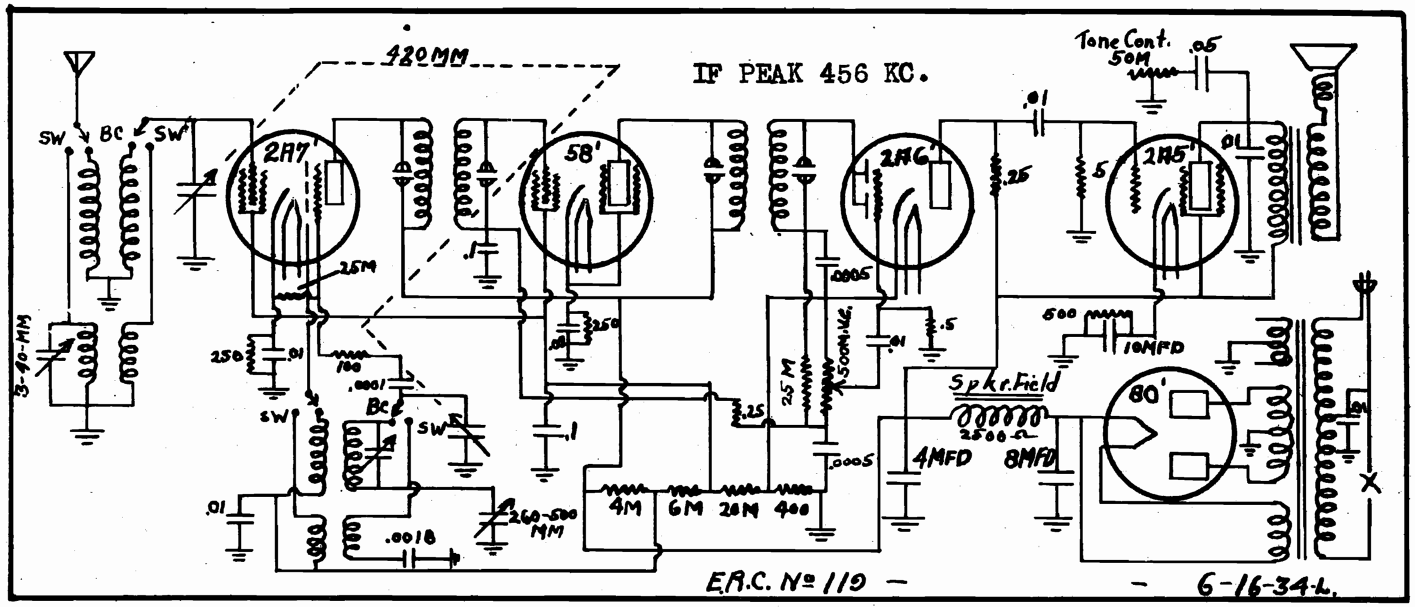

Model 111

This set is designed to oscillate across a major portion of the broadcast band. This regeneration is controllable by reducing the volume of the set. Oscillation in a set of this type increases the sensitivity from ten to twenty times.

MODEL 119
Schematic, Parts List
Alignment

## ECHOPHONE RADIO CORP.

405 Escutcheon Plate
406 Silvertone Pyralin Plate
407 Dual 3-40 mmf trimmer cond.
408 260-500 Padder condenser
409 Candohm
410 Knob #XK 3444
451 Variable condenser
455 Power Transformer




This set is designed to operate on 105 to 120 volts AC - 60 cycles only. Also furnished for 25 cycles. Covers the regular broadcast band from 1720-540 KC and 15-55 meters.

The circuit is a superheterodyne, using 1-2A7 1st detector and oscillator, 1 -58 IF, 1-2A6 second detector, first audio and a.v.c., 1- 2A5 power output and 1-80 rectifier.

To align receiver, proceed as follows:

1-Peak the two IF transformers, applying a 456 note at the 2A7 control grid.

2-Turn variable condenser all the way open, peaking the oscillator stage of variable condenser, applying a 1712 KC signal into the antenna, then peak the RF stage.

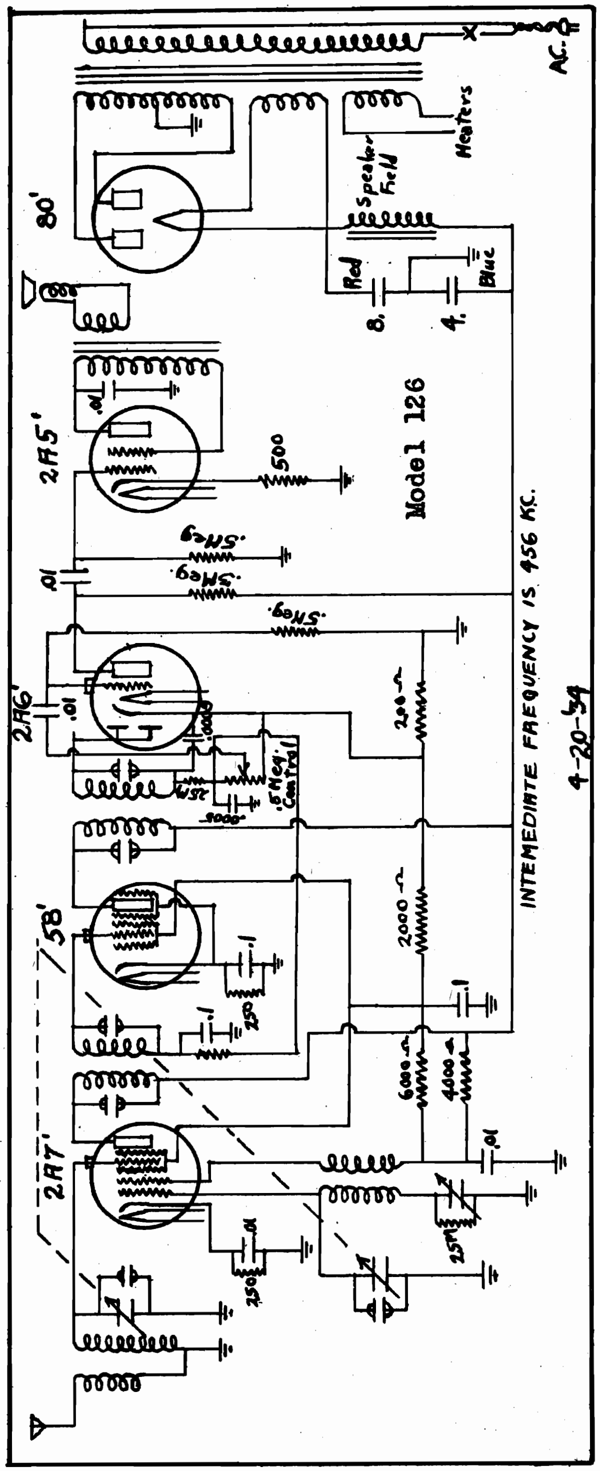
3-Tune gang condenser to approximately 600 KC and adjust low frequency padder to maximum noise level.

4-Tune to some weak signal at 1400 KC and readjust RF section of variable condenser.

| No. | |
|---|---|
| 156 | 8&4 mfd Electrolytic cond. |
| 158 | Power cord and plug |
| 256 | Volume control 1/switch |
| 306 | Tone control w/switch |
| 307 | 10 mfd 25 volt electrolytic |
| 310 | .0018 mica condenser |
| 401 | Dynamic speaker |
| 402 | Set of coils complete |
| 402a | BC Antenna coil |
| 402b | SW " " |
| 402c | BC & SW Oscillator coil |
| 402d | Series wnd. I.F. Unit- top or bottom grid |
| 403 | Short wave switch |
| 404 | Tuning unit with dial |

MODEL 124
Schematic, Alignment
MODEL 126
Schematic, Alignment

# ECHOPHONE RADIO MFG. CO.



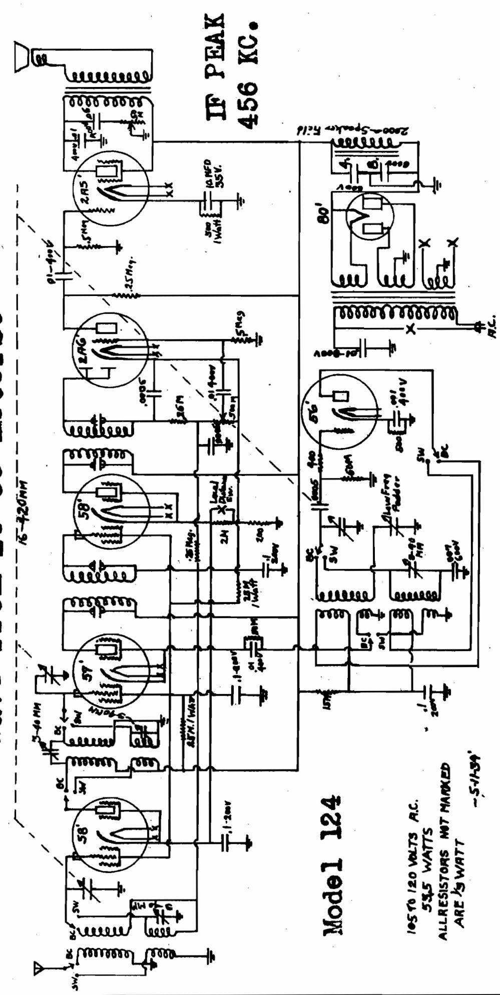

Model 124

This set is designed to operate on 105-120 volts, A.C. The regular band covers from 1712 KC-550 KC and short wave from 15-55 meters.

Model 124

To align set on broadcast, remove 56 oscillator tube, trim Intermediate Frequency Transformers at 456 KC from an oscillator, feeding same into 57, first detector grid. Secondly, open gang condenser wide open and adjust trimmer condensers on top to maximum noise level, then adjust low frequency padder at approximately 600 KC; after doing this go back and recheck at 1700 KC.

To adjust short wave, turn switch left to 31 meters and tune gang condenser to 31 meters on dial and trim small padders underneath to maximum noise level or some station, checking oscillator coil padder with gang condenser tuned at different points.



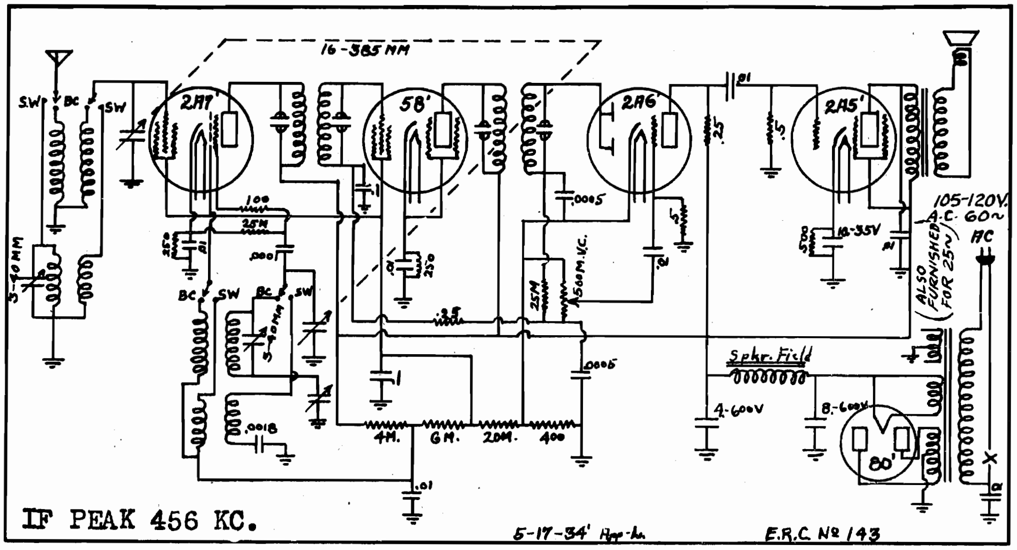

Model 124

Model 126

To balance set, first align the IF transformers at 456 kc with gang condenser closed, next turn condenser all way open and align at 1720 kc, then adjust padder condenser at 600 kc, then go back and check at 1720 kc.

MODEL 143
Schematic, Alignment
Parts List

## ECHOPHONE RADIO MFG. CO.




This set covers from 1720 KC to 540 KC regular broadcast including 1712 KC police and 15 - 55 meters short wave which covers major foreign stations.

The circuit uses 1-2A7 1st detector and oscillator; 1-58 IF; 1-2A6 second detector and first audio; 1-2A5 power output and 1-80 rectifier.

To align receiver proceed as follows:

1. Peak the two IF transformers, applying a 456 note at the 2A7 grid.
2. Turn variable condenser wide open, peaking oscillator stage at 1712 KC- then peak RF and antenna stage.
3. Adjust low frequency with gang tuned to 600 KC, to maximum peak.
4. Go back and check trimmers on gang condenser at 1400 KC.

If radio stops playing turn off immediately - check tubes. For-

Hum -check for
- Open resistor
- Bad Filter condenser
- Open by pass condenser
- Defective tube or tubes.

Poor tone- check for
- Bad resistor
- Voice coil in speaker rubbing
- Defective by pass condenser
- Defective filter condenser

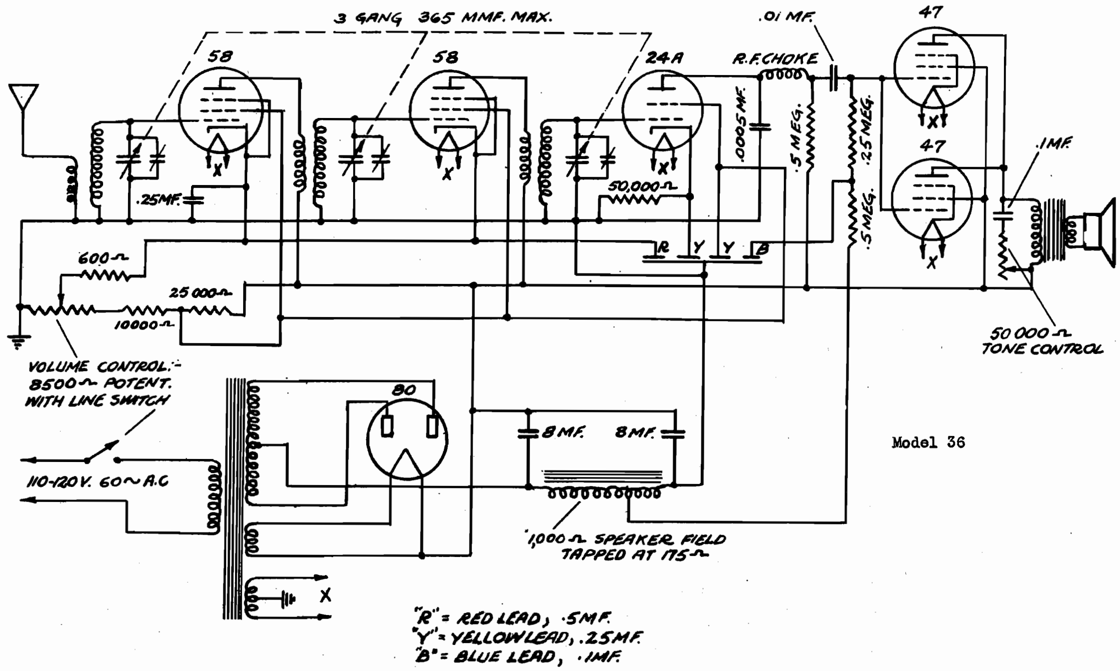
### PARTS LIST

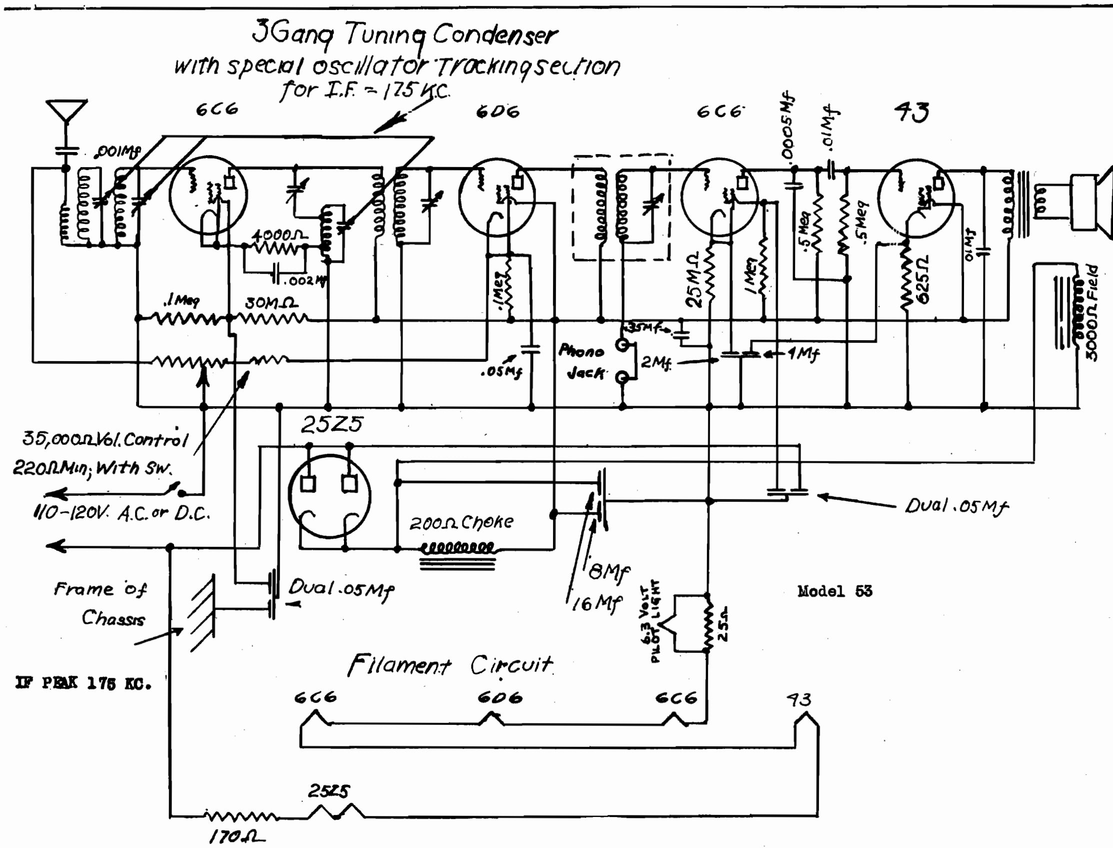
| No. | |
|---|---|
| 450 | Dynamic Speaker |
| 451 | Variable condenser |
| 452 | Volume control w/switch |
| 453 | Short wave switch |
| 454 | Airplane Dial complete |
| 455 | Power Transformer |
| 456 | Set of coils-complete |
| 456a | RFE Antenna coil-S.W. |
| 456b | RFE Oscillator " |
| 456c | RF Antenna BC |
| 457D | 456 KC IF units |
| 156 | 8&4 mfd condenser |
| 307 | 10 mfd 25v electrolytic |
| 308 | Terminal strip - 5 lug |
| 310 | .0018 Mica condenser |
| 309 | .01 mfd 800v cond. in can |
| 108 | Padder condenser 7 plate |
| 158 | Power cord & plug |
| | Any tube socket (state no.of prongs) |
| | Any resistor (state ohms & watts) |
| | Any by pass-not listed above (state capacity) |

Weak - check for
- Set out of balance
- Defective coils
- Bad resistor
- Bad condenser

# EDISON-BELL CO., INC.

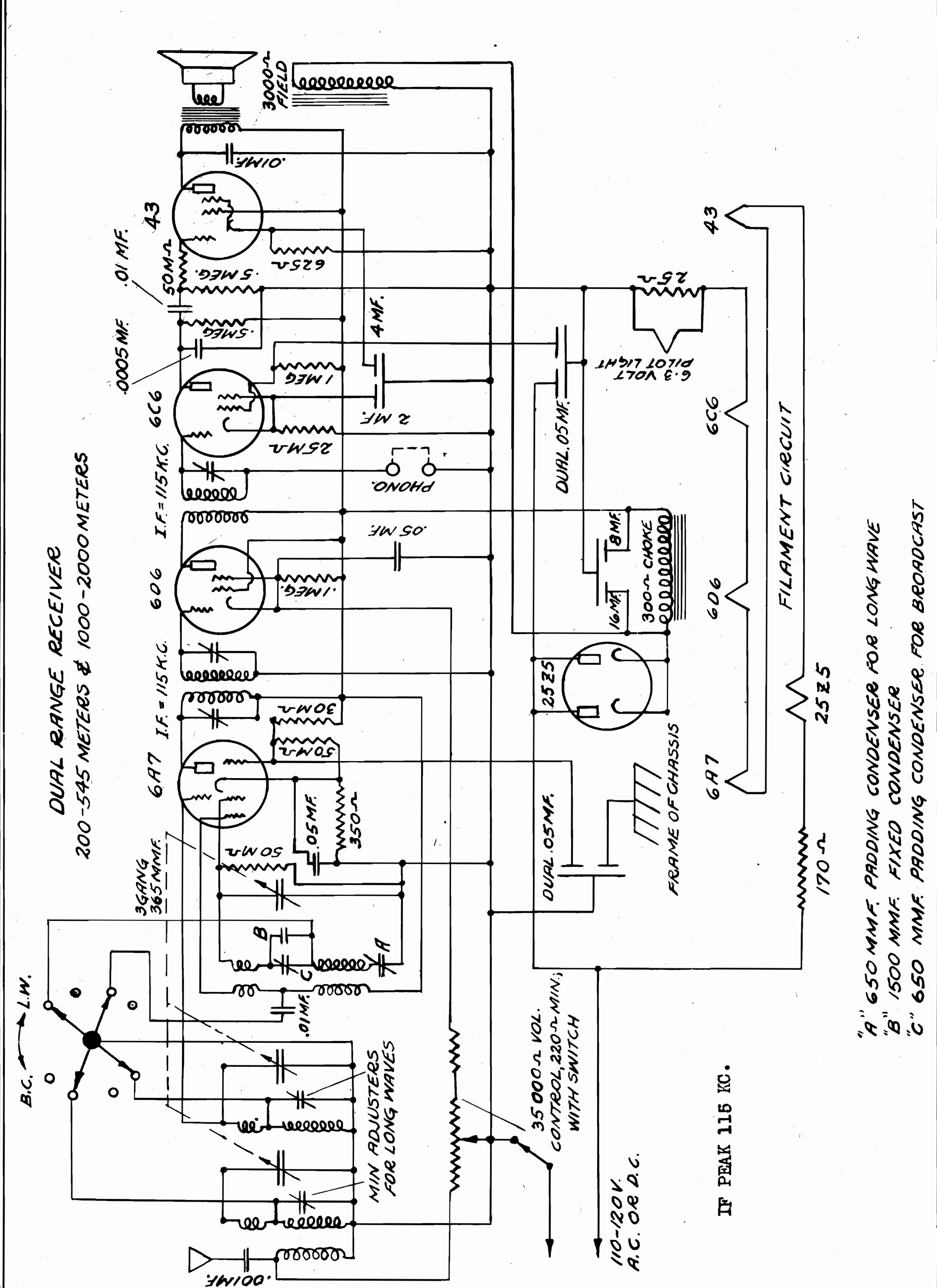
**MODEL 36**
**MODEL 53**
**Schematics**



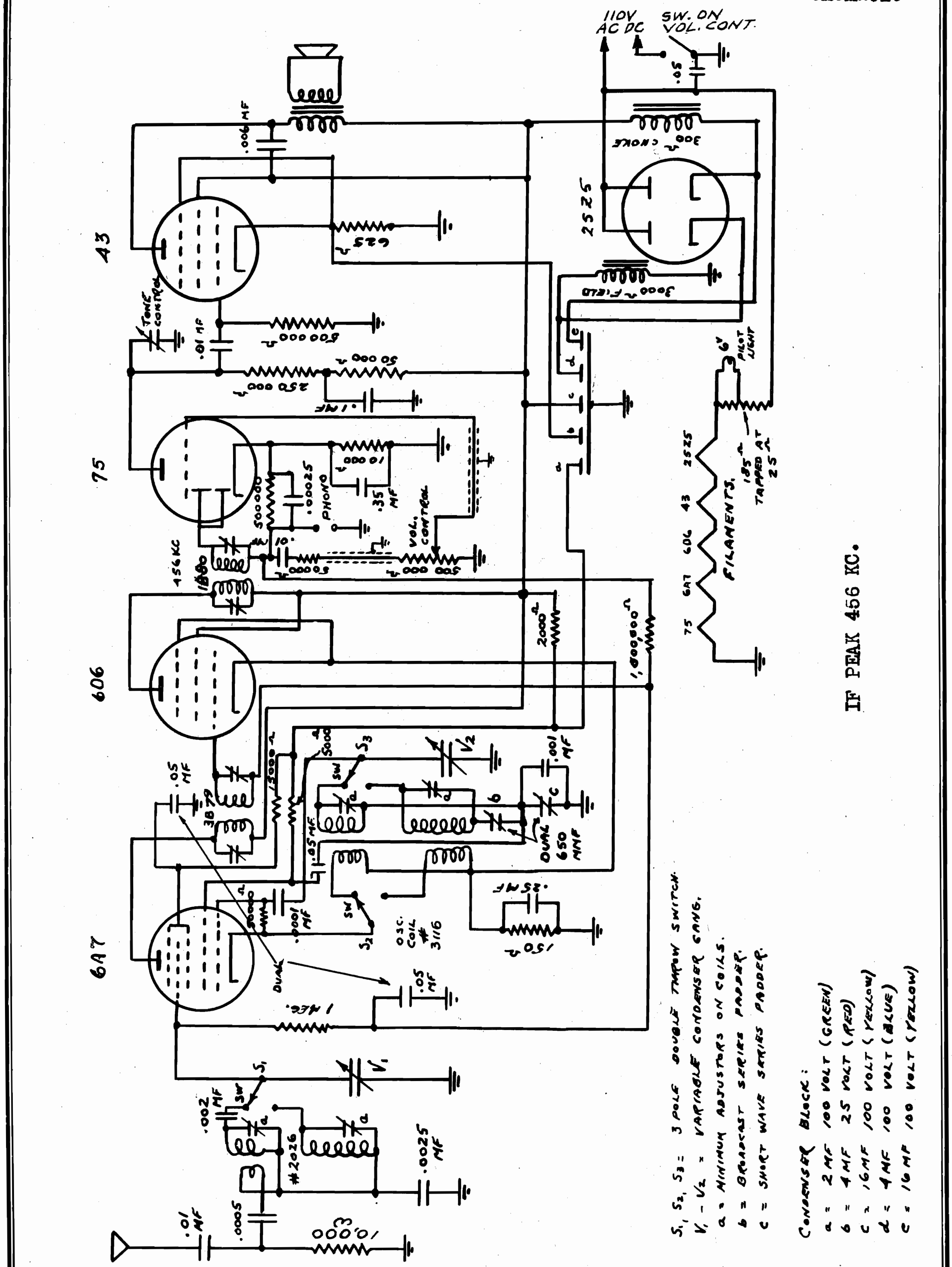
MODEL 53 LW
Schematic

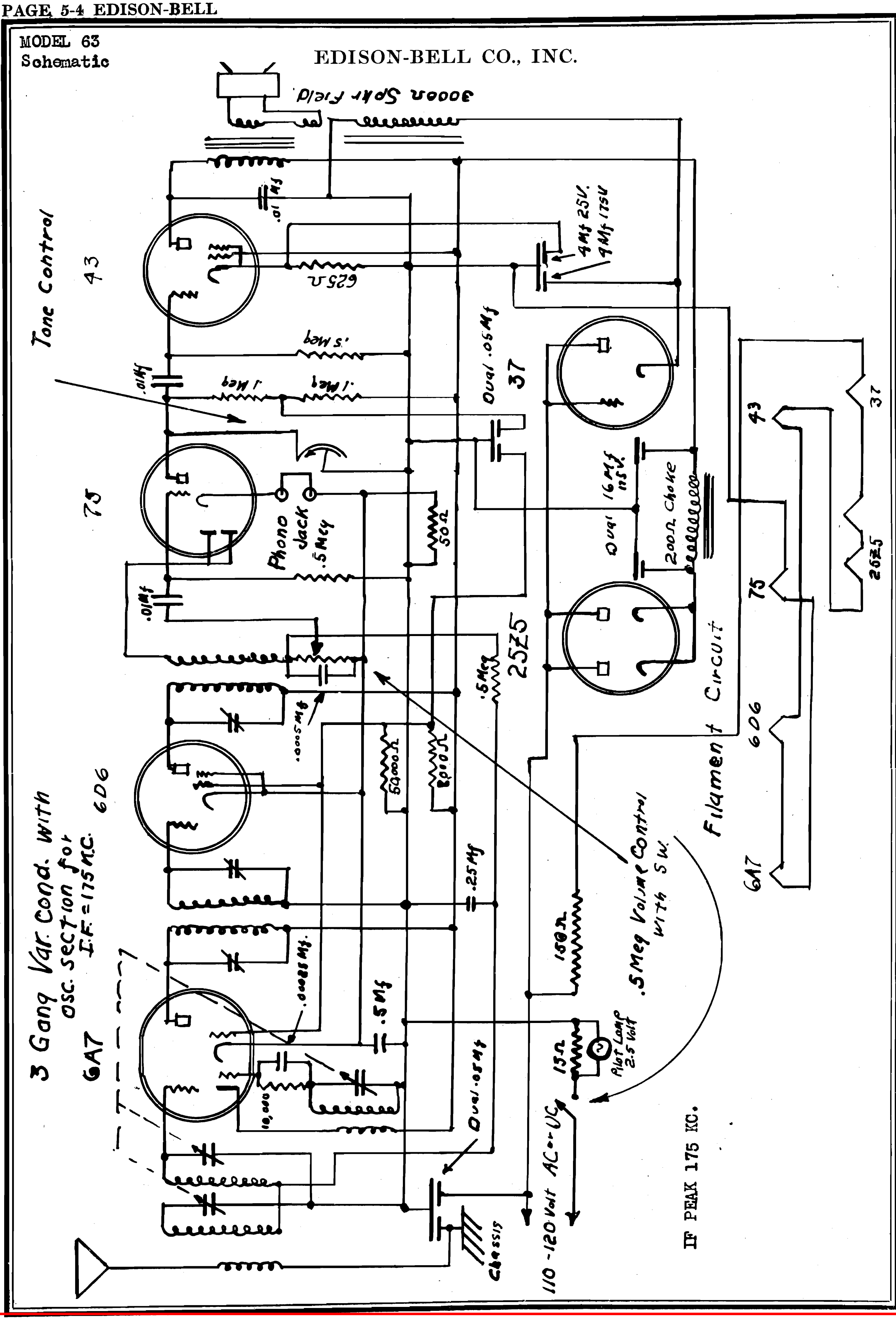
EDISON-BELL CO., INC.



EDISON-BELL CO., INC.

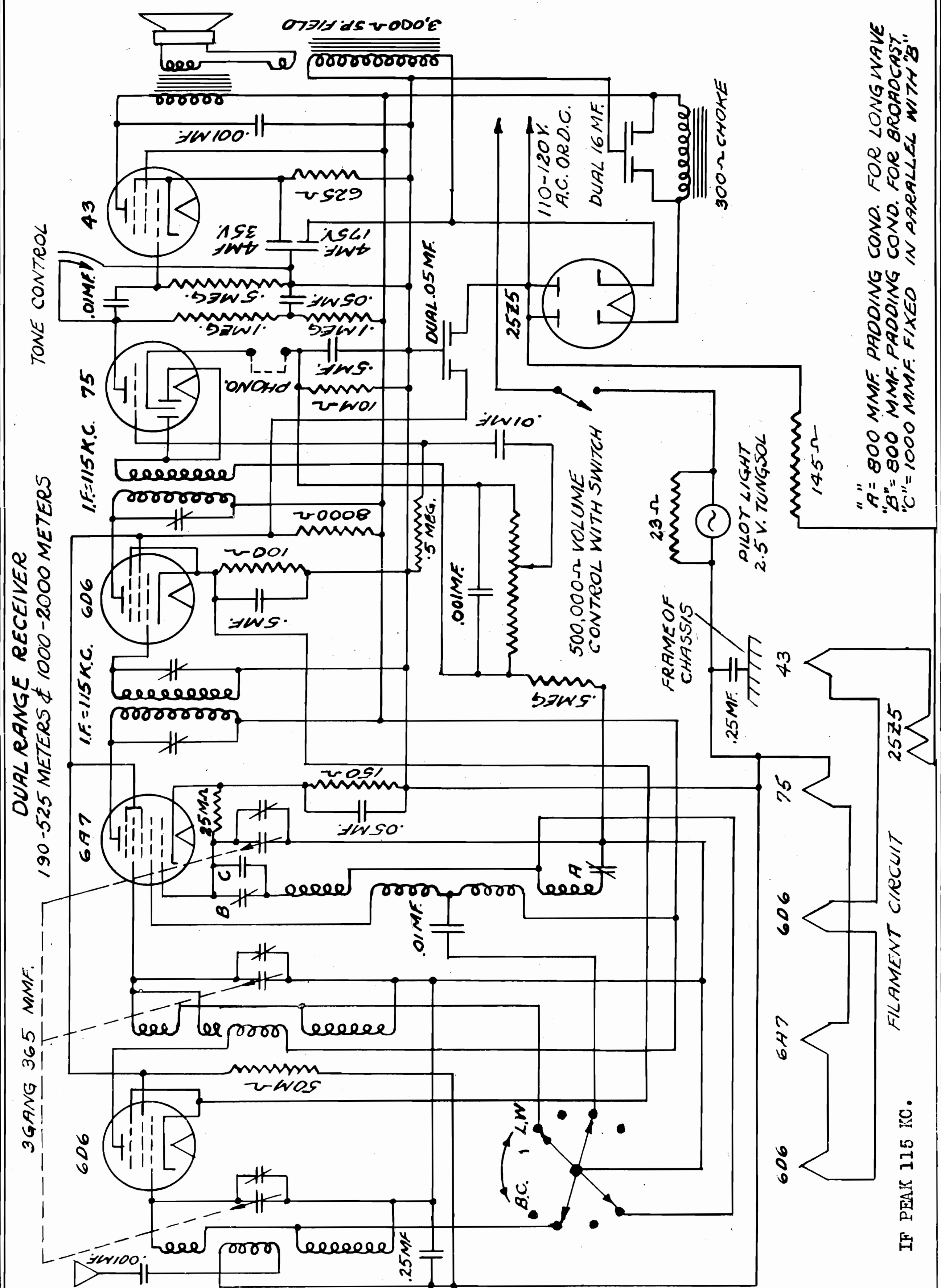
MODEL 55 AW
Schematic




MODEL 63
Schematic
EDISON-BELL CO., INC.
3000Ω Spkr Field
.01 Mf
4 Mf 25V.
4 Mf 175V
625Ω
43
Tone Control
.5 Meg
.1 Meg
.1 Meg
.01 Mf
Dual .05 Mf
37
75
Phono Jack
.5 Meg
50Ω
Dual 16 Mf 175V.
200Ω Choke
.01 Mf
25Z5
.5 Meg
.0005 Mf
50000Ω
8000Ω
6D6
3 Gang Var. Cond. with osc. section for I.F.=175 KC.
.25 Mf
150Ω
.5 Meg Volume Control with Sw.
Filament Circuit
.00085 Mf.
.5 Mf
6A7
10,000
Dual .05 Mf
15Ω
Pilot Lamp 2.5 Volt
110-120 Volt AC or DC
Chassis
IF PEAK 175 KC.

EDISON-BELL CO., INC.

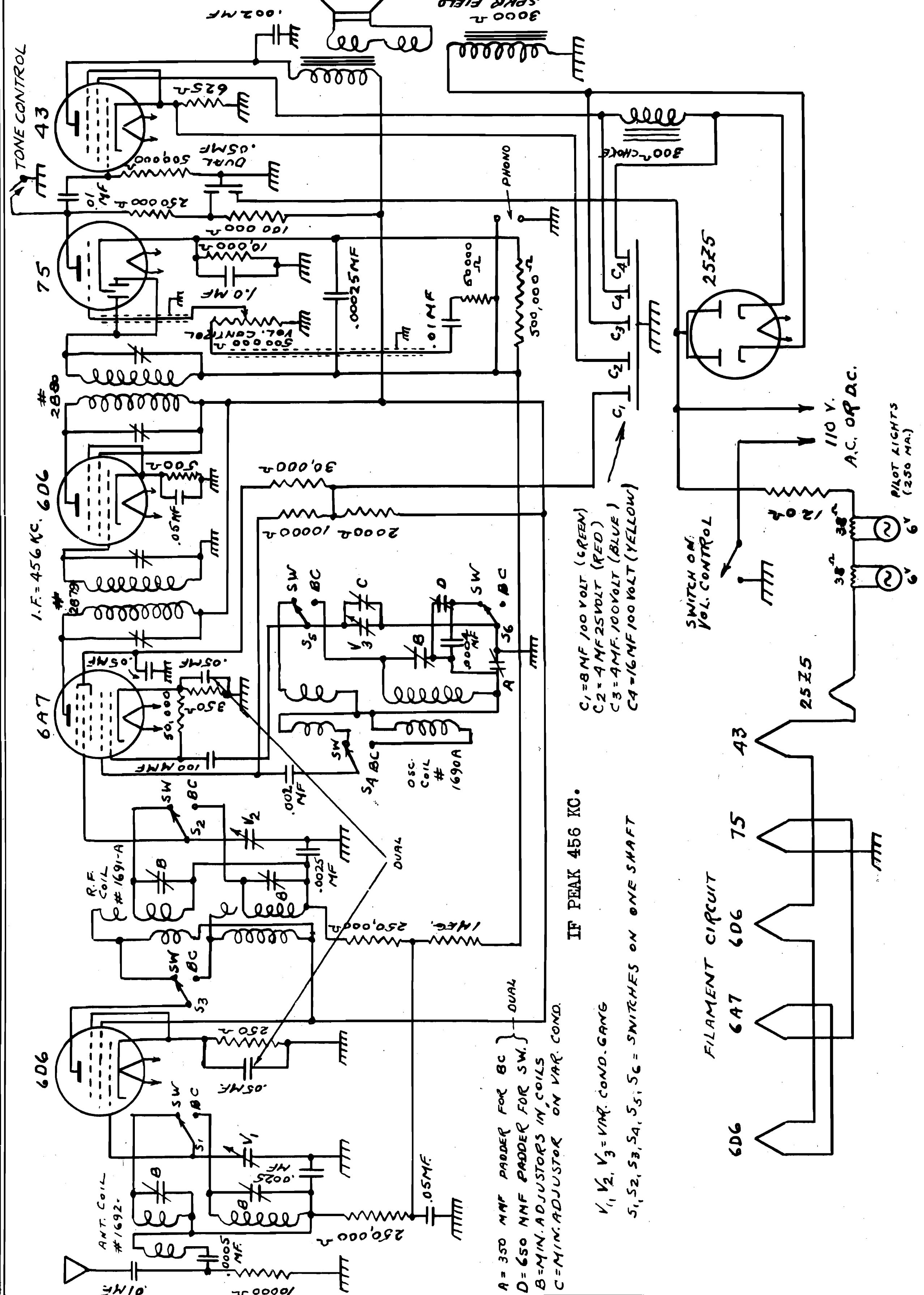
MODEL 63 LW
Schematic




IF PEAK 115 KC.

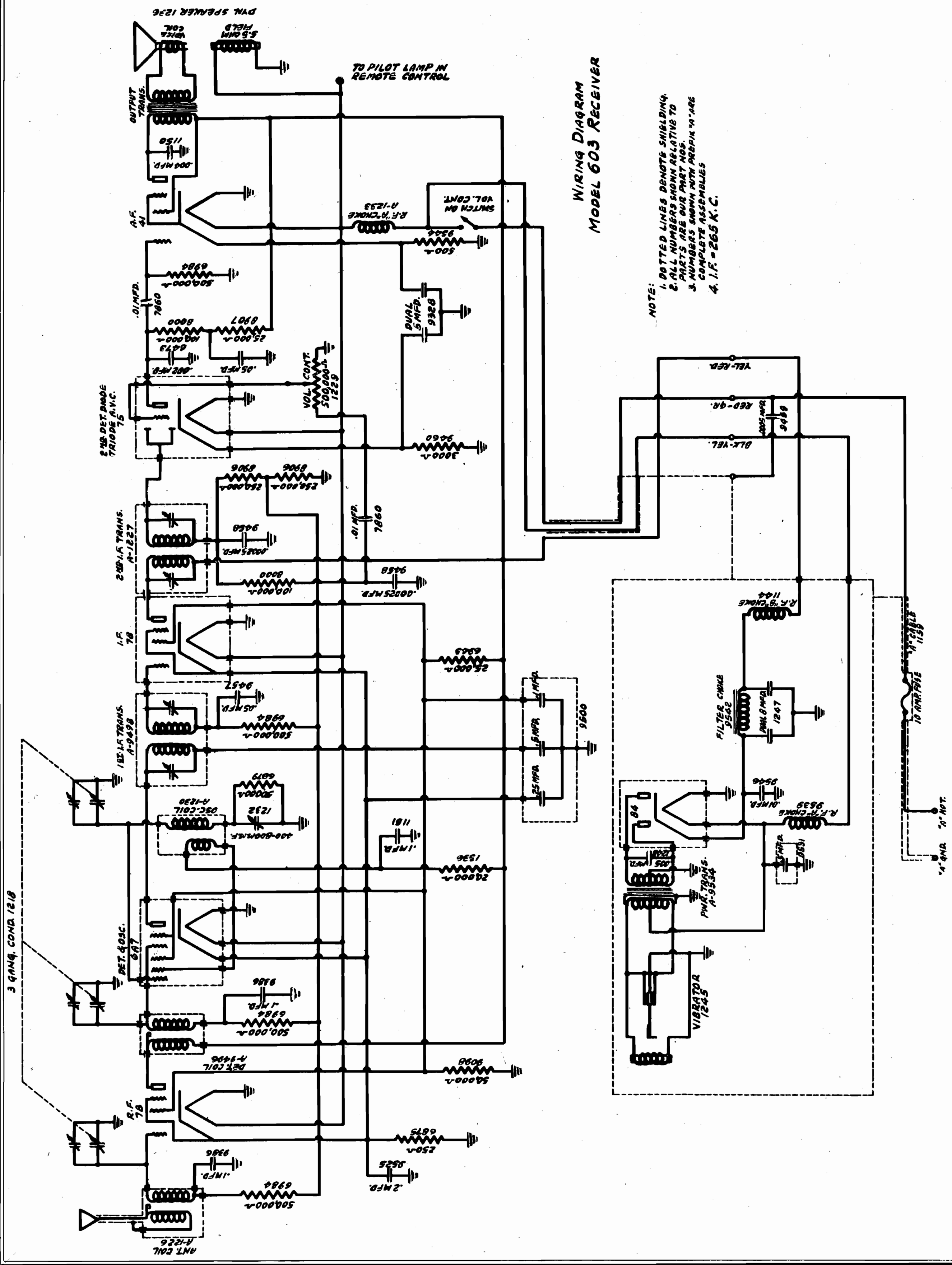
MODEL 66 AW
Schematic

EDISON-BELL CO., INC.



**MODEL 603**
**Schematic**

# ELECTRICAL RESEARCH LABS.



MODEL 603
Voltage, Alignment
Parts List

# ELECTRICAL RESEARCH LABS.

ALIGNMENT PROCEDURE: For properly aligning either the intermediate transformer or the variable condenser it is necessary that an accurately calibrated oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 6A7 tube leaving the control grid cap disconnected. Connect the ground side of the oscillator to the receiver chassis.

2. Set the oscillator frequency at 265 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning one of the trimmer screws up and down until maximum reading is obtained on the output meter, and then adjust the other trimmer screw of the intermediate transformer for maximum sensitivity.

4. Adjust the second intermediate transformer in the same manner.

NOTE: Two types of intermediate transformer trimmers have been used in this model receiver. One type has two parallel holes in the top of the shield, one for each trimmer. The other type has a brass hex nut for adjusting one intermediate trimmer, the other intermediate trimmer being adjusted with the trimmer screw located inside of the brass hex nut. Regardless of which type trimmer is used the procedure is the same.

TO ALIGN THE VARIABLE CONDENSER: It is not necessary to remove the receiver chassis from the set housing to align the gang condenser. Regardless of whether or not the receiver is or is not mounted in the set housing the alignment procedure is the same. Three holes are provided in the left hand side of the set housing for the gang condenser trimmers and one in the front of the set housing for the 600 kilocycle padding condenser.

1. Properly connect the remote control head and shafts and adjust the dial needle on the dial face so that the dial calibration is correct.

2. Connect the high output side of the oscillator to the antenna and the ground to the receiver chassis.

3. Tune the receiver to exactly 1400 kilocycles on the dial and adjust the oscillator to this frequency. BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE OSCILLATOR GANG CONDENSER TRIMMER. Looking at the side of the receiver and reading from top to bottom the trimmer condensers are the antenna, R. F. and oscillator sections. Next, adjust the R. F. and antenna sections of the gang condenser for maximum sensitivity

4. Tune the receiver to approximately 600 kilocycles on the dial and set the oscillator to this frequency. Then adjust the 600 kilocycle padding condenser, which is located on and accessible through the hole in the front of the chassis for maximum output. Always rock the condenser slightly to the right and left when making this adjustment using the position of greatest output.

| TYPE OF TUBE | POSITION OF TUBE | FILAMENT VOLTS | TUBE VOLTAGES PLATE VOLTS | TUBE VOLTAGES CATHODE VOLTS | SCREEN VOLTS | GRID NO. 1 | GRID NO. 2 | GRID NO. 3 | GRID No. 5 |
|---|---|---|---|---|---|---|---|---|---|
| 78 | Radio Frequency | 6 | 210 | 4 | 80 | | | | |
| 6A7 | Oscillator & Modulator | 6 | 210 | 4 | | 35 | 140 | 80 | 80 |
| 78 | Intermediate Frequency | 6 | 210 | 4 | 80 | | | | |
| 75 | 2nd Detector Diode & AVC | 6 | 100 | 1.5 | | | | | |
| 41 | Output | 6 | 200 | 8 | 210 | | | | |
| 84 | Rectifier | 6 | 260## | 235 | | | | | |

## A. C. each plate
Total "A" current - 6.0 amperes
Read all voltages from socket to chassis

| PART NUMBER | | LIST PRICE |
|---|---|---|
| 1226 | Antenna Coil | $1.77 |
| 9496 | Detector Coil | .99 |
| 1230 | Oscillator | 1.01 |
| 9498 | 1st I. F. Transformer | 1.49 |
| 1227 | 2nd I. F. Transformer | 2.03 |
| 1236 | Dynamic Speaker | 7.00 |
| 1158 | Antenna Lead | .34 |
| 1244 | Set Cable | .60 |
| 9098 | 50,000 Ohm 1/2 Watt Resistor | .19 |
| 6943 | 25,000 Ohm 1 Watt Resistor | .21 |
| 6984 | 500,000 Ohm 1/3 Watt Resistor | .19 |
| 8000 | 100,000 Ohm 1/3 Watt Resistor | .19 |
| 9460 | 3,000 Ohm 1/3 Watt Resistor | .19 |
| 9544 | 500 Ohm 1 Watt Resistor | .21 |
| 6875 | 250 Ohm 1/3 Watt Resistor | .19 |
| 8906 | 250,000 Ohm 1/3 Watt Resistor | .19 |
| 8907 | 25,000 Ohm 1/3 Watt Resistor | .19 |
| 1336 | 20,000 Ohm 1/2 Watt Resistor | .19 |
| 1232 | Padding Condenser | .55 |
| 1218 | Three Gang Condenser | 4.10 |
| 9500 | Bypass Condenser (1-.1,1-.25, 1-.5 Mfd.) | 1.29 |
| 7860 | .01 Mfd. 400 Volt Condenser | .17 |
| 9386 | .1 Mfd. 200 Volt Condenser | .18 |
| 6473 | .002 Mfd. 400 Volt Condenser | .17 |
| 9525 | .2 Mfd. 200 Volt Condenser | .24 |
| 9203 | .1 Mfd. 400 Volt Condenser | .20 |
| 1150 | .004 Mfd. 400 Volt Condenser | .18 |
| 9328 | Dry Electrolytic Condenser (2-5 Mfd.) | 1.15 |
| 9133 | Generator .5 Mfd. Condenser | .55 |
| 9597 | Spark Plug Suppressor | .55 |
| 9598 | Distributor Suppressor | .55 |
| 9600 | Wood Mounting Block | .16 |
| 7717 | Housing Carriage Bolt 3/8" x 3" | .10 |
| 7718 | Hex Nut for 3/8" Carriage Bolt | .05 |
| 7716 | Mounting Bolt Steel Washer | .10 |
| 9458 | .0025 Mfd. Mica Condenser | .17 |
| 9463 | No. 75 Tube Socket | .13 |
| 9422 | No. 78 Tube Socket | .13 |
| 9493 | No. 41 Tube Socket | .13 |

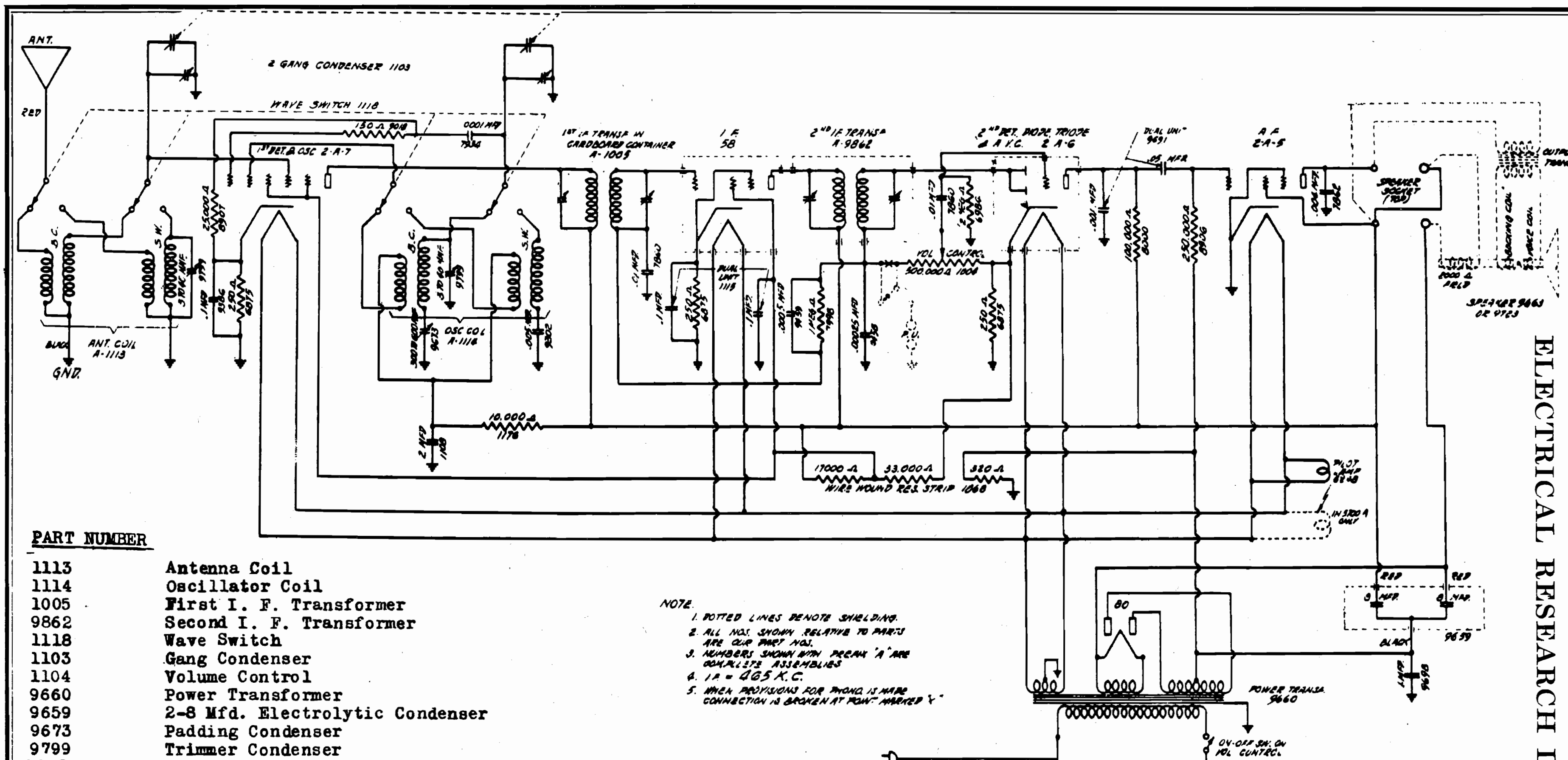
| PART NUMBER | | LIST PRICE |
|---|---|---|
| 9453 | 6A7 Tube Socket | $ .13 |
| 1255 | Set Housing Back | .25 |
| 1284 | Set Housing Cover | .55 |
| 1223 | Set Housing | 3.52 |
| 9581 | 10 Ampere Fuse | .06 |
| 1159 | "A" Battery complete with Fuse and Receptacle | .90 |
| 9063 | Tube Shield Retainer Base | .05 |
| 1361 | Tube Shield | .11 |
| 1253 | R. F. "A" Choke | .28 |
| 1229 | Volume Control with Switch | 1.22 |
| 109 | "B" Eliminator | 15.00 |
| 1246 | Vibrator Rubber Case | .40 |
| 1245 | Vibrator | 5.50 |
| 9534 | Power Transformer | 2.75 |
| 9542 | Filter Choke | .85 |
| 9539 | R. F. "A" Choke | .40 |
| 1144 | R. F. "B" Choke | .32 |
| 1247 | 2x 8 Mfd. Condenser Block | 2.75 |
| 9531 | .5 Mfd. Bypass Condenser | .58 |
| 9546 | .01 Mfd. 600 Volt Condenser | .18 |
| 1248 | .005 Mfd. 1000 Volt Condenser | .23 |
| 9559 | .0005 Mfd. Moulded Condenser | .21 |
| 9529 | No. 84 Tube Socket | .13 |
| 9513 | "B" Eliminator Housing Case | .55 |
| 9514 | "B" Eliminator Housing Case Cover | .35 |
| 1249 | "B" Terminal Strip with Screws | .60 |
| 1240 | Remote Control Complete | 9.00 |
| 1458 | Tuning Control Ring | .77 |
| 1459 | Volume Control Ring | .77 |
| 1460 | Dial Light Assembly | .44 |
| 1460A | Pilot Light Bulb | .44 |
| 1461 | Condenser Pulley Assembly | 1.20 |
| 1462 | Vol. Control Pulley Assembly | 1.00 |
| 1463 | Drive Cable Assembly | 2.30 |
| 1464 | Dial Glass & Sticker Assembly | .40 |
| 1465 | Steering Post Clamp | .11 |
| 1466 | Key | .17 |
| 1467 | Dial Scale Assembly | .33 |
| 1468 | Dial Glass Retaining Ring | .11 |

Prices are subject to change without notice.

Part No. 603

# MODEL 5700,5721
## Schematic,Voltage
## Parts List

ELECTRICAL RESEARCH LABS.




| PART NUMBER | |
|---|---|
| 1113 | Antenna Coil |
| 1114 | Oscillator Coil |
| 1005 | First I. F. Transformer |
| 9862 | Second I. F. Transformer |
| 1118 | Wave Switch |
| 1103 | Gang Condenser |
| 1104 | Volume Control |
| 9660 | Power Transformer |
| 9659 | 2-8 Mfd. Electrolytic Condenser |
| 9673 | Padding Condenser |
| 9799 | Trimmer Condenser |
| 1068 | Wire Wound Resistor Strip |
| 6984 | 500,000 Ohm 1/3 Watt Resistor |
| 7997 | 1 Meg Ohm 1/3 Watt Resistor |
| 8000 | 100,000 Ohm 1/3 Watt Resistor |
| 8906 | 250,000 Ohm 1/3 Watt Resistor |
| 6875 | 250 Ohm 1/3 Watt Resistor |
| 9018 | 150 Ohm 1/3 Watt Resistor |
| 8907 | 25,000 Ohm 1/3 Watt Resistor |
| 1176 | 10,000 Ohm 1/3 Watt Resistor |
| 9698 | 1 Mfd. 100 Volt Condenser |
| 9386 | .1 Mfd. 200 Volt Condenser |
| 7862 | .004 Mfd. 400 Volt Condenser |
| 7860 | .01 Mfd. 400 Volt Condenser |
| 1115 | 2x.1 Mfd. 200 Volt Condenser |
| 9691 | .05 Mfd. & .001 Mfd, 400 Volt Cond |
| 1108 | 2 Mfd. Dry Electrolytic Condenser |
| 9307 | .005 Mfd. Moulded Condenser |
| 9458 | .00025 Mfd. Moulded Condenser |
| 7934 | .0001 Mfd. Moulded Condenser |
| 9459 | .0005 Mfd. Moulded Condenser |

VOLTAGE TABLE

Line : 115
Volume : Full on

| TUBE | | FIL. | PLATE | SCREEN | CATHODE | GRID NO.1 | GRID NO.2 | GRID NO. 3 & 5 |
|---|---|---|---|---|---|---|---|---|
| 58 | I. F. Amplifier | 2.45 | 205 | 80 | 2 | | | |
| 2A7 | Oscillator & 1st Detector | 2.45 | 205 | | 2.5 | 1.5 | 160 | 80 |
| 2A6 | Second Detector Diode AVC and Triode | 2.45 | 100## | | 1 | | | |
| 2A5 | Output | 2.45 | 190 | 205 | .8### | | | |
| 80 | Rectifier | 4.85 | | | | | | |

## Triode Plate. Comparative voltage only.

Read all voltages from socket to chassis unless otherwise specified.

### Read from grid to chassis.

MODEL 5700, 5721
Alignment

# ELECTRICAL RESEARCH LABS.

**NOTE:** It may be found that stations on the short wave band are received at a slightly different dial setting than formerly received after changing the aerial dimensions. Using one of the antenna transmission systems designed for man-made static elimination may prove beneficial for very difficult locations. Care must be taken in using this type aerial system as an improperly designed transmission system will decrease the range of the receiver, particularly on short wave reception. Simply using a transmission system will not eliminate the noise unless the flat top of the aerial can be erected outside of the field of disturbance. A shielded lead-in is not recommended as the signal loss on short waves will be excessive. The antenna should be connected to the red lead coming out at the rear of the chassis and for best results it is recommended that a good ground be connected to the black lead coming out at the rear of the chassis.

**BAND SELECTOR SWITCH:** Two different frequency bands are available, the frequency range being:

1715 to 535 Kilocycles- 175 to 560.75 Meters
16 to 5.2 Megacycles- 18.7 to 57.7 Meters

Selection of the desired frequency band is made with the band selector switch knob, which is located on the lower right front of the cabinet. When the band selector switch is placed in the maximum left hand position the receiver is operating on the 5.2 to 16 megacycle band. For operation on the 1715 to 535 kilocycle band place the band selector switch knob in the maximum right hand position. Both bands are calibrated on a single dial, one section of which is calibrated in kilocycles, 1715 to 535 kilocycles, and the other section is calibrated in megacycles, 16 to 5.2 megacycles.

**ALIGNMENT PROCEDURE:** Only when an IF transformer, antenna or oscillator coil is replaced should it ever be necessary to realign the receiver. For aligning either the intermediate transformer or the variable condenser it is absolutely necessary that a good accurate calibrated oscillator be used with some type of output measuring device.

**INTERMEDIATE ALIGNMENT:**

1. Connect the high side of the oscillator output to the control grid of the 2A7 tube leaving the grid cap disconnected. The ground side of the oscillator should be connected to the receiver chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the intermediate transformer brass hext adjusting nut located on top of the intermediate transformer can up and down until maximum reading is obtained on the output meter. Then adjust the trimmer screw located inside the brass hex nut for maximum output.

4. Adjust the second I. F. transformer in the same manner as the first I. F. transformer.

**VARIABLE CONDENSER ALIGNMENT:** It is essential that the following instructions be carefully adhered to in the order given otherwise the receiver will be insensitive and the dial calibration will be inaccurate.

1. Connect the high side of the oscillator output to the set antenna lead and the oscillator ground to the receiver chassis.

2. Place the band selector switch for operation on the 16 to 5.2 megacycle band.

3. Set the oscillator frequency to exactly 15 megacycles and adjust the receiver dial to exactly 15 megacycles. Then BRING IN THE 15 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE trimmer condenser of the oscillator gang condenser section. The oscillator trimmer condenser is mounted on top of the rear section of the variable condenser. The front section of the variable condenser tunes the antenna stage.

4. Place the band selector switch for operation on the 1715 to 535 kilocycle band, set the oscillator to exactly 1400 kilocycles and tune the receiver dial to 1400 kilocycles. BRING IN THIS 1400 KILOCYCLE SIGNAL BY ADJUSTING THE SMALL TRIMMER CONDENSER which is located underneath near the center and towards the front of the chassis.

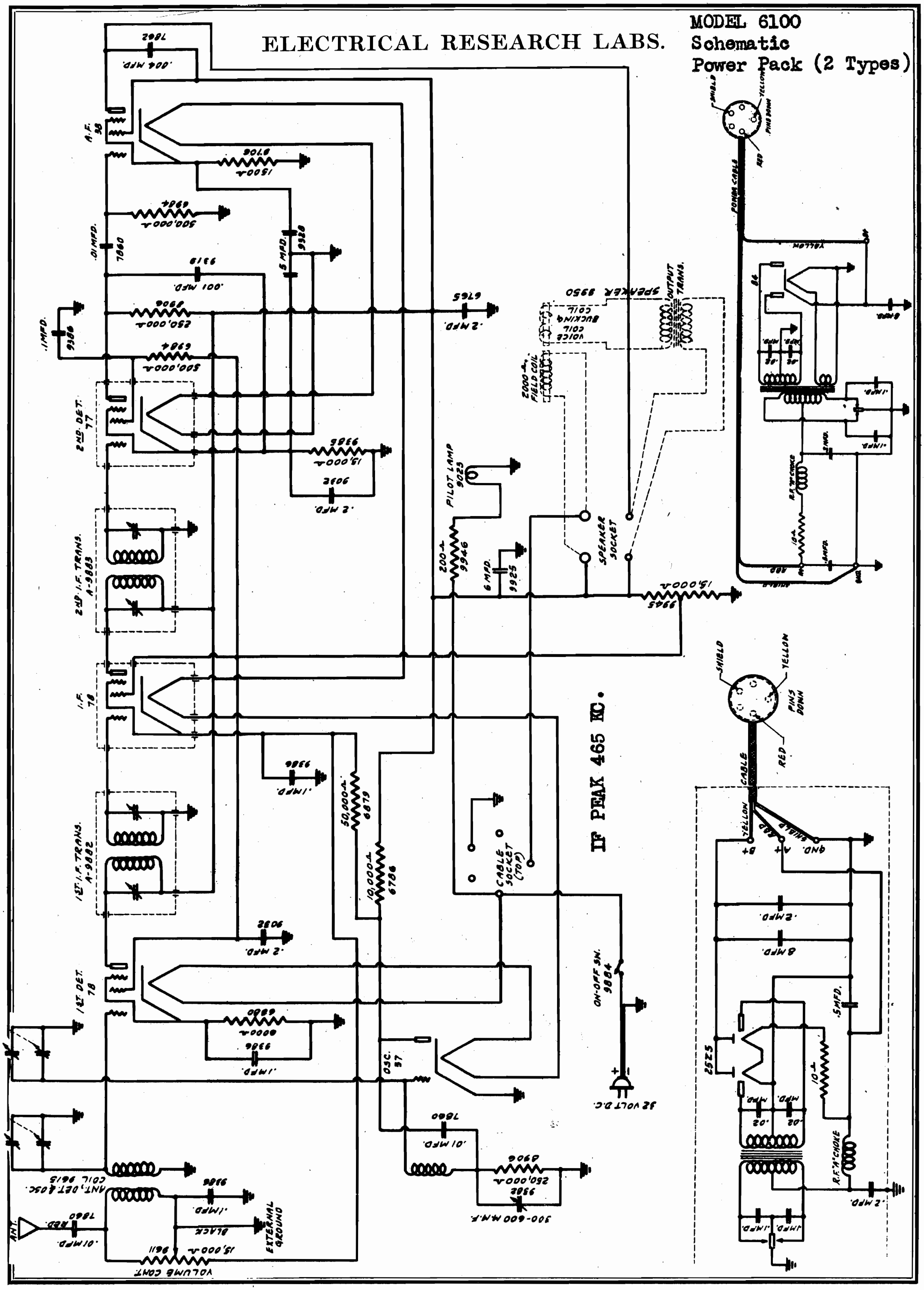
5. Next adjust the antenna variable gang condenser section trimmer condenser for maximum output (front section).

6. Leave the receiver operating on the same band and set the oscillator frequency to approximately 600 kilocycles and adjust the dial to approximately 600 kilocycles. Then while rocking the variable condenser slightly to the right and left, adjust the 600 kilocycle padding condenser which is located below the speaker and accessible through the front of the chassis for maximum output.

7. Recheck the 1400 kilocycle adjustment.

8. Place the band selector switch for operation on the 16 to 5.2 megacycle band and tune the dial to exactly 15 megacycles and set the oscillator frequency to 15 megacycles. Then adjust the trimmer condenser which is located underneath and toward the center of the right hand side of the chassis for maximum output.

This completes the alignment procedure and it is suggested that all the adjustments be rechecked.


ELECTRICAL RESEARCH LABS.
MODEL 6100
Schematic
Power Pack (2 Types)
IF PEAK 465 KC.
A.F. 38
2ND DET. 77
2ND I.F. TRANS. A-9883
I.F. 78
1ST I.F. TRANS. A-9882
1ST DET. 78
OSC. 57
PILOT LAMP 9025
SPEAKER SOCKET
CABLE SOCKET (TOP)
ON-OFF SW. 9884
32 VOLT D.C.
SPEAKER 8950
OUTPUT TRANS.
FIELD COIL
VOICE COIL
BUCKING COIL
VOLUME CONT.
EXTERNAL GROUND
ANT.
POWER CABLE
SHIELD
YELLOW
RED
PINS DOWN
CABLE
B+
A+
GND.
2525
84
R.F. "A" CHOKE

**MODEL 6100**
**Voltage, Alignment**
**Parts List**

# ELECTRICAL RESEARCH LABS.

VOLTAGE TABLE

Line Voltage : 32 Volts
Volume Control: Full On

| TUBE | | FIL. | PLATE | SCREEN | CATHODE |
|---|---|---|---|---|---|
| 78 | 1st Detector | 6.5 | 160 | 70 | 5 |
| 37 | Oscillator | 6.5 | 100 | | 20 |
| 78 | I.F. | 6.5 | 160 | 70 | 25 |
| 77 | 2nd Detector | 6.5 | 65* | 25* | 25 |
| 38 | Output | 6.5 | 150 | 160 | 15 |
| 25Z5 | Rectifier or 84 Rectifier | | | | |

* Comparative voltage only.
Read voltage from socket to receiver chassis.

## 32 VOLT SIX TUBE SUPERHETERODYNE RECEIVER.

This receiver is designed to operate on 32 volt battery plants only and must not be used on 36 volt battery plants without a voltage regulator. Generally, it is not advisable to operate the receiver while the generator is charging the battery due to the fact that considerable radio interference (static noise) may be encountered. This is not a reflection on the receiver, but is due to interference caused by the power plant generator, itself. Some generators have built-in traps to eliminate this interference and when so constructed this particular type of plant generator will not cause interference. If excessive static noise is encountered be sure that it is not caused by the 32 volt plant generator.

THIRTY-TWO VOLT POWER UNIT: Two power units have been furnished with the six tube 32 volt receiver, one unit utilizes a 25Z5 tube and the other an 84 tube. Diagrams for both of these units are shown on the receiver circuit diagram. It will be noted from the parts and price list that all parts with the exception of the power transformer and tube sockets are interchangeable. When ordering these parts be sure to order by part number.

NOTE: The dynamotor type unit supplied with the five tube 32 volt receiver cannot be used with the six tube receiver nor can the power units (utilizing the 84 or 25Z5 tube) furnished with the six tube receiver be used with the five tube 32 volt set.

The 32 volt power unit is shipped unmounted and must be placed in the sound-proof celotex compartment. In the console models this is located below the receiver mounting board and in the table models it is located above the chassis. To install the power unit in the sound-proof box remove the wood screws which hold the celotex back to the box, then place the power unit on the rubber mounting blocks provided inside of this box so that the unit is floating free on these rubber insulators. It is very important that the unit does not touch the side of the box. If excessive vibration is noticed be sure to check the power unit installation, as excessive vibration will result if it is not properly mounted on all of the rubber supports or if it is permitted to touch the side of the celotex housing.

PILOT LIGHT: A type T-3¼ #40 6.3 volt pilot light is used. The pilot light is readily accessible for removal from the rear of the cabinet.

ANTENNA AND GROUND: Under ordinary conditions an aerial from twenty-five to seventy-five feet in length including lead-in will prove ample. In some locations which are located a considerable distance from broadcast stations it may be necessary to use a longer aerial than this to obtain satisfactory daylight reception. Never place the aerial lead-in in close proximity to the 32 volt lighting lines, as considerable static noise may be picked up if the antenna lead-in is run parallel to the 32 volt power lines for any distance.

INTERMEDIATE ALIGNMENT: Only when an intermediate transformer has become defective due to an open or burned out winding should it be necessary to readjust the intermediate transformer. For aligning either the intermediate transformer or the variable condenser it is necessary that an oscillator be used with some type of output measuring device. To align the intermediate transformer:

1. Connect the high side of the oscillator output to the control grid of the #36 modulator tube. The ground side of the oscillator should be connected to the ground lead.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning one of the intermediate transformer trimmer screws up and down until maximum reading is obtained on the output meter. Then adjust the other trimmer screw in the same manner.

4. The second I. F. transformer should next be adjusted in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

To align the variable condenser:

1. Connect the high output side of the oscillator to the set antenna lead and the ground side of the oscillator to the ground lead.

2. Tune the receiver to 1400 kilocycles on the dial and set the oscillator to this frequency.

3. Adjust the variable condenser trimmer screws for maximum output reading.

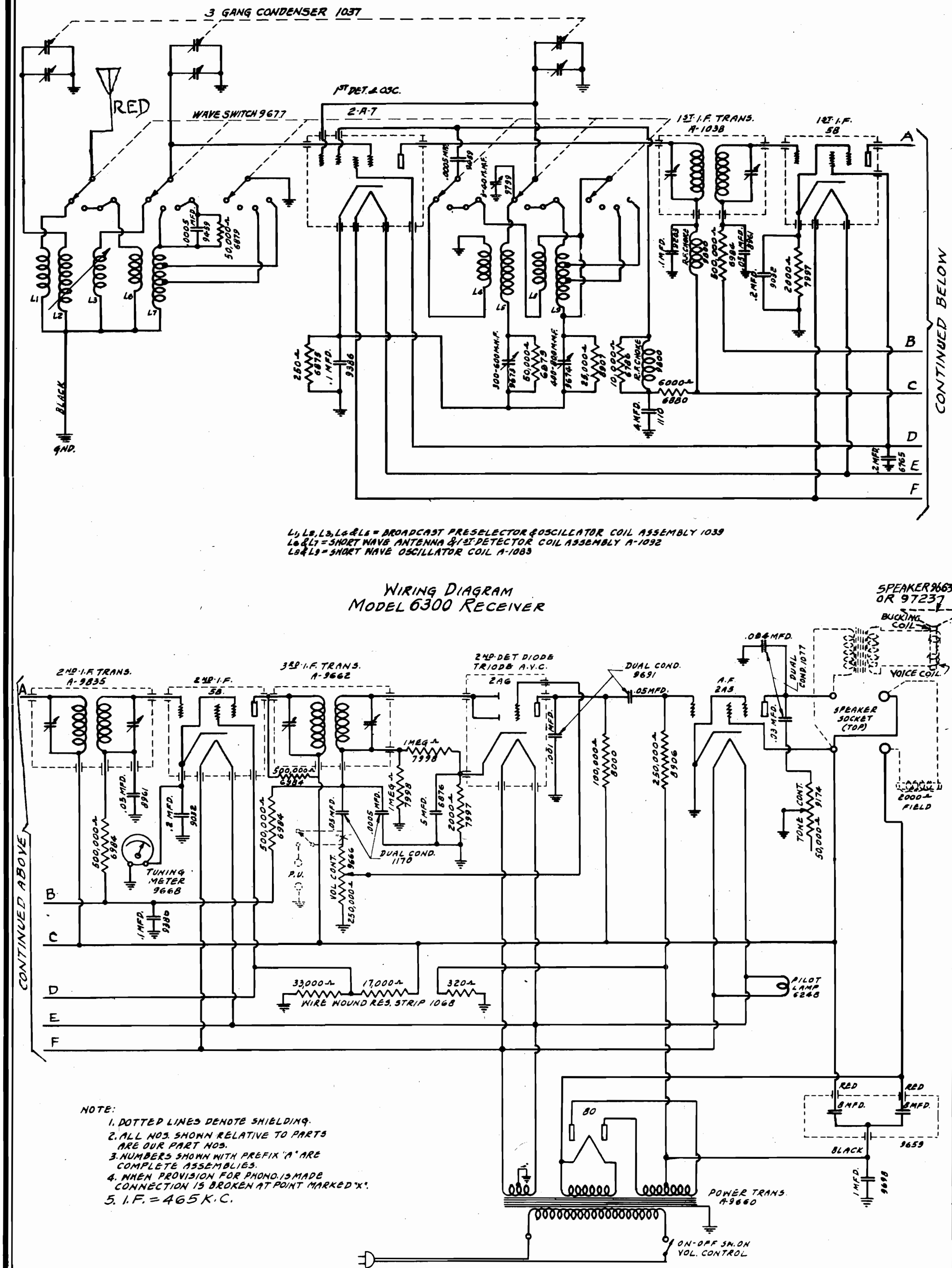
4. Tune the set to approximately 600 kilocycles on the dial and adjust the oscillator frequency to 600 kilocycles. Adjust the padding condenser located on the rear of the chassis adjacent to the antenna and ground leads and accessible through the hole in the chassis for maximum output reading.

When making this adjustment be sure to rock the variable condenser to the right and left using the position where the greatest reading is obtained.

| | |
|---|---|
| 9946 | Wire Wound Resistor Strip 15,000 Ohms |
| 9945 | Wire Wound Resistor Strip 200 Ohms |
| 9925 | 6 Mfd. Electrolytic Condenser |
| 9328 | Dual 5 Mfd. Electrolytic Condenser |
| 9882 | First I. F. Transformer |
| 9883 | Second I. F. Transformer |
| 9615 | Antenna, Detector & Oscillator Coil |
| 6765 | .2 Mfd. 400 Volt Condenser |
| 9052 | .2 Mfd. 200 Volt Condenser |
| 9386 | .1 Mfd. 200 Volt Condenser |
| 7860 | .01 Mfd. 400 Volt Condenser |
| 7862 | .004 Mfd. 400 Volt Condenser |
| 9319 | .001 Mfd. Moulded Condenser |
| 8906 | 250,000 Ohm 1/3 Watt Resistor |
| 6984 | 500,000 Ohm 1/3 Watt Resistor |
| 6786 | 10,000 Ohm 1/3 Watt Resistor |
| 9706 | 1,500 Ohm 1/3 Watt Resistor |
| 6880 | 6,000 Ohm 1/3 Watt Resistor |
| 9385 | 15,000 Ohm 1/3 Watt Resistor |
| 107 | 32 Volt Power Unit complete with 25Z5 Tube |
| 107A | 32 Volt Power Unit complete with 84 Tube |
| 9907 | Three Conductor Power Cable with Plug |
| 8701 | Vibrator |
| 8702 | .5 Mfd. Condenser |
| 8703 | .02-.02 Mfd. Condenser |
| 8704 | .1-.1 Mfd. Condenser |
| 8705 | 8 Mfd. Condenser |
| 8706 | 1 Mfd. Condenser |
| 8707 | Cord & Plug |
| 8708 | RF A Choke |
| 8709 | Transformer used with 25Z5 Tube |
| 8710 | Transformer used with 84 Tube |
| 8711 | 5 Ohm Resistor |
| 9611 | Volume Control |
| 9382 | Padding Condenser |

**MODEL 6300, 6315, 6317, 6323**
**Schematic**

# ELECTRICAL RESEARCH LABS.



MODEL 6300, 6315, 6317, 6323
Alignment, Voltage

# ELECTRICAL RESEARCH LABS.

SHORT WAVE TRIMMER: A short wave trimmer control is incorporated in the receiver and is used for a fine tuning adjustment when tuning for short wave reception from 1.5 megacycles to 24 megacycles. The band selector switch knob consists of two sections. The small front section knob is used for adjusting the short wave trimmer and the large rear section is the band selector switch knob. When tuning for short wave reception always rotate the tuning control slowly until a station is heard with maximum volume. Don't hurriedly skim over the dial or pass up any weak signals. After adjusting the tuning control so as to bring the station in at its loudest point adjust the short wave trimmer control by turning the trimmer knob first in the clockwise and then in the counter-clockwise direction to the position of greatest volume. Occasionally after tuning in this manner still better results may be obtained by readjusting the tuning control, and then further fine adjustment should be made with the short wave trimmer for maximum volume. It may be found that when adjusting the short wave trimmer that the signal will disappear, indicated by the elimination of signal, static and background noises. Rotating the short wave trimmer control slightly either clockwise or counter-clockwise will bring the signal in again. When operating the receiver on the broadcast band (1500 K.C. to 540 K.C.) the trimmer is inoperative.

Line Voltage : 115
Volume Control: Full on
Wave Band : Broadcast

| TUBE | Fil. | Plate | Screen | Cathode Volts | Grid No.1 | Grid No.2 | Grid No. 3 & 5 |
|---|---|---|---|---|---|---|---|
| 2A7 Oscillator 1st Detector | 2.45 | 220 | | 2.2 | 3.5 | 200 | 90 |
| 58 First I. F. Amplifier | 2.45 | 220 | 90 | 6 | | | |
| 58 Second I. F. Amplifier | 2.45 | 220 | 90 | 3.5 | | | |
| 2A6 Second Detector | 2.45 | 120## | | 1 | | | |
| 2A5 Output | 2.45 | 210 | 220 | | | | |
| 80 Rectifier | 4.89 | | | | | | |

## Triode Plate. Comparative voltage only. The voltmeter is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

ALIGNMENT PROCEDURE: Only when an antenna, oscillator or I. F. transformer has become defective due to an open or shorted winding should it be necessary to realign the receiver. For aligning either the intermediate transformer or variable condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 2A7 First Detector tube, leaving the grid clip disconnected. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer up and down until maximum reading is obtained on the output meter, then adjust the trimmer screw located inside of the brass hex nut in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

4. The second and third I. F. transformers should next be adjusted in the same manner as the first I.F. transformer.

TO ALIGN THE VARIABLE CONDENSER: It is important when aligning the variable condenser and padding condensers to follow the procedure given carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect.

1. Connect the high output side of the oscillator to the antenna and the ground to the chassis.

2. Place the band selector switch for operation on the 1.5 to 4 megacycle band. Tune the receiver to exactly 1.7 megacycles onthe dial, set the short wave trimmer about half the distance between maximum clockwise and counter-clockwise rotation and adjust the oscillator frequency to exactly 1.7 megacycles.

Next, bring this 1.7 megacycle signal in to maximum output by adjusting the padding condenser accessible through the hole in the right hand side and closest to the rear of the chassis.

3. Leave the band selector switch for operation on the 1.5 to 4 megacycle band and tune the receiver to exactly 3.4 megacycles on the dial.

Next, set the test oscillator to exactly 3.4 megacycles and tune the signal in by adjusting the oscillator variable condenser trimmer mounted on top of the variable condenser. The middle section of the variable condenser is the oscillator section. Recheck the 1.7 megacycle adjustment after making the adjustment at 4 megacycles. For best results it is always advisable to check each adjustmet several times. NOTE: This completes the short wave adjustment.

4. Adjust the band selector switch for operation on the broadcast band (1500 to 540 kilocycles) and tune the receiver to exactly 1400 kilocycles on the dial and set the oscillator to this frequency. Turn the receiver on end and bring this 1400 kilocycle signal in to maximum output by adjusting the trimmer screw on the small trimmer, which is located adjacent to the short wave switch underneath the chassis.

Next, adjust the antenna and preselector variable condenser section trimmers mounted on top of the variable condenser for maximum signal output. (These are the front and rear gang sections).

5. Leave the band selector switch for operation on the broadcast band (1500 to 540 kilocycles) and tune the receiver and oscillator to approximately 600 kilocycles. Then adjust the 600 kilocycle padding condenser which is located on the right hand side and towards the front of the chassis for maximum output reading. This adjustment is quite critical and it is necessary to rock the condenser slightly to the right and left to obtain maximum sensitivity.

Always recheck the 1400 kilocycle alignment after making the adjustment at 600 kilocycles.

MODEL 6300,6315
6317,6323
Parts List,Notes

# ELECTRICAL RESEARCH LABS.

SIX TUBE SUPERHETERODYNE RECEIVER
24 Megacycles to 540 Kilocycles

Band No. 1 - from 10 Megacycles to 24 Megacycles
Band No. 2 - from 4 Megacycles to 10 Megacycles
Band No. 3 - from 1.5 Megacycles to 4 Megacycles
Band No. 4 - from 1500 Kilocycles to 540 Kilocycles

Selection of the desired frequency band is made with the band selector switch knob (large rear knob of double knob) which is located on the lower right front of the cabinet below the tuning control knob. When the band selector switch is placed in the maximum left hand position the receiver is operating on Band No. 1, 10 megacycles to 24 megacycles. Rotating the band selector knob in the clockwise direction the three other positions are in the order named, Band No. 2, 4 megacycles to 10 megacycles, Band No. 3, 1.5 to 4 megacycles and Band No. 4, 1500 kilocycles to 540 kilocycles. All four frequency bands are calibrated on a single dial. The calibrated section of the dial for the band that the receiver is adjusted to operate on is indicated by the dial indicator which is automatically adjusted by the band selector switch knob.

SHORT WAVE RECEPTION: The usual careless tuning that is sufficient to bring in the long wave length regular broadcast stations will fail in tuning in short wave reception. In tuning for short wave stations, great care must be taken so that the stations are not passed over, as the tuning is very sharp and quite critical. Many times a lack of results when tuning for short wave stations is due not only to the operator tuning the receiver incorrectly, but also to the operator trying to pick up foreign and North American short wave stations when the stations are not broadcasting. An important consideration is the time difference between the United States and European Countries;i.e., at 10:00 P.M. Central Standard Time it is 4:00 A. M. in England and 5:00 A. M. in most other countries in Europe and, as a rule, no stations are broadcasting at that time. While short wave reception presents a varied and more thrilling entertainment then we have been accustomed to hearing on the broadcast band, the many peculiarities and difficulties of short wave reception have been minimized and the possibilities over-emphasized, which has resulted in the erroneous belief that reception of foreign short wave stations is an easy accomplishment. To the contrary, short wave stations are not tuned in with the ease we have been accustomed to in tuning in local broadcast stations, but requires patience, extreme care in tuning, an understanding of the proper procedure and favorable conditions. Reception of short wave stations, as a rule, is not comparable to the clear, static-free programs received from the local broadcast stations, but is more erratic and is generally accompanied by fading and static although occasionally reception may be as good as local programs.

Reception of short wave stations varies from season to season and between daylight and after sunset.

Band No. 4 (regular broadcast band) from 1500 to 540 kilocycles varies also in that the range of the station is materially increased after dark and fading of distant stations becomes more pronounced. In some locations stations that are received during daylight occasionally fade so badly after sundown that it is impossible to receive good reception after dark. Other stations which cannot be heard during daylight provide good reception after darkness.

Band No. 3, 1.5 to 4.0 megacycles permits reception of police calls and some amateur phone stations. The range of the stations broadcast within this band is increased after sundown.

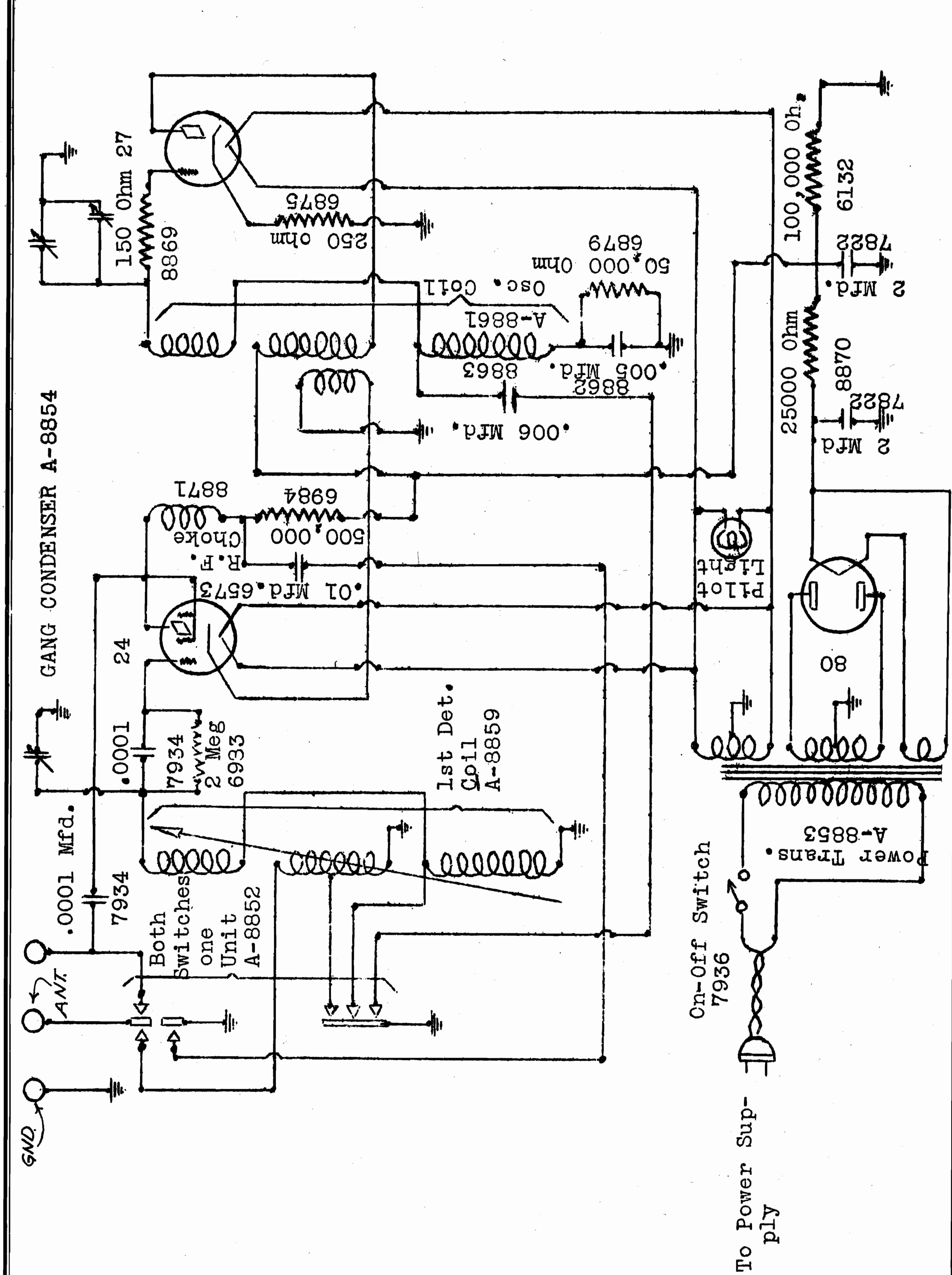
Band No. 2 from 10.0 to 4.0 megacycles includes the 49 meter band, the 31 meter band and some amateur stations. Stations broadcast within this band include many of the foreign short wave stations and North American Stations. Reception of stations transmitting on the 49 meter band is most reliable during the Summer months when located approximately 300 miles or more during daylight which increases to 1,500 miles or more when a large portion of the signal path lies in darkness. The Winter range is approximately 600 miles during daylight and 2,000 miles or more after sundown. Stations operating on the 31 meter band are most reliable when the receiver is located about 800 miles away during daylight in the Summer months increasing to 2,500 miles after sundown.

Band No. 1, from 24 megacycles to 10.0 megacycles includes the 25, 19 and 16 meter bands. Reception of stations in the 25 meter band is best during daylight when the receiver and transmitter are located 1,000 miles or less than 2,000 miles apart. After sundown reception may be expected only from stations located a distance of 2,000 miles or more away from the receiver. Stations operating on the 19 meter band provide satisfactory reception generally during daylight hours only. After nightfall or when any appreciable portion of the transmission path is in darkness signals are rarely heard. Stations operating below 19 meters are generally useful only when transmitting during daylight and over a distance of 2,000 miles or more. Ordinarily they cannot be received after sunset.

| | |
|---|---|
| 1039 | Broadcast, Antenna, Preselector & Oscillator Coil |
| 1083 | Short Wave Oscillator Coil |
| 1092 | Short Wave Antenna & First Detector Coil |
| 1038 | First I. F. Transformer |
| 9835 | Second I. F. Transformer |
| 9662 | Third I. F. Transformer |
| 9800 | R. F. Choke |
| 6786 | 10,000 Ohm 1/3 Watt Resistor |
| 7998 | 1 Meg Ohm 1/3 Watt Resistor |
| 8906 | 250,000 Ohm 1/3 Watt Resistor |
| 6880 | 6,000 Ohm 1/3 Watt Resistor |
| 9287 | Short Wave Trimmer Disc. Assembly |
| 9682 | Short Wave Trimmer Worm Tuning Rod |
| 9673 | Padding Condenser |
| 9674 | Padding Condenser |
| 9799 | Trimmer Condenser |
| 9659 | Electrolytic Condenser Dual 8 Mfd. |
| 8876 | Electrolytic Condenser 5 Mfd. |
| 1110 | Electrolytic Condenser 4 Mfd. |
| 9660 | Power Transformer |
| 9663 | Dynamic Speaker 6" |
| 9723 | Dynamic Speaker 8" |
| 9666 | Volume Control |
| 9174 | Tone Control |
| 9668 | Tuning Meter |
| 1068 | Wire Wound Resistor Strip |
| 9671 | Pilot Lamp Socket |
| 6248 | 2.5 Volt Pilot Lamp Bulb |
| 8980 | Tube Shield |
| 9082 | Tube Shield Cap |
| 9459 | .0005 Mfd. Moulded Condenser |
| 9698 | 1 Mfd. 100 Volt Condenser |
| 9203 | .1 Mfd. 400 Volt Condenser |
| 9386 | .1 Mfd. 200 Volt Condenser |
| 8961 | .05 Mfd. 400 Volt Condenser |
| 1077 | .03 Mfd. & .004 Mfd. 400 Volt Condenser |
| 1170 | .0005 Mfd. & .05 Mfd. 400 Volt Condenser |
| 9691 | .001 Mfd. & .05 Mfd. 400 Volt Condenser |
| 6765 | .2 Mfd. 400 Volt Condenser |
| 9032 | .2 Mfd. 200 Volt Condenser |
| [illegible]84 | 500,000 Ohm 1/3 Watt Resistor |
| 8000 | 100,000 Ohm 1/3 Watt Resistor |
| 6879 | 50,000 Ohm 1/3 Watt Resistor |
| 8907 | 25,000 Ohm 1/3 Watt Resistor |
| 6875 | 250 Ohm 1/3 Watt Resistor |
| 7997 | 2,000 Ohm 1/3 Watt Resistor |

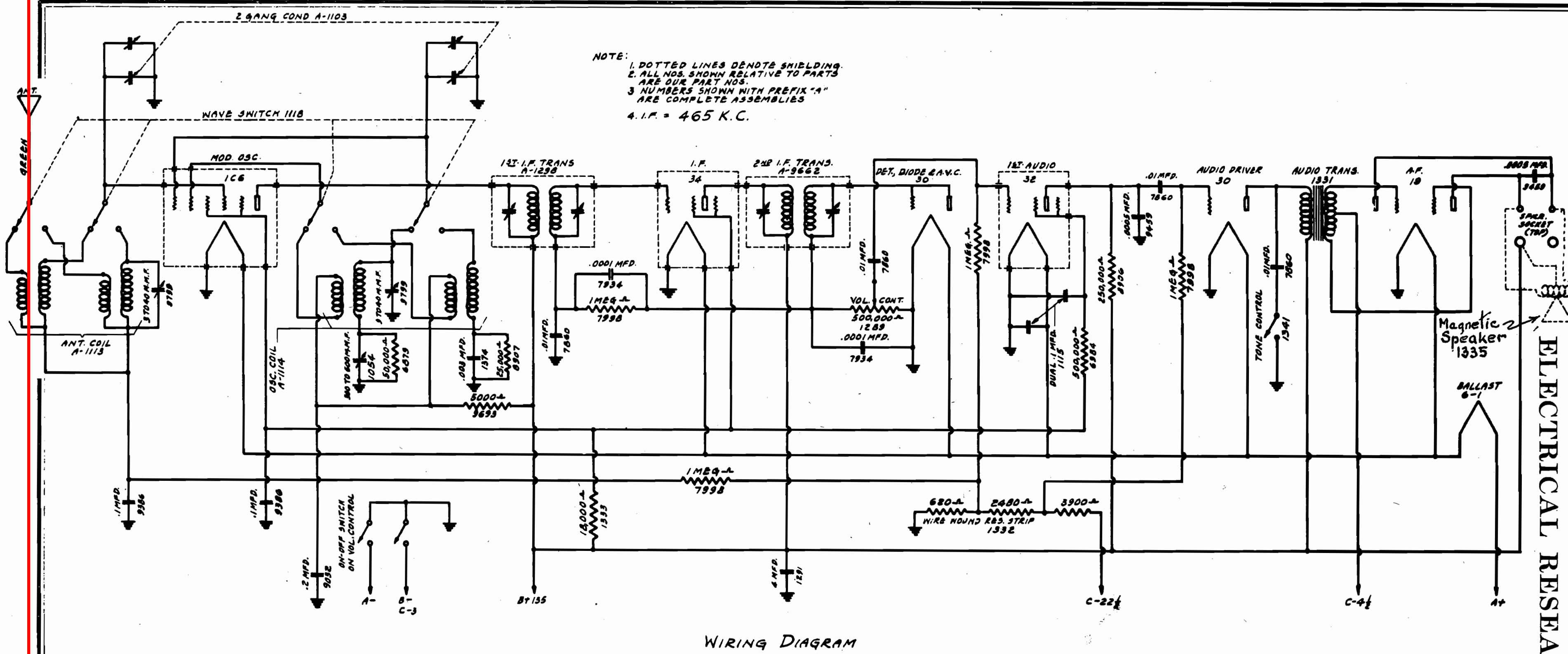
**MODEL SW Converter**
**Schematic**

# ELECTRICAL RESEARCH LABS.



# ELECTRICAL RESEARCH LABS.

## MODEL 7700,7732,7741 Schematic,Voltage




WIRING DIAGRAM

VOLTAGE TABLE
"A" Battery - 3 Volt Dry Cell
"B" Battery - 3 45 Volt "B" Batteries
"C" Battery - 1 22½ Volt Battery

| TUBE | | FIL. | PLATE | SCREEN | GRID NO.2 | GRID NO 3 & 5 |
|---|---|---|---|---|---|---|
| 1C6 | Oscillator & 1st Detector | 2.1 | 135 | | 115 | 67½ |
| 30 | Second Detector | 2.1 | | | | |
| 34 | I. F. | 2.1 | 135 | 67½ | | |
| 32 | 1st Audio | 2.1 | 37.5## | 20## | | |
| 30 | Driver | 2.1 | 135 | | | |
| 19 | Output | 2.1 | 135 each plate | | | |

## Comparative voltage only
Read all voltages from socket to chassis

Total "B" Drain - .023 Amperes
Total "A" Drain - .620 Amperes

When making tube voltage checks use batteries that deliver full voltage with the receiver turned on.

MODEL 7700,7732,7741
Alignment,Parts List

# ELECTRICAL RESEARCH LABS.

| PART NUMBER | | LIST PRICE | PART NUMBER | | LIST PRICE |
|---|---|---|---|---|---|
| 1113 | Antenna Coil | $1.63 | 1333 | 18,000 Ohm 1/2 Watt Resistor | $ .19 |
| 1114 | Oscillator Coil | 1.63 | 9693 | 5,000 Ohm 1/3 Watt Resistor | .19 |
| 1298 | 1st I. F Transformer | 2.05 | 8907 | 25,000 Ohm 1/3 Watt Resistor | .19 |
| 9662 | 2nd I. F. Transformer | 2.05 | 1292 | 6 Conductor Battery Cable | .68 |
| 1331 | Audio Transformer | 1.40 | 1289 | Volume Control with D.P.S.T. Switch | 1.24 |
| 1291 | 4 Mfd. Wet Electrolytic Condenser | .85 | 1341 | Tone Control Switch | .40 |
| 1115 | Dual .1 Mfd. 200 Volt Condenser | .35 | 1370 | One Color Tuning Dial | .30 |
| 7860 | .01 Mfd. 400 Volt Condenser | .17 | 1338 | Two Color Tuning Dial | .35 |
| 9032 | .2 Mfd. 200 Volt Condenser | .23 | 1103 | Two Gang Condenser | 3.93 |
| 9459 | .0005 Mfd. Mica Mould Condenser | .21 | 1361 | Tube Shield | .15 |
| 7934 | .0001 Mfd. Mica Mould Condenser | .21 | 9988 | Tube Shield | .11 |
| 1374 | .003 Mfd. Mica Mould Condenser | .21 | 1053 | Padding Condenser | .50 |
| 1332 | Wire Wound Resistor Strip | .35 | 1054 | Padding Condenser | .55 |
| 7998 | 1 Meg Ohm 1/3 Watt Resistor | .19 | 9799 | Trimmer Condenser | .15 |
| 6984 | 500,000 Ohm 1/3 Watt Resistor | .19 | 6-1 | Voltage Regulator Tube | 3.00 |
| 8906 | 250,000 Ohm 1/3 Watt Resistor | .19 | 1179 | Knob, Large | .15 |
| 6879 | 50,000 Ohm 1/3 Watt Resistor | .19 | 1180 | Knob, Small with Dot | .17 |
| | | | 9758 | Knob, Small | .14 |

Prices are subject to change without notice.

PART NO.7700

SERVICE NOTES
for the
BATTERY OPERATED
SEVEN TUBE SUPERHETERODYNE RECEIVER

ALIGNMENT PROCEDURE: For properly aligning either the intermediate transformer or the gang condenser it is necessary that an accurately calibrated oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 106 tube leaving the grid cap disconnected. Connect the ground side of the oscillator to the receiver chassis.

2. Set the test oscillator frequency to 465 kilocycles (this must be accurate).

3. Align the first intermediate ansformer by turning one of the trimmer screws up and down until maximum reading is obtained on the output meter, and then adjust the other trimmer screw of the same transformer for maximum sensitivity.

4. Adjust the second intermediate transformer in the same manner.

NOTE: Two type intermediate transformer trimmers have been used in this receiver. One type has two parallel holes in the top of the shield, one for each trimmer. The other type has a brass hex nut for adjusting one trimmer, the other intermediate trimmer being adjusted with the trimmer screw located inside of the brass hex nut. Regardless of which type trimmer is used the procedure is the same.

TO ALIGN THE VARIABLE CONDENSER: It is important when aligning to follow the procedure carefully, otherwise the receiver will lack sensitivity and the dial calibration will be incorrect.

1. Connect the high output side of the oscillator to the receiver antenna lead and the ground to the chassis.

2. Place the band selector switch for operation on the short wave band, tune the receiver to exactly 15 megacycles on the dial and set the test oscillator frequency to exactly 15 megacycles. THEN TUNE IN THE 15 MEGACYCLE SIGNAL BY ADJUSTING THE TRIMMER MOUNTED ON TOP OF THE OSCILLATOR SECTION OF THE GANG CONDENSER TO MAXIMUM OUTPUT.

Looking at the front of the receiver the oscillator section is the rear section of the gang condenser.

3. Set the band selector switch for operation on the broadcast band, adjust the test oscillator frequency to 1400 kilocycles and set the receiver dial to exactly 1400 kilocycles. NEXT, BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE TRIMMER LOCATED UNDERNEATH AND NEAR THE CENTER FRONT OF THE CHASSIS.

4. After making this adjustment tune the dial to 1720 kilocycles and set theoscillator frequency to 1720 kilocycles. If the 1720 kilocycle signal cannot be received reduce the 1400 kilocycle trimmer capacity until the 1720 kilocycle signal is brought in.

5. Next, set the receiver dial and test oscillator to exactly 1400 kilocycles, and adjust the trimmer located on the front section of the gang condenser for maximum sensitivity.

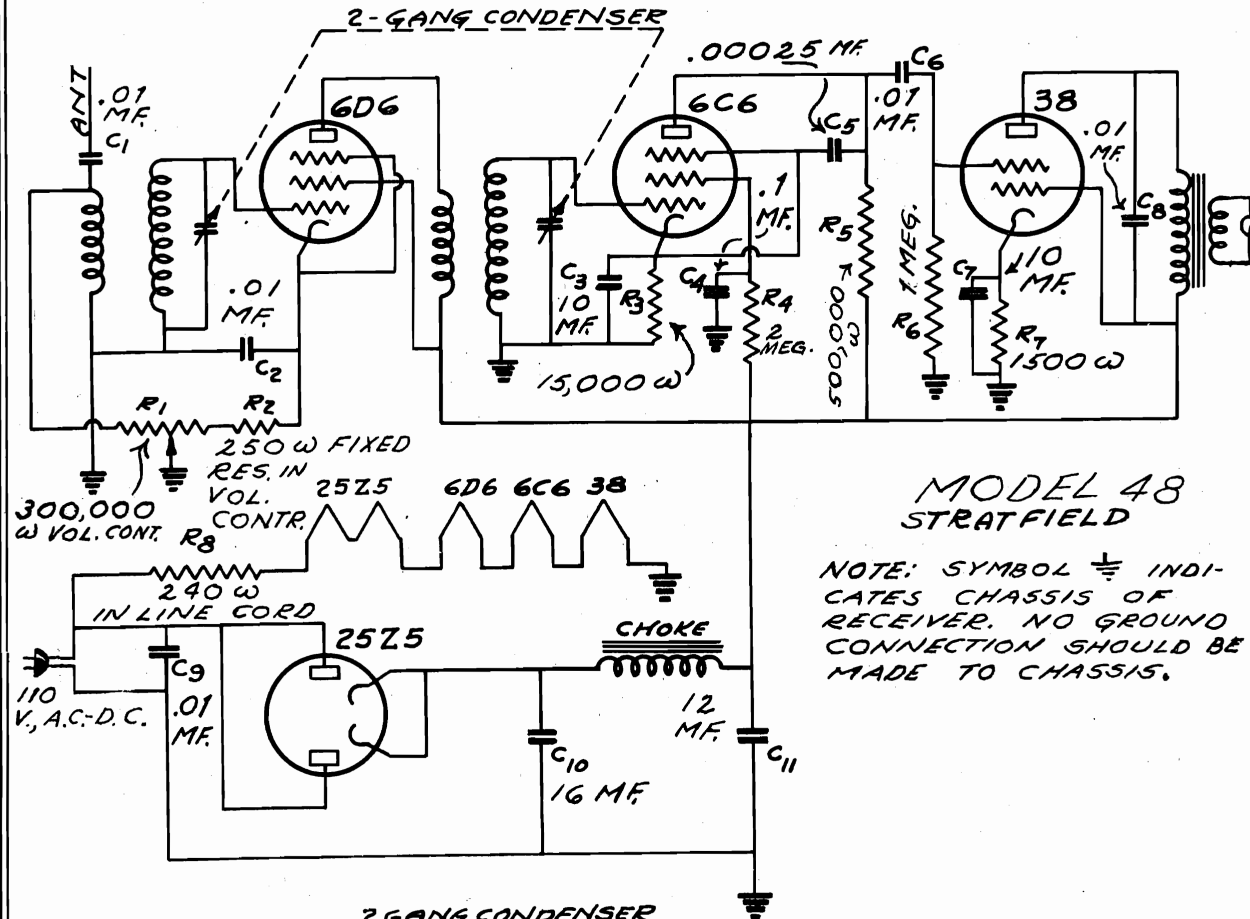
6. Leave the band selector switch for operation on the broadcast band, tune the receiver and set the oscillator to approximately 600 kilocycles. Then adjust the 600 kilocycle padding condenser,which is located on and accessible through the small hole in the front of the chassis, for maximum sensitivity. As this adjustment is quite critical it is necessary to rock the condenser slightly to the right and left to find the point of greatest sensitivity.

7. Place the band selector switch for operation on the short wave band, adjust the test oscillator frequency to exactly 15 megacycles and set the receiver dial to 15 megacycles. Turn the receiver on its back with the dial up and adjust the trimmer, which is mounted on the top of the coil underneath and near the right hand side of the chassis, for maximum output. Be sure to rock the condenser slightly to the right and left when making this adjustment.

This completes the alignment procedure. It is recommended that all of the adjustments be gone over again Generally it will be found that improved results can be obtained if this is done.

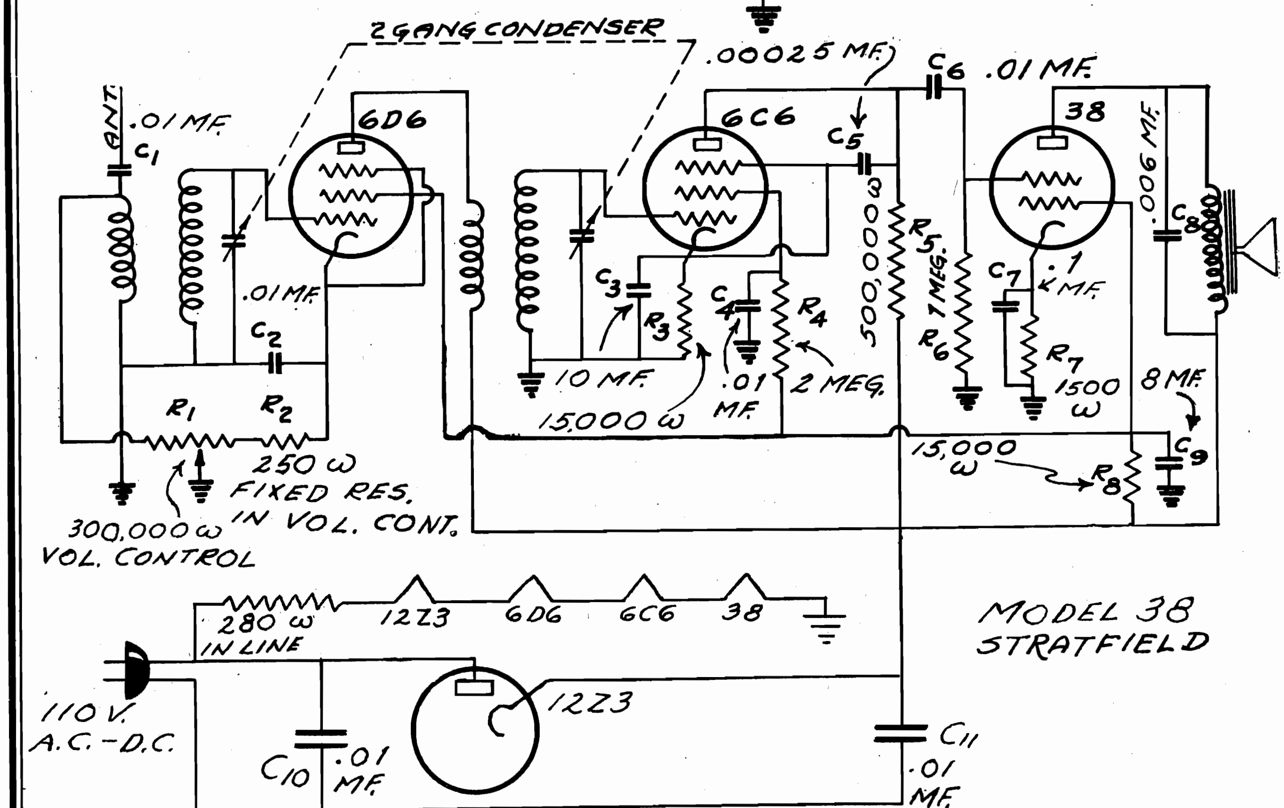
ELECTRIC SPEC. EXPORT CORP.

MODEL 38 Schematic
MODEL 48 Schematic




MODEL 48
STRATFIELD

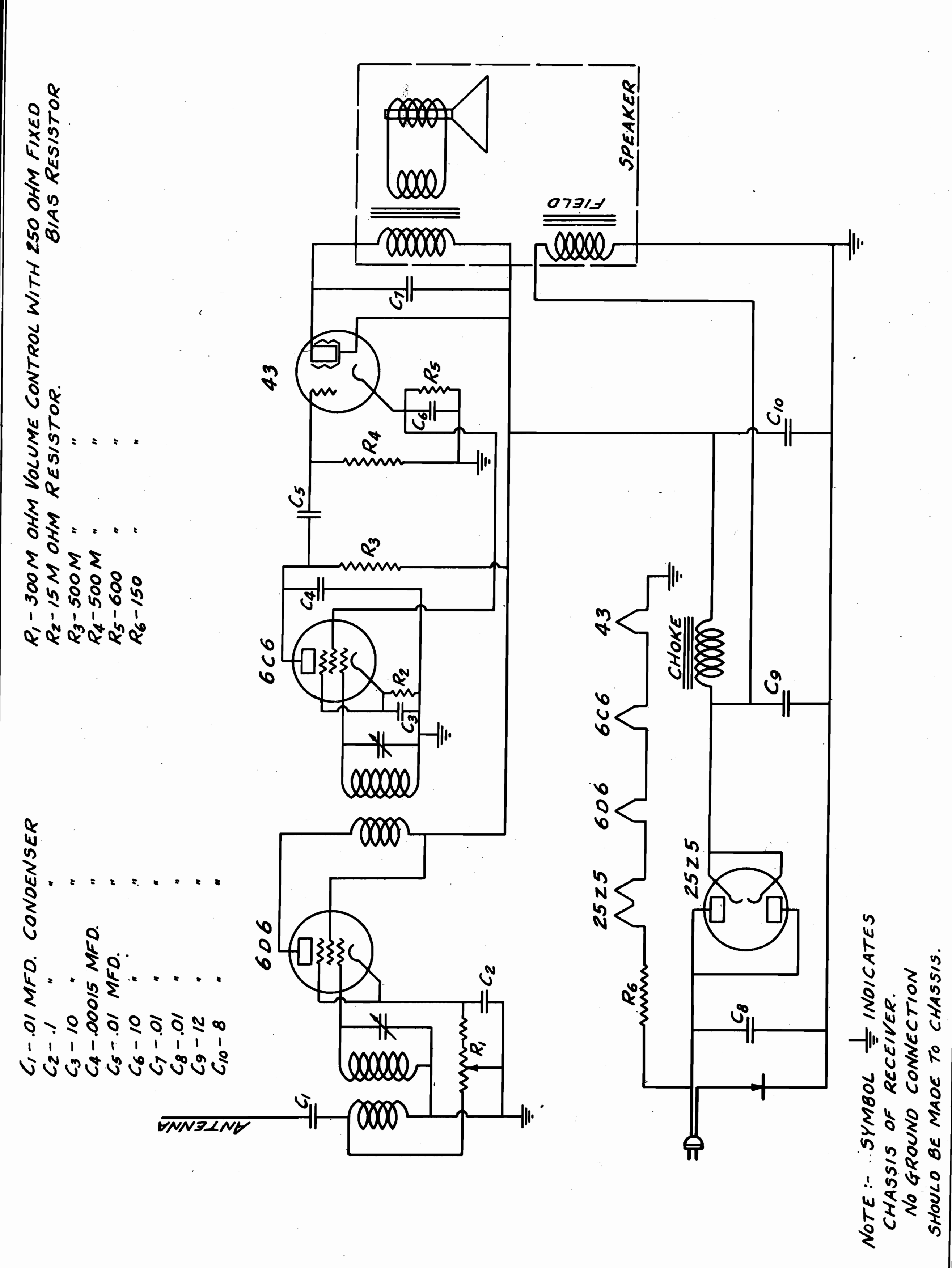
NOTE: SYMBOL ⏚ INDICATES CHASSIS OF RECEIVER. NO GROUND CONNECTION SHOULD BE MADE TO CHASSIS.




MODEL 38
STRATFIELD

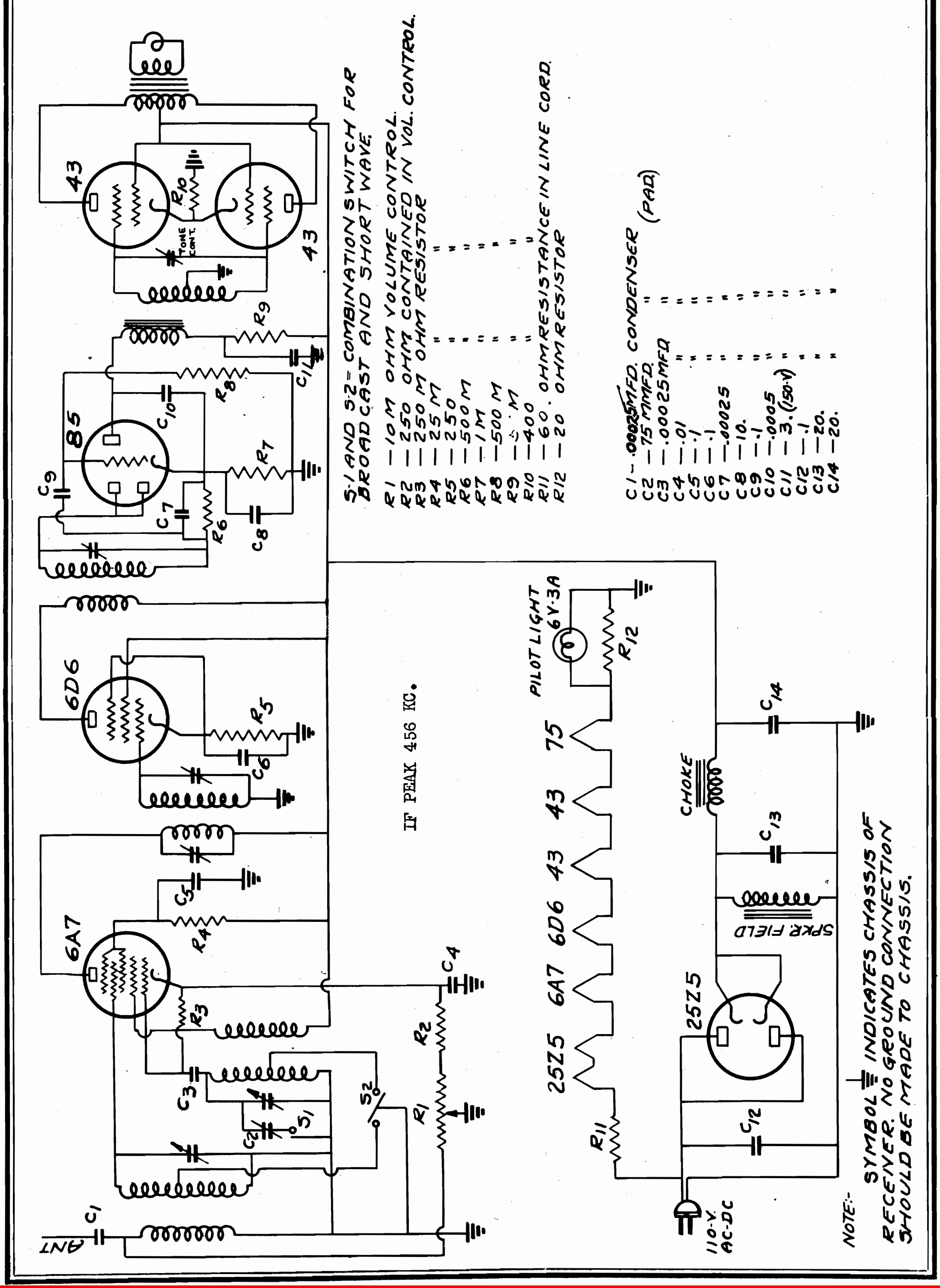
**MODEL 45**
**Schematic**

# ELECTRIC SPEC. EXPORT CORP.



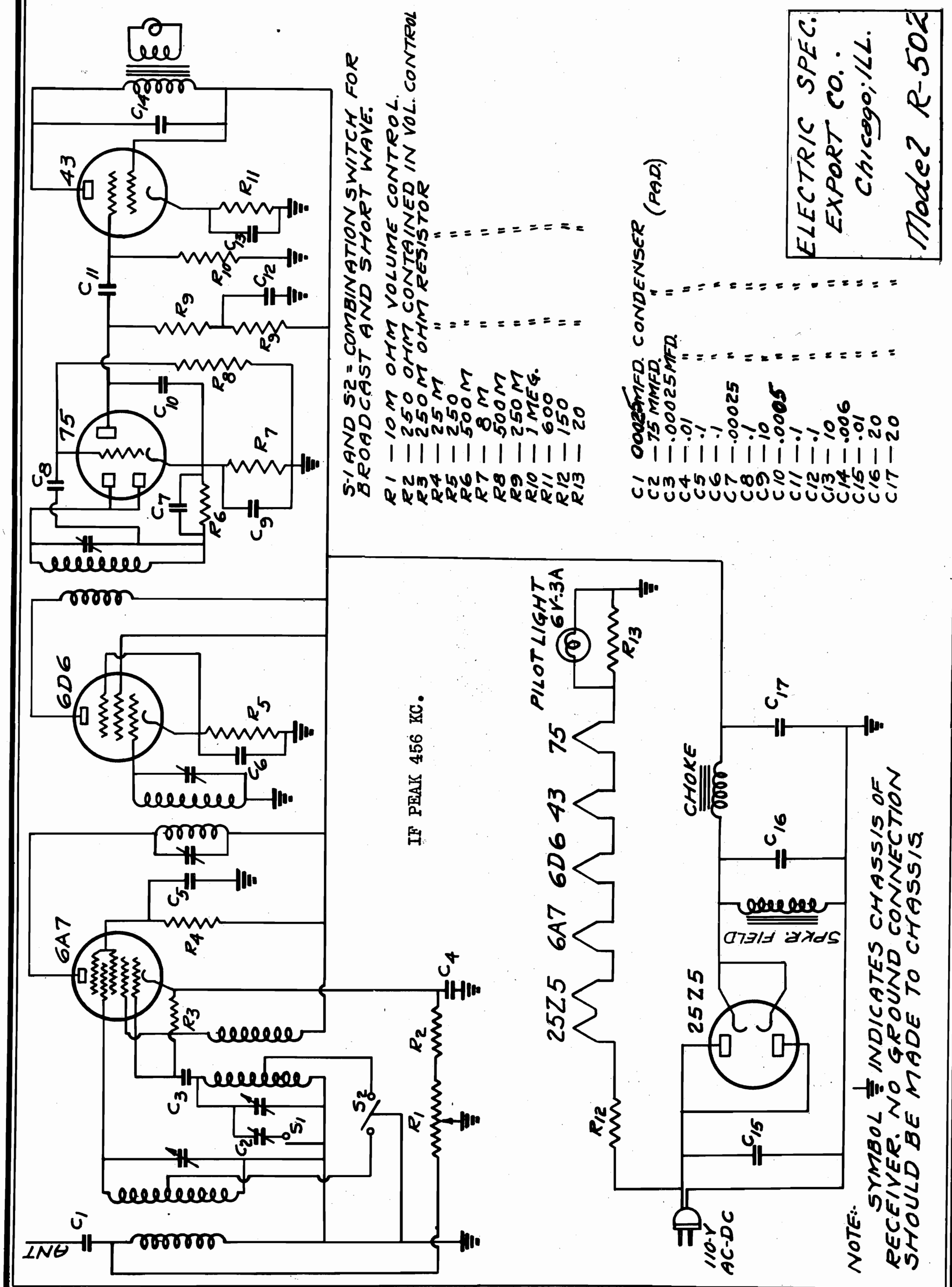
MODEL 69
Schematic

ELECTRIC SPEC. EXPORT CORP.



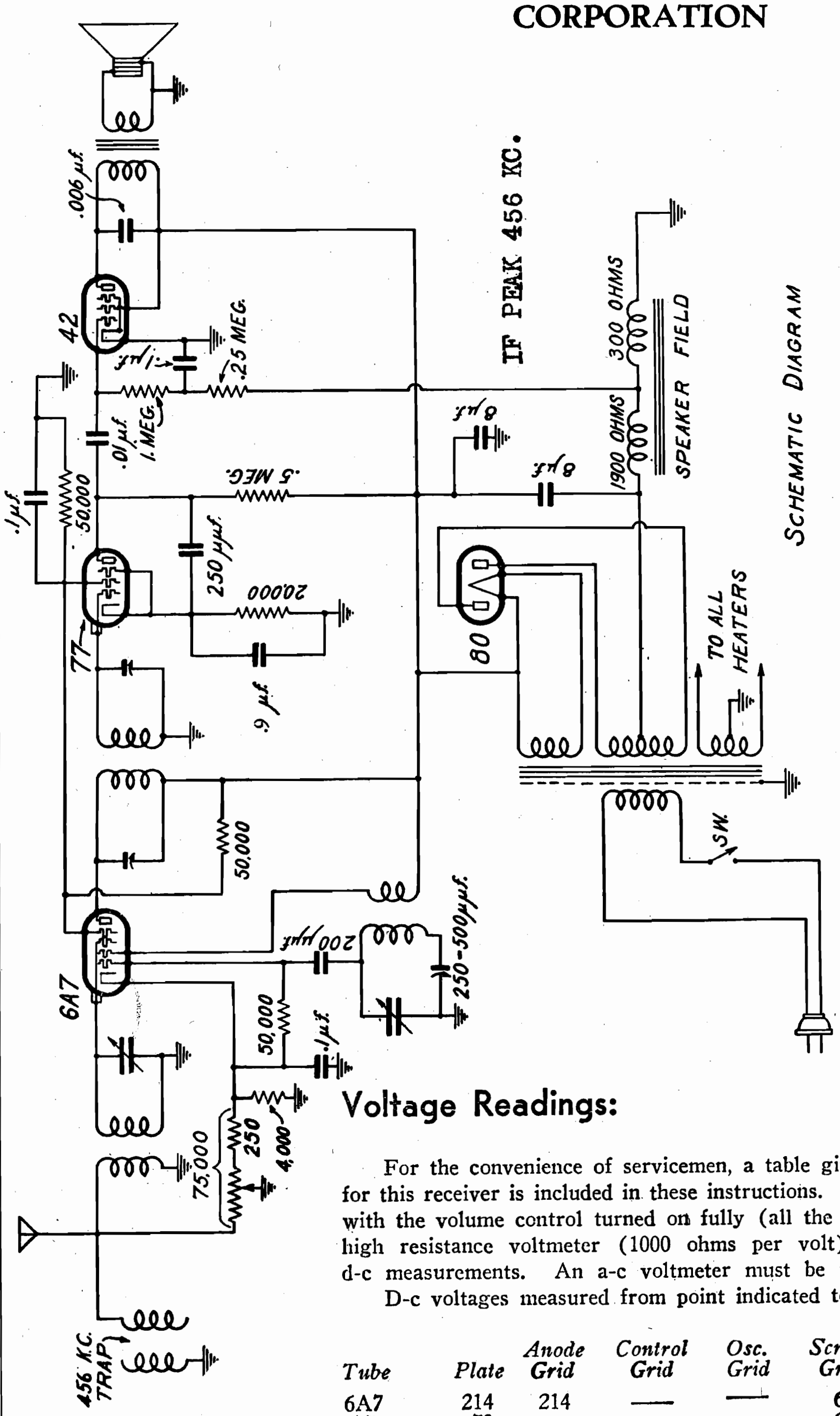
MODEL R-502
Schematic

ELECTRIC SPEC. EXPORT CORP.



MODEL 23 (4-B)
Schematic, Voltage
Parts List

# EMERSON RADIO AND PHONOGRAPH CORPORATION




## Model 23
Chassis Model 4B

| Part No. | Description | List Price Effective as of Sept. 1st, 1934 |
|---|---|---|
| BBT-111 | Antenna Coil | $ .75 each |
| BBT-112 | Oscillator Coil | .50 " |
| BBT-113 | Intermediate Transformer | 1.50 " |
| BBT-114 | Power Transformer | 2.70 " |
| BBR-112 | Volume Control with Switch | .90 " |
| BBC-120 | Two Gang Variable Condenser | 2.20 " |
| UC-93 | Electrolytic Filter Condenser—Dual 8 mfd. | 1.80 " |
| BBC-121 | Padding Condenser | .30 " |
| BBS-74 | Dynamic Speaker | 5.00 " |
| | Any Resistor (give location or specify value—refer to wiring diagram) | .16 |
| | Any Mica Condenser (give location) | .16 |
| BBC-131 | .9 mfd. Roll Type Condenser | .35 |
| | Any Other Roll Type Condenser (give location) | .16 |

## Voltage Readings:

For the convenience of servicemen, a table giving the voltage readings for this receiver is included in these instructions. Readings should be taken with the volume control turned on fully (all the way to the right) and a high resistance voltmeter (1000 ohms per volt) must be used for the d-c measurements. An a-c voltmeter must be used on the a-c circuits. D-c voltages measured from point indicated to ground.

| Tube | Plate | Anode Grid | Control Grid | Osc. Grid | Screen Grid. | Suppressors | Cathode |
|---|---|---|---|---|---|---|---|
| 6A7 | 214 | 214 | — | — | 62 | — | 2 |
| 77 | 70 | — | — | — | 62 | 4 | 4 |
| 42 | 194 | — | *—13 | — | 215 | — | — |
| 80 | — | — | — | — | — | — | — |

*Measured from ground to tap on speaker field winding.

Voltage across field—100 volts d-c.

Voltage across 80 filament—5 volts a-c.

Voltage across all other filaments or heaters—6.2 volts a-c.

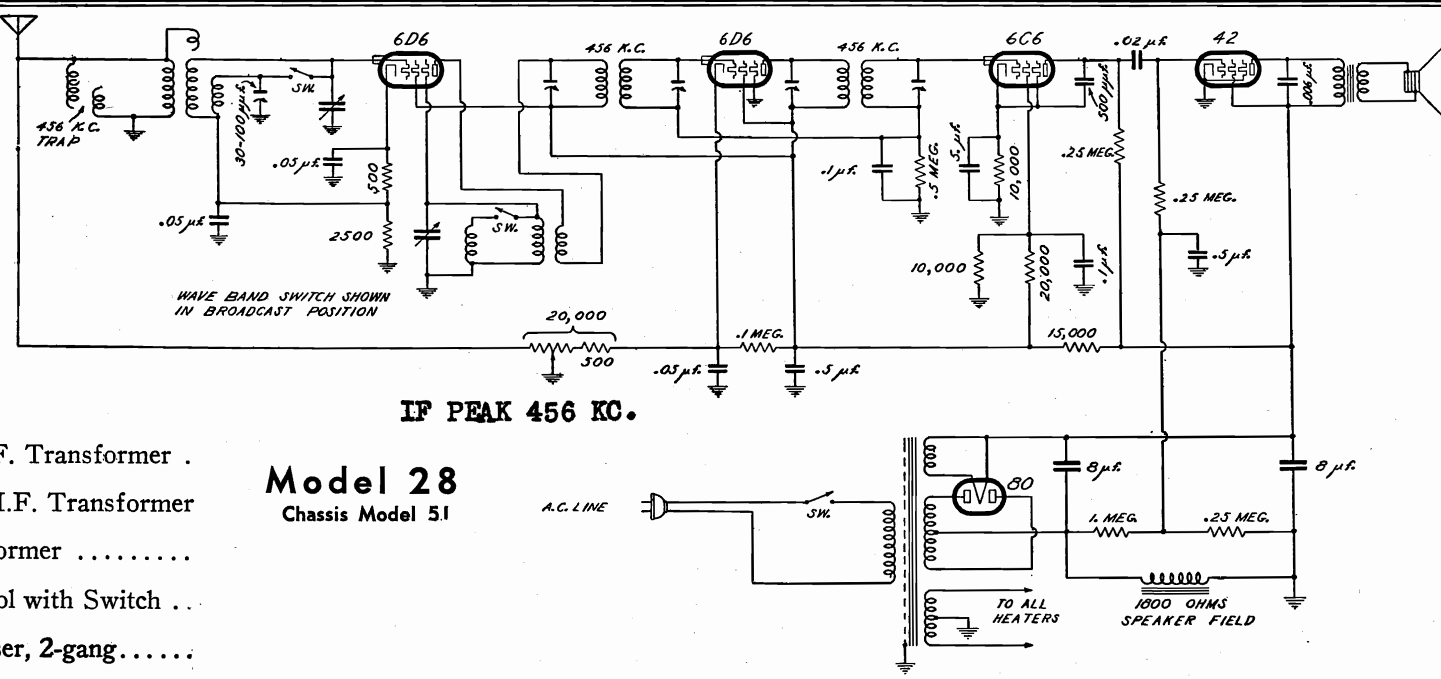
The above voltages, with slight variations, should be obtained with an a-c input line voltage of 117.5.

MODEL 28 (5-J)
Schematic, Voltage
Parts List

# EMERSON RADIO AND PHONOGRAPH CORPORATION

**Broadcast**
540—1500 Kilocycles
550— 200 Meters

**Short Wave**
1500—3000 Kilocycles
200— 100 Meters




**IF PEAK 456 KC.**

## Model 28
Chassis Model 5.1

| Part No. | Description |
|---|---|
| ST-62 | Antenna Coil |
| ST-63 | Oscillator Coil |
| DDT-120 | First Stage I.F. Transformer . |
| DDT-121 | Second Stage I.F. Transformer |
| DDT-122 | Power Transformer ......... |
| DDR-121 | Volume Control with Switch . . |
| UC-90 | Variable Condenser, 2-gang...... |
| UC-93 | 8x8 Mfd. Electrolytic Condenser . |
| IC-43 | 5 Mfd. Electrolytic Condenser . . . |
| EC-19 | .5 Mfd. Roll-type Paper Condenser. |
| | Any other Condenser, (specify capacity or location in circuit) |
| UR-90 | 15,000-ohm 2-watt Resistor.......... |
| | Any other Resistor, (give resistance or location in circuit) |
| | Any socket (specify tube no.)........ |
| UD-10 | Dial Assembly .................... |
| KL-6 | Pilot Lamp ..................... |
| DDS-78 | Dynamic Speaker .................. |
| US-56 | Short-wave to Broadcast change-over Switch |
| SC-81 | Adjustable Trimmer Condenser ........... |

## Voltage Readings:

For the convenience of servicemen, the following voltage readings will serve as a guide in trouble shooting.

Readings are to be taken with all the tubes in their places, volume control turned on full and antenna wire grounded to chassis.

The D.C. Voltmeter used should be 1000 ohms per volt, or over. Line volts 117 A.C.

| | Fil. | Ground to Plate | Ground to Screen | Ground to Cathode | Ground to Suppressor |
|---|---|---|---|---|---|
| 6D6 Osc. 1st Det. | 6.3 A.C. | 80 D.C. | 80 D.C. | 12 D.C. | ............ |
| 6D6 I.F. Amplifier | 6.3 A.C. | 80 D.C. | 80 D.C. | 3 D.C. | ............ |
| 6C6 2nd Det..... | 6.3 A.C. | 150 D.C. | 30 D.C. | 1.7 D.C. | 1.7 D.C. |
| 42 Output ..... | 6.3 A.C. | 245 D.C. | 255 D.C. | ............ | ............ |
| 80 Rectifier ..... | 5.0 | | | | |

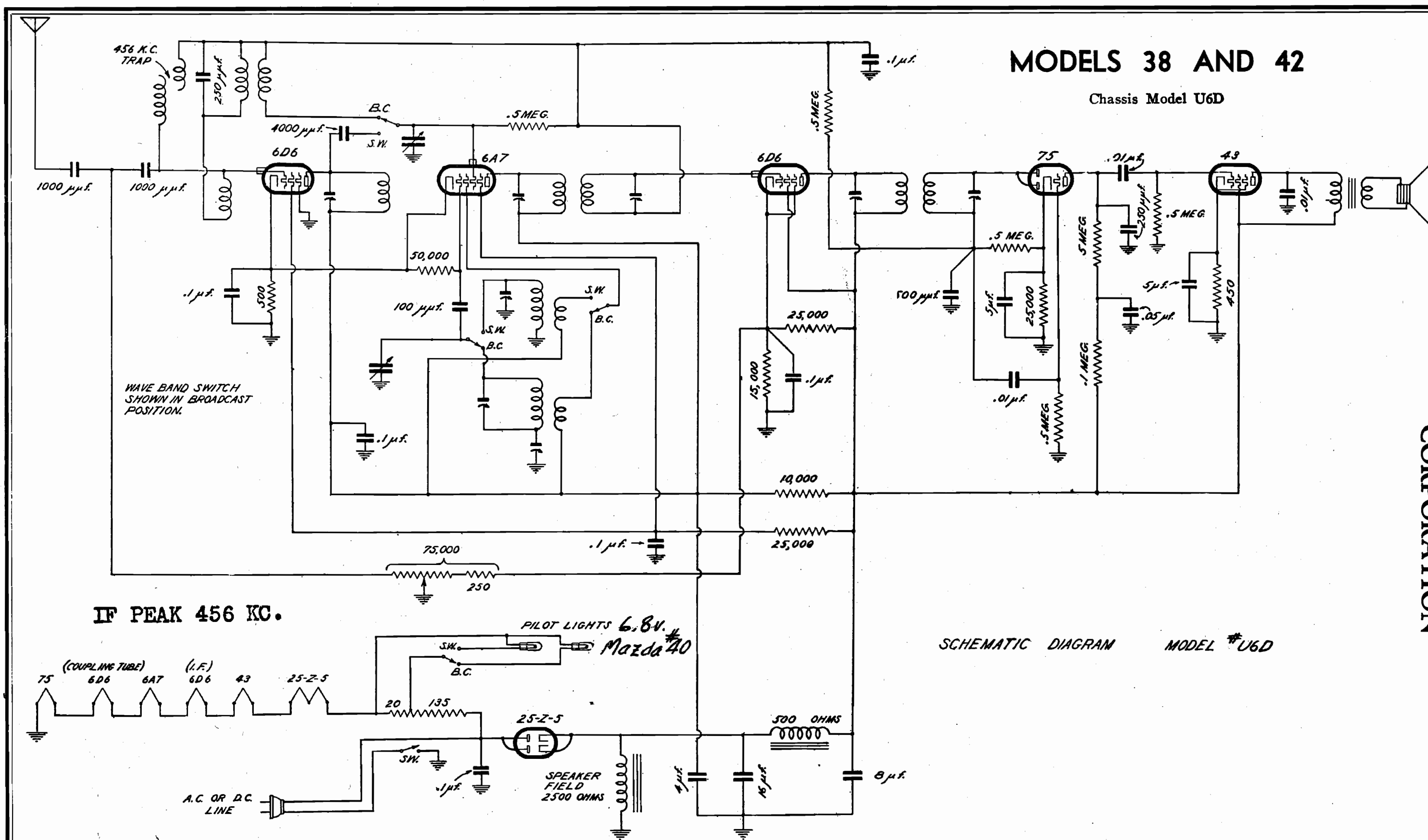
Voltage across speaker field, 90.

MODEL 38,42 (U-6-D)
Schematic,Voltage

# EMERSON RADIO AND PHONOGRAPH CORPORATION

## MODELS 38 AND 42

Chassis Model U6D




Voltages listed below are from the point indicated to ground.

| | Plate | Screen | Suppressor | Cathode |
|---|---|---|---|---|
| 6D6 R.f. | 70 | 50 | 0 | 3 |
| 6A7 Oscillator-Modulator | 70 | 50 | — | 3 |
| 6D6 I.f. | 100 | 100 | 3.5 | 3.5 |
| 75 A.f. | 60 | — | — | 1 |
| 43 Output | 100 | 100 | — | 12.5 |

Voltage across field 125 volts.

Line voltage—117.5 volts a.c.

MODEL 38,42 (U-6-D)
Parts List,Alignment

# EMERSON RADIO AND PHONOGRAPH CORPORATION

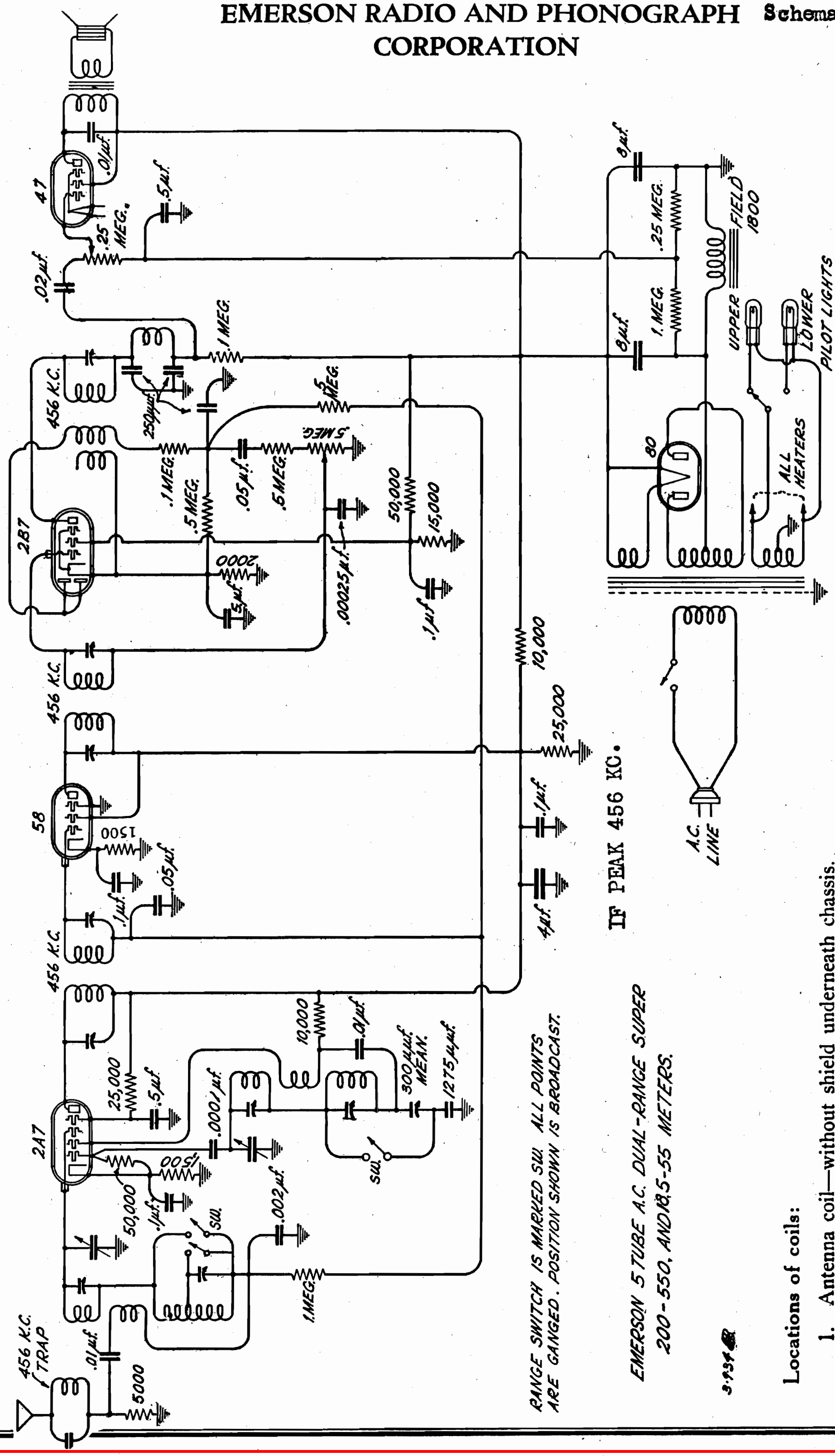
**Alignment procedure:**

1. Short circuit oscillator stator of the variable condenser to ground.
2. Introduce the 456 kc signal on the grid of the 6D6 i-f tube.
3. Adjust the single tuned i-f transformer for maximum response on the output meter.
4. Remove the 456 kc signal from the 6D6 grid and put it on the 6A7 grid.
5. Adjust both trimmers on first i-f transformer for maximum response.
6. Remove 456 kc signal from 6A7 grid.
7. Remove the short circuit from the stator of the oscillator section of the gang condenser.
8. Set the range changing switch to the broadcast band.
9. Make sure that the needle on the dial reaches its extreme position at both ends of the broadcast band when the gang condenser is at maximum and minimum. If the needle does not do this, loosen the set-screw on the hub of the dial and rotate the gang condenser to maximum capacity. Then rotate the needle of the dial (by means of the selector knob) to its extreme position at the 550 kc end of the broadcast band. Tighten the set-screw securely and proceed to realign the set.
10. Set the needle on the dial to 1600 kc.
11. Introduce a 1600 kc signal into the antenna.
12. Adjust oscillator trimmer (the one farthest from the chassis on the oscillator coil) for maximum response.
13. Introduce a 600 kc signal into the antenna. Rock the gang condenser back and forth around the 600 kc dial reading and at the same time adjust the series padding condenser for maximum output. Leave the series padder set to the point of maximum sensitivity. The series padder is on the front of the chassis.
14. Check alignment on 1600 kc.
15. Now throw the range switch to short-wave position and introduce a 15 megacycle (mc) signal into the antenna.
16. Set the dial needle to 15 mc.
17. Adjust oscillator trimmer for maximum output. The short-wave oscillator trimmer is the one nearest the oscillator coil.
18. Connect the antenna to the set and adjust the interstage coil for maximum noise at 15 mc. The interstage coil is the one with only one trimmer on it. Before starting the adjustment turn the trimmer out so as to have minimum capacity and gradually increase it. A peak will be noticed and then as the capacity is increased the noise diminishes and disappears. When the capacity is increased further, the noise may increase again. The peak with the trimmer having less capacity than it has when the noise disappears is the proper peak.

| *Part No.* | *Description* | | |
|---|---|---|---|
| CCT-115 | Composite broadcast short-wave antenna coil | CCC-124 | Two-gang variable condenser |
| CCT-116 | Short-wave r-f interstage tuning choke | BBC-121 | 250-500 mmf padding condenser |
| CCT-117 | Composite broadcast—short wave oscillator coil | CCR-116 | Special ballast resistor |
| CCT-118 | Double-tuned 456 kc first i-f transformer | CCR-118 | 450 ohm 1 watt wire-wound resistor |
| CCT-119 | Double-tuned 456 kc second i-f transformer | CCD-15 | Dial assembly |
| KT-40 | Iron-core filter choke | KL-6 | Pilot lamp, Mazda No. 40 |
| CCR-117 | Volume control with switch | CCS-76 | Range—change switch |
| CCC-125 | 4-8-16 mf, 150 volt d.c., electrolytic filter cond | CCS-75 | 5″ dynamic speaker |
| HC-32 | Dual 5 mf electrolytic condenser, 25 volts d-c | | |
| CCC-126 | .004 mfd. mica condenser | | |

**MODEL 39,59 (D-S5) Schematic**

# EMERSON RADIO AND PHONOGRAPH CORPORATION




Locations of coils:

1. Antenna coil—without shield underneath chassis.
2. Oscillator coil—in round can fastened to front of chassis, underneath.
3. Last i.f. coil—fastened to back of chassis, in small can, underneath.
4. First i.f. coil—on top of chassis with grid lead feeding into 58 tube.
5. Second i.f. coil—on top of chassis with grid lead feeding into 2B7.

MODEL 39,59 (D-S5)
Voltage
Alignment

# EMERSON RADIO AND PHONOGRAPH CORPORATION

Line voltage 115 volts, A.C.—60 Cycles

| | *Plate to ground* | *Screen to ground* | *Cathode to ground* |
|---|---|---|---|
| 2A7 Oscillator | 70 | 50 | 6 |
| 2A7 Modulator | 90 | ... | ... |
| 58 | 90 | 90 | 5.5 |
| 47 | 227 | 235 | ... |
| 2B7 | 115 | 53 | 3 |

## ADJUSTMENTS

This instrument was carefully aligned and adjusted at the factory. ***No one but an experienced serviceman should make an attempt at re-aligning the receiver.*** If it becomes necessary, the following procedure should be accurately executed: :

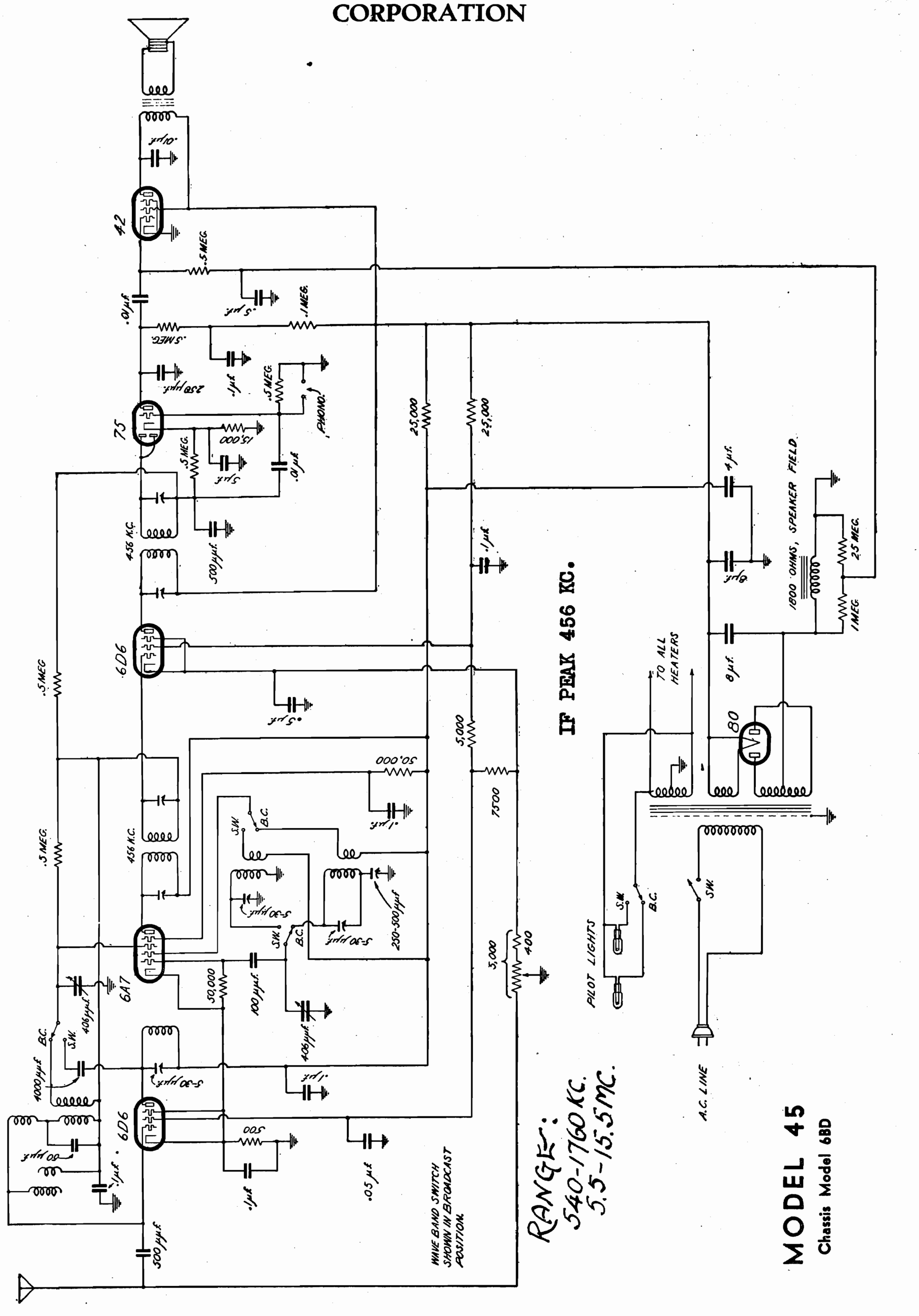
A good accurate oscillator should be used with frequencies of 456 k.c., 600 k.c., 1425 k.c., and 15,000 k.c. In addition, an output meter across the voice coil should be used for the precise results necessary.

Alignment procedure:

1. Short circuit oscillator stator of variable condenser to ground.
2. Introduce 456 k.c. on the grid of the 58 tube.
3. Adjust the trimmer on the single tuned i.f. coil for maximum response on the output meter.
4. Adjust the two trimmers on the double tuned i.f. coil following the 58 tube.
5. Remove the oscillator signal from the 58 grid and introduce it on the grid of the 2A7 tube.
6. Adjust the two trimmers on the first i.f. coil.
7. Re-align all i.f. trimmers for maximum response on the output meter.
8. Remove the 456 k.c. signal from the 2A7 grid. It will not be used again.
9. Remove the short circuit from the stator of the oscillator section of the condenser.
10. Rotate the range changing switch to the left for the short-wave range.
11. Make sure that the needle on the dial reaches its extreme position at both ends of the broadcast scale when the condenser is at maximum and minimum. If this condition is not obtained, loosen the set-screw on the hub of the dial and rotate the condenser plates to maximum capacity. Then rotate the needle of the dial (by means of the selector knob) to its extreme position at the 550 k.c. end of the broadcast scale. Tighten the set-screw securely once again and re-alignment may proceed.
12. Set the pointer of the dial to a little above the higher wave length edge of the 19-meter, brown segment, on the dial.
13. Introduce a strong 15,000 k.c. signal into the antenna.
14. Adjust the short-wave oscillator trimmer, (the trimmer nearest the chassis on the oscillator coil), until the signal comes to maximum. Attenuate the signal.
15. Adjust the short-wave antenna trimmer (the one on the free end of the antenna coil) until the signal again comes to maximum. When these conditions are fulfilled the receiver is aligned on the short-wave range. Remove the 15,000 k.c. signal from the antenna.
16. Rotate the range switch to the right (broadcast position) and set the pointer of the dial to 1425.
17. Introduce the 1425 k.c. signal into the antenna. Adjust the oscillator trimmer (the trimmer on the oscillator coil, furthest from the edge of the chassis) for maximum response. Attenuate this signal.
18. Adjust the broadcast antenna trimmer for maximum response (the trimmer on the end of the antenna coil closest to the chassis). Remove the 1425 k.c. signal from the antenna.
19. Introduce 600 k.c. into the antenna. Rock the gang condenser back and forth around the 600 k.c. dial reading, and at the same time, adjust the series padding condenser for maximum output. Leave the series padder set to the point of maximum sensitivity. (Series padder is on side of oscillator coil can). Broadcast alignment is now complete.

**MODEL 45 (6-BD)**
**Schematic**

# EMERSON RADIO AND PHONOGRAPH CORPORATION



MODEL 45 (6BD)
Alignment
Voltage

# EMERSON RADIO AND PHONOGRAPH CORPORATION

1. Short circuit oscillator stator of the variable condenser to ground.
2. Introduce the 456 kc signal on the grid of the 6D6 I-f tube.
3. Adjust both trimmers of the second stage I-f transformer for maximum response on the output meter.
4. Remove the 456 kc signal from the 6D6 grid and put it on the 6A7 grid.
5. Adjust both trimmers on first I-f transformer for maximum response.
6. Remove 456 kc signal from 6A7 grid.
7. Remove the short circuit from the stator of the oscillator section of the gang condenser.
8. Set the range changing switch to the broadcast band.
9. Make sure that the needle on the dial reaches its extreme position at both ends of the broadcast band when the gang condenser is at maximum and minimum. If the needle does not do this, loosen the set-screw on the hub of the dial and rotate the gang condenser to maximum capacity. Then rotate the needle of the dial (by means of the selector knob) to its extreme position at the 550 kc end of the broadcast band. Tighten the set-screw securely and proceed to re-align the set.
10. Introduce a 1600 kc signal into the antenna.
11. Rock the gang condenser back and forth around the unmarked cardinal division at the bottom of the high frequency end of the dial and at the same time adjust oscillator trimmer (the one farthest from the chassis on the oscillator coil) for maximum response.
12. Introduce a 600 kc signal into the antenna. Rock the gang condenser back and forth around the 600 kc dial reading and at the same time adjust the series padding condenser for maximum output. Leave the series padder set to the point of maximum sensitivity. The series padder is on the front of the chassis.
13. Check alignment on 1600 kc.
14. Now throw the range switch to short-wave position and introduce a 15 megacycle (mc) signal into the antenna.
15. Set the dial needle to 15 mc.
16. Adjust oscillator trimmer for maximum output. The short-wave oscillator trimmer is the one nearest the chassis on the oscillator coil.
17. Connect the antenna to the set and adjust the interstage coil for maximum noise at 15 mc. The interstage coil is the one with only one trimmer on it. Before starting the adjustment turn the trimmer out so as to have minimum capacity and gradually increase it. A peak will be noticed and then as the capacity is increased the noise diminishes and disappears. When the capacity is increased further, the noise may increase again. The peak with the trimmer having less capacity than it has when the noise disappears is the proper peak.

**Voltage Analysis:**

Readings should be taken with a 1000 ohms per volt meter.

Voltages listed below are from the point indicated to ground. With volume control on full.

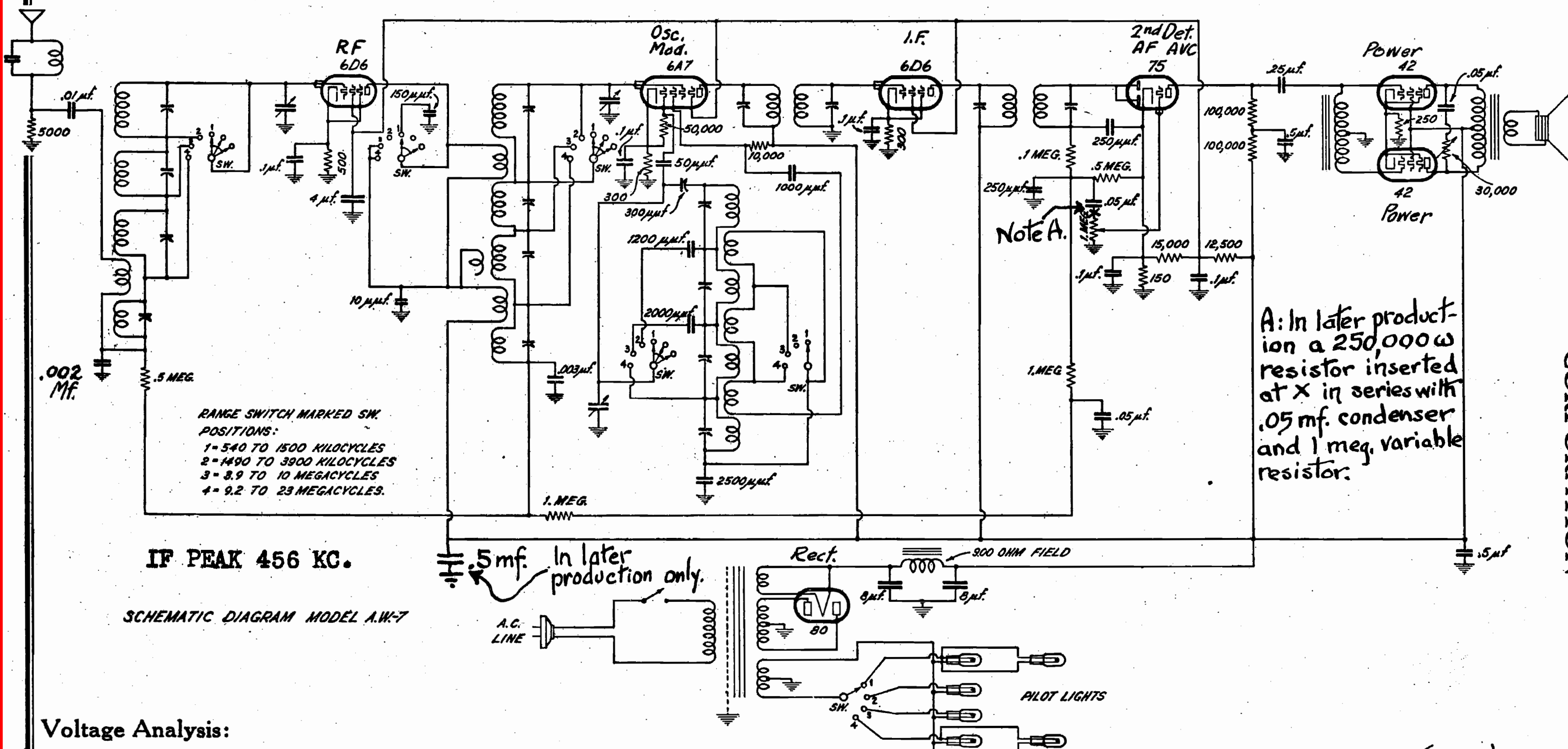
| | *Plate* | *Screen* | *Suppressor* | *Cathode* |
|---|---|---|---|---|
| 6D6 R-f. | 100 | 45 | 3.0 | 3.0 |
| 6A7 Oscillator-Modulator | 100 | 50 | — | 3.0 |
| 6D6 I-f. | 250 | 80 | 4.0 | 4.0 |
| 75 A-f. | 85 | — | — | 1.5 |
| 42 Output | 230 | 250 | — | 0 |

The pilot lights used are Mazda No. 40, 6-8 volts and .15 ampere.

Voltage across field 100 volts. Line voltage—117.5 volts a.c.

MODEL 71,770 (AW-7) Schematic, Voltage Socket Layout

# EMERSON RADIO AND PHONOGRAPH CORPORATION




IF PEAK 456 KC.

SCHEMATIC DIAGRAM MODEL A.W-7

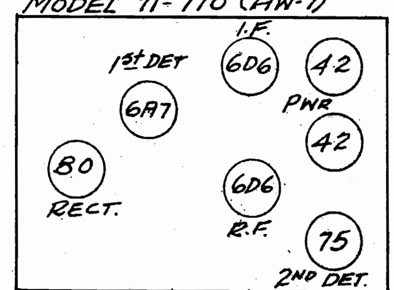
## Voltage Analysis:

Readings should be made with a 1000 ohms per volt meter:

*Line voltage 115 volts, A.C.—60 cycles.*

| | Plate to ground | Screen to ground | Cathode to ground | Oscillator Anode to ground |
|---|---|---|---|---|
| 6D6 R.F. amplifier | 250 | 100 | 4.5 | ... |
| 6A7 Oscillator-modulator | 250 | 100 | 4.5 | 160 |
| 6D6 I.F. amplifier | 250 | 100 | 3 | ... |
| 75 | 150 | ... | 1.25 | ... |
| 42 | 240 | 250 | 16.5 | ... |

MODEL 71-770 (AW-7)




FRONT.

**MODEL 415, 416**
**Revised**
**Voltage, Schematic**

# EMERSON RADIO AND PHONOGRAPH CORPORATION

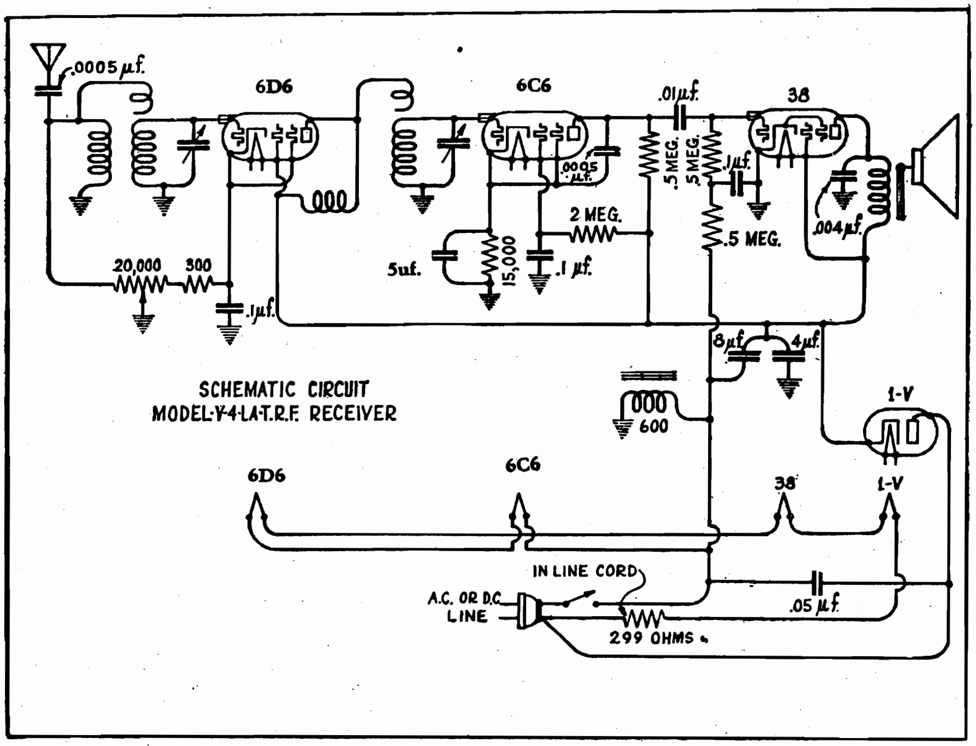
## Voltage Readings:

Readings should be taken with Volume Control fully on, Tuning Control set for 550 KC, and antenna outside of set. Use a D. C. voltmeter having a resistance of 1000 ohms per volt.

| *Chassis* | *To— Plate* | *Screen* | *Cathode* |
|---|---|---|---|
| 6C6—Detector | 10- 15 | 9- 12 | 1- 2 |
| 6D6—R.F. Amplifier | 105-115 | 105-115 | 2- 3 |
| 38—Output Pentode | 105-115 | 105-115 | —— |

Voltage across filter choke is "C" bias for 38 Tube=10v.

Readings will not change materially regardless of type of power supply.




## Notes:

Due to the compact construction of this Model, in order to keep the heat out of the cabinet, the filament dropping resistor has been placed in the cord, thus dissipating the heat along a greater area. The cord will, therefore, become warm under normal operating conditions, without impairing the performance and without damage to the set. Allowing the heat to be radiated by the cord instead of in the set, assures more efficient operation of the set. The total heat and current drain is about the same as a 30 watt electric bulb. To insure normal heating of the cord during operation, stretch out to its full length.

Do not attempt to shorten cord by cutting out a section, as this will ruin the cord.

The antenna can be replaced in its compartment by winding the wire in a small coil. Start the winding close to the set so that the loose end of the wire forms the last coil. If the coil is begun with the end away from the set the wire will twist and kink as it is wound.

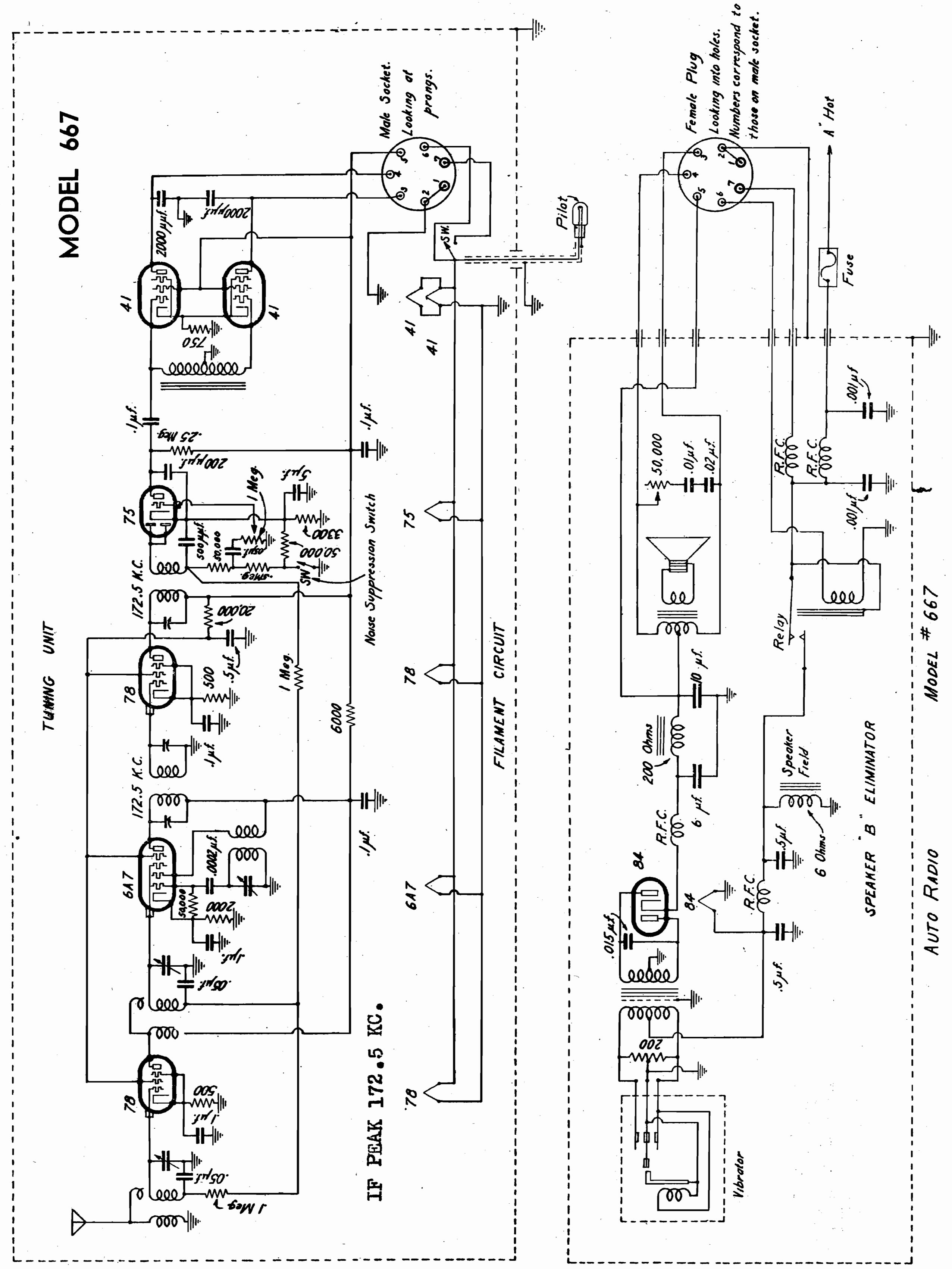
Tubes may be replaced by removing the back of the cabinet.

*Instructions for Replacing Shielded Tubes:*

1. Remove lead at top of tube.
2. Take firm hold of tube and shield and remove both (at the same time) from socket.
3. Slip off ring toward base of tube.
4. TO REPLACE SHIELD REVERSE ABOVE PROCEDURE.

MODEL 667
Schematic

# EMERSON RADIO AND PHONOGRAPH CORPORATION



**MODEL 667**
**Voltage, Alignment**
**Installation Data**

# EMERSON RADIO AND PHONOGRAPH CORPORATION

After unpacking the receiver and before starting to install it, a careful check of the parts furnished should be made.

The following is a list of the items:

1. The receiver proper, complete with six tubes in their places inside, and with front cover intact.
2. Receiver mounting bracket with plate, nut, and lockwasher.
3. Remote control head.
4. Two drive cables.
5. Speaker-eliminator complete with vibrator, tube, mounting bracket, battery cable and receiver connector cable with plug.
6. One distributor suppressor.
7. Six spark plug suppressors.
8. One generator condenser.
9. One ammeter condenser.
10. Four screws and four lock washers for securing bracket to receiver.
11. Two bolts, two nuts and two lockwashers for mounting speaker.

Make a general examination of the receiver. See that the tubes are pushed down in their sockets and that the grid caps are in place on the proper tubes. In order to do this it will be necessary to remove the cap nuts from the front cover plate and slide the receiver out of its housing by pulling out on the cover plate.

Mounting the receiver—while the receiver may be mounted in any available location, three recommended positions are listed below—

1. Mounted so that the control cables face right.
2. Mounted so that the control cables face front.
3. Mounted so that the control cables face left.

Positions 2 and 3 will be found best for most cars. It should be borne in mind that the controls will operate more smoothly if the cables are bent as little as possible. Select a position for the receiver that will allow the cables to fall in an easy sweep. There should be no sharp bends or kinks.

Hold the receiver up against the dash in the desired location with the cables in the direction chosen. Mark around it with a pencil, and in the center of the area bounded by the pencil lines drill a ½" hole through the dash.

Mount the bracket on the receiver using the four screws and lockwashers. Put a lockwasher under the head of each screw and insert the screws through the bracket holes and into the tapped holes in the case. Screw up tightly.

Now lift the receiver into place, pushing the bracket bolt through the hole in the dash. On the engine side of the dash put the mounting plate on the bolt, then the lockwasher and nut. After making certain that the receiver is straight, tighten the nut securely.

Mount the control head on the steering column and connect the cables to control head, following instructions given on the red tag.

To attach the control cables to the receiver insert the free end of the right hand cable into the upper chuck on the receiver. Push the cable in lightly while turning the right hand knob back and forth until the tongue on the drive cable engages with the slot in the condenser shaft. While holding the cable in place tighten the set screw in the chuck enough to prevent turning or withdrawal of the cable housing. If the set screws are too tight the cables will bind.

Proceed in the same manner to connect the other drive cable, inserting the key or key knob into the key hole at the left on the control head, and turning back and forth as before. On turning all the way to the left, the switch will snap to the "off" position.

Connect the pilot light leads to the control head, the black wire going to the insulated post.

Tie the control cables and pilot light lead to the steering column and the dash, using friction tape. Do this at as many points as is necessary to prevent swinging and vibration, always bearing in mind the fact that smooth operation of the controls depends on the manner in which the cables are run.

Now line up the dial pointer, following the instructions furnished on the red tag.

Install the speaker in any convenient location that the length of cable will allow. Drill two ⅜" holes and mount the bracket, using the ⅜" bolts.

Two cables extend from the speaker. On one of these cables is the female end of a detachable six prong plug, the male end of which is on the receiver. Connect the speaker to the receiver by means of this plug, observing that the two large pins on the male half of the plug engage with the two large holes in the female half of the plug. Do not try to force the plug together in any other manner.

A 10 ampere fuse is located in a small tubular holder in the battery lead. To replace the fuse, remove the cap, insert the fuse and replace the cap. The fuse is intended to protect the receiver, and in no case should one larger than 10 amperes be used.

The other cable terminates in a clip, designed for connection to the ammeter binding post. Before attaching this clip the remote control should be tested. See that the knob for the volume control and switch operates properly. When turned all the way to the left the switch should be heard to snap to the "off" position. On turning the knob to the right the switch first snaps on and then operates as the volume control.

The clip on the battery cable may now be attached. Squeeze the sides of the clip together so that the holes are in line, then push it over the battery post of the ammeter and release. If uncertain as to which post is on the battery side of the ammeter, connect the clip to either post and switch on the set by turning the left hand control knob to the right. The dial will immediately light up. Now notice the reading on the ammeter as the set is turned on and off. If when the set is on the ammeter shows discharge, turn off the set and move the clip to the other post.

At this point the antenna should be connected. Proceed as follows:

Assuming that the car is already equipped with a suitable antenna, see that the lead-in is shielded and kept away from the motor compartment and high tension ignition wires.

Check the antenna for a possible ground and if found satisfactory connect it to the inner wire extending through and beyond the shield of the antenna lead on the receiver. Be careful to make a good splice, soldering if possible. Make the splice close enough to both shields so that the portion of wire left unshielded will be short.

Cover the splice with several layers of friction tape and then connect both shields together, again soldering if possible. Ground the shield at one or more points to the dash or car body.

For installations in cars not equipped with built-in antennae, see the instructions given under "Antenna".

The installation of the receiver may now be considered complete, provided all the foregoing instructions were faithfully carried out. A preliminary test can now be made, after which the suppression of any motor noises that are present may be undertaken.

**Intermediate Frequency.**

To align the intermediate frequency transformers use a good modulated oscillator set for 172.5 k.c. Set the volume control for maximum volume and short circuit the rear section of the variable condenser.

Connect the oscillator output across the grid of the 6A7 tube and ground. Connect an output meter across the primary of the speaker transformer or across the voice coil. Using the smallest output from the test oscillator that will give a small reading on the meter, adjust the two i.f. transformers for the largest reading obtainable. Use a non-metallic screw driver if possible.

**Radio frequency and oscillator stages.**

To align the r.f. and oscillator sections, remove the short from the variable condenser, and couple the oscillator through a standard dummy antenna to the antenna lead and ground of the receiver. Set the test oscillator to some frequency between 1350 and 1450 k.c. Set the dial to the frequency selected, following the pointer alignment instructions on the red tag. Adjust the trimmers on the variable condenser, beginning with the oscillator trimmer. Reduce the output of the test oscillator and repeat. In the absence of an oscillator, the r.f. sections may be aligned by tuning in a weak station between 1350 and 1450 k.c. and aligning as before. If an output meter is not available, adjust for maximum volume from the speaker.

**Voltage analysis:**

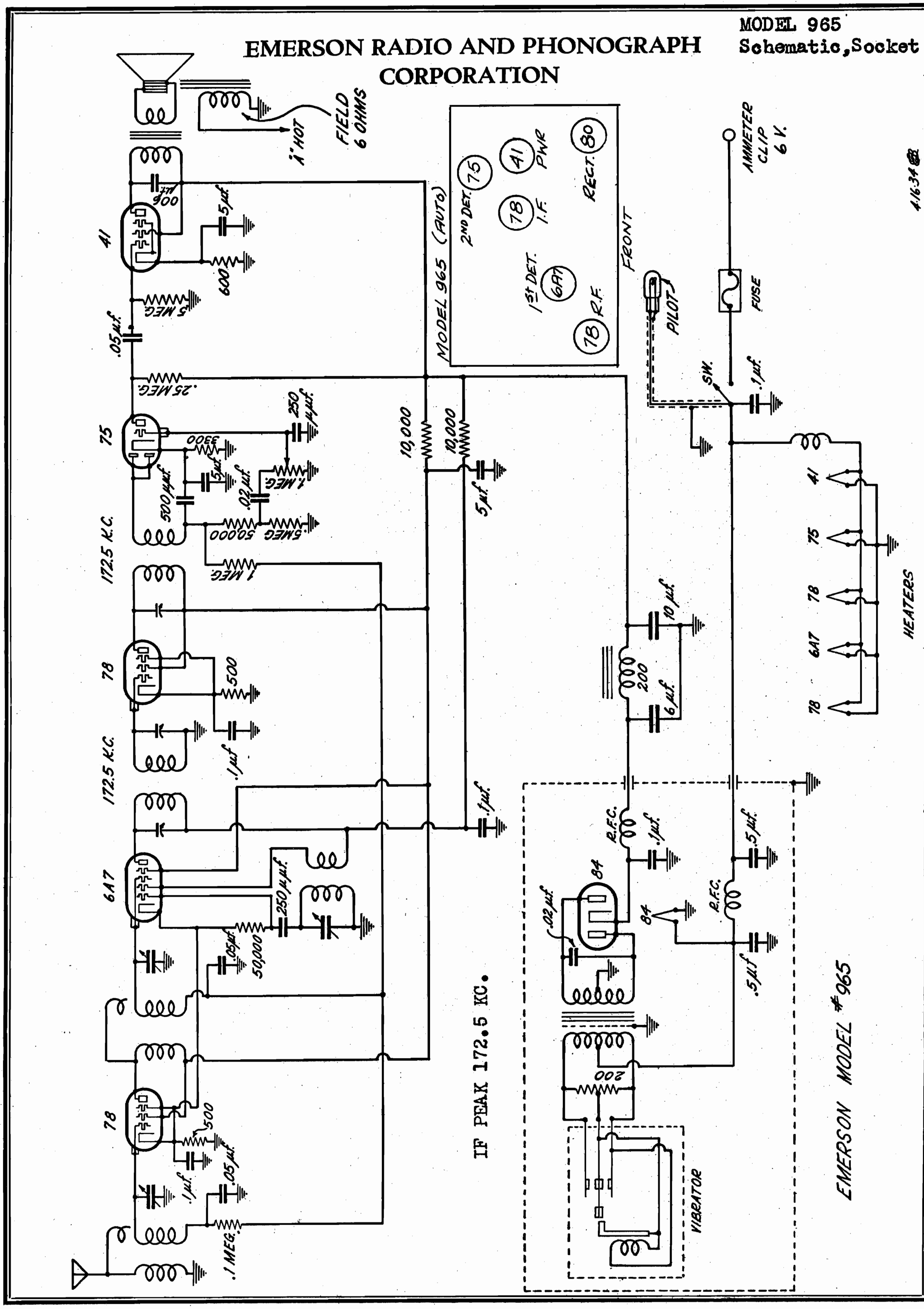
**Note: All "B" and "C" voltages should be measured on a high resistance voltmeter of 1000 ohms per volt or over. Voltages are measured from the chassis (ground) to the point indicated. Ground the antenna to the shield when taking readings.**

Voltage across battery—6 volts.
Voltage across speaker field—6 volts scant.
Voltage across all heaters—6 volts scant.

| *Tube* | *Plate* | *Screen* | *Cathode* | *Suppressor* | *Osc. Plate* |
|---|---|---|---|---|---|
| 78 R.f. | 135 | 90 | 3.5 | 3.5 | ........... |
| 6A7 | 135 | 90 | 12.5 | ........... | 140 |
| 78 I.f. | 180 | 90 | 3. | 3. | ........... |
| 75 | 75 | ........... | 1. | ........... | ........... |
| 41 | 185 | 192 | 16.5 | ........... | ........... |
| 41 | 185 | 192 | 16.5 | ........... | ........... |

MODEL 965
Schematic, Socket

# EMERSON RADIO AND PHONOGRAPH CORPORATION



MODEL 965
Voltage, Alignment

# EMERSON RADIO AND PHONOGRAPH CORPORATION

Tubes and their functions:

| | | |
|---|---|---|
| 1—78 | Radio frequency amplifier. | |
| 1—6A7 | Electron coupled oscillator. First detector. | |
| 1—78 | Intermediate frequency amplifier. | |
| 1—75 | Diode second detector. Audio frequency amplifier. Automatic volume control. | |
| 1—41 | Output power tube. | |
| 1—84 | Full-wave rectifier. | |
| 1—Non-synchronous vibrator inverter. | | |

*Voltage Analysis*:

Note: All "B" and "C" voltages should be measured on a high resistance voltmeter of 1000 ohms per volt or over.

The voltages are measured to ground from the points named. Ground the antenna to its shield when taking readings.

Battery volts—6. Volts across heaters—6 scant. Volts across speaker field—6 scant.

| *Tube* | *Plate* | *Screen* | *Cathode* | *Suppressor* | *Osc. plate* |
|---|---|---|---|---|---|
| 78 | 110 | 110 | 6 | 6 | —— |
| 6A7 | 170 | 110 | 6 | —— | 170 |
| 75 | 110 | —— | 1.3 | —— | —— |
| 78 | 110 | 110 | 3.5 | 3.5 | —— |
| 41 | 210 | 220 | 15 | —— | —— |

If the set fails to operate look for some minor cause which might be one of the following:—

1. No "A" supply—"A" lead to set not making contact with ammeter post. Fuse blown.
2. Low "A" supply—The car battery needs recharging.
3. Tubes not in place in their sockets.
4. Grid caps not in place.
5. Defective tubes.
6. Antenna lead shorted to shield at splice, or otherwise grounded.

A 10-ampere fuse is located in a small tubular holder in the battery lead. To replace the fuse, unscrew the threaded cap, insert the fuse and replace the cap, screwing up firmly. The fuse is intended to protect the receiver and in no case should one larger than 10 amperes be used.

## ADJUSTMENTS

### Intermediate Transformers

To align the intermediate frequency transformers, use a good modulated oscillator set for 172½ k.c. Set the volume control for maximum volume and turn the dial to a point where little or no signal is received; then ground the antenna.

Connect the oscillator output between the grid of the 6A7 tube and ground. Connect an output meter across the primary of the speaker transformer or across the voice coil. Using the smallest output from the test oscillator that will give a small reading on the meter, adjust the two I.F. transformers for the largest reading obtainable. Use a non-metallic screw driver if possible.

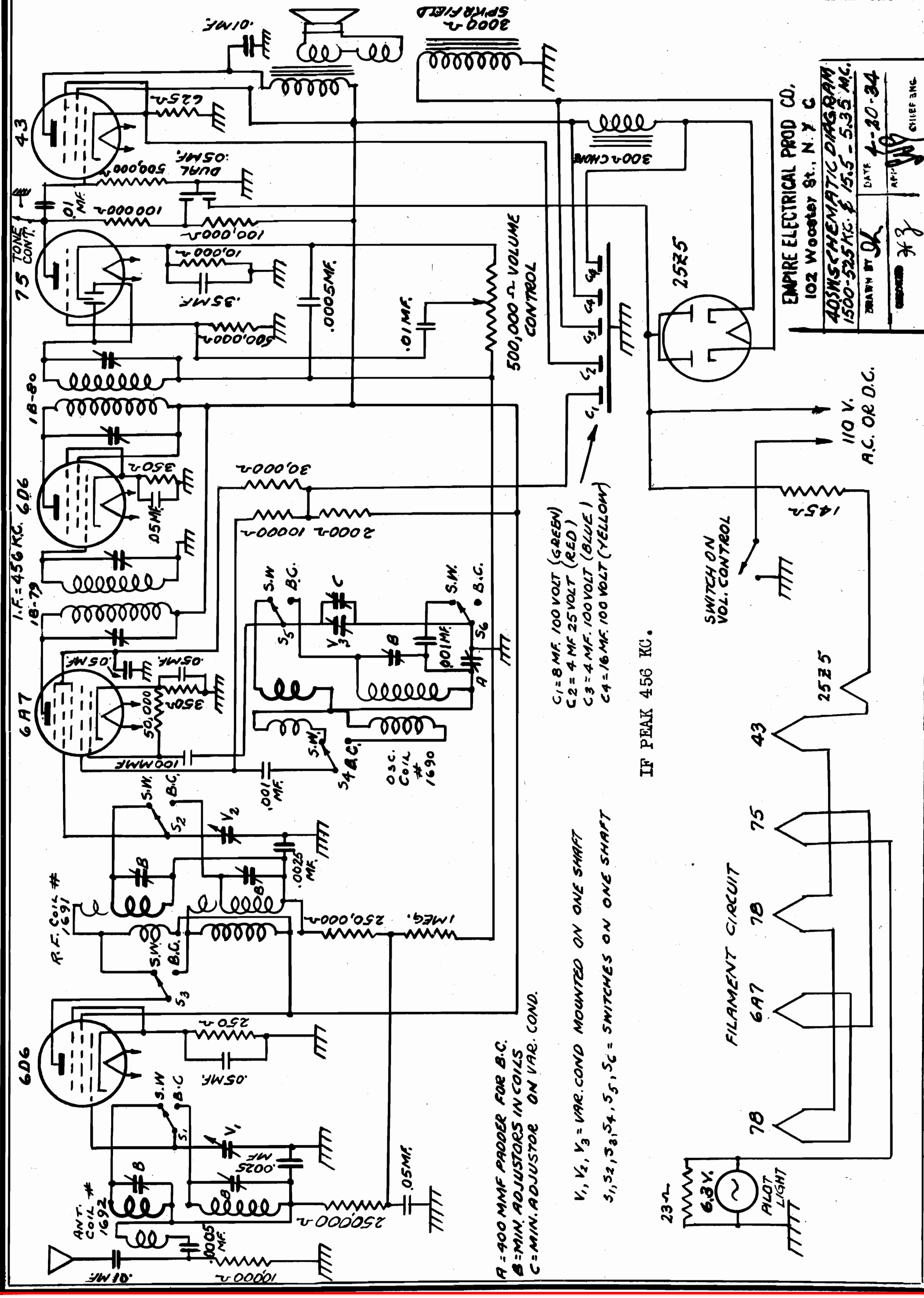
### Radio Frequency and Oscillator

To align the R.F. and oscillator sections, couple the oscillator through a standard dummy antenna to the antenna lead and ground of the receiver. Set the test oscillator to some frequency between 1350-1450 k.c. Set the dial to the frequency selected. Adjust trimmers on the variable condenser beginning with the oscillator trimmer. Reduce the output of the test oscillator and repeat. In the absence of an oscillator, the R.F. sections may be aligned on broadcast.

Tune in a weak station between 1350 and 1450 k.c. and align as before. If an output meter is not available, adjust for maximum volume, then reduce the input and repeat.

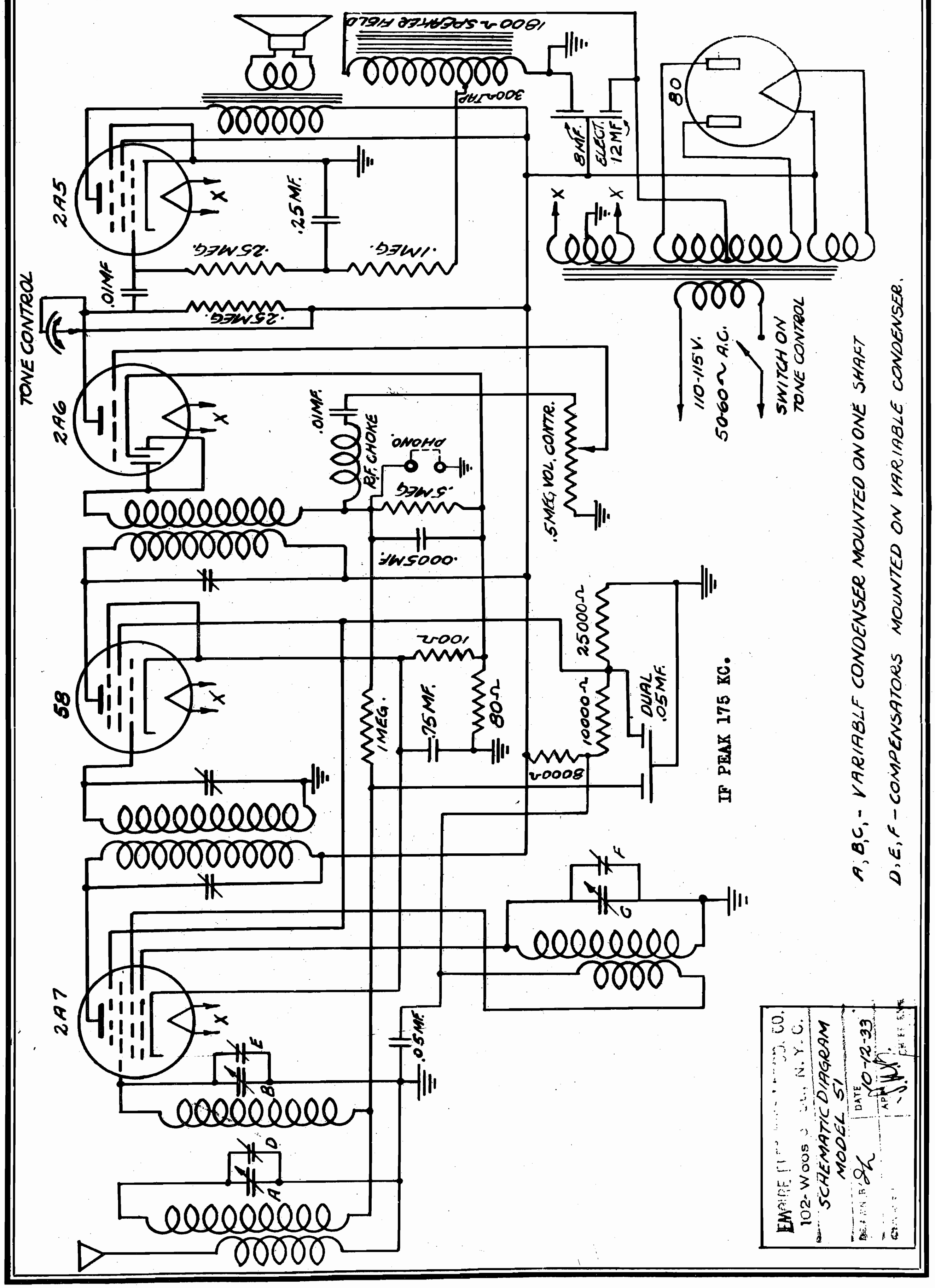
# EMPIRE ELECTRICAL PRODUCTS CO.

**MODEL 40 SW**
Schematic



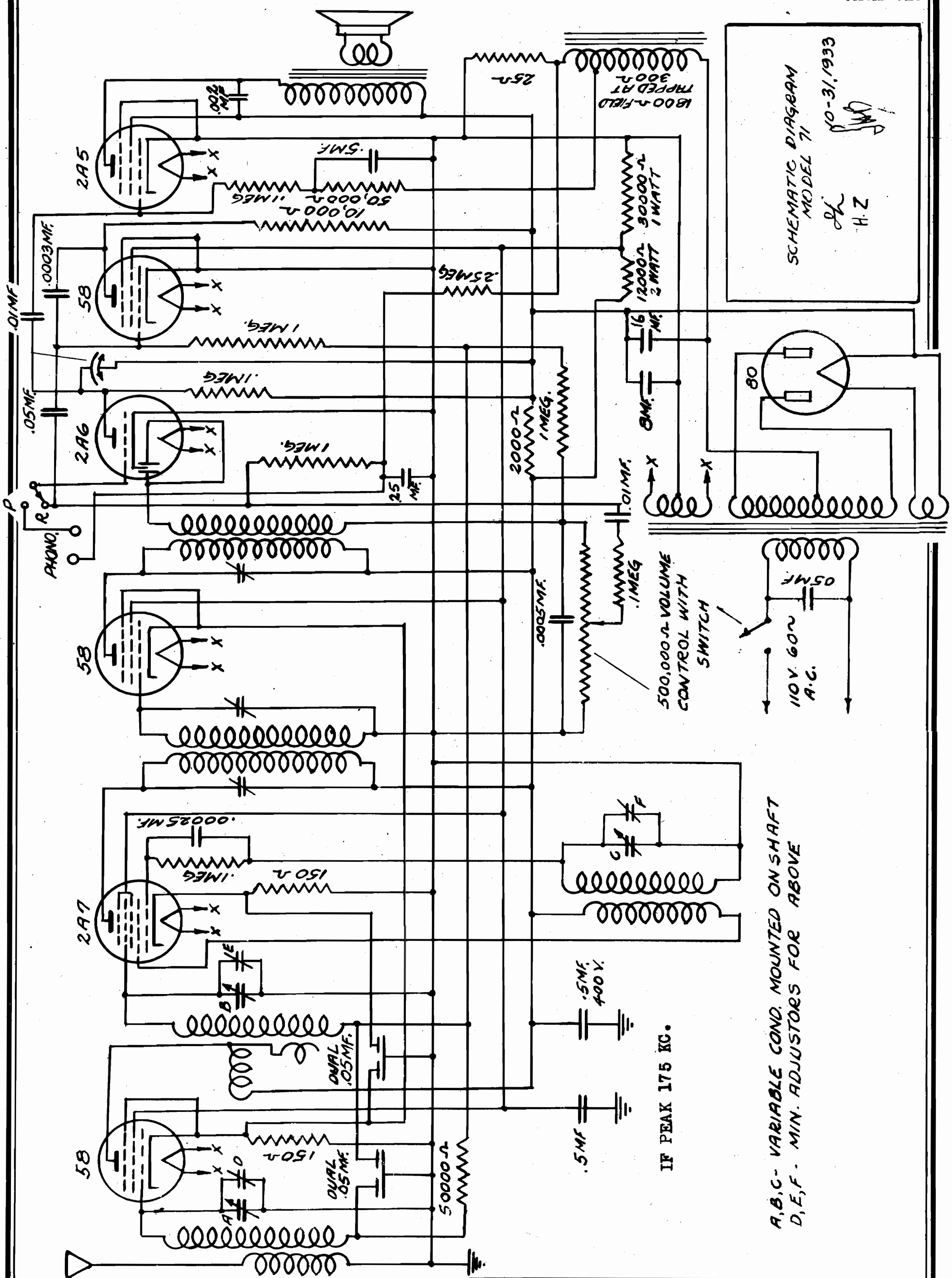
MODEL 51
Schematic

EMPIRE ELECTRICAL PRODUCTS CO.



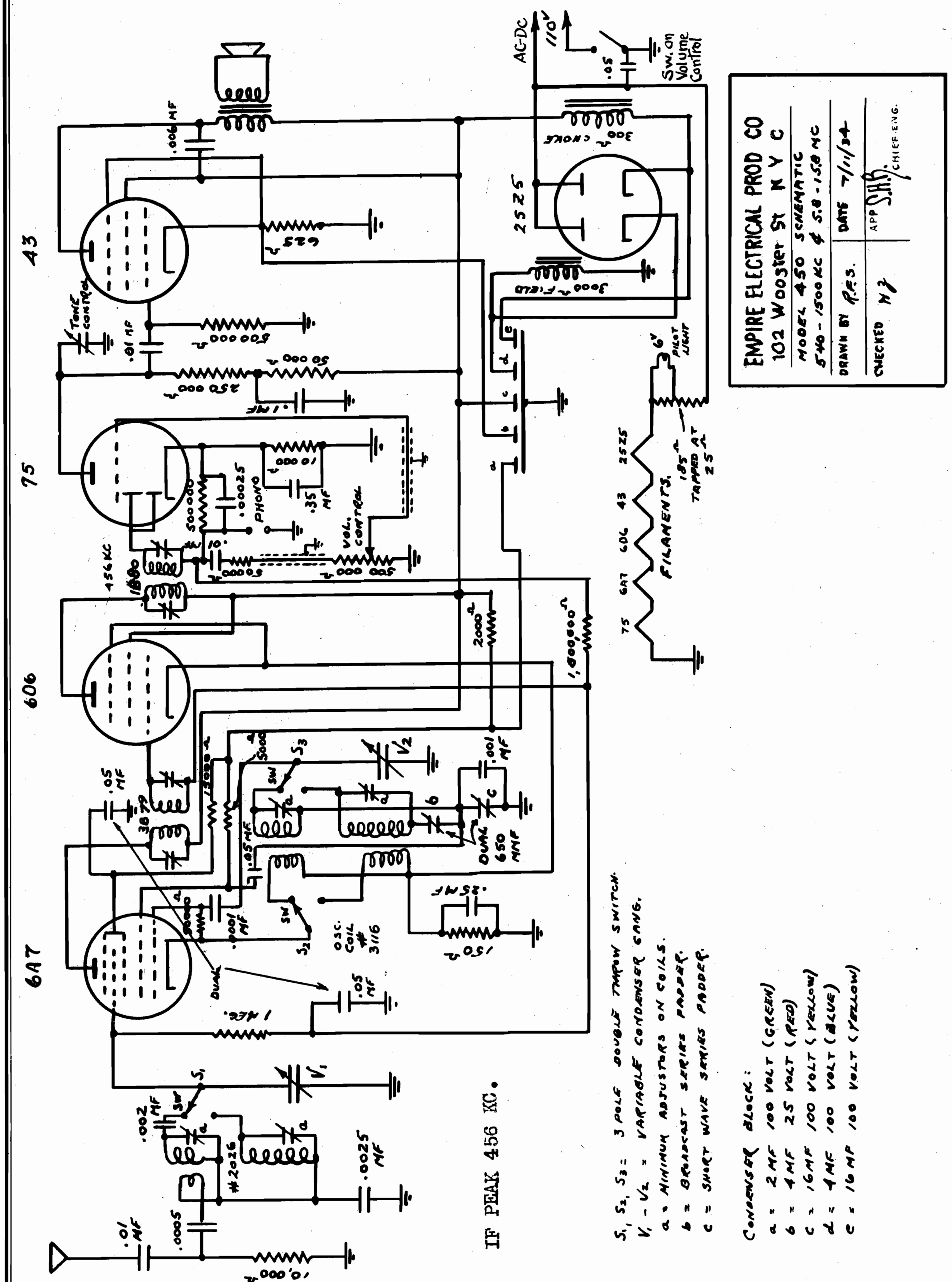
**MODEL 71**
**Schematic**

## EMPIRE ELECTRICAL PRODUCTS CO.



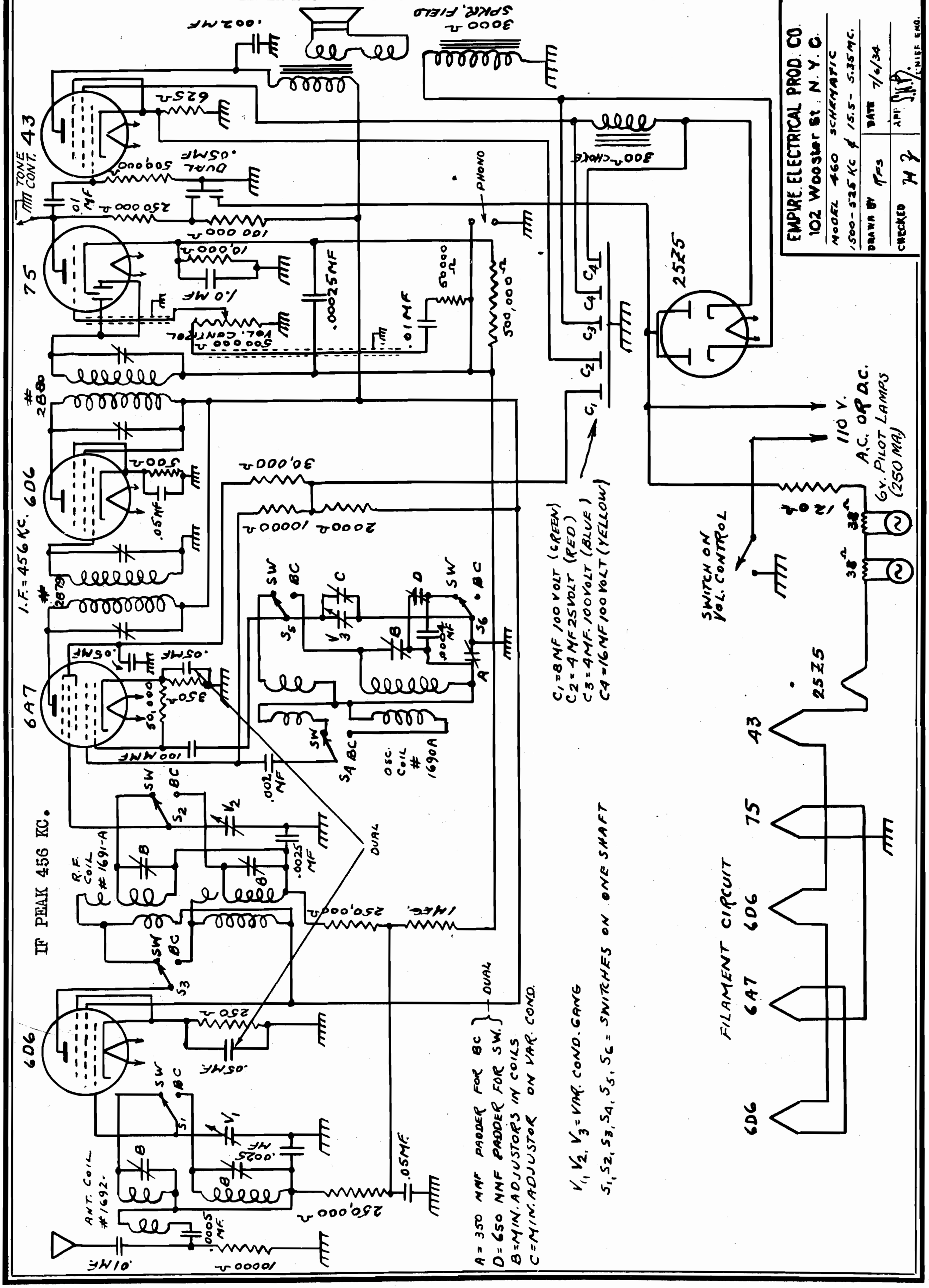
**MODEL 450-A**
**Schematic**

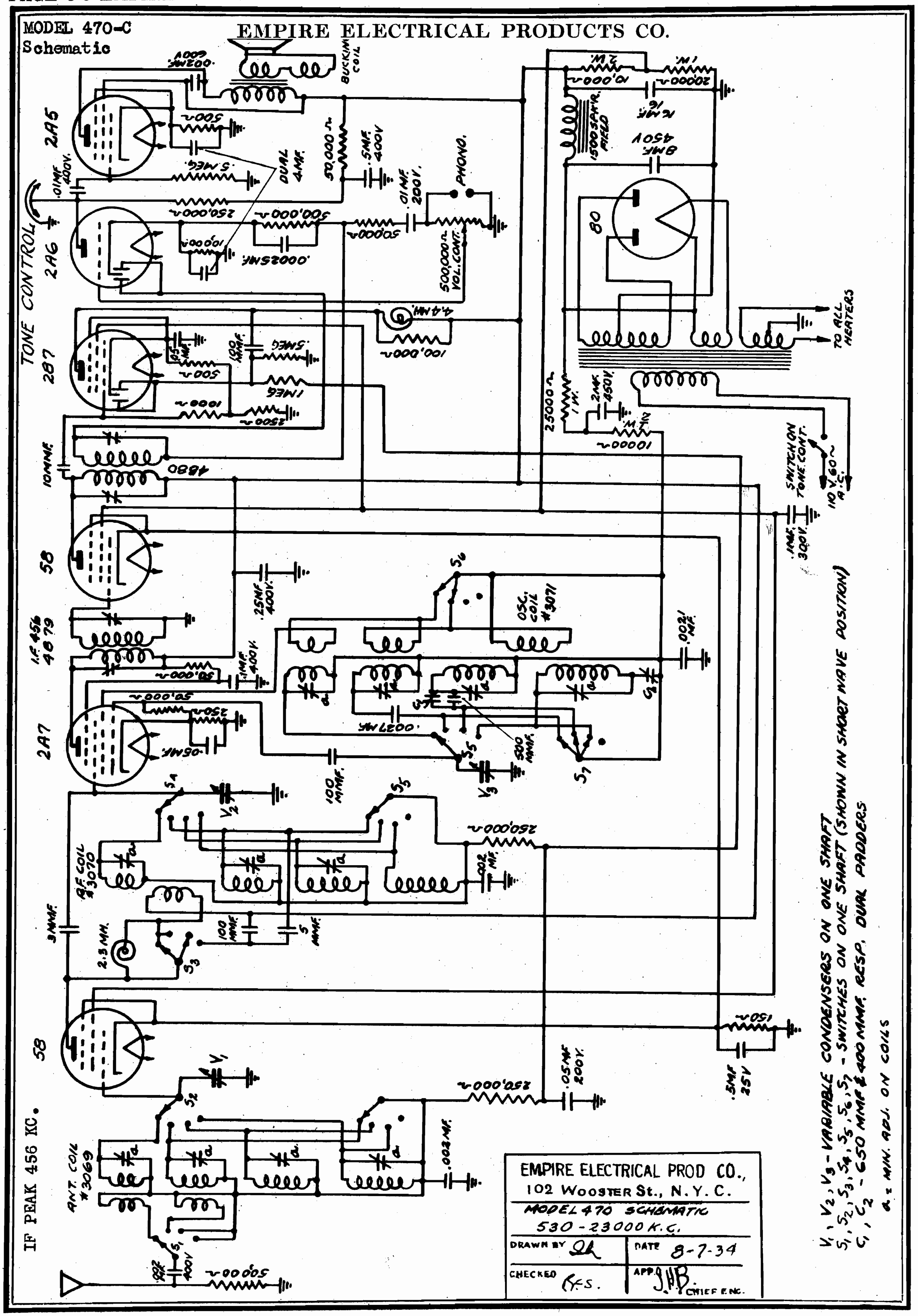
# EMPIRE ELECTRICAL PRODUCTS CO.

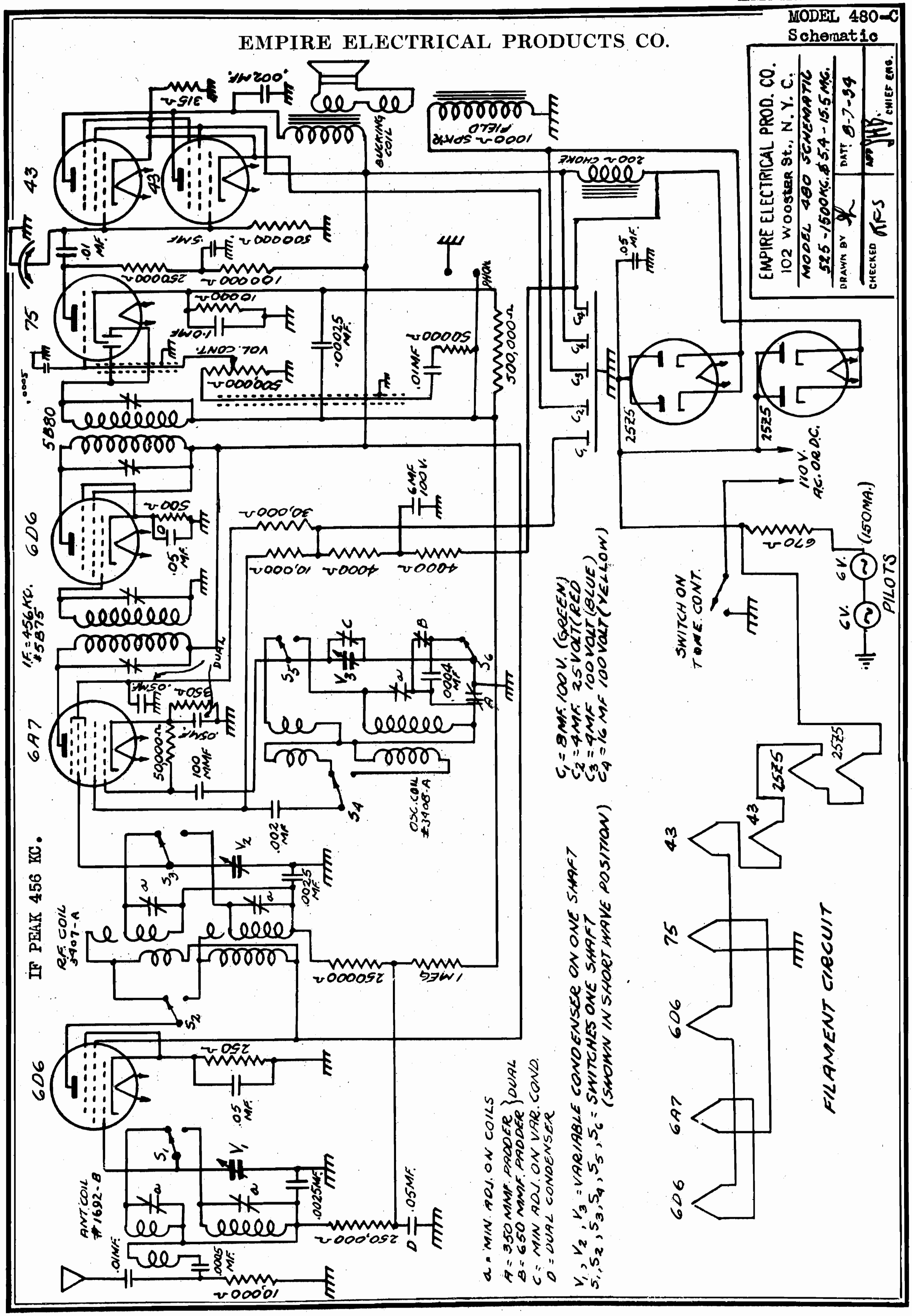


**MODEL 460-B**
**Schematic**

# EMPIRE ELECTRICAL PRODUCTS CO.

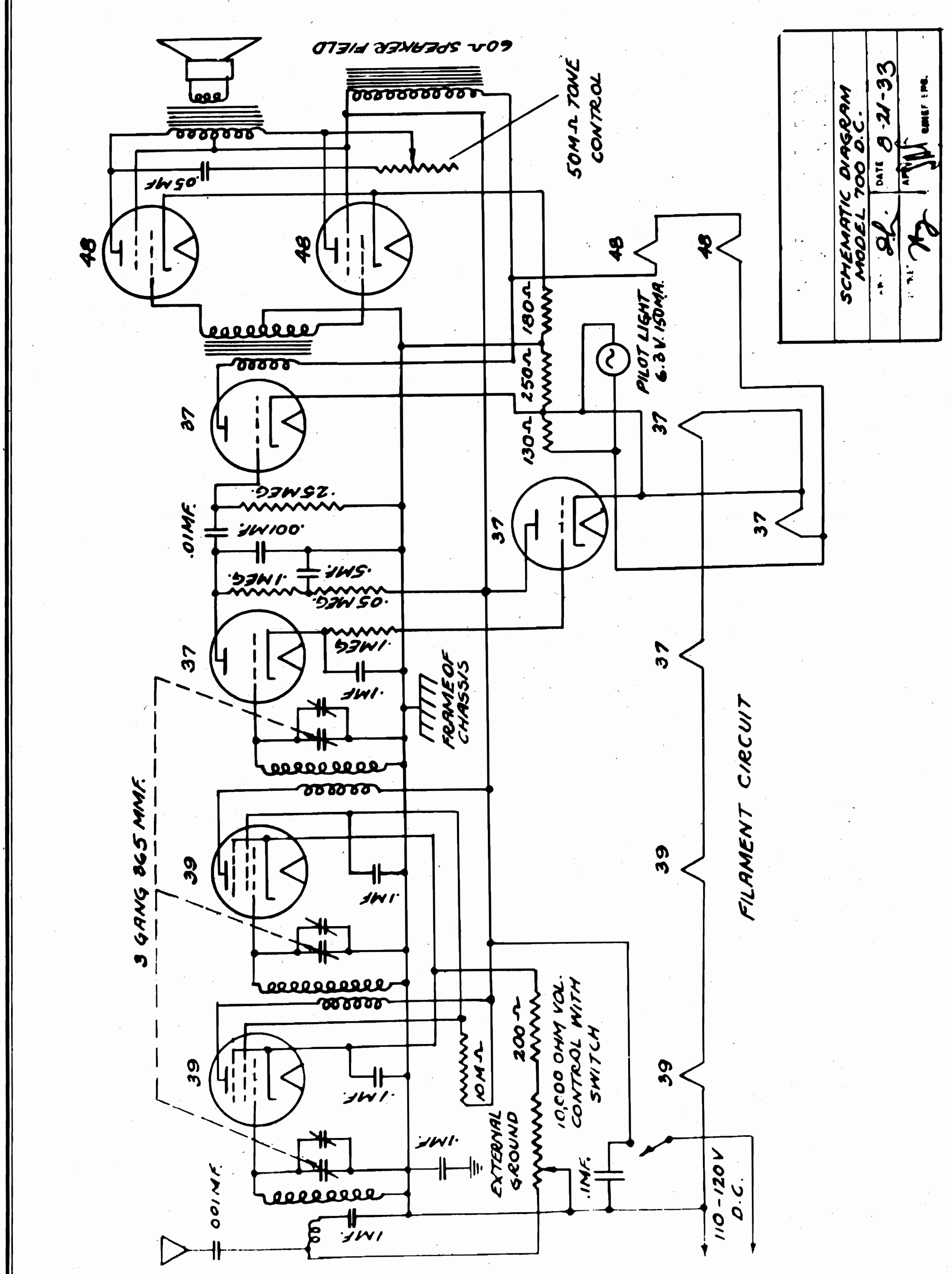



MODEL 470-C
Schematic
EMPIRE ELECTRICAL PRODUCTS CO.
IF PEAK 456 KC.
2A5
2A6
2B7
58
2A7
58
80
TONE CONTROL
BUCKING COIL
PHONO.
500,000 Ω VOL. CONT.
1500 Ω SPKR. FIELD
TO ALL HEATERS
SWITCH ON TONE CONT.
110 V. 60 ~ A.C.
OSC. COIL #3071
R.F. COIL #3070
ANT. COIL #3069
I.F. 456 4679
4880
V1, V2, V3 - VARIABLE CONDENSERS ON ONE SHAFT
S1, S2, S3, S4, S5, S6, S7 - SWITCHES ON ONE SHAFT (SHOWN IN SHORT WAVE POSITION)
C1, C2 - 650 MMF. & 400 MMF. RESP. DUAL PADDERS
a = MIN. ADJ. ON COILS
EMPIRE ELECTRICAL PROD CO.,
102 WOOSTER St., N.Y.C.
MODEL 470 SCHEMATIC
530 - 23000 K.C.
DRAWN BY
DATE 8-7-34
CHECKED
APP.
CHIEF ENG.


MODEL 480-C
Schematic
EMPIRE ELECTRICAL PRODUCTS CO.
EMPIRE ELECTRICAL PROD. CO.
102 Wooster St., N. Y. C.
MODEL 480 SCHEMATIC
525-1500KC. & 5.4-15.5MC.
DATE 8-7-34
IF PEAK 456 KC.
FILAMENT CIRCUIT
PILOTS
SWITCH ON TONE CONT.
110 V. A.C. OR D.C.
a = MIN. ADJ. ON COILS
A = 350 MMF. PADDER
B = 650 MMF. PADDER } DUAL
C = MIN ADJ. ON VAR. COND.
D = DUAL CONDENSER
$V_1, V_2, V_3$ = VARIABLE CONDENSER ON ONE SHAFT
$S_1, S_2, S_3, S_4, S_5, S_6$ = SWITCHES ONE SHAFT (SHOWN IN SHORT WAVE POSITION)
$C_1$ = 8 MF. 100 V. (GREEN)
$C_2$ = 4 MF. 25 VOLT (RED)
$C_3$ = 4 MF 100 VOLT (BLUE)
$C_4$ = 16 MF 100 VOLT (YELLOW)

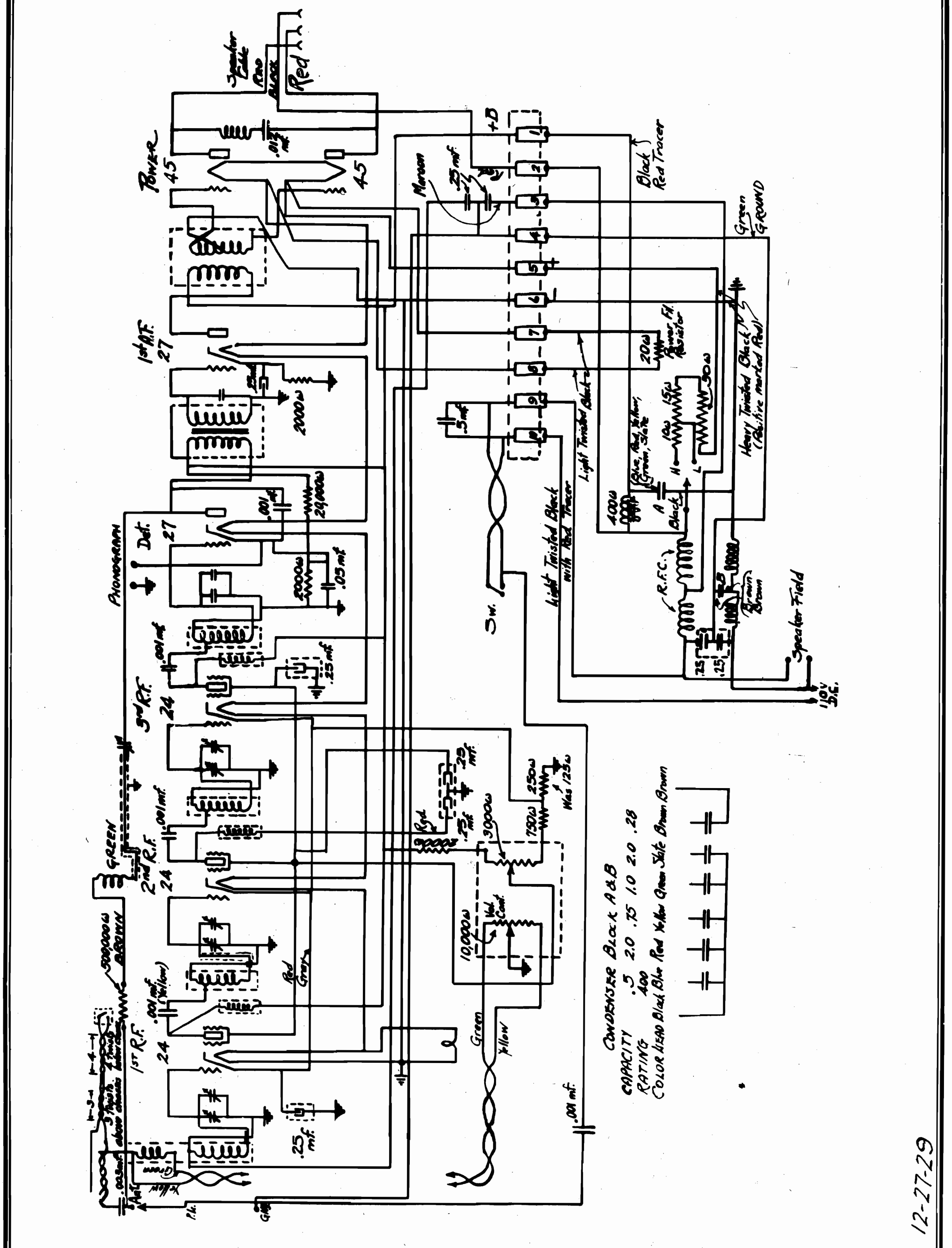
MODEL 700 DC
Schematic

EMPIRE ELECTRICAL PRODUCTS CO.



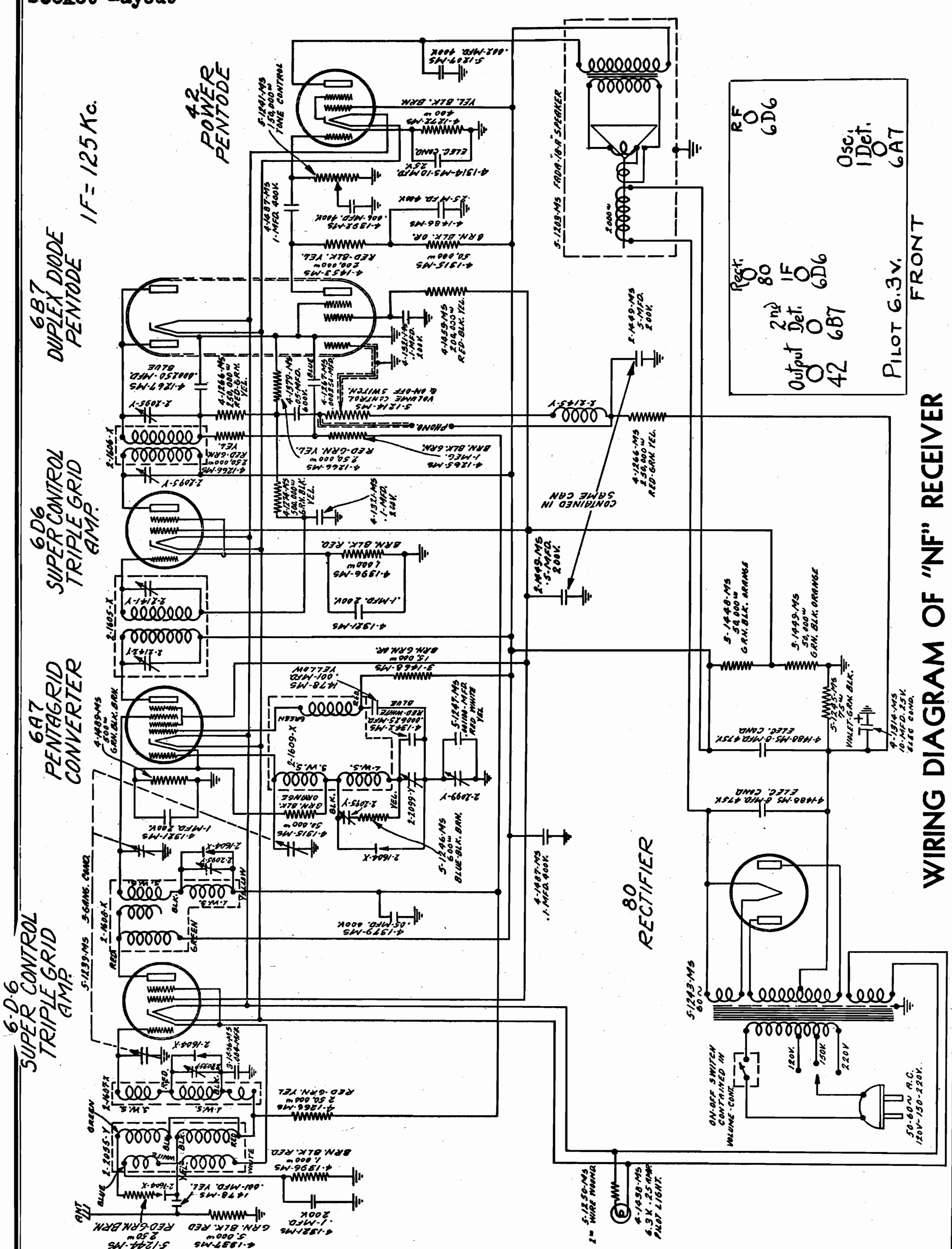
MODEL S, 26-36
Schematic

FADA RADIO & ELECTRIC CORP.



**MODEL NF**
**Schematic**
**Socket Layout**

# FADA RADIO & ELECTRIC CORP.



MODEL 133,134,135 ( RW)
Alignment, Trimmers
Socket Layout

# FADA RADIO & ELECTRIC CORP.

## COMPENSATING INSTRUCTIONS FOR MODELS 133, 134, 135 ETC.

"RW" CHASSIS (60-25 CYCLES)

NOTE:- The wave band switch is to be in the normal wave (550 to 1500 KC) position for the following adjustments.

### ADJUSTMENT OF I.F. CONDENSERS

The four (4) I.F. condensers are located as indicated in the sketch.

1st - Disconnect the outside antenna system from the receiver.

2nd - Remove the shield cap from the first detector tube shield. Connect a lead wire from the dummy antenna system of the signal generator to the control grid of the first detector tube. Do not disconnect the control grid connector from the tube, nor remove the tube shield. Connect the ground (slate) lead of the receiver to the ground post of the signal generator. In the event that the signal generator being used does not have a dummy antenna system, connect a 250 mmfd. condenser in series with the lead wire.

3rd - Remove the F-37 oscillator tube from the receiver socket.

4th - Place an output meter across the secondary of the receiver output transformer (which is mounted on the speaker) so that the variations in signal output can be noted. Output meters (with a multi-range scale) are generally supplied with good quality commercial signal generators.

5th - Place the signal generator in operation and adjust the frequency output to 265 KC. Regulate the attenuator control so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers of the receiver.

6th - With the aid of a #4 socket wrench, adjust the four (4) I.F. condensers to resonance as indicated by the greatest deflection on the output meter.

### ADJUSTMENT OF OSCILLATOR SERIES COMPENSATOR

The oscillator series compensator can be adjusted through the hole near the input push-pull transformer (see sketch)

1st - Adjust the carrier frequency output of the signal generator to 600 KC.

2nd - Set the calibrated dial of the receiver to read 600 KC.

3rd - With the aid of a #4 socket wrench adjust the oscillator series compensator until a maximum output signal is indicated on the output meter. To insure perfect adjustment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.

4th - After the oscillator series compensator is properly adjusted, turn the calibrated dial of the receiver to 1400 KC and adjust the signal generator to the same frequency. Then readjust all variable condenser compensators as outlined in the foregoing instructions.

### ADJUSTMENT OF THE GANGED VARIABLE CONDENSER COMPENSATORS

There are three holes (see sketch) in the overall condenser shield housing which permit the insertion of a screw driver for compensating purposes.

1st - Place F-37 oscillator tube in socket.

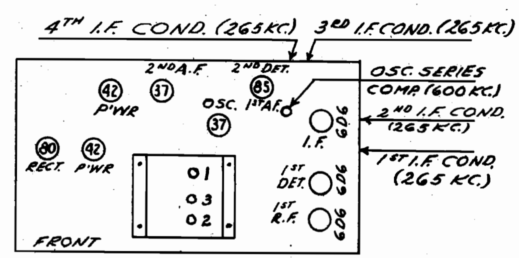
2nd - Remove the lead wire which is connected to both the control grid of the first detector tube and to the dummy antenna system of the signal generator. Replace the shield cap on the first detector tube shield.

3rd - Connect the antenna (red) wire of the receiver to the dummy antenna system of the signal generator. The ground (slate) wire should remain connected to the ground post of the signal generator.

4th - Adjust the carrier frequency output of the signal generator to 1400 KC.

5th - Set the calibrated dial of the Receiver to read 1400 KC.

6th - Starting with the compensator nearest the rear of the receiver, adjust each compensator (as indicated on sketch) in turn for maximum signal output. Do not disturb the setting of the ganged variable condenser during these operations. Leave the volume control on full and regulate the signal output with the attenuator control of the signal generator.



**MODEL 141,141-Z (NA)**
**Alignment, Trimmers**
**Voltage, Socket Layout**

# FADA RADIO & ELECTRIC CORP.

This receiver is equipped with an automatic volume control which necessitates setting the manual volume control of the receiver to its maximum position, to assure accuracy in alignment. To control the signal output of the receiver it will be necessary to use the attenuator control of the signal generator.

## ADJUSTMENT OF I.F. CONDENSERS

The four (4) I.F. condensers are located as indicated in the sketch.

1st - Disconnect the outside antenna system from the receiver.

2nd - Connect a lead wire from the dummy antenna system of the signal generator to the control grid of the 6A7 first detector tube. Do not disconnect the control grid connector from the tube nor remove the tube shield. Connect the ground (slate) lead of the receiver to the ground post of the signal generator. In the event that the signal generator being used does not have a dummy antenna system, connect a 250 mmfd. condenser in series with the lead wire.

3rd - Place an output meter across the secondary of the receiver output transformer (which is mounted on the speaker) so that the variations in signal output can be noted. Output meters (with a multi-range scale) are generally supplied with good quality commercial signal generators.

4th - Place the signal generator in operation and adjust the carrier frequency output to 265 KC. Regulate the attenuator control so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers of the receiver.

5th - With the aid of a #4 socket wrench, adjust the four (4) I.F. condensers to resonance as indicated by the greatest swing of the needle on the output meter.

## ADJUSTMENT OF THE GANGED VARIABLE CONDENSER COMPENSATORS

The compensators are located at the top of their respective tuning condenser section and can be adjusted with the aid of a screw driver in the order indicated on the attached sketch.

1st - Remove the lead wire which is connected to both the control grid of the first detector tube and to the dummy antenna system of the signal generator.

2nd - Connect the antenna (red) wire of the receiver to the dummy antenna system of the signal generator. The ground (slate) wire should remain connected to the ground post of the signal generator.

3rd - Adjust the carrier frequency output of the signal generator to 1400 KC.

4th - Set the calibrated dial of the receiver to read 1400 KC.

5th - Starting with the compensator nearest the rear of the receiver, adjust each compensator (as indicated on sketch) in turn for maximum signal output. Do not disturb the setting of the gang condenser during these operations. Leave the volume control on full and regulate the signal output with the attenuator control of the signal generator.

## COMPENSATING INSTRUCTIONS FOR MODELS 141 & 141-Z

"NA" CHASSIS (60-25 CYCLES)

## ADJUSTMENT OF OSCILLATOR SERIES COMPENSATOR

The oscillator series compensator can be adjusted through the hole in the right hand side of chassis (see sketch).

1st - Adjust the carrier frequency output of the signal generator to 600 KC.

2nd - Set the calibrated dial of the receiver to read 600 KC.

3rd - With the aid of a #4 socket wrench adjust the oscillator series compensator until a maximum output signal is indicated on the output meter. To insure perfect adjustment it is necessary to "rock" the gang variable condenser in order to follow the maximum signal output.

4th - After the oscillator series compensator is properly adjusted, turn the calibrated dial of the receiver to 1400 KC and adjust the signal generator to the same frequency. Then readjust all variable condenser compensators as outlined in the foregoing instructions.

## CONTINUITY AND VOLTAGE READINGS ON NA CHASSIS -- MODEL 141 (60 CYCLE)

Line voltage - 115 volts A.C. -- Input watts 50

| TYPE OF TUBE | POSITION OF TUBE | PLATE VOLTS | PLATE MA CURRENT | CONTROL GRID VOLTS | SCREEN GRID VOLTS |
|---|---|---|---|---|---|
| 6-A-7 | 1st Det.-Osc. | 236 | 2.5 | 2.2** | 88 |
| 6-D-6 | Int. freq. | 236 | 7.5 | 2.2** | 88 |
| 37 | 2nd Det. | --- | --- | --- | -- |
| 77 | 1st A.F. | 78* | 0.23 | 2.1** | 54* |
| 42 | Pwr. Pentode | 204 | 30.0 | 14.0 | 224 |
| 80 | Rectifier | --- | 58. TOTAL | | |

*These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

**Correct readings cannot be obtained at control grid due to series resistors. To be measured across each respective bias resistor.

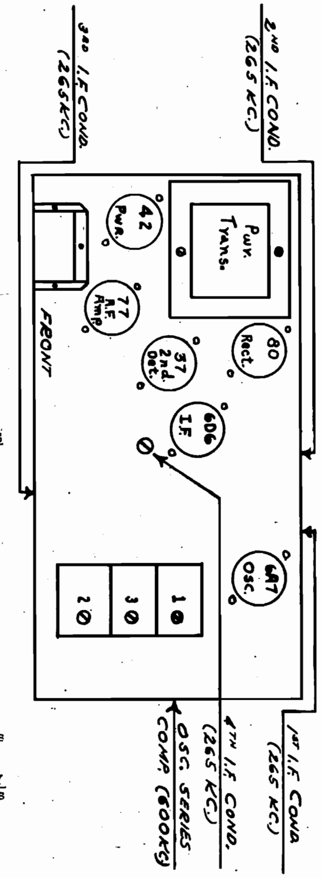
VOLTAGE ACROSS ELECTROLYTIC CONDENSER (5-1209-Ms)

| 1st section | 2nd section |
|---|---|
| 361 volts | 238 volts |

Voltage across 2,000 ohm speaker field - - - - - - - - - 123 volts

## D.C. RESISTANCE VALUES

| | | PRIMARY | SECONDARY |
|---|---|---|---|
| 2-1601-X | Antenna coil | 20.0 ohms | 5.4 ohms |
| 2-1602-X | Pre-selector coil | --------- | 5.4 " |
| 2-1603-X | Oscillator coil --Total winding | --------- | 5.3 " |
| 1993-X | I.F. trans. | 36.3 ohms | 77.0 " |
| 1994-X | I.F. trans. | 50.0 " | 50.0 " |
| Output trans. | (mounted on 18-A speaker) | 672.0 " | .4 " |
| Speaker field coil | | 2,000 | ohms |
| Speaker voice coil | | | 3.5 " |
| 2-2134-Y | Hum bucking choke | | .4 " |
| 5-1204-Ms | Power trans. high voltage sec. winding " | | 410.0 " (green) |
| " | " " primary " | | 9.0 " (white) |
| " | " " heater sec. " | | 0.16 " (red) |
| " | " " rectifier sec. " | | 0.16 " (yellow) |



MODEL (52),5212, 5212-A,5241 Schematics

# FAIRBANKS-MORSE HOME APP., INC.

MODEL (51),5106, 5107,5108,5109, 5111,5112,5141, 5143

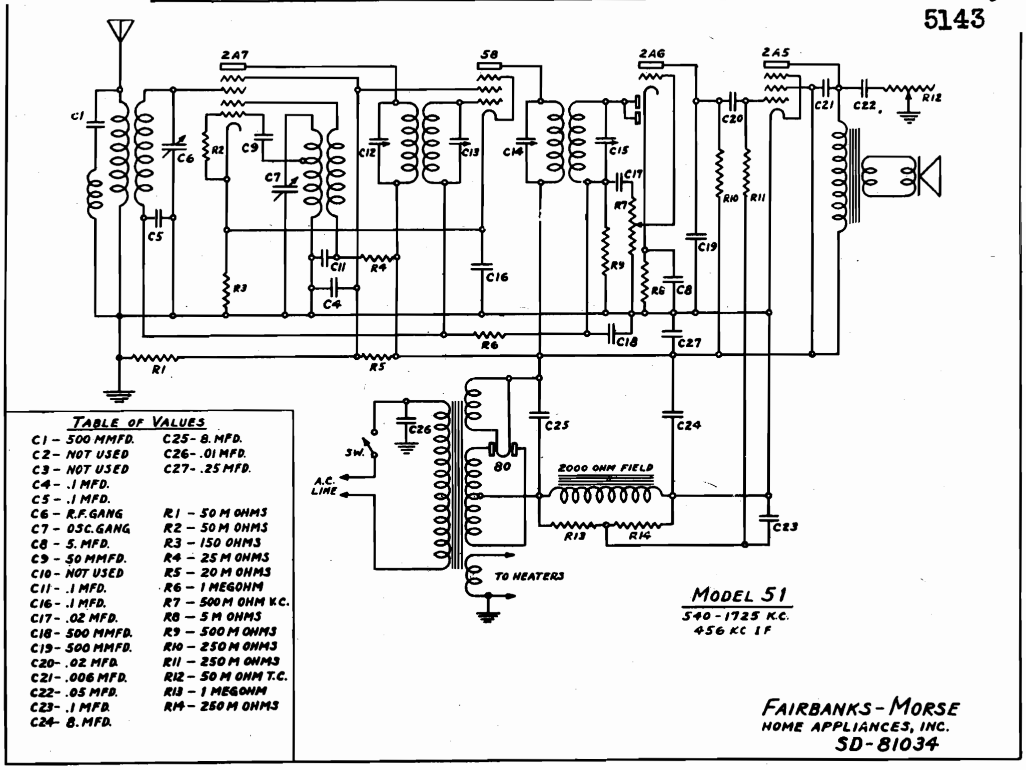



TABLE OF VALUES

| | |
|---|---|
| C1 - 500 MMFD. | C25 - 8. MFD. |
| C2 - NOT USED | C26 - .01 MFD. |
| C3 - NOT USED | C27 - .25 MFD. |
| C4 - .1 MFD. | |
| C5 - .1 MFD. | |
| C6 - R.F. GANG | R1 - 50 M OHMS |
| C7 - OSC. GANG | R2 - 50 M OHMS |
| C8 - 5. MFD. | R3 - 150 OHMS |
| C9 - 50 MMFD. | R4 - 25 M OHMS |
| C10 - NOT USED | R5 - 20 M OHMS |
| C11 - .1 MFD. | R6 - 1 MEGOHM |
| C16 - .1 MFD. | R7 - 500 M OHM V.C. |
| C17 - .02 MFD. | R8 - 5 M OHMS |
| C18 - 500 MMFD. | R9 - 500 M OHMS |
| C19 - 500 MMFD. | R10 - 250 M OHMS |
| C20 - .02 MFD. | R11 - 250 M OHMS |
| C21 - .006 MFD. | R12 - 50 M OHM T.C. |
| C22 - .05 MFD. | R13 - 1 MEGOHM |
| C23 - .1 MFD. | R14 - 250 M OHMS |
| C24 - 8. MFD. | |

**Model 51**

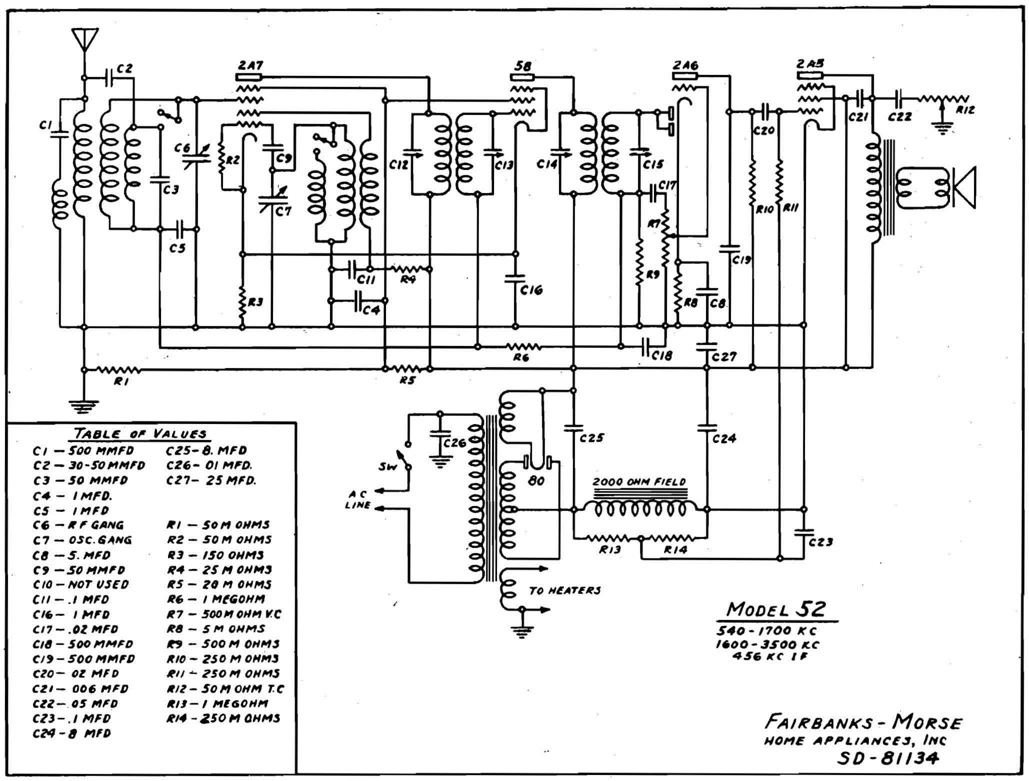



TABLE OF VALUES

| | |
|---|---|
| C1 - 500 MMFD | C25 - 8. MFD |
| C2 - 30-50 MMFD | C26 - 01 MFD. |
| C3 - 50 MMFD | C27 - 25 MFD. |
| C4 - 1 MFD. | |
| C5 - 1 MFD | |
| C6 - R F GANG | R1 - 50 M OHMS |
| C7 - OSC. GANG | R2 - 50 M OHMS |
| C8 - 5. MFD | R3 - 150 OHMS |
| C9 - 50 MMFD | R4 - 25 M OHMS |
| C10 - NOT USED | R5 - 20 M OHMS |
| C11 - .1 MFD | R6 - 1 MEGOHM |
| C16 - 1 MFD | R7 - 500 M OHM V.C |
| C17 - .02 MFD | R8 - 5 M OHMS |
| C18 - 500 MMFD | R9 - 500 M OHMS |
| C19 - 500 MMFD | R10 - 250 M OHMS |
| C20 - 02 MFD | R11 - 250 M OHMS |
| C21 - 006 MFD | R12 - 50 M OHM T.C |
| C22 - 05 MFD | R13 - 1 MEGOHM |
| C23 - .1 MFD | R14 - 250 M OHMS |
| C24 - 8 MFD | |

**Model 52**

MODEL (53) 5312,
5312-A, 5341
Schematic, Coil Data

## FAIRBANKS-MORSE HOME APP., INC.

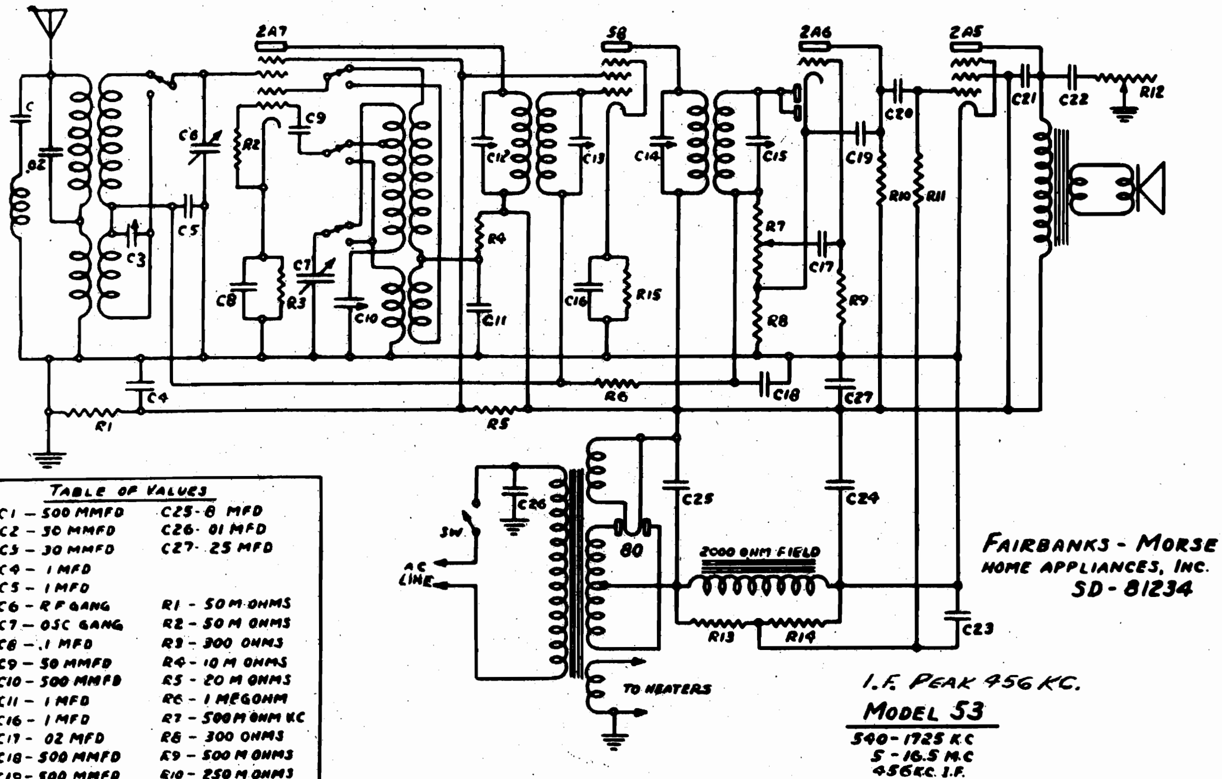



TABLE OF VALUES

| | |
|---|---|
| C1 — 500 MMFD | C25 - 8 MFD |
| C2 — 30 MMFD | C26 - 01 MFD |
| C3 — 30 MMFD | C27 - 25 MFD |
| C4 — 1 MFD | |
| C5 — 1 MFD | |
| C6 — RF GANG | R1 - 50 M OHMS |
| C7 — OSC GANG | R2 - 50 M OHMS |
| C8 — .1 MFD | R3 - 300 OHMS |
| C9 — 50 MMFD | R4 - 10 M OHMS |
| C10 — 500 MMFD | R5 - 20 M OHMS |
| C11 — 1 MFD | R6 - 1 MEGOHM |
| C16 — 1 MFD | R7 - 500 M OHM VC |
| C17 - 02 MFD | R8 - 300 OHMS |
| C18 - 500 MMFD | R9 - 500 M OHMS |
| C19 - 500 MMFD | R10 - 250 M OHMS |
| C20 - .02 MFD | R11 - 250 M OHMS |
| C21 - 006 MFD | R12 - 50 M OHM TC |
| C22 - .05 MFD | R13 - 1 MEGOHM |
| C23 - 1 MFD | R14 - 250 M OHMS |
| C24 - 8 MFD | R15 - 300 OHMS |

## MISCELLANEOUS RESISTANCE — TABLE —

| PART | MODELS | PRIMARY | SECONDARY |
|---|---|---|---|
| Antenna Wave Trap Coil | 51-52-53 | | 4 OHMS |
| Antenna Coil | 51-(52-53-B.C.)<br>52 S.W.<br>53 S.W. | 24 OHMS<br>24 OHMS<br>1 OHM | 3 OHMS<br>1 OHM<br>.1 OHM |
| Oscillator Coil (Grid) | 51-(52-53-B.C.)<br>52-S.W.<br>53-S.W. | | 3 OHMS<br>1.5 OHMS<br>1 OHM |
| Oscillator Coil (Plate) | 51-(52-53-B.C.)<br>52-S.W.<br>53-S.W. | 3 OHMS<br>3 OHMS<br>1 OHM | |
| First I. F. Transformer | 51-52<br>53 | 12 OHMS<br>8 OHMS | 12 OHMS<br>8 OHMS |
| Second I. F. Transformer | 51-52-53 | 12 OHMS | 12 OHMS |
| Output Transformer | 51-52-53 | 600 OHMS | .75 OHM |
| Speaker (Voice Coil)<br>(Field) | 51-52-53 | 2 OHMS | <br>2000 OHMS |
| Power Transformer Primary<br>High Voltage Secondary (Each Half) | 51-52-53 | 15 OHMS | <br>250-275 |

FAIRBANKS-MORSE HOME APP., INC. **MODEL 51,52,53 Series Alignment, Color Code, Notes**

## MODELS 51, 52, AND 53

### THE CIRCUIT

Models 51, 52, and 53 are 5 tube superheterodynes. The circuits are very similar, the only differences being those made necessary in order to cover different wave bands. These sets are in many ways a radical departure from conventional design. Maximum performance with a minimum number of tubes is accomplished thru the use of new multi-purpose tubes and new type, high efficiency, I. F. transformers. Due to the use of a high impedance primary, a litz wire secondary, and a wave trap, very good pre-selection and high gain are obtained in the tuned antenna stage. The antenna circuit is fed into a 2A7 which serves the triple purpose of R. F. amplifier, electron coupled oscillator, and first detector. The I. F. output of this tube is fed into the double tuned, first I. F. transformer and from there into the 58 I. F. amplifier. The output of this tube is fed into the second, double tuned, I. F. transformer. The output of this transformer is fed into the 2A6 where three functions are accomplished. Detection, automatic volume control, and audio amplification. The A. F. output of this tube is resistance coupled to the grid circuit of the 2A5, high gain, output tube from where it is transfered to the loudspeaker. A familiar type 80 rectifier is used in a conventional power supply circuit.

### WAVE BANDS

The model 51 chassis is a standard broadcast receiver covering a frequency range of 540 to 1725 kilocycles. The model 52 is a dual band chassis covering frequency ranges of 540 to 1700 kilocycles and 1600 to 3500 kilocycles. The model 53 is a split band chassis covering frequency ranges of 540 to 1725 kilocycles and 5 to 16.5 megacycles.

### SUGGESTED SERVICE PROCEDURE

If the set does not operate test all tubes. If no tube tester is available replace the tubes in the set, one by one, with tubes known to be good. A noisy tube cannot always be found by checking in a tube tester, however by sharply tapping each of the tubes in the set the bad tube can usually be located.

If, after replacing any defective tubes, the set is still inoperative follow the instructions given under Resistance and voltage analysis.

### ALIGNMENT PROCEDURE

Proper adjustment of the tuned circuits will only be possible thru the use of a good service oscillator and output meter.

The gang condenser plates are properly adjusted in the factory and under no condition should it be necessary to bend them.

All adjustments should be made with the volume control full "on". The wave band switch on models 52 and 53 should be in the broadcast position.

1. Supply a 456 kilocycle signal to the grid of the 2A7 thru a .00005 Mfd. condenser. Carefully adjust both trimmers on the first I. F. transformer. The center screw will peak the grid side and the hexagon nut will peak the plate side. Next adjust the second I. F. transformer in the same manner. Since these adjustments are very critical it is advisable to go back over them to make sure they are correct.

2. Turn the gang condenser until it is fully meshed. The dial should read 540 kilocycles, if it is incorrect loosen the set screw and move the dial until the reading is correct.

3. Supply a 1500 kilocycle signal from the test oscillator to the antenna of the set. Tune the set until the dial reads 1500 kilocycles. Adjust the trimmer on the oscillator section of the gang condenser (front section) until the signal comes in at 1500 on the dial. Adjust the trimmer on the R. F. section, of the gang condenser, for maximum output with minimum input from the service oscillator. Some sets do not have a trimmer on the oscillator section and in this case it will only be necessary to adjust the R. F. trimmer for maximum output with the set tuned to the correct frequency reading.

4. On the model 53 a low frequency padding condenser will be found located on the front of the chassis. To adjust this condenser tune the set and the service oscillator to 600 kilocycles. Adjust the padding condenser for maximum output at the same time tune the set back and forth across the 600 kilocycle signal to make sure the correct peak is obtained.

5. If all adjustments have been carefully made the dial readings will be approximately correct on all frequencies If not it will be necessary to go over the entire procedure again.

6. On models 51 and 53 it will sometimes be necessary to make high frequency adjustments at 1200 kilocycles rather than 1500 in the event police calls do not come in properly after alignment.

7. On the model 53 a small trimmer condenser will be found under the chassis and connected across the secondary of the short wave R. F. coil. This condenser should be peaked at 16 megacycles. Turn the band selector to the short wave position and tune the set to 16 megacycles. Supply a 16 megacycle signal to the antenna and adjust the trimmer for maximum output. If no oscillator, supplying a 16 megacycle signal, is available it may be possible to pick up the tenth harmonic of the 1500 kilocycle signal (15 megacycles) from a standard service oscillator. If neither is available it will be necessary to use the signal from a short wave station, near 16 megacycles, or adjust for maximum noise level.

### COLOR CODES

#### SHORT WAVE COIL ASSEMBLY MODEL 53

**ANTENNA COIL**
White—Antenna
Other End—Ground

**OSC. GRID COIL**
Green—Grid
Other End—Ground

**OSC. PLATE COIL**
Blue Plate
Red B Plus

**RF GRID COIL**
Green and White—Grid
Black and White—Grid Return

#### CONDENSER BY-PASS CAN ASSEMBLY

| | | | | |
|---|---|---|---|---|
| Red Lead | .25 | MFD | 400 Volts | C-27 |
| Brown Lead | .1 | MFD | 300 Volts | C-16 |
| Blue Lead | .1 | MFD | 300 Volts | C-11 |
| Green | .1 | MFD | 300 Volts | C-23 |
| Red with White | .1 | MFD | 300 Volts | C- 4 |

CAN—COMMON GROUND

**POWER TRANSFORMER**
Black (two) 2.5 Volts
Brown (two) PRIMARY
Yellow (two) 5. Volts
Green (two) High Voltage
Red C. T. High Voltage

**FIRST I. F. TRANSFORMER**
Blue—P-2A7
Red—B PLUS
Green—Grid
Black and White—Grid Return

**SECOND I. F. TRANSFORMER**
Blue—Plate
Red—B PLUS
Green—Diode Plates
Black and White—Diode Plate Return

The inner screw on the adjustment condenser is the grid adjustment. The outer hex nut is the plate adjustment.

### STANDARD RMA RESISTOR AND CONDENSER COLOR CODE

| | | | | |
|---|---|---|---|---|
| 0—Black | 2—Red | 4—Yellow | 6—Blue | 8—Grey |
| 1—Brown | 3—Orange | 5—Green | 7—Purple | 9—White |

### RESISTORS

The **body color** represents the **first figure** of the resistance value.

The **end color** represents the **second figure** of the resistance value.

The **dot color** represents the **number of ciphers** following the first two figures.

### MICA CONDENSERS

The **first dot** on the condenser represents the **first figure** of the capacity.

The **second dot** on the condenser represents the **second figure** of the capacity.

The **third dot** on the condenser represents the **number of ciphers** following the first two figures.

MODEL 51,52,53 Series
Voltage

FAIRBANKS-MORSE HOME APP., INC.

## RESISTANCE AND VOLTAGE ANALYSIS

The following chart gives detailed information regarding the resistance from various points to various other points on the chassis. The measured voltage from the various tube socket contacts to ground is also given. When this chart is faithfully followed little difficulty should be experienced in finding almost any fault that may develop.

**Resistance Tests.** These tests should be made with an accurate ohm-meter. The speaker should be connected. All tubes should be removed from the set. The volume and tone controls should be full "on". The A. C. line plug must be removed from the A. C. outlet.

**Voltage Tests.** These readings should be taken with all tubes in their sockets. The volume and tone controls should be full "on". The antenna should be disconnected. Tune the set to a point where no signal is received.

## RESISTANCE AND VOLTAGE ANALYSIS CHART

| FROM | TO | MODEL | *VOLTS | †OHMS | POSSIBLE FAULTY UNITS |
|---|---|---|---|---|---|
| K-2A7 | GND | 51-52 | 2.5 | 150 | C-16 R-3 |
| | | 53 | 2.5 | 300 | C-8 R-3 |
| OSC G 2A7 | K 2A7 | 51-52-53 | .... | 50M | R-2 |
| OSC P 2A7 | GND | 51-52 | 135 | 95M | R-1 R-4 R-5 COIL C-4 C-11 C-24 C-25 C-27 |
| | | 53 | 170 | 80M | R-1 R-4 R-5 COIL, SWITCH, C-4 C-11 C-24 C-25 C-27 |
| CG-2A7 | GND | 51-52 | 0 | 1.5 MEG | R-6 R-9 COIL (SWITCH 52) C-5 C-17 C-18 |
| | | 53 | 0 | 1.5 MEG | R-6 R-7 R-8 COIL, SWITCH, C-5 C-17 C-18 |
| P 2A7 | GND | 51-52-53 | 205 | 70M | R-1 R-5 COIL, C-4 C-11 C-24 C-25 C-27 |
| SG 2A7 | GND | 51-52-53 | 85 | 50M | R-1 C-4 |
| K 58 | GND | 51-52 | 2.5 | 150 | C-16 R-3 |
| | | 53 | 2.5 | 300 | C-16 R-15 |
| SG 58 | GND | 51-52-53 | 85 | 50M | R-1 C-4 |
| CG 58 | GND | 51-52 | 0 | 1.5 MEG | R-6 R-9 COIL, (SWITCH 52) C-5 C-17 C-18 |
| | | 53 | 0 | 1.5 MEG | R-6 R-7 R-8 COIL, SWITCH, C-5 C-17 C-18 |
| P 58 | GND | 51-52-53 | 205 | 70M | R-1 R-5 COIL, C-4 C-11 C-24 C-25 C-27 |
| DP 2A6 | GND | 51-52-53 | .... | 500M | C-17 C-18 R-7 R-8 |
| G 2A6 | GND | 51-52 | 0 | 500M | R-7 C-17 (VOLUME CONTROL "GN") |
| | | 53 | | 500M | R-9 C-17 (VOLUME CONTROL "ON") |
| P 2A6 | GND | 51-52-53 | 85 | 320M | R-1 R-5 R-10 C-4 C-19 C-24 C-25 C-27 |
| K 2A6 | GND | 51-52 | .8 | 5M | R-8 C-8 |
| | | 53 | .125 | 300 | R-8 |
| P 2A6 | G 2A5 | 51-52-53 | .... | 820M | C-20 |
| K 2A5 | GND | 51-52-53 | 0 | 0 | ............ |
| G 2A5 | GND | 51-52-53 | 0 | 500M | R-11 R-14 C-23 |
| SG 2A5 | GND | 51-52-53 | 205 | 70M | C-4 C-24 C-25 C-27 R-1 R-5 |
| SG 2A5 | P 2A5 | 51-52-53 | .... | 600 | C-21 PRI. OUTPUT TRANSFORMER |
| P 2A5 | GND | 51-52-53 | 195 | 70600 | R-1 R-5 C-4 C-22 C-24 C-25 C-27 PRI. OUTPUT TRANSFORMER |
| F 80 | GND | 51-52-53 | 205 | 70M | R-1 R-5 C-4 C-24 C-25 C-27 |
| P 80 | GND | 51-52-53 | 80 | 2250<br>2275 | OPEN H.V. SECONDARY, FIELD<br>SHORTED H.V. SECONDARY, FIELD |
| ANT | GND | 51-52-53 | .... | 26 | ANT. COIL PRIMARY |
| AC PLUG | GND | 51-52-53 | .... | OPEN | C-26 (SWITCH "ON") |

*VOLTAGE AS MEASURED WITH 1000 OHM PER VOLT WESTON METER.
*†VARIATIONS OF 10% PLUS OR MINUS ARE ALLOWABLE ON ALL READINGS.
†IF SOME RESISTANCE READINGS ARE LOW TRY REVERSING POLARITY OF OHM-METER.

FAIRBANKS-MORSE HOME APP., INC.

**MODEL 51, 52, 53 Series Parts List**

## MODEL 51 CHASSIS EMPLOYED IN MODELS

5106—5107—5108—5109

5111—5112—5141—5143

## MODEL 52 CHASSIS EMPLOYED IN MODELS

5212—5212A—5241

## MODEL 53 CHASSIS EMPLOYED IN MODELS

5312—5312A—5341

## COMPOSITE PARTS LIST MODELS 51 - 52 - 53

| Part Number | Used on Models | Description of Part | List Price |
|---|---|---|---|
| 14061 | 51-52-53 | Wave Trap Coil | 1.00 |
| 14007 | 51-52-53 | Combination Antenna Oscillator Coil | 2.50 |
| 14104 | 52 | Short Wave Oscillator and R. F. Coil | 1.50 |
| 14206 | 53 | Short Wave Coil Assembly | 2.50 |
| 14210 | 53 | First I. F. Transformer | 3.00 |
| 11022 | 51-52 | First I. F. Transformer | 1.50 |
| 11023 | 51-52-53 | Second I. F. Transformer | 1.50 |
| 14003 | 51-52-53 | Power Transformer 115 Volt 60 Cycle | 4.00 |
| T-6204 | 51-52-53 | Power Transformer 115 Volt 25 Cycle | 6.00 |
| T-6203 | 51-52-53 | Power Transformer 240 Volt 60 Cycle | 4.50 |
| T-6202 | 51-52-53 | Power Transformer 110 and 220 Volt 60 Cycle | 5.00 |
| T-6201 | 51-52-53 | Power Transformer 135 Volt 50 Cycle | 5.00 |
| 14002 | 51-52 | Gang Condenser Clockwise (With Tracking Section) | 3.00 |
| 14055 | 51-52 | Gang Condenser Counter Clockwise (No Tracking Section) | 3.00 |
| 14203 | 53 | Gang Condenser Clockwise | 3.00 |
| 14201 | 53 | Gang Condenser Counter Clockwise | 3.00 |
| 14009 | 51 | Dial Assembly (Scale and Hub) | .50 |
| 14111 | 52 | Dial Assembly (Scale and Hub) | .50 |
| 14022 | 51-52-53 | Escutcheon (Peep Type) | .50 |
| 14522 | 53 | Escutcheon (Full Vision) | 1.00 |
| 14056 | 52-53 | Aeroplane Dial—Disc and Hub with Two Pilot Light Sockets | 1.00 |
| 14211 | 53 | Dial Assembly (Scale and Hub) | .50 |
| 14212 | 53 | Aeroplane Dial Scale (Celluloid) | .50 |
| 14005 | 51-52-53 | 5 Inch Speaker 2000 OHM Field | 6.00 |
| 14004 | 51-52-53 | 6 Inch Speaker 2000 OHM Field | 8.00 |
| 14552 | 51-52-53 | 8 Inch Speaker 2000 OHM Field | 12.00 |
| S-5910 | 51-52-53 | Speaker Socket | .10 |
| S-5911 | 51-52-53 | 2A5 Socket | .10 |
| S-5912 | 51-52-53 | 2A6 Socket | .10 |
| S-5913 | 51-52-53 | 2A7 Socket | .10 |
| S-5914 | 51-52-53 | 80 Socket | .10 |
| S-5915 | 51-52-53 | 58 Socket | .10 |
| 14024 | 51-52-53 | Dial Lamp 2.5 Volt | .10 |
| S-5820 | 51-52-53 | Tube Shield | .15 |
| V-6503 | 51-52-53 | Volume Control and Switch R-7 | 1.20 |
| V-6504 | 51-52-53 | Tone Control—R-12 | .80 |
| R-1836 | 51-52-53 | 250,000 OHM ½ Watt Resistor R-10 | .20 |
| R-1236 | 51-52-53 | 250,000 OHM ¼ Watt Resistor R-11 | .20 |
| R-1296 | 51-52-53 | 1 Megohm ¼ Watt Resistor R-13 | .20 |
| R-1266 | 51-52-53 | 500,000 OHM ¼ Watt Resistor R-9 | .20 |
| R-1581 | 51-52 | 5,000 OHM ½ Watt Resistor R-8 | .20 |
| R-1716 | 51-52 | 25,000 OHM ½ Watt Resistor R-4 | .20 |
| R-1746 | 51-52-53 | 50,000 OHM ½ Watt Resistor R-1 | .20 |
| R-1146 | 51-52-53 | 50,000 OHM ¼ Watt Resistor R-2 | .20 |
| R-1431 | 51-52 | 150 OHM ½ Watt Resistor R-3 | .20 |
| R-2901 | 51-52-53 | 20,000 OHM 1 Watt Resistor R-5 | .20 |
| R-846 | 53 | 300 OHM ¼ Watt Resistor R-3 | .20 |
| R-1656 | 53 | 10,000 OHM ½ Watt Resistor R-4 | .20 |
| EC-16 | 51-52-53 | By-Pass Condenser Can Assembly (C-4-C11-C-16-C-23-C-27) | 1.60 |
| EL-8 | 51-52-53 | 8 MFD. Electrolytic Cond. 450 Volt C-24-25 | 1.00 |
| EC-4 | 51-52-53 | .05 Tubular Condenser 400 Volt C-22 | .20 |
| EC-12 | 51-52-53 | .006 Tubular Condenser 400 Volt C-21 | .20 |
| EC-3 | 51-52-53 | .02 Tubular Condenser 400 Volt C-20 | .20 |
| EC-2 | 51-52-53 | .01 Tubular Condenser 400 Volt C-26 | .20 |
| EC-5 | 51-52-53 | .1 Tubular Condenser 300 Volt C-4-C-5-C-8-C-11-C16 | .25 |
| EL-6 | 51-52 | 5. MFD. Tubular Elect. Cond. 25 Volt C-8 | .50 |
| C-304 | 51-52-53 | 500 MFD. (.0005 MFD.) Moulded C-1-C-18-C-19 | .20 |
| C-303 | 51-52-53 | 200 MFD. (.002 MFD.) Moulded C-9 | .20 |
| C-301 | 51-52-53 | 50MMFD. (.00005 MFD.) Moulded C-9 | .20 |
| C-207 | 53 | Trimmer Condenser (Short Wave) C-3 | .25 |
| C-203 | 52-53 | Padding Condenser C-10 | 1.00 |
| 14058 | 51-52-53 | A. C. Line Cord and Plug Assembly | .40 |
| 14025 | 52 | Band Selector Switch | 1.00 |
| 14202 | 53 | Band Selector Switch | 1.25 |
| | | Knobs, each | .20 |

When ordering knobs give coloring, size, shape, shaft size, if push or set screw type, model of set, and style of cabinet.

**NOTE**

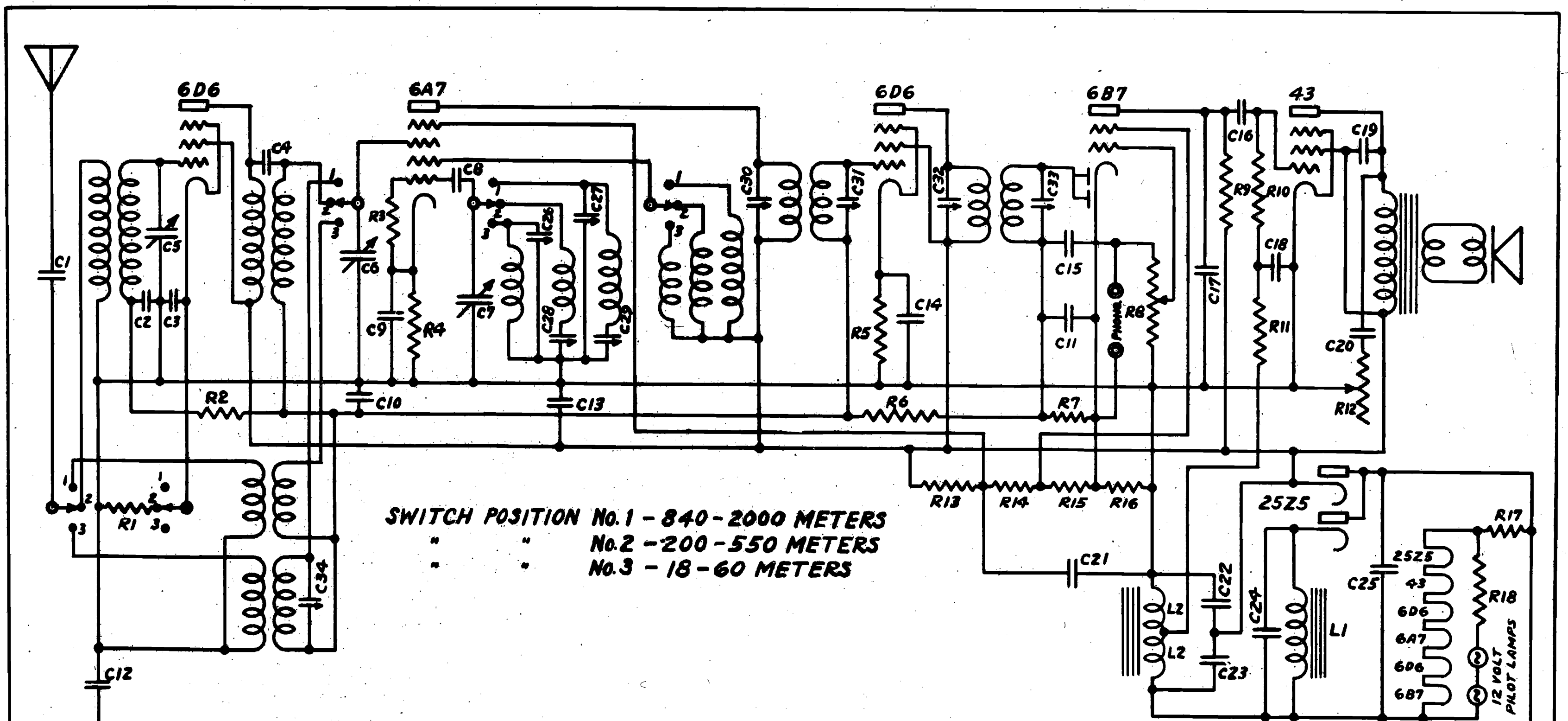
Speaker cones cannot be supplied.

Speakers on which cones have been damaged will be repaired at the following prices:

| | |
|---|---|
| 5 Inch Speaker Cone Repair | 2.50 |
| 6 Inch Speaker Cone Repair | 2.50 |
| 8 Inch Speaker Cone Repair | 2.50 |

**MODEL 61**
**Schematic**

# FAIRBANKS-MORSE HOME APP., INC.




## TABLE OF VALUES

| | | |
|---|---|---|
| R1 - 300 OHMS | C1 - 500 MMFD. | C19 - .006 MFD. |
| R2 - 500 M OHMS | C2 - .05 MFD. | C20 - .05 MFD. |
| R3 - 25 M OHMS | C3 - .1 MFD. | C21 - .1 MFD. |
| R4 - 500 OHMS | C4 - 3 MMFD. | C22 - 10. MFD. |
| R5 - 300 OHMS | C5 - R.F. GANG | C23 - 16. MFD. |
| R6 - 500 M OHMS | C6 - DET. GANG | C24 - 5. MFD. |
| R7 - 500 M OHMS | C7 - OSC. GANG | C25 - .1 MFD. |
| R8 - 500 M OHM V.C. | C8 - 100 MMFD. | |
| R9 - 500 M OHMS | C9 - .1 MFD. | |
| R10 - 250 M OHMS | C10 - .05 MFD. | |
| R11 - 2 MEGOHMS | C11 - 200 MMFD. | L1 - SPK. FIELD 3200 OHMS |
| R12 - 50 M OHM T.C. | C12 - .1 MFD. | |
| R13 - 7500 OHMS | C13 - .25 MFD. | L2 — 300 OHMS |
| R14 - 5750 OHMS | C14 - .1 MFD. | L2' — 200 OHMS |
| R15 - 4250 OHMS | C15 - .01 MFD. | |
| R16 - 520 OHMS | C16 - .01 MFD. | |
| R17 - 112 OHMS | C17 - 100 MMFD. | |
| R18 - 512 OHMS | C18 - .05 MFD. | |

MODEL 61
I.F. 456 K.C.

FAIRBANKS-MORSE
HOME APPLIANCES, INC.
SD-82334

MODEL (70),7014, 7040,7052
Schematic,Coil Data

# FAIRBANKS-MORSE HOME APP., INC.

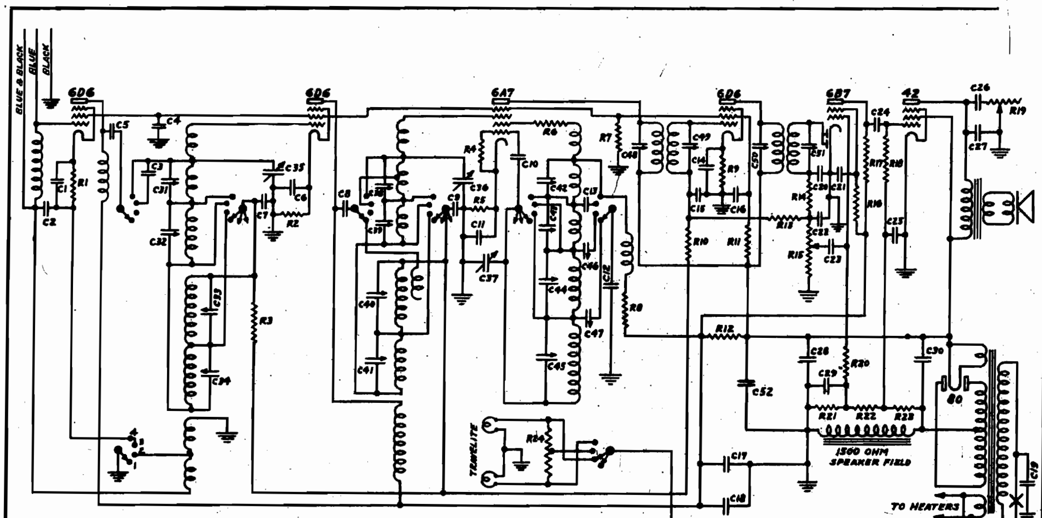


**TABLE OF VALUES**

| | | | |
|---|---|---|---|
| C1–.1 MFD. | C16–4. MFD. | R1–300 OHMS | R16–2 MEGOHMS |
| C2–.01 MFD. | C17–4. MFD. | R2–300 OHMS | R17–500 M OHMS |
| C3–30 MMFD. | C18–.05 MFD. | R3–1000 OHMS | R18–500 M OHMS |
| C4–.1 MFD. | C19–.01 MFD. | R4–100 M OHMS | R19–50 M OHM T.C. |
| C5–.01 MFD. | C20–200 MMFD. | R5–300 OHMS | R20–1 MEGOHM |
| C6–.1 MFD. | C21–.05 MFD. | R6–100 OHMS | R21–100 M OHMS |
| C7–.05 MFD. | C22–200 MMFD. | R7–15 M OHMS | R22–250 M OHMS |
| C8–.01 MFD. | C23–.01 MFD. | R8–10 M OHMS | R23–2 MEGOHMS |
| C9–.05 MFD. | C24–.01 MFD. | R9–300 OHMS | R24–50 OHMS |
| C10–50 MMFD. | C25–.25 MFD. | R10–1 MEGOHM | |
| C11–.1 MFD. | C26–.05 MFD. | R11–10 M OHMS | |
| C12–.006 MFD. | C27–.006 MFD. | R12–1000 OHMS | C52–.05 MFD. |
| C13–.01 MFD. | C28–8. MFD. | R13–500 M OHMS | |
| C14–.05 MFD. | C29–.1 MFD. | R14–50 M OHMS | |
| C15–.05 MFD. | C30–16. MFD. | R15–250 M OHM V.C. | |

ALL SWITCHES ARE SHOWN IN BROADCAST POSITION, No. 1.

MODEL 70
456 K.C. I.F.
530–1500 K.C. 1500–4200 K.C.
4.17–12 M.C. 9.5–24 M.C.

FAIRBANKS-MORSE HOME APPLIANCES, INC.
SD-81734

**Second I.F. Transformer**
Plate..........Blue
"B" Plus..........Red
Diode Return..........Black
Diodes..........Green

**First I.F. Transformer**
Plate..........Blue
"B" Plus..........Red
Grid Return..........Black
Grid (Top)..........Green
Capacity Lead..Green or Black

## FIGURE 2

### Power Transformer

Primary..........Two White Leads
6.3 Volt Filament..........Two Black Leads
5. Volt Filament..........Two Green Leads
High Voltage..........Two Yellow Leads
C.T. High Voltage..........Green and Yellow

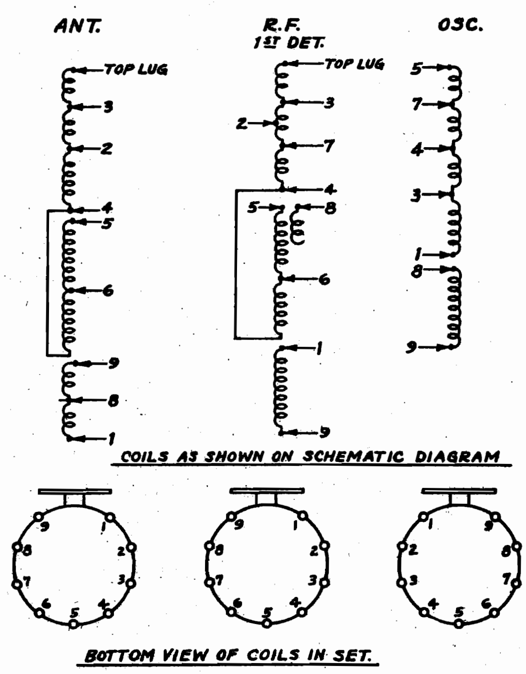
### Dry Electrolytic Condenser (EL-18)

4 Mfd. 300 Volt..........Blue Lead
4 Mfd. 300 Volt..........Red and White
Common Ground..........Black Lead

## COIL RESISTANCE VALUES

(Refer to Figure 5 for reference point numbers)

| COIL | FROM | TO | D. C. RESISTANCE |
|---|---|---|---|
| Antenna | Top Lug | 3 | .13 Ohm |
| | 3 | 2 | .02 Ohm |
| | 2 | 4 | .04 Ohm |
| | 5 | 6 | 3.5 Ohms |
| | 6 | 4 | 1. Ohm |
| | 1 | 8 | 3. Ohms |
| | 8 | 9 | 5.75 Ohms |
| R. F. First Detector | Top Lug | 3 | .08 Ohm |
| | 3 | 2 | .03 Ohm |
| | 2 | 7 | .025 Ohm |
| | 7 | 4 | .025 Ohm |
| | 5 | 6 | 3.6 Ohms |
| | 6 | 4 | 1. Ohm |
| | 1 | 9 | 19. Ohms |
| Oscillator | 9 | 8 | .6 Ohm |
| | 1 | 3 | .02 Ohm |
| | 3 | 4 | .06 Ohm |
| | 4 | 7 | .9 Okm |
| | 7 | 5 | 4.5 Ohms |




## MISCELLANEOUS RESISTANCES

**Power Transformer**

Primary Winding .......... 6. Ohms
6.3 Volt Winding .......... .12 Ohm
5. Volt Winding .......... .14 Ohm
High Voltage Winding ..........350. Ohms

Oscillator "B" Choke
11. Ohms
Antenna Choke
.7 Ohm
Antenna Plate Choke
3.5 Ohms

## FIGURE 5

MODEL (70),7014,
7040,7042
Alignment,Parts

FAIRBANKS-MORSE HOME APP., INC.

## DISTORTIONLESS AUTOMATIC VOLUME CONTROL

Full automatic volume control, detection, and audio amplification are obtained through the use of a 6B7 tube. The diode plates of the tube are connected together to form a half wave rectifier. Due to the characteristics of this portion of the tube, current flows from the cathode to the diode plates and through the secondary of the second I.F. transformer through resistors R-14 and R-15 to ground, and back to the cathode to form a complete circuit. A voltage drop is produced across resistor R-15. The D. C. component of this drop is added to the fixed bias on the 6A7 and two of the 6D6 tubes to produce automatic volume control. The magnitude of this voltage is dependent on the strength of the incoming signal carrier. This circuit has been carefully designed so that no delay is present. This avoids any possibility of audio distortion. R-3; R-10; and R-13 are decoupling resistors. C-7; C-9; and C-15 are R.F. by-pass condensers, to provide a direct path to ground for signal currents. Resistor R-14 and condensers C-20 and C-22 form a filter circuit to remove extraneous noises from the rectified current.

The audio component of the voltage drop across resistor R-15 is taken off through condenser C-23 and is applied to the grid of the pentode section of the 6B7.

## ALIGNMENT PROCEDURE

To insure the performance this set is capable of delivering the following instructions should be carefully studied before any alignment adjustments are attempted.

Proper adjustment of the tuned circuits will only be possible through the use of a reliable, all wave, service oscillator and an output meter. Two types of service oscillators have been tested in our laboratories and found satisfactory for use in aligning the model 70. The new Clough-Brengle, continuously variable, Model OC manufactured by the Clough-Brengle Company, 1134 West Austin Avenue, Chicago, Illinois, was very satisfactory. The Triumph Universal, Model 100 built by the Triumph Manufacturing Co., 4017 West Lake Street, Chicago, Illinois, was also satisfactory.

All adjustments should be made with the volume control full "on". Any desired variations in signal strength should be obtained by adjusting the output of the service oscillator.

## I. F. ALIGNMENT

All Intermediate Frequency alignment adjustments must be made with the band selector switch in the broadcast position (Band Number One).

1. Supply a 456 Kilocycle signal, from an accurate service oscillator, to the grid of the 6A7 tube. A small condenser, about .00005 Mfd. (50 Mmfd.), should be connected in series with the oscillator lead to prevent the characteristics of the oscillator circuit from affecting the I. F. transformer.

2. Adjust the grid side (the center screw, Figure 3) of the first I. F. transformer, carefully, for maximum output with minimum input from the service oscillator.

3. Adjust the plate side (the hexagon nut, Figure 3) of the first I. F. transformer, carefully, for maximum output with minimum input from the service oscillator.

4. Repeat steps 2 and 3 on the second I. F. transformer.

5. Much of the sensitivity and selectivity of the receiver depend upon the proper setting of these critical adjustments, for this reason it is advisable to go back over them to make sure they are correct.

## ANTENNA, R.F. FIRST DETECTOR, AND OSCILLATOR

The adjustment condensers for the antenna, R.F. first detector, and oscillator stages are located in the same shields that house the coils for these stages. These coils are contained in the three large aluminum shield cans located to the right of the gang condenser, on the chassis. Four holes are located in the side of each of these cans through each of which a condenser adjusting screw is accessible.

On each coil the **upper screw** is for **band number one** (530—1500 kilocycles). The **second screw**, from the top, is for **band number two** (1500—4200 Kilocycles). The **third screw**, from the top, is for **band number three** (4.17—12 Megacycles). The **fourth screw**, from the top, is for **band number four** (9.5—24 Megacycles).

The first shield, from the front of the chassis, contains the oscillator coil. The second shield, from the front of the chassis, contains the R.F. first detector coil. The third or rear shield contains the antenna coil.

The adjustment condensers located in these three coil cans serve the same purpose as the small trimmers usually found on the gang condenser of a strictly broadcast receiver. Since this set covers four wave bands, four separate trimmers are necessary for each stage. A non-metallic tool must be used for making adjustments on these condensers.

### BAND NUMBER ONE
### (530-1500 Kilocycles)

1. Supply a 1500 Kilocycle signal to the antenna of the set. Turn the gang condenser all the way out of mesh. Adjust the oscillator trimmer condenser for maximum output with minimum input from the service oscillator.

2. Supply a 1400 Kilocycle signal to the antenna of the set. Tune the gang condenser to 1400 Kilocycles. Adjust the R.F. first detector trimmer for maximum output with minimum input from the service oscillator. Adjust the antenna trimmer for maximum output with minimum input from the service oscillator.

3. Supply a 600 Kilocycle signal to the antenna of the set. Tune the gang condenser to 600 Kilocycles. Adjust the **upper section** (C-47, Figure 4) of the low frequency padding condenser for maximum output with minimum input from the service oscillator. At the same time rock the gang condenser back and forth across the signal to make sure the correct peak is obtained. The low frequency padding condensers are located on the right front side of the chassis.

### BAND NUMBER TWO
### (1500-4200 Kilocycles)

1. Supply a 4200 Kilocycle signal to the antenna of the set. Turn the gang condenser all the way out of mesh. Adjust the oscillator trimmer condenser for maximum output with minimum input from the service oscillator.

2. Supply a 3900 Kilocycle signal to the antenna of the set. Tune the gang condenser to 3900 Kilocycles. Adjust the R.F. first detector trimmer for maximum output with minimum input from the service oscillator.

Adjust the antenna trimmer for maximum output with minimum input from the service oscillator.

3. Supply a 1650 Kilocycle signal to the antenna of the set. Tune the gang condenser to 1650 Kilocycles. Adjust the **lower section** (C-46, Figure 4) of the low frequency padding condenser for maximum output with minimum input from the service oscillator. At the same time rock the gang condenser back and forth across the signal to make sure the correct peak is obtained. The low frequency padding condensers are located on the right front side of the chassis.

### BAND NUMBER THREE
### (4.17—12 Megacycles)

1. Supply a 12 Megacycle signal to the antenna of the set. Turn the gang condenser all the way out of mesh. Adjust the oscillator trimmer condenser for maximum output with minimum input from the service oscillator.

2. Supply an 11 Megacycle signal to the antenna of the set. Tune the gang condenser to 11 Megacycles. Adjust the R.F. first detector trimmer for maximum output with minimum input from the service oscillator.

Adjust the antenna trimmer for maximum output with minimum input from the service oscillator.

### BAND NUMBER FOUR
### (9.5—24 Megacycles)

1. Supply a 24 Megacycle signal to the antenna of the set. Turn the gang condenser all the way out of mesh. Adjust the oscillator trimmer condenser for maximum output with minimum input from the service oscillator.

2. Supply a 22 Megacycle signal to the antenna of the set. Tune the gang condenser to 22 Megacycles. Adjust the R.F. first detector trimmer for maximum output with minimum input from the service oscillator.

Adjust the antenna trimmer for maximum output with minimum input from the service oscillator.

## GANG CONDENSER PLATES

The adjustment of the various plates of the gang condenser is very critical since it must be accurate on four bands. These adjustments are made in the factory with precision equipment and under no condition should it be necessary to change them by bending plates.

## DIAL CALIBRATION

Tune in a weak station of known frequency, on the low frequency end of the broadcast band. If the reading on the dial scale is incorrect, loosen the set screw on the hub of the dial. Turn the dial carefully until the correct reading is obtained. This should be done in such a manner as not to disturb the setting of the gang condenser. After the station comes in at the correct frequency tighten the set screw.

| Part Number | Description | List Price |
|---|---|---|
| 14516 | 3 Gang Variable Condenser | $6.00 |
| C-204 | 4 Gang Trimming Condenser | .60 |
| C-208 | Dual Padder Condenser (C-46, C-47) | 1.50 |
| EC-2 | .01 Tubular Condenser (C-5, C-13, C-23, C-24) 400 Volt | .20 |
| EC-4 | .05 Tubular Condenser (C-18, C-21, C-26) 400 Volt | .20 |
| EC-5 | .1 Tubular Condenser (C-1, C-4, C-6, C-11, C-29) 300 Volt | .25 |
| EC-7 | .25 Tubular Condenser (C-25) 300 Volt | .30 |
| EC-12 | .006 Tubular Condenser (C-12, C-27) 400 Volt | .20 |
| EC-20 | .01 Tubular Condenser Metal Clad (C-19) 400 Volt | .40 |
| EC-26 | .05 Tubular Condenser (C-7, C-9, C-14, C-15) 300 Volt | .20 |
| C-305 | .0002 Mica Condenser Wire Lead (C-20, C-22) | .20 |
| C-310 | .00005 Mica Condenser Wire Lead (C-10) | .20 |
| R-5004 | Travelite Unit 50 Ohms (Wirewound) (R-24) | .50 |
| V-6508 | 250 M Volume Control (R-15) | .80 |
| V-6509 | 50 M Tone Control and Switch (R-19) | 1.20 |
| R-816 | 100 Ohm ¼ Watt Resistor (R-6) | .20 |
| R-846 | 300 Ohm ¼ Watt Resistor (R-1, R-2, R-5, R-9) | .20 |
| R-1146 | 50M Ohm ¼ Watt Resistor (R-4, R-14, R-19, R-24) | .20 |
| R-1191 | 100M Ohm ¼ Watt Resistor (R-21) (R-4 Early Sets) | .20 |
| R-1236 | 250M Ohm ¼ Watt Resistor (R-15, R-22) | .20 |
| R-1266 | 500M Ohm ¼ Watt Resistor (R-13, R-17, R-18) | .20 |
| R-1296 | 1 Megohm ¼ Watt Resistor (R-20) | .20 |
| R-1311 | 2 Megohm ¼ Watt Resistor (R-16) | .20 |
| R-1491 | 1M Ohm ½ Watt Resistor (R-3, R-12) | .20 |
| R-1656 | 10M Ohm ½ Watt Resistor (R-8, R-11) | .20 |
| R-1896 | 1 Megohm ½ Watt Resistor (R-10) | .20 |
| R-2286 | 15M Ohm 1 Watt Resistor (R-7) | .20 |
| R-2856 | 10M Ohm 3 Watt Resistor (R-8, R-11) | .30 |
| 14527 | Antenna Coil Assembly in Can | 3.50 |
| 14528 | R. F. First Detector Coil Assembly in Can | 3.50 |
| 14529 | Oscillator Coil Assembly in Can | 3.50 |
| 14548 | Antenna Choke Coil | .50 |
| 14549 | R. F. Primary Coil | .75 |
| 14550 | Oscillator Choke Coil | 1.00 |
| 14530 | 8 Inch D-16 Speaker | 12.00 |
| 14531 | 10 Inch D-19 Speaker | 16.00 |
| K-565 | Knobs, Small, Round ⅞" Diameter...Each | .20 |
| K-569 | Knobs, Large, Round 1⅛"...Each | .25 |

# FAIRBANKS-MORSE HOME APP., INC.

MODEL (70)
7040,7042,7014
Socket,Trimmers
Parts View


FIGURE 3

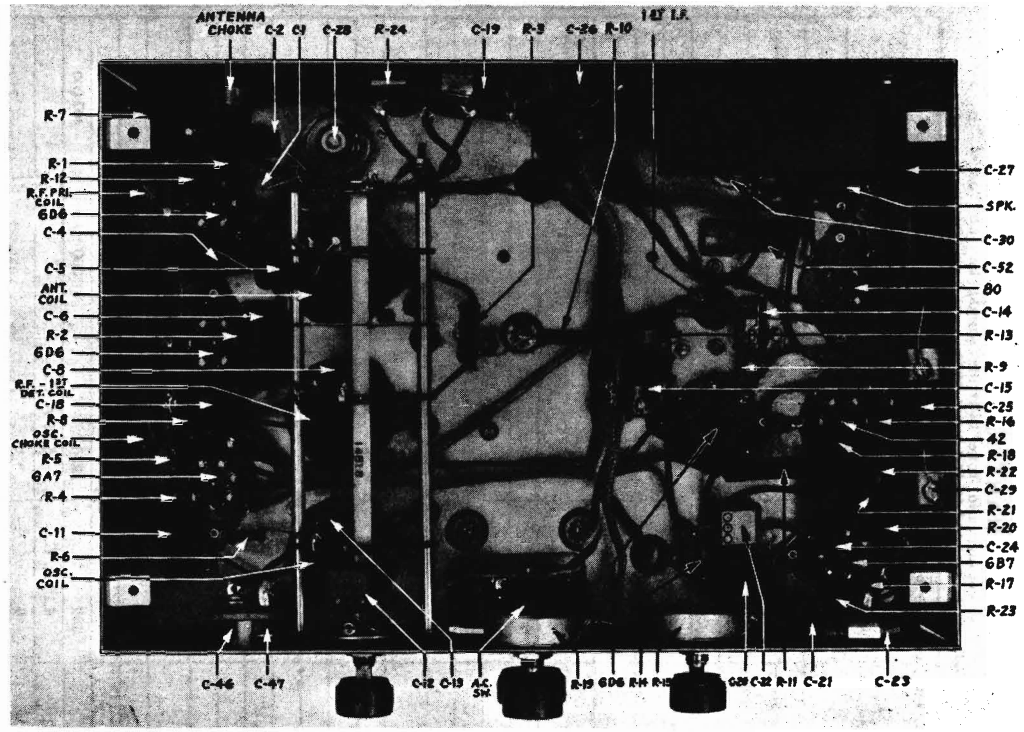



FIGURE 4

## WAVE BANDS

The Model 70 is an all wave chassis covering a frequency range from 530 Kilocycles to 24 Megacycles in four bands. Band selection is accomplished by means of a dual four gang switch, controlled by a knob located on the right side of the front panel. The counter-clockwise (extreme left) position is **Band Number One** (530—1500 Kilocycles); turning in a clockwise direction, the next position is **Band Number Two** (1500—4200 Kilocycles); the next position is **Band Number Three** (4.17—12 Megacycles); and the next position (extreme right) is **Band Number Four** (9.5—24 Megacycles). One Megacycle is 1000 Kilocycles.

## TUBES AND CIRCUIT

New multi-purpose tubes are employed thereby giving performance equal to the ordinary ten tube set. Two type 6D6 tubes are used as first and second radio frequency amplifiers. A 6A7 is used as a combined oscillator and first detector. A 6D6 is used as the intermediate frequency amplifier. A 6B7 tube is employed and performs three functions, second detector, distortionless automatic volume control, and first audio amplifier. A 42 is used as the audio output tube. A familiar type 80 rectifier is used in a full wave power supply circuit.

Several unique features will be found in this chassis. The most unusual is that two radio frequency amplifier stages are employed on both of the higher frequency bands. Special low loss coils are used. Each coil has a separate high frequency trimmer for each band. A total of eight tuned circuits are brought into use on each band. A new type, high gain, intermediate frequency transformer is used.

## HUM

A ground is made to the A. C. line through a .01 Mfd. condenser, connected to the primary of the power transformer. If a hum is noted in the set the A. C. plug should be reversed to connect the grounded side of the line to the grounded side of the set. In most cases the line ground is some distance from the wall outlet to which the set is connected, for this reason an external ground should be used.

## STANDARD R M A
### Resistor and Condenser Color Code

| | | | | |
|---|---|---|---|---|
| 0 Black | 2 Red | 4 Yellow | 6 Blue | 8 Grey |
| 1 Brown | 3 Orange | 5 Green | 7 Purple | 9 White |

### Resistors

The **Body Color** represents the **first figure** of the resistance value.

The **End Color** represents the **second figure** of the resistance value.

The **Dot Color** represents the **number of ciphers** following the first two figures.

### Mica Condensers
(Capacity in Micro-Microfarads)

The **First Dot** on the condenser represents the **first figure** of the capacity.

The **Second Dot** on the condenser represents the **second figure** of the capacity.

The **Third Dot** on the condenser represents the **number of ciphers** following the first two figures.

The colors on the condensers should be read from left to right with the condenser in an upright position.

MODEL (70) Series
Voltage Data

FAIRBANKS-MORSE HOME APP., INC.

## VOLTAGE ANALYSIS CHART

Voltage readings should be taken with all tubes in their sockets. The volume and tone controls should be full "on". The antenna should be disconnected. The blue wire and the blue and black wire should be twisted to the black wire.

| FROM GROUND TO† | MEASURED VOLTAGES** | | | | METER†† | |
|---|---|---|---|---|---|---|
| | Band 1 530-1500 Kilocycles | Band 2 1500-4200 Kilocycles | Band 3 4.17-12 Megacycles | Band 4 9.5-24 Megacycles | Range in Volts | Resistance of Range In Ohms |
| **6D6 Ant. Stage** 1. Cathode | 17 | 16 | 2.5 | 2.5 | 30 | 30,000 |
| 2. Suppressor | 17 | 16 | 2.5 | 2.5 | 30 | 30,000 |
| 3. Screen | 100 | 100 | 85 | 85 | 300 | 300,000 |
| 4. Plate | 225 | 225 | 210 | 210 | 300 | 300,000 |
| 5. Heater | 0 | 0 | 0 | 0 | ... | ...... |
| 6. Heater | 6.15 A. C. | 6.15 A. C. | 6.15 A. C. | 6.15 A. C. | ... | ...... |
| 7. Grid | 0 | 0 | 0 | 0 | ... | ...... |
| **6D6 R. F. Stage** 8. Cathode | 3 | 3 | 2.5 | 2.5 | 30 | 30,000 |
| 9. Suppressor | 3 | 3 | 2.5 | 2.5 | 30 | 30,000 |
| 10. Screen | 100 | 100 | 85 | 85 | 300 | 300,000 |
| 11. Plate | 225 | 225 | 210 | 210 | 300 | 300,000 |
| 12. Heater | 0 | 0 | 0 | 0 | ... | ...... |
| 13. Heater | 6.15 A. C. | 6.15 A. C. | 6.15 A. C. | 6.15 A. C. | ... | ...... |
| 14. Grid | 0 | 0 | 0 | 0 | ... | ...... |
| **6A7 Converter** 15. Cathode* | 2.8 | 3 | 3.5 | 4 | 30 | 30,000 |
| 16. Osc. Grid G1* | —6.5 | —3 | 2 | 2 | 30 | 30,000 |
| 17. Osc. Plate G2 | 180 | 175 | 150 | 130 | 300 | 300,000 |
| 18. Screen G3-G5 | 100 | 100 | 85 | 85 | 300 | 300,000 |
| 19. Plate | 235 | 235 | 230 | 230 | 300 | 300,000 |
| 20. Heater | 6.15 A. C. | 6.15 A. C. | 6.15 A. C. | 6.15 A. C. | ... | ...... |
| 21. Heater | 0 | 0 | 0 | 0 | ... | ...... |
| 22. Grid | 0 | 0 | 0 | 0 | ... | ...... |
| **6D6 I. F. Stage** 23. Cathode | 2.5 | 2.5 | 2 | 2 | 30 | 30,000 |
| 24. Suppressor | 2.5 | 2.5 | 2 | 2 | 30 | 30,000 |
| 25. Screen | 100 | 100 | 85 | 85 | 300 | 300,000 |
| 26. Plate | 235 | 235 | 230 | 230 | 300 | 300,000 |
| 27. Heater | 6.15 A. C. | 6.15 A. C. | 6.15 A. C. | 6.15 A. C. | ... | ...... |
| 28. Heater | 0 | 0 | 0 | 0 | ... | ...... |
| 29. Grid | 0 | 0 | 0 | 0 | ... | ...... |
| **6B7 Det. and A. F.** 30. Cathode | 0 | 0 | 0 | 0 | ... | ...... |
| 31. Diode Plate | 0 | 0 | 0 | 0 | ... | ...... |
| 32. Diode Plate | 0 | 0 | 0 | 0 | ... | ...... |
| 33. Screen | 30 | 30 | 27.5 | 27.5 | 300 | 300,000 |
| 34. Plate | 35 | 35 | 35 | 35 | 300 | 300,000 |
| 35. Heater | 0 | 0 | 0 | 0 | ... | ...... |
| 36. Heater | 6.15 A. C. | 6.15 A. C. | 6.15 A. C. | 6.15 A. C. | .... | ...... |
| 37. Grid | ...... | ...... | ...... | ...... | ... | ...... |
| **42 Output** 38. Cathode | 0 | 0 | 0 | 0 | ... | ...... |
| 39. Grid | — 1 | — 1 | — 1 | — 1 | 30 | 30,000 |
| 40. Screen | 235 | 235 | 230 | 230 | 300 | 300,000 |
| 41. Plate | 225 | 225 | 220 | 220 | 300 | 300,000 |
| 42. Heater | 0 | 0 | 0 | 0 | ... | ...... |
| 43. Heater | 6.15 A. C | 6.15 A. C | 6.15 A. C. | 6.15 A. C. | ... | ...... |
| **80 Rectifier** 44. Plate | —130 | —130 | —135 | —135 | 300 | 300,000 |
| 45. Plate | —130 | —130 | —135 | —135 | 300 | 300,000 |
| 46. Filament | 235 | 235 | 230 | 230 | 300 | 300,000 |
| 47. Filament | 235 | 235 | 230 | 230 | 300 | 300,000 |
| | A. C. Line—115 Volts | | | | | |

†The figures in the first column refer to the socket hole numbers shown on Figure 3.
††It is essential that a meter be used which is similar to the one indicated in the last two columns.
**Allowable variation—10% plus or minus on all readings.
*Subject to large variations due to 6A7 characteristics.

# FAIRBANKS-MORSE HOME APP., INC.

**MODEL 70 Series**
**Voltage Data**

## RESISTANCE ANALYSIS CHART

These tests should be made with an accurate ohm-meter. The speaker must be connected. All tubes must be removed from the set. The volume and tone controls should be full "on". The A.C. line plug must be removed from the A.C. outlet.

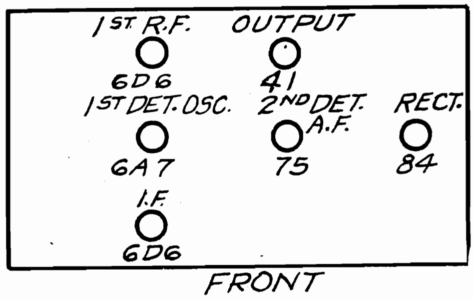
| FROM† | TO | Resistance In Ohms* | If Reading Differs More Than 10% Plus or Minus From Stated Value Check These Parts |
|---|---|---|---|
| **6D6 Ant. Stage** 1. Cathode | Ground | 300 | C-1; R-1; Switch (switch must be on Band 3 or 4) |
| 2. Suppressor | Ground | 300 | C-1; R-1; Switch (switch must be on Band 3 or 4) |
| 3. Screen | Ground | 15,000 | C-4; C-16; C-52; C-28; C-30; C-26; C-27; C-17; C-18; C-12; R-7; R-11; R-12 |
| 4. Plate | Ground | 26,000 | C-5; C-8; C-17; C-18; C-28; C-30; C-16; C-4; C-52; R-12; R-11; R-7; Plate Choke |
| 5. Heater | Ground | 0 | Open Ground |
| 6. Heater | Ground | 0 | Filament Winding; Travelite |
| 7. Grid | Ground | 10 | Antenna Choke; R. F. Primary |
| **6D6 R. F. Stage** 8. Cathode | Ground | 300 | C-6; R-2 |
| 9. Suppressor | Ground | 300 | C-6; R-2 |
| 10. Screen | Ground | 15,000 | C-4; C-16; C-52; C-28; C-30; C-26; C-27; C-17; C-18; C-12; R-7; R-11· R-12 |
| 11. Plate | Ground | 26,000 | C-5; C-8; C-17; C-18; C-28; C-30; C-16; C-4; C-32; R-12; R-11; R-7; Coil Primary |
| 12. Heater | Ground | 0 | Open Ground |
| 13. Heater | Ground | 0 | Filament Winding; Travelite |
| 14. Grid | Ground | 1.75 Meg. | C-7; C-9; C-15; C-22; R-3; R-10; R-13; R-15; Coil; Switch |
| **6A7 Converter** 15. Cathode | Ground | 300 | C-11; R-5 |
| 16. Osc. Grid G1 | Ground | 50,300 | C-10; C-11; R-4; R-5 (100,000 on early production) |
| 17. Osc. Plate G2 | Ground | 36,100 | C-13; C-17; C-18; C-28; C-30; C-52; C-26; C-27; C-16; C-4; C-12; R-8; R-6; R-12; R 11; R-7; Coil; Choke; Switch |
| 18. Screen G3-G5 | Grouud | 15,000 | C-4; C-16; C-52; C-28; C-30; C-26; C-27; C-17; C-18; C-12; R-7; R-11; R-12 |
| 19. Plate | Ground | 25,000 | C-52; C-28; C-30; C-16; C-4; C-17; C-18; C-26; C-27; R-11; R-7; R-12; I. F. Primary |
| 20. Heater | Ground | 0 | Filament Winding |
| 21. Heater | Ground | 0 | Open Ground |
| 22. Grid | Ground | 1.75 Meg. | C-7; C-9; C-15; C-22; R-10; R-13; R-15; Coil; Switch |
| **6D6 I. F. Stage** 23. Cathode | Ground | 300 | C-14; R-9 |
| 24. Suppressor | Ground | 300 | C-14; R-9 |
| 25. Screen | Ground | 15,000 | C-4; C-16; C-52; C-28; C-30; C-26; C-27; C-17; C-18; C-12; R-7; R-11; R-12 |
| 26. Plate | Ground | 25,000 | C-52; C-28; C-30; C-16; C-4; C-17; C-18; C-26; C-27; R-11; R-7; R-12; I. F. Primary |
| 27. Heater | Ground | 0 | Filament Winding; Travelite |
| 28. Heater | Ground | 0 | Open Ground |
| 29. Grid | Ground | 750,000 | C-15, C-22; R-13; R-15; I. F. Secondary |
| **6B7 Det. and A. F.** 30. Cathode | Ground | 0 | Connection |
| 31. Diode Plate | Ground | 300,000 | C-20; C-22; C-23; R-14; R-15; I. F. Secondary |
| 32. Diode Plate | Ground | 300,000 | C-20; C-22; C-23; R-14; R-15; I. F. Secondary |
| 33. Screen | Ground | 2 Meg. | C-21; R-16; R-12; R-11; R-7 |
| 34. Plate | Ground | 526,000 | C-24; C-5; C-8; C-17; C-18; C-28; C-30; C-16; C-4; C-32; R-17; R-12; R-11; R-7 |
| 35. Heater | Ground | 0 | Open Ground |
| 36. Heater | Ground | 0 | Filament Winding; Travelite |
| 37. Grid | Ground | 1.1 Meg. | C-23; C-29; R-20; R-21 |
| **42 Output** 38. Cathode | Ground | 0 | Connection |
| 39. Grid | Ground | 800,000 | C-24; C-25; C-29; R-18; R-21; R-22; R-23; Field |
| 40. Screen | Ground | 25,000 | C-30; C-28; C-52; C-16; C-4; C-26; C-27; C-17; C-18 |
| 41. Plate | Ground | 25,450 | C-26; C-27; C-30; C-28; C-52; C-16; C-4; C-17; C-18; Output Transformer |
| 42. Heater | Ground | 0 | Open Ground |
| 43. Heater | Ground | 0 | Filament Winding; Travelite |
| **80 Rectifier** 44. Plate | Ground | 1,675 | High Volgage Secondary; Field |
| 45. Plate | Ground | 1,675 | High Voltage Secondary; Field |
| 46. Filament | Ground | 25,000 | C-30; C-28; C-52; C-16; C-4; C-26; C-27; C-17; C-18 |
| 47. Filament | Ground | 25,000 | C-30; C-28; C-52; C-16; C-4; C-26; C-27; C-17; C-18 |
| **Miscellaneous** 48. A. C. Line | Ground | Open | C-19; Primary; Switch |
| 49. A. C. Line | Ground | Open | C-19; Primary; Switch |
| 50. Ant. (Blue) | Ground | 0 | Antenna Choke; R. F. Primary |
| 51. Doublet (Blue & Black) | Ground | 0 | R. F. Primary |
| 52. Ground (Black) | Ground | 0 | Connection |
| 48. A. C. Line | 49. A. C. Line | 6 | Primary; Switch; A. C. Cord; Plug |
| 44. Plate 80 | 45. Plate 80 | 350 | High Voltage Secondary |
| 46. Fil. 80 | 47. Fil. 80 | 0 | Rectifier Filament Winding |

Travelite sockets and R-24 must be checked separately.
*If some resistance readings are low try reversing polarity of Ohm-meter.

†The figures in the first column refer to the socket hole numbers shown on Figure 3.

MODEL 346,B-6
MODEL 347
Schematics,Voltage
Socket

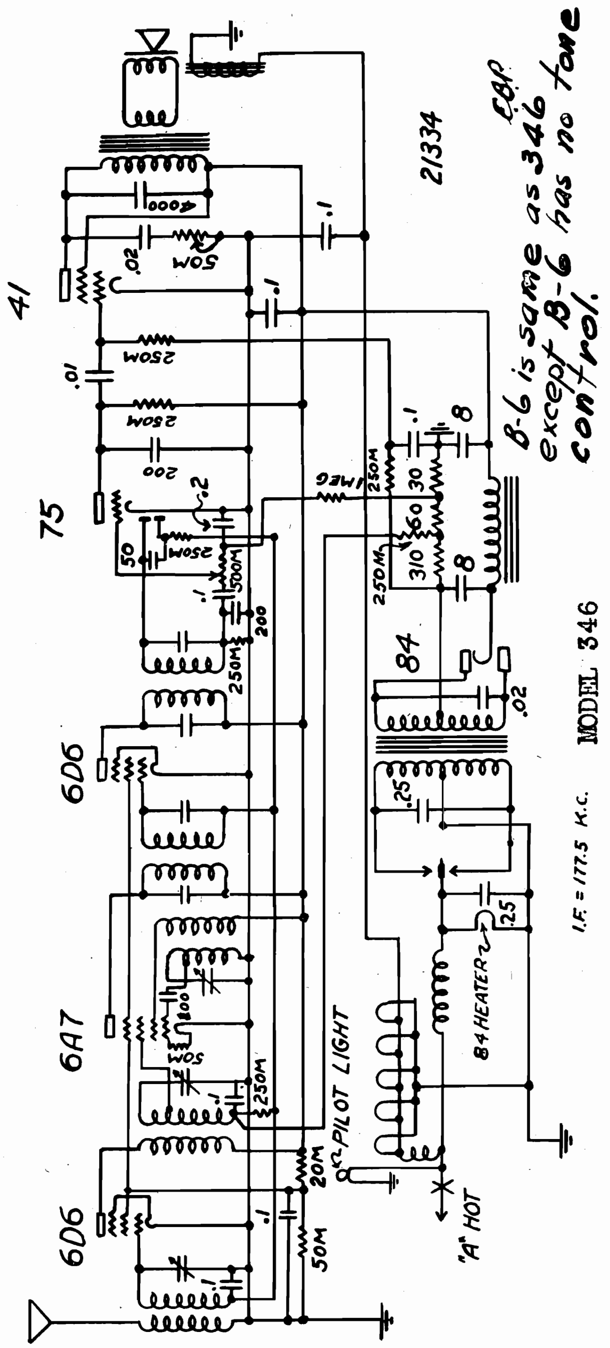
# FAIRBANKS-MORSE HOME APP., INC.

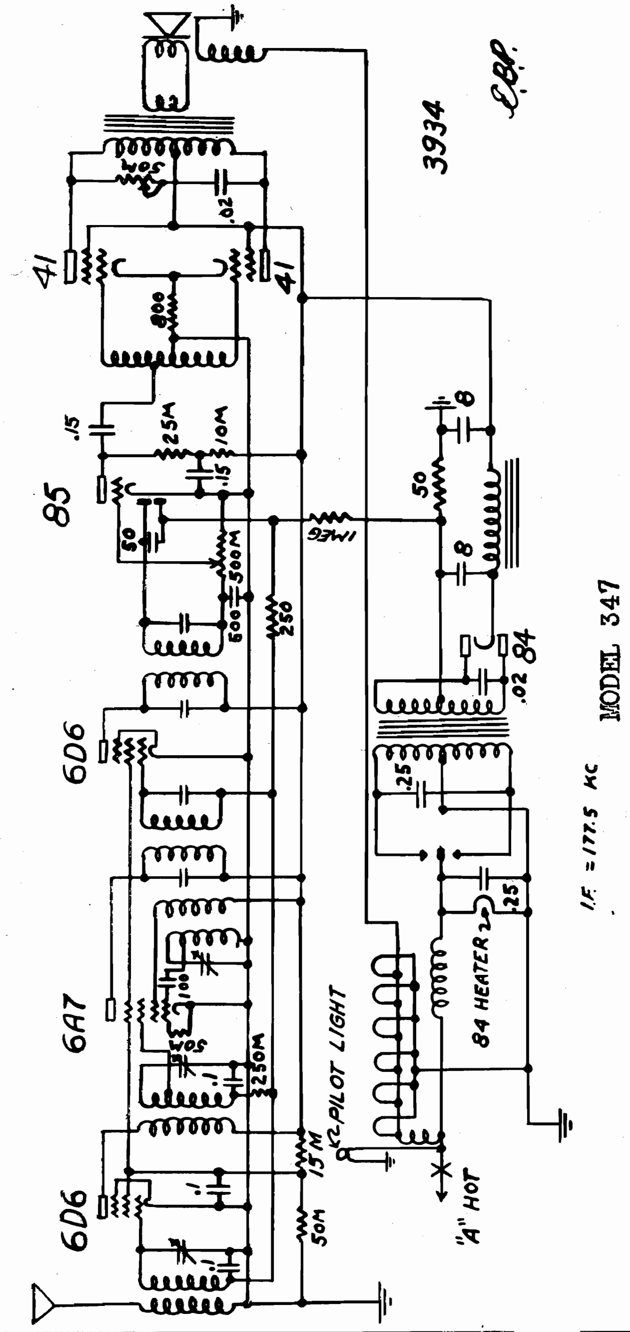



## VOLTAGE CHART

The following chart gives the voltages and plate currents of all the tubes when the set is in operating condition, but with no signal being received. A thousand ohm-per-volt meter of the 0-250 volt type is used for all voltage readings.

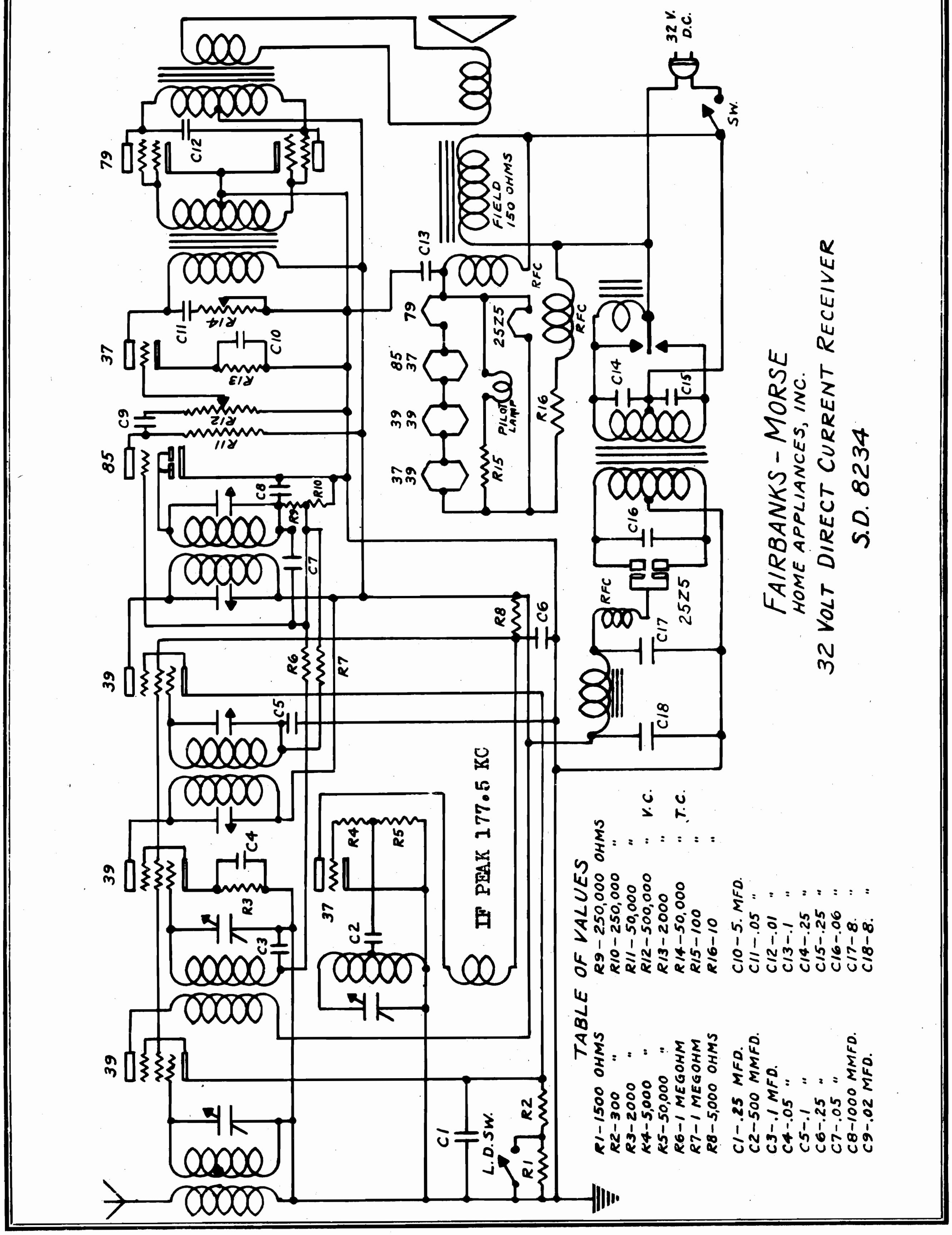
| Type of Tube | Function | Heater Voltage | Plate to Ground | Screen to Ground | Grid to Ground | Normal Plate M.A. |
|---|---|---|---|---|---|---|
| 6D6 | R. F. | 6.1 | 230 | 100 | 1b | 5 |
| 6A7 | 1st Det. | | 230 | | | 2.5 |
| | and Osc. | 6.1 | 230a | 100 | 1b | 5.5a |
| 6D6 | I. F. | 6.1 | 230 | 100 | 1b | 5 |
| 75 | 2nd Det. | | | | | |
| | 1st Audio | 6.1 | 120 | | | .3 |
| 41 | Output | 6.1 | 215 | 230 | 10c | 15 |



**MODEL 32 Volt**
**Schematic**

# FAIRBANKS-MORSE HOME APP., INC.



**MODEL 32 Volt Voltage, Parts Alignment**

FAIRBANKS-MORSE HOME APP., INC.

## VOLTAGES

Tolerances of about 10% plus or minus are allowable on the following list of measured voltages. In the event all voltages are low try replacing the 25Z5 rectifier tube or vibrator. All measurements are made to ground except on filament voltage.

| TUBE | | PLATE | GRID | SCREEN | CATHODE | HEATER |
|---|---|---|---|---|---|---|
| 39 | 1st Det. | 205 | 0 | 120 | 12.5 | 6.3 |
| 39 | R. F. | 205 | 0 | 120 | 5 | 6.3 |
| 39 | I. F. | 205 | 0 | 120 | 5 | 6.3 |
| 37 | Osc. | 120 | 0 | - | 0 | 6.3 |
| 37 | A. F. | 185 | 0 | - | 12.5 | 6.3 |
| 85 | 2nd Det. | 45 | 0 | - | 0 | 6.3 |
| 79 | A. F. | 205 each | 0 each | - | 0 | 6.3 |
| 25Z5 | Rect. | - | - | - | - | - |

## ALIGNMENT PROCEDURE

If the set is weak or broad it is possibly out of alignment and the following adjustments should be made.

1. A 177.5 kilocycle signal, from a good service oscillator, should be supplied to the grid of the 39 first detector tube thru a small condenser (.00005 MFD). The trimmers on the first and second I. F. transformers should be adjusted for maximum output with minimum input from the service oscillator. The first I. F. transformer is located at the left of the chassis and the second I. F. at the right of the chassis, viewed from the front. These trimmers may be reached from the bottom of the chassis.
2. Supply a 1500 kilocycle signal to the antenna of the set. Tune the dial to 1500 kilocycles. Adjust the trimmer on the oscillator section of the gang condenser (the rear section) for maximum output with minimum input from the service oscillator.

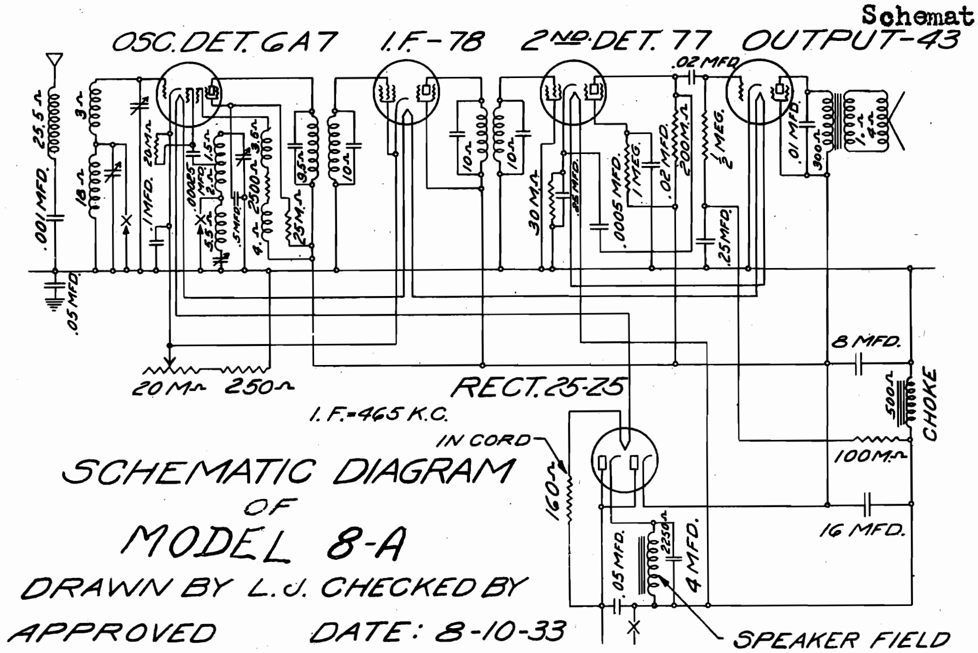
3. Adjust the trimmers on the R. F. and first detector sections of the gang condenser for maximum output with minimum input from the service oscillator.

## PARTS LIST

| Part Number | Description of Part | Part Number | Description of Part |
|---|---|---|---|
| R-5005 | 10 Ohm Resistor Wire Wound | R-1896 | 1 Megohm Resistor 1/2 Watt |
| R-5006 | 100 Ohm Resistor Wire Wound | C-304 | 500 MMFD. Moulded Condenser |
| R-1446 | 300 Ohm Resistor 1/2 Watt | C-311 | 1000 MMFD. Moulded Condenser |
| R-1506 | 1500 Ohm Resistor 1/2 Watt | EC-1 | .004 MFD. Condenser Tub. 400 V. |
| R-921 | 2000 Ohm Resistor 1/4 Watt | EC-3 | .02 MFD. Condenser Tubular 400 V. |
| R-1521 | 2000 Ohm Resistor 1/2 Watt | EC-4 | .05 MFD. Condenser Tubular 400 V. |
| R-1581 | 5000 Ohm Resistor 1/2 Watt | EC-5 | .1 MFD. Condenser Tubular 300 V. |
| R-1746 | 50,000 Ohm Resistor 1/2 Watt | EC-6 | .25 MFD. Condenser Tubular 400 V. |
| R-2346 | 50,000 Ohm Resistor 1 Watt | EC-7 | .25 MFD. Condenser Tubular 300 V. |
| R-1236 | 250,000 Ohm Resistor 1/4 W. | EL-6 | 5. MFD. Cond. Tub. Electrolyt. 25 V. |
| R-1836 | 250,000 Ohm Resistor 1/2 W. | EL-9 | 8. MFD. Cond. Tub. Electrolyt. 250V. |
| 14611 | Dial Assembly Complete | 14601 | Power Transformer |
| V-6511 | Volume Control | 14602 | Vibrator Assembly |
| V-6512 | Tone Control | 14603 | Filter Choke |
| SW-6102 | Switch | 14604 | Antenna Coil |

MODEL 8-A
Schematic, Voltage
MODEL 7-A, 13-A, 24-A
Schematic, Voltage

# FEDERATED PURCHASER

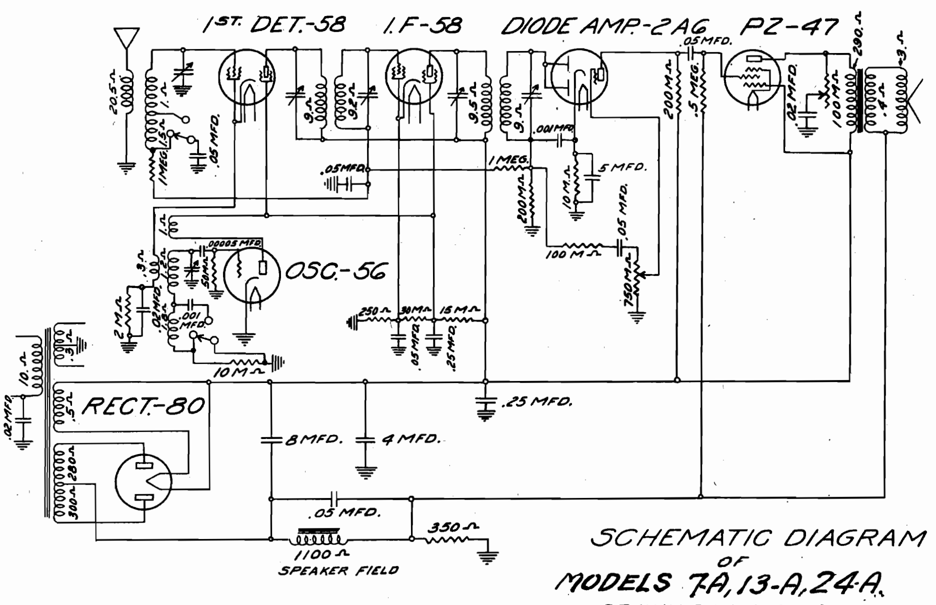



SOCKET VOLTAGE ANALYSIS OF MODEL 8-A

Line Voltage 110

| TUBE | STAGE | Ep | Eg | Ek | Esg | Esug | Ip | Ep-O | Eg-O | Ip-O |
|---|---|---|---|---|---|---|---|---|---|---|
| 6A7 | Osc-Det. | 105 | 2.4 | 20 | 38 | | 1 | 92 | .1 | 3 |
| 78 | I-F. | 105 | 2.1 | 20 | 105 | 0 | 6.5 | | | |
| 77 | 2 Det. | 35 | 15 | 18 | .6 | 1.4 | .1 | | | |
| 43 | Output | 100 | .3 | 18 | 107 | | 19 | | | |
| 25Z5 | Rectif. | 110* | | 110** | | | 37* | | | |

* per plate ** per cathode Vol. Cont. Full On O-Oscillator




SOCKET VOLTAGE ANALYSIS OF MODELS 7-A, 13-A, 24-A

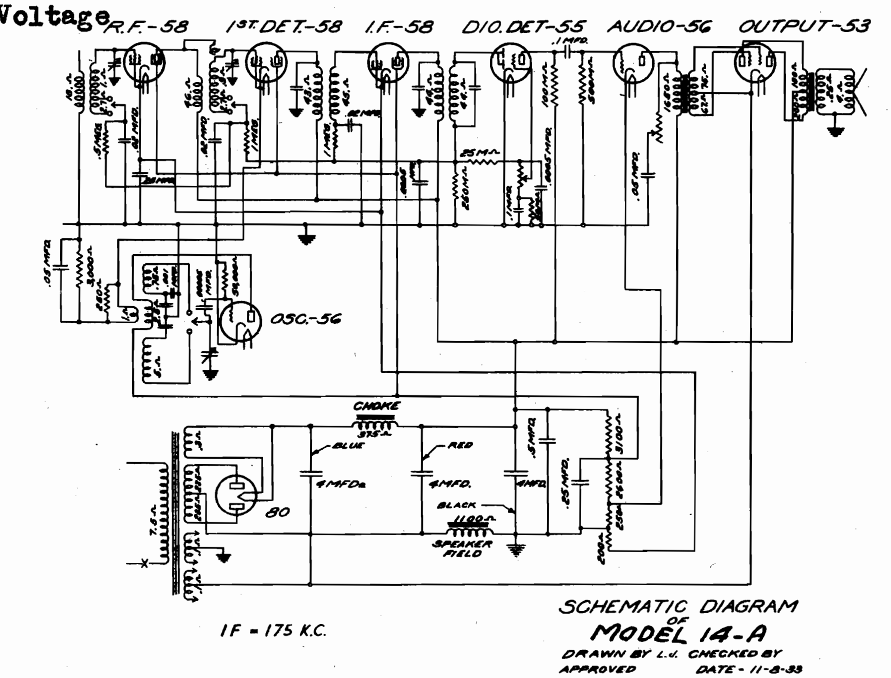
Line Voltage - 109 v.

| TUBE | STAGE | Ep | Eg | Ek | Esg | Esug | Ip | Ef |
|---|---|---|---|---|---|---|---|---|
| 58 | 1 Det | 235 | .4 | 7 | 80 | 0 | 2.7 | 2.1 |
| 56 | Osc. | 95 | .6 | 0 | | | 5 | 2.1 |
| 58 | I-F. | 243 | .3 | 2.2 | 85 | 0 | 6 | 2.1 |
| 2A6 | Diode | 140 | 4. | 1.1 | .1** | | .2 | 2.1 |
| 47 | Output | 235 | .5 | 240 | | | 24 | 2.1 |
| 80 | Rectif. | 328* | | | | | 24* | 4.7 |

* per plate ** Diode plate Vol.Cont.-Full On

MODEL 6-A,12-A
Schematic
MODEL 14-A
Schematic,Voltage

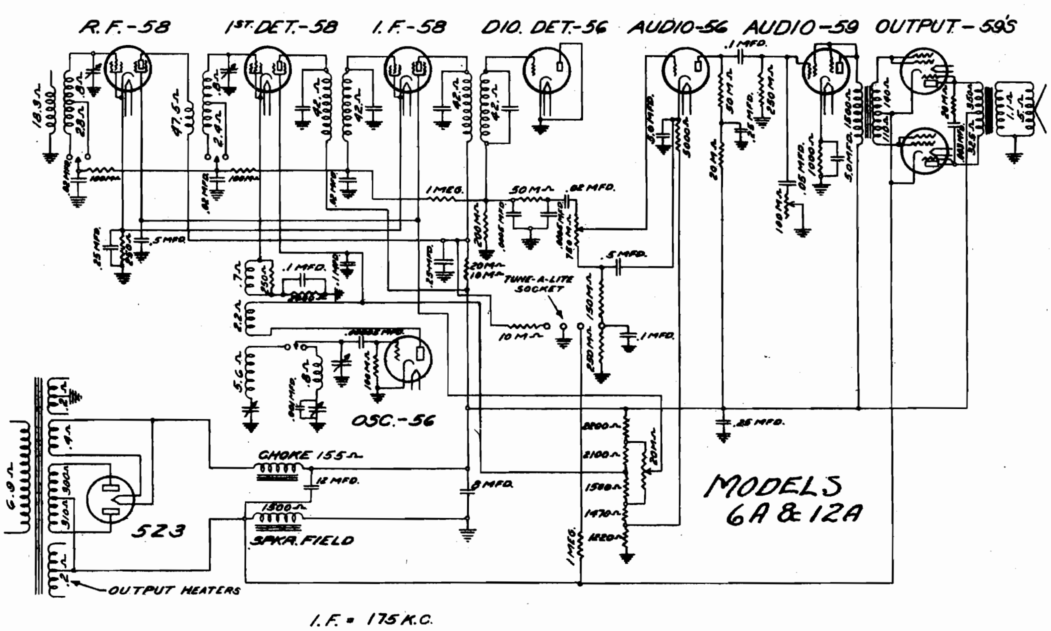
# FEDERATED PURCHASER




SOCKET VOLTAGE ANALYSIS OF MODEL 14-A
Line Voltage - 107 v.

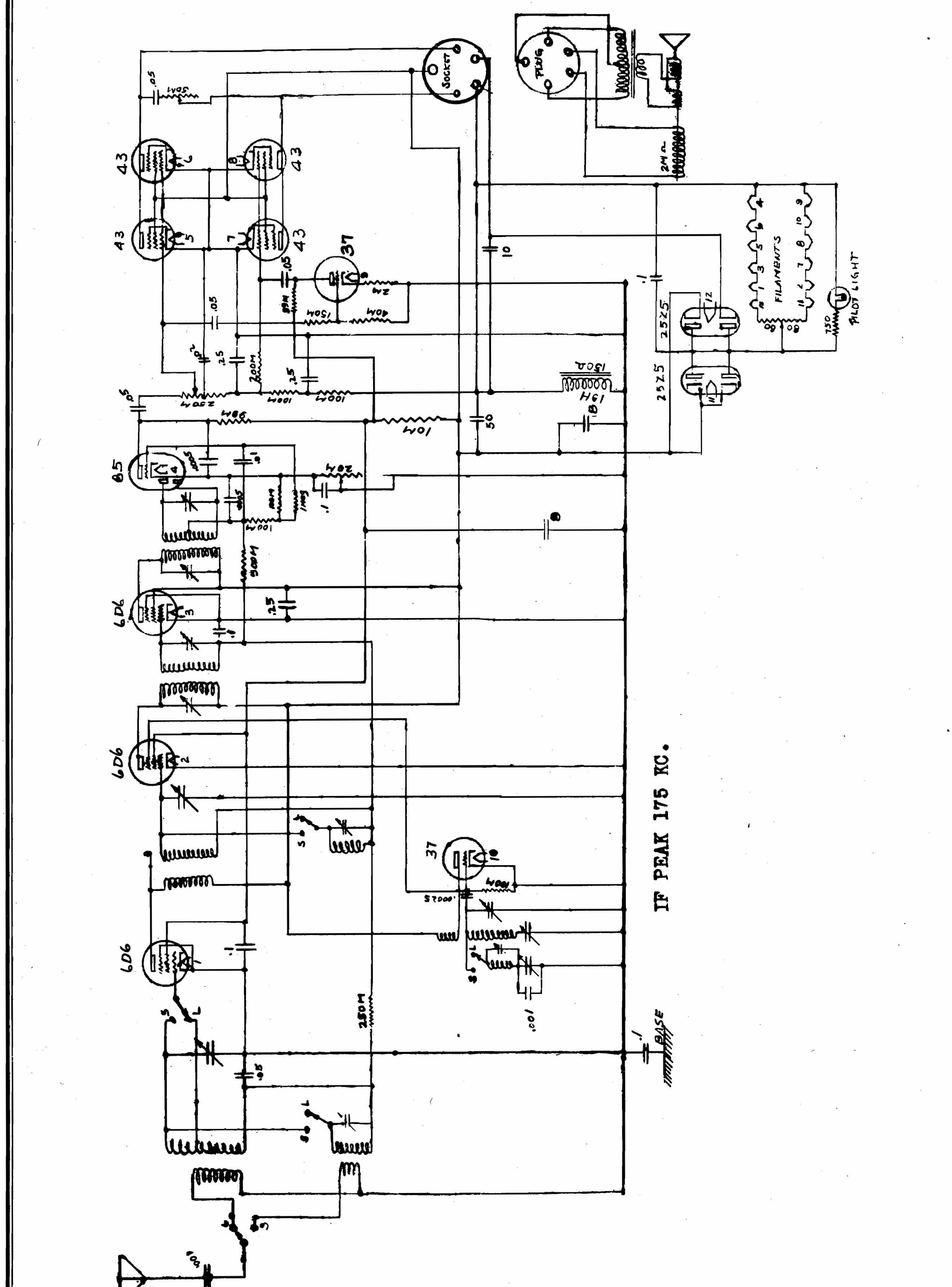
| TUBE | STAGE | Ep | Eg | Ek | Esg | Esug | Ip |
|---|---|---|---|---|---|---|---|
| 58 | R-F | 190 | .3 | 2.9 | 83 | 0 | 6 |
| 58 | 1 Det. | 190 | .3 | 7 | 78 | 0 | 2 |
| 56 | Osc. | 83 | .3 | 0 | | | 4.5 |
| 58 | I-F. | 190 | .3 | 2.9 | 83 | 0 | 5.5 |
| 55 | Diode | 36 | .2 | 0 | .2** | | 2 |
| 56 | A-F. | 198 | .2 | 10 | | | 5 |
| 53 | Output | 292* | 0 | 0 | | | 12* |
| 80 | Rectif. | 292* | | | | | 37* |

* per plate **Diode voltage Vo.Cont.Full On



MODEL 32-A, 36-A
Schematic

# FEDERATED PURCHASER



MODEL 32-A,36-A
Alignment,Voltage

# FEDERATED PURCHASER

## TABLE OF VOLTAGES

Line Voltage - 115 Volts - 60 Cycles AC
Interchannel Noise Suppressor Set for Maximum Sensitivity

| Position | Tube | Plate | Screen | Cathode |
|---|---|---|---|---|
| RF | 6D6 | 100 | 60 | 0 |
| MOD | 6D6 | 100 | 60 | 0 |
| OSC | 37 | 100 | | 0 |
| IF | 6D6 | 100 | 100 | 0 |
| DET | 85 | 20 | | 0 |
| PHASE REVERSER | 37 | 20 | | 1-2V |
| OUTPUT | 43 | | 100 | 0 |

Above voltage's measured with 0-250 V--1000 ohm per volt DC Voltmeter
Drop ACROSS CHOKE - 18 Volts
Drop ACROSS SPEAKER FIELD -
When operated on 115 Volts DC or 25 cycle AC the above voltages will be slightly lower

## FILAMENT VOLTAGES

| | | | | |
|---|---|---|---|---|
| 25Z5 | - | 25 Volts | - | AC or DC |
| 43 | - | 25 " | - | AC " DC |
| 6D6 | - | 6.3 " | - | AC " DC |
| 37 | - | 6.3 " | - | AC " DC |
| 85 | - | 6.3 Volts | - | AC " DC |

## ALIGNMENT PROCEDURE

Should it ever become necessary to realign the RF and IF circuits, the procedure outlined below should be followed.

1. Apply a modulated 175 Kilocycle signal to the grid of the modulator (1st detector) tube and align the four dual trimmer adjustments in the top of the IF transformer cans for maximum output from the receiver.

2. With the band switch knob in the 530-1500 Kilocycle or clockwise position, and the tuning dial set to 1400 Kilocycles, apply a 1400 Kilocycle signal at the antenna and adjust the three trimmer screws on the gana condenser for maximum output from the receiver.

3. Apply a 600 Kilocycle signal at the antenna and track the oscillator by varying the nut adjustment on the oscillator padding condenser and returning the dial until maximum response is obtained. This adjustment should be made disregarding calibration.

4. With the band switch in the short wave or counter-clockwise position and the dial set to 3.6 Megacycles, apply a 3600 Kilocycle signal at the antenna and align the three trimmers in the top of the short wave coil cans for maximum response.

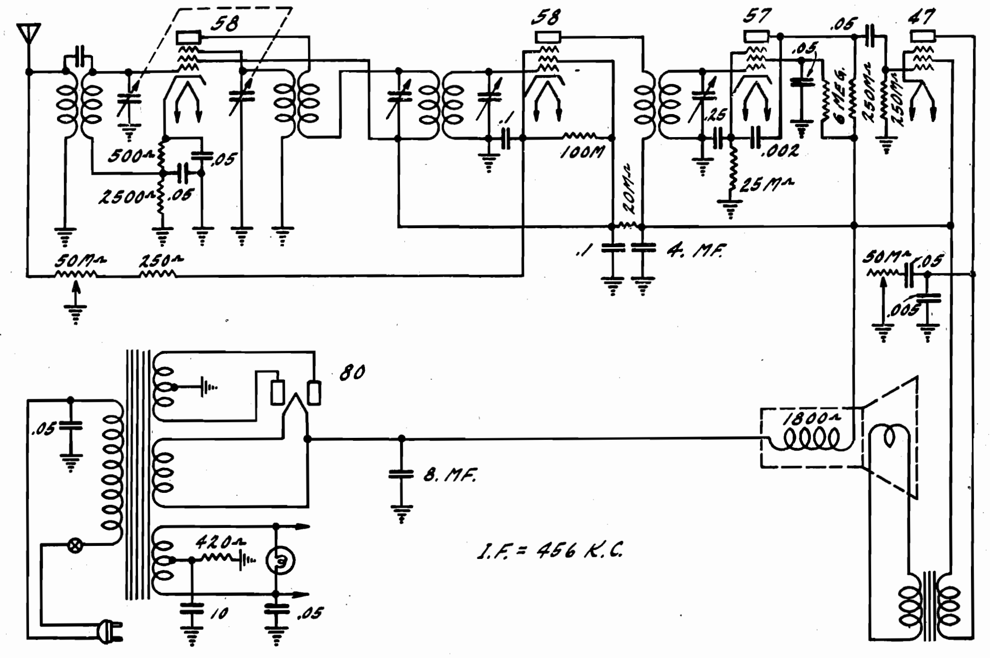
5. Apply a 1600 Kilocycle signal at the antenna and track the oscillator as at 600 Kilocycles in the broadcast band by adjusting the slotted screw adjustment on the oscillator padding condenser.

Suitable harmonies of a broadcast oscillator may be used for alignment purposes in the short wave band.

At all steps in the aligning procedure, the output should be kept only as high as is necessary for good alignment but the output should always be lowered by decreasing the input to the receiver, never by reducing the volume control setting. The volume control should be at maximum setting during any adjustments of the RF and IF circuits. A suitable output meter should be connected across the speaker voice coil to indicate the correct adjustment for maximum response.

MODEL 38-A
Schematic, Voltage
Alignment

## FEDERATED PURCHASER




ALIGNMENT PROCEDURE

1. Apply a modulated 456 KC. signal to the grid of the modulator tube and align the four dual trimmer adjustments in the top of the I-F. transformer cans for maximum output from the receiver.

2. Apply a 600 KC. signal at the Antenna and track the Oscillator by varying the nut adjustment on the Oscillator Padding Condenser and turning the dial until maximum response is obtained. This adjustment should be made disregarding calibration.

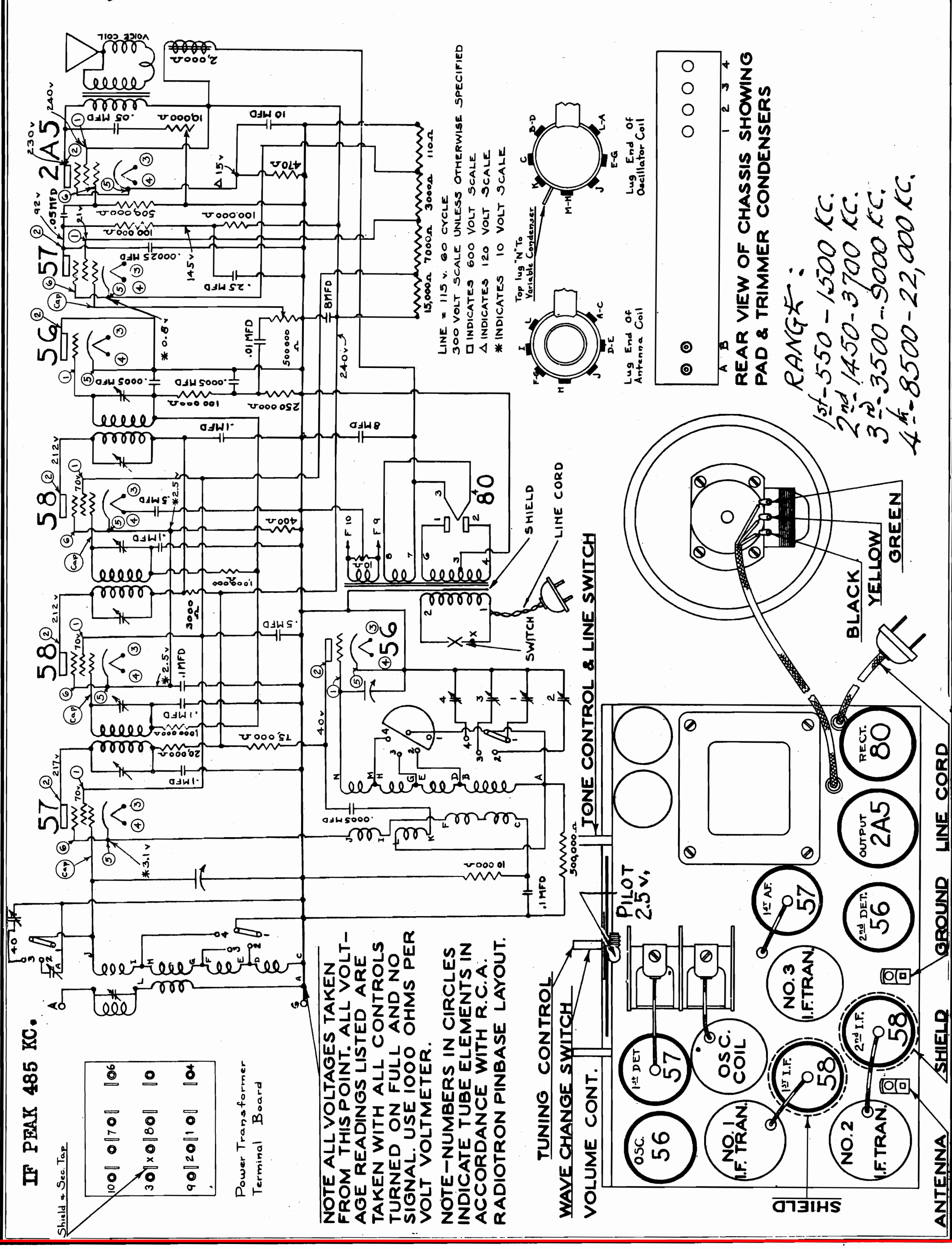
During the aligning procedure, the output should be kept only as high as is necessary for good alignment, but the output should ALWAYS BE LOWERED by decreasing the input to the receiver, NEVER by reducing the Volume Control setting. The Volume Control should be set at maximum during any adjustments of the R-F. and I-F. circuits. A suitable output meter should be connected across the speaker voice coil to indicate the correct adjustment for maximum response.

TABLE OF VOLTAGES Line: 115 volts, 60 cycles

| TUBE | FUNCTION | GRID | PLATE | SCREEN | FILAMENT |
|---|---|---|---|---|---|
| 58 | Osc.1st Det. | -2.5 | 60 | 60 | 2.5 |
| 58 | IF | -2.0 | 250 | 75 | 2.5 |
| 57 | 2nd Det. | -3.5 | 75 | 6 | 2.5 |
| 47 | Output | -5.0 | 210 | 225 | 2.5 |
| 80 | Rectifier Filament to Ground 325 volts. | | | | 5.0 |

MODEL 39-A, 43-A, 44-A, 86, 87
Schematic, Voltage, Trimmers, Socket

# FEDERATED PURCHASER



MODEL 39-A,43-A,44-A, 86,87
Alignment

# FEDERATED PURCHASER

IN ALL GANGING OPERATIONS USE THE WEAKEST SIGNAL THAT WILL GIVE A SATISFACTORY INDICATION ON THE OUTPUT METER, AND TURN THE VOLUME & TONE CONTROLS TO THEIR MAXIMUM POSITIONS (clockwise).

The I.F. trimmer adjustments are carefully made at the factory and should not be tampered with unless a thorough investigation definitely proves the I.F. amplifier to be at fault,in that event:-

(1) Attach the output meter from plate to screen of 2A5 tube.
(2) Feed the signal from the local oscillator tuned to exactly 485 kc. into the receiver at the control grid of the first detector, providing a D.C. path from the point to ground.
(3) Adjust the I.F. trimmers to give maximum indication on the output meter. There are three I.F. transformers, each with two screw adjustments. On the early models these adjustments are on the bottom of the transformers, accessible from the under side of the chassis. On the later models these adjustments are on the top of the transformers.
(4) NEXT-feed the 485 kc. signal in at the antenna post,replace the first detector grid cap, and adjust the wave trap condenser for MINIMUM indication on the output meter. This adjustment is a $\frac{1}{4}$" hex nut on a two plate trimmer under the chassis,below the gang condenser, near the band switch.

(1) Set the dial to the point where a station (or oscillator) of known frequency, about 1400 kc.,should come in.
(A) Set Band switch to band 1 (top scale).
(B) Adjust oscillator trimmer (screw adjustment, top-rear of gang condenser) until desired signal is heard. There will be two peaks in adjusting this trimmer. The peak obtained with the loosest trimmer setting is correct.
(2) Repeat operation 1 at,or near,550 kc., using band 1.
(A) Adjust oscillator pad (fourth adjustment from right, on rear of chassis pan) until desired signal is heard.
(3) Repeat operation 1 at, or near,1450 kc.,using band 2.
(A) Adjust oscillator pad (third adjustment from right on rear of chassis pan) until the desired signal is heard.
(4) Repeat operation 1 at, or near, 3500 kc.,using band 3.
(A) Adjust oscillator pad (second adjustment from right on rear of chassis pan) until the desired signal is heard.
(5) Repeat operation 1 at, or near, 8500 kc.,using band 4.
(A) Adjust oscillator pad (extreme right adjustment on rear of chassis pan) until the desired signal is heard.

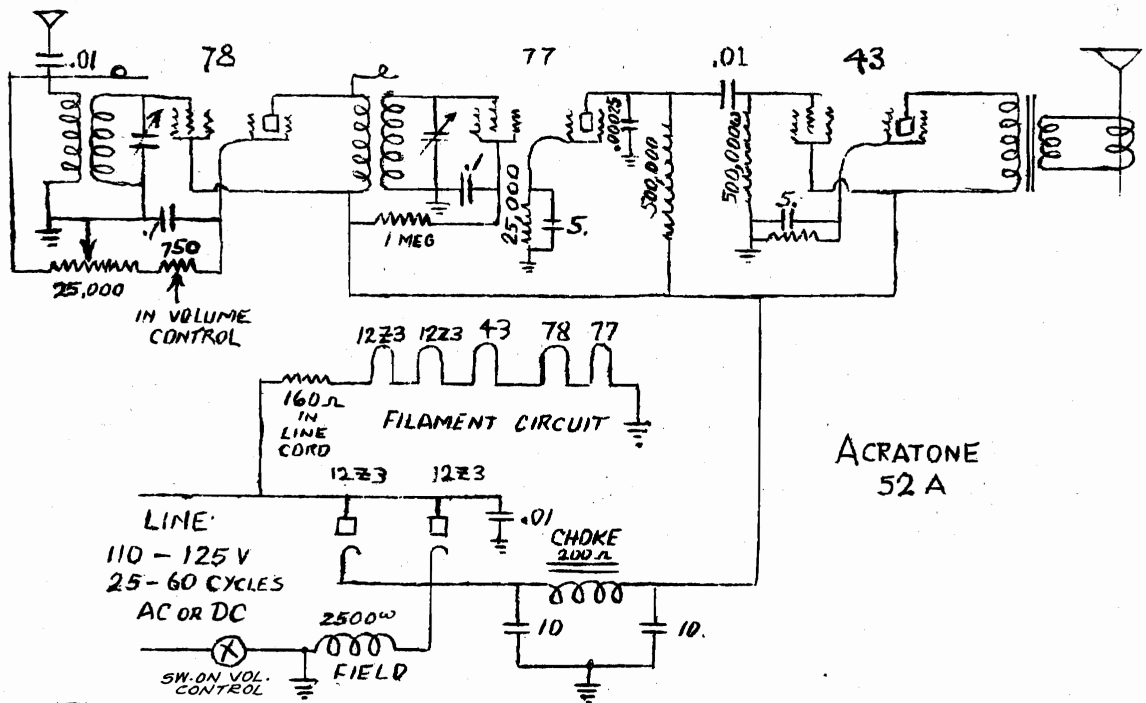
TO ALIGN (or gang) THE R.F. CIRCUITS

(1) Set the dial to 1400 kc., using band 1.
(A) Attach oscillator, tuned to set, to antenna post.
(B) Attach output meter from screen to plate of 2A5 tube.
(C) Adjust R. F. trimmer (screw adjustment, top-front-of gang condenser) for maximum output. KEEP SIGNAL INPUT LOW!
(2) Set the dial to 3700 kc., using band 2.
(A) Tune the oscillator to the receiver and adjust R.F. trimmer (extreme left adjustment on rear of chassis pan) for maximum output. KEEP SIGNAL INPUT LOW!
(3) Set the dial to 9000 kc., using band 3.
(A) Tune the oscillator to the receiver and adjust R.F. trimmer (second adjustment from left on rear of chassis pan)

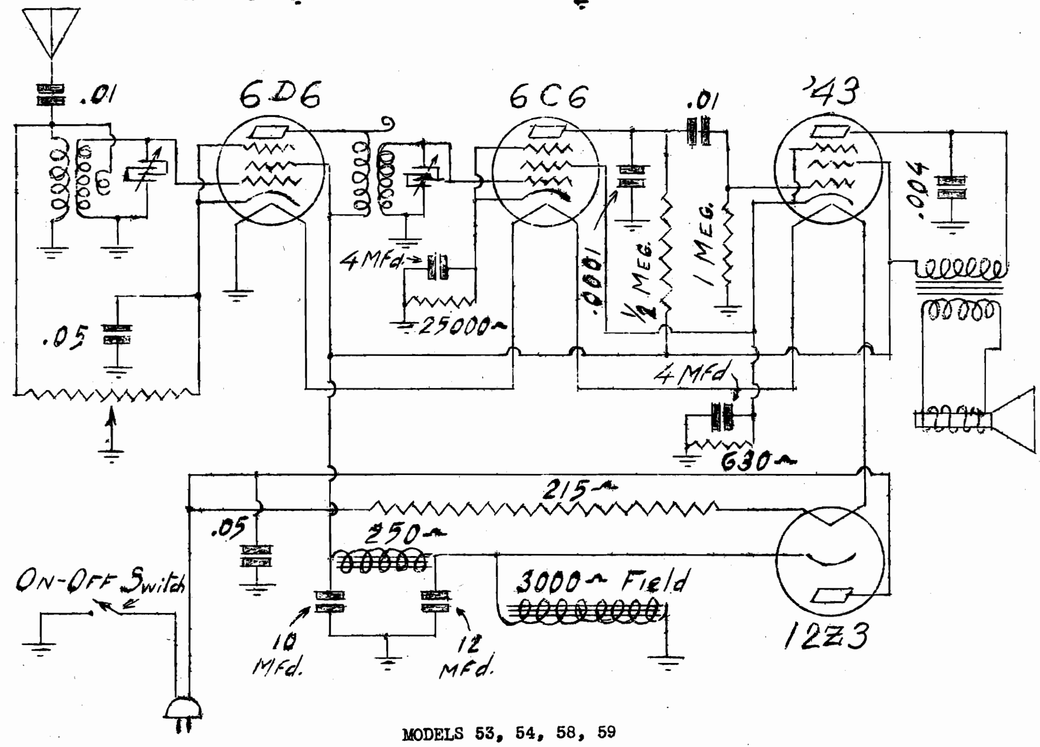
Note 1-In case the local oscillator will not reach the higher alignment frequencies, harmonics of lower frequencies may be used.

MODEL 52-A
MODEL 53,54,58,59
Schematic

# FEDERATED PURCHASER

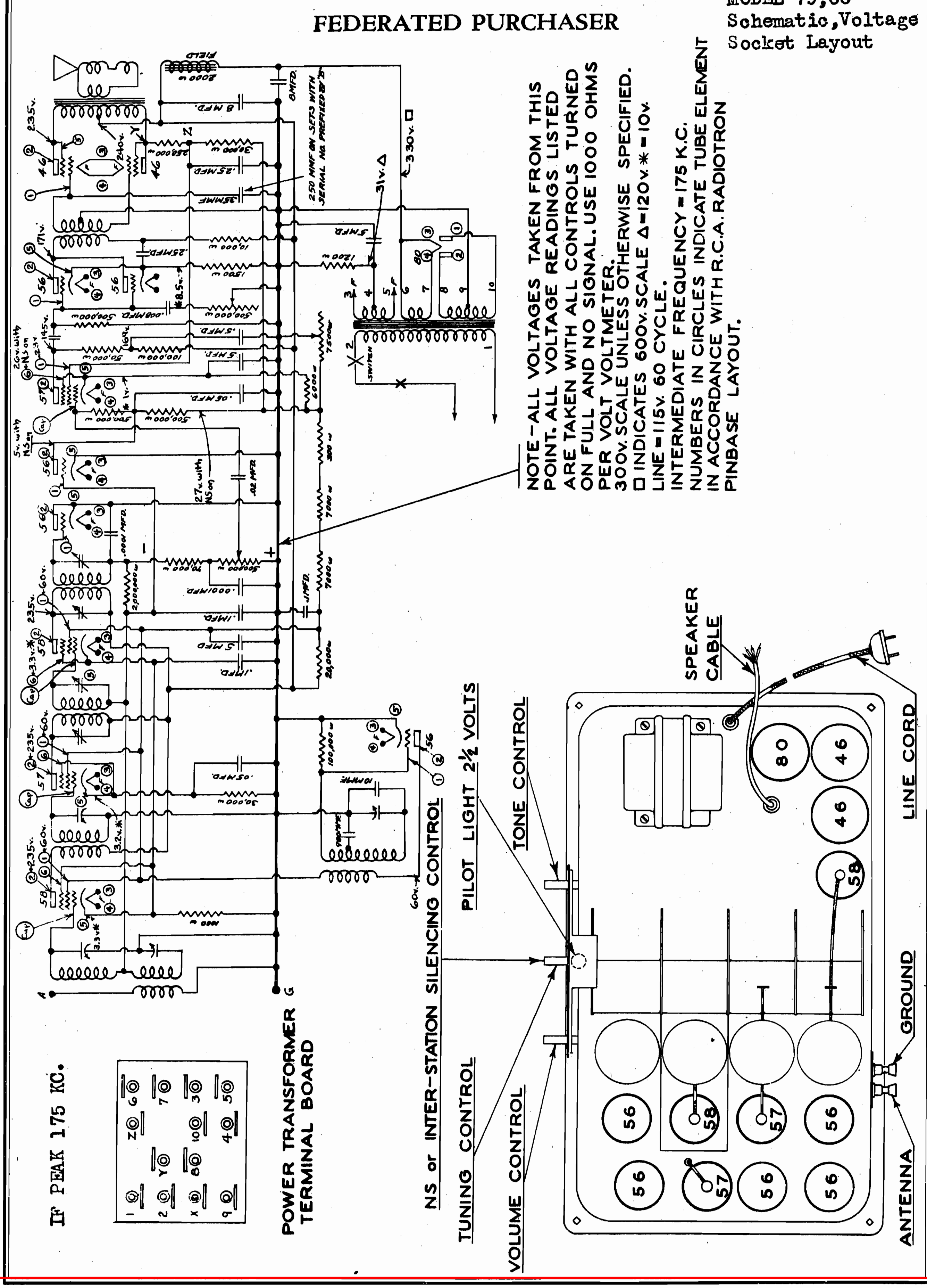



ACRATONE
52 A




MODELS 53, 54, 58, 59

MODEL 79,80
Schematic, Voltage
Socket Layout



MODEL 79,80
Alignment

# FEDERATED PURCHASER

IN ALL GANGING OPERATIONS USE THE WEAKEST SIGNAL THAT WILL GIVE A SATISFACTORY INDICATION ON THE OUTPUT METER, and TURN ALL CONTROLS TO THEIR MAXIMUM POSITIONS (CLOCKWISE).

The I. F. trimmer adjustments are carefully made at the factory and should not be tampered with unless a thorough investigation definitely proves the I. F. amplifier to be at fault. In that event:-

(1) Attach the output meter from plate to plate of the 46 tubes.

(2) Feed the signal from the local oscillator tuned to exactly 175 kc. into the receiver at the control grid of the 57 first detector, providing a D. C. path from this point to ground

(3) Adjust the I. F. trimmers to give maximum indication on the output meter. The 4 I. F. trimmers are mounted under the chassis pan, adjustable through holes in the chassis pan under the gang condenser, accessible when the rotor plates of the gang condenser are completely engaged with the stator plates. The adjustments are $\frac{1}{4}$" hex nuts. A recheck of each adjustment to insure perfect alignment of the I. F. stages is recommended.

(1) Set the dial to the point where a station (or oscillator) of known frequency, about 1400 kc., should be received.

(A) Adjust the oscillator trimmer (screw adjustment, top front end of gang condenser) until desired signal is heard.

(2) Set the dial to the point where a station (or oscillator) of known frequency, about 1100 kc., should be received.

(A) Bend rotor plates of front section of gang condenser to correct the calibration. If the dial reading for resonance with the desired signal is higher than the true frequency bend the rotor plates out, and vica versa.

(3) Repeat operation 2 at, or near, 750 kc.

(4) Repeat operation 2 at, or near, 600 kc.

This completes the alignment procedure, and this (front) section of the gang condenser is NOT TO BE DISTURBED during the alignment of the R. F. circuits.

TO ALIGN (or gang) THE R. F. CIRCUITS

(1) Set the dial to 1400 kc.

(A) Attach the output meter from plate to plate of the 46 tubes.

(B) Attach the local oscillator to the antenna post of the receiver and adjust to resonance with the receiver.

(C) Adjust the R. F. trimmers (screw adjustments, top of gang condenser, ALL EXCEPT FRONT SCREW, for maximum indication on the output meter. KEEP SIGNAL INPUT LOW!

(2) Set the dial to 1100 kc.

(A) Adjust local oscillator to resonance with receiver.

(B) Bend rotor plates on ALL EXCEPT FRONT SECTION for maximum indication on the output meter. KEEP SIGNAL INPUT LOW!

(3) Repeat operation 2 at 750 kc.

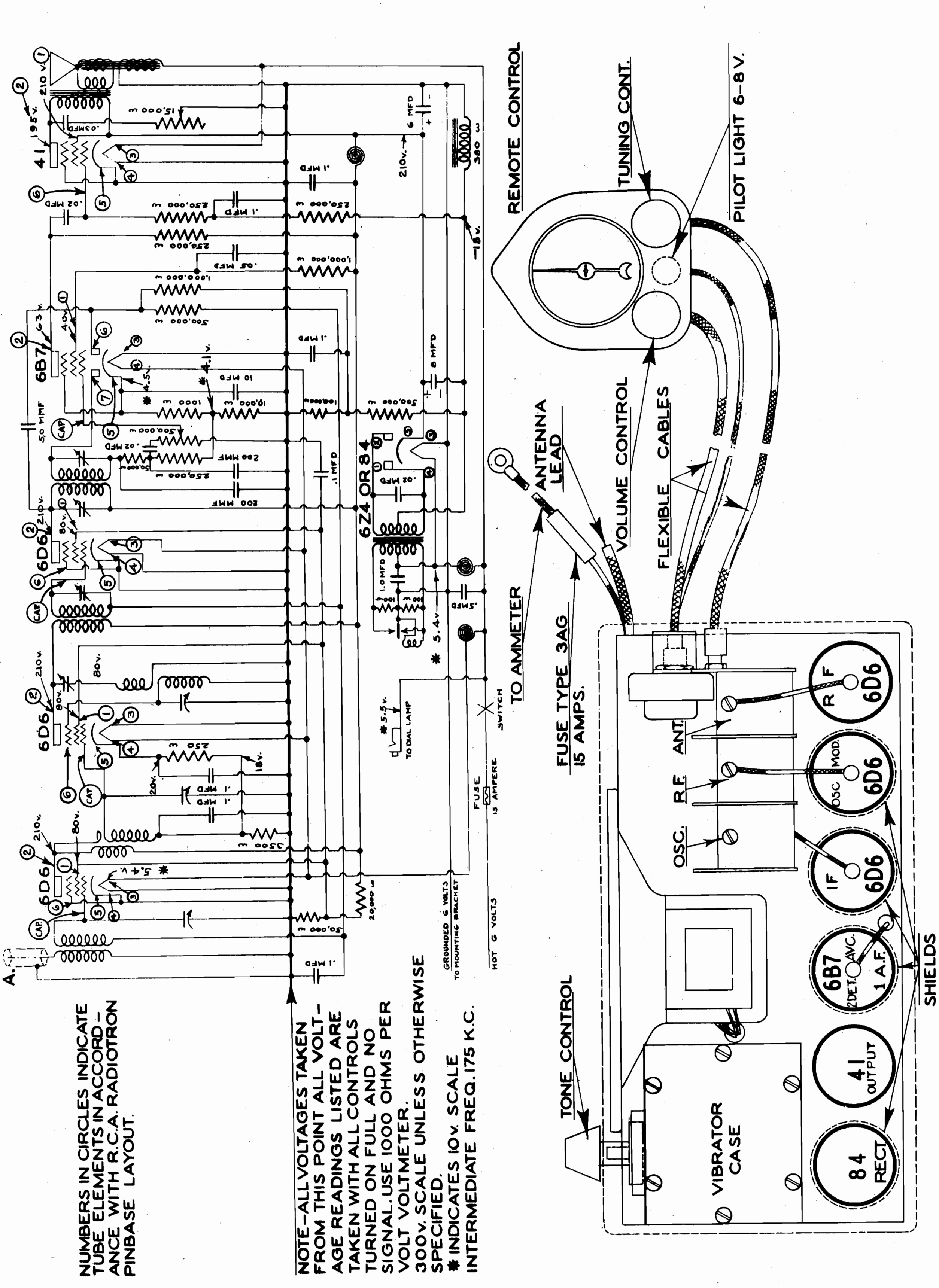
(4) Repeat operation 2 at 600 kc.

This completes the alignment of the R. F. circuits.

The alignment operations involving plate bending should be performed with utmost care if maximum results are to be obtained.

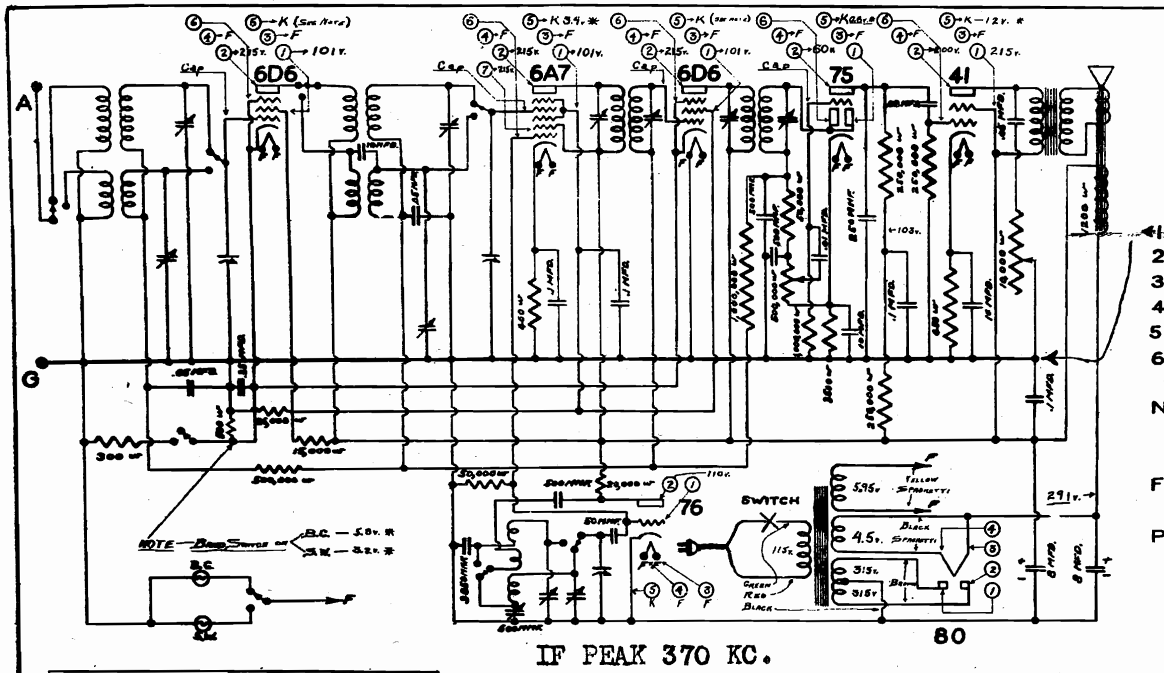
# FEDERATED PURCHASER

MODEL 92
Schematic, Voltage
Socket Layout



MODEL 93,94,96,97
Schematic, Voltage
Socket Layout
Trimmers

# FEDERATED PURCHASER




IF PEAK 370 KC.

## NOTES

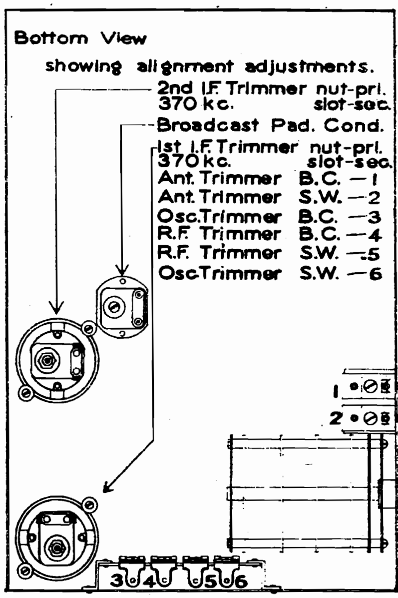
ALL VOLTAGES MEASURED

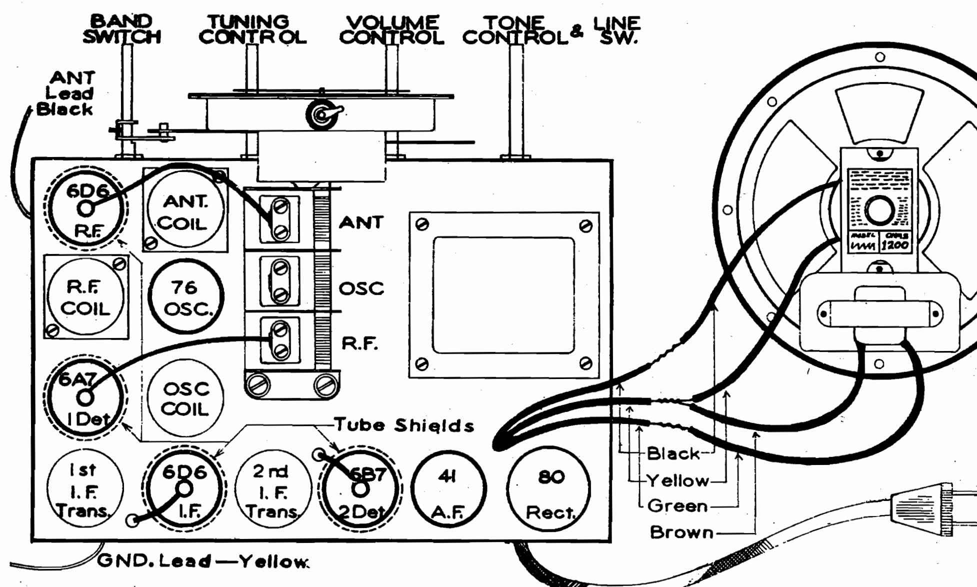
1. From this point (ground) with line at 115 v. 60 c.
2. With a 1000 ohm/volt voltmeter
3. With all controls turned full ON (on BC band)
4. With NO SIGNAL! Short ant. lead if necessary.
5. Use the 300v. scale unless otherwise indicated.
6. △ Indicates 100v. scale ✳ Indicates 10v. scale.

NUMBERS IN CIRCLES indicate tube elements in accordance with R.C.A-Cunn. Pinbase Layout.

FREQUENCY RANGE 550 to 1550 kc. & 6 to 16 mc.

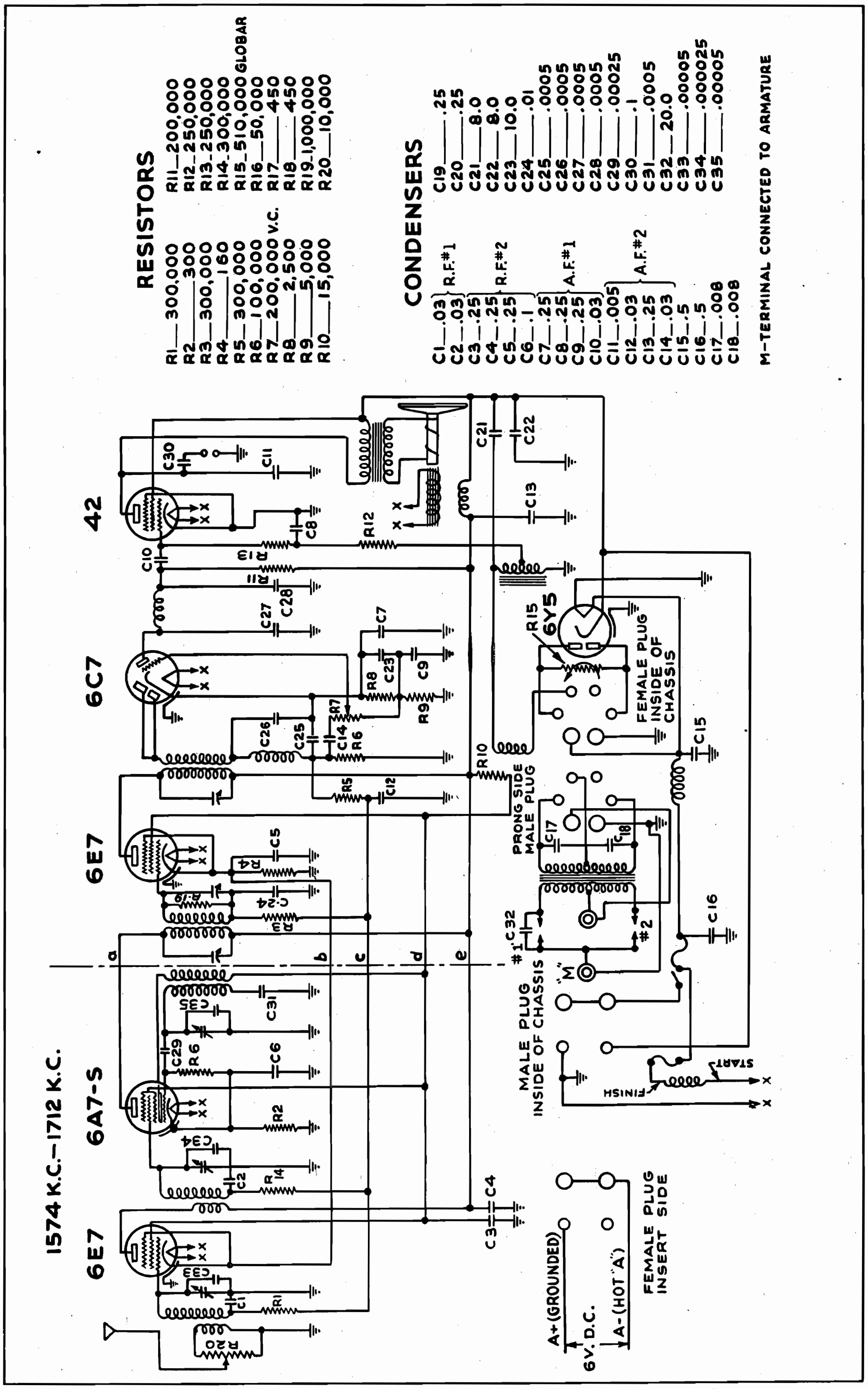
PILOT LIGHTS—6.3v. 2 req'd. code---- blue bead
NOTE—pilot lites wired to band switch to light only the calibration of the band in use.



# FORD MOTOR CAR CO.

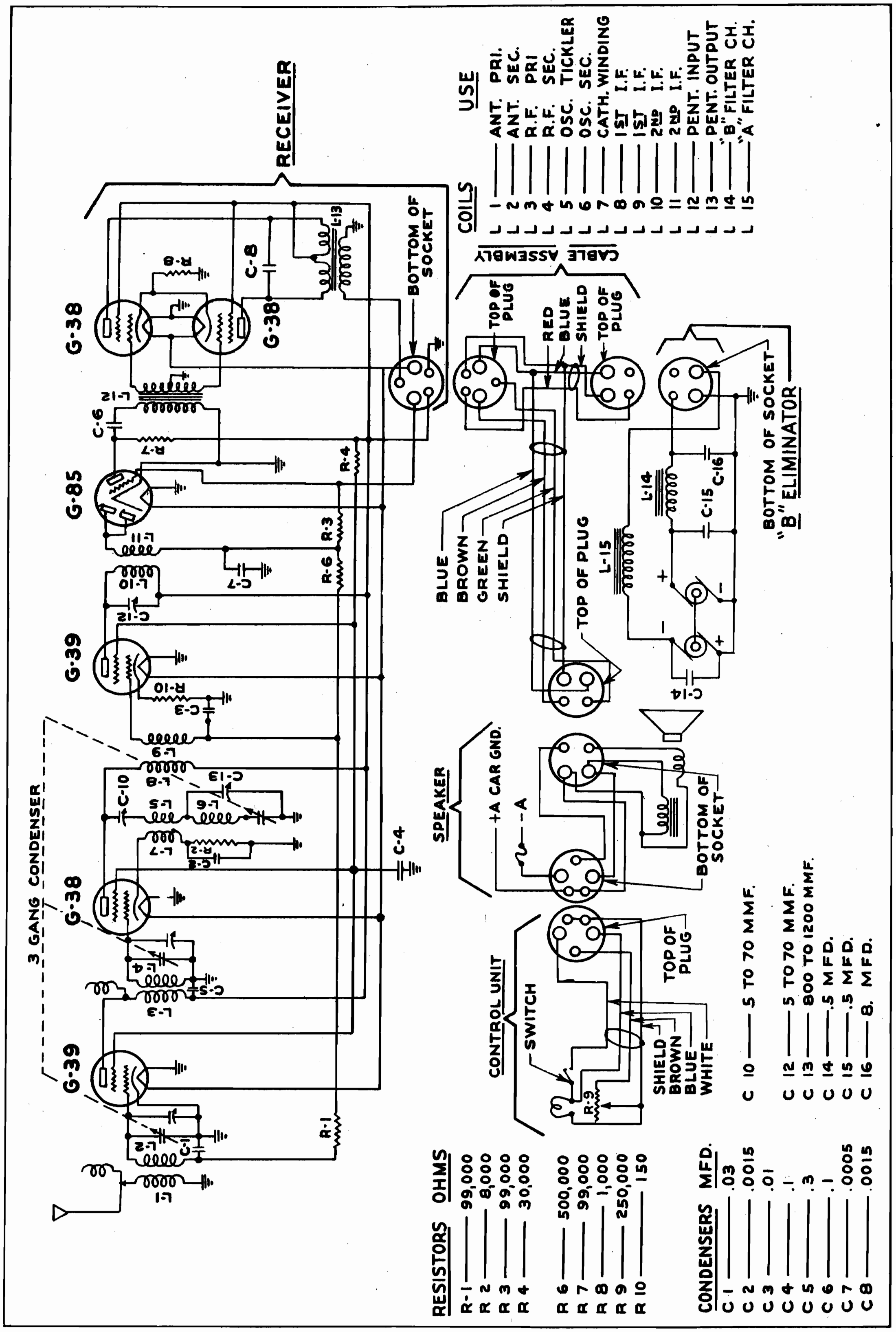
MODEL Ford Glove Box
Type Police Radio
Built by Grigsby-
Grunow
Schematic




Ford Glove Box Type Police Auto Radio Receiver (built by Grigsby Grunow Co.)

MODEL Ford B-18805
Auto Radio Built by
Grigsby-Grunow
Schematic

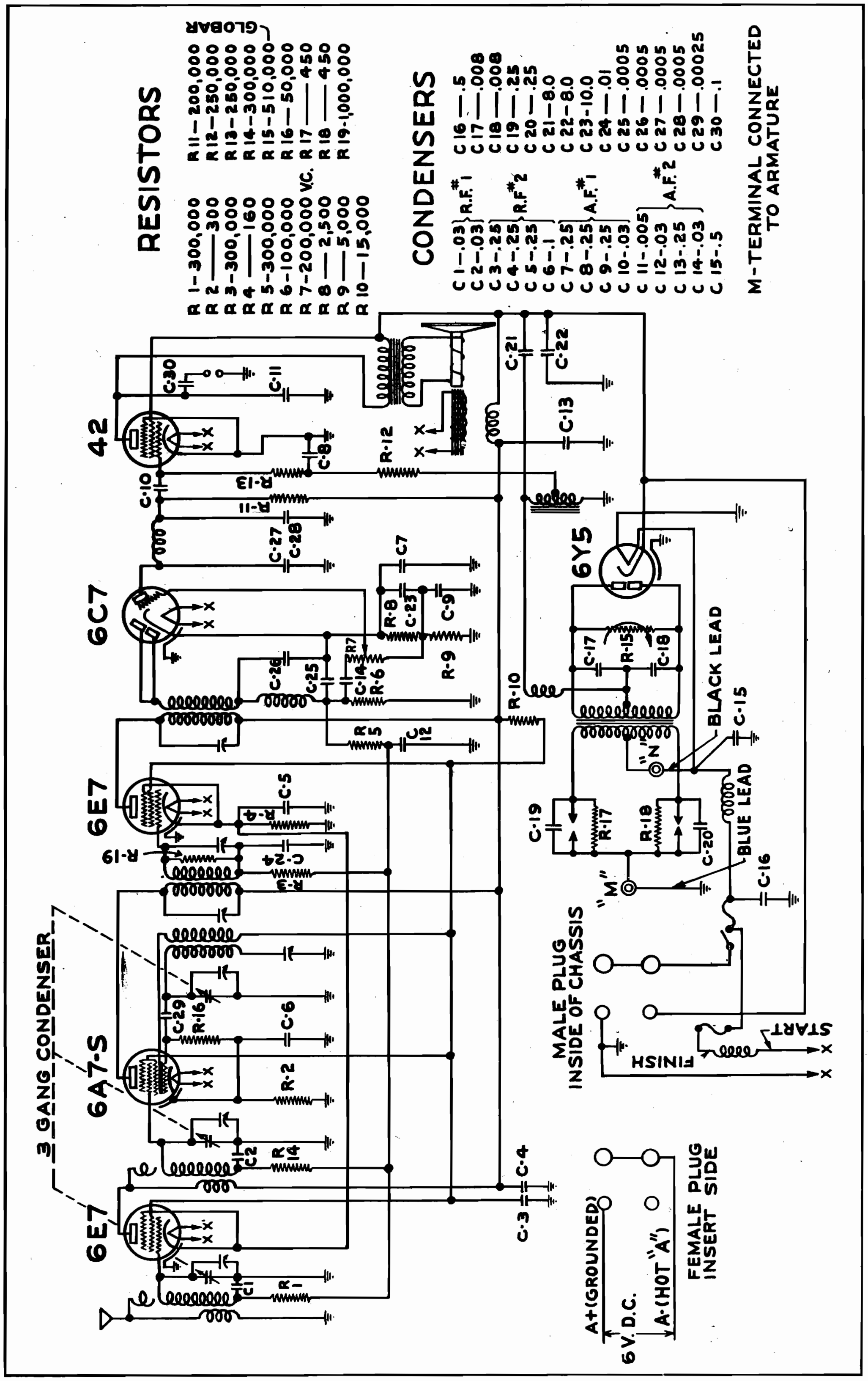
# FORD MOTOR CAR CO.




FORD B-18805 AUTO RADIO RECEIVER WITH MOTOR-GENERATOR "B" SUPPLY

MODEL Ford 40-18805
Glove Box Auto Radio
Built by Grigsby-
Grunow
Schematic

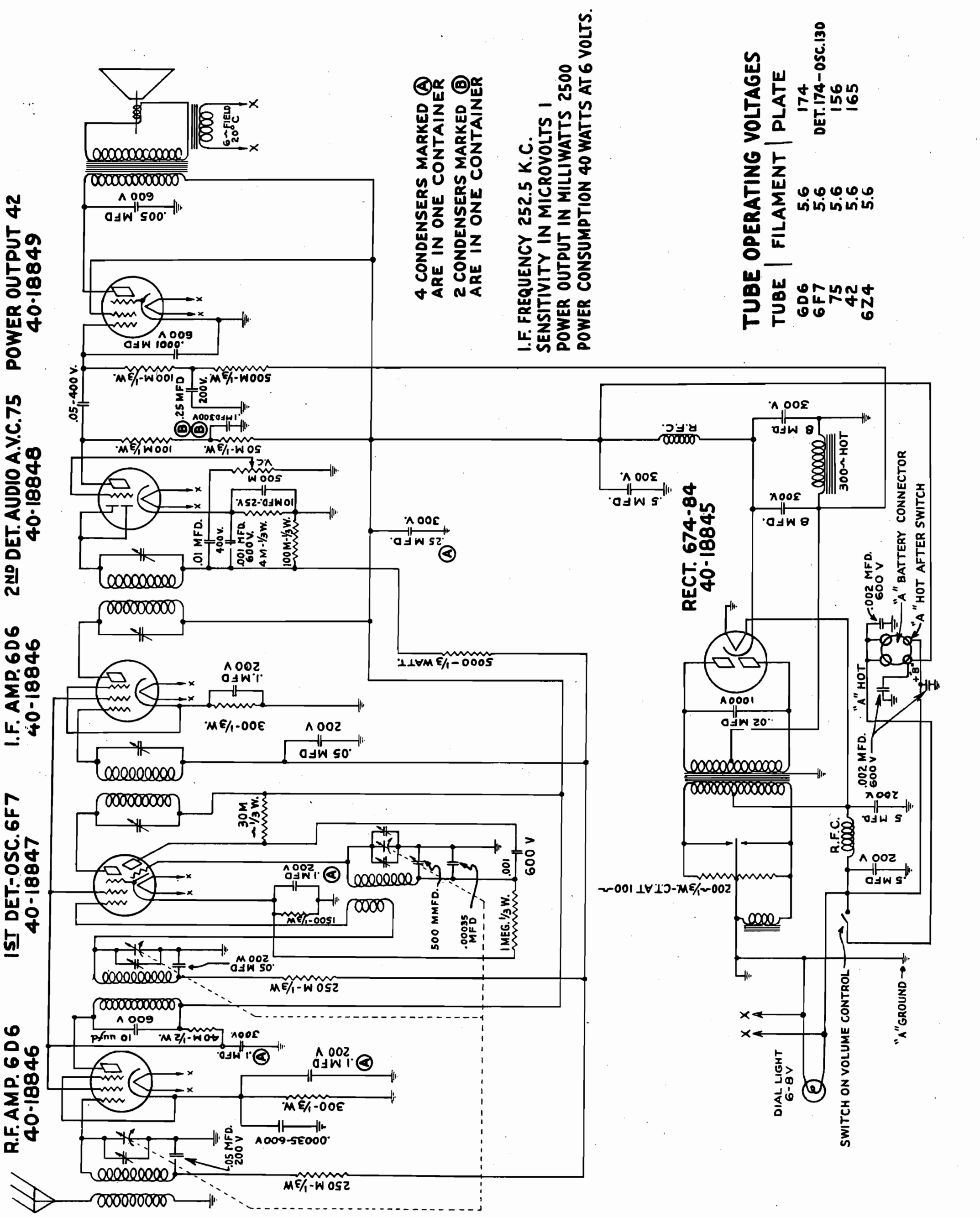
# FORD MOTOR CAR CO.



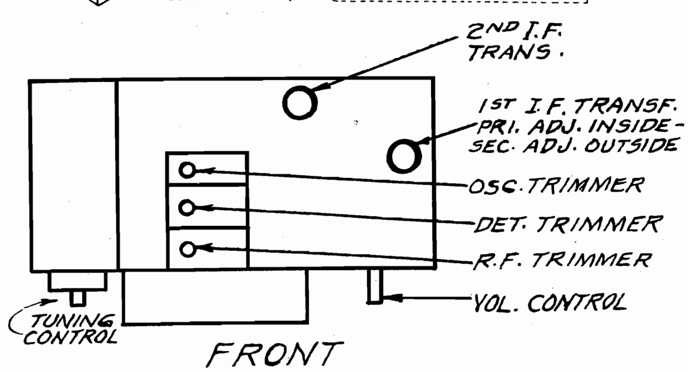

FORD 40-18805-B GLOVE BOX TYPE AUTO RADIO RECEIVER (BUILT BY GRIGSBY GRUNOW CO.)

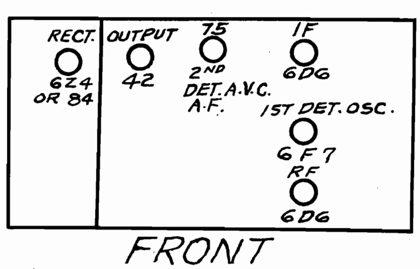
**MODEL Ford-Lincoln Auto Radio Built by Zenith Schematic**

# FORD MOTOR CAR CO.



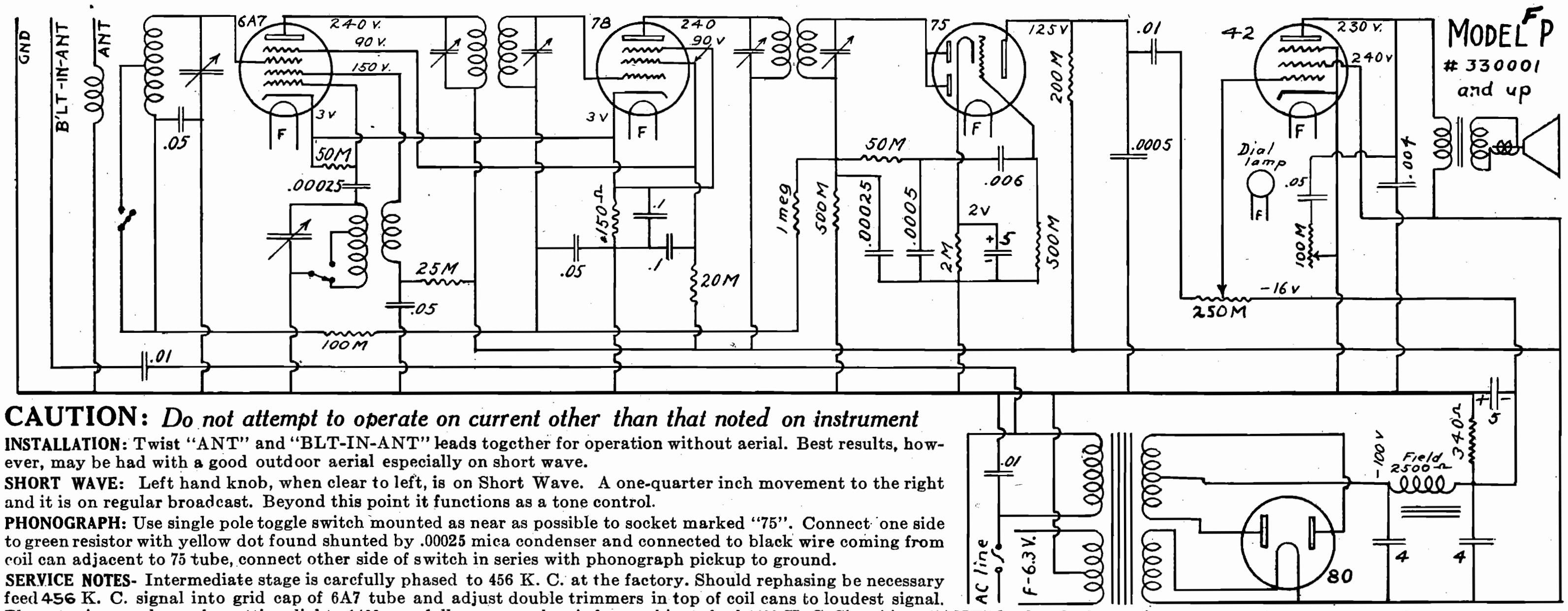

Ford Glove Box Type Auto Radio Receiver (built by Zenith Radio Corp.)



# FORDSON RADIO, INC.

MODEL FP (330001 up)
Schematic,Alignment
MODEL FP Battery
(173501 up)
Schematic,Alignment



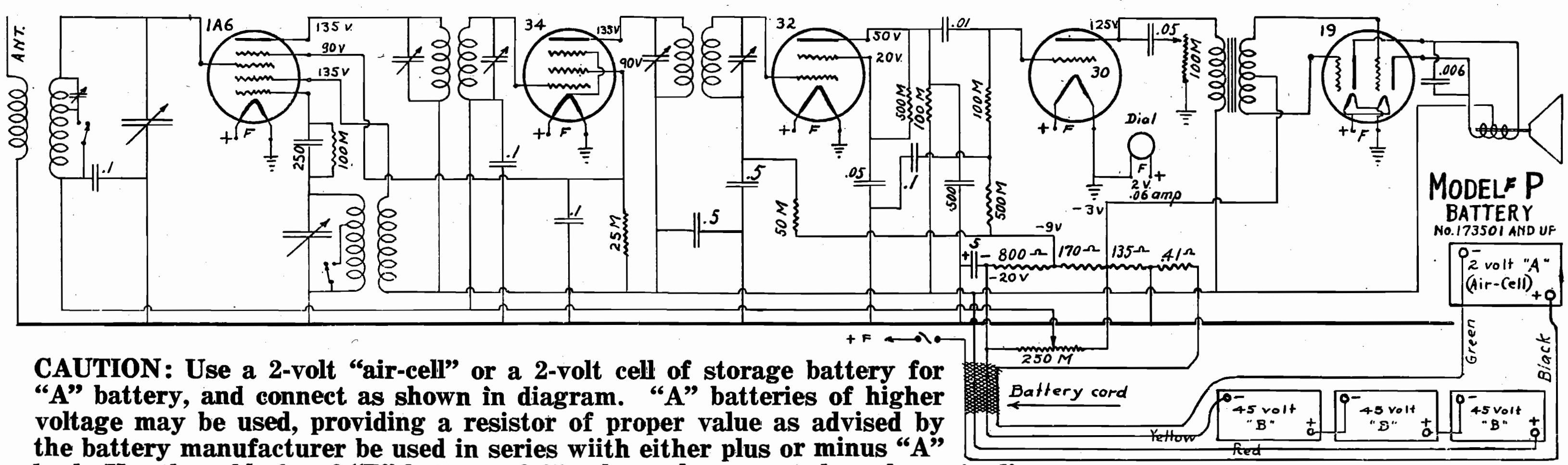

**CAUTION:** *Do not attempt to operate on current other than that noted on instrument*

**INSTALLATION:** Twist "ANT" and "BLT-IN-ANT" leads together for operation without aerial. Best results, however, may be had with a good outdoor aerial especially on short wave.

**SHORT WAVE:** Left hand knob, when clear to left, is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

**PHONOGRAPH:** Use single pole toggle switch mounted as near as possible to socket marked "75". Connect one side to green resistor with yellow dot found shunted by .00025 mica condenser and connected to black wire coming from coil can adjacent to 75 tube, connect other side of switch in series with phonograph pickup to ground.

**SERVICE NOTES-** Intermediate stage is carefully phased to 456 K. C. at the factory. Should rephasing be necessary feed 456 K. C. signal into grid cap of 6A7 tube and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400, carefully remove chassis from cabinet, feed 1400 K. C. Signal into "ANT" lead and adjust trimmers on tuning condenser to loudest signal

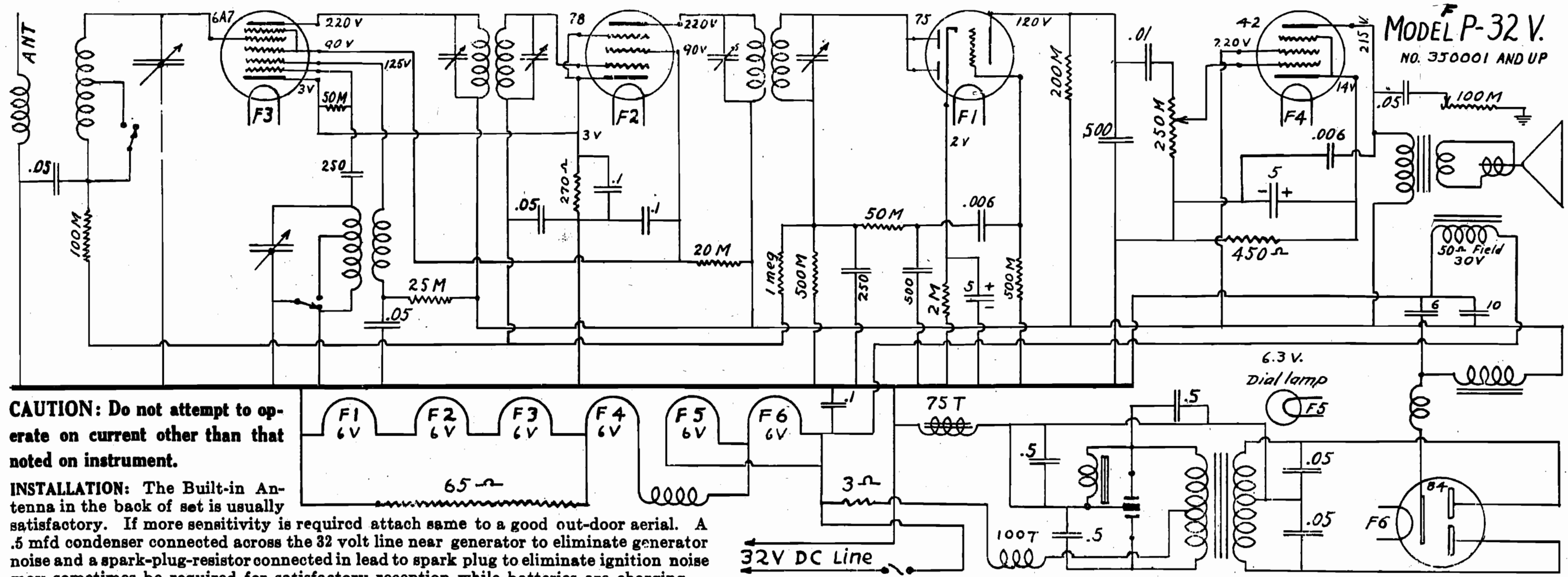



**CAUTION: Use a 2-volt "air-cell" or a 2-volt cell of storage battery for "A" battery, and connect as shown in diagram. "A" batteries of higher voltage may be used, providing a resistor of proper value as advised by the battery manufacturer be used in series wiith either plus or minus "A" lead. Use three blocks of "B" battery of 45 volts each, connected as shown in diagram.**

**INSTALLATION:** A good outdoor aerial will give best results, especially on short wave. No ground wire is usually required.
**PHONOGRAPH:** Use single pole toggle switch mounted as near as possible to socket marked "32." Cut black wire coming from bottom of coil can adjacent to this tube and connect across switch. Connect phonograph pickup across switch.
**SERVICE NOTES:** Intermediate stage is carefully phased to 456 k.c. at the factory. Should rephasing be necessary, feed 456 k.c. signal into grid cap of "1A6" tube, and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400 k.c., carefully remove chassis from cabinet, feed 1400 k.c. signal into antenna lead and adjust trimmers on tuning condenser to loudest signal.

MODEL FP 32 V
(350001 up)
MODEL FR (189001 up)
Schematic, Alignment

# FORDSON RADIO, INC.

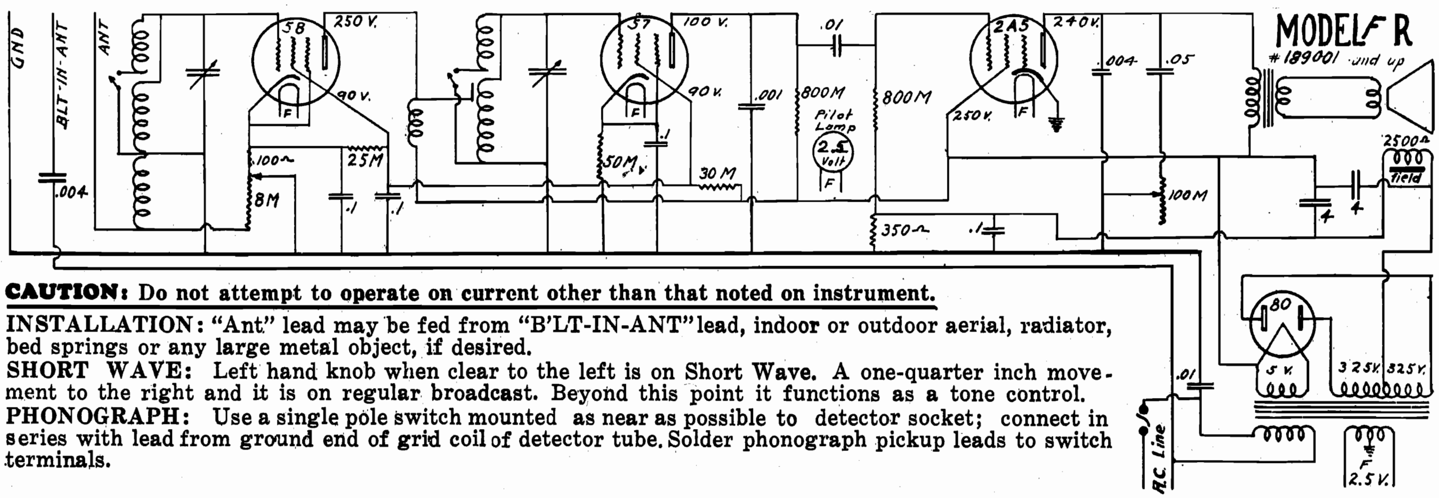



**CAUTION: Do not attempt to operate on current other than that noted on instrument.**

**INSTALLATION:** The Built-in Antenna in the back of set is usually satisfactory. If more sensitivity is required attach same to a good out-door aerial. A .5 mfd condenser connected across the 32 volt line near generator to eliminate generator noise and a spark-plug-resistor connected in lead to spark plug to eliminate ignition noise may sometimes be required for satisfactory reception while batteries are charging.

USE NO GROUND CONNECTION ON SET. **SHORT WAVE:** Left hand knob, when clear to left, is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control. **PHONOGRAPH:** Use single pole toggle switch mounted as near as possible to socket marked "75". Connect one side to green resistor with yellow dot found shunted by .00025 mica condenser and connected to black wire coming from coil can adjacent to 75 tube, connect other side of switch in series with phonograph pickup to ground.

**SERVICE NOTES-** Intermediate stage is carefully phased to 456 K. C. at the factory. Should rephasing be necessary feed 456 K. C. signal into grid cap of 6A7 tube and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400, carefully remove chassis from cabinet, feed 1400 K. C. Signal into "ANT" lead and adjust trimmers on tuning condenser to loudest signal



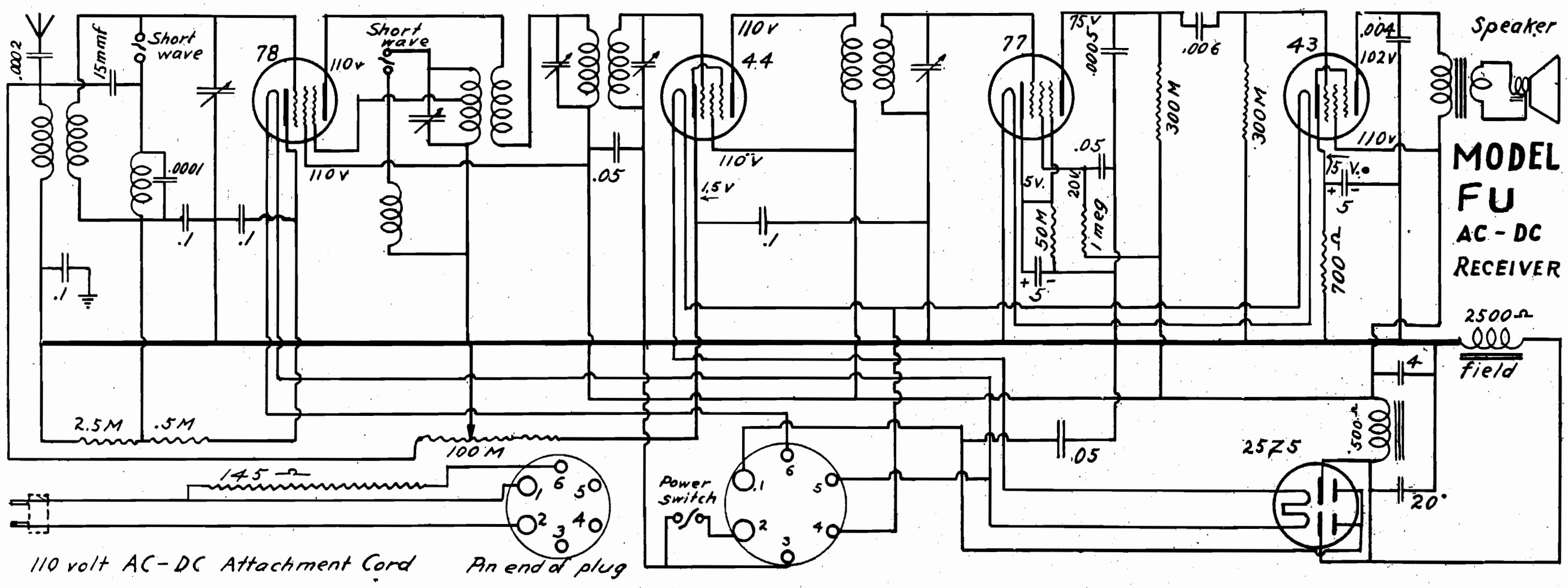

**CAUTION:** Do not attempt to operate on current other than that noted on instrument.

INSTALLATION: "Ant" lead may be fed from "B'LT-IN-ANT" lead, indoor or outdoor aerial, radiator, bed springs or any large metal object, if desired.

SHORT WAVE: Left hand knob when clear to the left is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

PHONOGRAPH: Use a single pole switch mounted as near as possible to detector socket; connect in series with lead from ground end of grid coil of detector tube. Solder phonograph pickup leads to switch terminals.

FORDSON RADIO, INC.




# OPERATING INSTRUCTIONS

## Model FU Long and Short Wave

### CAUTION:

This instrument is equipped for operation on 110 volts D. C. or A. C., any frequency from 25 to 133 cycles per second. Before attempting to operate on any other voltage be sure that the proper adaptors are connected and the instructions accompanying them are understood. Special adaptors can be secured from the factory at a slight extra cost, for operating this receiver on automobiles, 32 volt farm light plants and 220 volt A. C. or D. C. ALWAYS plug cord into back of set before plugging into power supply. Cord for 110 volt or 220 volt heats moderately as the cord contains resistance necessary for operation at these voltages. The 20 ft. aerial wire extending from the back of the set should be unwound, laid out along the floor or hung outside a window and is ordinarily all the aerial required. No ground connection should be used. Sometimes results are better if the tip of the antenna wire is connected to a radiator or other ground connection or to an outside aerial.

### TO OPERATE:

Turn left hand knob to right as far as it will go. Wait a few moments for tubes to heat. Turn right hand knob slowly back and forth till a station is heard. Numbers on the dial correspond to kilocycle of station when one zero is added. Adjust this knob carefully to secure best tone and adjust left hand knob to volume desired. When left knob is turned entirely to left a click is heard and power is turned off. When operating on D. C. current and set fails to operate after waiting a reasonable time for tubes to heat up, reverse power supply plug.

### TO RECEIVE SHORT WAVES:

Push handle of switch in rear toward end of cabinet for short wave position. Local police calls, etc., will then be heard at approximately 65 and 100 on the dial, and amateurs, etc., at various other positions. Often local conditions make short wave reception difficult unless the aerial wire is grounded or attached to outside aerial. Reception of short wave requires a good aerial and more careful adjustment of both knobs than is necessary on the broadcast band.

### PHONOGRAPH:

Trace wire from cap of tube in left rear socket to where it solders to bracket in chassis. Note that a black wire connects between the adjacent bracket and chassis. Disconnect black wire at the bracket, inserting small single pole switch between wire and bracket. Solder phonograph pick-up leads to switch terminals.

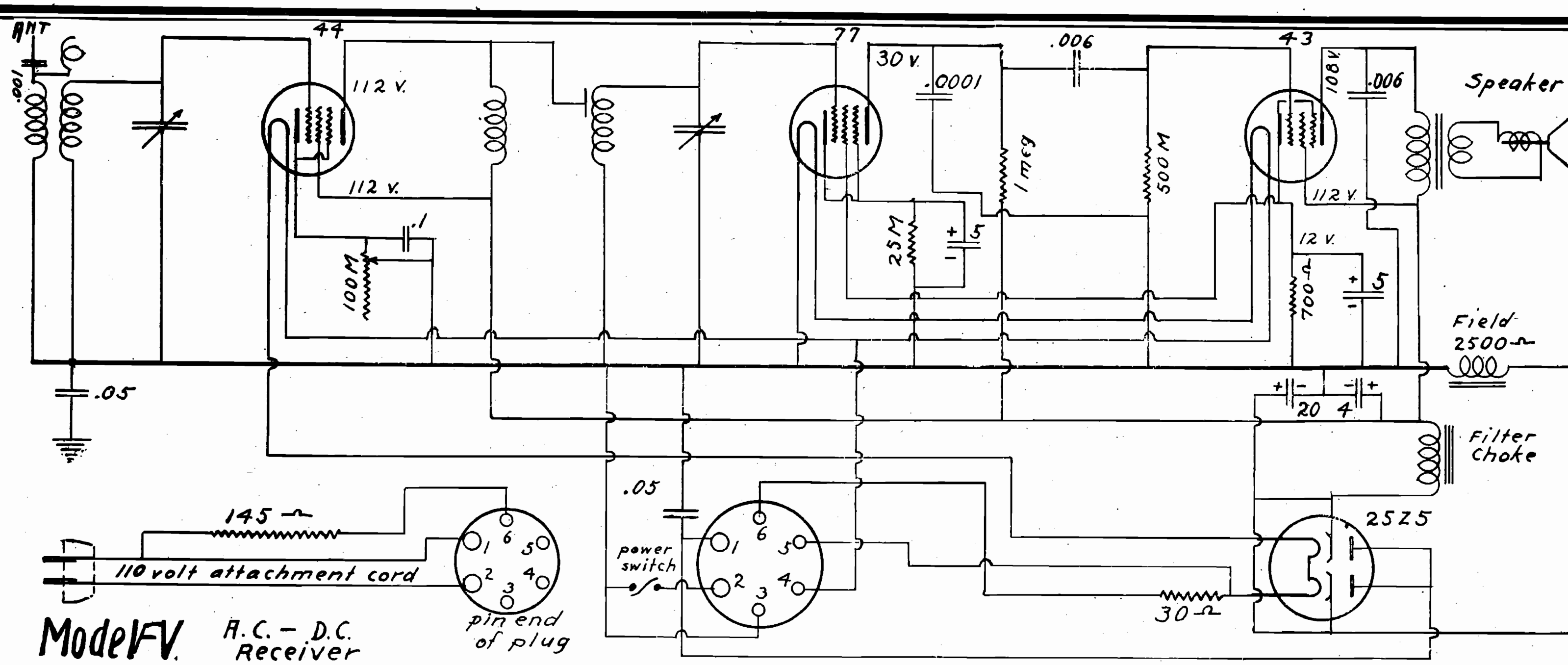
### SERVICE NOTES:

To balance set remove from cabinet. Intermediates are first balanced. Feed a 456 K. C. signal into grid of 78 tube. Adjust double and single trimmers through rear flange of chassis. Next, trim radio frequency coil by first setting tuning condenser to 1400 K. C. on dial, carefully remove from cabinet and attach test oscillator to antenna lead and feed 1400 K. C. signal to antenna coil. Adjust trimmers on tuning condenser to loudest signal.

If used in automobile, antenna stage should be trimmed to car antenna at time of installation.

MODEL FV
Schematic, Alignment

FORDSON RADIO, INC.




ModelFV. A.C. – D.C. Receiver

# OPERATING INSTRUCTIONS

## ModelFV

### CAUTION:

This instrument is equipped for operation on 110 volts D. C. or A. C., any frequency from 25 to 133 cycles per second. Before attempting to operate on any other voltage be sure that the proper adaptors are connected and the instructions accompanying them are understood. Special adaptors can be secured from the factory at a slight extra cost, for operating this receiver on automobiles, 32 volt farm light plants and 200 volt A. C. or D. C. ALWAYS plug cord into back of set before plugging into power supply. Cord for 110 volt or 220 volt heats moderately, as the cord contains resistance necessary for operation at these voltages. The 20 ft. aerial wire extending from the back of the set should be unwound, laid out along the floor or hung outside a window and is ordinarily all the aerial required. No ground connection should be used. Sometimes results are better if the tip of the antenna wire is connected to a radiator or other ground connection or to an outside aerial.

### TO OPERATE:

Turn left-hand knob to right as far as it will go. Wait a few moments for tubes to heat. Turn right-hand knob slowly back and forth till a station is heard. Adjust this knob carefully to secure best tone and adjust left-hand knob to volume desired. When left knob is turned entirely to left a click is heard and power is turned off. When operating on D. C. current and set fails to operate after waiting a reasonable time for tubes to heat up, reverse power supply plug.

### PHONOGRAPH:

Connect pick-up leads to single pole toggle switch, which may be mounted in large hole in rear flange of set. Unsolder black wire and 5 mfd condenser from ground lug of coil on under side of chassis and resolder to one side of toggle switch. Solder other side of switch to ground lug of coil.

### SERVICE NOTES:

To remove set from cabinet, disconnect from power supply, remove knobs, remove back if compact model, and unscrew the four felt headed screws on bottom of cabinet.

To balance set remove from cabinet, turn tuning condenser plates completely out, attach a test oscillator delivering 1712 K. C. to antenna of set and adjust trimmers on tuning condenser to loudest signal. Change test oscillator signal to 1400 K. C., turn tuning condenser until signal is tuned in and check trimmers again without moving tuning condenser.

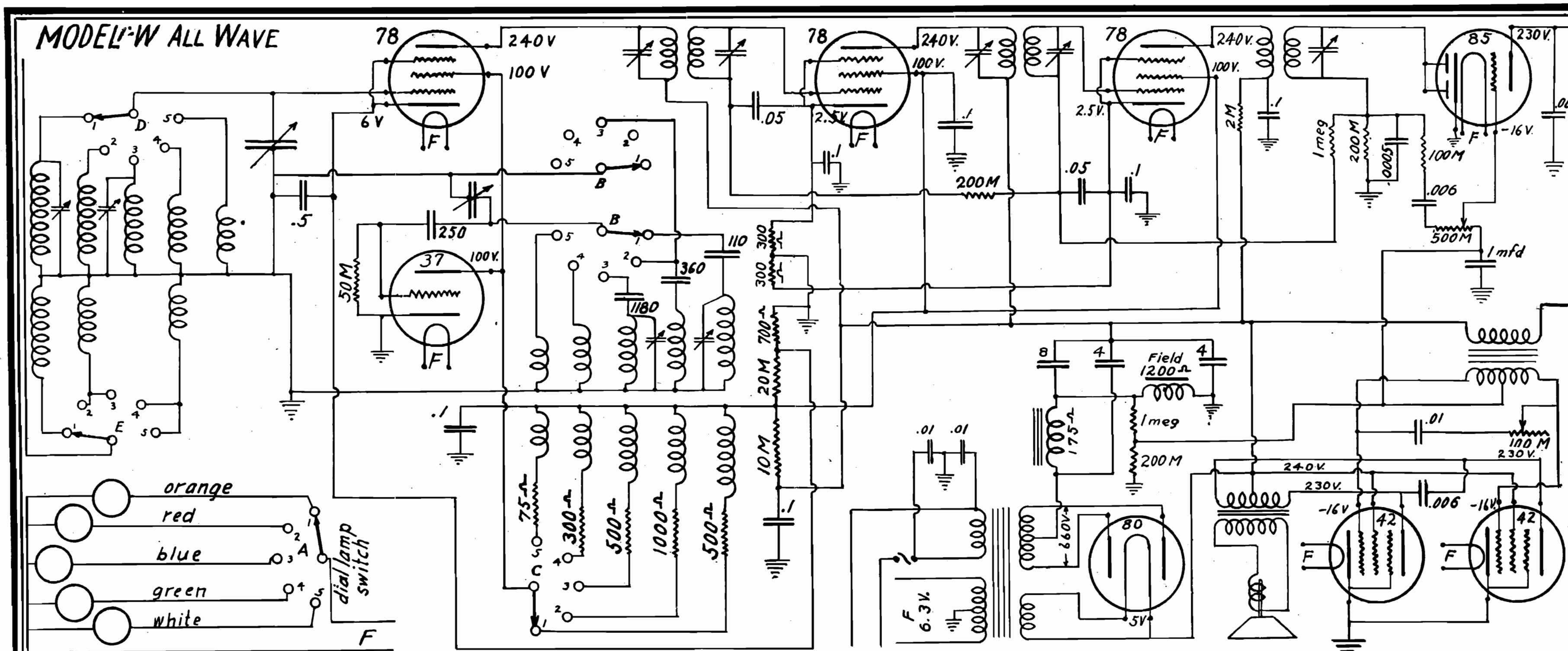
If used in automobiles antenna stage should be trimmed to the car antenna at time of installation.

### GUARANTEE:

This instrument is guaranteed for ninety days, within which period any part showing electrical or mechanical defect will be replaced without charge when returned prepaid to the factory.

# FORDSON RADIO, INC.

**MODEL FW**
**Schematic, Alignment**




**IF PEAK 456 KC**

## INSTALLATION:

The built-in aerial at the back of the set usually gives satisfactory sensitivity when stretched around the edge of the floor or along the picture moulding of the room. A good outside aerial connected to the built-in aerial sometimes increases sensitivity. Power noise interferes especially with short-wave reception. If set is located where power noise is prevalent it may be necessary to install an aerial high above the street and use a "transposition" lead-in to the set. Any radio dealer can supply such an aerial kit with full instructions for installing.

## CONTROL KNOBS:

The lower middle knob is for selecting the various frequency bands as indicated on the dial. The upper middle knob is tuning control. The right-hand knob is power switch and volume control and the left-hand knob is tone control.

## PHONOGRAPH:

Mount a single pole toggle switch and two insulated pin jacks in the rear of the chassis near the tube socket marked "85," connect one side of the switch to one pin jack, the remaining pin jack to one outside terminal of the volume control and the remaining switch terminal to the other outside terminal of the volume control. Plug the phonograph pickup leads into the pin jacks.

## SERVICE NOTES:

The intermediate stages are carefully phased to 456 kilocycles at the factory. Should rephasing be necessary, feed a 456 kilocycle signal from a test oscillator to the grid cap of the tube marked "78," located at the rear end of the tuning condenser, then adjust the double trimmers in the top of the coil cans nearest this tube, also the single trimmer in the top of the coil can near the "85" tube, to loudest volume, being sure to keep the oscillator signal at a low volume level. In trimming the frequency bands, first set the dial to the third group of figures from the right-hand end. Trim the "red" band first by adjusting the trimmers on the top of the tuning condenser until a signal of the proper frequency applied to the built-in aerial is heard at its loudest. Next, trim the "orange" band by adjusting the three-plate trimmers, located on the underside of the chassis, to loudest volume with proper signal frequency applied to the antenna. Next, trim the "blue" band by adjusting the two-plate trimmers located adjacent to the three-plate trimmers, to loudest volume with the proper signal frequency applied to the antenna. In trimming the various bands be sure that the band switch is set to the proper band as indicated by the color of the dial lamp. Also, keep the oscillator signal to as low volume level as possible for accuracy.

**NOTE:** Should it be necessary to write to the factory for parts or information, always give the serial number of the set as stamped on the back of the chassis.

## SHORT WAVE TIPS:

In listening for short-wave broadcast DON'T forget to consider the difference in time between the location of the broadcaster and the receiver. DON'T expect to hear a station because it is on the air, as many things govern short-wave reception. DON'T get discouraged if reception is poor one night; it may be fine the next. DON'T expect stations to tune broadly; most stations tune sharply. DON'T tune below 10,000 kilocycles (above 30 meters) for distant stations in daylight. DON'T tune above 12,000 kilocycles (below 25 meters) for distant stations after dark. DON'T expect to find stations on all parts of the dial. Short-wave stations are widely separated, except in a few instances. DON'T skim over the dial. It requires some knowledge of tuning to get good results. Tune very slowly. DON'T pass up any weak signal, as it may often be brought in stronger by careful tuning.

**MODEL Twin "8"**
**Notes, Alignment**
**MODEL Dual "6"**
**Notes, Alignment**

GALVIN MFG. CO.

# SERVICE NOTES

# 1934 Motorola Auto Radio

## Twin "8" — Dual "6"

To assist you in gaining an understanding of the operation and servicing of the Dual "6" and Twin "8" we are outlining herein a brief description of the circuits employed together with the function of various units. For general installation instructions see the sheet enclosed with each Motorola set.

* * * * * * *

TWIN "8" ----The signal is fed into the primary of the antenna coil, which is of the aperiodic type and is induced into its associated secondary circuit, tuned by the 1st gang of the variable condenser. The signal is then fed to the 78 tube used as the first RF amplifier.

Reference to the circuit diagram (Fig. 3) will show that the 2nd RF stage is impedance coupled, feeding its energy into the grid of the 77 autodyne. In the aperiodic type of antenna coil the gain drops slightly near the 500 K.C. end, while in the impedance type coupling used in the 2nd RF coil rises slightly at this point. It will be seen then that by using these two in combination an overall flat sensitivity curve is obtained.

The type 77 autodyne tube is used because of its simplicity, performance and ability to withstand the vibration to which an auto set is subjected. The use of the padder system in the oscillator is used to allow greater accuracy in dial calibration.

In the 85 tube full wave rectification is used and A.V.C. bias is obtained by voltage drop across the 200M ohm resistance connecting the secondary of the diode feeder to ground. Full A.V.C. voltage is applied to the grids of the RF stage and IF stage and to the grid of the 85 tube. The audio component is amplified in the triode section of the 85, which is resistance coupled to the #37, 2nd audio used as a driver and is impedance coupled to the L.A. tubes operating in Push-Pull Class A Prime.

* * * * * * *

The DUAL "6" ----For all ordinary servicing of the RF section of the Dual "6" the above description will be sufficient.

Reference to the circuit diagram (Fig. 4) will show that a #75 is used as a diode detector resistance coupled to a single 42 output tube.

The manual volume control is in the grid of the 75 whereas in the Twin "8" it is in the grid circuit of the 37 tube.

Fixed bias is used on the 75 grid obtained through the voltage drop across the screen network.

* * * * * * *

### SERVICING

In shooting trouble in an auto radio it is well to endeavor to isolate it to one particular section of the set.

The set may be divided into four parts for servicing. (1) Outer housing. (2) Power supply. (3) Speaker. (4) Set chassis.

The audio end of the chassis may be easily checked by removing the grid cap of the 85 or 75 tube and, if normal, a loud hum will occur.

Check the autodyne circuit by tuning the variable condensers to the minimum position and touching the oscillator stator plates. If a click is heard when touching them and also when removing the finger, it indicates that the autodyne is oscillating properly.

### ALIGNMENT OF VARIABLE CONDENSERS

Because of the necessity of aligning the variable condensers with the chassis out of the housing it is important to use a definite point. Unless this is done the dial calibration will be incorrect when replacing the chassis in its housing. This point we may take as 1400 KC which is exactly 32° of angular rotation from minimum condenser setting.

Connect the oscillator feeder to the antenna pin of the chassis and set the oscillator to 1400 KC.

Carefully adjust the trimmers of the oscillator and RF variable condensers for maximum reading of output meter.

Next set the service oscillator to 600 KC rotating the variable condensers to a point 155 degrees 30 min. from minimum condenser setting.

Adjust the 600 KC padder condenser (accessible from the front of the chassis) for highest output reading.

The 600 KC setting may also be found by setting the service oscillator to 600 KC. Tune in the oscillator signal and rotate the variable condensers back and forth while adjusting the 600 KC trimmer condenser for highest reading of the output meter. The variable condensers should now track perfectly and coincide with the dial calibration.

### ALIGNMENT OF THE IF TRANSFORMERS

The IF transformers and diode feeder in the Twin "8" and Dual "6" should always be aligned with a good calibrated service oscillator or signal generator.

Connect the feeder from the oscillator to the grid of the 77 autodyne tube. Remove the grid connection and connect a 500M ohm resistor from grid of the tube to the ground.

Rotate the variable condensers to the full open position.

Set the oscillator to a frequency of 262 KC and adjust the IF and diode feeder trimmers to obtain maximum reading on the output meter.

### PART REPLACEMENTS

In the design of the Twin "8" and Dual "6" interchangeability of parts has been accomplished wherever possible. This greatly simplifies service. In these sets the complete power packs and their various parts along with the RF oscillator, IF coils and variable condenser are interchangeable.

Volume Control — (1) Remove rear set cover. (2) Disconnect volume control and switch leads. (3) Remove hex head screws holding volume control mounting plate and remove complete assembly. (4) Replace with standard Motorola replacement control.

By-Pass Condensers — (1) Disconnect condenser and push up-wards from bottom of chassis. (2) Insert new condenser from bottom of chassis and reconnect.

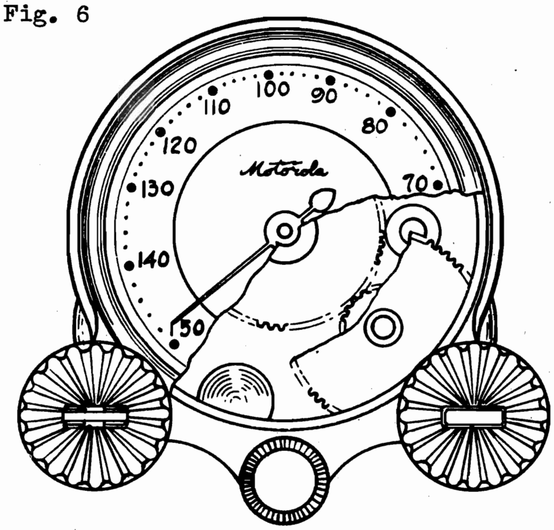
Tube Sockets — (1) Disconnect all wires at socket contacts, insert tube in socket, press down firmly and turn in counter-clockwise direction until released. (2) Place new socket on tube base, press it down firmly into chassis hole and turn in clockwise direction.

Coil and IF Transformer — (1) Each coil may be removed without disturbing any other units. (2) Remove mounting screws, disconnect its respective wires and insert new coil.

MODEL Twin "8"
MODEL Dual "6"
Control Adjustment

GALVIN MFG. CO.

Fig. 6




ADJUSTMENT OF MOTOROLA UNIVERSAL AIRPLANE TYPE CONTROL

The general construction of the control head is shown in the cut away view. (Fig. 6).

In connecting the flexible shafts to the control head:

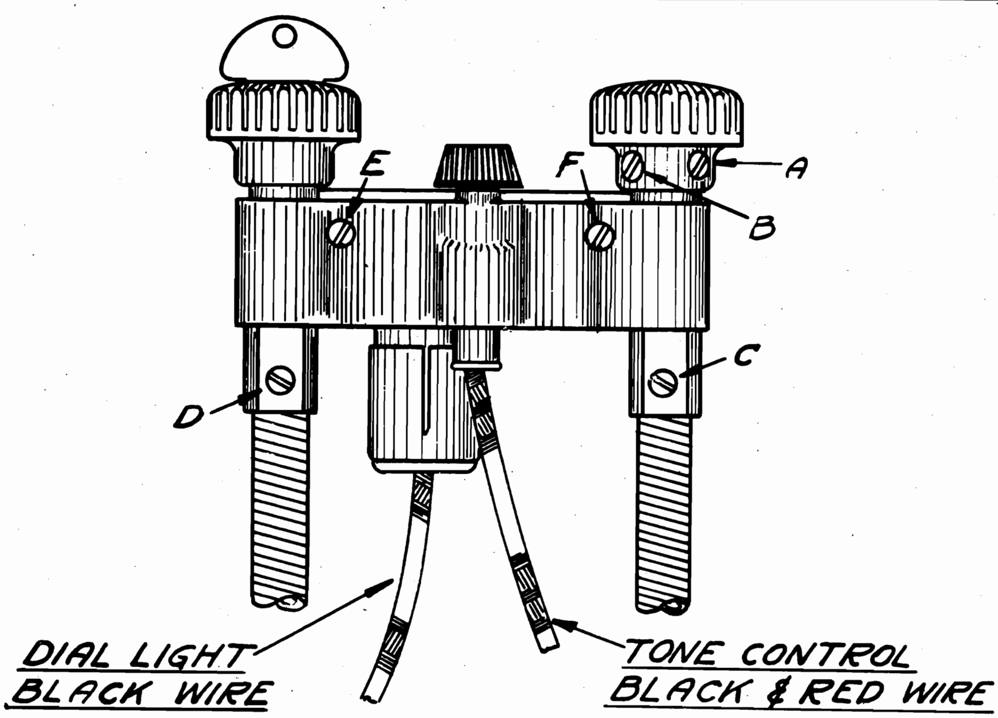
1. Insert the volume control shaft into the control head to its limit then release the shaft housing about 1/32 inch to relieve any binding. Tighten set screw (D) Fig. (7) against housing.

2. Insert condenser drive shaft into control head so that the shaft extends into the tuning knob. Tighten knob set screws A and B. Release shaft housing about 1/32 inch to relieve binding. Tighten set screw (C) against housing. The tuning knobs may be removed by completely removing the set screws E and F, Fig. (7). This is necessary when mounting control in instrument panel.

To adjust indicator arrow, tune in a station of known frequency preferably between 1000 KC and 1300 KC, then insert screw driver in rear center of control head and adjust indicator to correct frequency setting.

Special lengths of flexible shafts may be secured from your Motorola distributor or from the factory.

Fig. 7



GALVIN MFG. CO.

MODEL Twin "8"
Resistance Test
Data

TWIN 8 OUTER HOUSING CONTINUITY TEST.

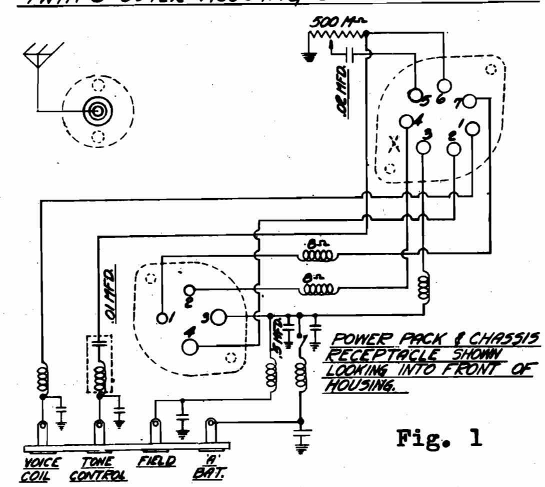



Fig. 1

TWIN "8"
VOLTAGE AT BATTERY 6.2

| TUBE | PLATE | SCREEN | CATHODE | CONTROL GRID | FIL. |
|---|---|---|---|---|---|
| 78 R.F. | 220 | 55 | .5 | * | 5.8 |
| 77 AUTODYNE | 220 | 55 | 4.5 | - | 5.8 |
| 78 I.F. | 220 | 55 | 1.5 | * | 5.8 |
| 85 DIODE | 40 | | | - | 5.8 |
| 37 1st AUDIO | 60 | | | 3.8** | 5.8 |
| LA POWER | 222 | 220 | | -20** | 5.8 |

* A.V.C. VOLTAGE APPLIED TO GRIDS.
** VOLTAGE MEASURED FROM GRID. RETURN TO GROUND.

## CONTINUITY OF TWIN "8" CHASSIS

Refer to circuit diagram Fig. (3)

| TEST | SHOULD TEST | IF OTHERWISE |
|---|---|---|
| Terminal #4 to P of LA. . . . . | 400 ohm | Open output trans. |
| P of 37 tube to grid of LA . . . | Open | Shorted .05 cond. |
| Terminal #7 to P of 1st 78. . . . | 25 ohm | Open prim. choke. |
| Terminal #7 to P of 77. . . . . . | 35 ohm | Open prim. I.F. |
| Terminal #7 to P of 2nd 78. . . . | 110M ohm | Open resistor. |
| Terminal #7 to Screen of LA . . | Short | Loose connect. |
| Diode of 85 to Ground . . . . . | 200M ohm | AVC network shorted. |
| Terminal #2 to ground . . . . . | 500 ohm | Open 400 or 100 ohm resistor. |
| Terminal #2 to Grids of LA's. . | 2000 ohm | Defective input Choke. |
| Terminal #7 to Ground. | 200M ohm | Open bleeder or shorted plate by-pass. |
| Screen of 78 to ground . . . . . | 100M ohm | Shorted .02 screen by-pass condenser. |

## CONTINUITY OF TWIN "8" HOUSING AND SPEAKER

Readings taken from front of housing with chassis removed. Volume control full on position. "A" Battery disconnected. Speaker connected.

| TEST | SHOULD TEST | IF OTHERWISE |
|---|---|---|
| Chassis receptacle terminal . . | #1 to Voice Coil terminal . . .Closed | Loose connections. |
| Chassis receptacle terminal . . | #2 to Power Pack #4 .Closed | Loose connections. |
| Chassis receptacle terminal . . | #3 to Power Pack #3 .Closed | Open fil. choke. |
| Chassis receptacle terminal . . | #4 to Power Pack #2 . 8 ohm | Open R.F. choke. |
| Chassis receptacle terminal . . | #6 to Ground . . . .500M ohm | Open volume control. |
| Chassis receptacle terminal . . | #6 to chassis recept. #5 Open | Shorted .02 coupling cond. |
| Chassis receptacle terminal . . | #7 to Power Pack Term. #1. . . . 8 ohm | Open R.F. choke. |
| Chassis receptacle terminal . . | #1 to ground . . . . . . 2 ohm | Open voice coil. |
| Power Pack terminal . . | #3 to A Bat. terminal.Closed | Defective power switch. |
| Power Pack terminal . . | #3 to ground . . . . . .4½ ohm | Open speaker field. |
| Ant. receptacle . . | To ground Open | Shorted ant. |

MODEL Dual "6"
Resistance Test
Data

## GALVIN MFG. CO.

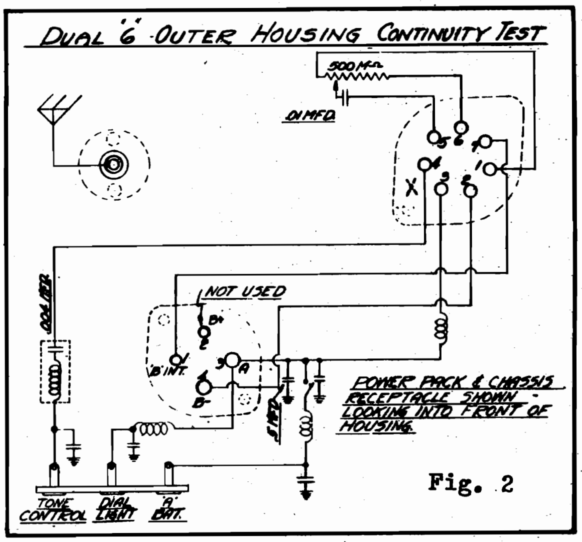



Fig. 2

| DUAL "6" | | | | | |
|---|---|---|---|---|---|
| TUBE | PLATE | SCREEN | CATHODE | CONTROL GRID | FIL. |
| 78 R.F. | 210 | 70 | .6 | * | 5.8 |
| 77 AUTODYNE | 210 | 70 | 5.6 | - | 5.8 |
| 78 I.F. | 210 | 70 | 2.5 | * | 5.8 |
| 75 DIODE | 65 | | .6 | - | 5.8 |
| 42 POWER | 200 | 205 | | -16 | 5.8 |

* A.V.C. VOLTAGE APPLIED TO GRIDS.

### CONTINUITY OF CHASSIS DUAL "6"

Refer to circuit diagram Fig. (4)

| | SHOULD READ | IF OTHERWISE |
|---|---|---|
| Terminal #5 to Grid 75 | Short | Loose connect. |
| Terminal #2 to ground. | 300 ohm | Open bias resistor. |
| Terminal #7 to ground. | 60M ohm | Shorted plate or screen by-pass open resistor. |
| Terminal #6 to ground. | 250 ohm | Def. 75 bias resistor. |
| Terminal #3 to ground. | Low resistance | Through tube fil. |
| Terminal #4 to P of 75 tube. | Short | Loose connect. |
| Terminal #6 to ground | 200M ohm | AVC network short to ground. |

### CONTINUITY OF DUAL "6" SET HOUSING

Readings taken from front of housing with chassis removed. Volume control full on position "A" battery disconnected.

| TEST | SHOULD TEST | IF OTHERWISE |
|---|---|---|
| Chassis recept. term. #1 to Term. #6. . . . . | 500M ohm | Def. volume control. |
| Chassis recept. term. #2 to Power Pack term. #4. . . . . | Closed | Loose connect. |
| Chassis recept. term. #3 to Power Pack term. #3. . . . . | Closed | Def. fil. choke. |
| Chassis recept. term. #3 to "A" Bat. Term. board . . . | Closed | Def. power switch. |
| Chassis recept. term. #4 to tone control term.board. | Open | Shorted .004 term. cond. |
| Chassis recept. term. #5 to term. #6. . . . . | Open | Shorted .01 coupling cond. |
| Ant. receptacle to ground. . . | Open | Shorted antenna. |

MODEL Twin "8"
Schematic

# GALVIN MFG. CO.

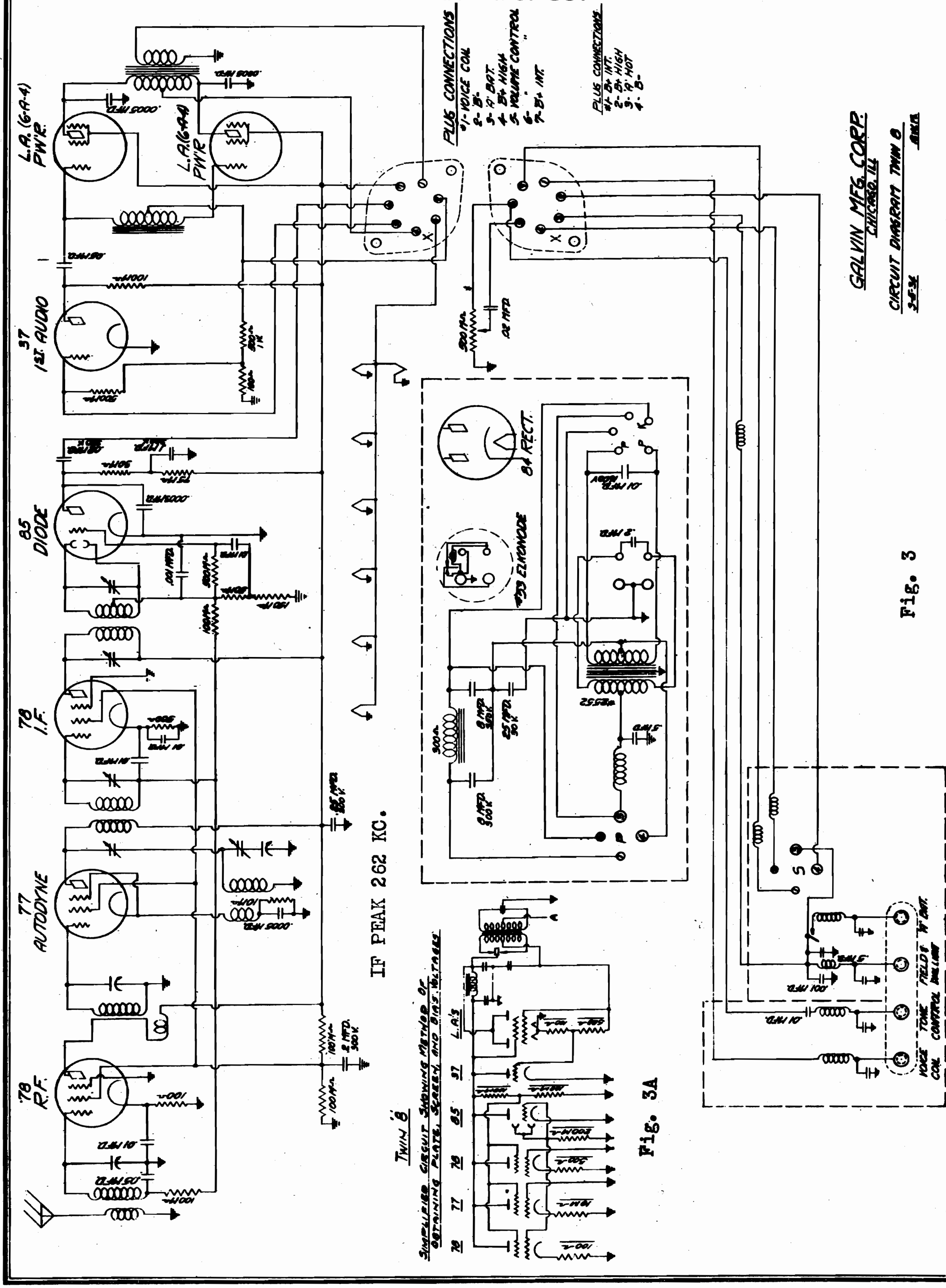
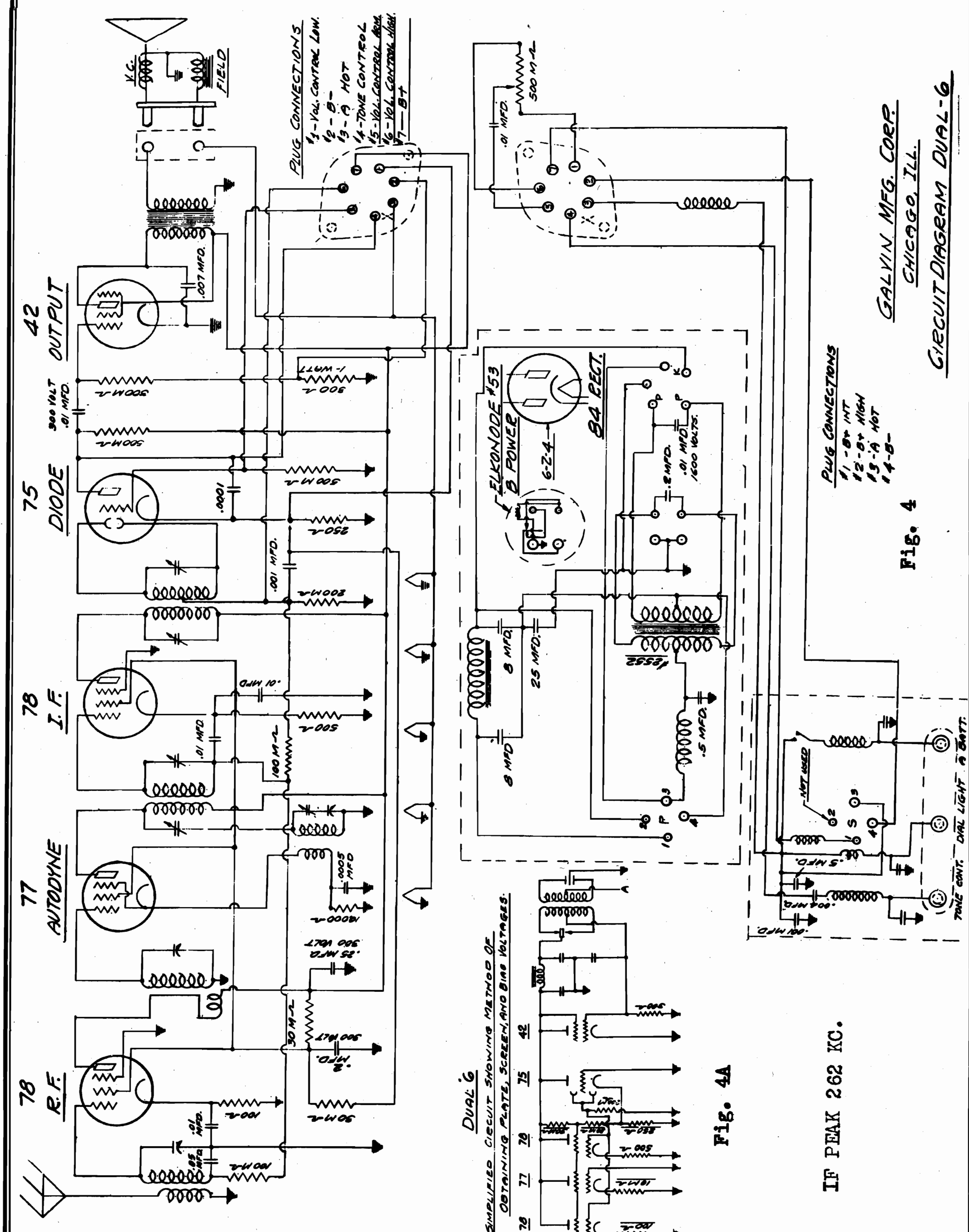



Fig. 3

Fig. 3A

MODEL Dual "6"
Schematic

GALVIN MFG. CO.



GALVIN MFG. CO.

MODEL Twin "8"
MODEL Dual "6"
Power Pack Test Data

# POWER PACK CONTINUITY TEST

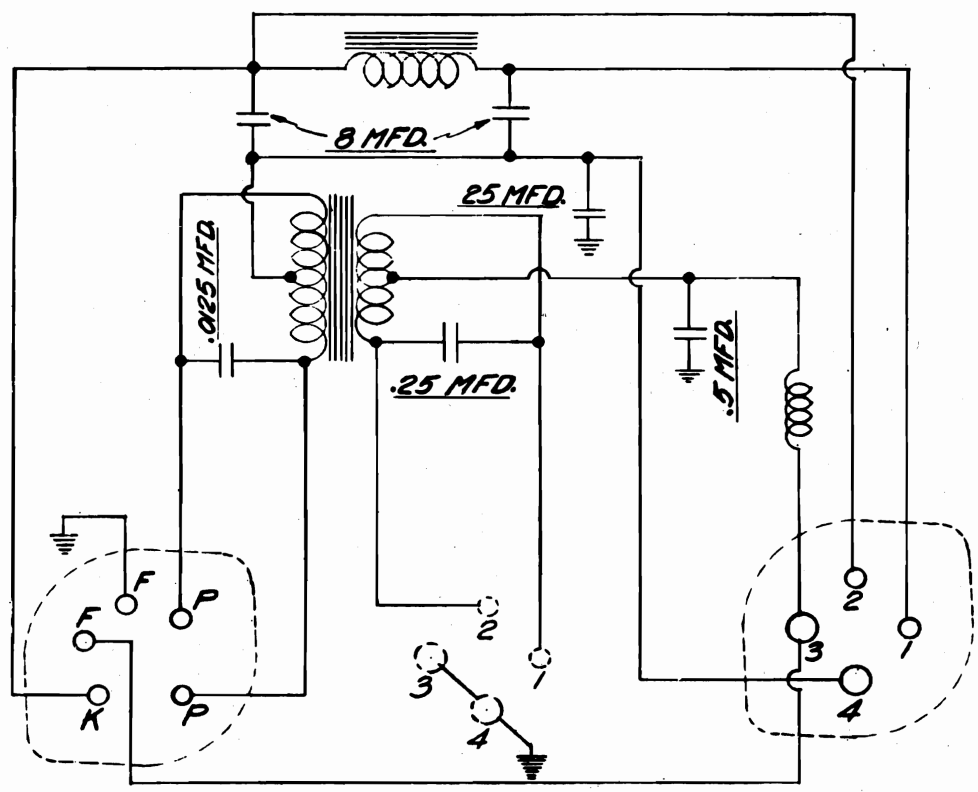



Fig. 5

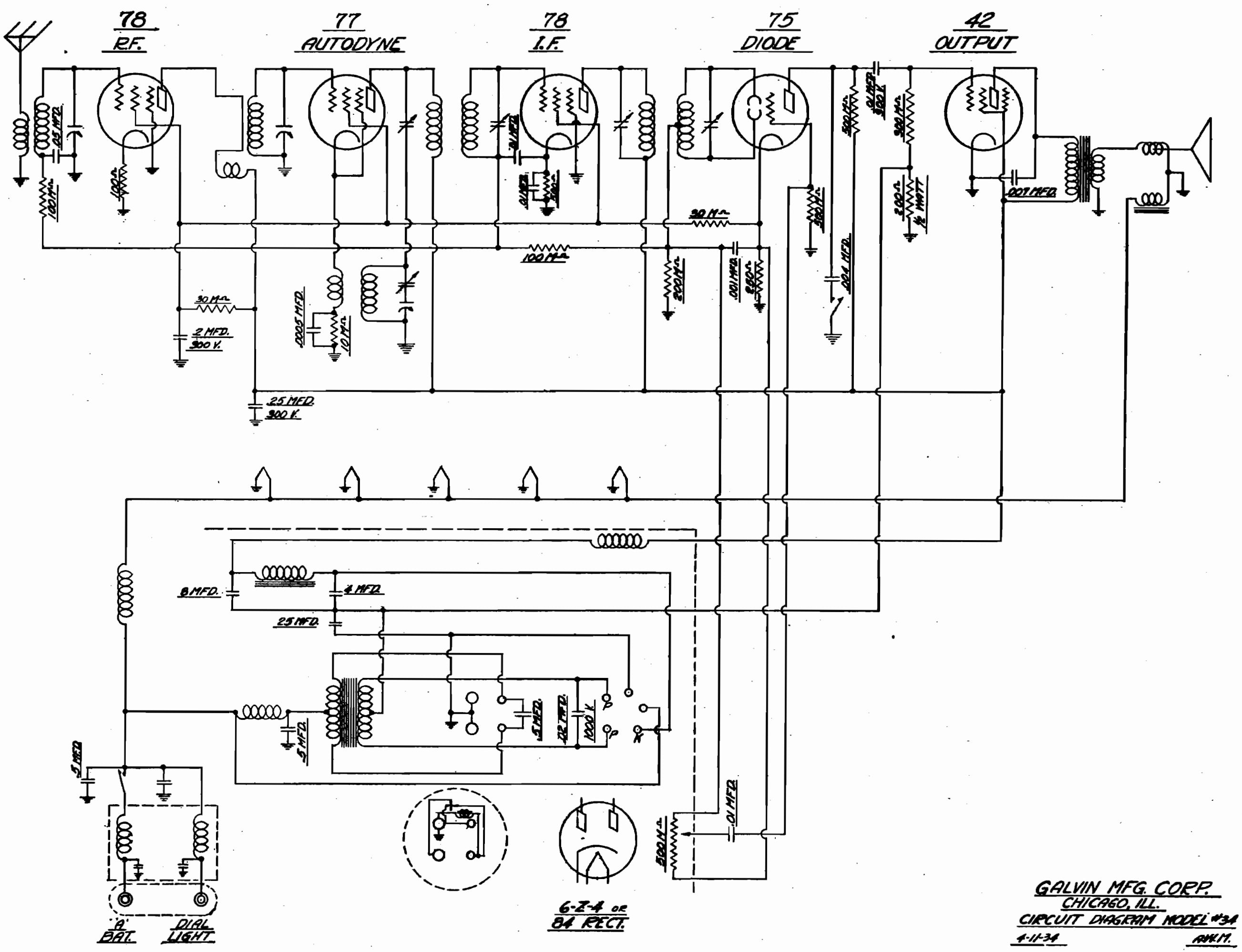
## CONTINUITY TEST ON POWER PACK

| TEST | SHOULD TEST | IF OTHERWISE |
|---|---|---|
| 1. Terminal #1 to K of 84 socket . . | 300 ohm | Defective filter choke. |
| 2. Terminal #1 to terminal #4 socket | Open * | Effective 8 mfd. cond. |
| 3. Terminal #4 to ground socket. . . | Open * | Defective 25 mfd. cond. |
| 4. Terminal #2 to terminal #4 socket | Open * | Defective 8 mfd. cond. |
| 5. Terminal #3 to terminal #1 and 2 Elk. socket. . . . . . . . . . . | Closed | Loose connection. |
| 6. Terminal #3 to ground . . . . . . | Closed through 84 fil. | Def. tube shorted .5 mfd. cond. |
| 7. Terminal #4 to P and P of 84 socket . . . . . . . . . . . . . . | 200 ohm | Def. sec. power trans. |
| 8. P to P on 84 socket . . . . . . . | 400 ohm | Shorted buffer cond. |
| 9. K to P and P of 84 socket . . . . | Open | Defective 84 tube. |

* On tests #2, 3 and 4 allowance should be made for polarization, or normal leakage of electrolytic condenser.

MODEL 34
Schematic

# GALVIN MFG. CO.




## ADJUSTMENT OF TUNING CONDENSER GEAR

The tuning condenser gear may be adjusted against its drive pinion by simply turning the cam screw, reaching through a hole in the left side of front cover. This hole is covered by button, easily pried upward with screwdriver. Turn screw to the left until slight drag is felt on the station selector knob, then back off slightly until free movement is obtained. After adjustment has been made tighten small locking screw located on face of cam screw.

## BALANCING THE SET TO THE ANTENNA

After the set is installed ready for operation, it may be necessary to balance the set to the antenna. This is done by adjustment of the antenna trimmer, located under a 3/8" hole in the TOP of the set. This hole is covered by a button which is removed by simply prying upward with a screw driver.

In making this adjustment tune in a very weak station around 120 to 140 on the dial. Adjust the trimmer with a screw driver until the point of maximum volume is reached.

## ADJUSTING THE STATION SELECTOR INDICATOR

Tune in a station of known frequency preferably between 1000KC and 1300 KC.

Insert a screw driver in the center rear of the control head and adjust indicator to the frequency of the station being received. (See Fig. 4).

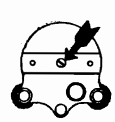


Fig. 4

# GENERAL HOUSEHOLD UTILITIES CO.

**MODEL 450 (4A)**
**Temporary Alignment Parts List**

## ALIGNMENT PROCEDURE CHASSIS 4A

1. Equipment

A - Test Oscillator

A - A modulated oscillator capable of producing signals at 262 K.C., 455 K.C., 1400 K.C., 3700 K.C. (10 M.C. and 20 M.C. used on 7B & 11A only) is necessary for alignment of the 1934 Grunow Receivers.

B - Out-put Meter

This may be any of the standard out-put meters on the marked but should be sufficiently sensitive to provide a good deflection at low signal strength, it should also incorporate an adjustable shunt so that extremely strong signals may be read.

C - Coupling Means

Coupling condensers of .25 Mfd. and 200 Mmf. should be used when coupling oscillator to receiver during alignment as specified in following paragraphs.

2. Dial Setting

Turn dial pointer so that end mark of dial is directly under pointer with variable condenser fully meshed.

It will be necessary to simulate the dial plate during alignment when Chassis is removed from cabinet.

3. I.F. Alignment

A - Connect signal lead of oscillator through .25 Mfd. condenser to grid of 6F7 (1st Detector Tube) located on rear right hand corner of Chassis as you face same. Connect the ground lead to the Chassis.

B - Place oscillator in operation at 455 K.C. and turn receiver volume control to maximum. (Volume Control should remain at maximum during entire alignment procedure and signal should be attenuated at oscillator to lowest value consistent with obtaining a readable indication on out-put meter.

C - Align four I.F. trimmers (A1, A2, A3, A4) located on under side of Chassis at base of I. F. Coils.

4. 1400 K.C. Alignment

A - Connect signal lead of oscillator to antenna lead (the blue wire leading from rear of Chassis) through 200 Mmf. Condenser.

B - Set Dial at 1400 K.C. and place oscillator in operation at 1400 K.C. Throw range switch on rear of Chassis to broadcast position.

C - Align oscillator trimmer (A5), which is the first of the two on the variable condenser as you face Chassis.

D - Align Antenna Trimmer (A6), which is the second trimmer on variable condenser as you face Chassis.

5. 600 K.C. Alignment

A - Place oscillator in operation at 600 K.C.

B - Tune in signal to maximum (this point does not have to be exactly at the 600 K.C. dial setting).

C - Adjust the 600 K.C. trimmer (A7 - located on rear face of Chassis and covered with a seal) in direction of signal increase and at the same time rock the tuning condenser back and forth through resonance. Continue this procedure until maximum signal is obtained on the out-put meter.

D - This should be performed with great care so that the alignment is the best that can be obtained, otherwise the selectivity of the set will suffer.

E - Recheck adjustment on 1400 K.C. antenna trimmer.

6. 3700 K.C. Alignment

A - Throw Range Switch to S.W. position.

B - Set oscillator in operation at 3700 K.C.

C - Turn Dial pointer to 3700 K.C. or 3.7 M.C.

D - Adjust 3700 K.C. Trimmer (A8) located on top of Chasis near variable condenser.

7. Recheck Dial Calibration and 1400 K.C. Alignment.

Model 450

Chassis 4A - Speaker 8B1

| Part No. | Specifications | Quantity Required |
|---|---|---|
| 20861 | Attachment Cord | 1 |
| 20962 | Grid Cap | 2 |
| 21598 | Rubber Grommet | 1 |
| 22858 | 1 Meg. Ohm Resistor, ¼ Watt | 1 |
| 23284 | Bakelite Washer | 6 |
| 23358 | Vertical Terminal Strip | 1 |
| 23538 | 200,000 Ohm Resistor, ¼ Watt | 1 |
| 23849 | 500,000 Ohm Resistor, ¼ Watt | 1 |
| 23998 | 250,000 Ohm Resistor, ¼ Watt | 1 |
| 24254 | 1,000 Mmf. Condenser | 1 |
| 24789 | 4 MFD - 25 V. Dry Electrolytic Condenser | 1 |
| 26564 | Tube Shield Base | 2 |
| 26634 | 35000 Ohm Resistor, ½ Watt | 1 |
| 27338 | I.F. Shield and Eyebolt Assembly | 1 |
| 27382 | Trimmer Condenser Assembly | 1 |
| 27784 | 400 Ohm Resistor, ¼ Watt | 1 |
| 27831 | Pilot Light Assembly | 2 |
| 28045 | Pilot Lamp | 2 |
| 28366 | Oscillator Coil Mtg.Strip | 1 |
| 28522 | Trimmer Condenser Assembly | 1 |
| 28721 | .01 MFD 500 Volt Tubular Condenser | 1 |
| 28722 | .04 MFD 500 Volt Tubular Condenser | 1 |
| 28726 | .1 MFD 400 Volt Tubular Condenser | 1 |
| 28729 | .5 MFD 100 Volt Tubular Condenser Assembly | 1 |
| 28876 | .02 MFD 500 Volt Tubular Condenser | 1 |
| 29087 | Tube Shield | 2 |
| 29115 | Candohm Resistor | 1 |
| 29117 | Two Gang Condenser | 1 |
| 29118 | 2 Meg. Ohm Resistor, ¼ Watt | 2 |
| 29119 | Volume Control | 1 |
| 29120 | Range Switch | 1 |
| 29121 | Power Transformer Assembly - 60 Cycle | 1 |
| 29132 | Antenna Coil Assembly | 1 |
| 29135 | 0.1 MFD 100 Volt Tubular Condenser | 1 |
| 29136 | 1st I.F. Assembly | 1 |
| 29137 | 2nd I.F. Assembly | 1 |
| 29159 | Double Pointer Knob | 1 |
| 29160 | Single Pointer Knob | 1 |
| 29164 | 50 M. Ohm Resistor | 1 |
| 29168 | Dual 8 MFD 450 Volt Electrolytic Cond. | 1 |
| 29170 | .017 MFD 500 Tubular Condenser | 1 |
| 29176 | Speaker Cable Assembly | 1 |
| 29264 | Antenna and Gr. Lead Assembly | 1 |
| 31077 | Socket (5 Prong) | 1 |
| 31079 | Socket (6 Prong) | 1 |
| 31080 | Socket (7 Prong) | 1 |
| 62523 | 5/8" X. #8 Hex. Hd. S.T. Screw Type Z | 4 |
| 62847 | Flat Washer 500 ODX .187 ID | 4 |

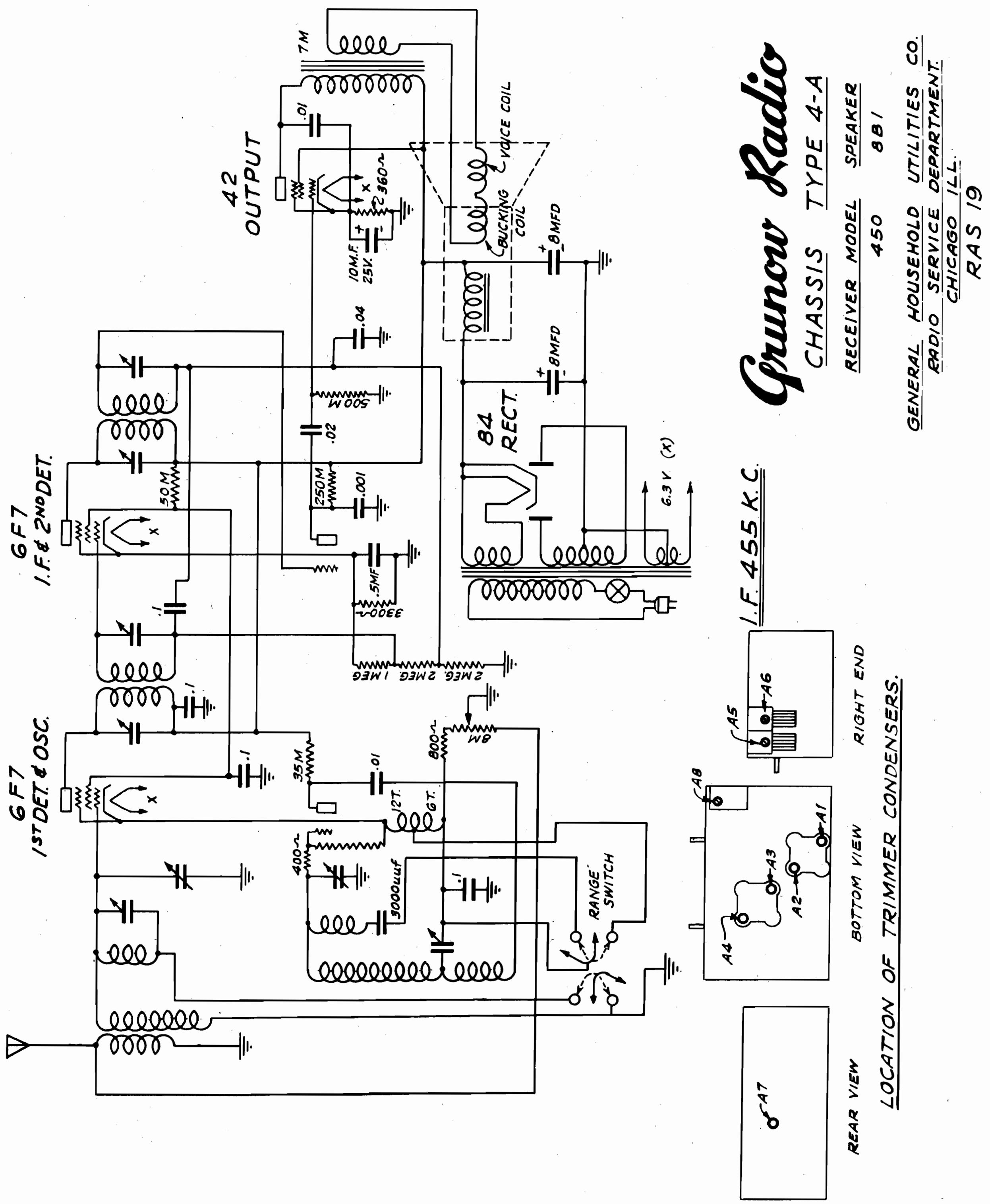
SPEAKER PARTS
Type 8-B1

| Part No. | Specifications |
|---|---|
| 28844 | Field Yoke and Pole Piece Assembly |
| 29038 | Cone Mtg. Gasket |
| 29040 | Speaker complete |
| 29042 | Field Coil |
| 29043 | Speaker Head Assembly |
| 29047 | Terminal Strip Cover |
| 29741 | Transformer |
| 29769 | Clamp Ring |
| 31355 | Cone and Voice Coil Assembly |

Complete Speakers may not be returned for credit.

MODEL 450 (4A)
Temporary
Schematic,Trimmers

# GENERAL HOUSEHOLD UTILITIES CO.



MODEL 460 (4B)
Temporary
Alignment

GENERAL HOUSEHOLD UTILITIES CO.

SEPTEMBER 1934

# Grunow Radio

## TEMPORARY SERVICE NOTES & PARTS LIST

CHASSIS TYPE 4 B
RECEIVER MODEL 460
SPEAKER TYPE 8B3

GENERAL HOUSEHOLD UTILITIES CO.
CHICAGO U.S.A.

31555-1

LITHO. U.S.A.

## ALIGNMENT PROCEDURE CHASSIS 4B

1. Equipment

A - Test Oscillator

A - A modulated oscillator capable of producing signals at 455 K.C., 600 K.C., 1400 K.C. and 1700 K.C. is necessary for alignment of the 4B Grunow Receivers.

B - Out-put Meter
This may be any of the standard out-put meters on the market but should be sufficiently sensitive to provide a good deflection at low signal strength, it should also incorporate an adjustable shunt so that extremely strong signals may be read.

C - Coupling Means
Coupling condensers of .25 Mfd. and 200 Mmf. should be used when coupling oscillator to receiver during alignment as specified in following paragraphs.

2. Dial Setting

Turn dial pointer until condensers are fully meshed. The dial pointer should be on the horizontal line of the dial.

3. I. F. Alignment

A - Connect signal lead of oscillator through .25 Mfd. condenser to grid of 6A7 (1st Detector Tube) located on front right hand corner of Chassis. Connect the ground lead to the Chassis.

B - Place oscillator in operation at 455 K.C. and turn receiver volume control to maximum. (Volume Control should remain at maximum during entire alignment procedure and signal should be attentuated at oscillator to lowest value consistent with obtaining a readable indication on out-put meter).

C - Align three I.F. trimmers (A1-A2-A3) located on top of Chassis. Two on top of 1st I.F. Can and 1 on Chassis between 42 and 6F7 tube.

4. 1700 K.C. Alignment

A - Connect signal lead of oscillator to antenna lead, (the blue wire leading from rear of chassis) through 200 Mmf. Condenser.

B - Set dial pointer at 1700 K.C. and place oscillator in operation at 1700 K.C.

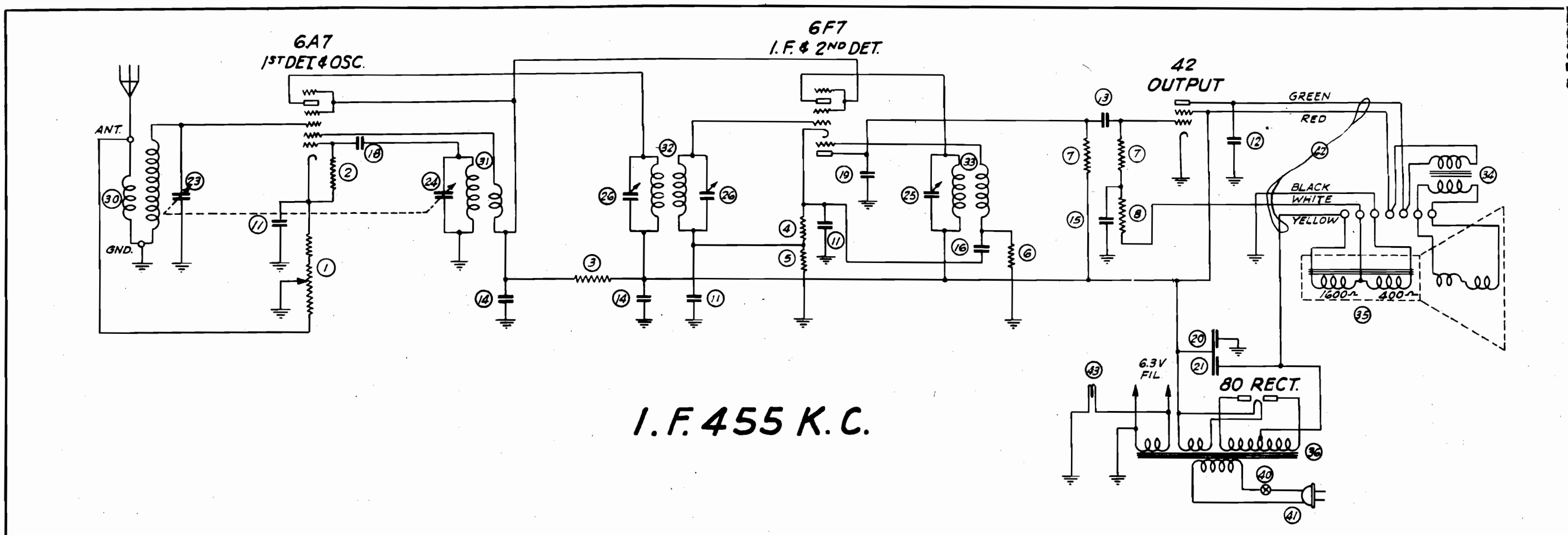
C - Align oscillator trimmer (A4) which is the first of the two on the variable condenser.

5. 1400 K.C. Alignment

A - Place oscillator in operation at 1400 K.C.
B - Set dial pointer at 1400 K.C.
C - Align antenna trimmer (A5). This operation may require rocking the variable condenser back and forth through resonance. The object of this operation is to be sure that the receiver will reach 1712 K.C. and at the same time have maximum sensitivity on the rest of the broadcast band.

MODEL 460 (4B)
Temporary
Schematic
Trimmers

# GENERAL HOUSEHOLD UTILITIES CO.




I. F. 455 K.C.

### RESISTORS

| ITEM | PART NO. | DESCRIPTION | NO. REQ. |
|---|---|---|---|
| 1 | 31222 | VOLUME CONTROL (7,500Ω) | 1 |
| 2 | 23853 | 50,000 OHM ±20% - ¼ W. | 1 |
| 3 | 31231 | 20,000 OHM ±5% ¼ W - WIRE W. | 1 |
| 4 | 31224 | 400 OHM ±10% - 10 M.A. WIRE W. | 1 |
| 5 | | 1400 OHM ±10% - 10 M.A. - WIRE W. | |
| 6 | 22858 | 1 MEG OHM ±20% - ¼ W. | 1 |
| 7 | 23849 | 500,000 OHM ±20% - ¼ W. | 2 |
| 8 | 23898 | 250,000 OHM ±20% - ¼ W. | 1 |

### PAPER CONDENSERS

| ITEM | PART NO. | DESCRIPTION | NO. REQ. |
|---|---|---|---|
| 11 | 29135 | 0.1 MFD. +20% -10% 100 V. | 3 |
| 12 | 28720 | 0.005 MFD. +20% -10% 700 V. | 1 |
| 13 | 29567 | 0.02 MFD. +20% -10% 400 V. | 1 |
| 14 | 28726 | 0.1 MFD. ±10% 400 V. | 2 |
| 15 | 28728 | 0.25 MFD. ±10% 100 V. | 1 |
| 16 | 30143 | 0.05 MFD. ±10% 100 V. | 1 |

### MICA CONDENSERS

| ITEM | PART NO. | DESCRIPTION | NO. REQ. |
|---|---|---|---|
| 18 | 24487 | 250 - MMFD ±10% | 1 |
| 19 | 31339 | 2000 - MMFD ±10% | 1 |

### ELECTROLYTIC CONDENSERS

| ITEM | PART NO. | DESCRIPTION | NO. REQ. |
|---|---|---|---|
| 20 | 31208 | 8 MFD. 350 D.C. VOLTS | 1 |
| 21 | | 8 MFD. 350 D.C. VOLTS | |

### ADJUSTABLE CONDENSERS

| ITEM | PART NO. | DESCRIPTION | NO. REQ. |
|---|---|---|---|
| 23 | 31218 | R.F. SEC. OF 2 GANG | 1 |
| 24 | | OSC. SEC. OF 2 GANG | 1 |
| 25 | 27382 | 15 TO 75 MMF. | 1 |
| 26 | 30170 | 20 - 120 MMF. | |

### TRANSFORMERS & CHOKES

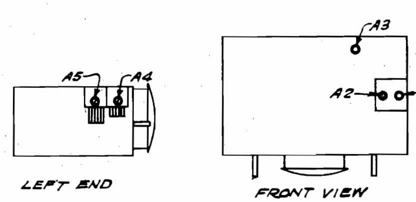
| ITEM | PART NO. | DESCRIPTION | NO. REQ. |
|---|---|---|---|
| 30 | 31234 | ANT. COIL ASSEMBLY | 1 |
| 31 | 31232 | OSC. COIL ASSEMBLY | 1 |
| 32 | 31235 | 1ST I.F. ASSEMBLY | 1 |
| 33 | 31288 | 2ND I.F. ASSEMBLY | 1 |
| 34 | 29741 | OUT-PUT TRANS. | 1 |
| 35 | 29786 | SPEAKER FIELD | 1 |
| 36 | 31226 | POWER TRANS. (50-60~) | 1 |

### MISCELLANEOUS

| ITEM | PART NO. | DESCRIPTION | NO. REQ. |
|---|---|---|---|
| 40 | 31223 | LINE SWITCH | 1 |
| 41 | 20861 | LINE CORD | 1 |
| 42 | 31266 | SPEAKER CABLE | 1 |
| 43 | 31267 | PILOT LIGHT ASSEMBLY | 1 |
| | 23284 | BAKELITE WASHER | 1 |
| | 26564 | TUBE SHIELD BASE | 1 |
| | 20962 | GRID CAP | 1 |
| | 28366 | OSC. COIL MTG. STRIP ASSEM. | 1 |
| | 31075 | 4 PRONG SOCKET | 1 |
| | 310-9 | 6 PRONG SOCKET | 1 |
| | 31080 | 7 PRONG SOCKET | 2 |
| | 31172 | DIAL WINDOW | 1 |

### MISCELLANEOUS - CONTINUED.

| ITEM | PART NO. | DESCRIPTION | NO. REQ. |
|---|---|---|---|
| | 31209 | DIAL POINTER | 1 |
| | 31211 | REFLECTOR & DIAL MTG. | 1 |
| | 31219 | JUNCTION TERM. BOARD | 1 |
| | 31237 | DIAL CHART | 1 |
| | 28010 | KNOB | 3 |
| | 29162 | TUBE SHIELD | 2 |
| | 31165 | 8B3 SPEAKER | 1 |
| | 62570 | $\frac{3}{8}$" x #8 H.H. SELF TAP SCREW | 4 |
| | 63839 | FELT WASHERS | 3 |
| | 63847 | FLAT WASHERS | 4 |




LOCATION OF TRIMMER CONDENSERS.

**Grunow Radio**
CHASSIS TYPE 4-B
RECEIVER MODEL 460 — SPEAKER 8B3

GENERAL HOUSEHOLD UTILITIES CO.
RADIO SERVICE DEPARTMENT
CHICAGO, ILL.
RAS-18

DT 9-19-34

# GENERAL HOUSEHOLD UTILITIES CO.

**MODEL 550 (5B)**
**Temporary Parts List Alignment**

## ALIGNMENT PROCEDURE CHASSIS 5B

### 1. Equipment

A - Test Oscillator

A modulated oscillator capable of producing signals at 455 K.C., 600 K.C. and 1400 K.C. is necessary for alignment of the 5B Chassis.

B - Out-put Meter

This may be any of the standard output meters on the market but should be sufficiently sensitive to provide a good deflection so that extremely strong signals may be read.

C - Coupling Means

Coupling Condensers of 200 Mmf., 25 Mfd., should be used when coupling oscillator to receiver during alignment as specified in following paragraphs.

### 2. I. F. Alignment

A - Connect signal lead of oscillator through .25 Mfd. condenser to grid of 78 tube. (1st Detector Tube). The ground lead to ground post on rear of Chassis.

B - Place oscillator in operation at 455 K.C. and turn receiver volume control to maximum. (Volume Control should remain at maximum during entire alignment procedure and signal should be attenuated at oscillator to lowest value consistent with obtaining a readable indication on out-put meter).

C - Align three I. F. trimmers (A1-A2-A3) located on under side of Chassis at base of I.F. Coils.

### 3. Dial Calibration

A - With condensers fully meshed dial pointer should be directly over end mark on dial.

B - When Chassis is removed from cabinet it will be necessary to simulate dial escutcheon which incorporates dial pointer.

### 4. 1400 K.C. Alignment

A - Connect signal lead of oscillator through 200 Mmf. condenser to antenna leading from Chassis.

B - Turn dial to 140 (1400 K.C.) and align 1400 K.C. oscillator trimmer (A4), located forward on variable condenser.

C - Align Antenna Trimmer (A5) which is the second trimmer on variable condenser.

### 5. 600 K.C. Alignment.

A - Place oscillator in operation at 600 K.C. Tune in signal (this does not have to be exactly on 600 Dial Setting).

B - Adjust 600 K.C. trimmer (A6) located on under side of Chassis directly under variable condenser) in direction of signal increase. Rocking dial knob through resonance until maximum output is obtained.

C - Recheck dial calibration: Over several points on dial.

## CHASSIS 5B

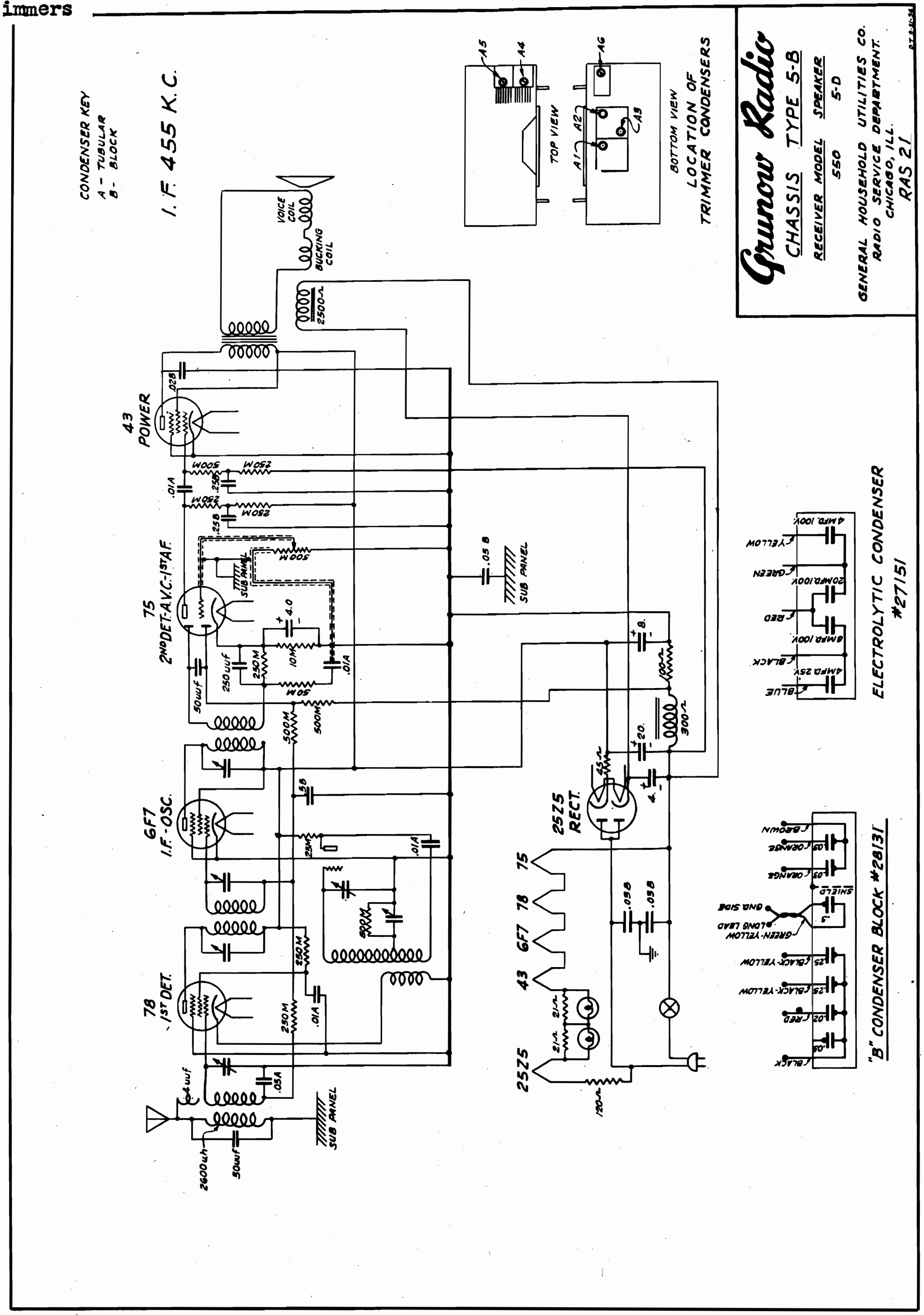
## MODEL 550

| Part No. | Description | Quantity Required |
|---|---|---|
| 20962 | Grid Cap only | 3 |
| 22856 | Resistor, 25,000 ohm, Carbon, ¼ Watt | 1 |
| 23358 | Insulated Terminal-Single | 1 |
| 23849 | Resistor, 500,000 Ohm, Carbon, ¼ Watt | 3 |
| 23852 | Resistor, 10,000 Ohm, Carbon, ¼ Watt | 1 |
| 23853 | Resistor, 50,000 Ohm, Carbon, ¼ Watt | 1 |
| 23998 | Resistor, 250,000 Ohm, Carbon, ¼ Watt | 6 |
| 24416 | Insulated Terminal--Double | 1 |
| 24487 | Condenser, 250 Mmf. Mica | 1 |
| 26198 | Oscillator Transformer Shield | 1 |
| 26247 | I. F. Transformer Shield | 2 |
| 26564 | Tube Shield Base | 2 |
| 27151 | Electrolytic Filter Condenser Block | 1 |
| 27153 | Resistor, 100 ohm, Candohm | 1 |
| 27155 | Resistor, 21-21 ohm, Candohm | 1 |
| 27163 | Volume Control | 1 |
| 27164 | Filter Choke Assembly | 1 |
| 27170 | Tuning Condenser Assembly | 1 |
| 27171 | Volume Control Pilot Lamp Socket | 1 |
| 27182 | Tuning Condenser Pilot Lamp Socket | 1 |
| 27184 | Oscillator Transformer | 1 |
| 27185 | 1st I. F. Transformer | 1 |
| 27186 | 2d I. F. Transformer | 1 |
| 27188 | Trimmer Condenser Assembly | 1 |
| 27404 | Attachment Cord (Voltage Reducing) | 1 |
| 27686 | Antenna Transformer | 1 |
| 27740 | Selector Dial Assembly | 1 |
| 27741 | Volume Control Dial Assembly | 1 |
| 27992 | Resistor, 45 ohm, Candohm | 1 |
| 28045 | Pilot Lamp, 6-8 Volt | 2 |
| 28125 | Ground Binding Post | 1 |

| Part No. | Description | Quantity Required |
|---|---|---|
| 28131 | Bypass Condenser Block | 1 |
| 28721 | Condenser, .01 Mfd., 500 Volt Tubular | 3 |
| 28723 | Condenser, .05 Mfd., 400 Volt Tubular | 1 |
| 29083 | Condenser, 50 Mmf., Mica | 1 |
| 29087 | Tube Shield | 2 |
| 29453 | Condenser, .01 Mfd. 400 Volt Tubular | 1 |
| 29903 | Grille, Chromium Plated | 1 |
| 29904 | Escutcheon Plate | 2 |
| 29905 | Knob, Selector or Volume Control | 2 |
| 29909 | Cabinet Insulator Assembly | 1 |
| 31079 | Tube Socket - 6 Prong | 4 |
| 31080 | Tube Socket - 7 Prong | 1 |
| 62521 | Wood Screw - Cabinet Insulator | 2 |
| 62522 | Wood Screw - Cabinet Back | 6 |
| 62570 | Chassis Mounting Screws | 4 |
| 63847 | Chassis Mounting Washer | 4 |
| 64500 | Escutcheon Pin | 4 |
| | SPEAKER PARTS | |
| 26321 | Cone Head Assembly | 1 |
| 28435 | Field Coil | 1 |
| 28436 | Bucking Coil | 1 |
| 28437 | Output Transformer | 1 |

MODEL 550 (5B)
Temporary
Schematic
Trimmers

# GENERAL HOUSEHOLD UTILITIES CO.



# GENERAL HOUSEHOLD UTILITIES CO

## ALIGNMENT PROCEDURE CHASSIS 6A

1. Equipment

A - Test Oscillator

A modulated oscillator capable of producing signals at 262 K.C., 455 K.C., 600 K.C., 1400 K.C., 3700 K.C., (10 M.C. and 20 M.C. used on 7B & 11A only) is necessary for alignment of the 1934 Grunow Receivers.

B - Output Meter

This may be any of the standard output meters on the market but should be sufficiently sensitive to provide a good deflection at low signal strength, and should also incorporate an adjustable shunt so that extremely strong signals may be read.

C - Coupling Means

Coupling Condensers of 200 Mmf.,.25 Mfd., should be used when coupling oscillator to receiver during alignment as specified in following paragraphs.

2. Dial Setting

Turn dial knob until condensers are fully meshed. The dial pointer should be on the horizontal line of the dial.

3. I. F. Alignment

Connect signal lead of test oscillator to grid of the 6D6 (1st Detector Tube) through .25 Mfd. Condenser. Connect the ground lead to Chassis.

A - Set Dial pointer to 1400 K.C. and range switch on position "A". (Left)

B - Place test Oscillator in operation at 262 K.C. Turn receiver volume control and tone control to maximum.

C - Attenuate test oscillator out-put to lowest value consistent with obtaining a readable indication on out-put meter.

D - Adjust four I.F. Trimmers, (A1-A2-A3-A4), located on under side of Chassis, until maximum output is obtained. During alignment, maintain as low a value of signal as will allow obtaining of accurate adjustment.

4. 3700 K.C. Alignment

A - Throw range switch to position "B". (Right)

B - Connect signal lead of test Oscillator to Antenna post on Chassis through 200 Mmf. Condenser.

C - Turn dial pointer to 3700 K.C.

D - Place Oscillator in operation at 3700 K.C.

E - Align Oscillator Trimmer (A5), (front trimmer located on top of variable condenser.

5. 1400 K.C. Alignment

A - Throw range switch to position "A", (Left)

B - Turn Dial pointer to 1400 K.C.

C - Place Oscillator in operation at 1400 K.C.

D - Align the 1400 K.C. Trimmer (A6), (located on the front left face of the Chassis, the lower of the two at this location).

E - Align the second and third trimmers (A7 & A8) on the top of the variable condenser.

F - Repeat the 1400 K.C. alignment at least twice.

6. 600 K.C. Alignment

A - Place Oscillator in operation at 600 K.C.

B - Tune in 600 K.C. signal (this does not have to be exactly on 600 K.C. dial setting).

C - Adjust 600 K.C. trimmer (A9), (located on the front left face of the Chassis, the upper of the two at this location), in direction of signal increase. At the same time, rock the tuning condenser back and forth through resonance. Continue this procedure until maximum signal is obtained on output meter.

CHASSIS 6A - 6AW - 6AX - 6AZ
MODELS 650 - 651

| Part No. | Description | Number Required |
|---|---|---|
| 20678 | Ground Terminal | 1 |
| 20861 | Attachment Cord | 1 |
| 20929 | Resistor, 50,000 ohm Carbon 1 Watt | 1 |
| 23570 | Resistor, 100,000 Ohm, Carbon, ½ Watt | 2 |
| 23849 | Resistor, 500,000 Ohm, Carbon, ½ Watt | 3 |
| 23853 | Resistor, 50,000 Ohm, Carbon, ½ Watt | 1 |
| 23998 | Resistor, 250,000 Ohm Carbon, ½ Watt | 2 |
| 24251 | Condenser, 100 Mmf. Mica | 1 |
| 24487 | Condenser, 250 Mmf. Mica | 2 |
| 24873 | Resistor, 75,000 Ohm, Carbon, ½ Watt | 1 |
| 27283 | 2d I.F. Transformer Shield | 1 |
| 27382 | Trimmer Condenser | 1 |
| 27388 | 1st I.F. Transformer Shield | 1 |
| 27492 | Knob, Selector and Volume Control | 2 |
| 27851 | Pilot Light Socket - Insulated | 2 |
| 28010 | Knob - Tone Control | 1 |
| 28045 | Pilot Light, 6-8 Volt | 2 |
| 28658 | Dial Pointer Screw | 1 |
| 28717 | Condenser, .002 Mfd., 700 Volt Tubular | 1 |
| 28721 | Condenser, .01 Mfd., 500 Volt Tubular | 2 |
| 28725 | Condenser, .05 Mfd., 400 Volt Tubular | 1 |
| 28726 | Condenser, .1 Mfd., 400 Volt Tubular | 1 |
| 28919 | Resistor - Candohm | 1 |
| 28922 | Bypass Condenser Block | 1 |
| 28923 | 2d I. F. Transformer | 1 |
| 28925 | Drive Drum Assembly | 1 |
| 28939 | Trimmer Condenser Assembly | 1 |
| 29002 | 1st Detector Transformer | 1 |
| 29005 | Antenna Transformer | 1 |
| 29007 | Oscillator Transformer | 1 |
| 29011 | Resistor, 40,000 Ohm, Carbon, 1 Watt | 1 |
| 29065 | Electrolytic Condenser Clamp | 1 |
| 29074 | Condenser, 250 - 100 Mmf. Mica | 1 |
| 29083 | Condenser, 50 Mmf. Mica | 1 |
| 29086 | Condenser, 18 Mfd. 300 Volt Electrolytic | 1 |
| 29087 | Tube Shield | 2 |
| 29233 | Speaker Cable | 1 |
| 29399 | Dial Pointer | 1 |
| 29400 | Dial Chart | 1 |
| 29401 | Tuning Condenser, 3 Gang | 1 |
| 29404 | Volume Control | 1 |
| 29406 | Tone Control | 1 |
| 29409 | Tuning Condenser Mounting Bracket | 1 |
| 29410 | Reflector Assembly | 1 |
| 29425 | Drive Cable with Eyelets | 1 |
| 29426 | Cable Tension Spring | 1 |
| 29453 | Condenser, .01 Mfd. 400 Volt Tubular | 1 |
| 29557 | Condenser, 8 Mfd. 450 Volt Dry Electrolytic | 1 |
| 29564 | Condenser, .075 Mfd., 100 Volt Tubular | 1 |
| 29575 | Tube Shield | 2 |
| 29597 | Condenser, 600 Mmf. Mica | 1 |
| 29623 | Drive Shaft Bearing | 1 |
| 29864 | Power Transformer, 115 Volt, 50-60 cycles | 1 |
| 29884 | 1st I.F. Transformer | 1 |
| 29921 | Drive Shaft | 1 |
| 29922 | Front Bearing Plate | 1 |
| 29924 | Antenna Binding Post Assembly | 1 |
| 29925 | Power Transformer, 115 Volt - 60 Cycles only | 1 |
| 29926 | Power Transformer, 115 Volt - 25 to 50 Cycles | 1 |
| 29927 | Range Switch | 1 |
| 29932 | Escutcheon Window | 1 |
| 29933 | Window Retaining Ring | 1 |
| 29934 | Escutcheon | 1 |
| 29946 | Range Switch Front Bearing Plate | 1 |
| 29947 | Escutcheon Retaining Spring | 1 |
| 29949 | Range Switch Mounting Bracket | 1 |
| 29958 | Decalcomania - "A,B" | 1 |
| 29988 | Condenser, 1950 Mmf. Mica | 1 |
| 29989 | Condenser, 480 Mmf. Mica | 1 |
| 30005 | Power Transformer, 110-135-220-250 Volts, 50-60 Cycles | 1 |
| 31075 | Tube Socket - 4 Prong | 1 |
| 31079 | Tube Socket - 6 Prong | 4 |
| 31080 | Tube Socket - 7 Prong | 1 |
| 31116 | Resistor, 1 Ohm, Ohmite | 1 |
| 61116 | Chassis Mounting Screw | 4 |
| 63839 | Felt Knob Washer | 4 |
| 63863 | Chassis Mounting Washer | 4 |

SPEAKER PARTS

Type 8A5

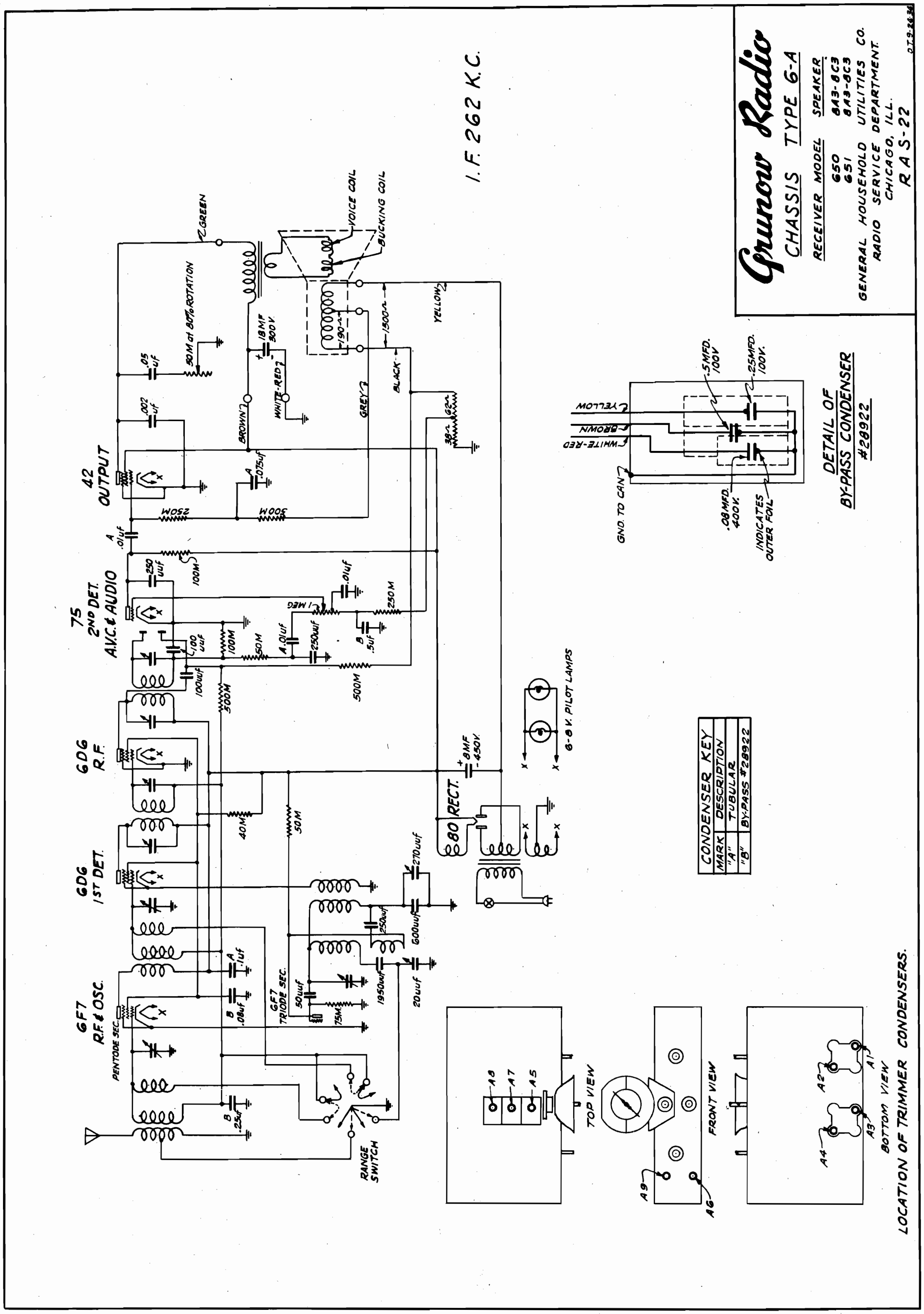
| Part No. | Description |
|---|---|
| 20003 | Speaker Pot & Pole Piece Assy. |
| 20040 | Speaker pot clamp |
| 20045 | Terminal strip cover |
| 20047 | Terminal Strip |
| 20058 | Spider Clamp Ring |
| 29078 | Electrolytic Mtg. Bracket |
| 29675 | Speaker complete |
| 29705 | Cone Mtg. Gasket |
| 29726 | Field Coil Assy. |
| 29732 | Output Transformer |
| 29735 | Speaker Head Assy. |
| 31309 | Cone & Voice Coil Assy. |

Type 8C3

| Part No. | Description |
|---|---|
| 20040 | Speaker Pot Clamp |
| 20045 | Terminal Strip Cover |
| 20047 | Terminal Strip |
| 20058 | Spider Clamp Ring |
| 29078 | Electrolytic Mtg. Bracket |
| 29674 | Speaker Complete |
| 29699 | Speaker Pot and Pole Piece Assy. |
| 29705 | Cone Mtg. Gasket |
| 29732 | Output Transformer |
| 29767 | Speaker Head Assy. |
| 29768 | Field Coil Assy. |
| 31309 | Cone and Voice Coil Assy. |

MODEL 650,651 (6A)
Temporary
Schematic,Trimmers

# GENERAL HOUSEHOLD UTILITIES CO.



# GENERAL HOUSEHOLD UTILITIES CO.

**MODEL 660,661,662 (6C)**
**Temporary Alignment, Parts**

ALIGNMENT PROCEDURE

1. Equipment

A - Test Oscillator

A modulated oscillator capable of producing signals at 262 K.C. - 600 K.C. - 1400 K.C. - 16 M.C.

B - Output Meter

This may be any of the standard output meters on the market, but should be sufficiently sensitive to provide a good deflection at low signal strength, and should also incorporate an adjustable shunt so that extremely strong signals may be read.

C - Coupling Means

Coupling condensers of 200 Mmf., 25 Mfd. and a 400 ohm resistor should be used when coupling test oscillator to receiver during alignment as specified in the following paragraphs.

2. Dial Setting

Turn dial knob until condensers are fully meshed. The dial pointer should be on the horizontal line of the dial.

3. I. F. Alignment

A. Connect signal lead of test oscillator to grid of the 6A7 (first detector tube) through a .25 Mfd. condenser. Connect the ground lead to the chassis.

B - Set dial pointer to 1400 K.C. and range switch on counter-clockwise (broadcast) position.

C - Place test oscillator in operation at 262 K.C. Turn receiver volume control and tone control to maximum.

5. 1400 K.C. Alignment

A - Turn range switch counter-clockwise to broadcast position.

B - Connect signal lead of test oscillator through 200 Mmf. condenser to antenna binding post.

C - Place test oscillator in operation at 1400 K.C. and set dial pointer on 1400 K.C.

D - Adjust the lower of the two trimmers (A11) located at the left front end of chassis and trimmers on 2nd (A8) and 3rd (A9) section of variable condensers to maximum output.

6. Recheck Operation No. 4 (16 M.C. Alignment)

7. 600 K.C. Alignment

A - Place test oscillator in operation at 600 K.C.

B - Tune in signal to maximum. (This point does not have to be exactly at 600 K.C. dial setting)

C - Adjust the 600 K.C. padding condenser (A10) (this is the upper of the two trimmers located at the left front end of chassis), in direction of signal increase; at the same time rock the tuning condenser back and forth through resonance while adjusting padding condenser until maximum output is obtained.

D - Attenuate test oscillator output to lowest value consistent with obtaining a readable indication on output meter.

E - Adjust the four I.F. trimmers (A1-A2-A3-A4) located on the under-side of the chassis, until maximum output is obtained. During alignment maintain as low a value of signal as will allow obtaining of accurate adjustment.

4. 16 M. C. ALIGNMENT

A - Connect signal lead of test oscillator through 400 ohm resistor to antenna binding post of chassis.

B - Connect the ground lead to ground terminal of chassis.

C - Set range switch to S.W. range (clockwise position).

D - Place test oscillator in operation at 16 M.C. and set dial pointer on 16 M.C.

E - Adjust trimmer (A5) on front section of variable condenser (oscillator) --, trimmer (A6) on top of detector coil and A7 on top of the antenna coil - to maximum output - (the detector and antenna coils are located on left-hand side on top of the chassis).

F - On oscillator alignment use the lower of the two images for the oscillator alignment point. It will be noted that there are two settings at which the signal will be received. Use the setting giving most capacity, that is, the setting at which the trimmer screw is farthest in. While adjusting the detector and antenna coil trimmers rock the variable condensers back and forth until maximum output is obtained.

PARTS LIST
CHASSIS 6C - 6CW - 6CX - 6CZ
MODELS 660 - 661 - 662

| Part No. | Description |
|---|---|
| 22856 | Resistor, 25,000 Ohm, Carbon, ¼ Watt |
| 23284 | Bakelite Washer |
| 23358 | Insulated Terminal |
| 23370 | Resistor, 100,000 Ohm, Carbon, ¼ Watt |
| 23849 | Resistor, 500,000 Ohm, Carbon, ¼ Watt |
| 23850 | Resistor, 16,000 Ohm, Carbon, ¼ Watt |
| 23853 | Resistor, 50,000 Ohm, Carbon, ¼ Watt |
| 23998 | Resistor, 250,000 Ohm, Carbon, ¼ Watt |
| 24251 | Condenser, 100 Mmf. Mica |
| 24487 | Condenser, 250 Mmf. Mica |
| 28045 | Pilot Lamp, 6-8 Volt |
| 28421 | Resistor, 2,000 Ohm, Carbon, ¼ Watt |
| 28720 | Condenser, .005 Mfd., 700 Volt Tubular |
| 28723 | Condenser, .05 Mfd., 400 Volt Tubular |
| 28726 | Condenser, .1 Mfd., 400 Volt Tubular |
| 28729 | Condenser, .5 Mfd., 100 Volt Tubular |
| 28925 | Drive Drum Assembly |
| 28939 | Trimmer Condenser Assembly |
| 29074 | Condenser, 250-100 Mmf., Mica |
| 29083 | Condenser, 50 Mmf. Mica |
| 29087 | Tube Shield |
| 29135 | Condenser, .1 Mfd., 100 Volt Tubular |
| 29404 | Volume Control |
| 29406 | Tone Control |
| 29409 | Tuning Condenser Mounting Bracket |
| 29410 | Reflector Assembly |
| 29428 | Resistor, Candohm |
| 29432 | Antenna Transformer |
| 29434 | 1st Detector Transformer |
| 29435 | Oscillator Transformer |
| 29453 | Condenser, .01 Mfd., 400 Volt Tubular |
| 29530 | 2d I.F. Transformer |
| 29551 | Antenna and Doublet Binding Posts |
| 29557 | Condenser, 8 Mfd., 450 Volt, Dry Electrolytic |
| 29562 | Condenser, 18 Mfd., 300 Volt, Wet Electrolytic |
| 29564 | Condenser, .075 Mfd., 100 Volt Tubular |
| 29567 | Condenser, .02 Mfd., 400 Volt Tubular |
| 29989 | Condenser, 480 Mmf., Mica |
| 29990 | Condenser, .02 Mfd., 400 Volt Tubular |
| 31035 | Power Transformer, 115 Volt, 50-60 Cycles |
| 31051 | Tuning Condenser, 3 Gang |
| 31053 | Power Transformer, 110-135-220-250 Volt, 50-60 Cycles |
| 31072 | Oscillator Transformer Shield |
| 31114 | Speaker Cable |
| 31116 | Resistor, 1 ohm, Ohmite |
| 31117 | Knob, Range Switch |
| 31171 | Resistor, 25,000 ohm, Carbon, 2 Watt |
| 31185 | 1st I.F. Transformer |
| 31199 | Drive Cable with Eyelets |
| 31202 | Power Transformer, 115 Volts, 25-50 Cycles |
| 31216 | Drive Shaft - Outer |
| 61154 | Chassis Mounting Screw |

SPEAKER PARTS

Type 8-B2

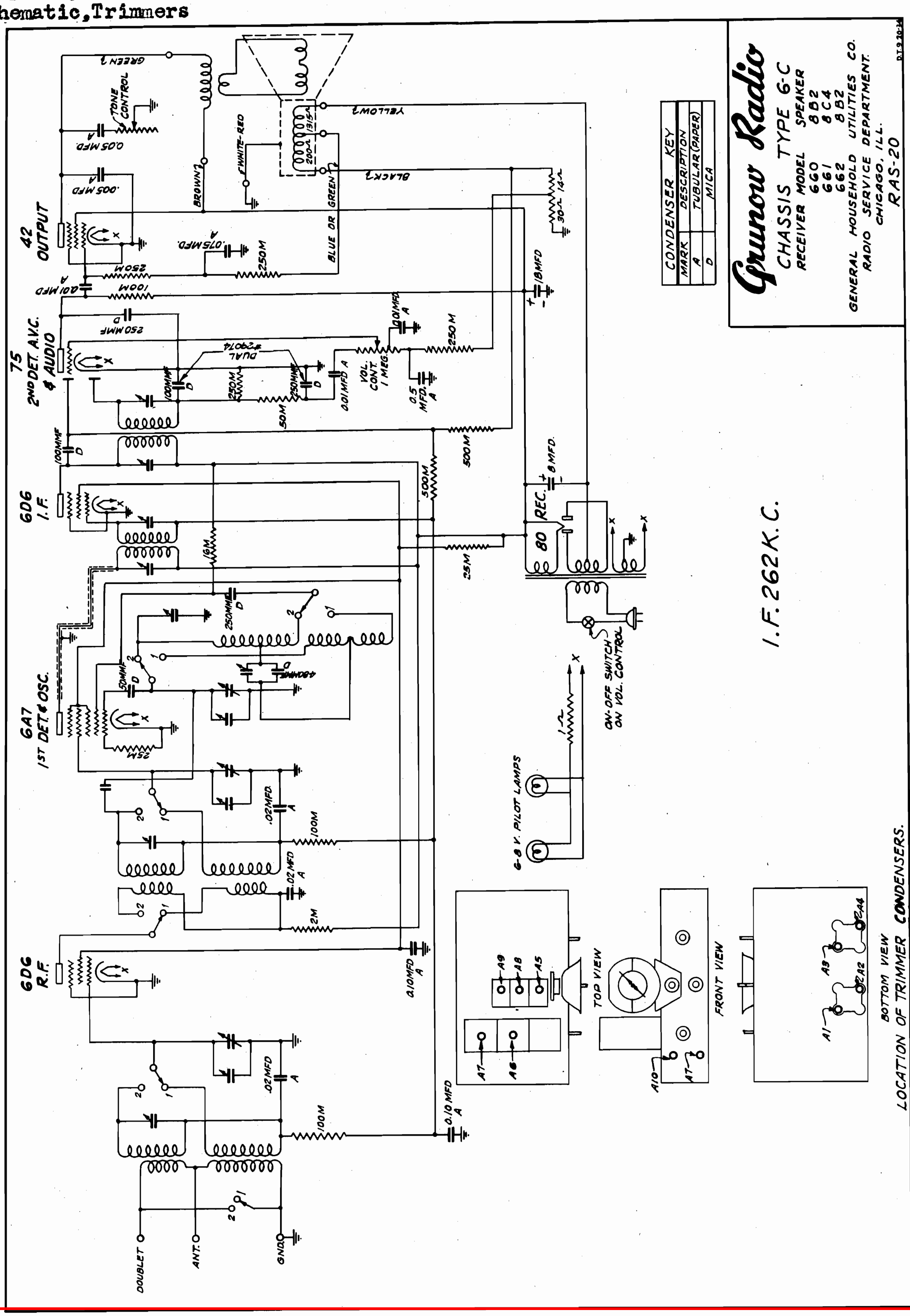
| | |
|---|---|
| 28844 | Field Yoke and Pole Piece Assembly |
| 29038 | Cone Mounting Gasket |
| 29043 | Speaker Head Assembly |
| 29047 | Terminal Strip |
| 29051 | Terminal Strip Cover |
| 29670 | Speaker Complete |
| 29741 | Output Transformer |
| 29769 | Clamp Ring |
| 29774 | Field Coil |
| 31355 | Cone and Voice Coil Assembly |

Type 8-C4

| | |
|---|---|
| 20040 | Speaker Pot Clamp |
| 20045 | Terminal Strip Cover |
| 20058 | Spider Clamp Ring |
| 29671 | Speaker Complete |
| 29699 | Speaker Pot and Pole Piece Assembly |
| 29705 | Cone Mounting Gasket |
| 29732 | Output Transformer |
| 29767 | Speaker Head Assembly |
| 29778 | Speaker Field Coil Assembly |
| 31309 | Cone and Voice Coil Assembly |

MODEL 660,661,662
(6C)
Temporary
Schematic,Trimmers

# GENERAL HOUSEHOLD UTILITIES CO.



# GENERAL HOUSEHOLD UTILITIES CO

SEPTEMBER 1934

**Grunow Radio**

TEMPORARY

SERVICE NOTES & PARTS LIST

CHASSIS TYPE 6D

RECEIVER MODELS 670 & 671

SPEAKER TYPES 8C6 10A5

GENERAL HOUSEHOLD UTILITIES CO.
CHICAGO U.S.A.

31561-1 LITHO. U.S.A.

## ALIGNMENT PROCEDURE CHASSIS 6D

GENERAL

The Type 6D Chassis is used in conjunction with the 8C6 speaker in receiver model 670 and with the 10A5 speaker in the model 671 receiver.

This Chassis is a 6 tube all wave (550 to 21800 K.C.) superheterodyne, using 1 - 6D6 tube as an R.F. Amplifier, 1 - 6A7 tube as first Detector and Oscillator, 1 -6D6 tube as a Bi-Selector I.F. Amplifier, 1 - 75 tube acting as a second Detector, Automatic Volume Control and Audio Amplifier, 1 - 42 tube as the Audio Output and an 80 tube for the Rectifier.

The intermediate frequency is 455 K.C. An efficient range switch controls the four ranges in which the receiver operates.

ALIGNMENT

1. Equipment

A - Test Oscillator
A modulated Oscillator capable of producing signals at 455 K.C., 600 K.C., 1400 K.C., 4500 K.C., 12 M.C. and 21 M.C. is necessary for alignment of the Type 6D Chassis.

B - Output Meter
This may be any of the standard output meters on the market but should be sufficiently sensitive to provide a good deflection at low signal strength, and should also incorporate an adjustable shunt so that extremely strong signals may be read.

C - Coupling Means
Coupling Condensers of 200 Mmf., .25 Mfd., and a 400 Ohm resistor should be used when coupling oscillator to receiver during alignment as specified in following paragraphs.

2. Dial Setting

Turn dial knob until condensers are fully meshed. The dial pointer should be on the horizontal line of the dial.

3. I. F. Alignment

Connect signal lead of test Oscillator to grid of the 6A7 (1st Detector Tube) through .25 Mfd. Condenser. Connect the ground lead to the Chassis.

A - Set Dial pointer to 1400 K.C. and range switch on position "A". (Broadcast).

B - Place test Oscillator in operation at 455 K.C. Turn receiver volume control and tone control to maximum.

C - Attenuate test Oscillator output to lowest value consistent with obtaining a readable indication on output meter.

D - Adjust five I.F. Trimmers, (A1, A2, A3, A4, A5), located on the I.F. transformers on top of the Chassis, (2 Trimmers are on top of each transformer and the fifth is at the lower side of the 1st I.F. transformer, (this is the Bi-Selector I.F. stage), until maximum output is obtained. During alignment, maintain as low a value of signal as will allow obtaining of accurate adjustment.

4. 4500 K.C. Alignment

A - Connect signal lead of test Oscillator through 200 Mmf. Condenser to Antenna binding part.

B - Connect the test Oscillator ground lead to the ground post of Chassis.

C - Turn Range Switch to range "B" and set Dial Pointer to 4500 K.C.

D - Align the following "B" range trimmers: Oscillator (A6), Detector (A7) Antenna (A8).

5. 1400 K.C. Alignment

A - Place test Oscillator in operation at 1400 K.C.

B - Turn Dial to 1400 K.C.

C - Turn Range Switch to range "A".

D - Adjust the following "A" range trimmers: Oscillator (A9), Detector (A10) Antenna (A11).

6. 600 K.C. Alignment

A - Place test Oscillator in operation at 600 K.C.

B - Tune in signal to maximum (this point does not have to be exactly at 600 K.C. setting).

C - Adjust the 600 K.C. Padding Condenser, (A12) in direction of signal increase. At same time rock the tuning condenser back and forth through resonance while adjusting Padding Condenser until maximum output is obtained.

7. 12 M.C. Alignment

A - Connect signal lead of test Oscillator through 400 ohm resistor to Antenna binding post of Chassis.

B - Connect the ground lead to ground terminal of Chassis.

C - Set Range Switch to range "C".

D - Place test Oscillator in operation at 12 M.C.

E - Adjust the following "C" range trimmers: Oscillator (A13), Detector (A14), Antenna (A15).

F - When adjusting the Detector Trimmer (A14) on the "C" range it is necessary to rock the tuning condenser in a manner similar to that required when setting the 600 K.C. Padding Condenser.

G - When adjusting the Oscillator Trimmer on the "C" range with a 12 M.C. signal it will be noted that there are two settings at which the signal will be received. Use the higher frequency setting, that is, the setting at which the trimmer screw is farthest out. On the "A", "B" and "C" range the Oscillator operates at a higher frequency than the incoming signal, and consequently the trimmer capacity will be lower when adjustment is completed.

8. 21 M.C. Alignment

A - Set Range Switch on range "D".

B - Place test Oscillator in operation at 21 M.C.

C - Turn Dial Pointer to 21 M.C.

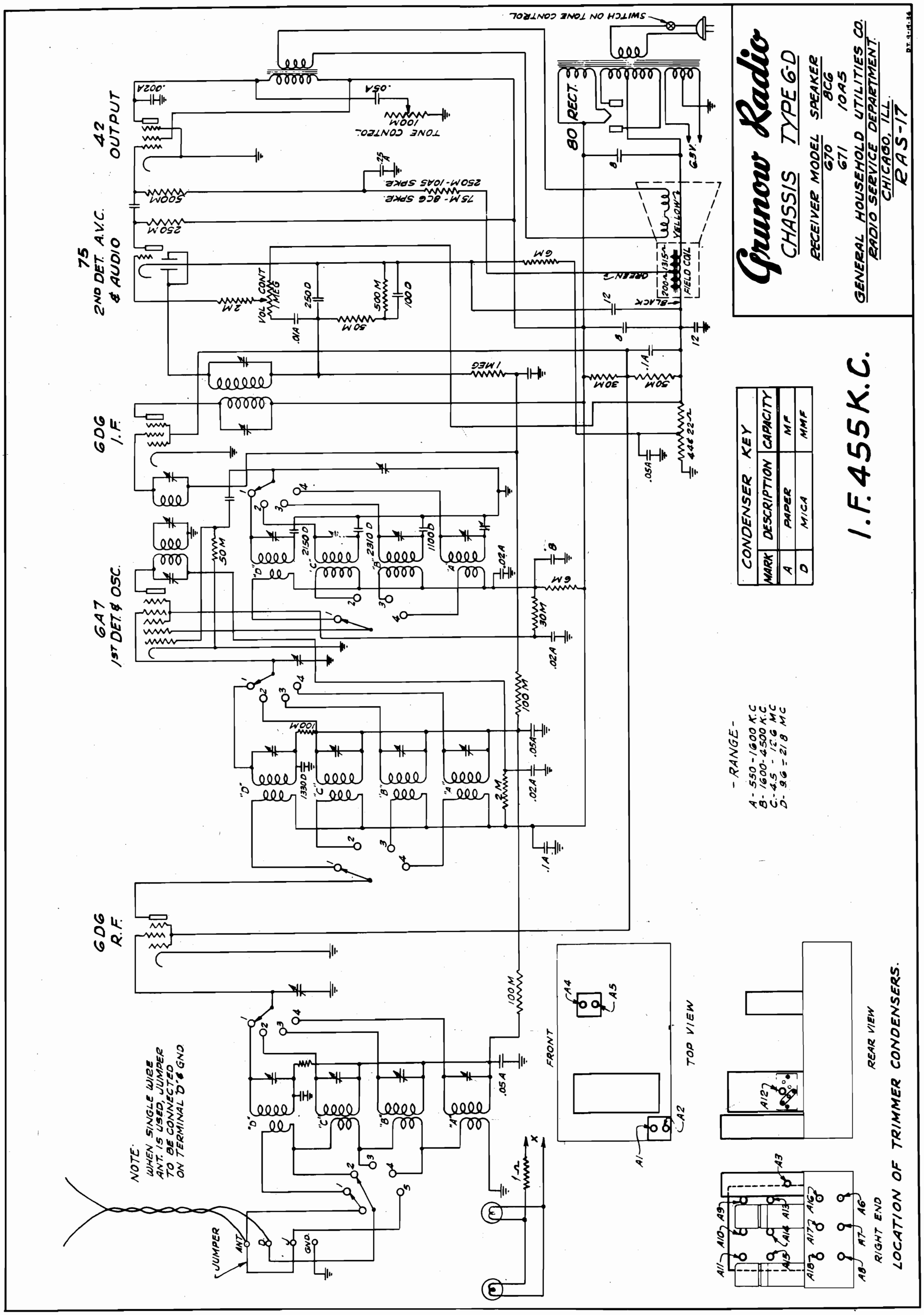
D - Adjust the following "D" range trimmers: Oscillator (A16), Detector (A17), Antenna (A18).

E - When adjusting the Detector Trimmer (A17) on the "D" range it is necessary to rock the tuning condenser back and forth through resonance in the same manner as required when setting the 600 K.C. Padding Condenser.

F - When adjusting the Oscillator trimmer on the "D" range with a 21 M.C. signal it will be noted that there are two settings at which the signal will be received. Use the lower frequency setting, that is, the setting at which the trimmer screw is farthest in. On the "D" range the Oscillator operates at a lower frequency than the incoming signal, and consequently the trimmer capacity will be higher when adjustment is completed.

**MODEL 670,671 (6D)**
**Temporary Schematic**

# GENERAL HOUSEHOLD UTILITIES CO.



GENERAL HOUSEHOLD UTILITIES CO.

Service Notes and Parts List

# Grunow Radio

## CHASSIS TYPE 7B

| Receiver Model | Speaker Model |
|---|---|
| 750 | 8A4—8C2 |
| 751 | 10A3 |
| 752 | 10A3 |
| 753 | 10A3 |

**GENERAL HOUSEHOLD UTILITIES COMPANY**
RADIO SERVICE DEPT. CHICAGO, U. S. A.

Chassis 7B —115 volt 60 cycle
Chassis 7BX—115 volt 25-50 cycle

Power Consumption 75 watts.

Chassis 7BW 115 volt 50-60 cycle
Chassis 7BZ {110—135—220—250 volt / 50-60 cycle}
Tubes—1-6D6, 1-6A7, 1-6F7, 1-75, 1-42, 1-76, 1-80

### INTRODUCTION

The following characteristics apply to the Grunow Radio —Chassis Type 7B:

This model is a 7 tube Super-Heterodyne All Wave (540 to 21,500 KC) Receiver using 1-6D6 tube as an R. F. Amplifier, 1-6A7 tube as a 1st Detector or mixer—being electronicly coupled to a 76 oscillator tube. 1-6F7 tube the pentode section of which is used as an I.F. amplifier with a frequency of 262 K.C. and the Triode section being used as a Signal Beacon or beat oscillator. Plate Voltage of the Signal Beacon being applied by closing the switch on the tone control. A 75 tube (double diode—high mu Triode) is used as a diode detector or signal rectifier, delayed automatic volume control (AVC) and high-gain audio amplifier. The 42 output tube is a power amplifier pentode and is capable of producing large power output with a relatively small input signal. This tube receives its bias through the voltage drop produced in the tapped speaker field. The rectifier tube is an 80, the output of which is well filtered through the choke action of the speaker field and the 16 and 18 mfd. electrolytic condensers.

The broadcast section of the receiver consists of the following 4 tuned circuits: R.F. input, bi-selector, mixer input and oscillator. These circuits are tuned with a 4-gang variable condenser of rugged construction.

The short wave section of the receiver consists of 3 tuned circuits, the bi-selector being cut out to prevent losses when the receiver is working at the higher frequencies.

The Signal Beacon is a beat oscillator using the triode section of the 6F7 tube, and is a feature of the 7B Chassis. When this section of the tube is brought into operation it acts as a local oscillator and beats against the incoming signal. The presence of a station's signal will be indicated by a high pitched "whistle", becoming lower in pitch as a "resonance", or exact tuning, is approached. The Signal Beacon note becomes very low and finally reaches zero; at this point the receiver is said to be tuned to "zero beat", which indicates that it is tuned exactly to the station. The Signal Beacon is also used to receive telegraph or continuous wave signals.

The remainder of the circuit is typical and has been designed along the lines of what is considered the best engineering practice to date. Parts are all oversize and of the finest quality.

## SERVICE DATA

The chassis frame is built in such a way that the end plates may be disconnected allowing easy inspection of the underside of the chassis assembly. (Fig. 6).

The range switch and coil assembly is made up in a unit and may be removed for inspection or repair. (Fig. 7). The removal of this assembly necessitates the unsoldering of 13 wire leads. These leads and the positions to which they are connected are marked on the illustrations with letters. The leads A-B-C on the Coil Assembly (Fig. 7) are attached to the points marked A-B-C on the Chassis Assembly (Fig. 5). The leads marked D-E-F-G on the Coil Assembly (Fig. 7) are attached to the points of corresponding letters on the Chassis Assembly (Fig. 6). Leads H-I-J-K-L-M on Coil Assembly are connected as follows:

Lead "H" connects the ground side of the short wave antenna transformer (Red) to the rotor ground of the variable condenser.

Lead "I" connects Arm 2 of Deck 5 to the No. 1 stator of the variable condenser.

Lead "J" is the shielded lead connecting the bi-selector transformer to the No. 2 stator of the variable condenser.

Lead "K' connects Arm 2 of Deck 3 to the No. 3 stator of the variable condenser.

Lead "L" connects the switch assembly ground to the varible condenser rotor ground.

Lead "M" connects Arm 2 of Deck 2 with No. 4 stator of the variable condenser.
Care should be exercised in making these connections. (A soldering iron with a bent point should be used in this operation).

### Continuity and Voltage

Continuity and voltage readings should be taken from the underside of the Chassis. The values given on the schematic diagram are average and allow the service man to make a quick check of the chassis constants. The socket layouts given on the schematic diagram show each socket from the underside.

### The Range Switch

In servicing the 7-B Receiver, consider the radio frequency end as four different and distinct radios:

One working from 550 to 1500 k.c. (D Range)
One working from 1500 to 4200 k.c. (C Range)
One working from 4100 to 10,000 k.c. (B Range)
One working from 8500 to 21,500 k.c. (A Range)

These four radios are put into operation as desired by means of the Range Switch.

When on position "A" the short wave coils covering the range from 8,500 to 21,500 k.c. are connected into the three tuned circuits of the receiver, one coil as an R.F. Transformer, one as the Detector Coupler, and one as the Oscillator Transformer.

On position "B" the 4100 to 10,000 k.c. coils are put into operation.

On "C" position, the 1500 to 4200 k.c. coils are shunted across the 550 to 1500 k.c. coils in such a manner as to lower the total inductance of the combined coils and reduce the losses caused by open end coils.

On both the "C" and "D" positions, four coil sets are put into the circuit and the receiver operates as a four tuned circuit radio. On all four ranges the receiver works at maximum sensitivity and selectivity. All coils and condensers are of such construction that atmospheric and temperature changes have minimum effect.

Each circuit is completely shielded from each other, and the complete range switch and coil assembly may be removed for inspection or repair.

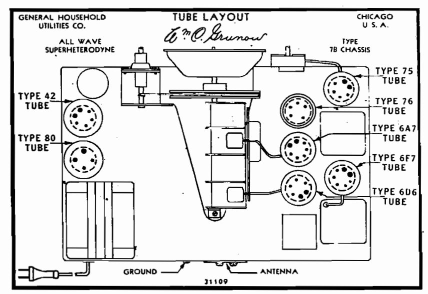


Fig. 1

MODEL 750,751,752
753 (7B)
Schematic,Voltage

# GENERAL HOUSEHOLD UTILITIES CO.

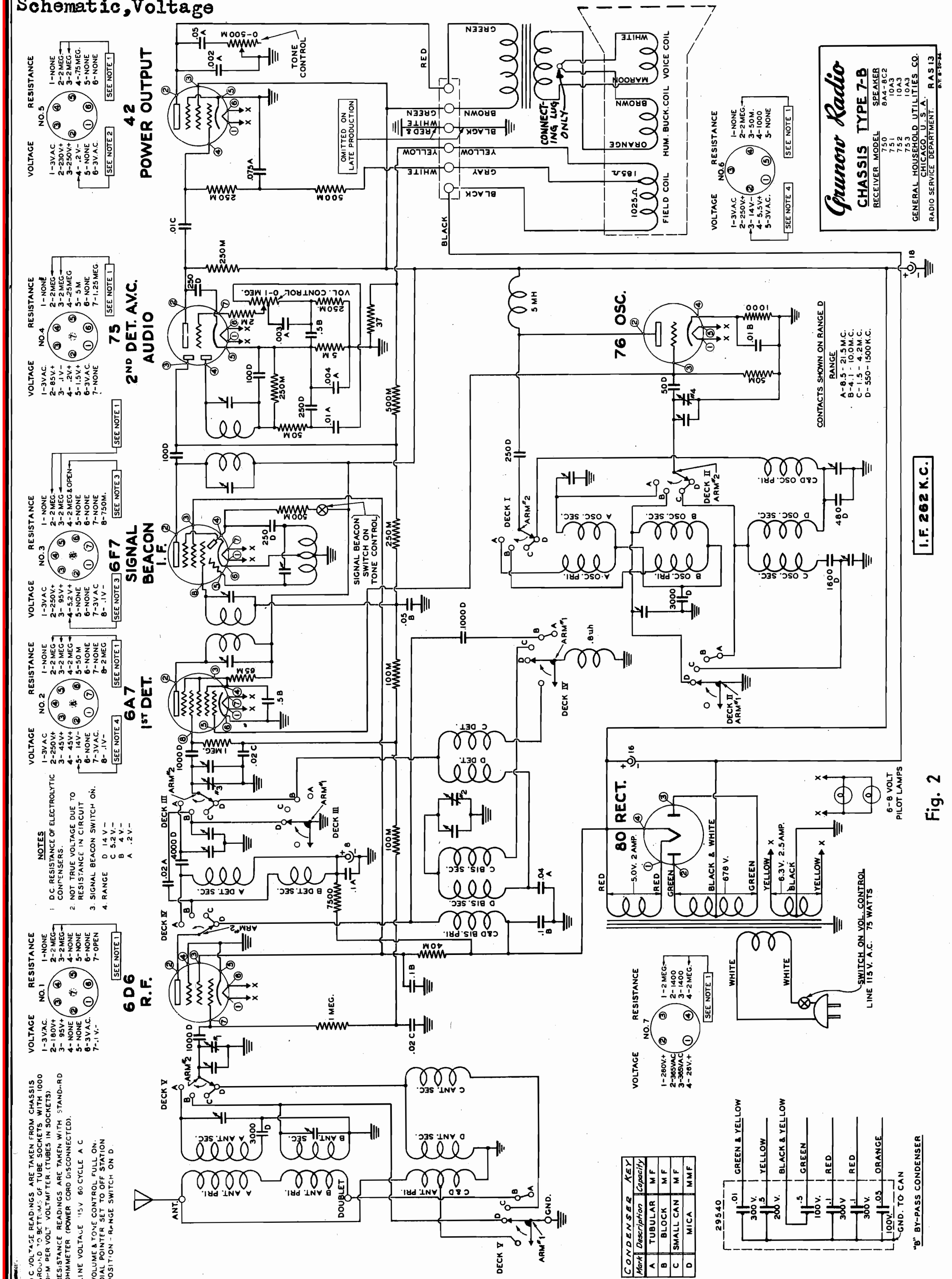


Fig. 2

# GENERAL HOUSEHOLD UTILITIES CO.

**MODEL 750,751,752 753 (7B) Trimmers,Coil**

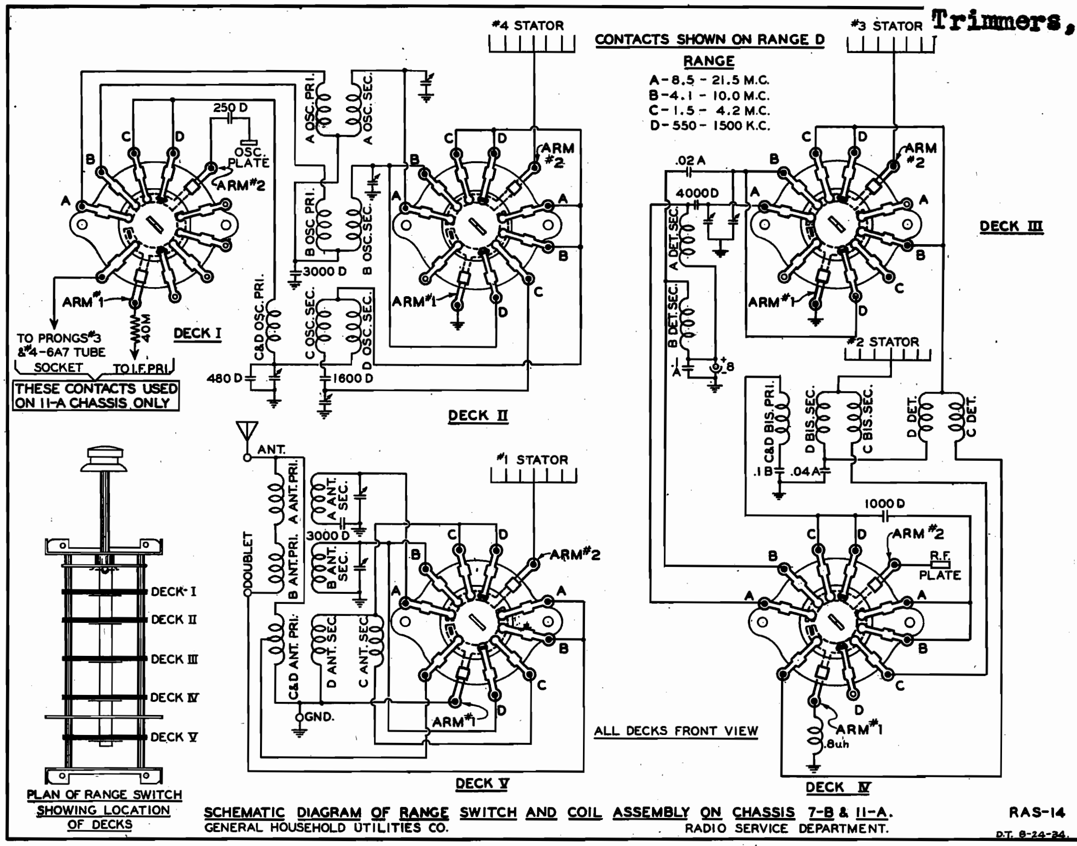
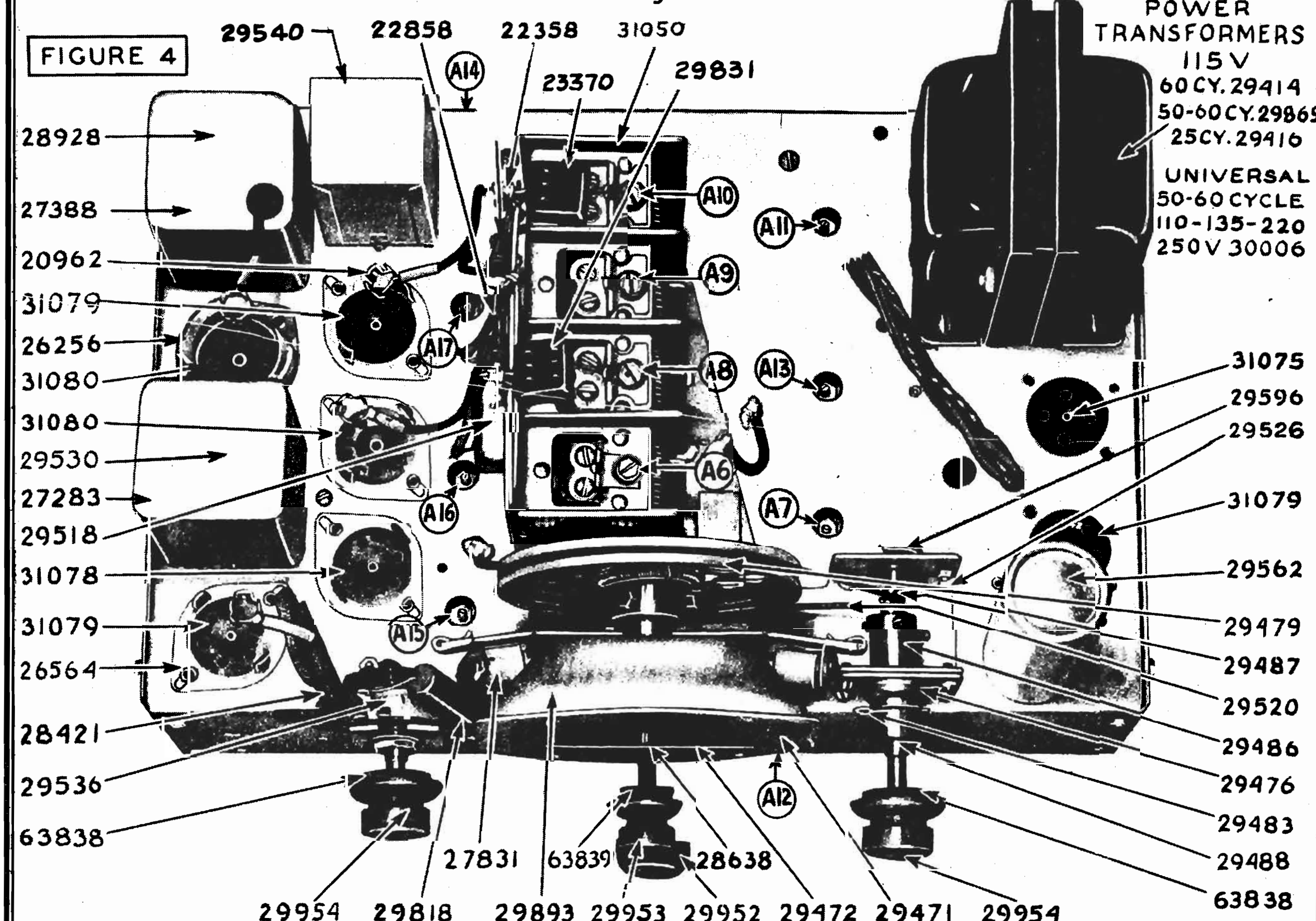



Fig. 3

FIGURE 4



**MODEL 750,751,752
753 (7B)**

# GENERAL HOUSEHOLD UTILITIES CO.

**Alignment,Parts**

## PARTS AND PRICE LIST

| Part No. | Description | No. used | List Price |
|---|---|---|---|
| 22858 | Resistor, 1 Megohm, Carbon, 1/4 watt | 3 | .20 |
| 23284 | Bakelite Washer, Trim. Condensers | 13 | .20 |
| 23370 | Resistor, 100,000 ohm Carbon, 1/4 watt | 3 | .20 |
| 23849 | Resistor, 500,000 ohm Carbon, 1/4 watt | 3 | .20 |
| 23853 | Resistor, 50,000 ohm Carbon, 1/4 watt | 2 | .20 |
| 23998 | Resistor, 250,000 ohm Carbon, 1/4 watt | 4 | .20 |
| 24251 | Condenser, 100 Mmf. Mica | 1 | .15 |
| 24487 | Condenser, 250 Mmf. Mica | 2 | .20 |
| 27283 | 2nd I. F. Transformer Shield | 1 | .35 |
| 27382 | Trimmer Condenser Assembly | 5 | .35 |
| 27388 | 1st I. F. Transformer Shield | 1 | .30 |
| 27455 | Tube Shield (Tubular)—76 | 1 | .15 |
| 27490 | Resistor, 1,000 ohm Carbon | 1 | .20 |
| 28183 | Resistor, 7500 ohm Carbon, 1 watt | 1 | .20 |
| 28421 | Resistor, 2000 ohm Carbon, 1/4 watt | 1 | .20 |
| 28717 | Condenser, .002 Mfd., 700 Volt, Tubular | 1 | .25 |
| 28723 | Condenser, .05 Mfd. 400 Volt Tubular | 1 | .25 |
| 28726 | Condenser, .1 Mfd., 400 Volt, Tubular | 1 | .25 |
| 28928 | 1st I. F. Transformer (includes 27388) | 1 | 2.90 |
| 29011 | Resistor, 40,000 ohm Carbon, 1 watt | 1 | .20 |
| 29074 | Condenser, 250-100 Mmf. Mica | 1 | .30 |
| 29083 | Condenser, 50 Mmf. Mica | 1 | .20 |
| 29087 | Tube Shield (Goat) 6A7, 6F7, 75 | 3 | .10 |
| 29414 | Power Transformer, 115 Volt, 60 cycles only | 1 | 6.00 |
| 29416 | Power Transformer, 115 Volt, 25 to 50 cycles only | 1 | $ 7.25 |
| 29453 | Condensers .01 Mfd., 400 V Tubular | 1 | .25 |
| 29471 | Dial Chart for General Instrument Condenser only—see 30033 | 1 | .50 |
| 29496 | Antenna Transformer, Broadcast | 1 | 1.75 |
| 29497 | Bi-Selector Transformer, Broadcast | 1 | 1.50 |
| 29498 | 1st Detector Transformer, Broadcast | 1 | 1.25 |
| 29499 | Oscillator Transformer, Broadcast | 1 | 1.50 |
| 29500 | Antenna Transformer, Short Wave (Red) | 1 | 1.75 |
| 29501 | 1st Detector Transformer, Short Wave (Black) | 1 | 1.25 |
| 29502 | Oscillator Transformer, Short Wave (Green) | 1 | 1.50 |
| 29508 | Trimmer Condenser Assembly — includes 29989 | 1 | .75 |
| 29509 | Range Switch and Coil Assembly | 1 | 26.50 |
| 29515 | Resistor Panel Assembly — includes 29518 | 1 | 1.25 |
| 29518 | Condenser, .02-.02 Mfd. (small can) | 1 | .75 |
| 29523 | Condenser Mounting Bearing | 1 | .10 |
| 29524 | Cable Tension Spring | 1 | .10 |
| 29526 | Condenser Mounting Bracket Ass'bly | 1 | .60 |
| 29530 | 2nd I. F. Transformer Assembly | 1 | 3.10 |
| 29533 | Resistor, 5000-37 Ohm, Candohm | 1 | .40 |
| 29534 | Condenser, .01 Mfd. (small can) | 1 | .60 |
| 29536 | Volume Control, 0-1 Megohm | 1 | 1.30 |
| 29537 | Tone Control, 0-500,000 Ohm | 1 | $ 1.15 |
| 29539 | Oscillator Plate Choke | 1 | .60 |
| 29540 | Bypass Condenser Block | 1 | 2.50 |
| 29551 | Antenna and Doublet Binding Post Assembly | 1 | .10 |
| 29552 | Escutcheon Window | 1 | .15 |
| 29553 | Window Retaining Ring | 1 | .10 |
| 29554 | Escutcheon | 1 | .60 |
| 29558 | Condenser, 16 Mfd., 450 Volt Dry Electrolytic | 1 | 1.90 |
| 29559 | See 31052 | | |
| 29562 | Condenser, 18 Mfd., 300 Volt Wet Electrolytic | 1 | 1.25 |
| 29563 | Resistor, 65,000 ohm Carbon, 1/2 watt | 1 | .20 |
| 29564 | Condenser, .075 Mfd., 100 V Tubular | 1 | .30 |
| 29566 | Condenser, 1600 Mmf. Mica | 2 | .30 |
| 29575 | Tube Shield (Goat) | 1 | .10 |
| 29579 | Signal Beacon Assembly | 1 | 2.25 |
| 29580 | Signal Beacon Trimmer Condenser | 1 | .75 |
| 29582 | Signal Beacon Coil Assembly | 1 | 1.25 |
| 29584 | Signal Beacon Shield | 1 | .30 |
| 29596 | Drive Leaf Spring | 2 | .05 |
| 29611 | Coupling Inductance Coil | 1 | .25 |
| 29612 | Escutcheon Retaining Spring | 1 | .20 |
| 29613 | Condenser, 4,000 Mmf. Mica | 1 | .50 |
| 29616 | Insulated Terminal—Single | 1 | .10 |
| 29617 | Insulated Terminal—Double | 1 | .15 |
| 29812 | Condenser, .04 Mfd., 500 V Tubular | 1 | .30 |
| 29813 | Condenser, .004 Mfd., 700 V Tubular | 1 | .25 |
| 29818 | Condenser, .003 Mfd., 700 V Tubular | 1 | .25 |
| 29830 | Condenser, 3,000 Mmf., Mica | 2 | .40 |
| 29831 | Condenser, 1,000 Mmf. Mica | 3 | .30 |
| 29832 | Tube Shield Body | 4 | .15 |
| 29836 | —Trimmer Condenser Assembly | 1 | .25 |
| 29850 | Drive Drum Assembly | 1 | 1.10 |
| 29865 | Power Transformer, 115 Volt, 50-60 cycles only | 1 | 7.00 |
| 29900 | Trimmer Condenser Assembly | 1 | .50 |
| 29948 | Insulated Terminal—Single | 2 | .10 |
| 29949 | Insulated Terminal—Double | 1 | .10 |
| 29952 | Knob—Range Switch | 1 | .30 |
| 29953 | Knob—Tone Control | 1 | .20 |
| 29954 | Knob—Selector or Volume Control | 2 | .20 |
| 29957 | Decalcomania, "A, B, C, D" | 1 | .10 |
| 29989 | Condenser, 480 Mmf. Mica | 1 | .30 |
| 29990 | Condenser, .02 Mfd. 400 V Tubular | 1 | .20 |
| 29997 | Speaker Cable | 1 | .95 |
| 30006 | Power Transformer, 110-135-220-250 Volt, 50-60 cycles | 1 | 7.50 |
| 30033 | Dial Chart, for Reliance Condenser only | 1 | .50 |
| 30034 | Tuning Condenser, 4 Gang, Reliance | 1 | 7.50 |
| 31050 | Tuning Condenser, 4 Gang, General Instrument | 1 | 7.50 |
| 31052 | Condenser, 8 Mfd., 350 Volt Dry, Electrolytic | 1 | 1.25 |
| 31075 | Tube Socket—4 Prong | 1 | .10 |
| 31078 | Tube Socket—5 Prong | 1 | .10 |
| 31079 | Tube Socket—6 Prong | 3 | .15 |
| 31080 | Tube Socket—7 Prong | 2 | .15 |
| 31215 | Tube Shield Cap | 4 | .10 |

## SPEAKER PARTS

| Part No. | Description | List Price |
|---|---|---|
| | TYPE 10A3—USED ON MODEL No. 751-752-753 | |
| 20010 | Speaker Pot & Pole Piece Assembly | $ 1.15 |
| 20041 | Speaker Pot Clamp | .10 |
| 20045 | Terminal Strip Cover | .15 |
| 20047 | Terminal Strip | .10 |
| 27240 | Cone Gasket | .10 |
| 27591 | Output Transformer | 1.75 |
| 28755 | Cone & Voice Assembly | 3.30 |
| 29964 | Field Coil Assembly | 3.30 |
| 29678 | Speaker Complete | 11.50 |
| | TYPE 8A4—USED ON MODEL No. 750 | |
| 20003 | Speaker pot & pole piece assembly | .80 |
| 20040 | Speaker Pot Clamp | .10 |
| 20045 | Terminal Strip Cover | .15 |
| 20047 | Terminal Strip | .10 |
| 29242 | Field Coil Assembly | 2.20 |
| 29673 | Speaker Complete | 10.00 |
| 29705 | Cone Mounting Gasket | $ .10 |
| 29732 | Output Transformer | 1.75 |
| 30058 | Spider Clamp Ring | .25 |
| 31309 | Cone & Voice Coil Assembly | 3.10 |
| | TYPE 8C2—USED ON MODEL No. 750 | |
| 20040 | Speaker Pot Clamp | .10 |
| 20045 | Terminal Strip Cover | .15 |
| 20047 | Terminal Strip | .10 |
| 29677 | Speaker Complete | 10.00 |
| 29697 | Speaker Field Coil Assembly | 2.50 |
| 29699 | Speaker Pot & Pole Piece | 1.20 |
| 29705 | Cone Mounting Gasket | .10 |
| 29732 | Output Transformer | 1.75 |
| 30058 | Spider Clamp Ring | .25 |
| 31309 | —Cone & Voice Assembly | 3.10 |

## ALIGNMENT PROCEDURE

Do not attempt to align the 7B Chassis without the proper equipment. Alignment condensers are shown in the accompanying illustrations and are numbered in order of procedure.

1. EQUIPMENT.

A—Test Oscillator.

A modulated oscillator capable of producing signals at 262 K.C.—600 K.C.—1400 K.C.—3700 K.C.—10 M.C. and 20 M.C. is necessary for alignment of the 7B chassis.

B—Insulated screw driver—(All bakelite or fibre) about 6" long.

C—Output Meter.

This may be any of the standard output meters on the market but should be sufficiently sensitive to provide a good deflection at low signal strength, and should also incorporate an adjustable shunt so that extremely strong signals may be read.

D—Coupling Means.

Coupling Condensers of 200 mmf., .25 Mfd., and a 400 Ohm resistor should be used when coupling oscillator to receiver during alignment as specified in the following paragraphs.

E—The receiver should be aligned in a location free from local interference (man made static)—as high frequency disturbances will cause difficulties when the short wave section is being adjusted. (A screen room is to be recommended).

2. DIAL SETTING.

Turn dial knob until condensers are fully meshed. The dial pointer should be on the horizontal line of the dial.

3. I. F. ALIGNMENT.

Connect signal lead of test oscillator to grid of the 6A7—(1st Detector Tube) through .25 Mfd. Condenser. Connect the ground lead to the Chassis.

A—Set Dial pointer to 1400 K.C. and range switch on position D.

B—Place test Oscillator in operation at 262 K.C. Turn receiver volume control and tone control to maximum.

C—Attenuate test oscillator output to lowest valve consistent with obtaining a readable indication on output meter.

D—Adjust four I. F. Trimmers, A1-A2-A3-A4 Fig. 6, located on under side of chassis, until maximum output is obtained. During alignment, maintain as low a value of signal as will allow obtaining of accurate adjustment.

E—Turn the tone control counter clockwise until the Signal Beacon switch snaps on.

F—Adjust Signal Beacon trimmer, A5, Fig. 5, which is located on left hand face of Chassis to zero beat with the 262 K.C. incoming signal.

4. 3700 K.C. ALIGNMENT.

A—Connect signal lead of test oscillator through 200 Mmf condenser to Antenna binding post.

B—Connect the test oscillator ground lead to the ground post of Chassis.

C—Turn range switch to range "C" and set dial pointer to 3700 K.C.

D—Align Set Oscillator or front trimmer A6, Fig. 4, on variable condenser. It may be necessary to approximate adjustment of the other three trimmers on variable condenser to obtain sufficient sensitivity to make 3700 K.C. adjustment.

5. 1400 K.C. ALIGNMENT.

A—Place test oscillator in operation at 1400 K.C.

B—Turn dial pointer to 1400 K.C.

C—Turn Range Switch to range D.

D—Adjust 1400 K.C. padding condenser, A7, Fig. 4, which is the first of three located on top of Chassis on the right hand side as you face it.

E—Adjust 1st Det. Trimmer A8, Fig. 4, which is the second from front on top of variable condenser.

F—Adjust Bi-selector trimmer A9, Fig. 4, which is the third from front on top of variable condenser.

G—Adjust Antenna Trimmer A10, Fig. 4 which is the fourth from the front on top of variable condenser.

6.—600 K.C. ALIGNMENT.

A—Place test oscillator in operation at 600 K.C.

B—Tune in signal to maximum (this point does not have to be exactly at 600 K.C. dial setting).

C—Adjust the 600 K.C. Padding Condenser A11, Fig. 4, (which is on top of Chassis on right hand side third from front as you face Chassis), in direction of signal increases. At same time rock the tuning condenser back and forth through resonance while adjusting padding condenser until maximum output is obtained.

7. 10 M.C. ALIGNMENT.

A—Connect signal lead of test oscillator through 400 Ohm resistor to Antenna binding post of Chassis.

B—Connect the ground lead to ground terminal of Chassis.

C—Set Range Switch to Range "B" and turn dial pointer to 10 M.C.

D—Place test oscillator in operation at 10 M.C.

E—Adjust set oscillator trimmer A12, Fig. 4, (located on front face of chassis).

F—Adjust detector trimmer A13, Fig. 4, (located on right hand side on top of Chassis second from front).

G—Adjust antenna trimmer A14, Fig. 4, (located on rear face of Chassis).

8. 20 M.C. ALIGNMENT.

A—Set Range Switch on Range A.

B—Place Test Oscillator in operation at 20 M.C.

C—Turn Dial Pointer to 20 M.C.

D—Adjust Set Oscillator trimmer A15, Fig. 4, (located on top of Chassis on left of gang condenser, first from front).

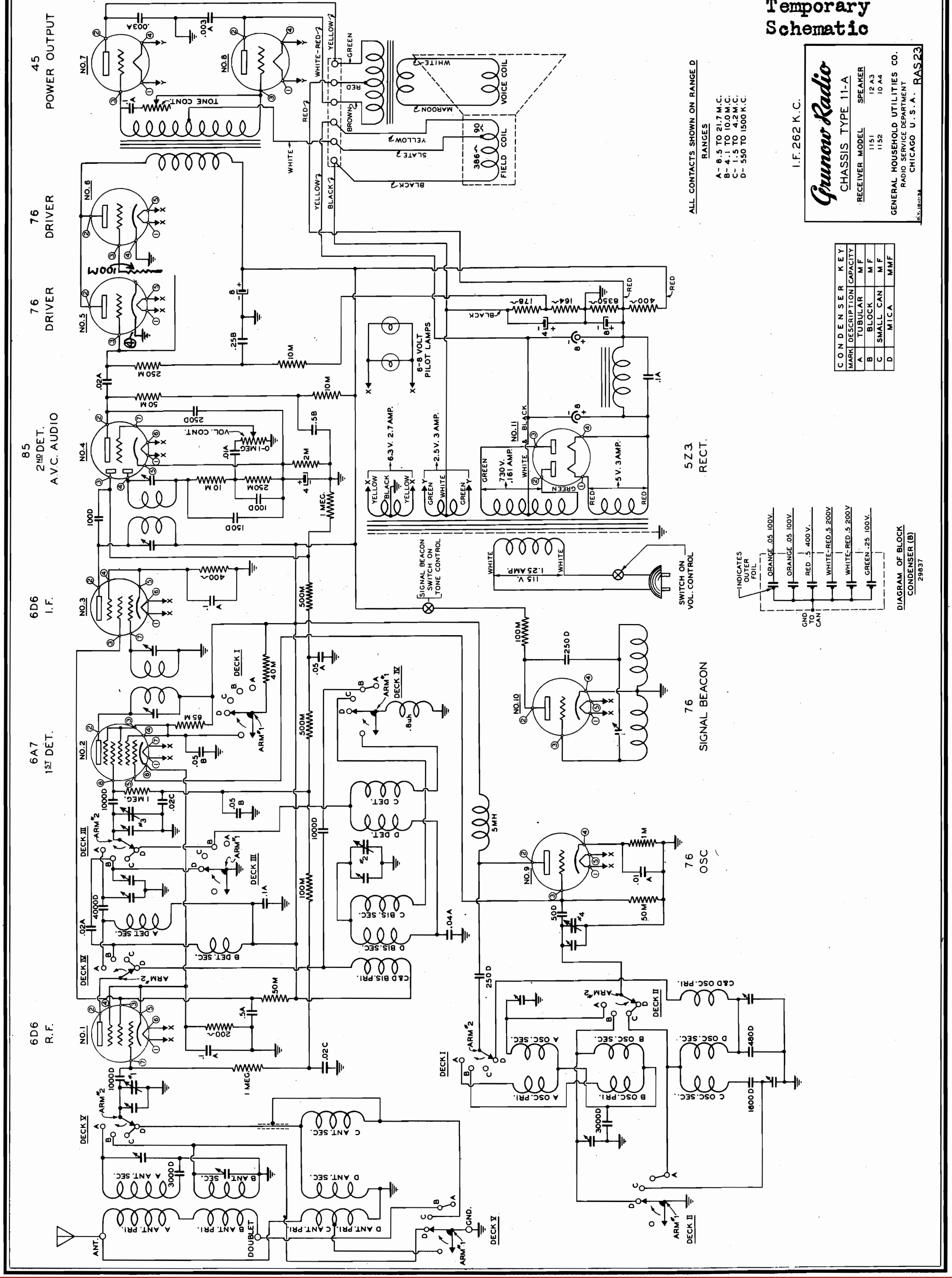
E—Adjust Detector trimmer A16, Fig. 4, (located second from front on top of Chassis on left hand side).

F—Adjust Antenna trimmer A17, Fig. 4, (located third from front on top of Chassis on left hand side).

# GENERAL HOUSEHOLD UTILITIES CO.

**MODEL 1151,1152 (11A)**

**Temporary Schematic**



# MODEL 1151, 1152 (11A)
## Temporary Parts Alignment

# GENERAL HOUSEHOLD UTILITIES CO.

ALIGNMENT PROCEDURE
CHASSIS TYPE 11A

1. Equipment.

A - Test Oscillator
A modulated oscillator capable of producing signals at 262 K.C., 455 K.C., 600 K.C., 1400 K.C., 3700 K.C., 10 M.C. ad 20 M.C. is necessary for alignmem of the 1934 Grunow Receivers.

B - Output Meter
This may be any of the standard output meters on the market but should be sufficiently sensitive to provide a good deflection at low signal strength, and should also incorporate an adjustable shunt so that extremely strong signals may be read.

C - Coupling Means
Coupling Condensers of 200 Mmf., .25 Mfd., and a 400 Ohm resistor should be used when coupling oscillator to receiver during alignment as specified in following paragraphs.

2. Dial Setting.
Turn dial knob until condensers are fully meshed. The dial pointer should be on the horizontal line of the dial.

3. I. F. Alignment.
Connect signal lead of test oscillator to grid of the 6A7 (1st Detector Tube) through .25 Mfd. Condenser. Connect the ground lead to the Chassis.

A - Set Dial pointer to 1400 K.C. and range switch on position D.

B - Place test Oscillator in operation at 262 K.C. Turn receiver volume control and tone control to maximum.

C - Attenuate test oscillator output to lowest valve consistent with obtaining a readable indication on output meter.

D - Adjust four I.F. Trimmers, located on under side of chassis, until maximum output is obtained. During alignment, maintain as low a value of signal as will allow obtaining of accurate adjustment.

E - Turn the tone control clockwise until the beat oscillator switch snaps on.

F - Adjust beat oscillator trimmer which is located on under side at rear of Chassis to zero beat with the 262 K.C. incoming signal.

4. 3700 K.C. Alignment.

A - Connect signal lead of test oscillator through 200 Mmf. condenser to Antenna binding part.

B - Connect the test oscillator ground lead to the ground post of Chassis.

C - Turn range switch to range "C" and set dial pointer to 3700 K.C.

D - Align Set Oscillator or front trimmer on variable condenser. It may be necessary to approximate adjustment of the other three trimmers on variable condenser to obtain sufficient sensitivity to make 3700 K.C. adjustment.

5. 1400 K.C. Alignment.

A - Place test oscillator in operation at 1400 K.C.

B - Turn dial to 1400 K.C.

C - Turn Range Switch to range D.

D - Adjust 1400 K.C. padding condenser, which is the first of three located on top of Chassis on the right hand side as you face it.

E - Adjust 1st Det. Trimmer which is the second from front on top of variable condenser.

F - Adjust Bi-selector Trimmer which is the third from front on top of variable condenser.

G - Adjust Antenna Trimmer which is the fourth from the front on top of variable condenser.

6. 600 K.C. Alignment.

A - Place test oscillator in operation at 600 K.C.

B - Tune in signal to maximum (this point does not have to be exactly at 600 K.C. dial setting).

C - Adjust the 600 K.C. Padding Condenser (which is on top of Chassis on right hand side third from front as you face Chassis), in direction of signal increase. At same time rock the tuning condenser back and forth through resonance while adjusting padding condenser until maximum output is obtained.

7. 10 M.C. Alignment.

A - Connect signal lead of test oscillator through 400 Ohm resistor to Antenna binding post of Chassis.

B - Connect the ground to lead to ground terminal of Chassis.

C - Set Range Switch to Range "B".

D - Place test oscillator in operation at 10 M.C.

E - Adjust set oscillator trimmer (located on front face of Chassis).

F - Adjust detector trimmer (located on right hand side on top of Chassis second from front).

G - Adjust antenna trimmer (located on rear face of Chassis).

8. 20 M.C. Alignment.

A - Set Range Switch on Range A.

B - Place Test Oscillator in operation at 20 M.C.

C - Turn Dial Pointer to 20 M.C.

D - Adjust Set Oscillator trimmer. (Located on top of Chassis on left of gang condenser, first from front).

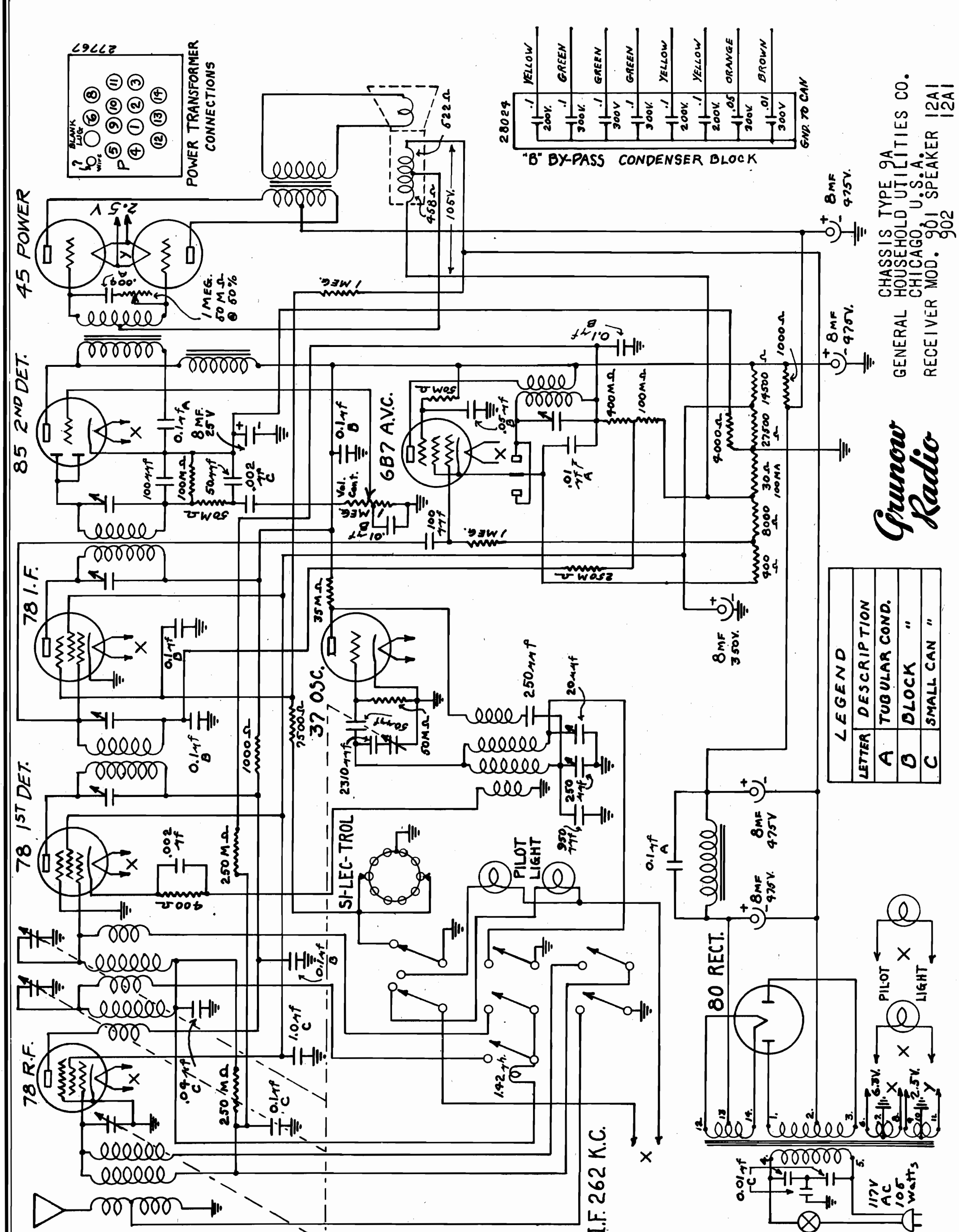
E - Adjust Detector trimmer (located second from front on top of Chassis on left hand side).

F - Adjust Antenna trimmer (located thrid from front on top of Chassis on left hand side).

| Part No. | Description |
|---|---|
| 20929 | Resistor, 50,000 Ohm Carbon, 1 Watt |
| 22858 | Resistor, 1 Megohm Carbon, $\frac{1}{4}$ Watt |
| 23370 | Resistor, 100,000 Ohm Carbon, $\frac{1}{4}$ Watt |
| 23849 | Resistor, 500,000 Ohm Carbon, $\frac{1}{4}$ Watt |
| 23852 | Resistor, 10,000 Ohm Carbon, $\frac{1}{4}$ Watt |
| 23853 | Resistor, 50,000 Ohm Carbon, $\frac{1}{4}$ Watt |
| 23998 | Resistor, 250,000 Ohm Carbon, $\frac{1}{4}$ Watt |
| 24251 | Condenser, 100 Mmf. Mica |
| 24487 | Condenser, 250 Mmf. Mica |
| 24789 | Condenser, 4 Mfd. 25 Volt Dry Electrolytic |
| 27490 | Resistor, 1,000 Ohm Carbon $\frac{1}{4}$ Watt |
| 27710 | Condenser, 8 Mfd. 475 Volt Wet Electrolytic (Chrome) |
| 27711 | Condenser, 8 Mfd. 475 Volt Wet Electrolytic |
| 27715 | Condenser, 4 Mfd. 350 Volt - 8 Mfd. 100 Volt Dry Electrolytic |
| 27784 | Resistor, 400 Ohm Carbon, $\frac{1}{4}$ Watt |
| 28421 | Resistor, 2,000 Ohm Carbon, $\frac{1}{4}$ Watt |
| 28573 | Short Wave Coil Shield Assembly |
| 28726 | Condenser, .1 Mfd. 400 Volt tubular |
| 28876 | Condenser, .02 Mfd. 400 Volt tubular |
| 28928 | 1st I.F. Transformer (Includes 27588) |
| 29011 | Resistor, 40,000 Ohm Carbon, 1 Watt |
| 29074 | Condenser, 250-100 Mmf. Mica |
| 29083 | Condenser, 50 Mmf. Mica |
| 29135 | Condenser, .1 Mfd. 100 Volt tubular |
| 29453 | Condenser, .01 Mfd. 400 Volt tubular |
| 29496 | Antenna Transformer - Broadcast |
| 29497 | Bi-Selector Transformer - Broadcast |
| 29498 | 1st Detector Transformer - Broadcast |
| 29499 | Oscillator Transformer - Broadcast |
| 29500 | Antenna Transformer - Short Wave |
| 29501 | 1st Detector Transformer - Short Wave |
| 29502 | Oscillator Transformer - Short Wave |
| 39508 | Trimmer Condenser Assembly - Includes 29989 |
| 29509 | Range Switch and Coil Assembly |
| 29515 | Resistor Panel Assembly - Includes 29518 |
| 29518 | Condenser, .02-.02 Mfd. Bathtub Type |
| 29539 | Oscillator Plate Choke |
| 29563 | Resistor, 65,000 Ohm Carbon, $\frac{1}{2}$ Watt |
| 29566 | Condenser, 1,600 Mmf. Mica |
| 29567 | Condenser, .02 Mfd. 400 Volt Tubular |
| 29580 | Signal Beacon Trimmer Condenser |
| 29582 | Signal Beacon Coil Assembly |
| 29613 | Condenser, 4,000 Mmf. Mica |
| 29626 | Volume Control |
| 29627 | Tone Control |
| 29628 | Insulated Terminal |
| 29630 | Power Transformer, 115 Volt, 60 Cycles only |
| 29631 | Power Transformer, 115 Volt, 25-50 Cycles only |
| 29632 | Condenser, 8 Mfd. 500 Volt Dry Electrolytic |
| 29637 | Filter Choke |
| 29637 | Audio Input Transformer |
| 29640 | Resistor, 200 Ohm Carbon, $\frac{1}{4}$ Watt |
| 29641 | Resistor - Candohm |
| 29652 | Condenser, 150 Mmf. Mica |
| 29662 | Condenser, .15 Mfd. 200 Volt tubular |
| 29812 | Condenser, .04 Mfd. 500 Volt tubular |
| 29813 | Condenser, .004 Mfd. 700 Volt tubular |
| 29818 | Condenser, .003 Mfd. 700 Volt tubular |
| 29830 | Condenser, 3,000 Mmf. Mica |
| 29831 | Condenser, 1,000 Mmf. Mica |
| 29832 | Tube Shield Body |
| 29836 | Trimmer Condenser Assembly |
| 29837 | Bypass Condenser Block |
| 29844 | 2d I.F. Transformer Assembly |
| 29850 | Drive Drum Assembly |
| 29866 | Power Transformer 115 Volt, 50-60 Cycles |
| 29893 | Reflector Assembly |
| 29896 | Speaker Cable |
| 29900 | Trimmer Condenser Assembly |
| 29989 | Condenser, 460 Mmf. Mica |
| 29990 | Condenser, .02 Mfd. 400 Volt tubular |
| 30007 | Power Transformer 110-135-220-250 Volt, 50-60 Cycles |
| | SPEAKER PARTS Type 10A4 |
| 20010 | Pot & Pole Piece Assy. |
| 20041 | Pot clamp |
| 20045 | Terminal strip cover. |
| 20047 | Terminal strip. |
| 27240 | Cone Mtg. Gasket |
| 28755 | Cone and Voice Coil Assy. |
| 29781 | Output Transformer. |
| 29782 | Cone head Assy. |
| 29783 | Field Coil. |
| 31166 | Speaker Comp. |
| | Speaker Type 12A5 |
| 20045 | Terminal strip cover |
| 20047 | Terminal strip |
| 27208 | Pot & Pole Piece Assy. |
| 27242 | Cone Mtg. Gasket |
| 26979 | Speaker Comp. |
| 29753 | Output transformer |
| 29757 | Cone head Assy. |
| 29758 | Field Coil |
| 31310 | Cone & Voice Coil Assy. |

MODEL 901,902 (9A)
(Revised)
Schematic

# GENERAL HOUSEHOLD UTILITIES CO

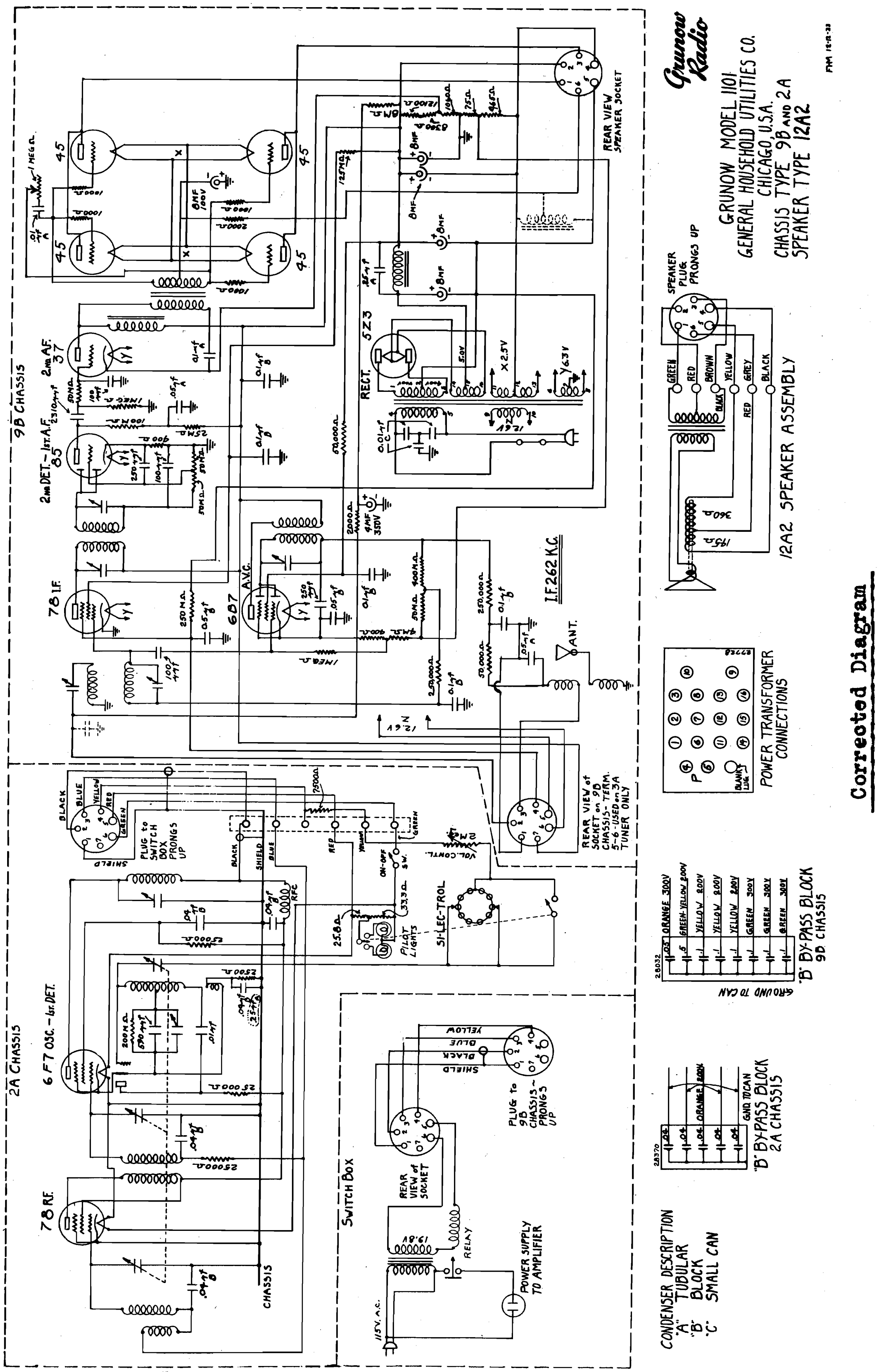



| LETTER | DESCRIPTION |
|---|---|
| A | TUBULAR COND. |
| B | BLOCK " |
| C | SMALL CAN " |

THIS PRINT SUPERSEDES ALL PRIOR TO THIS DATE 2-13-34

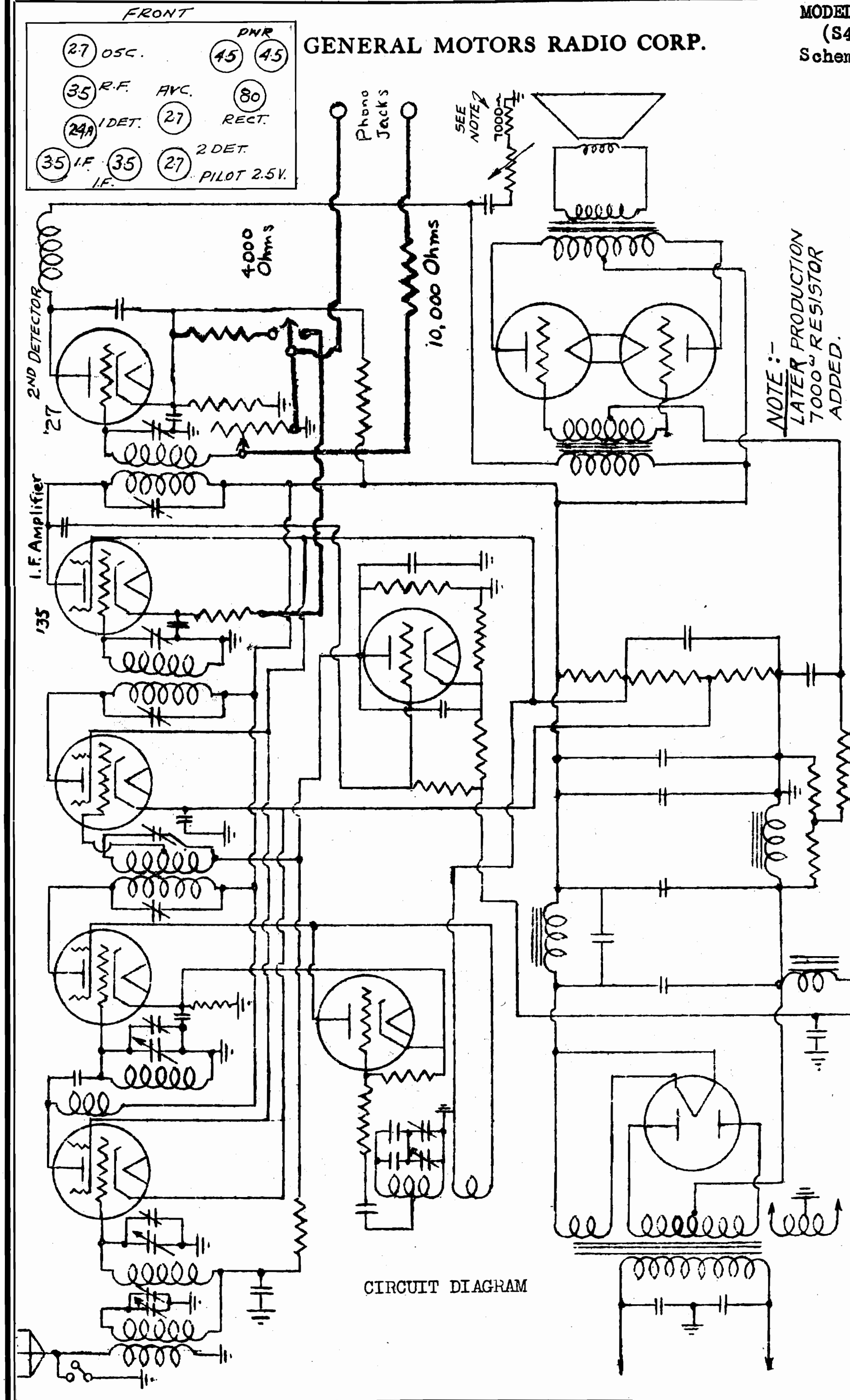
MODEL 1101 (9B-2A)
(Revised)
Schematic

# GENERAL HOUSEHOLD UTILITIES CO.



**MODEL 292,293**
**(S4-A,S4-B)**
**Schematic,Socket**

# GENERAL MOTORS RADIO CORP.



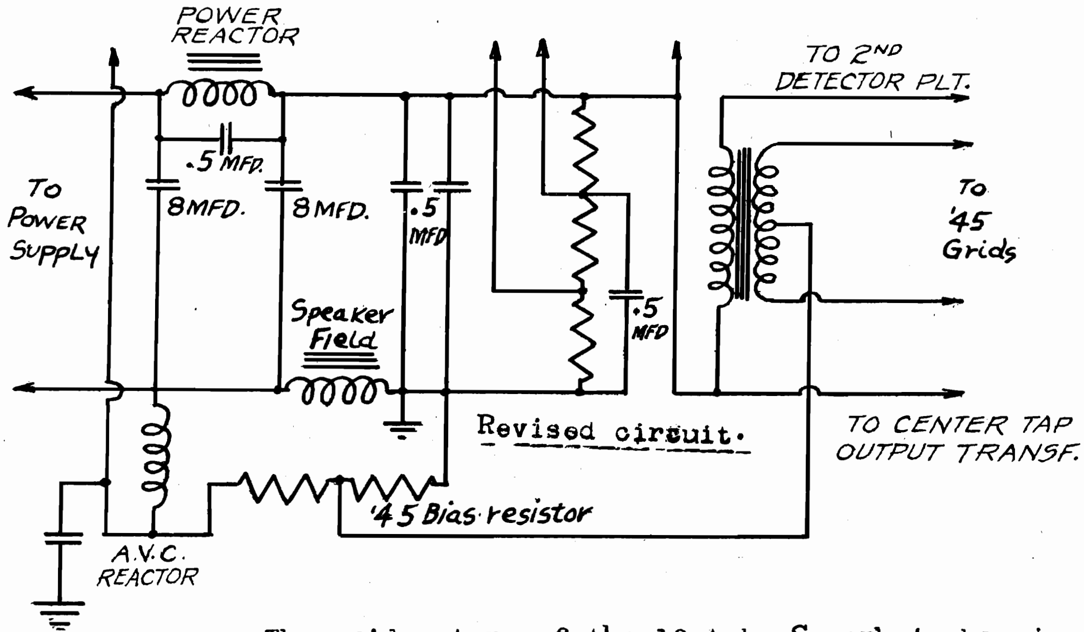

CIRCUIT DIAGRAM

SPECIAL PARTS LIST FOR S4A AND S4B

| Name of Part | Part No. | | | | |
|---|---|---|---|---|---|
| Shaft, Switch Cable Drive. | 1204770 | Resistor, 4,000 Ohms... | 1204108 | Bracket, Phono Switch.. | 1204763 |
| Switch, Phono-Radio...... | 1204552 | Resistor, 10,000 Ohms... | 1201633 | Cable, Switch Drive.... | 1204764 |
| Transformer, No. 3 I.F.... | 1202591 | Insulator, Phono Jack... | 1200435 | Cord, Phono Motor...... | 1204762 |
| Pick-Up Head & Cable ... | 1202609 | Jack, Phono........... | 1200438 | Cover, Needle Cup...... | 1204612 |

MODEL 292,293
Changes
MODEL 253,254,255,
256,257,258
Changes

# GENERAL MOTORS RADIO CORP.




Revised circuit.

The grid return of the 10 tube Superhet chassis has been changed on chassis beginning with serial numbers approximately as follows:

| Chassis model | Serial # |
|---|---|
| S-3-A | 3429 |
| S-3-B | 1069 |
| S-4-A | 1296 |
| S-4-B | 1001 |

Note:For original circuit refer to:
Rider Manuals
Early 346-I
Revised 2-11 & 2-12
Radiotron 1101-1102

The change in the circuit also involves changes in parts numbers of two parts as follows:

| | Part # below serial listed above | Part # above serial listed above. |
|---|---|---|
| 245 bias resistor | 1203535 | 1205259 |
| Bypass cond.pack | 1205971 | 1204162 or 1205971 |

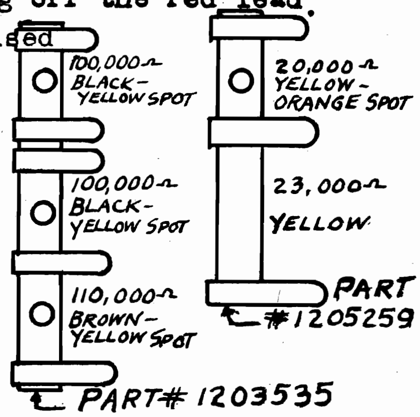
Note if it should be necessary to replace the bypass cond.pack on models which use the original circuit ,use part # 1205971.
if it should be necessary to replace bypass cond.pack on models which use the new circuit(shown above) with the tone control in the 2nd det.plate circuit,use part # 120597 by cutting off the red lead.

To replace bypass cond.pack on models having revised circuit,as above,with tone control in 45 plate circuit,use cond.pack part # 1204162.

The two bypass cond.packs can be distinguished by the number of leads,as follows:

# 1204162 = 7 leads
# 1205971 = 8 leads

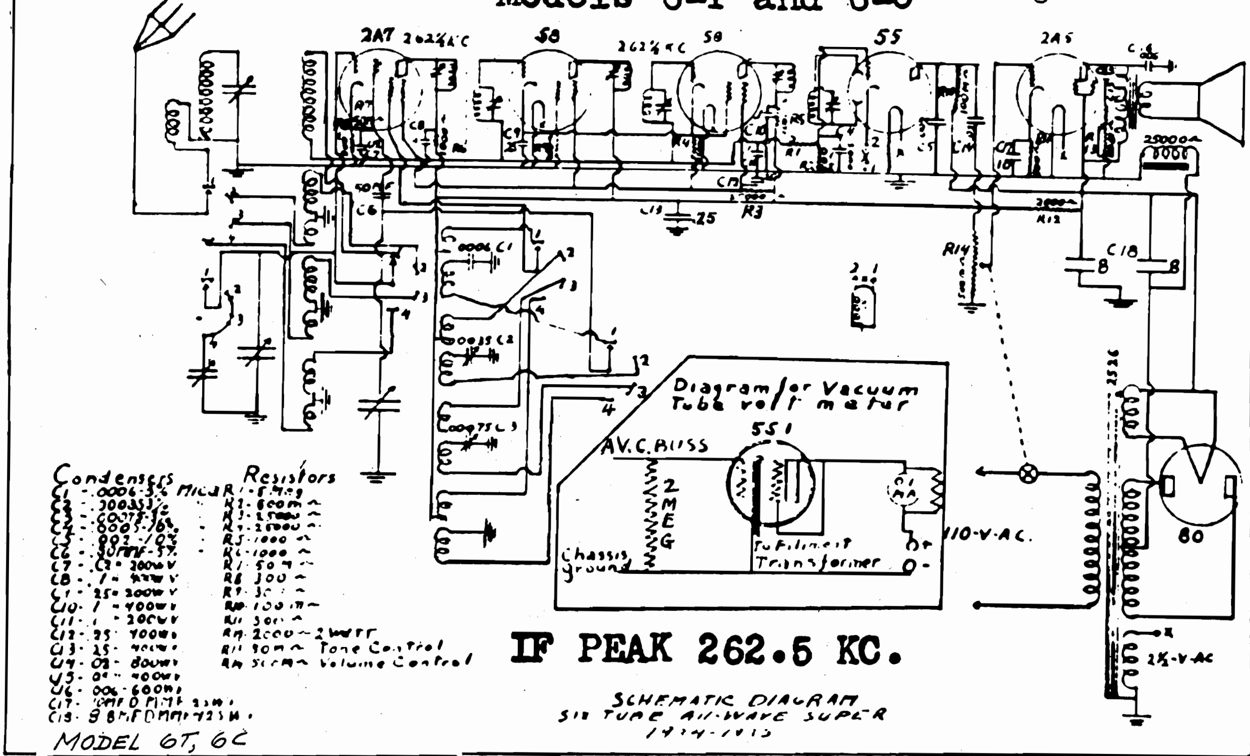
The 245 bias resistors can be distinguished by their length,color and number of sections,as shown on the diagram here.

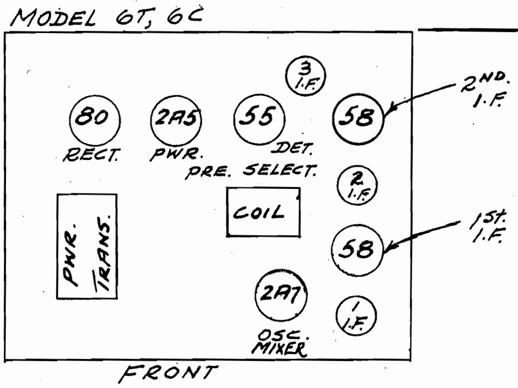


GILFILLAN BROS., INC

MODEL 6T,6C
Schematic,Alignment
MODEL 8T,8C,47,50
Alignment

# Models 6-T and 6-C




## SERVICE DATA (SIX TUBE ALL-WAVE SUPER HETERODYNE 1934-1935)
## SERVICE DATA EIGHT TUBE ALL-WAVE SUPER HETERODYNE 1934-1935)

All models have automatic volume control of the diode type, controlling the first detector as well as the high frequency amplifier tubes. This A.V.C. makes it impossible to service and rebalance without a meter of the type to be described. This meter will work on any make or type of A.V.C., provided care is used. It can not be damaged by improper connection of the leads.

### PARTS REQUIRED FOR VACUUM TUBE VOLT METER

1—O to 1 or O to 1.5 milliampmeter.
1—Bell ringing transformer with secondary of 6-10 volts.
1—5 prong socket.
1—551 tube.
1—2 megohn grid leak.
1—10 ohm rheostat.
1—45 volt B battery.
Clips, Box, Cord, Hookup Wire.

### USING VACUUM TUBE VOLT METER

The cathode clip is connected to the cathodes of the tubes controlled by the A.V.C. The buss clip is connected to the A.V.C. buss in front of the isolating resistor.

Adjust rheostat shunt until meter shows full scale reading.

All balancing is done with maximum peak indicated by the meter swing toward O. Sensitivity of various receivers can be checked by the swing of meter from a known station. Short Wave fading can be seen by tuning in the station with meter connected to set.

### REBALANCING

Do not rebalance a set until you are sure it requires it. 99 per cent of the sets do not need it. We do not find one case in one hundred that really should be rebalanced.

### INTERMEDIATES

Connect a 262½ K. C. oscillator to the first detector grid (No. 2-A 7 tube) leaving grid cap in place. Set dial at 1400 K.C. Hook up vacuum tube meter as described and carefully adjust 3 screws on top of Intermediates for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

### CONDENSER GANG

Set dial at 1400 K.C. when gang is at minimum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section of gang until frequency is correct on dial.

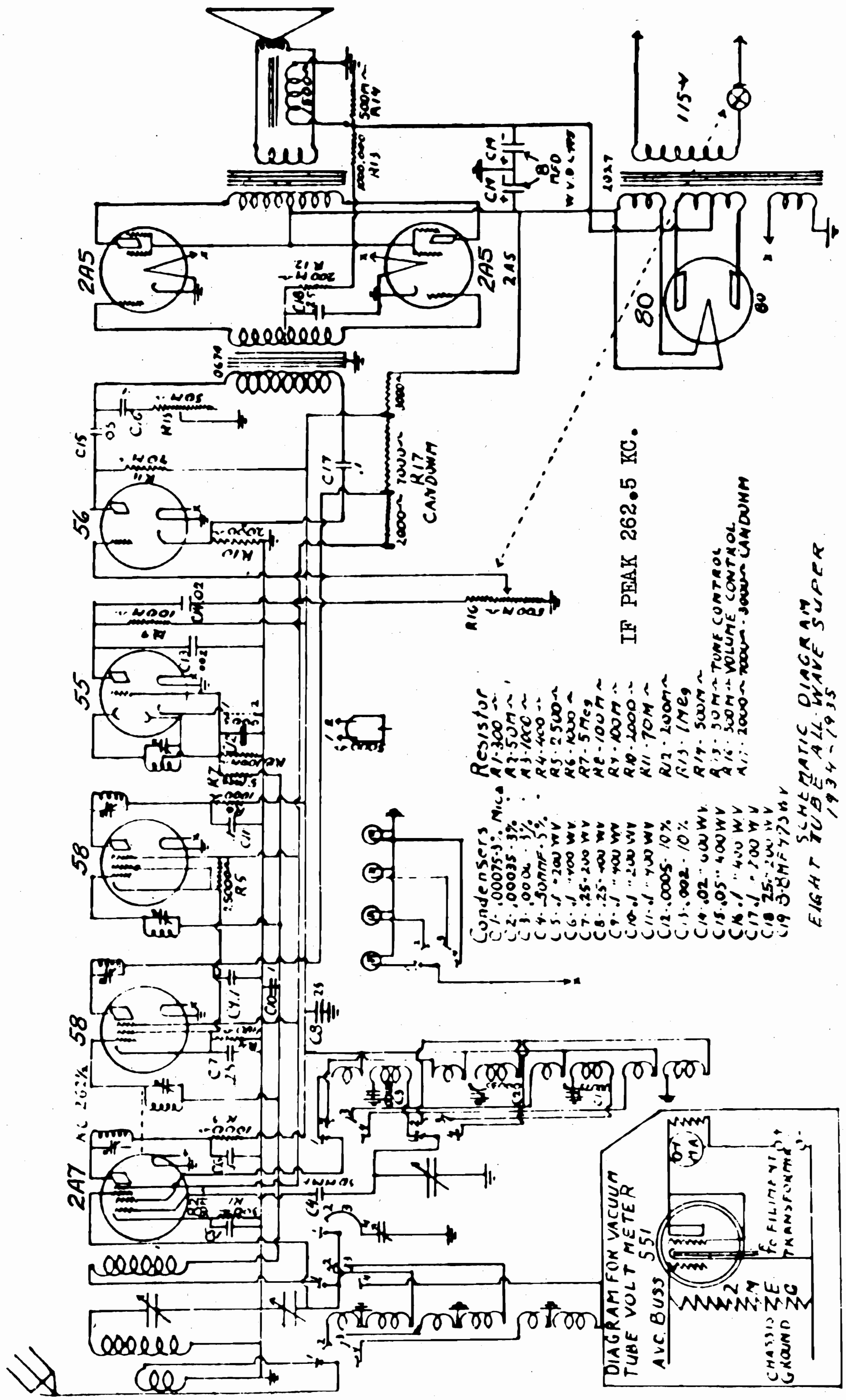
If the intermediates are balanced on 262½ K.C., the dial will now track within 5 K.C. over the entire dial.

Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.

**Don't bend any condenser plates unless absolutely necessary.**

MODEL 8C,8T,47,50
Schematic

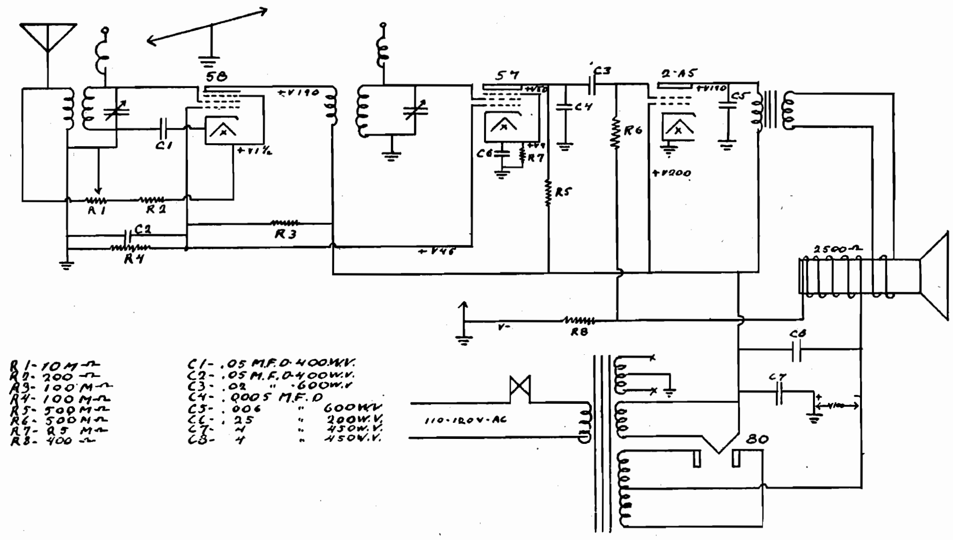
## GILFILLAN BROS., INC.




For Alignment,
See Index

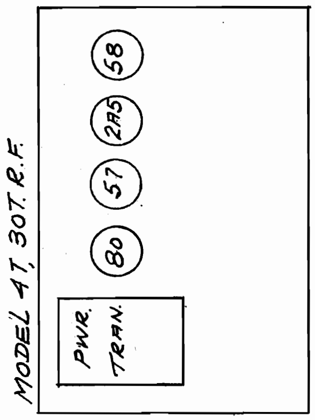
MODEL 4T,30
Schematic,Socket
Alignment
MODEL 5C,5T,32,35,41
Schematic,Socket
Alignment

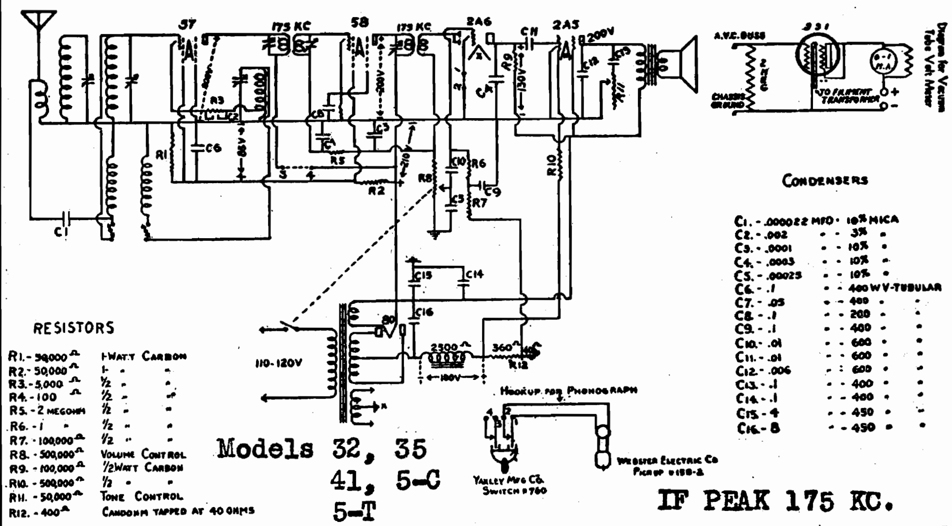
# GILFILLAN BROS., INC.




4 Tube T.R.F.
1934-1935

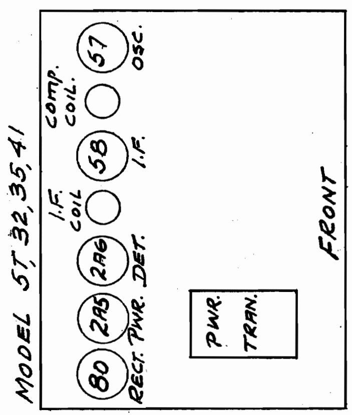
Models 30 and 4-T




Models 32, 35
41, 5-C
5-T

IF PEAK 175 KC.




## SERVICE DATA, FIVE TUBE SUPER-HETERODYNE, 1934-1935

All models have automatic volume control of the diode type, controlling the first detector as well as the high frequency amplifier tubes. This A.V.C. makes it impossible to service and rebalance without a meter of the type to be described. This meter will work on any make or type of A.V.C., provided care is used. It can not be damaged by improper connection of the leads.

### USING VACUUM TUBE VOLT METER

The cathode clip is connected to the cathodes of the tubes controlled by the A.V.C. The buss clip is connected to the A.V.C. buss in front of the isolating resistor.

Adjust rheostat shunt until meter shows full scale reading.

All balancing is done with maximum peak indicated by the meter swing toward O. Sensitivity of various receivers can be checked by the swing of meter from a known station. Short Wave fading can be seen by tuning in the station with meter connected to set.

### REBALANCING

Do not rebalance a set until you are sure it requires it. 99 per cent of the sets do not need it. We do not find one case in one hundred that really should be rebalanced.

### INTERMEDIATES

Connect a 175 K.C. oscillator to the first detector grid (No. 57 tube) leaving grid cap in place. Set dial at 1400 K.C. Hook up vacuum tube volt meter as described and carefully adjust 3 screws on top of Intermediates for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

### CONDENSER GANG

Set dial at 1400 K.C. when gang is at minimum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section of gang until frequency is correct on dial.

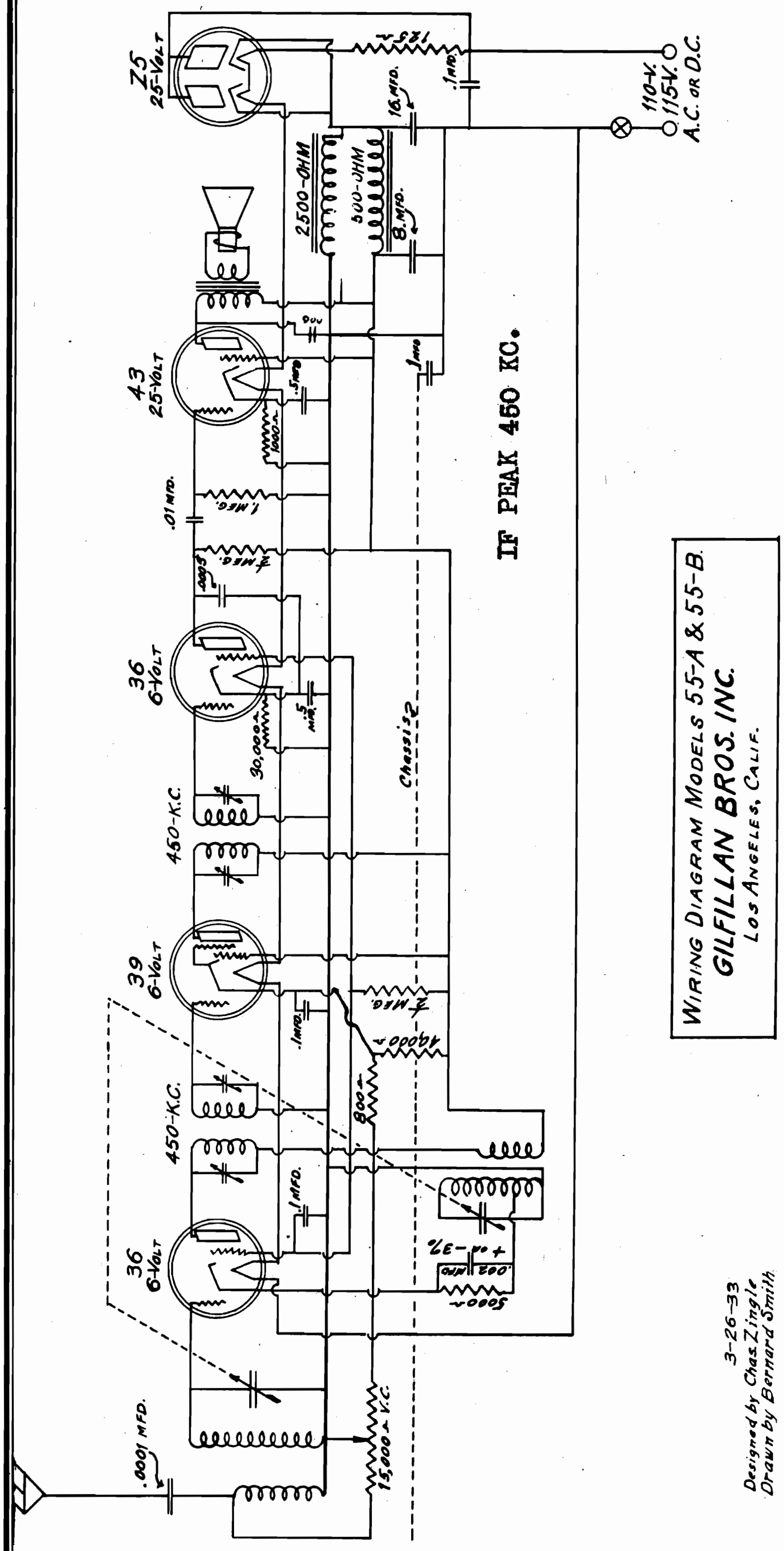
If the intermediates are balanced on 175 K.C., the dial will now track within 5 K.C. over the entire dial.

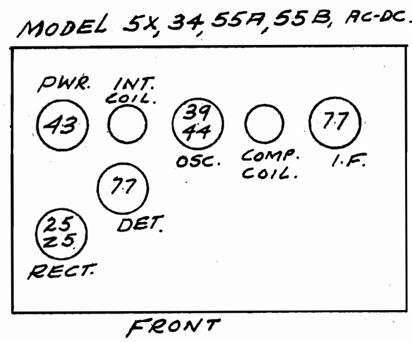
Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.

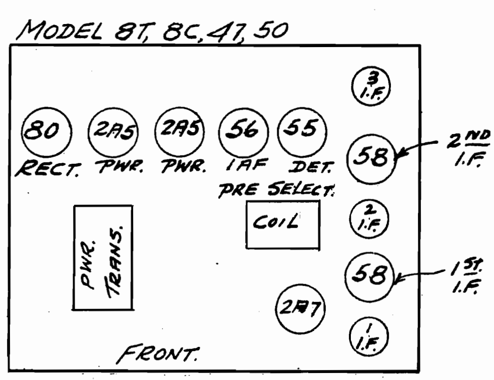
**Don't bend any condenser plates unless absolutely necessary.**

MODEL 5X,34,55A,55B
Schematic,Socket
MODEL 6C,6T,8C,8T,47,50
Socket Layout

GILFILLAN BROS., INC.

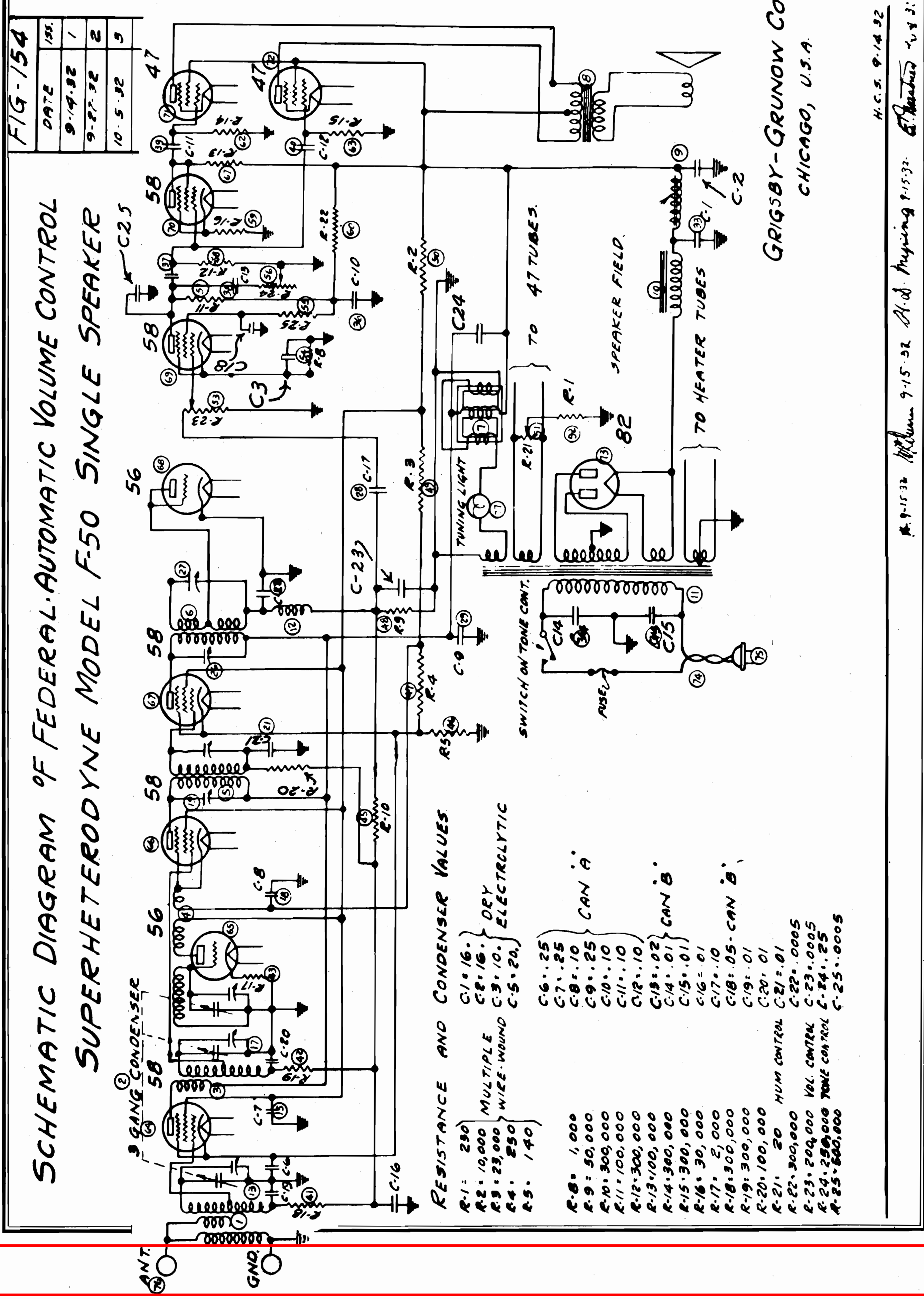


MODEL F-50
Schematic

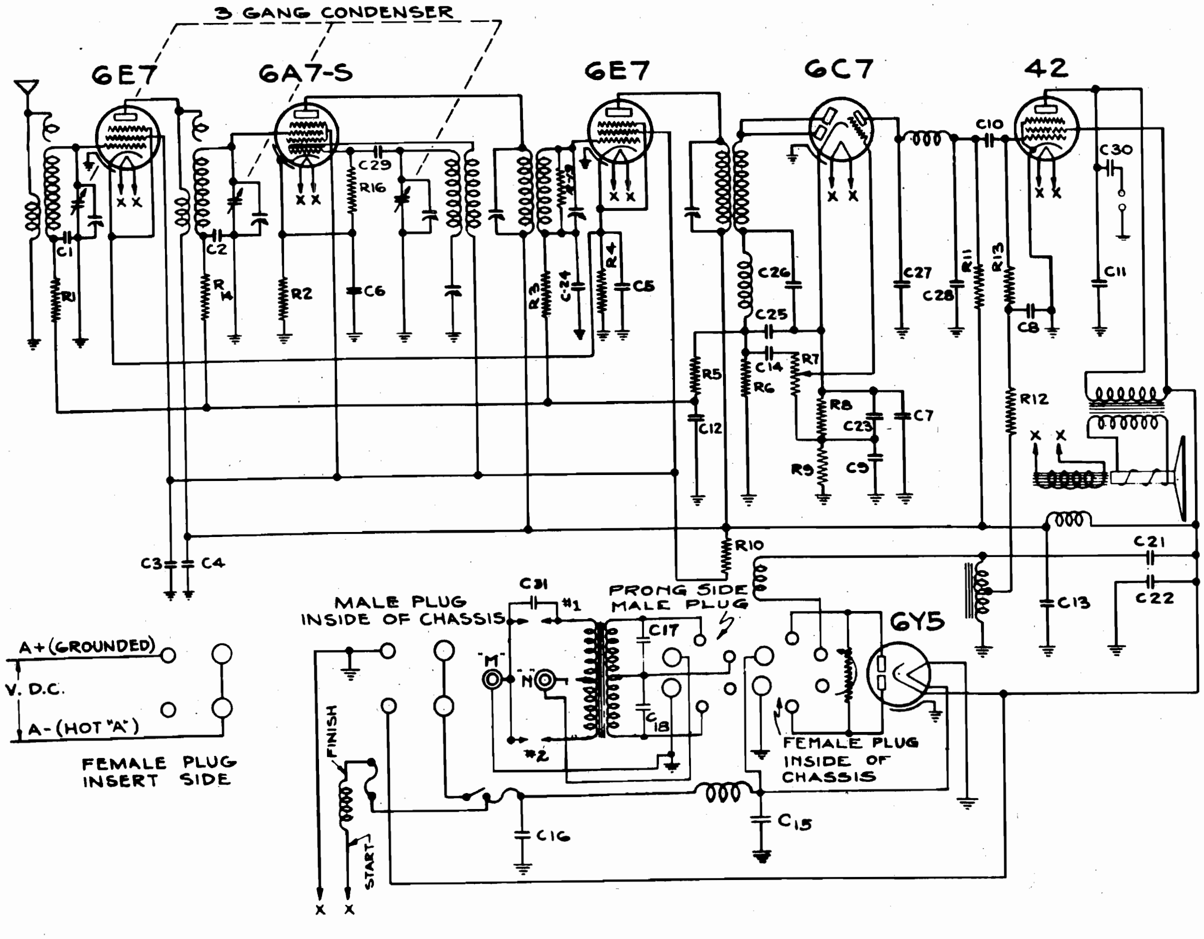
GRIGSBY - GRUNOW CO.



MODEL 118
Schematic

GRIGSBY - GRUNOW CO.

# SCHEMATIC DIAGRAM OF MAJESTIC MODEL 118 AUTOMOBILE RECEIVER




## RESISTORS

R1—300,000
R2—300
R3—300,000
R4—160
R5—300,000
R6—100,000
R7—200,000 V.C.
R8—2,500
R9—5,000
R10—15,000
R11—200,000
R12—250,000
R13—250,000
R14—300,000
R15—510,000 GLOBAR
R16—50,000
R19—1,000,000

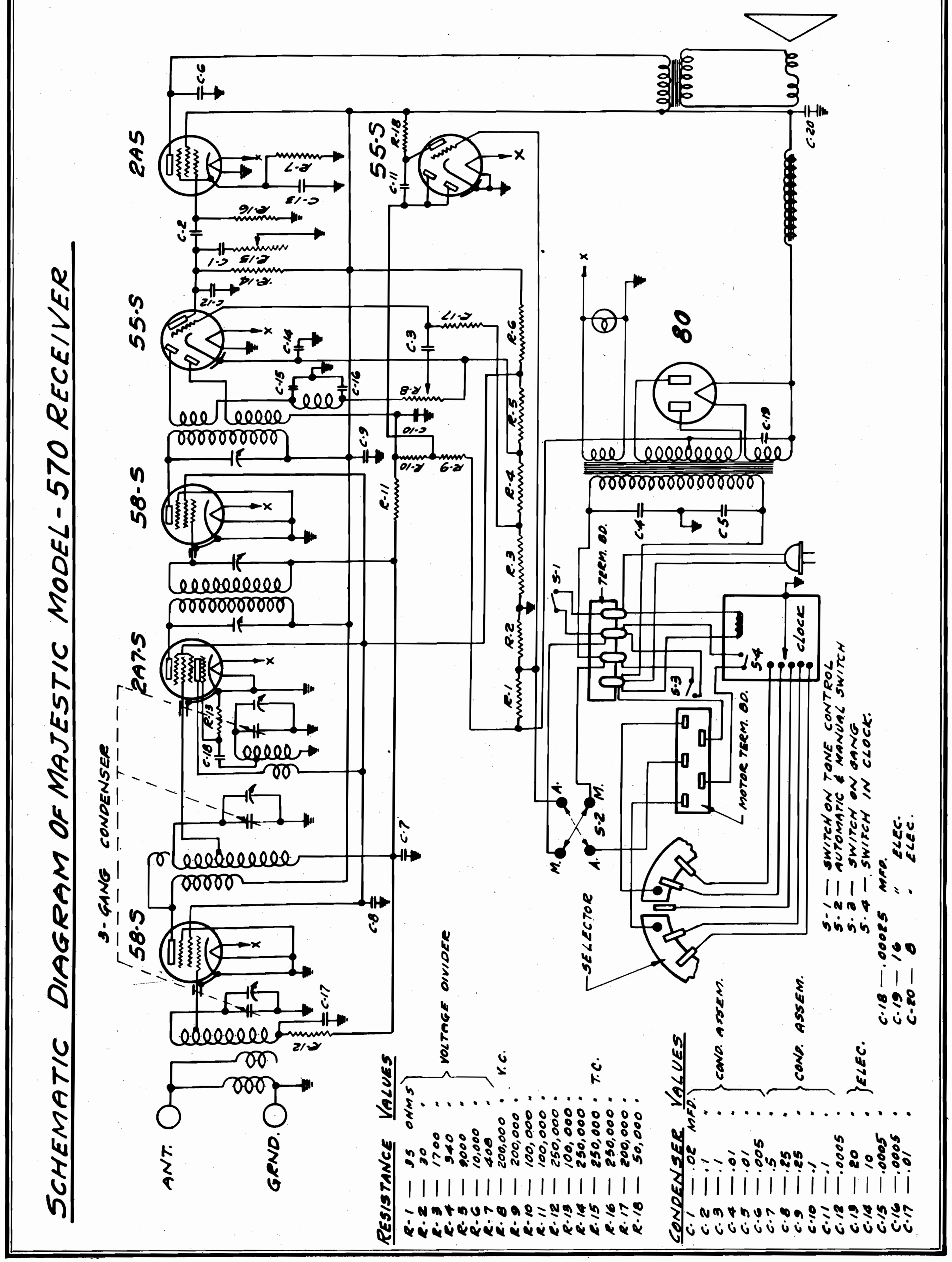
## CONDENSERS

C1—.03 } R.F. #1
C2—.03 }
C3—.25 }
C4—.25 } R.F. #2
C5—.25 }
C6—.1
C7—.25 }
C8—.25 } A.F. #1
C9—.25 }
C10—.03 }
C11—.005 }
C12—.03 } A.F. #2
C13—.25 }
C14—.03 }
C15—.5.
C16—.5
C17—.008
C18—.008
C21—8.0
C22—8.0
C23—10.0
C24—.01
C25—.0005
C26—.0005
C27—.0005
C28—.0005
C29—.00025
C30—.1
C31—20.0

M-TERMINAL CONNECTED TO ARMATURE

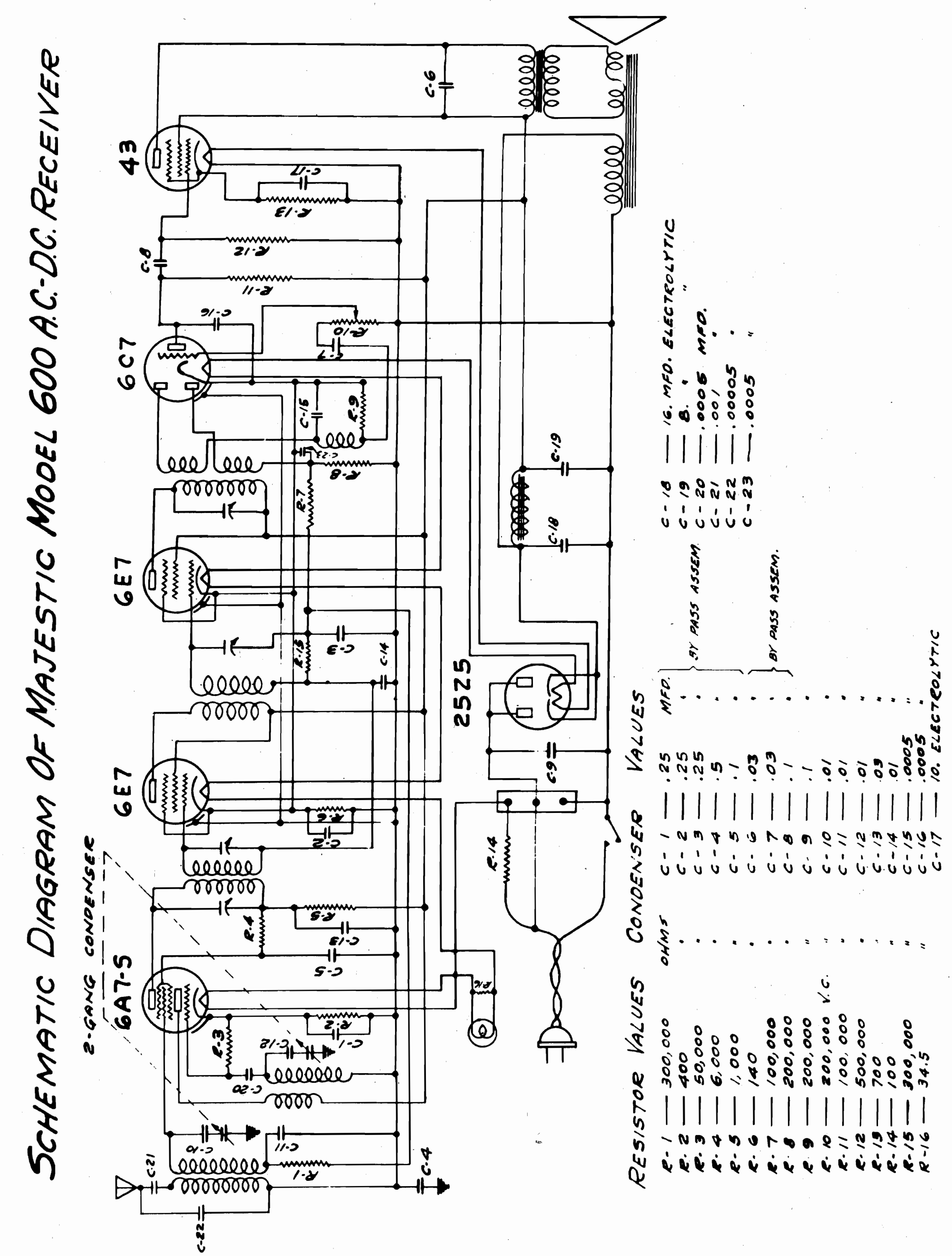
**MODEL 570**
**Schematic**

GRIGSBY - GRUNOW CO.



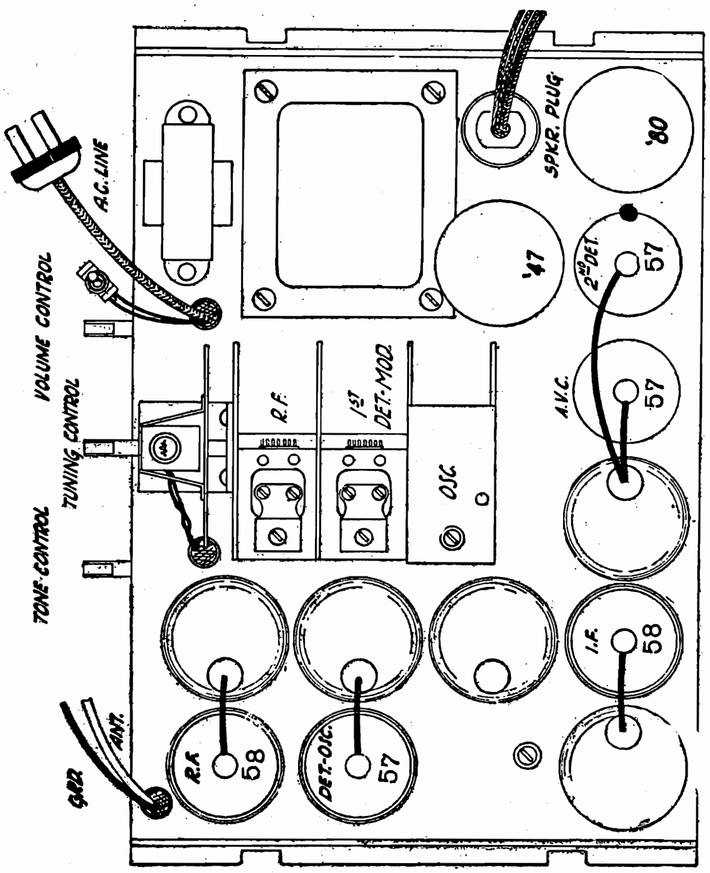
MODEL 600 AC-DC
Schematic

GRIGSBY - GRUNOW CO.



GULBRANSEN CO.

MODEL 872
Schematic, Changes
Socket Layout




## Change in Later Models

In the first models of this chassis, resistors R-1 and R-3 were carbon resistors of the values as shown in Fig 1. Resistors R-12 and R-14, were in one vitreous enamel unit. The voltages for the sets with these resistors are shown in the voltage chart on Page 4 at the left.

In later models the four above mentioned resistors were replaced by one armored wire wound resistor unit New values are used as follows

| Code | Resistance |
|---|---|
| R-12 | 220 ohms |
| R-14 | 40 ohms |
| R-1 | 9,540 ohms |
| R-3 | 10,650 ohms |

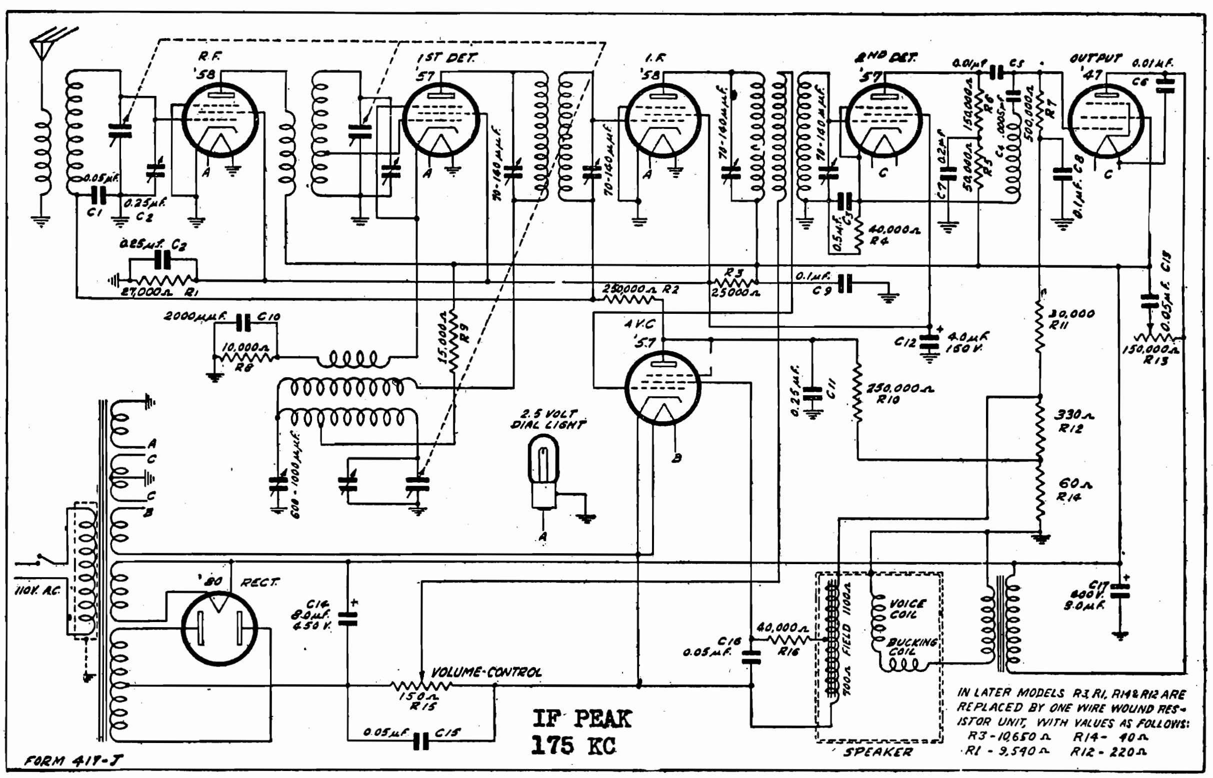
The voltages for the sets with the four-section wire wound resistor are shown in the second voltage chart on Page 4 at the right.

## Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer and an additional filter condenser are used. Also, a slight change is made in the power unit wiring. In the twenty-five cycle set, condenser C-17 the dry electrolytic unit is put in parallel with condenser C-14. An 8.0 mfd wet electrolytic condenser is put in place of condenser C-17.

The twenty-five cycle chassis can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true that is the sixty cycle chassis cannot be operated from a twenty-five cycle power supply.

A 110-220 volt 40-60 cycle power transformer is also available for this model.



MODEL 872
Alignment, Voltage
Parts List

GULBRANSEN CO.

## Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 175 K.C. and accurately calibrated signals over the broadcast band, and an output indicating meter are necessary. The procedure is as follows:

Set the signal generator for 175 K.C. Connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. Then adjust the four intermediate frequency condensers for maximum output. The adjusting screws for these condensers are reached from the bottom of the chassis.

Next set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the signal generator, is, in this instance, connected to the antenna lead of the receiver. Set the dial pointer on the 1400 K.C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw for this condenser is reached from the top of the chassis and is between the I.F. and oscillator coil cans.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condensor rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

## Voltages at Sockets

**LINE VOLTAGE 115—ANTENNA LEAD SHORTED TO GROUND—VOLUME CONTROL AT MAXIMUM**

| | | | For early Models with 2-section vitreous enamel resistor. | | | | For later Models with 4-section armoured wire-wound resistor. | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Type of Tube | Function | Across Filament or Heater | Plate to Cathode | Screen to Cathode | Grid to Cathode | Normal Plate M. A. | Plate to Cathode | Screen to Cathode | Grid to Cathode | Normal Plate M. A. |
| '58 | R.F. | 2.4 | 282 | 107 | 4 (1) | 8. | 258 | 106 | 2.8 (1) | 8.0 |
| '57 | 1st Det. | 2.4 | 270 | 100 | 5 | .4 | 250 | 103 | 5 | .4 |
| '58 | I.F. (2) | 2.4 | 282 | 107 | 4 (1) | 8. | 258 | 106 | 2.8 (1) | 8.0 |
| '57 | A.V.C. | 2.4 | 90 | 40 | 9.5 | 0 | 103 | 45 | 10 | 0 |
| '57 | 2nd Det. | 2.4 | 207 | 98 | 6 | .15 | 190 | 101 | 6 | .15 |
| '47 | Audio | 2.4 | 262 | 280 | 24 (3) | 31 | 242 | 260 | 17 (3) | 30 |
| '80 | Rect. | 4.8 | | | | 30 per plate | | | | 34 per plate |

(1) Read Across R-14.
(2) If I.F. readings are made with a cord and plug, ground the control grid through a condenser to prevent oscillation.
(3) Read Across R12 and R14.

## REPAIR PARTS LIST FOR 7 TUBE SUPERHETERODYNE RECEIVER

When ordering parts, the part number and the serial number of chassis must be given. If there is a spot of paint on the chassis be sure to give this color. If this information is not available return the old part to insure getting the correct part.

| Part No. | Name | List Price |
|---|---|---|
| P-1677 | No. 57 Tube Socket | $1.15 |
| P-1678 | No. 58 Tube Socket | .15 |
| P-1468 | No. 47 Tube Socket | .15 |
| P-1474 | No. 80 Tube Socket | .15 |
| P-1479 | Speaker Socket | .15 |
| P-40426 | Aluminum Tube Shield | .20 |
| P-40425 | Tube Shield Base | .10 |
| P-40411 | Aluminum Coil Shield—R.F. Coils | .20 |
| P-1476 | Three-Lug Insulated Terminal Strip | .10 |
| P-1513 | Eleven-Lug Insulated Terminal Strip | .15 |
| P-1054 | "On-Off" Switch | .80 |
| P-20529 | Drive Shaft | .10 |
| P-10224 | Rubber Drive Pinion | .10 |
| P-30374 | Brass Bushing for Rubber Pinion | .10 |
| P-10191 | Rubber Cushions for Channel Brackets | .10 |
| P-1273 | Pilot Lamp 2.5 Volt | .25 |
| P-5062 | Antenna R.F. Transformer Assembly | .80 |
| P-5057 | Interstage R.F. Transformer Assembly | .80 |
| P-5058 | Oscillator Coil Assembly | .95 |
| P-5059 | 1st I.F. Transformer Assembly, complete with can | 2.25 |
| P-5060 | 2nd I.F. Transformer Assembly, complete with can | 2.50 |
| P-50541 | Output Transformer Assembly | 1.75 |
| P-50542 | Power Transformer, 60 cycle, 110 volt | 5.25 |
| P-50543 | Power Transformer, 25 cycle, 110 volt | 8.50 |
| P-50545 | Power Transformer, 40-60 cycle, 110 volt | 8.00 |
| P-1497 | Pilot Light Bracket and Drive Gear Assembly | .45 |
| P-1383-C | Drive Bracket and Bearing | .30 |
| P-1684 | Celluloid Dial Strip | .20 |

### CONDENSERS

| Part No. | Code | Capacity | Voltage | Type | List Price |
|---|---|---|---|---|---|
| P-80862-C | C-1 | .05 mfd. | 200 V. | Tubular | $ .30 |
| P-80888-A | C-2 | .25 mfd. | 200 V. | Tubular | .40 |
| P-80886-C | C-3 / C-7 / C-11 | .5 mfd. / .2 mfd. / .25 mfd. | 200 V. / 400 V. / 200 V. | Block | 1.60 |
| P-80867 | C-4 | .0005 mfd. | 600 V. | Molded | .25 |
| P-80872-B | C-5 | .01 mfd. | 600 V. | Tubular | .25 |
| P-80872-B | C-6 | .01 mfd. | 600 V. | Tubular | .25 |
| P-80864-D | C-8 | .1 mfd. | 200 V. | Tubular | .25 |
| P-80887-B | C-9 | .1 mfd. | 400 V. | Tubular | .40 |
| P-80914 | C-10 | .002 mfd. | 600 V. | Tubular | .20 |
| P-80891-B | C-12 | 4.0 mfd. | 150 V. | Electrolytic | .85 |
| P-80890-B | C-13 | .05 mfd. | 400 V. | Tubular | .20 |
| P-80894-B | C-14 / C-17 | 8.0 mfd. / 8.0 mfd. | 450 V. / 450 V. | Electrolytic Block | 2.85 |
| P-80862-C | C-15 | .05 mfd. | 200 V. | Tubular | .30 |
| P-80862-C | C-16 | .05 mfd. | 200 V. | Tubular | .30 |
| P-80849 | | 8.0 mfd. | 450 V. | Wet Electrolytic (25 Cycle only) | 2.20 |
| P-1385-B | 600 K.C Trimmer Condenser | | | | .75 |
| P-80882 | Three-Gang Condenser | | | | 5.70 |

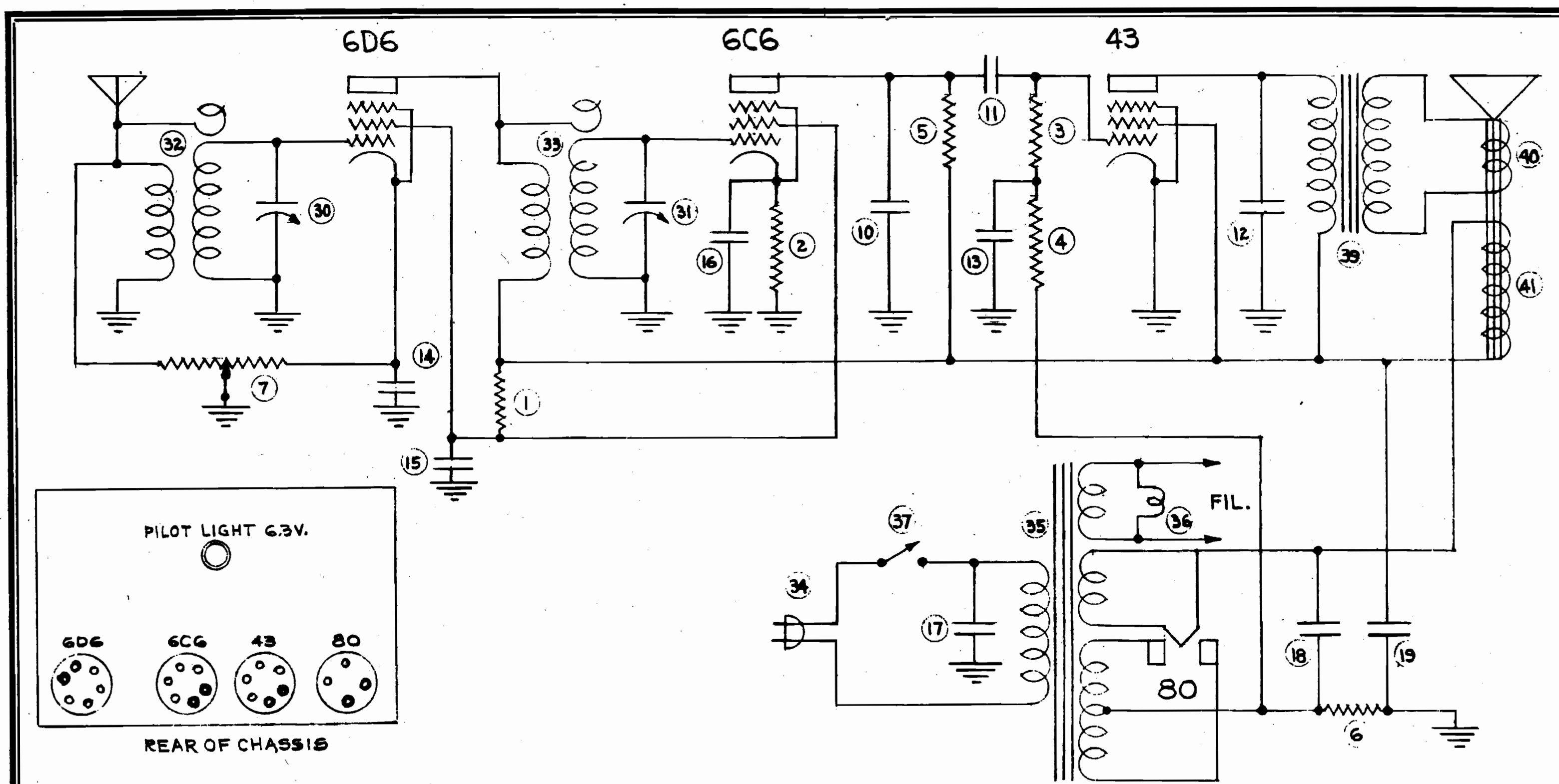
### RESISTORS

| Part No. | Code | Resistance | Wattage | Type | List Price |
|---|---|---|---|---|---|
| *P-91003 | R-1 | 27,000 ohms | .5 Watts | Carbon | $ .25 |
| P-90954 | R-2 | 250,000 ohms | .2 Watts | Carbon | .25 |
| *P-91002 | R-3 | 25,000 ohms | 1.0 Watts | Carbon | .25 |
| P-90916 | R-4 | 40,000 ohms | .2 Watts | Carbon | .25 |
| P-90941 | R-5 | 50,000 ohms | .2 Watts | Carbon | .25 |
| P-90963 | R-6 | 150,000 ohms | .2 Watts | Carbon | .25 |
| P-90929 | R-7 | 500,000 ohms | .2 Watts | Carbon | .25 |
| P-90930 | R-8 | 10,000 ohms | .2 Watts | Carbon | .20 |
| P-90905 | R-9 | 15,000 ohms | .2 Watts | Carbon | .25 |
| P-90954 | R-10 | 250,000 ohms | .2 Watts | Carbon | .25 |
| P-90956 | R-11 | 30,000 ohms | .2 Watts | Carbon | .25 |
| *P-91040 | R-12 / R-14 | 330 ohms / 60 ohms | | Vitreous Enamel | .50 |
| P-90993 | R-13 | 150,000 ohms | | Tone Control | .90 |
| P-91041 | R-15 | 150 ohms | | Volume Control | .80 |
| P-90916 | R-16 | 40,000 ohms | .2 Watts | Carbon | .25 |
| †P-91048 | R12 / R14 / R1 / R3 | 220 ohm / 40 ohm / 9540 ohm / 10650 ohm | 1.0 Watts / .2 Watts / 1.0 Watts / 2.5 Watts | Armored Wire-wound Resistor | 1.05 |

* Used in early models—in later models these resistors are replaced by resistor P-91048.
† See above.

MODEL 410
Schematic, Socket
Parts List

# HALSON RADIO CORP.




| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1158 | RESISTOR 110,000ω 1 WATT | 11 | 1101 | CONDENSER | .01 M.F. | 400V. | 30 | 1285 | VARIABLE COND. 370 M.M.F. | 39 | 1293 | OUTPUT TRANS. 7000ω |
| 2 | 1160 | " 51,000ω 1/4 " | 12 | " | " | " " | " | 31 | " | " " " " " | 40 | SPKR. | VOICE COIL |
| 3 | 1165 | " 260,000ω " " | 13 | 1040 | " | .05 " | 200V. | 32 | 1286 | ANTENNA COIL | 41 | ASSY. | FIELD COIL 2000ω |
| 4 | " | " " " " | 14 | " | " | " " | " | 33 | 1288 | R.F. COIL | | | |
| 5 | 1029 | " " 1 " | 15 | 1036 | " | .1 " | " | 34 | 1115 | LINE CORD & PLUG | | | |
| 6 | 1292 | " 400ω 1 " | 16 | 1103 | " | .25 " | " | 35 | 1194 | POWER TRANSFORMER | | | |
| 7 | 1289 | VOLUME CONTROL 25,000ω | 17 | 1102 | " | .02 " | 400V. | 36 | 1086 | PILOT LIGHT 6.3V. | | | |
| | | | 18 | 1194 | ELECTROLYTIC COND. 8M.F. 450V. | | | 37 | — | LINE SWITCH ON NO.7 | | | |
| 10 | 1098 | CONDENSER 510 M.M.F. MICA | 19 | " | " | " " | " | | | | | | |

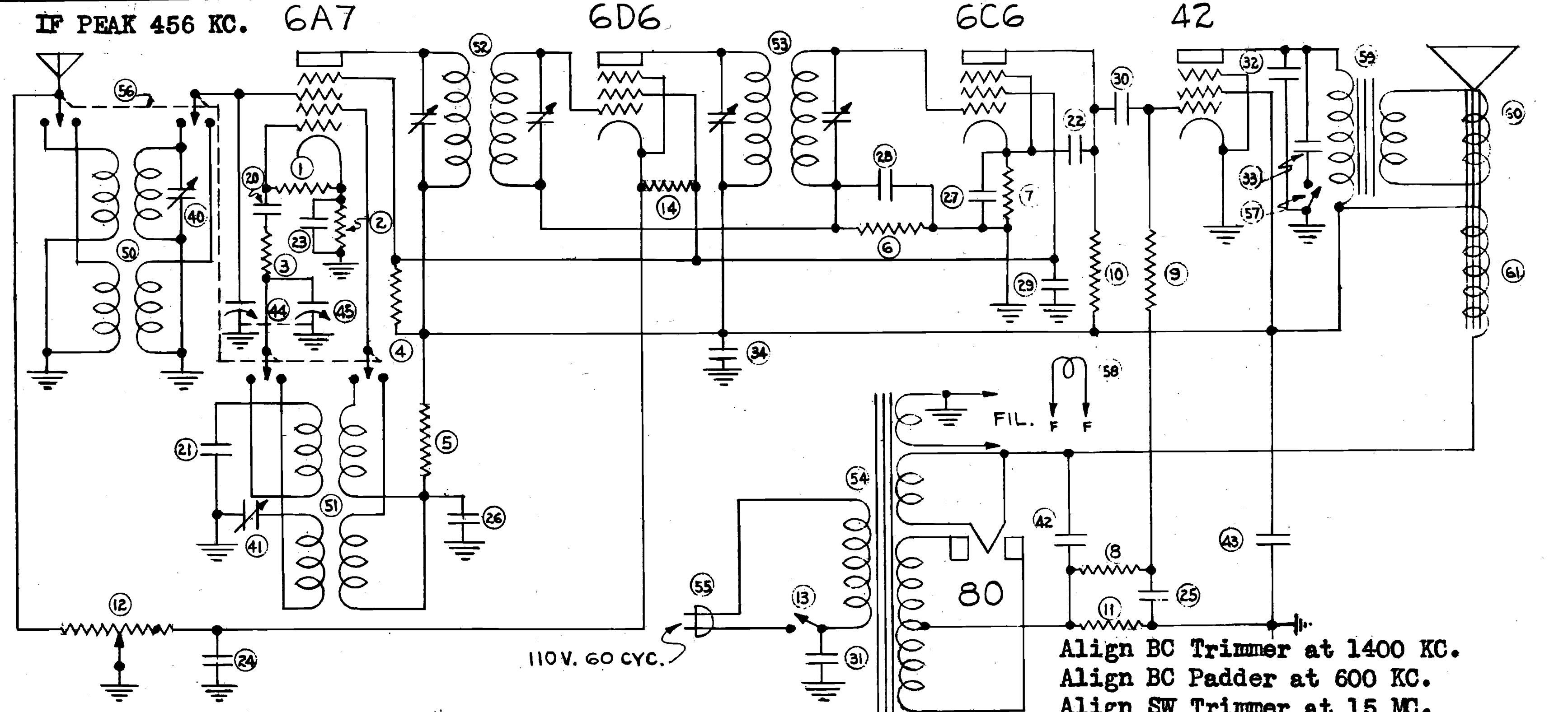
ALIGN TRIMMERS AT 1400 KC.

| CIRCUIT DIAGRAM | | MODEL 410 | |
|---|---|---|---|
| DRAWN BY E.A.W. | CHECKED BY HB | APPROVED BY HB | HALSON NUMBER 410 |
| HALSON RADIO MFG. CORP. N.Y.C. | | | |

MODEL 520
Schematic, Socket
Alignment

# HALSON RADIO CORP.

IF PEAK 456 KC.

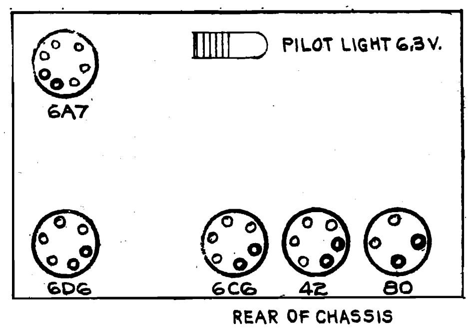



**Align BC Trimmer at 1400 KC.**
**Align BC Padder at 600 KC.**
**Align SW Trimmer at 15 MC.**

| ITEM | PART NO. | NAME | |
|---|---|---|---|
| a 1 | 1160 | RESISTOR | 51,000Ω 1/4 WATT |
| 2 | 1031 | " | 310Ω " " |
| 3 | 1218 | " | 210Ω " " |
| 4 | 1164 | " | 21,000Ω 1 " |
| 5 | " | " | " " " |
| 6 | 1030 | " | 510,000Ω 1/4 " |
| 7 | 1160 | " | 51,000Ω " " |
| 8 | 1165 | " | 260,000Ω " " |
| 9 | " | " | " " " |
| 10 | 1029 | " | " 1 " |
| 11 | 1273 | " (WIRE) | 310Ω " " |
| 12, 13 | 1209 | VOLUME CONT. 25,000Ω & LINE SWITCH | |
| b 14 | 1245 | RESISTOR | 51,000Ω 1/2 WATT |

| ITEM | PART NO. | NAME | |
|---|---|---|---|
| 20 | 1099 | CONDENSER | 260 M.M.F. MICA |
| 21 | 1096 | " | 2500 " " |
| 22 | 1098 | " | 510 " " |
| 23 | 1040 | " | .05 M.F 200 V. |
| 24 | " | " | " " " |
| 25 | " | " | " " " |
| 26 | 1103 | " | .25 " " |
| 27 | " | " | " " " |
| 28 | 1036 | " | .1 " " |
| 29 | " | " | " " " |
| 30 | 1102 | " | .02 " 400V. |
| 31 | " | " | " " " |
| 32 | 1101 | " | .01 " " |
| 33 | 1275 | " | .03 " " |
| 34 | | " | .05 " " |

| ITEM | PART NO. | NAME |
|---|---|---|
| 40 | 1107 | ANT. TRIMMER COND. 5-30 M.M.F |
| 41 | 1104 | PADDING COND. 250-400 " |
| 42 | 1194 | ELECTROLYTIC COND 8 M.F. 450V. |
| 43 | " | " " " |
| 44, 45 | 1206 | VARIABLE COND. 370 M.M.F. / " " " " |
| 50 | 1211 | ANTENNA COIL |
| 51 | 1212 | OSCILLATOR COIL |
| 52 | 1213 | I.F. TRANS. 456 K.C. |
| 53 | " | " " |
| 54 | 1112 | POWER TRANS. 110V. 60~ |
| 55 | 1220 | LINE CORD & PLUG |
| 56 | 1210 | WAVE CHANGE SWITCH |
| 57 | 1203 | TONE CONT. SWITCH |
| 58 | 1086 | PILOT LIGHT 6.3V. |
| 59 | 1221 SPKR. ASSY. | OUTPUT TRANS. 7000Ω |
| 60 | | VOICE COIL 4Ω |
| 61 | | FIELD COIL 1670Ω (HOT) |



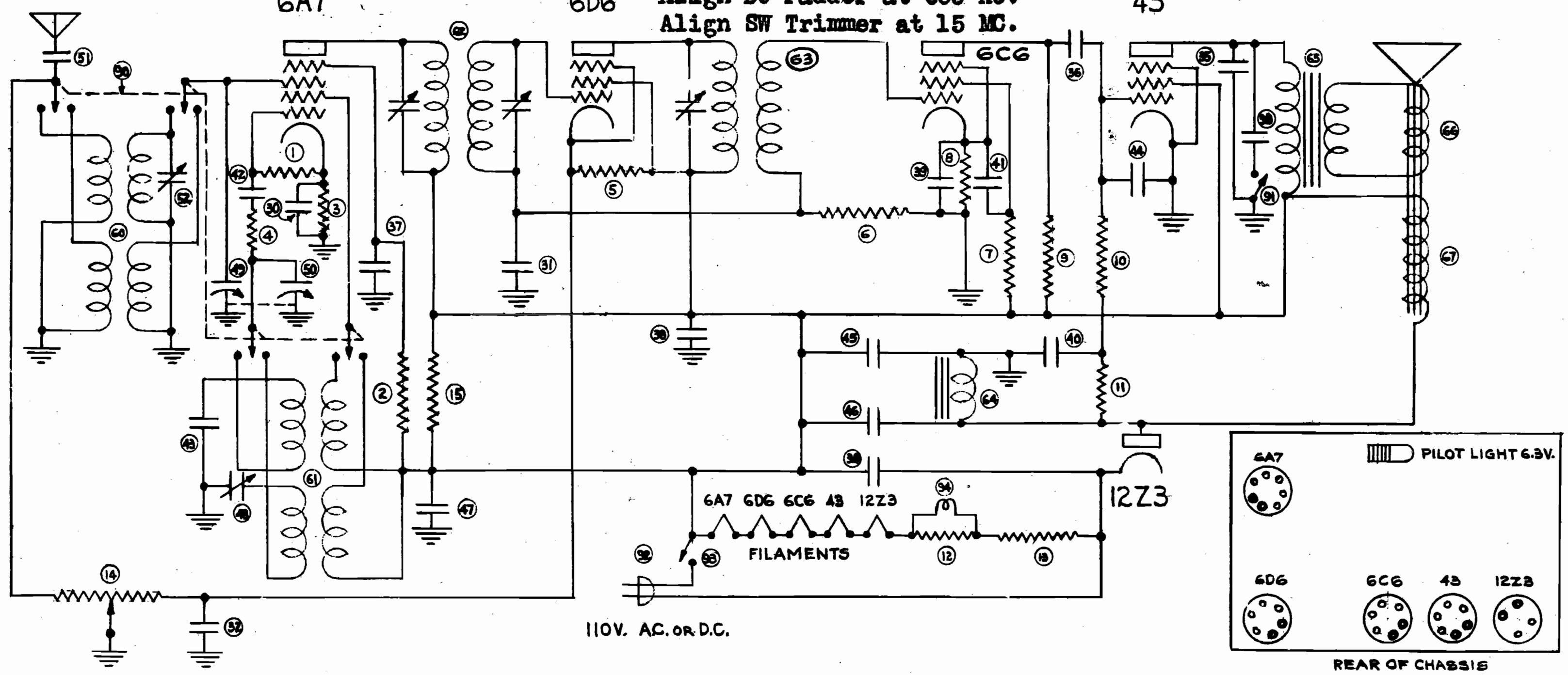

| REVISIONS | | | |
|---|---|---|---|
| LTR. | WAS | DATE | NAME |
| a | 110,000Ω | 7-16-34 | E.P.W. |
| b | added | " | " |

| CIRCUIT DIAGRAM | MODEL 520 | |
|---|---|---|
| DRAWN BY E.P.W. 6-28-34 | CHECKED BY Andy | APPROVED BY H.B |
| HALSON RADIO MFG. CORP. N.Y.C. N.Y. U.S.A. | | |

**MODEL 530**
**Schematic, Socket Alignment**

# HALSON RADIO CORP.

IF PEAK 456 KC.
Align BC Trimmer at 1400 KC.
Align BC Padder at 600 KC.
Align SW Trimmer at 15 MC.

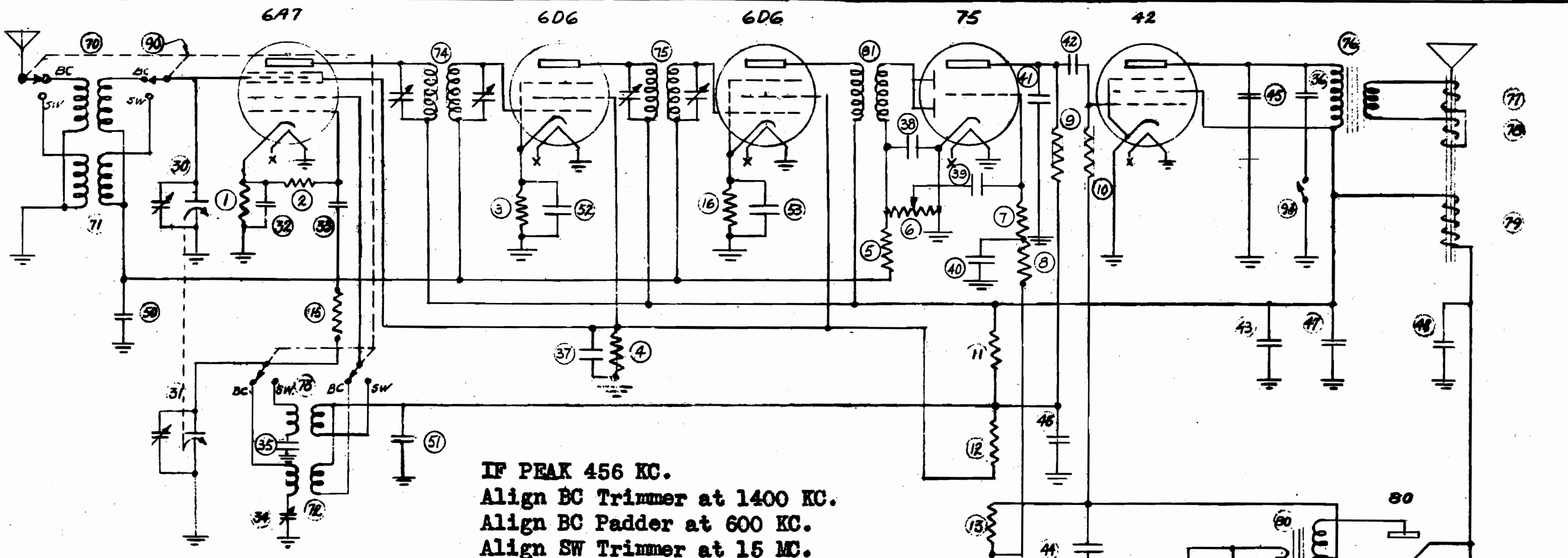



| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1242 | RESISTOR 21,000Ω ¼ WATT | 13 | — | RESISTANCE 190Ω WITH 92 | 37 | 1040 | CONDENSER .05 M.F. 200V. | 49 | 1206 | VARIABLE COND. 370 M.M.F. | 90 | 1210 | WAVE CHANGE SWITCH |
| 2 | " | " " " | 14 | 1209 | VOLUME CONT. 25,000Ω | 38 | 1036 | " .1 " | 50 | | " " " " | 91 | 1203 | TONE CONTROL SWITCH |
| 3 | 1243 | " 260Ω " | | | WITH 93 | 39 | 1103 | " .25 " " | 51 | 1101 | CONDENSER .01 M.F. 400V. | 92 | 1278 | LINE CORD & PLUG WITH 13 |
| 4 | 1276 | " 110Ω " | 15 | 1315 | RESISTOR 5100Ω ½ WATT | 40 | " | " " " " | 52 | 1107 | ANT. TRIMMER COND. 5-30 M.M.F. | 93 | — | LINE SWITCH WITH 14 |
| 5 | 1245 | " 51,000Ω ½ WATT | | | | 41 | 1036 | " .1 " " | 60 | 1211 | ANTENNA COIL | 94 | 1086 | PILOT LIGHT BULB 6.3V. |
| 6 | 1094 | " 1.1 MEGΩ ¼ WATT | 30 | 1040 | CONDENSER .05 M.F. 200V. | 42 | 1099 | " 260 M.M.F. MICA | 61 | 1212 | OSCILLATOR COIL | | | |
| 7 | " | " " " | 31 | " | " " " " | 43 | 1096 | " 2500 " " | 62 | 1213 | I.F. TRANSFORMER 456 K.C. | | | |
| 8 | 1027 | " 31,000Ω " | 32 | " | " " " " | 44 | 1098 | " 510 " " | 63 | 1316 | I.F. TRANSFORMER 456 K.C. | | | |
| 9 | 1029 | " 260,000Ω 1 WATT | 33 | " | " " " " | 45 | 1320 | " ELEC. 8 M.F. 150V. | 64 | 1281 | FILTER CHOKE | | | |
| 10 | 1030 | " 510,000Ω ¼ WATT | 34 | 1102 | " .02 " 400V. | 46 | " | " " " " | 65 | 1279 | OUTPUT TRANS. 4300Ω | | | |
| 11 | 1165 | " 260,000Ω " | 35 | 1101 | " .01 " " | 47 | " | " " " " | 66 | SPKR. | VOICE COIL | | | |
| 12 | 1016 | " 20Ω 2 WATT | 36 | " | " " " " | 48 | 1104 | PADDING COND. 250-400 M.M.F. | 67 | ASSY. | FIELD COIL 4500Ω | | | |

| CIRCUIT DIAGRAM | | MODEL 530 | |
|---|---|---|---|
| DRAWN BY | CHECKED BY | APPROVED BY | HALSON NUMBER 530 |
| E.P.W. 7-13-34 | Andy | HOS | |
| HALSON RADIO MFG. CORP. N.Y.C. | | | |

**MODEL 610**
**Schematic, Socket**
**Alignment**

# HALSON RADIO CORP.

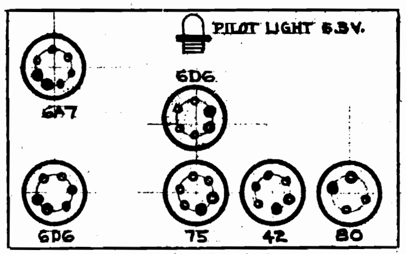



**IF PEAK 456 KC.**
**Align BC Trimmer at 1400 KC.**
**Align BC Padder at 600 KC.**
**Align SW Trimmer at 15 MC.**

| | PT. NO. | NAME | |
|---|---|---|---|
| 1 | 1031 | 310 Ω RESISTOR | ¼ W |
| 2 | 1092 | 110000 Ω " | ¼ W |
| 3 | 1219 | 5100 Ω " | ¼ W |
| 4 | 1095 | 31000 Ω " | 1 W |
| 5 | 1093 | 2.1 MEG Ω " | ¼ W |
| 6 | 1072 | 500000 Ω VOL. CONTROL | |
| 7 | 1093 | 2.1 MEG Ω RESISTOR | ¼ W |
| 8 | 1094 | 1.1 MEG Ω " | ¼ W |
| 9 | 1091 | 110000 Ω " | 1 W |
| 10 | 1030 | 510000 Ω " | ¼ W |
| 11 | 1064 | 6800 Ω VOLTAGE DIVIDER | 1½ W |
| 12 | 1064 | 8200 Ω VOLTAGE DIVIDER | ½ W |
| 13 | 1064 | 250 Ω VOLTAGE DIVIDER | 1 W |
| 14 | 1064 | 26 Ω VOLTAGE DIVIDER | 1 W |
| 15 | 1218 | 210 Ω RESISTOR | ¼ W |
| 16 | 1159 | 510 Ω " | ¼ W |

| | PT. NO. | NAME | | |
|---|---|---|---|---|
| 30 | 1063 | 370 MMF | VAR. 2 GANG COND. | |
| 31 | 1063 | 370 MMF | VAR. 2 GANG COND. | |
| 32 | 1040 | .05 MF | COND. | 200 V |
| 33 | 1098 | 510 MMF | " | MICA |
| 34 | 1104 | 400 MMF | " | TRIMMER |
| 35 | 1096 | 2500 MMF | " | MICA |
| 36 | 1102 | .02 MF | " | 400 V |
| 37 | 1040 | .05 MF | " | 200 V |
| 38 | 1097 | 110 MMF | " | MICA |
| 39 | 1101 | .01 MF | " | 400 V. |
| 40 | 1040 | .05 MF | " | 200 V |
| 41 | 1098 | 510 MMF | " | MICA |
| 42 | 1101 | .01 MF | " | 400 V. |
| 43 | 1100 | .1 MF | " | 400 V. |
| 44 | 1036 | .1 MF | " | 200 V. |
| 45 | 1101 | .01 MF | " | 400 V. |
| 46 | 1088 | 8 MF 300 V. | ELECTROLYTIC CONDENSER | |
| 47 | 1088 | 8 MF 450 V. | ELECTROLYTIC CONDENSER | |
| 48 | 1088 | 8 MF 450 V. | ELECTROLYTIC CONDENSER | |
| 49 | 1102 | .02 MF | COND. | 400 V. |
| a 50 | 1036 | .1 | " | 200 V. |
| 51 | 1040 | .05 | " | 200 V. |
| 52 | 1040 | .05 | " | 200 V. |
| 53 | 1040 | .05 | " | 200 V. |

| | PT. NO. | NAME | |
|---|---|---|---|
| 70 | 1108 | BROADCAST | ANT. COIL |
| 71 | 1108 | SHORT WAVE | ANT. COIL |
| 72 | 1109 | BROADCAST | OSCL. COIL |
| 73 | 1109 | SHORTWAVE | OSCL. COIL |
| 74 | 1110 | 1ST I.F. TRANSFORMER | |
| 75 | 1111 | 2ND I.F. TRANSFORMER | |
| 76 | 1116 | OUTPUT TRANSFORMER | SPEAKER ASSEMBLY |
| 77 | 1116 | SPEAKER VOICE COIL | SPEAKER ASSEMBLY |
| 78 | 1116 | SPEAKER HUM-BUCK COIL | SPEAKER ASSEMBLY |
| 79 | 1116 | SPEAKER FIELD COIL | SPEAKER ASSEMBLY |
| 80 | 1112 | POWER TRANSFORMER | |
| 81 | 1271 | 3RD. I.F. TRANSFORMER | |
| 90 | 1069 | RANGE SWITCH | |
| 91 | — | LINE SW. ON VOL. CONT. | |
| 92 | 1115 | LINE CORD & PLUG | |
| 93 | 1086 | PILOT LIGHT 6.3V. | |
| 94 | 1203 | TONE CONT. SWITCH | |

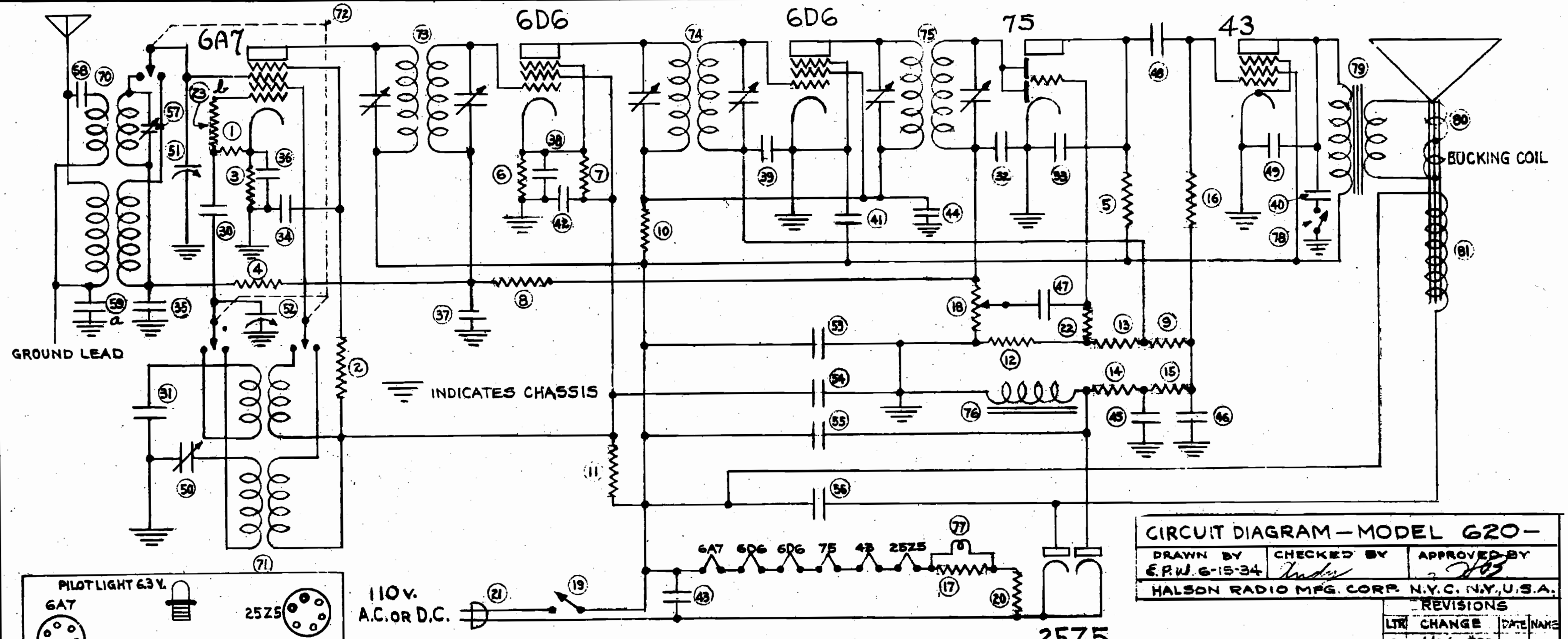



REAR OF CHASSIS

| TITLE CIRCUIT DIAGRAM MODEL 610 | | | |
|---|---|---|---|
| SCALE | MATERIAL | FINISH | HALSON |
| DRAWN BY RJF 5/15/34 | CHECKED BY | APPROVED BY | |
| HALSON RADIO MFG. CORP. NYC | | | |

**MODEL 620**
**Schematic, Socket**
**Alignment**

# HALSON RADIO CORP.



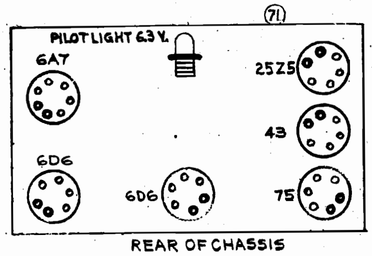

CIRCUIT DIAGRAM — MODEL 620 —

| DRAWN BY | CHECKED BY | APPROVED BY |
|---|---|---|
| E.R.W. 6-15-34 | | |

HALSON RADIO MFG. CORP. N.Y.C. N.Y., U.S.A.

REVISIONS

| LTR. | CHANGE | DATE | NAME |
|---|---|---|---|
| a | added - #59 .02 M.F. COND. | | |
| b | added - #23 110Ω - RES. | 7-3 | E.W. |

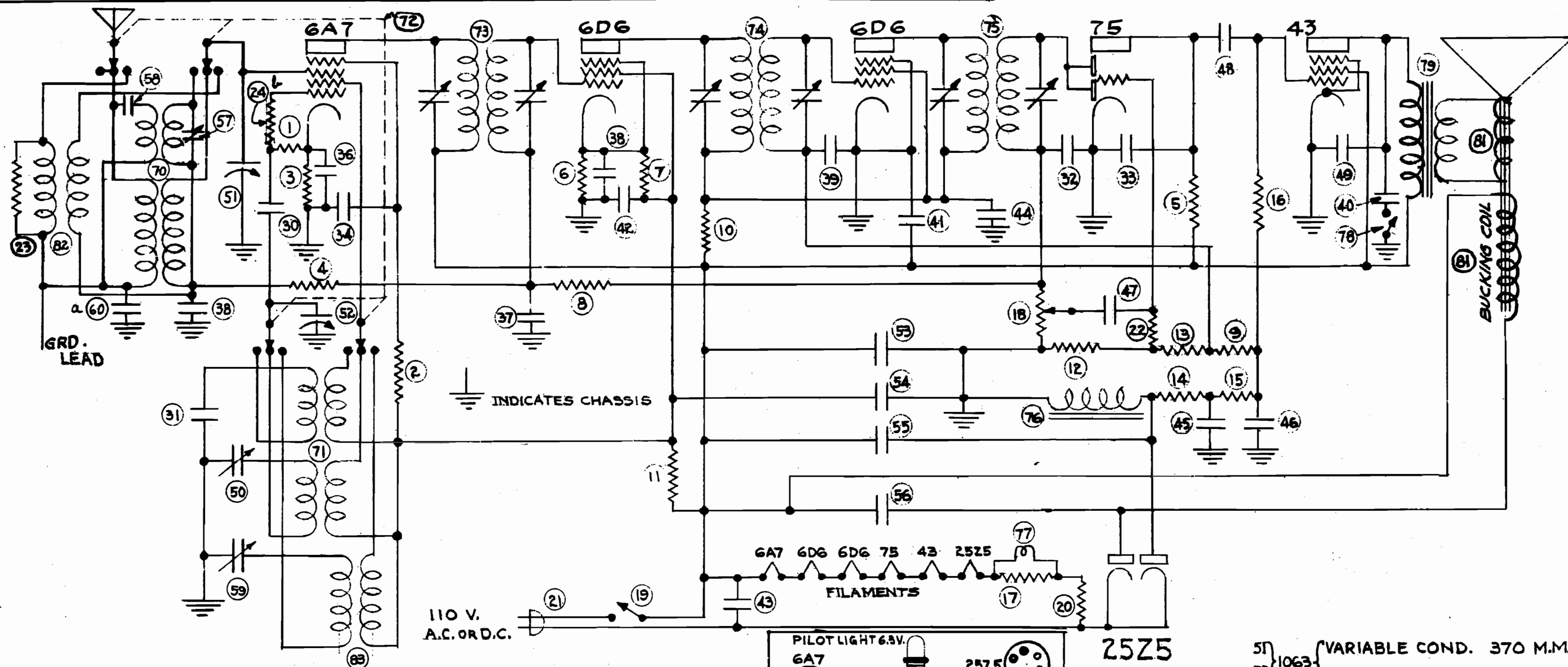


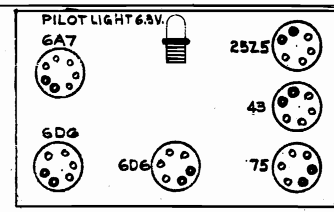

**IF PEAK 456 KC.**
**Align BC Trimmer at 1400 KC.**
**Align BC Padder at 600 KC.**
**Align SW Trimmer at 15 MC.**

| ITEM | PART NO. | NAME | | |
|---|---|---|---|---|
| 1 | 1242 | RESISTOR | 21,000Ω | ¼ WATT |
| 2 | " | " | " | " |
| 3 | 1243 | " | 260Ω | " |
| 4 | 1165 | " | 260,000Ω | " |
| 5 | " | " | " | " |
| 6 | 1159 | " | 510Ω | " |
| 7 | 1245 | " | 51,000Ω | ½ WATT |
| 8 | 1094 | " | 1.1 MEGΩ | ¼ WATT |
| 9 | " | " | " | " |
| 10 | 1032 | " | 2,100Ω | " |
| 11 | 1244 | " | 5,100Ω | " |
| 12 | 1246 | " | 310,000Ω | " |
| 13 | 1248 | " | 3.1 MEGΩ | " |
| 14 | 1092 | " | 110,000Ω | " |
| 15 | " | " | " | " |
| 16 | 1246 | RESISTOR | 510,000Ω | ¼ WATT |
| 17 | 1249 | " | 20Ω | 2 WATT |
| 18, 19 | 1240 | VOL. CONT. & LINE SWITCH | 100,000Ω | |
| 20, 21 | 1233 | RESISTANCE & LINE CORD & PLUG | 127Ω | |
| 22 | 1246 | RESISTOR | 510,000Ω | ¼ WATT |
| b-23 | 1276 | " | 110Ω | " |
| 30 | 1099 | CONDENSER | 260 M.M.F. | MICA |
| 31 | 1096 | " | 2500 " | " |
| 32 | 1097 | " | 110 " | " |
| 33 | 1098 | " | 510 " | " |
| 34 | 1241 | " | .5 M.F. | 200V. |
| 35 | 1040 | " | .05 " | " |
| 36 | 1040 | CONDENSER | .05 M.F. | 200V. |
| 37 | " | " | " " | " |
| 38 | " | " | " " | " |
| 39 | " | " | " " | " |
| 40 | " | " | " " | " |
| 41 | 1103 | " | .25 " | " |
| 42 | " | " | " " | " |
| 43 | " | " | " " | " |
| 44 | 1036 | " | .1 " | " |
| 45 | " | " | " " | " |
| 46 | " | " | " " | " |
| 47 | 1101 | " | .01 " | 400V. |
| 48 | " | " | " " | " |
| 49 | " | " | " " | " |
| 50 | 1104 | PADDING COND. | 250-400 M.M.F. | |
| a-59 | 1102 | CONDENSER | .02 M.F. | 400 |
| 51, 52 | 1063 | VARIABLE COND. | 370 M.M.F. | |
| 53 | 1230 | ELECTROLYTIC COND. | 8 M.F. | 150 V. |
| 54 | 1230 | " | 16 " | " |
| 55 | 1230 | " | 8 " | " |
| 56 | 1230 | " | 4 " | " |
| 57 | 1237 | ANT. TRIMMER COND. | 5-30 M.M.F. | |
| 58 | 1097 | CONDENSER | 110 M.M.F. | MICA |
| 70 | 1238 | ANTENNA COIL | | |
| 71 | 1109 | OSCILLATOR COIL | | |
| 72 | 1069 | WAVE CHANGE SWITCH | | |
| 73 | 1250 | I.F. TRANSFORMER | 1ST | 456 K.C. |
| 74 | " | " " | 2ND | " |
| 75 | 1251 | " " | 3RD | " |
| 76 | 1231 | FILTER CHOKE | 430Ω | |
| 77 | 1086 | PILOT LIGHT | 6.3 V. | |
| 78 | 1203 | TONE CONTROL SWITCH | | |
| 79 | 1252 | OUTPUT TRANS. | 4300Ω PRI. IMP. | |
| 80 | SPKR. ASSY. | VOICE COIL | | |
| 81 | SPKR. ASSY. | FIELD COIL | 2300Ω HOT | |

MODEL 630
Schematic, Socket
Alignment

# HALSON RADIO CORP.




**IF PEAK 456 KC.**
**Align BC Trimmer at 1400 KC.**
**Align BC Padder at 600 KC.**
**Align SW Trimmer at 15 MC**

| ITEM | PART NO. | NAME | | |
|---|---|---|---|---|
| 1 | 1242 | RESISTOR | 21,000Ω | 1/4 WATT |
| 2 | " | " | " | " |
| 3 | 1243 | " | 260Ω | " |
| 4 | 1165 | " | 260,000Ω | " |
| 5 | " | " | " | " |
| 6 | 1159 | " | 510Ω | " |
| 7 | 1245 | " | 51,000Ω | 1/2 WATT |
| 8 | 1094 | " | 1.1 MEGΩ | 1/4 WATT |
| 9 | " | " | " | " |
| 10 | 1032 | " | 2,100Ω | " |
| 11 | 1244 | " | 5,100Ω | " |
| 12 | 1246 | " | 310,000Ω | " |
| 13 | 1248 | " | 3.1 MEGΩ | " |
| 14 | 1092 | " | 110,000Ω | " |
| 15 | " | " | " | " |
| 16 | 1246 | RESISTOR | 510,000Ω | 1/4 WATT |
| 17 | 1249 | " | 20Ω | 2 WATT |
| 18, 19 | 1240 | VOL. CONT. & LINE SWITCH | 100,000Ω | |
| 20, 21 | 1233 | RESISTANCE & LINE CORD & PLUG | 127Ω | |
| 22 | 1246 | RESISTOR | 510,000Ω | 1/4 WATT |
| 23 | 1267 | " | 11,000Ω | " |
| b 24 | 1276 | " | 110Ω | " |
| 30 | 1099 | CONDENSER | 260 M.M.F. | MICA |
| 31 | 1096 | " | 2500 " | " |
| 32 | 1097 | " | 110 " | " |
| 33 | 1098 | " | 510 " | " |
| 34 | 1241 | " | .5 M.F. | 200V. |
| 35 | 1040 | " | .05 " | " |
| 36 | 1040 | CONDENSER | .05 M.F. | 200V. |
| 37 | " | " | " " | " |
| 38 | " | " | " " | " |
| 39 | " | " | " " | " |
| 40 | " | " | " " | " |
| 41 | 1103 | " | .25 " | " |
| 42 | " | " | " " | " |
| 43 | " | " | " " | " |
| 44 | 1036 | " | .1 " | " |
| 45 | " | " | " " | " |
| 46 | " | " | " " | " |
| 47 | 1101 | " | .01 " | 400V |
| 48 | " | " | " " | " |
| 49 | " | " | " " | " |
| 50 | 1104 | PADDING COND. | 250-400 M.M.F. | |
| 51 | 1063 | VARIABLE COND. | 370 M.M.F. | |
| 52 | 1063 | " | " | |
| 53 | 1230 | ELECTROLYTIC COND. | 8 M.F. | 150V. |
| 54 | 1230 | " | 16 " | " |
| 55 | 1230 | " | 8 " | " |
| 56 | 1230 | " | 4 " | " |
| 57 | 1262 | ANT. TRIMMER COND. | 5-30 M.M.F. | |
| 58 | 1097 | CONDENSER | 110 M.M.F. | MICA |
| 59 | 1262 | " | 50 TO 120 M.M.F. | |
| a 60 | 1102 | " | .02 M.F. | 400 V. |
| 70 | 1238 | ANTENNA COIL | | |
| 71 | 1109 | OSCILLATOR COIL | | |
| 72 | 1069 | WAVE CHANGE SWITCH | | |
| 73 | 1250 | I.F. TRANSFORMER 1ST | 456 K.C. | |
| 74 | " | " " 2ND | " | |
| 75 | 1251 | " " 3RD | " | |
| 76 | 1231 | FILTER CHOKE | 430Ω | |
| 77 | 1086 | PILOT LIGHT | 6.3V. | |
| 78 | 1203 | TONE CONTROL SW. | | |
| 79 | 1252 | OUTPUT TRANS. | 4300Ω PRI. IMP. | |
| 80 | SPKR. ASSY. | VOICE COIL | | |
| 81 | SPKR. ASSY. | FIELD COIL | 2300Ω HOT | |
| 82 | 1264 | L.W. ANT. COIL | | |
| 83 | 1265 | L.W. OSCL. COIL | | |

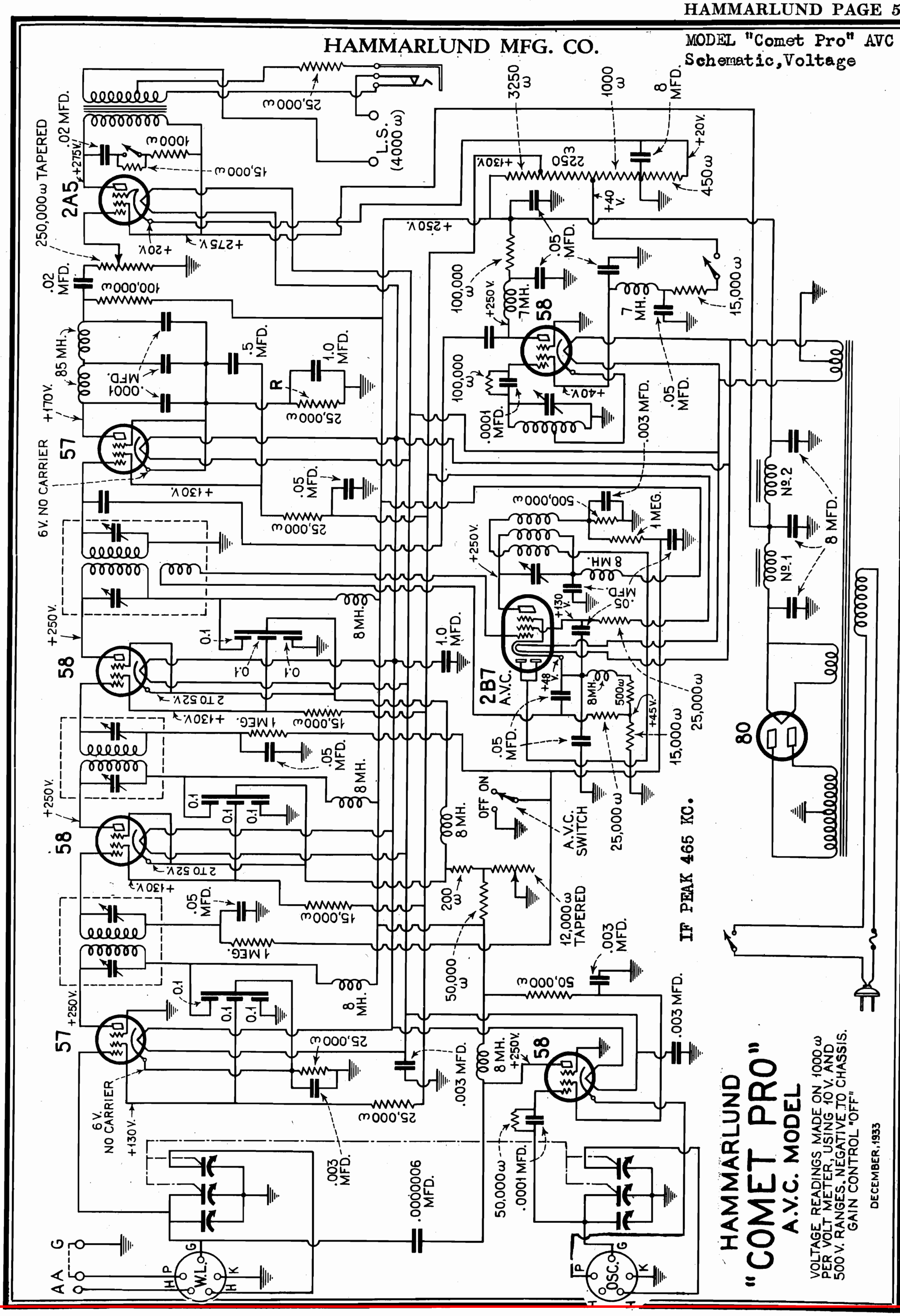
CIRCUIT DIAGRAM – MODEL-630

| DRAWN BY | CHECKED BY | APPROVED BY |
|---|---|---|
| E.P.W. 6-22-34 | ANDY | [illegible] |

HALSON RADIO MFG. CORP. N.Y.C. N.Y.

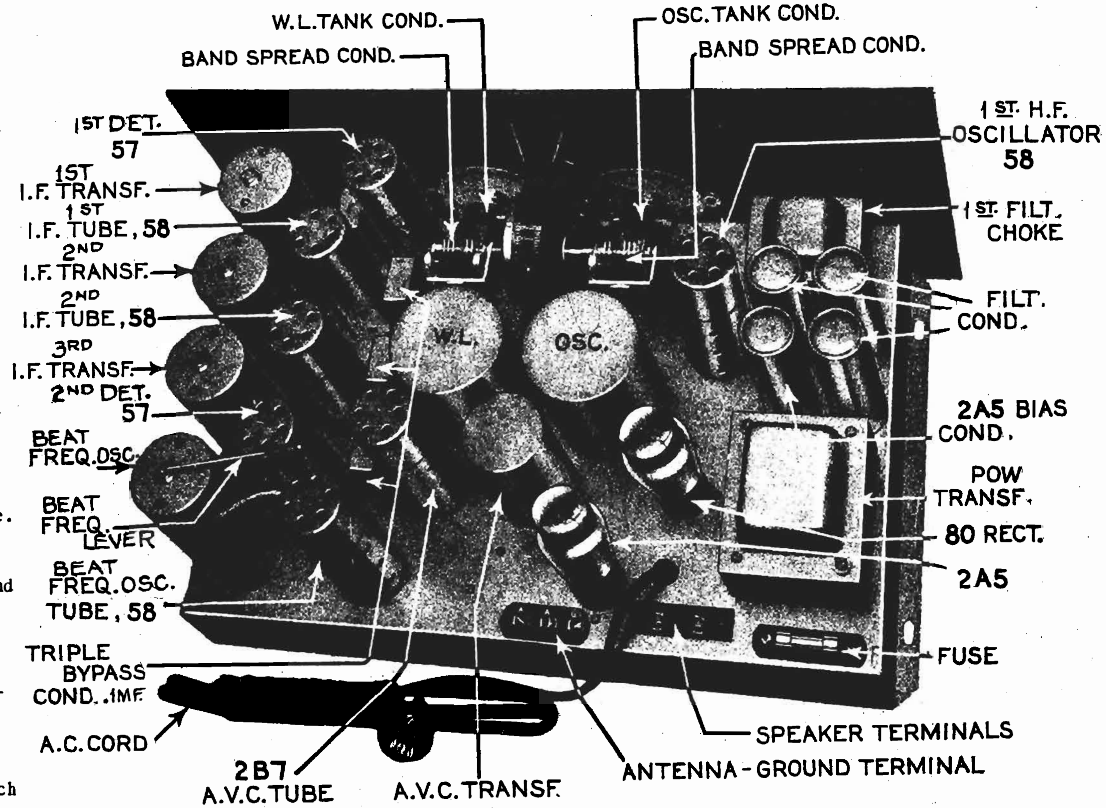
REVISIONS

| LTR | CHANGE | DATE | NAME |
|---|---|---|---|
| a | 60-.02 M.F. added | 7-3 | E.P.W. |
| b | 24-110Ω | " | |


HAMMARLUND MFG. CO.
MODEL "Comet Pro" AVC
Schematic,Voltage
HAMMARLUND
"COMET PRO"
A.V.C. MODEL
VOLTAGE READINGS MADE ON 1000 ω
PER VOLT METER, USING 10 V. AND
500 V. RANGES, NEGATIVE TO CHASSIS.
GAIN CONTROL "OFF"
DECEMBER, 1933
IF PEAK 465 KC.

MODEL "Comet Pro" AVC
Alignment, Socket

HAMMARLUND MFG. CO.




Should it be necessary to remove the Comet "Pro" chassis from its shield cabinet it is easily accomplished by removing the four machine screws which extend through the bottom of the cabinet and the twelve screws around the edge of the front panel. The entire panel and chassis assembly may then be slipped out of the cabinet by drawing it forward. When thus removed all parts and wiring located beneath the chassis are exposed for examination or test. The shield cans found under the chassis may be removed if necessary by pulling them off.

First remove the chassis from the cabinet and prop it up on its rear edge so that both the top and bottom are accessible. Then connect the 10 ohm range of a 1000 ohm per volt voltmeter across the 25,000 ohm resistor between the cathode of the second detector and ground. This resistor is marked "R" in the schematic diagram. This meter will function as a resonance indicator, showing maximum deflection when exact resonance is obtained.

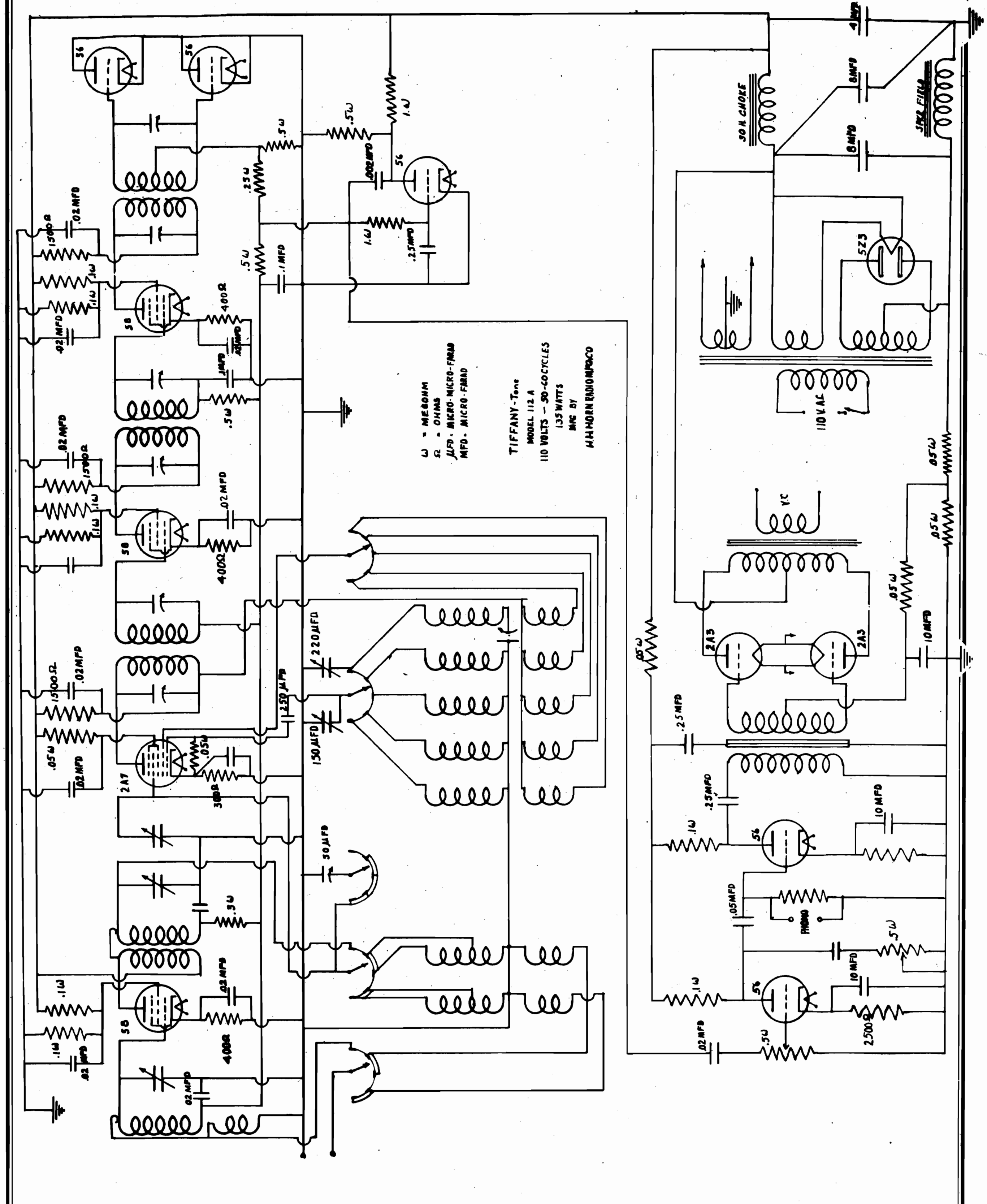
Next provide a signal source. If an oscillator is available, tune it to 465 kc. and couple it to the receiver. If such an oscillator is not at hand the carrier of a fairly powerful station may be employed provided the station selected is one which is free from fading and interference. This signal should be tuned in on the receiver in the usual way and the gain control adjusted to cause an increase of about 2 volts in the voltmeter reading.

The actual alignment can now proceed. First adjust the bottom condensers of the three i.f. transformers. These are accessible from the under side of the chassis. Adjust them one after the other until maximum deflection of the resonance indicating meter is obtained. If the meter reading increases materially during this process retard the gain control to bring it back to the original plus 2 volts reading. Then make a similar adjustment of the condensers at the tops of the three i.f. transformers. Finally repeat this whole process, readjusting each condenser a second time to insure exactness of resonance.

After the i.f. stages are thus accurately lined up, turn on the heterodyne-beat oscillator and set its top lever so that it points diagonally away from the rear right-hand corner of the chassis. Then adjust the bottom adjustment screw on this transformer for exact zero beat. When this has been accomplished the receiver is in accurate alignment.

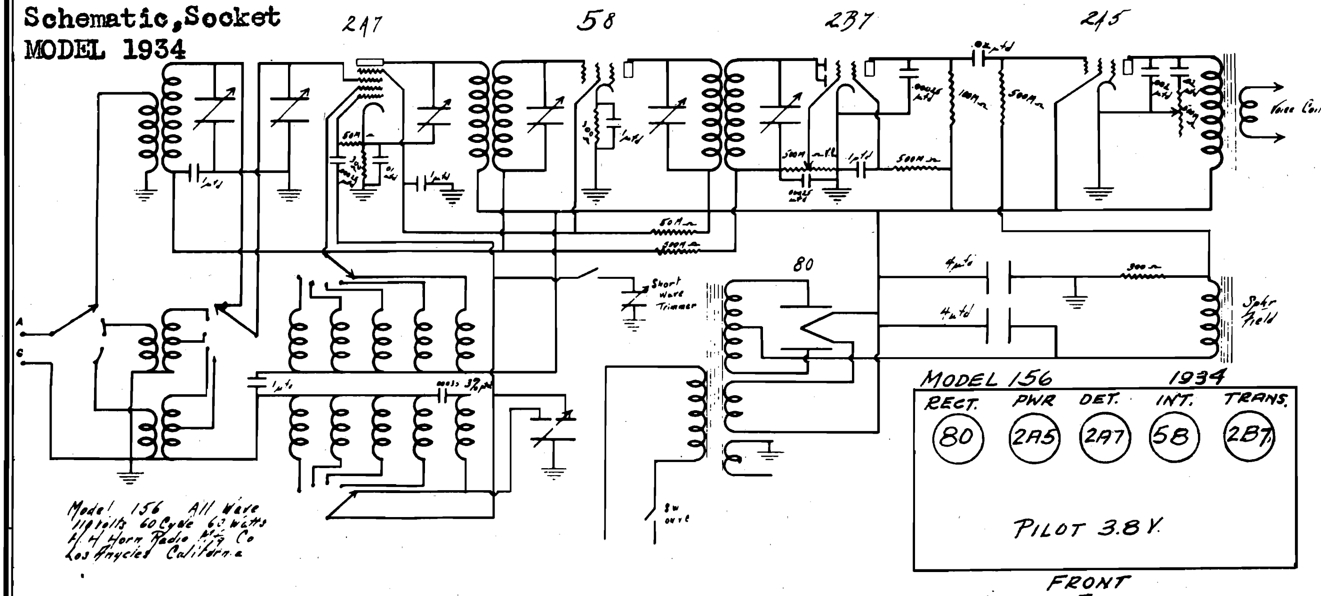
MODEL 112-A
Schematic

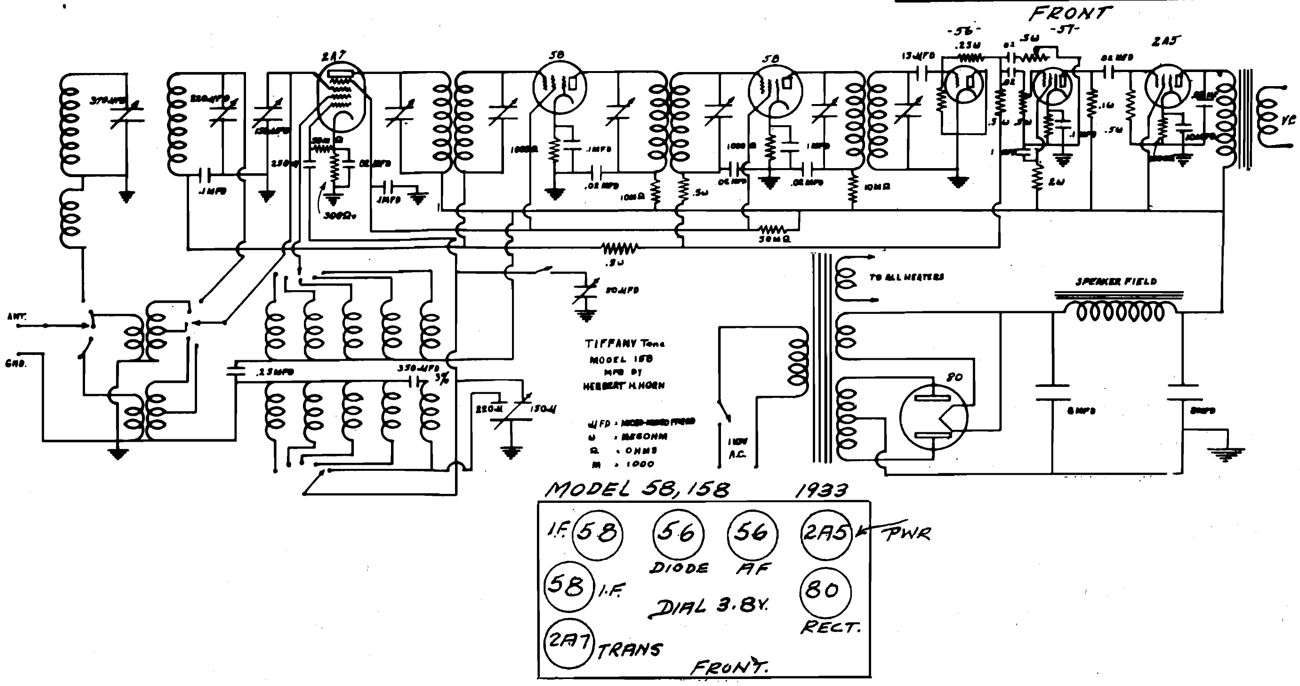
# HERBERT H. HORN

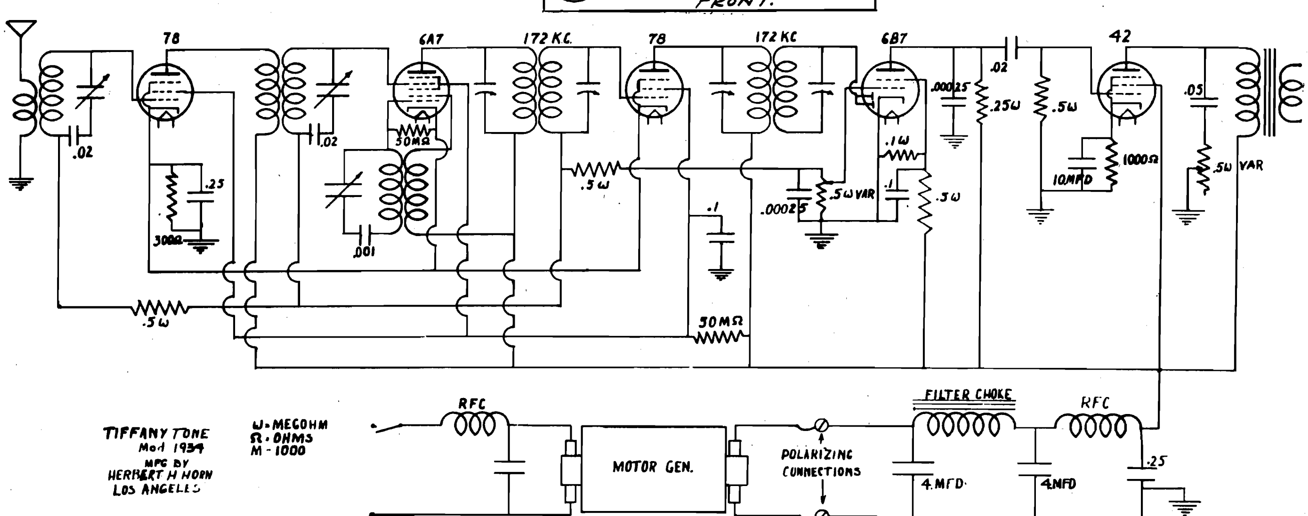


MODEL 58,158
Schematic,Socket
MODEL 156
Schematic,Socket
MODEL 1934

# HERBERT H. HORN

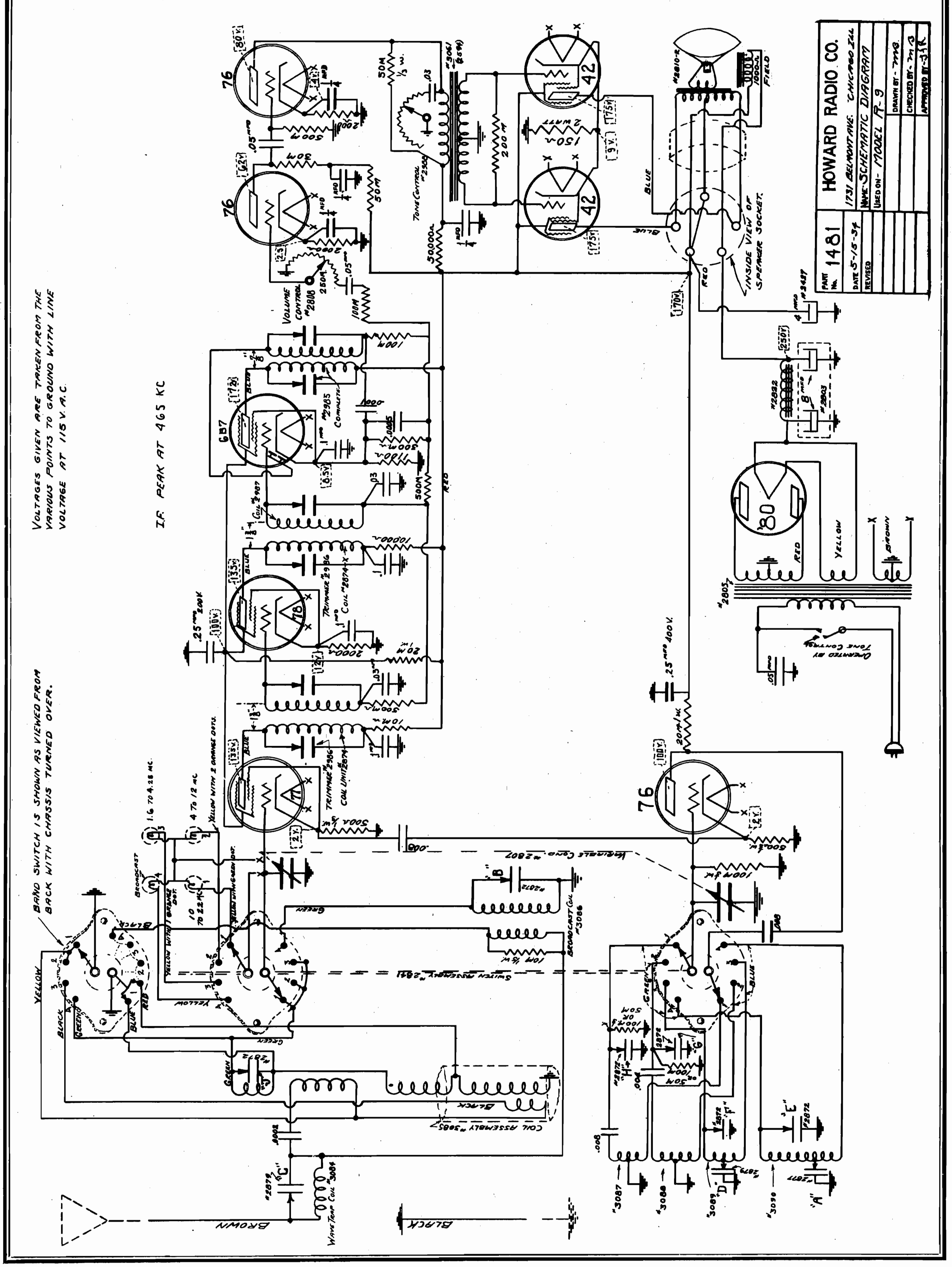


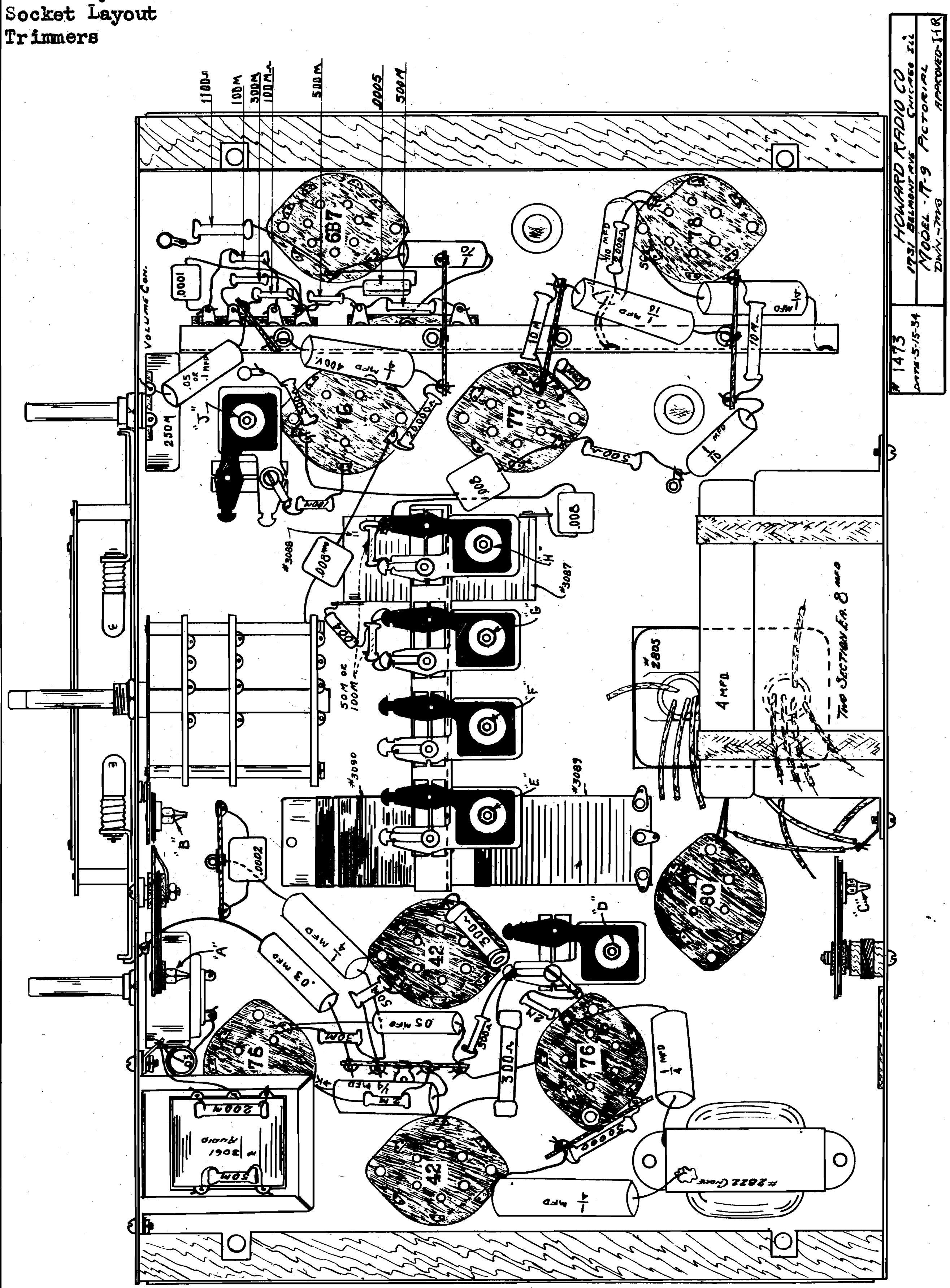
# HOWARD RADIO CO.

**MODEL R-9**
**Schematic**



MODEL R-9
Parts Layout
Socket Layout
Trimmers

## HOWARD RADIO CO.



MODEL R-9
Alignment

HOWARD RADIO CO.

## NOTES

(1) One of the sections of the gang condenser is not used.
(2) The two lower pilot light bulbs may be changed when necessary by loosening the screw holding the light bracket and it will pull out to the side. It is not necessary that the chassis be taken out of the cabinet.
(3) It is important that the chassis is made to float as freely as possible within the cabinet.
(4) When adjusting the oscillator circuits be sure to start on the right signal. The best procedure is to turn the trimmer all the way out and then pick the strongest signal when tuning in. If the oscillator happens to be on the wrong side, the set will be very insensitive around the center of the band.
(5) Keep the input low from the signal generator when making the various adjustments, to prevent overloading.

The alignment of the I.F.'s; the intermediate frequency is 465 KC and the stages are aligned in the customary manner by adjusting the trimmers in the top of the IF cans for the maximum deflection with 465 KC input.

The Alignment of the Oscillator Circuits;

Before making any adjustments be sure that the hand is directly over the first line above 550 (which would be about 540) when the variable condenser is turned to maximum capacity.

I Starting with the 1st Short Wave Band (1.6 to 4 Megacycles)
 (1) Set your signal generator to 4 MC.
 (2) Set dial to 4 MC.
 (3) Then peak oscillator Trimmer (lettered "F" on the pictorial diagram) to the signal.
 (4) Set generator to 1.6 MC.
 (5) Set dial to 1.6 MC.
 (6) Peak Oscillator Padding Condenser lettered "D" to signal.
 (7) Reset generator and dial back to 4 MC and check any variation.

II Second (2) S.W.Band, 4 to 12 MC.
 (1) Set Generator and dial to 12 MC. Peak Oscillator trimmer lettered "G" for 12 MC.
 (2) Cut down the signal generator to a very weak input in to the set, and adjust the RF trimmer lettered "J" at 12 MC.

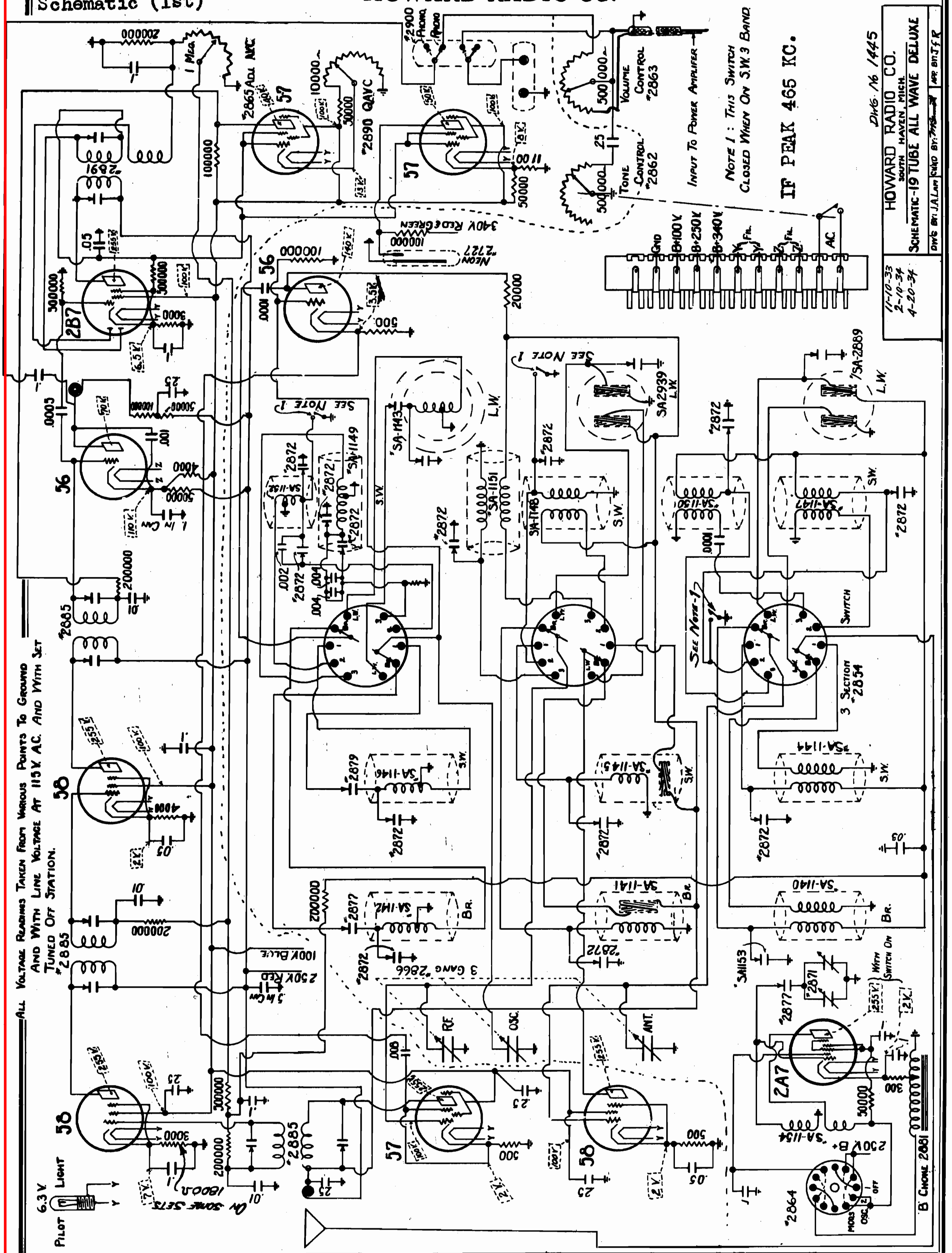
III The 3rd S.W.Band 10 to 22 MC.
 (1) Set generator and dial to 20 MC.
 (2) Peak Oscillator trimmer lettered "H" at 20 MC.

IV The Broadcast band is aligned by;
 (1) Adjusting trimmer "E" at 1400 KC.
 (2) Peak Padding Condenser "A" at 600 KC.
 (3) Adjust trimmer "B" across secondary winding of RF coil to peak at 1400 KC.

V The wave trap (Trimmer "C") is adjusted to a minimum setting with 465 KC fed in to the Antenna.

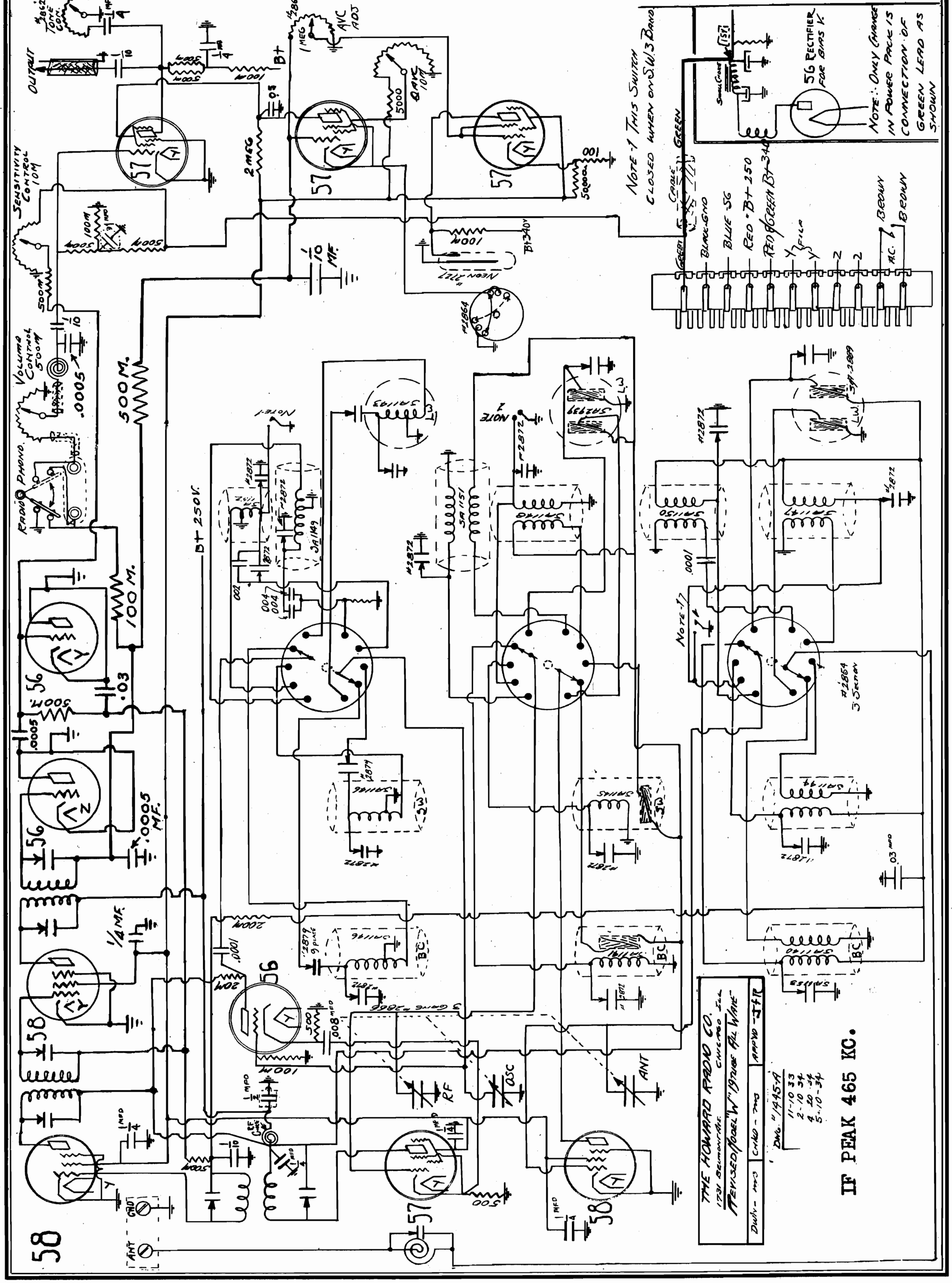
MODEL W
Schematic (1st)

# HOWARD RADIO CO.



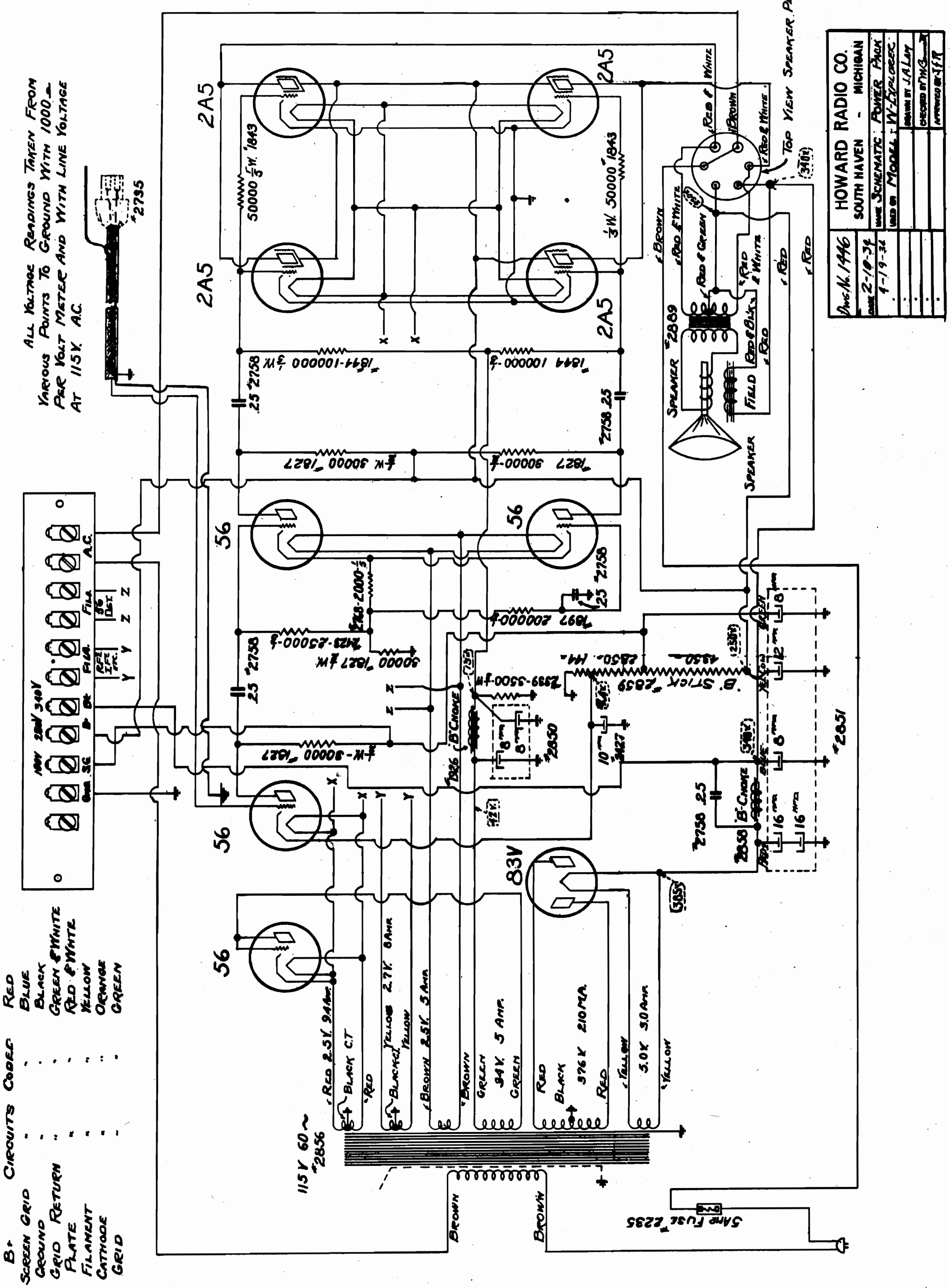
# HOWARD RADIO CO.

MODEL W
Schematic (2nd)



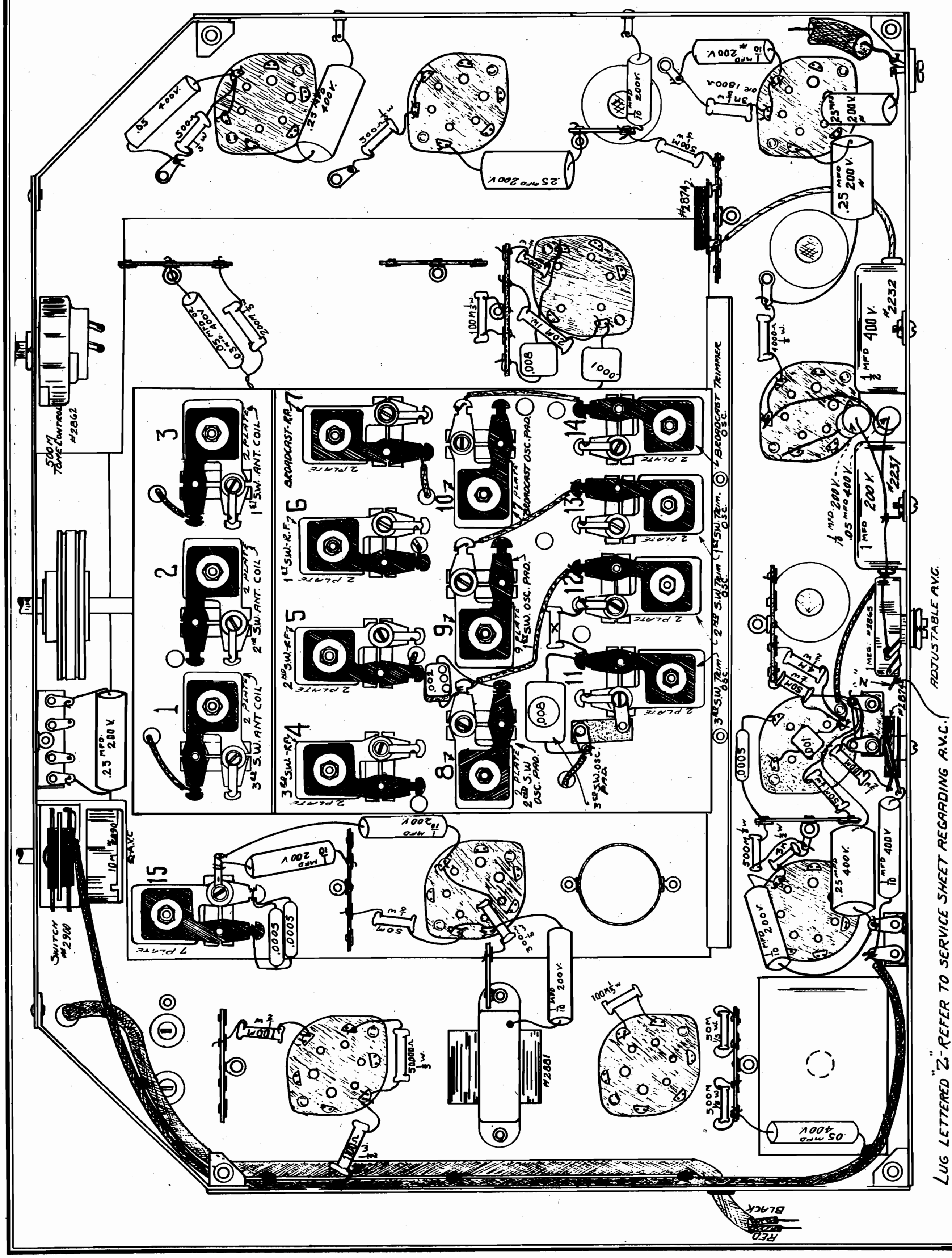
MODEL W
Power Amplifier
Schematic

## HOWARD RADIO CO.



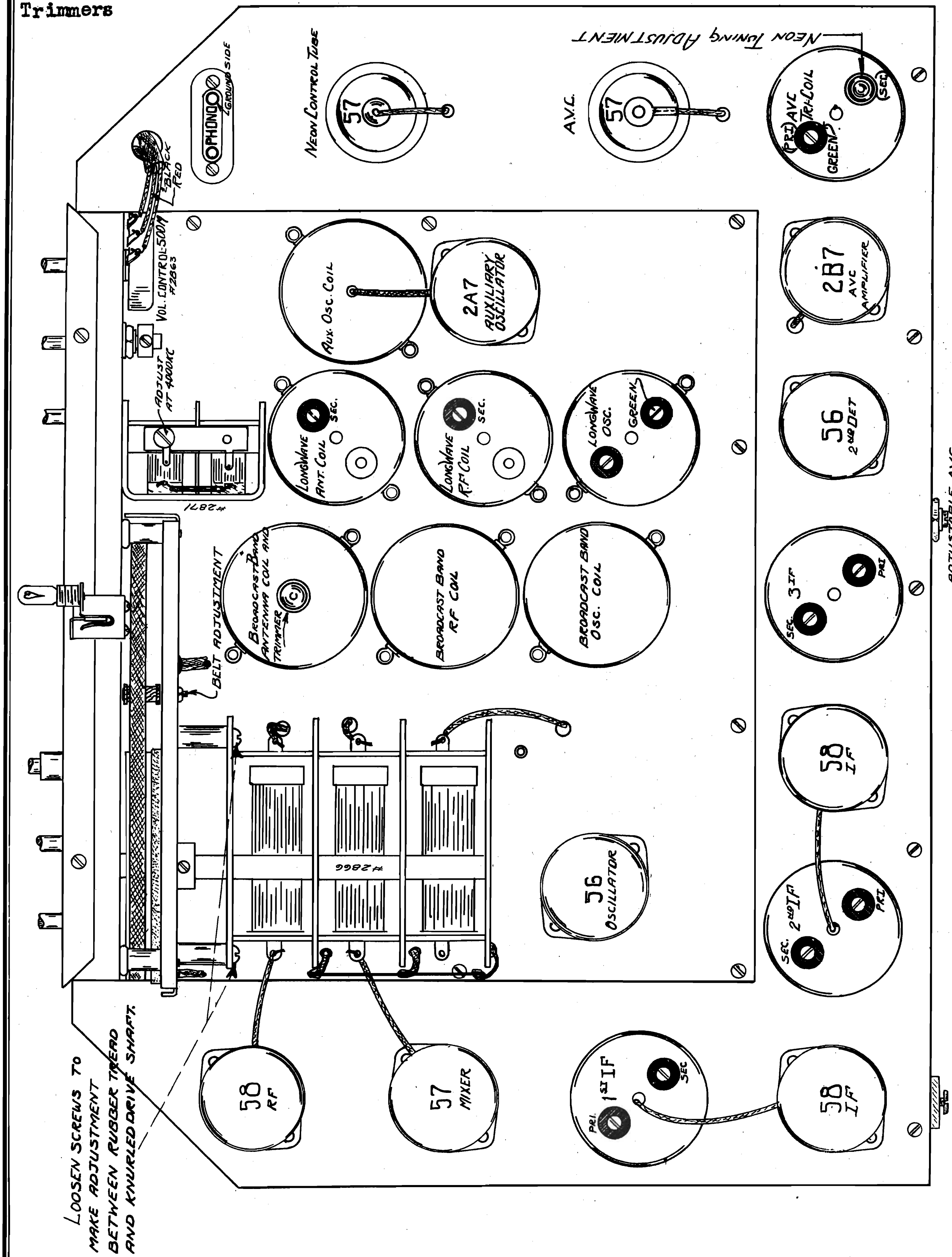
# HOWARD RADIO CO.

MODEL W
Receiver
Socket Layout
Trimmers



MODEL W
Receiver
Socket Layout
Trimmers

# HOWARD RADIO CO.



# HOWARD RADIO CO.

There are two important things to keep in mind when adjusting this receiver.

1. Since all adjustments are made with AVC inactive, extreme care must be used to attenuate the input signal low enough so that there will be no overloading of tube amplifiers while making adjustments. If the input signal voltage is attenuated to the point where the speaker voice coil power does not exceed 50 or 75 milliwatts no trouble will be experienced from this source.

2. After the high frequency adjustments have been made on short wave bands, the test oscillator or generator should be advanced to 930 KC higher in frequency - the output voltage of generator advanced considerably and notice of the image signal of receiver oscillator falls at this point. In case this signal is not heard, the adjustment of the receiver oscillator has been incorrectly made. As an example:
   After the third shortwave band has been adjusted at 20 m.c. it should be possible to move the test oscillator to 20, 930 KC and hear the signal.

## 6. THE ALIGNMENT OF THE FREQUENCY METER

(a) Turn main dial to where 4800 KC comes in. This may be checked by your signal generator. The signal generator is not used, however, in aligning the Frequency Meter.
(b) Make certain the hand on the Frequency Meter falls on 1.5 when the 2-gang condenser is at full capacity.
(c) Turn the oscillator switch all the way to the right to the Modulator position.
(d) Turn frequency dial to 4 and adjust the trimmer on the two-gang variable condenser to resonance with the main dial setting.
(e) Turn band indicator switch to first short wave band (1.5 to 3.5)
(f) Set the main dial to where 1500 KC comes in, which is at the .55 figure (as mentioned before).
(g) Turn frequency dial to 1.5 and adjust Trimmer No. 15 for maximum signal.

## 7. AVC ADJUSTMENT

Looking at the bottom view drawing #1416, there will be noted a terminal of the AVC control marked "Z". Connect the negative terminal of a high resistance voltmeter (1000 ohms per volt at least, using a medium voltage scale) to this terminal marked "Z". Connect the positive side of voltmeter to chassis ground.

Adjust the receiver to a signal having approximately two or three thousand microvolt intensity (Note: a fairly powerful local station may also be used for this).

In the top of the coil can assembly in upper right hand corner (facing rear of tuner) will be found an adjustment. This adjustment is the one located in top next to neon adjustment.

Watching voltmeter, set the above adjustment with insulated screw driver until a maximum reading is obtained on voltmeter.

The AVC circuit has been fundamentally adjusted by the above procedure and should be set for the locality in which set is to be operated, in accordance with adjustment number 8.

## 8. AVC ADJUSTMENT FOR VARIOUS LOCALITIES

In certain localities especially close to a broadcast station, it may be necessary to readjust the AVC (slotted shaft) control.

In order to properly make this adjustment, tune the receiver in exact resonance with the most powerful station to be received. Then if the station's signals sound "fringy" or rough, turn the control to the right until this condition stops. Do not turn this control beyond this point.

## 9. NEON TUNING INDICATOR

Facing the back of tuner chassis, extending through one of the tall shielded assemblies in the upper right hand corner, will be found a small black knurled knob. This knob is used to adjust the Neon resonance indicator. Due to the fact that in some localities the signal strength from certain stations varies somewhat, it is advantageous to be able to set this adjustment.

At the time of day during which the station signals are the most powerful (usually in the evening) adjust the receiver dial to a powerful station, then turn the neon adjustment until the light just fills the opening in arrow of dial. Then readjust the tuning dial of receiver. Should the light become more brilliant, leave the dial at point of highest brilliancy and again readjust neon indicator until it just fills the arrow opening.

A little practice will enable the user to set this indicator to meet the individual requirements.

When once adjusted for the locality in which the receiver is to be used, it should not have to be readjusted.

Since the inter-station silent tuning system is a proportional function of the neon light, the inter-station silent tuning system will be correctly adjusted.

The neon light system is not intended to work on the short wave stations. However, on the more powerful signals it will generally give an indication of resonance.

**MODEL W**
**I-F Alignment**
**R-F, Osc. Alignm't.**

# HOWARD RADIO CO.

## THE PROCEDURE TO ALIGN THE I.F. STAGES

The IFs are aligned in the usual system of feeding the intermediate frequency of 465 KC into the grid of the 57 1st Detector tube.

Make certain that the AVC adjustment (which is the slotted shaft extending from the back of the chassis) is turned all the way to the left when gaining the IF, RF or oscillator circuits.

The two trimmers in each of the three IF Coil Cans should be very carefully tuned to resonance as they are very critical and will greatly affect the performance of the receiver.

The sensitivity of the IF stages should be between 10 and 20 Microvolts.

## ALIGNING THE R.F. AND OSCILLATOR CIRCUITS

After the IFs are aligned, the various circuits may be aligned in the order given below.

Keep the AVC adjustment all the way off to the left as before.

It is not necessary that the oscillator be taken out of its socket when aligning any of the RF circuits.

Always adjust the oscillator stage before the RF in any particular band.

Be sure to start on the right signal when adjusting the oscillator trimmer. The best procedure is to turn the trimmer all the way out and then pick the strongest signal when turning in. If the oscillator happens to be on the wrong side, the set will be very insensitive around the center of the dial.

The plates on the variable condenser should be bent to make the KC readings on the dial line up ONLY on the Broadcast Band.

Before adjusting any band, make certain that the pointer of the station indicator is set on the last black line when the dial is turned all the way to the left on the broadcast band just above .55 — at this point the variable condenser should be all the way in to maximum capacity.

### 1. THE LONG WAVE

(a) Turn the band indicator to .15 to .35
(b) Set dial to .35
(c) Feed 350 KC into the antenna post and adjust the trimmer in the long wave oscillator can for resonance. The correct trimmer for this adjustment is the one that is not green coded on the trimmer washer. (Refer to pictorial diagram, top view).
(d) Adjust RF and antenna stages. There is only one trimmer for each.
(e) Rotate dial to just above .17 and adjust the oscillator trimmer that is coded green, for resonance with 175 KC.
(f) Recheck the 350 KC setting.

### 2. THE BROADCAST BAND

It is necessary on the broadcast band only that a metal bottom with holes in line with the trimmer nuts be used so that the circuits will not be detuned when the regular bottom plate is screwed back on.

(a) Turn band indicator to Broadcast .55 to 1.5
(b) Set dial to 1.4
(c) Feed in 1400 KC and adjust trimmer No. 14 (see pictorial diagram, bottom view) for resonance.
(d) Adjust RF and antenna stages. The RF is No. 7, and the Antenna Trimmer consists of the knurled knob extending from the top of the Antenna Coil Can.
(e) Rotate dial to .55 and adjust trimmer No. 10 for resonance with 550 KC.
(f) Recheck the setting at 1400 and bend plates of variable condenser at 950 or other points where necessary for KC reading on dial.

### 3. THE FIRST SHORT WAVE BAND

(a) Turn band indicator to 1.5 to 3.5.
(b) Set dial to 3.5
(c) Feed in a 3500 KC signal and adjust Trimmer No. 13 for resonance.
(d) Adjust RF and Antenna stages, Trimmers Nos. 3 and 6
(e) Rotate dial to where the hand points to .55 on the broadcast band. The dial calibration may be found to be slightly off at this point and the .55 figure corresponds to 1.5 on the First Short Wave Band. Feed in 1500 KC and adjust Trimmer No. 9 for Resonance.
(f) Recheck setting at 3500 KC.

### 4. THE SECOND SHORT WAVE BAND

(a) Turn band indicator to 3.5 to 9
(b) Set dial to about 8.9. The calibration is slightly off at this point and the 8.9 figure corresponds to 8.5
(c) Feed in 8500 KC and adjust Trimmer No. 12 for resonance
(d) Adjust RF and Antenna stages with Trimmers Nos. 3 and 2
(e) Rotate dial to 3.5 and adjust Trimmer No. 8 for resonance with 3500 KC
(f) Recheck setting at 8.5 (8.9).

### 5. THE THIRD SHORT WAVE BAND

(a) Turn band indicator to 9 to 21
(b) Set the dial to 20
(c) Feed in 20000 KC signal and adjust oscillator trimmer No. 11 for resonance
(d) Adjust RF and Antenna stages, trimmers Nos. 1 and 4
(e) The alignment at 9 is obtained by use of the fixed condensers. This should not require any change.
(f) In order to make the band more sensitive where most of the foreign reception is obtained, it is advisable to turn the dial to 12 on the third band and readjust the Antenna coil trimmer (No. 1) to peak at 12000 KC.

# HOWARD RADIO CO.

10. THE POWER AMPLIFIER

The Power Amplifier schematic diagram will clearly give all information that is needed from a servicing standpoint.

The tuner is coupled to the Audio by the 56 tube, resistance coupled to two 56 drivers into the four push-pull parallel 2A5s.

The rectifier circuit uses the 83V tube for the B Supply.

However, the bias voltage for the 2A5s is obtained by an additional rectifying circuit comprising the 56 tube and additional choke and filter.

11. VARIOUS MECHANICAL ADJUSTMENTS

(a) The adjustment of the white fabric drive belt is very easily made tighter or looser by use of a socket wrench to turn the nut holding the idler pulley stud which is adjustable in the slot (see pictorial diagram). Pushing the stud upward tightens the belt, and downward loosens the tension of the belt. There is no necessity for making this belt real tight, as the belt is under no load -- only the dial disc -- it is advisable to just take out the slack.

(b) Adjustment of the rubber tread drum against the knurled drive shaft is accomplished by loosening the screws holding the variable condenser spacers (see pictorial diagram).

It is advisable to loosen and reset the fabric belt as mentioned above after making this adjustment, since the changing of one will affect the other.

The right tension between the drum and the knurled shaft can be easily determined by turning the condenser to one extreme rotation and adjusting the space just so it will pull the drive mechanism. Too much pressure will cause too much work between the rubber and shaft, resulting in slippage of the drive on slow speed. Too little pressure of course will result in slippage at any speed.

(c) For other drive adjustments, remove the Escutcheon Plate three screws on top, five along bottom -- to adjust the drive discs, if necessary.

12. NOTES:-

(1) The replacement parts list is given on the last sheet of this manual.

(2) On some of the models the dual speed is accomplished by use of a push-pull knob instead of a double knob.

(3) The first terminal lug next to the ground terminal on the 11 terminal strip is not used.

(4) The resistance value of the resistor marked "X" on the pictorial diagram may be of different values, since it is placed there to reduce tendency of oscillations in the Third Short Wave Band.

(5) On one series of sets a single shielded wire is used to couple tuner to amplifier. The later sets use a double shielded wire. The red wire is the feed wire to the amplifier, and the black is ground and connects directly from the volume control to the ground lug within the power pack. This provides a better ground connection in addition to the shielding.

(6) Should the receiver blow fuses easily the 83V tube should be checked the first thing.

REPLACEMENT PARTS LIST OF "W" (EXPLORER) TUNER

| Part No. | Name | Amt. Per Unit | Price Ea. |
|---|---|---|---|
| 2885 | 1st IF complete | 1 | $ 1.10 |
| 2885 | 2nd IF complete | 1 | 1.10 |
| 2885 | 3rd IF complete | 1 | 1.10 |
| 2891 | Tri Coil Assembly complete | 1 | 1.10 |
| SA1140 | Broadcast Antenna Coil complete | 1 | 1.10 |
| SA1141 | Broadcast RF Coil complete | 1 | 1.00 |
| SA1142 | Broadcast OSC Coil complete | 1 | 1.10 |
| SA1144 | Short Wave #1 Band Antenna Coil | 1 | .90 |
| SA1145 | Short Wave #1 Band RF Coil | 1 | .90 |
| SA1146 | Short Wave #1 Band OSC Coil | 1 | .90 |
| SA1147 | Short Wave Band #2 Antenna Coil | 1 | .90 |
| SA1148 | Short Wave Band #2 RF Coil | 1 | .90 |
| SA1149 | Short Wave Band #2 OSC Coil | 1 | .90 |
| SA1150 | Short Wave Band #3 Antenna Coil | 1 | .85 |
| SA1151 | Short Wave Band #3 RF Coil | 1 | .85 |
| SA1152 | Short Wave Band #3 OSC Coil | 1 | .85 |
| SA1154 | Auxillary OSC Coil | 1 | .75 |
| S..2889 | Long Wave Antenna Coil Assembly | 1 | 1.10 |
| SA2939 | Long Wave RF Coil Assembly | 1 | 1.10 |
| SA1143 | Long Wave OSC Coil Assembly | 1 | 1.20 |
| 2872 | Two Plate Trimmer | 12 | .25 |
| 2877 | Seven Plate Trimmer | 2 | .35 |
| 2879 | Nine Plate Trimmer | 1 | .35 |
| 2364 | Oscillator Switch | 1 | .30 |
| 2863 | Volume Control 500,000 ohms | 1 | .75 |
| 2890 | 10,000 ohm Noise suppressor | 1 | .75 |
| 2862 | 500,000 Ohm tone control and switch | 1 | 1.00 |

**MODEL W**
**Parts List**

# HOWARD RADIO CO.

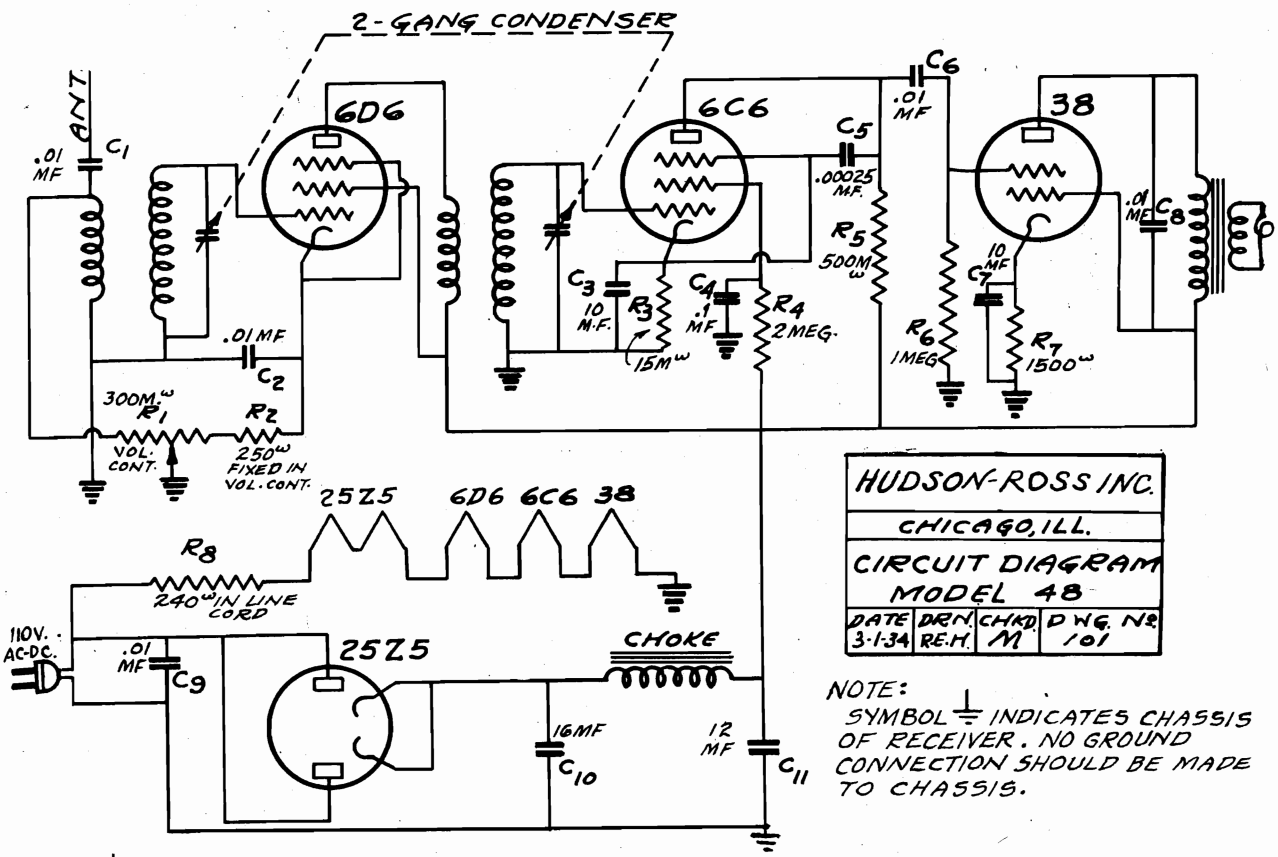
| Part No. | Name | Amt. Per Unit | Price Ea. |
|---|---|---|---|
| 2384 | 1/4 mfd. 200 volt Paper Condenser | 4 | .25 |
| 2758 | 1/4 mfd. 400 volt Paper Condenser | 2 | .25 |
| 2378 | 1/10 mfd. 200 volt Paper Condenser | 8 | .20 |
| 2756 | 1/10 mfd. 400 volt Paper Condenser | 1 | .20 |
| 2757 | .05 mfd. 400 volt Paper Condenser | 4 | .20 |
| 1767 | .01 mfd. 200 volt Paper Condenser | 3 | .20 |
| 2759 | .03 mfd. 200 volt Paper Condenser | 1 | .20 |
| 2231 | 1 mfd. 200 volt Paper Condenser | 1 | .60 |
| 2232 | 1/2 mfd. 400 volt Paper Condenser | 1 | .60 |
| 2287 | .002 Mica Condenser | 1 | .25 |
| 2381 | .0001 Mica Condenser | 2 | .20 |
| 2419 | .008 Mica Condenser | 2 | .35 |
| 1801 | .001 Mica Condenser | 1 | .20 |
| 2422 | .0005 Mica Condenser | 3 | .20 |
| 2763 | 500,000 Ohm 1/5 watt Resistor | 3 | .15 |
| 1897 | 200,000 Ohm 1/5 watt Resistor | 5 | .15 |
| 1844 | 100,000 Ohm 1/5 watt Resistor | 2 | .15 |
| 1873 | 100,000 Ohm 1/2 watt Resistor | 3 | .15 |
| 1843 | 50,000 Ohm 1/5 watt Resistor | 3 | .15 |
| 1747 | 50,000 Ohm 1/2 watt Resistor | 2 | .15 |
| 1772 | 20,000 Ohm 1 watt Resistor | 1 | .20 |
| 2274 | 4,000 Ohm 1/2 watt Resistor | 1 | .15 |
| 1956 | 4,000 Ohm 1/5 watt Resistor | 1 | .15 |
| 1835 | 3,000 Ohm 1/5 watt Resistor | 1 | .15 |
| 2383 | 3,000 Ohm 1/2 watt Resistor | 1 | .15 |
| 1829 | 1,800 Ohm 1/2 watt Resistor | 1 | .15 |
| 2373 | 1,100 Ohm 1/2 watt Resistor | 1 | .15 |
| 2774 | 500 Ohm 1/5 watt Resistor | 1 | .15 |
| 2206 | 500 Ohm 1/2 watt Resistor | 2 | .15 |
| 2761 | 300 Ohm 1/5 watt Resistor | 1 | .15 |
| 2871 | Two Gang Variable | 1 | 2.50 |
| 2866 | Three Gang Variable | 1 | 3.00 |

REPLACEMENT PARTS LIST OF POWER AMPLIFIER

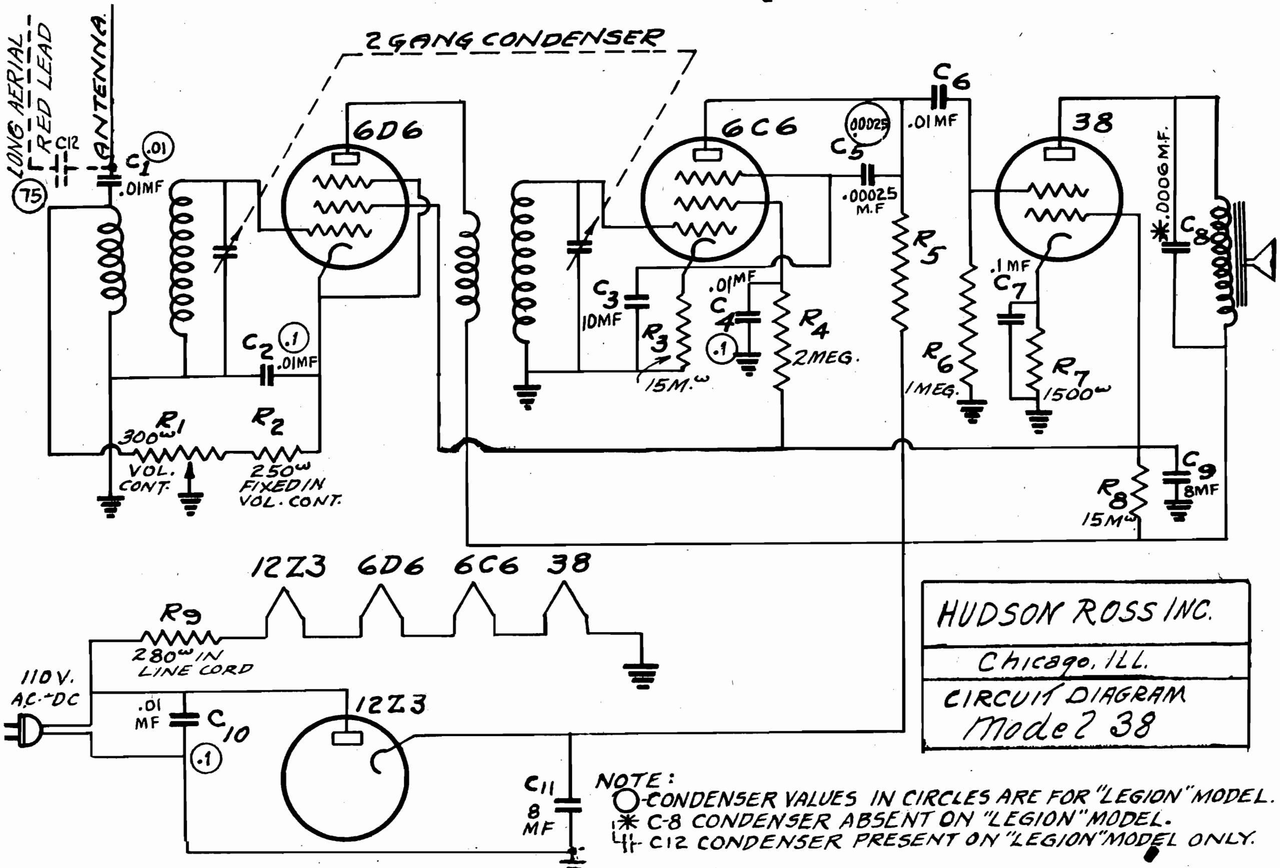
| Part No. | Name | Amt. Per Unit | Price Ea. |
|---|---|---|---|
| 2856 | Power Transformer, 110 volt 60 cycle | 1 | $ 7.50 |
| 2235 | 5 Amp. Fuse | 1 | .10 |
| 2859 | "B" Voltage Divider | 1 | .70 |
| 2851 | Filter Block 4 Section | 1 | 7.00 |
| 2850 | Filter Condenser 2 Section | 1 | 2.00 |
| 2427 | 10 mfd. Electrolytic Condenser | 1 | .75 |
| 1926 | Small "B" Choke | 1 | 1.00 |
| 2858 | Large "B" Choke | 1 | 2.00 |
| 2758 | 1/4 mfd. Condenser 400 volt | 5 | .25 |
| 1827 | 30,000 Ohm 1/2 watt Resistor | 4 | .15 |
| 2423 | 25,000 Ohm 1/5 watt Resistor | 1 | .15 |
| 2768 | 2,000 Ohm 1/5 watt Resistor | 1 | .15 |
| 2339 | 3,500 Ohm 1/2 watt Resistor | 1 | .15 |
| 1897 | 200,000 Ohm 1/5 watt Resistor | 1 | .15 |
| 1844 | 100,000 Ohm 1/5 watt Resistor | 1 | .15 |
| 1843 | 50,000 Ohm 1/5 watt Resistor | 2 | .15 |
| 2980-C | Speaker Cone for the "Ortho" | 1 | 1.00 |
| 2980-T | Speaker Transformer | 1 | 2.00 |
| 2980-P | Speaker - 6 prong plug | 1 | .25 |

MODEL 38 Schematic
MODEL 48 Schematic

HUDSON-ROSS, INC.



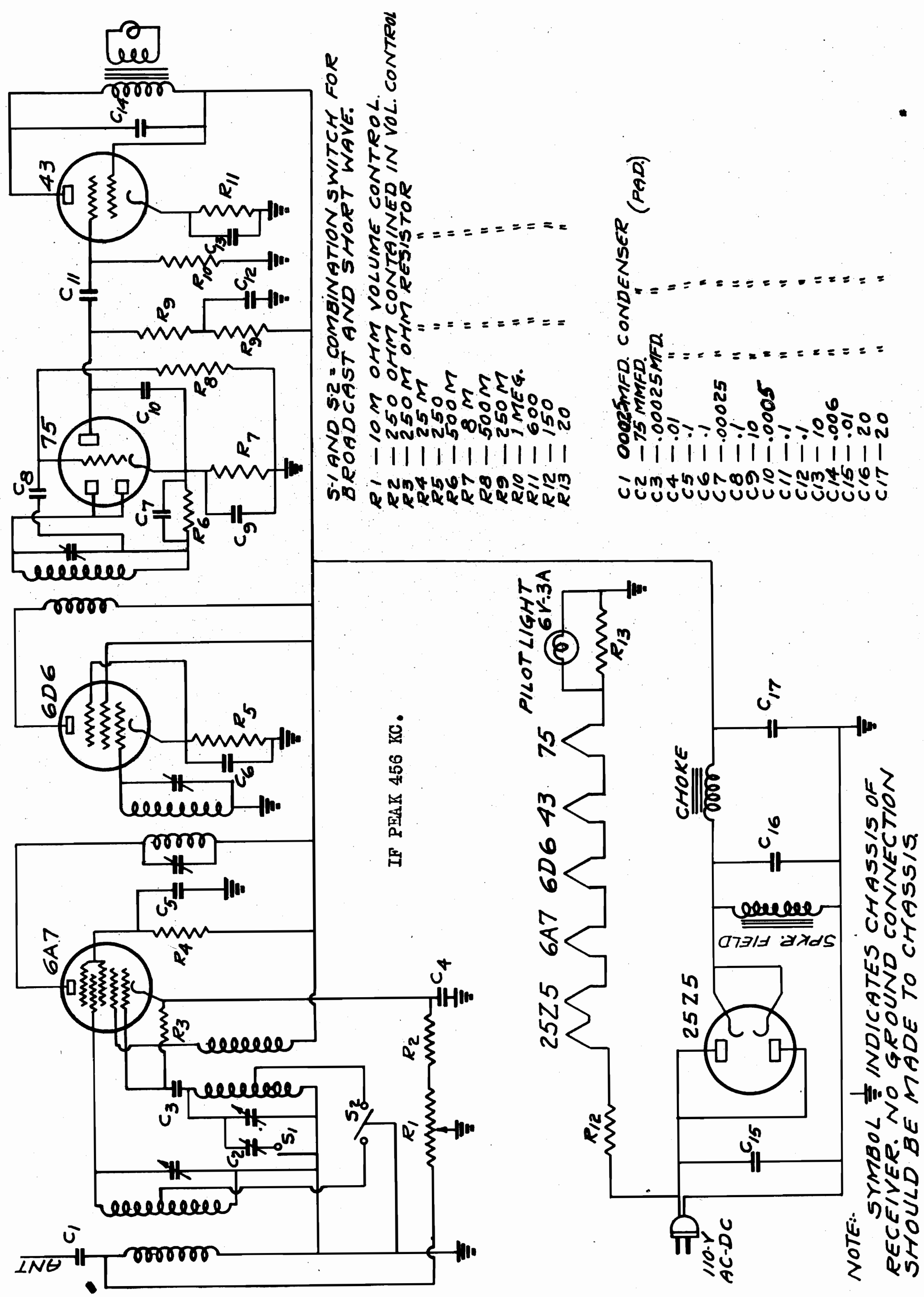

NOTE:
SYMBOL ⏚ INDICATES CHASSIS OF RECEIVER. NO GROUND CONNECTION SHOULD BE MADE TO CHASSIS.




NOTE:
○ CONDENSER VALUES IN CIRCLES ARE FOR "LEGION" MODEL.
✱ C-8 CONDENSER ABSENT ON "LEGION" MODEL.
⊣⊢ C12 CONDENSER PRESENT ON "LEGION" MODEL ONLY.

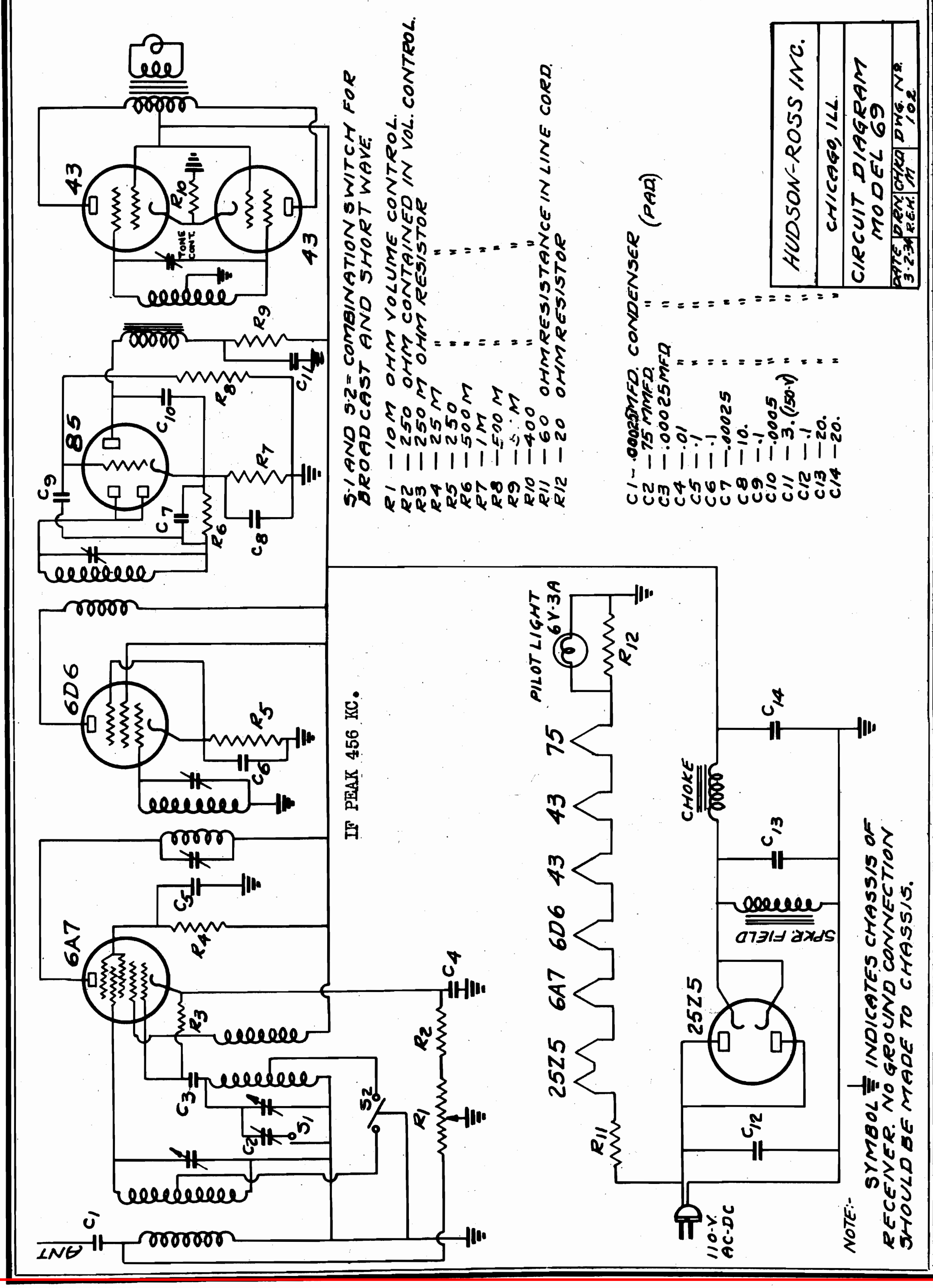
MODEL 59
Schematic

HUDSON-ROSS, INC.



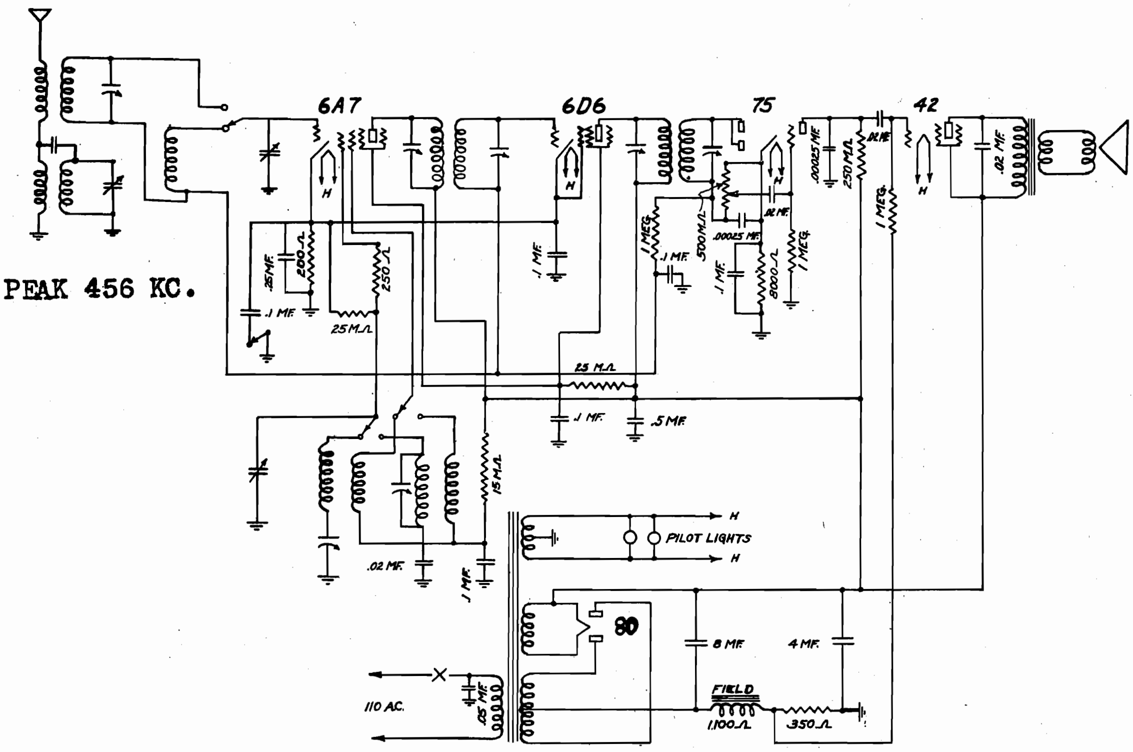
MODEL 69
Schematic

HUDSON-ROSS, INC.



**MODEL 80**
**Schematic, Parts**

# HUDSON-ROSS, INC.

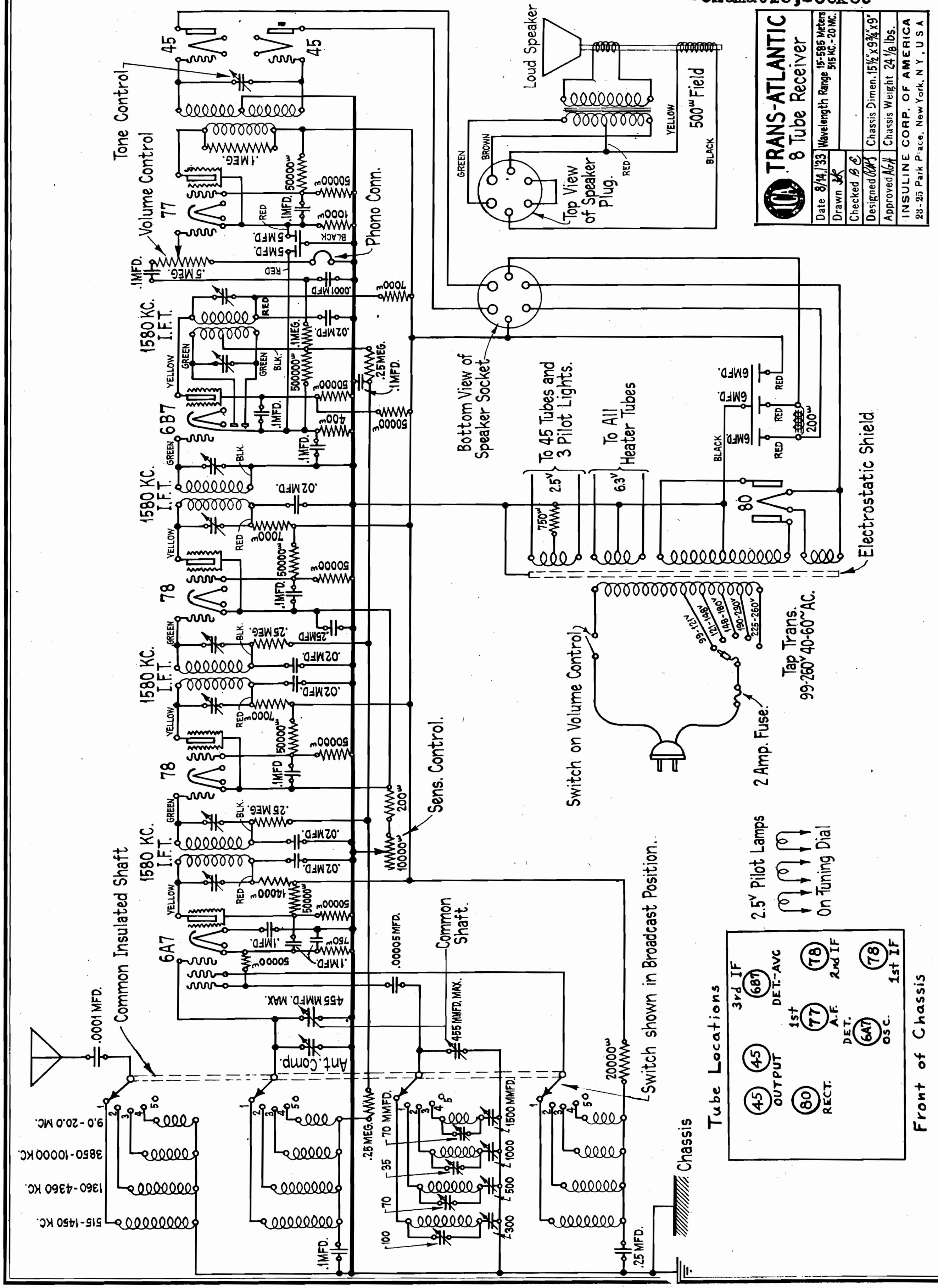



IF PEAK 456 KC.

| PART NO. | DESCRIPTION |
|---|---|
| 701 | FILTER CONDENSER |
| 702 | .1 BY-PASS CONDENSER |
| 703 | .05 " " |
| 704 | .02 " " |
| 705 | .25 " " |
| 706 | .5 " " |
| 707 | .00025 " " |
| 708 | 1-WATT RESISTOR |
| 709 | MISCELLANEOUS RESISTORS(SPECIFY VALUES) |
| 717 | 350 OHM POWER RESISTOR |
| 718 | VOLUME CONTROL |
| 719 | SHORT WAVE AND BROADCAST SWITCH |
| 720 | OSCILLATOR COIL 456 KC |
| 723 | CORD AND PLUG |
| 733 | POWER TRANSFORMER |
| 738 | 3-GANG CONDENSER |
| 739 | 1ST I F TRANSFORMER |
| 740 | 2ND I F TRANSFORMER |
| 741 | PRE SELECTOR COIL |
| 745 | PILOT LAMP |
| 749 | TRIMMER |
| 751 | KNOB (LARGE) |
| 751-A | KNOBS |
| 754 | PILOT LIGHT SOCKET |
| 758 | SPEAKER |
| 758-A | SPIDER AND VOICE COIL |
| 758-B | 6" DIAPHRAM |
| 762 | S.W. OSCILLATOR COIL |
| 763 | ANTENNA S.W. OSCILLATOR COIL |
| 767 | DIAL DRIVE DISC |
| 768 | CELLULOID DRIVE DISC |
| 769 | DIAL FACE |
| 777 | DIAL POINTER |
| 779 | CONVEX DIAL CRYSTAL |

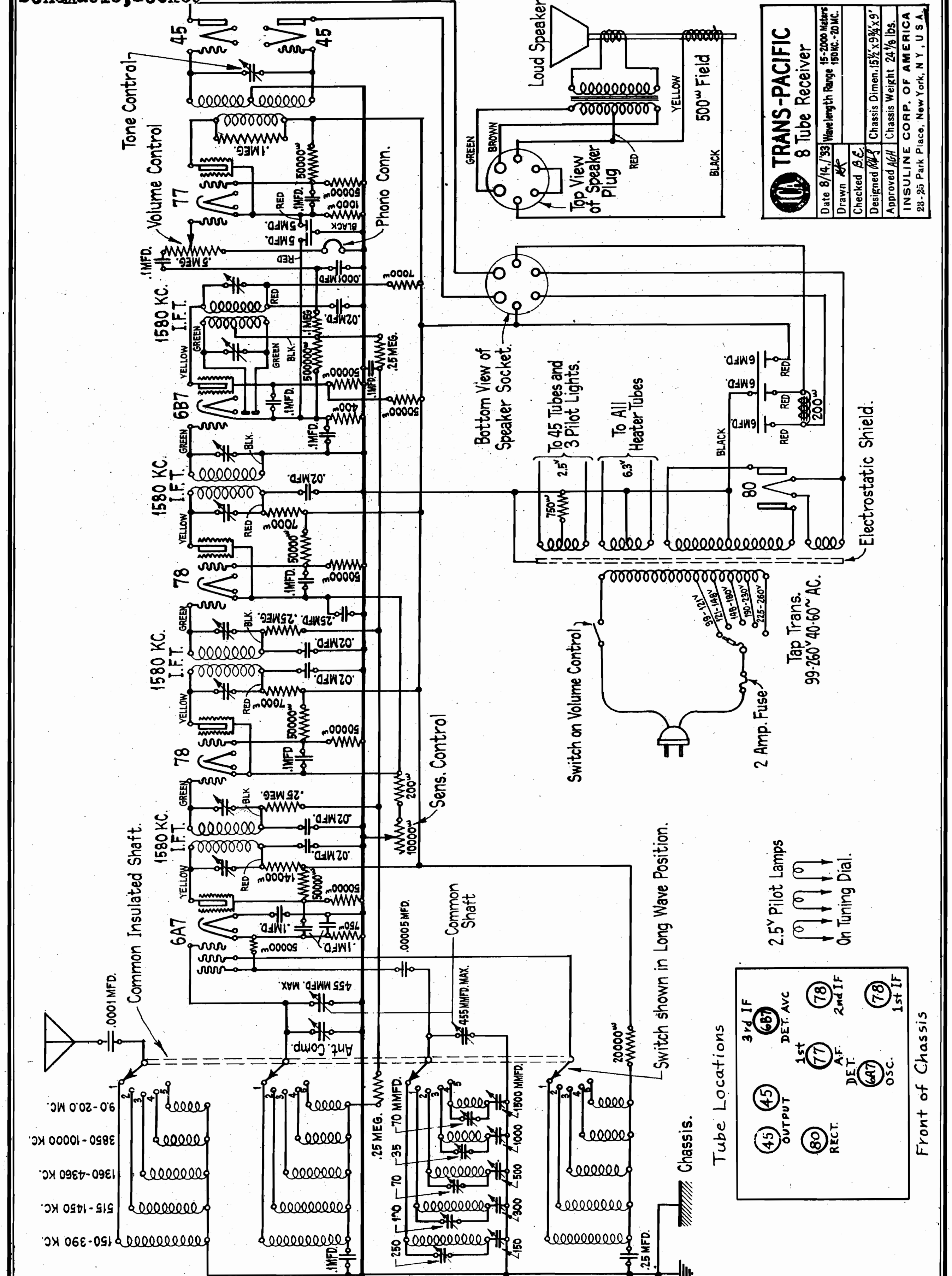
# INSULINE CORP. OF AMERICA

MODEL "Trans-Atlantic"
Schematic, Socket



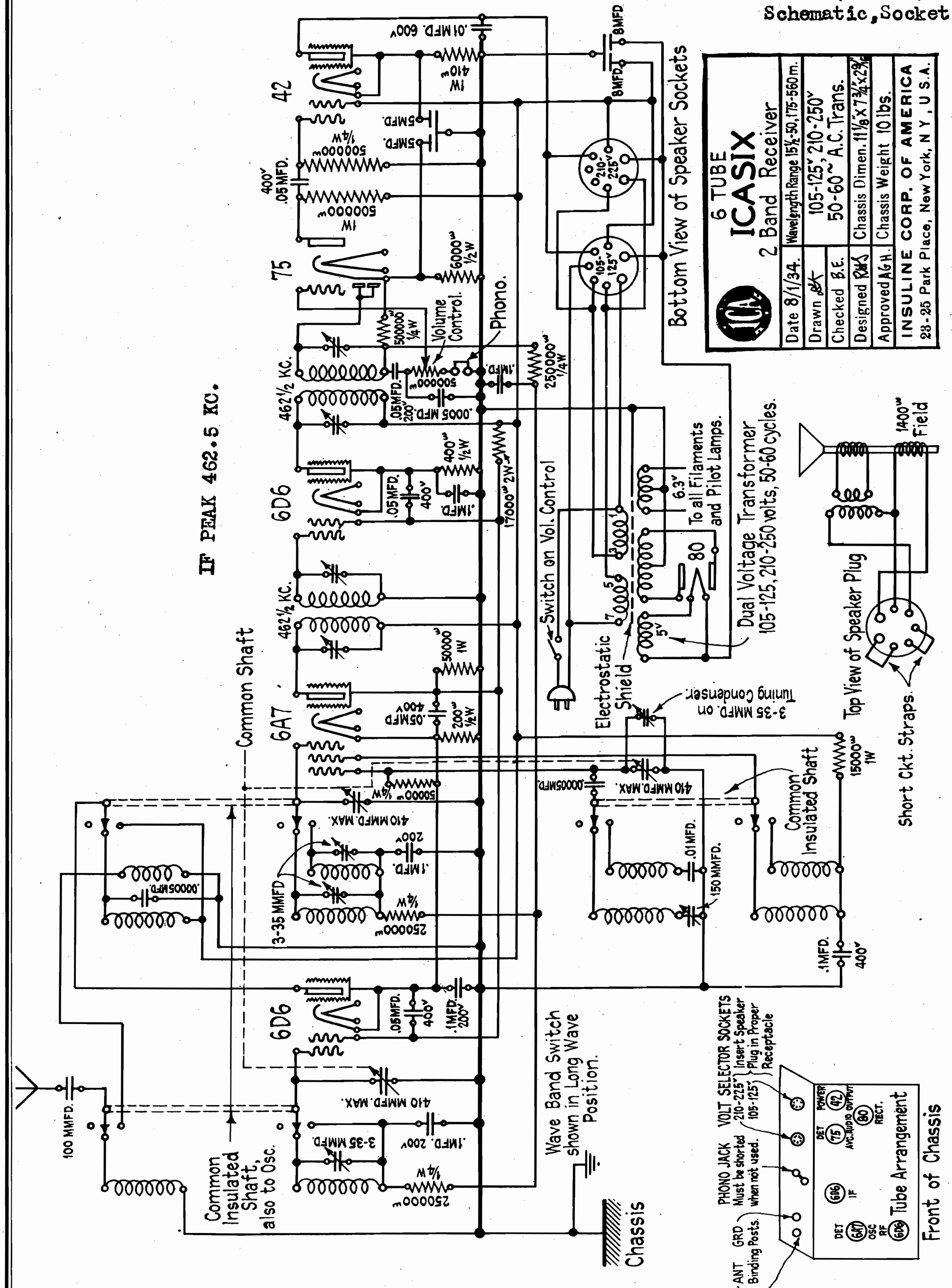
MODEL "Trans-Pacific"
Schematic, Socket

# INSULINE CORP. OF AMERICA



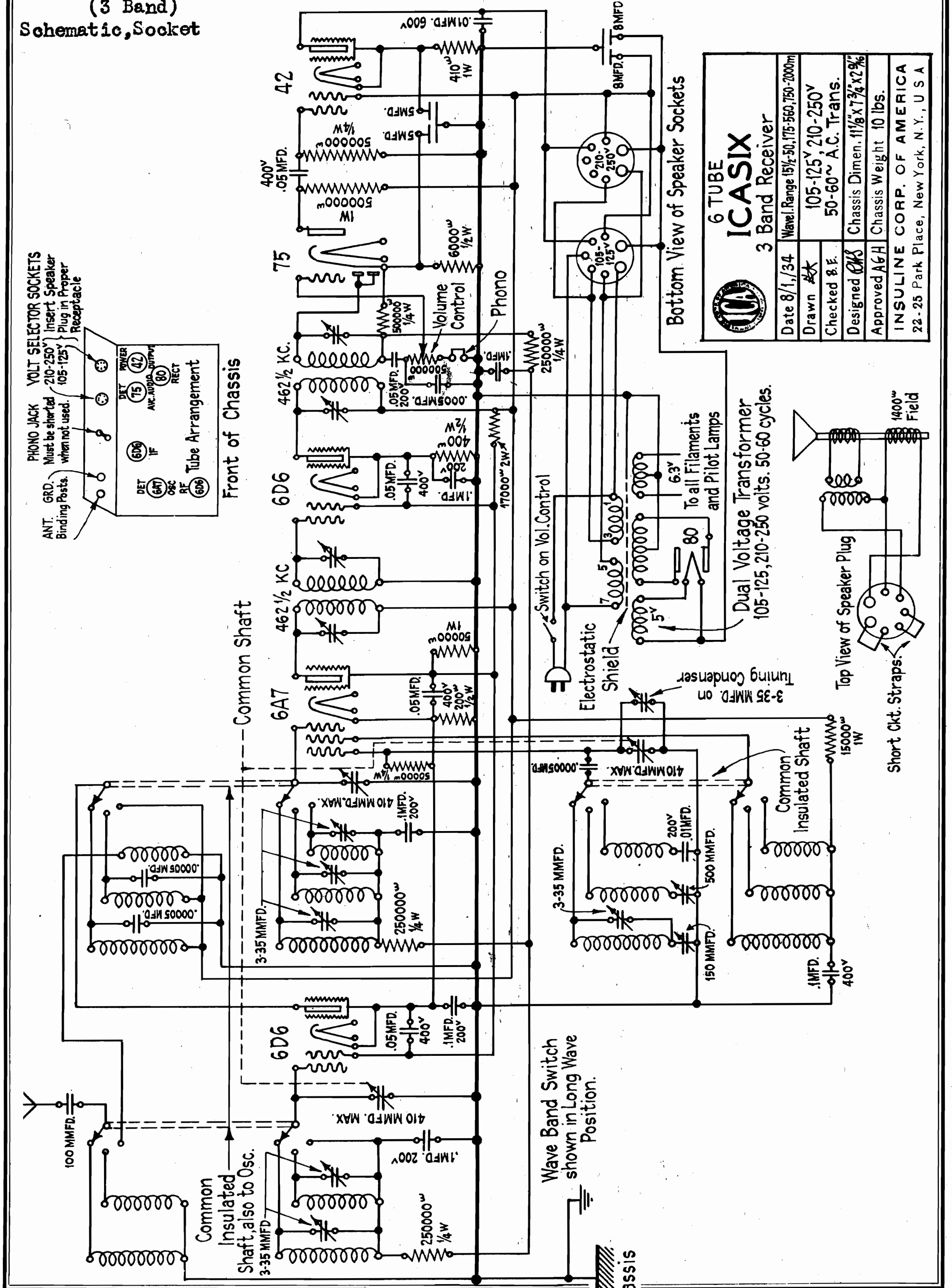
MODEL "Icasix"
(2 Band)
Schematic, Socket

## INSULINE CORP. OF AMERICA



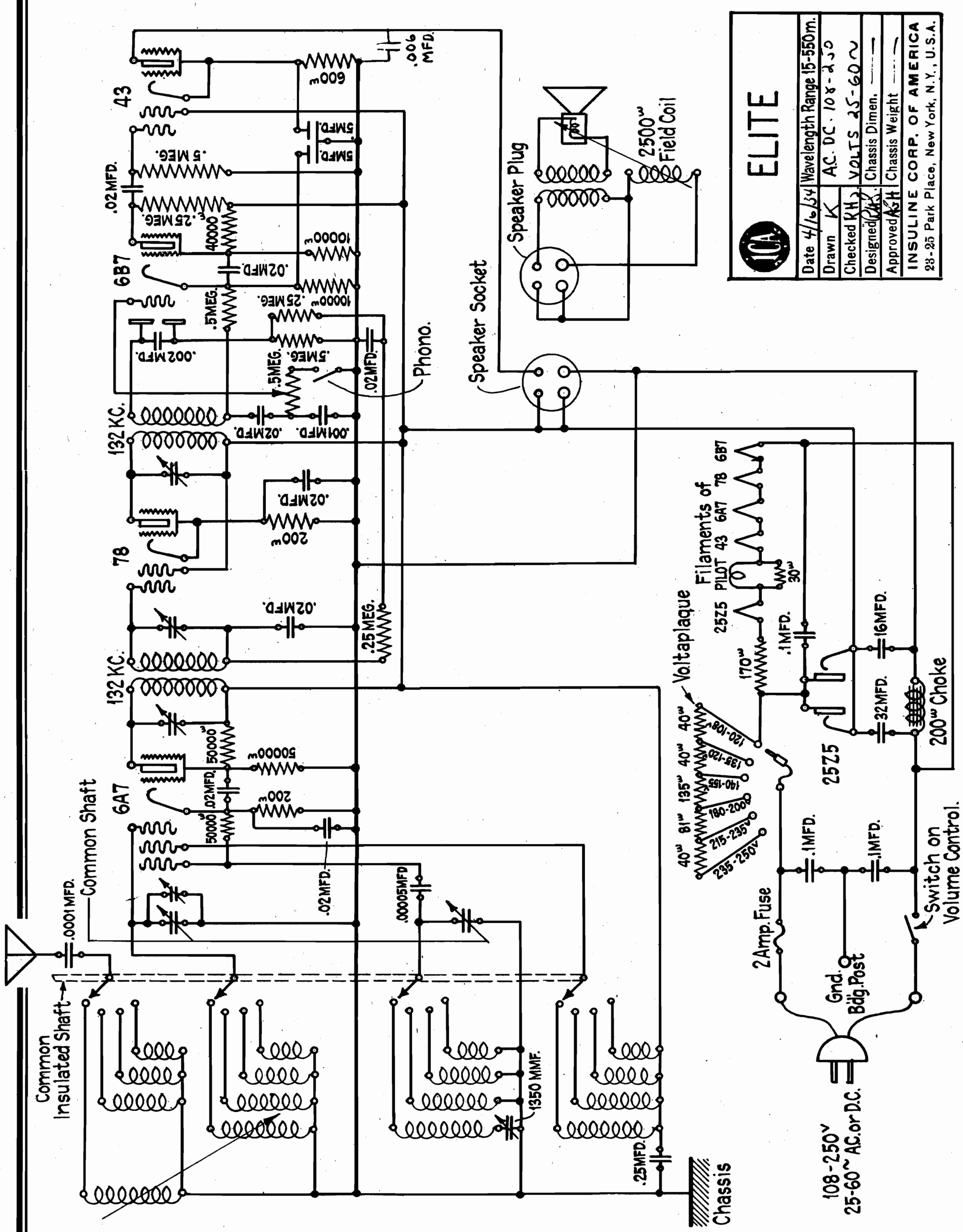
MODEL "Icasix"
(3 Band)
Schematic,Socket

INSULINE CORP. OF AMERICA



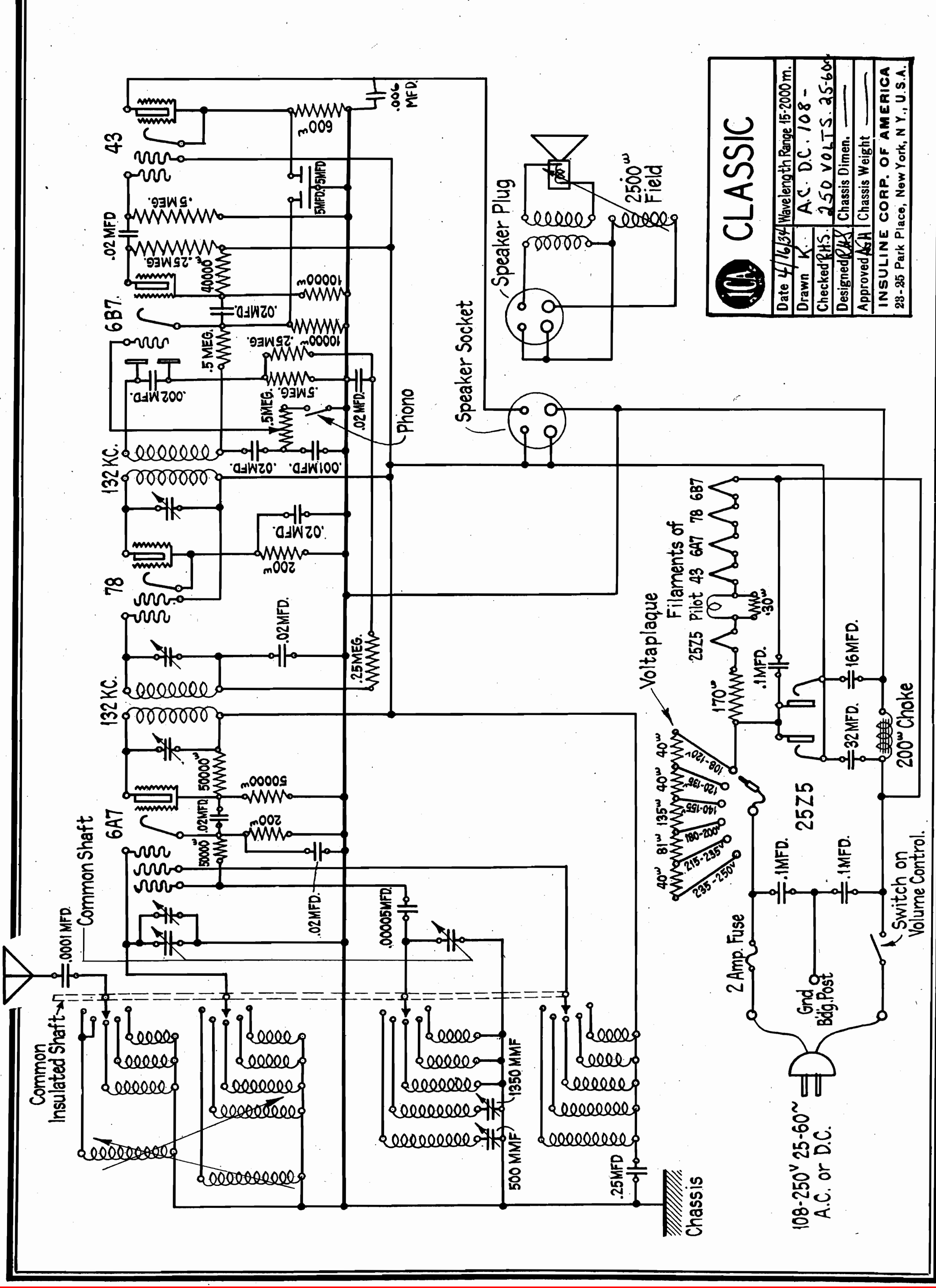
MODEL "Elite"
Schematic

# INSULINE CORP. OF AMERICA



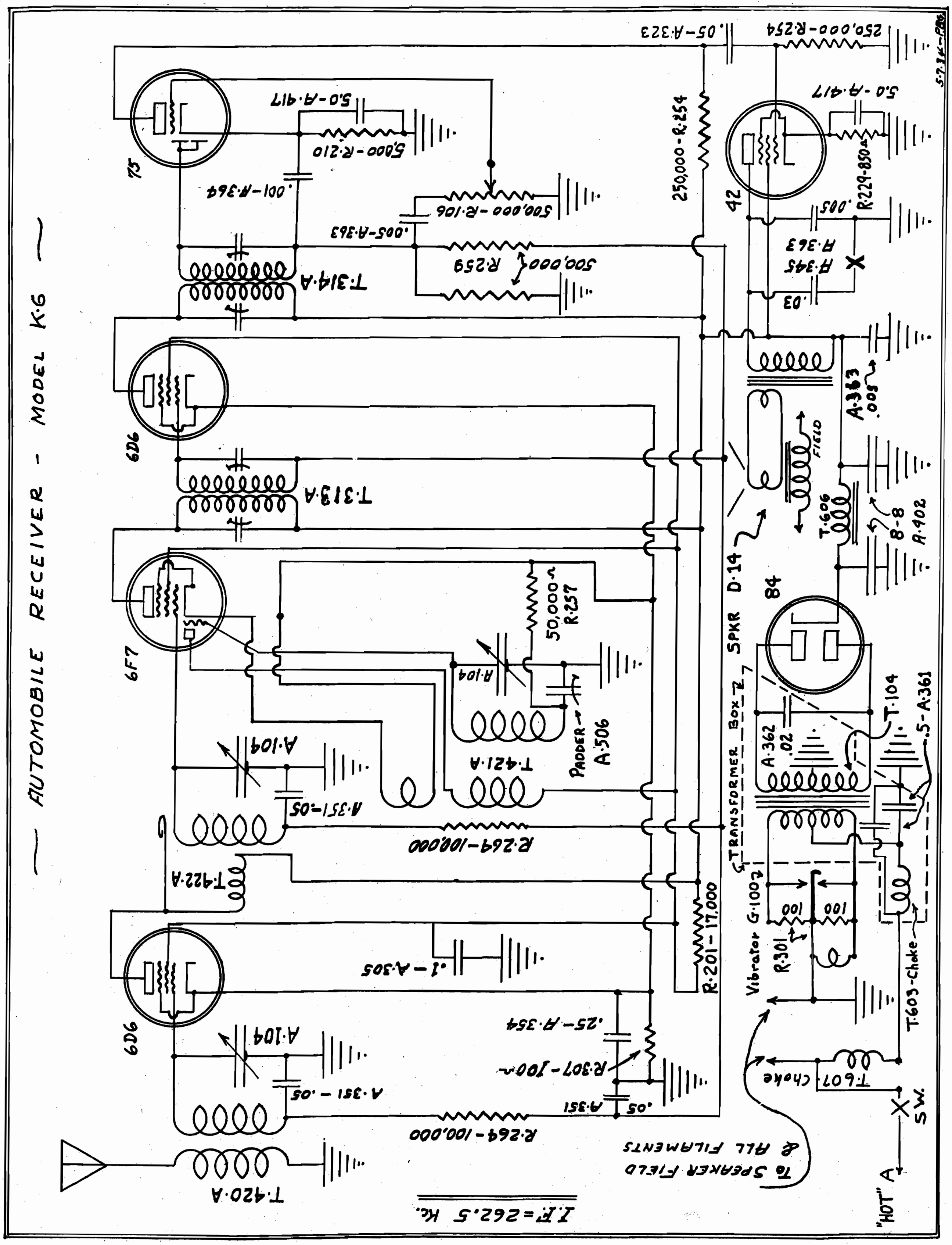
MODEL "Classic"
Schematic

## INSULINE CORP. OF AMERICA



# INTERNATIONAL RADIO CORP.

**MODEL K-60 (K-6) (St.Regis) Schematic**



MODEL K-60 (K-6)
(St.Regis)
Voltage,Alignment

INTERNATIONAL RADIO CORP.

TO REPLACE DIAL LIGHT

Dial light socket assembly may be pried out from the rear of control head by using a small screw driver or knife blade.

AVERAGE TUBE VOLTAGES:

Measurements made from indicated points to chassis. Battery voltage 6 volts.

| POSITION | TUBE | Ef | Ek | $Eg_1$ | $Eg_2$ | $Eg_3$ | Ep |
|---|---|---|---|---|---|---|---|
| R. F. Amplifier | 6D6 | 5.6 | 2 | * | 2 | 75 | 185 |
| 1st Det.-Osc. | 6F7 | 5.6 | 3 | Det. * <br> Osc. —1 | 3 | 75 | Det. 185 <br> Osc. 75 |
| I.F. Amplifier | 6D6 | 5.6 | 2 | * | 2 | 75 | 185 |
| 2nd Det.-A.V.C. | 75 | 5.6 | 2 | 0 | 0 | — | 75 |
| Power Amp. | 42 | 5.6 | 15 | 0 | — | 185 | 175 |
| Rectifier | 84 | 5.6 | 185 | — | — | — | — |

f—Filament; k—Cathode; $g_1$—Control Grid; $g_2$—Suppressor Grid; $g_3$—Screen Grid; p—Plate; *—Depends on applied signal strength.

# Balancing and Aligning

Each automobile radio is carefully balanced on accurate oscillators before leaving the factory. If it is necessary to rebalance because of part changes or other causes a good test oscillator capable of delivering modulated signals at 262½, 1500 and 600 Kc. will be needed. The customary audio out-put meter may be used IF the out-put of the test oscillator is weak enough to get below the A.V.C. action. Otherwise a microammeter will be needed to measure the A.V.C. voltage developed. It should be connected from ground to the junction of two 100M resistors and one condenser in the center bottom of the chassis.

To balance the I.F. circuits, attach the antenna wire to the test oscillator. Short out the oscillator section of the tuning condenser in the radio by inserting a thin piece of metal between the plates. Set the test oscillator to 262½ Kc. and adjust the trimmers on the I.F. transformers for maximum output. Go over all four adjustments at least twice for accuracy.

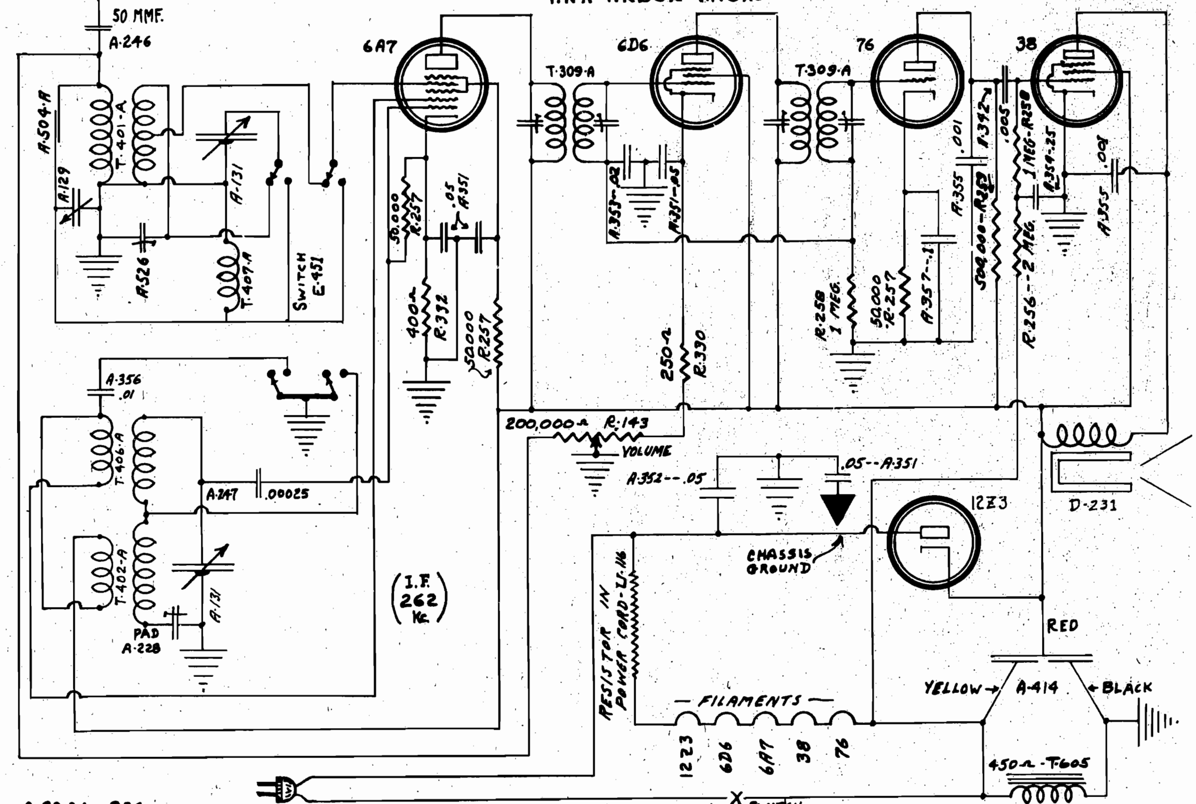
Next set the test oscillator at 1500 Kc. and open the tuning condenser until it is tuned to the test signal as indicated by maximum output. Adjust the small trimmers on top of the condenser gang for maximum output.

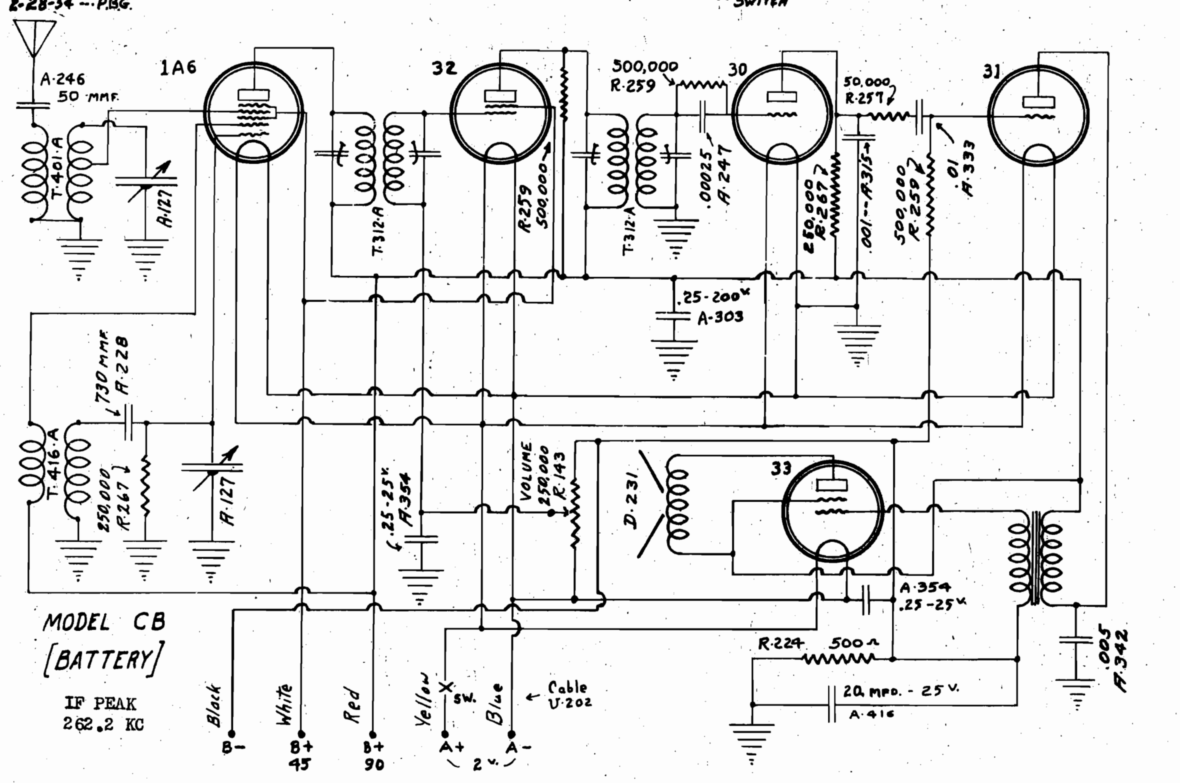
Set the test oscillator at 600 Kc. and, while rocking the tuning condenser slowly back and rorth across this setting, adjust the padder condenser for maximum output. Go over the adjustments at least twice for accuracy.

# INTERNATIONAL RADIO CORP.

MODEL CB (Battery)
Schematic
MODEL CMS
Schematic

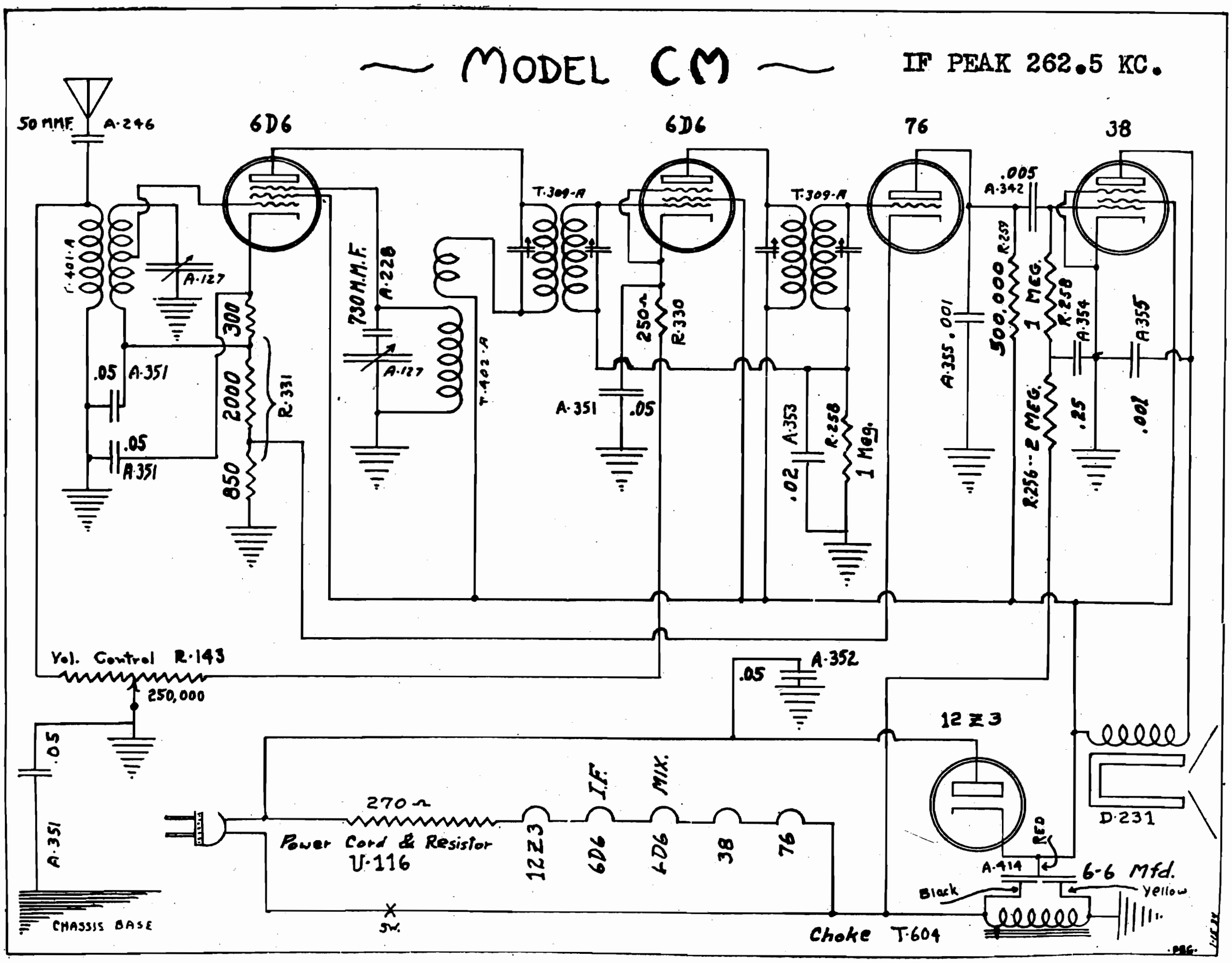
MODEL "CMS" - BROADCAST & SHORT WAVE
INTERNATIONAL RADIO CORP.
ANN ARBOR - MICH.



**MODEL CM**
**Schematic, Voltage**

# INTERNATIONAL RADIO CORP.




**For Balancing Data, Alignment Data** **See Index**

## CHASSIS CM

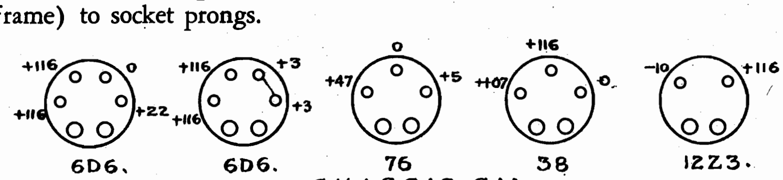
To adjust IF units and align condensers follow these operations in the order given using an output meter connected across the speaker—Operations 1 (oscillator section of 2 gang condenser nearest rear of chassis), 2, 3 and 4.

### Color Code Marking of Coils

| | |
|---|---|
| 1st IF—Red | 2nd IF—Red |
| Antenna—Red | Oscillator—Red |

### Socket Voltages

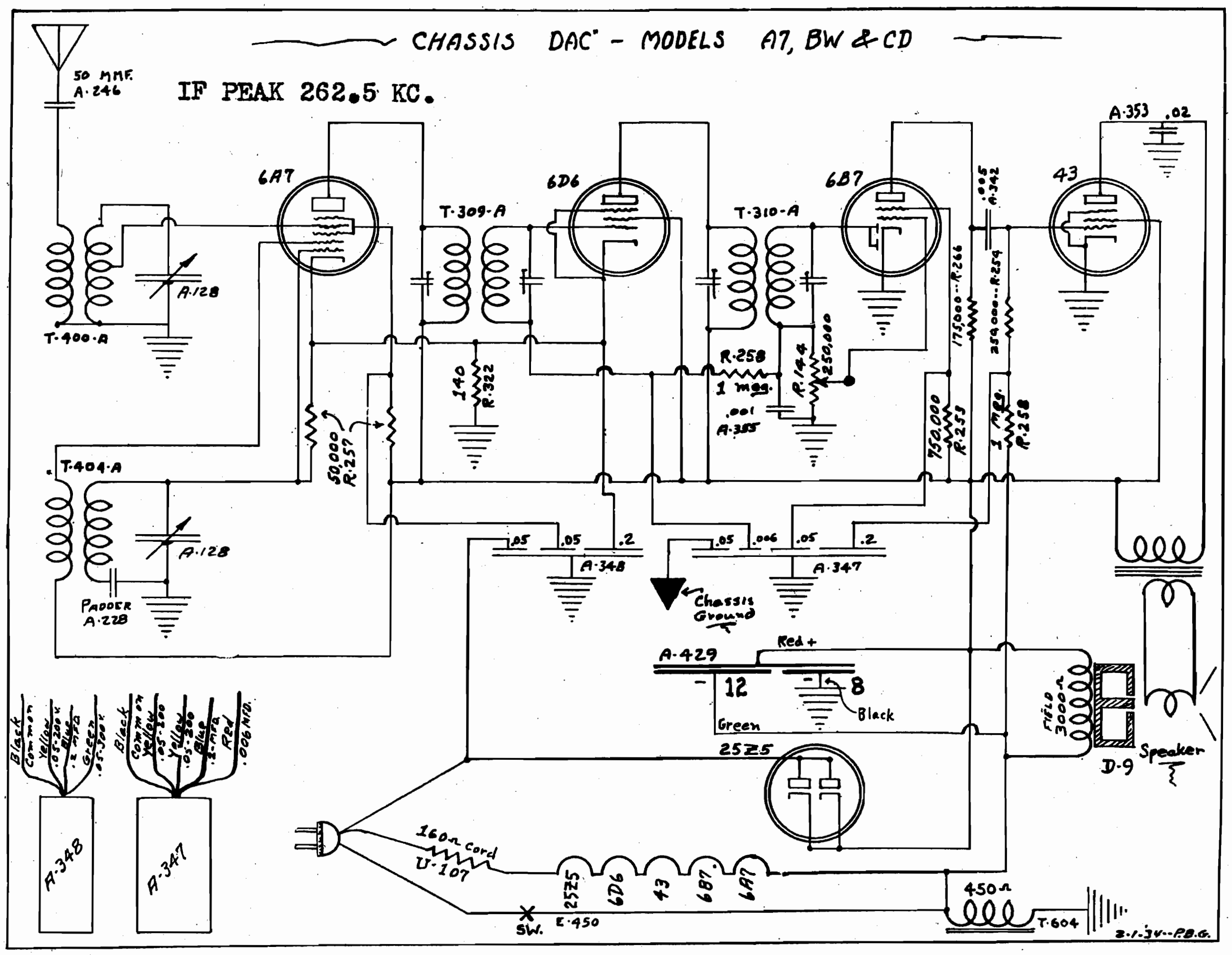
Approximately normal tube voltages measured with a 0-300 volt, 1000 ohm per volt DC voltmeter with set operated on a 115 volt AC line. Volume control in FULL ON position. Measurements made from B negative (condenser frame) to socket prongs.




CHASSIS CM.
BOTTOM VIEW.

**MODEL A-7,BW,CD (DAC)**
**Schematic,Voltage**

# INTERNATIONAL RADIO CORP.




**For Balancing Data, Alignment Data** **see Index**

## CHASSIS DAC

To adjust units and align condensers follow these operations in the order given using microammeter or D. C. milliammeter connected as previously described—Operations 1 (oscillator section of 2 gang condenser nearest front of chassis), 2, 3, and 4.

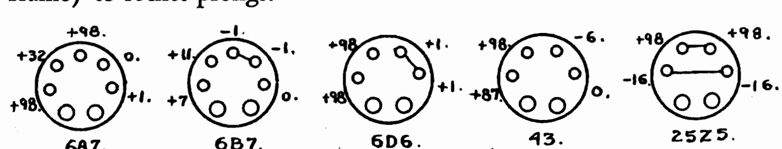
## Color Code Marking of Coils

1st IF—Red
Antenna—Green

2nd IF—Green
Oscillator—Yellow

## Socket Voltages

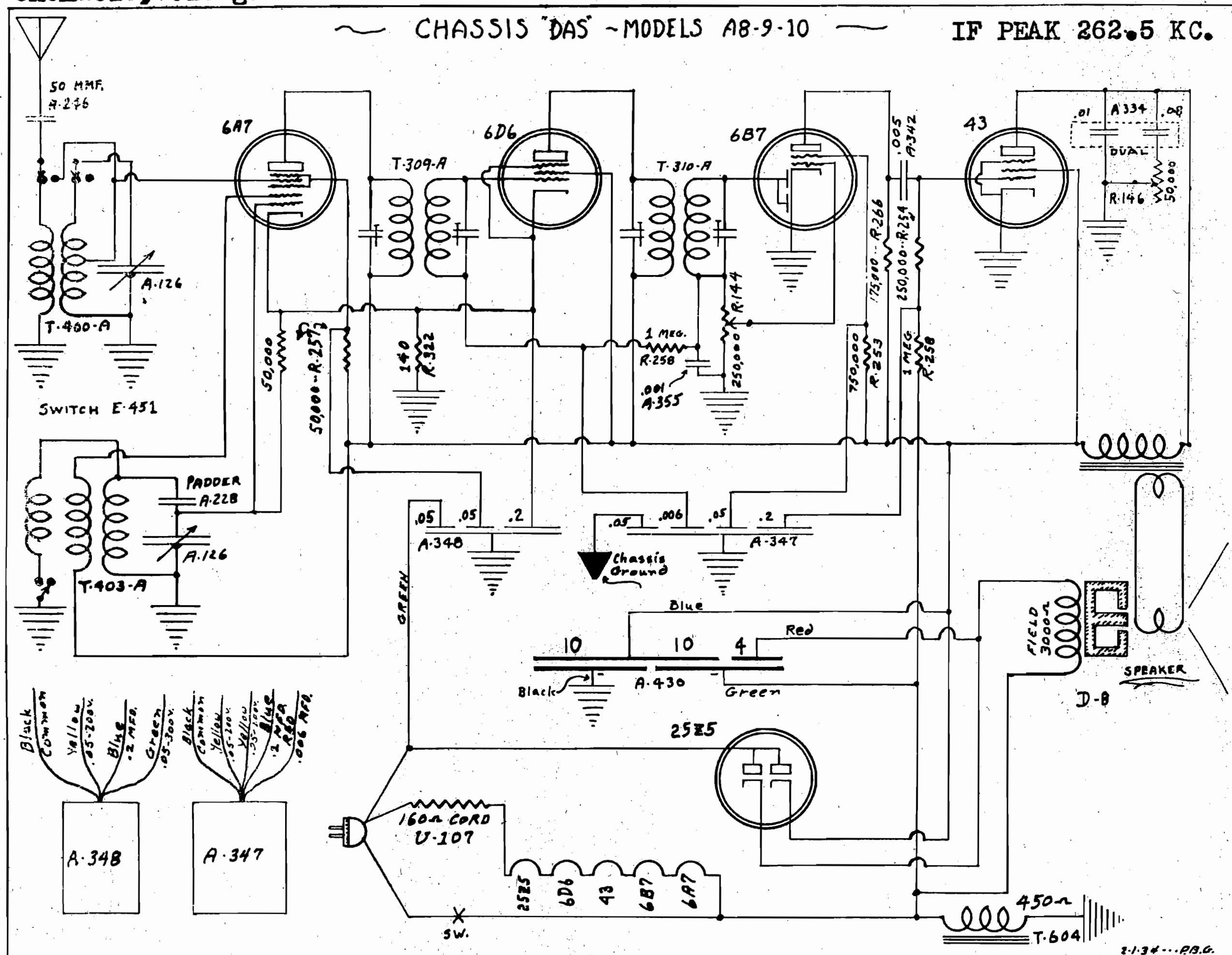
Approximate normal tube voltages measured with a 0-300 volt, 1000 ohm per volt DC voltmeter with set operated on a 115 volt AC line. Volume control in FULL ON position. Measurements made from B negative (condenser frame) to socket prongs.




CHASSIS DAC.
BOTTOM VIEW.

MODEL A-8, A-9, A-10, AD-11, AD-12 (Chassis DAS)
Schematic, Voltage

# INTERNATIONAL RADIO CORP.




## CHASSIS DAS

**For Balancing and Alignment Data, see Index**

To adjust IF units and align condensers follow these operations in the order given using microammeter or D. C. milliammeter as previously described—Operations 1 (oscillator section of 2 gang condenser nearest front of chassis), 2, 3, and 4.

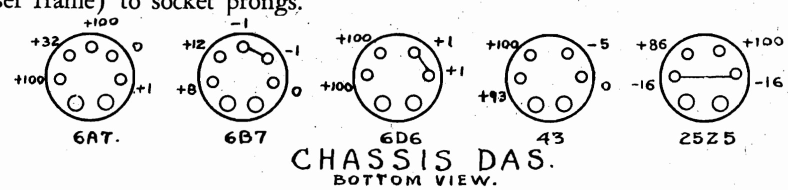
## Aligning Short Wave on DAS Chassis

When properly adjusted for the broadcast band No Additional Adjustments Are Necessary on the Short Wave Band.

## Color Code Marking of Coils

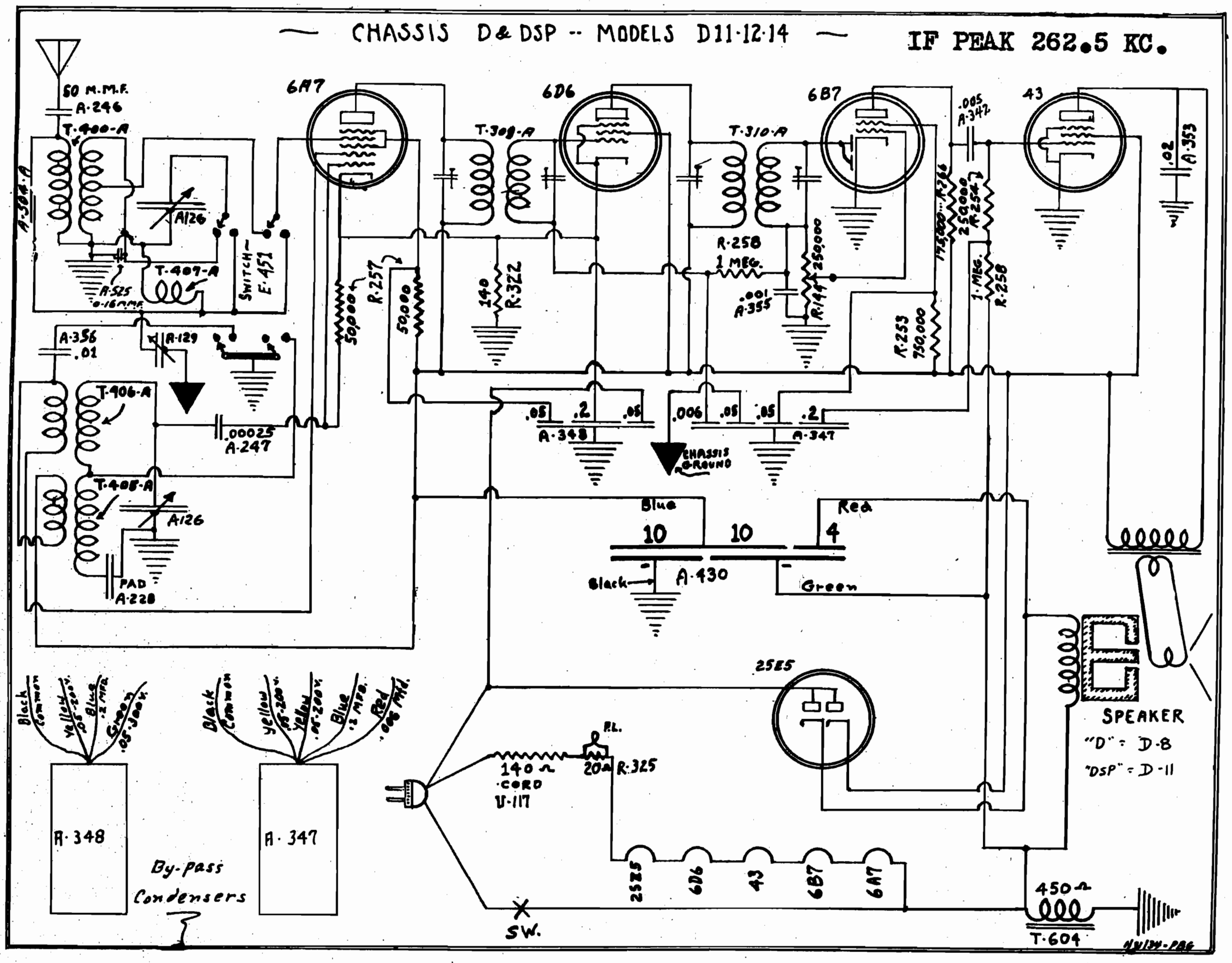
| | |
|---|---|
| 1st IF—Red | 2nd IF—Green |
| Antenna—Green | Oscillator—No mark |

Approximate normal tube voltages measured with a 0-300 volt, 1000 ohm per volt DC voltmeter with set operated on a 115 volt AC line. Volume control in FULL ON position. Measurements made from B negative (condenser frame) to socket prongs.



# INTERNATIONAL RADIO CORP.

**MODEL DA-8, DA-9, DA-10**
**D-11, D-12, D-14**
**(Chassis D, DSP)**
**Schematic, Voltage**



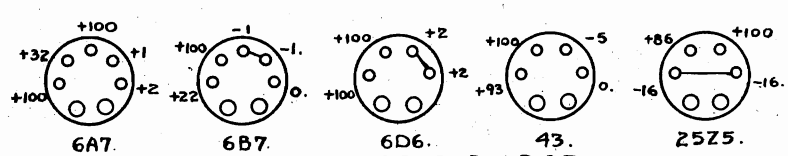

**For Balancing Data, Alignment Data** **see Index**

## Color Code Marking of Coils

| | |
|---|---|
| 1st IF—Red | 2nd IF—Green |
| BC Antenna—Green | BC Oscillator—Green |
| SW Antenna—Green | SW Oscillator—Green |

## Socket Voltages

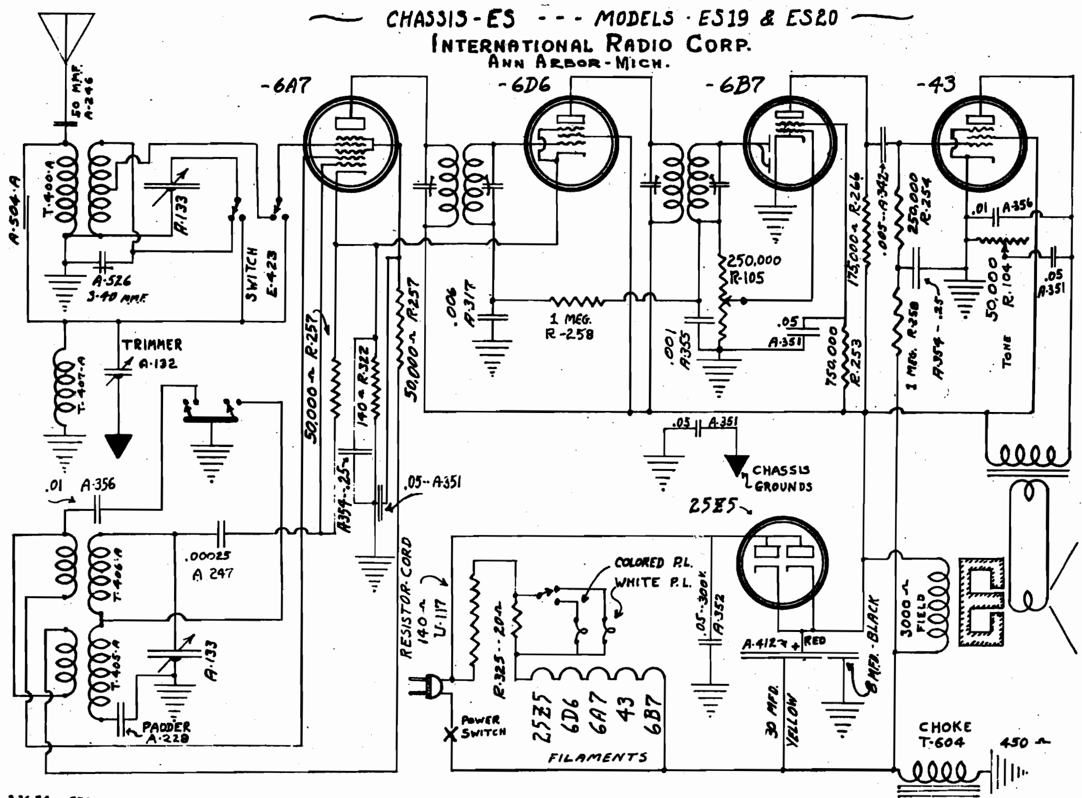
Approximate normal tube voltages measured with a 0-300 volt, 1000 ohm per volt DC voltmeter with set operated on a 115 volt AC line. Volume control in FULL ON position. Measurements made from B negative (condenser frame) to socket prongs.




CHASSIS D.&DSP.
BOTTOM VIEW.

MODEL ES-19, ES-20
Chassis ES
Schematic
Alignment Data

# INTERNATIONAL RADIO CORP.




3-26-34 -- P.B.A.

## Instructions for Balancing and Aligning

Adjustments have been carefully made at the factory and should not need to be changed unless it has been necessary to replace an IF transformer or coil or the adjustments have been tampered with. Later in this bulletin, when the different chassis are taken up one by one, reference will be made to the following operations.

OPERATION No. 1 Adjustment of IF transformers. When adjusting the IF units the oscillator section of the 2 gang variable condenser must be shorted out. This is easily accomplished by inserting a thin strip of metal between the plates. Set the test oscillator to 262½ kilocycles and connect its output to the antenna wire of the set. Using a No. 4 fibre spintite socket wrench adjust the 4 nuts at the ends of the IF units until exact resonsnace is obtained. It is advisable to go over them more than once as when one nut is adjusted it may throw the adjustment on the other end of the unit, slightly out of resonance.

OPERATION No. 2. Adjusting trimmers on 2 gang condenser at 1500 kilocycles. Set the test oscillator to 1500 kilocycles and connect its output to the antenna wire of the set. If the output of the oscillator is too strong connect through a very small fixed condenser or place the output wire of the oscillator near the antenna wire without making any direct connection. Open the variable condenser until maximum signal is indicated by the meter. Then adjust the trimmer on the antenna section of the condenser until maximum signal is indicated on the meter. See "Recommended Service Department Equipment" for instructions regarding meter.

OPERATION No. 3. Aligning 2 gang condenser on 1000 kilocycles. Test oscillator set at 1000 kilocycles and coupled to antenna wire of set. Insert a thin bakelite, celluloid or mica feeler strip between the plates of the variable condensers to determine whether the circuits are properly matched. The action is this—the dielectric constant of the celluloid feeler strip being higher than that of the air it displaces, results in an increase of capacity. Open the variable condenser just enough to indicate two or three points below maximum signal. As the feeler is inserted the meter reading should indicate increasing signal and then decreasing as the feeler is inserted farther. This procedure should be followed on both sections.Should the meter fail to show an increase in signal as the strip is inserted in either section this indicates too great a capacity for that section. This may be corrected by bending the outside rotor plates out at the point where they begin to mesh with the stator.

OPERATION No. 4 Aligning 2 gang condenser at 550 kilocycles. Instructions same as for operation 3 except test oscillator and set tuned at 550 kilocycles.

## CHASSIS' D & DSP

Chassis DSP is the same as chassis D except that an external 6" dynamic type speaker is used.

To adjust IF units and align condensers follow these operations in the order given—Operations 1 (oscillator section of 2 gang condenser nearest front of chassis), 5 (given below), 6 (given below), 3, 4 and 7 (given below). Use microammeter or DC milliammeter as previously described.

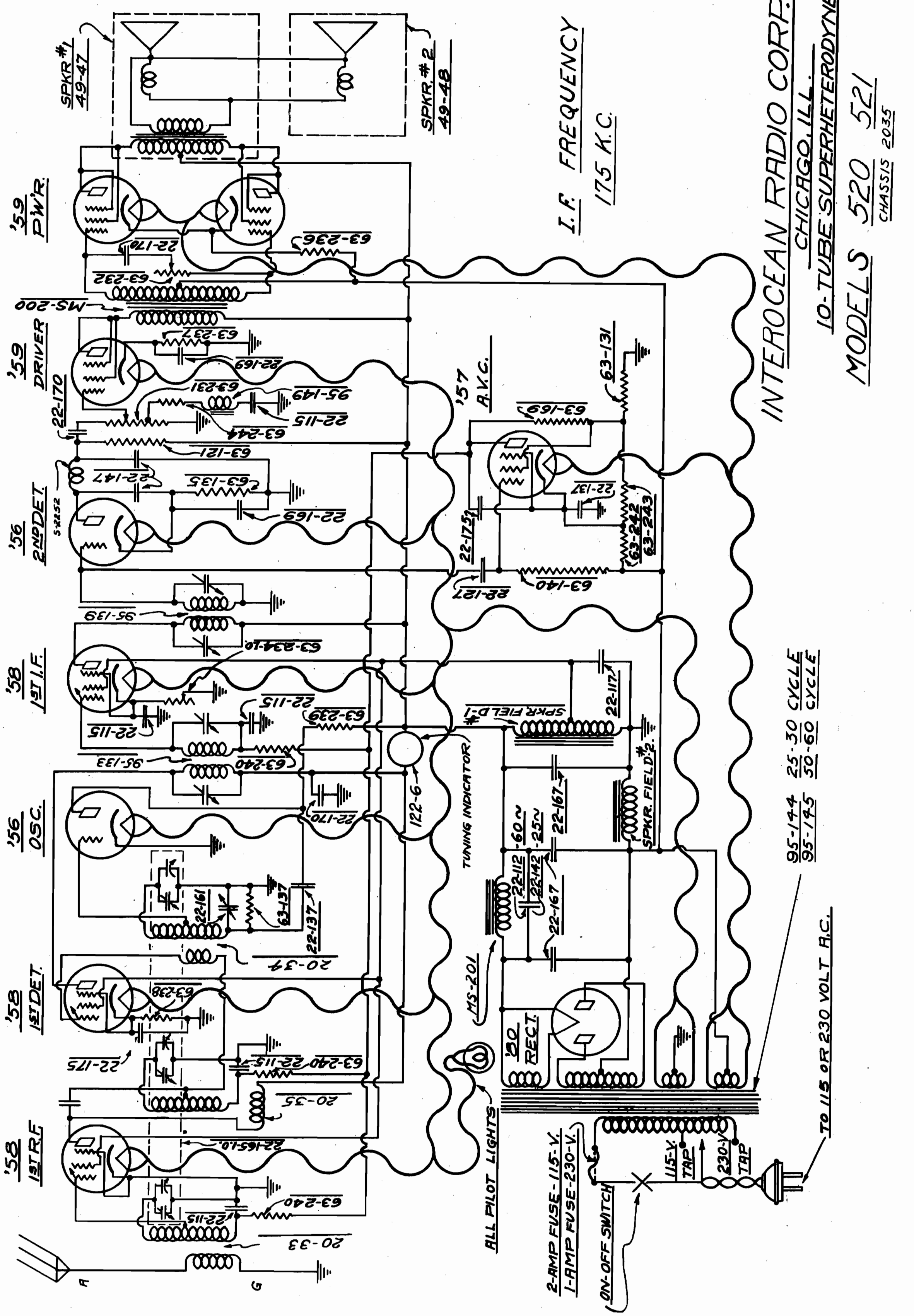
OPERATION No. 5 Be sure the switch on the rear of the chassis is turned to the short wave position. Remove short from the oscillator section of the 2 gang condenser and proceed as follows. Turn the small two plate vernier condenser so that it is only about 1/5 meshed. If the test oscillator is to be coupled direct to the antenna wire it should be attached close to the chassis. The coiled up antenna wire acts as an RF choke and high frequency signals will not go through it. A pin pushed through the insulation of the antenna wire will allow connection close to the chassis. Set the test oscillator so that it is radiating a signal on approximately 22 meters and rotate the condenser gang very slowly until this signal is picked up. Alternately change the setting of the trimmer on the oscillator section of the 2 gang and retune the 2 gang until the maximum signal is indicated.

OPERATION No. 6 Turn the switch on the rear of the chassis to the broadcast position. Tune in the 1500 kilocycle signal from the broadcast test oscillator. It will have been noted that there is no trimmer in the customary location on the antenna section of the 2-gang condenser. The trimmer is mounted externally near the 2 plate vernier condenser. This trimmer is used only on the broadcast band, the 2-plate vernier being in the circuit on the short wave position. Adjust the broadcast antenna trimmer for maximum signal.

OPERATION No. 7. Turn the switch on the rear of the chassis to the short wave position. Set the two plate vernier condenser so that it is about 4/5 meshed. Pick up the 45 meter signal from the short wave test oscillator. Test for resonance with the feeler strip as described in operation 3 but do not bend any plates. If the antenna section of the condenser gang has insufficient capacity it will be necessary to crowd together two or three turns of wire on the short wave antenna coil. If too much capacity, they must be spread somewhat. The short wave antenna coil is the space wound coil on the bottom of the chassis.

MODEL 520,521
Chassis 2035
Schematic

INTEROCEAN RADIO CORP.



MODEL 520,521
Voltage,Socket
Parts List

# INTEROCEAN RADIO CORP.

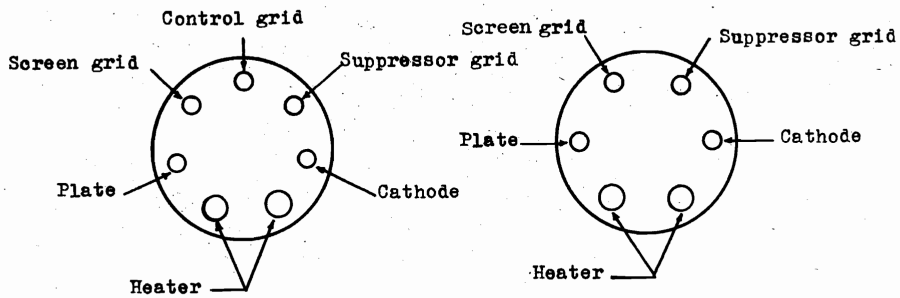
## VOLTAGE READINGS - MODELS 520 521

Antenna Disconnected

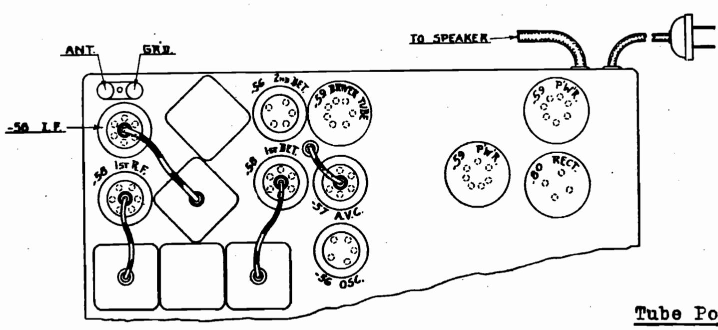
Meter 1000 Ohms Per Volt

| Tube Type | Position | Fil. Volt. | Plate Volt. | Cath. Volt. | Screen Volt. | Plate Current |
|---|---|---|---|---|---|---|
| Z-58 | R.F. | 2.5 | 220 | 0 | 100 | 5.2 |
| Z-58 | 1st Det. | 2.5 | 220 | +2 | 100 | 3. |
| Z-56 | Osc. | 2.5 | 120 | 0 | 0 | 4. |
| Z-58 | I.F. | 2.5 | 220 | 0 | 100 | 6. |
| Z-56 | 2nd Det. | 2.5 | 120 | 20 | 0 | .75 |
| Z-57 | A.V.C. | 2.5 | -40 | -75 | -2 | 0 |
| Z-59 | Driver | 2.5 | 220 | +25 | 220 | 8.2 |
| Z-59 | Power | 2.5 | 230 | -65 | 230 | 25. |
| Z-59 | Power | 2.5 | 230 | -65 | 230 | 25. |
| Z-80 | Rect. | 5.0 | 400* | | | 62.5* |

Line voltage 115 (Reading to Ground) Volume control maximum




Six and seven prong socket connections (Bottom of socket)




Tube Position

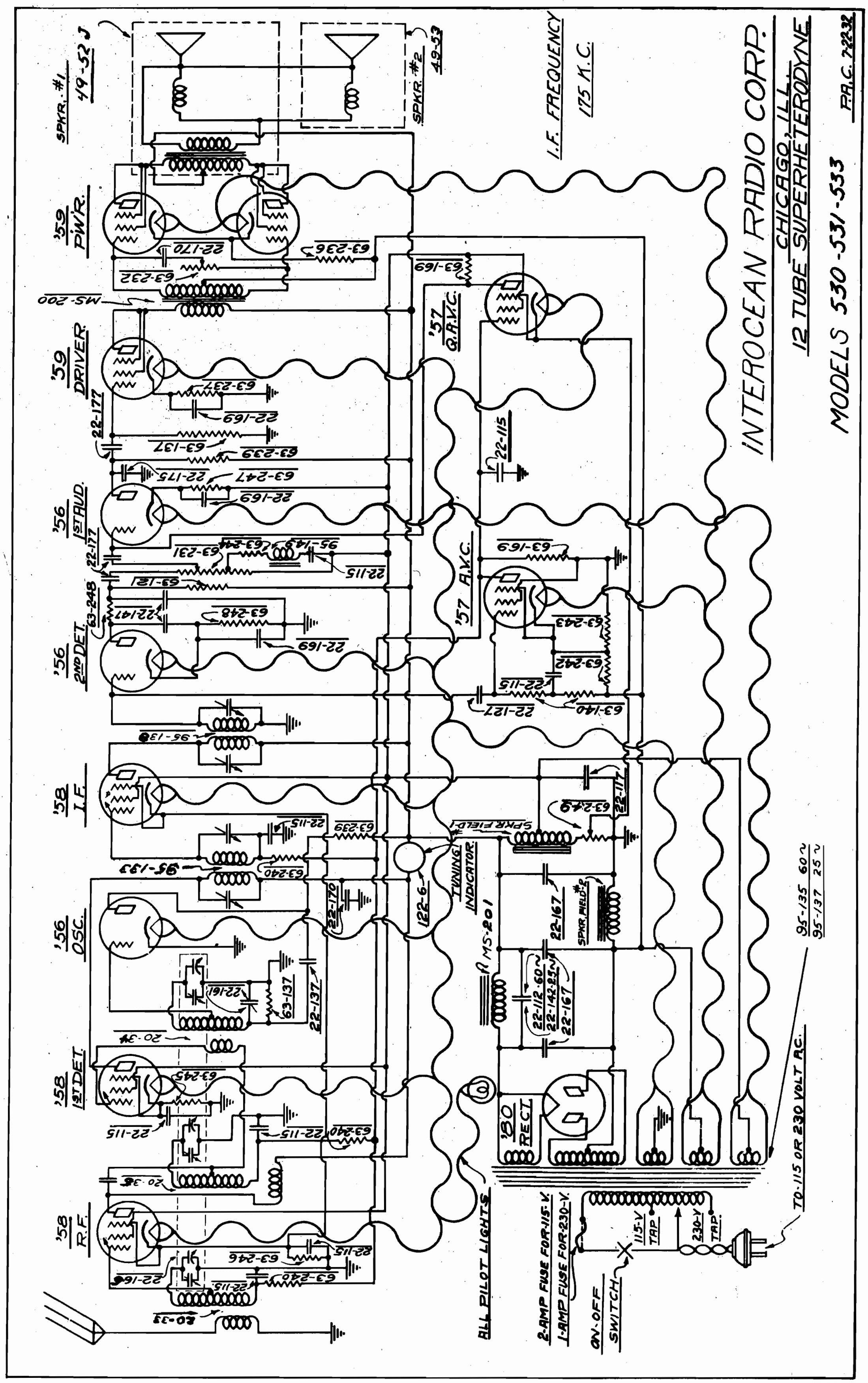
PARTS AND PRICES
MODELS 520 521
CHASSIS NO. 2035

| | | |
|---|---|---|
| | **Dial and Meter Assembly** | |
| 11-3 | Dial Pulley String......per ft. | $ .25 |
| 26-38 | Calibrated Dial Strip | .15 |
| 80-69 | Dial Cord Tension Spring | .01 |
| 80-85 | Volume and Tone Control Dial Tension Spring | .01 |
| 83-274 | Volume Control Dial Strip | .10 |
| 83-275 | Tone Control Dial Strip | .10 |
| 100-18 | 2.5 Volt Pilot Lamp | .12 |
| 122-5 | Shadowgraph Meter | 2.00 |
| | **Condensers** | |
| 22-112 | .1 mfd 300 Volt (Filter) | .25 |
| 22-115 | .1 " 200 " (5 used, see footnote) | .35 |
| 22-117 | .5 " 300 " (Filter) | .50 |
| 22-137 | .05 " 400 " (Oscillator Plate) | .25 |
| 22-142 | .4 " 300 " (Filter, 25 Cycle Only) | .40 |
| 22-147 | .0005 600 " (2nd Detector Plate) | .20 |
| 22-161 | Padder | .45 |
| 22-165 | Three Gang Variable | 3.50 |
| 22-167 | 8. mfd 500 Volt (Filter) | 1.50 |
| 22-169 | 8. " 50 " (2nd Detector Cathode, Driver Cathode, and 1st Audio Cathode) | .55 |
| 22-170 | .1 " 400 " (1st Detector Plate, Audio Coupling and Tone Control) | .25 |
| | **Resistors** | |
| 63-121 | 100M Ohm 1 Watt (2nd Detector Plate) | .25 |
| 63-135 | 50M " 1 " (2nd Detector Cathode) | .25 |
| 63-137 | 250M " 1/8 " (Oscillator Grid) | .25 |
| 63-140 | 1 Meg" 1/8 " (A. V. C. Grid) | .25 |
| 63-169 | 400 " 1/8 " (A. V. C. Plate) | .25 |
| 63-231 | Volume Control Assembly | 1.25 |
| 63-232 | Tone Control Assembly | .75 |
| 63-234 | Sensitivity Control | .75 |
| 63-236 | 500 Ohm........(Power Bias) (Wide Metal) | .25 |
| 63-237 | 1500 " ........(Driver Bias)(Narrow Metal) | .25 |
| 63-238 | 1000 " 1/4 Watt (1st Detector Cathode) | .25 |
| 63-239 | 24M " 1 " (Oscillator Plate) | .25 |
| 63-240 | 1900 " 1/4 " (R.F.,1st Detector & I.F. Grids) | .25 |
| 63-242 | 2500 " 1/8 " (A. V. C. Cathode) | .25 |
| 63-243 | 18M " 1 " (A. V. C. Cathode) | .25 |
| 63-244 | 500 " 1/4 " (Acoustic Filter) | .25 |
| | **Coils** | |
| 20-33 | Antenna Coil | .75 |
| 20-34 | Oscillator Coil | .85 |
| 20-35 | Detector Coil | 1.00 |
| S-2252 | 2nd Detector Plate Choke and Bracket | .50 |
| 95-133 | 1st I. F. Transformer (with Grid Lead) | 1.25 |
| 95-139 | 2nd I. F. Transformer (without Grid Lead) | 1.25 |

*22-115 R. F., 1st Detector, I. F. Grid Returns, I. F. Cathode, and Acoustic Filter.

MODEL 530,531,533
Chassis 2038
Schematic

# INTEROCEAN RADIO CORP.



**MODEL 530, 531, 533**
**Voltage, Socket**
**Alignment**

# INTEROCEAN RADIO CORP.

VOLTAGE READINGS - MODELS 530 531 533

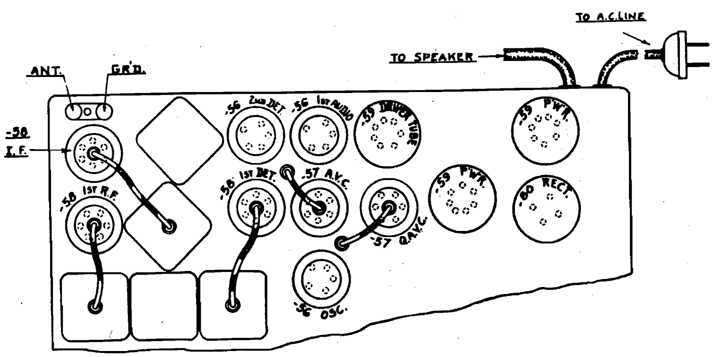
Antenna Disconnected — Meter 1000 Ohms Per Volt

| Tube Type | Position | Fil. Volt. | Plate Volt. | Cath. Volt. | Screen Volt. | Supp. Volt. | Plate Current |
|---|---|---|---|---|---|---|---|
| Z-58 | 1st R.F. | 2.5 | 175 | 2.2 | 75 | 2.2 | 5.7 |
| Z-58 | 1st Det. | 2.5 | 190 | 4.5 | 75 | 4.5 | 2.3 |
| Z-56 | Osc. | 2.5 | 100 | 0 | - | - | 3.5 |
| Z-58 | 1st I.F. | 2.5 | 200 | 2.2 | 75 | 2.2 | 5.5 |
| Z-56 | 2nd Det. | 2.5 | 110 | 10 | - | - | .3 |
| Z-56 | 1st Audio | 2.5 | 170 | 80 | - | - | .8 |
| Z-57 | A.V.C. | 2.5 | - | -85 | - | -85 | - |
| Z-57 | Q.A.V.C. | 2.5 | 30 | 13 | 75 | 13 | - |
| Z-59 | Driver | 2.5 | 190 | 20 | 190 | 190 | 13 |
| Z-59 | Power | 2.5 | 195 | -70 | 195 | 195 | 22 |
| Z-59 | Power | 2.5 | 195 | -70 | 195 | 195 | 22 |
| Z-80 | Rect. | 5.0 | 360 | - | - | - | 65 |

Line Voltage 115 (Reading to Ground) Volume control maximum

(All readings, with exception of heaters, taken from socket connections to ground. Use 1,000 ohm per volt D. C. meter.)

BALANCE I.F. frequency at 175 K.C. Condenser gang at 1500 K.C. and oscillator padder at 600 K.C.




Tube Position

PARTS AND PRICES — MODELS 530 531 533 CHASSIS 2038

Dial and Meter Assembly

| | | |
|---|---|---|
| 11-3 | Dial Pulley String....per ft. | $ .10 |
| 26-38 | Calibrated Dial Strip.... | .15 |
| 80-69 | Dial Cord Tension Spring.... | .01 |
| 80-85 | Volume and Tone Control Dial Tension Spring.... | .01 |
| 83-274 | Volume Control Dial Strip.... | .10 |
| 83-275 | Tone Control Dial Strip.... | .10 |
| 100-18 | 2½ Volt Pilot Lamp.... | .12 |
| 122-5 | Shadowgraph Meter.... | 2.00 |

Condensers

| | | |
|---|---|---|
| 22-112 | .1 mfd 300 volt...(Filter).... | .25 |
| *22-115 | .1 " 200 " ...(Eight Used, See Below).... | .35 |
| 22-117 | .5 " 300 " ...(Filter).... | .50 |
| 22-127 | .000025 600 " ...(A.V.C. Grid).... | .35 |
| 22-137 | .05 mfd 400 " ...(Oscillator Plate).... | .25 |
| 22-142 | .4 " 300 " ...(Filter 25 Cycle Only).... | .40 |
| 22-147 | .0005" 600 " ...(2nd Detector Plate).... | .20 |
| 22-161 | Padder.... | .45 |
| 22-165 | Three Gang Variable.... | 3.50 |
| 22-167 | 8. mfd 500 volt...(Filter).... | 1.50 |
| 22-169 | 8. " 50 " ...(2nd Det. Cathode, Driver Cathode & 1st Audio Cathode).... | .55 |
| 22-170 | .1 " 400 " ...(1st Det. Plate, Tone Control).... | .25 |
| 22-175 | .002 " 600 " ...(1st Audio Plate).... | .25 |
| 22-177 | .2 " 400 " ...(2nd Det. Plate, 1st Audio Grid, 1st Audio Plate).... | .25 |

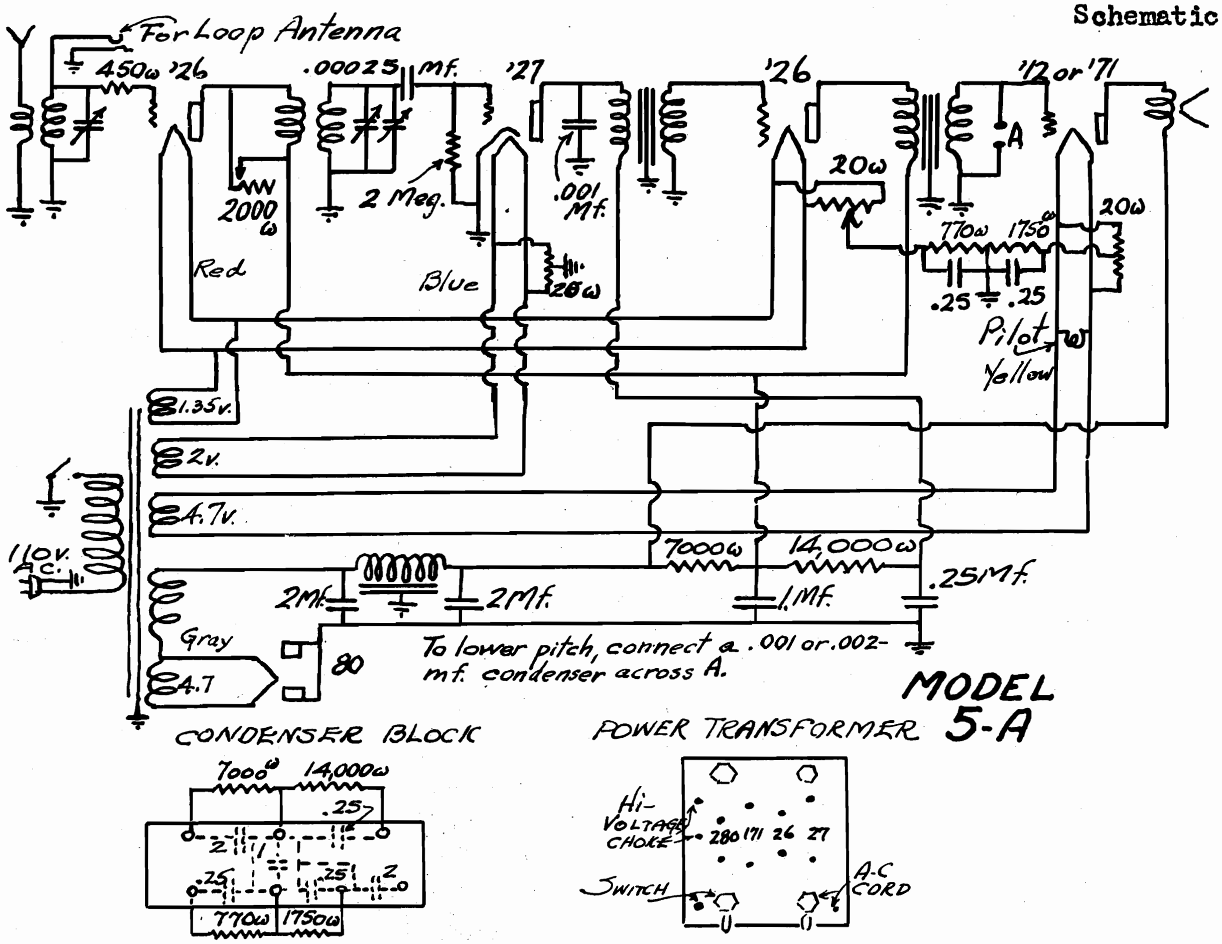
Resistors

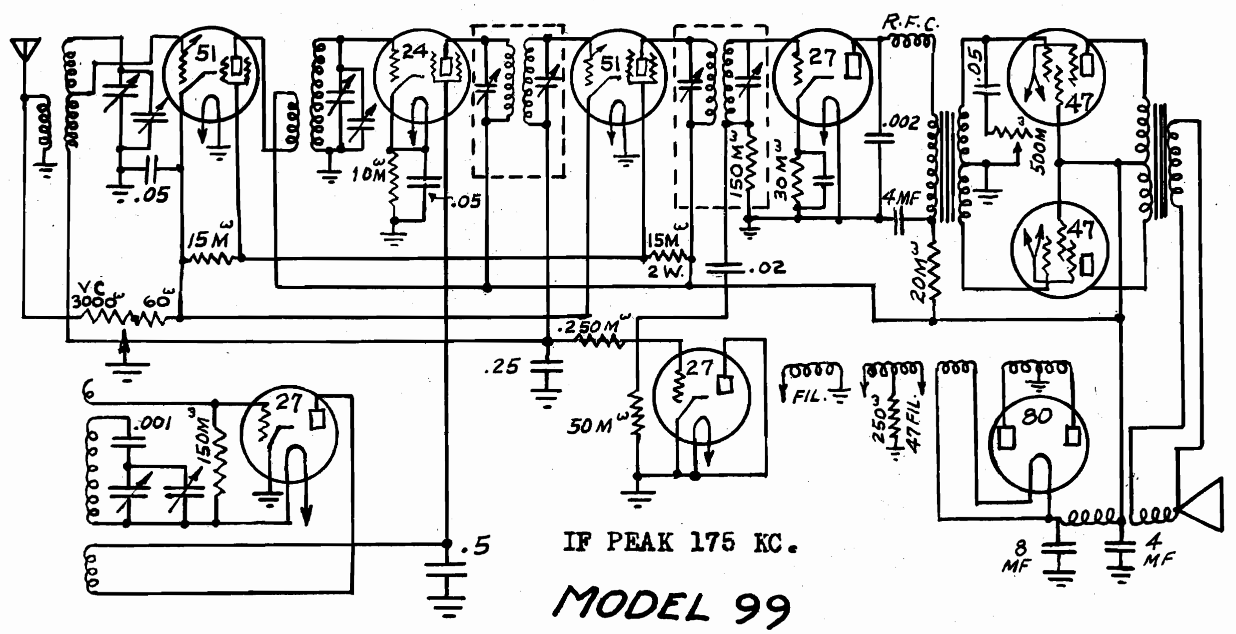
| | | |
|---|---|---|
| 63-121 | 100M ohm 1 watt...(2nd Detector Plate).... | .25 |
| 63-137 | 250M " ½ " ...(Driver Grid).... | .25 |
| 63-140 | 1 meg" ½ " ...(A.V.C. Grid & Cathode).... | .25 |
| 63-169 | 400 " ½ " ...(A.V.C. & Q.A.V.C. Plate).... | .25 |
| 63-231 | Volume Control & Switch Assembly.... | 1.40 |
| 63-232 | Tone Control.... | .75 |
| 63-236 | 500 ohm ...(Wide Metal) (Power Tube Bias).... | .25 |
| 63-237 | 1500 " ...(Narrow Metal) (Driver Tube Bias).... | .25 |
| 63-239 | 24M " 1 watt...(Osc. & 1st Audio Plate).... | .25 |
| 63-240 | 1900 " ¼ " ...(R.F. 1st Det. & I.F. Grids).... | .25 |
| 63-242 | 2500 " ½ " ...(A.V.C. Cathode).... | .25 |
| 63-243 | 18M " 1 " ...(A.V.C. Cathode).... | .25 |
| 63-244 | 500 " ¼ " ...(Acoustic Filter).... | .25 |
| 63-245 | 1500 " ¼ " ...(1st Detector Cathode).... | .25 |
| 63-246 | 150 " ¼ " ...(R.F. Cathode).... | .25 |
| 63-247 | 8M " ¼ " ...(1st Audio Cathode).... | .25 |
| 63-248 | 50M " 1 " ...(2nd Det. Plate & Cathode).... | .25 |
| 63-249 | Sensitivity & Quiet Control.... | .75 |

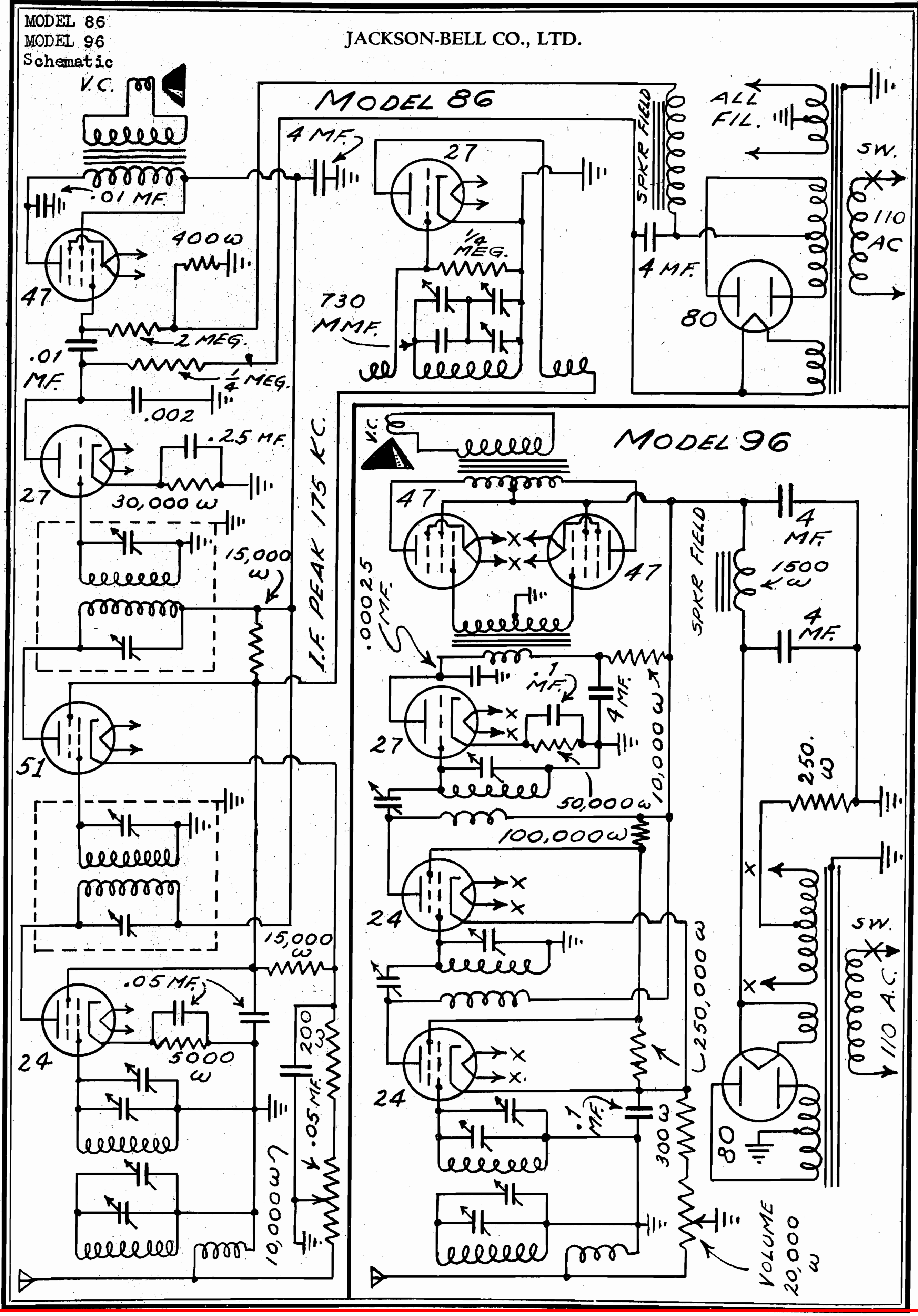
*22-115 R.F. 1st Detector, I.F. Grid Returns, A.V.C. Plate, A.V.C. Cathode, 1st Detector Cathode, R.F. Cathode, and Acoustic Filter.

MODEL 5-A
Schematic
MODEL 99
Schematic

# JACKSON-BELL CO., LTD.

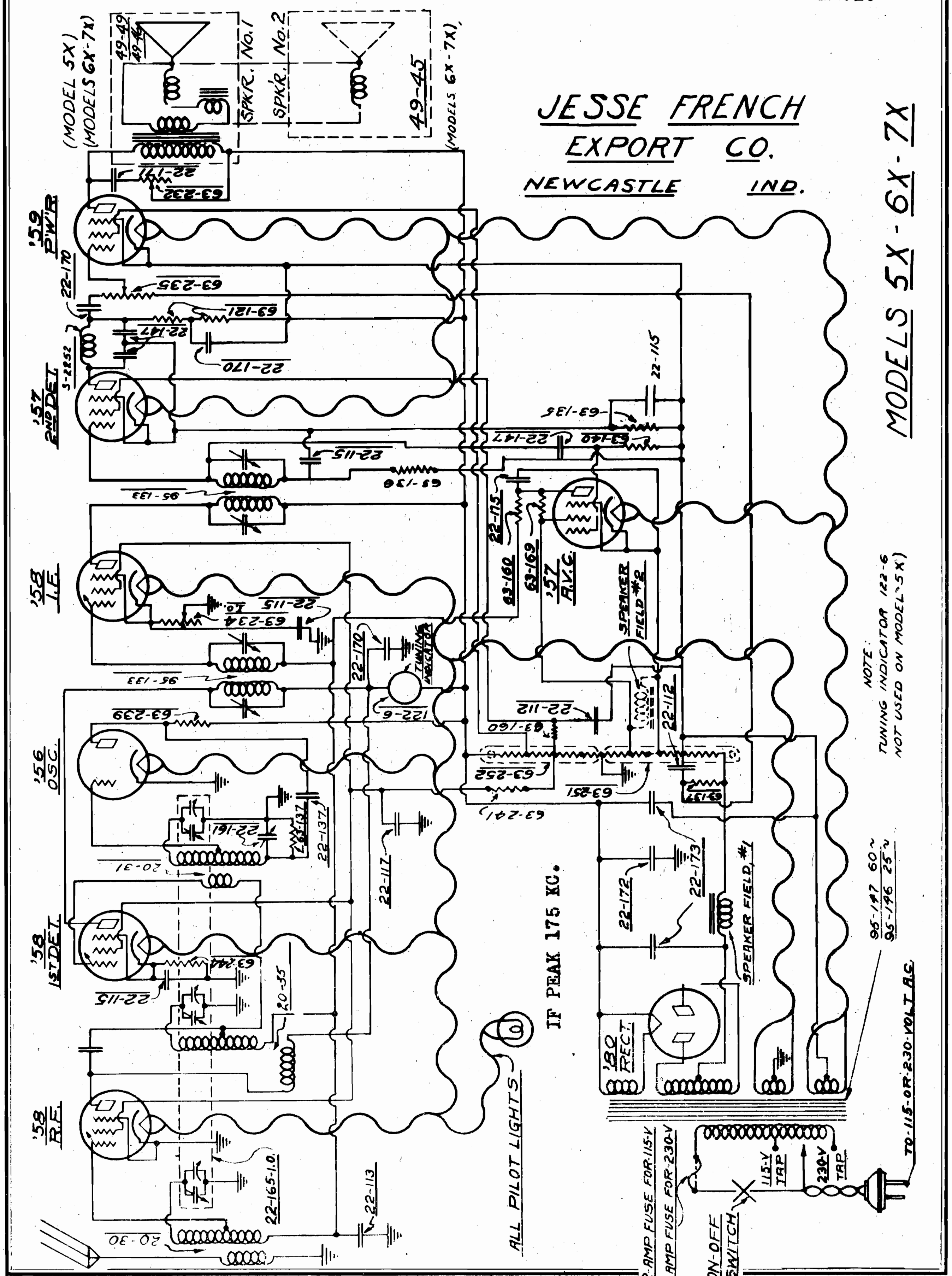



MODEL 86
MODEL 96
Schematic
JACKSON-BELL CO., LTD.
MODEL 86
MODEL 96
V.C.
.01 MF.
47
400ω
2 MEG.
.01 MF.
1/4 MEG.
.002
27
.25 MF.
30,000 ω
15,000 ω
I.F. PEAK 175 KC.
51
15,000 ω
24
.05 MF.
5000 ω
200 ω
.05 MF.
10,000 ω
4 MF.
27
1/4 MEG.
730 MMF.
SPKR FIELD
ALL FIL.
SW.
110 AC
4 MF.
80
47
47
.00025 MF.
SPKR FIELD
4 MF.
1500 ω
4 MF.
.1 MF.
4 MF.
27
50,000 ω
10,000 ω
100,000 ω
250. ω
24
250,000 ω
24
.1 MF.
300 ω
SW.
110 A.C.
80
VOLUME 20,000 ω

JESSE FRENCH EXPORT CO.

MODEL 5X, 6X, 7X
Schematic



MODEL 5X, 6X, 7X
Socket, Voltage
Parts List

# JESSE FRENCH EXPORT CO

## SOCKET VOLTAGES

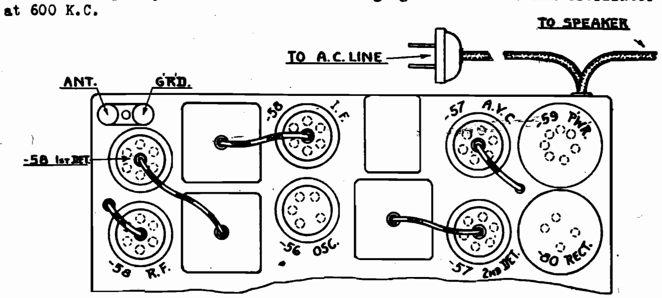
MODELS 5X 6X 7X

| Tube Type | Position | Fil. Volt. | Plate Volt. | Cath. Volt. | Screen Volt. | Supp. Volt. | Plate Current |
|---|---|---|---|---|---|---|---|
| Z-58 | R.F. | 2.4 | 190 | 0 | 95 | 0 | 7. |
| Z-58 | 1st Det. | 2.4 | 190 | 2.3 | 95 | 2.3 | 4. |
| Z-56 | Osc. | 2.4 | 100 | 0 | - | - | 4. |
| Z-58 | I.F. | 2.4 | 190 | 0 | 90 | 0 | 2. |
| Z-57 | 2nd Det. | 2.4 | 90 | -60 | 70 | -60 | .2 |
| Z-57 | A.V.C. | 2.4 | -10 | -65 | -2 | -65 | 0 |
| Z-59 | Power | 2.4 | 175 | -70 | 165 | -70 | 25 |
| Z-80 | Rect. | 5. | *350 | - | - | - | *36 |

Line 115 Volts — All Controls Maximum

(All readings, with exception of heaters, taken from socket connections to ground. Use 1,000 ohm per volt D. C. meter.)

BALANCE I.F. frequency at 175 K.C. Condenser gang at 1500 K.C. and oscillator padder at 600 K.C.




## PARTS AND PRICES
MODELS 5X 6X 7X
CHASSIS 8037

### Dial and Meter Assembly

| | | |
|---|---|---|
| 11-3 | Pulley String....per ft. | $ .10 |
| 26-38 | Dial Drum Strip.... | .10 |
| 61-19 | Tuning Shaft Pulley (small idler).... | .05 |
| 61-22 | Tuning Shaft Pulley (large idler).... | .10 |
| 80-65 | Dial Drum Pulley Tension Spring.... | .01 |
| 80-69 | Volume and Tone Control Tension Spring.... | .01 |
| 100-18 | 2½ volt Pilot Lamp.... | .12 |
| 122-5 | Shadow Meter.... | 2.00 |
| S-2242 | Volume Control Dial Assembly.... | .35 |
| S-2243 | Tone Control Dial Assembly.... | .35 |

### Condensers

| | | |
|---|---|---|
| 22-112 | .1 mfd 300 volt.(2nd Detector Screen & Power Grid).... | .25 |
| 22-113 | .5 " ........(R.F.1st Detector & I.F.Grid Return).... | .35 |
| *22-115 | .1 " 200 volt.(Four used, see below).... | .35 |
| 22-117 | .5 " ........(R.F.1st Detector, & I.F. Screen).... | .50 |
| 22-137 | .05 " 400 volt.(Oscillator Plate).... | .25 |
| 22-147 | .0005" 600 volt.(2nd Detector Plate & A.V.C.Screen).... | .25 |
| 22-161 | Padder.... | .45 |
| 22-165 | Three Gang Variable.... | 3.50 |
| 22-170 | .1 mfd 400 volt.(R.F. & 1st Detector Plate, 2nd Detector Plate).. | .35 |
| 22-171 | .05 " 600 volt.(Tone Control).... | .25 |
| 22-172 | 2. " 450 volt.(Filter).... | .60 |
| 22-173 | 8. " 500 volt.(Filter).... | 1.25 |
| 22-175 | .002 " 600 volt.(A.V.C. Plate).... | .25 |

### Resistors

| | | |
|---|---|---|
| 63-121 | 100M ohm 1 Watt...(2nd Detector Plate).... | .25 |
| 63-135 | 25M " ½ " ...(2nd Detector Cathode).... | .25 |
| 63-137 | 250M " ½ " ...(Oscillator & Power Grid).... | .25 |
| 63-140 | 1 Meg " ½ " ...(A.V.C. Screen).... | .25 |
| 63-160 | 100M " ½ " ...(A.V.C. Plate).... | .25 |
| 63-169 | 400M " ½ " ...(A.V.C. Grid).... | .25 |
| 63-232 | Manual Tone Control.... | .75 |
| 63-234 | Manual Sensitivity Control.... | .75 |
| 63-235 | Manual Volume Control.... | 1.25 |
| 63-239 | 24M ohm 1 Watt...(Oscillator Plate).... | .25 |
| 63-241 | 5M " 1 " ...(RF., 1st DET., I.F. Screen).... | .25 |
| 63-244 | 500 " ¼ " ...(1st Detector Cathode).... | .25 |
| 63-251 | Voltage Divider...(six tap).... | .65 |
| 63-252 | Voltage Divider...(five tap).... | .60 |

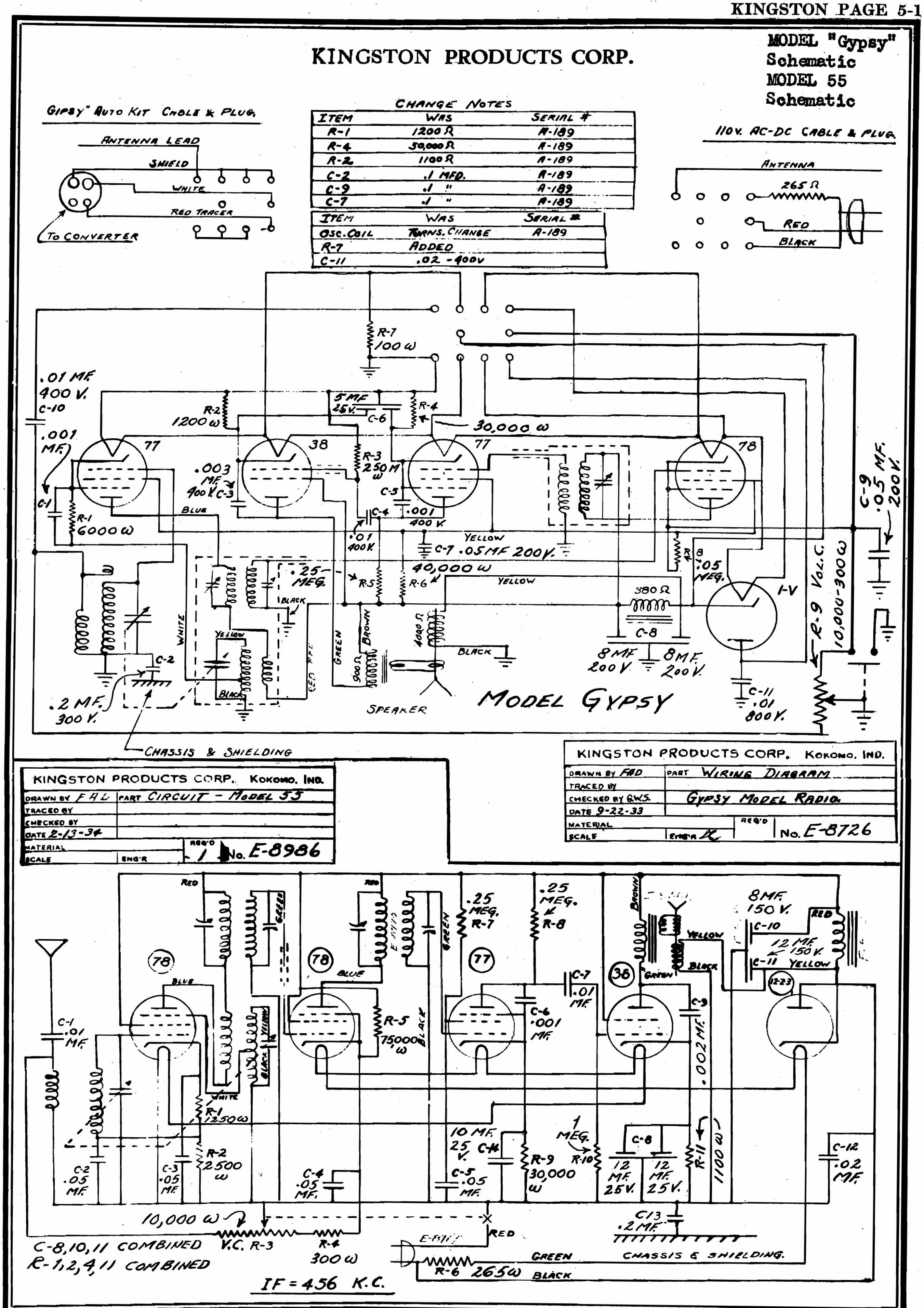
*22-115 R. F., 1st Detector, I. F. Grid Return, A.V.C. Plate, A.V.C. Cathode, 1st Detector Cathode, R.F. Cathode, and Acoustic Filter.

### Coils and Chokes

| | | |
|---|---|---|
| 20-30 | Antenna Coil.... | $ .75 |
| 20-31 | Oscillator Coil.... | .85 |
| 20-35 | Detector Coil.... | 1.00 |
| 95-133 | 1st & 2nd I. F. Transformer.... | 1.25 |
| S-2252 | Plate Choke and Bracket.... | .50 |

### Miscellaneous

| | | |
|---|---|---|
| 46-46 | Large Knob.... | .20 |
| 46-62 | Small Knob.... | .10 |
| 49-45 | Dynamic Speaker for Models 6X and 7X without transformer.... | 6.00 |
| 49-46 | Dynamic Speaker for Models 6X and 7X with transformer.... | 8.00 |
| 49-49 | Dynamic Speaker for Model 5X with transformer.... | 7.00 |
| 52-32 | Speaker Multicord.... | .35 |
| 57-343 | Escutcheon Plate.... | .50 |
| 78-56 | 59 Seven Prong Socket.... | .15 |
| 78-57 | 56 Five Prong Socket.... | .15 |
| 78-58 | 58 Six Prong Socket.... | .15 |
| 78-59 | 57 Six Prong Socket.... | .15 |
| 78-60 | 80 Four Prong Socket.... | .15 |
| 95-146 | 115 volt 25 cycle Power Transformer.... | 5.50 |
| 95-147 | 115 volt 60 cycle Power Transformer.... | 3.75 |
| 126-109 | Tube Shield.... | .10 |
| 136-2 | 2 amp Fuse.... | .06 |

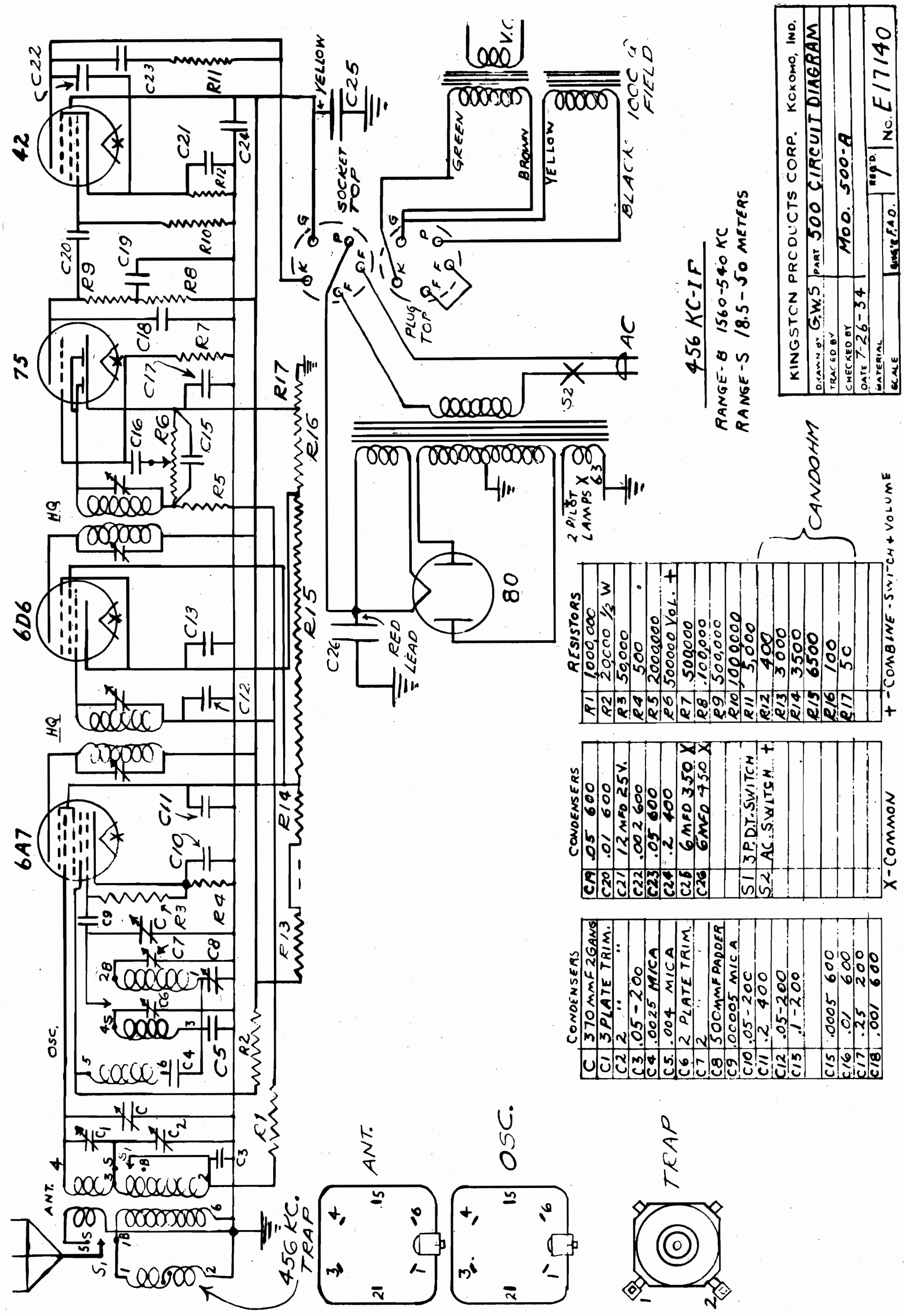



CHANGE NOTES

| ITEM | WAS | SERIAL # |
|---|---|---|
| R-1 | 1200 Ω | A-189 |
| R-4 | 50,000 Ω | A-189 |
| R-2 | 1100 Ω | A-189 |
| C-2 | .1 MFD. | A-189 |
| C-9 | .1 " | A-189 |
| C-7 | .1 " | A-189 |
| ITEM | WAS | SERIAL # |
| OSC. COIL | TURNS. CHANGE | A-189 |
| R-7 | ADDED | |
| C-11 | .02 - 400V | |

**MODEL 500-A, 500**
**Schematic**

# KINGSTON PRODUCTS CORP.




| CONDENSERS | |
|---|---|
| C | 370 mmF 2 GANG |
| C1 | 3 PLATE TRIM. |
| C2 | 2 " " |
| C3 | .05-200 |
| C4 | .0025 MICA |
| C5 | .004 MICA |
| C6 | 2 PLATE TRIM. |
| C7 | 2 |
| C8 | 500 mmF PADDER |
| C9 | .00005 MICA |
| C10 | .05-200 |
| C11 | .2 400 |
| C12 | .05-200 |
| C13 | .1-200 |
| | |
| C15 | .0005 600 |
| C16 | .01 600 |
| C17 | .25 200 |
| C18 | .001 600 |

| CONDENSERS | |
|---|---|
| C19 | .05 600 |
| C20 | .01 600 |
| C21 | 12 MFD 25V. |
| C22 | .002 600 |
| C23 | .05 600 |
| C24 | .2 400 |
| C25 | 6 MFD 350 X |
| C26 | 6 MFD 450 X |
| | |
| S1 | 3P.D.T. SWITCH |
| S2 | AC. SWITCH + |

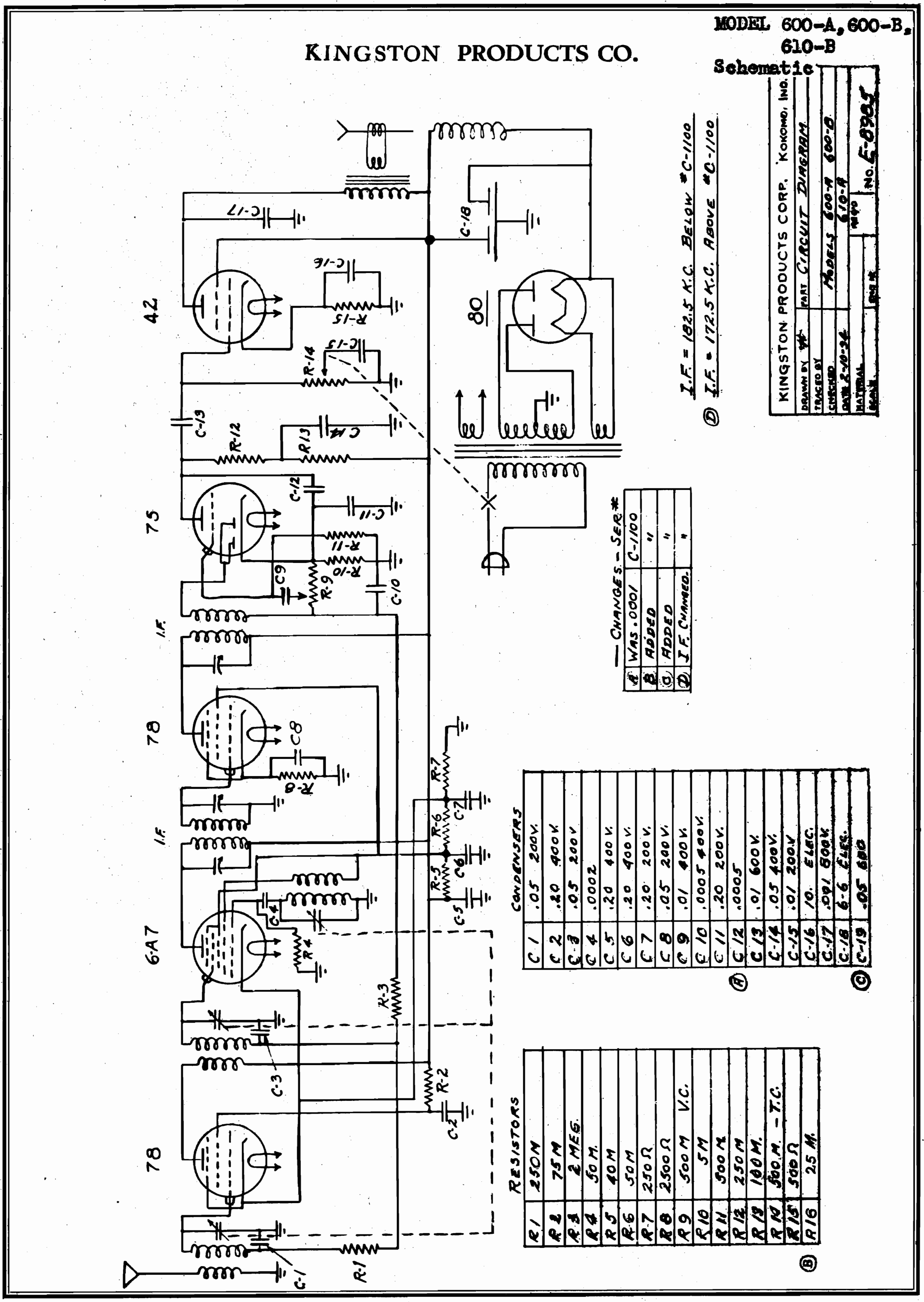
X-COMMON

| RESISTORS | |
|---|---|
| R1 | 1,000,000 |
| R2 | 20,000 1/2 W |
| R3 | 50,000 |
| R4 | 500 |
| R5 | 2,000,000 |
| R6 | 500000 VOL. + |
| R7 | 500,000 |
| R8 | 100,000 |
| R9 | 500,000 |
| R10 | 1,000,000 |
| R11 | 5,000 |
| R12 | 400 |
| R13 | 3000 |
| R14 | 3500 |
| R15 | 6500 |
| R16 | 100 |
| R17 | 50 |

+ - COMBINE - SWITCH + VOLUME

**MODEL 600-A, 600-B, 610-B**

**Schematic**




| Resistors | |
|---|---|
| R1 | 250M |
| R2 | 75M |
| R3 | 2 MEG. |
| R4 | 50M. |
| R5 | 40M |
| R6 | 50M |
| R7 | 250Ω |
| R8 | 2500Ω |
| R9 | 500M V.C. |
| R10 | 5M |
| R11 | 500M |
| R12 | 250M |
| R13 | 100M. |
| R14 | 500M. -T.C. |
| R15 | 500Ω |
| R16 | 25M. |

Ⓑ

| Condensers | |
|---|---|
| C1 | .05 200V. |
| C2 | .20 400V. |
| C3 | .05 200V |
| C4 | .0002 |
| C5 | .20 400V. |
| C6 | .20 400V. |
| C7 | .20 200V. |
| C8 | .05 200V. |
| C9 | .01 400V. |
| C10 | .0005 400V. |
| C11 | .20 200V. |
| C12 | .0005 |
| C13 | .01 600V. |
| C-14 | .05 400V. |
| C-15 | .01 200V. |
| C-16 | 10. ELEC. |
| C-17 | .001 800V. |
| C-18 | 6-6 ELEC. |
| C-19 | .05 600 |

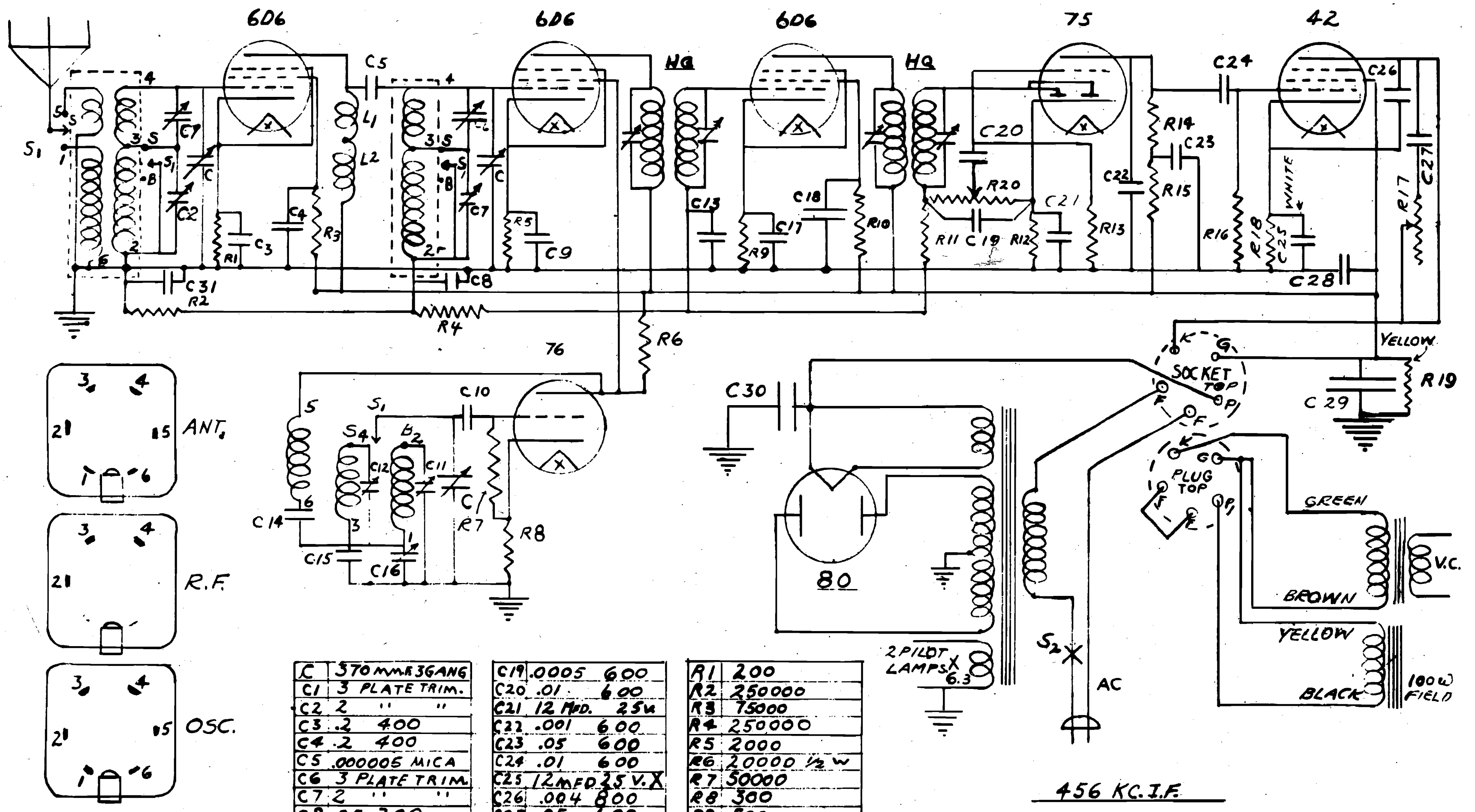
Ⓐ Ⓒ

— CHANGES — SER.#

| | | |
|---|---|---|
| Ⓐ | WAS .0001 | C-1100 |
| Ⓑ | ADDED | " |
| Ⓒ | ADDED | " |
| Ⓓ | I.F. CHANGED | " |

**MODEL 700, 700-A**
**700-B**
**Schematic**

# KINGSTON PRODUCTS CO.




| C | 370 MMF. 3 GANG |
|---|---|
| C1 | 3 PLATE TRIM. |
| C2 | 2 " " |
| C3 | .2 400 |
| C4 | .2 400 |
| C5 | .000005 MICA |
| C6 | 3 PLATE TRIM. |
| C7 | 2 " " |
| C8 | .05-200 |
| C9 | .05-200 |
| C10 | .00005 MICA |
| C11 | 2 PLATE TRIM. |
| C12 | 2 " " |
| C13 | .05-200 |
| C14 | .0025 MICA |
| C15 | .004 " |
| C16 | 500 MMF. PADDER |
| C17 | .05 200 |
| C18 | .2 KPC |

| | |
|---|---|
| C19 | .0005 600 |
| C20 | .01 600 |
| C21 | 12 MFD. 25V |
| C22 | .001 600 |
| C23 | .05 600 |
| C24 | .01 600 |
| C25 | 12 MFD 25 V.X |
| C26 | .004 800 |
| C27 | .05 600 |
| C28 | .4 400 |
| C29 | 10 MFD 350 V.X |
| C30 | 10 MFD 450 V. |
| C31 | .05 200 |
| S1 | WAVE CHANGE SW. |
| S2 | AC SWITCH + |
| L1 | RF PLATE CHOKE |
| L2 | " " " |
| R20 | VOL. 500000 |

| | |
|---|---|
| R1 | 200 |
| R2 | 250000 |
| R3 | 75000 |
| R4 | 250000 |
| R5 | 2000 |
| R6 | 20000 ½ W |
| R7 | 50000 |
| R8 | 300 |
| R9 | 500 |
| R10 | 50000 |
| R11 | 2,000,000 |
| R12 | 3000 |
| R13 | 500000 |
| R14 | 500000 |
| R15 | 100,000 |
| R16 | 1,000,000 |
| R17 | TONE 100000 + |
| R18 | 400 BIAS |
| R19 | 15000 |

} CANDOHM

+ COMBINES WITH TONE    X COMMON

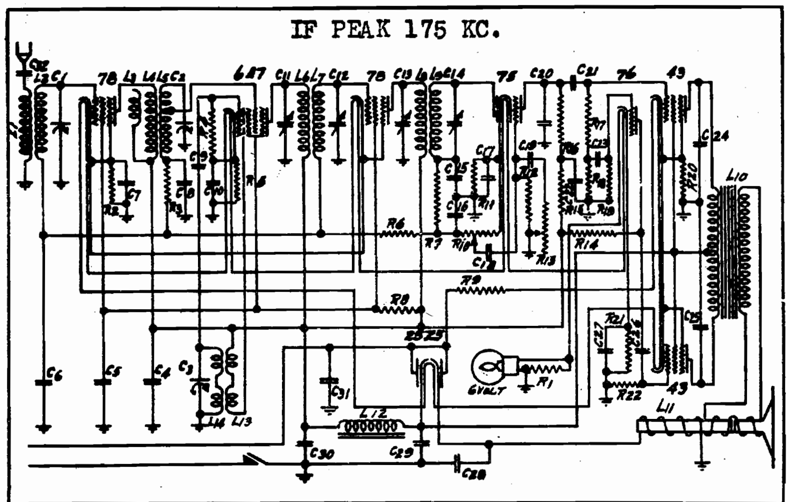
456 KC. I.F.

RANGE-B- 1560-540 KC
RANGE-S- 18.5-50 METERS

| KINGSTON PRODUCTS CORP. KOKOMO IND. | | |
|---|---|---|
| DRAWN BY G.W.S. | PART 700 CIRCUIT DIAGRAM | |
| TRACED BY | | |
| CHECKED BY | MOD 700-A 700-B | |
| DATE 7-25-34 | | |
| MATERIAL | REQ'D 1 | No E17141 |
| SCALE | ENG'R F.A.D. | |

# LAFAYETTE RADIO & TELEVISION CORP.

**MODEL AM-8 Schematic, Parts List**
**MODEL AM-10 Schematic, Parts List**




## MODEL AM-8

### RESISTORS

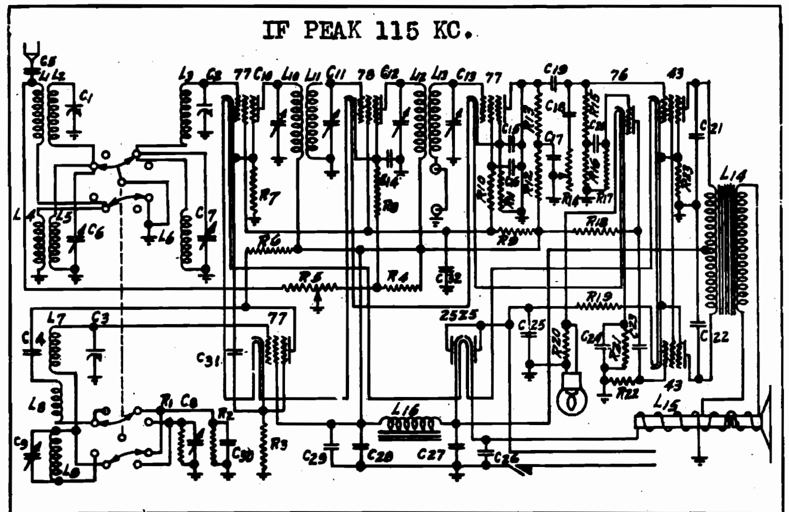
| CODE | PART NO. | |
|---|---|---|
| R1 | 1309 | 13 Ohm Pilot Light Shunt Resistor |
| R2 | 1062 | 250 Ohm R.F. and I.F. Cathode Resistor |
| R3 | 923 | 100,000 Ohm A.V.C. Network Resistor |
| R4 | 921 | 40,000 Ohm Oscillator Grid Leak Resistor |
| R5 | 1062 | 250 Ohm 6A7 Cathode Resistor |
| R6 | 926 | 1 Megohm A.V.C. Network Resistor |
| R7 | 898 | 50,000 Ohm A.V.C. Network Filter Resistor |
| R8 | 941 | 20,000 Ohm 78 & 6A7 Screen Feed Resistor |
| R9 | 1119 | 36 Ohm Filament Series Resistor |
| R10 | 1315 | 500,000 Ohm Volume Control |
| R11 | 919 | 5,000 Ohm 75 Cathode Resistor |
| R12 | 925 | 500,000 Ohm 75 Grid Lead Resistor |
| R13 | 1317 | 250,000 Ohm Tone Control |
| R14 | 924 | 250,000 Ohm 76 Plate Resistor |
| R15 | 923 | 100,000 Ohm 75 Plate Filter Resistor |
| R16 | 924 | 250,000 Ohm 75 Plate Resistor |
| R17 | 925 | 500,000 Ohm 43 Grid Leak Resistor |
| R18 | 922 | 75,000 Ohm Push-pull Network Resistor |
| R19 | 925 | 500,000 Ohm 76 Grid Leak Resistor |
| R20 | 1062 | 250 Ohm 43 Cathode & Screen Resistor |
| R21 | 920 | 10,000 Ohm 76 Cathode Resistor |
| R22 | 925 | 500,000 Ohm 43 Grid Leak Resistor |

### CONDENSERS

| CODE | PART NO. | |
|---|---|---|
| C1 | 833 | 371 MMFD. Preselector Section of 3 Gang Condenser |
| C2 | 833 | 371 MMFD. Preselector Section of 3 Gang Condenser |
| C3 | 833 | 336 MMFD. Oscillator Section of 3 Gang Condenser |
| C4 | 266 | 1. MFD. B Supply By-pass Condenser |
| C5 | 272 | .1 MFD. Screen By-pass Condenser |
| C6 | 272 | .1 MFD. A.V.C. By-pass Condenser |
| C7 | 272 | .1 MFD. R.F. & I.F. Cathode By-pass Condenser |
| C8 | 272 | .1 MFD. First Detector By-pass Condenser |
| C9 | 268 | .00025 MFD. Oscillator Coupling Condenser |
| C10 | 272 | .1 MFD. 6A7 Cathode By-pass Condenser |
| C11 | 1104 | 70-200 MMFD. First I.F. Primary Trimmer Condenser |
| C12 | 1105 | 70-200 MMFD. First I.F. Secondary Trimmer Condenser |
| C13 | 1106 | 70-200 MMFD. Second I.F. Primary Trimmer Condenser |
| C14 | 1107 | 70-200 Second I.F. Secondary Trimmer Condenser |
| C15 | 339 | .0001 MFD. Diode Filter Condenser |
| C16 | 339 | .0001 MFD. Diode Filter Condenser |
| C17 | 272 | .1 MFD. 75 Cathode By-pass Condenser |
| C18 | 269 | .01 MFD. Volume Control Condenser |
| C19 | 269 | .01 MFD. Tone Control Condenser |
| C20 | 265 | .001 MFD. 75 Plate Filter Condenser |
| C21 | 269 | .01 MFD. Audio Feed Condenser |
| C22 | 272 | .1 MFD. 75 Hum Filter Condenser |
| C23 | 269 | .01 MFD. Inverter Feed Condenser |
| C24 | 343 | .004 MFD. Output Plate Filter Condenser |
| C25 | 343 | .004 MFD. Output Plate Filter Condenser |
| C26 | 269 | .01 MFD. Push-pull Coupling Condenser |
| C27 | 272 | .1 MFD. 76 Cathode By-pass Condenser |
| C28 | 1295 | 4 MFD. Field Supply Filter Condenser |
| C29 | 1295 | 10 MFD. Push-pull Plate Supply Filter Condenser |
| C29 | 1085 | 19 MFD. Push-pull Plate Supply Filter Condenser |
| C30 | 1295 | 4 MFD. B Supply Filter Condenser |
| C31 | 272 | .1 MFD. Power Line By-pass Condenser |

### INDUCTANCES

| CODE | PART NO. | |
|---|---|---|
| L1 | 1138 | Preselector Primary 450 Turns #36 S.S.E. |
| L2 | 1138 | Preselector Secondary 144 Turns #36 D.C.C. |
| L3 | 1213 | Detector Primary Condenser Winding 32 Turns #36 S.S.E. |
| L4 | 1213 | Detector Primary 450 Turns #36 S.S.E. |
| L5 | 1213 | Detector Secondary 91 and 108 Turns #36 D.C.C. |
| L6 | 1101 | 8,000 Microhenry First I.F. Primary 175 K.C. |
| L7 | 1101 | 8,000 Microhenry First I.F. Secondary |
| L8 | 1101 | 8,000 Microhenry Second I.F. Primary 175 K.C. |
| L9 | 1101 | 8,000 Microhenry Second I.F. Secondary |
| L10 | | 43 Push-pull Output Transformer |
| L11 | | 2,500 Ohm Speaker Field |
| L12 | 940 | 20 Henry Filter Choke |
| L13 | 1111 | Oscillator Primary 35 Turns & 15 Turns #36 S. S.E. |
| L14 | 1111 | Oscillator Secondary 72 Turns & 50 Turns #36 D.C.C. |




## MODEL AM-10

### RESISTORS

| CODE | PART NO. | |
|---|---|---|
| R1 | 1042 | 25,000 Ohm Long Wave Oscillator Grid |
| R2 | 1042 | 25,000 Ohm Broadcast Oscillator Grid |
| R3 | 1063 | 500 Ohm Oscillator Cathode |
| R4 | 922 | 75,000 Ohm I.F. Cathode Feed |
| R5 | 1296 | 10,000 Ohm Volume Control & Switch |
| R6 | 941 | 20,000 Ohm Oscillator Plate Feed |
| R7 | 919 | 5,000 Ohm First Detector Cathode |
| R8 | 1062 | 250 Ohm I.F. Cathode |
| R9 | 921 | 40,000 Ohm Screen Feed |
| R10 | 924 | 250,000 Ohm Second Detector Screen |
| R11 | 1003 | 15,000 Ohm Second Detector Cathode |
| R12 | 923 | 100,000 Ohm Second Detector Plate Hum Resistor |
| R13 | 924 | 250,000 Ohm Second Detector Plate |
| R14 | 1317 | 250,000 Ohm Tone Control |
| R15 | 925 | 500,000 Ohm 43 Grid Leak Resistor |
| R16 | 922 | 75,000 Ohm Push-pull Network Resistor |
| R17 | 925 | 500,000 Ohm 76 Grid Leak Resistor |
| R18 | 924 | 250,000 Ohm 76 Plate Feed Resistor |
| R19 | 1119 | 36 Ohm Filament Series Resistor |
| R20 | 1309 | 13 Ohm Pilot Light Shunt Resistor |
| R21 | 920 | 10,000 Ohm 76 Cathode |
| R22 | 925 | 500,000 Ohm 43 Grid Leak Resistor |
| R23 | 1062 | 250 Ohm 43's Cathode & Grid |

### CONDENSERS

| CONDENSERS | | CONDENSERS |
|---|---|---|
| C1 | 833 | 371 MMFD. Preselector Section of 3 Gang Condenser |
| C2 | 833 | 371 MMFD. Preselector Section of 3 Gang Condenser |
| C3 | 833 | 336 MMFD. Oscillator Section of 3 Gang Condenser |
| C4 | 269 | .01 MFD. Oscillator Coupling Condenser |
| C5 | 269 | .01 MFD. Antenna Series Condenser |
| C6 | 971 | 2 Plate First Preselector Trimmer |
| C7 | 971 | 2 Plate Second Preselector Trimmer |
| C8 | 784 | 4 Plate Long Wave Oscillator Trimmer |
| C9 | 972 | 2 Plate Long Wave Oscillator Trimmer |
| C10 | 993 | 75-150 MMFD. First I.F. Primary Trimmer |
| C11 | 994 | 75-150 MMFD. First I.F. Secondary Trimmer |
| C12 | 995 | 75-150 MMFD. Second I.F. Primary Trimmer |
| C13 | 996 | 75-150 MMFD. Second I.F. Secondary Trimmer |
| C14 | 272 | .1 MFD. I.F. Cathode By-pass Condenser |
| C15 | 926 | 25 MFD. Second Detector Cathode Filter Condenser |
| C16 | 269 | .01 MFD. Second Detector Screen By-pass Condenser |
| C17 | 272 | .1 MFD. Second Detector Plate Hum Filter |
| C18 | 269 | .01 MFD. Tone Control Condenser |
| C19 | 269 | .01 MFD. Audio Feed Condenser |
| C20 | 269 | .01 MFD. Invertor Feed Condenser |
| C21 | 343 | .004 MFD. 43 Plate Filter Condenser |
| C22 | 343 | .004 MFD. 43 Plate Filter Condenser |
| C23 | 269 | .01 MFD. Push-pull Feed Condenser |
| C24 | 272 | .1 MFD. 76 Cathode By-pass Condenser |
| C25 | 272 | .1 MFD. Lone By-pass Condenser |
| C26 | 1295 | 4 MFD. Field Supply Filter Condenser |
| C27 | 1295 | 10 MFD. Push-pull Plate Supply Filter Condenser |
| C27 | 1085 | 10 MFD. Push-pull Plate Supply Filter Condenser |
| C28 | 1295 | 4 MFD. B Supply Filter Condenser |
| C29 | 266 | 1 MFD. B Supply By-pass Condenser |
| C30 | 343 | .004 MFD. Broadcast Oscillator Condenser |
| C31 | 269 | .01 MFD. Oscillator Coupling Condenser |
| C32 | 272 | .1 MFD. Screen By-pass Condenser |

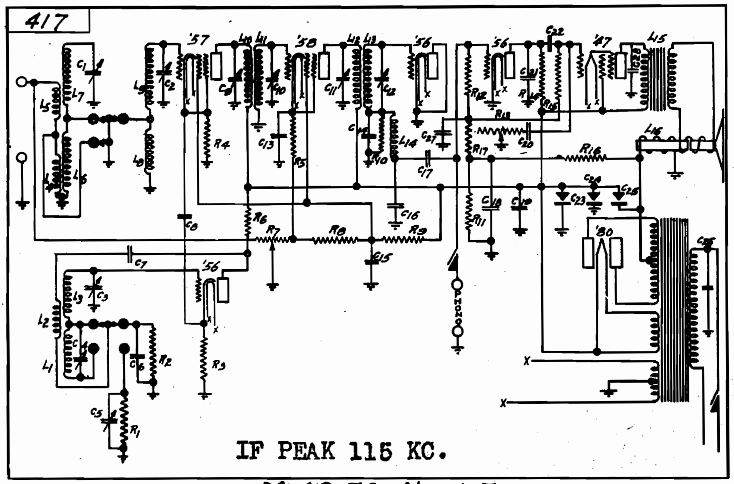
### INDUCTANCES

| CODE | PART NO. | |
|---|---|---|
| L1 | 976 | Broadcast Preselector Primary 178 Turns #36 S. S. E. |
| L2 | 976 | Broadcast First Preselector Secondary 139 Turns #36 S. S. E. |
| L3 | 976 | Broadcast Second Preselector Secondary 132 Turns #36 S. S. E. |
| L4 | 781 | Long Wave Preselector Primary |
| L5 | 781 | Long Wave First Preselector Secondary |
| L6 | 781 | Long Wave Second Preselector Secondary |
| L7 | 782 | Long Wave Oscillator Secondary |
| L8 | 782 | Long Wave & Broadcast Oscillator Primary |
| L9 | 782 | Broadcast Oscillator Secondary |
| L10 | 999 | 25,000 Microhenry First I.F. Primary |
| L11 | 999 | 25,000 Microhenry First I.F. Secondary |
| L12 | 1156 | 14,000 Microhenry Second I.F. Primary |
| L13 | 1156 | 14,000 Microhenry Second I.F. Secondary |
| L14 | | 43 Push-pull Output Transformer |
| L15 | | 2500 Ohm Speaker Field |
| L16 | 940 | 20 Henry Filter Choke |

MODEL A-7, M-69, M-70
Schematic, Parts List

# LAFAYETTE RADIO & TELEVISION CORP.

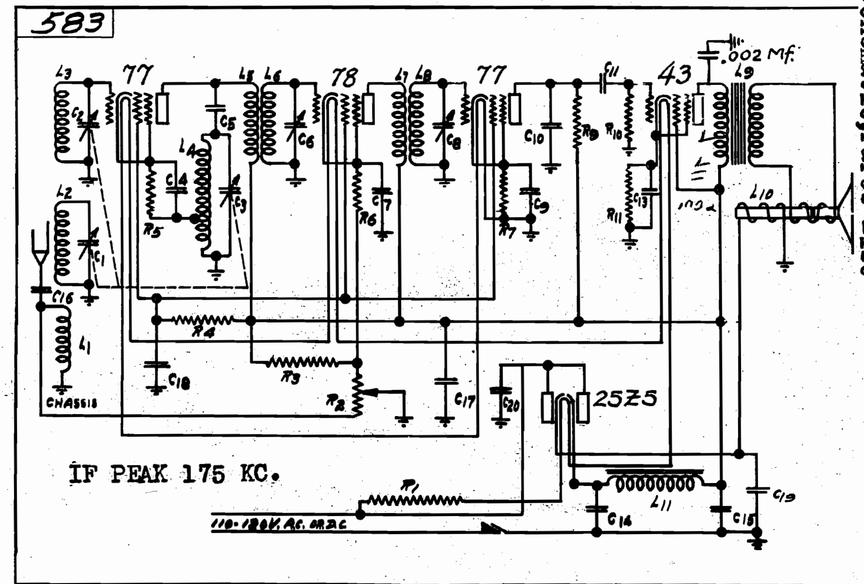
MODEL A-15
Schematic, Parts List




MODEL M-69, 70. Also A-7

| CODE | PART NO. | RESISTORS |
|---|---|---|
| R1 | 94 | 25,000 Ohm Type J Resistor Long Wave Oscillator Grid |
| R2 | 94 | 25,000 Ohm Type J Resistor Broadcast |
| R3 | 279 | 500 Ohm Type J Resistor Oscillator Cathode |
| R4 | 193 | 1,000 Ohm Type J Resistor First Detector Cathode |
| R5 | 323 | 250 Ohm Type J Resistor First I.F. Cathode |
| R6 | 276 | 20,000 Ohm Type J Resistor Oscillator Plate Feed |
| R7 | 512 | 10,000 Ohm Potentiometer Volume Control and Switch |
| R8 | 192 | 40,000 Ohm Type J Resistor Volume Control Voltage Feed |
| R9 | 278 | 20,000 Ohm Type J Resistor R.F. and I.F. Screen Feed |
| R10 | 201 | 500,000 Ohm Type J Resistor Second Detector Grid |
| R11 | 200 | 100,000 Ohm Type J Resistor C Bias Network |
| R12 | 201 | 500,000 Ohm Type J Resistor First Audio Grid Bias |
| R13 | 534 | 250,000 Ohm Variable Resistance, Tone Control |
| R14 | 200 | 100,000 Ohm Type J Resistor First Audio Plate Feed |
| R15 | 201 | 500,000 Ohm Type J Resistor 247 Grid Bias |
| R16 | 198 | 1 Megohm Type J Resistor C Bias Network |
| R17 | 201 | 500,000 Ohm Type J Grid Bias Hum Filter |
| | | CONDENSERS |
| C1) | | (365 MMFD Preselector Section of Three Gang Condenser |
| C2) | 547 | (365 MMFD Preselector Section of Three Gang Condenser |
| C3) | | (350 MMFD Oscillator Section of Three Gang Condenser |
| C4 | | One Plate Long Wave Reciprocal Oscillator Trimmer |
| C5 | | Four Plate Long Wave Grid Oscillator Trimmer |
| C6 | 503 | .004 Broadcast Oscillator Condenser |
| C7 | 503 | .004 MFD Oscillator Feed Condenser |
| C8 | 269 | .01 MFD Oscillator Cathode Feed Condenser |
| C9 | | 75 - 150 MMFD First I.F. Primary Trimmer |
| C10 | | 75 - 150 MMFD First I.F. Secondary |
| C11 | | 75 - 150 MMFD Second I.F. Primary Trimmer |
| C12 | | 75 - 150 MMFD Second I.F. Secondary Trimmer |

| CODE | PART NO. | DESCRIPTION |
|---|---|---|
| C13 | 272 | .1 MFD I.F. Cathode By-pass Condenser |
| C14 | 339 | .0001 MFD Second Detector Grid By-pass |
| C15 | 272 | .1 MFD R.F. and I.F. Screen By-pass Condenser |
| C16 | 307 | .0005 MFD Second Detector R.F. Filter Condenser |
| C17 | 269 | .01 MFD First Audio Feed Condenser |
| C18 | 180 | 1. MFD C Bias By-pass Condenser |
| C19 | 266 | 1. MFD B. By-pass Condenser |
| C20 | 269 | .01 MFD Tone Control Condenser |
| C21 | 662 | .002 MFD First Audio Plate Filter Condenser |
| C22 | 269 | .01 MFD Second Audio Coupling Condenser |
| C23 | 721 | 8 MFD Electrolytic Filter Condenser |
| C24) | 533 | (4 MFD Electrolytic Filter Condenser |
| C25) | | (4 MFD Electrolytic Filter Condenser |
| C26 | 269 | .01 MFD Power Line By-pass Condenser |
| C27 | 272 | .1 MFD Grid Bias Hum Filter Condenser |
| C28 | 343 | .004 MFD Output Plate Filter Condenser |
| | | INDUCTANCES |
| L1 | | Long Wave Oscillator Secondary 1975 Microhenrys |
| L2 | | Long Wave and Broadcast Oscillator Primary 10 Turns #36 P.E. |
| L3 | | Long Wave Oscillator Secondary 95 Turns #32 P.E. |
| L4 | | Long Wave First Preselector Primary U.W. 800 Turns #36 S.S.E. |
| L5 | | Broadcast First Preselector Primary U.W. 110 Turns #36 S.S.E. |
| L6 | | Long Wave First Preselector Secondary U.W. 3380 Microhenries |
| L7 | | Broadcast First Preselector Secondary 126 Turns #32 P.E. |
| L8 | | Long Wave Second Preselector Secondary 3380 Microhenries |
| L9 | | Broadcast Second Preselector Secondary 118 Turns #32 P.E. |
| L10) | | (25,000 Microhenries First I.F. Primary U.W. 115 K.C. |
| L11) | 999 A | (25,000 Microhenries First I.F. Secondary U.W. 115 K.C. |
| L12) | | (25,000 Microhenries Second I.F. Primary U.W. 115 K.C. |
| L13) | 999 A | (25,000 Microhenries Second I.F. Secondary U.W. 115 K.C. |
| L14 | 100 | 5.5 Millihenries R.F. Choke |
| L15 | | Output Transformer |
| L16 | | 2,500 Ohm Speaker Field |



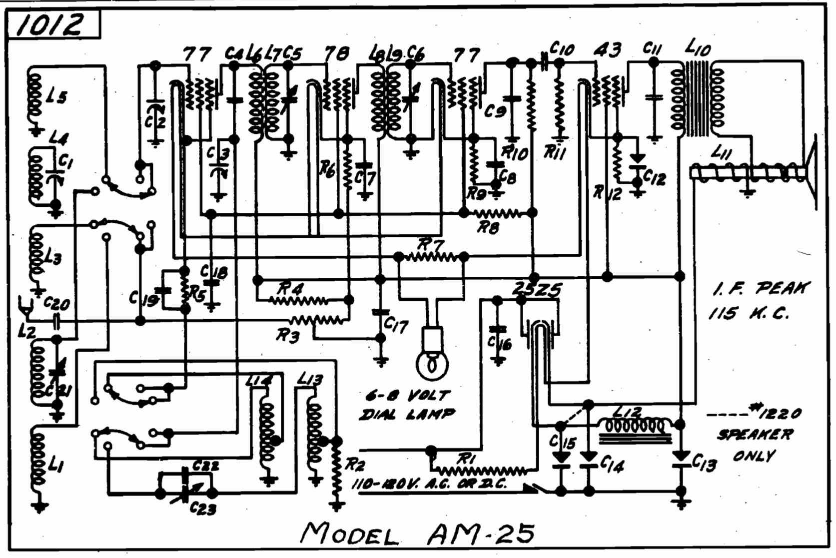

MODEL A-15

| Code | Part No. | RESISTORS |
|---|---|---|
| R1 | 1125 | 130 Ohm Filament Resistor In Power Cord |
| R2 | 853 | 10,000 Ohm Volume Control and Switch |
| R3 | 922 | 75,000 Ohm Resistor I.F. Cathode Feed |
| R4 | 921 | 40,000 Ohm Resistor Screen Feed |
| R5 | 919 | 5,000 Ohm Resistor First Detector & Oscillator Cathode |
| R6 | 1063 | 500 Ohm Resistor I.F. Cathode Feed |
| R7 | 941 | 20,000 Ohm Resistor Second Detector Cathode |
| R8 | | |
| R9 | 924 | 250,000 Ohm Resistor Second Detector Plate Load |
| R10 | 925 | 500,000 Ohm Resistor Output Grid Bias |
| R11 | 1063 | 500 Ohm Resistor 43 Bias |
| R12 | 1308 | 20 OHM PILOT LIGHT SHUNT |
| | | CONDENSERS |
| C1 | 833 | 365 MMFD. Preselector Section of Variable Condenser |
| C2 | 833 | 365 MMFD. Preselector Section of Variable Condenser |
| C3 | 833 | 350 MMFD. Oscillator Section of Variable Condenser |
| C4 | 265 | .001 MFD. First Detector & Oscillator Cathode Condenser |
| C5 | 264 | .00005 MFD. Oscillator Coupling Condenser |
| C6 | 477 | 75-150 MMFD. First I.F. Trimmer Condenser |
| C7 | 272A | .1 MFD. I.F. Cathode By-pass Condenser |
| C8 | 849 183A | 75-150 MMFD. Second I.F. Trimmer Condenser |
| C9 | 183A | .2 MFD. Second Detector Cathode |

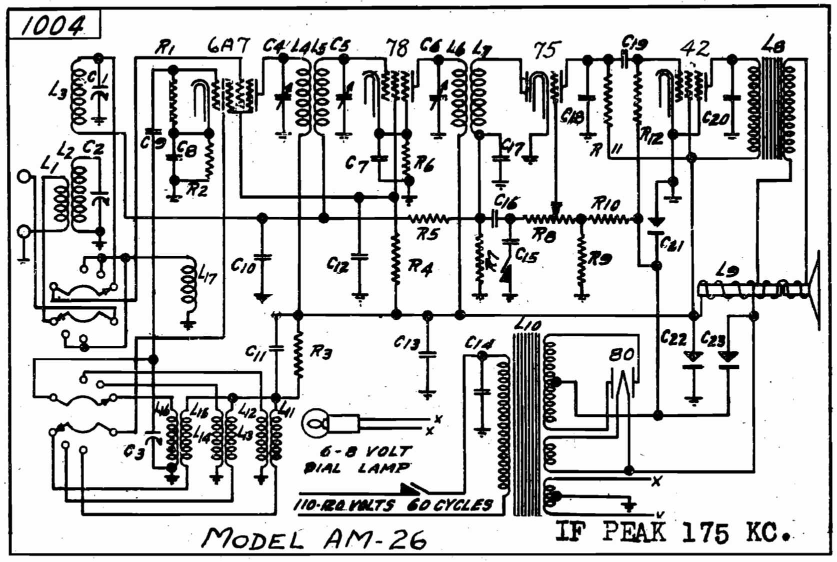
| Code | Part No. | Description |
|---|---|---|
| C10 | 265 | .001 MFD. Second Detector Plate R.F. Filter |
| C11 | 269A | .01 MFD. Audio Feed Condenser |
| C12 | | |
| C13 | 928 | 25 MFD. C. Bias By-pass |
| C14 | | 12 MFD. Voltage Filter Condenser |
| C15 | 1085 | 4 MFD. Voltage Filter Condenser |
| C16 | 265 | .001 MFD. Antenna Series Condenser |
| C17 | 267A | .5 B Supply By-pass Condenser |
| C18 | 272A | .1 200 Volt Screen By-pass Condenser |
| C19 | 1015 | 4 MFD. Voltage Filter Condenser |
| C20 | 272A | .1 MFD. 200 Volt Line By-pass Condenser |
| | | INDUCTANCES |
| L1 | 847 | Preselector Primary 178 Turns #36 S.S.E. U.W. |
| L2 | 847 | Preselector First Secondary 128 Turns #36 S.S.E. U.W. |
| L3 | 847 | Preselector Second Secondary 133 Turns #36 S.S.E. U.W. |
| L4 | 938 | Oscillator Coil 98 Turns Tapped 15 Turns #36 S.S.E. |
| L5 | 938 | First I.F. Primary 650 Turns #36 S.S.E. U.W. |
| L6 | 938 | First I.F. Secondary 650 Turns #36 S.S.E. U.W. |
| L7 | 937 | Second I.F. Primary 650 Turns #36 S.S.E. U.W. |
| L8 | 937 | Second I.F. Secondary 650 Turns #36 S.S.E. U.W. |
| L9 | | Single #43 Output Transformer |
| L10 | 917 | 3,000 Ohm Speaker Field |
| L11 | 940 | 32 Henry Choke |

# LAFAYETTE RADIO & TELEVISION CORP.

## MODEL AM-25 Schematic, Parts List
## MODEL AM-26 Schematic, Parts List




MODEL AM-25




MODEL AM-26

### Model AM-25

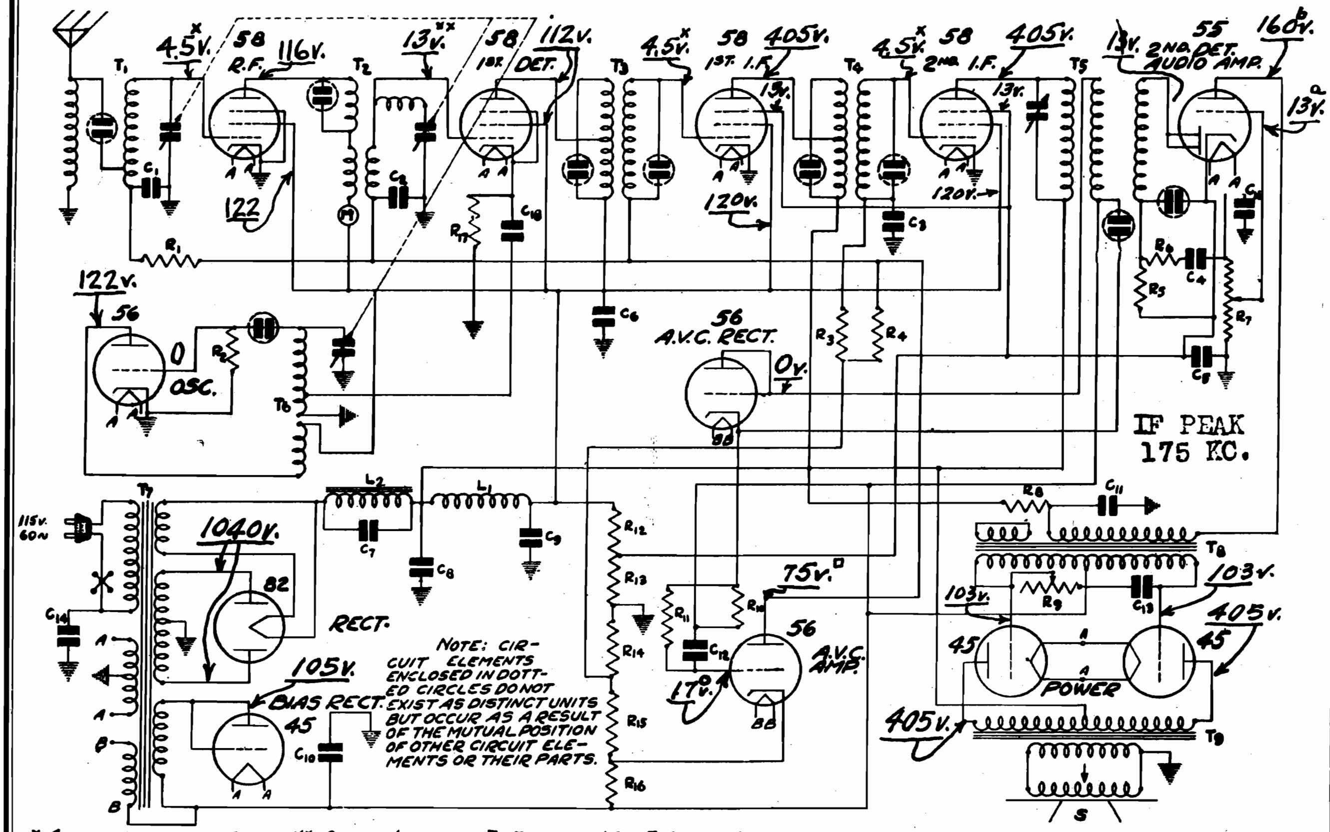
| CODE | PART NO. | RESISTORS |
|---|---|---|
| R1 | 1125 | 130 Ohm Resistor in Power Cord A.P. |
| R2 | 1063 | 500 Ohm Long Wave Oscillator Resistor |
| R3 | 1296 | 10,000 Ohm Volume Control & Switch |
| R4 | 922 | 75,000 Ohm I.F. Cathode Resistor |
| R5 | 919 | 5,000 Ohm Oscillator Feed Resistor |
| R6 | 1063 | 500 Ohm I.F. Cathode Bias Resistor |
| R7 | 1308 | 20 Ohm Pilot Light Shunt Resistor |
| R8 | 921 | 40,000 Ohm R.F. & I.F. Screen Feed Resistor |
| R9 | 941 | 20,000 Ohm Second Detector Cathode Bias Resistor |
| R10 | 924 | 250,000 Ohm Second Detector Plate Load Resistor |
| R11 | 925 | 500,000 Ohm 43 Grid Bias Resistor |
| R12 | 1063 | 500 Ohm 43 Cathode Bias Resistor |
| | | **CONDENSERS** |
| C1 | 833 | 371 MMFD. First Preselector Section of 3 Gang |
| C2 | 833 | 371 MMFD. Second Preselector Section of 3 Gang |
| C3 | 833 | 336 MMFD. Oscillator Section of 3 Gang |
| C4 | 264 | .00005 MFD. Oscillator Plate Feed Condenser |
| C5 | 1521 | 75-150 MMFD. First I.F. Trimmer |
| C6 | 1523 | 75-150 MMFD. Second I.F. Trimmer |
| C7 | 272A | .1 MFD. 200 Volt I.F. Cathode By-Pass |
| C8 | 183A | .2 MFD. 200 Volt Second Detector Cathode By-Pass |
| C9 | 662 | .002 MFD. Mica Second Detector Plate Filter |
| C10 | 269A | .01 MFD. 400 Audio Feed Condenser |
| C11 | 269A | .01 MFD. 400 Volt Output Plate Filter |
| C12 | 928 | 25 MFD. 25 Volt 43 Cathode By-Pass |
| C13 | 1295 | 4 MFD. 150 W.V. Dry Electrolytic |
| C14 | 1295 | 4 MFD. 150 W.V. Dry Electrolytic |
| C15 | 1295 | 10 MFD. 150 W.V. Dry Electrolytic |
| C16 | 272A | .1 MFD. 200 Volt Line By-Pass Condenser |
| C17 | 267A | .5 MFD. 200 Volt B. Supply By-Pass Condenser |
| C18 | 272A | .1 MFD. 200 Volt R.F. & I.F. Screen By-Pass |
| C19 | 265 | .001 MFD. Mica Oscillator Coupling Condenser |
| C20 | 265 | .001 MFD. Mica Antenna Series Condenser |
| C21 | 972 | 2 Plate L.W. Preselector Trimmer |
| C22 | 339 | 2-.0001 MFD. Mica L.W. Oscillator Series Condenser |
| C23 | 1522 | 75-100 MMFD. L.W. Oscillator Series Trimmer |
| | | **INDUCTANCES** |
| L1 | 1475 | L.W. Preselector Primary 800 Turns #36 S.S.E. |
| L2 | 1475 | Long-Wave Preselector Secondary 490 Turns #36 S.S.E. |
| L3 | 847 | Broadcast Preselector Primary 178 Turns #36 S.S.E. |
| L4 | 847 | Broadcast First Secondary 133 Turns #36 S.S.E. |
| L5 | 847 | Broadcast Second Secondary 128 Turns #36 S.S.E. |
| L6 | 1470 | Microhenry First I.F. Primary |
| L7 | 1470 | 25,000 Microhenry First I.F. Secondary |
| L8 | 1473 | 25,000 Microhenry Second I.F. Primary |
| L9 | 1473 | 25,000 Microhenry Second I.F. Secondary |
| L10 | | #43 Output Transformer 917 Rola 1220 Quam |
| L11 | | 3000 Ohm Speaker Field 917 Rola 1220 Quam |
| L12 | 940 | 20 Henry Choke |
| L13 | 1476 | L.W. Oscillator 390 Turns #36 S.S.E. Tapped 20 Turns |
| L14 | 1470 | Broadcast Oscillator 106 Turns #36 S.S.E. Tapped 30 Turns |

### Model AM-26

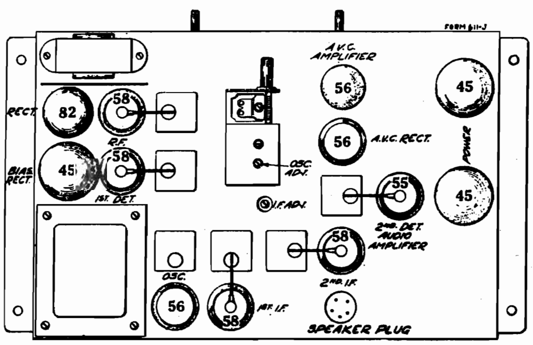
| CODE | PART NO. | RESISTORS |
|---|---|---|
| R1 | 898 | 50,000 Ohm Oscillator Grid Leak |
| R2 | 1062 | 250 Ohm 6A7 Cathode Bias |
| R3 | 920 | 10,000 Ohm Oscillator Feed |
| R4 | 898 | 50,000 Ohm 6A7 & 78 Screen Grid |
| R5 | 926 | 1 Meg Ohm A.V.C. Network |
| R6 | 1063 | 500 Ohm 78 Cathode Bias |
| R7 | 925 | 500,000 Ohm A.V.C. Network |
| R8 | 1291 | 500,000 Ohm Volume Control & Switch |
| R9 | 1122 | 40 Ohm C Bias Network |
| R10 | 1063 | 500 Ohm C Bias Network |
| R11 | 923 | 100,000 Ohm 75 Plate Resistor |
| R12 | 925 | 500,000 Ohm 42 Grid Resistor |
| | | **CONDENSERS** |
| C1 | 833 | 371 MMFD. Preselector Section of 3 Gang |
| C2 | 833 | 371 MMFD. Preselector Section of 3 Gang |
| C3 | 833 | 336 MMFD. Oscillator Section of 3 Gang |
| C4 | 1104 | 70-200 MMFD. First I.F. Primary Trimmer |
| C5 | 1105 | 70-200 MMFD. First I.F. Secondary Trimmer |
| C6 | 849 | 75-150 MMFD. Second I.F. Primary Trimmer |
| C7 | 272A | .1 MFD. 200 Volt 78 Cathode By-Pass |
| C8 | 272A | .1 MFD. 200 Volt 6A7 Cathode By-Pass |
| C9 | 264 | .00005 MFD. Mica Oscillator Coupling Condenser |
| C10 | 272A | .1 MFD. 200 Volt A.V.C. By-Pass |
| C11 | 272A | .1 MFD. 200 Volt Oscillator Feed By-Pass |
| C12 | 272A | .1 MFD. 200 Volt 6A7 & 78 Screen Grid By-Pass |
| C13 | 569A | .2 MFD. 400 Volt B By-Pass |
| C14 | 269A | .01 MFD. 400 Volt Line By-Pass |
| C15 | 343A | .004 MFD. 600 Volt Tone Control Condenser |
| C16 | 269A | .01 MFD. 400 Volt Second Detector Feed |
| C17 | 307 | .0005 MFD. Mica Diode Filter Condenser |
| C18 | 265 | .001 MFD. Mica 75 Plate Filter |
| C19 | 269A | .01 MFD. 400 Volt Audio Feed |
| C20 | 269A | .01 MFD. 400 Volt 42 Plate Filter |
| C21 | 928 | 25 MFD. 25 Volt Electrolytic C Bias Filter |
| C22 | 1379 | 4 MFD. 350 W.V. Electrolytic B Filter |
| C23 | 721 | 8 MFD. 450 W.V. Electrolytic B Filter |
| | | **INDUCTANCES** |
| L1 | 1108 | Antenna Primary 178 Turns #36 S.S.E. |
| L2 | 1108 | Preselector, First 136 Turns #36 S.S.E. |
| L3 | 1108 | Preselector, Second 126 Turns #36 S.S.E. |
| L4 | 1101 | 8,000 Microhenries First I.F. Primary |
| L5 | 1101 | 8,000 Microhenries First I.F. Secondary |
| L6 | 1172 | 6,000 Microhenries Second I.F. Primary |
| L7 | 1172 | 6,000 Microhenries Second I.F. Secondary |
| L8 | 1380 | Single 42 Output Transformer |
| L9 | 1380 | 1,500 Ohm Speaker Field |
| L10 | 1301 | Power Transformer (Unless Special) |
| L11 | 1444 | Foreign Band Oscillator Primary 9½ Turns #36 D.C.C. |
| L12 | 1444 | Foreign Band Oscillator Secondary 8½ Turns #24 S.S.C |
| L13 | 1487 | Police Band Oscillator Primary 15 Turns #36 S.S.E. |
| L14 | 1487 | Police Band Oscillator Secondary 40 Turns #36 D.C.C. |
| L15 | 1111 | Broadcast Oscillator Primary 50 Turns #36 S.S.E. |
| L16 | 1111 | Broadcast Oscillator Secondary 120 Turns #36 D.C.C. |
| L17 | 1486 | Short Wave Antenna Impedance 75 Turns #30 S.S.E. |

MODEL B-51, B-52 B-53, B-54

# LAFAYETTE RADIO & TELEVISION CORP.




*As read across R-14. **As read across R-17 and R-14. ▫As read across R-15 with 1,000,000 ohm meter.
∘As read across R-16. a Vol. Cont. at Minimum.
b Triode plate to cathode




## RESISTORS

| Part No. | Code | Resistance | Type | |
|---|---|---|---|---|
| P-A95204 | R1 | 200,000 ohm | Carbon | $0.20 |
| P-A95504 | R2 | .5 megohm | Carbon | .25 |
| P-A95105 | R3 | 1 megohm | Carbon | .25 |
| P-A95504 | R4 | .5 megohm | Carbon | .25 |
| P-B94803 | R5 | 80,000 ohm | Carbon | .25 |
| P-A95104 | R6 | 100,000 ohm | Carbon | .25 |
| P- 96008 | R7 | 2 megohm | Vol. Con. & Switch | 1.20 |
| P-C94403 | R8 | 40,000 ohm | Carbon | .25 |
| P- 97006 | R9 | 3 megohm | Tone Control | .90 |
| P-A95204 | R10 | 200,000 ohm | Carbon | .20 |
| P-A95105 | R11 | 1 megohm | Carbon | .25 |
| P- 98003 | R12 / R13 | 4000 ohm / 390 ohm | Armoured Wire Wound | .50 |
| P-A94902 | R14 | 9,000 ohm | Carbon | .25 |
| P-A94154 | R15 | 150,000 ohm | Carbon | .25 |
| P-A94353 | R16 | 35,000 ohm | Carbon | .25 |
| P-A95352 | R17 | 3,500 ohm | Carbon | .20 |

"A" preceding the number signifies .2 watt
"B" preceding the number signifies .5 watt
"C" preceding the number signifies 1.0 watt

## CONDENSERS

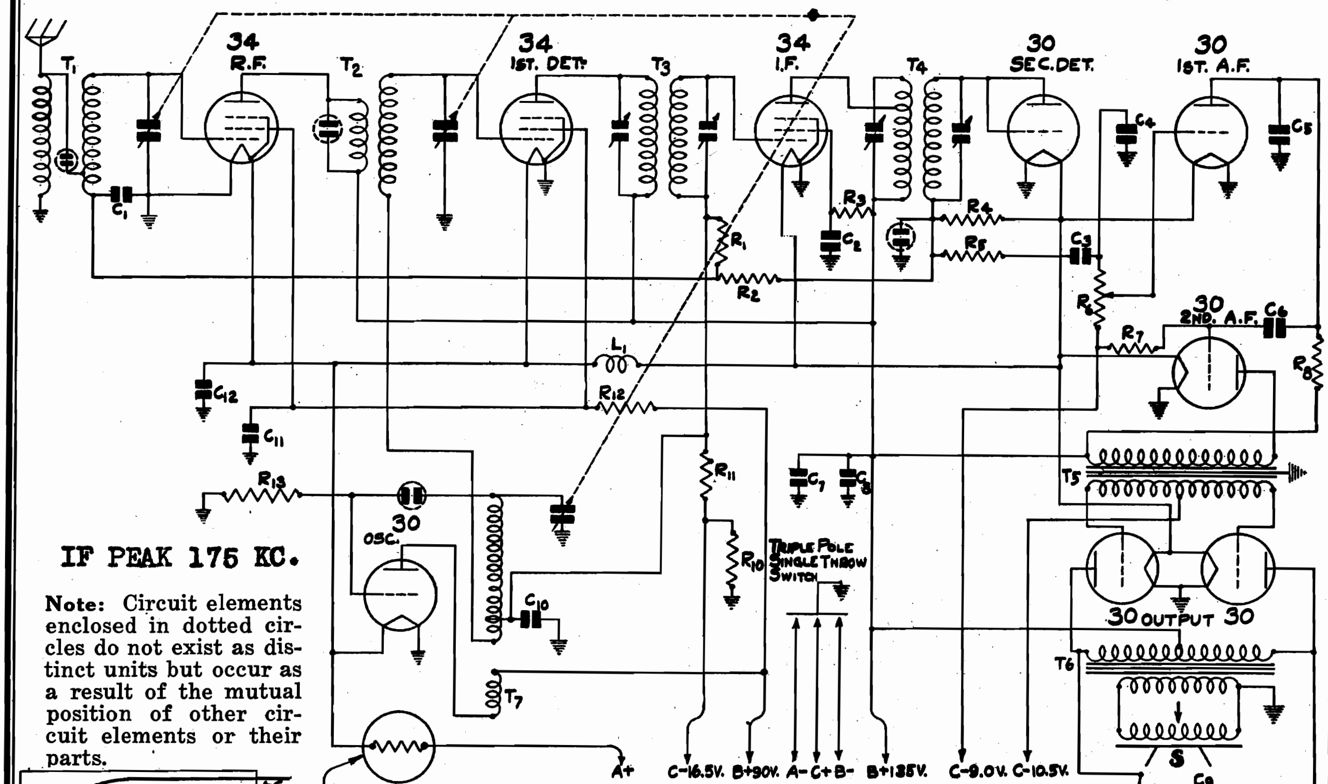
| Part No. | Code | Capacity | Voltage | Type | List Price |
|---|---|---|---|---|---|
| P-80862 | C1 | .050 mfd. | 200 V. | Tubular | $0.30 |
| P-80987 | C2 | .150 mfd. | 200 V. | Tubular | .25 |
| P-80862 | C3 | .050 mfd. | 200 V. | Tubular | .30 |
| P-80862 | C4 | .050 mfd. | 200 V. | Tubular | .30 |
| P-80888 | C5 | .250 mfd. | 200 V. | Tubular | .40 |
| P-80888 | C6 | .250 mfd. | 200 V. | Tubular | .40 |
| P-80985 | C7 | .150 mfd. | 200 V.AC | Tubular | .55 |
| P-80984 | C8 / C9 / C10 / C11 | 16. mfd. / 6. mfd. / 8. mfd. / 4. mfd. | 450 V. / 150 V. / 100 V. / 350 V. | Electrolytic Block | 4.00 |
| | | 16 mfd. Section—Term. 3+, Term. 1− | | | |
| | | 6 mfd. Section—Term. 5+, Term. 1− | | | |
| | | 4 mfd. Section—Term. 4+, Term. 1− | | | |
| | | 8 mfd. Section—Term. 6+, Term. 2− | | | |
| P-80862 | C12 | .050 mfd. | 200 V. | Tubular | .30 |
| P-80863 | C13 | .004 mfd. | 600 V. | Tubular | .25 |
| P-80997 | C14 | .010 mfd. | 600 V. | Metal Can | .50 |
| P-80919 | C16 | .00025 mfd. | 600 V. | Moulded | .20 |
| P-80914 | C18 | .002 mfd. | 200 V. | Tubular | .20 |
| P-80991 | 3 Gang Condenser | | | | 3.85 |
| P-1922 | 3rd I. F. Trimmer Condenser | | | | .50 |

Set the signal generator for 175 K. C. Connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. Then adjust the 3rd I. F. primary condenser for maximum output. The adjusting screw for this condenser is reached from the top of the sub-panel and will be seen in back of the tuning condenser.

Next set the signal generator for a signal of exactly 1400 K. C. The antenna lead from the signal generator is, in this instance, connected to the antenna lead of the receiver. Set the dial pointer on the 1400 K. C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

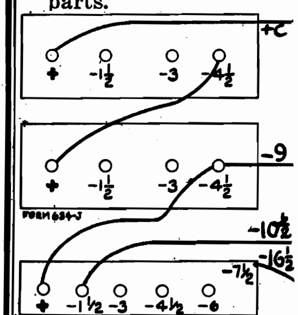
# LAFAYETTE RADIO & TELEVISION CORP

**MODEL B-60**
**Schematic, Voltage Socket, Parts List**




**IF PEAK 175 KC.**

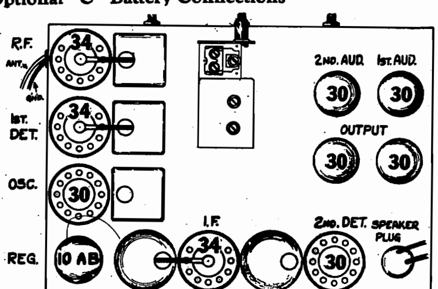
**Note:** Circuit elements enclosed in dotted circles do not exist as distinct units but occur as a result of the mutual position of other circuit elements or their parts.

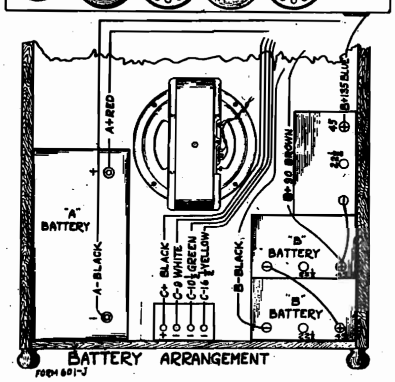



Optional "C" Battery Connections

| Part No. | Code | Resistance | Type |
|---|---|---|---|
| P-A95504 | R1 | .5 megohm | Carbon |
| P-A94105 | R2 | 1.0 megohm | Carbon |
| P-A95353 | R3 | 35,000 ohms | Carbon |
| P-A94204 | R4 | 200,000 ohms | Carbon |
| P-A95104 | R5 | 100,000 ohms | Carbon |
| P- 96009 | R6 | 1 megohm | Volume Control |
| P-A94105 | R7 | 1 megohm | Carbon |
| P-A95104 | R8 | 100,000 ohms | Carbon |
| P- 97005 | R9 | 150,000 ohms | Tone Control |
| P-A94153 | R10 | 15,000 ohms | Carbon |
| P-A94405 | R11 | 4 megohms | Carbon |
| P-A94153 | R12 | 15,000 ohms | Carbon |
| P-A95504 | R13 | .5 megohm | Carbon |

| Part No. | Code | Capacity | Voltage | Type |
|---|---|---|---|---|
| P-80864 | C1 | .10 mfd. | 200 V. | Tubular |
| P-80862 | C2 | .050 mfd. | 200 V. | Tubular |
| P-80862 | C3 | .050 mfd. | 200 V. | Tubular |
| P-80919 | C4 | .00025 mfd. | 600 V. | Moulded |
| P-80919 | C5 | .00025 mfd. | 600 V. | Moulded |
| P-80862 | C6 | .050 mfd. | 200 V. | Tubular |
| P-80968 | C7 | 4.00 mfd. | 150 V. | Electrolytic |
| P-80862 | C8 | .050 mfd. | 200 V. | Tubular |
| P-80940 | C9 | .02 mfd. | 400 V. | Tubular |
| P-80981 | C10 | .01 mfd. | 400 V. | Tubular |
| P-80888 | C11 | .25 mfd. | 200 V. | Tubular |
| P-80888 | C12 | .25 mfd. | 200 V. | Tubular |
| P-80980 | Three Gang Variable Condenser | | | |




BATTERY ARRANGEMENT

## Voltages at Sockets

**Antenna Shorted to Ground**
**Batteries Up to Rated Voltages. See Fig. 1**
**Voltages Read From Negative Filament Terminal**

| Type of Tube | Function | Across Filament | Plate to Cathode | Screen to Cathode | Grid to Cathode | Normal Plate M. A. |
|---|---|---|---|---|---|---|
| 34 | R.F. | 2.0 | 135 | 65 | 3.0(1) | 2.6 |
| 34 | 1st Det. | 2.0 | 135 | 65 | 4.5(1) | 2.5 |
| 30 | Osc. | 2.0 | 90 | | 2–4(2) | 3.3 |
| 34 | I.F. | 2.0 | 135 | 90 | 4.5(1) | 3.0 |
| 30 | 2nd Det. | 2.0 | | | | |
| 30 | 1st Audio | 2.0 | 90 | | 9.0(3) | .45 |
| 30 | 2nd Audio | 2.0 | 130 | | 9.0(4) | 3.4 |
| 30 | Output | 2.0 | 135 | | 10.5 | 2.5 |

(1) Computed figure—cannot be read because of high resistance circuit.
(2) Varies with frequency setting. (4) As read at battery.
(3) Volume Control at minimum.

Aug., 1933

MODEL B-60
Alignment
Parts List

# LAFAYETTE RADIO & TELEVISION CORP.

## Batteries

The batteries and voltages required are shown in Figs. 2 and 3.

The majority of potential complaints on short "B" battery life can be prevented if proper instructions are given to the customer at the time the receiver is installed. The average "B" drain of this receiver under no signal conditions is 18 milliamperes. **A milliammeter in the negative "B" line will quickly determine whether the "B" drain is excessive or normal.**

Two factors directly affect the "B" battery consumption. One is the strength of the station signal. When the signal is weak, little or no automatic volume control action is obtained, and the 34 tubes draw high plate current. As the strength of the incoming signal increases, plate current in these tubes is reduced with a corresponding reduction in total "B" battery current. The other factor is the volume used. As the volume is increased, the "B" battery drain of the output tubes is increased.

As this receiver does not have a pilot lamp, it is easy to forget to turn it off. When this happens, the receiver may be on as long as 24 hours or more. A continuous drain of this kind for a long period will shorten the life of the "B" batteries considerably. **Caution the customer regarding this.**

The "A" Battery consists of any direct current power supply source delivering from 2 to 3 volts. An air cell, 3 volt dry cell bank, and 2 volt storage cell are some of the units which can be used. **Caution—do not use a 6 volt storage battery.**

For the "C" battery a special 22½ volt "C" battery with 9, 10½ and 16½ volt taps, as indicated in Fig. 2, may be used. If such a battery is not available, two standard 4½ volt "C" batteries and a standard 7½ volt "C" battery can be connected as shown in Fig. 3 to supply the necessary voltages.

If the receiver does not operate satisfactorily test the batteries under load. A high resistance meter is required for the "B" and "C" voltages. If any of the batteries are considerably below their rated voltage, new ones should be used. When the "B" batteries are replaced the "C" batteries should also be replaced. The reason for this is that the "C" drain is such that the "C" batteries are run down in about the same time as the "B" batteries.

## Tubes

The tubes used in this receiver are all of the 2 volt series. The 34's are R. F. Pentodes with the suppressor grid tied internally to the cathode. The 30 tube is a general purpose triode. All of these tubes are of the filament or directly heated cathode type. All of them have a 2 volt filament and should not be connected to a power supply not intended for this type of tube. The filaments of both types of tubes take 60 milliamperes at 2 volts and the total "A" drain is therefore 9 times .06 or .54 amperes. The average "B" drain of the receiver under no signal conditions is 18 milliamperes. The tube marked 10AB is a voltage regulator which keeps the filament voltage within safe operating limits over a battery range of 2 to 3 volts.

## Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 175 K. C. and accurately calibrated signals over the broadcast band, and an output indicating meter are desirable. The procedure is as follows:

Set the signal generator for 175 K. C. Connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. Then adjust the four intermediate frequency condensers for maximum output. The adjusting screws for these condensers are reached from the bottom of the chassis.

Next set the signal generator for a signal of exactly 1400 K. C. The antenna lead from the signal generator is, in this instance, connected to the antenna lead of the receiver. Set the dial pointer on the 1400 K. C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

The tuning condensers are all adjusted at the factory for the correct relative capacity between the oscillator section and the other two sections. As a rule no adjustment other than at 1400 K. C., as mentioned above, is required. If, after the receiver has been aligned at 1400 K. C., the sensitivity is still low at some portion of the band, adjust the signal generator to that setting and tune for maximum output with the station selector knob on the receiver. Then, without readjusting the trimmers, bend the slotted rotor plates on the **front two sections** of the gang to obtain maximum output. Care should be taken not to bend these plates too far in an inward direction as the condenser may short as a result.

After any adjustment of this nature, set the signal generator again for a signal of 1400 K. C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

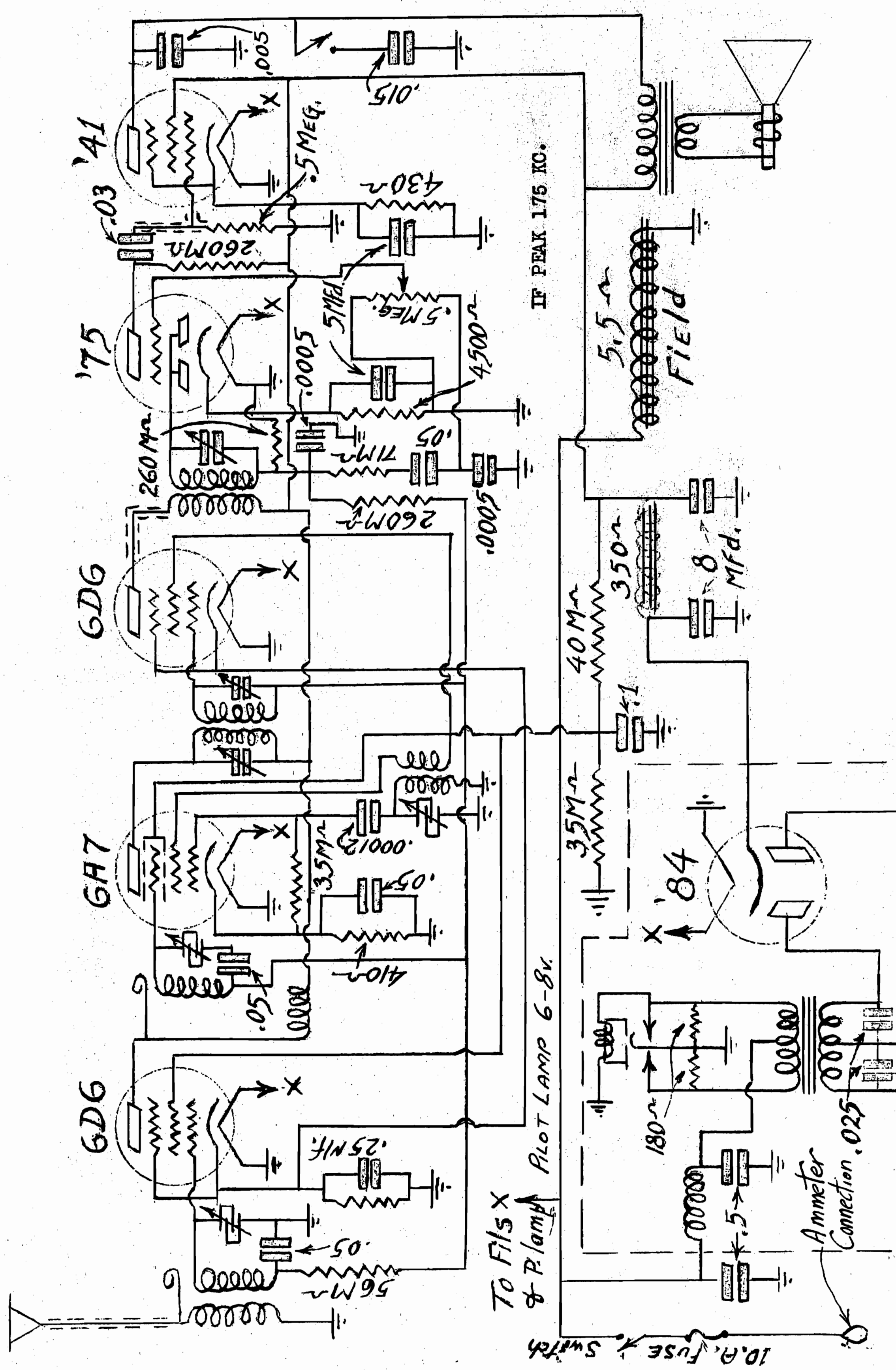
## REPAIR PARTS LIST FOR 10 TUBE BATTERY OPERATED SUPERHETERODYNE RECEIVER

**When ordering parts be sure and give the part number. Also give the series number which will be found in the License Notice label. If there is a spot of paint on the chassis, give this color.**

| Part No. | Item |
|---|---|
| P-1727 | No. 30 Socket |
| P-1729 | No. 34 Socket |
| P-1832 | Reg. Socket |
| P-1640 | Spkr. Socket |
| P-20406B | Tube Shield |
| P-20408 | Tube Shield Base |
| P-1960 | On-Off Switch |
| P-1504 | 8-Lug Terminal Strip |
| P-20714 | Bottom Plate |
| P-5115 | Antenna R. F. Transf. Assembly less can |
| P-5116 | Interstage R. F. Transf. Assembly less can. |
| P-5117 | Oscillator Coil Assembly less can |
| P-40432 | Cans for the above assemblies |
| P-5128 | 1st I. F. Assembly complete with can |
| P-5129 | 2nd I. F. Assembly complete with can |
| P-5111 | Filament Choke |
| P-50589 | Audio Input Transformer |
| P-50590 | Audio Output Transformer |
| P-70751 | 9-Wire Battery Cable |
| P-10272 | Rubber Mtg. Feet |
| P-1540 | Knobs, Plain |
| P-1724 | Knob, Indicator |
| P-30342 | Grid Cap Only |
| P-10224 | Rubber Drive Pinion |
| P-30374 | Bushing for Rubber Pinion |
| P-1897 | Permanent Magnet Dynamic Speaker |
| P-1627 | Tuning Meter |

MODEL LW-10
Schematic

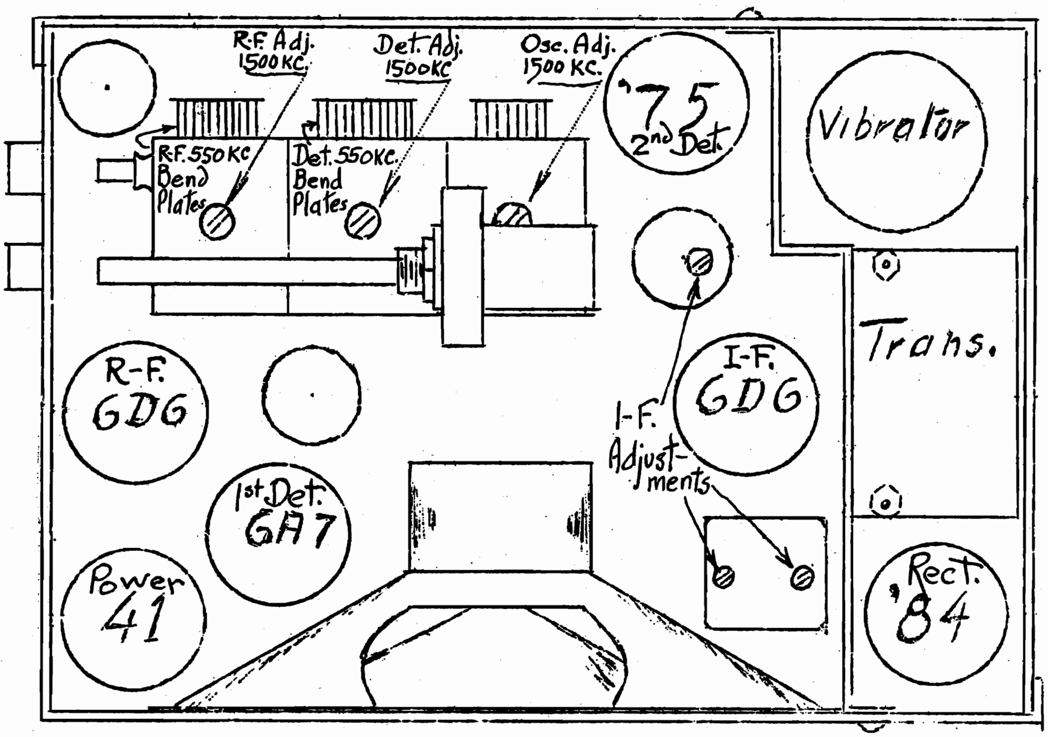
# LAFAYETTE RADIO & TELEVISION CORP.




The set operates on 6 to 8 volts battery with either POSITIVE or NEGATIVE grounded.

**MODEL LW-10**
**Socket, Parts**
**Alignment**

# LAFAYETTE RADIO & TELEVISION CORP.




**I-F. Alignment**
**Connect test oscillator, set at 175 KC. to Grid of 6A7 and Gnd. Ground stator of oscillator condenser during the adjustment.**

**R-F. Alignment**
**Connect test oscillator to antenna and ground. Adjust as shown above.**

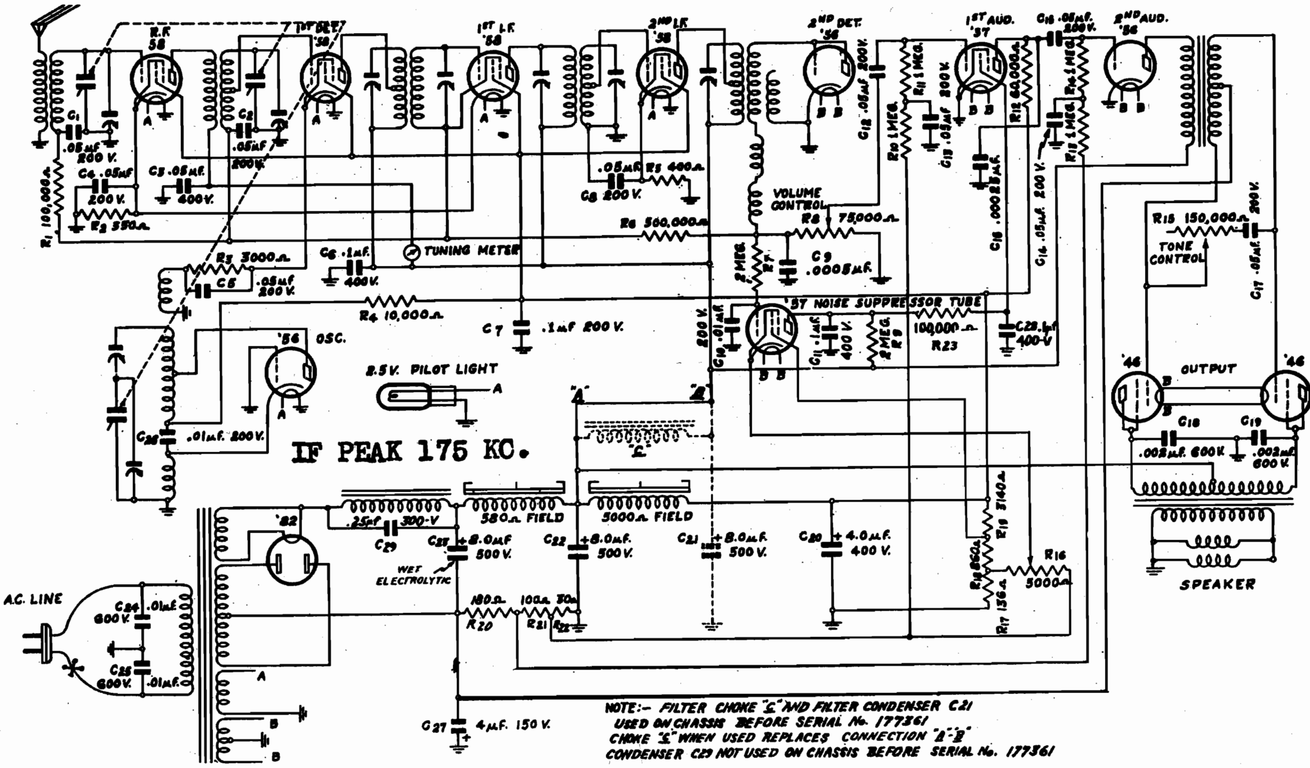
| | |
|---|---|
| 1233 | Filter Choke. |
| 1234 | Dual IF Transformer. |
| 1235 | Single I.F. Transformer |
| 1236 | Antenna Transformer |
| 1237 | Oscillator Coil. |
| 1238 | R.F. Transformer |
| 2206 | Variable Condenser |
| 2213 | .00012 Mica Condenser |
| 2051 | .0005 Mica Condenser |
| 2215 | .005 Tubular Condenser |
| 2084 | .015 Tubular Condenser |
| 2190 | .02 Tubular Condenser |
| 2046 | .05 Tubular Condenser |
| 2022 | .1 Tubular Condenser |
| 2033 | .25 Tubular Condenser |
| 2209 | .5 Tubular Condenser |
| 2211 | 5 Mfd -25 Volt Electrolytic Condenser |
| 2212 | 5 Mfd. Electrolytic Strap |
| 2210 | Dual 8 Mfd. Electrolytic Filter Cond |
| 2152 | Generator Condenser |
| 2214 | Ammeter Condenser |
| 3276 | Distributor Suppressor |
| 3277 | Spark Plug Suppressor |
| 5077 | Antenna Cable |
| 5081 | Pilot Light Cable less socket |
| 7128 | Speaker |
| 8401 | Volume Control & Switch |
| 8399 | Fuse Retainer |
| 8403 | Pilot Light Socket only |
| 8407 | Pilot Light Bulb |
| 8405 | Knob, Tone Control |
| 8404 | Switch, Tone Control |
| 9392 | Mounting Stud |
| | Wing Nuts |

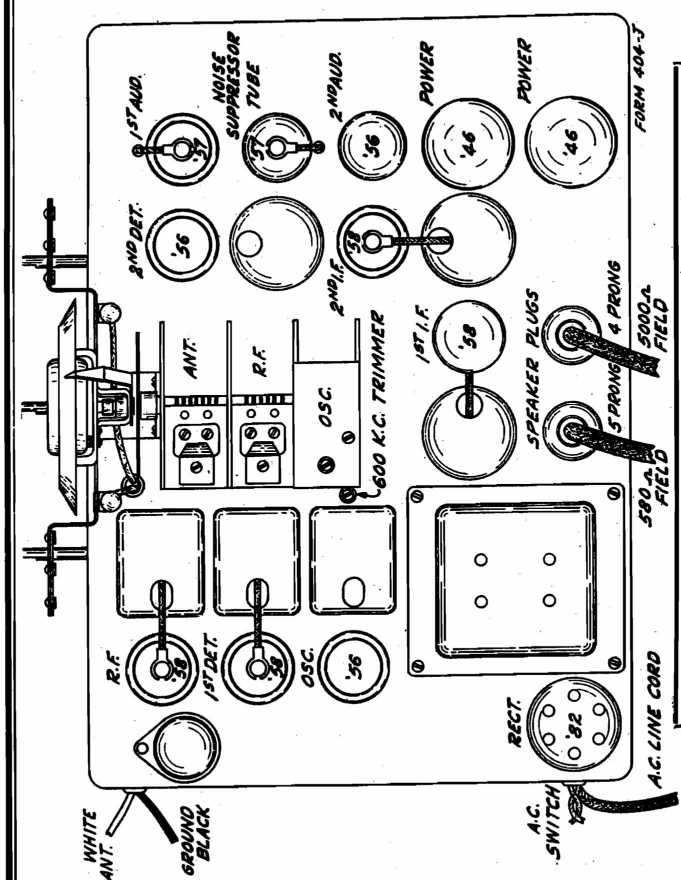
## MODEL 640 ELIMINATOR

| | |
|---|---|
| 1239 | Power Transformer |
| 2207 | .5 120 Volt Metal Clad Cond. with Stud |
| 2208 | .025 1000 Volt Metal Clad Cond. |
| 1163-C | R.F. Choke (A circuit) |

**MODEL L-1, L-2, L-3, L-4**
**Schematic**
**Voltage**

# LAFAYETTE RADIO & TELEVISION CORP.




## Voltages at Sockets

**LINE VOLTAGE 115—ANTENNA SHORTED TO GROUND—NOISE SUPPRESSOR AT MAXIMUM CLOCKWISE POSITION**

| Type of Tube | Function | Across Filament or Heater | Plate to Cathode | Screen to Cathode | Grid to Cathode | Normal Plate M. A. |
|---|---|---|---|---|---|---|
| 58 | R.F. | 2.4 | 242 | 90 | 4 (1) | 4 |
| 58 | 1st Det. | 2.4 | 250 | 86 | 7 (1) | 2 |
| 56 | Osc. | 2.4 | 24 | | 0 | 8 |
| 58 | 1st I.F. (2) | 2.4 | 252 | 90 | 4 (1) | 4 |
| 58 | 2nd I.F. (2) | 2.4 | 254 | 91 | 3 | 5.7 |
| 56 | 2nd Det. | 2.4 | 0 | | 0 | 0 |
| 57 | 1st Audio | 2.4 | 65 | 55 | 4 (3) | .4 |
| 57 | NoiseSup. | 2.4 | 55 | 20 | 3 (1) | 0 |
| 56 | 2nd Audio | 2.4 | 255 | | 14 (4) | 3.3 |
| 46 | Power | 2.4 | 260 | 260 | 34 | 23 |
| 82 | Rectifier | 2.4 | 880 volts plate to plate | | | 53 per plate |

(1) Read from cathode to ground.
(2) If I.F. readings are made with a cord and plug, ground the control grid through a condenser to prevent oscillation and motor boating.
(3) Read across 30 ohm section of voltage divider.
(4) Read across 30 ohm and 100 ohm section of voltage divider.

MODEL L-11, L-12
Schematic,
Voltage
Socket
Trimmers

# LAFAYETTE RADIO & TELEVISION CORP.

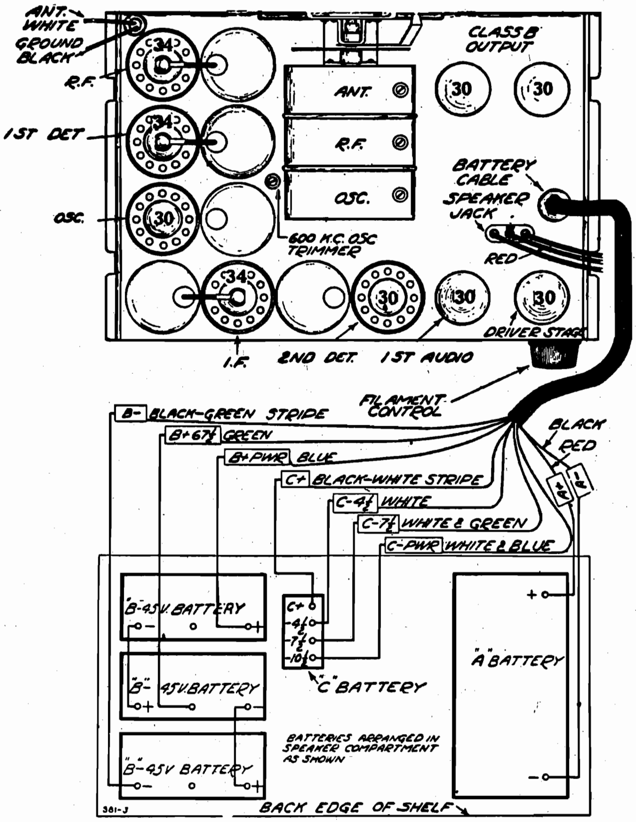


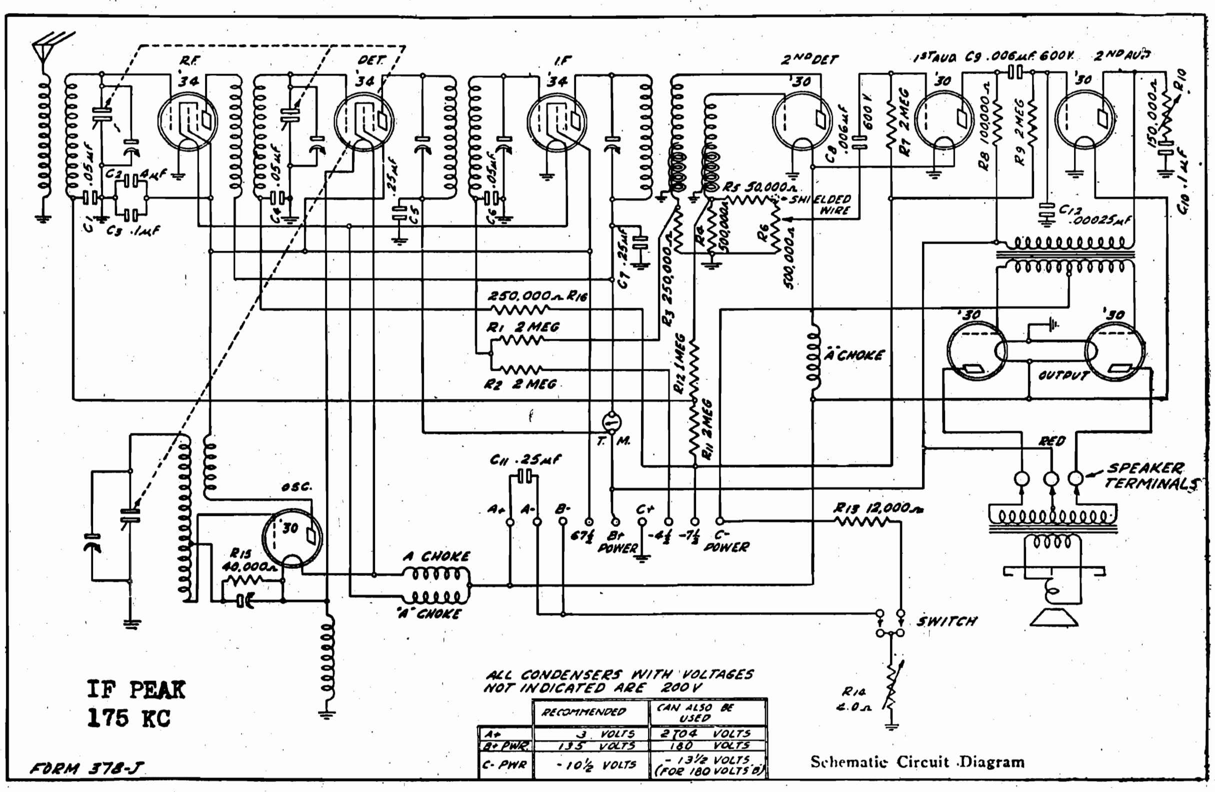
Fig. 2—Tube Arrangement and Battery Connections

## Voltages at Sockets

"B" AND "C" BATTERIES UP TO RATED VOLTAGE—FILAMENT CONTROL KNOB SET SO THAT FILAMENT VOLTAGE IS 2—ANTENNA LEAD SHORTENED TO GROUND—VOLTAGES READ FROM NEGATIVE FILAMENT LEG

| Type of Tube | Function | Across Filament | Plate to Cathode | Screen to Cathode | Grid to Cathode | Normal Plate MA |
|---|---|---|---|---|---|---|
| '34 | R.F | 2.0 | 125 | 65 | 2.88(1) | 2.3 |
| '34 | 1st Det. | 2.0 | 130 | 65 | 7.5(1) | 1.4 |
| '30 | Osc. | 2.0 | 67 | | 4-15(2) | 1.6-4(2) |
| '34 | I.F | 2.0 | 120 | 65 | 2.38(1) | 2.4 |
| '30 | 2nd Det. | 2.0 | 0 | | 0 | 0 |
| '30 | 1st Audio | 2.0 | 85 | | 7.5(1) | .5 |
| '30 | Driver | 2.0 | 125 | | 7.5(1) | 4.0 |
| '30 | Output | 2.0 | 130 | | 10. | 1.1 |

(1) Computed figure—cannot be read with ordinary voltmeter because of high resistance in this circuit. See article "Voltages" for further information.
(2) Subject to variation with dial setting.

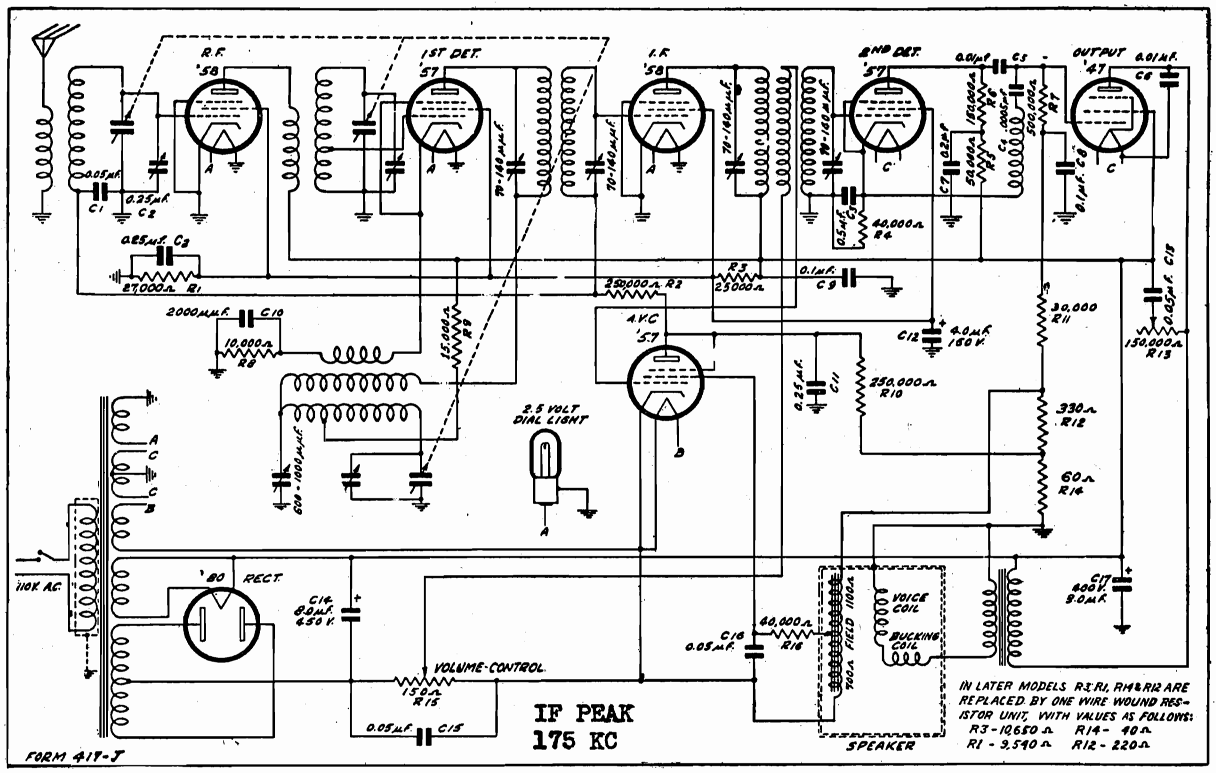


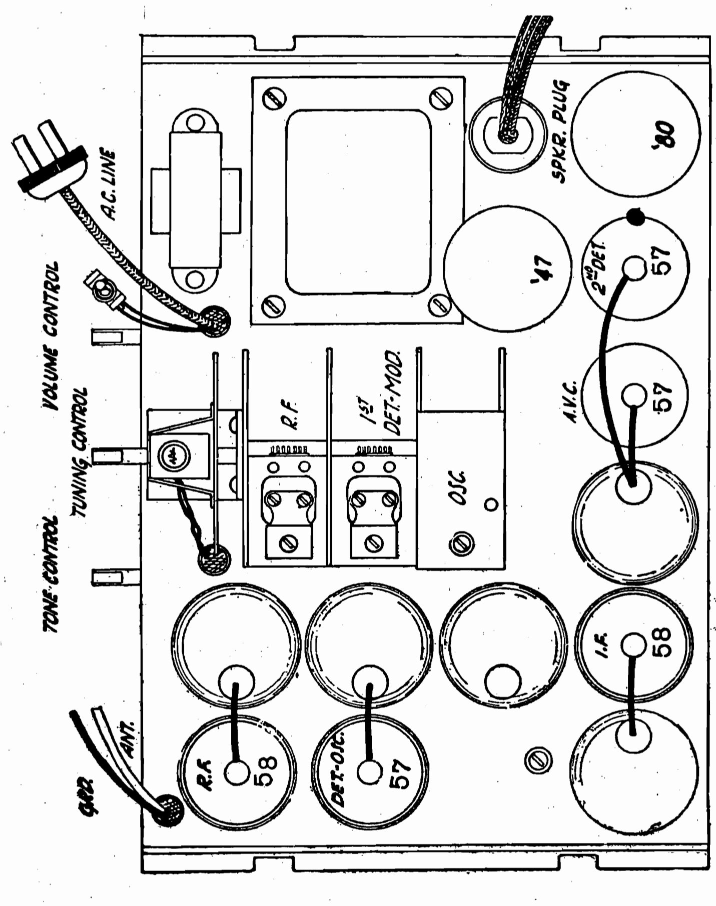

| | RECOMMENDED | CAN ALSO BE USED |
|---|---|---|
| A+ | 3 VOLTS | 2 TO 4 VOLTS |
| B+ PWR | 135 VOLTS | 180 VOLTS |
| C- PWR | -10½ VOLTS | -13½ VOLTS (FOR 180 VOLTS B) |

Schematic Circuit Diagram

# LAFAYETTE RADIO & TELEVISION CORP

MODEL L-16, L-17
L-18, L-19
Schematic
Socket, Changes




## Change in Later Models

In the first models of this chassis, resistors R-1 and R-3 were carbon resistors of the values as shown in Fig 1 Resistors R-12 and R-14, were in one vitreous enamel unit. The voltages for the sets with these resistors are shown in the voltage chart on Page 4 at the left.

In later models the four above mentioned resistors were replaced by one armored wire wound resistor unit New values are used as follows

| Code | Resistance |
|---|---|
| R-12 | 220 ohms |
| R-14 | 40 ohms |
| R-1 | 9,540 ohms |
| R-3 | 10,650 ohms |

The voltages for the sets with the four-section wire wound resistor are shown in the second voltage chart on Page 4 at the right.

## Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer and an additional filter condenser are used Also, a slight change is made in the power unit wiring In the twenty-five cycle set, condenser C-17 the dry electrolytic unit is put in parallel with condenser C-14 An 8.0 mfd wet electrolytic condenser is put in place of condenser C-17

The twenty-five cycle chassis can be operated satisfactorily from a sixty cycle power supply However, the reverse is not true that is the sixty cycle chassis cannot be operated from a twenty-five cycle power supply

A 110-220 volt 40-60 cycle power transformer is also available for this model.

MODEL L-16, L-17
L-18, L-19

# LAFAYETTE RADIO & TELEVISION CORP.

Alignment, Parts
Voltage

## REPAIR PARTS LIST FOR 7 TUBE SUPERHETERODYNE RECEIVER

When ordering parts, the part number and the serial number of chassis must be given. If there is a spot of paint on the chassis be sure to give this color. If this information is not available return the old part to insure getting the correct part.

| Part No. | Name | List Price |
|---|---|---|
| P-1677 | No. 57 Tube Socket | $1.15 |
| P-1678 | No. 58 Tube Socket | .15 |
| P-1468 | No. 47 Tube Socket | .15 |
| P-1474 | No. 80 Tube Socket | .15 |
| P-1479 | Speaker Socket | .15 |
| P-40420 | Aluminum Tube Shield | .20 |
| P-40425 | Tube Shield Base | .10 |
| P-40411 | Aluminum Coil Shield—R.F. Coils | .20 |
| P-1476 | Three-Lug Insulated Terminal Strip | .10 |
| P-1513 | Eleven-Lug Insulated Terminal Strip | .15 |
| P-1054 | "On-Off" Switch | .80 |
| P-20529 | Drive Shaft | .10 |
| P-10224 | Rubber Drive Pinion | .10 |
| P-30374 | Brass Bushing for Rubber Pinion | .10 |
| P-10191 | Rubber Cushions for Channel Brackets | .10 |
| P-1273 | Pilot Lamp 2.5 Volt | .25 |
| P-5062 | Antenna R.F. Transformer Assembly | .80 |
| P-5057 | Interstage R.F. Transformer Assembly | .80 |
| P-5058 | Oscillator Coil Assembly | .95 |
| P-5059 | 1st I.F. Transformer Assembly, complete with can | 2.25 |
| P-5060 | 2nd I.F. Transformer Assembly, complete with can | 2.50 |
| P-50541 | Output Transformer Assembly | 1.75 |
| P-50542 | Power Transformer, 60 cycle, 110 volt | 5.25 |
| P-50543 | Power Transformer, 25 cycle, 110 volt | 8.50 |
| P-50545 | Power Transformer, 40-60 cycle, 110 volt | 8.00 |
| P-1497 | Pilot Light Bracket and Drive Gear Assembly | .45 |
| P-1383-C | Drive Bracket and Bearing | .30 |
| P-1684 | Celluloid Dial Strip | .20 |

### CONDENSERS

| Part No. | Code | Capacity | Voltage | Type | List Price |
|---|---|---|---|---|---|
| P-80862-C | C-1 | .05 mfd. | 200 V. | Tubular | $ .30 |
| P-80888-A | C-2 | .25 mfd. | 200 V. | Tubular | .40 |
| P-80886-C | C-3 / C-7 / C-11 | .5 mfd. / .2 mfd. / .25 mfd. | 200 V. / 400 V. / 200 V. | Block | 1.60 |
| P-80867 | C-4 | .0005 mfd. | 600 V. | Molded | .25 |
| P-80872-B | C-5 | .01 mfd. | 600 V. | Tubular | .25 |
| P-80872-B | C-6 | .01 mfd. | 600 V. | Tubular | .25 |
| P-80864-D | C-8 | .1 mfd. | 200 V. | Tubular | .25 |
| P-80887-B | C-9 | .1 mfd. | 400 V. | Tubular | .40 |
| P-80914 | C-10 | .002 mfd. | 600 V. | Tubular | .20 |
| P-80891-B | C-12 | 4.0 mfd. | 150 V. | Electrolytic | .85 |
| P-80890-B | C-13 | .05 mfd. | 400 V. | Tubular | .20 |
| P-80894-B | C-14 / C-17 | 8.0 mfd. / 8.0 mfd. | 450 V. / 450 V. | Electrolytic Block | 2.85 |
| P-80862-C | C-15 | .05 mfd. | 200 V. | Tubular | .30 |
| P-80862-C | C-16 | .05 mfd. | 200 V. | Tubular | .30 |
| P-80849 | | 8.0 mfd. | 450 V. | Wet Electrolytic (25 Cycle only) | 2.20 |
| P-1385-B | 600 K.C Trimmer Condenser | | | | .75 |
| P-80882 | Three-Gang Condenser | | | | 5.70 |

### RESISTORS

| Part No. | Code | Resistance | Wattage | Type | List Price |
|---|---|---|---|---|---|
| *P-91003 | R-1 | 27,000 ohms | .5 Watts | Carbon | $ .25 |
| P-90954 | R-2 | 250,000 ohms | .2 Watts | Carbon | .25 |
| *P-91002 | R-3 | 25,000 ohms | 1.0 Watts | Carbon | .25 |
| P-90916 | R-4 | 40,000 ohms | .2 Watts | Carbon | .25 |
| P-90941 | R-5 | 50,000 ohms | .2 Watts | Carbon | .25 |
| P-90963 | R-6 | 150,000 ohms | .2 Watts | Carbon | .25 |
| P-90929 | R-7 | 500,000 ohms | .2 Watts | Carbon | .25 |
| P-90930 | R-8 | 10,000 ohms | .2 Watts | Carbon | .20 |
| P-90905 | R-9 | 15,000 ohms | .2 Watts | Carbon | .25 |
| P-90954 | R-10 | 250,000 ohms | .2 Watts | Carbon | .25 |
| P-90956 | R-11 | 30,000 ohms | .2 Watts | Carbon | .25 |
| *P-91040 | R-12 / R-14 | 330 ohms / 60 ohms | | Vitreous Enamel | .50 |
| P-90993 | R-13 | 150,000 ohms | | Tone Control | .90 |
| P-91041 | R-15 | 150 ohms | | Volume Control | .80 |
| P-90916 | R-16 | 40,000 ohms | .2 Watts | Carbon | .25 |
| †P-91048 | R12 / R14 / R1 / R3 | 220 ohm / 40 ohm / 9540 ohm / 10650 ohm | 1.0 Watts / .2 Watts / 1.0 Watts / 2.5 Watts | Armored Wire-wound Resistor | 1.05 |

* Used in early models—in later models these resistors are replaced by resistor P-91048.
† See above.

## Voltages at Sockets

**LINE VOLTAGE 115—ANTENNA LEAD SHORTED TO GROUND—VOLUME CONTROL AT MAXIMUM**

| | | | For early Models with 2-section vitreous enamel resistor. | | | | For later Models with 4-section armoured wire-wound resistor. | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Type of Tube | Function | Across Filament or Heater | Plate to Cathode | Screen to Cathode | Grid to Cathode | Normal Plate M. A. | Plate to Cathode | Screen to Cathode | Grid to Cathode | Normal Plate M. A. |
| '58 | R.F. | 2.4 | 282 | 107 | 4(1) | 8. | 258 | 106 | 2.8(1) | 8.0 |
| '57 | 1st Det. | 2.4 | 270 | 100 | 5 | .4 | 250 | 103 | 5 | .4 |
| '58 | I.F.(2) | 2.4 | 282 | 107 | 4(1) | 8. | 258 | 106 | 2.8(1) | 8.0 |
| '57 | A.V.C. | 2.4 | 90 | 40 | 9.5 | 0 | 103 | 45 | 10 | 0 |
| '57 | 2nd Det. | 2.4 | 207 | 98 | 6 | .15 | 190 | 101 | 6 | .15 |
| '47 | Audio | 2.4 | 262 | 280 | 24(3) | 31 | 242 | 260 | 17(3) | 30 |
| '80 | Rect. | 4.8 | | | | 30 per plate | | | | 34 per plate |

(1) Read Across R-14.
(2) If I.F. readings are made with a cord and plug, ground the control grid through a condenser to prevent oscillation.
(3) Read Across R12 and R14.

## Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 175 K.C. and accurately calibrated signals over the broadcast band, and an output indicating meter are necessary. The procedure is as follows:

Set the signal generator for 175 K.C. Connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. Then adjust the four intermediate frequency condensers for maximum output. The adjusting screws for these condensers are reached from the bottom of the chassis.

Next set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the signal generator, is, in this instance, connected to the antenna lead of the receiver. Set the dial pointer on the 1400 K.C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

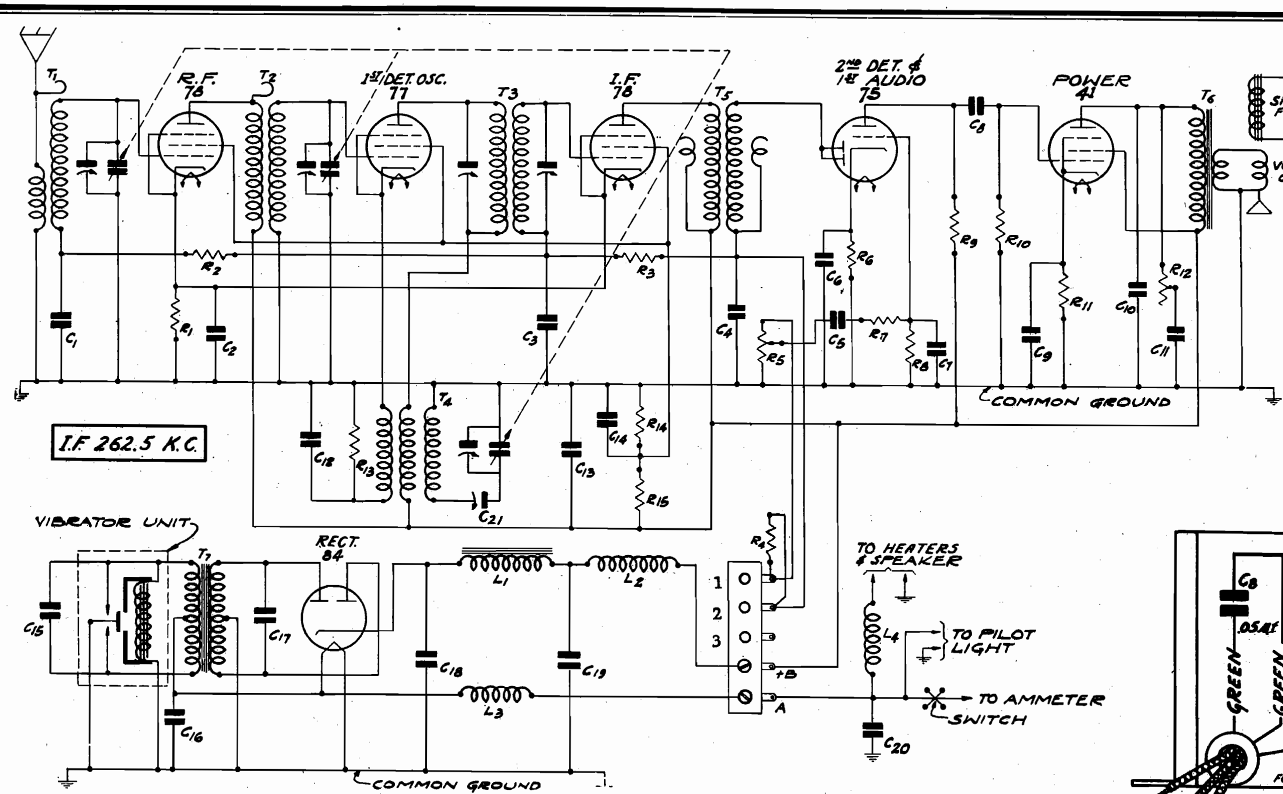
Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw for this condenser is reached from the top of the chassis and is between the I.F. and oscillator coil cans.

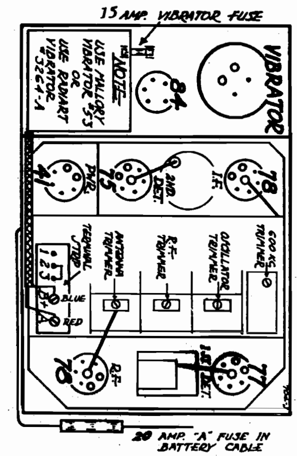
A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condensor rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

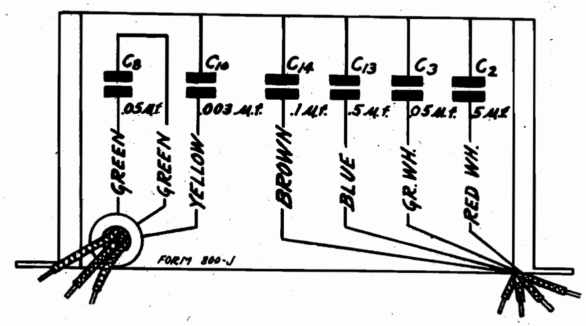
Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

MODEL L-30
Schematic
Trimmers
Voltage
Socket

# LAFAYETTE RADIO & TELEVISION CORP.




## Voltages At Sockets

On the following chart are given the voltages at the sockets with all tubes in and the set in operating condition. The antenna should be disconnected.

The voltages can be read with the chassis in the box, by means of an analyzer plug.

If the chassis unit is taken out of the box all of the socket terminals can easily be reached under the chassis with test prods.

If the chassis is taken out, the power unit must also be taken out. Connect a jumper from chassis base to the metal wall of unit to complete the ground circuit.

Connect the Hot side of battery to the battery cable on the chassis and the ground side of the battery to the metal chassis base.

The reading at the battery should be 6 volts with the set operating.

VOLTAGES AT SOCKETS
Antenna Disconnected—Battery 6 Volts Under Load

| Type of Tube | Function | Across Heater | Plate to Cath. | Screen to Cath. | Cath. to Ground | Normal Plate M.A. |
|---|---|---|---|---|---|---|
| 78 | R. F. | 5.7 | 220 | 100 | 3.5 | 5.0 |
| 77 | 1st Det. and Osc. | 5.7 | 220 | 100 | 8.0 (1) | 1.1 (1) |
| 78 | I. F. | 5.7 | 220 | 100 | 3.5 | 5.0 |
| 75 | 2nd Det. | 5.7 | 140 (2) | | 1.0 | 0.3 |
| 41 | Output | 5.7 | 200 | 210 | 15.5 | 18.0 |
| 84 | Rect. | 5.7 | | | | 20. per plate |

(1) Subject to variation.
(2) Triode Plate to Cathode—as read with 1,000,000 ohm meter.

June, 1934

MODEL L-30
Alignment

LAFAYETTE RADIO & TELEVISION CORP.

## Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and accurately calibrated signals at and around 262.5 K. C., the intermediate frequency and an output indicating meter are desirable.

**Do not take the chassis out of the box.** First set the signal generator at approximately 262.5 K. C. Connect the antenna lead from the generator to the control grid of the I. F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A. V. C. action. Note from Fig. 1 that the second I. F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262.5 K. C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Do not change the signal generator setting. Then adjust the 1st I. F. trimmer condenser screws for maximum output. There are 2 holes at one end of the chassis box. The 2 trimmer screws can be reached through these holes. CAUTION—use an insulated screwdriver to prevent short circuiting to ground.

Now disconnect the signal generator and adjust it to exactly 1400 K. C. The antenna lead from the generator is then connected to the antenna lead of the receiver. Connect the tuning condenser flexible drive shaft to the chassis if it has been disconnected. Turn the station selector knob until the rotor plates are completely in mesh. Then with a screwdriver turn the calibration screw on the back of the control unit, until the pointer is at the lowest frequency mark. This is the large point, 5 points below the 55 mark. Then turn the station selector knob until the pointer on the dial scale is at 1400 K. C.

Then adjust the oscillator R. F. and antenna trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator section first. See Fig. 2.

Next, set the signal generator for a signal of 600 K. C. and adjust the oscillator 600 K. C. trimmer. This condenser is mounted on the end of the gang condenser. See Fig. 2.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K. C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K. C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

If the control unit or flexible shaft is moved after the set has been aligned, the setting of the dial pointer may change. This can be adjusted by turning the control unit calibration screw until the pointer is at the correct setting.

## Adjusting Antenna Trimmer

After the receiver is installed and the car antenna is connected it will be necessary to adjust the antenna trimmer. Tune in a weak signal between 1200 and 1400 K. C. with the volume control about three-fourths on. Remove the cover of he chassis box. The antenna trimmer is the trimmer condenser closest to the terminal strip—see Fig. 2. Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION—Do not turn any of the other trimmer adjusting screws for this adjustment.

### Removing "B" Unit From Box

Disconnect the "A" and "B+" leads at the terminal strip. On the end of the box at which the "B" unit is located will be found 9 screws **around the edge.** Remove these 9 screws. The "B" unit and end plate can then be lifted out.

### Replacing the Vibrator

Note that vibrator unit is of the plug-in type. This unit can be inserted and removed in the same manner as a tube.

### Replacing Chassis Unit

In replacing the chassis unit be sure that the ground spring near the output transformer makes a good contact with the chassis box. Reverse the procedure as given above for removing this unit.

### Replacing "B" Unit

When replacing the "B" unit be sure that the ground spring makes a good contact to the partition wall in the chassis box. Reverse the procedure as given above for removing this unit.

### Removing Speaker

If service work is required on the chassis, it is advisable in some cases to remove the speaker, as this will permit ready access to all of the units and wiring.

The pot magnet is secured to the vertical walls of the chassis base by means of 3 screws, 2 on one side and 1 on the other. Remove these screws. Then carefully lift out the speaker as far as the leads will permit. The yellow field lead and the black secondary lead may then be unsoldered.

## Trouble Shooting and Service

### Vibrator Unit

When servicing this receiver a new vibrator unit should be tried out in the same manner as a new set of tubes would be tried out. These units are plugged in in the same manner as a tube. One or more vibrator units should be kept on hand for replacement purposes.

### "B" Unit

In case of failure in the "B" unit try out a new vibrator. If this does not remedy the difficulty and the "B" unit cannot be repaired locally it is not necessary to return the entire chassis. Remove the "B" unit from the chassis box as per the instructions in this manual after which this unit may be carefully packed and returned separately.

## Weak Reception

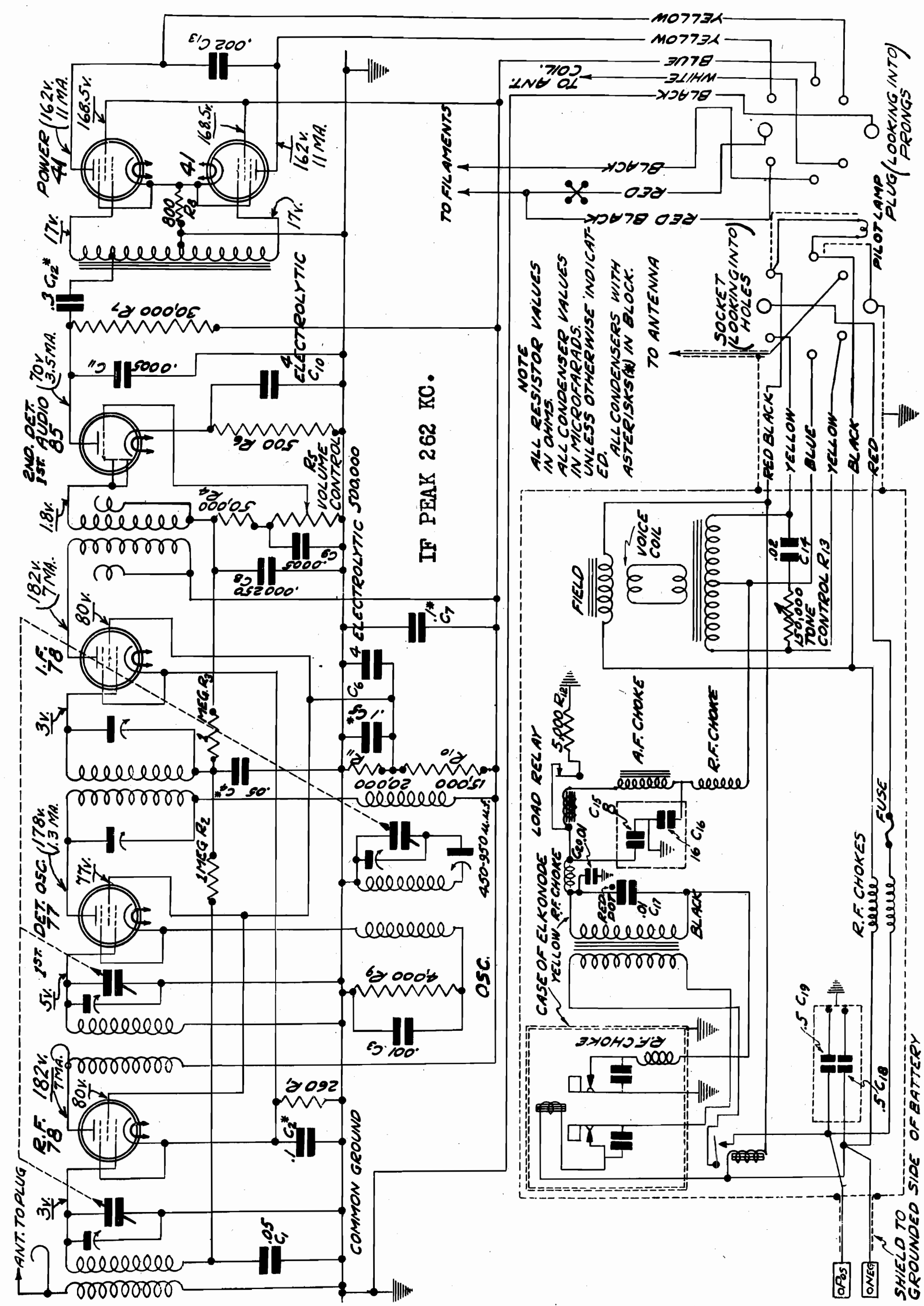
**Defective Tubes**—Try out a new set of tested tubes and note any difference in performance.

**Poor Antenna**—To try out the effectiveness of the antenna used, check the volume against the volume when using a straight length of wire about 15 feet long, run out of the car through one of the windows. If, upon test, the external wire is found to be much superior as far as volume is concerned, the antenna is not satisfactory and will have to be re-vamped or a new one installed. The antenna or lead-in may be too near grounded metal portions of the car frame or body resulting in a high capacity to ground. There may be grounded metal mesh in the car roof. There may be a poor soldered connection between the antenna, lead-in, or antenna lead from the set. The antenna system may be partially grounded at some point.

**Antenna Trimmer not Adjusted**—See Article "Adjusting Antenna Trimmer."

MODEL S-17762
Schematic

# LAFAYETTE RADIO & TELEVISION CORP.



MODEL S-17762
Socket
Alignment
Trimmers

LAFAYETTE RADIO & TELEVISION CORP.

# Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and accurately calibrated signals at and around 262 K.C., the intermediate frequency and an output indicating meter are desirable.

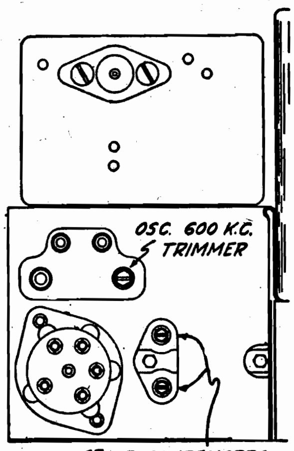



*Fig. 12—Location of Trimmers*

First set the signal generator at approximately 262 K.C. Connect the antenna lead from the generator to the control grid of the I.F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A.V.C. action. Note from Fig. 10 that the second I.F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262 K.C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Then adjust the two intermediate frequency condensers for maximum output. The location of the adjusting screws for these condensers is shown in Fig. 12.

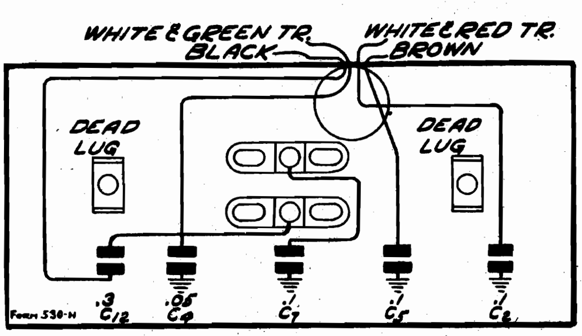
Now set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the generator is, in this instance, connected to the antenna lead of the receiver. Connect the flexible drive shaft to the chassis if it has been disconnected. As explained previously, the dial scale should be at the low frequency end stop when the rotor is completely in mesh. Then turn the station selector knob until the dial scale is at 1400 K.C.

Then adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator section first (section farthest from drive gear).

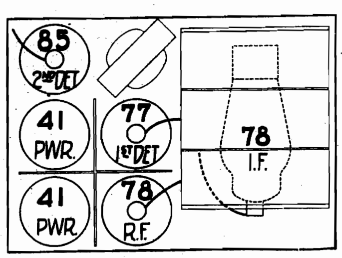
Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The location of this condenser is shown in Fig. 12.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.




*Condenser Block—Internal Wiring*




*Location of Tubes*

# Trying Out the Set and Adjusting

After the wiring has all been completed and before the chassis is permanently installed, try out the set and adjust the antenna trimmer condenser. The location of the tubes is shown in Fig. 8. Do not start the engine of the car yet.

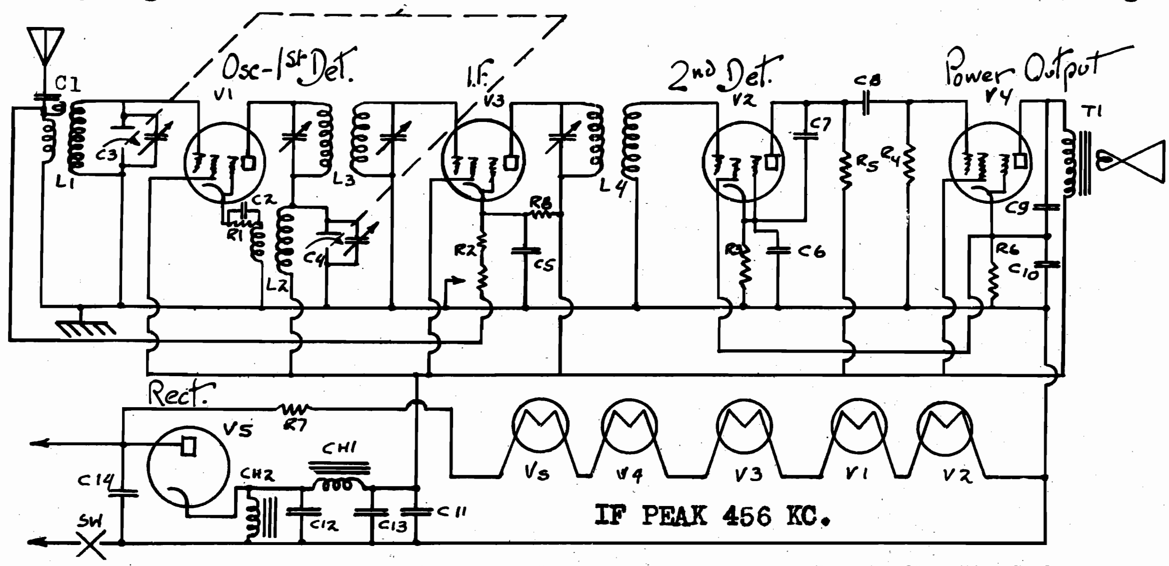
To adjust the antenna trimmer, tune in a weak signal between 1200 and 1400 KC with the volume control about three-quarters on. On one end of the chassis box is a small metal plate. Remove the two screws which hold this plate in place. Directly under the hole in the chassis box is the antenna trimmer condenser screw. Turn this adjusting screw up or down until maximum output is obtained.

If the receiver fails to operate, check the items as given under the article by that name.

MODEL 503-US
Schematic, Alignment

# LANG RADIO CORP. (New Co.)

MODEL UG-5B
Schematic, Alignment

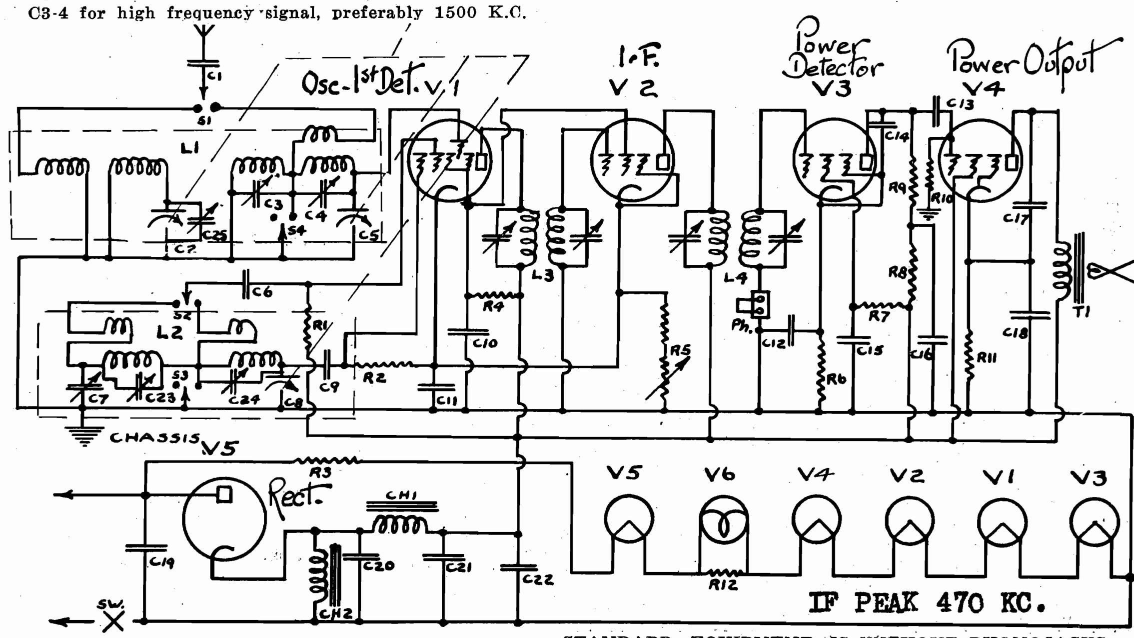



V1-2—6C6 Tube
V3—6D6 Tube
V4—43 Tube
V5—12Z3 Tube
C1-2—.002 Condenser
C3—365 Mmfd. Var. Cond.
C4—456 K.C. Osc. Cond.
C5-11-14—.05 Condenser
C6-10—10 Mmfd. Condenser

C7—.00025 Condenser
C8-9—.01 Condenser
C12—12 Mmfd. Conderser
C13— 8 Mmfd. Condenser
R1—7000 Ohm Resistor
R2—10M 200 Min. Vol. Cont.
R3—20M Resistor
R4-5—1 Meg. Resistor
R6—700 Ohm Resistor

R7—205 Ohms Line Cord
R8—35M Resistor
L1—Antennae Coil
L2—Oscillator Coil
L3—D.T. I.F. 456 Coil
L4—S.T. I.F. 456 Coil
CH1—Filter Choke
CH2—3M Field
T1—Speaker Transformer

To align the receiver, turn C3-4 out—with R2 fully on, apply 456 signal to grid of V3 and adjust L4—apply 456 signal to V1 and adjust L3—with antennae wire coiled up and capacitatively coupled to the signal, adjust trimmers on C3-4 for high frequency signal, preferably 1500 K.C.




STANDARD EQUIPMENT IS WITHOUT PHONOJACKS

540 K.C. to 1550 K.C.
5,900 to 15,400 K.C.

V1—6A7 Tube
V2—6D6 Tube
V3—6C6 Tube
V4—43 Tube
V5—12Z3 Tube
V6—6.3 Volt Pilot Light
C1-6—.002 mfd. Cond.
C2-5-8—365 mmfd. Var. Cond.
C3-4-23-24-25—40 mmfd. Trimmer
C7—600 mmfd. Trimmer
C9—.00005 mfd. Cond.
C10-15-16-19-22—.05 mfd Cond.

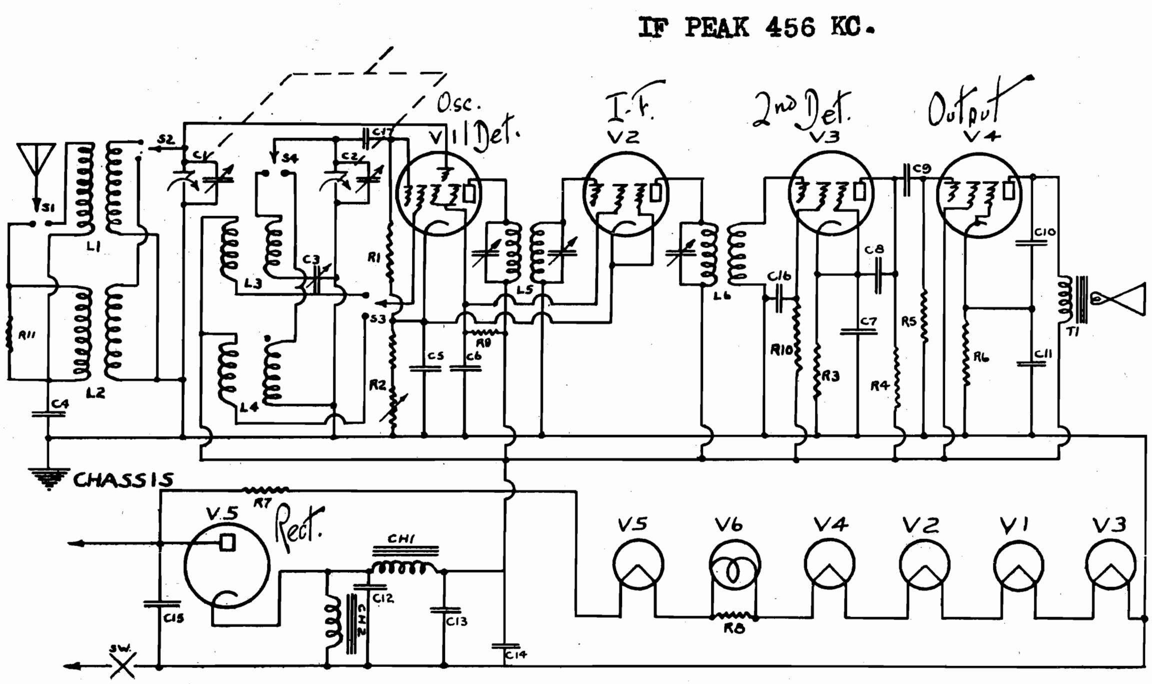
C11—.25 mfd. Cond.
C12-18—10 mfd. Cond.
C13-17—.01 mfd. Cond.
C14—.0005 mfd. Cond.
C20—12 mfd. Cond.
C21—8 mfd. Cond.
CH1—Choke
CH2—3000 Ohm Speakerfield
Ph.—Phono.
T1—Speaker Transformer
S1-2-3-4—Band switch
SW.—Switch on Volume control

R1-2-4—20,000 Ohm Resistor
R3—205 Ohms in line cord
R5—4M Ohm Vol. Cont. 190 Ohm min.
R6—50,000 Ohms
R7—2 Meg Ohm Resistor
R8—100,000 Ohm resistor
R9-10—500,000 Ohm resistor
R11—700 Ohm resistor
R12—25 Ohm resistor
L1—Antennae Coil
L2—Oscillator Coil
L3-4—D.T. 470 K.C. I.F. Coil

To align the receiver: Turn band switch to shortwave—short C8—apply 470 K.C. to grid of V2 and adjust L4—apply 470 K.C. to grid of V1 and adjust L3—remove short from C8—apply 15,000 K.C. to antennae and adjust C24 and C4—turn band switch to broadcast—apply 1,400 K.C. to antennae and adjust C3, C23, and C25—apply 600 K.C. and adjust C7—readjust C3, C23 and C25 if necessary.

MODEL 502-US
Schematic, Alignment
Parts List

# LANG RADIO CORP. (New Co.)




V1—6A7 Tube
V2—6D6 Tube
V3—6C6 Tube
V4—43 Tube
V5—12Z3 Tube
V6—6.3 Volt Pilot Light
C1-2—365 mmfd. Var. Cond.
C3—600 mmfd. Cond.
C4—.002 mfd. Cond.
C5—.25 mfd. Cond.
C6-14-15-16—.05 mfd. Cond.
C7-11—10 mfd. Cond.

C8-17—.00025 mfd. Cond.
C9-10—.01 mfd. Cond.
C12—12 mfd. Cond.
C13—8 mfd. Cond.
CH1—200 Ohm Choke
CH2—3000 Ohm Speaker Field
T1—Speaker Transformer
S1-2-3-4—Band Switch
SW—Switch on Volume Control
R1-3-9—20M Ohm Resistor
R2—4000 Ohm Vol. Control 190 Ohm min.
R4-5—500M Ohm Resistor

R6—700 Ohm Resistor
R7—170 Ohm Resistor
R8—205-Ohms in line cord
R10—2 meg. Ohm Resistor
L1—Broadcast Antennae Coil
L2—Short Wave Antennae Coil
L3—Broadcast Oscillator Coil
L4—Short Wave Oscillator Coil
L5—D.T. I.F. 456 K.C. Coil
L6—S.T. I.F. 456 K.C. Coil
R11—10M Ohm Resistor

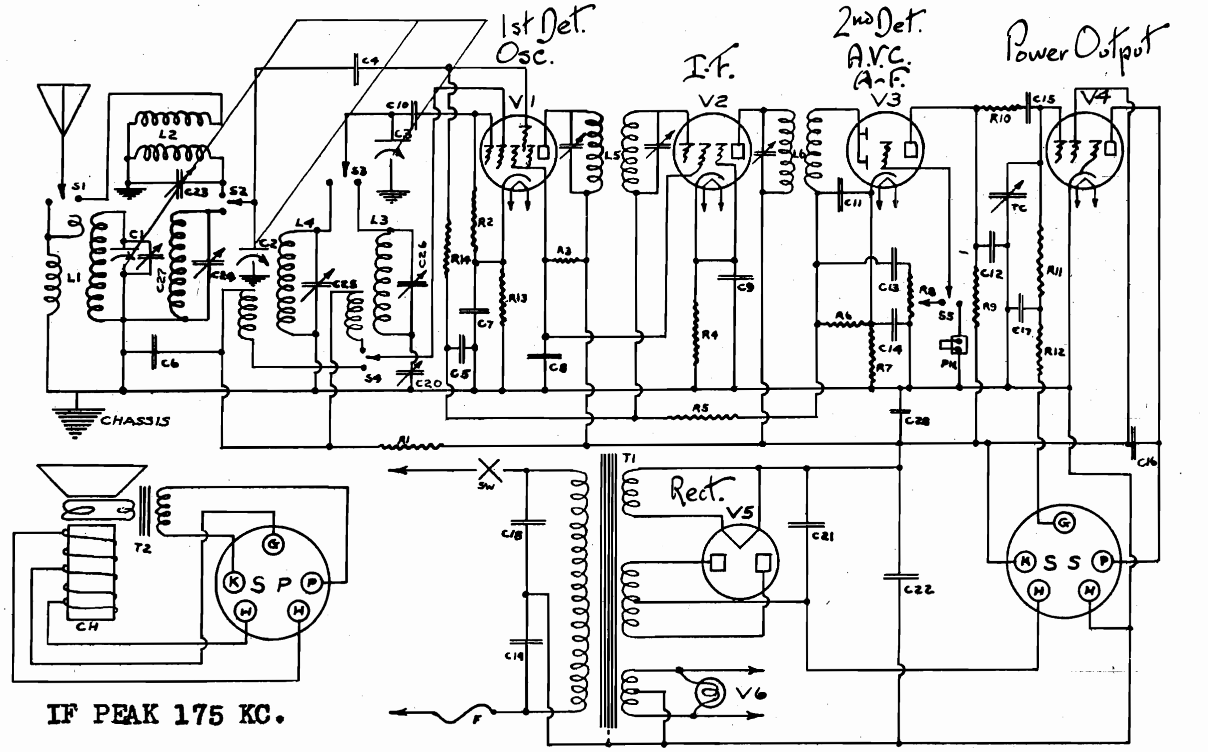
To align receiver: Turn band switch to broadcast— short C2—apply 456 K.C. to grid of V2 and adjust L6—apply 456 K.C. to grid of V1 and adjust L5—remove short from C2—apply 1400 K.C. to antennae and adjust trimmers on C1, C2—apply 600 K.C. and adjust C3.

540 to 1550 K.C. 502 US 5,900 to 15,400

This receiver is a five tube Universal dual wave receiver. One band covers the usual broadcasting 540 to 1550 kilocycles, and the other takes in the high frequency broadcasting 5900 to 15400 kilocycles. The high frequency range includes the important international broadcast bands 19, 25, 31 and 49 meters. Tuning and selection of bands are facilitated by the use of colors on the dial. The broadcast band is calibrated in kilocycles, and the high frequency bands are indicated in tan, amateur in red, airplane in blue, and unclassified in white. 49 meter band is from 6.01 to 6.15 megacycles; 31 meter is from 9.5 to 9.6 megacycles; 25 meter is from 11.7 to 11.9 megacycles, and 19 meter is from 15.1 to 15.34 megacycles.

MODEL 503-AS
Schematic, Parts
Alignment

# LANG RADIO CORP. (New Co.)




V1—2A7 Tube
V2—58 Tube
V3—2A6 Tube
V4—2A5 Tube
V5—80 Tube
V6—2.5 Pilot Light
C1-2-3—365 mmfd. Var. Cond.
C4-10—.0001 mfd. Cond.
C5-6-7-8-9—.05 mfd. Cond.
C11-12—.00025 mfd. Cond.
C13-15-18-19—.01 mfd. Cond.
C23-24-25 26-27—40 mmfd. Cond.
C28—.1 mfd Cond.
C14—5 mfd Cond.
C16—.006 mfd. Cond.
C17—.25 mfd. Cond.

C20—1000 mmfd. Cond.
C21—12 mfd. Cond.
C22—8 mfd. Cond.
R1—20,000 Ohms
R2-10—50.000 Ohms
R3—25,000 Ohms
R4—700 Ohms
R5-14—1 meg.
R6-11—500,000 Ohms
R7—3,000 Ohms
R8—½ meg. Volume Control
R9-12—250,000 Ohms
R13—300 Ohms
PH—Phono
F—Fuse
SP—Speaker Plug

SS—Speaker Socket
T2—Speaker Transformer
T1—Power Transformer
TC—Tone Control
S1-2-3-4—Band Selector Sw.
L1—Broadcast Antennae Coil
L2—Shortwave Antennae Coil
L3—Broadcast Oscillator Coil
L4—Shortwave Oscillator Coil
L5—D.T. I.F. 175 K.C. Coil
L6—S.T. I.F. 175 K.C. Coil
S5—Phono switch on volume control
SW—Power switch on tone control
CH—Speaker Field 1800—Tapped at 300 Ohms

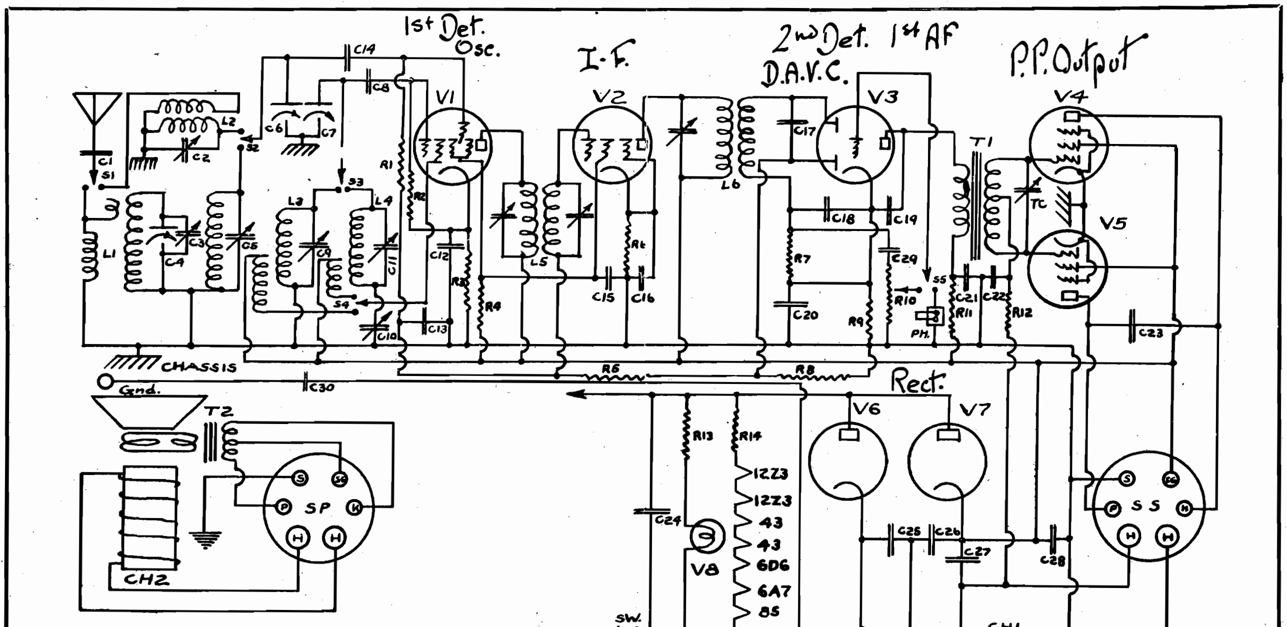
To align the receiver: Turn the band selector switch to broadcast—Short C3—Apply 175 K.C. to grid of V2 and adjust L6—Apply 175K.C. to grid of V1 and adjust L5—Remove short from C3—Apply 1400 K.C. to antennae and adjust C27, C24, C26—Apply 600K.C. and adjust C20—Shift band switch to shortwave—Apply 15 megacycles and adjust C25 to low peak then adjust C23.

540 to 1550 K.C. | 503 AS | 5.5 to 17.0 megacycles

This receiver is a five tube A.C. dual wave receiver. One band covers the usual broadcasting 540 to 1550 K.C., and the other takes in the high frequency broadcasting 5500 to 17000 K.C. The high frequency range includes the important international broadcast bands 19, 25, 31, and 49 meters. Tuning and selection of bands are facilitated by the use of "Select-Ur-Band" dial. Movement of the selector switch automatically shifts the mask on dial, so that only proper band can be seen. The broadcast part is calibrated in kilocycles, and the high frequency in megacycles. Broadcast bands are indicated in tan, amateur in red, airplane in blue, and unclassified in white. 49 meter band is from 6.01 to 6.15 megacycles; 31 meter is from 9.5 to 9.6 megacycles; 25 meter is from 11.7 to 11.9 megacycles; and 19 meter is from 15.1 to 15.34 megacycles.

MODEL 703-US
Schematic,Parts
Alignment

# LANG RADIO CORP. (New Co.)




IF PEAK 175 KC.

V1—6A7 Tube
V2—6D6 Tube
V3—85 Tube
V4—43 Tube
V5—43 Tube
V6—12Z3 Tube
V7—12Z3 Tube
V8—6.3 Pilot Light
C1—.002 mfd. condenser
C2-3-5-9-11—40 mmfd. Trimmer
C4-6-7—365 mmfd. Variable Cond.
C8-14—.0001 mfd. condenser
C10—1000 mmfd. Trimmer
C12-13-15-16-24-27-30—.05 mfd. cond.
C17—.00005 mfd. Cond.
C18—.00025 mfd. Cond.
C19—.001 mfd. Cond.
C20—5 mfd. Cond.
C21—6 mfd. Cond.
C22—.25 mfd. Cond.
C23—.006 mfd. Cond.
C25-28—8 mfd. Cond.
C26—16 mfd. Cond.
CH1—370 Ohm Choke
CH2—Speaker Choke
R1-5-8 1,000,000 Resistor
R2—30,000 Ohm Resistor
R3—300 Ohm Resistor
R4—20,000 Ohm Resistor
R6—400 Ohm Resistor
R7-12—250,000 Ohm Resistor
R11-9—3000 Ohm Resistor
R13—767 Ohm Resistor
R14—86 Ohm Resistor
R10—½ Meg. Volume Control
PH—Phono
LI—Broadcast Ant. Coil
L2—Shortwave Ant. Coil
L3—Shortwave Osc. Coil
L4—Broadcast Osc. Coil
L5—D. T. 175 K C I. F. Coil
L6—S. T. 175 K C I. F. Coil
T1—Audio Trasnformer
T2—Speaker Transformer
TC—Tone Control
S1-2-3-4—Band Selector Switch
S5—Phono Switch on Volume Control
SW—Power Switch on Tone Control
SS—Speaker Socket
SP—Speaker Plug

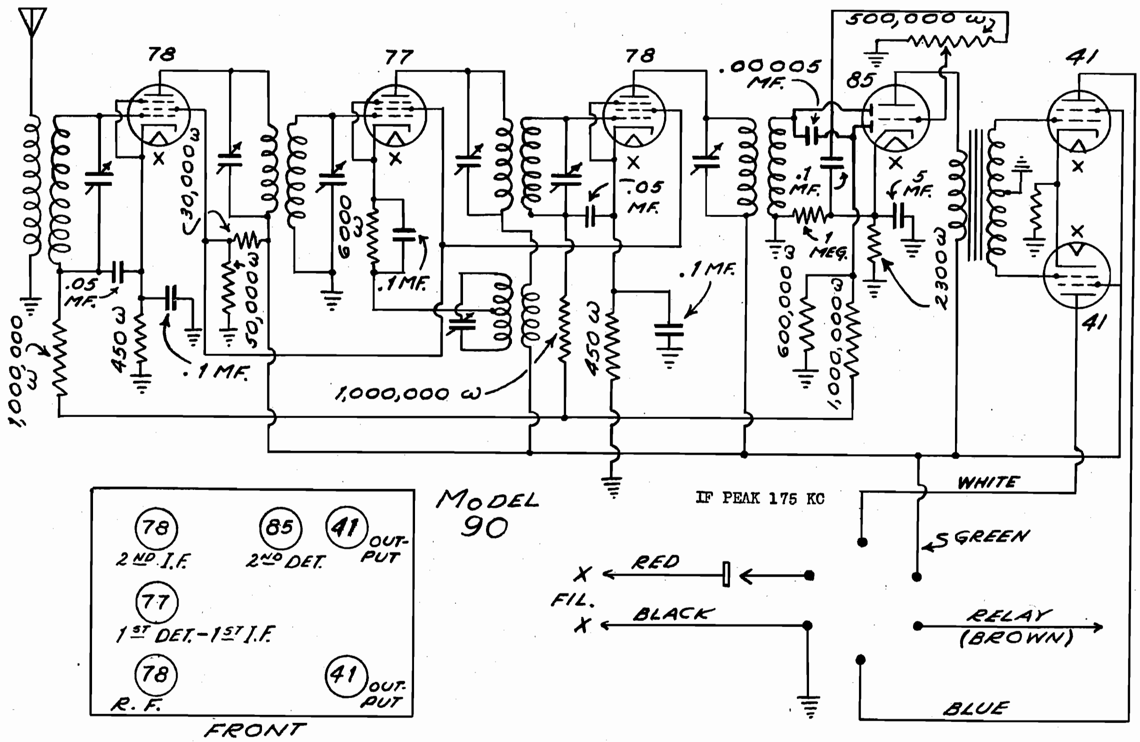
To align the receiver: Turn the band selector to broadcast—Short C7—apply 175 KC to grid of V2 and adjust L6—apply 175 KC to grid of VI and adjust L5—Remove short from C7—apply 1400 KC to antennae and adjust C3, 5, 11—apply 600 KC and adjust C10, Shift band switch to shortwave—apply 15 megacycles and adjust C9 to low peak, then adjust C2.

540 to 1550 KC | 703 US | 5.5 to 17.0 Megacycles

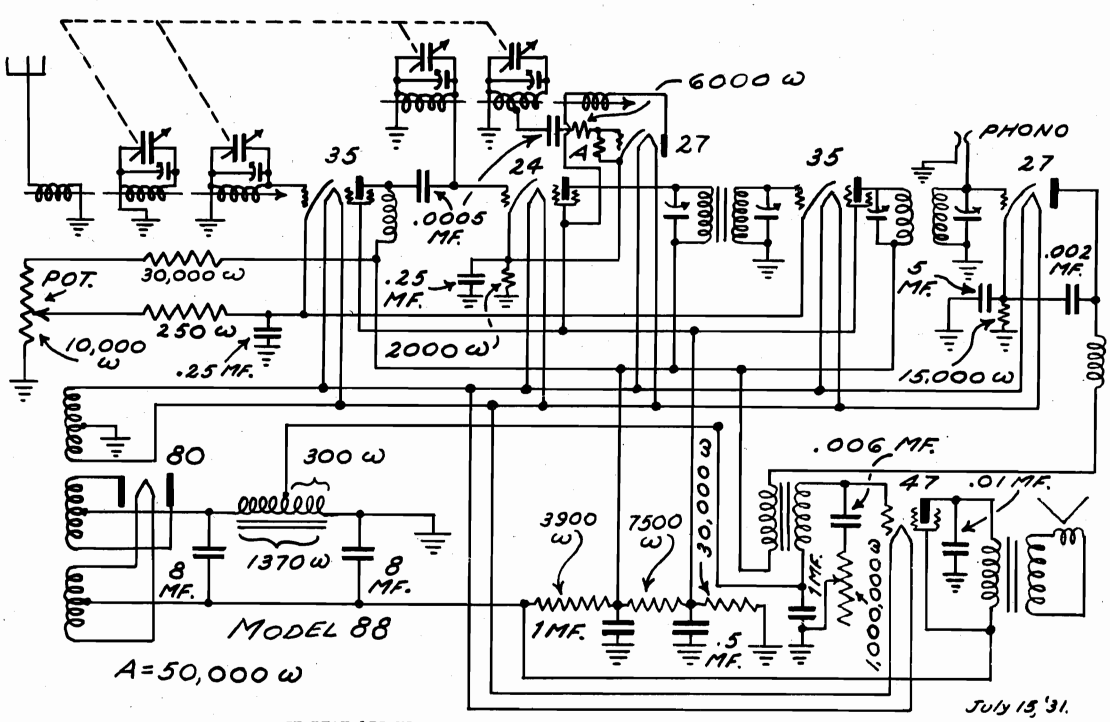
This receiver is a seven tube Universal dual wave receiver. One band covers the usual broadcasting 540 to 1550 K C, and the other takes in the high frequency broadcasting 5500 to 17000 K. C. The high frequency range includes the important international broadcast bands 19, 25, 31, and 49 meters. Tuning and selection of bands are facilitated by the use of the "Select-Ur-Band" dial. Movement of the selector switch automatically shifts the mask on dial, so that only proper band can be seen. The broadcast part is calibrated in kilocycles, and the high frequency in megacycles. Broadcast bands are indicated in tan, amateur in red, airplane in blue, and unclassified in white. 49 meter band is from 6.01 to 6.15 megacycles, 31 meter is from 9.5 to 9.6 megacycles, 25 meter is from 11.7 to 11.9 megacycles and 19 meter is from 15.1 to 15.34 megacycles.

MODEL 88
Schematic
MODEL 90
Schematic, Socket

# LARKIN CO., INC.



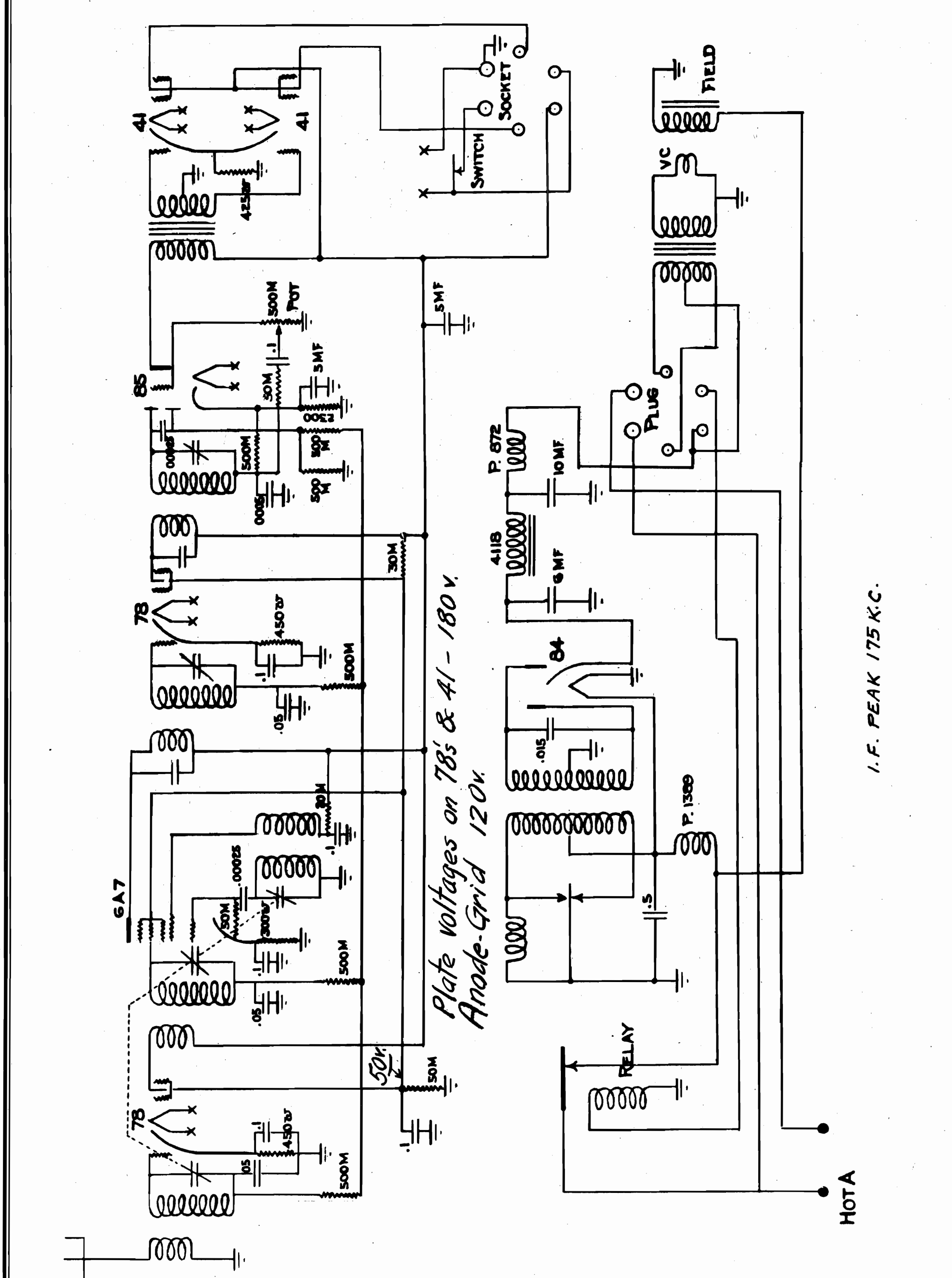

IF PEAK 175 KC




IF PEAK 175 KC

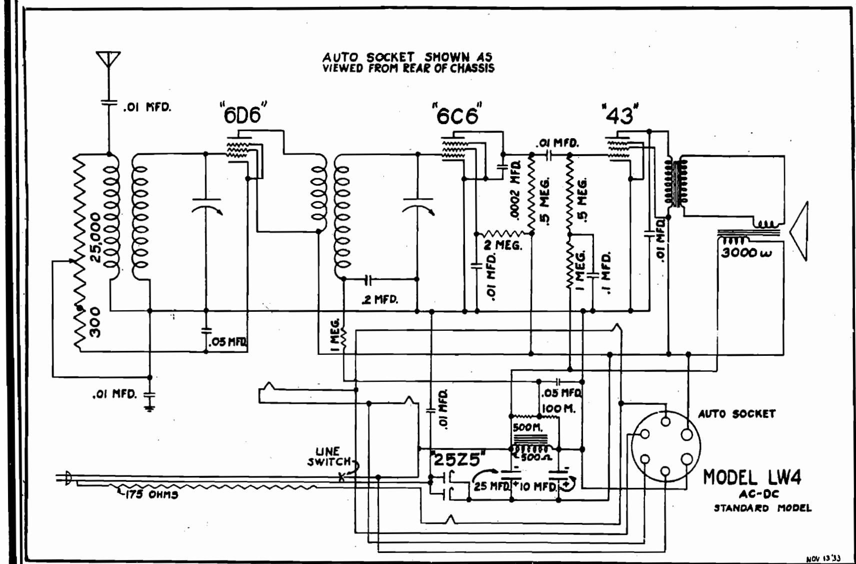
MODEL 91
Schematic

LARKIN CO., INC.



MODEL LW-4
Schematic, Voltage
MODEL LW-4-DW
Schematic, Voltage

LEWOL MFG. CORP.



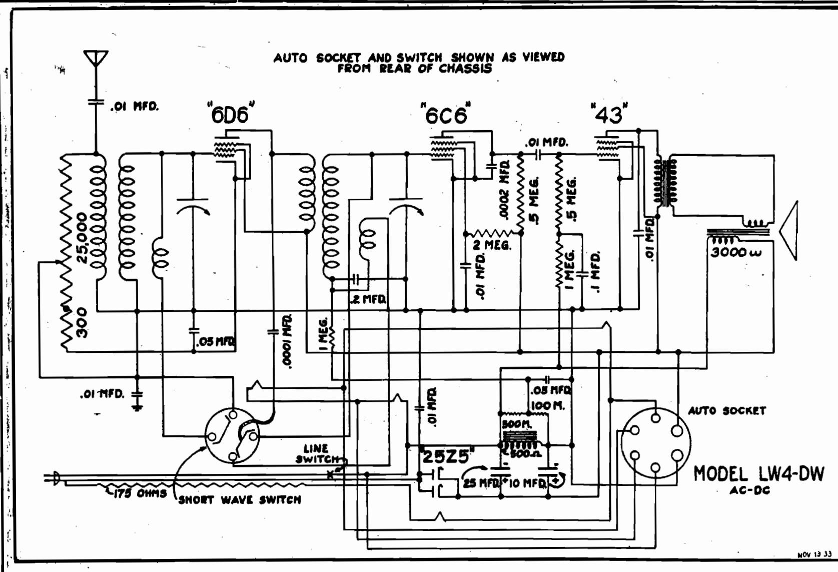

## TUBE SOCKET VOLTAGES

| Type | Position | Heater | Cathode | Screen | Plate |
|---|---|---|---|---|---|
| 6D6 | R.F. | 6 | 2.5 | 100 | 100 |
| 6C6 | Det. | 6 | -0- | 12* | 30* |
| 43 | Output | 25 | -0- | 100 | 100 |
| 25Z5 | Rectifier | 25 | 100 | ------ | ------ |

All voltages measured to -B line (variable condenser frame).

* Measurements made with meter having a resistance of about 300,000 ohms.

Align condenser trimmers at 1690 Kc and check 1712 Kc.




CIRCUIT DIAGRAM—DUAL WAVE MODEL

## TUBE SOCKET VOLTAGES

| Type | Position | Heater | Cathode | Screen | Plate |
|---|---|---|---|---|---|
| 6D6 | R.F. | 6 | 2.5 | 100 | 100 |
| 6C6 | Det. | 6 | -0- | 12* | 30* |
| 43 | Output | 25 | -0- | 100 | 100 |
| 25Z5 | Rectifier | 25 | 100 | ------ | ------ |

All voltages measured to -B line (variable condenser frame).

* Measurements made with meter having a resistance of about 300,000 ohms.

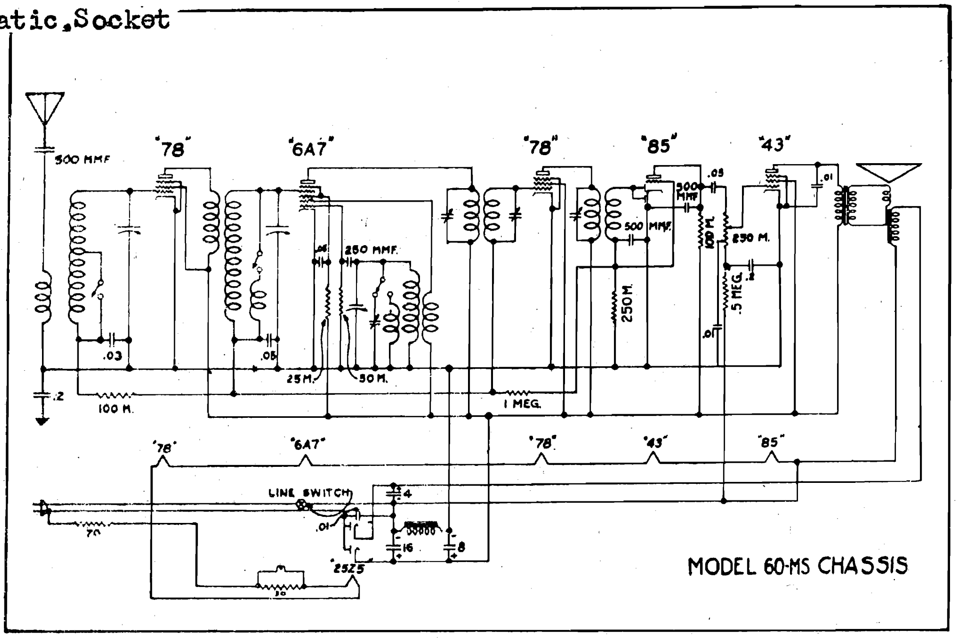
## DUAL WAVE MODEL:

Align condenser trimmers at 1500 Kc with switch on broadcast band position.

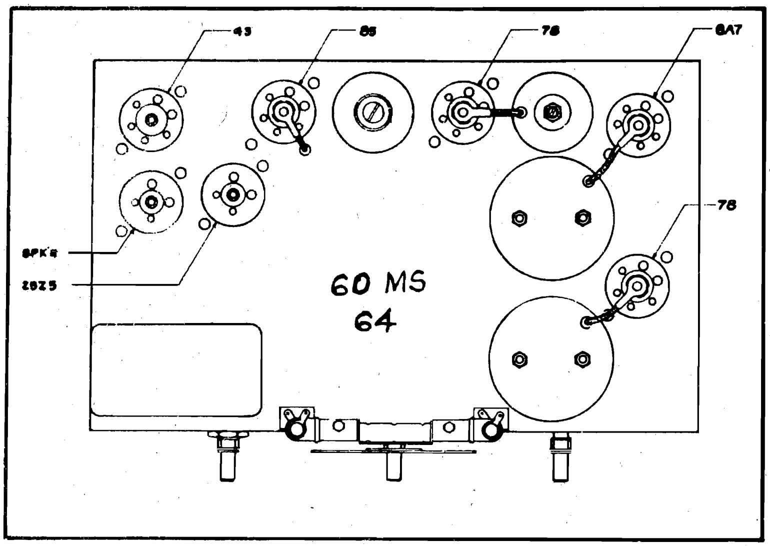
Align short wave at 1712 Kc sliding short wave shunt on antenna coil, with switch on short wave position.

MODEL 60-MS
Socket, Schematic
MODEL 64
Schematic, Socket

# LEWOL MFG. CORP.




MODEL 60-MS CHASSIS



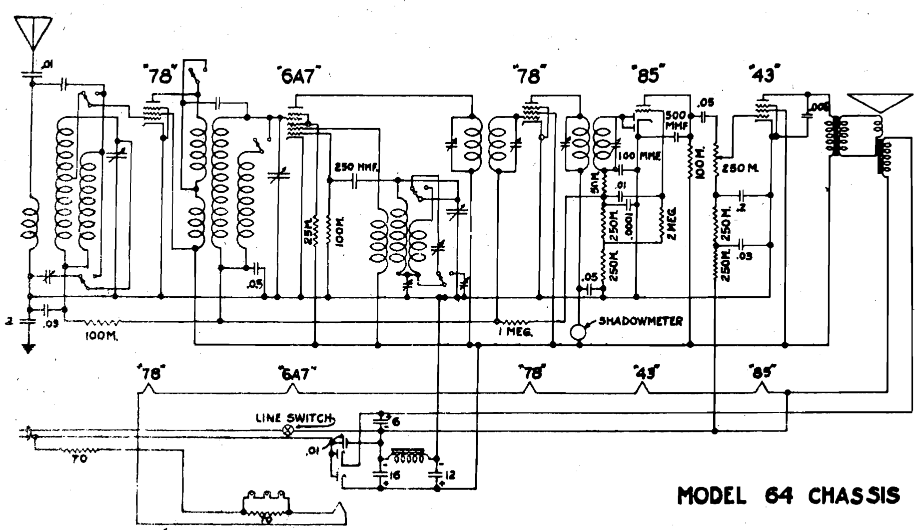

Place tubes in sockets as indicated in diagram.

Corresponding numbers will be found on base of tubes.

Plug on end of speaker cable should be inserted in "speaker" socket.

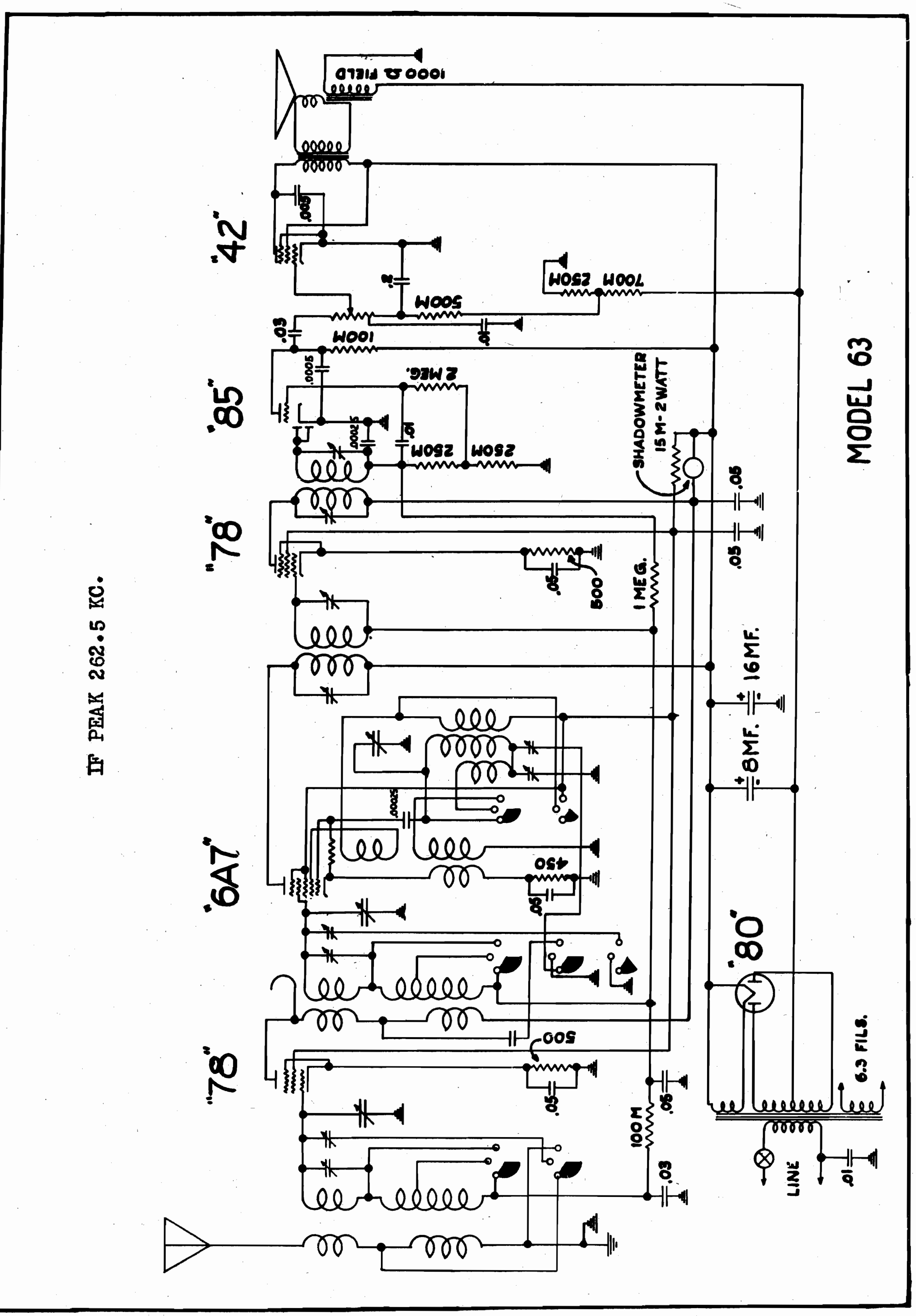
The cord which terminates in the wall plug will become warm during the operation of the receiver. This should cause no concern as it is designed to act in this fashion. Be very careful not to cut this cord or lengthen it in any fashion as this will generally impair the operation of the receiver.

A ground connection may be tried and left connected or not as trial will dictate. The black wire is the ground lead. UNDER NO CIRCUMSTANCES ATTACH A GROUND WIRE TO THE CHASSIS DIRECT.




MODEL 64 CHASSIS

LEWOL MFG. CORP.



MODEL 63
Alignment
Voltage

SERIES "63"
All Wave

## TRACKING

Peak IF transformer at 262.5 kc.

Next, align condensor trimmers on broadcast range with switch turned all of the way to the left and dial set at 1500 kc., with a signal of the same frequency. Turn dial to 550 kc., and track with a signal of that frequency by means of a series pad for the broadcast range (inside screw on isolantite base at rear of set).

Turn the frequency change switch to the right one position and turn dial to 4000 kc. Put in a signal of approximately 4000 kc.and move dial, if necessary to maximum response. Adjust the RF and antenna trimmers to resonance for the second band. These are located as follows: with the set inverted and the rear of the chassis nearest the operator, the two trimmers in the furthest right-hand corner are for the antenna coil. The nearer one is for the second band and the further one for the third band. The RF coil trimmers are located toward the center of the rear of the chassis, the left one being the second band and the right being the third band. Oscillator pad is tracked at 1750 kc. (external nut on isolantite base at rear of set).

Again turning the switch one more position to the right which is the third band, track the oscillator trimmer with the dial set at 14,000 kc. and a corresponding signal. Check the alignment at 6000 kc., and if necessary bend the tuning condensor plates slightly. No pad is used here.

## TUBE SOCKET VOLTAGES

| Type | Position | Heater | Cathode | Screen | Plate | Osc. Plate | Osc. Grid. | Diode | Cont Grid |
|---|---|---|---|---|---|---|---|---|---|
| 78 | RF | 6.3 v. | 3.0 | 100 | 250 | -- | -- | -- | 0 |
| 6A7 | 1st Det. & Osc. | 6.3 v. | 4.5 | 100 | 260 | 100 | -6 v. | 0 | 0 |
| 78 | IF | 6.3 v. | 3.0 | 100 | 250 | -- | -- | -- | 0 |
| 85 | 2nd Det. & Osc. | 6.3 v. | 0 | -- | 50 | -- | -- | -1 v. | 0 |
| 42 | Output | 6.3 | 0 | 260 | 255 | -- | -- | -- | -8 v |
| 80 | Rectf. | 5.0 | 260 | -- | -- | -- | -- | -- | -- |

The above readings taken with a 300 volt 1000 ohm per volt DC voltmeter.

Line voltage 115 volts, 60 cycles AC. All DC voltages taken with respect to chassis ground with switch in first position.

MODEL 1932 Type
Single Reed
Elkonodes

P. R. MALLORY & CO.

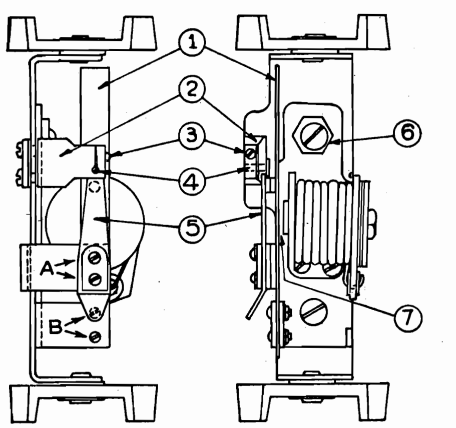
# Directions for Servicing
# 1932 Type Mallory 'Single-Reed' Elkonodes

The 1932 type Mallory Elkonode is a half-wave, single-reed converter used with a BR Raytheon tube for rectification. This Elkonode is supplied in six standard types—from 1 to 6 inclusive—and modifications are supplied for special requirements, such as S101, S102, S103, T112, and S111. 12-volt single-reed Elkonodes are supplied in types G1 to G6 inclusive, and 32-volt Elkonodes in types from F1 to F6 inclusive.

The mechanical construction of the single-reed Elkonode is the same in all types with the exception of the size and number of turns of wire on the Elkonode coil. Following is a table of characteristics indicating the output obtainable from these standard Elkonodes:

| Milli-amperes / Volts | 12 | 15 | 17 | 20 | 22 | 25 | 27 | 30 | 32 | 35 | 37 | 40 | 42 | 45 | 47 | 50 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 220 | 2 | 3 | 4 | 4 | 5 | 6 | 6 | | | | | | | | | |
| 210 | 2 | 3 | 3 | 4 | 5 | 5 | 6 | 6 | | | | | | | | |
| 200 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | | | | | | | | |
| 190 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | | | | | | | |
| 180 | 1 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | | | | | | |
| 170 | | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 6 | | | | | |
| 160 | | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | | | | | |
| 150 | | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 6 | 6 | 6 | | | |
| 140 | | 1 | 2 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 6 | 6 | 6 | | |
| 135 | | 1 | 2 | 2 | 3 | 3 | 3 | 4 | 4 | 5 | 5 | 5 | 6 | 6 | | |

The following reproductions picture the Mallory single-reed Elkonode in two positions:




No. I
1. Reed Assembly
2. Stop Post mntg. block
3. Stop Post locking-screw

No. II
4. Stop-Post
5. Contact Spring Assm.
6. Cam-nut adjustment

7. Air-gap

(1) is a side view showing the Elkonode with cover and rubber cushion removed. (2) is a front view with can and cushion removed. Numbered arrows clearly indicate the position of the Elkonode parts involved in installing new contact spring assemblies and new reed assemblies.

## Routine for Dismantling Elkonodes for the Purpose of Replacing Contact and Reed Springs

(a) Remove screws which fasten outer housing or can to base.

(b) Hold can in upright position and tamp gently against hand permitting base and rubber housing inside of can to drop out gently. (CAUTION: Do not attempt to remove Elkonode assemblies from cans by pulling on the base.)

(c) Remove rubber cushion from Elkonode assembly in the same manner as entire assembly was removed from can.

## TO REMOVE SPRINGS:

(d) Remove contact spring assembly by extracting screws at point marked "A" on above diagram.

(e) Remove reed assembly by extracting screws at point marked "B" on above diagram.

(f) Install reed assembly, using care to insure that metal blocks in which this reed is mounted are squarely aligned. NOTE: Use only Kester Resin Core Solder.

(g) Install contact spring assembly using care to properly align metal blocks in which this spring assembly is mounted.

(h) Inspect alignment of contact points to insure that contacts on both reed and contact springs are in proper alignment, and that their surfaces engage squarely and evenly. Alignment of these points is controlled by the position of the springs, and the screws mounting these springs should not be tightened firmly until the points are in alignment.

(i) With points in proper alignment, the air-gap or clearance between pole-piece of the coil and reed should be adjusted to approximately 1/32 inch. This adjustment is provided for by the cam nut and locking screw at point marked "6" in diagram 2. The reed should be in a perfectly perpendicular plane, and the surface of the pole-piece or core of the coil should be exactly parallel with surface of reed.

MODEL 1933-34 Type
Dual Reed Elkonodes

# P. R. MALLORY & CO.

(j) Loosen the locking screw of the stop post (identified at point 3, on diagram 1) and adjust the stop post (identified at point 4, diagram 1) so that the tip of contact spring assembly engages screw-side of stop post head, allowing contacts to meet with a light pressure. This stop post is easily adjusted by turning to left until head of contact post pulls contact on left, or contact spring, away from contact on right, or reed contact. Then turn stop post screw to right about 1/8 to 1/4 turn, until contact points meet the light pressure. At this point, stop post locking screw should be firmly tightened down to hold stop post in this position.

(k) If the foregoing mechanical adjustment has been carefully followed out the Elkonode is now ready for Electrical Tests. These tests should be conducted with a master Eliminator, into which the Elkonode can be inserted while the can and rubber cushion are still removed, and with a "dummy" load on the Eliminator which will require 180 volts at 35 m.a. for Elkonode types 6, S101, S102, S103, S111, and T112. The output of the Elkonode is adjusted by increasing or decreasing the air-gap clearance between pole-piece of coil and surface of the armature reed. A cam nut and locking screw arrangement provide a flexible adjustment which sometimes must be supplemented by inserting thin metal shims between coil and bracket. NB—Shims are required only where construction of the unit will not permit air-gap clearance being decreased to point required, by adjustment of cam nut.

(l) Electrical adjustment for other types of Elkonodes, from 1 to 5 inclusive, must be conducted with "dummy" load to equal maximum output available from whichever type Elkonode is involved per characteristics shown in the foregoing table.

(m) Extreme care must be exercised to insure that no dirt or foreign matter is allowed to accumulate on contact points and that entire Elkonode assembly is kept thoroughly dry.

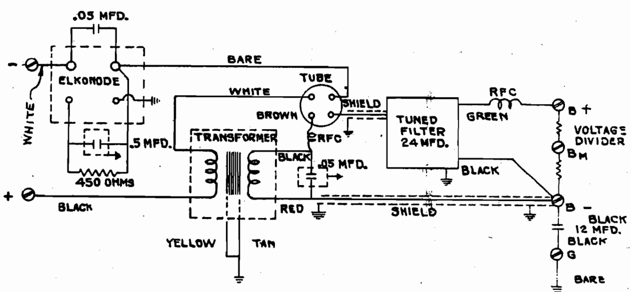
(n) Excessive sparking usually results from improper pressure between and alignment of contact points. If it is found necessary to bend the reed to secure a flat alignment of points, this should be done very carefully, using a pair of thin flat-nosed pliers, to grasp the reed firmly *at the base where it is mounted*. A very slight pressure at this point will be required to change the angle of contact for vibrator points. *No sparking* whatever results from improper adjustment of stop post, permitting contact springs to follow reed springs past the center of cycle of amplitude or arc of vibration. Contacts should be lightly touching when at rest so there is about .014 inch clearance between stop post and contact spring. Stop post will then break this contact at the center of cycle of amplitude.

If the foregoing instructions are followed carefully, and if reliable instruments are used to measure the output of the Elkonode when electrical adjustments are being completed, you should be able to install contact and reed spring assemblies without difficulty. When adjustments have been completed to your satisfaction, place vibrator assembly inside rubber cushion by holding cushion in inverted position, and allowing assembly to drop into place. Next, place entire assembly inside can, in same manner, and fasten can to base, using screws provided for that purpose.

Thorough instructions for servicing other parts of the Mallory Elkon "B" Eliminator are provided in the service and installation bulletin accompanying each unit,—copies of which may be had upon request.

The following equipment is recommended as being extremely useful in conducting repairs on Mallory-Elkon "B" Eliminators and Elkonodes:

1. High resistance volt-meter. Scale: 0 to 300. Resistance: Not less than 1000 ohms per volt.
2. One good quality milliammeter. Scale: 0 to 50.
3. One set feeler gauges.
4. One small screw-driver.
5. One pair thin, flat-nosed pliers (duck-bill type).
6. One 1932 Mallory-Elkon "B" Eliminator chassis.
7. One variable resistor—"dummy" load arrangement to duplicate maximum load for which each of six standard types of Elkonodes is designed.




## Directions for Servicing 1933-34 Type Dual-Reed Mallory 'Self-Rectifying' Elkonodes

The 1933 Mallory Self-Rectifying Elkonode is a dual-reed converter which within itself sets up the essentially alternating current required, and likewise rectifies it to the form of direct current required for radio receiver plate supply. No rectifying tube is used with the 1933 Mallory Self-Rectifying Elkonode.

This Elkonode is supplied in five standard types—from 10 to 14 inclusive—and modifications are supplied for special requirements under such designations as Nos. 30, 31, 34, 35 (for Motorola Receivers), and Nos. 36 and 37. 12-volt types are supplied in types G10 to G14 inclusive, and 32-volt types from F10 to F14 inclusive. The mechanical construction of the dual-reed Self-Rectifying Elkonode is the same in all types with the exception of size and number of turns of wire on Elkonode coil.

MODEL 1933-34 Type
Dual Reed Elkonodes
Dismantling-Repair

# P. R. MALLORY & CO.

Following is a table of characteristics indicating output obtainable from each standard Elkonode at storage battery terminal voltage of 6.6, for the 6-volt, 13.2 for 12-volt type.

## ELKONODE RATING TABLE

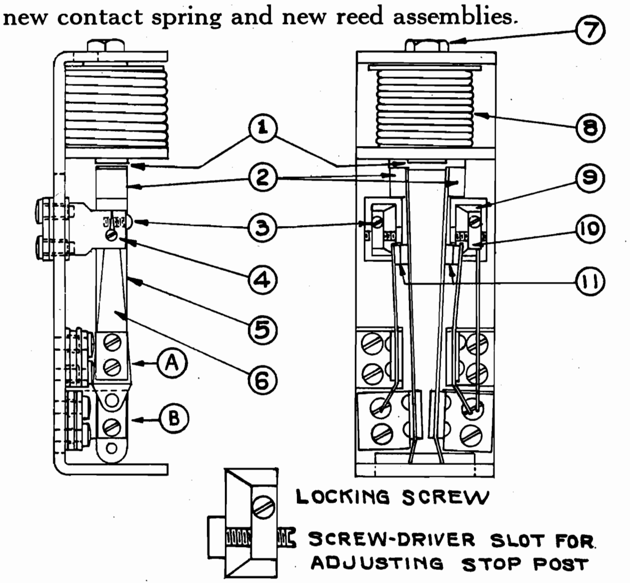
| Elkonode Type | Volts Output | For Receivers Requiring the Following Current in Milliamperes in the B Minus Lead at 200 V. on Signal | | Elkonode Rated Output Watts | Storage Battery Drain in Amps. |
|---|---|---|---|---|---|
| | | Without Voltage Dividers in Elim. | With 2 M. A. (100,000 Ohm) Voltage Divider in Elim. | | |
| 10 | 200 | 40–45 | 38–43 | 8.4 | 2.1 |
| 11 | 200 | 35–40 | 33–38 | 7.4 | 1.9 |
| 12 | 200 | 30–35 | 28–33 | 6.4 | 1.6 |
| 13 | 200 | 25–30 | 23–28 | 5.4 | 1.4 |
| 14 | 200 | 20–25 | 18–23 | 4.4 | 1.2 |

## Current at which Phantom Load Relay should be adjusted

| Elkonode Type | No. 10 | No. 11 | No. 12 | No. 13 | No. 14 |
|---|---|---|---|---|---|
| Current | 20 M.A. | 17.5M.A. | 15 M.A. | 12.5M.A. | 10 M.A. |

Special Types Should be Adjusted to SET MFRS. Specifications (See Paragraph "N")

The following reproductions picture the Mallory dual-reed or self-rectifying Elkonode in two positions: (3) is a side view showing the Elkonode with cover and rubber cushion removed, and (4) is a front view with cover and cushion removed. Numbered arrows clearly indicate position of Elkonode parts involved in installing new contact spring and new reed assemblies.




ENLARGED STOP POST ASSEMBLY

No. III
1. Air-gap
2. Reed counter weights
3. Stop-post Locking-screw
4. Stop-post
5. Reed Spring Assm.
6. Contact Spring Assm.

No. IV
7. Coil mounting nut
8. Coil
9. Stop-post mounting block
10. Position contact spring behind stop-post head
11. Contact points

# Routine for Dismantling Dual-Reed or Self-Rectifying Elkonodes for the Purpose of Replacing Contact and Reed Springs

(a) Remove screws which fasten outer housing or can to base.

(b) Hold can in upright position and tamp gently against hand, permitting base and rubber housing inside of can to drop out gently. (CAUTION: Do not attempt to remove Elkonode assemblies from cans by pulling on base.)

(c) Remove rubber cushion from Elkonode assembly in the same manner as entire assembly was removed from can.

(d) With internal assembly in view, displace condensers by turning each outward from center carefully.

TO REMOVE SPRINGS AND REEDS:

(e) Remove contact spring assembly by extracting screws at point marked "A" on above diagram, No. III.

(f) Remove reed assembly by extracting screws at point marked "B" on above diagram No. III.

(g) Install reed assembly, using care to insure that metal brackets in which these reeds are mounted are squarely aligned with reeds. (NB—Use only Kester Rosin Core Solder.)

(h) Install contact spring assembly using care to properly align metal brackets and blocks with which this assembly is mounted.

(i) Inspect alignment of contact points to insure that contacts on reed and contacts on springs are in proper alignment. Their surfaces must engage squarely and evenly. Alignment of points is controlled by the position of the springs. Screws mounting these springs should not be tightened firmly until points are in alignment.

(j) With points in proper alignment, air-gap or clearance between pole-piece of coil and counter-weights on ends of reed assemblies should be adjusted to approximately 1/32 inch, when reeds are pulled in to *center position*. This adjustment is provided for by removing or inserting shims between the Elkonode frame and coil, at top of coil.

(k) Loosen locking screw of stop posts (identified at point 3, diagram III, above) so that tips of contact spring assembly engage screw-side of stop post head, allowing contacts to meet with contacts on reed assemblies at light pressure. Stop post is adjusted by turning to left until head of contact post pulls contact springs away from contact on reed assembly. Then turn stop post screw to right (about ⅛ to ¼ turn) until contact points on both contact spring and reeds meet with light pressure. At this point, stop post locking screw should be firmly tightened to hold stop post in this position.

MODEL 1933-34 Type
Dual Reed Elkonodes
Dismantling and
Adjustments

## P. R. MALLORY & CO.

(l) It is extremely important, if secondary reed and contact spring assembly show any sign of having been burned as a result of "arcing," that condenser No. 16611, rated at .01 mfd. 1600 V., used across the secondary side of the Elkonode be replaced with a new one.

(m) Elkonodes which have become inoperative through the breaking down of this condenser, or which show evidence of overload at contact points, should never be replaced in Eliminators or automotive radio receivers until the adjustment of the "phantom load" relay has been checked carefully. Following is an outline of the causes which may bring about Elkonode failure through no fault of the Elkonode, and the method for correcting them:

(n) Elkonode failure is usually the result of a "no load" operating condition, which ordinarily is due to (A) film of dirt between contact points of phantom load relay, (B) iron filings between core and clapper of phantom load relay, (C) insufficient tension in phantom load relay springs, (D) open phantom load resistor, (E) receiver output tube defective, (F) connections to output tube open.

Most prevalent of these difficulties are items (B) and (C) which invariably cause Elkonode failure through no fault of the Elkonode.

Conditions (A) and (B) are corrected by thorough cleaning with strips of paper. Condition (C) is corrected by inserting milliammeter in coil circuit of phantom load relay, or in B+ lead to receiver, and adjusting spring tension so that relay clapper will pull to core when current is equivalent to current rating for that type of Elkonode, as indicated in foregoing table. Conditions (D) and (F) are detected by continuity checks, while Condition (E) is detected by means of a tube tester.

(o) A choke coil is mounted within the rubber cushion in the base of the Elkonode can, and the continuity of this choke coil should be checked by continuity tests between mounting prongs and soldering terminal of the secondary contact spring assembly.

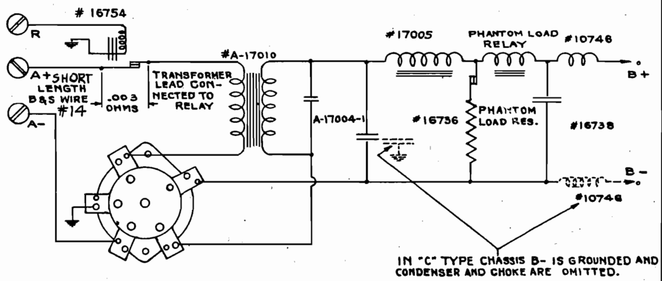
(p) If the foregoing mechanical adjustments have been carefully followed out, the Elkonode is now ready for electrical tests. These tests should be conducted with a master Eliminator, into which the Elkonode can be inserted while the can and rubber cushion are still removed. A "dummy" load to equal the output characteristics of whichever type dual-reed self-rectifying Elkonode is involved should be imposed, and all tests should be conducted with a battery terminal voltage of 6.6. Special types of Elkonodes designed for so-called "all-electric" automotive receivers may best be tested in this same manner, or with a "dummy" resistor load to match the output characteristics of that Elkonode.

(q) Extreme care must be exercised to insure that no dirt or foreign matter is allowed to accumulate on contact points, and that the entire Elkonode assembly is kept thoroughly dry.

(r) "Excessive sparking" usually results from improper pressure between and alignment of contact points. If it is found necessary to bend reed assembly to secure flat alignment of points, this should be done by carefully grasping reed assembly at bracket where it is mounted with a pair of thin, flat-nosed pliers. A very slight pressure will be required to change the angle of contact for vibrator points. "No sparking" results from improper adjustment of stop post, permitting contact spring to follow reed spring past center of cycle of amplitude or arc of vibration. Contacts should be lightly touching when at rest, so a clearance of approximately .012 exists between stop post head and contact spring on interrupter side and .002 to .006 on rectifier side. Stop post will then break these contacts at center of cycle of amplitude.

If the foregoing instructions are followed carefully, and if reliable instruments are used to measure output of Elkonodes when electrical adjustments are being completed, you should be able to install these contact spring and reed assemblies without difficulty. When adjustments have been completed to your satisfaction, place vibrator assembly inside rubber cushion by holding cushion in inverted position and allowing assembly to drop into place. Next, place entire assembly inside can, in the same manner, and fasten can to base.

Thorough instructions for servicing other parts of the Mallory-Elkon "B" Eliminator are provided in Service and Installation Bulletin accompanying each unit, copies of which may be had upon request. A circuit diagram of the entire Eliminator is shown herewith for your convenience in making continuity tests.




**It is important that Elkonodes be used only with Eliminators having same type numbers, and that phantom load relays and resistors are matched to type of Elkonode and Eliminator involved. Correct types of phantom load relays and resistors are shown in the parts list.**

The following equipment is recommended as being extremely useful in conducting repairs on Mallory-Elkon "B" Eliminators and Elkonodes:

1. High resistance volt-meter. Scale: 0 to 300. Resistance: Not less than 1000 ohms per volt.
2. One good quality milliammeter. Scale: 0 to 50.
3. One set feeler gauges.
4. One small screw-driver.
5. One pair thin, flat-nosed pliers (duck-bill type).
6. One 1933 type 10 Mallory-Elkon "B" Eliminator chassis, with one each proper phantom load relay and resistor for types 10, 11, 12, 13 and 14. (A test-board switching arrangement to cut in whichever type phantom load relay is required for the Elkonode being repaired will be valuable in conducting these tests.)

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# Routine for Dismantling Elkonodes for the Purpose of Replacing Contact and Reed Springs

(a) Remove screws holding cover on can.

(b) Loosen cover from can and hold in upright position, prongs down; gently shake the rubber sock and Elkonode from the can.

(c) Closely observe the manner in which the leads from the prong base to the Elkonode are placed in the outer slots of the rubber sock. This is important for correct placement of wires when replacing assembly in can.

(d) Observe the location of the various parts, especially the position of the reed Armature (2) with respect to the coil pole shoe of the Elkonode. (1).

(e) Unsolder the three leads at the Elkonode terminals, noting that the top lead (with Elkonode held as in diagram) crosses over the ground lead to the center connection at the plug. Unsolder the coil wire at the spring terminal.

(f) Loosen lock nuts A, and A2 and turn the adjusting screws B, and B2 counter clockwise until the insulating bushings (5) are against the frame, then remove screws and slide out bushings.

(g) Loosen stack screws (3) and remove. Press on the under side of the bakelite stack and reed so as to move the assembly out from between the frame. Save the insulating bushings (5), stack screws (3), connector plate (4), adjusting screws, and the lock nuts. Remove the bakelite stack spacers and insulating tubes from the assembly.

## ROUTINE FOR REBUILDING THE ELKONODE:

(h) Rebuild the stack assembly, making sure to use the thicker of the four bakelite spacers on either side of the reed.

(i) Since the Elkonode is largely magnetic in operation, extreme care must be taken to prevent particles or filings of iron from attaching themselves to the iron parts of the Elkonode. Clean the pole shoe, frame, and reed thoroughly.

(j) Hold the assembly with the reed in the position shown in the illustration, place the frame under the assembly, as shown also, and insert the assembly from the top. It may be necessary to spread the frame slightly in order to make the insertion. Inspect the stack screws for signs of weakening, and if satisfactory, replace with the connector plate and tighten slightly.

(k) The reed should stand approximately in the center of the frame at rest. The end of the reed should be parallel to the face of the pole shoe and from .003″ to .005″ distant from it when the reed is pulled down opposite its center. This distance should be accurately set by feeler gauges. The reed may be adjusted because of play in the mounting holes.

(l) Insert the insulating bushings in the slots in the ends of the springs, thread the adjusting screws into place, together with the lock nuts. Adjust the screws to place the contacts close to the reed contacts. The springs should be moved so as to allow the contacts to strike the reed contacts without overlapping. The contacts should be fairly flat in making contact, and still not bind on the insulated adjusting bushing.

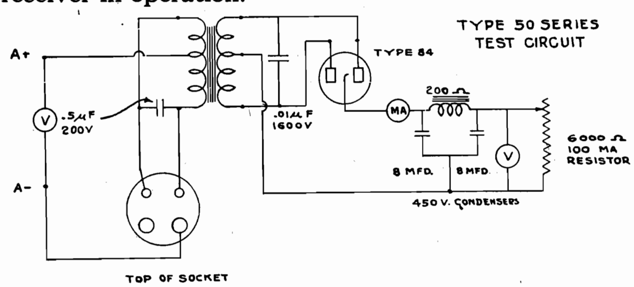
(m) Tighten the stack firmly without disturbing the adjustments. Hold the reed over a piece of white paper in the vertical position shown in the illustration. The end edge of the reed, on the opposite side from the armature should rest from flush with the edge of the pole piece to .003″ above same. Any bending of the reed should be done at the extreme armature end, and only slight alterations should ever be necessary. Should the pole shoe not be parallel with the armature in a vertical direction, turn the pole shoe with a pair of long-nosed pliers; *do not attempt to twist the reed.* Check the air-gap spacing and tightness of coil mounting screws, if such adjustments are made, then recheck alignment.

(n) Solder the leads back as before, with the ungrounded heater terminal lead to the reed tail. The connector plate is soldered to the reed tail also, at the same time, and the coil wire to the near spring lug.

(o) Some method of exerting high pressure upon the stack end of the Elkonode while the final tightening of the clamping screws is taking place is essential. It is suggested that an arbor press, capable of exerting a total pressure of about 2000 pounds, be used. Pressure should be exerted directly over the stack, between the screws, while a large screw driver draws the screws down firmly. This prevents loosening of the stack in service and consequent failure.

(p) Turn the adjusting screw B-1 clockwise until the space between the contacts G and H is between .003″ and .004″, as measured carefully with a feeler gauge, with the lock nut A-1 tightened firmly. Proceed likewise with B-2 and A-2 until clearance between contacts E and F is between .004″ to .006″. Check lock nuts for tightness. The unit should then be ready for operation.

Following is a test circuit which may be set up for electrically testing and adjusting Elkonodes of the "50" Series. "Sound" tests may be obtained only with receiver in operation.




(Transformer should be the same as used in set from which the Elkonode was taken. The set itself may be used for test if an extension lead is made up. Do not expect quiet operation while set is open and unit is uncanned.)

(q) If test equipment is available, operate the Elkonode on this equipment before placing it in the Elkonode can. The unit should start operation at 4.4 volts (2 cells of 6-volt battery on charge), should provide correct output at 6.6 volts and should operate satisfactorily at 8.8 volts (4 cells on charge). Should any adjustment be necessary, adjust screw B-2 only. A very slight movement of the screw should permit final adjustment.

### CAUTION

(r) Do not attempt to bend contact springs.
Use only Kester Rosin Core Solder.
Keep moisture from all parts of the Elkonode.
Keep metallic particles out of Elkonode.
Keep dust, moisture, grease and liquid from the contact surfaces. Clean contact surfaces with a dry, clean piece of linen paper.

MODEL 60,60,80 Series
Elkonodes-Repair

# P. R. MALLORY & CO.

(Continued)

(s) When inserting the Elkonode into the rubber sock, be very careful to turn the frame of the Elkonode parallel with the flat sides of the inside holes of the sock, so as to leave the air spaces at the open sides of the Elkonode. The single ground lead (from reed) is taken down the smaller of the two slots, while the other two leads are taken down the larger slots. Place the Elkonode in the sock, so that no wires need be bent to meet this arrangement. Draw the leads to the prong base, and fold under the lid. Insert the sock assembly into the can, with the large slot next to the seam of the can. Screw cover to can with screws provided.

## SERVICE EQUIPMENT REQUIRED

1. High resistance volt-meter. Scale: 0 to 300 and 0 to 600. Resistance: Not less than 1000 ohms at 2 volts.
2. A good quality milliammeter. Scale: 0 to 50 and 0 to 100.
3. One set feeler gauges.
4. One small screw driver and one large screw driver.
5. One pair thin long-nosed pliers.
6. One medium-sized arbor press.

# "60-70-80" Series Units

The series 60, 70, and 80 Mallory Elkonodes are described as single-reed, full-wave inverters, with self-contained synchronous rectifiers. These units within themselves supply the direct current, high voltage for radio receiver plate supply. No tube rectifiers are required with these types. Inasmuch as the mechanical construction of all of the 60, 70 and 80 series units is the same, the following service information will apply to all such units:

The 60 series unit is no longer in production—having been replaced with the 70 series unit, and differs from the 70 series principally in that its self-contained point buffer condensers were of the wax impregnated paper type, rated at .008 mfd. 1600 volts DC. The 70 series is supplied with an oil-impregnated and immersed paper condenser of .01 mfd. capacity, rated at 1600 volts DC, and whenever occasion arises to replace contact spring and reed assemblies in the 60 series unit, advantage should be taken of that opportunity to replace the old unreliable paper condensers with the new type, described as our part A–18237.

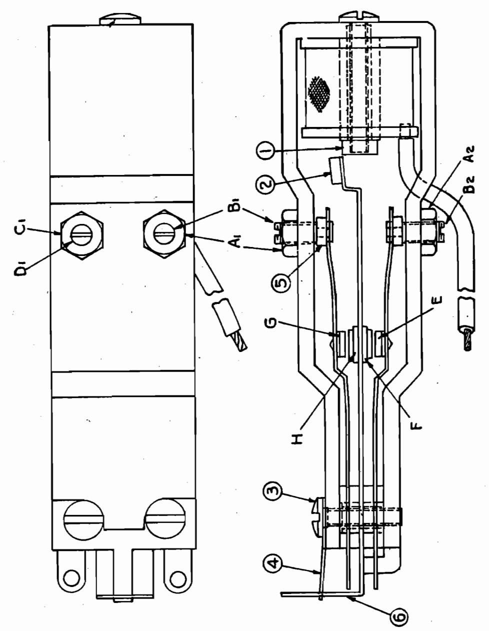
The 80 series Mallory Elkonodes are identical with the 60 and 70 series except that no internal point condensers are supplied. These units are to be used only in cases where the original point buffer condensers in the type 60 Elkonodes have been removed, and suitable condensers installed permanently at the Elkonode socket prong. In some special cases, a manufacturer may have used external secondary buffer condensers in place of the internal point condensers, but such cases will be rare.

As with all other types of Mallory Elkonodes, the prefix letter G denotes 12-volt operation, and the prefix letter F denotes 32-volt operation. Differences in wire size and in the number of turns of the Elkonode driver coil distinguish the 6-, 12-, and 32-volt types, but the output ratings as set forth in the following table apply to 6-, 12-, and 32-volt types alike:

| Elkonode Series No. | Maximum Watts Output |
|---|---|
| 60 —70 —80 | 11 |
| 60B—70B—80B | 18 |
| 61 —71 —81 | 11 |
| 63 —73 —83 | 18 |
| 65 —75 —83 | 11 |

The reed of the Elkonode is grounded to the can, and the receiver circuit ground is necessary for all types but the 60, 60B, 70, 70B, 80 and 80B units, in which cases the ground returns through the A Battery. The types 65, 75 and 85 are for use on household battery receivers, or similar applications where the battery is not on charge while the receiver is in operation. All ratings given are for operating battery voltages of 6.6, 13.2 and 33 volts, for the standard 6-volt, 12-volt and 32-volt series respectively. It is necessary that the Elkonodes be properly polarized in connecting the prong base and transformer, in order to prevent a reversal of output voltage.

The following reproduction pictures the Mallory type 80 Elkonode in both top and side views with covers and with point buffer condensers of course removed:




### Explanation of Above Charts

| | | |
|---|---|---|
| A—A2 | —Rectifier Lock Nut | 1. Magnet Coil Pole Shoe |
| B1—B2 | —Rectifier Adjusting Screw | 2. Reed Armature |
| C1—C2 | —Interrupter Lock Nut | 3. Stack Clamping Screw |
| D1—D2 | —Interrupter Adjusting Screw | 4. Connector Plate |
| E, F, G, H | —Rectifier Contacts | 5. Insulating Bushing |
| E, F, G, H | —Duplicate for Interrupter Side | 6. Reed Tail |

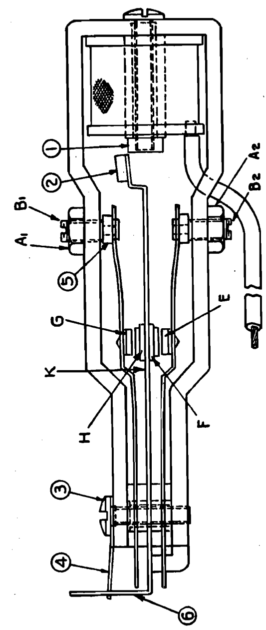
# P. R. MALLORY & CO.

The 50 Series Mallory Elkonode is a single-reed full-wave inverter for use in supplying alternating-current voltage which in turn is rectified by a tube rectifier for supplying the high direct-current voltage needed for radio receiver plate supply.

This Elkonode is used in three standard types, Nos. 50, 51, and 53, and in certain modified forms for special requirements. For 12-volt operation, the type number is prefixed with the letter "G" to designate the change in construction. Likewise, for 32-volt operation, the letter "F" is used. The mechanical construction for all types is the same except for a change in the driver-coil windings for the 12-volt and again for the 32-volt types. The types 50 and 51 Elkonodes are adjusted and intended to carry output loads up to *11 watts*. The type 53 Elkonode is designed for loads from 11 to 18 watts. These types have an advantage over earlier types in not being limited to a narrow range of load conditions. Ratings are given, in every case, for operating battery voltages of 6.6, 13.2, and 33 volts, for the 50, G-50, and F-50 Series, respectively.

The following reproduction pictures the Mallory Type 50 Series Elkonode in a top view, with covers removed.

1. **Magnet coil pole shoe**
2. **Reed armature**
3. **Stack clamping screw**
4. **Connector plate**
5. **Insulating bushing**
6. **Reed foil**




A—lock-nut. B—adjusting screw.
E, F, G, H—contact points

## Instructions For Adjusting Contact Springs When Such Springs Do Not Require Replacement

As with automobile ignition contacts, the tungsten contact points in Elkonodes will show some evidence of wear after they have been in service for a long period of time. This wear progresses gradually, and as long as the Elkonode is capable of operation, any amount of wear at the contact points will have no influence whatever on the performance of the radio set or on the voltage supplied to the tubes. However, after a long period of service the Elkonode may refuse to start, and when this point is reached it should be taken as indicative of excessively worn contact points. The Elkonode has been designed with a generous reserve of tungsten in its contact points, and this reserve may be utilized to give the Elkonode extended life, providing one simple adjustment is made. This adjustment is outlined as follows:

1. Remove the Vibrator unit from the can and rubber sock, by following closely the directions covered by paragraphs A, B, C and D in the procedure for dismantling Elkonode. Use care to avoid bending wires at the soldered connections.

2. Place the Elkonode on a piece of white paper, so that when viewed from above it appears exactly as in drawing above.

3. Loosen lock nut (A2) and turn screw (B2) clockwise until .005″ of light can be seen between contacts (F) and (E). If the contact points are roughened, the light can not be seen across their entire diameter, even though they are correctly spaced (i. e., within .005″ of touching each other).

4. A check on the accuracy of the spacing adjustment is obtained by pressing lightly against the center of the reed with a small pointed metal instrument in the direction and location shown by arrow (K). When the reed is thus moved, so as to just close contacts F and E, the weight (2) on the free end of the reed should move 1/64 inch from its "at rest" position. Check should be made after lock nut has been firmly tightened down.

5. DO NOT readjust spacing between contacts G and H, unless the tungsten is nearly all worn away. In this case, readjustment is obtained in exactly the same manner as for contacts F and E.

6. In reinserting the Elkonode into its rubber sock, be very careful to turn the "flats" of the sock hole so that they are in line with the lock-nuts. This provides ample space in the sock for the free movement of the reed. In reinserting the "socked" Elkonode into the can, be sure that the can seam lines up with the wider of the wire-carrying channels on the outside of the sock. This is important.

CAUTION: Inasmuch as the Elkonode mechanism is partially magnetic, extreme care should be observed while making adjustments to prevent iron filings or similar metallic matter from getting into the Elkonode.

MODEL 60,70,80 Series
Elkonode Repair
"B" Eliminator Types

# P. R. MALLORY & CO.

## Directions for Replacing Contact Spring and Reed Assemblies in the 1933 and 1934 '60,' '70,' and '80' Series Mallory Self-Rectifying Elkonodes

### ROUTINE FOR DISMANTLING ELKONODE:

(a) Remove screws holding cover on can.

(b) Loosen cover from can and hold in upright position, prongs down; gently shake the rubber sock and Elkonode from the can.

(c) Closely observe the manner in which the leads from the prong base to the Elkonode are placed in the outer slots of the rubber sock. This is important for correct placement of wires when replacing assembly in can.

(d) Observe the location of the various parts, especially the position of the reed Armature (2) with respect to the coil pole shoe of the Elkonode (1).

(e) For your own protection, it will be well to make a pencil sketch of the manner in which the five leads are connected to the Elkonode terminals, before removing these leads. Do not cut them to remove, but carefully unsolder each one. In the 60 and 70 series units, where Condensers are supplied internally, remove them also and unsolder the coil wire at the spring lug.

(f) Remove coil mounting screw from end of frame, and remove coil and pole shoe from frame. Loosen lock nuts A-1, A-2, C-1 and C-2 and remove adjusting screws B-1, B-2, D-1 and D-2. Remove the insulating bushings from the slots in ends of springs.

(g) Loosen stack screws (3) and remove. Press on the under side of the bakelite stack and reed so as to move the assembly out from between the frame. Save the insulating bushings (5), stack screws (3), connector plate (4), adjusting screws, and the lock nuts. Remove the bakelite stack spacers and insulating tubes from the assembly.

### ROUTINE FOR REBUILDING THE ELKONODE:

(h) Rebuild the stack assembly (unless you are using stack assembly complete as provided under our part Number A 18448), making sure to use the thicker of the four bakelite spacers on either side of the reed. Make sure that in assembling the springs, the lugs for soldering line up on the outside edge of the stack.

(i) Since the Elkonode is largely magnetic in operation, extreme care must be taken to prevent particles or filings of iron from attaching themselves to the iron parts of the Elkonode. Clean the pole shoe, frame, and reed thoroughly.

(j) Hold the assembly with the reed in the position shown in illustration, (*see page 24*). Place the frame under the assembly, as shown also, and insert the assembly from the top. It may be necessary to spread the frame slightly in order to make the insertion. Inspect the stack screws for signs of weakening, and if satisfactory, replace with the connector plate and tighten slightly.

(k) Reinsert the driver coil and pole shoe and clamp in place with the screw removed previously. Draw the screw up tightly, and with long-nosed pliers, turn the pole shoe to a vertical position parallel with the reed surface. The coil wire should be inserted through the hole in the frame before the coil is inserted in the frame.

(l) The reed should stand approximately in the center of the frame at rest. The end of the reed should be parallel to the face of the pole shoe, and from .003" to .005" distant from it when the reed is pulled down opposite its center. This distance should be accurately set by feeler gauges. The reed may be adjusted because of play in the mounting holes.

(m) Insert the insulating bushings in the slots in the ends of the springs, thread the adjusting screws into place, together with the lock nuts. Adjust the screws to place the contacts close to the reed contacts. The springs should be moved so as to allow the contacts to strike the reed contacts without overlapping. The contacts should be fairly flat in making contact, and still not bind on the insulated adjusting bushing.

(n) Tighten the stack firmly without disturbing the adjustments. Hold the reed, over a piece of white paper in the vertical position shown in illustration, (*see page 24*). The end edge of the reed, on the opposite side from the armature should rest from flush with the edge of the pole piece to .003" above same. Any bending of the reed should be done at the extreme armature end, and only slight alterations should ever be necessary. Should the pole shoe not be parallel with the armature in a vertical direction, turn the pole shoe with a pair of long-nose pliers, *do not attempt to twist the reed.* Check the air-gap spacing and tightness of coil mounting screws, if such adjustments are made, then recheck alignment.

(o) Solder the leads to the spring, and reed lugs after threading all into place first. If condensers are to be used, place them in position and solder the leads from them at the same time. Make sure that the insulation is over the "hot" condenser lead and that it does not "short" against the frame. Also make sure that the grounded lead does not touch the spring lug or wire. Solder the coil wire at the same time, and solder the connector plate lug to the reed tail. It is suggested that you use another Elkonode as a sample, since it is quite important that all wires be replaced exactly as removed.

(p) Some method of exerting high pressure upon the stack end of the Elkonode while the final tightening of the clamping screws is taking place is essential. It is suggested that an arbor press, capable of exerting a total pressure of about 2000 pounds, be used. Pressure should be exerted directly over the stack, between the screws, while a large screw driver draws the screws down firmly. This prevents loosening of the stack in service and consequent failure.

(q) Loosen lock nuts C, C-1 and C-2. Turn adjusting screw D-1 clockwise until clearance between contacts G and H is between .002" and .003" as measured with a feeler gauge. Lock nut C-1 should be drawn up firmly before this measurement is taken. Adjust C-2 similarly so that the clearance between contacts E and F is between .004" and .006" with the lock nut (C-2), drawn up firmly. This adjustment sets the interrupter section for correct operation.

(r) Turn the adjusting screw (B-1), until the clearance between contacts G and H is between .009" and .012". Adjust screw B-2 until the clearance between E and F is between .011" and .013". This sets the rectifier section in an approximately correct position for operation.

(s) **If test equipment** is available it is very advisable to inspect the operation of the Elkonode before assembling into the receiver. (A suitable test circuit is outlined later in this section.) The unit should start operating at 4.4 volts (2 cells of 6-volt battery on charge), should provide correct output at 6.6 volts, and should operate satisfactorily at 8.8 volts both with load and at no load.

(t) Should the unit flare or spark excessively at higher voltages, adjust the rectifier contacts slightly to control this arcing. The contacts E and F should always have slightly wider clearance between them than contacts G and H.

(u) *Do not adjust the interrupter contacts,* unless the unit will not start at 4.4 volts. Then adjust the B-2 screw only and do not make the clearance any smaller than is absolutely necessary. After any adjustment changes, always check the operation thoroughly at all voltages.

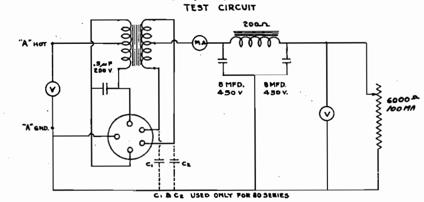
CAUTION

(v) Do not attempt to bend contact springs.
Use only Rosin Core Solder.
Keep moisture from all parts of the Elkonode.
Exercise extreme care to keep metallic particles out of Elkonode.
Keep dust, grease and liquid from the contact surfaces.
Clean with a clean, dry piece of linen paper.

(w) When inserting the Elkonode into the rubber sock, be very careful to turn the frame of the Elkonode parallel with the "flat" sides of the inside holes of the sock, so as to leave the air spaces at the open sides of the Elkonode. The tail of the reed should be pointing toward the narrower of the two slots in the outer surface of the rubber. Bring the two rectifier leads (smaller wire) down the smaller slot and the three interrupter and ground leads down the larger slot. One interrupter and one rectifier lead will have to be reversed to do this and enough slack must be left at the bend to prevent wire breakage at the soldered joint. Draw the remaining wires under the lid and fold down, seeing that the wires are not twisted in the slots.

(x) See that the rubber pad is in the can, insert assembly with the large slot adjacent to the seam of the can and screw the lid to the can with the screws provided.

TYPE 60, 70 & 80 SERIES
TEST CIRCUIT




The transformer should be the same as used in the set from which the Elkonode was taken. The set may be used for test if an extension cable is made up. Do not expect quiet operation while the set is open and unit is uncanned.

### SERVICE EQUIPMENT REQUIRED

1. High resistance volt-meter. Scale: 0 to 300 and 0 to 600. Resistance: Not less than 1000 ohms at 2 volts.
2. A good quality milliammeter. Scale 0 to 50 and 0 to 100.
3. One set feeler gauges.
4. One small screw driver and one large screw driver.
5. One pair thin long-nosed pliers.
6. One medium-sized arbor press.

## Explanation of Descriptive Letters Used to Identify Special Types of Mallory-Elkon "B" Eliminators

The Mallory-Elkon "B" Eliminator is supplied in two basic types—Standard (no descriptive letter) and the "C" type. The standard unit is designed for receivers which employ a floating B minus circuit (B minus not grounded) and with a voltage divider composed of a 75,000 ohm, ½ watt carbon type resistor between B minus and BM and a 25,000 ohm ½ watt carbon type resistor between BM and B plus. The "C" type is designed for receivers having the B minus grounded and where only one high voltage lead is used. Therefore, no voltage divider is used in the "C" type, except in special cases where the Eliminator is built to be used with a particular type of radio set as shown below in PC—CA—and CD:

**Type PC**—Basic type "C." 50,000 ohm 1 watt carbon type resistor between B plus and BM; 50,000 ohm 1 watt carbon type resistor between BM and B minus.

**Type CA**—Basic type "C." 1500 ohm 3 watt wire wound resistor between B plus and BM. Connect wire from B plus Choke to BM terminal instead of to B plus terminal.

**Type CD**—Basic type "C." 25,000 ohm 1 watt carbon type resistor between B plus and BM; 75,000 ohm 1 watt carbon type resistor between BM and B minus; 1850 ohm wire wound 3 watt resistor between B plus terminal and radio frequency Choke (B plus).

**Type P**—Standard basic type. 50,000 ohm 1 watt carbon type resistor between B plus and BM; 50,000 ohm 1 watt carbon type resistor between BM and B minus.

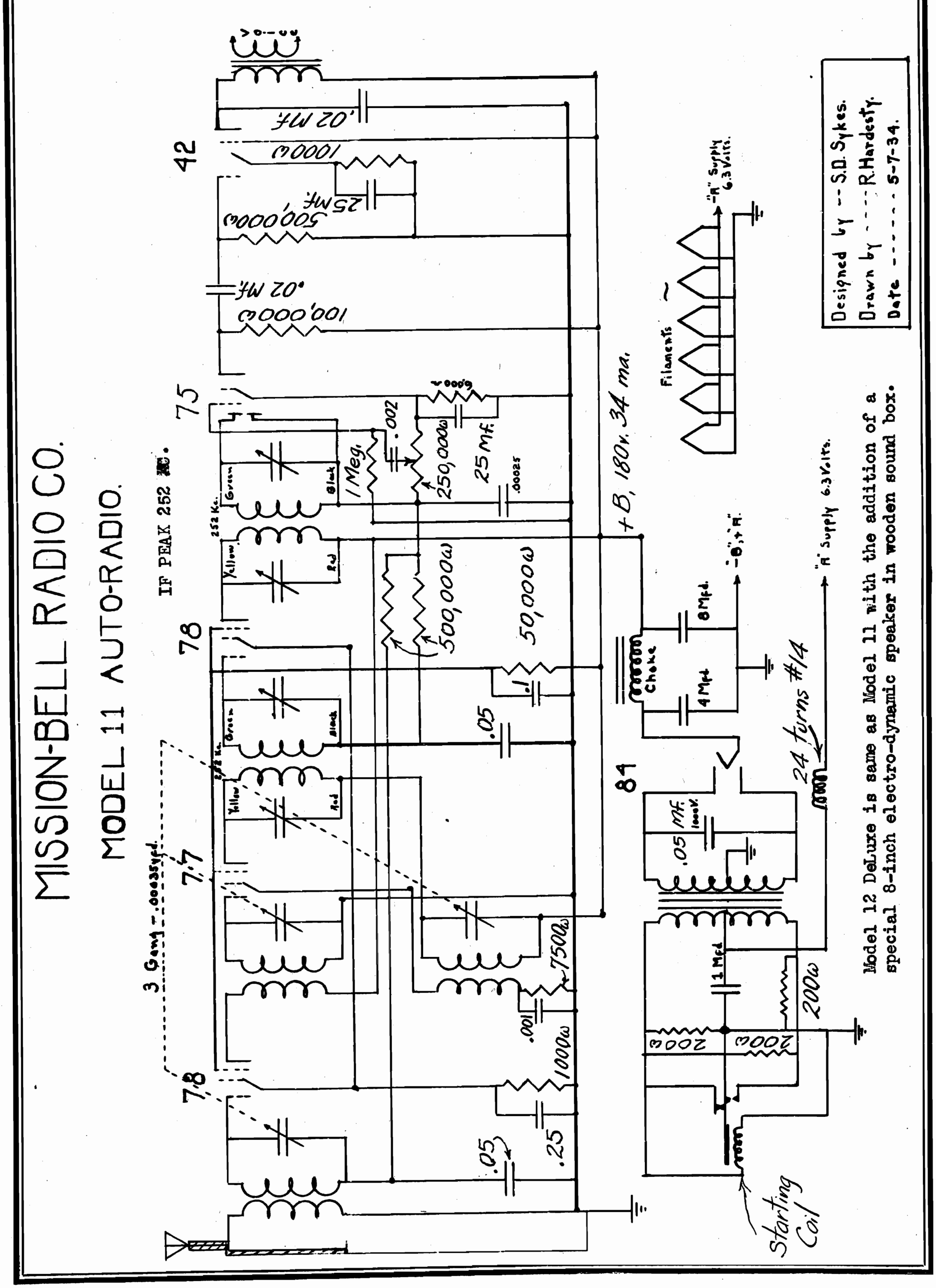
**Type M**—Standard basic type. Remove resistors between B plus and BM, and BM and B minus. Install 1250 ohm 1 watt resistor between B minus and G terminal. (It is necessary to provide screw for the G terminal point on terminal board.)

**Type S**—Standard basic type. Use 20,000 ohm ½ watt resistor between B plus and BM. Install 20,000 ohm ½ watt resistor from BM to G terminal. Install 5000 ohm 1 watt resistor from G terminal to B minus.

**Type ST**—Standard basic type. Install 20,000 ohm ½ watt resistor between B plus and BM. Install 20,000 ohm ½ watt resistor between BM and G terminal. Install 3500 ohm 1 watt resistor between B minus and G terminal.

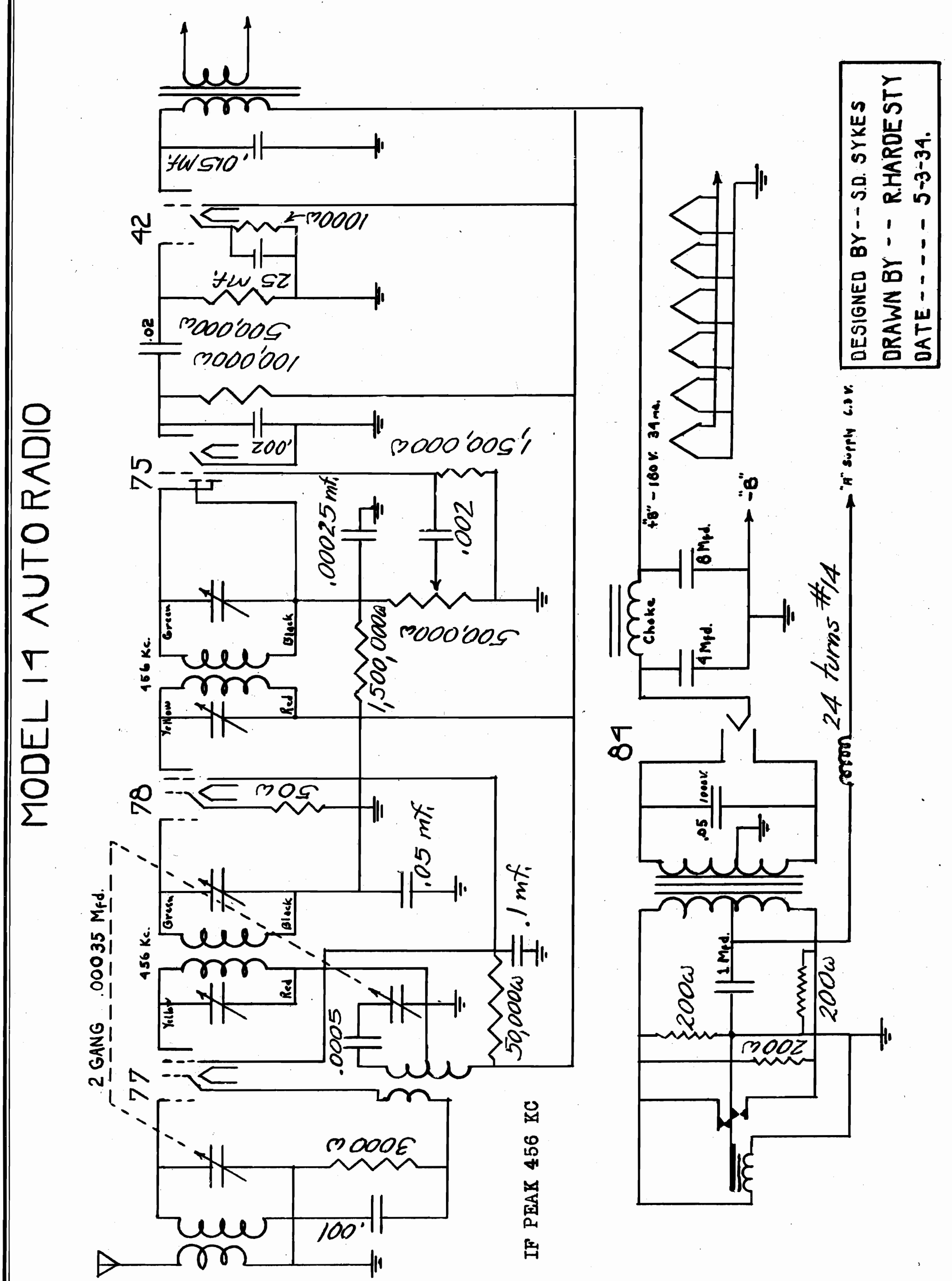
MODEL 11
Schematic

MISSION BELL RADIO MFG. CO., INC.



MODEL 14
Schematic

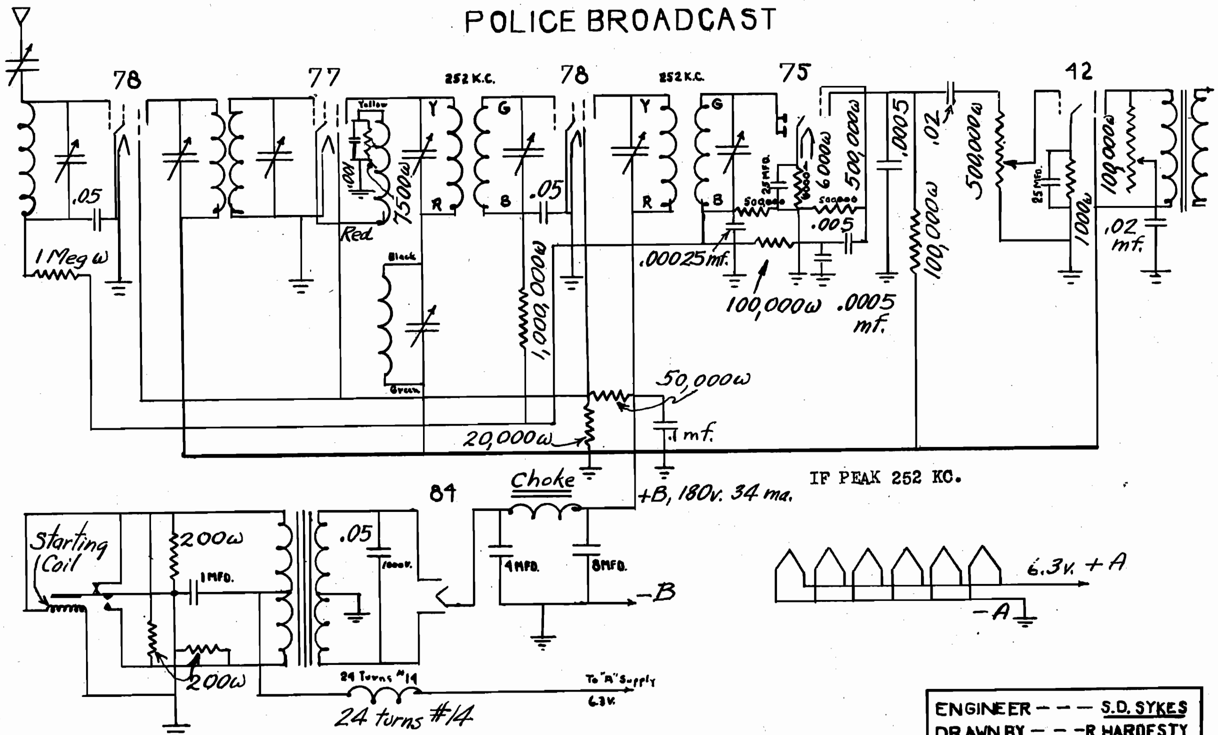
# MISSION BELL RADIO MFG. CO., INC.



MODEL 25-A Schematic
MODEL 40 Schematic

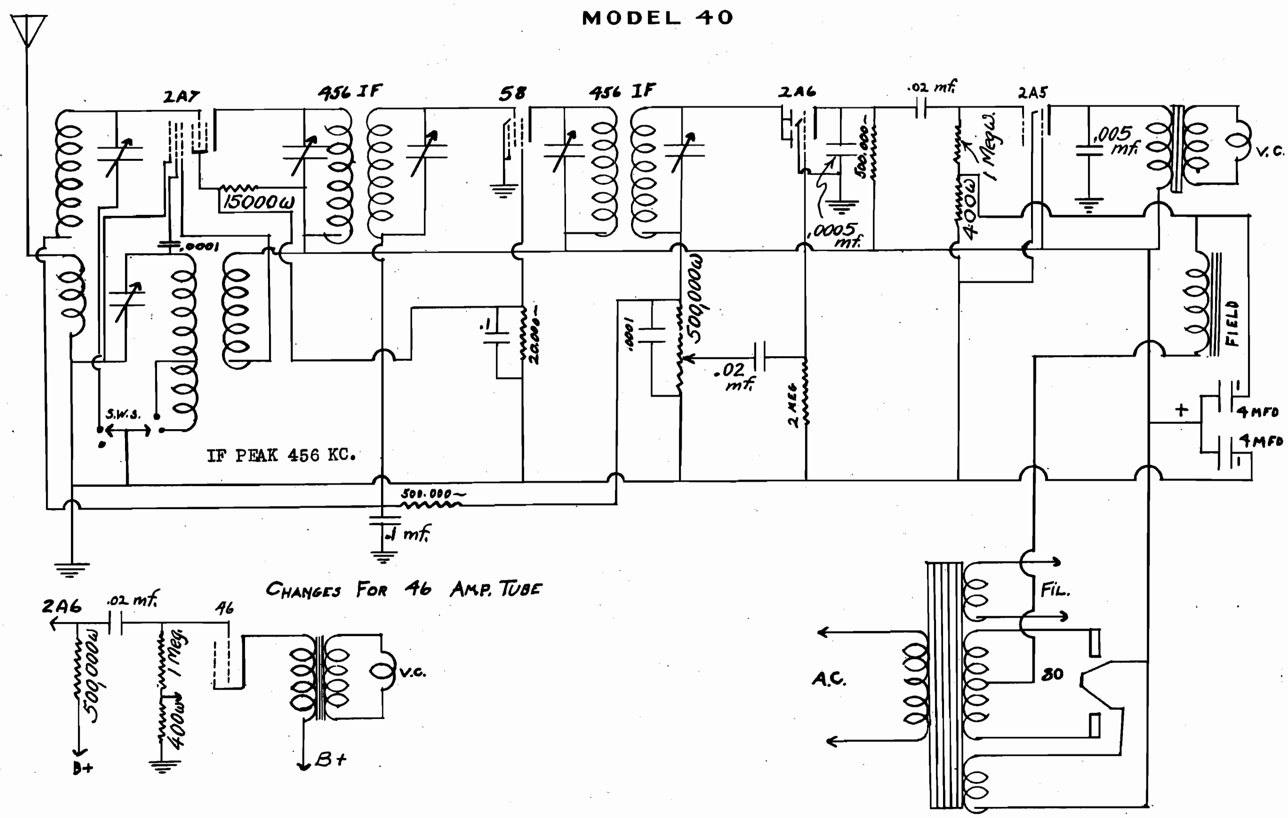
# MISSION BELL RADIO MFG. CO., INC.

## MISSION BELL RADIO CO.
MODEL 25-A 6-TUBE SUPER
POLICE BROADCAST



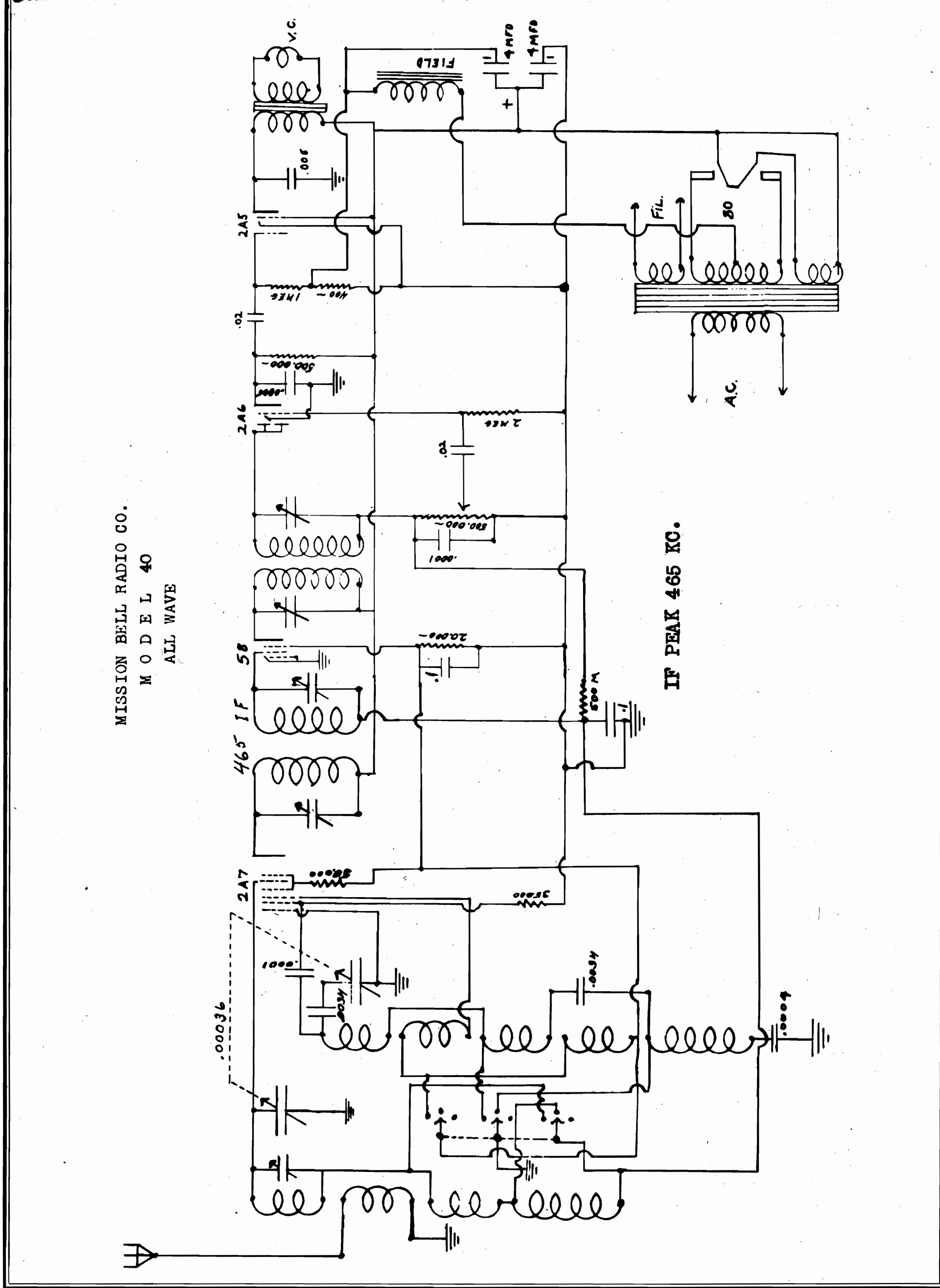

| |
|---|
| ENGINEER --- S.D. SYKES |
| DRAWN BY --- R. HARDESTY |
| 4-25-'34 --- |

## Mission Bell Radio Co.
MODEL 40



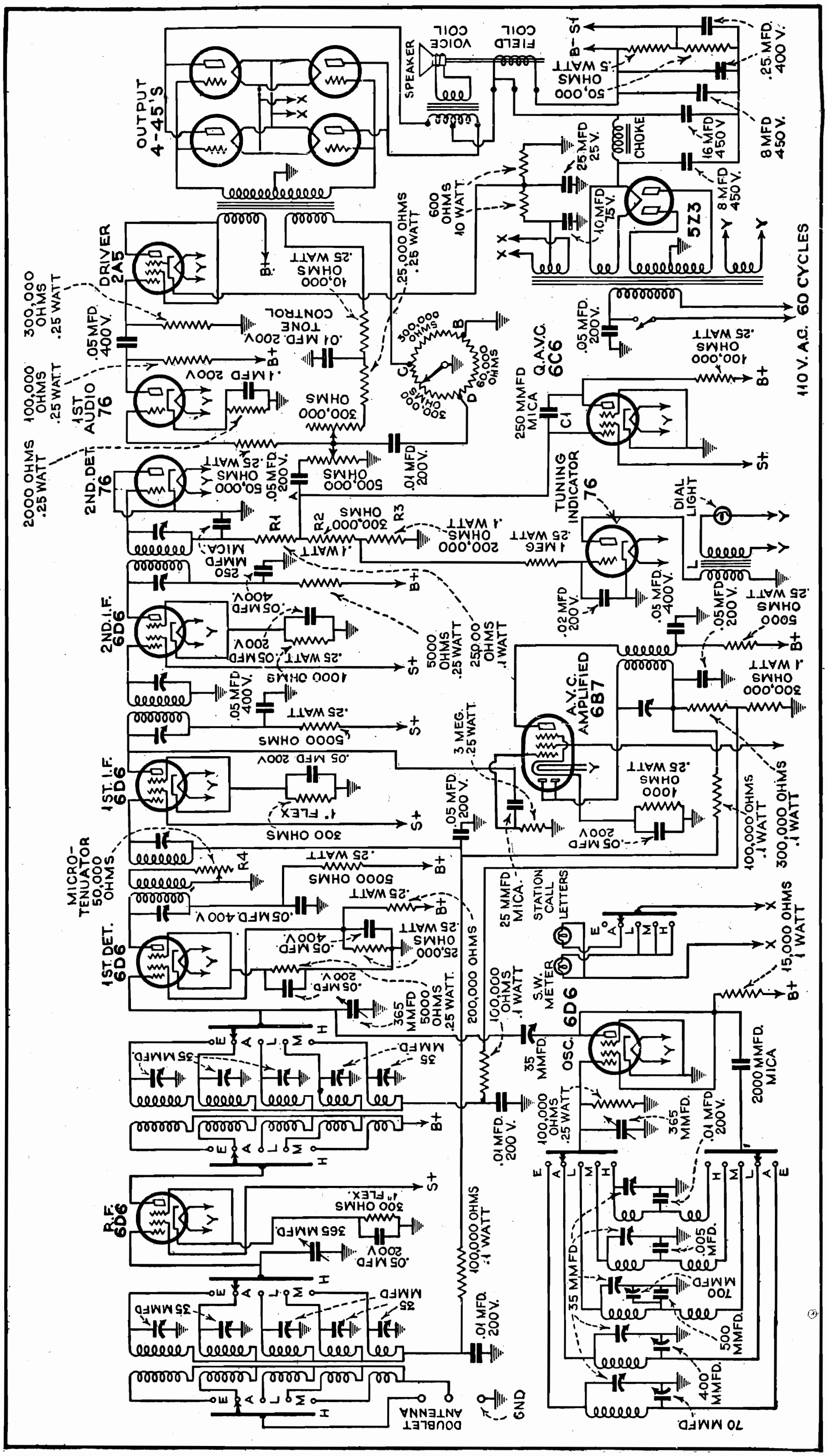
**MODEL 40 All-Wave Schematic**

## MISSION-BELL RADIO MFG. CO., INC.



# MID-WEST RADIO CORP.

MODEL 1935 Deluxe
Schematic



# MONTGOMERY-WARD & CO.

**MODEL 62-118**
**Schematic, Voltage Socket, Parts**

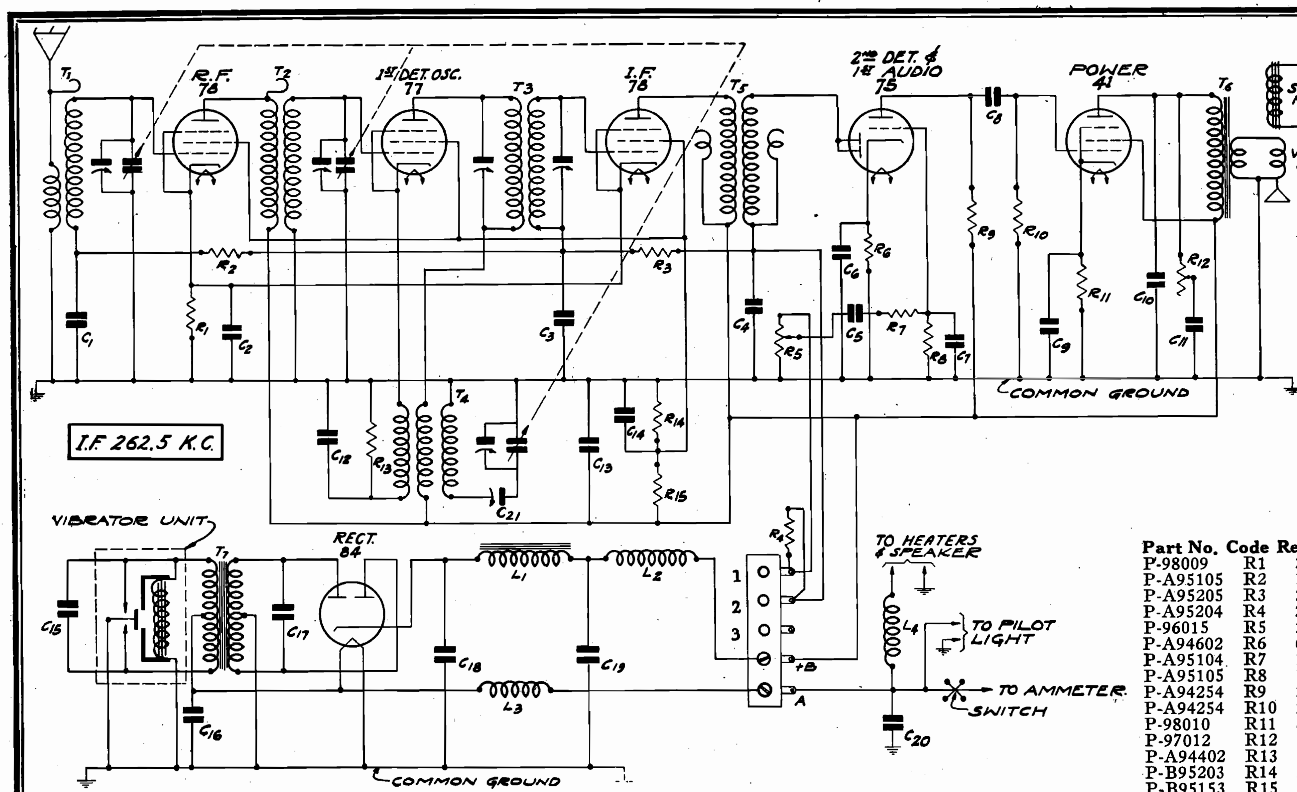



Fig. 1—Schematic Circuit Diagram.

## "B" UNIT PARTS

| Part No. | Item |
|---|---|
| P-50637 | Filter Choke L1 |
| P-50633 | Power Transformer T7 |
| P-5175 | Eliminator "A" Choke L3 |
| P-5174 | R.F. "B" Choke L2 |
| P-2080 | Vibrator—Mallory Type 53 |
| P-2110 | Vibrator—Radiart Type 3264 |
| P-1572 | Fuse Clip Assembly |
| P-2024 | No. 84 Tube Socket |
| P-2023 | Vibrator Socket |
| P-2082 | Two Lug Terminal Strip |
| P-2106 | Single Insulated Terminal Strip |
| P-1924 | 15 Ampere Fuse |
| P-70765 | Eliminator Cable |
| P-10322 | Sponge Rubber Disc |

## RESISTORS

| Part No. | Code | Resistance | Wattage | Type |
|---|---|---|---|---|
| P-98009 | R1 | 260 ohm. | 0.5 | Wire-Wound |
| P-A95105 | R2 | 1 megohm | 0.2 | Carbon |
| P-A95205 | R3 | 2 megohm | 0.2 | Carbon (In 2nd I.F.) |
| P-A95204 | R4 | 200,000 ohm | 0.2 | Carbon |
| P-96015 | R5 | 250,000 ohm | | Volume Control & Switch |
| P-A94602 | R6 | 6,000 ohms | 0.2 | Carbon |
| P-A95104 | R7 | 100,000 ohm | 0.2 | Carbon (In 2nd I.F.) |
| P-A95105 | R8 | 1 megohm | 0.2 | Carbon (In 2nd I.F.) |
| P-A94254 | R9 | 250,000 ohm | 0.2 | Carbon |
| P-A94254 | R10 | 250,000 ohm | 0.2 | Carbon |
| P-98010 | R11 | 800 ohm | 0.5 | Wire-Wound |
| P-97012 | R12 | 150,000 ohm | | Tone Control |
| P-A94402 | R13 | 4,000 ohm | 0.2 | Carbon |
| P-B95203 | R14 | 20,000 ohm | 0.5 | Carbon |
| P-B95153 | R15 | 15,000 ohm | 0.5 | Carbon |

## CONDENSERS — IN CHASSIS

| Part No. | Code | Capacity | Voltage | Type |
|---|---|---|---|---|
| P-81009 | C1 | 0.050 mfd. | 200 V. | Tubular |
| P-80919 | C4 | 0.00025 mfd. | 600 V. | Moulded (In 2nd I.F.) |
| P-80862 | C5 | 0.050 mfd. | 200 V. | Tubular |
| P-80919 | C7 | 0.00025 mfd. | 600 V. | Moulded (In 2nd I.F.) |
| P-81025 | C11 | 0.020 mfd. | 600 V. | Tubular |
| P-80821 | C12 | 0.001 mfd. | 600 V. | Moulded |
| P-81024 | C20 | 0.500 mfd. | 120 V. | Tubular |
| P-81026 | | | | Three Gang Condenser |
| P-1539 | C21 | 600 K.C. | | Trimmer Condenser |
| P-81022 | C2 | 0.500 mfd. | 200 V. | Condenser Block |
| | C3 | 0.050 mfd. | 200 V. | |
| | C8 | 0.050 mfd. | 300 V. | |
| | C10 | 0.003 mfd. | 600 V. | |
| | C13 | 0.500 mfd. | 300 V. | |
| | C14 | 0.100 mfd. | 200 V. | |
| P-81021 | C6 | 12.00 mfd. | 25 V. | Electrolytic Block |
| | C9 | 12.00 mfd. | 25 V. | |

## CONDENSERS — IN "B" UNIT

| Part No. | Code | Capacity | Voltage | Type |
|---|---|---|---|---|
| P-81024 | C15 | 0.500 mfd. | 120 V. | Tubular |
| P-81031 | C16 | 1.000 mfd. | 120 V. | Tubular |
| P-81030 | C17 | 0.010 mfd. | 1600 V. | Tubular |
| P-81028 | C18 | 10.00 mfd. | 350 V. | Electrolytic Block |
| | C19 | 10.00 mfd. | 350 V. | |

## VOLTAGES AT SOCKETS

Antenna Disconnected—Battery 6 Volts Under Load

| Type of Tube | Function | Across Heater | Plate to Cath. | Screen to Cath. | Cath. to Ground | Normal Plate M.A. |
|---|---|---|---|---|---|---|
| 78 | R. F. | 5.7 | 220 | 100 | 3.5 | 5.0 |
| 77 | 1st Det. and Osc. | 5.7 | 220 | 100 | 8.0 (1) | 1.1 (1) |
| 78 | I. F. | 5.7 | 220 | 100 | 3.5 | 5.0 |
| 75 | 2nd Det. | 5.7 | 140 (2) | | 1.0 | 0.3 |
| 41 | Output | 5.7 | 200 | 210 | 15.5 | 18.0 |
| 84 | Rect. | 5.7 | | | | 20. per plate |

(1) Subject to variation.
(2) Triode Plate to Cathode—as read with 1,000,000 ohm meter.

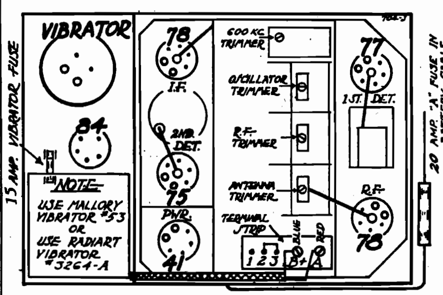



Fig. 2—Location of Tubes.

MODEL 62-118
Alignment, Data

MONTGOMERY-WARD & CO.

## Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and accurately calibrated signals at and around 262.5 K. C., the intermediate frequency and an output indicating meter are desirable.

**Do not take the chassis out of the box.** First set the signal generator at approximately 262.5 K. C. Connect the antenna lead from the generator to the control grid of the I. F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A. V. C. action. Note from Fig. 1 that the second I. F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262.5 K. C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Do not change the signal generator setting. Then adjust the 1st I. F. trimmer condenser screws for maximum output. There are 2 holes at one end of the chassis box. The 2 trimmer screws can be reached through these holes. CAUTION—use an insulated screwdriver to prevent short circuiting to ground.

Now disconnect the signal generator and adjust it to exactly 1400 K. C. The antenna lead from the generator is then connected to the antenna lead of the receiver. Connect the tuning condenser flexible drive shaft to the chassis if it has been disconnected. Turn the station selector knob until the rotor plates are completely in mesh. Then with a screwdriver turn the calibration screw on the back of the control unit, until the pointer is at the lowest frequency **mark. This is the large point, 5 points below the 55 mark.** Then turn the station selector knob until the pointer on the dial scale is at 1400 K. C.

Then adjust the oscillator, R. F., and antenna trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator section first. See Fig. 2.

Next, set the signal generator for a signal of 600 K. C. and adjust the oscillator 600 K. C. trimmer. This condenser is mounted on the end of the gang condenser. See Fig. 2.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

If the control unit or flexible shaft is moved after the set has been aligned, the setting of the dial pointer may change. This can be adjusted by turning the control unit calibration screw until the pointer is at the correct setting.

## Adjusting Antenna Trimmer

After the receiver is installed and the car antenna is connected it will be necessary to adjust the antenna trimmer. Tune in a weak signal between 1200 and 1400 K. C. with the volume control about three-fourths on. Remove the cover of the chassis box. The antenna trimmer is the trimmer condenser closest to the terminal strip—see Fig. 2. Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION—Do not turn any of the other trimmer adjusting screws for this adjustment.

## Removing and Replacing Units From Chassis Box

### Removing Chassis Unit From Box

Disconnect the flexible shafts, antenna cable and pilot lamp lead at the chassis box. Pull off the tone control knob and disconnect the battery cable at the fuse receptacle. Remove the cover of the box and take off the black lead on the cover screw. Disconnect the "A" and "B+" leads at the terminal strip. Pull the battery cable inside of the box.

Take out the 4 screws around the speaker grill. Then pull the chassis out by means of the "A" choke and condenser block. Do not pull the chassis out by means of the gang condenser as this might injure the cushion mounting.

### Removing "B" Unit From Box

Disconnect the "A" and "B+" leads at the terminal strip. On the end of the box at which the "B" unit is located will be found 9 screws **around the edge.** Remove these 9 screws. The "B" unit and end plate can then be lifted out.

### Replacing the Vibrator

Note that vibrator unit is of the plug-in type. This unit can be inserted and removed in the same manner as a tube.

### Replacing Chassis Unit

In replacing the chassis unit be sure that the ground spring near the output transformer makes a good contact with the chassis box. Reverse the procedure as given above for removing this unit.

### Replacing "B" Unit

When replacing the "B" unit be sure that the ground spring makes a good contact to the partition wall in the chassis box. Reverse the procedure as given above for removing this unit.

### Removing Speaker

If service work is required on the chassis, it is advisable in some cases to remove the speaker, as this will permit ready access to all of the units and wiring.

The pot magnet is secured to the vertical walls of the chassis base by means of 3 screws, 2 on one side and 1 on the other. Remove these screws. Then carefully lift out the speaker as far as the leads will permit. The yellow field lead and the black secondary lead may then be unsoldered.

## Trouble Shooting and Service

### Vibrator Unit

When servicing this receiver a new vibrator unit should be tried out in the same manner as a new set of tubes would be tried out. These units are plugged in in the same manner as a tube. One or more vibrator units should be kept on hand for replacement purposes.

### "B" Unit

In case of failure in the "B" unit try out a new vibrator. If this does not remedy the difficulty and the "B" unit cannot be repaired locally it is not necessary to return the entire chassis. Remove the "B" unit from the chassis box as per the instructions in this manual after which this unit may be carefully packed and returned separately.

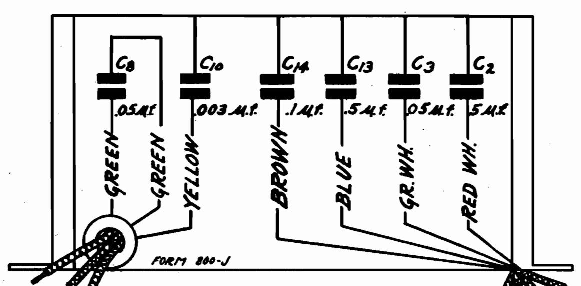
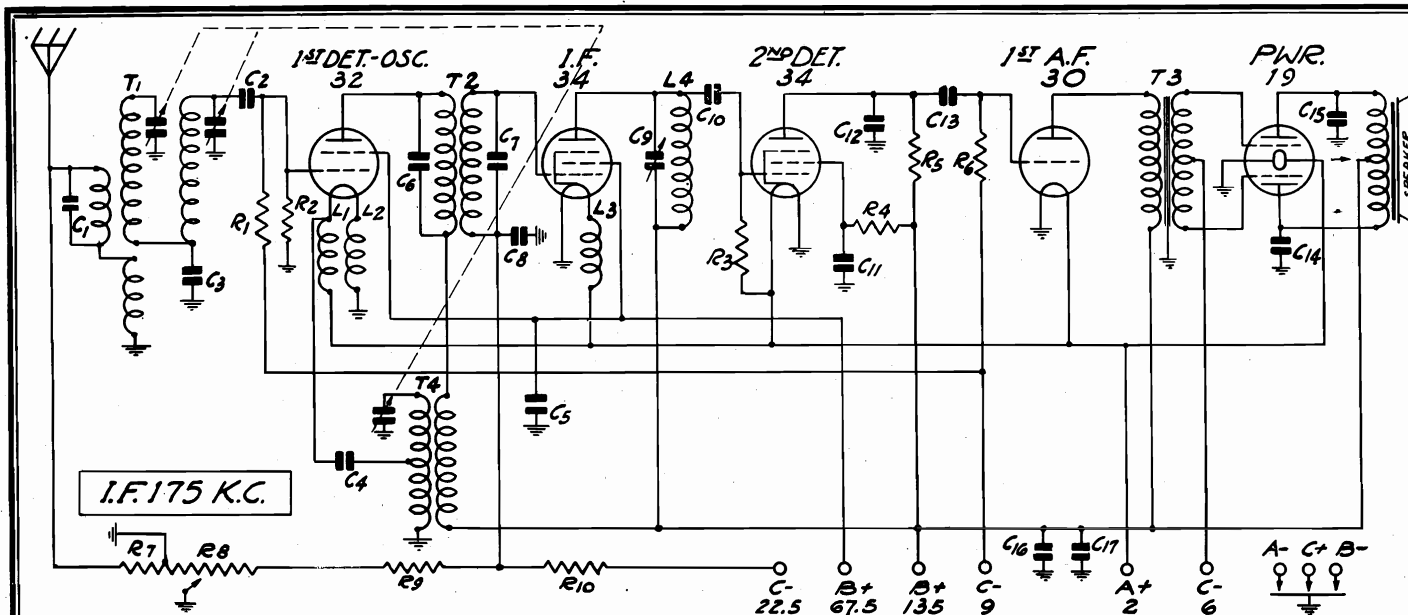
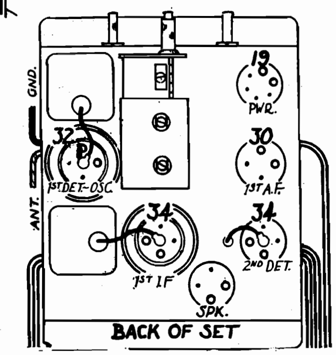



Fig. 3—Condenser Block.

MODEL 62-120, 62-122, 62-126, 62-128
Schematic, Socket, Parts

# MONTGOMERY-WARD & CO.




## D. C. Resistance of Windings

Following are the D.C. resistances of the various windings in the chassis.

| Part No. | Item | Code | D. C. Resistance in Ohms |
|---|---|---|---|
| P-5168 | Double Tuned Ant. Coil Pri. | T1 | 19.2 |
| | Double Tuned Ant. Coil Sec. (Preselector) | T1 | 3.2 |
| | Double Tuned Ant. Coil Sec. (1st Det.) | T1 | 3.2 |
| P-5199 | 1st I.F. Coil Pri. | T2 | 90.0 |
| | 1st I.F. Coil Sec. | T2 | 116.0 |
| P-50586-D | Audio Input Trans. Pri. | T3 | 1010. |
| | Audio Input Trans. Sec. Cent. Tap to outside end | T3 | 648. |
| | Audio Input Trans. Sec. Cent. Tap to inside end | T3 | 588. |
| P-5187 | Oscillator Coil, Grid Winding | T4 | 4.1 |
| | Oscillator Coil, Plate Winding | T4 | 10.4 |
| P-5172 | Double Filament Reactor Assem. | L1 | .61 |
| | Double Filament Reactor Assem. | L2 | .61 |
| P-5189 | Single Filament Reactor Assem. | L3 | .61 |
| P-5188 | 2nd I.F. Reactor Coil | L4 | 52.1 |
| P-2124 | 6" Magnetic Speaker, Center Tap to outside end | | 272. |
| | 6" Magnetic Speaker, Center Tap to inside end | | 225. |
| P-2125 | 8" Magnetic Speaker (same as P-2124) | | |

## MISCELLANEOUS

| Part No. | ITEM |
|---|---|
| P-2131 | No. 32 Socket |
| P-1645 | No. 34 Socket |
| P-1644 | No. 30 Socket |
| P-1833 | No. 19 Socket |
| P-1640 | Speaker Socket |
| P-20406-A | Tube Shield for 34 and 32 Tubes |
| P-20786 | Tube Shield Base |
| P-50586-D | Audio Input Transformer T3 |
| P-5168 | Double Tuned Ant. Trans. Assem. Comp. with resistors and condensers T1 less can |
| P-40432 | Can for above Assem. |
| P-5199 | 1st I.F. Coil and Can Assem. T2 |
| P-5187 | Oscillator Coil and Can Assem. T4 |
| P-5188 | 2nd I.F. Coil and Can Assem. L4 |
| P-5172 | Double Filament Reactor L1, L2 |
| P-5189 | Single Filament Reactor L3 |
| P-30342-A | Grid Cap Only |
| P-2060 | Knob, plain |
| P-2122 | Knob, Arrow Indicator |
| P-1441-A | Double Insulated Terminal Strip |
| P-1786 | Five Lug Terminal Strip |
| P-1831 | On-Off Switch |
| P-20711 | Gang Condenser Shield |
| P-10272 | Rubber Chassis Cushions |
| P-70703 | Antenna and Ground Wire |
| P-70749 | "B" Battery Wire Assem. |
| P-70771 | "A" Battery Wire Assem. |
| P-70772 | "C" Battery Wire Assem. |
| P-2124 | Speaker 6" |
| P-2125 | Speaker 8" |

## RESISTORS

| Part No. | Code | Resistance | Wattage | Type |
|---|---|---|---|---|
| P-A94505 | R1 | 5 Megohm | 0.2 | Carbon |
| P-A94105 | R2 | 1 Megohm | 0.2 | Carbon |
| P-A94205 | R3 | 2 Megohm | 0.2 | Carbon |
| P-B94104 | R4 | 100,000 Ohm | 0.5 | Carbon |
| P-B94403 | R5 | 40,000 Ohm | 0.5 | Carbon |
| P-A95105 | R6 | 1 Megohm | 0.2 | Carbon |
| P-96001 | R7<br>R8 | 3,000 Ohm<br>60,000 Ohm | | Volume Cont |
| P-A94901ww | R9 | 900 Ohm | 0.2 | Wire Wound |
| P-A94652 | R10 | 6,500 Ohm | 0.2 | Carbon |
| *P-A94106 | R1 | 10 Megohm | 0.2 | Carbon |
| *P-A94205 | R2 | 2 Megohm | 0.2 | Carbon |

*These resistors were used on first models.

## CONDENSERS

| Part No. | Code | Capacity | Voltage | Type |
|---|---|---|---|---|
| P-81812 | C1 | 200 mmf | | Wire—Part of Ant. Assem. |
| P-81801 | C2 | 35 mmf | | Wire—Part of Ant. Assem. |
| P-80862 | C3 | 0.05 mf | 200V | Tubular |
| P-80862 | C4 | 0.05 mf | 200V | Tubular |
| P-80862 | C5 | 0.05 mf | 200V | Tubular |
| P-81806 | C6 | 70 mmf | | Wire |
| P-81804 | C7 | 45 mmf | | Wire |
| P-80862 | C8 | 0.05 mf | 200V | Tubular |
| P-1685 | C9 | 70 + 30 mmf | | I. F. Trimmer |
| P-81800 | C10 | 50 mmf | | Wire |
| P-81045 | C11 | 0.25 mf | 200V | Tubular |
| P-80863 | C12 | 0.004 mf | 600V | Tubular |
| P-80898 | C13 | 0.006 mf | 600V | Tubular |
| P-80969 | C14<br>C15 | 0.01 mf<br>0.01 mf | 400V<br>400V | Dual |
| P-80864 | C16 | 0.1 mf | 200V | Tubular |
| P-80968 | C17 | 4.0 mf | 150V | Electrolytic |
| P-81036 | 3 Gang Condenser | | | |

MODEL 62-120, 62-122
62-126, 62-128
Alignment, Voltage

# MONTGOMERY-WARD & CO.

## Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and at the intermediate frequency, and an output meter are required for indicating the effect of adjustments.

First set the signal generator to a frequency of 175 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector thru a .05 mfd. condenser. The ground lead from the signal generator goes to the ground lead of the receiver. Adjust trimmer condenser C9 on the back panel of the chassis until maximum output is obtained. **A non-metallic screw driver should be used in making this adjustment as the I. F. trimmer is at B+ potential.**

Next set the signal generator for 1730 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Adjust the trimmer of the oscillator section of the 3 gang condenser until maximum output is obtained. The oscillator section is the one with the cut plate rotor.

Then set the signal generator for 1400 K. C. and turn the rotor until maximum output is obtained. Adjust the other two trimmers on the gang condenser for maximum output.

To obtain dial scale calibration tune in an 800 K. C. signal and set the dial pointer at that mark on the dial scale. When calibrated in this manner, the setting will be approximately correct at both ends of the scale.

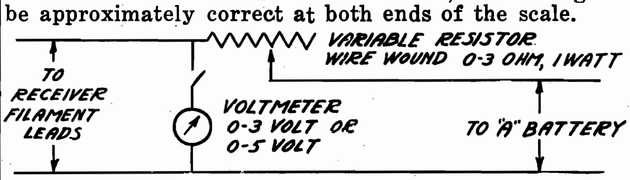



**Fig. 4—Using Voltage Regulator with 3 Volt "A" Battery**

The use of the cut plate type of condenser eliminates the necessity of a 600 K. C. padder and no adjustment at this frequency, therefore, is required.

## Low Volume

In a battery operated receiver the two most common causes of low volume are run down batteries and defective tubes.

Check the "B" and "C" batteries under load with a high resistance voltmeter. See if the filament voltage is low and if so, put in a new "A" unit. A high resistance voltmeter is not necessary for testing the "A" batteries.

The next most common cause of low volume is defective tubes. In any case of low volume, therefore, procure a new set of tubes that have been tested or have been operating satisfactorily in another receiver. Insert these in the chassis one at a time and note any difference in performance.

Altho a short inside antenna is sometimes satisfactory, a good outside antenna 100 to 150 ft. in length is recommended. If the antenna system is faulty or in a shielded location, the volume may be low on distant or weak stations. This is particularly true if the antenna is in or near a steel building. The antenna and lead-in should be inspected for poor connections and grounds. In a shielded location try a longer antenna in a different location.

Misaligning or mistracking of variable tuning condensers is another possible cause of low volume. Instructions for realigning are contained in this manual. Do not, however, attempt realignment unless other causes of low volume have first been investigated.

Other causes of low volume are defective speaker, and various opens, shorts and grounds in the receiver assembly.

## Voltages

Check the voltages at the sockets to see if correct values are being delivered to the tubes. The antenna and ground should be disconnected and the antenna and ground leads from the set connected together. The volume control should be turned to the right or maximum position.

VOLTAGES AT SOCKETS
**Volume Control at Maximum—Antenna Shorted to Ground**
**B+135 Volts**
**Voltages to Chassis**

| Type of Tube | Function | Across Filament | Plate to Cath. | Screen to Cath. | Grid to Cath. | Normal Plate M. A. |
|---|---|---|---|---|---|---|
| 32 | 1st Det. & Osc. | 2.0 | 135 | 67.5 | 7.5 (1) (2) | 2.5 |
| 34 | I. F. | 2.0 | 135 | 67.5 | 2.5 (3) | 2.8 |
| 34 | 2nd Det. | 2.0 | 50 | 40 (1) | 0 | 1.8 |
| 30 | 1st Audio | 2.0 | 135 | | 9 (4) | 3.0 |
| 19 | Output | 2.0 | 135 | | 6 | 1.8 Total |

(1) With 250,000 ohm meter.
(2) Subject to variation due to oscillatory current.
(3) With 25,000 ohm meter.
(4) As read at "C" battery.

All of the voltage readings as shown in the chart are read with a 1,000 ohm-per-volt meter. As high a range as possible should be used. In general, the higher the resistance of the meter, the more accurate the reading will be.

The voltage chart gives the voltages with all tubes in, the speaker connected and the set in operating condition. These voltages are typical of the sets but will vary slightly with variations in individual receivers, tubes, test equipment used and battery voltages.

## Oscillation and Whistle

Should the set oscillate on being connected up, it may be due to tubes whose characteristics vary considerably from the standard. In case of oscillation, therefore, change the tubes around and try out some new ones.

**See if the receiver is properly grounded and if it is, try out a new ground. See if any of the battery voltages are excessively high.**

The tube shields must all be on and the control grid leads to the top grid connection tubes firmly in place. Otherwise oscillation may result.

An open bypass condenser or open leads to the bypass condensers are a common cause of oscillation. Check the bypass condensers for capacity and the leads to them for continuity of circuit. A quick way to check bypass condensers for opens is to take a good condenser with test leads attached to the terminals and connect the new condenser across the condenser in the chassis. Oscillation may also be caused by poor chassis ground connections and by poor tuning condenser ground contacts. A shorted "A" line choke would, in some instances, result in oscillation.

# MONTGOMERY-WARD & CO.

MODEL 62-124, 62-129
Schematic, Parts
Coil Resistance

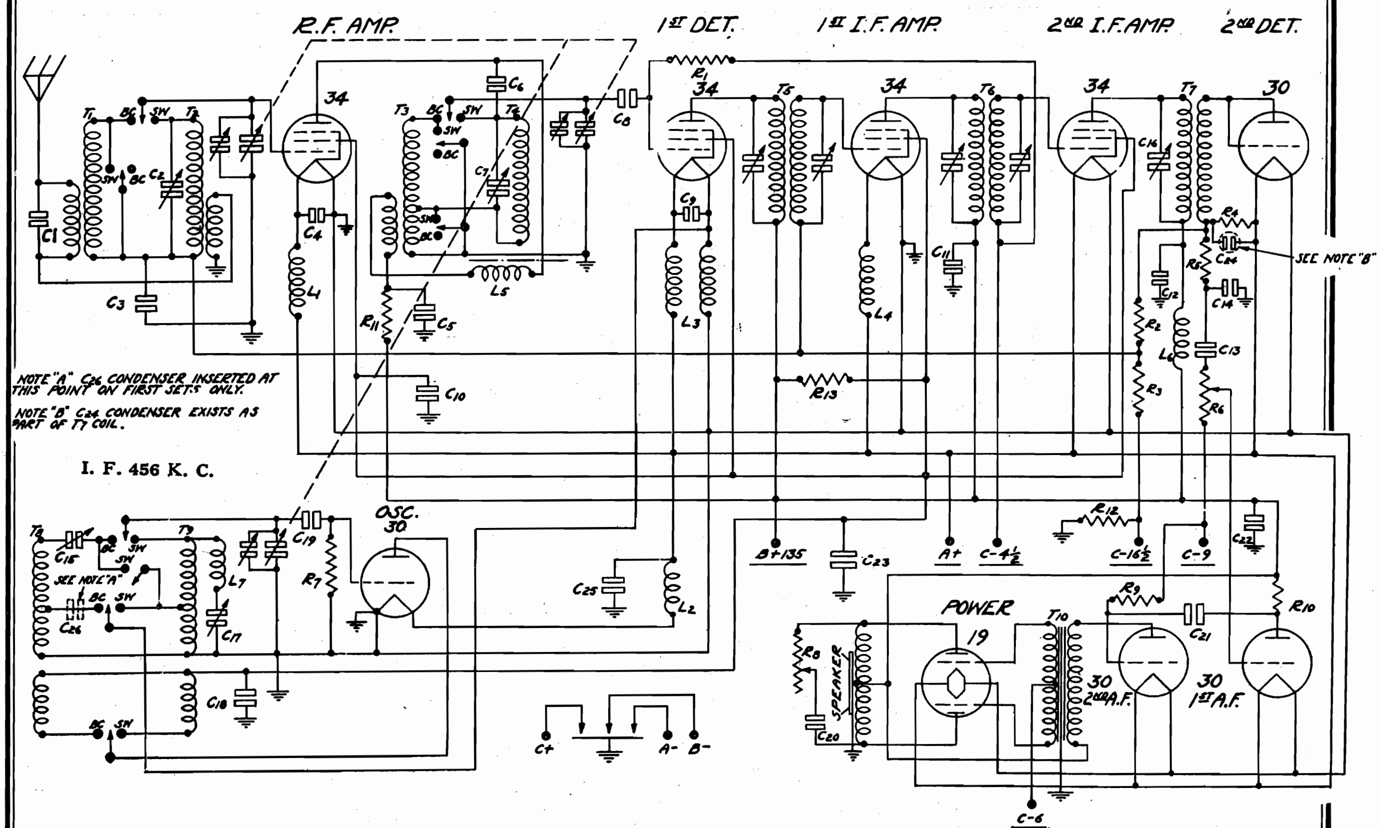



Fig. 1—Schematic Circuit Diagram

## RESISTORS

| Part No. | Code | Resistance | Wattage | Type |
|---|---|---|---|---|
| P-A95305 | R1 | 3 Megohm | .2 | Carbon |
| P-A95305 | R2 | 3 Megohm | .2 | Carbon |
| P-A94805 | R3 | 8 Megohm | .2 | Carbon |
| P-A94304 | R4 | 300,000 Ohm | .2 | Carbon |
| P-A95104 | R5 | 100,000 Ohm | .2 | Carbon |
| P- 96016 | R6 | 2 Megohm | | Volume Control |
| P-A94104 | R7 | 100,000 Ohm | .2 | Carbon |
| P- 97013 | R8 | 45,000 Ohm | | Tone Control |
| P-A94105 | R9 | 1 Megohm | .2 | Carbon |
| P-A94104 | R10 | 100,000 Ohm | .2 | Carbon |
| P-A95102 | R11 | 1,000 Ohm | .2 | Carbon |
| P-A95158 | R12 | 15,000 Ohm | .2 | Carbon |
| P-B94652 | R13 | 6,500 Ohm | .2 | Carbon |
| *P- 97011 | | 150,000 Ohm | | Tone Control |
| *P-A95603 | | 60,000 Ohm | .2 | Carbon |

* These parts were used on first models only—see article on "Changes in Early Models.

## CONDENSERS

| Part No. | Code | Capacity | Voltage | Type |
|---|---|---|---|---|
| P-80919 | C1 | 250 mmf. | | Moulded |
| P- 2102 | C2 | 3–40 mmf. | | Trimmer |
| P-81076 | C3 | .05 mf. | 200V | Tubular |
| P-81076 | C4 | .05 mf. | 200V | Tubular |
| P-81076 | C5 | .05 mf. | 200V | Tubular |
| P-81094 | C6 | .006 mf. | 600V | Tubular |
| P- 2102 | C7 | 3–40 mmf. | | Trimmer |
| P-81800 | C8 | 50 mmf. | | Wire Capacitor |
| P-81076 | C9 | .05 mf. | 200V | Tubular |
| P-81102 | C10 | .25 mf. | 140V | Tubular |
| P-81110 | C11 | .25 mf. | 200V | Tubular |
| P-81076 | C12 | .05 mf. | 200V | Tubular |
| P-81076 | C13 | .05 mf. | 200V | Tubular |
| P-80977 | C14 | 100 mmf. | | Wire Capacitor |
| P- 2112 | C15 | 300–500 mmf. | | Trimmer |
| P- 1685 | C16 | 40—100 mmf. | | Trimmer |
| P- 1685 | C17 | 40—100 mmf. | | Trimmer |
| P-81076 | C18 | .05 mf. | 200V | Tubular |
| P-81005 | C19 | 35 mmf. | | Moulded |
| P-81071 | C20 | .05 mf. | 400V | Tubular |
| P-81094 | C21 | .006 mf. | 600V | Tubular |
| P-82001 | C22 | 4.0 mf. | 150V | Electrolytic |
| | C23 | 8.0 mf. | 150V | |
| | C24 | Part of 3rd I. F. Coil Assembly T7 | | |
| P-81102 | C25 | .25 mf. | 140V | Tubular |
| *P-81076 | C26 | .05 mf. | 200V | Tubular |
| P-81027 | 3 Gang Condenser | | | |

# D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

| Part No. | Item | Code | D. C. Resistance in Ohms |
|---|---|---|---|
| P-5176 | B. C. Antenna R. F. Transformer, Primary | T1 | 28.0 |
| | B. C. Antenna R. F. Transformer, Secondary | T1 | 5.0 |
| | S. W. Antenna R. F. Transformer, Primary | T2 | 0.25 |
| | S. W. Antenna R. F. Transformer, Secondary | T2 | Small |
| P-5236 | B. C. Interstage R. F. Transformer, Primary | T3 | 5.25 |
| | B. C. Interstage R. F. Transformer, Secondary | T3 | 5.0 |
| | S. W. Interstage R. F. Transformer, Secondary | T4 | Small |
| P-5224 | B. C. Oscillator Grid Coil | T8 | 2.4 |
| | B. C. Oscillator Plate Coil | T8 | 3.5 |
| | S. W. Oscillator Grid Coil | T9 | 1.0 |
| | S. W. Oscillator Plate Coil | T9 | Small |
| P-5179-A | 1st I. F. Coil Primary | T5 | 12.0 |
| | 1st I. F. Coil Secondary | T5 | 13.0 |
| P-5185 | 2nd I. F. Coil Primary | T6 | 5.5 |
| | 2nd I. F. Coil Secondary | T6 | 5.5 |
| P-5186 | 3rd I. F. Coil Primary | T7 | 12.0 |
| | 3rd I. F. Coil Secondary | T7 | 30.0 |
| P-50586-B | Audio Transformer Primary | T10 | 910.0 |
| | Audio Transformer Secondary, Center tap to outside | T10 | 590.0 |
| | Audio Transformer Secondary, Center tap to inside | T10 | 530.0 |
| P-5189 | Filament Reactor | L1 | 0.65 |
| P-5189 | Filament Reactor | L2 | 0.65 |
| P-5235 | Double Filament Reactor (each) | L3 | 0.3 |
| P-5189 | Filament Reactor | L4 | 0.65 |
| P-5228 | S. W. R. F. Interstage Plate Reactor | L5 | 28.0 |
| P-5227 | I. F. Isolating Reactor | L6 | 1.6 |
| P-2179 | Speaker Voice Coil, Center tap to outside | | 300.0 |
| | Speaker Voice Coil, Center top to inside | | 250.0 |

# MONTGOMERY-WARD & CO.

## Condenser Alignment

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and re-alignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 456 K. C. and accurately calibrated signals over the broadcast and short wave bands, 530-1730 K. C. and 5.8-16.0 M. C., is required. An output indicating meter is also necessary. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screw driver for the adjustments. The complete procedure is as follows:

### Intermediate Frequency Adjustment

Set the signal generator for 456 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector through a .05 mfd. condenser. Turn the tuning

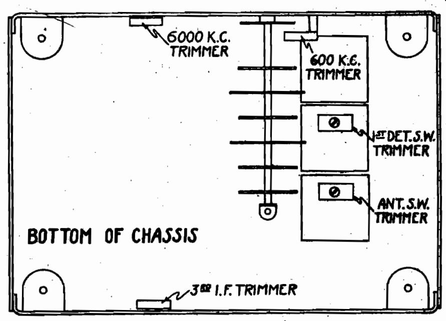



**Fig. 3—Trimmer Locations**

condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. The volume control should be at the maximum position. Reduce the signal so that A. V. C. action is not obtained.

Then adjust the five I. F. trimmer condensers until maximum output is obtained. The adjusting screws for the 1st and 2nd trimmer condensers are reached from the top of the chassis and are in the round I. F. cans—See Fig. 2. The openings of these trimmer condensers are covered over by small cover plates which are held in position by screws. Loosen these screws until the cover plates can be swung around. **CAUTION—Use an insulated screwdriver for adjusting trimmers to prevent short circuiting to ground.** In the 3rd I. F. coil, only the primary has a variable trimmer condenser. This condenser is mounted on the back panel of the chassis as shown in Fig. 3 and the adjustment screw is reached through a hole in the back panel.

### Broadcast Band Adjustment

The broadcast short wave switch should be in the broad-

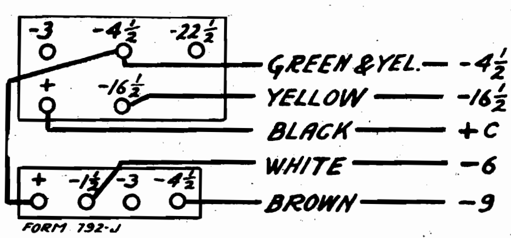



**Fig. 4—Optional 'C" Battery Connections**

cast position. Set the signal generator for 1730 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Reduce the signal so that A. V. C. action is not obtained. Adjust the oscillator broadcast trimmer until maximum output is obtained. This trimmer is on the tuning condenser and its location is shown in Fig. 2.

Then set the signal generator for 1500 K. C. Turn the rotor until maximum output is obtained. Loosen the set screw in the pointer hub and set the pointer at the 1500 K. C. mark on the broadcast band scale. Retighten the hub set screw. Then adjust the antenna and 1st detector broadcast trimmers until maximum output is obtained.

Next set the signal generator for 600 K. C. and adjust the 600 K. C. trimmer. The adjusting screw is reached through a hole in the front panel of the chassis as shown in Fig. 3. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting at the same time adjusting the 600 K. C. trimmer screw until the highest output is obtained.

### Short Wave Band Adjustment

CAUTION—After the broadcast band alignment as described above has been made, do not change the adjust-

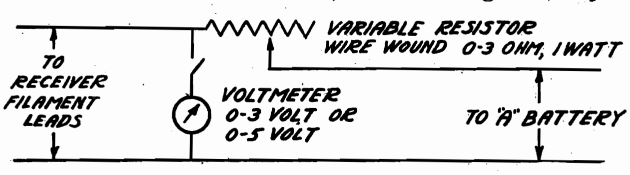



**Fig. 5—Using Voltage Regulator with a 3 Volt "A" Battery**

ment of any of the broadcast band trimmers.

In aligning the short wave band of the receiver, it will be noted that the signal will be heard with the signal generator set at two points 912 K. C. apart. That is, if the receiver is tuned to 15,000 K. C. a signal will be heard when the signal generator is set at 15,000 K. C. and again at approximately 15,912 K. C. This is due to image reception or the fact that a 456 K. C. beat is obtained when the signal is 456 K. C. lower than the receiver oscillator and also when the signal is 456 K. C. higher than the receiver oscillator. Care should be taken to see that the receiver is tracked with the signal generator adjusted to the lower of the two frequencies at which a signal is heard, in order that the oscillator in the receiver will be 456 K. C. higher in frequency than the signal.

Turn the broadcast short wave switch to the short wave position. As explained above, the volume control should be at the maximum position and the signal should be reduced to prevent A. V. C. action.

Next set the signal generator for 15,000 K. C. Turn the rotor until maximum output is obtained. Then adjust the antenna and 1st detector short wave trimmers for maximum output.

Next set the signal generator for 6000 K. C. and adjust the 6000 K. C. trimmer. This condenser is mounted on the front panel of the chassis as shown in Fig. 3 and is reached through a hole in the front panel. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 6000 K. C. trimmer screw until the highest output is obtained.

## Changes in Early Models

The condenser, C26 was used only on the early models of this receiver. Another change was in the tone control circuit. In the early models R8 was a 150,000 ohm resistor paralleled by a 60,000 ohm resistor. However, in the later models this arrangement was replaced by a single 45,000 ohm resistor to provide greater sensitivity in tone control.

MONTGOMERY-WARD & CO.

**MODEL 62-124, 62-129**
**Voltage, Socket, Drive Cord Data**

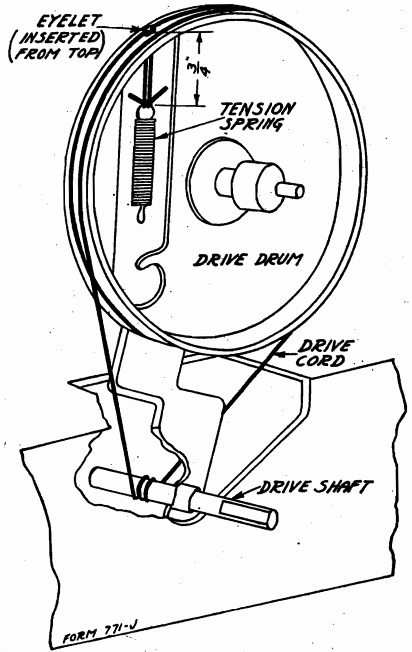



Fig. 6—Drive Cord Replacement

## Voltages at Sockets

**Antenna Shorted to Ground**
**Batteries Up to Rated Voltages. See Fig. 1**
**Voltages Read from Negative Filament Terminal**

| Type of Tube | Function | Across Fila-ment | Plate to Gnd. | Control Grid to Ground | Screen to Gnd. | Normal Plate M. A. |
|---|---|---|---|---|---|---|
| 34 | R. F. | 2.0 | 135 | 4.5(1) | 80 | 2.8 |
| 34 | 1st Det. | 2.0 | 135 | 4.5(1) | 80 | 3.0 |
| 30 | Osc. | 2.0 | 80 | | | 2.8 |
| 34 | 1st I. F. | 2.0 | 135 | 4.5(1) | 80 | 2.8 |
| 34 | 2nd I. F. | 2.0 | 135 | 4.5 | 80 | 2.8 |
| 30 | 2nd Det. | 2.0 | | | | |
| 30 | 1st Audio | 2.0 | 95 | 9.0(2) | | 0.35 |
| 30 | 2nd Audio | 2.0 | 135 | 9.0(3) | | 3.0 |
| 19 | Output | 2.0 | 135 | 6.0 | | 1.3 |

(1) Computed figure—cannot be read because of high resistance cir.
(2) Volume Control at minimum.
(3) As read at battery.

## Replacing Drive Cord

Lift off the pilot light assembly.

Detach the large pointer by removing the center screw.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis.

Then lay the complete dial assembly face downward in front of the chassis. It is not necessary to remove the volume control and tone control collars which hold the indicator cords of these two controls in position.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 6.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 6. Insert one end of the drive cord from the outside through the hole in the eyelet in the drive drum.

Tie the end of the cord which has been inserted in the hole to one end of the tension spring.

Wrap the cord in a clockwise direction (facing front of chassis) around the drive drum approximately one-half turn.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one-half times around the drive shaft as shown in Fig. 6.

Then bring this cord up from the drive shaft and wrap it around the drive drum approximately one and one fifth turns in a clockwise direction until it is up to the hole in this drum as illustrated.

Insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring, when hanging free, should be approximately ¾" from the flange of the drum as shown in Fig. 6. Cut off the surplus length of cord after it is knotted.

Then secure the other end of the tension spring over the spur on the drive drum.

Replace the dial assembly and pointer.

Replace the pilot light assembly.

## Batteries

To prolong "B" battery life instruct the customer to keep the volume down as high volume increases the "B" drain considerably. The average "B" drain is 23.5 milliamperes. The reception of weak signals also increases the "B" drain.

This receiver is designed to operate from a 2 volt

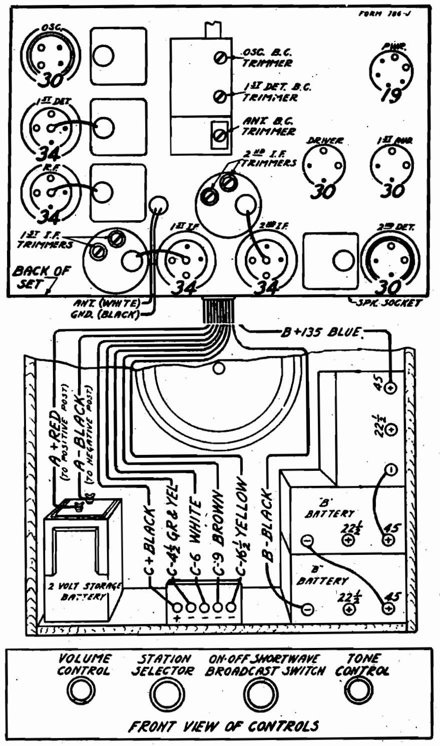



Fig. 2—Arrangement of Tubes, Batteries and Controls

storage cell but can be operated from a 3 volt dry cell used in conjunction with the voltage regulator shown in Fig. 5. This device consists of a rheostat in series with the supply, for controlling the voltage and a voltmeter for measuring it.

The voltmeter should not indicate more than 2 volts when the above arrangement is used, an optimum setting being 1.9 to 2.0 volts.

For the grid bias a special 22½ volt "C" battery with 4½, 6, 9 and 16½ volt taps (Fig. 2) may be used. If not available, a standard 4½ volt "C" and a standard 22½ volt "C" battery can be connected as shown in Fig. 4.

MODEL 62-132, 62-137
Schematic, Parts

# MONTGOMERY-WARD & CO.

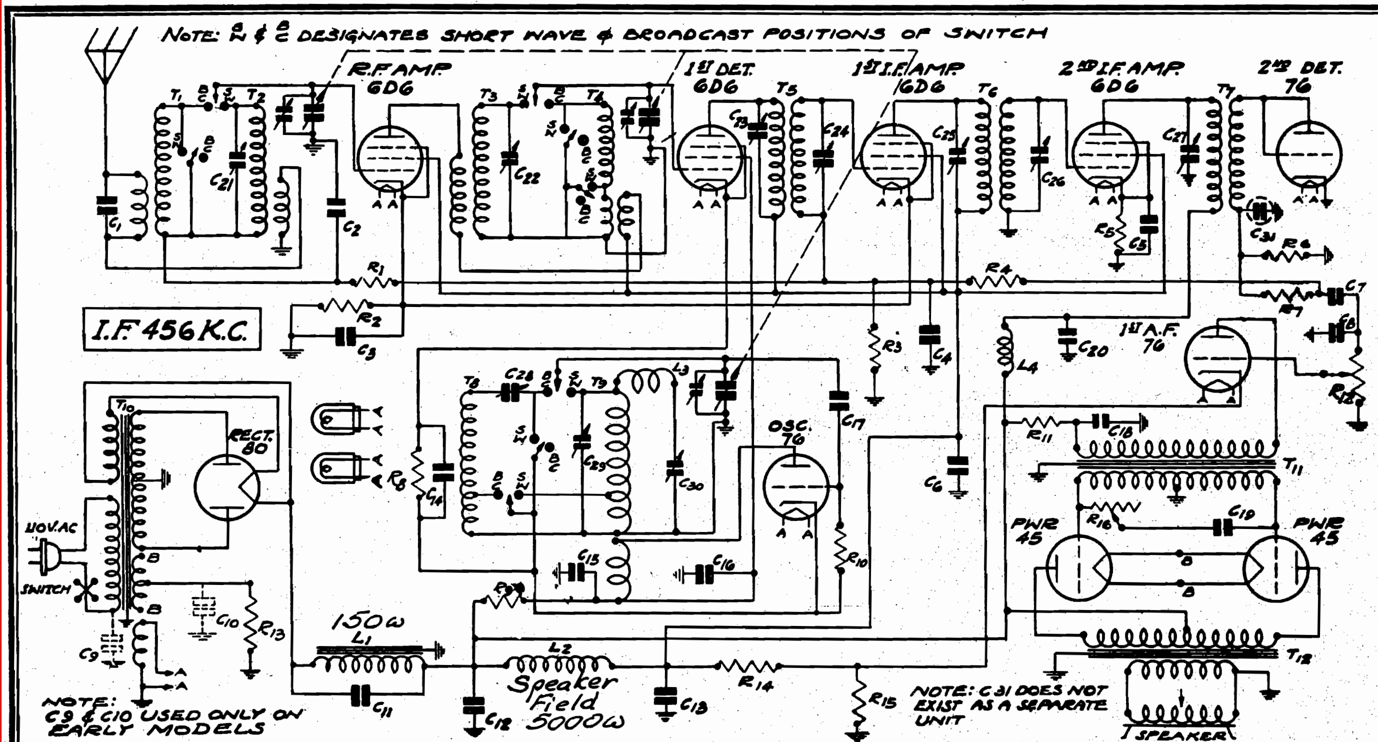



Fig. 1—Schematic Circuit Diagram

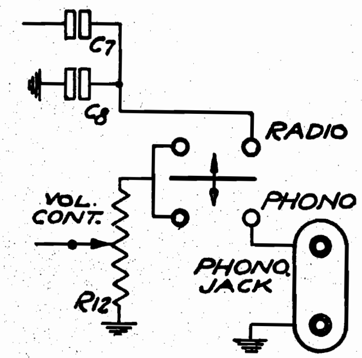



Fig. 5—Phonograph Connections

| Part No. | Code | Capacity | Volts | Type |
|---|---|---|---|---|
| P-80919 | C1 | 250 mmfd. | | Moulded |
| P-80862 | C2 | .05 mfd. | 200V. | Tubular |
| P-80888 | C3 | .25 mfd. | 200V. | Tubular |
| P-80862 | C4 | .05 mfd. | 200V. | Tubular |
| P-80862 | C5 | .05 mfd. | 200V. | Tubular |
| P-80888 | C6 | .25 mfd. | 200V. | Tubular |
| P-80862 | C7 | .05 mfd. | 200V. | Tubular |
| P-81005 | C8 | 35 mmfd. | 600V. | Moulded |
| *P-80997 | C9 | .01 mfd. | 600V. | Condenser in metal can |
| *P-80888 | C10 | .25 mfd. | 200V. | Tubular |
| P-80985 | C11 | .15 mfd. | 220V. | Tubular |
| P-81039 | C12 | 16.0 mfd. | 400V. | Wet Electrolytic |
| P-81018 | C13 | 6.0 mfd. | 150V. | Dry Electrolytic |
| | C16 | 2.0 mfd. | 300V. | |
| | C18 | 2.0 mfd. | 300V. | |
| P-80862 | C14 | .05 mfd. | 200V. | Tubular |
| P-80864 | C15 | .10 mfd. | 200V. | Tubular |
| P-81005 | C17 | 35 mmfd. | 600V. | Moulded |
| P-80863 | C19 | .004 mfd. | 600V. | Tubular |
| P-81041 | C20 | .10 mfd. | 400V. | Tubular |
| P-2102 | C21 | 3-40 mmfd. | | Ant. S.W. Trimmer |
| P-2102 | C22 | 3-40 mmfd. | | 1st Det. S.W. Trimmer |
| P-2103 | C23 | 200± 50 mmfd. | | Dual Trimmer |
| | C24 | 200± 50 mmfd. | | Part of I.F. Assem. |
| P-2103 | C25 | 200± 50 mmfd. | | Dual Trimmer |
| | C26 | 200± 50 mmfd. | | Part of I.F. Assem. |
| P-1685 | C27 | 70± 30 mmfd. | | 3rd I.F. Coil Trimmer |
| P-2112 | C28 | 300-500 mmfd. | | 600 K.C. Trimmer |
| P-2102 | C29 | 3-40 mmfd. | | Osc. S.W. Trimmer |
| P-1685 | C30 | 70± 30 mmfd. | | 6000 K.C. Trimmer |
| P-81027 | | Three Gang Condenser | | |

## RESISTORS

| Part No. | Code | Resistance | Watts | Type |
|---|---|---|---|---|
| P-A95204 | R1 | 200,000 ohm | .2 | Carbon |
| P-98023 | R2 | 150 ohm | .5 | Flex. Wire Wound |
| P-A95105 | R3 | 1 megohm | .2 | Carbon |
| P-A95205 | R4 | 2 megohm | .2 | Carbon |
| P-98024 | R5 | 400 ohm | .5 | Flex. Wire Wound |
| P-A94304 | R6 | 300,000 ohm | .2 | Carbon |
| P-A95104 | R7 | 100,000 ohm | .2 | Carbon |
| P-A94252 | R8 | 2,500 ohm | .2 | Carbon |
| P-98022 | R9 | 30,000 ohm | 2.0 | Carbon |
| P-A95104 | R10 | 100,000 ohm | .2 | Carbon |
| P-C94303 | R11 | 30,000 ohm | 1.0 | Carbon |
| P-96005 | R12 | 2 megohm | | Volume Control and Switch |
| P-98006 | R13 | 780 ohm | 3.0 | Armored Wire Wound |
| | R14 | 6000 ohm | 1.4 | |
| | R15 | 460 ohm | .2 | |
| P-97003 | R16 | 3 megohm | | Tone Control |

*Used in Early Models only.

| Part No. | Item |
|---|---|
| P-50638 | Power Transformer 115V. 60 cycles T 10 |
| P-50639 | Power Transformer 115V. 25 cycles T 10 |
| P-50640 | Power Transformer 115-230V. 40-60 cycles T 10 |
| P-50641 | Power Choke L 1 |
| P-50642 | Audio Output Transformer T 12 |
| P-50643 | Audio Input Transformer T 11 |
| P-5176 | Antenna R.F. Trans. T 1 and T 2 less can |
| P-5177 | Interstage R.F. Trans. T3 and T4 less can |
| P-5178 | Oscillator Coil Assembly T8 and T9 less can |
| P-5186 | 3rd I. F. Coil T7 less can |
| P-40433 | Cans for the above coils |
| P-5184 | 1st I.F. Coil & Can Assembly T5 |
| P-5185 | 2nd I.F. Coil & Can Assembly T6 |
| P-5190 | H. F. Oscillator Tracking Coil L3 |
| P-5151 | I.F. Plate Isolating Reactor L4 |
| P-70702 | A.C. Cord & Plug |
| P-1421 | Single Insulated Terminal Strip |
| P-1441 | Double Insulated Terminal Strip |
| P-2060 | Small Knob |
| P-2062 | Large Knob |
| P-30342A | Grid Cap only |
| P-30456 | Small Pointer |
| P-20912 | Large Double End Pointer |
| P-2012 | Pilot Light Bulb |
| P-10272 | Rubber Mounting Feet |
| P-10320 | Glass Crystal |
| P-20875 | Crystal Retaining Ring |
| P-1968 | 10" Dynamic Speaker Console L2 |
| P-2101 | Three Position Band Change Switch |
| P-20905 | Condenser Shield |
| | 8" Black Drive Cord (V.C. or T.C. Ind.) |
| | 29" Black Drive Cord (Cond. Drive) |
| P-2126 | Pilot Lamp Socket & Clip Assembly |
| P-20911 | Bottom Shield |
| P-1011A | Phono-Radio Switch |
| P-1193 | Phono Jack |

MONTGOMERY-WARD & CO.

## Condenser Alignment

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and re-alignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 456 K. C. and accurately calibrated signals over the broadcast and short wave bands, 530-1740 K. C. and 5.8-18.3 M. C., is required. An output indicating meter is also necessary. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screw driver for the adjustments. The complete procedure is as follows:

### Intermediate Frequency Adjustment

Set the signal generator for 456 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. The volume control should be at the maximum position. Reduce the signal so that A. V. C. action is not obtained.

Then adjust the five I. F. trimmer condensers until maximum output is obtained. The adjusting screws for the 1st and 2nd trimmer condensers are reached from the top of the chassis and are in the round I. F. cans - See Fig. 2. The openings to these trimmer condensers are covered over by small cover plates which are held in position by screws. Loosen these screws until the cover plates can be swung around. **CAUTION - Use an insulated screwdriver for adjusting trimmers to prevent short circuiting to ground.** In the 3rd I. F. coil, only the primary has a variable trimmer condenser. This condenser is mounted on the back panel of the chassis as shown in Fig. 2 and the adjustment screw is reached through a hole in the back panel.

### Broadcast Band Adjustment

The broadcast short wave switch should be in the broadcast position. Set the signal generator for 1740 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Reduce the signal so that A. V. C. action is not obtained. Adjust the oscillator broadcast trimmer until maximum output is obtained. This trimmer is on the tuning condenser and its location is shown in Fig. 2.

Then set the signal generator for 1500 K. C. Turn the rotor until maximum output is obtained. Loosen the set screw in the pointer hub and set the pointer at the 1500 K. C. mark on the broadcast band scale. Retighten the hub set screw. Then adjust the antenna and 1st detector broadcast trimmers until maximum output is obtained.

Next set the signal generator for 600 K. C. and adjust the 600 K. C. trimmer. The adjusting screw is reached through a hole in the front panel of the chassis as shown in Fig. 2. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting at the same time adjusting the 600 K. C. trimmer screw until the highest output is obtained.

### Short Wave Band Adjustment

CAUTION—After the broadcast band alignment as described above has been made, do not change the adjustment of any of the broadcast band trimmers.

In aligning the short wave band of the receiver, it will be noted that the signal will be heard with the signal generator set at two points 912 K. C. apart. That is, if the receiver is tuned to 15,000 K. C. a signal will be heard when the signal generator is set at 15,000 K. C. and again at approximately 15,912 K. C. This is due to image reception or the fact that a 456 K. C. beat is obtained when the signal is 456 K. C. lower than the receiver oscillator and also when the signal is 456 K. C. higher than the receiver oscillator. Care should be taken to see that the receiver is tracked with the signal generator adjusted to the lower of the two frequencies at which a signal is heard, in order that the oscillator in the receiver will be 456 K.C. higher in frequency than the signal.

Turn the broadcast short wave switch to the short wave position. Turn the rotor to the full open position. As explained above, the volume control should be at the maximum position and the signal should be reduced to prevent A. V. C. action. Set the signal generator for 18,300 K. C. Then adjust the oscillator short wave trimmer for maximum output. This trimmer is reached from under the chassis and its position is shown in Fig. 2. If a maximum output peak cannot be reached, it may be due to the fact that the antenna and 1st detector short wave trimmers are screwed down too far. Back off these two trimmer screws two or three turns and then adjust the oscillator short wave trimmer for maximum output.

Next set the signal generator for 15,000 K. C. Turn the rotor until maximum output is obtained. Then adjust the antenna and 1st detector short wave trimmers for maximum output.

Next set the signal generator for 6000 K. C. and adjust the 6000 K. C. trimmer. This condenser is mounted on the front panel of the chassis as shown in Fig. 2 and is reached through a hole in the front panel. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 6000 K. C. trimmer screw until the highest output is obtained.

## Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty-cycle, receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

A 115-230 Volt, 40-60 cycle Power Transformer is also available for this model.

## Phono Connections

Phonograph connections can be made as shown in Fig. 5. A single pole double throw switch and double pin jack are required. These should be mounted on the back panel of the chassis close to the 2nd detector. The connections are made by opening the diode circuit at the point shown in the illustration and completing the connections to the switch and pin jacks as indicated. A high impedance pick-up should be used. If a low impedance pick-up is used a step-up transformer will be required for sufficient volume. The volume control of the set will regulate the phono volume.

## Voltages at Sockets

LINE VOLTAGE — 115

ANTENNA SHORTED TO GROUND

| Type of Tube | Function | Across Fila. or Heater | Plate to Cath. | Screen to Cath. | Cath. to Ground | Normal Plate M. A. |
|---|---|---|---|---|---|---|
| 6D6 | R. F. | 6.3 | 95 | 95 | 2.8 | 7.0 |
| 6D6 | 1st Det. | 6.3 | 88 | 95 | 9.2 | 2.9 |
| 76 | Osc. | 6.3 | 110 | — | — | 5.0 |
| 6D6 | 1st I. F. | 6.3 | 95 | 95 | 2.8 | 7.0 |
| 6D6 | 2nd I. F. | 6.3 | 300 | 95 | 3.3 | 6.0 |
| 76 | 2nd Det. | 6.3 | — | — | — | — |
| 76 | 1st Audio | 6.3 | 160 | — | 9.0 | 4.0 |
| 45 | Output | 2.5 | 245 | — | 48.0 | 30.0 |
| 80 | Rectifier | 5.0 | 890 V. A. C. pl. to pl. | | | 58.0 per plate |

**MODEL 62-132, 62-137**
**Socket, Trimmers**
**Drive Cord Data**

# MONTGOMERY-WARD & CO.

## Replacing Drive Cord

Remove chassis from cabinet.

Take off the pilot light assembly by lifting off the two sockets and spring clips.

Detach the large pointer by removing the screw at the center of the dial.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis.

Then lay the complete dial assembly face downward in front of the chassis. It is not necessary to remove the volume control and tone control collars which hold the indicator cords of these two controls in position.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 4.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 4. Insert one end of the drive cord from the outside through the hole in the eyelet in the drive drum.

Tie the end of the cord which has been inserted in the hole to one end of the tension spring.

Wrap the cord in a clockwise direction (facing front of chassis) around the drive drum approximately one-half turn.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one-half times around the drive shaft as shown in Fig. 4.

Then bring this cord up from the drive shaft and wrap it around the drive drum approximately one and one fifth

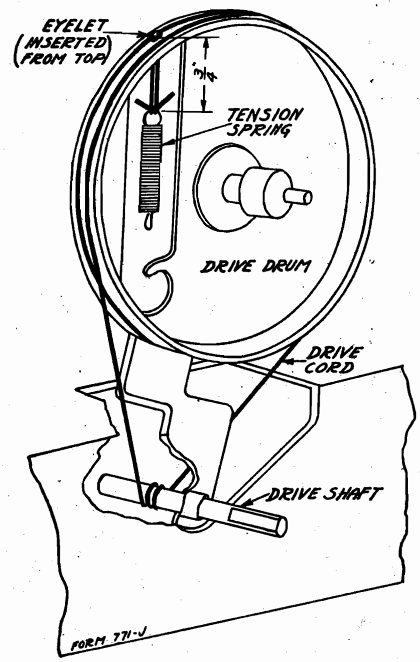



Fig. 4—Drive Cord Replacement

turns in a clockwise direction until it is up to the hole in this drum as illustrated.

Insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring, when hanging free, should be approximately ¾" from the flange of the drum as shown in Fig. 4. Cut off the surplus length of cord after it is knotted.

Then secure the other end of the tension spring over the spur on the drive drum.

Replace the dial assembly and pointer.

Replace the pilot light assembly after which the chassis may be reinstalled in the cabinet.

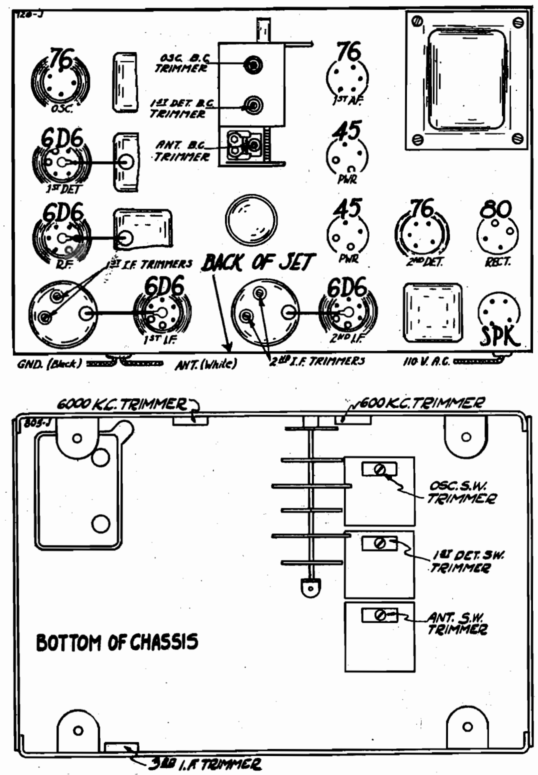



Fig. 2—Tube Arrangement & Location of Trimmers

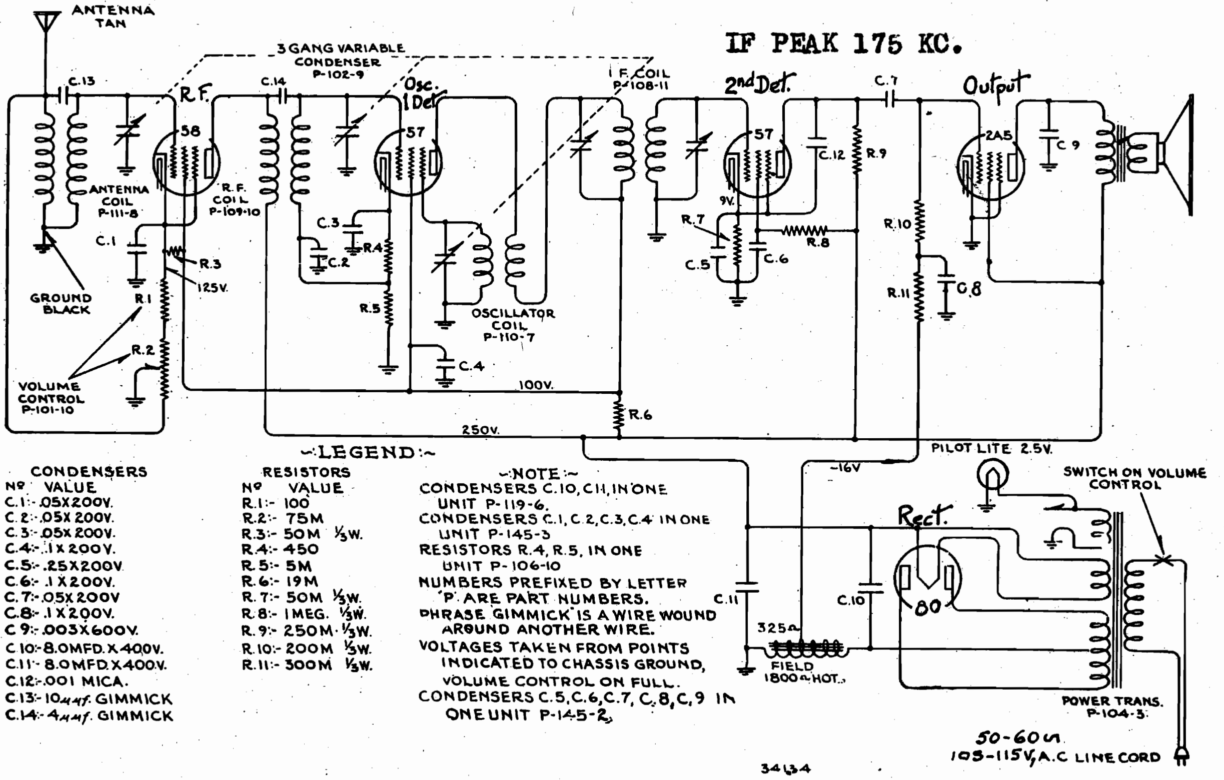
## Change in Early Models

In the early models of this receiver the side of the trimmer condenser C27 which is shown in Fig. 1 as connected to ground was connected to the B+ side of the 3rd I. F. coil primary.

# MONTGOMERY-WARD & CO.

MODEL 62-140, 62-140X
62-148, 62-148X
Schematic, Socket

IF PEAK 175 KC.




~LEGEND~

**CONDENSERS**

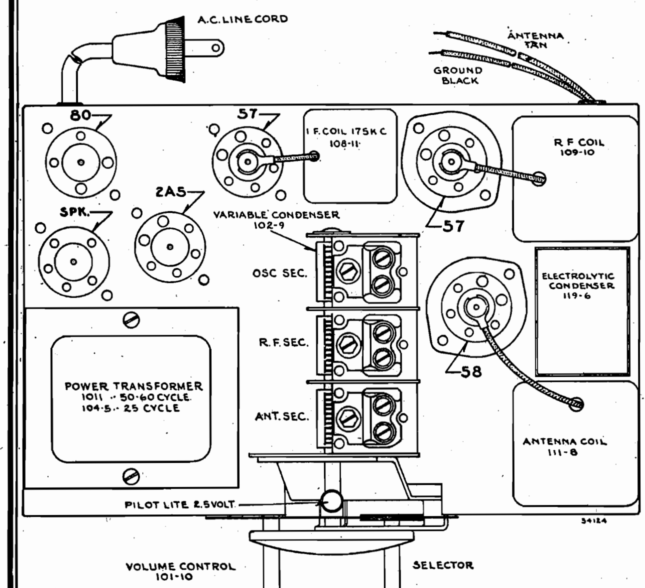
| Nº | VALUE |
|---|---|
| C.1 | .05X200V. |
| C.2 | .05X 200V. |
| C.3 | .05X 200V. |
| C.4 | .1 X 200V. |
| C.5 | .25X200V. |
| C.6 | .1 X 200V. |
| C.7 | .05X 200V |
| C.8 | .1 X 200V. |
| C.9 | .003X600V. |
| C.10 | 8.0MFD.X400V. |
| C.11 | 8.0MFD.X400V. |
| C.12 | .001 MICA. |
| C.13 | 10μμf. GIMMICK |
| C.14 | 4μμf. GIMMICK |

**RESISTORS**

| Nº | VALUE |
|---|---|
| R.1 | 100 |
| R.2 | 75M |
| R.3 | 50M 1/3W. |
| R.4 | 450 |
| R.5 | 5M |
| R.6 | 19M |
| R.7 | 50M 1/3W. |
| R.8 | 1MEG. 1/3W. |
| R.9 | 250M 1/3W. |
| R.10 | 200M 1/3W. |
| R.11 | 300M 1/3W. |

~NOTE~

CONDENSERS C.10, C.11, IN ONE UNIT P-119-6.
CONDENSERS C.1, C.2, C.3, C.4 IN ONE UNIT P-145-3
RESISTORS R.4, R.5, IN ONE UNIT P-106-10
NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.
PHRASE "GIMMICK" IS A WIRE WOUND AROUND ANOTHER WIRE.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND, VOLUME CONTROL ON FULL.
CONDENSERS C.5, C.6, C.7, C.8, C.9 IN ONE UNIT P-145-2.




## SERVICE SUGGESTIONS:

Make certain of the following: That all tubes are pushed firmly in their proper sockets and that the clips are securely fastened to the caps. That the aerial connection is good and not short-circuited to ground. (Pilot lights illuminate when set is turned on.)

### PILOT LIGHT:

The pilot light used is 2.5 volt Mazda. No. T41-G3½. To replace, remove receptacle clipped to top of the variable condenser.

**Part No. 145-2**

| | | |
|---|---|---|
| Common Black to Brown | —.003 | x 600 Volts |
| Common Black to Green | —.1 | x 200 Volts |
| Common Black to Red | —.1 | x 200 Volts |
| Common Black to Orange | —.25 | x 200 Volts |
| Blue to Blue | —.05 | x 400 Volts |

**Part No. 145-3**

| | | |
|---|---|---|
| Common Black to Brown | —.1 | x 200 Volts |
| Common Black to Green | —.05 | x 200 Volts |
| Common Black to Orange | —.05 | x 200 Volts |
| Common Black to Yellow | —.05 | x 200 Volts |

# Service Notes

Voltages taken from different points of circuit to chassis are measured with volume control full on, using a voltmeter having a resistance of 1000 ohms per volt. These voltages are indicated on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of similar capacity which is known to be in good condition, until the defective unit is located. Part numbers 145-2 and 145-3 are by-pass condenser blocks and consist of the following condensers:

Should any section of either of these blocks fail, it is not necessary to replace the entire condenser. A small tubular condenser may be used to replace the defective section.

Excessive hum, low volume or reduction in all D. C. voltages is usually caused by open or shorted electrolytic filter condensers. Open by-pass condensers cause oscillation and distorted reproduction.

MODEL 62-140, 62-140X
62-148, 62-148X
Alignment, Parts List

MONTGOMERY-WARD & CO.

# 25 Cycle Chassis

The 25 cycle model 62-148X chassis may be used on a power supply of from 105 to 125 volts, 60 cycles, but the 60 cycle model 62-148 must not under any circumstances be operated on 25 cycles.

## Alignment

The set should be thoroughly checked for all other possible causes of trouble, such as defective tubes, condensers, poor installations and low line voltages before any attempt is made at re-alignment.

### Aligning I. F. Transformer

1. With volume control full on, at extreme right of its rotation, and with variable condenser at its maximum capacity position (extreme right of its rotation) make the following adjustments:

(a) Connect an external oscillator adjusted to 175 kilocycles, in series with a .1 mfd. condenser, to the control grid cap of the type 57 tube located between the R. F. coil (part numbers 109-10) and the I. F. transformer (part number 108-11) and chassis.

(b) Adjust trimming condensers of I. F. transformer (part number 108-11) to resonance. See top view of chassis. Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or between the plate and screen terminals of the type 2A5 tube, by means of an adapter. Maximum deflection of the meter indicates resonance. Care must be taken to use only enough signal to give a readily readable output, as excessive input will result in overload and a false resonance point.

NOTE: The two trimmer condensers which tune the primary and secondary of the I. F. transformer are adjusted by set screws accessible from the back of the chassis.

### Aligning R. F. and Oscillator Circuits

1. Connect the external oscillator set at 1720 kilocycle and in series with a 200 Mfd. condenser, between the antenna (tan) and ground (black) leads.

(a) With volume control full on and variable condenser plates in minimum capacity position, plates entirely out of mesh (extreme left of its rotation), adjust trimmer of rear oscillator section of variable condenser to resonance.

(b) Shift external oscillator frequency from 1720 to 1400 kilocycles, pick up signal by rotating variable condenser and peak R. F. (center) and antenna (front) section trimmers of variable condenser to resonance.

(c) Check tracking at 1500, 1200, 1000, 800, 600 and 530 kilocycles by changing external oscillator frequency and rotating variable condenser to pick up signal. Adjust slotted end plates of R. F. (center) and antenna (front) sections to increase output, if necessary. DO NOT BEND OSCILLATOR PLATES.

## Tubes

The tube complement of this chassis is as follows:

1 Type 58 remote cut-off pentode as an R. F. amplifier.
1 Type 57 pentode as an oscillator and first detector.
1 Type 57 pentode as second detector.
1 Type 2A5 pentode output A. F. amplifier.
1 Type 80 high vacuum rectifier.

All resistors are RMA color coded—specify value and/or resistor (per schematic diagram) and model number.

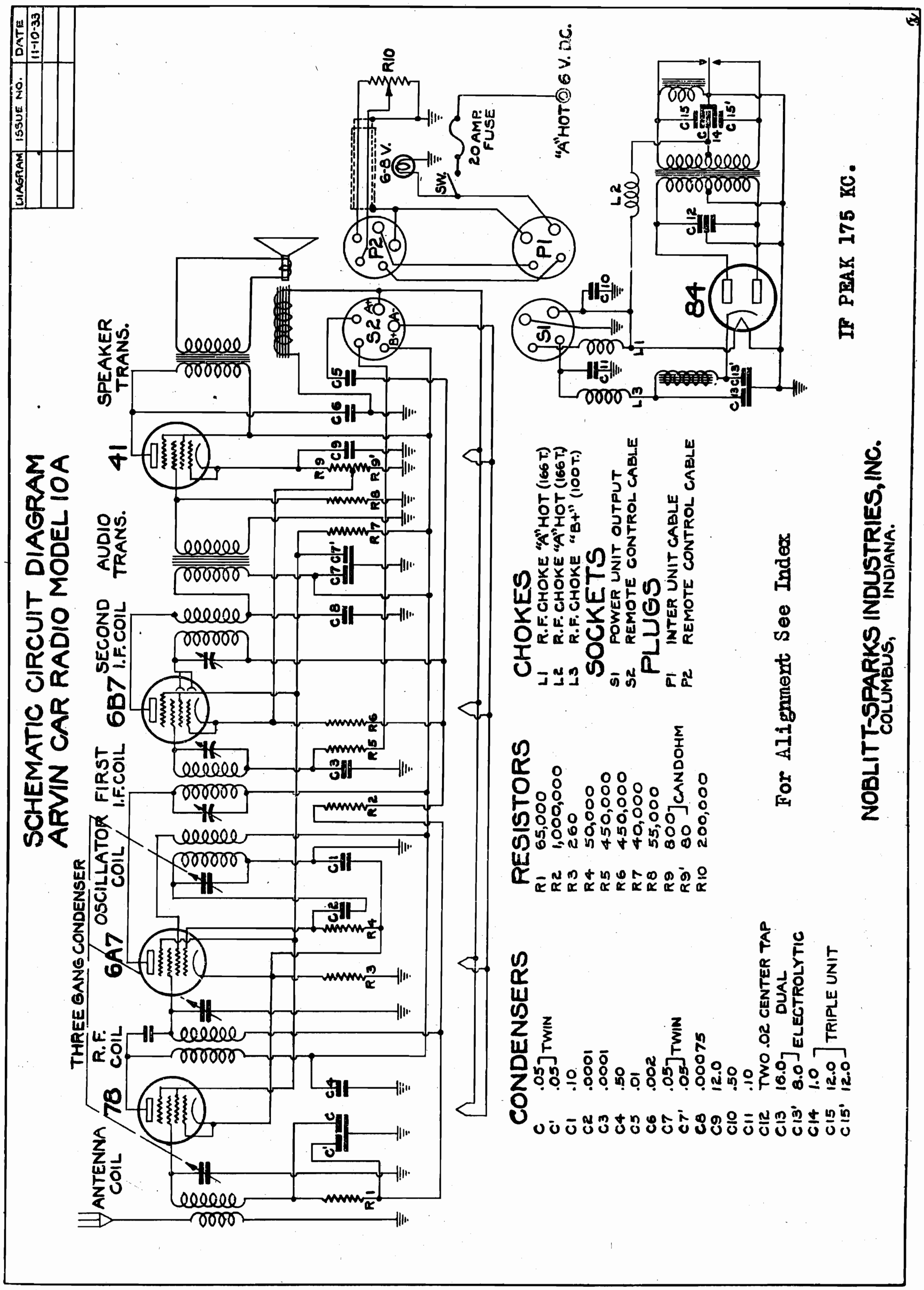
When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.

When ordering parts, always specify part and model number as well as serial-number of chassis.

| Part No. | Description |
|---|---|
| BE 101-10 | Volume Control with Switch.... |
| BE 102-9 | Three Gang Variable Condenser |
| BE 106-10 | 5,450 Ohm Metal Clad Resistor.. |
| BE 108-11 | I. F. Transformer Complete...... |
| BE 109-10 | R. F. Coil Complete............. |
| BE 110-7 | Oscillator Coil and Bracket...... |
| BE 111-8 | Antenna Coil Complete......... |
| BE 112-9 | Dial Bracket Drive Complete.... |
| BE 112-12 | Dial Scale .................... |
| BE 112-15 | Dial Glass .................... |
| BE 112-17 | Dial Drive Disc,................ |
| BE 112-34 | Pilot Light Socket.............. |
| BE 112-37 | Bakelite Escutcheon Plate........ |
| BE 114-3 | Dynamic Speaker .............. |
| | Cabinet—Model 62-148 ......... |
| | Cabinet—Model 62-140 ......... |
| BE 115-15 | Coil Cans ..................... |
| BE 115-22 | Tube Shield—No. 01360........ |
| BE 116-1 | 2.5 Volt Pilot Lamp—41-G3½... |
| BE 119-6 | Dual 8 Mfd. Electrolytic Condenser |
| BE 129-1 | .001 Mica Condenser............ |
| BE 130-5 | 300M Ohm—1/5 Watt Carbon Res. |
| BE 130-8 | 200M Ohm—1/5 Watt Carbon Res. |
| BE 130-11 | 250M Ohm—1/5 Watt Carbon Res. |
| BE 130-12 | 50M Ohm—1/5 Watt Carbon Res. |
| BE 130-19 | 1 Meg Ohm—1/5 Watt Carbon Res. |
| BE 130-25 | 19M Ohm—1.2 Watt Carbon Res. |
| BE 131-2 | Bakelite Knobs (Inc. Springs)..... |
| BE 145-2 | .503 Mfd. By-Pass Block.......... |
| BE 145-3 | .25 Mfd. By-Pass Block.......... |
| BE 1011 | Power Transformer—50-60 Cy..... |
| BE 1019 | Six Foot Cord and Plug.......... |
| | All Sockets .................. |
| BE 104-5 | Power Trans.—25 Cycle......... |

MODEL 10-A (2nd Type)
Schematic

# NOBLITT SPARKS INDUSTRIES



MODEL 10-A (2nd Type)
Voltage,Test Data
Coil Resistance

NOBLITT SPARKS INDUSTRIES

## MODEL 10-A SOCKET VOLTAGES

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

| Tube | Heaters | Plate | Screen | Cathode | Suppressor | Control | Anode Grid 1500 KC | Osc. Grid 1500 KC |
|---|---|---|---|---|---|---|---|---|
| 78 | 6.3 | 220 | 85 | 2.0 | 2.0 | *1.8 | — | — |
| 6A7 | 6.3 | 220 | 85 | 2.0 | — | *1.8 | 220 | *6 |
| 6B7 | 6.3 | 220 | 85 | 1.75 | — | *1.75 | — | — |
| 41 | 6.3 | 205 | 220 | 16.5 | — | *16.5 | — | — |
| 84 | 6.3 | 255 (AC) | — | 225 | — | — | — | — |

* Measured with vacuum tube voltmeter only.

## MODEL 10-A POINT TO POINT RESISTANCE CHECK

All readings taken to ground unless otherwise specified. Readings taken with all tubes removed from set and R. F. chassis and speaker disconnected from power pack unit.

**78**
+ Heater ........................Inf.
— Heater ........................0
Cathode ........................260
Suppressor (No. 3) ................260
Plate to B+......................100
Screen (No. 2) to B+...........40,000
Control Grid (No. 1).........1,515,080

**6A7**
+ Heater ........................Inf.
— Heater ........................0
Anode Grid (No. 2) to B+..........3.5
Osc. Grid (No. 1)...............50,260
Screen (No. 3-5) to B+.........40,000
Plate to B+......................125
Cathode ........................260
Control Grid (No. 4).........1,450,080

**6B7**
+ Heater ........................Inf.
— Heater ........................0
Cathode ........................80
Plate to B+......................75
Screen (No. 2) to B+...........40,000
Diode ........................450,000
Control Grid (No. 1) to Grid Term S2....................450,000

**41**
+ Heater ........................Inf.
— Heater ........................0
Screen (No. 2) to B+...............0
Plate to B+......................800
Cathode ........................800
Control Grid (No. 1).............1750

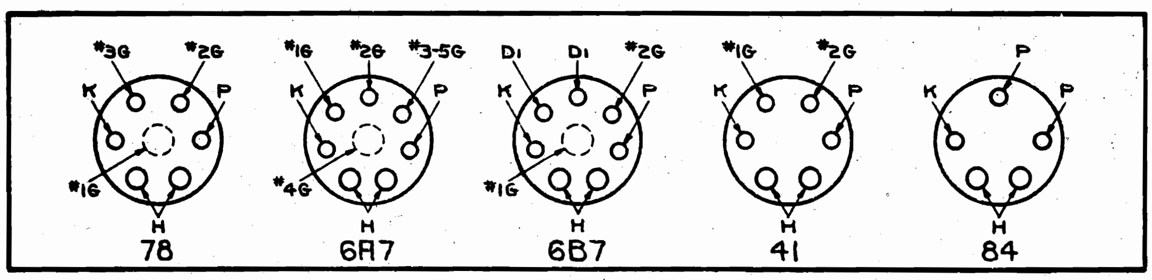
**84**
+ Heater ........................Inf.
— Heater ........................0
Plates ........................155
Plate to Plate....................310
Cathode ........................Inf.†

†Reads leakage of electrolytic condenser.

### COIL RESISTANCES

Ant. Primary ........................5
Ant. Secondary ........................5
R. F. Primary........................100
R. F. Secondary........................5
Osc. Primary........................2.5
Osc. Secondary........................3.5
First I. F. Primary....................125
First I. F. Secondary....................40
Second I. F. Primary....................75
Second I. F. Secondary..................75
Audio Transformer Primary........800
Audio Transformer Secondary.....1800

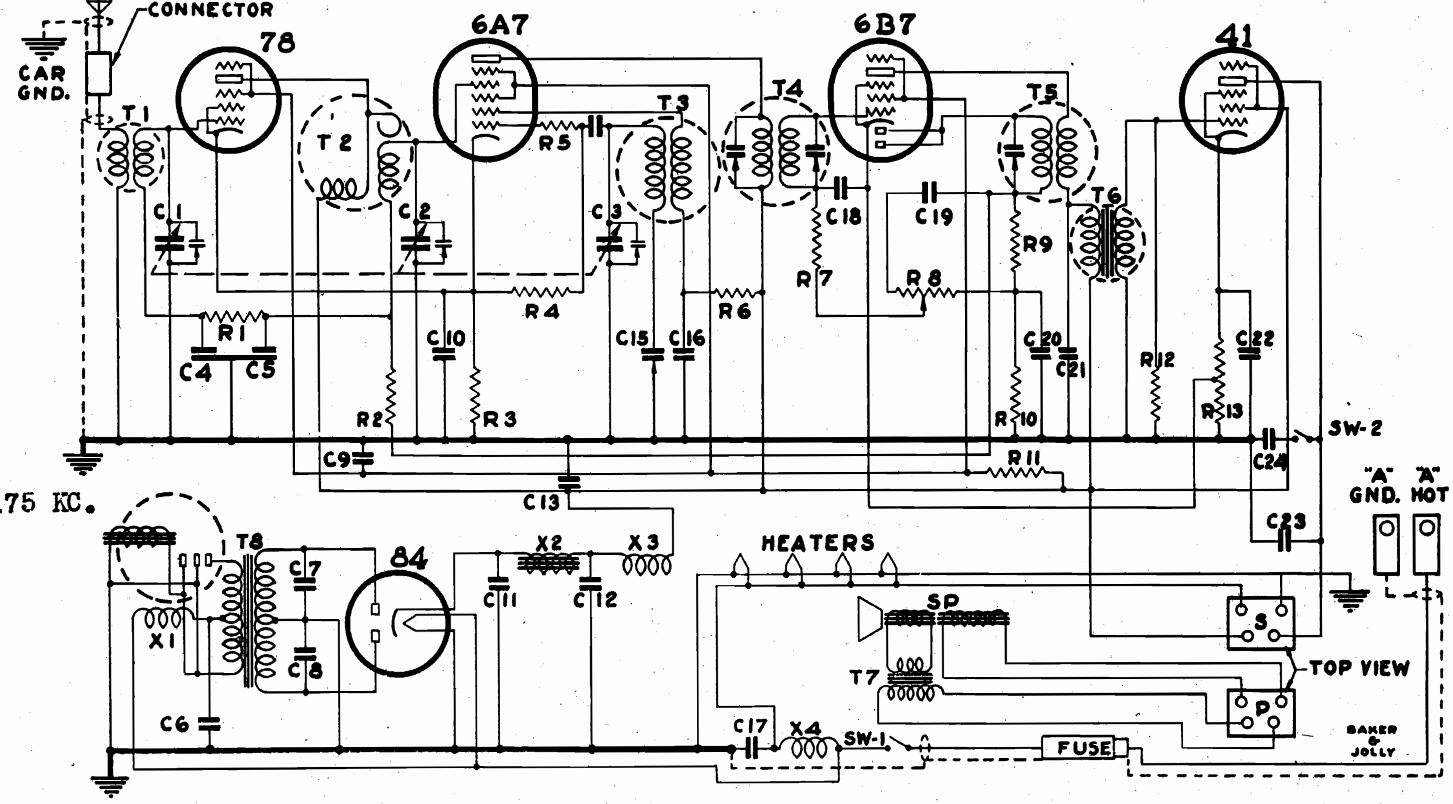
## LOOKING AT TOP OF TUBE SOCKETS



# NOBLITT SPARKS INDUSTRIES

## CIRCUIT DIAGRAM —FOR— ARVIN CAR RADIO MODEL 15

For Alignment See Index




IF PEAK 175 KC.

### CAPACITORS

| | Description | | Part No. |
|---|---|---|---|
| C 1, C 2, C 3 | 3 Gang Variable | | 00-4452 |
| C 4, C 5 | .015 *uf* | 50 V. Twin | 17-3004 |
| C 6 | .5 | 15 V. | 29-4284 |
| C 7, C 8 | .02 *uf* | 1000 V. Twin | 29-4193 |
| C 9 | .1 *uf* | 200 V. | 17-2097 |
| C10 | .1 *uf* | 200 V. | 17-2097 |
| C11 | 12 *uf* | 450 WVDC Dual Elec. | 17-4184 |
| C12 | 4 *uf* | 500 PVDC | |
| C13 | .5 *uf* | 300 V. | 17-3037 |
| C14 | 100 *uuf* | 600 V. Mica | 17-2064 |
| C15 | Padder | | 17-4181-1 |
| C16 | .001 *uf* | 600 V. Mica | 17-4292 |

### CAPACITORS

| | Description | | Part No. |
|---|---|---|---|
| C17 | .5 | 15 V. | 17-4284 |
| C18 | 500 *uuf* | 600 V. Mica | 17-2211 |
| C19 | .01 *uf* | 160 V. Tiny | 17-4291 |
| C20 | .5 *uf* | 10 V. | 29-2224 |
| C21 | 500 *uuf* | 600 V. Mica | 17-2211 |
| C22 | 12 *uf* | 20 V. Elec. | 17-2082 |
| C23 | .005 *uf* | 600 V. | 17-2252 |
| C24 | .02 *uf* | 400 V. | 17-2214 |

### MISCELLANEOUS

| | |
|---|---|
| SW-1 Switch (Integral with R8) | 17-4152 |
| SW-2 Switch | 17-4445 |
| SP—Speaker | 17-4226 |
| S—Socket, Connector | 17-4447 |
| P—Plug, Connector | 17-4448 |
| V—Vibrator Unit | 29-4186 |

### RESISTORS

| | Description | | Part No. |
|---|---|---|---|
| R 1 | 100,000 Ω | ¼ W. | 17-2068 |
| R 2 | 1,000,000 Ω | ¼ W. | 17-2080 |
| R 3 | 200 Ω | ¼ W. | 17-4287 |
| R 4 | 100,000 Ω | ¼ W. | 17-2068 |
| R 5 | 1,000 Ω | ¼ W. | 17-2065 |
| R 6 | 20,000 Ω | ¼ W. | 17-2072 |
| R 7 | 500,000 Ω | ¼ W. | 17-2070 |
| R 8 | 250,000 Ω Volume Control | | 17-4152 |
| R 9 | 500,000 Ω | ¼ W. | 17-2070 |
| R10 | 150,000 Ω | ¼ W. | 17-4283 |
| R11 | 40,000 Ω | ¼ W. | 17-4282 |
| R12 | 50,000 Ω | ¼ W. | 17-2060 |
| R13 | Tapped Candohm | | 17-3031 |

### TRANSFORMERS

| | Description | Part No. |
|---|---|---|
| T1 | Antenna | 00-3020-1 |
| T2 | Radio Frequency | 00-3017-1 |
| T3 | Oscillator | 00-3018-1 |
| T4 | 1st Intermediate | 00-2258-A |
| T5 | 2nd Intermediate | 00-2259-2 |
| T6 | Audio | 00-2261 |
| T7 | Output | 00-4111 |
| T8 | Power | 00-4102 |

### CHOKES

| | | |
|---|---|---|
| X1 | Center Tap Primary R. F. | 00-4131-1 |
| X2 | Filter | 00-4141 |
| X3 | "B" Radio Frequency | 00-2181-1 |
| X4 | "A" Radio Frequency | 00-4130-1 |

**MODEL 15**
**Voltage, Test Data**
**Coil Resistance**

## NOBLITT SPARKS INDUSTRIES

## MODEL 15 SOCKET VOLTAGES

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

| Tube | Heaters | Plate | Screen | Cathode | Suppressor | Control | Anode Grid 1500 KC | Osc. Grid 1500 KC |
|---|---|---|---|---|---|---|---|---|
| 78 | 6.3 | 250 | 50 | 2.2 | 2.2 | 2.0* | — | — |
| 6A7 | 6.3 | 250 | 50 | 2.2 | 2.2 | 2.0* | 150 | 5-10 |
| 6B7 | 6.3 | 245 | 50 | 2.0 | — | 1.8* | — | — |
| 41 | 6.3 | 245 | 250 | 18 | — | 14.0* | — | — |
| 84 | 6.3 | 275 (AC) | — | 260 | — | — | — | — |

* Measured with vacuum tube voltmeter only.

## MODEL 15 POINT TO POINT RESISTANCE CHECK

All readings taken to ground unless otherwise specified. Readings taken with all tubes removed from set.

**78**
+ Heater ........................Inf.
— Heater ..........................0
Plate to B+......................100
Screen Grid to B+.............40,000
Suppressor Grid...................200
Cathode..........................200
Control Grid................1,750,000

**6B7**
+ Heater ........................Inf.
— Heater ..........................0
Plate to B+.....................2000
Screen Grid to B+.............40,000
Diode .......................650,000
Diode .......................650,000
Cathode...........................52
Control Grid:
V. C. on.....................900,000
V. C. off....................650,000

**84**
+ Heater ........................Inf.
— Heater ..........................0
Plate ...........................190
Plate ...........................220
Plate to Plate...................410
Cathode ........................Inf.†

†Reads leakage of electrolytic condenser.

**6A7**
+ Heater ........................Inf.
— Heater ..........................0
Plate to B+......................104
Screen Grid to B+.............40,000
Anode Grid to B+..............20,000
Oscillator Grid ..............101,200
Cathode..........................200
Control Grid................1,650,000

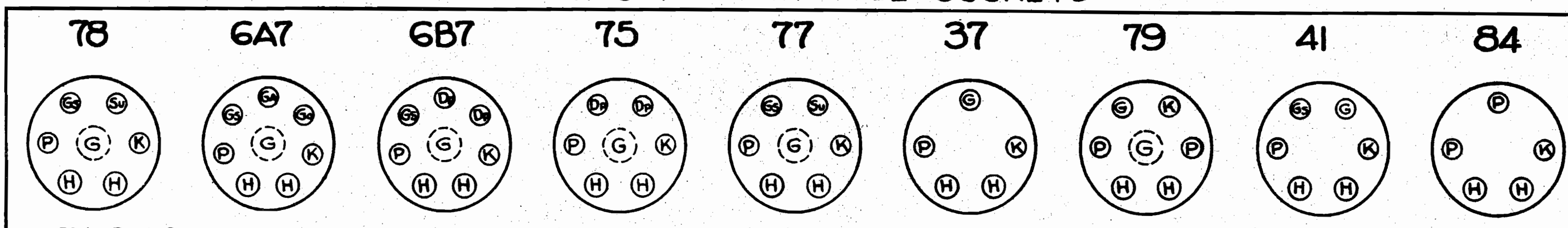
**41**
+ Heater ........................Inf.
— Heater ..........................0
Plate to B+.....................Inf.
Screen Grid to B+..................0
Control Grid....................1733
Cathode..........................692

## COIL RESISTANCES

Ant. Primary .....................13
Ant. Secondary ....................5
R. F. Primary....................100
R. F. Secondary....................5
Osc. Primary ......................2
Osc. Secondary ....................4

1st I. F. Primary.................82
1st I. F. Secondary...............82
2nd I. F. Primary................120
2nd I. F. Secondary..............120
Primary Output Transformer.......650
Voice Coil ......................35
Reflex Trans. Primary...........1850
Reflex Trans. Secondary.........1850

LOOKING AT BOTTOM OF TUBE SOCKETS




SYMBOLS — H-HEATER; P-PLATE; K-CATHODE; G-CONTROL GRID; GS-SCREEN GRID; GA-ANODE GRID
GO-OSCILLATOR GRID; SU-SUPPRESSOR GRID; DP-DIODE PLATE

MODEL 20-A
Voltage
MODEL 20-B
Voltage, Test Data
Coil Resistance

NOBLITT SPARKS INDUSTRIES

## MODEL 20-A SOCKET VOLTAGES

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

| Tube | Heaters | Plate | Screen | Cathode | Suppressor | Control |
|---|---|---|---|---|---|---|
| 78 | 6.3 | 180 | 60 | 0 | 0 | *1.0 |
| 77 | 6.3 | 180 | 60 | 6 | 6 | *5.8 |
| 78 | 6.3 | 180 | 60 | 2.4 | 2.4 | *2.2 |
| 75 | 6.3 | 120 | — | 1.3 | — | *1.3 |
| 41 | 6.3 | 175 | 180 | 16.0 | — | *16.0 |
| 84 | 6.3 | 200 (AC) | — | 190 | — | — |

* Measured with vacuum tube voltmeter only.

## MODEL 20-B SOCKET VOLTAGES

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

| Tube | Heaters | Plate | Screen | Cathode | Suppressor | Control | Anode Grid 1500 KC | Osc. Grid 1500 KC |
|---|---|---|---|---|---|---|---|---|
| 78 | 6.3 | 220 | 90 | 2.2 | 2.2 | *2.0 | — | — |
| 6A7 | 6.3 | 220 | 90 | 2.2 | — | *2.0 | 220 | *6 |
| 77 | 6.3 | 220 | 90 | 1.3 | 1.3 | *1.1 | — | — |
| 75 | 6.3 | 100 | — | 1.3 | — | *1.1 | — | — |
| 41 | 6.3 | 215 | 225 | 16.0 | — | *16.0 | — | — |
| 84 | 6.3 | 240 (AC) | — | — | — | — | — | — |

* Measured with vacuum tube voltmeter only.

## MODEL 20-B POINT TO POINT RESISTANCE CHECK

All readings taken to ground unless otherwise specified. Readings taken with all tubes removed from set and R. F. chassis and speaker disconnected from power pack unit.

**78**
+ Heater ........................ Inf.
— Heater ........................ 0
Cathode ........................ 500
Suppressor Grid (No. 3) ........ 500
Plate to B+ ........................ 100
Screen (No. 2) to B+ ........ 40,000
Control Grid (No. 1) ........ 2,000,000

**6A7**
+ Heater ........................ Inf.
— Heater ........................ 0
Anode Grid (No. 2) to B+ ........ 3.5
Osc. Grid (No. 1) ....................
Screen (No. 3-5) to B+ ........ 40,000
Plate to B+ ........................ 125
Cathode ........................ 500
Control Grid (No. 4) ........ 1,500,000

**77**
+ Heater ........................ Inf.
— Heater ........................ 0
Plate to B+ ........................ 75
Screen (No. 2) to B+ ........ 40,000
Suppressor Grid (No. 3) ........ 1000
Cathode ........................ 1000
Control Grid (No. 1) ........ 40

**75**
+ Heater ........................ Inf.
— Heater ........................ 0
Plate ........................ 100,000
Diode ........................ 500,000
Diode ........................ 500,000
Cathode ........................ 52
Control Grid (No. 1) to
Grid Term S2 ........................ 250,000

**41**
+ Heater ........................ Inf.
— Heater ........................ 0
Plate to B+ ........................ Inf.
Screen (No. 2) to B+ ........ 0
Cathode ........................ 692
Control Grid (No. 1) ........ 250,000

**84**
+ Heater ........................ Inf.
— Heater ........................ 0
Plate ........................ 155
Plate ........................ 155
Plate to Plate ........................ 310
Cathode ........................ Inf.†

†Reads leakage of electrolytic condenser.

## COIL RESISTANCES

Ant. Primary ........ 5
Ant. Secondary ........ 5
R. F. Primary ........ 100
R. F. Secondary ........ 5
Osc. Primary ........ 2.5
Osc. Secondary ........ 3.5
First I. F. Primary ........ 125
First I. F. Secondary ........ 40
Second I. F. Primary ........ 75
Second I. F. Secondary ........ 75

MODEL 15
Installation Notes
MODEL 25
Installation Notes

NOBLITT SPARKS INDUSTRIES

## SPECIAL INSTALLATION BULLETIN FOR THE MODEL 25 ARVIN CAR RADIO

### 1934 Models Plymouth and Dodge

The model 25 Arvin Car Radio will install very satisfactorily on these model cars in an *inverted* position directly above the accelerator pedal, leaving the entire right hand side of the dash for mounting an Arvin Heater.

First: Disconnect the free wheeling cable at the bottom, drill another hole in the dash 5 or 6 inches to the right and relocate the cable back through this hole. Connect the freewheeling cable again, making sure that this is done correctly so that it will engage and disengage. The oil pressure gauge tube should be moved to the left by disconnecting it at both ends and relocating it through another hole 4 or 5 inches to the left of its present location. The water temperature gauge tube does not have to be moved. A groove should be cut in the dash insulation for this tube to run in and then the set can be mounted over this. Make sure, however, that the tube is not bent nor pinched by the mounting bracket when the set is pulled up tight.

Now, to mount the set upside down, the mounting bracket is inserted, with the two mounting bolts in place, in the *horizontal* tapered slots in the back of the case. This bracket will then be in a horizontal position on the bulkhead when the set is mounted.

Locate the set just to the left of the cowl vent lever and as high as it will go. The flexible shafts and Bowden wire then enter at the bottom of the set. The tubes will operate satisfactorily in an inverted position. A special socket prevents them from falling out.

### 1933 Models Plymouth and Dodge

The same installation as explained above may be used on the 1933 models Plymouth and Dodge cars in which case it will not be necessary to relocate the oil pressure gauge tube.

Another way to install the Arvin No. 25 on the 1933 Plymouth and Dodge is as follows:

Relocate the free wheeling cable to either side of its present location. Then attach the radio to the right hand side of the dash directly under (or just to the left of) the glove compartment. The set is mounted in normal position with remote control connections at the top.

This location of the radio leaves room for an Arvin Hot Water Heater just above and to the right of the brake pedal.

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## SPECIAL INSTALLATION BULLETIN FOR THE MODEL 15 ARVIN CAR RADIO

NOTE: All parts of the model 15 Arvin Radio mentioned in this bulletin are fully described in the regular installation instruction sheet furnished with each set.

### All Model V-8 Ford Cars

The model 15 Arvin Car Radio can be installed very satisfactorily on Ford V-8 Cars directly below the glove compartment on the right hand side of the dash.

Remove the glove compartment by taking out the six screws around its front edge and also remove the door by taking the two screws out of the hinges which hold it. Now, by means of a hammer and anvil, flatten out the turned up lip at the rear of the instrument panel flange so as to provide a wider flange on which to mount the front end of the radio. Bend up the ears on either side of the front mounting bracket to conform to the contour of the bottom of the instrument panel. Also spread this bracket apart so that it forms about a 105 degree angle instead of a 90 degree angle.

Now, hold the front mounting bracket up against the instrument panel flange with its shorter leg butting up against the flange, and the longer leg extending upward behind the dash. Locate this bracket so that the right hand edge of its longer leg is just to the left of the loop in the door spring, or in other words, so that this spring will just clear the radio when the door is shut.

Mark the location of the holes to be drilled in the flange by inserting a pencil through the tapped holes in the mounting bracket. Drill a 9/32″ hole at each of these two points. Now lift the bracket into place with the shorter leg underneath and against the instrument panel flange (the illustration in the model 15 installation instruction sheet erroneously shows this leg resting on top of the flange with the screw entering from the bottom) and insert the ¼-20 oval head screw from the top, first through the flange and then into the tapped holes in the bracket by reaching through the glove pocket door opening. Draw these screws up tight with a short screw driver.

Next remove the main mounting plate from the radio as explained in the regular installation instruction sheet and install the rear mounting bracket onto this plate with its longer leg extending horizontally to the rear. Insert the threaded studs extending from the front end of this plate through the oval shaped holes in the bracket just mounted and fasten with the proper washers and nuts.

The rear end of the set is supported by one carriage bolt through the square hole in the center of the rear mounting bracket and clamped to the step plate in the dash. Mark the location of this hole and drill one 11/32″ hole. Insert the carriage bolt and draw up tight with the proper washers and nuts.

You are now ready to replace the glove compartment. This can be pushed through the door opening in the dash from the front and bolted into place in exactly the same manner as it came out. The lower front edge, of course, will have to be bent down around the top of the radio. However, this can be done without great difficulty. Now slip the radio chassis and outer cover, with speaker attached, up into place in the main mounting plate and complete the installation exactly as explained in the regular installation instruction sheet.

This procedure might appear to be a rather complicated and involved installation, however, it really is not at all difficult and in the end makes a very neat and workmanlike job.

MODEL 25
Schematic, Parts List

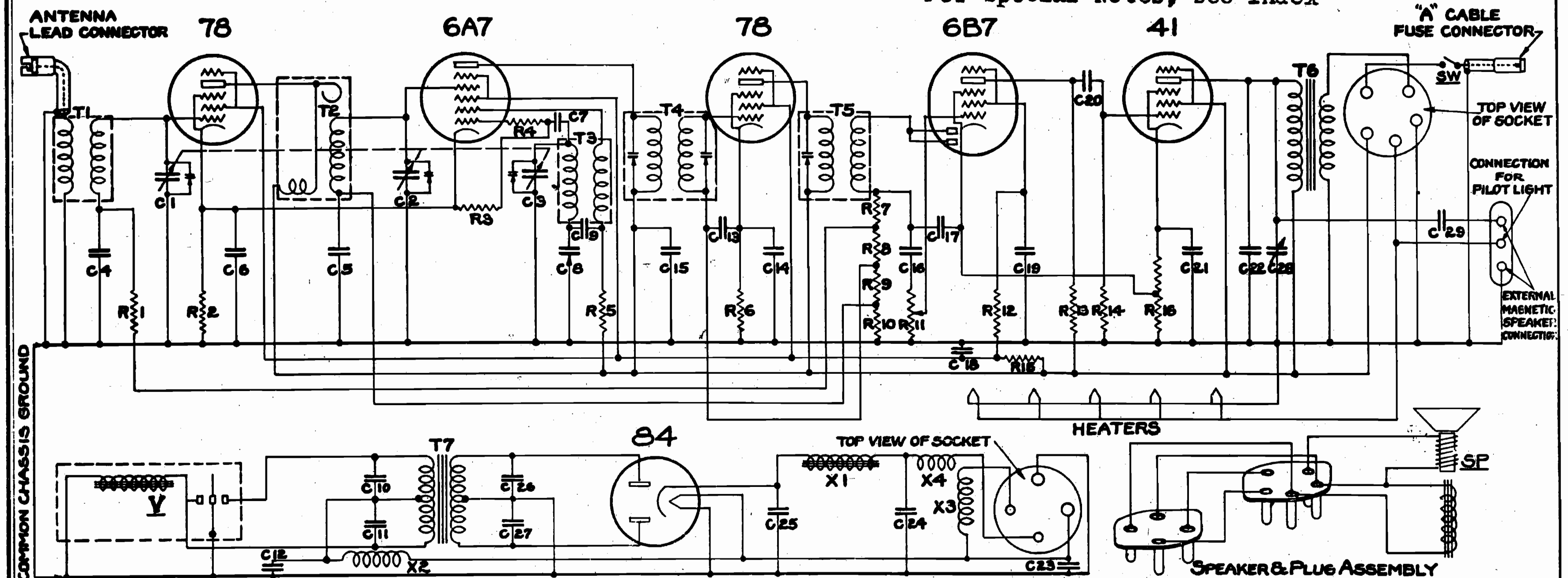
# NOBLITT SPARKS INDUSTRIES

| DIAGRAM | ISSUE NO. | DATE |
|---|---|---|
| D | 1 | 2-15-34 |

## CIRCUIT DIAGRAM OF ARVIN CAR RADIO MODEL 25.

IF PEAK 175 KC.

For Special Notes, see Index




### CONDENSERS

| DESCRIPTION | PART NO. |
|---|---|
| C1, C2, C3 THREE GANG VARIABLE | 19-3019 |
| C4, C5 .015 µf 50 V. TWIN | 17-3004 |
| C6 .10 µf 200 V. | 17-2097 |
| C7 100 µµf | 17-2064 |
| C8 SERIES PADDER (1400 µµf MAX.) | 17-4181 |
| C9 .001 µf 600 V. | 17-3005 |
| C10 12 µf 15 V. ELECTROLYTIC; C11 12 µf 15 V. ELECTROLYTIC — TRIPLE UNIT | 17-2253 |
| C12 1. µf 15 V. | |
| C13 .02 µf 400 V. | 17-2214 |
| C14 .10 µf 200 V. | 17-2097 |
| C15 .25 µf 300 V. | 29-4188 |
| C16 .05 µf 300 V. | 17-3006 |
| C17 500 µµf | 17-2211 |
| C18 .10 µf 200 V. | 17-2097 |
| C19 .10 µf 200 V. | 17-2097 |
| C20 .05 µf 300 V. | 17-3006 |
| C21 12 µf 20 V. ELECTROLYTIC | 17-2082 |
| C22 .005 µf 600 V. SPECIAL | 17-2252 |
| C23 .50 µf 10 V. | 29-2224 |
| C24 4 µf, C25 12 µf — 450 V. DUAL ELECTROLYTIC | 17-4201 |
| C26, C27 .02 µf 1000 V. TWIN | 29-4193 |
| C28 .02 VARIABLE TONE CONTROL | 17-4151 |
| C29 .02 µf 400 V. | 17-2214 |

NOTE:
ON ORDERS FOR REPLACEMENT PARTS, STATE PART NUMBER AND QUANTITY DESIRED.

### RESISTORS

| DESCRIPTION | PART NO. |
|---|---|
| R1 500000 Ω, ¼ WATT | 17-2070 |
| R2 260 Ω, ¼ WATT | 17-2066 |
| R3 100000 Ω, ¼ WATT | 17-2068 |
| R4 1000 Ω, ¼ WATT | 17-2065 |
| R5 20000 Ω, ¼ WATT | 17-2072 |
| R6 * 2000 Ω, ¼ WATT | 17-4202 |
| R7 250000 Ω, ¼ WATT | 17-3011 |
| R8 100000 Ω, ¼ WATT | 17-2068 |
| R9 100000 Ω, ¼ WATT | 17-2068 |
| R10 30000 Ω, ¼ WATT | 17-4276 |
| R11 250000 Ω, + | 17-4152 |
| R12 100000 Ω, ¼ WATT | 17-2068 |
| R13 30000 Ω, ¼ WATT | 17-4276 |
| R14 250000 Ω, ¼ WATT | 17-3011 |
| R15 75000 Ω, ¼ WATT | 17-2067 |
| R16 CANDOHM, 800 Ω TOTAL, TAPPED AT 100 & 120 Ω | 17-4281 |

* THIS RESISTOR MAY VARY FROM 1000 Ω TO 3000 Ω, CONTROLLING SENSITIVITY.
+ VOLUME CONTROL

### TRANSFORMERS

| DESCRIPTION | PART NO. |
|---|---|
| T1 ANTENNA | 00-3020-1 |
| T2 RADIO FREQUENCY | 00-3017-1 |
| T3 OSCILLATOR | 00-3018-1 |
| T4 FIRST INTERMEDIATE FREQUENCY | 00-2258-A |
| T5 SECOND INTERMEDIATE FREQUENCY | 00-2259 |
| T6 OUTPUT | 00-4111 |
| T7 POWER | 00-4102 |

### CHOKES

| DESCRIPTION | PART NO. |
|---|---|
| X1 FILTER CHOKE | 00-4141 |
| X2 CENTER TAP PRIMARY R.F. | 00-2178-E |
| X3 FILAMENT R.F. | 00-2178-F |
| X4 PLATE R.F. | 00-2181-1 |

### MISCELLANEOUS

| DESCRIPTION | PART NO. |
|---|---|
| V VIBRATOR UNIT | 29-2169-B |
| SW SWITCH INTEGRAL WITH R-11 | 17-4152 |
| SP DYNAMIC SPEAKER | 17-4226 |

For Alignment See Index

NOBLITT-SPARKS INDUSTRIES, INC.
COLUMBUS INDIANA

MODEL 25
Voltage,Test Data
Coil Resistance

# NOBLITT SPARKS INDUSTRIES

## MODEL 25 SOCKET VOLTAGES

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

| Tube | Heaters | Plate | Screen | Cathode | Suppressor | Control | Anode Grid 1500 KC | Osc. Grid 1500 KC |
|---|---|---|---|---|---|---|---|---|
| 78 | 6.3 | 250 | 70 | 2 | 2 | 1.8* | — | — |
| 6A7 | 6.3 | 250 | 70 | 2 | — | 1.8* | 150 | 5-10 |
| 78 | 6.3 | 250 | 70 | 2.5 | 2.5 | 2.3* | — | — |
| 6B7 | 6.3 | 220 | 45 | 1.8 | — | 1.6* | — | — |
| 41 | 6.3 | 245 | 255 | 20 | — | 20.0* | — | — |
| 84 | 6.3 | 275 (AC) | — | 255 | — | — | — | — |

* Measured with vacuum tube voltmeter only.

## MODEL 25 POINT TO POINT RESISTANCE CHECK

All readings to ground unless otherwise specified. Readings taken with all tubes removed from set and R. F. chassis and speaker disconnected from power pack unit.

**1st 78**
+ Heater ........................Inf.
— Heater ..........................0
Plate to B+.......................104
Screen Grid to B+.............75,000
Suppressor Grid...................260
Cathode...........................260
Control Grid..................730,000

**6B7**
+ Heater ........................Inf.
— Heater ..........................0
Plate to B+...................30,000
Screen Grid to B+............175,000
Diode ........................480,000
Diode ........................480,000
Cathode...........................100
Control Grid:
V. C. clear on................250,000
V. C. and switch off..............0-5

**2nd 78**
+ Heater ........................Inf.
— Heater ..........................0
Plate to B+........................75
Screen Grid to B+.............75,000
Suppressor Grid................2,000
Cathode........................2,000
Control Grid..................130,000

**84**
+ Heater ........................Inf.
— Heater ..........................0
Plate.............................190
Plate.............................220
Plate to Plate....................410
Cathode.........................Inf.†

†Reads leakage of electrolytic condenser.

**41**
+ Heater ........................Inf.
— Heater ..........................0
Plate to B+.......................650
Screen Grid .......................0
Control Grid..................250,000
Cathode...........................800

**6A7**
+ Heater ........................Inf.
— Heater ..........................0
Plate to B+.......................104
Screen Grid to B+.............75,000
Anode Grid to B+..............20,000
Oscillator Grid..............101,260
Cathode...........................260
Control Grid...................30,100

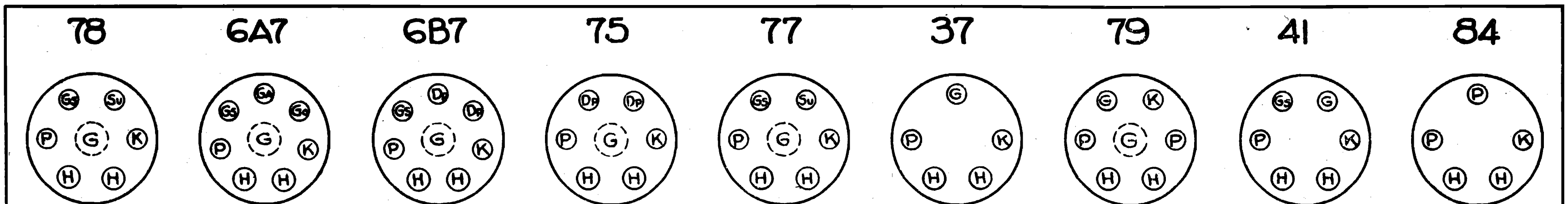
## COIL RESISTANCES

Ant. Primary......................13
Ant. Secondary.....................5
R. F. Primary.....................100
R. F. Secondary....................5

Osc. Primary.......................2
Osc. Secondary.....................4
1st I. F. Primary.................82
1st I. F. Secondary...............82

2nd I. F. Primary.................120
2nd I. F. Secondary...............120
Primary Output Transformer........650
Voice Coil........................35

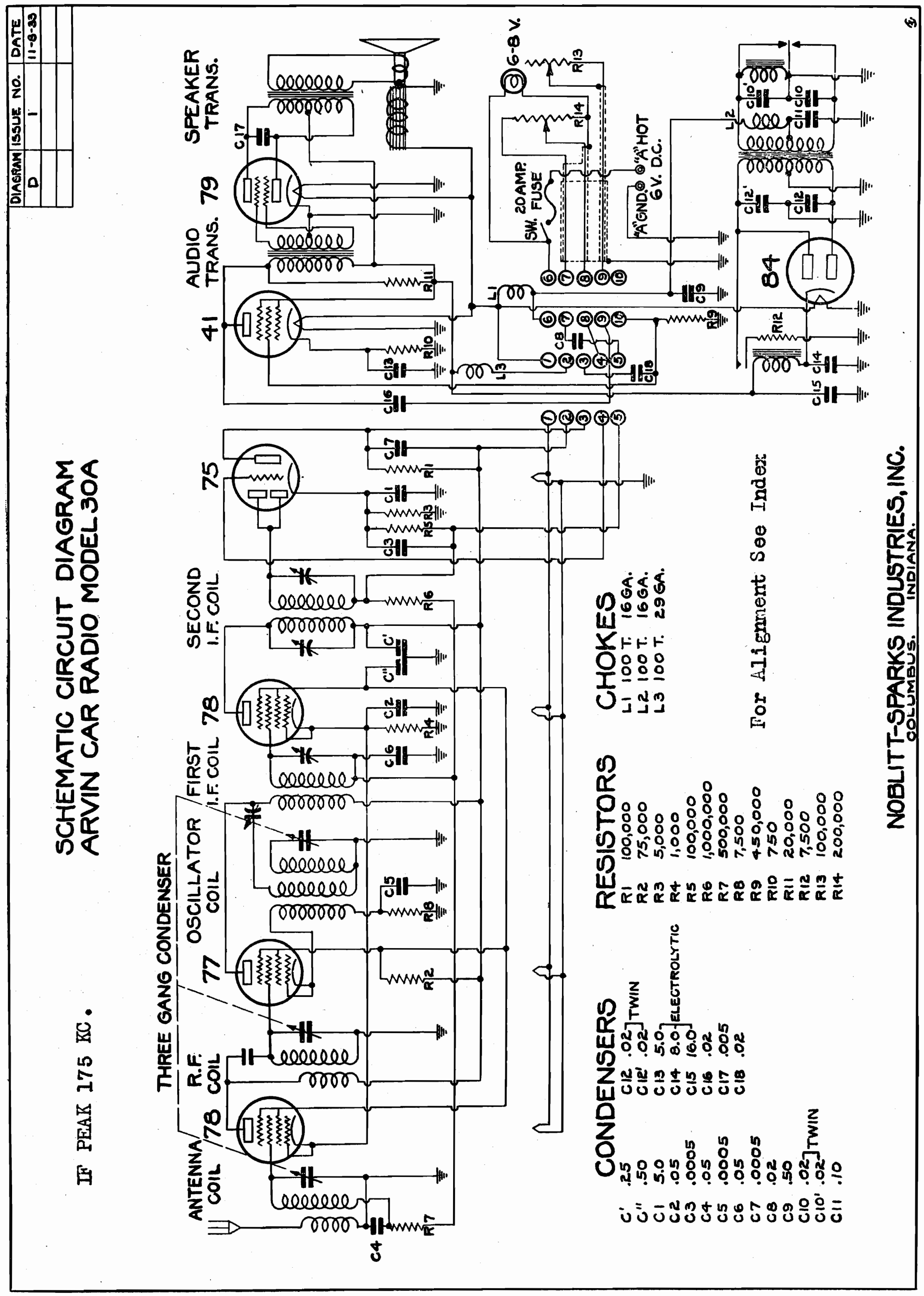
## LOOKING AT BOTTOM OF TUBE SOCKETS




SYMBOLS — H-HEATER; P- PLATE; K-CATHODE; G-CONTROL GRID; GS-SCREEN GRID; GA-ANODE GRID
GO- OSCILLATOR GRID; SU-SUPPRESSOR GRID; DP- DIODE PLATE

# NOBLITT SPARKS INDUSTRIES

MODEL 30-A (3rd Type)
Schematic



MODEL 30-A (3rd Type)
Voltage, Test Data
Coil Resistance

NOBLITT SPARKS INDUSTRIES

## MODEL 30-A SOCKET VOLTAGES—C SERIES

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

| Tube | Heaters | Plate | Screen | Cathode | Suppressor | Control |
|---|---|---|---|---|---|---|
| 78 | 6.3 | 180 | 60 | 2.4 | 2.4 | *2.2 |
| 77 | 6.3 | 180 | 60 | 6 | 9 | *5.8 |
| 78 | 6.3 | 180 | 60 | 2.4 | 2.4 | *2.2 |
| 75 | 6.3 | 120 | — | 1.3 | — | *1.3 |
| 41 | 6.3 | 175 | 180 | 16.0 | — | *16.0 |
| 79 | 6.3 | 180 | — | 0 | — | 0 |
| 84 | 6.3 | 700 (AC) | — | 190 | — | — |

* Measured with vacuum tube voltmeter only.

## MODEL 30-A POINT TO POINT RESISTANCE CHECK

All readings to ground unless otherwise specified. Readings taken with all tubes removed from set and R. F. chassis and speaker disconnected from power pack unit.

**1st 78**
+ Heater ........ Inf.
— Heater ........ 0
Cathode ........ 1000 some 500
Suppressor Grid (No. 3) .. 1000 some 500
Plate to B+ ........ 35
Screen (No. 2) to B+ ........ 75,000
Control Grid (No. 1) ........ 2,005,000

**77**
+ Heater ........ Inf.
— Heater ........ 0
Plate to B+ ........ 50
Screen (No. 2) to B+ ........ 75,000
Suppressor Grid (No. 3) ........ 7,500
Cathode ........ 7,500
Control Grid (No. 1) ........ 8

**2nd 78**
+ Heater ........ Inf.
— Heater ........ 0
Cathode ........ 1000 some 500
Suppressor Grid (No. 3) .. 1000 some 500
Plate to B+ ........ 50
Screen (No. 2) to B+ ........ 75,000
Control Grid (No. 1) ........ 1,505,000

**75**
+ Heater ........ Inf.
— Heater ........ 0
Plate to B+ ........ 100,000
Diode ........ 505,000
Diode ........ 505,000
Cathode ........ 5000
Control Grid (No. 1) ........ Inf.

**41**
+ Heater ........ Inf.
— Heater ........ 0
Plate to B+ ........ 590
Screen (No. 2) to B+ ........ 0
Cathode ........ 750
Control Grid (No. 1) ........ 250,000

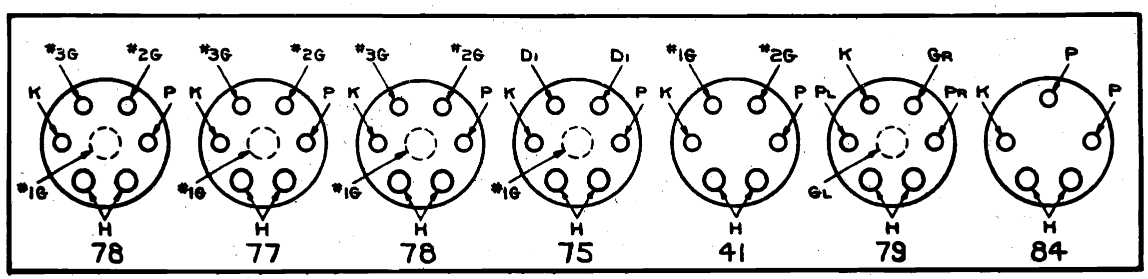
**79**
+ Heater ........ Inf.
— Heater ........ 0
Plate (PL) to B+ ........ 500
Control Grid (GR) ........ 150
Cathode ........ 0
Plate (PR) to B+ ........ 500
Control Grid (GL) ........ 150

**84**
+ Heater ........ Inf.
— Heater ........ 0
Plate ........ 125
Plate ........ 140
Plate to Plate ........ 265
Cathode ........ Inf.†

### COIL RESISTANCES

†Reads leakage of electrolytic condenser.
Ant. Primary ........ 2
Ant. Secondary ........ 8
R. F. Primary ........ 35
R. F. Secondary ........ 8
Osc. Primary ........ 11
Osc. Secondary ........ 6
First I. F. Primary ........ 50
First I. F. Secondary ........ 50
Second I. F. Primary ........ 50
Second I. F. Secondary ........ 50
Audio Transformer Primary ........ 600
Audio Transformer Sec. ........ 150 per half
Speaker Trans. Primary ........ 500 per half

### LOOKING AT TOP OF TUBE SOCKETS



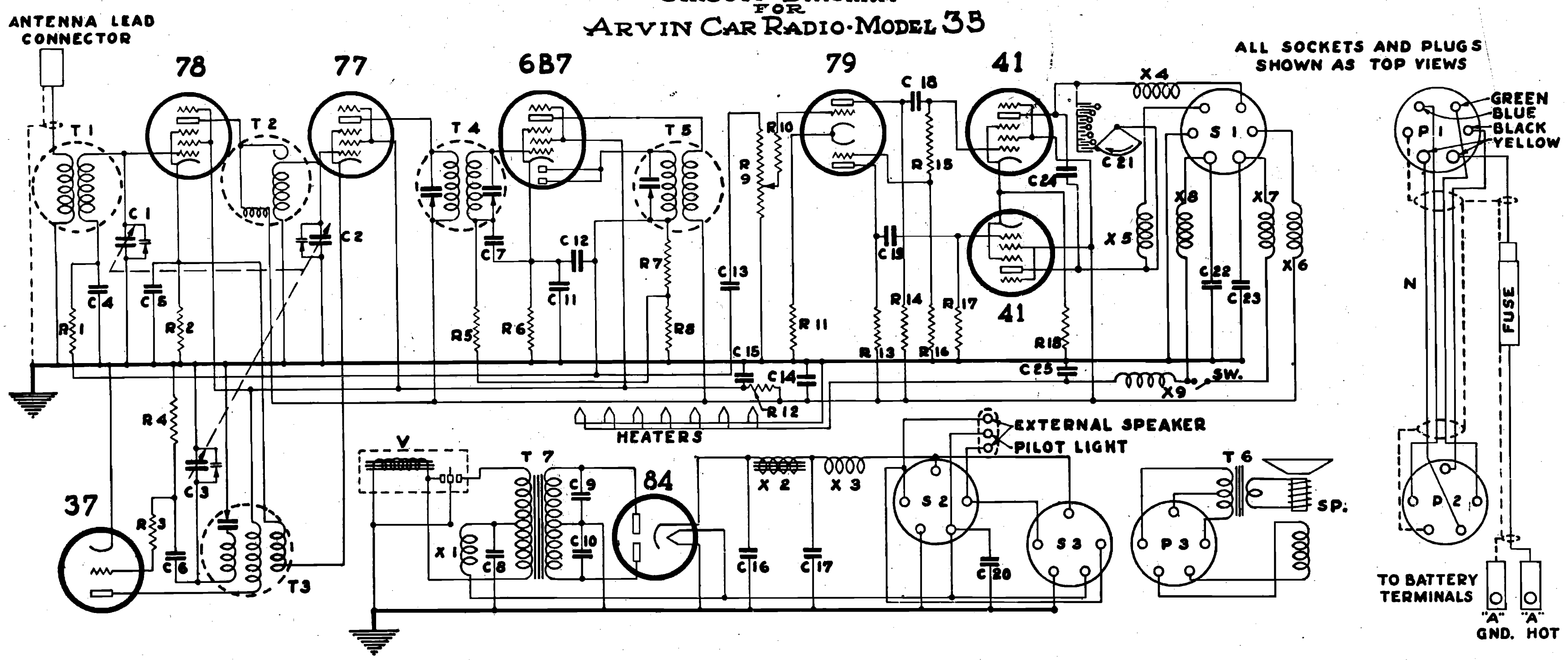
MODEL 35 Below E31577H
Schematic, Parts List

# NOBLITT SPARKS INDUSTRIES

For Alignment See Index

IF PEAK 175 KC.

## CIRCUIT DIAGRAM FOR ARVIN CAR RADIO·MODEL 35




### CAPACITORS

| | Description | | Part No. |
|---|---|---|---|
| C 1, C 2, C 3 | 3 Gang Variable | | 00-4182-1 |
| C 4 | .01 uf | 160 V. | 17-4291 |
| C 5 | .1 uf | 200 V. | 17-2097 |
| C 6 | 100 uuf | 600 V. Mica | 17-2064 |
| C 7 | .01 uf | 160 V. | 17-4291 |
| C 8 | .5 uf | 10 V. | 29-2224 |
| C 9 | .02 uf | | |
| C10 | | 1000 V. Twin | 29-4193 |
| C11 | .1 uf | 200 V. | 17-2097 |
| C12 | 500 uuf | 600 V. Mica | 17-2211 |
| C13 | .01 uf | 160 V. | 17-4291 |
| C14 | .5 uf | 300 V. | 17-3037 |
| C15 | .1 uf | 200 V. | 17-2097 |
| C16 | 12 uf | 450 WVDC Dual Elec. | |
| C17 | 4 uf | 500 PVDC | 17-4184 |
| C18 | .01 uf | 400 V. | 17-2189 |
| C19 | .01 uf | 400 V. | 17-2189 |

### CAPACITORS

| | Description | | Part No. |
|---|---|---|---|
| C25 | .002 uf | 600 V. Mica | 17-2063 |
| C20 | .5 uf | 10 V. | 29-2224 |
| C21 | Tone Control | | 17-4151 |
| C22 | .5 uf | 10 V. | 29-2224 |
| C23 | .5 uf | 10 V. | 29-2224 |
| C24 | .005 uf | 600 V. | 17-2252 |

### MISCELLANEOUS

| | Part No. |
|---|---|
| N—Interconnecting Cable, Complete | 00-4180 |
| SP—Speaker | 00-4227 |
| SW—Switch (Integral with R9) | 17-4152 |
| V—Vibrator | 29-4186 |

Socket S1 Receives Plug P1
Socket S2 Receives Plug P2
Socket S3 Receives Plug P3

NOTE: On orders for replacement parts, state part number and quantity desired. See price list for hardware replacements.

### RESISTORS

| | Description | | Part No. |
|---|---|---|---|
| R 1 | 1,000,000 Ω | ¼ W. | 17-2080 |
| R 2 | 260 Ω | ¼ W. | 17-2066 |
| R 3 | 10,000 Ω | ¼ W. | 17-4275 |
| R 4 | 50,000 Ω | ¼ W. | 17-2075 |
| R 5 | 1,000,000 Ω | ¼ W. | 17-2080 |
| R 6 | 500 Ω | ¼ W. | 17-2088 |
| R 7 | 30,000 Ω | ¼ W. | 17-4276 |
| R 8 | 500,000 Ω | ¼ W. | 17-2070 |
| R 9 | 250,000 Ω Volume Control | | 17-4152 |
| R10 | 250,000 Ω | ¼ W. | 17-3011 |
| R11 | 1,000 Ω | ¼ W. | 17-2065 |
| R12 | 60,000 Ω | ½ W. | 17-4190 |
| R13 | 100,000 Ω | ¼ W. | 17-2068 |
| R14 | 100,000 Ω | ¼ W. | 17-2068 |
| R15 | 500,000 Ω | ¼ W. | 17-2070 |
| R16 | 15,000 Ω | ¼ W. | 17-4191 |
| R17 | 500,000 Ω | ¼ W. | 17-2070 |
| R18 | 400 Ω | ½ W. | 17-4189 |

### TRANSFORMERS

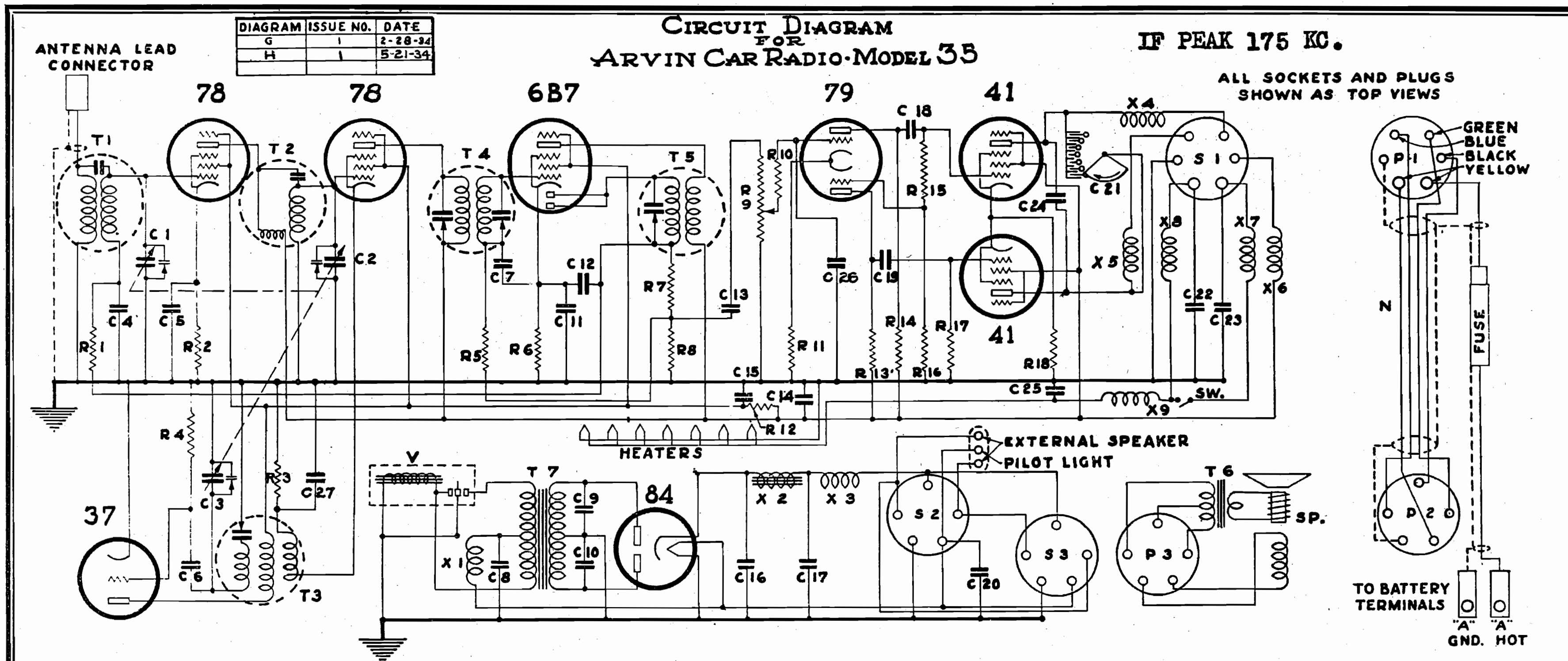
| | Description | Part No. |
|---|---|---|
| T1 | Antenna | 00-4134-1 |
| T2 | Radio Frequency | 00-4132-1 |
| T3 | Oscillator | 00-4133 |
| T4 | 1st Intermediate Freq. | 00-2258-A |
| T5 | 2nd Intermediate Freq. | 00-2259 |
| T6 | Output | 00-4112 |
| T7 | Power | 00-4101 |

### CHOKES

| | Description | Part No. |
|---|---|---|
| X1 | Center Tap Primary R. F. | 00-4131 |
| X2 | Filter | 00-4141 |
| X3 | "B" Radio Frequency | 00-2181-1 |
| X4 | Plate Radio Frequency | 00-2181-1 |
| X5 | Plate Radio Frequency | 00-2181-1 |
| X6 | "B" Radio Frequency | 00-2181-1 |
| X7 | "A" Radio Frequency | 00-4130-1 |
| X8 | "A" Radio Frequency | 00-4130-1 |
| X9 | "A" Radio Frequency | 00-4131 |

MODEL 35 Above E31577H
Schematic, Parts List

# NOBLITT SPARKS INDUSTRIES




## CAPACITORS

| | Description | | Part No. |
|---|---|---|---|
| C 1, C 2, C 3 | 3 Gang Variable | | 00-4182-1 |
| C 4 | .05 uf | 160 V. | 17-4329 |
| C 5 | .1 uf | 200 V. | 17-2097 |
| C 6 | 100 uuf | 600 V. Mica | 17-2064 |
| C 7 | .01 uf | 160 V. | 17-4291 |
| C 8 | .5 uf | 10 V. | 29-2224 |
| C 9, C10 | .02 uf | 1000 V. Twin | 29-4193 |
| C11 | .1 uf | 200 V. | 17-2097 |
| C12 | 500 uuf | 600 V. Mica | 17-2211 |
| C13 | .01 uf | 160 V. | 17-4291 |
| C14 | .5 uf | 300 V. | 17-3037 |
| C15 | .1 uf | 200 V. | 17-2097 |
| C16 | 12 uf | 450 WVDC | Dual Elec. |
| C17 | 4 uf | 500 PVDC | 17-4184 |
| C18 | .01 uf | 400 V. | 17-2189 |
| C19 | .01 uf | 400 V. | 17-2189 |

## CAPACITORS

| | Description | | Part No. |
|---|---|---|---|
| C25 | .002 uf | 600 V. Mica | 17-2063 |
| C20 | .5 uf | 10 V. | 29-2224 |
| C21 | Tone Control | | 17-4151 |
| C22 | .5 uf | 10 V. | 29-2224 |
| C23 | .5 uf | 10 V. | 29-2224 |
| C24 | .001 uf | 600 V. Mica | 17-4292 |
| C25 | .002 uf | 600 V. Mica | 17-2063 |
| C26 | 100 uuf | 600 V. Mica | 17-2064 |
| C27 | .1 uf | 200 V. | 17-2097 |

## MISCELLANEOUS

| Description | Part No. |
|---|---|
| N—Interconnecting Cable, Complete | 00-4180 |
| SP—Speaker | 00-4227 |
| SW—Switch (Integral with R9) | 17-4152 |
| V—Vibrator | 29-4186 |
| Socket S1 Receives Plug P1 | |
| Socket S2 Receives Plug P2 | |
| Socket S3 Receives Plug P3 | |

NOTE: On orders for replacement parts, state part number and quantity desired. See price list for hardware replacements.

## RESISTORS

| | Description | | Part No. |
|---|---|---|---|
| R 1 | 1,000,000 Ω | ¼ W. | 17-2080 |
| R 2 | 500 Ω | ¼ W. | 17-2088 |
| R 3 | 3,000 Ω | ¼ W. | 17-2090 |
| R 4 | 50,000 Ω | ¼ W. | 17-2075 |
| R 5 | 1,000,000 Ω | ¼ W. | 17-2080 |
| R 6 | 500 Ω | ¼ W. | 17-2088 |
| R 7 | 30,000 Ω | ¼ W. | 17-4276 |
| R 8 | 500,000 Ω | ¼ W. | 17-2070 |
| R 9 | 250,000 Ω Volume Control | | 17-4152 |
| R10 | 250,000 Ω | ¼ W. | 17-3011 |
| R11 | 1,000 Ω | ¼ W. | 17-2065 |
| R12 | 25,000 Ω | 1 W. | 17-3010 |
| R13 | 100,000 Ω | ¼ W. | 17-2068 |
| R14 | 100,000 Ω | ¼ W. | 17-2068 |
| R15 | 500,000 Ω | ¼ W. | 17-2070 |
| R16 | 15,000 Ω | ¼ W. | 17-4191 |
| R17 | 500,000 Ω | ¼ W. | 17-2070 |
| R18 | 400 Ω | ½ W. | 17-4189 |

## TRANSFORMERS

| | Description | Part No. |
|---|---|---|
| T1 | Antenna | 00-4134-1S |
| T2 | Radio Frequency | 00-4132-1S |
| T3 | Oscillator | 00-4133S |
| T4 | 1st Intermediate Freq. | 00 4489 |
| T5 | 2nd Intermediate Freq. | 00-4488 |
| T6 | Output | 00-4112 |
| T7 | Power | 00-4101 |

## CHOKES

| | Description | Part No. |
|---|---|---|
| X1 | Center Tap Primary R. F. | 00-4131 |
| X2 | Filter | 00-4141 |
| X3 | "B" Radio Frequency | 00-2181-1 |
| X4 | Plate Radio Frequency | 00-2181-1 |
| X5 | Plate Radio Frequency | 00-2181-1 |
| X6 | "B" Radio Frequency | 00-2181-1 |
| X7 | "A" Radio Frequency | 00-4130-1 |
| X8 | "A" Radio Frequency | 00-4130-1 |
| X9 | "A" Radio Frequency | 00-4131 |

For Alignment See Index

NOTE: The above circuit diagram is effective for all Model 35 Arvin Car Radios, beginning with and including that bearing the Serial No. E31577H.

MODEL 35
Voltage, Test Data
Coil Resistance

## NOBLITT SPARKS INDUSTRIES

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

| Tube | Heaters | Plate | Screen | Cathode | Suppressor | Control |
|---|---|---|---|---|---|---|
| 78 | 6.3 | 250 | 60 | 2.2 | 2.2 | *2.0 |
| 77 | 6.3 | 250 | 60 | 2.2 | 2.2 | *2.2 |
| 6B7 | 6.3 | 250 | 60 | 1.6 | — | *1.4 |
| 79 | 6.3 | 135 | — | 1.6 | — | *1.6 |
| 41 | 6.3 | 245 | 250 | 18 | — | *18 |
| 41 | 6.3 | 245 | 250 | 18 | — | *18 |
| 37 | 6.3 | 60 | — | 0 | — | *6—1500 KC |
| 84 | 6.3 | 275 (AC) | — | 255 | — | — |

* Measured with vacuum tube voltmeter only.

## MODEL 35 POINT TO POINT RESISTANCE CHECK

All readings to ground unless otherwise specified. Readings taken with all tubes removed from set and R. F. chassis disconnected from power pack unit.

**78**
+ Heater ........ Inf.
— Heater ........ 0
Plate to B+ ........ 50
Screen Grid to B+ ........ 60,000
Suppressor Grid ........ 260
Cathode ........ 260
Control Grid ........ 1,530,000

**41**
+ Heater ........ Inf.
— Heater ........ 0
Plate to B+ ........ Inf.
Screen Grid to B+ ........ 2
Control Grid ........ 500,000
Cathode ........ 400

**77**
+ Heater ........ Inf.
— Heater ........ 0
Plate to B+ ........ 100
Screen Grid to B+ ........ 60,000
Suppressor Grid ........ 260
Cathode ........ 260
Control Grid ........ 6

**41**
+ Heater ........ Inf.
— Heater ........ 0
Plate to B+ ........ Inf.
Screen Grid to B+ ........ 2
Control Grid ........ 500,000
Cathode ........ 400

**6B7**
+ Heater ........ Inf.
— Heater ........ 0
Plate to B+ ........ 90
Screen Grid to B+ ........ 60,000
Diode ........ 530,000
Diode ........ 530,000
Cathode ........ 500
Control Grid ........ 1,500,000

**79**
+ Heater ........ Inf.
— Heater ........ 0
Plate to B+ ........ 100,000
Control Grid ........ 15,000
Cathode ........ 1000
Plate to B+ ........ 100,000
Control Grid (Cap):
V. C. on ........ 500,000
V. C. off ........ 250,000

**37**
+ Heater ........ Inf.
— Heater ........ 0
Plate to B+ ........ 60,000
Control Grid ........ 60,000
Cathode ........ 0

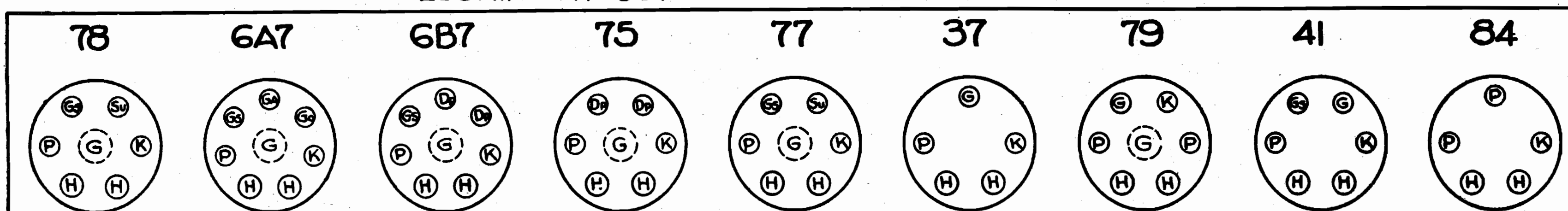
**84**
+ Heater ........ Inf.
— Heater ........ 0
Plate ........ 190
Plate ........ 160
Plate to Plate ........ 350
Cathode ........ Inf.†

†Reads leakage of electrolytic condenser.

### COIL RESISTANCES

Ant. Primary ........ 2
Ant. Secondary ........ 6
R. F. Primary ........ 50
R. F. Secondary ........ 6
Osc. Primary ........ 2
Osc. Secondary ........ 7
1st I. F. Primary ........ 100
1st I. F. Secondary ........ 100
2nd I. F. Primary ........ 82
2nd I. F. Secondary ........ 82
Primary Output Transformer ........ 600
Voice Coil ........ .35

LOOKING AT BOTTOM OF TUBE SOCKETS




SYMBOLS — H-HEATER; P-PLATE; K-CATHODE; G-CONTROL GRID; GS-SCREEN GRID; GA-ANODE GRID
GO-OSCILLATOR GRID; SU-SUPPRESSOR GRID; DP-DIODE PLATE

# ALIGNMENT PROCEDURE FOR ARVIN CAR RADIOS

## Models 10-A, 20-A, 20-B and 30-A

NOTE: All adjustments in the following instructions should be made with an output meter or some indicating device connected with the output of the radio receiver to insure maximum sensitivity and selectivity.

Remove the radio chassis from the case. Connect grounding wire from the radio chassis to the power pack. Connect the output of the oscillator to the grid cap of the 77 or 6A7 tube after removing the grid clip and adjust the oscillator to 175 kilocycles. Set the output to the lowest amount giving a satisfactory deflection of the output meter. Adjust with a Bakelite screwdriver the first and second I. F. transformer for a maximum output. Replace the grid clip, connect the output of the oscillator to the antenna terminal of the radio set through a .0001 mfd mica condenser and set the oscillator to 1510 kilocycles. Rotate the variable condenser fully out of mesh, then back until the rotor plates begin to enter the stator. Adjust the oscillator padder condenser until the maximum signal is attained. Then readjust the oscillator input to 1400 kilocycles, rotate the variable condenser until the signal is again heard.

Now adjust the antenna and R. F. padders until the output is again at the peak. With the Model 10A, 20A and 30A Radios further adjustment is made at other frequencies by bending the split plates on the R. F. and antenna sections either in or out, depending upon whether more or less capacity is needed to bring the set into resonance.

On the 20B receiver, set the oscillator output to 600 kilocycles and rotate the variable condenser until a signal is heard and then adjust the oscillator series padder condenser located on the right hand condenser back and forth until a point is found where the setting of the padder gives maximum deflection on the output meter. Setting of the padder and variable condenser are both variable, each dependent upon the other, there being one point on the setting of the variable condenser where a maximum deflection will be obtained.

After the 600 kilocycle adjustment has been made return to the 1400 kilocycle position and recheck slightly the adjustment of the radio frequency and the antenna padders to insure no change has been made.

NOTE: After installation on some cars slight readjustment of the antenna padder on all Radios—except model 10A—materially improves the sensitivity of the receiver.

MODEL 45 Below E40356L
Schematic, Parts List
Type 1

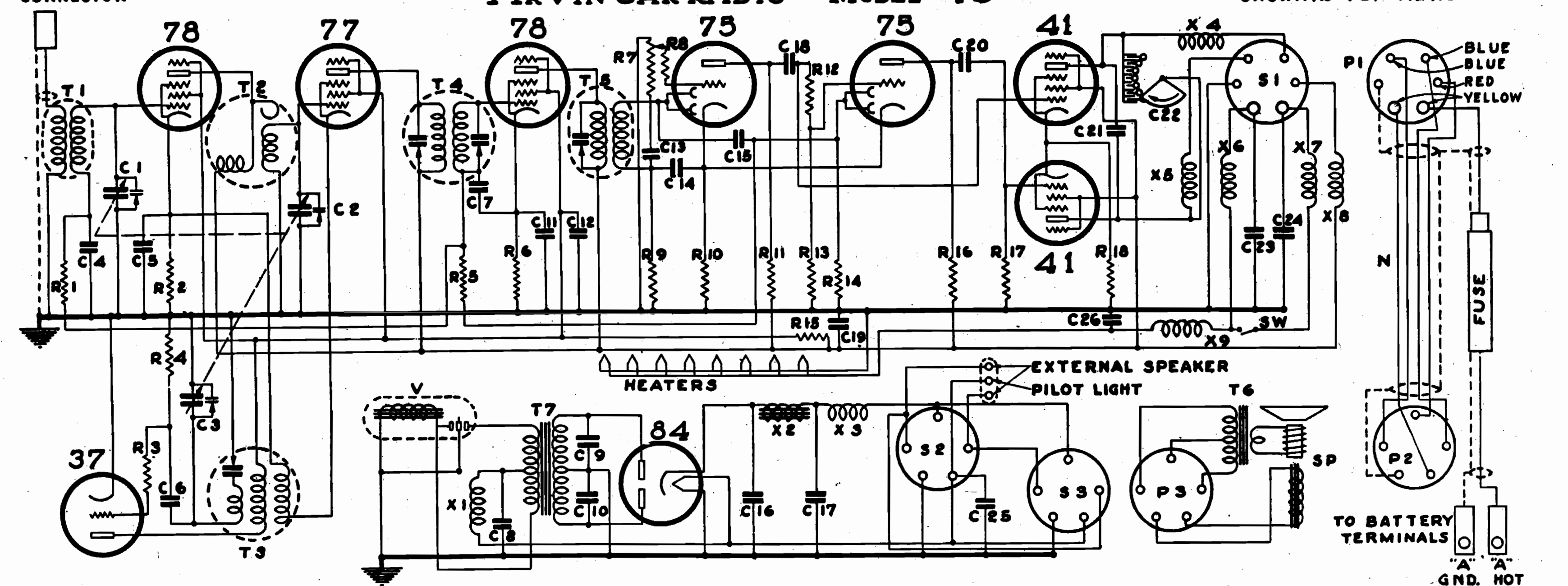
# NOBLITT SPARKS INDUSTRIES

For Alignment See Index

## CIRCUIT DIAGRAM FOR ARVIN CAR RADIO — MODEL 45

IF PEAK 175 KC.

ALL SOCKETS AND PLUGS SHOWN AS TOP VIEWS




### CAPACITORS

| | Description | | Part No. |
|---|---|---|---|
| C 1, C 2, C 3 | 3 Gang Variable | | 00-4182-1 |
| C 4 | .01 uf | 160 V. | 17-4291 |
| C 5 | .1 uf | 200 V. | 17-2097 |
| C 6 | 100 uuf | 600 V. Mica | 17-2064 |
| C 7 | .01 uf | 160 V. | 17-4291 |
| C 8 | .5 uf | 10 V. | 17-2224 |
| C 9, C10 | .02 uf | 1000 V. Twin | 17-4193 |
| C11 | .1 uf | 200 V. | 17-2097 |
| C12 | .1 uf | 200 V. | 17-2097 |
| C13 | .01 uf | 160 V. | 17-4291 |
| C14 | 500 uuf | 600 V. Mica | 17-2211 |
| C15 | 500 uuf | 600 V. Mica | 17-2211 |
| C16 | 12 uf | 450 WVDC } Dual Elec. | |
| C17 | 4 uf | 500 PVDC } | 17-4184 |
| C18 | .01 uf | 400 V. | 17-2189 |
| C19 | .5 uf | 300 V. | 17-3037 |
| C20 | .01 uf | 400 V. | 17-2189 |

### CAPACITORS

| | Description | | Part No. |
|---|---|---|---|
| C21 | .005 uf | 600 V. | 17-2252 |
| C22 | Tone Control | | 17-4151 |
| C23 | .5 uf | 10 V. | 17-2224 |
| C24 | .5 uf | 10 V. | 17-2224 |
| C25 | .5 uf | 10 V. | 17-2224 |
| C26 | .002 uf | 600 V. | 17-2063 |

### MISCELLANEOUS

| | |
|---|---|
| N—Interconnecting Cable, Complete | 00-4180 |
| SP—Speaker | 19-4228 |
| SW—Switch (Integral with R7) | 17-4152 |
| V—Vibrator | 29-4186 |
| Socket S1 Receives Plug P1 | |
| Socket S2 Receives Plug P2 | |
| Socket S3 Receives Plug P3 | |

NOTE: On orders for replacement parts, state part number and quantity desired. See price list for hardware replacements.

### RESISTORS

| | Description | | Part No. |
|---|---|---|---|
| R 1 | 1,000,000 Ω | ¼ W. | 17-2080 |
| R 2 | 260 Ω | ¼ W. | 17-2066 |
| R 3 | 10,000 Ω | ¼ W. | 17-4275 |
| R 4 | 50,000 Ω | ¼ W. | 17-2075 |
| R 5 | 1,000,000 Ω | ¼ W. | 17-2080 |
| R 6 | 500 Ω | ¼ W. | 17-2088 |
| R 7 | 250,000 Ω Volume Control | | 17-4152 |
| R 8 | 250,000 Ω | ¼ W. | 17-3011 |
| R 9 | 500,000 Ω | ¼ W. | 17-2070 |
| R10 | 2,500 Ω | ¼ W. | 17-2087 |
| R11 | 250,000 Ω | ¼ W. | 17-3011 |
| R12 | 500,000 Ω | ¼ W. | 17-2070 |
| R13 | 8,000 Ω | ¼ W. | 17-4290 |
| R14 | 500,000 Ω | ¼ W. | 17-2070 |
| R15 | 60,000 Ω | ½ W. | 17-4190 |
| R16 | 250,000 Ω | ¼ W. | 17-3011 |
| R17 | 500,000 Ω | ¼ W. | 17-2070 |
| R18 | 400 Ω | ½ W. | 17-4189 |

### TRANSFORMERS

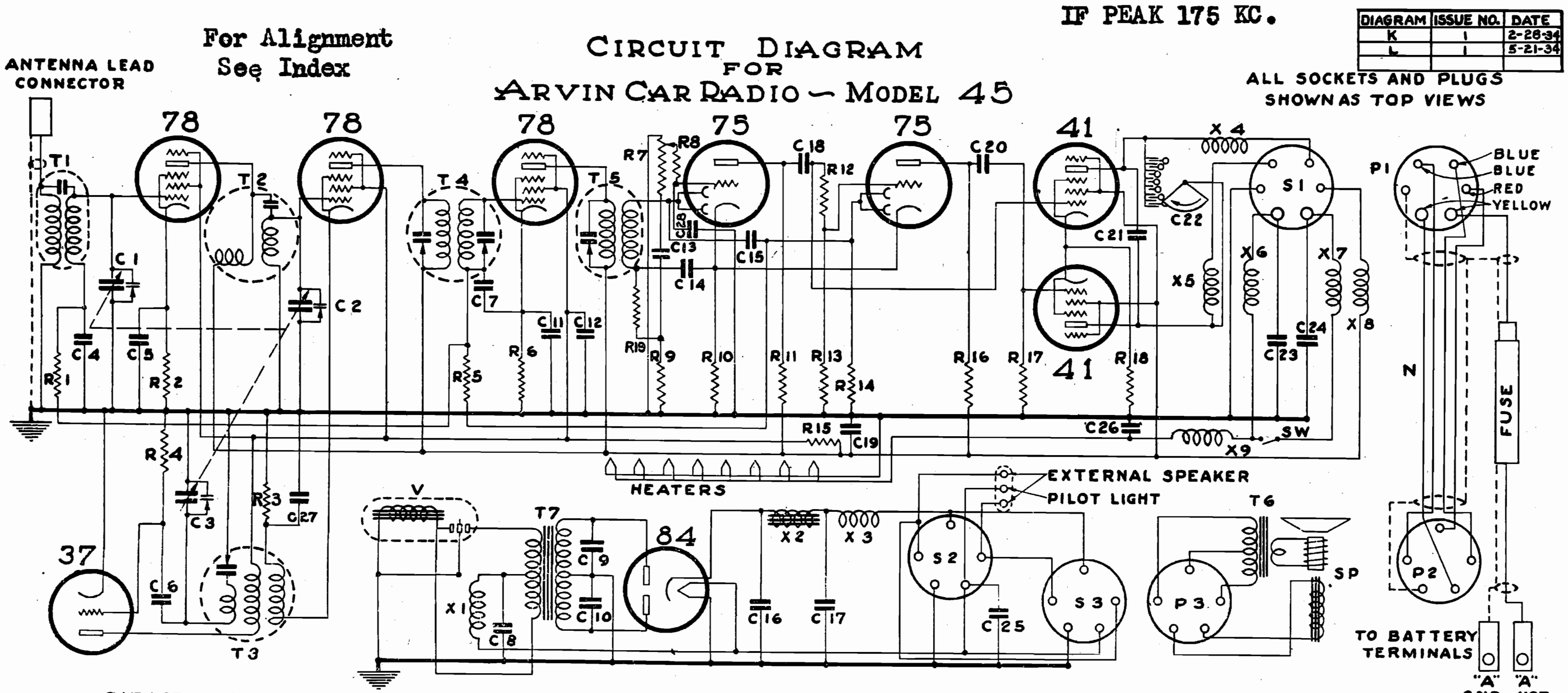
| | Description | Part No. |
|---|---|---|
| T1 | Antenna | 00-4134-1 |
| T2 | Radio Frequency | 00-4132-1 |
| T3 | Oscillator | 00-4133 |
| T4 | 1st Intermediate Freq. | 00-2258-A |
| T5 | 2nd Intermediate Freq. | 00-2259 |
| T6 | Output | 00-4112 |
| T7 | Power | 00-4101 |

### CHOKES

| | Description | Part No. |
|---|---|---|
| X1 | Center Tap Primary R. F. | 00-4131 |
| X2 | Filter | 00-4141 |
| X3 | "B" Radio Frequency | 00-2181-1 |
| X4 | Plate Radio Frequency | 00-2181-1 |
| X5 | Plate Radio Frequency | 00-2181-1 |
| X6 | "A" Radio Frequency | 00-4130-1 |
| X7 | "A" Radio Frequency | 00-4130-1 |
| X8 | "B" Radio Frequency | 00-2181-1 |
| X9 | "A" Radio Frequency | 00-4131 |

MODEL 45 Above E40356L
Schematic, Parts List
Type 2

# NOBLITT SPARKS INDUSTRIES




| CAPACITORS | Description | | Part No. |
|---|---|---|---|
| C 1, C 2, C 3 | 3 Gang Variable | | 00-4182-1 |
| C 4 | .05 *uf* | 160 V. | 17-4329 |
| C 5 | .1 *uf* | 200 V. | 17-2097 |
| C 6 | 100 *uuf* | 600 V. Mica | 17-2064 |
| C 7 | .01 *uf* | 160 V. | 17-4291 |
| C 8 | .5 *uf* | 10 V. | 17-2224 |
| C 9, C10 | .02 *uf* | 1000 V. Twin | 17-4193 |
| C11 | .1 *uf* | 200 V. | 17-2097 |
| C12 | .1 *uf* | 200 V. | 17-2097 |
| C13 | .01 *uf* | 160 V. | 17-4291 |
| C14 | 500 *uuf* | 600 V. Mica | 17-2211 |
| C15 | 500 *uuf* | 600 V. Mica | 17-2211 |
| C16 | 12 *uf* | 450 WVDC | Dual Elec. |
| C17 | 4 *uf* | 500 PVDC | 17-4184 |
| C18 | .01 *uf* | 400 V. | 17-2189 |
| C19 | .5 *uf* | 300 V. | 17-3037 |
| C20 | .01 *uf* | 400 V. | 17-2189 |

| CAPACITORS | Description | | Part No. |
|---|---|---|---|
| C21 | .001 *uf* | 600 V. Mica | 17-4292 |
| C22 | Tone Control | | 17-4151 |
| C23 | .5 *uf* | 10 V. | 17-2224 |
| C24 | .5 *uf* | 10 V. | 17-2224 |
| C25 | .5 *uf* | 10 V. | 17-2224 |
| C26 | .002 *uf* | 600 V. Mica | 17-2063 |
| C27 | .1 *uf* | 200 V. | 17-2097 |
| C28 | 100 *uuf* | 600 V. Mica | 17-2064 |

## MISCELLANEOUS

| | | |
|---|---|---|
| N—Interconnecting Cable, Complete | | 00-4180 |
| SP—Speaker | | 19-4228 |
| SW—Switch (Integral with R7) | | 17-4152 |
| V—Vibrator | | 29-4186 |

Socket S1 Receives Plug P1
Socket S2 Receives Plug P2
Socket S3 Receives Plug P3
NOTE: On orders for replacement parts, state part number and quantity desired. See price list for hardware replacements.

| RESISTORS | Description | | Part No. |
|---|---|---|---|
| R 1 | 1,000,000 Ω | ¼ W. | 17-2080 |
| R 2 | 500 Ω | ¼ W. | 17-2088 |
| R 3 | 3,000 Ω | ¼ W. | 17-2090 |
| R 4 | 50,000 Ω | ¼ W. | 17-2075 |
| R 5 | 1,000,000 Ω | ¼ W. | 17-2080 |
| R 6 | 500 Ω | ¼ W. | 17-2088 |
| R 7 | 250,000 Ω Volume Control | | 17-4152 |
| R 8 | 250,000 Ω | ¼ W. | 17-3011 |
| R 9 | 500,000 Ω | ¼ W. | 17-2070 |
| R10 | 2,500 Ω | ¼ W. | 17-2087 |
| R11 | 250,000 Ω | ¼ W. | 17-3011 |
| R12 | 500,000 Ω | ¼ W. | 17-2070 |
| R13 | 8,000 Ω | ¼ W. | 17-4290 |
| R14 | 500,000 Ω | ¼ W. | 17-2070 |
| R15 | 25,000 Ω | 1 W. | 17-3010 |
| R16 | 250,000 Ω | ¼ W. | 17-3011 |
| R17 | 500,000 Ω | ¼ W. | 17-2070 |
| R18 | 400 Ω | ½ W. | 17-4189 |
| R19 | 30,000 Ω | ¼ W. | 17-4276 |

| TRANSFORMERS | Description | Part No. |
|---|---|---|
| T1 | Antenna | 00-4134-1S |
| T2 | Radio Frequency | 00-4132-1S |
| T3 | Oscillator | 00-4133S |
| T4 | 1st Intermediate Freq. | 00-4489 |
| T5 | 2nd Intermediate Freq. | 00-4488 |
| T6 | Output | 00-4112 |
| T7 | Power | 00-4101 |

| CHOKES | | |
|---|---|---|
| X1 | Center Tap Primary R. F. | 00-4131 |
| X2 | Filter | 00-4141 |
| X3 | "B" Radio Frequency | 00-2181-1 |
| X4 | Plate Radio Frequency | 00-2181-1 |
| X5 | Plate Radio Frequency | 00-2181-1 |
| X6 | "A" Radio Frequency | 00-4130-1 |
| X7 | "A" Radio Frequency | 00-4130-1 |
| X8 | "B" Radio Frequency | 00-2181-1 |
| X9 | "A" Radio Frequency | 00-4131 |

**NOTE: The above circuit diagram is effective for all Model 45 Arvin Car Radios, beginning with and including that bearing the Serial No. E40356L.**

MODEL 45
Voltage,Test Data
Coil Resistance

# NOBLITT SPARKS INDUSTRIES

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

| Tube | Heaters | Plate | Screen | Cathode | Suppressor | Control |
|---|---|---|---|---|---|---|
| 78 | 6.3 | 250 | 60 | 2.2 | 2.2 | *2.0 |
| 77 | 6.3 | 250 | 60 | 2.2 | 2.2 | *2.2 |
| 78 | 6.3 | 250 | 60 | 1.6 | 1.6 | *1.4 |
| 37 | 6.3 | 60 | — | 0 | — | *6—1500 KC |
| 75 | 6.3 | 135 | — | 1.3 | — | *1.3 |
| 75 | 6.3 | 135 | — | 1.3 | — | *1.3 |
| 41 | 6.3 | 245 | 250 | 18 | — | *18 |
| 41 | 6.3 | 245 | 250 | 18 | — | *18 |
| 84 | 6.3 | 275 (AC) | — | 255 | — | — |

* Measured with vacuum tube voltmeter only.

## MODEL 45 POINT TO POINT RESISTANCE CHECK

All readings to ground unless otherwise specified. Readings taken with all tubes removed from set and R. F. chassis disconnected from power pack unit.

**1st 78**
+ Heater ........ Inf.
— Heater ........ 0
Plate to B+ ........ 50
Screen Grid to B+ ........ 60,000
Suppressor Grid ........ 260
Cathode ........ 260
Control Grid ........ 2,500,000

**75**
+ Heater ........ Inf.
— Heater ........ 0
Plate to B+ ........ 250,000
Diode ........ 500,000
Diode ........ 500,000
Cathode ........ 2500
Control Grid ........ 8000

**84**
+ Heater ........ Inf.
— Heater ........ 0
Plate ........ 190
Plate ........ 160
Plate to Plate ........ 350
Cathode ........ Inf.†

†Reads leakage of electrolytic condenser.

**77**
+ Heater ........ Inf.
— Heater ........ 0
Plate to B+ ........ 100
Screen Grid to B+ ........ 60,000
Suppressor Grid ........ 260
Cathode ........ 260
Control Grid ........ 6

**41**
+ Heater ........ Inf.
— Heater ........ 0
Plate to B+ ........ Inf.
Screen Grid to B+ ........ 2
Control Grid ........ 508,000
Cathode ........ 400

**2nd 78**
+ Heater ........ Inf.
— Heater ........ 0
Plate to B+ ........ 100
Screen Grid to B+ ........ 60,000
Suppressor Grid ........ 500
Cathode ........ 500
Control Grid ........ 1,500,000

**75**
+ Heater ........ Inf.
— Heater ........ 0
Plate to B+ ........ 250,000
Diode ........ 500,000
Diode ........ 500,000
Cathode ........ 2500
Control Grid:
V. C. on ........ 500,000
V. C. off ........ 250,000

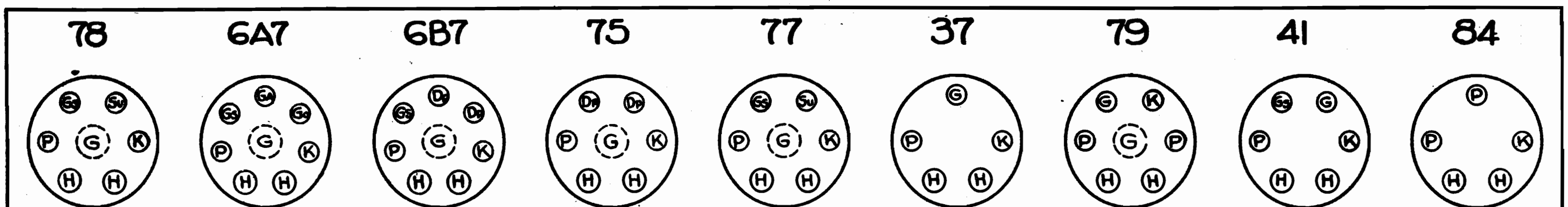
**37**
+ Heater ........ Inf.
— Heater ........ 0
Plate to B+ ........ 60,000
Control Grid ........ 65,000
Cathode ........ 0

**41**
+ Heater ........ Inf.
— Heater ........ 0
Plate to B+ ........ Inf.
Screen Grid to B+ ........ 2
Control Grid ........ 508,000
Cathode ........ 400

## COIL RESISTANCES

Ant. Primary ........ 2
Ant. Secondary ........ 6
R. F. Primary ........ 50
R. F. Secondary ........ 6
Osc. Primary ........ 2
Osc. Secondary ........ 7
1st I. F. Primary ........ 100
1st I. F. Secondary ........ 100
2nd I. F. Primary ........ 82
2nd I. F. Secondary ........ 82
Primary Output Transformer ........ 600
Voice Coil ........ 35

LOOKING AT BOTTOM OF TUBE SOCKETS




SYMBOLS — H-HEATER; P-PLATE; K-CATHODE; G-CONTROL GRID; GS-SCREEN GRID; GA-ANODE GRID
GO-OSCILLATOR GRID; SU-SUPPRESSOR GRID; DP-DIODE PLATE

NOBLITT SPARKS INDUSTRIES

# ALIGNMENT PROCEDURE FOR ARVIN

## Models 15, 25, 35, and 45

NOTE: All adjustments in the following instructions should be made with an output meter or some indicating device connected with the output of the radio receiver to insure maximum sensitivity and selectivity: Output meter may be connected to external speaker jack on all models.

Remove the radio chassis from the case. Connect the output of the oscillator to the grid cap of the 78 detector (2nd tube in set) or 6A7 tube after removing the grid clip and adjust the oscillator to 175 kilocycles. Set the output of the oscillator to the lowest amount giving a readable deflection of the output meter. Adjust with a Bakelite screwdriver the first and second I. F. transformer for maximum output. Replace the grid clip, connect the output of the oscillator to the antenna terminal of the radio set through a .0001 mfd mica condenser and set the oscillator to 1530 kilocycles. Rotate the variable condenser fully out of mesh, then back until the rotor plates begin to enter the stator. Adjust the oscillator padder, which is the section opposite shaft end, until the maximum signal is attained. Then readjust the oscillator input to 1400 kilocycles, rotate the variable condenser until the signal is again tuned in.

Now adjust the antenna (shaft end) and R. F. (middle) padders until the output is again at maximum.

Then adjust the oscillator series padder condenser (located by the 6B7 tube in the Model 15; on the left-hand side in the Model 25; in the top of the oscillator coil can in the compartment with the 37 tube in the Models 35 and 45) until a maximum deflection is obtained at 550 to 600 kilocycles (condenser plates almost in full mesh). At 600 kilocycles the adjustment of the series padder condenser are both variable; each dependent on the other. However, there is only one point where the relation between their settings will give maximum sensitivity.

NOTE: After installation to car antenna slight readjustment of antenna padders, through holes provided on all models (see installation notes) will improve sensitivity and performance. Always adjust at about ten to twenty dial setting.

# SPECIAL SERVICE BULLETIN

## for Models 35 and 45

***Motor Noise Elimination***

The Model 35 and 45 Arvin Car Radios have been especially designed for ease of elimination of motor noise.

The Chassis case is well shielded to prevent chassis pick-up and a special motor noise suppression system has been built into the set to block out "feed-back" through the "A" line. With these two sources of entry of motor noise blocked any such interference present must be picked up by the antenna and carried into the set exactly as a station signal. This type of motor noise is the easiest to eliminate and can usually be suppressed by standard suppression.

In rare cases, however, where a car is exceptionally "hot" it has been found that a slight amount of "chassis-pick-up" is present in the Model 35 and 45 Arvin sets—and the purpose of this bulletin is to suggest a method of eliminating this.

Solder one end of a 3½" length of shielding to the underneath side of the condenser pulley mounting bracket directly between the two 6-32 screws which hold the Bowden wire housing clamp onto this bracket.

The other end of this piece of shielding is then hung over the edge of the chassis case on top of the copper case ground shim, and when the cover is put on the set, it automatically bonds the condenser pulley assembly to the outer case.

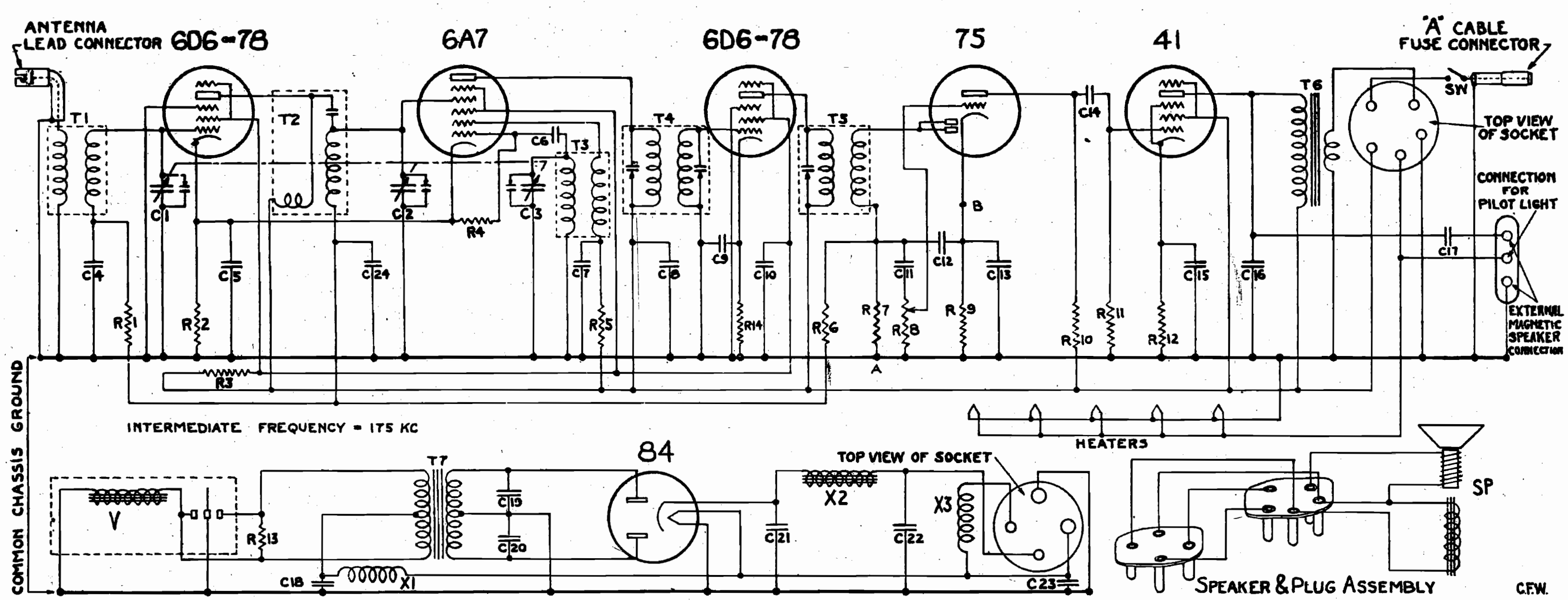
It has been found that this extra ground eliminates the last trace of "chassis-pick-up" motor noise interference from the Model 35 and 45 Arvin Car Radios.

MODEL 16
Schematic, Parts List

# NOBLITT SPARKS INDUSTRIES

| DIAGRAM | ISSUE NO. | DATE |
|---|---|---|
| B | 1 | 7-23-34 |

## Circuit Diagram of Arvin Car Radio Model 16




### CAPACITORS

| | Description | | Part No. |
|---|---|---|---|
| C 1, C 2, C 3 | 3 Gang Variable | | 19-2248 |
| C 4 | .05 *uf* | 160 V. | 17-4329 |
| C 5 | .1 *uf* | 100 V. | 17-4393 |
| C 6 | 100 *uuf* | 600 V. | 17-2064 |
| C 7 | .001 *uf* | 600 V. | 17-4292 |
| C 8 | .25 *uf* | 300 V. | 29-4188 |
| C 9 | .02 *uf* | 100 V. | 17-4394 |
| C10 | .1 *uf* | 200 V. | 17-2097 |
| C11 | .05 *uf* | 160 V. | 17-4329 |
| C12 | 500 *uuf* | 600 V. | 17-2211 |
| C13 | .5 *uf* | 10 V. | 29-2224 |
| C14 | .05 *uf* | 300 V. | 17-3006 |
| C15 | 12. *uf* | 25 V. | 17-2082 |
| C16 | .007 *uf* | 600 V. | 17-4392 |
| C17 | .02 *uf* | 400 V. | 17-2214 |
| C18 | 1. *uf* | 10 V. | 17-4395 |
| C19, C20 | .02 *uf* Twin | 1000 V. | 29-4193 |

### CAPACITORS

| | Description | | Part No. |
|---|---|---|---|
| C21, C22 | 12. *uf*, 4. *uf* Twin | 450 V. | 17-4201 |
| C23 | .5 *uf* | 10 V. | 29-2224 |
| C24 | .05 *uf* | 160 V. | 17-4329 |

### MISCELLANEOUS

| | |
|---|---|
| SP—Dynamic Speaker | 17-4226 |
| SW—Switch, Part of R8 | 17-4152-1 |
| V—Vibrator Unit | 29-2169C |

In districts where signal strength is abnormally low, a slight increase in sensitivity may be obtained by removing the inter-channel noise suppression feature. Disconnect R7 at A and reconnect at B.

### RESISTORS

| | Description | | Part No. |
|---|---|---|---|
| R 1 | 100,000 Ω | ¼ W. | 17-2068 |
| R 2 | 260 Ω | ¼ W. | 17-2066 |
| R 3 | 30,000 Ω | ¼ W. | 17-4276 |
| R 4 | 100,000 Ω | ¼ W. | 17-2068 |
| R 5 | 20,000 Ω | ¼ W. | 17-2072 |
| R 6 | 1 Megohm | ¼ W. | 17-2080 |
| R 7 | 150,000 Ω | ¼ W. | 17-4283 |
| R 8 | 250,000 Ω | Pot. | 17-4152-1 |
| R 9 | 5,000 Ω | ¼ W. | 17-2071 |
| R10 | 250,000 Ω | ¼ W. | 17-3011 |
| R11 | 500,000 Ω | ¼ W. | 17-2070 |
| R12 | 800 Ω | ½ W. | 17-4273 |
| R13 | 200 Ω | ¼ W. | 17-4287 |
| R14 | 2,000 Ω | ¼ W. | 17-4202 |

R14 Note: This resistor may be varied to control sensitivity.

### TRANSFORMERS

| | Description | Part No. |
|---|---|---|
| T1 | Antenna | 00-3020-1 |
| T2 | Radio Frequency | 00-3017-1 |
| T3 | Oscillator | 00-4482-1 |
| T4 | First I F | 00-2258A |
| T5 | Second I F | 00-4476 |
| T6 | Output | 00-4111 |
| T7 | Power | 00-4102-2 |

### CHOKES

| | | |
|---|---|---|
| X1 | C T Primary | 00-2178E |
| X2 | Filter | 00-4141 |
| X3 | Filament | 00-2178F |

Note: On orders for replacement parts, state part number and quantity desired.

# MISCELLANEOUS GENERAL INFORMATION RELATIVE TO REMOVING MOTOR NOISE

When primary wires to the coil run through the same conduit as the secondary or spark plug wire run—remove this wire from the conduit and shield it if necessary, grounding the shielding at both ends to some part of the motor block or the bulkhead between the passenger's compartment and the motor.

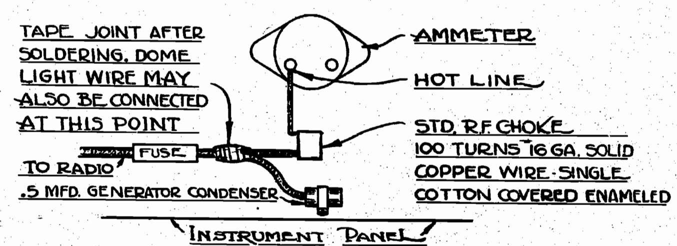
Also, be sure when shielding the secondary lead from the coil to the distributor to ground both ends of this shield, either to the motor or to the bulkhead. On some few cars the hood over the engine appears to be ungrounded or at least is a very high resistance ground and should be grounded with pigtails of shielding cable soldered to both sides of the hood and also to the motor bulkhead or motor block.

On cars equipped with co-incidental lock on the steering post an extra generator condenser should be installed from one switch terminal to ground. The exact terminal on which to install this condenser can be determined only by experiment. The condenser body should be grounded to the dash or to the motor bulkhead. On some Ford V-8's it is necessary to install an extra generator condenser on the generator to the other terminal of the cutout relay, thus making two condensers on the same relay—one on each terminal to ground.

On some Chevrolets, generally of the older models, it is necessary to install an extra condenser from the primary of the ignition coil to ground. The exact terminal to connect this condenser to can only be determined by experiment. Be sure that the grounding of this condenser is solid, preferably to the motor block or to the motor bulkhead.

On all cars equipped with "Electrolock" it may be found necessary to remove the primary return wire from the switch to the coil and replace it with a new wire run through a piece of shielding loom grounded near the switch and also to the metal bulkhead on the motor side of the dash. This lead should be brought out through the dash as far as possible from the rest of the electrical wiring of the car.

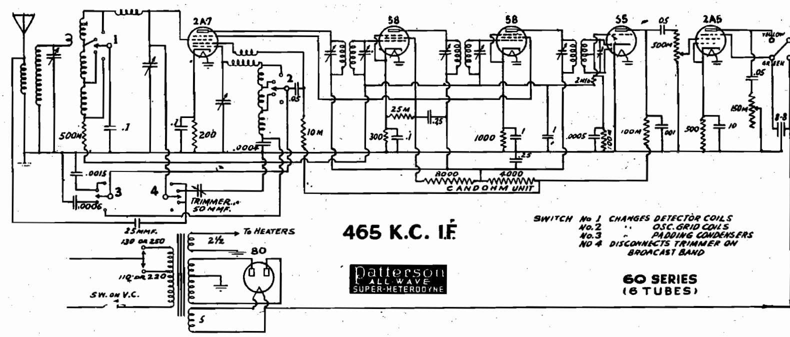
It may be pointed out that loose connections anywhere in the electrical circuit of the car will cause motor noise or what appears to be motor noise. If this condition exists it is wise to check the entire electrical circuit of the car and make sure that all connections are tight before trying any other extreme methods of motor noise elimination.

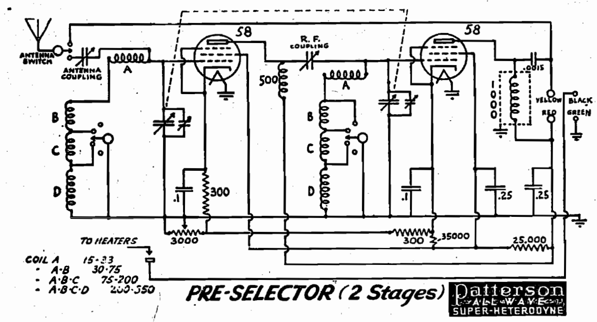



The use of a choke and condenser at the ammeter with the 10A has proven to be a great help in the elimination of motor noise. (See illustration above.)

MODEL 60 Series
Schematic
MODEL Pre-Selector
Schematic,Data

# PATTERSON RADIO CO.




## PHONOGRAPH CONNECTION

### INSTRUCTIONS FOR CONNECTING ELECTRIC PICKUP TO ALL MODEL RECEIVERS:

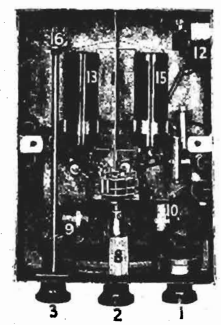
The use of jacks and switches for operation of electric phonograph pickups is unsatisfactory with the modern highly perfected radio receivers. The electrical loss in the long leads used to connect the switch and jack into the circuit is enough to unbalance these highly sensitive, long distance receivers and the full capabilities of the set are lost.

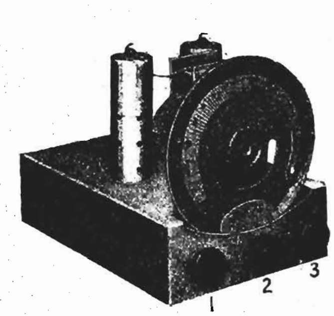
For best radio and phonograph operation the rules below should be followed. With the methods graphically shown, full efficiency of the radio and phonograph are utilized and the greatest satisfaction is obtained.

1. Sensitivity Control
2. Push, Band Change, Normal Preselection Dial
3. Antenna Change-over Switch
8. Switch Clutch
9. 15-33 First Stage Coil
10. 15-33 Second Stage Coil
11. Band Change Switch, Silver Plated Contacts
12. Output "B" + Choke
13. 3-Band Coils, First Stage
14. Shield
15. 3-Band Coils, Second Stage
16. Antenna Change-over Switch

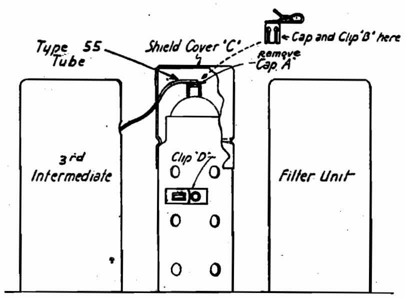
Weight Packed, 22 Lbs.

Same type construction as in the PR-10.





1. Sensitivity Control
2. Push Band Change, Normal Preselection Dial
3. Antenna Change-over Switch
4. Two-Gang Condenser, Rubber Mounted
5. First R.F. Stage, No. 58
6. Second R.F. Stage, No. 58
7. Band Indicator

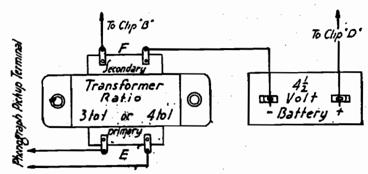



### METHOD No. 1

Remove shield cover "C." Remove cap "A."

Place cap "B," with attached clip, on top of 55 tube. Connect one phonograph pickup wire to clip "B." Connect other phonograph wire to clip "D." Phonograph will now play and volume control on radio will control phonograph.

Some pickups work better with a 4½ volt C battery in series with lead that connects to clip "D." (+) to clip. (—) to pickup lead.




### METHOD No. 2

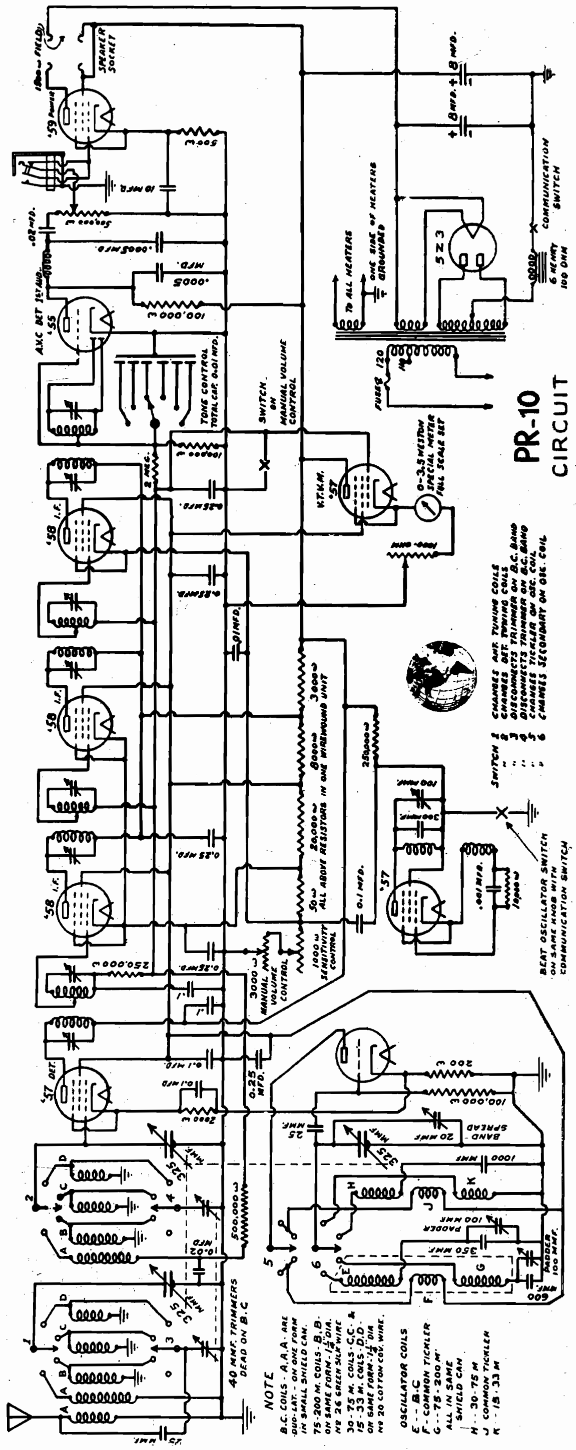
Use Method 2 where extreme volume is required. Remove shield cover "C." Remove cap "A." Place cap "B" (with attached clip), on top of 55 tube. Connect one of transformer (secondary) terminals to negative terminal (—) of 4½ volt battery. Connect positive terminal of battery (+) to clip "D." Connect other (secondary) terminal of transformer to clip "B." Connect phonograph pickup terminal wires to transformer primary terminals. Any good audio transformer may be used as a step up for phonograph use. Phonograph will now operate and volume control on radio set will control phonograph volume.

Cap "A" and cover "C" are not used when phonograph is played. Remove cap "B" and replace cap "A" for radio operation.

**MODEL PR-10**
**Schematic**
**Socket**

# PATTERSON RADIO CO.

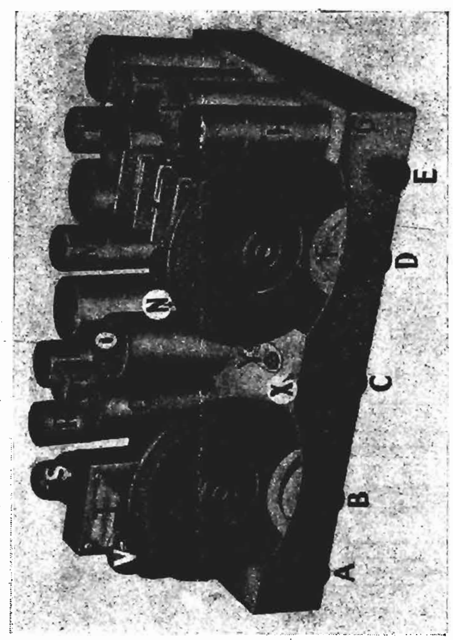
To rebalance the receiver does not require any equipment. The meter will indicate the exact resonance point of the I.F. trimmers and also the condenser gang. Proceed as follows: Set band spread dial at "O," then tune in a station on the high frequency end of the Broadcast band (any station around 1400 K.C. is okay). Next, adjust the trimmer on the condenser section nearest the dial until the station reads exactly on its known K.C. Now, tune in a station in around 600 K.C. and be careful to be on the exact center of the carrier. All of the above operations must be made with the manual control in off position. Next, turn the sensitivity control toward minimum so that the meter reads about R-9. Now, adjust each of the eight I.F. trimmers very carefully until the meter swings the farthest to the right. You probably will not be able to increase the gain more than 1.5-R. It should not be necessary to turn any trimmer more than 1/8 of a turn.



PR-10 CIRCUIT

Everything from A to Z

A—"B" on and off, Beat Oscillator switch.
B—Push, Tone Control. Normal, Band Spread.
C—Volume Control, Power Switch.
D—Push, Band Change. Normal, Main Tuning.
E—Short-Wave Trimmer, two gang.
F—Band Indicator.
G—Heavy 18-gauge Chromium Plated Chassis.
H—First Detector—#57.
I—First I. F. Tube—#58.
J—B. C. and 75 Meter Oscillator.
K—Second I. F. Tube—#58.
L—Three Stages I. F.
M—Third I. F. Tube—#58.
N—High Frequency Oscillator Tube—#56.
O—Beat Oscillator Control.
P—Second Detector and AVC Tube—#55.
Q—Beat Oscillator Tube—#57.
R—Vacuum Tube Volt Meter—#57.
S—Output Tube—#59.
T—Heavy Duty Power Supply.
U—Moisture-proof Filter.
V—Rectifier Tube—5Z3.
W—Patterson Velvet Tuning Dials.
X—Manual Control Mounts Here.
Y—Sensitivity, "R" Meter Adjustments.
Z—Three-gang Condenser, Rubber Mounted.



PR-10 Chassis

MODEL G
Installation Data

PHILCO RADIO & TELEV. CORP.

# CHRYSLER • DODGE • PLYMOUTH • CAR RADIO

The Model "CGD" is a custom built radio which is made exclusively for the Chrysler Corporation and its various car divisions and which is sold only through their dealer organizations.

The Receiver and controls are specially designed for installation in the 1934 Chrysler Six Models CA and CB, the Dodge Models DR and DS and the Plymouth Models PE and PF. Many of these cars will be equipped at the car factory with the Philco custom built radio. In many others, the installation will be made by you in your service stations.

Don't file this "Service Broadcast" in your Office. The men in your service station must know how to install and service these radios if you expect to get your share of this profitable installation and service work.

Carefully unpack the cartons and check the contents with the material packing lists. Examine the parts and compare them with illustrations given in these instructions so that you may become familiar with them and thus make the installation easily and quickly.

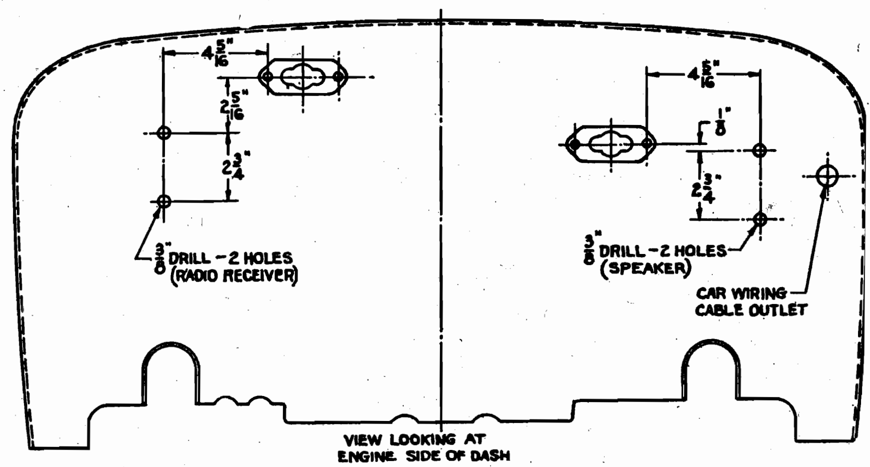



FIGURE 1

## *Receiver and Speaker Installation*

Refer to Figure 1, which gives detailed dimensions for the location and drilling of the holes in the dash. Remove the paint from the dash for ¾" from around the holes to insure good ground contact after drilling. All dimensions are shown from the engine side of the dash. After drilling the holes, bolt the two (2) mounting brackets to the inside of the dash, using both the flat and the lockwashers under the nuts. The left-hand bracket (over the steering column) is for the speaker unit; the right-hand bracket is for the Receiver.

Remove the car wiring cable outlet grommet cap on the left-hand side of the dash, so that the battery cable can be installed. Push the metal fuse housing end of the cable through the grommet from the engine side, leaving just enough slack so that the cable can be connected and fastened in place as shown in Figure 4. Route the cable through the clip that holds the car wiring harness and along under the floor boards to the battery. Replace the grommet and cap, but do not connect the cable terminal to the battery terminal at this time.

The Receiver mounting plate must be fastened to the Receiver housing, using the four (4) self-tapping screws. Four (4) holes are provided for these screws in the side of the housing. To fasten the speaker mounting plate to the speaker, first remove the four (4) hex-head machine screws from the back of the speaker. Use these same four (4) screws to fasten the mounting plate to the back of the speaker. Figures 2 and 3 show the correct positions of the brackets and mounting plates. Hang the Receiver on its bracket and fasten it securely with the hex-head retaining screw at the bottom of the plate.

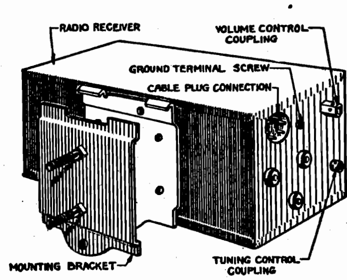



FIGURE 2

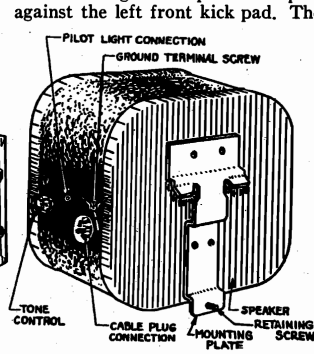



FIGURE 3

Before installing the speaker, remove the car wiring fuse on ammeter. To get the speaker in place turn it sideways with the back against the left front kick pad. Then slide it in between the kick pad and the steering column. Push the clutch pedal down to get sufficient clearance and then turn the speaker around over the steering column with its back against the dash. Hang the speaker in place on its bracket and fasten it securely with the hex-head retaining screw at the bottom of the plate. The battery cable must be placed over top of speaker.

Connect the interconnecting cable to both the Receiver and the Speaker, the six (6) hole plug connecting to the Receiver and the four (4) hole plug to the Speaker. The shield terminals at the cable ends must be grounded under their respective ground terminal screws on the Receiver and Speaker housings, shown in Figures 2 and 3. Ground the pigtail in the center of the cable to the dash, using the hole that holds the dash lining retainer and the 8-32 screw.

The antenna lead branches out of the interconnecting cable near the Receiver. Place this lead over the top of the Receiver, splice, and tape it to the antenna lead-in as close as possible to where the lead-in leaves the front right windshield pillar. Cut off excess car

MODEL G
Installation Data
Service Data

PHILCO RADIO & TELEV. CORP.

lead-in. The shielding must be grounded to the cowl panel by drilling a 1/8" hole where the hood overlaps and as close to the A pillar as possible, using the 8-32 bolt and nut supplied for this purpose. (See Figures 4 and 5.) Remove paint from around hole.

Place the fuse and fuse insulator in the metal fuse housing of the battery cable and connect it to the small fuse connector which branches out of the interconnecting cable close to the Speaker. The two (2) shield terminals at the fuse housing must be connected under the same terminal screw that is used to ground the speaker cable shield at the speaker. Figure 4 shows the general layout of the cables and connections.

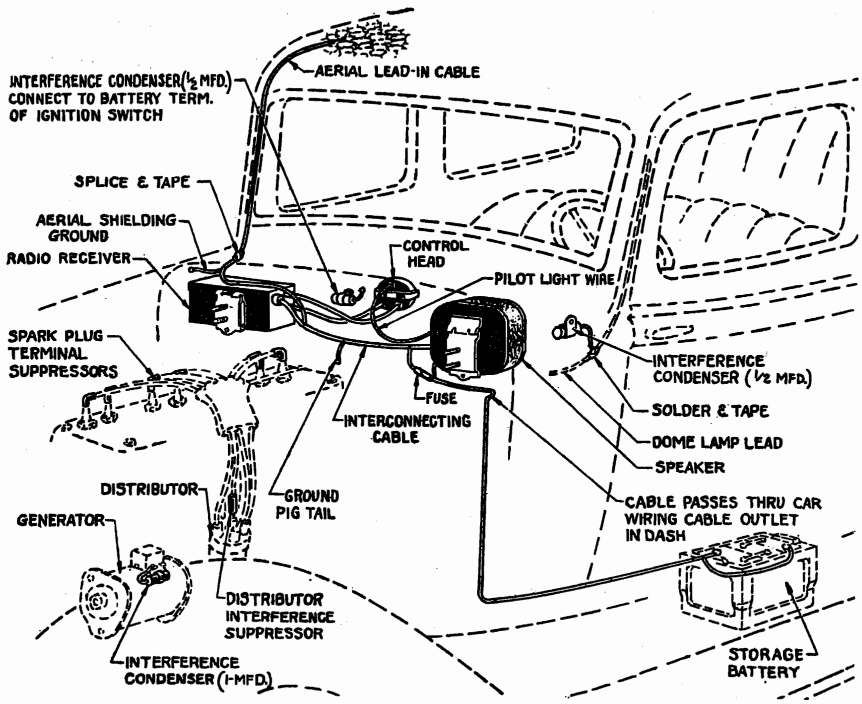



FIGURE 4

## *Instrument Panel Control*

Remove the ash receiver from the panel with an upward pull. Remove the ash receiver bezel from the panel by compressing the retaining tabs at the bottom of the bezel assembly. This can be done best by using a screw-driver and working from in back of the instrument panel. While pushing up on an end tab, pull the bezel forward and it will come out.

Loosen the two (2) screws which secure the instrument board brace to the instrument board flange. The cradle assembly can then be slid forward. Next, loosen the bolts on the brace in back of the instrument panel and remove the toggle spring. Slide the entire assembly forward and remove. Figure 6 gives the details of the ash receiver assembly, while Figure 7 gives an enlarged view of the Section A in Figure 6. Be sure to tighten all bolts and screws that were loosened for this operation. (See Note 1.)

Loosen the car lighting switch to permit more working space. While this operation is not absolutely necessary, it makes the following operation easier.

Push the flexible shafts of the control through the opening in the panel and install the control unit in this opening.

The "U" retaining clamp must be placed over the studs on the back of the control and the hex-

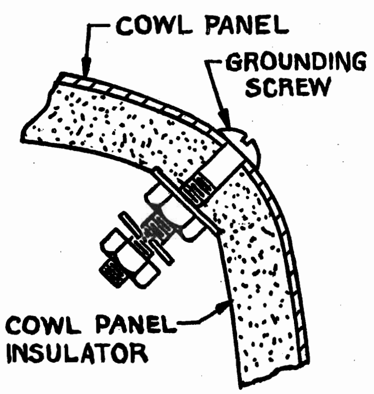



FIGURE 5

nuts tightened to draw the control bezel flush with the instrument panel. (See Figure 8.) Replace and tighten the car lighting switch.

The flexible shafts must be placed around to the Receiver. The ends of the two (2) shafts are different so that they can only be installed in the proper couplings. The long shaft and housing is on the left of the control unit, while the short one is on the right.

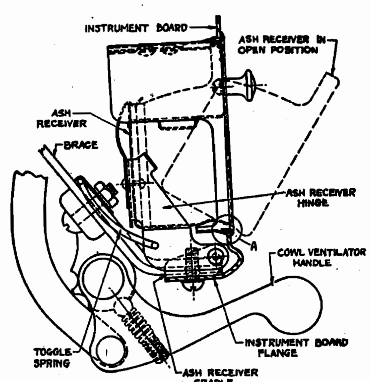



FIGURE 6

The set screws on the coupling bushings must be loosened sufficiently to allow the shaft housings and couplings to be properly seated. After the shafts have been coupled, tighten the set screws again.

## *Battery Connections*

Connect the battery lead to the negative terminal of the storage battery. Be sure this connection is tight. The shield terminal must be connected to positive or ground terminal of the storage battery.

The black lead from the control unit must be connected to the pilot light terminal on the Speaker. (See Figure 3.)

## *Adjustment*

Turn on the Receiver and tune in a station whose frequency in kilocycles is known. (The numbers on the dial represent channel numbers which, with the addition of a cipher, become the frequency numbers.) Pull the knob from the right-hand control shaft and loosen the set screw found there. (See Figure 8.) Turn the shaft until the indicator points to the correct number on the dial. Then tighten the set screw and replace the knob.

## *Motor Interference Suppression*

Cut the elbow terminals from the spark plug cables and screw on the molded bakelite elbow suppressor terminals. Cut off the end of the distributor center lead cable and screw the straight molded resistor into the lead. Then plug this into the distributor cap. Install a one microfarad by-pass condenser on the generator. Mount it on the generator frame under the screw that holds the generator relay in place. Connect the condenser lead under the screw that connects the generator battery lead to the relay

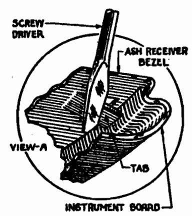



FIGURE 7

NOTE 1.—A hole large enough for the dash control has been provided in the center of the instrument panel in all standard Plymouth Model, Code PF. This hole is covered with a special Plymouth plate which can be removed easily by forcing it out from the rear with the fingers or with a screw-driver.

(see Figure 4). Install a ½ microfarad by-pass condenser, splicing and soldering it to the dome light lead as close as possible to the point where it enters the windshield pillar. The condenser must be fastened to the cowl panel in front of the hood line by drilling a ⅛" hole where the hood overlaps and as close to the pillar as possible, using the 8-32 bolt and nut supplied for this purpose. (See Figures 4 and 5.) Remove paint from around hole. Replace the car lighting fuse—test the lights and horn.

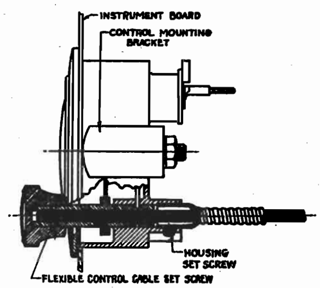



FIGURE 8

There may be some interference caused by an excessive gap between the distributor rotor and the high tension contacts. This can be overcome by lengthening the contact end of the rotor.

The following procedure should be carefully followed: Remove the distributor cap and chalk the inside faces of the stationary contacts. Remove the rotor and place the contact end on a small anvil or steel block. Peen or hammer the end carefully with a small machinists' hammer. Replace the rotor and the cap, then turn the engine over by hand. After a couple of revolutions, examine the distributor cap to see if the rotor has scraped or touched any of the stationary contacts in the cap. If so, dress lightly with a fine file. Repeat the above operation until the rotor just clears the contacts.

In some stubborn cases, it may be necessary to solder a bond to the control wires and tubes where they enter the dash, grounding them securely under one of the dash grommet cap screws. No. 14 stranded and tinned copper wire can be used for this purpose, a length of which is provided (see Figure 9). Be sure that all the high tension wires are properly seated in their sockets in the distributor cap.

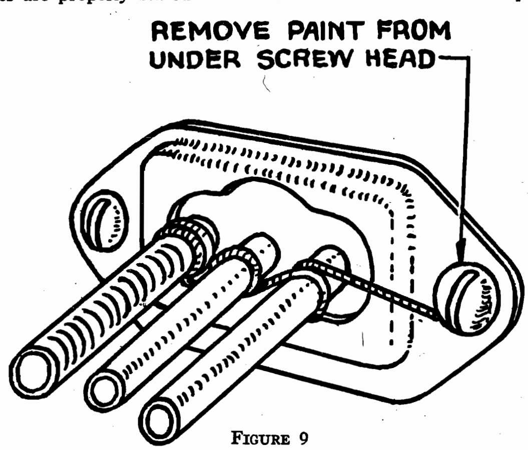



FIGURE 9

An additional ½ microfarad condenser may at times be used to advantage. This condenser should be mounted on the bottom edge of the instrument board and connected to one of the terminals on the ignition switch directly behind the instrument panel.

## *I. F. Transformer and Padders*

The new style I. F. transformer complete with padders is used in the Model G.

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figures 10 and 11.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 1.

If replacements are ever necessary, replace the entire coil assembly 32-1236 for the first I. F. stage and 32-1237 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

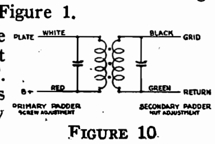



FIGURE 10

## *Model G Adjustments*

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the lid from the Receiver. Remove the grid cap from the 6A7 tube (for location see Figure 11).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 6A7 tube. (See Figure 11.) The output meter must be connected by means of an adapter to the small prong of the speaker plug and to the chassis.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

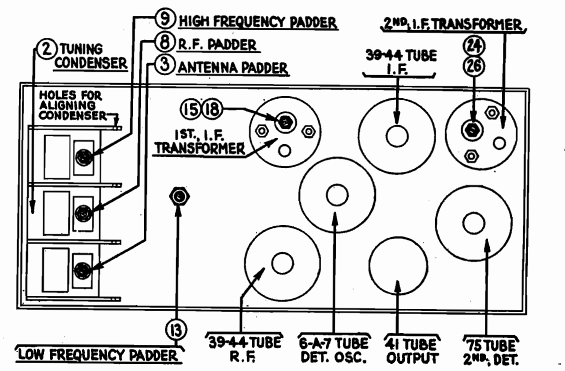



FIGURE 11

The padders 24 and 26 are adjusted first (Figures 11 and 12). Turn the adjusting screw 24 all the way in. A metal screw-driver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut 26 with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw 24 for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

Repeat the above procedure with the condensers 15 and 18.

After padding the first I. F. stage, remove the generator lead from the 6A7 tube and reconnect the grid lead to the 6A7 tube. Set the generator to 1500 K. C. and then connect the generator lead to the antenna lead.

There are four holes in line, one in each of the sections of the tuning condenser housing. (See Figure 11.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency padder 9 until the maximum reading is obtained in the output meter. This is the true setting for 1500 K. C., 150 on the dial scale.

Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder 8 and the antenna padder 3 are next adjusted for the maximum reading on the output meter.

Turn the condenser plates in mesh to 60 on the scale, 600 K. C., and readjust the signal generator to this frequency. Adjust the low-frequency padder 13 for the maximum meter reading.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

MODEL G
Schematic
Chassis Layout
Parts List

# PHILCO RADIO & TELEV. CORP.

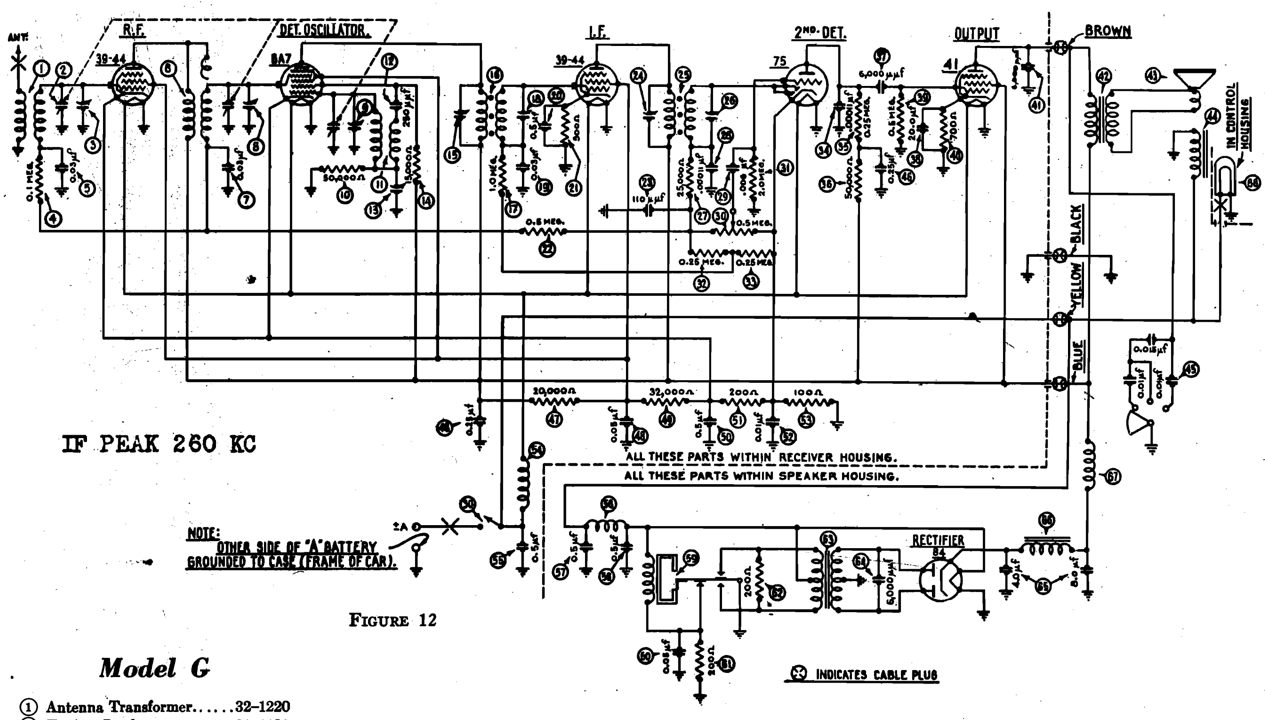



FIGURE 12

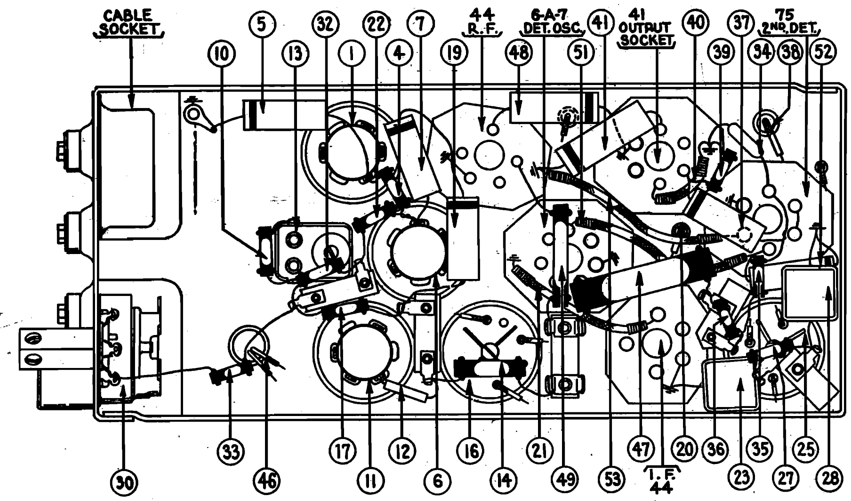



FIGURE 13

## Model G

(1) Antenna Transformer......32–1220
(2) Tuning Condenser........31–1182
(3) 1st Padder (on tuning cond.).......
(4) Resistor (99,000 ohms)..... 6099
(5) Condenser (.03 mfd.)......30–4025
(6) R. F. Transformer........32–1221
(7) Condenser (.03 mfd.)......30–4025
(8) 2nd Padder (on tuning cond.)......
(9) 3rd Padder (on tuning cond.)......
(10) Resistor (51,000 ohms)..... 6098
(11) Oscillator Transformer.....32–1222
(12) Condenser (.00025 mfd.)... 3082
(13) Padder..................31–6012
(14) Resistor (15,000 ohms)..... 6208
(15) Padder (Prim. 1st I. F.) part of 32–1236 assembly.......
(16) I. F. Transformer (1st)....32–1236
(17) Resistor (1,000,000 ohms)..33–1096
(18) Padder (Secondary 1st I. F.) part of 32–1236 assembly.......
(19) Condenser (.03 mfd.)......30–4025
(20) Condenser (.5 mfd.).......30–4018
(21) Resistor (500 ohms)....... 6977
(22) Resistor (500,000 ohms).... 6097
(23) Condenser (.00011 mfd.)...30–1006
(24) Padder (Prim. 2nd I. F.) part of 32–1237 assembly.......
(25) I. F. Transformer (2nd)....32–1237
(26) Padder (Secondary 2nd I. F.) part of 32–1237 assembly.......
(27) Resistor (25,000 ohms).....33–1013
(28) Condenser (.00011 mfd.)...30–1006
(29) Condenser (.006 mfd.).....30–4125
(30) Volume Control Assembly...33–5056
(31) Resistor (2,000,000 ohms)..33–1025
(32) Resistor (250,000 ohms)....33–1097
(33) Resistor (250,000 ohms)....33–1097
(34) Condenser (.00011 mfd.)...30–1006
(35) Resistor (250,000 ohms)....33–1097
(36) Resistor (51,000 ohms)....... 6098
(37) Condenser (.006 mfd.).....30–4123
(38) Condenser (20 mfd.).......30–2063
(39) Resistor (500,000 ohms).... 6097
(40) Resistor (700 ohms)....... 6443
(41) Condenser (.006 mfd.).....30–4024
(42) Output Transformer....... 2598
(43) Cone and Voice Coil.......36–3159
(44) Field Coil Assembly.......36–3140
(45) Tone Control............30–4127
(46) Condenser (.25, .25 mfd.)..30–4126
(47) Resistor (20,000 ohms)..... 5649
(48) Condenser (.05 mfd.)......30–4020
(49) Resistor (32,000 ohms)..... 3525

(50) Condenser (.5 mfd.).......30–4018
(51) Resistor (200 ohms)....... 7217
(52) Condenser (.01 mfd.)......30–4124
(53) Resistor (100 ohms).......33–3023
(54) "A" Choke..............32–1312
(55) Condenser (.5 mfd.).......30–4015
(56) Vibrator Choke..........32–1260
(57) Condenser (.5 mfd.).......30–4015
(58) Condenser (.5 mfd.).......30–4015
(59) Vibrator Unit...........38–5036
(60) Condenser (.05 mfd.)......30–4039
(61) Resistor (200 ohms)....... 7217
(62) Resistor (200 ohms)....... 7217
(63) Power Transformer.......32–7110
(64) Condenser (.006 mfd.).....30–4024
(65) Filter Condenser (4 mfd., 8 mfd.)..............30–2030
(66) "B" Chokes.............32–7118
(67) R. F. Choke............32–1260

(68) Pilot Lamp.............34–2031
Spark Plug Resistor.......33–1015
Distributor Resistor.......33–1113
1 mfd. Condenser......... 4522-S
½ mfd. Condenser........30–4007
Glass for Control.........27–7325
Bezel Assembly...........42–5115
Dial (Plymouth)..........42–5123
Dial (Dodge & Chrysler 6).42–5122
Pointer (Dodge)..........28–1764
Pointer (Plymouth).......28–1763
Pointer (Chrysler 6).......28–1825
Control Assembly (Plymouth)..............42–5113
Control Assembly (Dodge).42–5112
Control Assembly (Chrysler 6)..................42–5134
Knobs (Plym.—tuning)....27–4083
Knobs (Plym.—volume)...27–4084

Knobs (Dodge—tuning)...27–4079
Knobs (Dodge—volume)...27–4080
Knobs (Chry. 6—tuning)..27–4071
Knobs (Chry. 6—volume)..27–4072
Knobs Springs...........28–1738
Interconnecting cable......41–3065
Battery Cable...........41–3073
Flexible Shaft—tuning.....28–8188
Flexible Shaft—volume....28–8198
Speaker Mounting Plate...28–1790
Speaker Mounting Bracket.28–1791
Receiver Mounting Plate...28–1792
Receiver Mounting Bracket.28–1848
Fuse.................... 7227
Fuse Insulator...........27–7131
"U" Control Bracket......29–1705
5-Prong Socket..........27–6014
6-Prong Socket.......... 7547
7-Prong Socket..........27–6005

PHILCO RADIO & TELEV. CORP.

# MODEL 10 (Code 122) RECEIVER

THE MODEL 10 (Code 122) represents the latest developments in single-unit automobile radio. Compact and easy to install, its performance is amazing.

A superheterodyne, using six of the latest tubes designed for automobile radio, it has a tremendous power output and is equipped with a full-size electro-dynamic speaker, the same type used in high-priced home radio Receivers.

Bass compensation gives full rounded tone at any volume. Four point tone control is provided to satisfy the individual preference. Greater sensitivity, a three-section tuning condenser giving improved selectivity and fidelity, inherently quiet circuits and all the other improvements, make this model the outstanding automobile radio.

The new interference filters and improvement in shielding, cut installation time to just a fraction of what it would be without these improvements. The ease of installation characteristic of this model (only one unit to install, one lead to the antenna and one lead to the ammeter) makes it the most desirable one to sell, install or own.

## I. F. TRANSFORMER AND PADDERS

A new style I. F. transformer complete with padders is used in the Model 10. (Code 122.)

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1236 for the first I. F. stage and 32-1237 for the second I. F. Stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

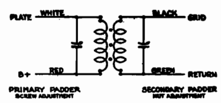



FIG. 1

A new type first I. F. transformer is used, but retains the same part no. 32-1236.

This transformer can be distinguished from the old type, since the bottom fibre spacer is painted green.

## MODEL 10 (Code 122) ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the speaker lid from the Receiver and disconnect the antenna lead from the Receiver. Remove the grid cap from the 6A7 tube (for location see Fig. 2).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 6A7 tube. (See Fig. 2.) The output meter must be connected by means of an adapter to the small prong of the speaker plug and to the chassis.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders (25) and (27) must be adjusted first. These padders should be adjusted to peak. (Figs. 2 and 3.) First adjust the screw, then the nut.

The padders (17) and (21) must be adjusted next. (Figs. 2 and 3.) Turn the adjusting screw (17) all the way in. A metal screwdriver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut (21) with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw (17) for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

After padding the first I. F. stage, remove the generator lead from the 6A7 tube and reconnect the grid cap to the 6A7 tube. Connect the antenna lead to the Receiver. Set the generator to 1500 K. C. and then connect the generator lead to the antenna lead.

There are four holes in line, one in each of the sections of the tuning condenser housing. (See Fig. 2.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency padder (12) until the maximum reading is obtained in the output meter. This is the true setting for 1500 K. C., 150 on the dial scale.

Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder (10) and the antenna padder (3) are next adjusted for the maximum reading on the output meter.

Turn the condenser plates in mesh to 60 on the scale, 600 K. C., and readjust the signal generator to this frequency. Adjust the low-frequency padder (15) for the maximum meter reading.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

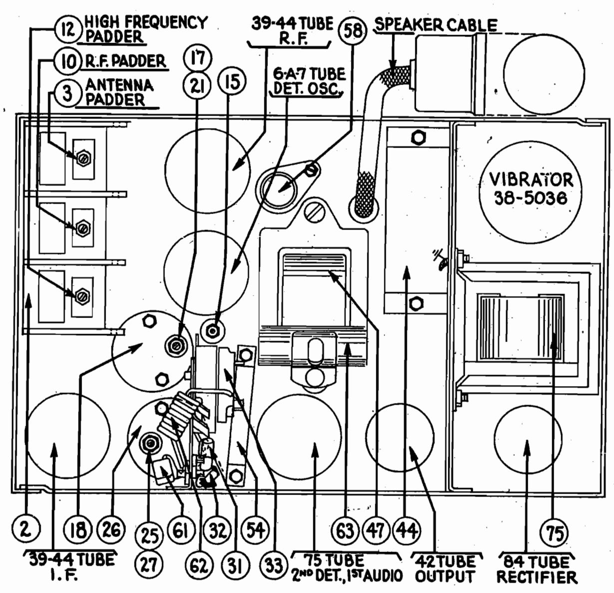



FIG. 2

# MODEL 10 (Code 122)
Schematic
Chassis, Parts List

## PHILCO RADIO & TELEV. CORP.

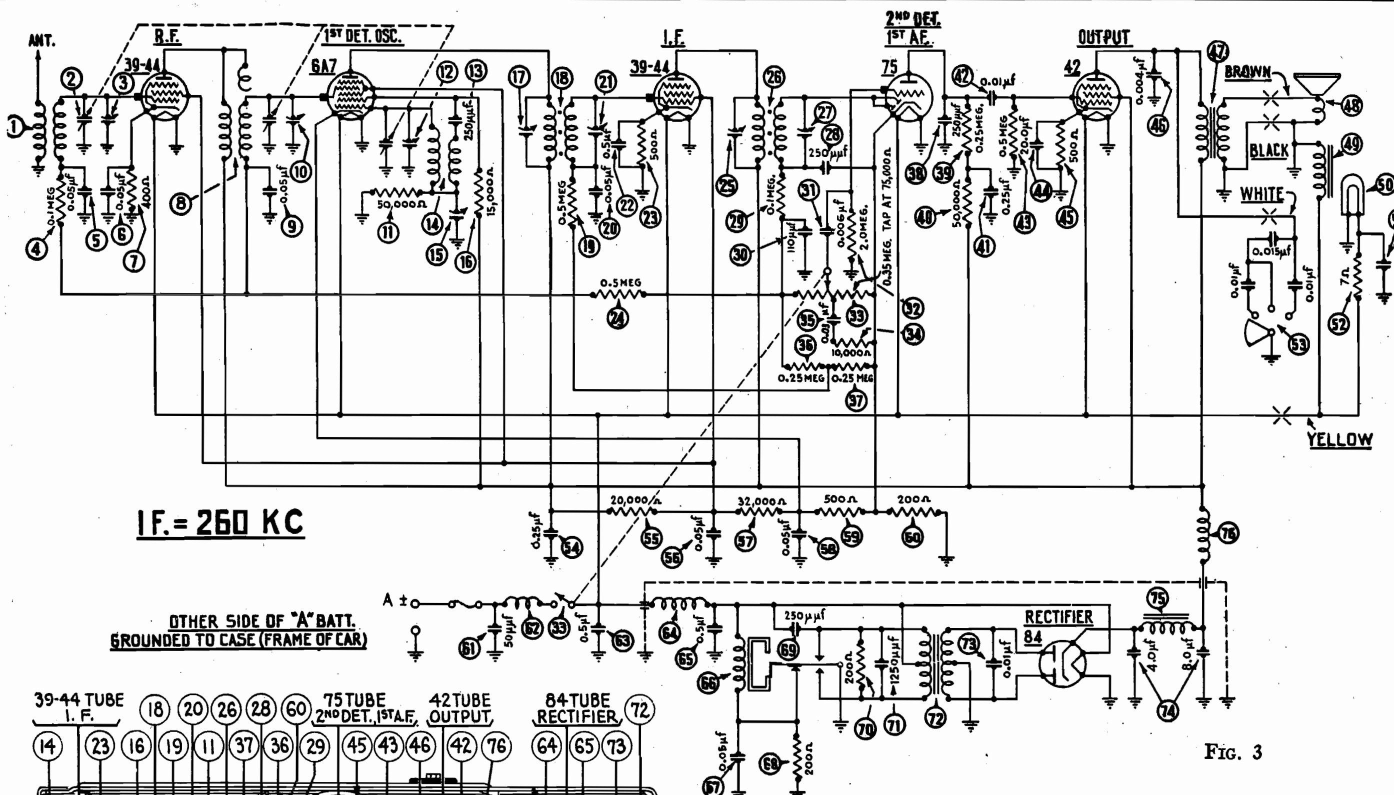



Fig. 3

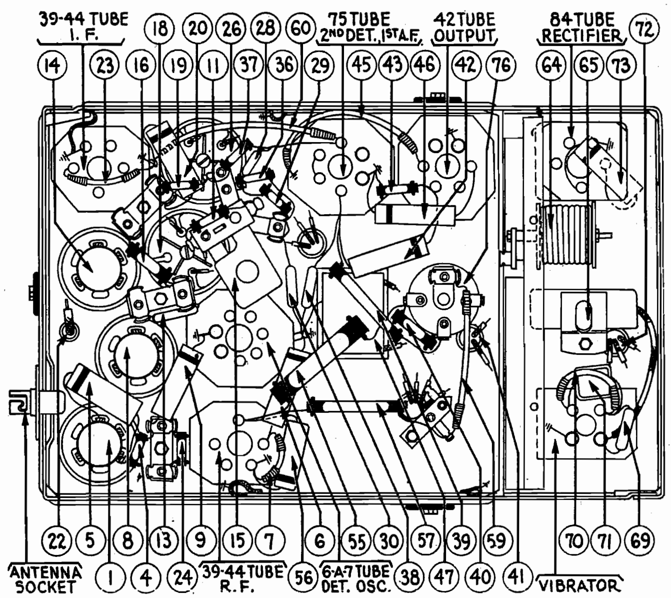



Fig. 4

(1) An enna Transformer......32-1220
(2) Tuning Condenser.........31-1202
(3) First Padder (in tun. cond.).......
(4) Resistor (100,000 ohms).... 6099
(5) Condenser (.05 mfd.)......30-4020
(6) Condenser (.05 mfd.)......30-4020
(7) Resistor (400 ohms).......33-3016
(8) R. F. Transformer.........32-1221
(9) Condenser (.05 mfd.)......30-4020
(10) Second Padder (in tun. cond.)......
(11) Resistor (50,000 ohms)..... 6098
(12) Third Padder (in tun. cond.).......
(13) Condenser (.00025 mfd.)...30-1032
(14) Oscillator Transformer.....32-1222
(15) Padder...................04000S
(16) Resistor (15,000 ohms)..... 6208
(17) Padder (Pri. 1st I.F. Trans.) .....
(18) First I. F. Transformer....32-1236
(19) Resistor (500,000 ohms).... 6097
(20) Condenser (.05 mfd.)......30-4020
(21) Padder (Sec. 1st I. F. Trans.).......
(22) Condenser (.5 mfd.).......30-4058
(23) Resistor (500 ohms)....... 6977
(24) Resistor (500,000 ohms).... 6097
(25) Padder (Pri. 2nd I. F. Trans.)......
(26) Second I. F. Transformer...32-1237
(27) Padder (Sec. 2nd I. F. Trans.)......
(28) Condener (.00025 mfd.)....30-1032
(29) Resistor (100,000 ohms).... 6099
(30) Condenser (.00011 mfd.)...30-1031
(31) Condenser (.006 mfd.).....30-4125
(32) Resistor (2,000,000 ohms)..33-1025
(33) Vol. Control Sw. Assembly 38-5851
(34) Resistor (10,000 ohms).....33-1000
(35) Condenser (.03 mfd.)......30-4025
(36) Resistor (250,000 ohms)....33-1097
(37) Resistor (250,000 ohms)....33-1097
(38) Condenser (.00025 mfd.)...30-1032
(39) Resistor (250,000 ohms).... 3768
(40) Resistor (50,000 ohms).... 4237
(41) Condenser (.25 mfd.)......30-4065
(42) Condenser (.01 mfd.)......30-4169
(43) Resistor (500,000 ohms).... 6097
(44) Condenser (20 mfd.).......30-4065
(45) Resistor (500 ohms)....... 6977
(46) Condenser (.004 mfd.).....30-4185
(47) Output Transformer.......32-7102
(48) Cone and Voice Coil.......36-3159
(49) Field Coil Assembly.......36-3130
(50) Pilot Lamp...............34-2039
(51) Condenser (.00005 mfd.)...30-1029
(52) Resistor (7 ohms).........33-3035
(53) Tone Control.............30-4056
(54) Condenser (.25 mfd.)...... 04360
(55) Resistor (20,000 ohms)..... 6649
(56) Condenser (.05 mfd.)......30-4020
(57) Resistor (32,000 ohms)..... 3525
(58) Condenser (.05 mfd.)......30-4020
(59) Resistor (500 ohms)....... 6977
(60) Resistor (200 ohms)....... 7217

(61) Condenser (.00005 mfd.)...30-1029
(62) Choke...................32-1374
(63) Condenser (.5 mfd.).......30-4061
(64) Vibrator Choke...........32-1259
(65) Condenser (.5 mfd.).......30-4061
(66) Vibrator.................38-5036
(67) Condenser (.05 mfd.)......30-4039
(68) Resistor (200 ohms)....... 7217
(69) Condenser (.00025 mfd.)... 5858
(70) Resistor (200 ohms)....... 7217
(71) Condenser (.00125 mfd.)... 5886
(72) Power Transformer........32-7098
(73) Condenser (.01 mfd.)......30-4051
(74) Filter Condenser (4-8 mfd.).30-2015
(75) Filter Choke.............32-7104
(76) R. F. Choke..............32-1281
Spark Plug Resistors......33-1015
Distributor Resistor......33-1113E
Interference Condenser.....30-4007
Studs....................28-6036
Nuts (mounting).......... W55A
Battery Cable............38-5296
Antenna Lead.............38-5131

Acorn Nut.............. W821
Bracket................ 6035
Strap.................. 04344
Strap Pad.............. 6206
Knob...................27-4058
Glass..................27-7325
Glass Gasket...........27-7509
Pointer................28-1957
Shaft..................28-8206
Face Assembly..........42-5173
Control Assembly....... 42-5171

## MODEL 10 (Code 122)

JULY, 1934

PHILCO RADIO & TELEVISION CORP.

# MODEL 11 RECEIVER

THE PHILCO auto radio Model 11 is a new Philco development in single-unit automobile radio. It is compact, easy to install and will give exceptional performance.

A superheterodyne, using six of the latest tubes designed for automobile radio, it has a genuine Philco electro-dynamic speaker, the same type that is used in many of the larger home radio Receivers. A three-section tuning condenser giving improved selectivity, remarkable sensitivity and tone, inherently quiet circuits and other improvements make this model one of the outstanding and most popular automobile radios.

Added to this, the ease of installation characteristic of this model (only one unit to install, one lead to the antenna and one lead to the ammeter) and the handy, attractive steering-column control which makes this model universal in its use are additional features which make the Model 11 a very desirable one for the dealer and for the owner.

## I. F. TRANSFORMER AND PADDERS

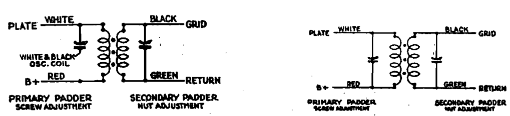
The new style I. F. transformer complete with padders is used in the Model 11.

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1329 for the first I. F. stage and 32-1237 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.




1st I. F. Transformer 32-1329

2nd I. F. Transformer 32-1237

FIG. 1

## MODEL 11 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the speaker lid from the Receiver. Remove the grid cap terminal from the 77 tube (for location see Fig. 2).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 77 tube. (See Fig. 2.) The output meter must be connected.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders (22) and (24) are adjusted first (Figs. 2 and 3). Turn the adjusting screw (22) all the way in. A metal screwdriver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut (24) with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw (22) for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

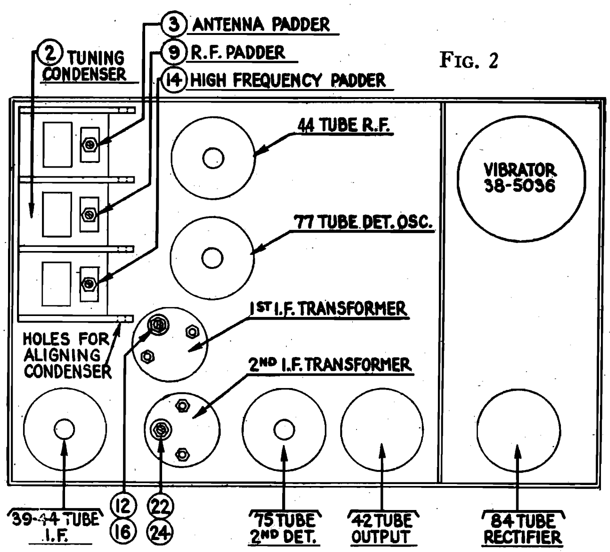



FIG. 2

Repeat the above procedure with the condensers (12) and (16).

After padding the first I. F. stage, remove the generator lead from the 77 tube and reconnect the grid lead to the 77 tube. Set the generator to 1500 K. C. and then connect the generator lead to the antenna lead

There are four holes in line, one in each of the sections of the tuning condenser housing. (See Fig. 2.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

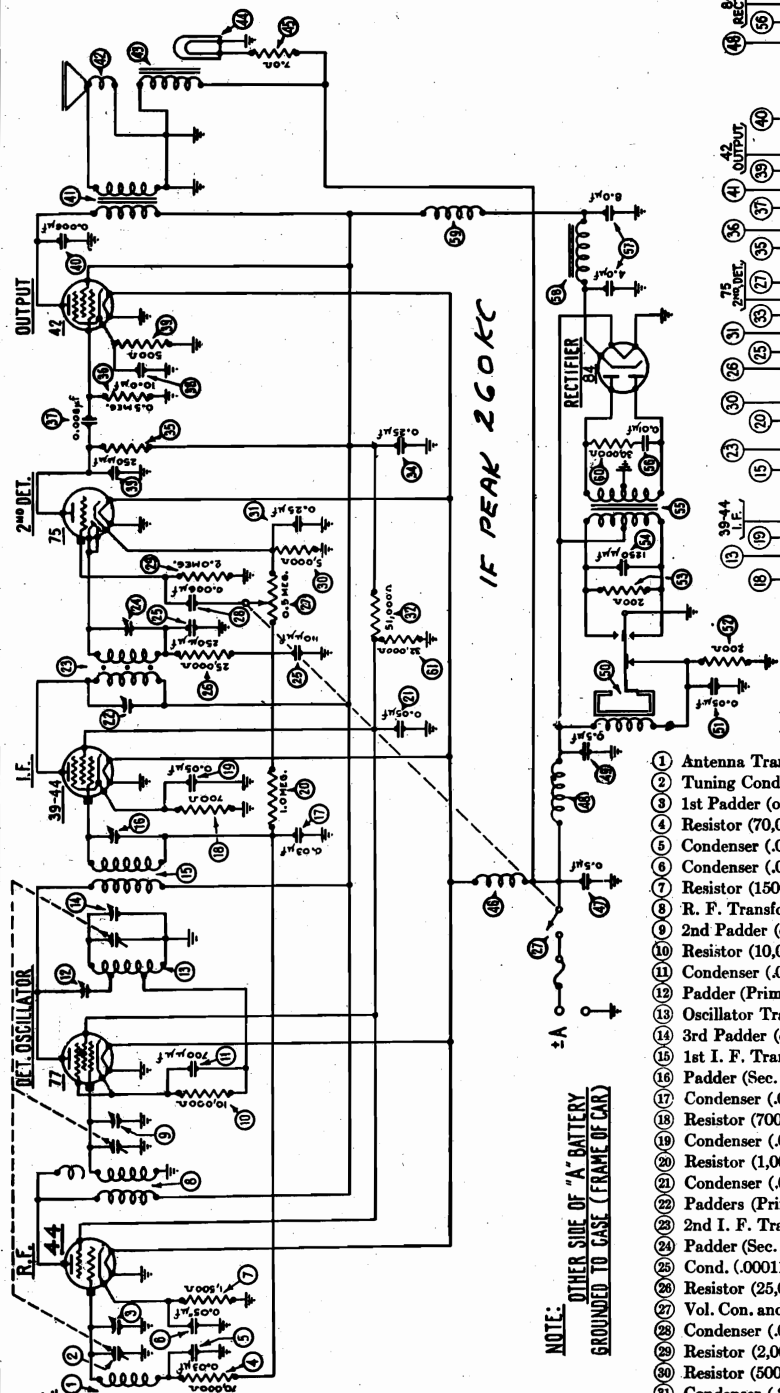
With the tuning condenser in this position adjust the high-frequency padder (14) until the maximum reading is obtained in the output meter. This is the true setting for 1500 K. C., 150 on the dial scale.

Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder (9) and the antenna padder (3) are next adjusted for the maximum reading on the output meter.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

MODEL 11
Schematic
Chassis Layout
Parts List

# PHILCO RADIO & TELEVISION CORP.



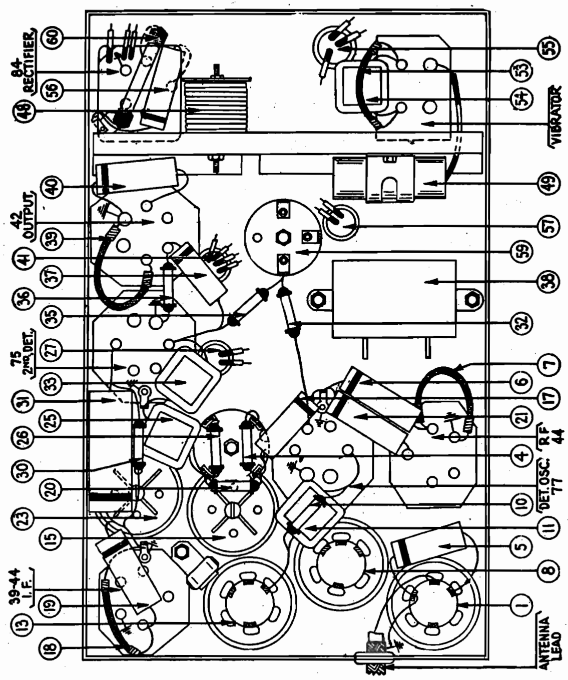




FIG. 4

## MODEL 11 PARTS LIST

| No. | Part | Part No. |
|---|---|---|
| 1 | Antenna Transformer | 32–1331 |
| 2 | Tuning Condenser | 31–1149 |
| 3 | 1st Padder (on tun. cond.) | |
| 4 | Resistor (70,000 ohms) | 33–1115 |
| 5 | Condenser (.03 mfd.) | 30–4025 |
| 6 | Condenser (.05 mfd.) | 30–4020 |
| 7 | Resistor (1500 ohms) | 33–3047 |
| 8 | R. F. Transformer | 32–1332 |
| 9 | 2nd Padder (on tun. cond.) | |
| 10 | Resistor (10,000 ohms) | 33–1000 |
| 11 | Condenser (.0007 mfd.) | 5863 |
| 12 | Padder (Prim. 1st I. F. Tran.) | |
| 13 | Oscillator Transformer | 32–1333 |
| 14 | 3rd Padder (on tun. cond.) | |
| 15 | 1st I. F. Transformer | 32–1329 |
| 16 | Padder (Sec. 1st I. F. Tran.) | |
| 17 | Condenser (.03 mfd.) | 30–4025 |
| 18 | Resistor (700 ohms) | 6443 |
| 19 | Condenser (.05 mfd.) | 30–4020 |
| 20 | Resistor (1,000,000 ohms) | 33–1096 |
| 21 | Condenser (.05 mfd.) | 30–4020 |
| 22 | Padders (Prim. 2nd I. F.) | |
| 23 | 2nd I. F. Transformer | 32–1237 |
| 24 | Padder (Sec. 2nd I. F. Tran.) | |
| 25 | Cond. (.00011–.00025 mfd.) | 30–1020 |
| 26 | Resistor (25,000 ohms) | 33–1013 |
| 27 | Vol. Con. and Switch Assm. | 33–5058 |
| 28 | Condenser (.006 mfd.) | 30–4125 |
| 29 | Resistor (2,000,000 ohms) | 33–1025 |
| 30 | Resistor (5000 ohms) | 33–1001 |
| 31 | Condenser (.25 mfd.) | 30–4146 |
| 32 | Resistor (51,000 ohms) | 5868 |
| 33 | Condenser (.00025 mfd.) | 3082 |
| 34 | Condenser (.25 mfd.) | 04360 |
| 35 | Resistor (100,000 ohms) | 6099 |
| 36 | Resistor (500,000 ohms) | 6097 |
| 37 | Condenser (.006 mfd.) | 30–4125 |
| 38 | Condenser (10 mfd.) | 7440 |
| 39 | Resistor (500 ohms) | 33–3031 |
| 40 | Condenser (.006 mfd.) | 30–4024 |
| 41 | Output Transformer | 32–7214 |
| 42 | Cone and Voice Coil | 02861 |
| 43 | Field Coil Assembly | 36–3097 |
| 44 | Pilot Light | 6608 |
| 45 | Resistor (7 ohms) | 33–3035 |
| 46 | "A" Choke | 32–1268 |
| 47 | Condenser (.5 mfd.) | 30–4047 |
| 48 | Vibrator Choke | 32–1235 |
| 49 | Condenser (.5 mfd.) | 30–4147 |
| 50 | Vibrator Unit | 38–5036 |
| 51 | Condenser (.05 mfd.) | 30–4039 |
| 52 | Resistor (200 ohms) | 7217 |
| 53 | Resistor (200 ohms) | 7217 |
| 54 | Condenser (.00125 mfd.) | 5886 |
| 55 | Power Transformer | 32–7216 |
| 56 | Condenser (.01 mfd.) | 30–4051 |
| 57 | Condenser (4.–8. mfd.) | 30–2072 |
| 58 | "B" Choke | 32–7215 |
| 59 | R. F. Choke | 32–1281 |
| 60 | Resistor (30,000 ohms) | 7836 |
| 61 | Resistor (32,000 ohms) | 3525 |
| | Spark Plug Resistor | 33–1015 |
| | Distributor Resistor | 4546 |
| | Screw Type Resistor | 4851 |
| | Interference Condenser | 30–4007 |
| | Dial | 27–5038 |
| | Studs | 28–6036 |
| | Nuts (mounting) | W55A |
| | Knobs (tuning) | 03334 |
| | Knobs (volume) | 06886 |
| | Battery Cable | 38–5296 |
| | Acorn Nut | W821 |
| | Key | 6091 |
| | Fuse | 7227 |
| | Fuse Insulator | 27–7131 |
| | 4-Prong Socket | 27–6006 |
| | 5-Prong Socket | 27–6014 |
| | 6-Prong Socket | 6417 |
| | Cont. Unit Assm. (Dir. Dr.) | 42–5150 |
| | Shafts—Tuning | 28–8139 |
| | Volume | 28–8141 |
| | Cont. Unit Assm. (Gr. Dr.) | 42–5157 |
| | Shafts—Tuning | 28–8217 |
| | Volume | 28–8217 |

PHILCO RADIO & TELEV. CORP.

# Model 18 (Code 124)

Model 18 (code 124) is an eight-tube superheterodyne receiver, for operation on alternating current (A.C.) The range of receivable frequencies is from 530 to 1720 kilocycles which includes standard broadcasts and police stations on the first (lowest) police band. The tubes used are: Type 78 R.F.; type 6A7 detector-oscillator; type 78 I.F.; type 75 2d detector, 1st A.F.; type 42 driver; two type 42 output tubes, and type 80 rectifier. The intermediate frequency is 260 kilocycles.

## Adjusting Compensating Condensers

The adjustment of the compensating or padding condensers in Model 18 (124) requires an accurate signal generator, such as the Philco Model 024, an output meter, and a special insulated hex wrench. The adjustments are made as follows:

1. I. F. (Intermediate Frequency). Remove the grid clip from the cap on the 6A7 tube and attach the shielded antenna lead from the signal generator to the grid cap of the 6A7. Set the switch of the signal generator at 260 K. C. (the I. F. of Model 18) and the dial of the set at 550. Turn on the set and signal generator. Adjust each of the three I. F. compensating condensers in turn to give maximum reading in the output meter (connected to primary of output transformer). If the needle on the meter goes off scale, turn down the attenuator adjustment on the signal generator. See Fig. 4 for locations of the I. F. compensating condensers. The first and 2d I. F. primary condensers (21) and (25) are accessible through the two holes in the chassis sub-base directly over them. The 1st I. F. secondary (24) is accessible from the rear.

2. ANT. H. F., DET., and OSC. H. F. CONDENSERS (5), (10), and (12).) These are located on top of the tuning condenser assembly and adjusted from above. (5) is mounted on the section nearest front of set. Replace the grid cap clip on the 6A7 and connect the antenna lead of signal generator direct to antenna post of set for these adjustments. Set signal generator at 1500 and dial of set at 1500.

3. OSC., L. F.—This adjustment (15) is made from rear of chassis (see Fig. 4). Set Signal Generator and dial of set at 600. The tuning condenser assembly should be "rocked" while this adjustment is being made.

## Replacement Parts for Model 18 (Code 124)

| No. on Figs. | Description | Part No. | List Price |
|---|---|---|---|
| (1) | Resistor (10,000 ohms) (Brown-Black-Orange) | 33-1000 | $0.25 |
| (2) | Resistor (70,000 ohms) (Violet-Black-Orange) | 5385 | .25 |
| (3) | Antenna Transformer | 32-1396 | .60 |
| (4) | Tuning Condenser Assembly | 31-1196 | 6.00 |
| (5) | Compensating Condenser (Ant.) | Part of (4) | .... |
| (6) | Condenser (.05 Twin—Bakelite Block) | 3615AM | .40 |
| (7) | Resistor (200 ohms Flexible Wire-wound) | 7217 | .20 |
| (8) | Condenser (.09 Twin-Bakelite Block) | 4989AC | .40 |
| (9) | Detector Transformer | 32-1397 | .50 |
| (10) | Compensating Condenser (Det.) | Part of (4) | .... |
| (11) | Resistor (50,000 ohms) (Green-Brown-Orange) | 4518 | .25 |
| (12) | Compensating Condenser (Osc. H. F.) | Part of (4) | .... |
| (13) | Oscillator Transformer | 32-1398 | .45 |
| (14) | Condenser (.00011 Mfd. Mica) | 4519 | .35 |
| (15) | Compensating Condenser (Osc. L. F.) | 04000R | .45 |
| (16) | Resistor (20,000 ohms) (Red-Black-Orange) | 6650 | .25 |
| (17) | Resistor (20,000 ohms) (Red-Black-Orange) | 6650 | .25 |
| (18) | Condenser (Double: .05—.15 Bakelite Block) | 6287M | .40 |
| (19) | Resistor (2 Meg.) (Red-Black-Green) | 5872 | .25 |
| (20) | Condenser ( 05 Mfd. Bakelite Block) | 3615AA | .35 |
| (21) | Compensating Condenser (1st I. F. Pri.) | 04000M | .20 |
| (22) | Resistor (2500 ohms) (Red-Green-Red) | 7775 | .25 |
| (23) | 1st I. F. Transformer | 32-1288 | .55 |
| (24) | Compensating Condenser (1st I. F. Secondary) | 04000X | .20 |
| (25) | Compensating Condenser (2d I. F. Primary) | 04000A | .15 |
| (26) | 2d I. F. Transformer | 32-1258 | .55 |
| (27) | Condenser (.00011 Mfd. Twin-Bakelite Block) | 8035-K | $0.25 |
| (28) | Resistor (.1 Meg. White-White-Orange) | 4411 | .25 |
| (29) | Condenser (.05 Mfd. Tubular Paper) | 30-4020 | .35 |
| (30) | Volume Control (350,000 ohms Tapped at 75,000) | 33-5069 | 1.00 |
| (31) | Resistor (.25 Meg.) (Red-Yellow-Yellow) | 4410 | .25 |
| (32) | Condenser (.01 Mfd. Bakelite Block) | 3903-Z | .25 |
| (33) | Resistor (1. Meg.) (Brown-Black-Green) | 4409 | .25 |
| (34) | Resistor (.5 Meg.) (Yellow-White-Yellow) | 4517 | .25 |
| (35) | Resistor (10,000 ohms) (Brown-Black-Orange) | 4412 | .25 |
| (36) | Shadowmeter | 45-2028 | 2.50 |
| (37) | Condenser (.00011 Mica) | 4519 | .35 |
| (38) | Condenser (.09 Mfd.) (Bakelite Block) | 4989-N | .35 |
| (39) | Resistor (50,000 ohms) (Green-Brown-Orange) | 4518 | .25 |
| (40) | Condenser (Electrolytic—1, 1, 2 Mfd.) | 30-2029 | 1.20 |
| (41) | Resistor (.1 Meg.) (White-White-Orange) | 4411 | .25 |
| (42) | Resistor (.5 Meg.) (Yellow-White-Yellow) | 4517 | .25 |
| (43) | Condenser (.015 Mfd. Bakelite) | 3793AB | .35 |
| (44) | Condenser (.006 Mfd. Tubular Paper) | 30-4024 | .40 |
| (45) | Input (Audio) Transformer | 32-7114 | 2.00 |
| (46) | Resistor (10,000 ohms) (Brown-Black-Orange) | 3524 | .25 |
| (47) | Condenser (.01 Mfd. Bakelite Block) | 3903-P | .25 |
| (48) | Output Transformer | 32-7078 | 1.40 |
| (49) | Voice Coil and Cone Assembly H-13 | 02625 | .80 |
| | Voice Coil and Cone Assembly K-17 | 36-3159 | .50 |
| (50) | Field Coil and Pot. Assembly | 36-3104 | 2.70 |
| (51) | Resistor (B) (6500 ohms Wire-wound) | 33-3033 | .30 |
| (52) | Resistor (Voltage Divider—9.5, 112, 84 ohms Wire-wound) | 33-3034 | $0.20 |
| (53) | Tone Control | 30-4073 | .75 |
| (54) | Condensers (in Tone Control) | Inside (53) | .... |
| (55) | Resistor (32,000 ohms) (Orange-Red-Orange) | 33-1026 | .35 |
| (56) | Resistor (50,000 ohms) (Green-Brown-Orange) | 4518 | .25 |
| (57) | Condenser (Twin .015 Mfd. Bakelite Block) | 3793-R | .40 |
| (58) | Power Transformer | 32-7111 | 5.75 |
| (59) | Condenser (Electrolytic 8 and 10 Mfd.) | 30-2045 | 1.95 |
| (60) | Condenser (Electrolytic 8 Mfd.) | 30-2025 | 2.00 |
| (61) | Condenser (.25 Mfd. Bakelite Block) | 6287-N | .40 |
| (62) | Filter Choke | 32-7115 | 1.80 |
| (63) | On-Off Switch | 42-1064 | .40 |
| (64) | Pilot Lamp (Station Selector) | 6608 | .11 |
| (65) | Pilot Lamp (Shadowmeter) | Part of (36) | .... |
| (66) | Resistor (2900 ohms) (Red-White-Red) | 5309 | .25 |
| | A. C. Cord and Plug Assembly | L-943A | .60 |
| | Tube Shield | 28-1107 | .10 |
| | 4 Prong Socket | 7544 | .10 |
| | 6 Prong Socket | 7547 | .11 |
| | 7 Prong Socket | 27-6005 | .11 |
| | Speaker Socket | 4957 | .10 |
| | Knob (Large) | 27-4051 | .10 |
| | Knob (Small) | 27-4052 | .10 |
| | Chassis Mfg. Screw | W-1345-A | 2.75C |
| | Chassis Mfg. Washer | 29-2089 | .35C |
| | Chassis Mfg. Foot (Rubber) | 27-4116 | .05 |
| | Chassis Mfg. Foot Plate | 27-7497 | .35C |
| | Dial Assembly | 31-1207 | .50 |
| | Dial Scale | 27-5049 | .25 |

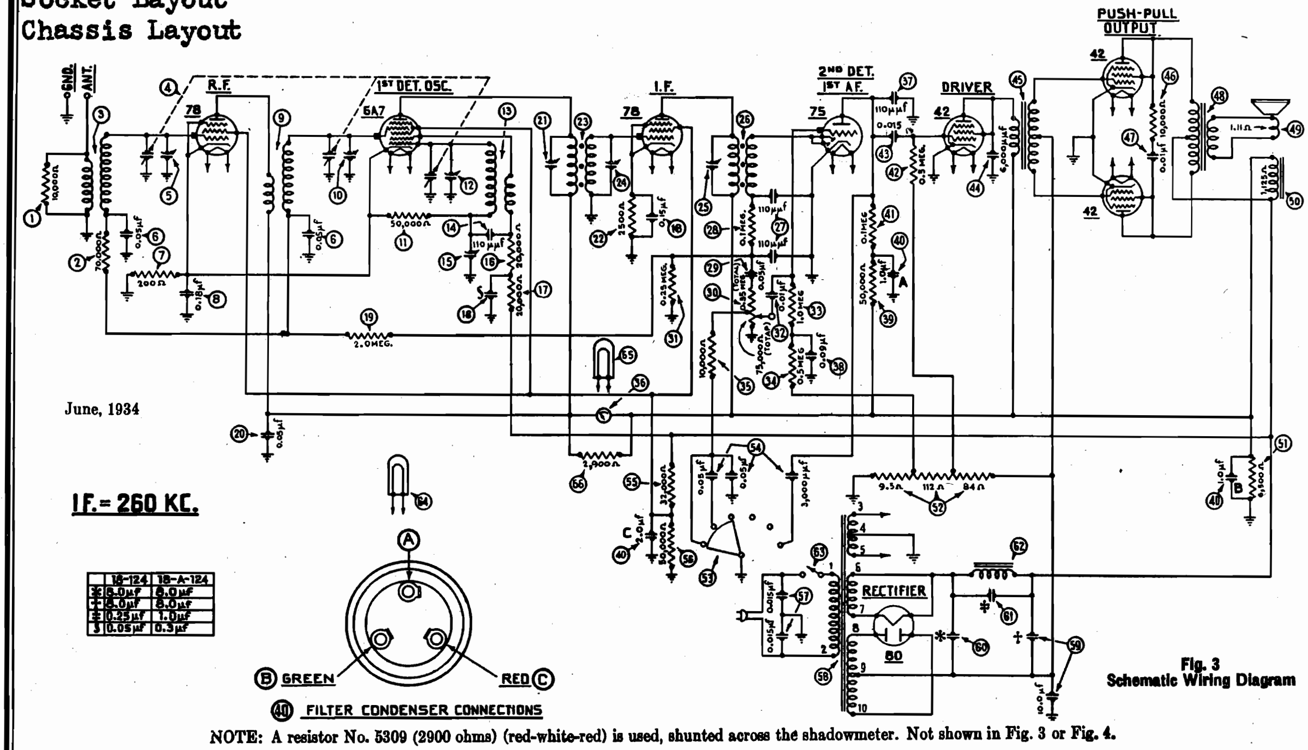
## Tube Socket Voltages

| Circuit | R. F. | Det. Osc. | I. F. | 1st A. F. | Driver | Output (Class "A") | | Recti-fier |
|---|---|---|---|---|---|---|---|---|
| Type Tube | 78 | 6A7 | 78 | 75 | 42 | 42 | 42 | 80 |
| Filament (F-F) | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 | 5.0 |
| Plate (P-K) | 210 | 210 | 210 | 120 | 205 | 280 | 280 | 350 |
| Screen Grid (SG-K) (6A7) | 80 | .. | 80 | .. | 200 | 300 | 300 | .. |
| G1-K | .. | 35 | .. | .. | .. | .. | .. | .. |
| G2-K | .. | 130 | .. | .. | .. | .. | .. | .. |
| Cathode (K-F) | 2.8 | 2.8 | 5.3 | 0 | 0 | 0 | 0 | .. |

All the above values were obtained from the underside of the chassis, using test prods and leads with an A. C. voltmeter for filament voltages and a high-resistance multi-range D. C. voltmeter for all other values. The **Philco Model 048 All-Purpose Set Tester** is highly recommended for this use. Volume control at maximum and station selector at 520 K. C. Readings obtained with a plug-in adaptor will NOT be satisfactory.

MODEL 18 (Code 124)
Schematic
Socket Layout
Chassis Layout

# PHILCO RADIO & TELEV. CORP.




| | 18-124 | 18-A-124 |
|---|---|---|
| * | 8.0μf | 8.0μf |
| † | 8.0μf | 8.0μf |
| ‡ | 0.25μf | 1.0μf |
| § | 0.05μf | 0.3μf |

Fig. 3 Schematic Wiring Diagram

NOTE: A resistor No. 5309 (2900 ohms) (red-white-red) is used, shunted across the shadowmeter. Not shown in Fig. 3 or Fig. 4.

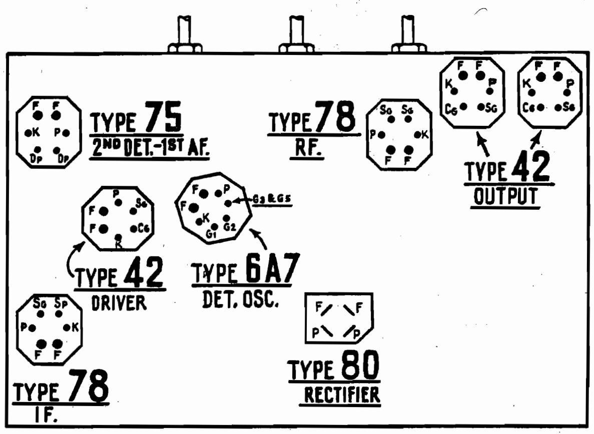



Fig. 1—Socket Layout (Underneath)

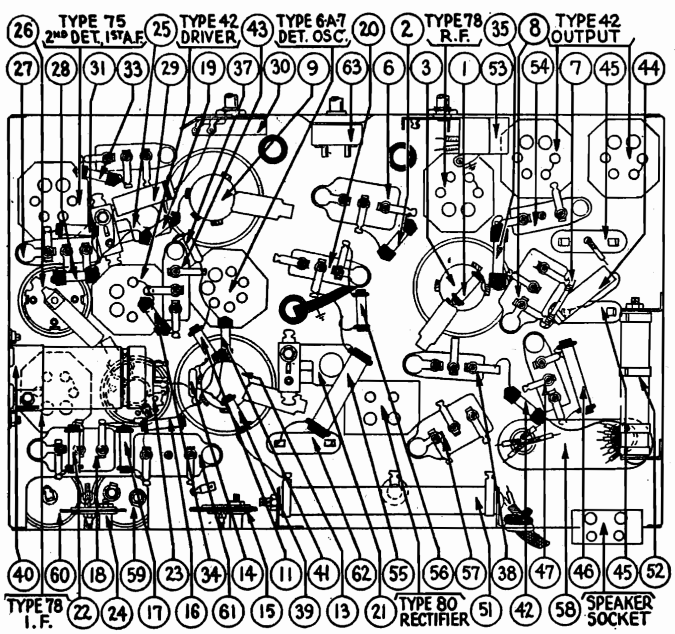



Fig. 4—Bottom View of Chassis Showing Parts

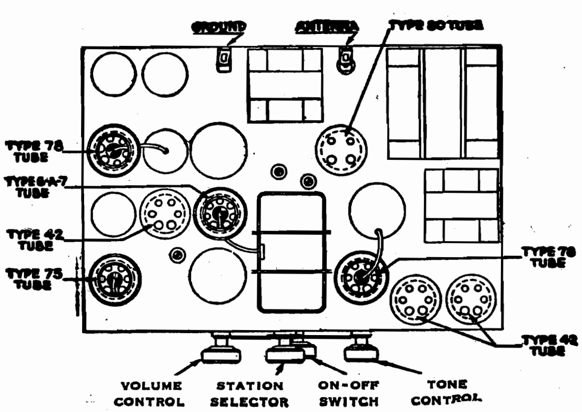



Fig. 2—Top View of Chassis

## Power Transformer Data

| Terminal | A. C. Volts | Circuit | Color |
|---|---|---|---|
| 1–2 | 105-125 | Primary | White |
| 3–5 | 6.3 | Filament | Black |
| 6–7 | 5.0 | Filament of 80 | Blue |
| 8–10 | 760 | Plates of 80 | Yellow |
| 4 | .... | Center Tap of 3–5 | Black—Yellow Tracer |
| 9 | .... | Center Tap of 8–10 | Yellow—Green Tracer |

MODEL 28
Alignment
Parts List

PHILCO RADIO & TELEV. CORP.

# Adjusting Compensating Condensers

For adjustment of compensating (padding) condensers in Model 28, an accurately calibrated signal generator, an output meter, and a special insulated padding wrench and screwdriver are needed. We suggest the Philco Model 024 Signal Generator, which is accurately calibrated and easy to handle. Philco No. 3164 fibre wrench and No. 27-1159 fibre-handled screwdriver are also recommended. For the output meter either Philco Model 025 complete tester or Philco Model 012 shadow output meter is suggested.

The chassis must be removed from cabinet in order to make all adjustments.

Adjustments are made in the following order—

ADJUSTMENT OF THE INTERMEDIATE FREQUENCY—Remove the grid clip from the type 6-A-7 tube and connect the "ANT" output terminal of the signal generator to the grid cap of the tube. Connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver chassis.

Connect the output meter adapter leads to the plate and cathode prongs of the type 43 tube. Set the signal generator at 460 K.C. (the intermediate frequency of Model 28) and with the receiver and signal generator turned on, the wave band switch at left and dial at 600 K.C., adjust each of the I. F. compensating condensers in turn, to give maximum response in the output of the receiver. The three pairs of I. F. compensating condensers are located one pair at the top of each of the three I. F. transformer shields. These are the three metal "cans" near the rear of the chassis. Each of the transformers has a dual compensating condenser mounted at its top, and accessible through a hole in the top of the coil shield. In the dual compensators, the Primary circuit is adjusted by turning the screw; the Secondary circuit is adjusted by turning the hex-head nut.

ADJUSTMENT OF THE WAVE TRAP—Replace the grid clip upon the Detector-Oscillator tube (Type 6-A-7). Connect the output leads from the signal generator directly to the antenna and ground terminals of the receiver. Set the Wave-Band Switch of the receiver to the standard broadcast band (left-hand position) and the Station Selector at the low frequency (540 K.C.) end. Adjust the Wave Trap condenser to give MINIMUM response to a 460 K.C. signal from the signal generator. The Wave Trap ② is located at rear and underneath the chassis, and is shown in Figure 1. It is reached from the rear of the chassis by inserting the fibre wrench through the hole near left-hand rear corner of chassis.

ANTENNA AND OSCILLATOR "HIGH" AND "LOW" FREQUENCY ADJUSTMENTS—The "antenna" and "oscillator H. F." compensators are located on top of the tuning condenser assembly, reached from above.

Set the signal generator at 1500 K.C., tune in this signal on the set and adjust the antenna compensator ⑧ (nearest tuning control) to give maximum reading in the output meter.

Next adjust the oscillator H. F. condenser ⑭ (located on the other section of tuning condenser) to maximum reading.

Finally, set the signal generator at 600, tune in this signal and adjust the "oscillator L. F." condenser, located underneath chassis (⑱ in Fig. 1) to maximum reading. This adjustment is reached through the hole in top of chassis, between the two electrolytic condensers (left-hand end of chassis when facing rear).

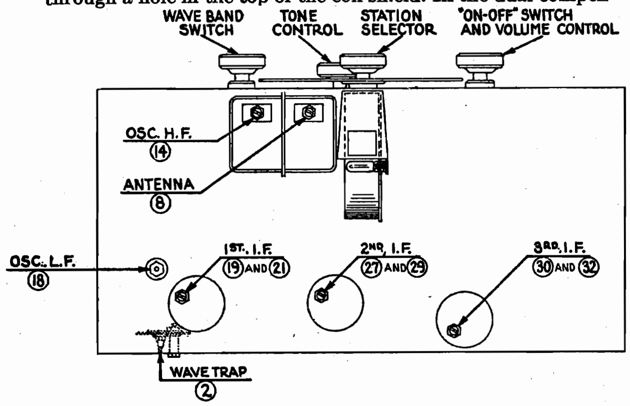



**Fig. 1—Top View Showing Location of Compensating Condensers.**

| No. on Figs. | Description | Part No. | List Price Each |
|---|---|---|---|
| ① | Condenser (.00125 mfd.—Mica) | 5886 | $0.35 |
| ② | Wave Trap | 38-6050 | .50 |
| ③ | Resistor (10,000 ohms) (Brown-Black-Orange) | 33-1000 | .25 |
| ④ | Antenna Transformer | 32-1360 | .60 |
| ⑤ | Wave Band Switch | 42-1062 | 1.10 |
| ⑥ | Condenser (.25 mfd.—Tubular) | 30-4146 | .40 |
| ⑦ | Tuning Condenser Assembly | 31-1366 | 5.70 |
| ⑧ | Compensating Condenser (Antenna) | Part of ⑦ | .... |
| ⑨ | Condenser (.1 mfd.—Tubular) | 30-4122 | .35 |
| ⑩ | Resistor (400 ohms—Flex.) (Yellow-Black-Brown) | 33-3016 | .20 |
| ⑪ | Condenser (.1 mfd.—Tubular) | 30-4122 | .35 |
| ⑫ | Resistor (120,000 ohms) (Brown-Red-Yellow) | 33-1128 | .... |
| ⑬ | Condenser (.003 mfd.—Mica) | 30-1028 | .60 |
| ⑭ | Compensating Condenser (Osc. H. F.) | Part of ⑦ | .65 |
| ⑮ | Oscillator Transformer | 32-1361 | .65 |
| ⑯ | Condenser (.0008 mfd.—Mica) | 5878 | .35 |
| ⑰ | Resistor (10,000 ohms) (Brown-Black-Orange) | 3524 | .25 |
| ⑱ | Compensating Condenser (Osc. L. F.) | 04000S | .35 |
| ⑲ | Compensating Condenser (1st I. F. Primary) | Part of ⑳ | .... |
| ⑳ | First I. F. Transformer | 32-1362 | 1.50 |
| ㉑ | Compensating Condenser (1st I. F Secondary) | Part of ⑳ | .... |
| ㉒ | Resistor (200 ohms—Flex.) (Red-Black-Black) | 7217 | .20 |
| ㉓ | Condenser (.1 mfd.—Tubular) | 30-4122 | .35 |
| ㉔ | Condenser (.09 mfd.—Twin Bakelite Block) | 4989M | .40 |
| ㉕ | Resistor (15,000 ohms) (Brown-Green-Orange) | 6208 | .25 |
| ㉖ | Resistor (.1 meg.) (White-White-Orange) | 4411 | .25 |
| ㉗ | Compensating Condenser (2d I. F. Primary) | Part of ㉘ | .... |
| ㉘ | 2d I. F. Transformer | 32-1363 | 1.50 |
| ㉙ | Compensating Condenser (2d I. F. Secondary) | Part of ㉘ | .... |
| ㉚ | Compensating Condenser (3d I. F. Primary) | Part of ㉛ | .... |
| ㉛ | 3d I. F. Transformer | 32-1364 | 1.55 |
| ㉜ | Compensating Condenser (3d I. F. Secondary) | Part of ㉛ | .... |
| ㉝ | Condenser (.05 mfd.—Tubular) | 30-4020 | .35 |
| ㉞ | Resistor (1000 ohms) (Brown-Black-Red) | 5837 | .25 |
| ㉟ | Resistor (2 megs.) (Red-Black-Green) | 5872 | .25 |
| ㊱ | Condenser (.0001 mfd.—Twin-Bakelite Block) | 8035E | .25 |
| ㊲ | Resistor (50,000 ohms) (Green-Brown-Orange) | 4518 | .25 |
| ㊳ | Volume Control and On-Off Switch (350,000 ohms, tapped at 75,000) | 33-5066 | 1.45 |
| ㊴ | Resistor (10,000 ohms) (Brown-Black-Orange) | 33-1000 | .25 |
| ㊵ | Condenser (.05 mfd.—Bakelite Block) | 3615-BU | .35 |
| ㊶ | Condenser (.01 mfd.—Tubular) | 30-4124 | .25 |
| ㊷ | Condenser (.00025 mfd.—Mica) | 5858 | .35 |
| ㊸ | Resistor (1 meg.) (Brown-Black-Green) | 4409 | .25 |
| ㊹ | Resistor (.5 meg.) (Yellow-White-Yellow) | 4517 | .25 |
| ㊺ | Condenser (.1 mfd.—Tubular) | 30-4122 | .35 |
| ㊻ | Condenser (.25 mfd.—Tubular) | 30-4146 | .40 |
| ㊼ | Condenser (.00011 mfd.—Mica) | 30-1031 | .35 |
| ㊽ | Condenser (.02 mfd.—Mica) | 30-4113 | .30 |
| ㊾ | Resistor (.25 meg.) (Red-Yellow-Yellow) | 4410 | .25 |
| ㊿ | Resistor (.5 meg.) (Yellow-White-Yellow) | 4517 | .25 |
| 51 | Resistor (50,000 ohms) (Green-Brown-Orange) | 4518 | $0.25 |
| 52 | Condenser (.09 mfd.—Twin-Bakelite Block) | 4989M | .40 |
| 53 | Resistor (25,000 ohms) (Red-Green-Orange) | 33-1013 | .25 |
| 54 | Tone Control (3-point) | 30-4211 | .75 |
| 55 | Condensers (In tone control) | Inside 54 | .... |
| 56 | Output Transformer (28C) | 32-7243 | 1.10 |
| 57 | Condenser (.25 mfd.—Tubular) | 30-4146 | .40 |
| 58 | Voice Coil and Cone Assembly P-21 | 02861 | .65 |
| | Voice Coil and Cone Assembly K-27 | 36-3159 | .80 |
| 59 | Field Coil and Pot Assembly P-21 | 36-3357 | 3.50 |
| | Field Coil and Pot Assembly K-27 | 36-3352 | 4.00 |
| 60 | Pilot Lamp | 4567 | .... |
| 61 | Resistor (Wire Wound, New Type) (37, 63, 29 ohms) | 33-3159 | .35 |
| 62 | Filter Choke | 6658 | 1.50 |
| 63 | Filter Choke | 32-7018 | 1.50 |
| 64 | Condenser (.05 mfd.—Tubular) | 30-4123 | .35 |
| 65 | Condenser (Electrolytic 6 and 12 mfd., 150 volts) | 30-2083 | 1.70 |
| 66 | Resistor (Wire Wound, New Type) (10, 137 ohms) | 33-3158 | .45 |
| 67 | Condenser (.09 mfd.—Tubular) | 30-4122 | .35 |
| 68 | Condenser (Electrolytic 6 and 12 mfd., 150 volts) | 30-2083 | 1.70 |

August, 1934

MODEL 28
Schematic
Layouts, Voltage

# PHILCO RADIO & TELEV. CORP.

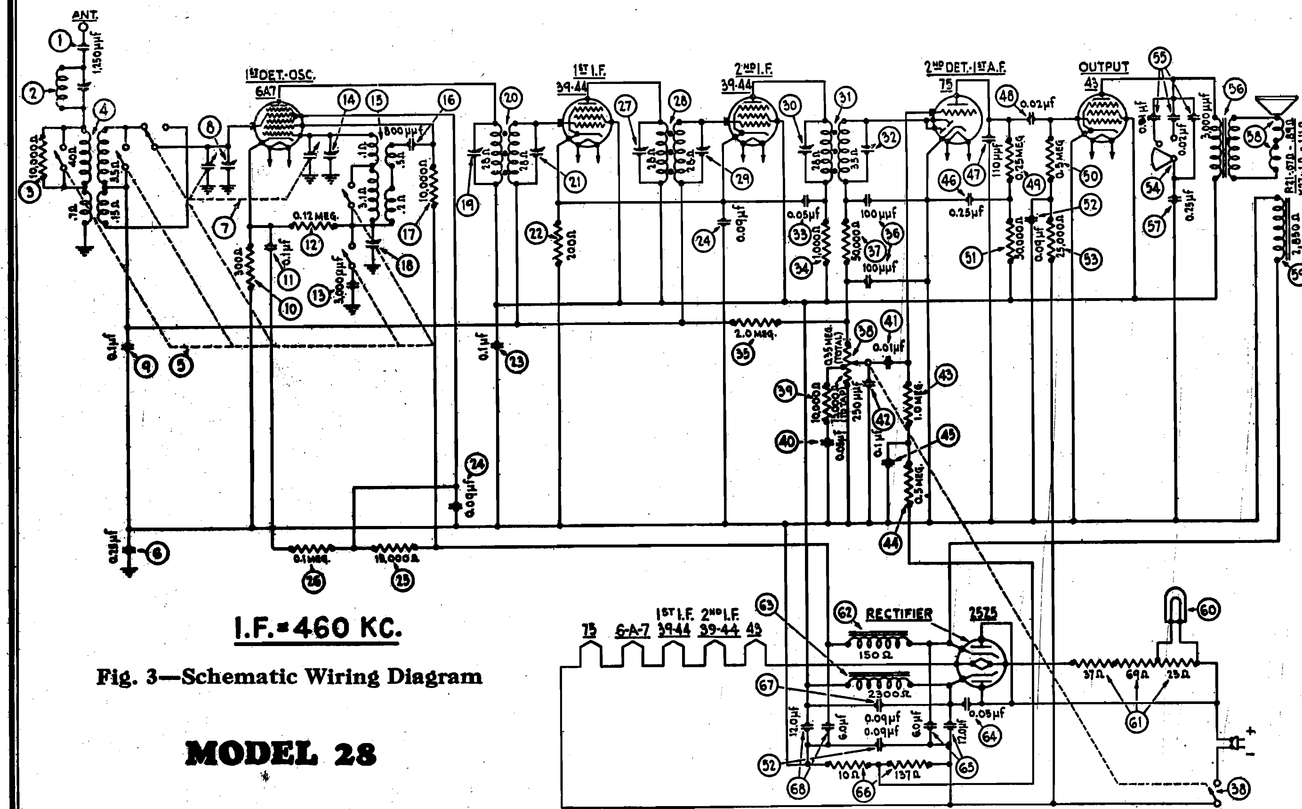



Fig. 3—Schematic Wiring Diagram

## MODEL 28

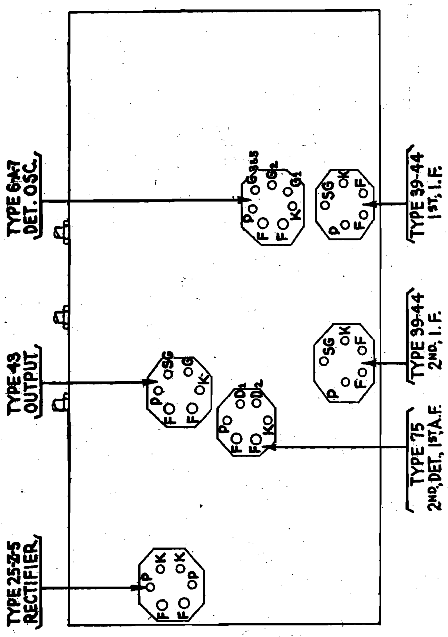



Fig. 2—Bottom View of Sockets for Testing Voltages.

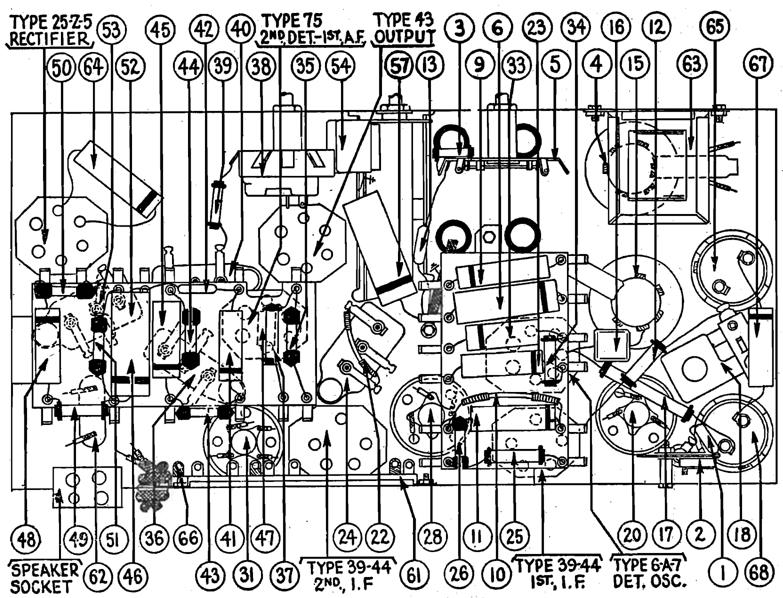



Fig. 4—Bottom View of Chassis Showing Parts.

## TUBE SOCKET VOLTAGES

On Line Voltage 120 A.C. — On Line Voltage 120 D.C.

| Type Tube | 6-A-7 | 39-44 | 39-44 | 75 | 43 | 25-Z-5 | 6-A-7 | 39-44 | 39-44 | 75 | 43 | 25-Z-5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plate (P to K)....... | 100 | 100 | 98 | 45 | 95 | 120 | 95 | 95 | 85 | 40 | 90 | .. |
| Screen Grid (SG to K) | G1=-8<br>G2=80<br>G3&5=60 | 100 | 100 | .. | 100 | .. | G1=-10<br>G2=80<br>G3&5=60 | 95 | 95 | .. | 95 | .. |

Total Filament Voltage—75 — Total Filament Voltage—83

High resistance D.C. voltmeter used for above tests. Volume control at maximum; dial at 55; wave band switch at left. Refer to Fig. 2 (Socket View).

Philco Model 025 Circuit Tester is recommended for making the above voltage tests.

PHILCO RADIO & TELEV. CORP.

Philco Model 29 is a superheterodyne receiver operating on alternating current and capable of receiving either standard and police broadcasts between 540 and 1720 kilocycles, or short-wave stations between 4.2 and 13 megacycles. The left hand side of the dial is calibrated in kilocycles and the right in megacycles. A two-position switch changes reception from standard to short-waves. This model is equipped with shadow tuning, three point tone control with fixed bass compensation, and automatic volume control. The output is 5 watts.

Model 29 uses a type 6-A-7 detector-oscillator, two type 39-44 I. F. tubes, type 75 2d detector, type 42 output tube, and type 80 rectifier. The power consumption is 70 watts. The intermediate frequency is 460 K.C.

## Adjusting Compensating Condensers

For adjustment of compensating (padding) condensers in Model 29, an accurately calibrated signal generator and a special insulated padding wrench and screwdriver are needed. We suggest the Philco Model 024 Signal Generator or the 048 Tester which includes a similar instrument. Philco No. 3164 wrench and 27-1159 screwdriver are recommended in addition.

Adjustments are made in the following order:—

ADJUSTMENT OF INTERMEDIATE FREQUENCY—Remove the grid clip from the type 6-A-7 tube and connect the "ANT" output terminal on the signal generator to the grid cap of the tube. Connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver chassis.

Connect the output meter to the primary terminals of the output transformer. Set the signal generator at 460 K.C. (the intermediate frequency of Model 29) turn wave-band switch of receiver to left and dial to 600 K.C. Turn receiver and Signal Generator "ON". Adjust each of the I. F. compensating condensers in turn, to give maximum response in the output of the receiver. The three pairs of I. F. compensating condensers are located, one pair at the top of each of the three I. F. transformer shields. These are the metal "Cans" near the rear of chassis. Each of these transformers has a dual compensating condenser mounted at its top, and accessible thru a hole in the top of the coil shield. In the dual compensators, the Primary circuit is adjusted by turning the screw; the secondary circuit is adjusted by turning the hex-head nut.

ADJUSTMENT OF WAVE TRAP—Replace the grid clip upon the Detector-Oscillator tube (Type 6-A-7). Connect the output leads from the Signal Generator directly to the antenna and ground terminals of the receiver. Set the wave-band switch of the receiver to the standard broadcast band (left hand position) and the Station Selector at the low frequency (540 K.C.) end. Adjust the Wave Trap condenser to give MINIMUM response to a 460 K.C. Signal from signal generator. The Wave Trap ① is located at rear and underneath the chassis, and is shown in Figure 4. It is reached from the rear of the chassis, thru hole at right hand end of set base.

DETECTOR; AND OSCILLATOR — "HIGH" AND "LOW FREQUENCY" ADJUSTMENTS—The "Antenna" and "Oscillator H. F." compensators are located on top of the tuning condenser assembly, reached from above.

Set the signal generator at 1500 K.C., tune in this signal on the set, and adjust the antenna compensator ⑦ (nearest tuning control), to give maximum reading in the output meter.

Next adjust the oscillator H. F. condenser ⑪, located on the other section of tuning condenser, to maximum reading. Finally set the signal generator at 600, tune in this signal and adjust the oscillator L. F. condenser, located underneath chassis (⑮ in Fig. 4) to maximum reading. This adjustment is reached thru the hole in top of chassis, between the two electrolytic condensers (left-hand end of chassis when facing rear).

### Tube Socket Voltages—(Line Voltage 115)

| Function | Det. Osc. | 1st I. F. | 2nd I. F. | 2nd Det. | Output | Rectifier |
|---|---|---|---|---|---|---|
| Type | 6A7 | 39/44 | 39/44 | 75 | 42 | 80 |
| Filament (F to F) | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 | 5.0 |
| Plate (P to K) | 210 | 200 | 200 | 200 | 300 | 310 |
| Screen (SG to K) | 80 | 80 | 80 | ... | 315 | ... |
| Cathode (K to GND) | 4.8 | 4.8 | 4.8 | 0 | 0 | ... |
| 6-A-7 Grid G1 to K | 35 | ... | ... | ... | ... | ... |
| 6-A-7 Grid G2 to K | 170 | ... | ... | ... | ... | ... |

### Power Transformer Voltages

| Terminals | A. C. Volts | Circuit | Color of Leads |
|---|---|---|---|
| 1–2 | 120 | Primary | White |
| 3–4 | 5.0 | Fil. of 80 | Blue |
| 5–7 | 746 | Plates of 80 | Yellow |
| 8–10 | 6.3 | Filaments | Black |
| 6 | ... | Center of 5–7 | Black—Yellow Tracer |
| 9 | ... | Center of 8-10 | Yellow—Green Tracer |

The above tests were made with an A. C. voltmeter for filament voltages and a high-resistance D. C. voltmeter for all others. Dial at 550 K.C., wave-band switch to left, volume control at maximum. Tests made with test prods applied to sockets underneath chassis.

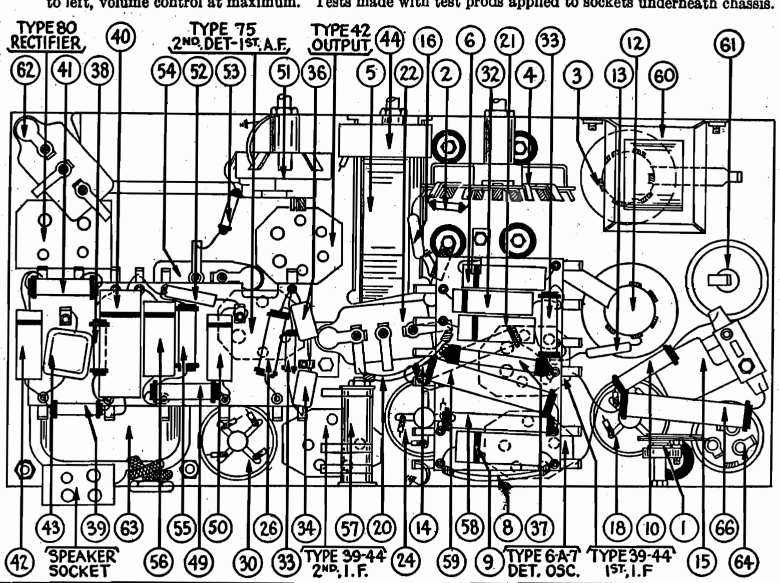



Fig. 4—Bottom View

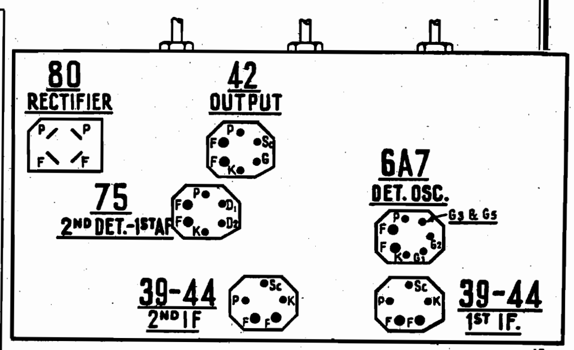



Fig. 1—Tube Socket Layout

MODEL 29
Schematic
Layout, Parts List

PHILCO RADIO & TELEV. CORP.

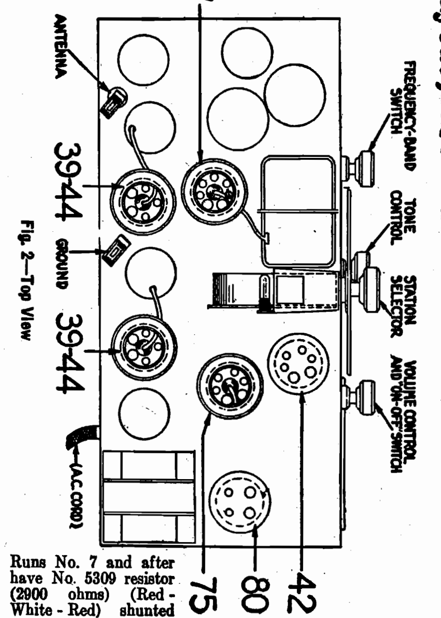
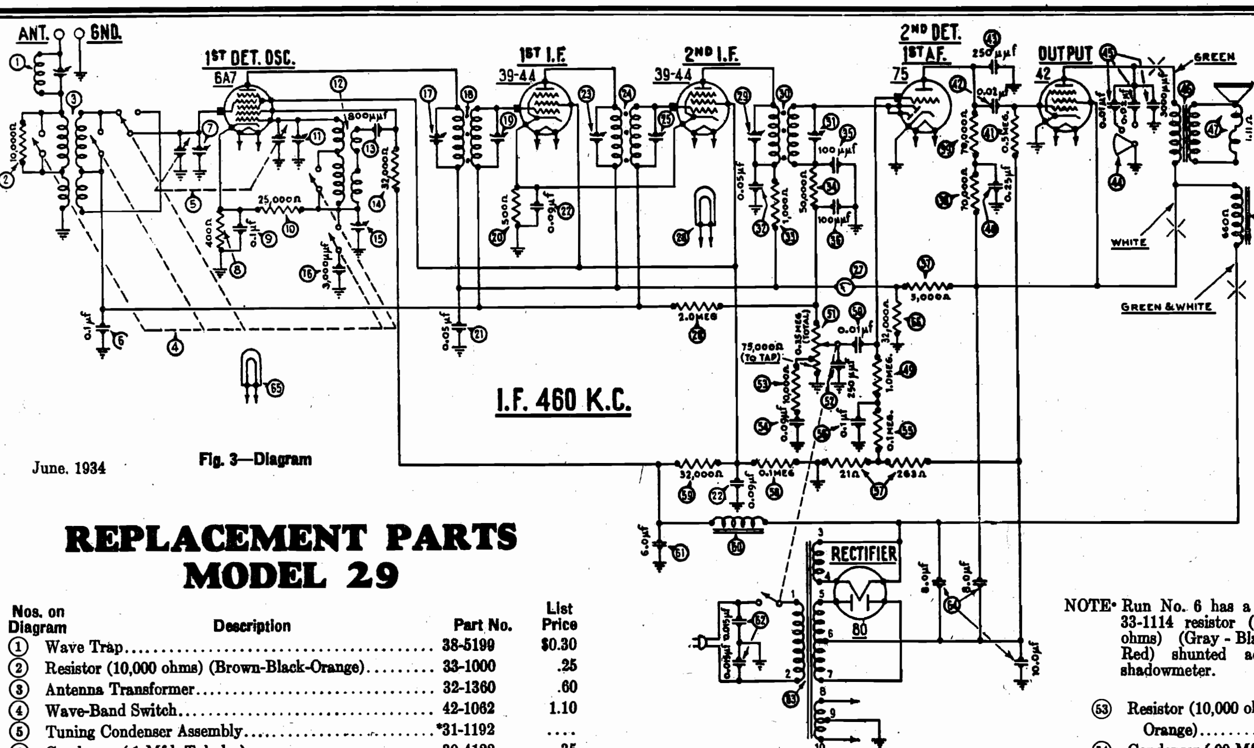



Fig. 2—Top View




June, 1934

Fig. 3—Diagram

# REPLACEMENT PARTS MODEL 29

| Nos. on Diagram | Description | Part No. | List Price |
|---|---|---|---|
| 1 | Wave Trap | 38-5199 | $0.30 |
| 2 | Resistor (10,000 ohms) (Brown-Black-Orange) | 33-1000 | .25 |
| 3 | Antenna Transformer | 32-1360 | .60 |
| 4 | Wave-Band Switch | 42-1062 | 1.10 |
| 5 | Tuning Condenser Assembly | *31-1192 | .... |
| 6 | Condenser (.1 Mfd. Tubular) | 30-4122 | .35 |
| 7 | Compensating Condenser (Det.) | Part of 5 | .... |
| 8 | Resistor (400 ohms Flexible Wire-Wound) | 33-3016 | .20 |
| 9 | Condenser (.1 Mfd. Tubular) | 30-4122 | .35 |
| 10 | Resistor (25,000 ohms) (Red-Green-Orange) | 4516 | .25 |
| 11 | Compensating Condenser (Osc. H. F.) | Part of 5 | .... |
| 12 | Oscillator Transformer | 32-1361 | .65 |
| 13 | Condenser (.0008 Mfd. Mica) | 5878 | .35 |
| 14 | Resistor (32,000 ohms) (Orange-Red-Orange) | 3525 | .25 |
| 15 | Compensating Condenser (Osc. L. F.) | 04000S | .35 |
| 16 | Condenser (.003 Mfd. Mica) | 7301 | .45 |
| 17 | Compensating Condenser (1st I. F. Primary) | Part of 18 | .... |
| 18 | First I. F. Transformer | 32-1362 | 1.50 |
| 19 | Compensating Condenser (1st I. F. Sec.) | Part of 18 | .... |
| 20 | Resistor (500 ohms Flexible Wire-Wound) | 6977 | .20 |
| 21 | Condenser (.05 Mfd. Tubular) | 30-4123 | .35 |
| 22 | Condenser (.09 Mfd. Twin) (Bakelite Block) | 4989-Z | .40 |
| 23 | Compensating Condenser (2d I. F. Pri.) | Part of 24 | .... |
| 24 | 2d I. F. Transformer | 32-1363 | 1.50 |
| 25 | Compensating Condenser (2d I. F. Sec.) | Part of 24 | .... |
| 26 | Resistor (2 Megohms) (Red-Black-Green) | 5872 | .25 |
| 27 | Shadowmeter | 6497 | 2.50 |
| 28 | Pilot Lamp (Shadowmeter) | Part of 27 | .... |
| 29 | Compensating Condenser (3d I. F. Pri.) | Part of 30 | .... |
| 30 | 3d I. F. Transformer | 32-1364 | 1.55 |
| 31 | Compensating Condenser (3d I. F. Sec.) | Part of 30 | .... |
| 32 | Condenser (.05 Mfd. Tubular) | 30-4123 | .35 |
| 33 | Resistor (1,000 ohms) (Brown-Black-Red) | 5837 | .25 |
| 34 | Resistor (50,000 ohms) (Green-Brown-Orange) | 6098 | .25 |
| 35 | Condenser (.0001 Mfd. Mica) | 30-1031 | .... |
| 36 | Condenser (.0001 Mfd. Mica) | 30-1031 | .... |
| 37 | Resistor (5,000 ohms) (Green-Black-Red) | 3526 | .25 |
| 38 | Resistor (70,000 ohms) (Violet-Black-Orange) | 5385 | .25 |
| 39 | Resistor (70,000 ohms) (Violet-Black-Orange) | 5385 | .25 |
| 40 | Condenser (.25 Mfd. Tubular) | 30-4134 | .45 |
| 41 | Resistor (500,000 ohms) (Yellow-White-Yellow) | 4517 | .25 |
| 42 | Condenser (.02 Mfd. Tubular) | 30-4113 | .30 |
| 43 | Condenser (.00025 Mfd. Mica) | 5858 | .35 |
| 44 | Tone Control | 30-4178 | .75 |
| 45 | Condensers (Inside 44) | Part of 44 | .... |
| 46 | Output Transformer | 32-7178 | 1.60 |
| 47 | Voice Coil and Cone Assembly (H-16) | 02625 | .80 |
| 48 | Field Coil and Pot. Assembly (H-16) | 36-3218 | 3.50 |
| 49 | Resistor (1 Meg.) (Brown-Black-Green) | 4409 | .25 |
| 50 | Condenser (.01 Mfd. Tubular) | 30-4124 | .35 |
| 51 | Volume Control and On-Off Switch | 33-5066 | 1.45 |
| 52 | Condenser (.00025 Mfd. Mica) | 5858 | .35 |
| 53 | Resistor (10,000 ohms) (Brown-Black-Orange) | 33-1000 | .25 |
| 54 | Condenser (.09 Mfd.) (Bakelite Block) | 4989-AM | .35 |
| 55 | Resistor (100,000 ohms) (White-White-Orange) | 4411 | $0.25 |
| 56 | Condenser (.1 Mfd. Tubular) | 30-4122 | .35 |
| 57 | B. C. Resistor (263 ohms; 23 ohms; Wire-Wound) | 33-3069 | .25 |
| 58 | Resistor (.1 Meg.) (White-White-Orange) | 3767 | .25 |
| 59 | Resistor (32,000 ohms) (Orange-Red-Orange) | 33-1026 | .35 |
| 60 | Filter Choke | 32-7018 | 1.50 |
| 61 | Condenser (Electrolytic—6 Mfd.) | 30-2020 | 1.40 |
| 62 | Condenser (.015 Mfd. Twin—Bakelite Case) | 3793-E | .40 |
| 63 | Power Transformer | 32-7229 | 5.25 |
| 64 | Condenser (Electrolytic—8 Mfd., 8 Mfd., 10 Mfd.) | 30-2073 | 3.45 |
| 65 | Pilot Lamp (Dial) | 6608 | .11 |
| 66 | Resistor (32,000 ohms) (Orange-Red-Orange) | 33-1026 | .35 |
| | A. C. Cord and Plug Assembly | L-943-A | .60 |
| | Tube Shield | 28-1107 | .10 |
| | Four-Prong Socket | 7544 | .10 |
| | Five-Prong Socket | 7547 | .11 |
| | Six-Prong Socket | 7546 | .11 |
| | Seven-Prong Socket | 27-6005 | .11 |
| | Speaker Socket | 4957 | .10 |
| | Knob (Large) | 27-4051 | .10 |
| | Knob (Small) | 27-4052 | .10 |
| | Dial Assembly | *31-1208 | .45 |
| | Dial Scale | 27-5042 | .25 |
| | Chassis Mounting Screw | W-1345A | 2.75 C. |
| | Chassis Mounting Foot (Steel) | 29-1983 | .03 |
| | Chassis Mounting Foot (Rubber) | 27-4116 | .05 |
| | Chassis Mounting Foot Plate | 27-7497 | .35 C. |
| | Screw (Foot mtg.) | W-644A | 1.50 C. |

NOTE: Run No. 6 has a No. 33-1114 resistor (8000 ohms) (Gray-Black-Red) shunted across shadowmeter.

Runs No. 7 and after have No. 5309 resistor (2900 ohms) (Red-White-Red) shunted across shadowmeter.

*Note: Some Model 29 sets use tuning condenser assembly No. 31-1250, which has dial assembly 31-1245. This is not interchangeable with 31-1192 and 31-1208.

PHILCO RADIO & TELEV. CORP.

## Model 16

Starting with run No. 14, all type Model 16 will use a different type tone control. This will be Part No. 30-4168 which replaces 30-4069 formerly used. Condenser 7653-C (60 on wiring diagram in Bulletin 165-B) is replaced by 3615-L.

The new tone control has fixed bass compensation, effective on all four positions, which helps subdue background noise and thus favorably affects short-wave reception.

Starting with Run No. 15, a No. 30-4125 tubular condenser, .006 mfd, will be added, connected between the plate of the 77 tube and the tone control. This gives a smoother variation in control and prevents too great a change in tone from one step to another.

Starting with Run No. 16, the tone control used on Model 16 will be part No. 30-4204, which replaces 30-4168. (See June 1st change notices.) At the same time, condenser 3615-L replaces 3615-J, and external tone control condenser 30-4125 is removed. This latter condenser is now built in as part of the new tone control, thus simplifying assembly of the set.

## Model 18-124

Starting with Run No. 4, Resistor 22 on wiring diagram of Model 18-124 will be Part No. 5837 (1000 ohms) instead of No. 7775 (2500 ohms). There is a slight change in the antenna and oscillator transformers, the new ones being identified by a red paint mark on the bracket. No change in part number. Change to increase sensitivity.

## Model 29 (Code 123-TX)

**The differences between regular Model 29 and the TX type are that the latter has the following parts added:**

| | |
|---|---|
| **Output transformer** | **32-7256** |
| **Speaker switch (toggle)** | **3116** |
| **Speaker** | **Type P-22** |

**Model 29-TX also includes a furniture-type speaker, HR-2, which is connected to the receiver by a 25-foot cable and plug assembly, part No. 36-3327, attached to the speaker cabinet.**

**The A. C. cord on 29-TX is a flat cable and contains an extra wire, which is for use as an antenna lead by connecting the antenna to the binding post mounted on the side of the special flat A. C. plug used. However, the antenna *may* be connected to the regular antenna clip terminal on the receiver chassis if desired and more convenient.**

**The part number of this special cable and plug assembly is 41-3104.**

## Model 29

Effective July 1st, condenser 64 in wiring diagram of Model 29 is changed from 4989 AM, (.09 mfd.) to 3615 AW (.05 mfd.). This improves the fixed bass compensation used in this model.

Starting with Run No. 8, the cathode resistor (20 in wiring diagram of Model 29) will be changed from Part No. 6977 (500 ohms) to 33-3016 (400 ohms). This will prevent variation in performance of sets due to considerable variation in 6A7 tubes.

Starting with Run No. 9, electrolytic condenser 61 (on wiring diagram) will be a Part No. 30-2026 instead of 30-2020. The new type is of a higher working voltage.

## Models 29 & 45

Effective July 1st, a new wave-trap will be used in this model. Part 1 on wiring diagram of Model 29 is changed from Part No. 38-5199 to 38-5995. The new wave trap uses an improved construction which facilitates production.

Effective July 1st, mica condenser 16 on wiring diagram of Model 29 was changed from Part No. 7301 to 30-1028. No change in capacity; change to facilitate wiring only.

MODELS 19,38,89
Notes

PHILCO RADIO & TELEV. CORP.

# Correcting Intermittent Operation

On some of the earlier models of the 89, 19 and 38, difficulty may occasionally be experienced with intermittent operation. This condition usually occurs during periods of humid weather, and is caused by stopping of the oscillator. In some cases, the radio may be completely dead and at other times this in-operative condition may exist over a portion of the dial only.

There are a number of possible causes for the difficulty and the necessary steps have been taken in later production to correct the condition. On a few of the earlier sets, however, it may be necessary to make one or more of the changes outlined below:

1. OSCILLATOR TUBE: In most cases, partial or complete failure of the oscillator circuit can be corrected by replacing the oscillator tube.
2. BATTERY VOLTAGE: In the Model 38, low voltage of the "A" or "B" battery may cause failure in oscillation.
3. CATHODE RESISTOR: In the Models 89 and 19, correct performance can usually be restored by changing the cathode resistor ⑩ in the wiring diagrams of service bulletins 146 and 146A from 15,000 ohms to 10,000 ohms (Philco Part No. 4412). In the Model 38, the cathode resistor ⑫ in the wiring diagram of service bulletin 106 is changed from 6,000 ohms to 4,000 ohms (Philco Part No. 33-1040).
4. COMPENSATING CONDENSERS: The first I. F. compensating condensers in Models 89 and 19 ⑮ in service bulletin 146, ⑬ in service bulletin 146-A and ⑩ in service bulletin 166 have been changed from Part No. 04000-M to Part No. 31-6016. The new condenser has a larger insulating surface between the plates of the condenser and the mounting holes. The possibility of moisture absorption is thus eliminated. It is necessary to re-drill a hole in the chassis so that the condenser can be mounted correctly with respect to the opening in the chassis for the compensating condenser wrench.
5. BAKELITE WASHERS: In order to prevent moisture absorption with resulting drifting in the compensating condenser adjustment, a bakelite washer and a metal washer are now being used on top of the compensating condenser, in place of the fibre washers previously used. The part number of the bakelite washer is 27-4109 and the metal washer (placed on top of the bakelite) is W-1331. These two replace the old fibre washer Part No. 3500.
6. MICA INSULATION: It was found on some sets that the mica which separates the leaves of the high frequency oscillator compensating condensers was extremely thin and would crack easily. Moisture absorption in the cracks was sufficient to stop oscillation. This condition was corrected by replacing the mica.
7. WIRE INSULATION: The wire which connects from the oscillator tuning condenser to the oscillator coil should be rubber-covered. Possible moisture absorption in the insulation of the cotton-covered wire may be sufficient to produce leakage to ground.
8. OSCILLATOR COIL IMPREGNATION: In some cases, it may be desirable to re-impregnate the oscillator coils in accordance with the present methods of production. The coil is dipped in hot paraffine for twenty seconds. The entire coil, including the terminals, is submerged; the only part which is out of the paraffine is a portion of the mounting lug, thus assuring a good ground connection. The coil and the paraffine both are allowed to cool until the paraffine becomes a considerably heavier consistency, at which time the coil is again dipped, thus allowing a fairly heavy covering over the entire coil. The coil is now entirely sealed and will not be affected by any moisture changes.
9. TUNING CONDENSER: A few tuning condensers of the 89 and 38 Models went out of the factory with a sanded surface on the bakelite between the stator and rotor plates. Moisture absorption at this point was sufficient to stop oscillation. Changing the tuning condenser to the type with smooth bakelite insulation will correct the trouble. In present production, these bakelite pieces are dipped in insulating varnish to seal all possible openings which might absorb moisture.
10. OSCILLATOR SOCKETS: In extreme cases it may be necessary to change the detector-oscillator tube socket. Moisture absorption occasionally takes place around the rough edges of the socket.

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# ELIMINATION OF NOISE INTERFERENCE CAUSED BY THE FARM LIGHTING SYSTEM

The operation of a radio receiver directly from a 32 volt farm lighting system is sometimes interfered with by noises in reception, caused by the operation of the lighting system's charging equipment. These noises are radiated from the service lines and picked up by the antenna and lead-in. A certain amount of the noise also comes directly thru the lines. A whirring or crackling noise may be caused by sparking at the brushes of the generator; and a "clicking" by the sparks at the spark plug of the gasoline motor used to drive the generator, and by the operation of the "breaker" in the spark coil primary.

Installation of the proper type of antenna system is of considerable importance in eliminating these troublesome noises. For maximum freedom from noise the antenna should be the special Philco "Three-Purpose" aerial system, which was designed to prevent pick-up of noise by the antenna lead-in.

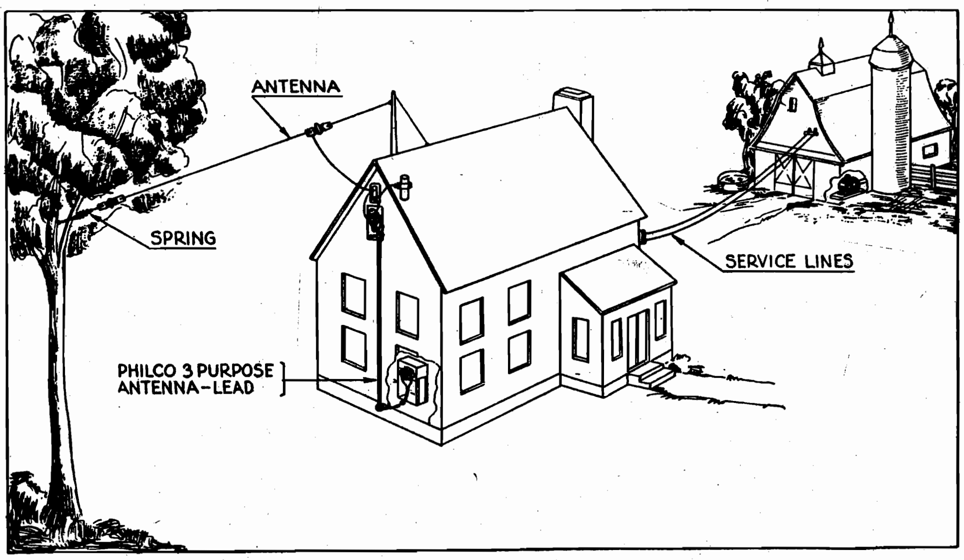


**Fig. 8—Best Method of Antenna Installation for Model 32**

The antenna wire should in all cases be run in a direction from the house opposite to that of the service leads from the lighting system, as indicated in Fig. 8. Where the Three-Purpose System is used, the instructions furnished with it should be very carefully followed. Note that this system employs a special "transmission line" lead-in, at each end of which a special transformer is installed. The transformers must be installed as per instructions, and if this is done the transmission line (lead-in) will be completely noise-proof. All other necessary parts for the antenna installation such as ground clamps, lighting arrester, etc. are included with the Three-Purpose Antenna System.

Philco has designed a special interference-suppression and filter for 32 volt systems which will eliminate most if not all of the interference encountered in the majority of installations. This unit consists of filter chokes and condensers, and is connected directly in the output lines of the generator as per instructions supplied with this special unit. The unit may be obtained from your Philco Distributor.

It is generally advisable also to connect a ½ mfd. fixed condenser (Philco Part No. 30-4015) from each set of generator brushes to the frame of the generator (which should be grounded). The method of locating these condensers is indicated in Fig. 9 which shows a cut-away view of one end of a generator. These condensers help eliminate the whirring or crackling caused by the generator brushes.

To reduce the clicking noise caused by the ignition at the spark plug, a suppressor (Philco Part No. 4531) should be inserted in series between the terminal of the plug and the cable leading to it. See Fig. 10.

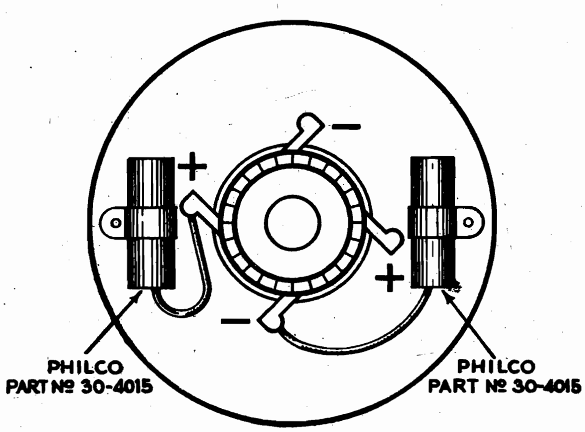


**Fig. 9—Condensers Attached to Generator for Suppressing Interference**

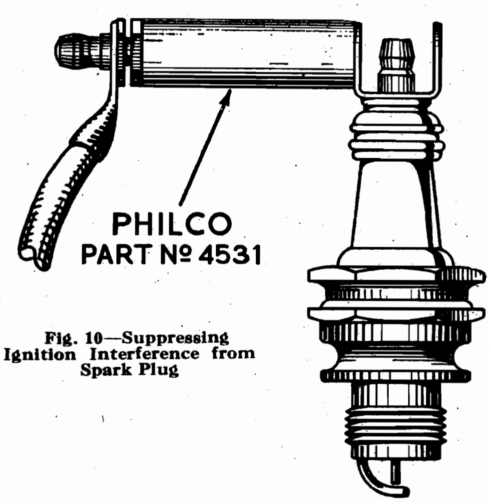


**Fig. 10—Suppressing Ignition Interference from Spark Plug**

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# Model 32

Philco Model 32 is a superheterodyne radio receiver designed to operate directly from a 32 volt D. C. (direct current) electric system, such as used on many farms for lighting purposes. In this model the filaments of the tubes (except the rectifier) are connected in series, while the necessary plate and grid voltages are secured from a special vibrator-and-rectifier unit, contained in a separate metal box mounted on a shelf of the radio cabinet. The rectifier tube is inside the vibrator-and-rectifier unit box. It obtains its filament voltage from a secondary winding of the transformer which is also located in the vibrator-and-rectifier unit box.

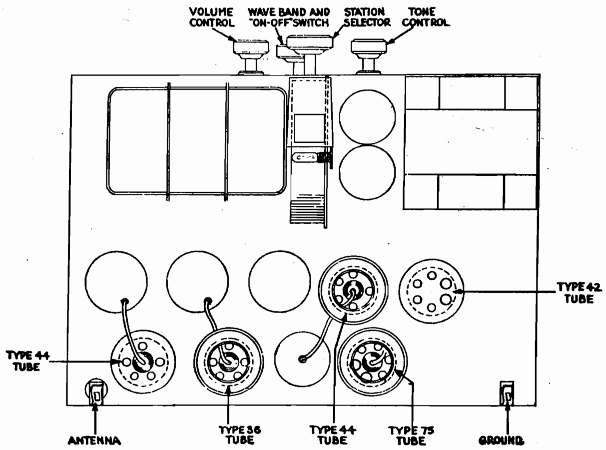


Fig. 1—Top View of Model 32

**NOTE: In 32-volt systems where the batteries are old, the voltage is high (40 volts) when generator is running (due to the higher internal resistance of the batteries). In such cases it will help conserve life of the tubes in the set if battery charging is done at periods of the day when the radio is not in use.**

Model 32 uses the following tubes: R. F., type 39-44; Detector-Oscillator, type 36; I. F., type 39-44; 2d detector, type 75; Output type 42; Rectifier, type 84.

The frequency range of the model 32 is 520 to 3260 kilocycles. The intermediate frequency (I. F.) is 260 K. C. The power consumption is 50 watts when the line voltage is 32, and approximately 70 watts when the line voltage reaches 38.

With a line voltage of 35 volts to the vibrator and an effective voltage of 28 at primary of power transformer (voltage from white lead to white-black-tracer), the A. C. voltage across secondary should be about 300 volts at 65 milliamperes. Secondary voltage measured from yellow lead to yellow-green-tracer. Voltage across 84 filament approximately 7 volts at .5 amperes. (Filament leads have blue insulation.)

## Tube Socket Data Line Voltage 34 Volts

| Circuit | RF | Det.-Osc. | IF | AF | Out-put | Rect. |
|---|---|---|---|---|---|---|
| Type Tube | 39-44 | 36 | 39-44 | 75 | 42 | 84 |
| Filament Volts.......... | 6.8 | 6.8 | 6.8 | 6.8 | 6.8 | 6.8 |
| Plate Volts............ | 205 | 200 | 235 | 155 | 220 | 300 |
| Screen Grid Volts (SG to K)........... | 85 | 83 | 85 | ...... | 240 | ...... |
| Cathode Volts (K to Gnd).......... | 4 | 8.5 | 4 | 0 | 0 | ...... |

The above voltage values were obtained with a high-resistance, multi-range D. C. voltmeter. The readings were taken from the underside of the chassis, with test prods and leads. The PHILCO MODEL 048 ALL-PURPOSE SET TESTER is an ideal instrument for taking these readings, and is highly recommended for this purpose. When the above values were obtained, the Station Selector was set at the low frequency (550 K. C.) end of the scale; the Volume Control was at maximum


Fig. 2—Terminal Arrangement of Tube Sockets Viewed from Under Side of Chassis

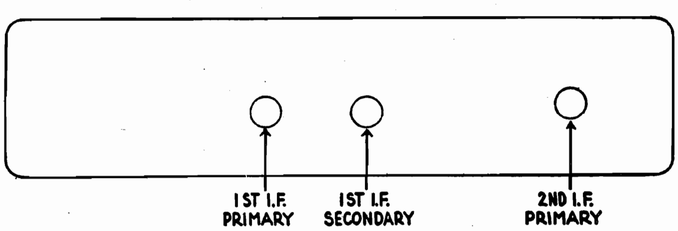


Fig. 3—Rear of Model 32 Chassis, showing location of I.F. Compensating Condensers. I.F. of Model 32 is 260 K. C.

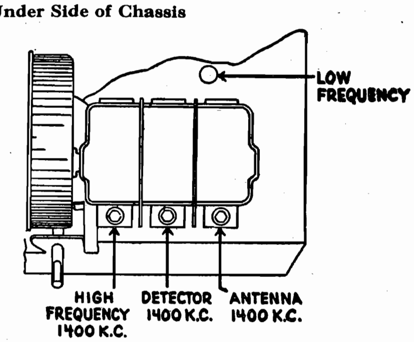


Fig. 4—Top View of Chassis Showing Compensating Condensers Mounted on Tuning Condenser, also Low Frequency Compensating Condenser.

# ADJUSTMENT OF MODEL 32

## COMPENSATING CONDENSERS

These receivers are adjusted accurately before they are shipped from the Factory. If re-adjustment is required, it is usually necessary to re-align only the intermediate frequency compensating condensers. Fig. 3 shows the location of these compensating condensers. The intermediate frequency is 260 kilocycles.

An accurately calibrated signal generator is required for these adjustments. The PHILCO MODEL 024 is a precision signal generator supplying frequencies from 105 kilocycles to 2000 kilocycles and is recommended for this work.

To adjust the I. F. condensers, remove the grid cap clip from the type 36 tube and connect the shielded antenna lead from the signal generator to the grid cap. Connect the ground lead from signal generator to ground post of set.

Connect the primary terminals of the output transformer to an output meter. Set the signal generator frequency switch at 260 K. C., turn it and the receiver "on" and adjust the attenuator of the signal generator so as to get a half scale deflection on the meter. Now with the fibre hex wrench, adjust each of the I. F. condensers in turn so as to obtain maximum reading in the meter.

If re-adjustment of the intermediate frequency circuits is not sufficient to restore sensitivity, the high frequency and low frequency compensating condensers are re-aligned as described in the following paragraphs. Figure 4 shows the location of these compensating condensers.

When making these adjustments replace the grid clip on the 36 tube, and connect the antenna and ground leads from the signal generator direct to the antenna and ground posts of set.

The High Frequency compensating condenser is first adjusted. This adjustment is made with the signal generator set at 1400 kilocycles. Next the Detector and Antenna Condensers, located on the tuning condenser assembly, should be adjusted, with the signal generator still operating at 1400. It may be necessary to readjust the attenuator on the signal generator for these adjustments.

The last adjustment is that of the low frequency (LF) compensating condenser which is accessible from above through the hole in chassis alongside the tuning condenser assembly. This adjustment is made with the signal generator set to give a 700 K. C. signal.

MODEL 32
Schematic

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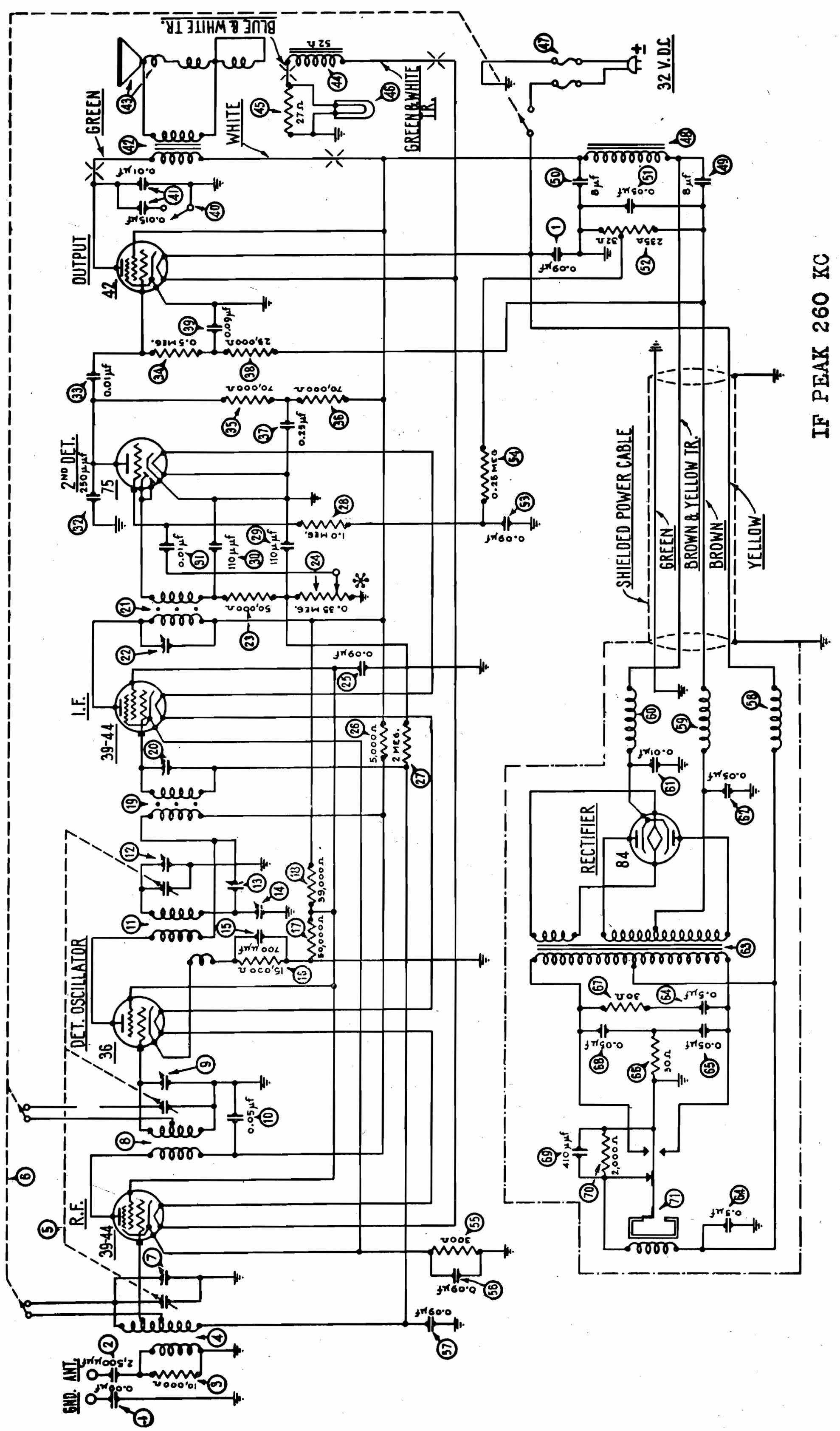


Fig. 5—Wiring Diagram—Model 32

* MUST BE GROUNDED AT 75 CATHODE

MODEL 32
Layouts
Parts List

# PHILCO RADIO & TELEV. CORP.

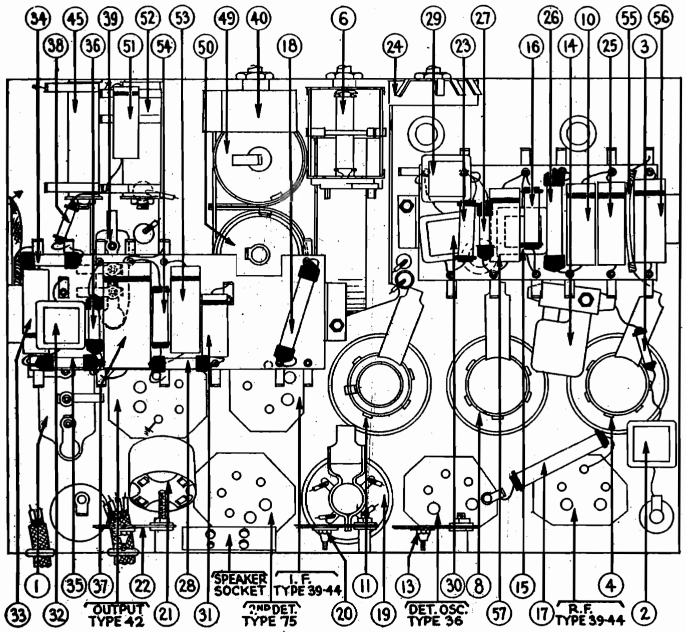


**Fig. 6—Bottom View of Chassis**

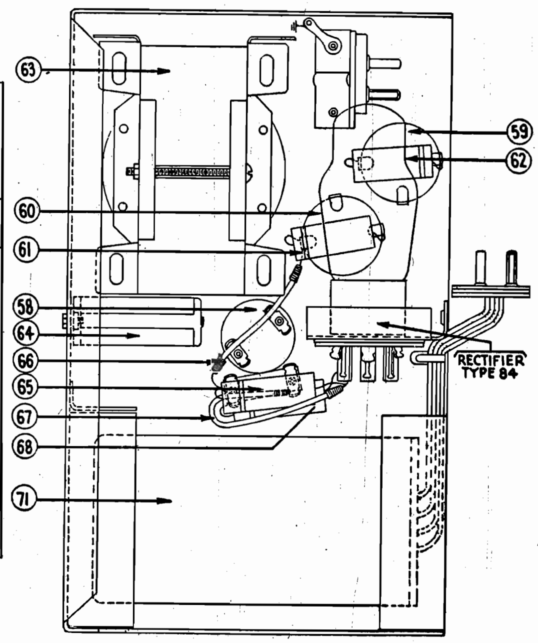


**Fig. 7—Bottom of Vibrator and Rectifier Unit**

## REPLACEMENT PARTS FOR MODEL 32

| No. on Figs. 6 and 7 | Description | Part No. | List Price |
|---|---|---|---|
| 1 | Condenser (.09 mfd.—.09 mfd.) | 4989-G | $0.40 |
| 2 | Condenser (.0025 mfd.) (mica) | 7006 | .40 |
| 3 | Resistor (10,000 ohms—Brown-Black-Orange) | 33-1000 | .25 |
| 4 | Antenna Transformer | 32-1062 | .70 |
| 5 | Tuning Condenser Assembly | 31-1059 | 5.00 |
| 6 | Wave-band & On-off Switch | 42-1017 | 1.00 |
| 7 | Compensating Condenser (ant.) | Part of 5 | .... |
| 8 | Detector Transformer | 32-1063 | .50 |
| 9 | Compensating Condenser (det.) | Part of 5 | .... |
| 10 | Condenser (.05 mfd. tubular) | 30-4123 | .35 |
| 11 | Oscillator Transformer | 06620 | .90 |
| 12 | Compensating Condenser (osc. H. F.) | Part of 5 | .... |
| 13 | Compensating Condenser (1st I. F. pri.) | 04000-M | .20 |
| 14 | Compensating Condenser (osc. L. F.) | 04000-S | .35 |
| 15 | Condenser (.0007 mfd.—mica) | 5863 | .35 |
| 16 | Resistor (15,000 ohms) (Brown-Green-Orange) | 6208 | .25 |
| 17 | Resistor (50,000 ohms) (Green-Brown-Orange) | 4518 | .25 |
| 18 | Resistor (39,000 ohms) (Orange-White-Orange) | 33-1027 | .25 |
| 19 | First I. F. Transformer | 32-1289 | .60 |
| 20 | Compensating Condenser (1st I. F. secondary) | 04000-M | .20 |
| 21 | Second I. F. Transformer | 06622 | 1.20 |
| 22 | Compensating Condenser (2d I. F. primary) | 04000-A | .15 |
| 23 | Resistor (50,000 ohms) (Green-Brown-Orange) | 4518 | .25 |
| 24 | Volume Control (350,000 ohms) | 33-5065 | 1.00 |
| 25 | Condenser (.09 mfd. tubular) | 30-4122 | .35 |
| 26 | Resistor (5,000 ohms) (Green-Black-Red) | 3526 | .25 |
| 27 | Resistor (2 meg. Red-Black-Green) | 5872 | .25 |
| 28 | Resistor (1 meg. Brown-Black-Green) | 4409 | .25 |
| 29 | Condenser (.00011 mfd.—mica) | 30-1006 | .35 |
| 30 | Condenser (.00011 mfd.—mica) | 30-1006 | .35 |
| 31 | Condenser (.01 mfd. tubular) | 30-4124 | .25 |
| 32 | Condenser (.00025 mfd.—mica) | 3082 | .35 |
| 33 | Condenser (.01 mfd. tubular) | 30-4145 | .25 |
| 34 | Resistor (.5 meg.) (Yellow-White-Yellow) | 4517 | .25 |
| 35 | Resistor (70,000 ohms) (Violet-Black-Orange) | 5385 | .25 |

| No. on Figs. 6 and 7 | Description | Part No. | List Price |
|---|---|---|---|
| 36 | Resistor (70,000 ohms) (Violet-Black-Orange) | 5385 | $0.25 |
| 37 | Condenser (.25 mfd. tubular) | 30-4134 | .45 |
| 38 | Resistor (25,000 ohms) (Red-Green-Orange) | 33-1013 | .25 |
| 39 | Condenser (.09 mfd.) (Bakelite block type) | 4989-AL | .35 |
| 40 | Tone Control | 06764 | .50 |
| 41 | Condensers | Part of 40 | .... |
| 42 | Output Transformer (For K-26 spkr.) | 32-7042 | .95 |
| 43 | Voice Coil and Cone (For K-26 spkr.) | 36-3174 | .40 |
| 44 | Field Coil and Pot Assembly (K-26) | 36-3306 | 2.85 |
| 45 | Resistor (Pilot light) (27 ohms) | 33-3132 | .20 |
| 46 | Pilot Lamp | 4567 | .12 |
| 47 | Line Fuses (Located in line plug) (3 amp.) | 45-2046 | ea. .06 |
| 48 | Filter Choke | 32-7213 | 1.60 |
| 49 | Condenser (Electrolytic—8 mfd. wet) | 30-2026 | 1.50 |
| 50 | Condenser (Electrolytic—8 mfd. dry) | 30-2014 | 1.70 |
| 51 | Condenser (.05 mfd. tubular) | 30-4020 | .35 |
| 52 | B. C. Resistor (235—32 ohms) | 7998 | .20 |
| 53 | Condenser (.09 mfd. tubular) | 30-4122 | .35 |
| 54 | Resistor (.25 meg.) (Red-Yellow-Yellow) | 4410 | .25 |
| 55 | Resistor (Flexible—300 ohms) | 33-3010 | .20 |
| 56 | Condenser (.09 mfd. tubular) | 30-4122 | .35 |
| 57 | Condenser (.09 mfd. tubular) | 30-4122 | .35 |
| | Speaker Plug Socket | 4957 | .10 |
| | Line Plug Assembly with Cord (Less fuses) | L-1738 | .85 |

### VIBRATOR AND RECTIFIER UNIT

| No. on Figs. 6 and 7 | Description | Part No. | List Price |
|---|---|---|---|
| 58 | R. F. Choke (Low voltage) | 32-1375 | $0.40 |
| 59 | R. F. Choke (High voltage) | 32-1348 | .30 |
| 60 | R. F. Choke (High voltage) | 32-1348 | .30 |
| 61 | Condenser (.01 mfd. tubular) | 30-4145 | .25 |
| 62 | Condenser (.05 mfd. tubular) | 30-4020 | .35 |
| 63 | Power Transformer | 32-7218 | 4.95 |
| 64 | Condenser (.5 mfd.—.5 mfd.—metal case) | 30-4155 | .85 |
| 65 | Condenser (.05 mfd. tubular) | 30-4020 | .35 |
| 66 | Resistor (30 ohms flexible wire wound) | 33-3119 | .25 |
| 67 | Resistor (30 ohms flexible wire wound) | 33-3119 | .25 |
| 68 | Condenser (.05 mfd. tubular) | 30-4020 | .35 |
| 69 | Condenser (.00041 mfd.—mica) | Inside 71 | .... |
| 70 | Resistor (2,000 ohms) | Inside 71 | .... |
| 71 | Vibrator Unit | 38-5640 | 6.00 |

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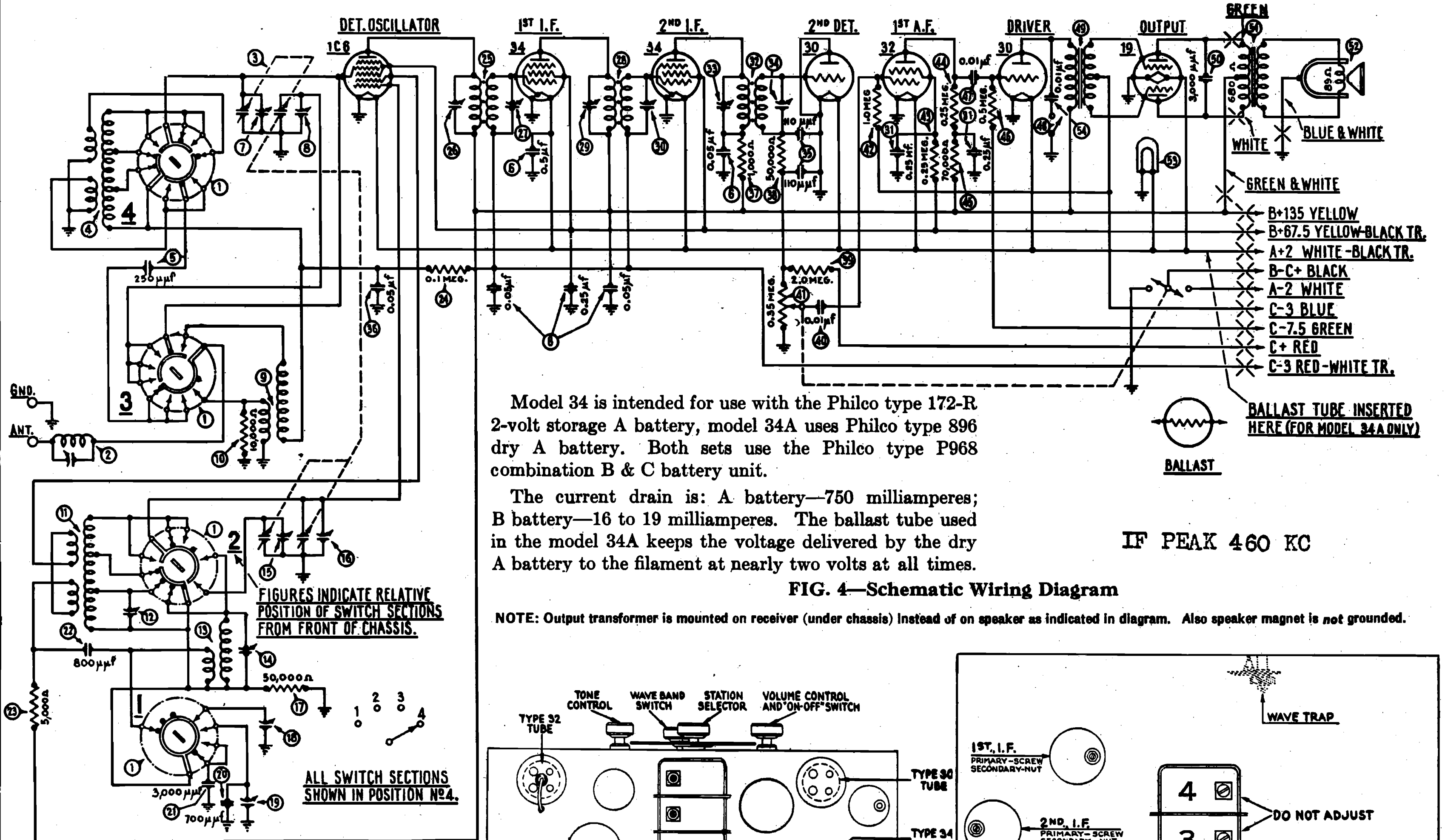


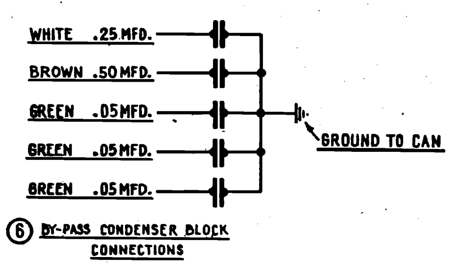

Model 34 is intended for use with the Philco type 172-R 2-volt storage A battery, model 34A uses Philco type 896 dry A battery. Both sets use the Philco type P968 combination B & C battery unit.

The current drain is: A battery—750 milliamperes; B battery—16 to 19 milliamperes. The ballast tube used in the model 34A keeps the voltage delivered by the dry A battery to the filament at nearly two volts at all times.

IF PEAK 460 KC

FIG. 4—Schematic Wiring Diagram

NOTE: Output transformer is mounted on receiver (under chassis) instead of on speaker as indicated in diagram. Also speaker magnet is *not* grounded.



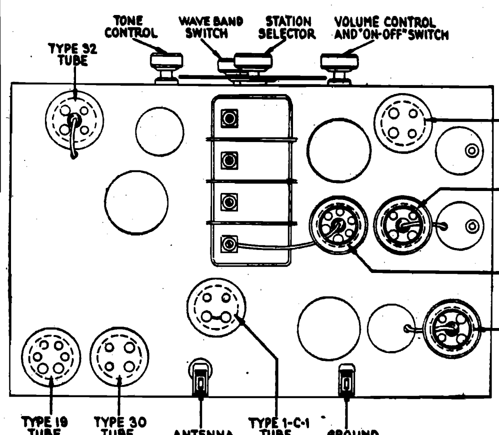




FIG. 1—Top View of Chassis

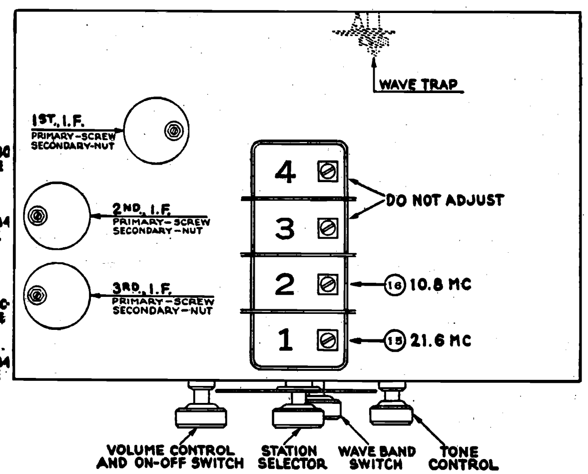



FIG. 2—Position of Compensating Condensers Reached from *Above* Chassis

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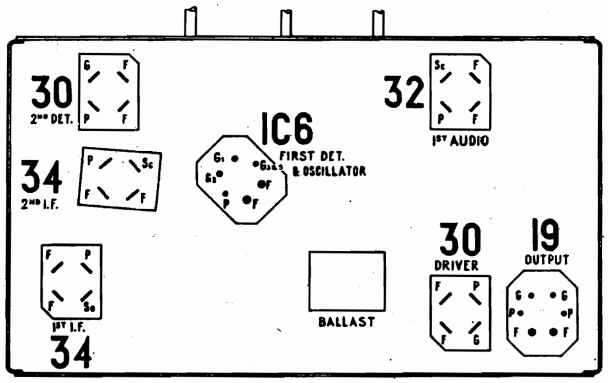



FIG. 3—Tube Socket Layout (View of Underside)

**Table 1—Tube Socket Data***

| CIRCUIT | Det.-Osc. | 1st I. F. | 2nd I. F. | 2nd Det. | 1st A. F. | Driver | Out-put |
|---|---|---|---|---|---|---|---|
| TYPE TUBES | 1C6 | 34 | 34 | 30 | 32 | 30 | 19 |
| Filament Volts.......... | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| Plate Volts............ | P-135 G2-120 | 135 | 135 | .. | 40 | 135 | 135 |
| Screen Grid Volts........ | 67½ | 67½ | 67½ | .. | 35 | .. | .. |

*The above values were obtained from the underside of the chassis, using test prods and leads, with a high-resistance multi-range D. C. voltmeter. The Philco Model 048 All Purpose Set Tester is highly recommended for all tests of this character. Receiver volume control at maximum; station selector at 520 kilocycles. Readings taken with a plug-in adapter will not be satisfactory.

# ADJUSTING MODEL 34

The compensating condensers of Model 34 have been adjusted accurately before shipment. If later adjustment is required, in most cases only the intermediate frequency and low frequency compensating condensers should be done. Extreme care must be given the adjustment of the high frequency circuits, and the adjustment should NOT be undertaken unless the receiver is seriously out of alignment.

DO NOT ATTEMPT TO ADJUST the compensating condensers mounted upon sections numbered 3 and 4 of the Tuning Condenser Assembly. These have been adjusted, and sealed, at the factory.

Philco Model 048 All-Purpose Set Tester, which incorporates a signal generator covering broadcast and police band frequencies, is recommended for the adjustment of the intermediate frequency and low frequency compensating condensers.

Philco Model 091 crystal-controlled Signal Generator is recommended for the high frequency adjustments. It gives an accurate and constant 3600 kilocycle (3.6 megacycle) signal, the harmonics of which include the necessary high frequencies for adjusting the compensating condensers in the high frequency circuits.

1—ADJUSTMENT OF THE INTERMEDIATE FREQUENCY—Remove the grid clip from the type 1C6 tube and connect the "ANT" output terminal of the signal generator to the grid cap of the tube. Connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver chassis.

Connect the output meter to the primary terminals of the output transformer. Set the signal generator at 460 K.C. (the intermediate frequency of Model 34) and adjust each of the I.F. compensating condensers in turn, to give maximum response in the output of the receiver. The location of the I.F. compensating condensers is shown in Figure 2. Each of these transformers has a dual compensating condenser mounted at its top, and accessible thru a hole in the top of the coil shield. In the dual compensators, the Primary circuit is adjusted by turning the screw; the Secondary circuit is adjusted by turning the hex-head nut.

2—ADJUSTMENT OF THE WAVE TRAP—Replace the grid clip upon the Detector-Oscillator tube (Type 1C6). Connect the output leads from the signal generator directly to the antenna and ground terminals of the receiver. Set the Wave-Band Switch of the receiver to the standard broadcast band (Range 1) and the Station Selector at the low frequency (520 K.C.) end. Adjust the Wave Trap ② condenser to give MINIMUM response to a 460 K.C. signal from the signal generator. The Wave Trap ② is located at rear and underneath the chassis, and is shown in Figures 2 and 5. It is reached from the rear of the chassis.

3—ADJUSTMENT OF THE DIAL FREQUENCIES—Model 34 has four separate frequency bands or ranges, each obtained by one of the four positions of the wave-band switch. There is a compensating condenser for each range, which must now be adjusted. In the following procedure, the frequency ranges referred to, and obtained by the different positions of the switch are:

Range 1............520 K.C.—1500 K.C.
Range 2............1.5 M.C.—4.0 M.C.
Range 3............4.0 M.C.—11.0 M.C.
Range 4............11.0 M.C.—23.0 M.C.

Connect the output terminals of the Model 091 or equivalent Signal Generator, to the "ANT" and "GND" terminals of the receiver chassis. Connect an output meter to the primary terminals of the Output Transformer of the receiver. Set the Wave-Band Switch to Range 4, and the Station Selector at 21.6 M.C. The sixth harmonic of the 3.6 M.C. crystal in the Model 091 Signal Generator is picked up at this point. Adjust the compensating condenser ⑮ on Section 1 of Tuning Condenser for maximum response in the output of the receiver.

Turn the Wave-Band Switch to Range 3, and the Station Selector to 10.8 M.C. Here, the third harmonic of the 3.6 M.C. crystal will be heard. Adjust the compensating condenser ⑯ on Section 2 of Tuning Condenser for maximum response in the output of the receiver.

Turn the Wave-Band Switch to Range 2, and adjust the Station Selector to 3.6 M.C. The "Antenna" connection between the Signal Generator and the receiver chassis must be removed for this adjustment, otherwise the output of the Signal Generator will be too great. Adjust the compensating condenser ⑫ to give maximum response in the output circuit. This compensating condenser is located underneath the chassis and is not accessible from above. See Figure 5.

This concludes adjustments requiring the Model 091 (or equivalent) high frequency signal generator.

The Model 048 or its equivalent is now used again. Turn the Wave-Band Switch of the set to Range 2 and the Station Selector to 1.5 M.C. Set the Signal Generator at 1500 K.C. Make sure the "Antenna" connection between the Signal Generator and the Chassis has been restored. Adjust compensating condenser ⑲ located underneath the chassis, (Figure 5). Adjustment is made from the underside of the chassis.

Tune the Wave-Band Switch to Range 1 and the Station Selector to 1400 K.C. Set the Signal Generator at 1400 K.C. Adjust compensating condenser ⑭, which is located underneath the chassis. (See Figure 5). This adjustment is made from the underside of chassis.

Finally, with Wave-Band Switch at Range 1, and Station Selector at 520 K.C., set the Signal Generator at 520 K.C. and adjust compensating condenser ⑱ (Figure 5). This compensating condenser is also mounted underneath the chassis, and reached from below.

**For proper and accurate adjustment of Model 34, the procedure must be followed exactly in the order given. The adjustment should not be undertaken without proper equipment as mentioned above.**

MODEL 34, 34-A
Chassis Layout
Parts List

# PHILCO RADIO & TELEVISION CORP.

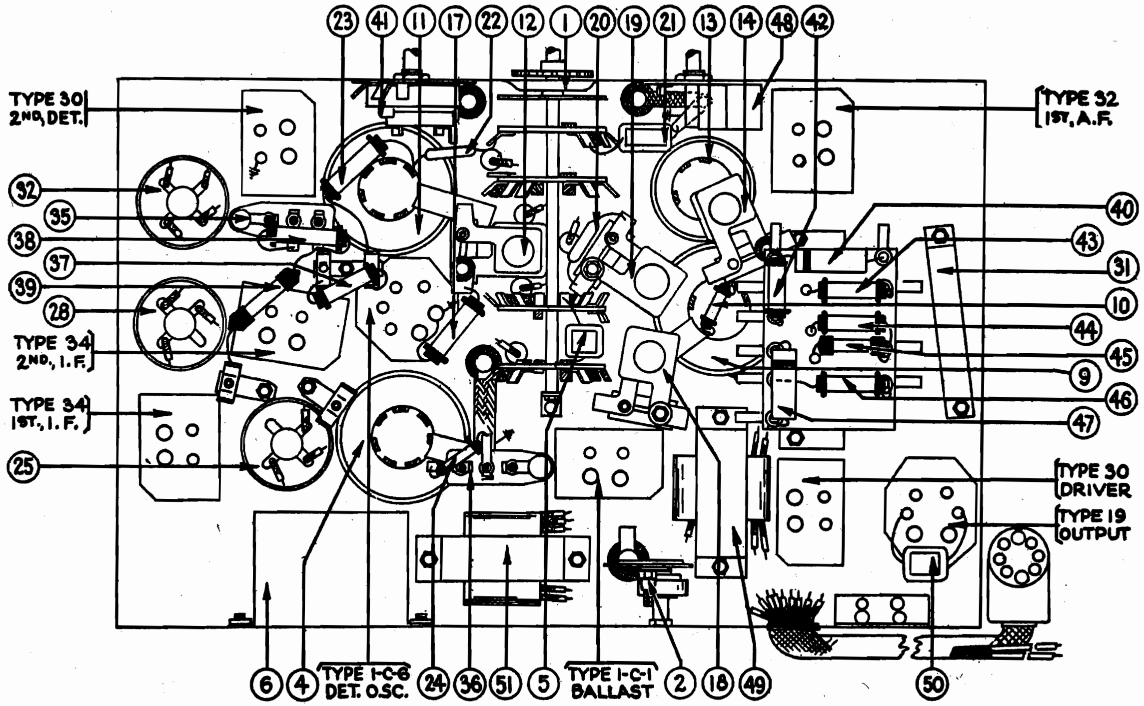



**FIG. 5—Bottom View of Chassis, Showing Parts, and Position of Compensating Condensers Reached from Below Chassis**

## MODEL 34 PARTS

| No. on Figs. | Description | Part No. | List Price Each |
|---|---|---|---|
| 1 | Wave-Band Switch | 42-1045 | $3.60 |
| 2 | Wave Trap | 38-5199 | .30 |
| 3 | Tuning Condenser Assembly | 31-1153 | 6.25 |
| 4 | Antenna Transformer (H. F. Bands) | 32-1271 | .70 |
| 5 | Condenser (.00025 mfd.) | 3082 | .35 |
| 6 | By-pass Condenser Block (.25-.5-.05-.05-.05 mfd.) | 30-4151 | 1.00 |
| 7 | Compensating Condenser (Ant. H. F.) | Part of (3) | .... |
| 8 | Compensating Condenser (Ant. B'cst) | Part of (3) | .... |
| 9 | Antenna Transformer (Broadcast) | 32-1270 | .55 |
| 10 | Resistor (10,000 ohms—Brown-Black-Orange) | 33-1000 | .25 |
| 11 | Oscillator Transformer (H. F. Bands) | 32-1273 | .35 |
| 12 | Compensating Condenser (Range 2) | 04000-C | .15 |
| 13 | Oscillator Transformer (Broadcast) | 32-1272 | .70 |
| 14 | Compensating Condenser (Osc. Range 1) | 04000-A | .15 |
| 15 | Compensating Condenser (Osc. Range 4) | Part of (3) | .... |
| 16 | Compensating Condenser (Osc. Range 3) | Part of (3) | .... |
| 17 | Resistor (50,000 ohms—Green-Brown-Orange) | 4518 | .25 |
| 18 | Compensating Condenser (Broadcast; Series) | 04000-S | .35 |
| 19 | Compensating Condenser (Range 2; Series) | 04000-R | .45 |
| 20 | Condenser (.0007 mfd.) | 5863 | .35 |
| 21 | Condenser (.003 mfd.) | 6009 | .60 |
| 22 | Condenser (.0008 mfd.) | 6021 | .35 |
| 23 | Resistor (5,000 ohms—Green-Black-Red) | 5310 | .25 |
| 24 | Resistor (100,000 ohms—White-White-Orange) | 6099 | .25 |
| 25 | First I. F. Transformer | 32-1341 | 1.35 |
| 26 | Compensating Condenser (1st I. F. Pri.) | 31-6007, Inc. as | .... |
| 27 | Compensating Condenser (1st I. F. Sec.) | part of (25) | .... |
| 28 | Second I. F. Transformer | 32-1341 | 1.35 |
| 29 | Compensating Condenser (2nd I. F. Pri.) | 31-6007, Inc. as | .... |
| 30 | Compensating Condenser (2nd I. F. Sec.) | part of (28) | .... |
| 31 | Condenser (.25-.25 mfd.) (By-pass) | 30-4150 | .70 |
| 32 | 3rd I. F. Transformer | 32-1342 | 1.35 |
| 33 | Compensating Condenser (3rd I. F. Pri.) | 31-6007, Inc. as | .... |
| 34 | Compensating Condenser (3rd I. F. Sec.) | part of (32) | .... |

| No. on Figs. | Description | Part No. | List Price Each |
|---|---|---|---|
| 35 | Condenser (.00011 mfd. twin) | 8035-C | $0.25 |
| 36 | Condenser (.05 mfd.) | 3615-J | .35 |
| 37 | Resistor (1,000 ohms—Brown-Black-Red) | 5837 | .25 |
| 38 | Resistor (50,000 ohms—Green-Brown-Orange) | 4518 | .25 |
| 39 | Resistor (2 meg.—Red-Black-Green) | 5872 | .25 |
| 40 | Condenser (.01 mfd.) | 30-4124 | .25 |
| 41 | Volume Control and On-Off Switch | 33-5064 | 1.45 |
| 42 | Resistor (1.0 meg.—Brown-Black-Green) | 4409 | .25 |
| 43 | Resistor (330,000 ohms—Orange-Orange-Yellow) | 4410 | .25 |
| 44 | Resistor (.25 meg.—Red-Yellow-Yellow) | 6046 | .25 |
| 45 | Resistor (70,000 ohms—Violet-Black-Orange) | 5385 | .25 |
| 46 | Resistor (.5 meg.—Yellow-White-Yellow) | 4517 | .25 |
| 47 | Condenser (.01 mfd.) | 30-4124 | .25 |
| 48 | Tone Control | 30-4152 | .50 |
| 49 | Audio (Input) Transformer | 7233 | 1.80 |
| 50 | Condenser (.003 mfd.) | 7301 | .45 |
| 51 | Output Transformer | 32-7223 | 1.50 |
| 52 | Voice Coil & Cone Assembly (KR-6) | 36-3157 | .50 |
| 53 | Pilot Lamp | 5316 | .35 |
| 54 | Condenser (.01 mfd.) | Part of (48) | .... |
| | Pilot Lamp Bracket | 38-5633 | .55 |
| | Battery Cable | 41-3083 | 2.00 |
| | Tube Shield (1) | 28-1107 | .10 |
| | Tube Shield (2) | 8005 | .06 ea. |
| | Six Prong Socket | 7547 | .11 |
| | Four Prong Socket | 7544 | .10 |
| | Speaker Socket | 4957 | .10 |
| | Knob (Medium) | 03063 | .10 |
| | Knob (Small) | 03064 | .10 |
| | Knob (Large) | 27-4025 | .10 |
| | Dial Assembly | 31-1162 | 1.25 |
| | Dial Scale | 27-5039 | .60 |
| | Idler Shaft Assembly | 31-1056 | .25 |
| | Gear (Wave-Band Switch) | 28-7012 | .20 |
| | Mounting Bolt | W-567 | 3.00 per C. |
| | Mounting Washer (Rubber) | 5189 | .04 |
| | Mounting Washer (Steel) | 5058 | .85 per C. |

MODELS 32,34,38-122
45
Changes

PHILCO RADIO & TELEV. CORP.

## Model 32

Starting with Run No. 4, the antenna and ground Fahnestock clip terminals will be replaced with insulated wire leads. This is done to better meet Underwriters' requirements.

Starting with Run No. 5, Model 32 will use a type 77 detector-oscillator tube instead of a type 36. This change gives more stable performance of the oscillator.

This change involves using a six-hole tube socket instead of the original five-hole socket used for type 36. It also requires making the following substitutions:

Part (10), No. 6208 resistor (15,000 ohms) is replaced by 33-1114 (8000 ohms)

Part (15), No. 5863 condenser (700 Mmfd) is replaced by 7007 (1400 Mmfd.)

On page 3, correct Part No. of (24) Volume Control is 30-5063, instead of 30-5055.
(List price given ($1.00) is correct.)

## Model 34

Correct *list price* of Part (52), 36-3157 voice-coil and cone-assembly, KR-6 speaker, to read ....... 0.75

Starting with Run No. 3, Model 34 will be equipped with a 4-point tone control instead of a 2-point. The part No. of the new control is 30-4168 which replaces 30-4152.

## Model 38-122

This model will use a new output transformer, Part No. 32-7286. This replaces No. 2565 formerly used.

Referring to change notice of July 1st regarding ballast tube shunt resistor on Model 38-122, the correct part number of the 20 ohm resistor used will be 33-3043 instead of 33-3160.

A new ballast tube shunt resistor will be used in production effective this date. This will be part No. 33-3160, 20 ohms, instead of part No. 7155, 30 ohms. This gives a slight (desirable) increase in filament voltage.

## Model 45

Starting with Run No. 5, the cathode resistor on 6A7 tube, Part No. (21) on diagram will be changed from Part No. 6977 (500 ohms) to 33-3016 (400 ohms). This is to prevent variation in output of sets due to variation in 6A7 tubes.

Starting with Run No. 6, electrolytic condenser (62) and (63) (Part No. 30-2028) is replaced by No. 30-2079, same capacity but higher voltage rating.

Starting with Run No. 8, electrolytic condenser (58) (see Service Bulletin 191) will be changed from part No. 30-2020 to 30-2026. Same capacity (6 mfd.), higher voltage rating.

Both Codes 121 and 122 on this model will now use bypass condenser 3615-W for part (54). This change was made to simplify assembly on this model and does not affect performance.

## Models 45 & 29

Effective July 1st, mica condenser (16) on wiring diagram of Model 29 was changed from Part No. 7301 to 30-1028. No change in capacity; change to facilitate wiring only.

Effective July 1st, a new wave-trap will be used in this model. Part (1) on wiring diagram of Model 29 is changed from Part No. 38-5199 to 38-5995. The new wave trap uses an improved construction which facilitates production.

MODEL 45
Alignment Data
Voltage, Layouts

PHILCO RADIO & TELEV. CORP.

# Model 45

Philco Model 45 is a six tube receiver operating on alternating current and capable of receiving either standard and police broadcasts between 540 and 1720 kilocycles, or short-wave stations between 4.2 and 13 megacycles. The left hand side of the dial is calibrated in kilocycles for standard reception and the right in megacycles for short-wave stations. A two-position switch changes reception from standard to short-waves.

Model 45 uses a type 6-A-7 detector-oscillator, two type 39-44 I. F. Tubes, type 75 2d detector, type 42 output tube, and type 80 rectifier. The power consumption is 65 watts. The intermediate frequency is 460 K.C.

**Power Transformer Voltages**

| Terminals | Volts | Circuit | Color Leads |
|---|---|---|---|
| 1–2 | 120 | Primary | White |
| 3–4 | 5.0 | Fil. of 80 | Blue |
| 5–7 | 680 | Plates of 80 | Yellow |
| 8–10 | 6.3 | Filaments | Black |
| 6 | ... | Center of 5–7 | Yellow—Green tr. |
| 9 | ... | Center of 8–10 | Black—Yellow tr. |

**Tube Socket Voltages**

| CIRCUIT | Det. Osc. | 1st IF | 2d IF | 2d Det. | Out-put | Rect. |
|---|---|---|---|---|---|---|
| Type Tube | 6A7 | 39–44 | 39–44 | 75 | 42 | 80 |
| Filament (F to F)......... | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 | 5.0 |
| Plate (P to K)............ | 260 | 255 | 255 | 175 | 250 | 335 |
| Screen Grid (SG to K)..... | G1-35<br>G2-135<br>G3&5-85 | 75 | 75 | ... | 260 | ... |
| Cathode (K to F)......... | 4.2 | 3.8 | 3.8 | 0 | 0 | ... |

The above tests were made with an AC voltmeter for filament voltages and a high resistance DC voltmeter for all others. Dial at 550 KC, volume control at maximum. Test made with test prods applied to socket terminals underneath chassis. Line voltage 115.

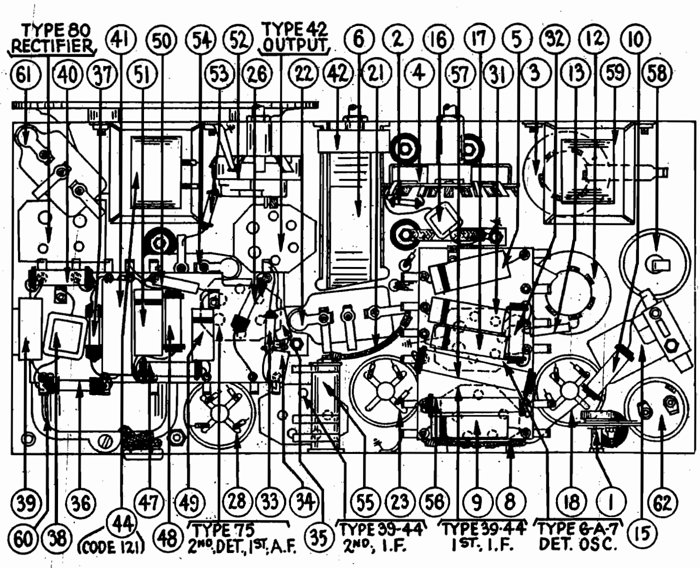



Fig. 4—Bottom View Showing Parts

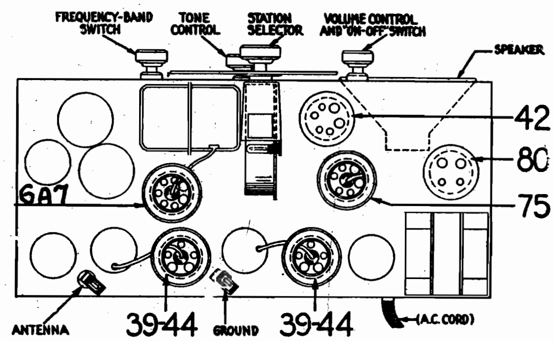



Fig. 2—Chassis Top View

## Adjusting Compensating Condensers

For adjustment of compensating (padding) condensers in model 45, an accurately calibrated signal generator and a special insulated padding wrench are needed. We suggest the Philco Model 024 Signal Generator or the 048 Tester which includes a similar instrument.

The chassis must be removed from cabinet in order to make all adjustments.

Adjustments are made in the following order—

ADJUSTMENT OF THE INTERMEDIATE FREQUENCY—Remove the grid clip from the type 6A7 tube and connect the "ANT" output terminal of the signal generator to the grid cap of the tube. Connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver chassis.

Connect the output meter to the primary terminals of the output transformer. Set the signal generator at 460 K.C. (the intermediate frequency of Model 45) and with the receiver and signal generator turned on, the wave band switch at left and dial at 600 K.C., adjust each of the I. F. compensating condensers in turn, to give maximum response in the output of the receiver. The three pairs of I. F. compensating condensers are located one pair at the top of each of the three I. F. transformer shields. These are the three metal "cans" near the rear of the chassis. Each of the transformers has a dual compensating condenser mounted at its top, and accessible thru a hole in the top of the coil shield. In the dual compensators, the Primary circuit is adjusted by turning the screw; the Secondary circuit is adjusted by turning the hex-head nut.

ADJUSTMENT OF THE WAVE TRAP—Replace the grid clip upon the Detector-Oscillator tube (Type 6A7). Connect the output leads from the signal generator directly to the antenna and ground terminals of the receiver. Set the Wave-Band Switch of the receiver to the standard broadcast band (left hand position) and the Station Selector at the low frequency (540 K.C.) end. Adjust the Wave Trap condenser to give MINIMUM response to a 460 K.C. signal from the signal generator. The Wave Trap ① is located at rear and underneath the chassis, and is shown in Figure 4. It is reached from the rear of the chassis, by inserting the fibre wrench thru the hole near right-hand rear corner of chassis.

DETECTOR, AND OSCILLATOR "HIGH" AND "LOW" FREQUENCY ADJUSTMENTS—The "antenna" and "oscillator H. F." compensators are located on top of the tuning condenser assembly, reached from above.

Set the signal generator at 1500 K.C., tune in this signal on the set and adjust the antenna compensator ⑦ (nearest tuning control) to give maximum reading in the output meter.

Next adjust the oscillator H. F. condenser ⑪ (located on the other section of tuning condenser) to maximum reading.

Finally set the signal generator at 600, tune in this signal and adjust the oscillator "L. F. condenser", located underneath chassis (⑮ in Fig. 4) to maximum reading. This adjustment is reached thru the hole in top of chassis, between the two electrolytic condensers (left hand end of chassis when facing rear).

MODEL 45
Schematic
Parts List
Socket Layout

# PHILCO RADIO & TELEV. CORP.

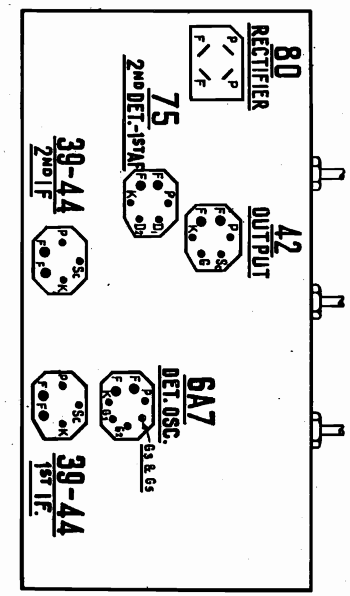
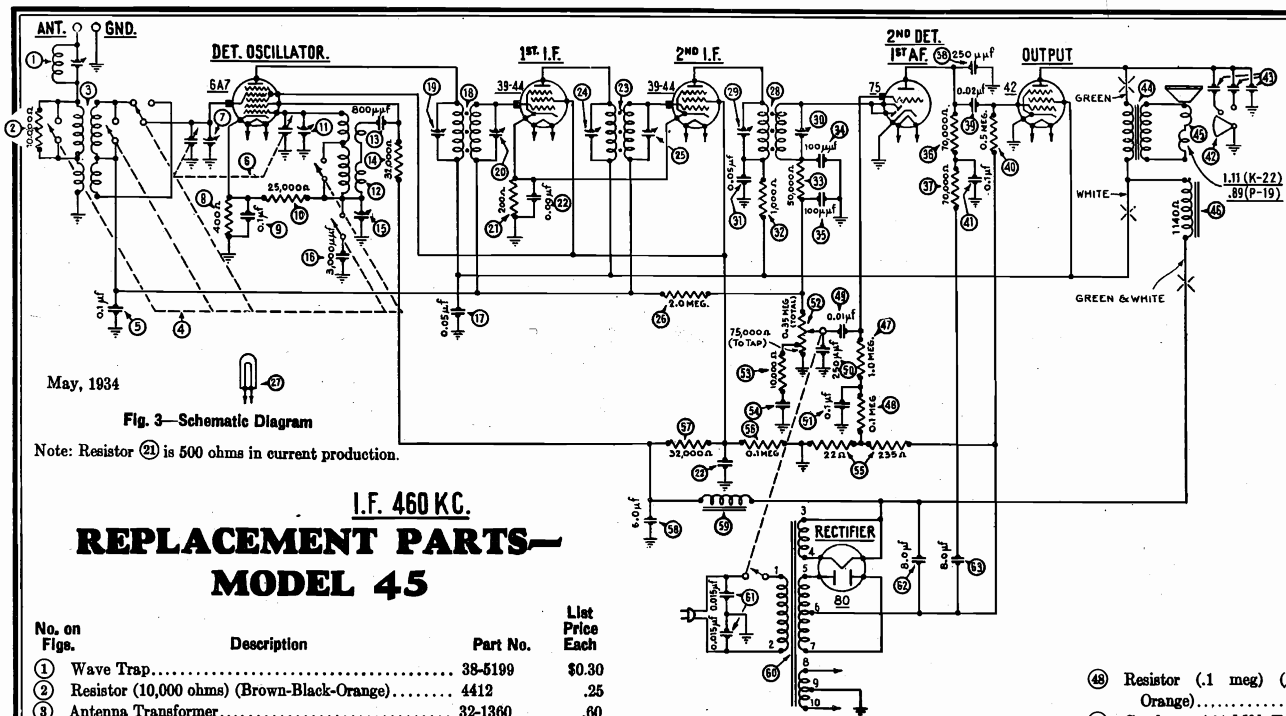



Fig. 1—Tube Socket Layout (underside)




May, 1934

Fig. 3—Schematic Diagram

Note: Resistor (21) is 500 ohms in current production.

I.F. 460 KC.

## REPLACEMENT PARTS—MODEL 45

| No. on Figs. | Description | Part No. | List Price Each |
|---|---|---|---|
| 1 | Wave Trap | 38-5199 | $0.30 |
| 2 | Resistor (10,000 ohms) (Brown-Black-Orange) | 4412 | .25 |
| 3 | Antenna Transformer | 32-1360 | .60 |
| 4 | Wave Band Switch | 42-1062 | 1.10 |
| 5 | Condenser (.1 Mfd.) (Tubular) | 30-4122 | .35 |
| 6 | Tuning Condenser Assembly | 31-1169 | 4.40 |
| 7 | Compensating Condenser (Det.) | Part of (6) | .... |
| 8 | Resistor (400 ohms—Flexible wire wound) | 33-3016 | .20 |
| 9 | Condenser (.1 Mfd.) (Tubular) | 30-4122 | .35 |
| 10 | Resistor (25,000 ohms) (Red-Green-Orange) | 4516 | .25 |
| 11 | Compensating Condenser (Osc. H. F.) | Part of (6) | .... |
| 12 | Oscillator Transformer | 32-1361 | .65 |
| 13 | Condenser (.0008 Mfd.—Mica) | 5878 | .35 |
| 14* | Resistor (32,000 ohms) (Orange-Red-Orange) | 3525 | .25 |
| 15 | Compensating Condenser (Osc. L. F.) | 04000-S | .35 |
| 16 | Condenser (.003 Mfd.—Mica) | 7301 | .45 |
| 17 | Condenser (.05 Mfd.—Tubular) | 30-4123 | .35 |
| 18 | 1st I. F. Transformer | 32-1362 | 1.50 |
| 19 | Compensating Condenser (1st I. F. Primary) | Part of (18) | .... |
| 20 | Compensating Condenser (1st I. F. Secondary) | Part of (18) | .... |
| 21 | Resistor (500 ohms—Flexible wire wound) | 6977 | .20 |
| 22 | Condenser (.09 Mfd. twin) (Bakelite block) | 4989-Z | .40 |
| 23 | 2d I. F. Transformer | 32-1363 | 1.50 |
| 24 | Compensating Condenser (2d I. F. Primary) | Part of (23) | .... |
| 25 | Compensating Condenser (2d I. F. Secondary) | Part of (23) | .... |
| 26 | Resistor (2 megs.) (Red-Black-Green) | 5872 | .25 |
| 27 | Pilot Lamp | 6608 | .11 |
| 28 | 3d I. F. Transformer | 32-1364 | 1.55 |
| 29 | Compensating Condenser—3d I. F. Primary | Part of (28) | .... |
| 30 | Compensating Condenser—3d I. F. Secondary | Part of (28) | .... |
| 31 | Condenser (.05 Mfd. Tubular) | 30-4123 | .35 |
| 32 | Resistor (1,000 ohms) (Brown-Black-Red) | 5837 | .25 |
| 33 | Resistor (50,000 ohms) (Green-Brown-Orange) | 4518 | .25 |
| 34 | Condenser (.0001 Mfd. Mica) | 30-1031 | .... |
| 35 | Condenser (.0001 Mfd. Mica) | 30-1031 | .... |
| 36 | Resistor (70,000 ohms) (Violet-Black-Orange) | 5385 | .25 |
| 37 | Resistor (70,000 ohms) (Violet-Black-Orange) | 5385 | .25 |
| 38 | Condenser (.00025 Mfd. Mica) | 5858 | .35 |
| 39 | Condenser (.02 Mfd. Tubular) | 30-4113 | .30 |
| 40 | Resistor (.5 meg.) (Yellow-White-Yellow) | 4517 | .25 |
| 41 | Condenser (.1 Mfd.) (Tubular) | 30-4170 | .35 |
| 42 | Tone Control | 30-4178 | .75 |
| 43 | Condensers | Inside 42 | .... |
| 44 | Output Transformer (Code 121) | 32-7041 | .95 |
| * | Output Transformer (Code 122) | 2580 | 1.25 |
| 45* | Voice Coil & Cone Assembly | | |
| | P-19 (Compact) | 36-3027 | .50 |
| | K-22 (Lowboy) | 36-3174 | .40 |
| 46* | Field Coil and Pot Assembly | | |
| | P-19 (Compact) | 36-3298 | 3.00 |
| | K-22 (Lowboy) | 02767 | 2.70 |
| 47 | Resistor (1 meg.) (Brown-Black-Green) | 4409 | .25 |
| 48 | Resistor (.1 meg) (White-White-Orange) | 4411 | .25 |
| 49 | Condenser (.01 Mfd. Tubular) | 30-4124 | .25 |
| | *Does not appear in Fig. 4. | | |
| 50 | Condenser (.00025 Mfd. Mica) | 5858 | $0.35 |
| 51 | Condenser (.1 Mfd. Tubular) | 30-4122 | .35 |
| 52 | Volume Control and On-Off Switch | 33-5066 | 1.45 |
| 53 | Resistor 10,000 ohms (Brown-Black-Orange) | 33-1000 | .25 |
| 54 | Condenser (Code 121) (.05 Mfd.) (Bakelite Block) | 3615-W | .35 |
| | Condenser (Code 122) (.09 Mfd.) (Bakelite Block) | 4989-AM | .35 |
| 55 | Voltage Divider (BC Resistor 22—235 ohms) (Wire wound) | 33-3037 | .20 |
| 56 | Resistor .1 meg (White-White-Orange) | 3767 | .25 |
| 57 | Resistor 32,000 ohms (Orange-Red-Orange) | 33-1026 | .35 |
| 58 | Condenser (Electrolytic—6 Mfd.) | 30-2020 | 1.40 |
| 59 | Filter Choke | 32-7018 | 1.50 |
| 60 | Power Transformer | 32-7226 | 4.25 |
| 61 | Condenser (.015 Mfd. twin—Bakelite block) | 3793-E | .40 |
| 62, 63 | Condenser (Electrolytic 8—8 Mfd. 450 Volts) | 30-3028 | 2.40 |
| | A. C. Cord and Plug Assembly | L-943-A | .60 |
| | Tube Shield | 28-1107 | .10 |
| | Four Prong Socket | 4955 | .10 |
| | Five Prong Socket | 4956 | .11 |
| | Six Prong Socket | 6417 | .11 |
| | Seven Prong Socket | 27-6005 | .11 |
| | Speaker Socket (Lowboy set—code 122) | 4957 | .10 |
| | Knob | 27-4052 | .10 |
| | Knob (Large) (Lowboy only) | 27-4051 | .10 |
| | Dial Assembly | 31-1208 | .45 |
| | Dial Scale | 27-5042 | .17 |
| | Mounting screw (Compact set) | W-1345 | 2.75 C. |
| | Mounting Washer (Compact set) | 5058 | .85 C. |
| | Foot (Rubber) | 27-4116 | .05 |

MODEL 49
Alignment Data
Parts List

PHILCO RADIO & TELEV. CORP.

Model 49 is a superheterodyne radio receiver designed for operation on 115 volts direct current (D. C.) only. Model 49 covers two bands of frequencies—from 530 to 1720 KC and from 4.2 to 12.0 megacycles. This gives either standard or short wave reception by turning the wave-band switch on the panel. The intermediate frequency (I. F.) of the set is 260 kilocycles. The power consumption of Model 49 is 50 watts. The receiver uses the following tubes: Type 6A7 detector-oscillator; type 78, R. F.; type 78, I. F.; type 85 2nd detector—1st A. F.; type 76 driver; two (2) type 43 output tubes.

# Adjusting Compensating Condensers

For adjusting compensating or padding condensers in Model 49, an accurately calibrated signal generator covering the broadcast range of frequencies is required and also a crystal controlled signal generator for the high frequency adjustments. For the former we suggest the Philco Model 024 Signal Generator and for the latter the Model 091, Crystal Controlled high frequency signal generator. The actual adjusting calls for a special insulated hex wrench and insulated screwdriver. Philco Part No. 3164 Fibre Wrench and No. 27-1159 Screwdriver are recommended. An output meter is also required, for connection to the receiver. Figs. 1 and 2 show the locations of the various compensating condensers.

I. F. ADJUSTMENT—The I. F. (intermediate frequency) of Model 49 is 260 K. C.

Remove the grid clip from the top of the 6A7 tube and connect the shielded antenna lead from the Signal Generator to the cap of this tube. Connect the ground lead of the Signal Generator to the ground post of receiver. Connect the output meter adapter leads to the plates of the output tubes (type 43) in the receiver. Set the wave-band switch at the left position (standard broadcast).

Set the wave switch of the Signal Generator at 260 K. C., and the dial of the receiver at 550. Turn on the set (volume full on), and the Signal Generator. Now adjust the 1st I. F. Primary and Secondary condensers (Nos. 21 and 23 in Fig. 2) and the 2d I. F. primary and secondary condensers (26 and 28) to give maximum reading on the output meter. The I. F. primary condenser is adjusted by turning the screw on top of the I. F. transformer and the secondary is adjusted by turning the nut. The I. F. transformers are in the smaller metal "cans". The screw and nut are reached through the hole in top. If the needle on the output meter goes off the scale, turn down the "attenuator" on the Signal Generator until a lower reading is obtained.

NOW REMOVE Antenna lead of signal generator from grid cap of 6A7 tube and reconnect it to antenna post of receiver. Replace cap on 6A7 tube.

ANTENNA, DETECTOR AND OSCILLATOR H. F. (Broadcast)—These condensers Nos. 8, 12, and 14, are located on top of the tuning condenser gang (See Fig. 2) adjustment made by means of the fibre wrench. Set the signal generator at 1500 K. C., tune in the signal at 1500 on dial and adjust these condensers in the order given, to give maximum output reading. 8 is located on the section nearest the front and 12 on the center section.

OSCILLATOR—LOW FREQUENCY—This is condenser 17 (see Fig. 1) located underneath chassis and accessible from underneath. Use the fibre wrench. Set signal generator switch at 600, tune in the signal at 600 on the dial and adjust condenser to maximum.

ANT. AND OSC. H. F.—SHORTWAVE—The crystal controlled signal generator is used for these adjustments. These are condensers 4 (Ant.) and 15 (Osc. H. F.) located underneath chassis. 4 is adjusted from underneath, and 15 from above, thru hole in sub-base directly behind tuning condenser assembly. The fundamental frequency of the Philco Model 091 crystal controlled signal generator is 3600 K. C. or 3.6 megacycles. The third harmonic of this is 10.8 M. C. Turn the wave-band switch of the set to the right and the dial to just below 11 M. C. The 10.8 harmonic should be picked up here and the two condensers should be adjusted to give maximum reading on the output meter, on this signal.

# REPLACEMENT PARTS

| Nos. on Diagram | Description | Part No. | List Price |
|---|---|---|---|
| 1 | Resistor (10,000 ohms) (Brown-Black-Orange) | 33-1000 | $0.25 |
| 2 | Antenna (R. F.) Transformer | 32-1379 | .70 |
| 3 | Wave-band Switch | 42-1046 | .80 |
| 4 | Compensating Condenser (Ant. S. W.) | 04000D | .15 |
| 5 | Tuning Condenser Assembly | 31-1334 | 6.85 |
| 6 | Resistor (70,000 ohms) (Violet-Black-Orange) | 33-1115 | .25 |
| 7 | Condenser (.05 Mfd. Tubular) | 30-4020 | .35 |
| 8 | Compensating Condenser (Ant.) | Part of 5 | .... |
| 9 | Condenser (.05 Mfd. Tubular) | 30-4020 | .35 |
| 10 | Detector Transformer | 32-1427 | .90 |
| 11 | Condenser (.000015 Mica) | 30-1030 | .35 |
| 12 | Compensating Condenser (Det.) | Part of 5 | .... |
| 13 | Resistor (160,000 ohms) (Brown-Blue-Yellow) | 5331 | .25 |
| 14 | Compensating Condenser (Osc. H. F.) | Part of 5 | .... |
| 15 | Compensating Condenser (Osc. S. W.) | 31-6016 | .15 |
| 16 | Oscillator Transformer | 32-1428 | .70 |
| 17 | Compensating Condenser (Osc. L. F.) | 04000R | .45 |
| 18 | Condenser (.003 Mfd. Mica) | 30-1028 | .60 |
| 19 | Condenser (.0008 Mfd. Mica) | 6021 | .35 |
| 20 | Resistor (10,000 ohms) (Brown-Black-Orange) | 4412 | .25 |
| 21 | Compensating Condenser (1st I. F. Primary) | Part of 22 | .... |
| 22 | First I. F. Transformer | 32-1381 | 1.50 |
| 23 | Compensating Condenser (1st I. F. Secondary) | Part of 22 | .... |
| 24 | Resistor 70,000 ohms (Violet-Black-Orange) | 33-1115 | .25 |
| 25 | Condenser (.09 Mfd. Bakelite Block) | 4989N | .35 |
| 26 | Compensating Condenser (2d I. F. Primary) | Part of 27 | .... |
| 27 | 2d I. F. Transformer | 32-1424 | 1.60 |
| 28 | Compensating Condenser (2d I. F. Secondary) | Part of 27 | .... |
| 29 | Condenser (.00011 Twin Bakelite Block) | 8035E | .25 |
| 30 | Resistor (50,000 ohms) (Green-Brown-Orange) | 6098 | .25 |
| 31 | Condenser (.05 Mfd. Tubular) | 30-4020 | .35 |
| 32 | Resistor (250,000 ohms) (Red-Yellow-Yellow) | 33-1097 | .25 |
| 33 | Resistor (10,000 ohms) (Brown-Black-Orange) | 33-1000 | .25 |
| 34 | Condenser (.09 Mfd. Bakelite Block) | 4989-P | .35 |
| 35 | Volume Control and On-Off Switch | 33-5024 | 1.45 |
| 36 | Condenser (.05 Mfd. Bakelite Block) | 3615-H | .35 |
| 37 | Resistor (1 Meg.) (Brown-Black-Green) | 33-1096 | .25 |
| 38 | Resistor (.5 Meg.) (Yellow-White-Yellow) | 6097 | .25 |
| 39 | Condenser (Metal Case Block) (.2-.75-.25-.05-.09) | 30-4144 | 1.30 |
| 40 | Resistor (200 ohms Flexible Wire-Wound) | 7217 | .20 |
| 41 | Condenser (.09 Mfd. Bakelite Block) | 4989P | .35 |
| 42 | Shadowmeter | 45-2042 | 2.50 |
| 43 | Condenser (.00011 Mfd. Mica) | 30-1006 | .35 |
| 44 | Condenser (.05 Mfd. Bakelite Block) | 3615AX | .35 |
| 45 | Resistor (.1 Meg.) (White-White-Orange) | 6099 | .25 |
| 46 | Resistor (.5 Meg.) (Yellow-White-Yellow) | 6097 | .25 |
| 47 | Resistor (25,000 ohms) (Red-Green-Orange) | 33-1013 | .25 |
| 48 | Resistor (.1 Meg.) (Yellow-White-Yellow) | 6099 | .25 |
| 49 | Tone Control | 30-4043 | .75 |
| 50 | Condensers in Tone Control | Part of 49 | .... |
| 51 | Audio Transformer | 32-7211 | 5.75 |
| 52 | Condenser (.006 Mfd. Bakelite Block) | 7625-E | .25 |
| 53 | Output Transformer | 2550 | 1.75 |
| 54 | Voice Coil and Cone Assembly H-10 | 02625 | .80 |
| | K-13 | 36-3159 | .50 |
| 55 | Field Coil and Pot Assembly | 02745 | $4.25 |
| 56 | Resistor (10,000 ohms) (Brown-Black-Orange) | 4412 | .25 |
| 57 | Resistor (50,000 ohms) (Green-Brown-Orange) | 4518 | .25 |
| 58 | Filter Choke | 32-7213 | 1.60 |
| 59 | Filter Choke | 32-7018 | 1.50 |
| 60 | B. C. Resistor (Wirewound; 5.1-10.2-27.0-10.8 ohms) | 33-3128 | .25 |
| 61 | Pilot Lamp (Dial) | 4567 | .09 |
| 62 | Pilot Lamp (Shadowmeter) | Part of 42 | .... |
| 63 | Condenser (2.0 Mfd. Metal Case) | 30-4140 | .80 |
| 64 | Condenser (1.0 Mfd. Metal Case) | 04357 | .75 |
| 65 | Condenser (.15 Mfd. Twin Bakelite Block) | 6287-T | .40 |
| 66 | Condenser (.09 Mfd. Twin Bakelite Block) | 4989AP | .35 |
| 67 | Resistor (2900 ohms) (Red-White-Red) | 5309 | .25 |
| 68 | Resistor (2 Meg.) (Red-Black-Green) | 33-1025 | .25 |
| | Dial Assembly | 31-1205 | .50 |
| | Dial Scale | 27-5046 | .25 |
| | Knob (large) | 27-4051 | .10 |
| | Knob (small) | 27-4052 | .10 |
| | Five Prong Socket | 7546 | .10 |
| | Six Prong Socket | 7547 | .10 |
| | Seven Prong Socket | 27-6005 | .11 |
| | Chassis Mtg. Screw | W-1358A | 2.60 C. |
| | Chassis Mtg. Foot (Rubber) | 27-4116 | .05 |
| | Chassis Mtg. Foot Plate | 27-7497 | .35 C. |
| | Chassis Mtg. Washer | 29-2089 | .35 C. |
| | Speaker Socket | 4957 | .10 |
| | Cord & Plug Assembly | L-943A | .60 |

MODEL 49
Schematic
Voltage,Layouts

# PHILCO RADIO & TELEV. CORP.

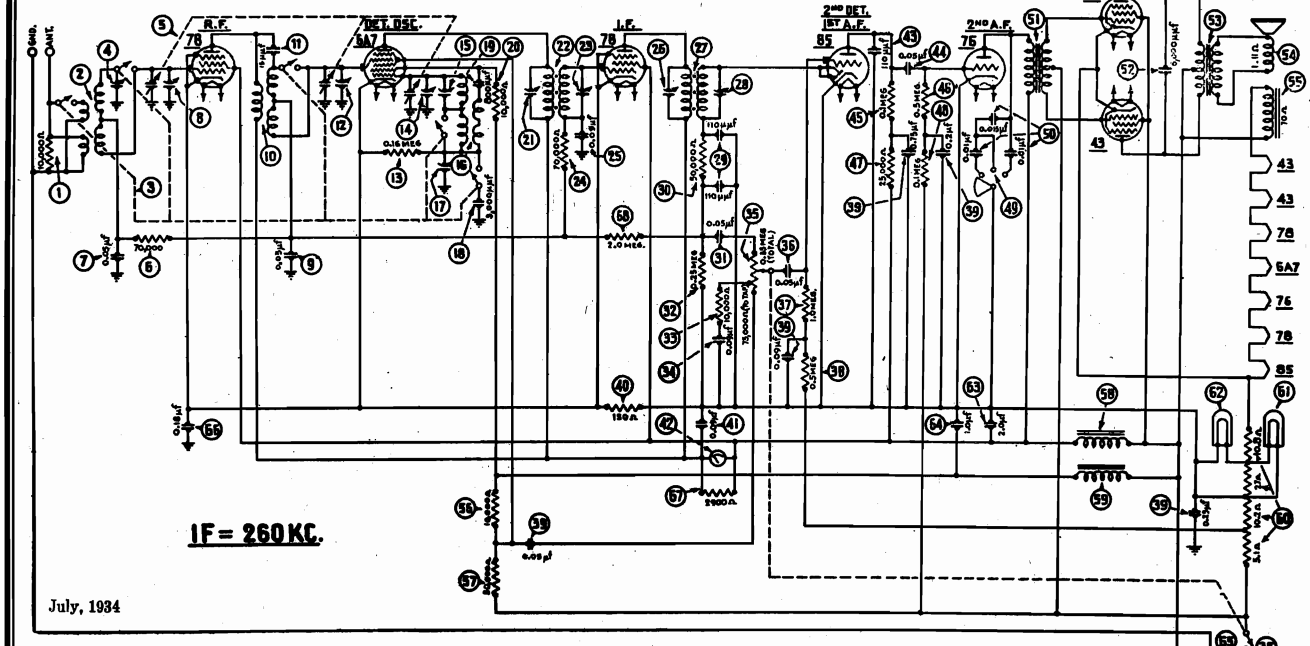



Fig. 3—Wiring Diagram—Wave band switch shown in Standard Broadcast position, (left hand)

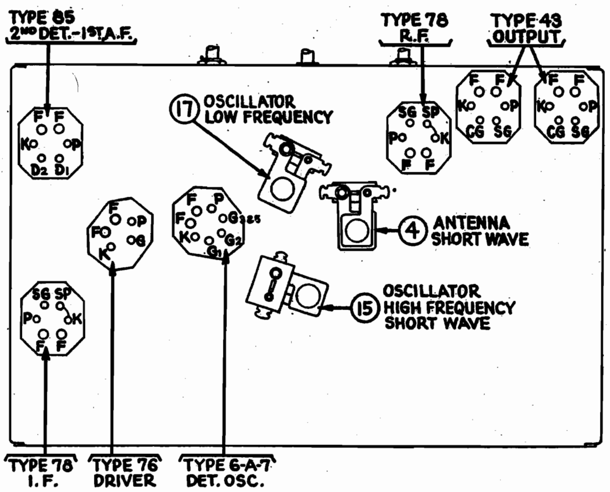



Fig. 1—Tube Sockets

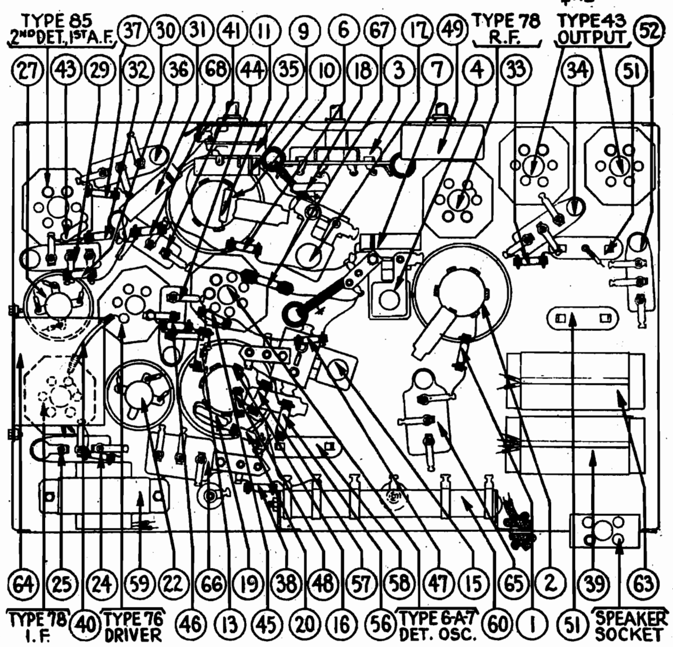



Fig. 4—Bottom View

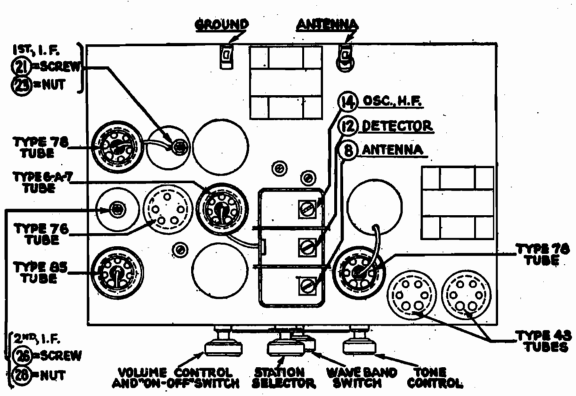



Fig. 2—Top View

All readings above made with a high resistance multirange D. C. voltmeter using test prods applied to tube sockets underneath chassis (See Fig. 1). Volume control at maximum, wave-band switch at left (standard broadcast) and dial at 550 K.C.

Philco Model 025 Circuit Tester or 048 All-Purpose Tester are highly recommended for making the above tests.

## Tube Socket Voltages—Line Voltage 120 D.C.

| TUBE Type | TUBE Circuit | Filament F to F | Plate P to K | Screen Grid SG to K | Cathode K to F |
|---|---|---|---|---|---|
| 78 | R. F. | 5.8 | 85 | 100 | 30 |
| 6A7 | Det.-Osc. | 5.7 | 90 | G3&5-K:65<br>G2 -K:80<br>G1 -K:12 | 22 |
| 78 | I. F. | 6.3 | 90 | 100 | 15 |
| 85 | 2d Det.—1st A. F. | 6.3 | 40 | ... | 15 |
| 76 | Driver | 6.3 | 100 | ... | 20 |
| 43<br>43 | Output | 2.6<br>2.6 | 100<br>100 | 105<br>105 | 60<br>60 |

PHILCO RADIO & TELEV. CORP.

# Model 59

Philco Model 59 is a four-tube superheterodyne receiver operating on alternating current, capable of receiving standard broadcasts, and police calls on the first (lowest) police range. The tubes are as follows: Type 77 detector-oscillator, type 77 second detector, type 42 output and type 80 rectifier. The intermediate frequency is 460 K.C. The power consumption of model 59 is 52 watts.

**Tube Socket Data—Line 115 Volts**

| Circuit | Det. Osc. | 2nd Det. | Out-put | Recti-fier |
|---|---|---|---|---|
| Type Tube | 77 | 77 | 42 | 80 |
| Filament Volts—F to F | 6.3 | 6.3 | 6.3 | 4.8 |
| Plate Volts—P to K | 235 | 45 | 235 | 300 |
| Screen Grid Volts—SG to K | 110 | 35 | 250 | .... |
| Control Grid Volts—CG to K | 10.5 | .25 | .25 | .... |
| Cathode Volts—K to F | 25 | 15 | 15 | .... |

**Power Transformer Data**

| Terminal | A. C. Volts | Circuit | Color |
|---|---|---|---|
| 1- 2 | 105-125 | Primary | White |
| 3- 5 | 6.3 | Filament | Black |
| 6- 7 | 5.0 | Filament of 80 | Blue |
| 8-10 | 580 | Plates of 80 | Yellow |
| 4 | ... | Center Tap of 3-5 | Black-Yellow Tracer |
| 9 | ... | Center Tap of 8-10 | Yellow-Green Tracer |

*All of the above readings were taken from the underside of the chassis, using test prods and leads with a suitable A. C. voltmeter for filament voltages and a high resistance multirange D. C. voltmeter for all other readings. Volume control at maximum and station selector turned to low frequency end. Readings taken with a plug-in adapter will NOT be satisfactory. The Philco Model 048 All-Purpose Set Tester is recommended for all tests of Model 59.

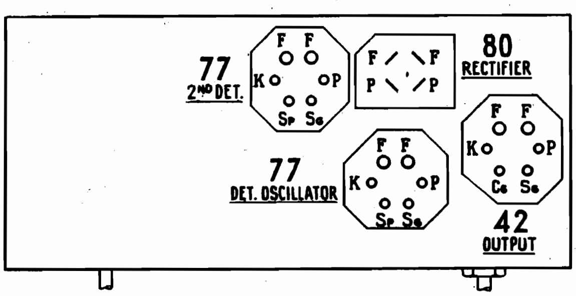



Fig. 1—Tube Socket Layout (Viewed from Bottom)

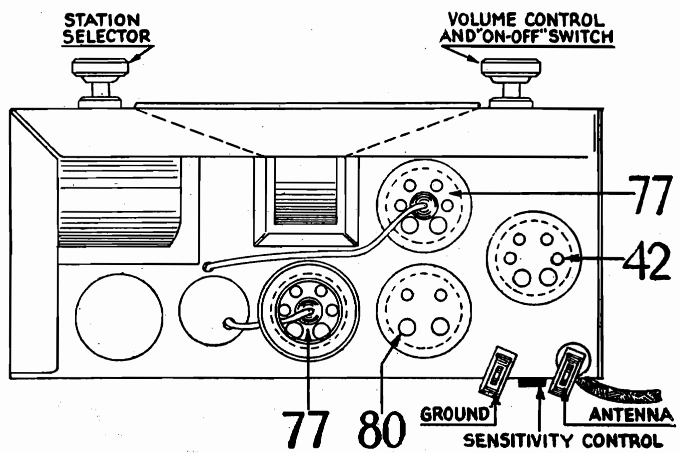



Fig. 2—Top View of Chassis

## Adjusting Compensating Condensers

In Model 59 the I. F. primary and secondary condensers and the "regeneration" compensating condenser are located at the rear of chassis and accessible from the rear; the "ANT" and "OSC H. F." are located on the side of the tuning condenser gang.

Referring to Fig. 3, the I. F. primary and secondary condensers ⑧ and ⑮ should be adjusted first. Use an accurate signal generator such as the Philco Model 024. Remove the grid cap clip from the detector-oscillator tube and connect the antenna lead from the signal generator to the cap of this tube. Connect the ground lead from the signal generator to the ground terminal of the set. Connect the primary terminals of the output transformer to an output meter. Set the frequency switch of the signal generator at 460 K.C. (the I. F. of model 59), and turn the switches of the set and signal generator on. Turn volume control full on. Turn the dial pointer on the set to 600, and then adjust the I. F. compensating condensers ⑧ and ⑮ by means of a fibre wrench so that maximum reading is obtained in the output meter. If the needle goes off scale, adjust the attenuator on the signal generator so that a lower reading is obtained.

Next adjust the ANT. and OSC. H. F. (high frequency) condensers ④ and ⑨ located on the tuning condenser gang. To adjust these condensers it is necessary to remove the chassis from the cabinet, necessitating removing back plate, base screws, knobs and pointers. Replace the grid clip on the 77 tube and connect the antenna and ground leads of the signal generator direct to the antenna and ground terminals of the set. Set the signal generator switch at 1400, turn the tuning condenser shaft until the rotary plates barely start to mesh with the stationary ones. Tune in the 1400 K.C. signal here and adjust condensers ④ and ⑨ for maximum output meter reading. When replacing the dial pointer, be sure it is mounted exactly as it was removed.

Finally adjust the regeneration condenser ⑯. With the set connected to an antenna, turn the station selector to receive a station at about 130 on the dial. With a screw driver turn the small fibre hex-head screw (which operates the regeneration condenser) located at rear of chassis below antenna and ground terminals, clockwise until the set squeals or oscillates. Then turn the hex-screw ¼ of a turn back until the squealing stops. Tune in other stations on different points on the scale to make sure that the squealing is eliminated. It will be necessary to readjust this condenser if a different type 77 tube is used for second detector.

MODEL 59
Schematic
Chassis, Parts List

PHILCO RADIO & TELEV. CORP.

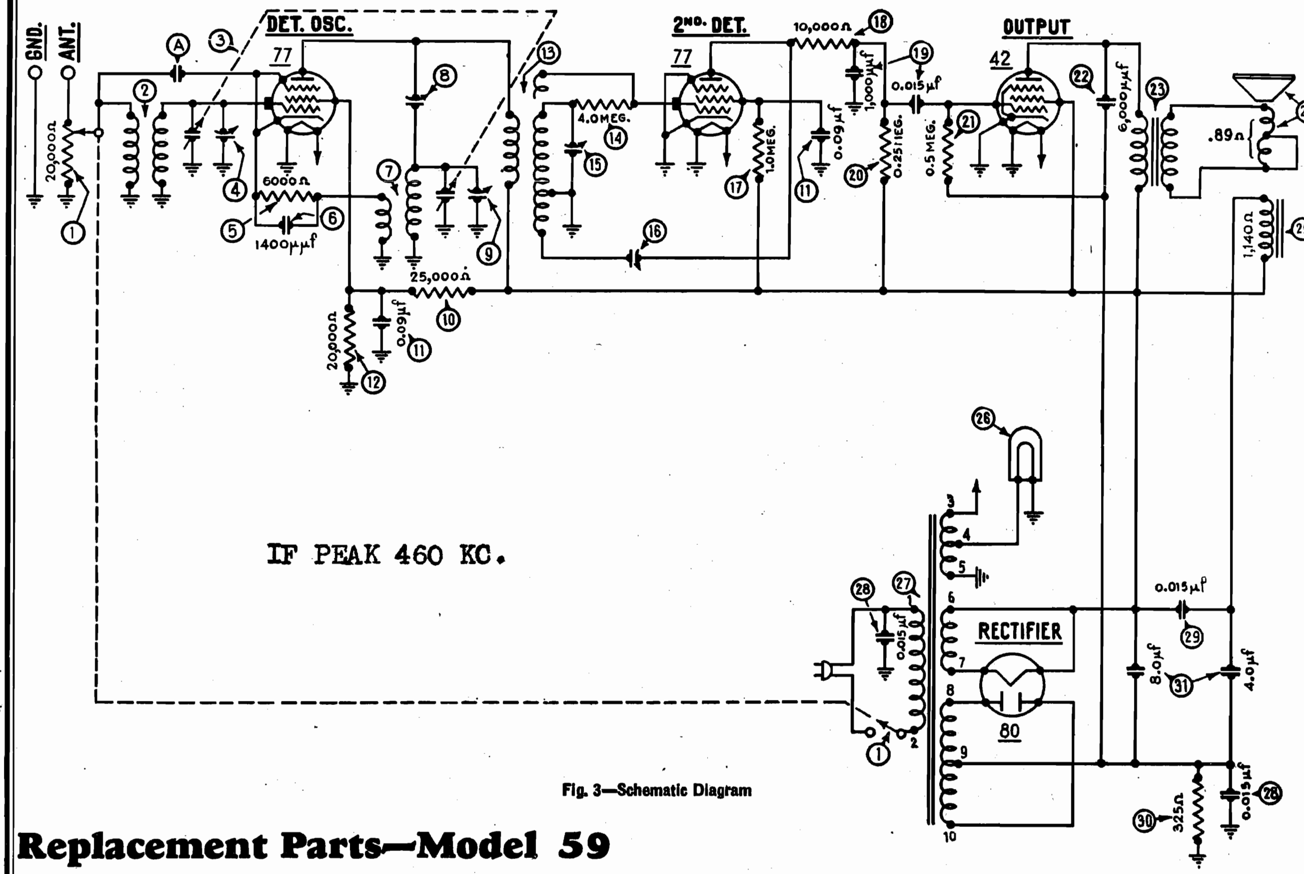



Fig. 3—Schematic Diagram

# Replacement Parts—Model 59

| No. on Diagram | Item | Part No. | List Price |
|---|---|---|---|
| (1) | Volume Control and On-Off Switch | 33-5057 | $1.40 |
| (2) | Antenna Transformer | 32-1388 | .45 |
| (3)* | Tuning Condenser Assembly | 31-1190 | 2.75 |
| (4)* | Compensating Condenser—Ant. | Part of (3) | .... |
| (5) | Resistor (6,000 ohms—Blue-Black-Red) | 7352 | .25 |
| (6) | Condenser (.0014 Mfd.—Mica) | 7007 | .35 |
| (7) | Oscillator Transformer | 32-1389 | .40 |
| (8) | Compensating Condenser (I. F. Primary) | 04000-A | .15 |
| (9)* | Compensating Condenser (Osc. H. F.) | Part of (3) | .... |
| (10) | Resistor (25,000 ohms—Red-Green-Orange) | 3656 | .25 |
| (11)* | Condenser (.09 twin—Black Bakelite) | 4989-C | .40 |
| (12) | Resistor (20,000 ohms—Red-Black-Orange) | 6650 | .25 |
| (13) | I. F. Transformer | 32-1155 | 1.20 |
| (14)* | Resistor (4 Megohms—Yellow-Black-Green) | 6010 | .25 |
| (15) | Compensating Condenser (I. F. Secondary) | 04000-D | .15 |
| (16) | Compensating Condenser (Regeneration) | 04000 | .20 |
| (17) | Resistor (1 Megohm—Brown-Black-Green) | 33-1096 | .25 |
| (18) | Resistor (10,000 ohms—Brown-Black-Orange) | 33-1000 | .25 |
| (19) | Condenser (.015-.0001 Mfd. Block type) | 7762-B | .30 |
| (20) | Resistor (250,000 ohms—Red-Yellow-Yellow) | 33-1097 | .25 |
| (21) | Resistor (500,000 ohms—Yellow-White-Yellow) | 6097 | .25 |
| (22)* | Condenser (.006 Mfd. Block type) | 7625-E | .25 |
| (23)* | Output Transformer | 32-7041 | .95 |
| (24)* | Voice Coil and Cone Assembly | 36-3029 | .75 |
| (25)* | Field Coil and Pot Assembly | 36-3081 | 1.75 |
| (26)* | Pilot Lamp | 6608 | .11 |
| (27) | Power Transformer | 32-7064 | 3.15 |
| (28) | Condenser (.015 Mfd. Twin) | 3793-R | .40 |
| (29) | Condenser (.015 Mfd.) | See Note A below | |
| (30) | Resistor (Wire wound 325 ohms) | 7465 | .15 |
| (31) | Condenser (Electrolytic 8.0—4.0 Mfd.) | 30-2013 | 1.95 |
| | Tube Shield | 28-1107 | .10 |
| | Four Prong Tube Socket | 7544 | .10 |
| | Six Prong Tube Socket | 7547 | .11 |
| | A. C. Cord and Plug | L-943A | .60 |
| | Dial Scale | 27-5023 | .15 |

*Does not show in Fig. 4.
Note A: Condenser (29) not used in production.

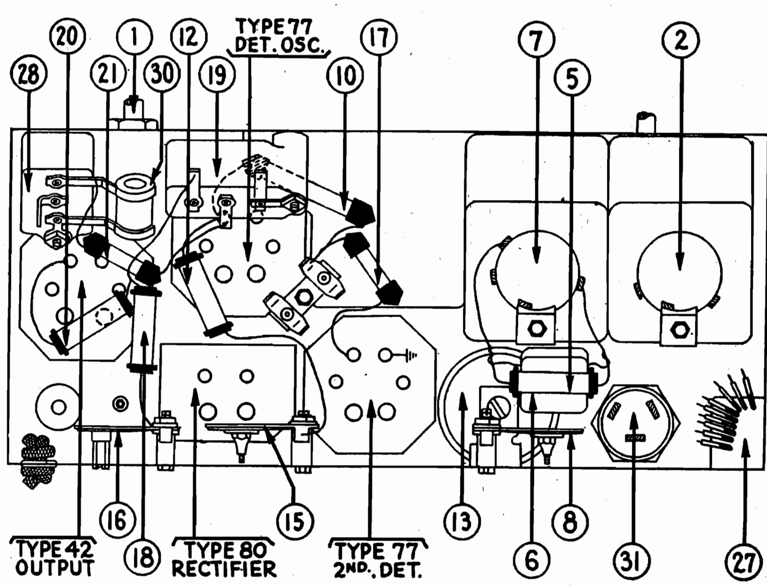



Fig. 4—Base View

May, 1934

MODEL 66
Alignment Data
Voltage
Parts List

PHILCO RADIO & TELEV. CORP.

# Model 66

Model 66 is a five-tube superheterodyne radio receiver, capable of receiving either standard broadcasts (and police calls up to 1720 K.C.), or short-wave stations within a frequency range of 5.5 to 16.0 megacycles. The frequency range on standard broadcast is 540-1720 kilocycles.

The tubes used are: Type 6A7 detector-oscillator, type 78 intermediate frequency, type 75 2d detector, type 42 output and type 80 rectifier. The intermediate frequency of the Model 66 is 460 K.C. and the power consumption is 60 watts.

## Adjusting Compensating Condensers

The adjustment of the compensating condensers in Model 66 Receiver requires the use of an accurate signal generator such as Philco Model 024, an efficient output meter (Philco Model 012 or Model 025 are recommended), and a suitable fibre hex wrench. Connect the output meter to the plate and cathode prongs of the 42 output tube.

Adjustments are made in the following order:

(1)—I. F. (Intermediate Frequency)—Remove grid clip from cap on 6A7 tube and connect antenna lead from signal generator to cap of tube. Connect ground lead to ground post on set. Turn on set and signal generator; set wave switch of latter to 460 K. C. (the I. F. of Model 66) and dial of set at 540, wave band switch to left. Adjust each of the four I. F. compensating condensers 17, 19, 22 and 24 in turn so that maximum reading is obtained in the output meter. If the meter reading goes off scale, adjust the attenuator on the signal generator so as to get a lower reading. These I. F. condensers (visible in Fig. 4) are adjusted by inserting the hex wrench thru the holes in rear of chassis sub-base (except one to extreme left when facing rear of set). Two of the holes are covered by small metal buttons which can be removed temporarily by hand.

(2)—WAVE TRAP—Replace grid clip on cap of 6A7 tube and connect antenna lead from signal generator to antenna post on set. Set signal generator at 460 K. C. and adjust wave trap 1 so as to get MINIMUM reading in output meter.

(3)—ANT. and OSC. H. F.—These adjustments 7 and 11 are located on top of the tuning condenser assembly at right (facing front of set) and adjusted from above. The "ANT" 7 is nearest front of set. Set signal generator at 1700 and dial of set at 1700 and adjust these two condensers to get maximum output meter reading.

(4)—OSC. L. F.—This condenser 13 is located underneath chassis (see Fig. 4) and is reached from underneath. Set dial of set and signal generator switch at 600, and adjust for maximum reading.

## Replacement Parts for Model 66

| No. on Figs. | Description | Part No. | List Price |
|---|---|---|---|
| 1 | Wave Trap | 38-5199 | $0.30 |
| 2 | Wave-band Switch | 42-1066 | .90 |
| 3 | Resistor (10,000 ohms) (Brown-Black-Orange) | 33-1000 | .25 |
| 4 | Antenna Transformer | 32-1412 | .85 |
| 5 | Condenser (.000015 Mfd.) | 30-1030 | .35 |
| 6 | Tuning Condenser Assembly | 31-1231 | 3.65 |
| 7 | Compensating Condenser (ANT) | Part of 6 | .... |
| 8 | Resistor (200 ohms Flexible) (Red-Black-Brown) | 7217 | .20 |
| 9 | Condenser (.05 Mfd. Tubular) | 30-4020 | .35 |
| 10 | Resistor (50,000 ohms) (Green-Green-Orange) | 6098 | .25 |
| 11 | Compensating Condenser (OSC. HF) | Part of 6 | .... |
| 12 | Condenser (.003 Mfd. Mica) | 30-1028 | .60 |
| 13 | Compensating Condenser (Osc. I. F.) | 04000-S | .35 |
| 14 | Condenser (.0008 Mfd. Mica) | 5878 | 35 |
| 15 | Resistor (32,000 ohms) (Orange-Red-Orange) | 5279 | .25 |
| 16 | Oscillator Transformer | 32-1413 | .60 |
| 17 | Compensating Condenser (1st I. F. Pri.) | 04000M | .20 |
| 18 | 1st I. F. Transformer | 32-1414 | 1.00 |
| 19 | Compensating Condenser (1st I. F. Secondary) | 04000M | .20 |
| 20 | Resistor (400 ohms Flexible) | 33-3016 | .20 |
| 21 | Condenser (.05 Mfd. Tubular) | 30-4020 | .35 |
| 22 | Compensating Condenser (2d I. F. Primary) | 04000M | .20 |
| 23 | 2d I. F Transformer | 32-1415 | $1.00 |
| 24 | Compensating Condenser (2d I. F. Secondary) | 04000J | .20 |
| 25 | Resistor (50,000 ohms) (Green-Brown-Orange) | 6098 | .25 |
| 26 | Condenser (.0001 Mfd. Twin Bakelite Block) | 8035-B | .25 |
| 27 | Condenser (.1 Mfd. Tubular) | 30-4170 | .35 |
| 28 | Resistor (70,000 ohms) (Violet-Black-Orange) | 33-1115 | .25 |
| 29 | Resistor (70 000 ohms) (Violet-Black-Orange) | 33-1115 | .25 |
| 30 | Condenser (.00011 Mfd. Mica) | 30-1006 | .35 |
| 31 | Condenser (.02 Mfd. Tubular) | 30-4113 | .30 |
| 32 | Resistor (500,000 ohms) (Yellow-White-Yellow) | 6097 | .25 |
| 33 | Tone Control | 30-4192 | .50 |
| 34 | Condensers in Tone Control | Inside 33 | .... |
| 35 | Output Transformer | 32-7019 | 1.25 |
| 36 | Voice Coil & Cone Assembly (S-12) | 36-3014 | .60 |
| 37 | Field Coil and Pot. Assembly (S-12) | 36-3341 | 2.75 |
| 38 | Resistor (2 Megohms) (Red-Black-Green) | 33-1025 | .25 |
| 39 | Volume Control and On-Off Switch | 33-5006 | 1.45 |
| 40 | Condenser (.01 Mfd.) (Bakelite Block) | 3903-AB | .25 |
| 41 | Resistor (1 Megohm) (Brown-Black-Green) | 33-1096 | .25 |
| 42 | Condenser (.1 Mfd.) | 30-4122 | .35 |
| 43 | Resistor (.1 Meg.) (White-White-Orange) | 6099 | .25 |
| 44 | Resistor (B C. Wire-wound) (22-235 ohms) | 33-3037 | .20 |
| 45 | Resistor (.1 Meg.) (White-White-Orange) | 6099 | $0.25 |
| 46 | Condenser (.05 Mfd. Tubular) | 30-4123 | .35 |
| 47 | Resistor (37,000 ohms) (Orange-Violet-Orange) | 33-1098 | .35 |
| 48 | Filter Choke | 32-7018 | 1.50 |
| 49 | Condenser (Electrolytic—6 Mfd.) | 30-2021 | 1.55 |
| 50 | Condenser (Electrolytic—8-8 Mfd.) | 30-2028 | 2.40 |
| 51 | Condenser (.09 Mfd. Bakelite Block) | 4989-D | .35 |
| 52 | Power Transformer | 8046 | 3.45 |
| 53 | Condenser (.015 Mfd. Bakelite Block) | 3793-W | .35 |
| 54 | Condenser (.05 Mfd. Tubular) | 30-4020 | .35 |
| 55 | Dial Light | 6608 | .11 |
| | Four Prong Socket | 7544 | .10 |
| | Six Prong Socket | 7547 | .11 |
| | Seven Prong Socket | 27-6005 | .11 |
| | Tube Shield | 28-1107 | .10 |
| | Chassis Mounting Screw | W-567 | 3.00C |
| | Chassis Mounting Washer (Metal) | W-315 | .50C |
| | Chassis Mounting Washer (Rubber) | 5189 | .04 |
| | Knob (Large) | 27-4051 | .10 |
| | Knob (Small) | 27-4052 | .10 |
| | Dial Assembly | 31-1234 | .30 |
| | Dial Scale | 27-5057 | .10 |
| | A. C. Cord and Plug Assembly | [illegible]3A | .60 |

### Tube Socket Voltages—Line Voltage 115

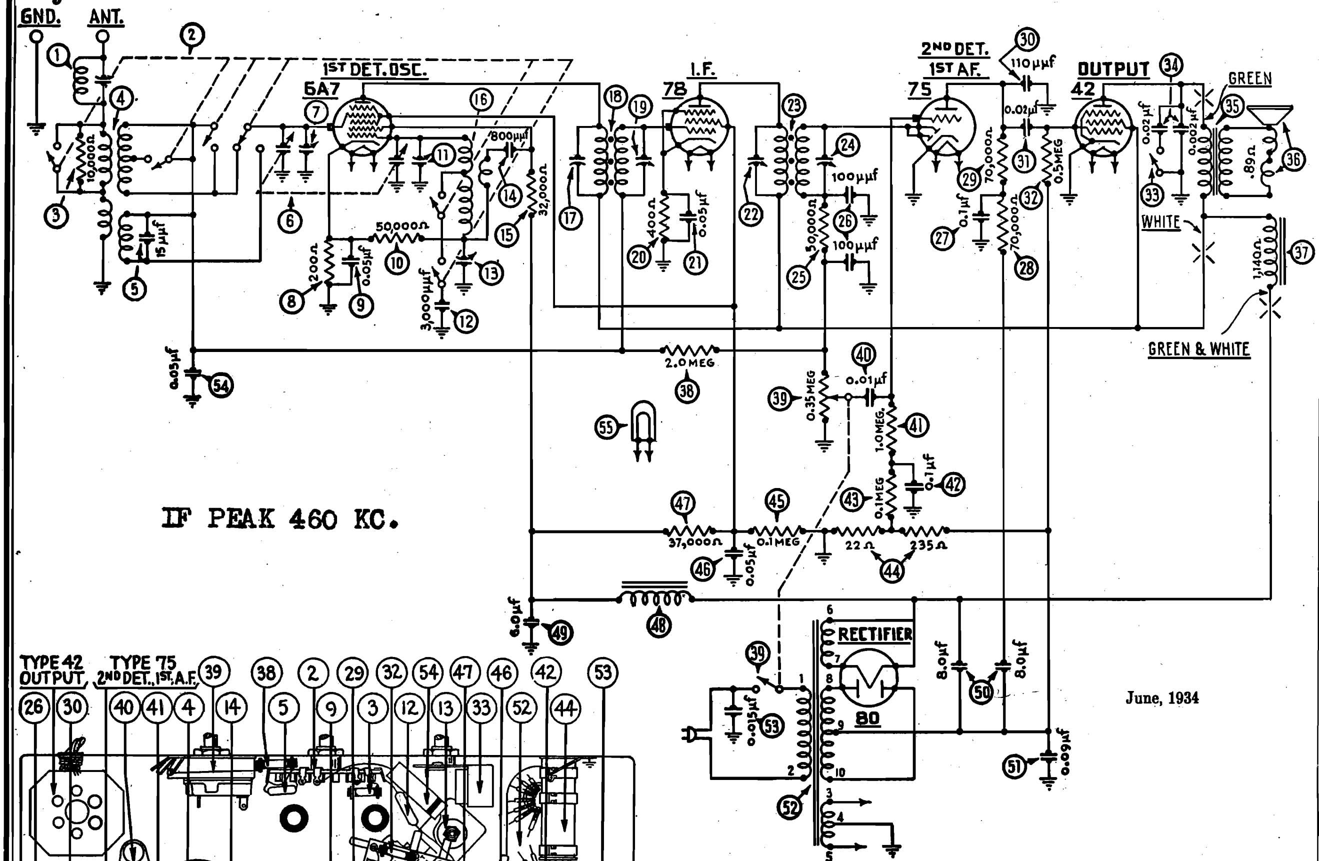
| Tube | 6A7 | 78 | 75 | 42 | 80 |
|---|---|---|---|---|---|
| Circuit | Det. Osc. | I. F. | 2d Det. | Output | Rect. |
| Filament (F-F) | 6.3 | 6.3 | 6.3 | 6.3 | 5.0 |
| Plate (P-K) | 260 | 260 | 160 | *250 | 340 |
| Screen (SG-K) | 85 | 85 | ... | 260 | |
| Cathode (K-F) | 2.1 | 2.2 | 0 | 0 | ... |

6A7-G1-K: 20; 6A7-G2-K: 130.

The above voltages were obtained by using a high resistance multi-range DC voltmeter, and an AC voltmeter for filaments. Tests made with test prods applied to tube sockets at underside of chassis (see Fig. 1). Volume control at maximum, dial at low frequency end of scale.

MODEL 66
Schematic
Layouts

# PHILCO RADIO & TELEV. CORP.




June, 1934

## Power Transformer Data

| Terminals | Volts | Circuit | Color of Leads |
|---|---|---|---|
| 1–2 | 105–125 | Primary | White |
| 3–5 | 6.3 | Filaments | Black |
| 6–7 | 5.0 | Filament of 80 | Blue |
| 8–10 | 680 | Plates of 80 | Yellow |
| 4 | ... | Center Tap of 3–5 | Black—Yellow Tracer |
| 9 | ... | Center Tap of 8–10 | Yellow—Green Tracer |

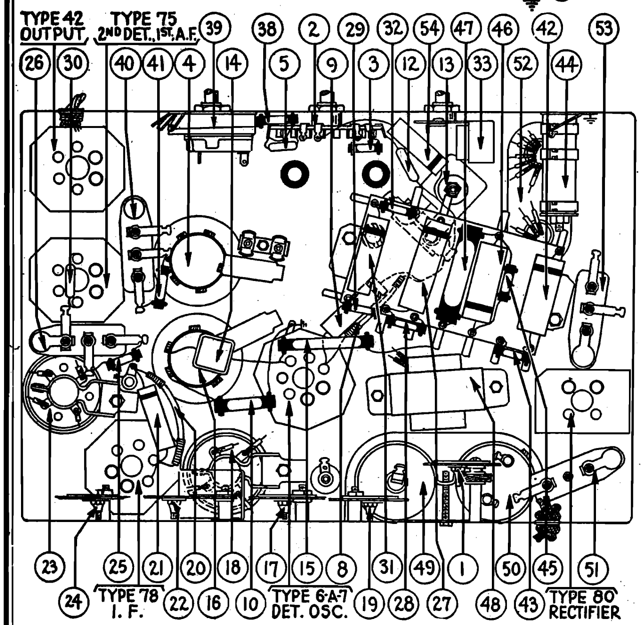



Fig. 4—Base View

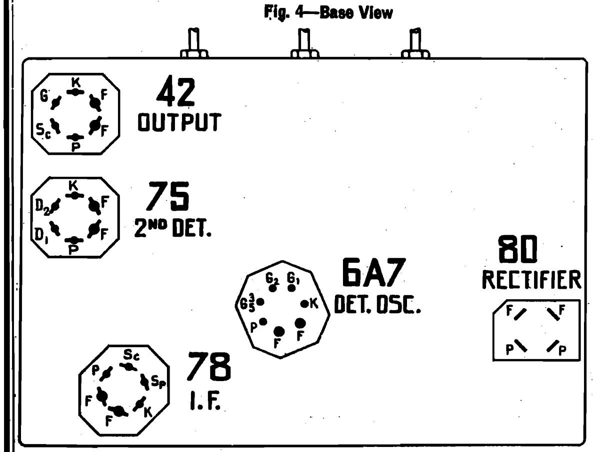



Fig. 1—Tube Sockets (Underside)

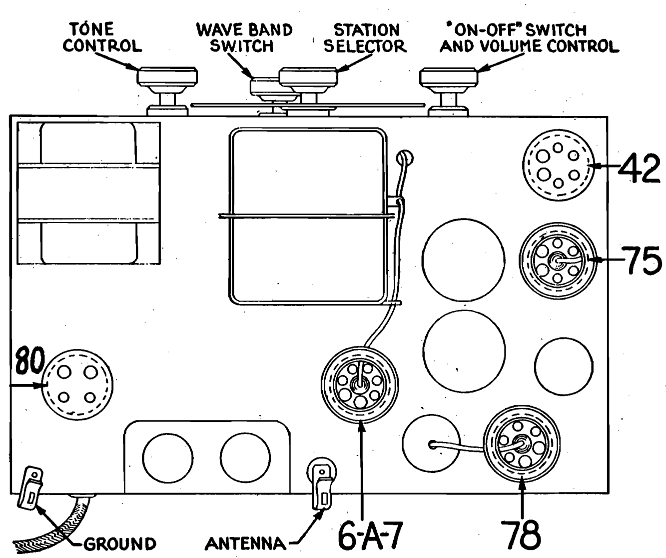



Fig. 2—Top View of Chassis

PHILCO RADIO & TELEV. CORP.

## Model 49

A change in the Shadowmeter Circuit on this model becomes effective with Run No. 4. This is in order to reduce the current thru the shadowmeter.

Referring to Figure 3 of Service Bulletin No. 199, the lead from the primary of ㉗ (2nd I. F. transformer) is removed from one side of the Shadowmeter ㊷ and connected to the other side. Resistor (67), Part No. 5309 is omitted.

In list of tubes for Model 49 (DC), correct to read 2 type 78 instead of 3.

Starting with Run No. 3, Part ㊵ , 3615AX By-Pass Condenser will be replaced with 3615BB. This change facilitates wiring in the factory.

## Model 66

Starting with Run No. 9 the following changes in compensating condensers will be made, which will make padding adjustments less critical.

Replace condenser ⑰, 04000M with an 04000J, and condenser ⑲ 04000M with an 04000A.

Connect a mica condenser, Part No. 30-1029 (.00005 mfd.) across ⑲.

Effective July 1st, a new wave trap will be used. Part ① in diagram will be Part No. 38-5994 instead of 38-5199 previously used. The new wave trap uses an improved construction which facilitates mounting.

Starting July 10th, a 70-ohm wire wound resistor Part No. 33-1129 will be added. Connected in series with condenser ⑭ on the oscillator coil side. This will prevent oscillation at extreme high frequency end of the short wave band.

The part number of the Tone Control on Model 66 will be 30-4212 instead of 30-4192 previously used. No change in wiring needed. The new Tone Control gives a slight desirable increase in response to high notes.

Effective August 1st, a 50 Mmfd. Mica Condenser, Part No. 30-1029 was added across the secondary of the 2nd I. F. Transformer. This makes adjustment of the 2nd I. F. Padder smoother and easier.

At the same time a 20,000 Ohm Resistor, Part No. 6650 was added, connected between the arm of the wave-band switch and the grounded junction of ⑧ and ⑨ This corrects any tendency toward oscillation on the high end of the short-wave band.

A 70-Ohm flexible wire-wound resistor is also added, Part No. 33-3027, connected in series between condenser ⑭ and the upper end (on diagram) of the oscillator transformer plate winding.

### CURRENT MODELS—IMPROVEMENT IN COMPENSATING CONDENSER

To prevent any tendency to "Frequency Drifting" in current models, a bakelite washer and a metal washer are now being used on top of the Compensating Condenser, in place of the fibre washer previously used.

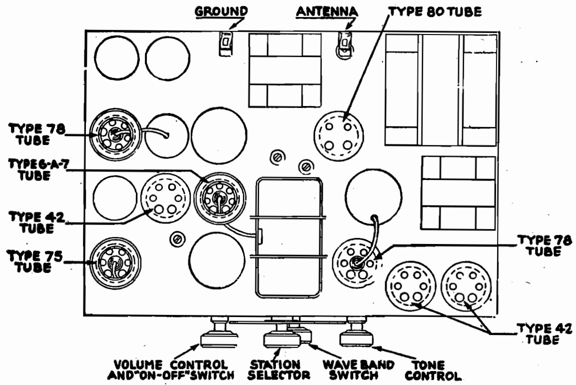
Part No. of bakelite washer is 27-4109, and of the metal washer (placed on top of bakelite) is W-1331. These two replace the old fibre washer Part No. 3500.

**MODEL 118**
**Layout Change**
**MODEL 118 (Code 121)**
**MODEL 118 (Code 123-RX)**
**Changes**

PHILCO RADIO & TELEV. CORP.

# Model 118

Incorrect cut was used by printer for Fig. 2 of this Bulletin. Correct cut is reproduced herewith and is same as Fig. 1 of Instruction Book on Model 118.




Correct price of dial scale, Part No. 27-5046 is . . . . . . . . . . $0.25

Effective with Run No. 8 on Code 121 and Run No. 2 on Code 123 (RX), the following parts on Model 118 will be changed. These changes are made to facilitate wiring. Note that resistors are not changed in value, but in current rating only. New resistors are 1/3 watt rating.

| *No. on Bulletin 194* | *Old Part No.* | *New Part No.* | *No. on Bulletin 194* | *Old Part No.* | *New Part No.* |
|---|---|---|---|---|---|
| 9 | 3615-BK | 3615-AU | 48 | 4517 | 6097 |
| 16 | 3615-D | 3615-AP (twin) | 42 | 4409 | 33-1096 |
| 43 | 4517 | 6097 | 64 | 4410 | 33-1097 |
| 65 | 4412 | 33-1000 | 40 | 4411 | 6099 |
| 10 | 5385 | 33-1115 | 60 | 4519 | 30-1031 |
| 20 | 4518 | 6098 | 19 | 30-4020 | Included in 16 |
| 15 | 5872 | 33-1025 | | | |

In the Model 118A (25 Cycle Model) the part numbers of parts which differ from the 60 Cycle Model are

70 Power Transformer 32-7112 $8.00 list price
72 Condenser 30-4093 (1.0 Mfd.) 0.60 list price

Also add a condenser, .1 Mfd. Tubular, Part No. 30-4122 connected across field coil of Speaker.

# Model 118 (Code 123-RX)

Replacement parts on Model 118-RX which differ from other 118 models are as follows:

| *No. on Bulletin 194* | *Model 118* | *118-RX* |
|---|---|---|
| 74 Electrolytic condenser | 30-2025 | 30-2014 |
| 6 Tuning condenser | 31-1173 | 31-1242 |
| Dial assembly | 31-1205 | 31-1241 |
| Dial scale | 27-5046 | 27-5058 |

Model 118-RX uses a type HR-2 speaker, which is equipped with a 25′ cable-and-plug assembly, part No. 36-3327.

The A. C. cord on Model 118-RX is a flat cable and contains an extra wire, which is for use as an antenna lead by connecting the antenna to the binding post mounted on the side of the special flat A. C. plug used. However, the antenna *may* be connected to the regular antenna clip terminal on the receiver chassis if desired and more convenient.

The part number of this special cable and plug assembly is 41-3104.

PHILCO RADIO & TELEV. CORP.

# Model 118

Philco Model 118 is an eight tube superheterodyne radio receiver operating on alternating current (A. C.) and designed for reception on either the standard broadcast band (including police bands up to 1720 K. C.), or a major section of the short wave band. A two-position switch changes reception from broadcast to short-wave. The frequency ranges are 540 to 1720 K. C. and 4.2 to 12 megacycles.

Model 118 is equipped with shadow-tuning, four point tone control with fixed bass compensation, and automatic volume control. The power consumption is 110 watts and the undistorted output of the Super Class "A" Amplifier is 10 watts. The intermediate frequency (I. F.) is 260 K. C.

Model 118 is equipped with the following tubes:

| | |
|---|---|
| R. F. | Type 78 |
| Detector-Oscillator | Type 6A7 |
| I. F. | Type 78 |
| 2d Det. 1st A. F. | Type 75 |
| Driver | Type 42 |
| Output tubes (2) (Connected as triodes) | Type 42 |
| Rectifier | Type 80 |

## Replacement Parts for Model 118

| No. on Diagram | Description | Part No. | List Price |
|---|---|---|---|
| 1 | Wave Trap | 38-5740 | .45 |
| 2 | Compensating Condenser (Ant.-H. F.) | 04000D | $0.15 |
| 3 | Resister (10,000 ohms) (Brown-Black-Orange) | 33-1000 | .25 |
| 4 | Antenna Transformer | 32-1378 | 1.00 |
| 5 | Wave Band Switch | 42-1046 | 80 |
| 6 | Tuning Condenser Assembly | 31-1173 | 6.25 |
| 7 | Compensating Condenser (Ant.-Broadcast) | Part of 6 | .... |
| 8 | Resistor (400 ohms Flexible Wire-Wound) | 33-3016 | .20 |
| 9 | Condenser (.05 Mfd.) (Bakelite Block) | 3615BK | .35 |
| 10 | Resistor (70,000 ohms) (Violet-Black-Orange) | 5385 | .25 |
| 11 | Condenser (.05 Mfd.) (Tubular) | 30-4020 | .35 |
| 12 | Detector Transformer | 32-1379 | .70 |
| 13 | Condenser (.000015 Mfd.) (Mica) | 30-1030 | .35 |
| 14 | Compensating Condenser (Det.) | Part of 6 | .... |
| 15 | Resistor (2 Meg.) (Red-Black-Green) | 5872 | .25 |
| 16 | Condenser (.05 Mfd.) (Bakelite Block) | 3615D | .35 |
| 17 | Condenser (.05 Mfd.) (Tubular) | 30-4020 | .35 |
| 18 | Resistor (300 ohms Flexible Wire-Wound) | 33-3010 | .20 |
| 19 | Condenser (.05 Mfd.) (Tubular) | 30-4020 | .35 |
| 20 | Resistor (50,000 ohms) (Green-Brown-Orange) | 4518 | .25 |
| 21 | Compensating Condenser (Osc. H. F. Bdcst.) | Part of 6 | .... |
| 22 | Compensating Condenser (Osc. H. F. Shortwave) | 31-6016 | .30 |
| 23 | Oscillator Transformer | 32-1380 | .70 |
| 24 | Condenser (.0008 Mfd. Mica) | 5878 | .35 |
| 25 | Resistor (20,000 ohms) (Red-Black-Orange) | 6650 | .25 |
| 26 | Resistor (20,000 ohms) (Red-Black-Orange) | 6650 | .25 |
| 27 | Pilot Lamp (Station Selector) | 6608 | .11 |
| 28 | Compensating Condenser (Osc. L. F.) | 04000R | .45 |
| 29 | Condenser (.003 Mfd. Mica) | 7301 | .45 |
| 30 | Compensating Condenser (1st I. F. Pri.) | Part of 31 | .... |
| 31 | 1st I. F. Transformer | 32-1381 | 1.50 |
| 32 | Compensating Condenser (1st I. F. Sec.) | Part of 31 | .... |
| 33 | Resistor (500 ohms Flexible Wire-Wound) | 6977 | .20 |
| 34 | Condenser (.05 Mfd.) (Bakelite Block) | 3615AU | .35 |
| 35 | Shadowmeter | 6497 | 2.50 |
| 36 | Shadowmeter Pilot Lamp | Part of 35 | .... |
| 37 | Compensating Condenser (2d I. F. Pri.) | *04000A | .15 |
| 38 | 2d I. F. Transformer (Early Prod. 32-1258) | 32-1424 | .... |
| 39 | Condenser (.0001 Mfd. Twin) (Bakelite Block) | 8035-K | .25 |
| 40 | Resistor (.1 Meg.) (White-White-Orange) | 4411 | .25 |
| 41 | Condenser (.01 Mfd. Bakelite Block) | 3903Z | .25 |
| 42 | Resistor (1 Meg.) (Brown-Black-Green) | 4409 | .25 |
| 43 | Resistor (.5 Meg.) (Yellow-White-Yellow) | 4517 | .25 |
| 44 | Condenser (.09 Mfd. Bakelite Block) | 4989D | .35 |
| 45 | Resistor (50,000 ohms) (Green-Brown-Orange) | 4518 | $0.25 |
| 46 | Condenser (Electrolytic 1, 1, 1, and 2 Mfd.) | 30-2078 | 2.45 |
| 47 | Resistor (.1 Meg.) (White-White-Orange) | 4411 | .25 |
| 48 | Resistor (.5 Meg.) (Yellow-White-Yellow) | 4517 | .25 |
| 49 | Condenser (.015 Mfd. Bakelite Block) | 3793F | .35 |
| 50 | Condenser (.0001 Mfd. Mica) | 4519 | .35 |
| 51 | Tone Control | 30-4186 | .75 |
| 52 | Condensers (In Tone Control) | Part of 51 | .... |
| 53 | Condenser (.006 Mfd. Tubular) | 30-4024 | .40 |
| 54 | Input Transformer | 32-7114 | 2.00 |
| 55 | Resistor (10,000 ohms) (Brown-Black-Orange) | 3524 | .25 |
| 56 | Condenser (.01 Mfd. Bakelite Block) | 3903P | .25 |
| 57 | Output Transformer | 32-7078 | 1.40 |
| 58 | Voice Coil and Cone Assembly | H-13-02625 | .80 |
| | | K-17-36-3020 | .60 |
| 59 | Field Coil and Pot Assembly | 36-3104 | 2.70 |
| 60 | Resistor (Wire-Wound) (6500 ohms) | 33-3033 | .30 |
| 61 | Resistor (Wire-Wound) (9.5, 112, 84 ohms) | 33-3034 | .20 |
| 62 | Volume Control and On-Off Switch | 33-5024 | 1.45 |
| 63 | Condenser (.05 Mfd. Tubular) | 30-4020 | .35 |
| 64 | Resistor (240,000 ohms) (Red-Yellow-Yellow) | 4410 | .25 |
| 65 | Resistor (10,000 ohms) (Brown-Black-Orange) | 4412 | .25 |
| 66 | Condenser (.025 Mfd. Bakelite Block) | 7653D | .35 |
| 67 | Resistor (32,000 ohms) (Orange-Red-Orange) | 33-1026 | .35 |
| 68 | Resistor (50,000 ohms) (Green-Brown-Orange) | 4518 | .25 |
| 69 | Condenser (.015 Mfd. Twin) (Bakelite Block) | 3793R | .40 |
| 70 | Power Transformer | 32-7111 | 5.75 |
| 71 | Filter Choke | 32-7115 | 1.80 |
| 72 | Condenser (.25 Mfd.) | 6287-R | .40 |
| 73 | Condenser (Elec. 8 Mfd. 10 Mfd.) | 30-2045 | 1.95 |
| 74 | Condenser (Elec. 8 Mfd.) | 30-2025 | 2.00 |
| 75 | Compensating Condenser (2d I. F. Secondary) | Part of 38 | .... |
| 76 | Resistor (2900 ohms) (Red-White-Red) | 5309 | .25 |
| | Chassis Mtg. Screw | W-1345A | 2.25C. |
| | Chassis Mtg. Washer | 29-2089 | .35C. |
| | Chassis Mtg. Foot (Rubber) | 27-4116 | .05 |
| | Chassis Mtg. Foot Plate | 27-7497 | .35C. |
| | Knob Assembly (Large) | 27-4051 | .10 |
| | Knob Assembly (Small) | 27-4052 | .10 |
| | Dial Assembly | 31-1205 | .50 |
| | Dial Scale | 27-5046 | .35 C. |
| | Tube Shield | 28-1107 | .10 |
| | 4 Prong Socket | 7544 | .10 |
| | 6 Prong Socket | 7547 | .11 |
| | 7 Prong Socket | 27-6005 | .11 |
| | Speaker Socket | 4957 | .10 |
| | A. C. Cord and Plug | L-943A | .60 |

*See Note below Fig. 4.

Note: Part 37, is as shown above only in early production. In later production this part is incorporated as part of 38, not visible from below.

**MODEL 118**
**Schematic**
**Socket Layout**

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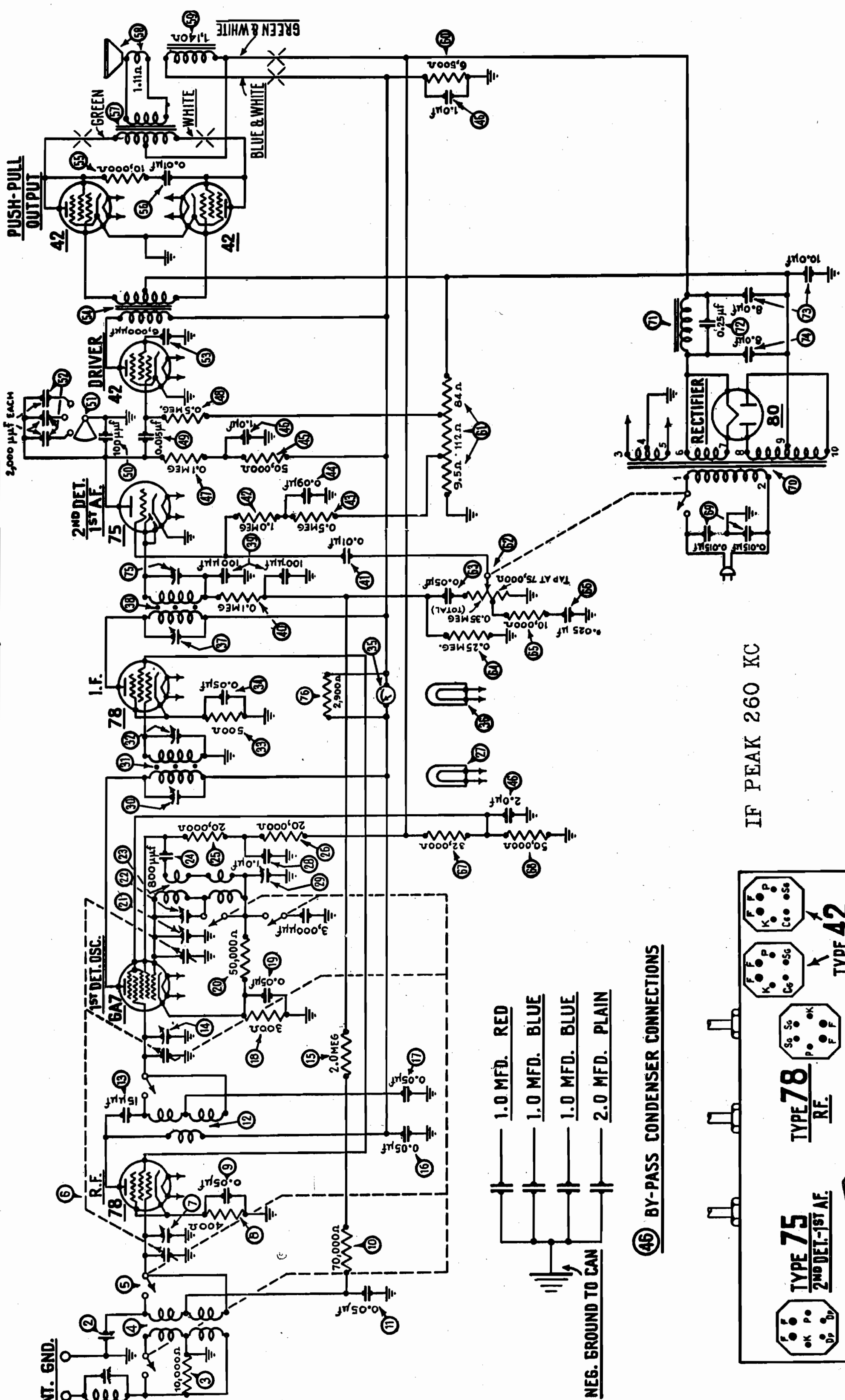


Fig. 3. Schematic Diagram

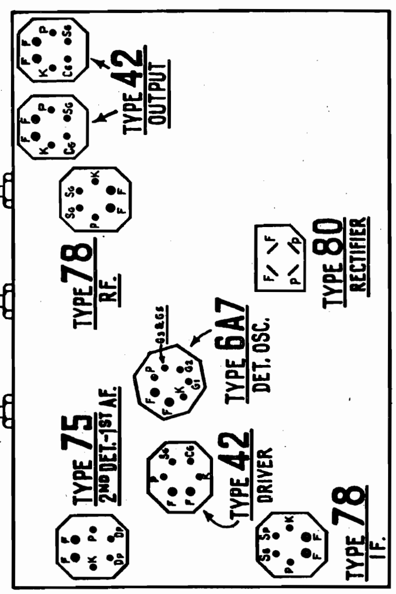


Fig. 1. Tube Socket Layout

June, 1934

PHILCO RADIO & TELEV. CORP.

**MODEL 118**
**Chassis Layout**
**Trimmer Locations**

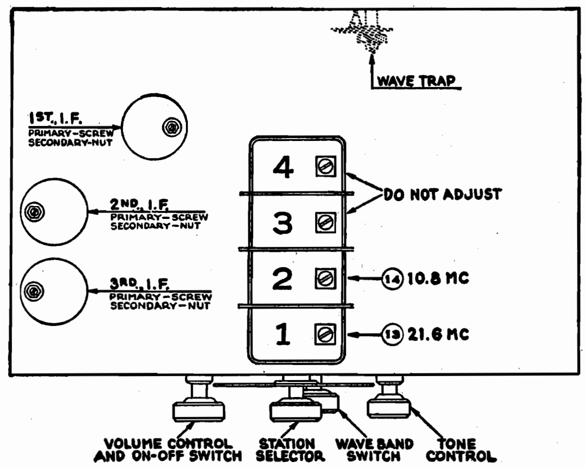


Fig. 2. Top View

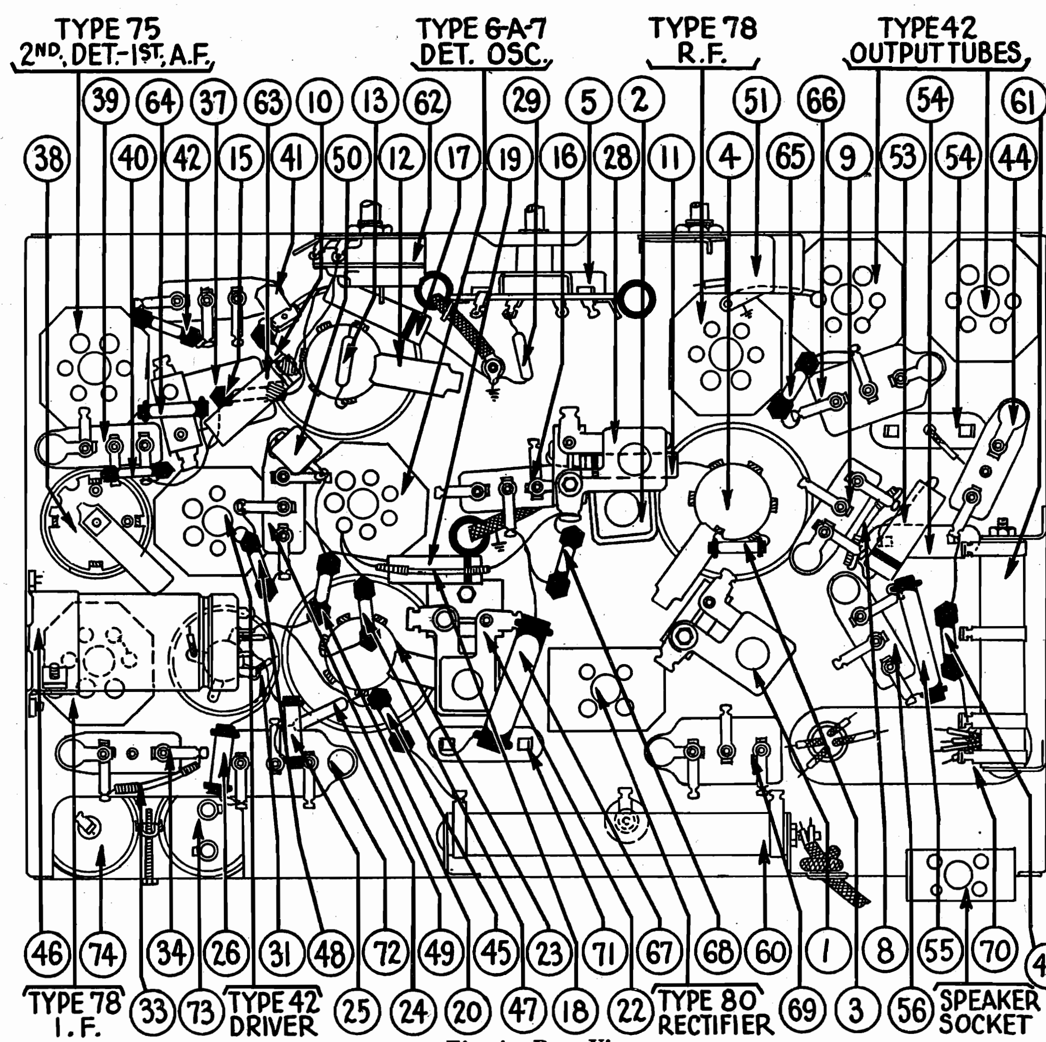


Fig. 4. Base View

MODEL 118
Alignment Data
Voltage

PHILCO RADIO & TELEV. CORP.

# Adjusting Compensating Condensers

For adjusting compensating or padding condensers in Model 118, an accurately calibrated signal generator covering the broadcast range of frequencies is required and also a crystal controlled signal generator for the high frequency adjustments. For the former we suggest the Philco Model 024 Signal Generator and for the latter the Model 091, Crystal Controlled high frequency signal generator. The actual adjusting calls for a special insulated hex wrench and insulated screwdriver. Philco Part No. 3164 Fibre Wrench and No. 27-1159 Screwdriver are recommended. An output meter is also required, for connection to the receiver.

I. F. ADJUSTMENT—The I. F. (intermediate frequency) of Model 118 is 260 K. C.

Remove the grid clip from the top of the 6A7 tube and connect the shielded antenna lead from the Signal Generator to the cap of this tube. Connect the ground lead of the Signal Generator to the ground post of receiver. Connect the output meter to the primary terminals of the output transformer of receiver. Set the waveband switch at the left position (standard broadcast).

Set the wave switch on the Signal Generator at 260 K. C., and the dial of the receiver at 550. Turn on the set (volume full on), and the Signal Generator. Now adjust the 1st I. F. Primary and Secondary condensers (Nos. ㉚ and ㉜ in Fig. 3) and the 2d I. F. primary and secondary condensers (㊲ and (75)) to give maximum reading on the output meter. The I. F. primary condenser is adjusted by turning the screw on top of the I. F. transformer and the secondary is adjusted by turning the nut. The I. F. transformers are in the smaller metal "cans". The screw and nut are reached through the hole in top. If the needle on the output meter goes off the scale, turn down the "attenuator" on the Signal Generator until a lower reading is obtained.

Note: In early production the 1st I. F. compensating condensers only are adjusted as described above. Part (75) is not used. The 2d I. F. primary ㊲ is an 04000A condenser reached and adjusted through hole in top of chassis near the 42 driver tube.

WAVE TRAP—Remove antenna lead from grid cap of 6A7 tube and attach it to antenna post on set. Replace cap on 6A7 tube. With Signal Generator still operating at 260 K. C., adjust wave-trap condenser (① in Figs. 3 & 4) so as to get MINIMUM reading in output meter. This adjustment is made from underneath the chassis.

ANTENNA, DETECTOR AND OSCILLATOR H. F. (Broadcast)—These condensers Nos. ⑦, ⑭, and ㉑, are located on top of the tuning condenser gang, adjustment made by means of the fibre wrench. Set the signal generator at 1500 K. C., tune in the signal at 1500 on dial and adjust these condensers in the order given, to give maximum output reading. ⑦ is located on the section nearest the front and ⑭ on the center section.

OSCILLATOR—LOW FREQUENCY—This is condenser ㉘ (see Figs. 3 and 4) located underneath chassis and accessible from underneath. Use the fibre wrench. Set signal generator switch at 600, tune in the signal at 600 on the dial and adjust condenser to maximum.

ANT. AND OSC. H. F.—SHORTWAVE—The crystal controlled signal generator is used for these adjustments. These are condensers ② (Ant. H. F.) and ㉒ (Osc. H. F.) located underneath chassis, and adjusted from underneath. The fundamental frequency of the Philco Model 091 crystal controlled signal generator is 3600 K. C. or 3.6 megacycles. The third harmonic of this is 10.8 M. C. Turn the waveband switch of the set to the right and the dial to just below 11 M. C. The 10.8 harmonic should be picked up here and the two condensers should be adjusted to give maximum reading on the output meter, on this signal.

**Tube Socket Voltages—Line Voltage 115**

| Function | R.F. | Det.-Osc. | I.F. | A.F. | Driver | Output | | Rect. |
|---|---|---|---|---|---|---|---|---|
| Type | 78 | 6A7 | 78 | 75 | 42 | 42 | 42 | 80 |
| Filament (F-F)...... | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 | 5.0 |
| Plate (P-K)......... | 180 | 180 | 200 | 125 | 195 | 280 | 280 | 315 |
| Screen (SG-K)....... | 80 | 175 | 80 | ... | 195 | 290 | 290 | .... |
| Cathode (K to F).... | 2.5 | 2.6 | 3.2 | 0 | 0 | 0 | 0 | ... |
| 6A7· $G^1$ to K........ | 26 | | | | | | | |
| 6A7· $G^2$ to K........ | 150 | | | | | | | |

**Power Transformer Voltages**

| Terminals | A.C. Volts | Circuit | Color of Leads |
|---|---|---|---|
| 1-2 | 120 | Primary | White |
| 3-5 | 6.3 | Filaments | Black |
| 6-7 | 5.0 | Filament of 80 | Blue |
| 8-10 | 760 | Plates of 80 | Yellow |
| 4 | .... | Center Tap of 3-5 | Black—Yellow Tracer |
| 9 | .... | Center Tap of 8-10 | Yellow—Green Tracer |

The above tests were made with an A. C. voltmeter for filament voltages and a high resistance D. C. voltmeter for all others. Dial at 550 K. C., wave band switch to left, volume control at maximum. Tests made with test prods applied to sockets underneath chassis. Philco Model 048 All-purpose Tester or Model 025 Circuit Tester are recommended for these tests. Use Fig. 1 in making tests given in left hand table above.

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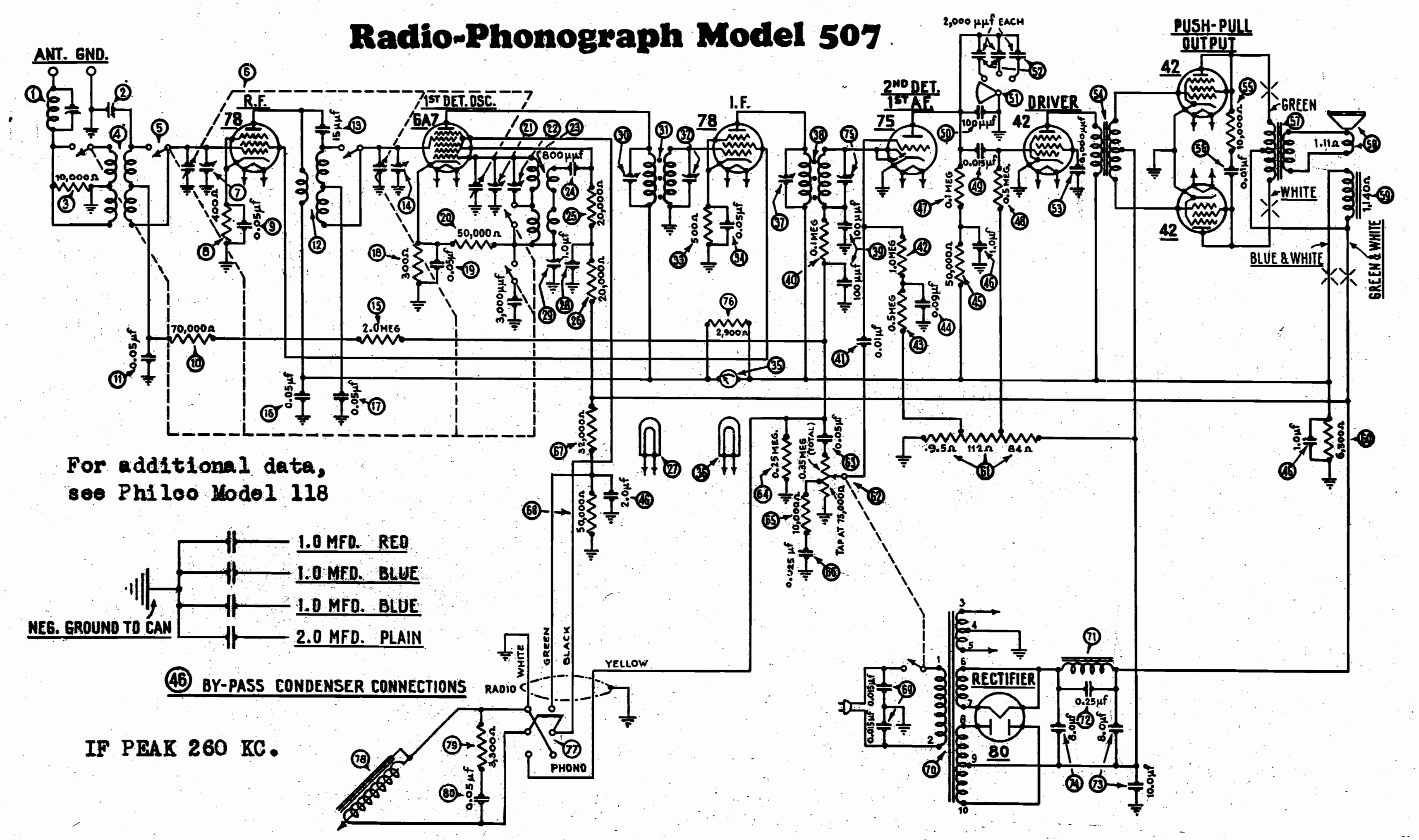
# Radio-Phonograph Model 507




I. F.=260 K. C. Fig. 1—Schematic Wiring Diagram. Note: Phonograph motor not shown in diagram. Numbers on this figure from ① to ⑯, inclusive, are the same as in Fig. 3, Service Bulletin No. 194

**Model 507 uses the same radio chassis as Model 118 Super-heterodyne.**

NOTE: Part ⑭ electrolytic condenser is a 30-2014 in Model 507 instead of the 30-2025 used in Model 118.

The electric motor of Model 507 is of the self-starting, synchronous type, depending on the power line frequency (cycles) for its correct speed. If the motor should develop trouble, do not attempt to repair it. Replace it, and communicate with your Distributor with regard to the faulty one. The motor should be lubricated at least once every six months. To do this, take off the turntable and put a few drops of a good grade of light machine oil in the oil-hole in the motor top-plate.

The pick-up is of the high impedance type. The impedance of the pick-up is approximately 2500 ohms, measured at 1000 cycles. The D. C. resistance is 600 ohms. Adjustment of the pick-up is described in Service Bulletin No. 89, "Adjusting the Electric Pick-up."

The tone arm must be free to rotate upon its axis at all times. Damage to the records will result if it is not.

The speaker unit is Type H-13.

MODELS 60,89,144
Changes

PHILCO RADIO & TELEV. CORP.

# Model 60

Effective August 1st, resistors ⑩ and ㉘ in wiring diagram of Model 60, Bulletin No. 164 will be changed from Part No. 4518 (½ watt) to Part No. 6098 (⅓ watt). These changes are made to facilitate wiring in assembly.

**Starting with Run No. 7, the following changes will be made. Note that a Wave Trap is added, necessitating several changes; other changes are to improve sensitivity.**

| *Part No.* (Fig. 3) | *Remove* | *Add* | *Location* |
|---|---|---|---|
| | ........ | 38-6073 Wave Trap | In series with antenna post |
| ⑧ | 4989-Z Condenser | ........ | ........ |
| ⑨ | 7217 Resistor | 33-3010 (Bias Resistor, 300 Ohms, flex.) | Refer to Schematic Diagram |
| | ........ | 33-3016 (Bias Resistor, 400 Ohms) | From 78 Cathode to Ground |
| | ........ | 30-4020 (Condenser .05 Mfd. Tubular | From 78 Cathode to Ground. |
| ㉔ | 3656 (25,000 Ohms) | 33-1027 (39,000 Ohms) | Refer to Schematic Diagram |
| ㉒ | 4412 | ........ | ........ |
| ⑲ | 4518 (5,000 Ohms) ½ Watt | 6099 (99,000 Ohms) 1/3 Watt | Refer to Schematic Diagram |
| ㉟ | 4517 | 6097 | Refer to Schematic Diagram |
| ⑱ | 04000M | 04000J | Refer to Schematic Diagram |
| ⑳ | 30-4063 (.05-.09-.09-.5-.2) (.2 section not used) | 30-4217 (.05-.09-.09-.5) | (Filter block) |

# Model 89

Effective with Run No. 13 compensating condenser ⑱ on diagram (1st I. F. primary) will be a Part No. 31-6024 instead of 04000M previously used.

The new condenser is of an improved construction which eliminates possibility of "frequency drift" or breakdown.

**Starting with Run No. 14, Model 89 will use a type 77 tube as detector-oscillator instead of the type 36 tube previously used. This change results in more stable performance of the oscillator.**

**In addition to requiring the use of a six-hole socket for the detector oscillator tube instead of the 5-hole previously used, the following changes are required:**

**Part ⑩, No. 6208 resistor (15,000 ohms) is replaced by No. 33-1114 (8,000 ohms).**

**Part ⑧ , No. 8174-B condenser (.09 and .0007 Mfd.) is replaced by No. 8322-B (.09 and .0014).**

# Model 144

Effective with Run No. 6, electrolytic condenser ㉑ (see Bulletin No. 193) will be changed from part No. 30-2020 to 30-2026. Same capacity (6 mfd.), higher working voltage.

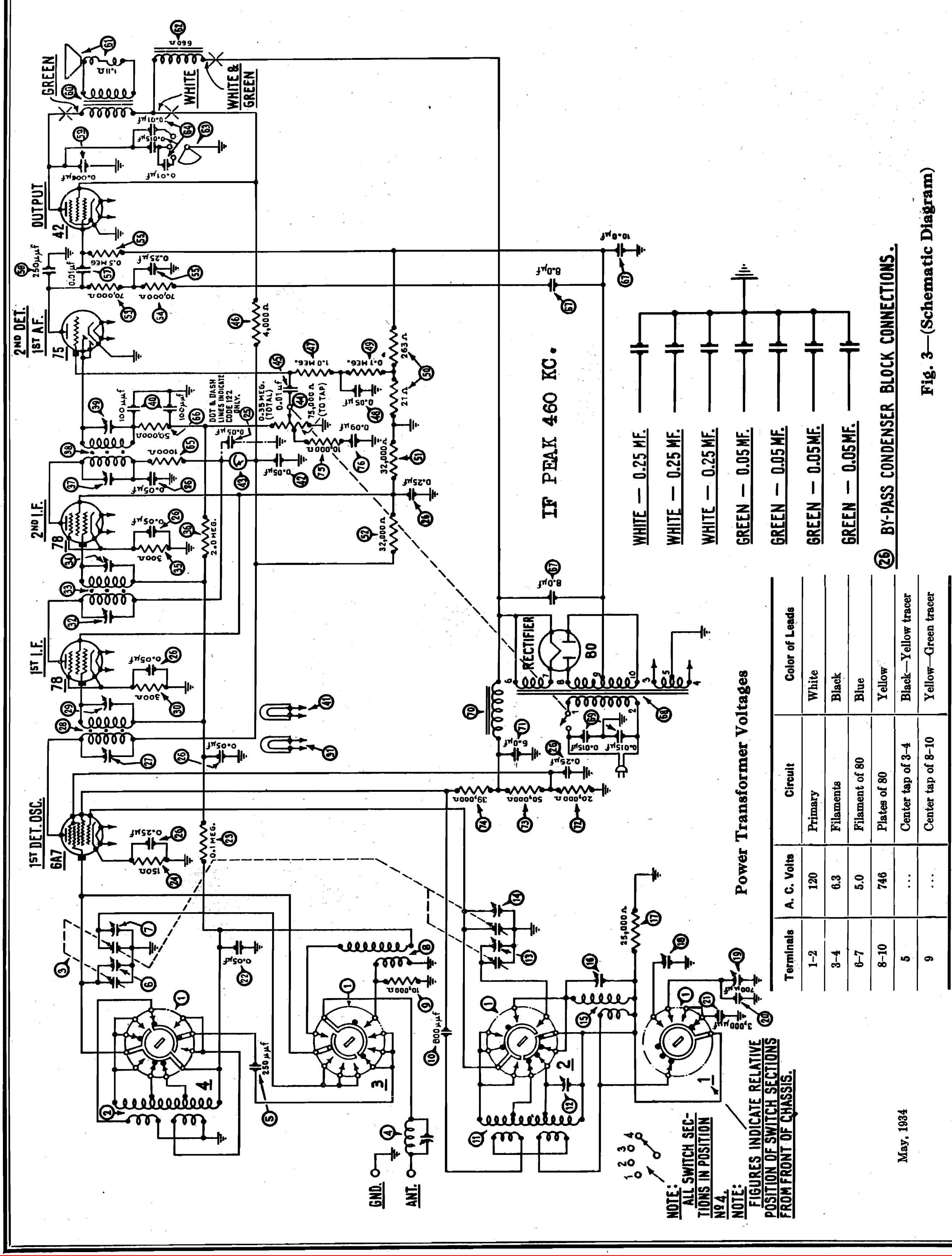
Starting with Run No. 7, Part ⑳ filter choke in Model 144 will be a 32-7018 instead of No. 5930 which has been used. This change is to adjust factory material lists and does not affect value of choke or performance of set.

The part number of the Shadowmeter to be used on the Model 144 will be 45-1106 instead of 6497 as listed on Bulletin 193. Change to identify in production.

**On Fig. 3 (Schematic) fixed condenser ⑯ used in the bass compensation circuit, should be marked .02 Mfd. (Part No. 30-4113). The list of parts on Page 3 of Service Bulletin 193 gives this part number and value, which is correct.**

PHILCO RADIO & TELEV. CORP.

## MODEL 144
Schematic
Transformer Voltages




Power Transformer Voltages

| Terminals | A. C. Volts | Circuit | Color of Leads |
|---|---|---|---|
| 1–2 | 120 | Primary | White |
| 3–4 | 6.3 | Filaments | Black |
| 6–7 | 5.0 | Filament of 80 | Blue |
| 8–10 | 746 | Plates of 80 | Yellow |
| 5 | ... | Center tap of 3–4 | Black—Yellow tracer |
| 9 | ... | Center tap of 8–10 | Yellow—Green tracer |

Fig. 3—(Schematic Diagram)

MODEL 144
Alignment Data

PHILCO RADIO & TELEV. CORP.

# Adjusting Compensating Condensers

The compensating condensers of Model 144 have been adjusted accurately before shipment. If later adjustment is required, in most cases only the intermediate frequency and low frequency compensating condensers should be done. Extreme care must be given the adjustment of the high frequency circuits, and the adjustment should NOT be undertaken unless the receiver is seriously out of alignment.

DO NOT ATTEMPT TO ADJUST the compensating condensers mounted upon sections numbered 3 and 4 of the Tuning Condenser Assembly (Fig. 5). These have been adjusted, and sealed, at the factory.

Philco Model 024, an accurately calibrated signal generator covering broadcast and police band frequencies, is recommended for the adjustment of the intermediate frequency and low frequency compensating condensers.

Philco Model 091 crystal-controlled Signal Generator is recommended for the high frequency adjustments. It gives an accurate and constant 3600 kilocycle (3.6 megacycle) signal, the harmonics of which include the necessary high frequencies for adjusting the compensating condensers in the high frequency circuits.

1—ADJUSTMENT OF THE INTERMEDIATE FREQUENCY—Remove the grid clip from the type 6A7 tube and connect the "ANT" output terminal of the signal generator to the grid cap of the tube. Connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver chassis.

Connect an output meter to the primary terminals of the output transformer. Set the signal generator at 460 K.C. (the intermediate frequency of Model 144) and adjust each of the I. F. compensating condensers in turn, to give maximum response in the output of the receiver. The location of the I. F. compensating condensers is shown in Figure 5. Each of the I. F. transformers has a dual compensating condenser mounted at its top, and accessible thru a hole in the top of the coil shield. In the dual compensators, the Primary circuit is adjusted by turning the screw; the Secondary circuit is adjusted by turning the hex-head nut.

2—ADJUSTMENT OF THE WAVE TRAP—Replace the grid clip upon the Detector-Oscillator tube (Type 6A7). Connect the output leads from the signal generator directly to the antenna and ground terminals of the receiver. Set the Wave-Band Switch of the receiver to the standard broadcast band (extreme left) and the Station Selector at the low frequency (520 K.C.) end. Adjust the Wave Trap ④ condenser to give MINIMUM response to a 460 K.C. signal from the signal generator. The Wave Trap ④ is located at rear and underneath the chassis, and is shown in Figures 4 and 5. It is reached from the rear of the chassis.

3—ADJUSTMENT OF THE DIAL FREQUENCIES—Model 144 has four separate frequency bands or ranges, each obtained by one of the four positions of the wave-band switch. There is a compensating condenser for each range, which must now be adjusted. In the following procedure, the frequency ranges referred to, and obtained by the different positions of the switch are:

| | |
|---|---|
| Range 1 | 520 K.C.—1500 K.C. |
| Range 2 | 1.5 M.C.—4.0 M.C. |
| Range 3 | 4.0 M.C.—11.0 M.C. |
| Range 4 | 11.0 M.C.—23.0 M.C. |

Connect the output terminals of the Model 091 or equivalent Signal Generator, to the "ANT" and "GND" terminals of the receiver chassis. Connect an output meter to the primary terminals of the Output Transformer of the receiver. Set the Wave-Band Switch to Range 4, and the Station Selector at 21.6 M.C. The sixth harmonic of the 3.6 M.C. crystal in the Model 091 Signal Generator is picked up at this point. Adjust the compensating condenser ⑬ on Section 1 of Tuning Condenser for maximum response in the output of the receiver. Turn the Wave-Band Switch to Range 3, and the Station Selector to 10.8 M.C. Here, the third harmonic of the 3.6 M.C. crystal will be heard. Adjust the compensating condenser ⑭ on Section 2 of Tuning Condenser for maximum response in the output of the receiver.

Turn the Wave-Band Switch to Range 2, and adjust the Station Selector to 3.6 M.C. The "Antenna" connection between the Signal Generator and the receiver chassis must be removed for this adjustment, otherwise the output of the Signal Generator will be too great. Adjust the compensating condenser ⑫ to give maximum response in the output meter. This compensating condenser is located underneath the chassis and is not accessible from above. See Figure 4.

This concludes adjustments requiring the Model 091 (or equivalent) high frequency signal generator.

The Model 024 or its equivalent is now used again. Turn the Wave-Band Switch of the set to Range 2 and the Station Selector to 1.5 M.C. Set the Signal Generator at 1500 K.C. Make sure the "Antenna" connection between the Signal Generator and the Chassis has been restored. Adjust compensating condenser ⑲ located underneath the chassis, (Figure 4). Adjustment is made from the underside of the chassis.

Turn the Wave-Band Switch to Range 1 and the Station Selector to 1400 K.C. Set the Signal Generator at 1400 K.C. Adjust compensating condenser ⑯, which is located underneath the chassis. (See Figure 4). This adjustment is made from the underside of the chassis.

Finally, with Wave-Band Switch at Range 1, and Station Selector at 520 K.C., set the Signal Generator at 520 K.C. and adjust compensating condenser ⑱ (Figure 4). This compensating condenser is also mounted underneath the chassis, and reached from below.

**For proper and accurate adjustment of Model 144, the procedure must be followed exactly in the order given. The adjustment should not be undertaken without proper equipment as mentioned above.**

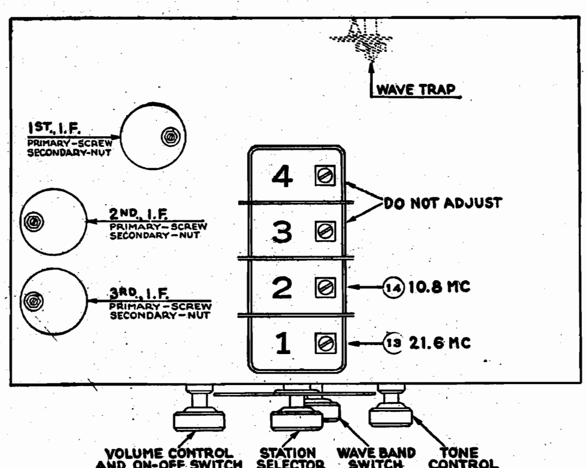



Fig. 5—Position of Compensating Condensers Reached from Above Chassis

PHILCO RADIO & TELEV. CORP.

# Model 144

Philco Model 144 is a six-tube superheterodyne receiver operating on alternating current (A. C.) and designed for reception of any frequency from 520 K.C. to 23,000 K.C. (23 megacycles). It is equipped with shadow-tuning, four-point tone-control with fixed bass compensation; Model 144 has 5 watts output. The intermediate frequency (I. F.) is 460 K.C. Tubes used are the following Philco high-efficiency types:—

| | |
|---|---|
| Detector-Oscillator | Type 6A7 |
| 1st I. F. | Type 78 |
| 2nd I. F. | Type 78 |
| 2nd Detector 1st A. F. | Type 75 |
| Output | Type 42 |
| Rectifier | Type 80 |

The power consumption of model 144 is 70 watts.

## REPLACEMENT PARTS—MODEL 144

| Nos. on Diagram | Description | Part No. | List Price |
|---|---|---|---|
| 1 | Wave-Band Switch | 42-1045 | $3.60 |
| 2 | Antenna Transformer (H. F. Bands) | 32-1271 | .70 |
| 3 | Tuning Condenser Assembly | 31-1175 | .... |
| 4 | Wave Trap | 38-5487 | .55 |
| 5 | Condenser (.00025 Mica) | 3082 | .35 |
| 6 | Compensating Condenser (Ant. H. F.) | Part of 3 | .... |
| 7 | Compensating Condenser (Ant. Broadcast) | Part of 3 | .... |
| 8 | Antenna Transformer (Broadcast Band) | 32-1270 | .55 |
| 9 | Resistor (10,000 ohms) (Brown-Black-Orange) | 33-1000 | .25 |
| 10 | Condenser (.0008 Mfd. Mica) | 6021 | .35 |
| 11 | Oscillator Transformer (H. F. Bands) | 32-1273 | .35 |
| 12 | Compensating Condenser (Range 2) | 04000C | .15 |
| 13 | Compensating Condenser (Osc. Range 4) | Part of 3 | .... |
| 14 | Compensating Condenser (Osc. Range 3) | Part of 3 | .... |
| 15 | Oscillator Transformer (Broadcast) | 32-1272 | .70 |
| 16 | Compensating Condenser (Osc. Broadcast) | 04000A | .15 |
| 17 | Resistor (25,000 ohms) (Red-Green-Orange) | 33-1013 | .25 |
| 18 | Compensating Condenser (Broadcast Series) | 04000S | .35 |
| 19 | Compensating Condenser (Range 2; Series) | 04000R | .45 |
| 20 | Condenser (.0007 Mfd. Mica) | 4520 | .35 |
| 21 | Condenser (.003 Mfd. Mica) | 7301 | .45 |
| 22 | Condenser (.05 Mfd. Bakelite Block) | 3615-L | .35 |
| 23 | Resistor (100,000 ohms) (White-White-Orange) | 4411 | .25 |
| 24 | Resistor (150 ohms Flexible Wire-Wound) | 33-3140 | .20 |
| 25 | Condenser (.05 mfd. tubular) (Used in Code 122 only) | 30-4123 | .35 |
| 26 | Condenser Block (.25, .25, .25, .05, .05, .05, .05 ) | 30-4167 | 1.15 |
| 27 | Compensating Condenser (1st I. F. pri.) | Part of 28 | .... |
| 28 | 1st I. F. Transformer | 32-1369 | 1.50 |
| 29 | Compensating Condenser (1st I. F. Sec.) | Part of 28 | .... |
| 30 | Resistor (300 ohms Flexible Wire-Wound) | 33-3010 | .20 |
| 31 | Pilot Lamp | 6608 | .11 |
| 32 | Compensating Condenser (2d I. F. Pri.) | Part of 33 | .... |
| 33 | 2d I. F. Transformer | 32-1306 | .90 |
| 34 | Compensating Condenser (2d I. F. Sec.) | Part of 33 | .... |
| 35 | Resistor (300 ohms Flexible Wire-Wound) | 33-3010 | .20 |
| 36 | Resistor (2 Megs.) (Red-Black-Green) | 33-1025 | .25 |
| 37 | Compensating Condenser (3d I. F. Pri.) | Part of 38 | .... |
| 38 | 3d I. F. Transformer | 32-1307 | .80 |
| 39 | Compensating Condenser (3d I. F. Sec.) | Part of 38 | .... |
| 40 | Condenser (.0001 Mfd. Twin—Bakelite Block) | 8035-L | .25 |
| 41 | Pilot Lamp for Shadowmeter | Part of 43 | .... |
| 42 | Condenser (.05 Mfd. Bakelite Block) | 3615AB | .35 |
| 43 | Shadowmeter | 6497 | 2.50 |
| 44 | Volume Control & On-Off Switch | 33-5068 | 1.45 |
| 45 | Condenser (.01 Mfd. Bakelite Block) | 3903J | .25 |
| 46 | Resistor (4,000 ohms) (Yellow-Black-Red) | 7832 | $0.25 |
| 47 | Resistor (1 Meg.) (Brown-Black-Green) | 4409 | .25 |
| 48 | Condenser (.05 Mfd. Bakelite Block) | 3615-L | .35 |
| 49 | Resistor (100,000 ohms) (White-White-Orange) | 4411 | .25 |
| 50 | Resistor BC (263 ohms, 21 ohms, Wire-Wound) | 33-3069 | .25 |
| 51 | Resistor (32,000 ohms) (Orange-Red-Orange) | 3525 | .25 |
| 52 | Resistor (32,000 ohms) (Orange-Red-Orange) | 3525 | .25 |
| 53 | Resistor (70,000 ohms) (Violet-Black-Orange) | 5385 | .25 |
| 54 | Resistor (70,000 ohms) (Violet-Black-Orange) | 5385 | .25 |
| 55 | Condenser (25 Mfd.) (Metal Case) | 4264 | .60 |
| 56 | Resistor (500,000 ohms) (Yellow-White-Yellow) | 4517 | .25 |
| 57 | Condenser (.01 Mfd. Bakelite Block) | 3903AN | .25 |
| 58 | Condenser (.00025 Mfd. Mica) | 30-1032 | .35 |
| 59 | Condenser (.006 Mfd. Tubular) | 30-4024 | .40 |
| 60 | Output Transformer | 32-7178 | 1.60 |
| 61 | Voice Coil & Cone Assembly | (H-16) 02625 | .80 |
| | | (K-23) 36-3174 | .40 |
| 62 | Field Coil & Pot Assembly | H-16 (36-3218) | 3.50 |
| | | K-23 (36-3239) | 3.75 |
| 63 | Tone Control | 30-4168 | .75 |
| 64 | Condensers (Inside 63) | Part of 63 | .... |
| 65 | Resistor (1,000 ohms) (Brown-Black-Red) | 5837 | .25 |
| 66 | Resistor (50,000 ohms) (Green-Brown-Orange) | 6098 | .25 |
| 67 | Condenser—Electrolytic (8-8-10 Mfd.) | 30-2073 | 3.45 |
| 68 | Power Transformer | 32-7234 | 4.75 |
| 69 | Condenser (.015 Mfd. Twin) | 3793-H | .40 |
| 70 | Filter Choke | 5930 | 1.75 |
| 71 | Condenser (6 Mfd. Electrolytic) | 30-2020 | 1.40 |
| 72 | Resistor (20,000 ohms) (Red-Black-Orange) | 6649 | .25 |
| 73 | Resistor (50,000 ohms) (Green-Brown-Orange) | 5868 | .35 |
| 74 | Resistor (39,000 ohms) (Orange-White-Orange) | 33-1027 | .25 |
| 75 | Resistor (10,000 ohms) (Brown-Black-Orange) | 33-1000 | .25 |
| 76 | Condenser (.02 Mfd. Tubular) | 30-4113 | .30 |
| | A. C. Cord and Plug Assembly | L-943A | .60 |
| | Dial Assembly | 31-1206 | 1.25 |
| | Dial Scale | 27-5044 | .65 |
| | Chassis Mounting Screw | W-1358A | 2.60 C. |
| | Chassis Mounting Foot (Rubber) | 27-4116 | .05 |
| | Chassis Mounting Foot (Plate) | 27-7497 | .35 C. |
| | Tube Shield | 28-1107 | .10 |
| | 4 Prong Tube Socket | 7544 | .10 |
| | 6 Prong Tube Socket | 7547 | .11 |
| | 7 Prong Tube Socket | 27-6005 | .11 |
| | Speaker Socket | 4957 | .10 |
| | Knob (Large) | 27-4051 | .10 |
| | Knob (Small) | 27-4052 | .10 |
| | Knob (Station Selector) | 27-4127 | .10 |

MODEL 144
Voltage
Chassis Layout
Socket Layout

# PHILCO RADIO & TELEV. CORP.

**Tube Socket Voltages—Line Voltage 115**

| CIRCUIT | Det.-Osc. | 1st I. F. | 2nd I. F. | A. F. | Out-put | Recti-fier |
|---|---|---|---|---|---|---|
| TUBE | 6A7 | 78 | 78 | 75 | 42 | 80 |
| Filament Volts (F-F) | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 | 5.0 |
| Plate Volts (P-K) | 250 | 230 | 230 | 185 | 300 | 350 |
| Screen Grid Volts (SG-K) | 60 | 75 | 75 | ... | 310 | ... |
| Cathode Volts (K-Gnd) | 1.4 | 2 | 2 | 0 | 0 | ... |
| 6A7—G2 to K | 160 | ... | ... | ... | ... | ... |
| 6A7—G1 to K | 20 | ... | ... | ... | ... | ... |

Above values were obtained by means of an A. C. voltmeter for filament voltages and a high resistance D. C. voltmeter for all others. All values obtained from underside of chassis with test prods. Positions of controls were: Volume Control—maximum; Wave-Band Switch—extreme left (counter-clockwise); Dial at 520 K.C.

Philco Model 048 All-Purpose Tester is recommended for making the above tests. Use the illustration below (Fig. 1) as a guide to determine the points to be voltage-tested.

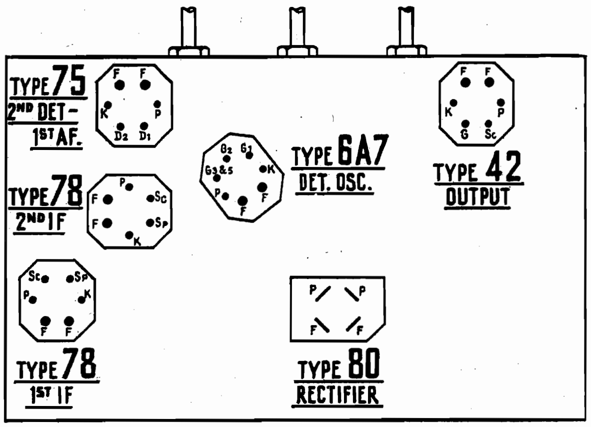



Fig. 1—Tube Sockets (underside)

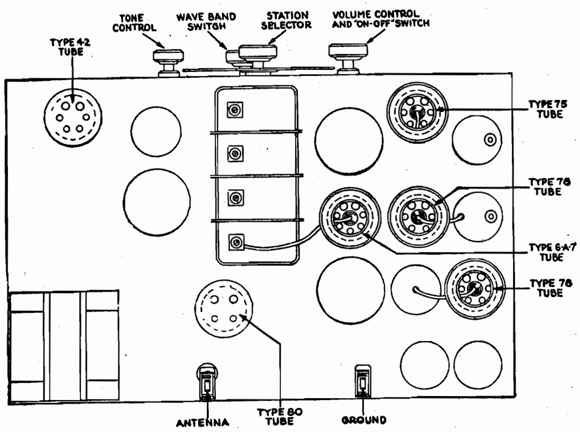



Fig. 2—Chassis—Top View

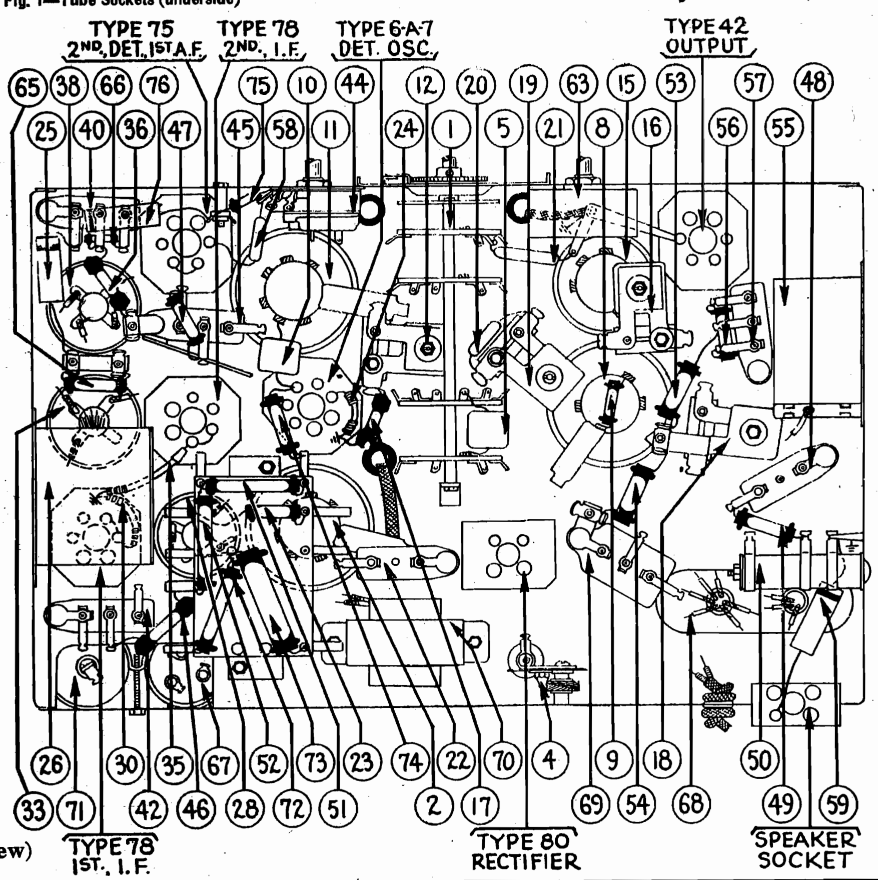
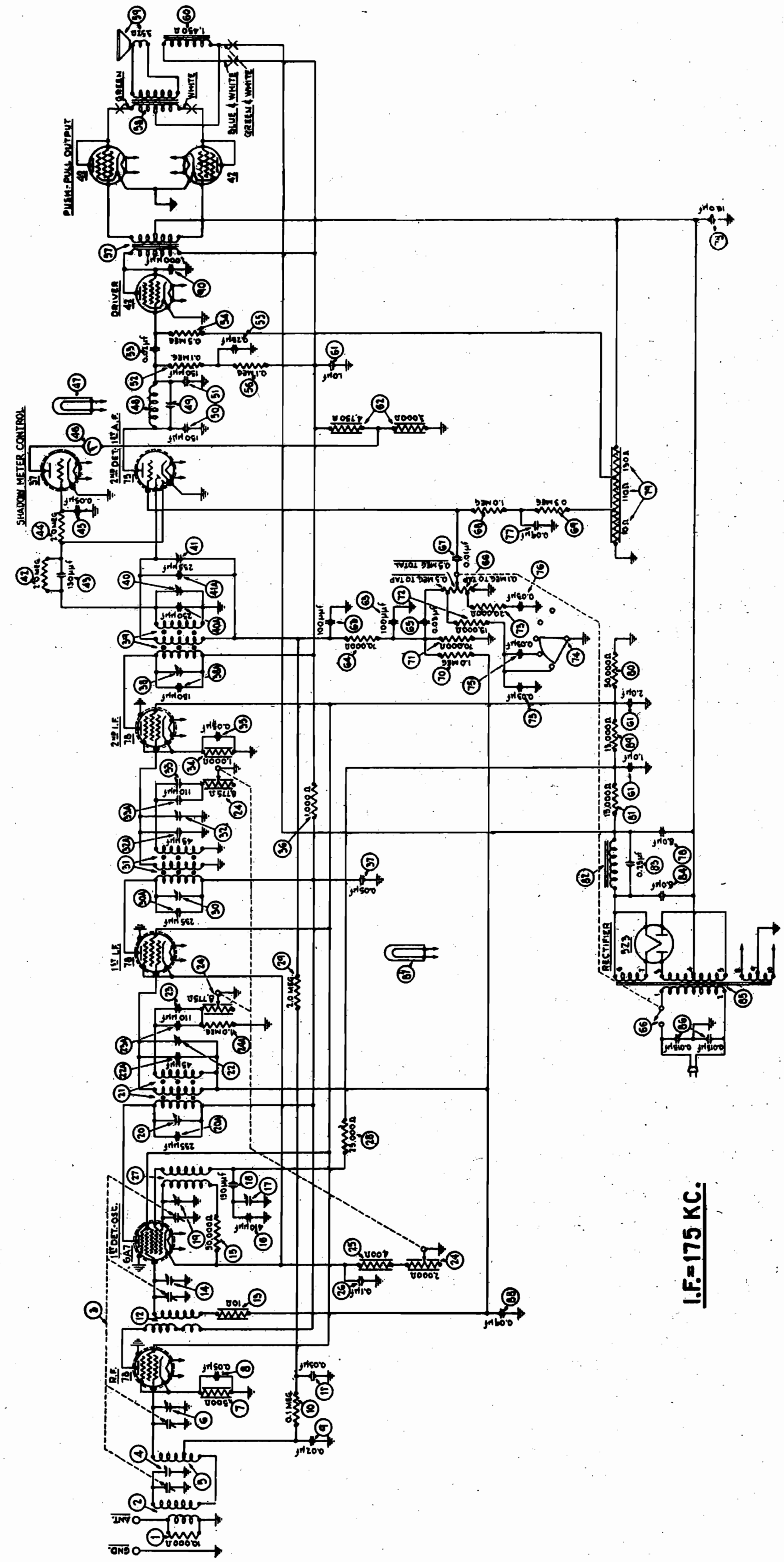



Fig. 4—(Base View)

# PHILCO RADIO & TELEV. CORP.

**MODEL 200-X**
**Schematic**




Wiring Diagram— Philco Model 200-X

**MODEL 200-X**
**Alignment Data**

# PHILCO RADIO & TELEV. CORP.

## ADJUSTING COMPENSATING CONDENSERS IN MODEL 200-X

The quality performance of this receiver depends to a great extent upon providing a wide channel through the R. F. and I. F. stages to permit the passage of a broadcast signal without cutting of the side bands.

In order to produce this wide tuning band, the set must be carefully and accurately adjusted. These adjustments will be more critical than in the conventional radio, and the padding procedure will be considerably more complicated.

In making the adjustments, it is necessary to use an unmodulated signal generator. The PHILCO Model 048 Set Tester or the Model 024 Signal Generator can be readily adapted for this purpose by the installation of a single-pole double-throw switch, and an additional grid leak resistor, as shown in Figure 9. This switch will adapt the signal generator for either a modulated or an unmodulated signal.

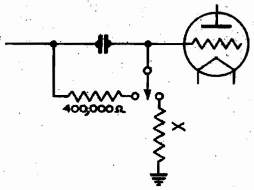



Figure 9

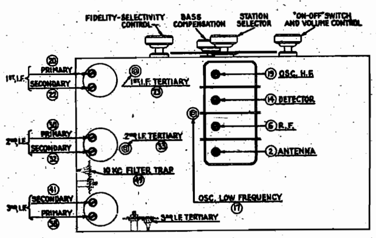



Figure 10

With an unmodulated signal, it is not possible to obtain an indication of output by means of the usual form of output meter. An indirect indication can be obtained, however, through the automatic volume control system by connecting a high resistance voltmeter having a scale reading of 0-5 or 0-10 volts across the R. F. cathode resistor , shown in the wiring diagram Fig. 8. This connection can be made conveniently through the use of leads equipped with test clips. With this arrangement, maximum output at the second detector will be indicated by a minimum reading of the meter, and vice versa. In other words, the action will be just the opposite of an output meter used to measure audio frequency voltage at the power output stage. With no signal applied to the receiver, the bias voltage indicated by the voltmeter, will be approximately 3 volts. This voltage will be reduced by the application of a signal to the R. F. or I. F. input circuits.

### I. F. ADJUSTMENTS

After preparing the unmodulated signal generator and connecting the voltmeter as directed, proceed as follows:

1. Set the receiver tuning dial at its extreme low frequency position. Remove the grid clip from the cap of the 6-A-7 detector oscillator tube, and connect the signal generator antenna lead in its place. Connect the ground lead from the signal generator to the ground terminal of the chassis. Adjust the signal generator frequency to exactly 175 K. C. Turn the fidelity control of the receiver all the way to the left.

2. Adjust the 6 I. F. padding condensers ⑳, ㉒, ㉚, ㉜, ㊶ and ㊳ (see Fig. 10) in the tops of the 3 I. F. cans, for maximum output (minimum meter reading), starting with the padder at the front of the chassis, and continuing with the adjustments toward the rear of the set. During these adjustments, the output of the signal generator should be regulated to maintain a voltmeter reading of approximately 2 volts.

3. Connect a 250 Mmf. Condenser from the plate of the 2nd I. F. tube to ground. This will increase the voltmeter reading to approximately 2.5 volts.

4. Readjust the 3d I. F. secondary padder ㊶ for maximum output.

5. Readjust the 3d I. F. primary padder ㊳ for maximum output. Do not touch the grid padder ㊶ again.

6. Turn the fidelity selectivity control all the way to the right.

7. Adjust the 1st & 2nd I. F. tertiary padders ㉓ and ㉝ for MINIMUM output (maximum voltmeter reading).

8. Leaving the fidelity selectivity control in the right hand position, it will be found, upon varying the frequency of the signal generator, that two definite dips will appear in the voltmeter reading—one at 167 K. C. and another at 182 K. C. These dips in the voltmeter reading indicate peaks in the tuning curve. The amplitude of these peaks should be equal; that is, the same voltmeter reading should be obtained at both 167 K. C. and 182 K. C. Any variations in these two readings can be corrected by a *slight* readjustment of the 3rd I. F. primary padder ㊳ . If the peak at 167 K. C. is higher than the one at 182 K. C., the primary padder will have to be turned out. If the reverse is true, the capacity of this padder must be increased. In any case, the voltmeter readings must be made equal by dividing the differences through readjustment.

### R. F. ADJUSTMENTS.

The R. F. portion of the receiver is adjusted as follows:

9. Replace the grid clip on the detector-oscillator tube and connect the antenna terminal of the signal generator to the antenna terminal of the chassis. Turn the fidelity selectivity control all the way to the left and set the receiver dial at 1,500 K. C. The same type of output indication is employed as in the I. F. adjustments.

10. Adjust the signal generator for a frequency of 1,500 K. C. Adjust the "oscillator" padding condenser ⑲ and the "detector" padding condenser ⑭ for maximum output and in the order mentioned. Regulate the signal generator output control to maintain a voltmeter reading of 2 volts as before.

11. Turn in padder ⑥ (R. F.) until the voltmeter reads 2.5 volts and then adjust padder ② (ANT.) for maximum output.

12. Readjust padder ⑥ for maximum output. Do not touch padder ② again.

13. Set the receiver dial and the signal generator at 600 K. C. Adjust the "oscillator low frequency" padder ⑰ for maximum output. As the R. F. tuning is rather broad, there will be a considerable range on the dial that will give about the same output when the oscillator L. F. padder is adjusted for maximum. The padder must be adjusted at the middle of this range. This point may be determined with accuracy in the following manner: Starting with the usual voltmeter reading of 2 volts, slowly turn the receiver dial toward the low frequency end and, at the same time, readjust the padder ⑰ for maximum output until a point is reached where the maximum output is indicated by a voltmeter reading of 2.5 volts. Note carefully the exact dial reading at this point. Follow the same procedure while turning the dial in the opposite direction until the output reading decreases to the same value. Set the dial at the exact center of these two points and readjust padder ⑰ , for maximum output.

14. Adjust the 3d I. F. tertiary padder [illegible] to give minimum width in the shadow tuning meter in the receiver. This padder is reached from rear of chassis.

### ADJUSTMENT OF 10 K. C. FILTER

The 10 K. C. filter in the audio circuit will rarely require readjustment. As the proper adjustment of this padder ( [illegible] on diagram) requires an accurately calibrated audio oscillator, it should be reset only in the event that it has been tampered with or in cases where it has become necessary to replace one of the elements of this filter. An emergency adjustment of this filter can be made in the following manner:

15. Connect the signal generator to the control grid of the type 6-A-7 tube, leaving the grid clip in place.

16. Disconnect the voltmeter from resistor ⑦ and connect an output meter to the plates of the power output tubes in the usual way.

17. Set the receiver dial at 550 K. C. At this point, the oscillator in the receiver will be tuned to 725 K. C. The adjustment of the signal generator (switch in unmodulated position) to approximately this same frequency will cause an audible beat note to be heard in the speaker. By means of the signal generator tuning control, reduce the frequency of this beat note until zero beat is reached, at which point the output meter reading will decrease to 0. Turning the receiver dial in either direction will gradually increase the frequency of the audible note so that at 540 or 560 K. C. a 10,000 K. C. note will be heard. At either of these points, the padder [illegible] should be adjusted for minimum reading of the output meter.

PHILCO RADIO & TELEV. CORP.

MODEL 700
Alignment Data
Socket Layout

## MODEL 700 RECEIVER

THE latest Philco development in single-unit automobile radio is the new Model 700. This Receiver is compact, easier to install than ever before and will give exceptional performance.

It is a six-tube super-heterodyne with a genuine full-size Philco electro-dynamic speaker—the same type that is used in many of the larger home radio Receivers. It has remarkable sensitivity, a three-section tuning condenser, giving improved selectivity—wonderful tone, with a three-point tone control, and inherently quiet circuits. Interference filters in the "A" lead and in the pilot light lead greatly simplify motor interference suppression. In most installations standard suppression is sufficient.

Added to this, the ease of installation characteristic of this model (only one unit to install—one lead to the antenna, one lead to the ammeter) and the convenient, attractive airplane type steering column control, which makes this model universal in its application, are additional features of the Model 700 which appeal to both the dealer and the public.

## I. F. TRANSFORMER AND PADDERS

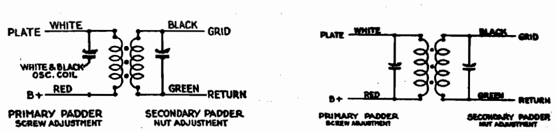
The new style I. F. transformer complete with padders is used in the Model 700.

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1329 for the first I. F. stage and 32-1237 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.




1st I. F. Transformer 32-1329    2nd I. F. Transformer 32-1237

FIG. 1

## MODEL 700 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the speaker lid from the Receiver. Remove the grid cap terminal from the 77 tube (for location see Fig. 2).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 77 tube. (See Fig. 2.) The output meter must be connected.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders ㉒ and ㉔ are adjusted first (Figs. 2 and 3). Turn the adjusting screw ㉒ all the way in. A metal screwdriver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut ㉔ with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw ㉒ for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

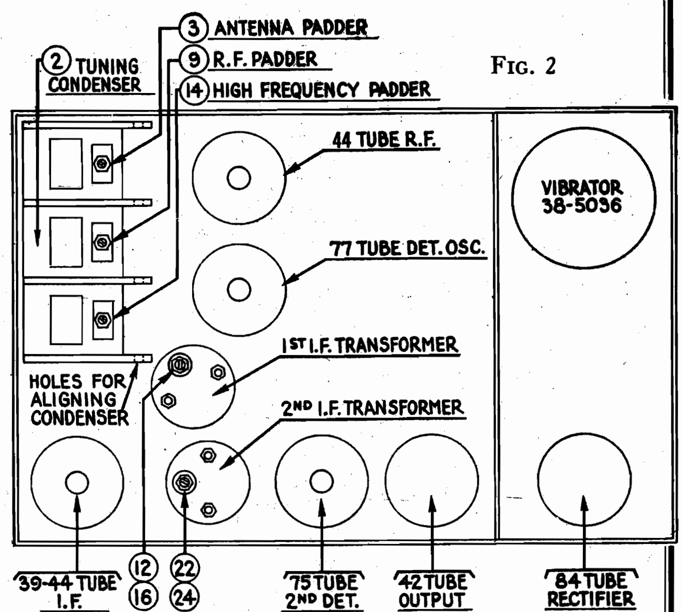



FIG. 2

Repeat the above procedure with the condensers ⑫ and ⑯.

After padding the first I. F. stage, remove the generator lead from the 77 tube and reconnect the grid lead to the 77 tube. Set the generator to 1600 K. C. and then connect the generator lead to the antenna lead.

There are four holes in line, one in each of the sections

MODEL 700
Schematic
Chassis Layout
Parts List

## PHILCO RADIO & TELEV. CORP.

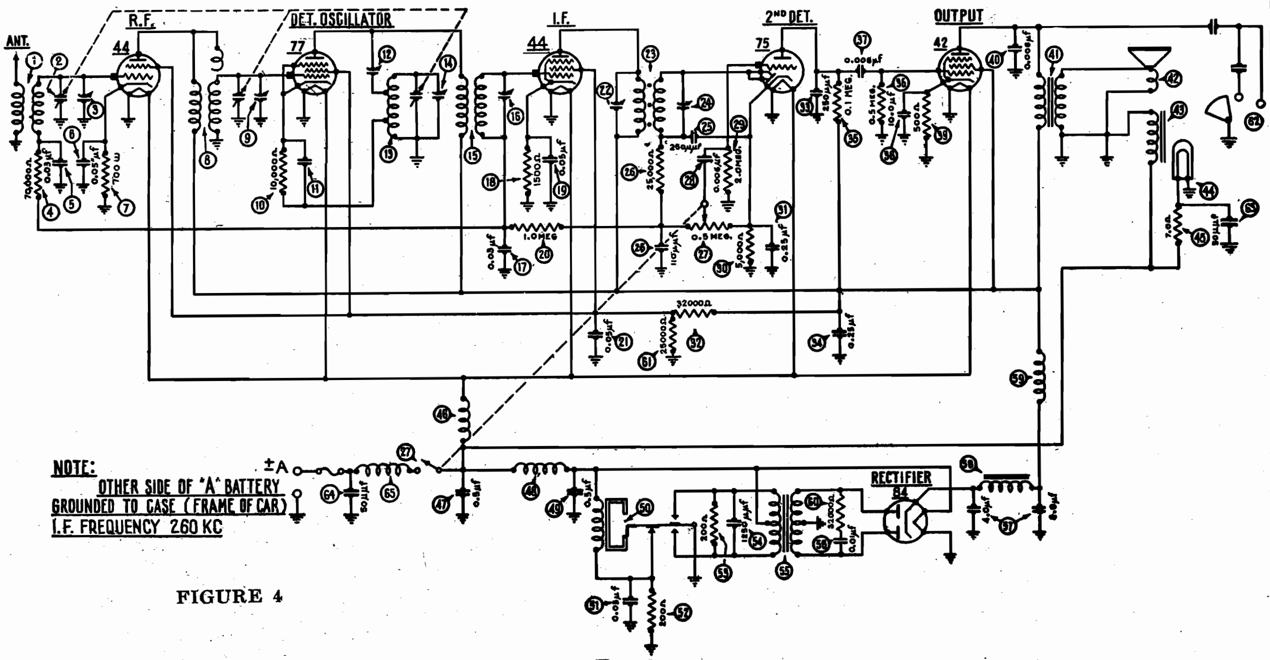



FIG. 3

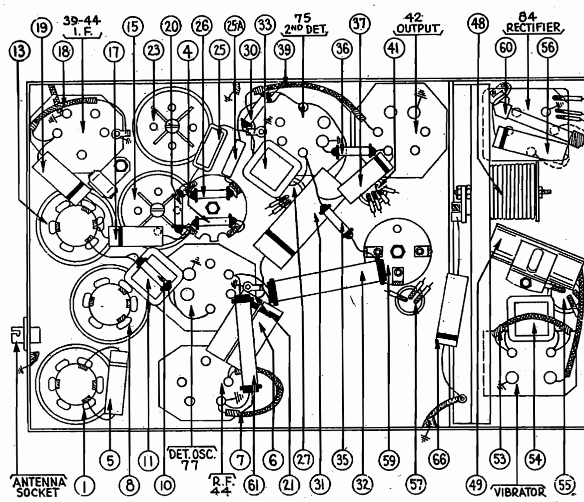



FIG. 4

of the tuning condenser housing. (See Fig. 2.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency padder ⑭ until the maximum reading is obtained in the output meter. This is the true setting for 1600 K. C., 160 on the dial scale.

Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder ⑨ and the antenna padder ③ are next adjusted for the maximum reading on the output meter.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

## MODEL 700 PARTS LIST

① Antenna Transformer......32-1331
② Tuning Condenser.........31-1199
③ 1st Padder (in tun. cond.).........
④ Resistor (70,000 ohms).....33-1115
⑤ Condenser (.03 mfd.)......30-4025
⑥ Condenser (.05 mfd.)......30-4020
⑦ Resistor (700 ohms)....... 6443
⑧ R. F. Transformer.........32-1332
⑨ 2nd Padder (in tun. cond.)........
⑩ Resistor (10,000 ohms).....33-1000
⑪ Condenser (.0007 mfd.).... 5863
⑫ Padder (Pri. 1st I. F. Tran.).......
⑬ Oscillator Transformer.....32-1333
⑭ 3rd Padder (in tun. cond.).........
⑮ 1st I. F. Transformer......32-1329
⑯ Padder (Sec. 1st I. F. Tran.).......
⑰ Condenser (.03 mfd.)......30-4025
⑱ Resistor (1500 ohms)......33-3047
⑲ Condenser (.05 mfd.)......30-4020
⑳ Resistor (1,000,000 ohms)..33-1096
㉑ Condenser (.05 mfd.)......30-4020
㉒ Padder (Pri. 2nd I. F. Tran.)......
㉓ 2nd I. F. Transformer.....32-1237
㉔ Padder (Sec. 2nd I. F. Tran.).......
㉕ Condenser (.00025 mfd.)...30-1032
㉖ Condenser (.00011 mfd.)...30-1031
㉖ Resistor (25,000 ohms).....33-1013
㉗ Vol. Con. & Switch Assm...38-5534
㉘ Condenser (.006 mfd.).....30-4125
㉙ Resistor (2,000,000 ohms)..33-1025
㉚ Resistor (5000 ohms)...... 6096
㉛ Condenser (.25 mfd.)......30-4146
㉜ Resistor (32,000 ohms)..... 3525
㉝ Condenser (.00025 mfd.)... 3082
㉞ Condenser (.25 mfd.)...... 04360
㉟ Resistor (100,000 ohms).... 6099
㊱ Resistor (500,000 ohms).... 6097
㊲ Condenser (.006 mfd.).....30-4125
㊳ Condenser (.10 mfd.)......30-2072
㊴ Resistor (500 ohms).......33-3031
㊵ Condenser (.006 mfd.).....30-4024
㊶ Output Transformer.......32-7214
㊷ Cone & Voice Coil.........36-3157
㊸ Field Coil Assembly.......36-3046
㊹ Pilot Lamp..............34-2031
㊺ Resistor (7 ohms).........33-3035
㊻ "A" Choke...............32-1268
㊼ Condenser (.5 mfd.).......30-4147
㊽ Vibrator Choke...........32-1235
㊾ Condenser (.5 mfd.).......30-4015
㊿ Vibrator................38-5036
(51) Condenser (.05 mfd.)......30-4039
(52) Resistor (200 ohms)....... 7217
(53) Resistor (200 ohms)....... 7217
(54) Condenser (.00125 mfd.)... 5886
(55) Power Transformer........32-7216
(56) Condenser (.01 mfd.)......30-4051
(57) Condenser (4-8 mfd.)......30-2072
(58) "B" Choke...............32-7215
(59) R. F. Choke..............32-1281
(60) Resistor (32,000 ohms)..... 3525
(61) Resistor (25,000 ohms).....33-1013
(62) Tone Control.............30-4180
(63) Condenser (.00005 mfd.)...30-1029
(64) Condenser (.00005 mfd.)...30-1029
(65) "A" Choke...............32-1374
(66) Condenser (1 mfd).........30-4122
Spark Plug Resistor.......33-1015
Distributor Resistor......33-1113E
Interference Condenser.....30-4007
Nuts (mounting)........... W55A
Battery Cable............38-5296
Acorn Nut................ W821
Fuse.................... 7227
Fuse Insulator............27-7131
Studs...................28-6036
Bracket.................. 6035
Strap.................... 04344
Strap Pad................ 6206
Knob....................27-4058
Glass....................27-7325
Gasket (for glass).........27-7509
Pointer..................28-1957
Face Assembly............42-5189
Control Housing Cover....29-7064
Control Unit Assembly.....42-5184
Shaft....................28-8206
Antenna Lead.............38-5771
4-Prong Socket............27-6006
5-Prong Socket............27-6014
6-Prong Socket............ 6417C

PHILCO RADIO & TELEV. CORP.

**MODEL 800 (Code 122)**
**Schematic**
**Chassis, Parts List**

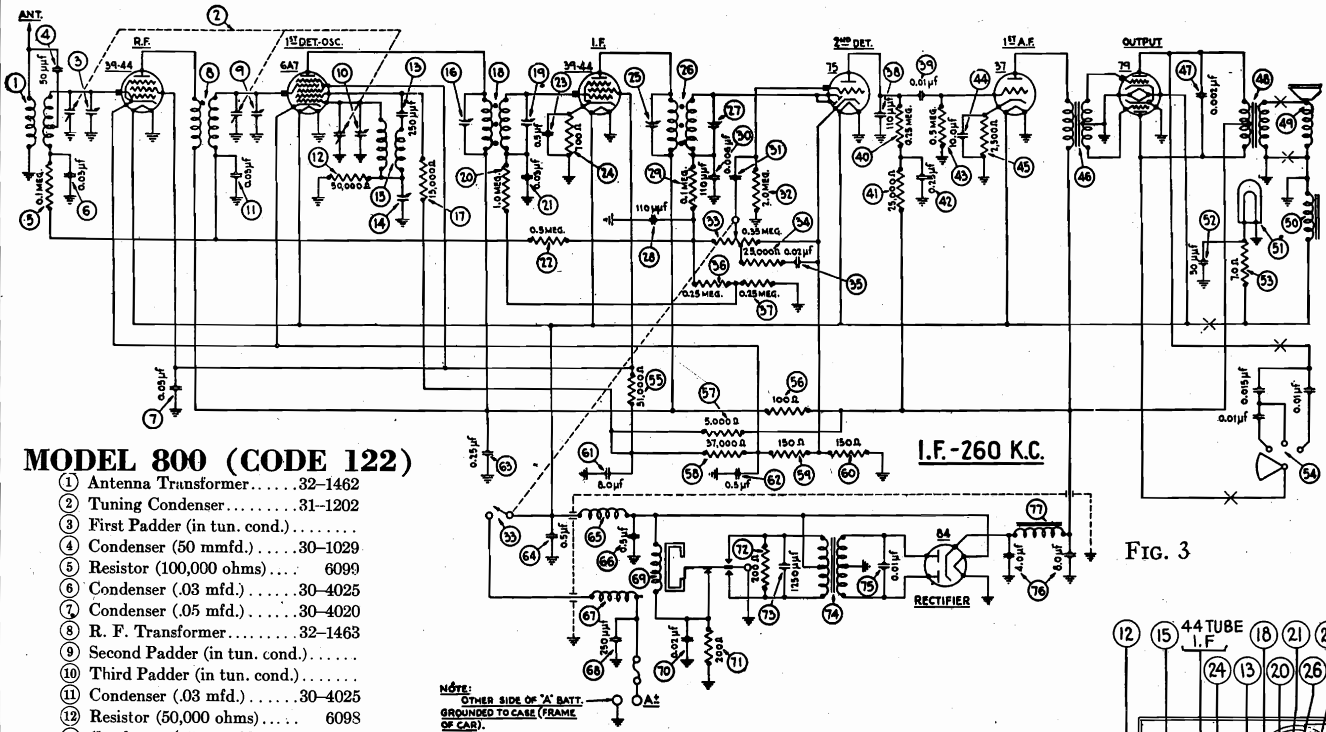



FIG. 3

# MODEL 800 (CODE 122)

| No. | Part | Part No. |
|---|---|---|
| 1 | Antenna Transformer | 32–1462 |
| 2 | Tuning Condenser | 31–1202 |
| 3 | First Padder (in tun. cond.) | |
| 4 | Condenser (50 mmfd.) | 30–1029 |
| 5 | Resistor (100,000 ohms) | 6099 |
| 6 | Condenser (.03 mfd.) | 30–4025 |
| 7 | Condenser (.05 mfd.) | 30–4020 |
| 8 | R. F. Transformer | 32–1463 |
| 9 | Second Padder (in tun. cond.) | |
| 10 | Third Padder (in tun. cond.) | |
| 11 | Condenser (.03 mfd.) | 30–4025 |
| 12 | Resistor (50,000 ohms) | 6098 |
| 13 | Condenser (250 mmfd.) | 30–1032 |
| 14 | Padder | 30–6012 |
| 15 | Oscillator Transformer | 32–1222 |
| 16 | Padder (Pri. 1st I. F. trans.) | |
| 17 | Resistor (15,000 ohms) | 6208 |
| 18 | First I. F. Transformer | 32–1471 |
| 19 | Padder (Sec. 1st I. F. trans.) | |
| 20 | Resistor (1,000,000 ohms) | 33–1096 |
| 21 | Condenser (.03 mfd.) | 30–4025 |
| 22 | Resistor (500,000 ohms) | 6097 |
| 23 | Condenser (.5 mfd.) | 30–4058 |
| 24 | Resistor (700 ohms) | 6443 |
| 25 | Padder (Pri. 2nd I. F. trans.) | |
| 26 | Second I. F. Transformer | 32–1449 |
| 27 | Padder (Sec. 2nd I. F. trans.) | |
| 28 | Condenser (110 mmfd.) | 30–1031 |
| 29 | Resistor (100,000 ohms) | 6099 |
| 30 | Condenser (110 mmfd.) | 30–1031 |
| 31 | Condenser (.006 mfd.) | 30–4125 |
| 32 | Resistor (2,000,000 ohms) | 33–1025 |
| 33 | Volume control & switch assembly | 38–5851 |
| 34 | Resistor (25,000 ohms) | 33–1013 |
| 35 | Condenser (.02 mfd.) | 30–4215 |
| 36 | Resistor (250,000 ohms) | 33–1097 |
| 37 | Resistor (250,000 ohms) | 33–1097 |
| 38 | Condenser (110 mmfd.) | 30–1031 |
| 39 | Condenser (.01 mfd.) | 30–4145 |
| 40 | Resistor (250,000 ohms) | 33–1097 |
| 41 | Resistor (25,000 ohms) | 33–1013 |
| 42 | Condenser (.25 mfd.) | 30–4135 |
| 43 | Resistor (500,000 ohms) | 6097 |
| 44 | Condenser (10 mfd.) | 30–4135 |
| 45 | Resistor (2500 ohms) | 33–1100 |
| 46 | Input Transformer | 32–7206 |
| 47 | Condenser (.002 mfd.) | 30–4177 |
| 48 | Output Transformer | 32–7205 |
| 49 | Cone & Voice Coil | 36–3159 |
| 50 | Field Coil Assembly | 02795 |
| 51 | Pilot Lamp | 34–2039 |
| 52 | Condenser (50 mmfd.) | 30–1029 |
| 53 | Resistor (7 ohms) | 33–3130 |
| 54 | Tone Control | 30–4220 |
| 55 | Resistor (51,000 ohms) | 4237 |
| 56 | Resistor (100 ohms) | 33–3023 |
| 57 | Resistor (5000 ohms) | 33–1070 |
| 58 | Resistor (37,000 ohms) | 33–1098 |
| 59 | Resistor (150 ohms) | 33–3045 |
| 60 | Resistor (150 ohms) | 33–3045 |
| 61 | Condenser (8 mfd.) | 30–4135 |
| 62 | Condenser (.5 mfd.) | 30–4018 |
| 63 | Condenser (.25 mfd.) | 30–4134 |
| 64 | Condenser (.5 mfd.) | 30–4015 |
| 65 | Vibrator Choke | 32–1474 |
| 66 | Condenser (.5 mfd.) | 30–4047 |
| 67 | "A" Choke | 32–1493 |
| 68 | Condenser (250 mmfd.) | 32–1493 |
| 69 | Vibrator | 38–5036 |
| 70 | Condenser (.02 mfd.) | 30–4039 |
| 71 | Resistor (200 ohms) | 7217 |
| 72 | Resistor (200 ohms) | 7217 |
| 73 | Condenser (1250 mmfd.) | 5886 |
| 74 | Power Transformer | 32–7098 |
| 75 | Condenser (.01 mfd.) | 30–4051 |
| 76 | Filter Condenser (4–8 mfd.) | 30–2015 |
| 77 | "B" Choke | 32–7104 |
| | Spark Plug Resistors | 33–1015 |
| | Distributor Resistor | 33–1113E |
| | Screw Type Resistor | 4851 |
| | Interference Condenser | 30–4007 |
| | Studs | 28–6036 |
| | Nuts (Mounting) | W55A |
| | Battery Cable | 38–5296 |
| | Antenna Lead | 38–5131 |
| | Acorn Nut | W821 |
| | Fuse | 7227 |
| | Fuse Insulator | 27–7131 |
| | Control Assembly | 42–5185 |
| | Bracket | 6035 |
| | Strap | 04344 |
| | Knob | 27–4058 |
| | Knob Spring | 28–1738 |
| | Glass | 27–7325 |
| | Glass Gasket | 27–7509 |
| | Pointer | 28–1957 |
| | Shaft | 28–8206 |
| | Face Assembly | 42–5191 |
| | Cover | 29–7064 |
| | 4-prong Socket | 27–6006 |
| | 5-prong Socket | 27–6014 |
| | 6-prong Socket | 27–6020 |
| | 7-prong Socket | 27–6005 |
| | Auto Radio Lock Switch | 42–1076 |

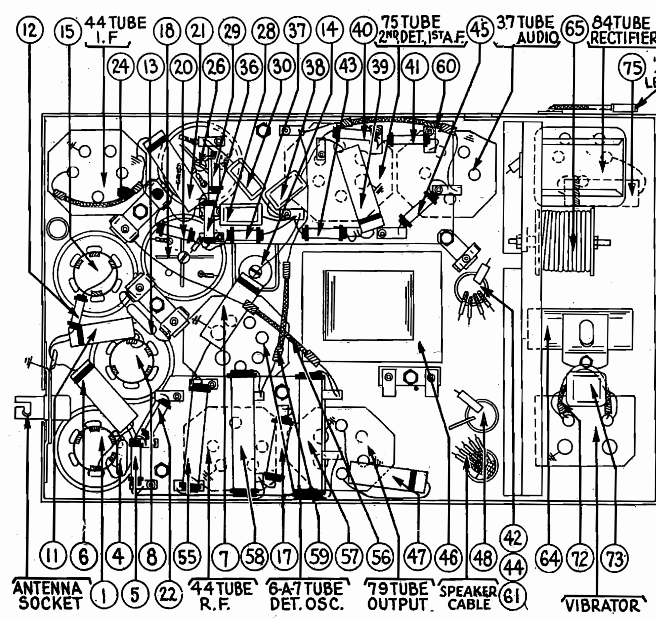



FIG. 4

**MODEL 800 (Code 122)**
**Alignment Data**
**Socket Layout**

**PHILCO RADIO & TELEV. CORP.**

## I. F. TRANSFORMER AND PADDERS

The new style I. F. transformer complete with padders is used in the Model 800 (Code 122).

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1471 for the first I. F. stage and 32-1449 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

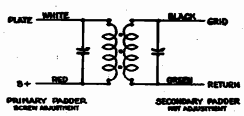



FIG. 1

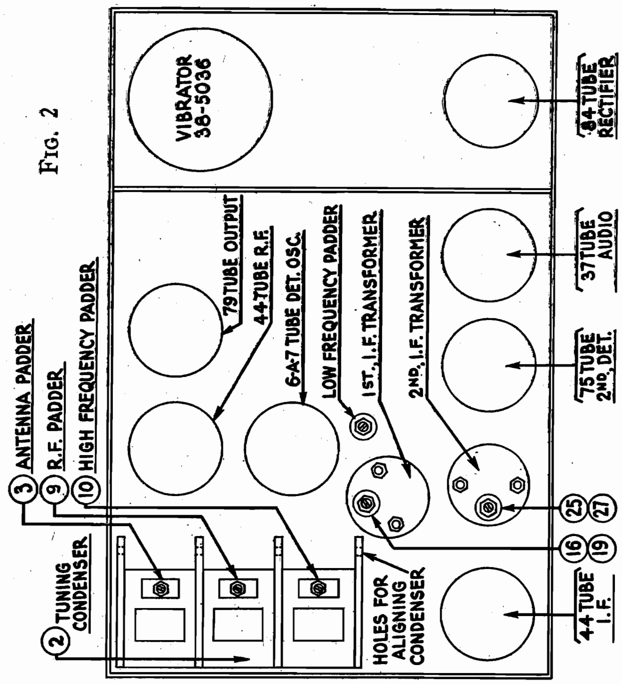



FIG. 2

## MODEL 800 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the speaker lid from the Receiver and disconnect the antenna lead from the Receiver. Remove the grid cap from the 6A7 tube (for location see Fig. 2).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 6A7 tube, grounding the shield. (See Fig. 2.) The output meter must be connected by means of an adapter to the small prong of the speaker plug and to the chassis.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders 25 and 27 are adjusted first (Figs. 2 and 3). Turn the adjusting screw 25 all the way in. A metal screw driver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut 27 with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw 25 for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

Repeat the above procedure with the first I. F. condensers, 16 and 19.

After padding the first I. F. stage, remove the generator lead from the 6A7 tube and reconnect the grid lead to the 6A7 tube. Connect the antenna lead to the Receiver. Set the generator to 1500 K. C. and then connect the generator lead to the antenna lead.

There are four holes in line, one in each of the sections of the tuning condenser housing. (See Fig. 2.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency padder 10 until the maximum reading is obtained in the output meter. This is the true setting for 1500 K. C., 150 on the dial scale.

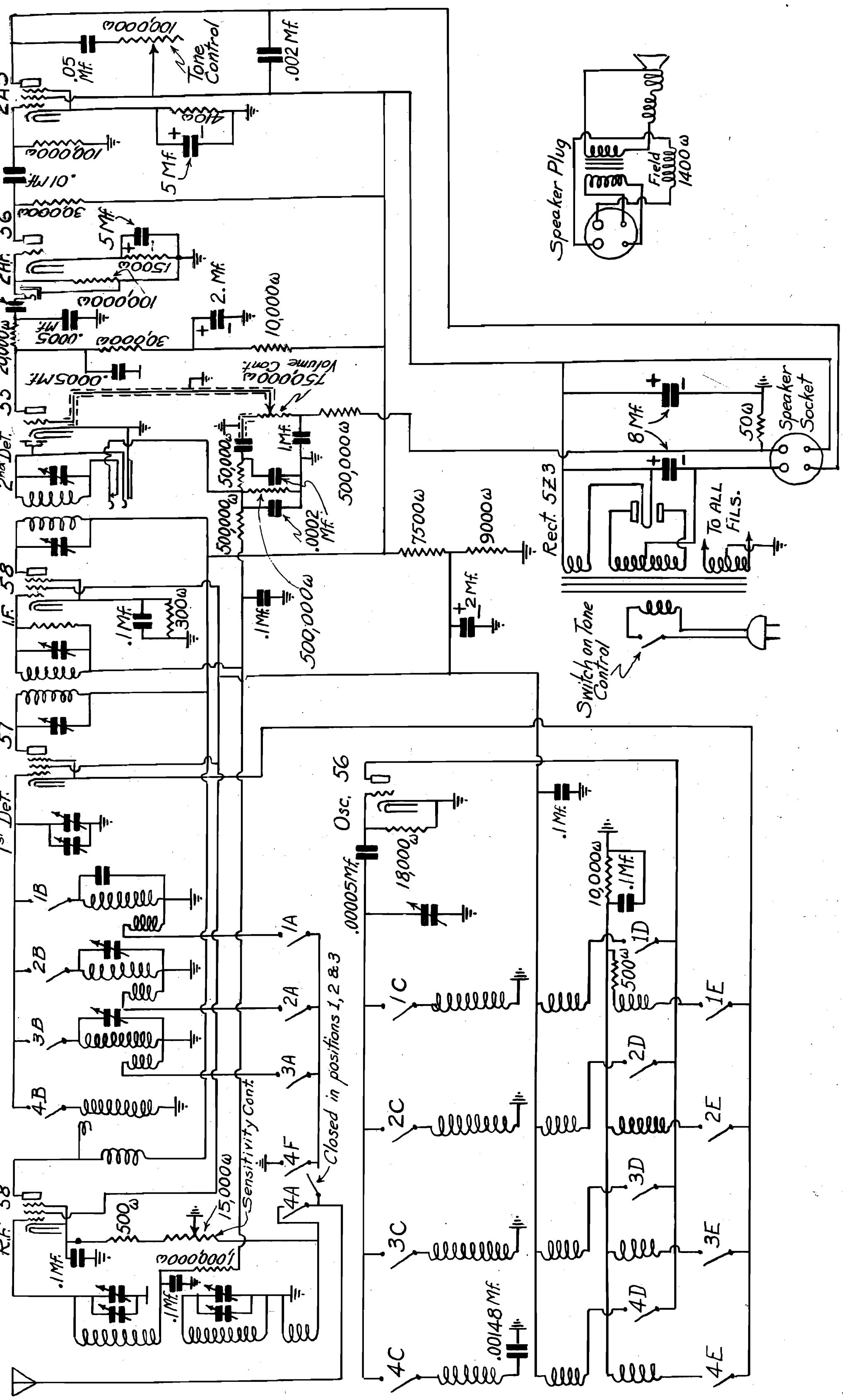
Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder 9 and the antenna padder 3 are next adjusted for the maximum reading on the output meter.

Turn the condenser plates in mesh to 60 on the scale, 600 K. C., and readjust the signal generator to this frequency. Adjust the low-frequency padder 14 for the maximum meter reading.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

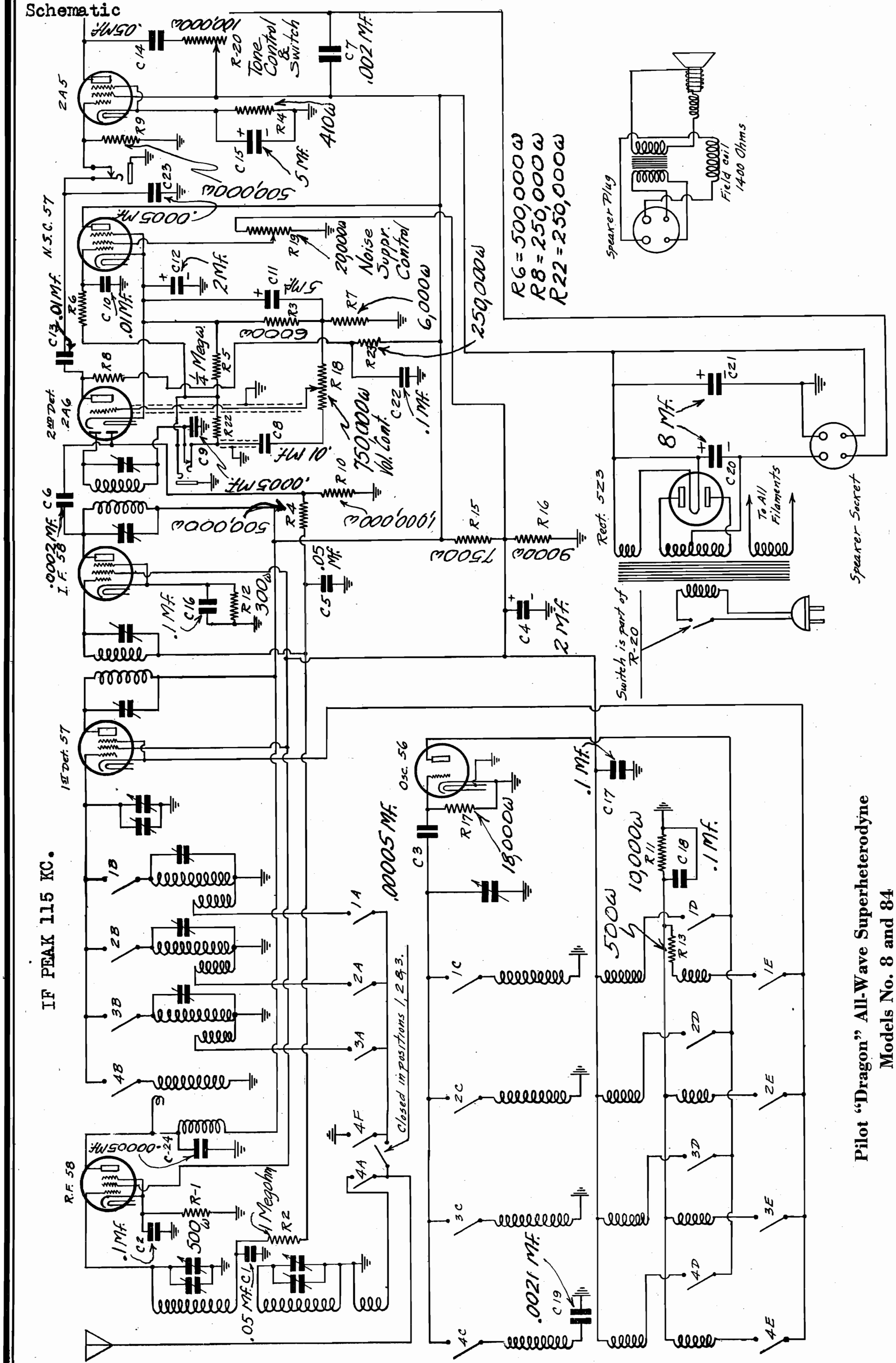
MODEL L-8
(8-Tube Dragon)
Schematic

# PILOT RADIO CO. (New Co.)



MODEL 8,84,7,81
(Dragon A-W. Super)
Schematic

PILOT RADIO CO. (New Co.)




Operating voltages .......... 115, 125, 150, 220, 240, volts. Alternating Current.
Frequency rating .......... 45 to 60 cycles.
Power consumption .......... 75 watts.

**Pilot "Dragon" All-Wave Superheterodyne**
**Models No. 8 and 84**

NOTE: In Models No. 7 and No. 81 the schematic diagram is identical except for the short-wave coil circuit.

PILOT RADIO CO. (New Co.)

MODEL 8,84,7,81
(Dragon A-W. Super)
Alignment Data

## REMOVAL OF CHASSIS FROM CABINET

To remove the chassis from the cabinet proceed as follows: Be certain that the line cord is not plugged in the power outlet socket. Dismount the Noise Suppression Control from the side of the cabinet. Remove the "slip-on" knobs and felt washers from the controls located at the front of the receiver.

Unfasten the four 10/32 mounting screws which support the chassis in the cabinet. They are located underneath the cabinet, one at each corner.

Remove the speaker plug from its socket at the rear of the chassis.

## ADJUSTMENT OF ALIGNMENT CAPACITORS

At the factory the receiver is carefully adjusted and aligned, and precautions are taken to maintain the accuracy of the adjustment. However, should the receiver ever require realignment the following procedure should be observed. In Fig. 2 the location and description of the various alignment capacitators are clearly illustrated. An External modulated oscillator with a frequency range sufficient to cover the requirements of the receiver should be used for obtaining best results.

Before connecting the chassis to the power line, reconnect the loudspeaker cable in its socket at the rear of the chassis. When aligning the Intermediate Amplifier the external oscillator must be set at 115 kilocycles which is the I.F. frequency of the receiver. The Frequency Range Selector Switch should be in the position marked B.C. when aligning the I.F. amplifier and the Broadcast range. For the various short wave ranges its position should correspond with aligning frequency selected from the external oscillator. Connect the antenna lead from the external oscillator to the control grid of the No. 58 tube in the I.F. amplifier stage. The alignment capacitators for the I.F. are located at top of the shielded I.F. transformers. When adjusting these units it is advisable to insulate the metal blade of the screwdriver so that short circuiting the B plus to the chassis will be avoided. Slowly rotate the adjusting screws of each of the capacitors until maximum output is noted in the loudspeaker output circuit. Use an output meter if one is available as a visual indication is likely to be more accurate than the audible method. With the completion of this operation, remove the external oscillator leads from the No. 58 I.F. amplifier tube and connect them in the same manner to the control grid of the No. 57 1st Detector tube. In a similar manner rotate each adjustor screw for maximum audio response in the speaker circuit.

CAUTION: Do not readjust the I.F. stage employing the No. 58 tube, when the external oscillator leads are connected to the No. 57 1st Detector control grid.

After the I.F. Amplifier has been completely realigned remove the external oscillator leads from control grid of the No. 57 tube and connect them to the Antenna and the Ground leads of the receiver. The BLACK wire at the rear of the chassis is the antenna connection; the YELLOW lead is for the ground. Set the frequency of the external oscillator at 1400 kilocycles. Rotate the "FREQUENCY SELECTOR DIAL" to a position where the "shadow line indicator" of the dial light is in a position coincident with the 1400 kilocycle calibration of the dial scale. Adjust the oscillator trimmer of the broadcast range (See Fig. 2) until resonance is indicated by maximum audio response in the speaker output circuit. Proceed next to the 1st Detector alignment capacitor which is located on the top of the gang condenser section of that circuit. The same procedure is followed in aligning the R.F. amplifier and the Preselector stages, the alignment capacitors of which are located also on top of their respective sections of the gang condenser. The correct positions are clearly illustrated in Fig. 2.

## ALIGNMENT OF THE SHORT WAVE RANGES

Each of the Short Wave ranges has a separate aligning capacitor in its heterodyne circuit. The alignment frequencies for the various short wave ranges are:

Range No. 3............ 3700 kilocycles
Range No. 2............ 8600 kilocycles
Range No. 1............15,000 kilocycles

The antenna and ground leads of the external oscillator should be connected to the black and yellow wires respectively of the receiver. Adjust the external oscillator to the required frequency for the short wave range being aligned. Rotate the "frequency selector dial" until the signal is noted in the audio output. Turn the tuning condenser slowly from the left to right in the vicinity of the signal, at the same time adjusting the alignment capacitor until the maximum signal response is noted in the loudspeaker output circuit. The signal voltage of the external oscillator should always be held constant while making alignment adjustments. The same alignment procedure should be followed on all of the short wave ranges.

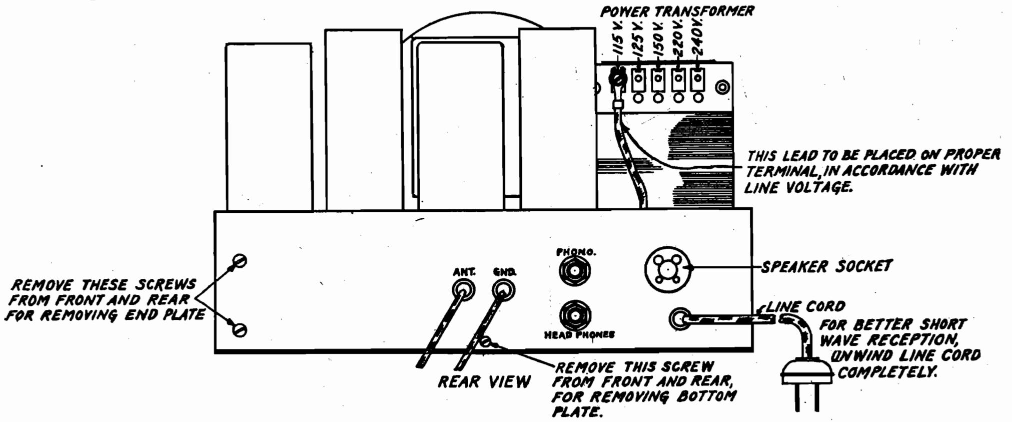
## REMOVAL OF FREQUENCY RANGE SELECTOR SWITCH ASSEMBLY

When removing this assembly great care must be exercised by the operator to avoid scratching or marking the coils. Remove the bottom plate and the side plate from the chassis. It is advisable to first unsolder the leads connecting the assembly to the main chassis. Remove the four 8/32 nuts which support the assembly in the chassis. The switch assembly is then ready for removal.

In replacing the switch assembly the same precautions must be observed to avoid damage to the coils. Refasten the assembly firmly in the mounting provided for it. Resolder all connections well. Use only ROSIN CORE SOLDER. DO NOT USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE. Replace the bottom plate and the side plate. It is advisable to realign the receiver after the replacement of the assembly is completed.

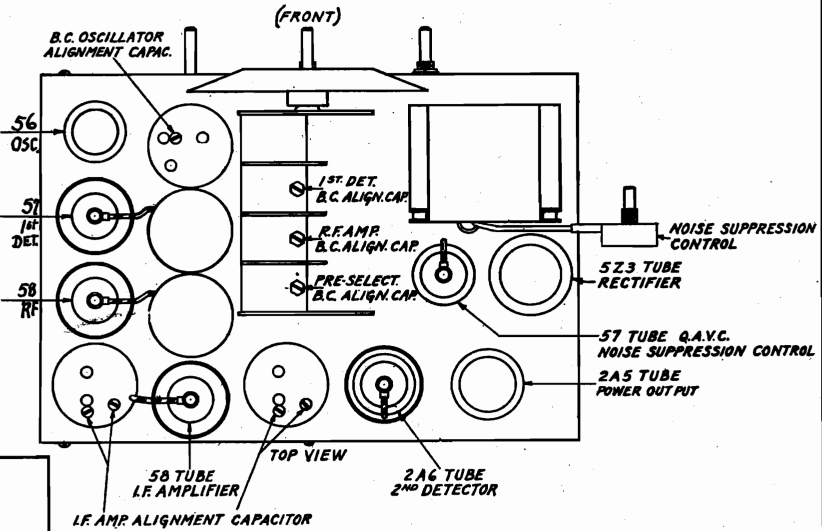
MODEL 8,84,7,81
(Dragon A-W. Super)
Socket Layout
Voltage,Trimmers

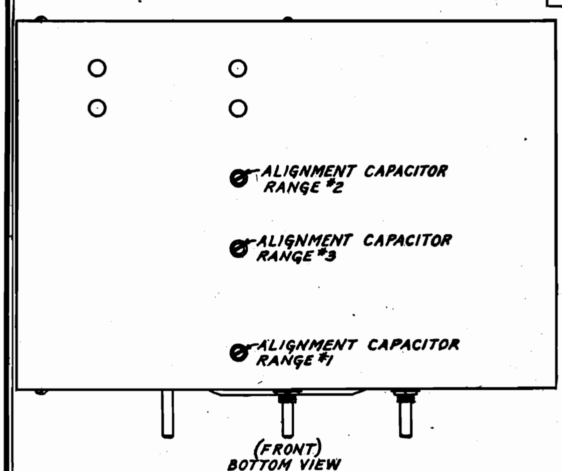
# PILOT RADIO CO. (New Co.)




## POWER SUPPLY

The operating voltage of the receiver is indicated on the label at the rear of the chassis. In the PILOT "DRAGON" receiver a special type of "universal" power transformer is used. Its design permits the receiver to be used on line voltages of 115, 125, 150, 220, or 240 volts ALTERNATING CURRENT from forty-five to sixty cycles. At the factory the transformer is connected for operation on voltages existing in the location where the receiver is to be used. If doubt exists regarding the voltage of the electric power in your locality consult the power company for advice. When certain that the receiver is connected for the proper operating voltage then plug in the line cord to the nearest outlet.




*Frequency coverage of Range Selector Switch positions.*

| | | | | |
|---|---|---|---|---|
| Position BC | 540—1500 | kilocycles | 555—200 | metres |
| 3 | 1500—3900 | kilocycles | 200—77. | metres |
| 2 | 3900—9000 | kilocycles | 77.—33.4 | metres |
| 1 | 9000—21,400 | kilocycles | 33.4—14. | metres |

Intermediate Frequency 115 kc. The use of this frequency provides a very favorable degree of sensitivity and selectivity.

The D.C. voltages measured at the tube sockets of the set should be read with a high resistance voltmeter of at least 1000 Ohms per volt.

Voltages measured at the tube socket

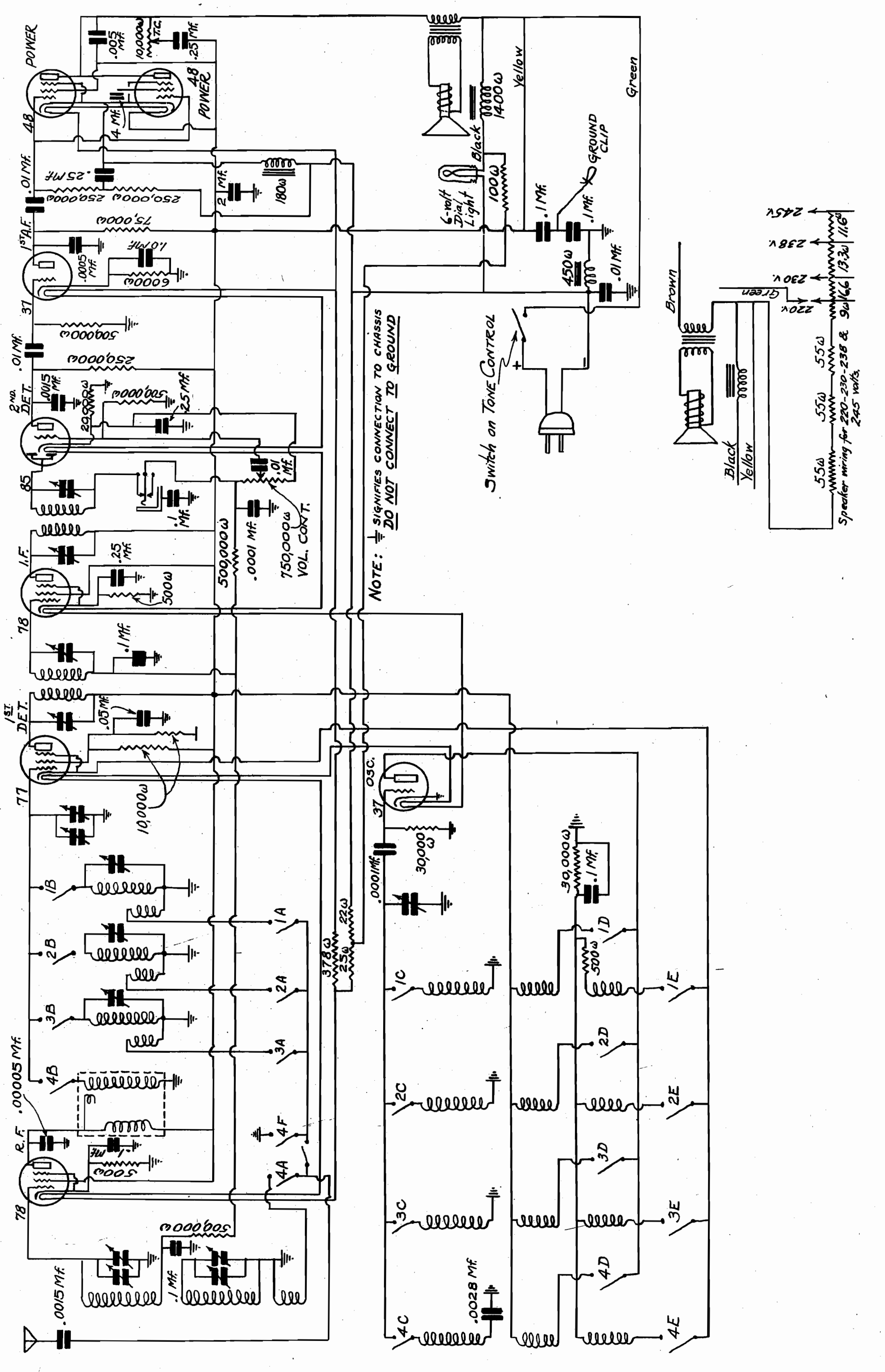
| | R.F. | Osc. | 1st Det. | Int. Amp. | 2nd Det. | Pwr Pentode | Rectifier | N.S.C. |
|---|---|---|---|---|---|---|---|---|
| | 58 | 56 | 57 | 58 | 2A6 | 2A5 | 5Z3 | 57 |
| Plate | 235 | 85 | 230 | 230 | *88 | 205 | 335 | 235 |
| Cathode | 3 | — | 5 | 2 | 2 | 14 | — | 2 |
| Screen | 82 | — | 80 | *83 | — | 220 | — | 0 to 83 |
| Filament | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 4.8 |

All plate voltages measured to cathode. Screen voltages measured to cathode.

All cathode voltages measured to chassis frame. Measurement at the 5Z3 tube made from filament to center tap of power transformer high voltage center tap. Speaker Field Voltage 100 V.

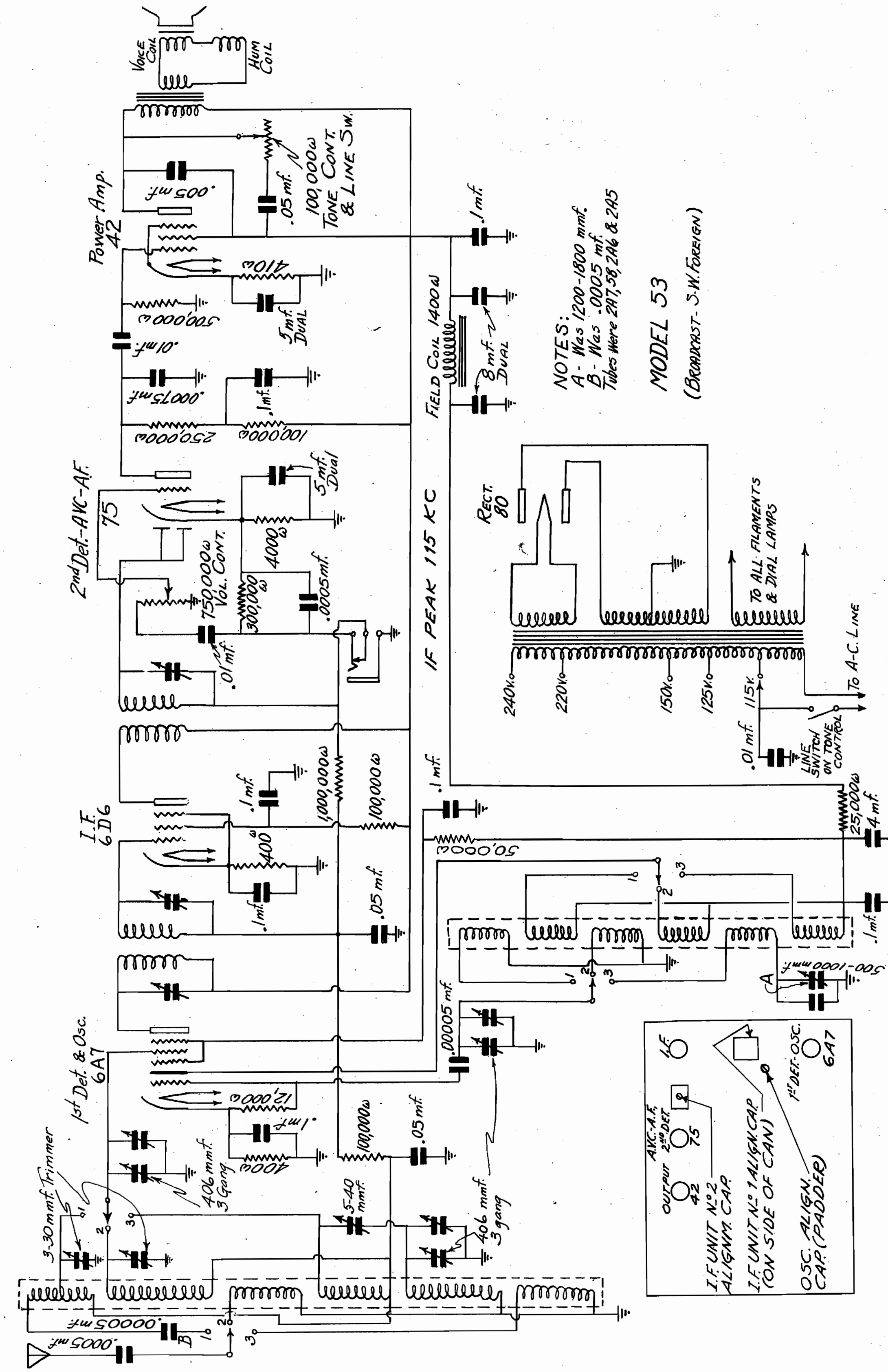
**MODEL 28**
**Schematic**

# PILOT RADIO CO. (New Co.)



**MODEL 53**
**Schematic**
**Socket Layout**

# PILOT RADIO CO. (New Co.)



PILOT RADIO & TUBE CORP.

ALIGNMENT OF INTERMEDIATE-FREQUENCY AMPLIFIER:

The I-F. peak frequency is 115 kc. Remove the chassis from the cabinet. To do this remove the slip-on knobs from the controls at the front of the receiver. Next remove the four screws which hold the chassis to the base of the cabinet. Set the signal generator at 115 kc. Connect the ground lead of the signal generator to the chassis of the receiver. Place the fixed condenser in series with the antenna lead from the signal generator (approximately .002 mf.) and connect the antenna lead to the control grid of the 6A7 tube. Adjust the intermediate-frequency capacitors of the I-F. unit No.1 and No.2 for maximum sensitivity. It is advisable to make these adjustments at least twice. Use a low input from the signal generator when aligning the receiver in order that greater accuracy may be obtained.

BROADCAST BAND ALIGNMENT:

Connect the antenna and ground leads of the signal generator to the antenna and ground leads of the chassis. Use a dummy antenna in place of the .002 mf. condenser, if one be available. Set the frequency range switch of the receiver in the broadcast position. Set the signal generator at 1400 kc. Rotate the tuning condenser of the receiver until the compass dial pointer coincides with the 1400 kc. calibration mark on the dial scale. Adjust the oscillator trimmer on the gang condenser until resonance is indicated in the loudspeaker circuit. Next adjust the heterodyne stage and preselector stage for maximum sensitivity. Next set the signal generator at a frequnecy of 1630 kc. Adjust the image suppression circuit condenser for minimum signal response, as noted in the loudspeaker circuit. When adjusting the image suppression condenser, a strong R-F. signal should be applied to the receiver. Again set the signal generator to 1400 kc. and adjust the oscillator, heterodyne stage and preselector trimmer condensers for maximum sensitivity. Next, set the signal generator at 600 kc. and rotate the tuning condenser on the chassis until resonance is noted in the loudspeaker output circuit. Adjust the 600 kc. alignment capacitor (padder) at the same time, slowly rocking the gang condenser to the right or left for maximum sensitivity. Again, set the signal generator at 1400 kc. Rotate the tuning condenser on the chassis until the compass dial pointer coincides with the 1400 kc. calibration mark on the dial scale. Readjust the oscillator, the heterodyne stage and the preselector circuit trimmer on the gang condenser. for maximum sensitivity. Check the sensitivity of the receiver at 1000 kc. and 600 kc.

SHORT-WAVE BAND No.2 ALIGNMENT:

Set the frequency range switch of the receiver on position Band No.2. Set the signal generator at 6100 kc. (49 meters.) Adjust the Band No.2 alignment capacitor for maximum sensitivity. Set the signal generator at 2400 kc. Check the sensitivity of the receiver at this point also.

SHORT-WAVE BAND No.1 ALIGNMENT:

Set the signal generator at 17,800 kc. (16.85 meters). Rotate the tuning condenser until the signal is noted in the loudspeaker circuit. The compass dial pointer should then be approximately on the 17.8 megacycle mark on the dial scale. Adjust the Band No.1 trimmer for maximum sensitivity. Set the signal generator at 7500 kc. and check the sensitivity of the set at this point.

When making all adjustments, it is advisable to have the volume control and tone control turned on full in a clockwise direction.

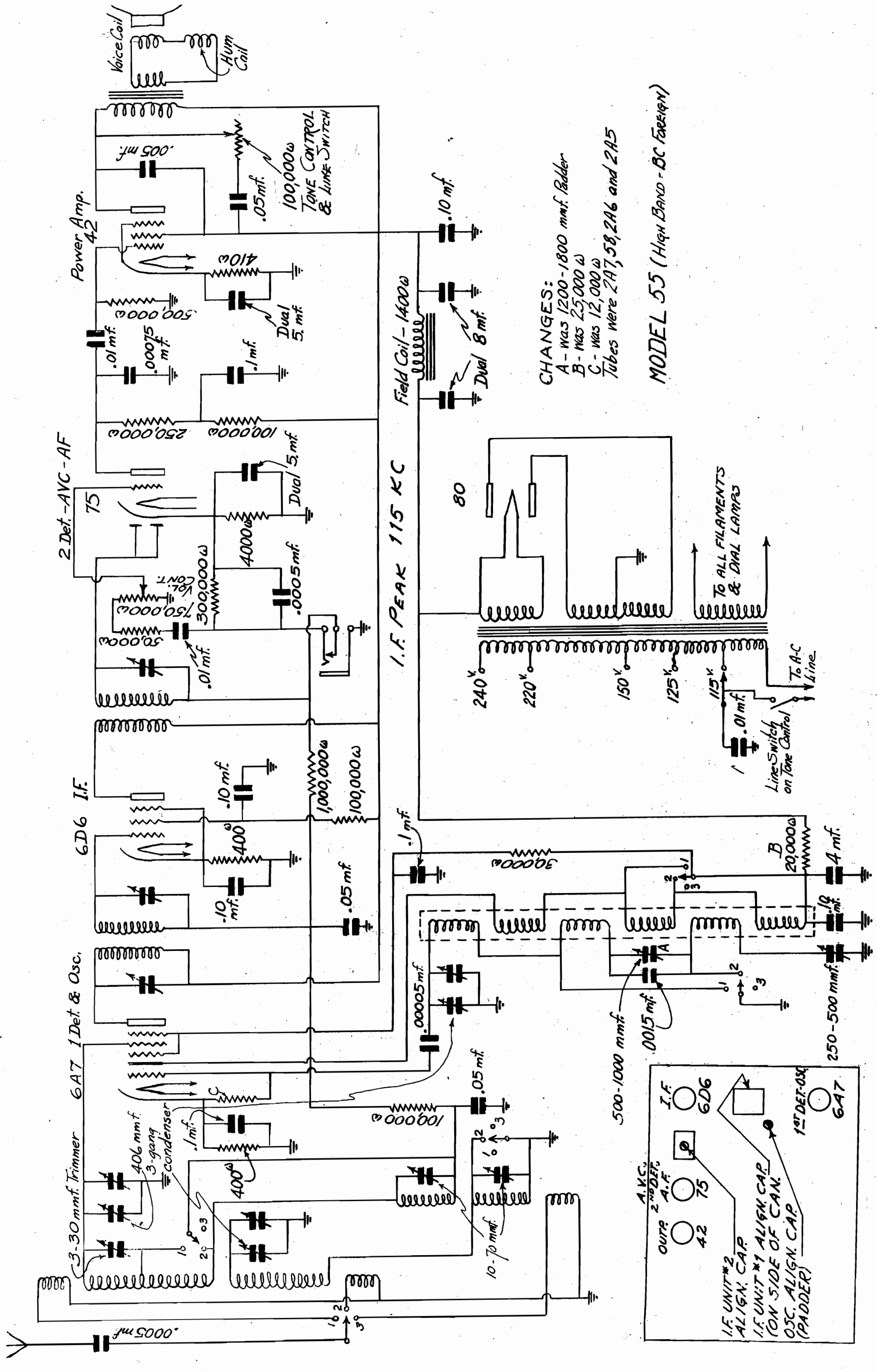
HIGH BAND SECTION ALIGNMENT:

Rotate the frequency range switch to the position marked "High Band". Set the signal generator at 300 kc. Rotate the tuning condenser until the 300 kc. signal is noted in the loudspeaker circuit. The signal should be observed when the dial pointer is on the 1000 meter calibration. Adjust the First Detector and the Preselector circuit alignment capacitors for maximum sensitivity. There is no oscillator capacitor adjustment at 1000 meters.

Set the signal generator at 155 kc. Rotate the tuning condenser until the signal is noted in the loudspeaker circuit at 1930 meters on the dial. Adjust the "High Band" padder condenser for maximum sensitivity. Realign the set at 1000 meters and check the sensitivity at 1500 meters (200 kc.).

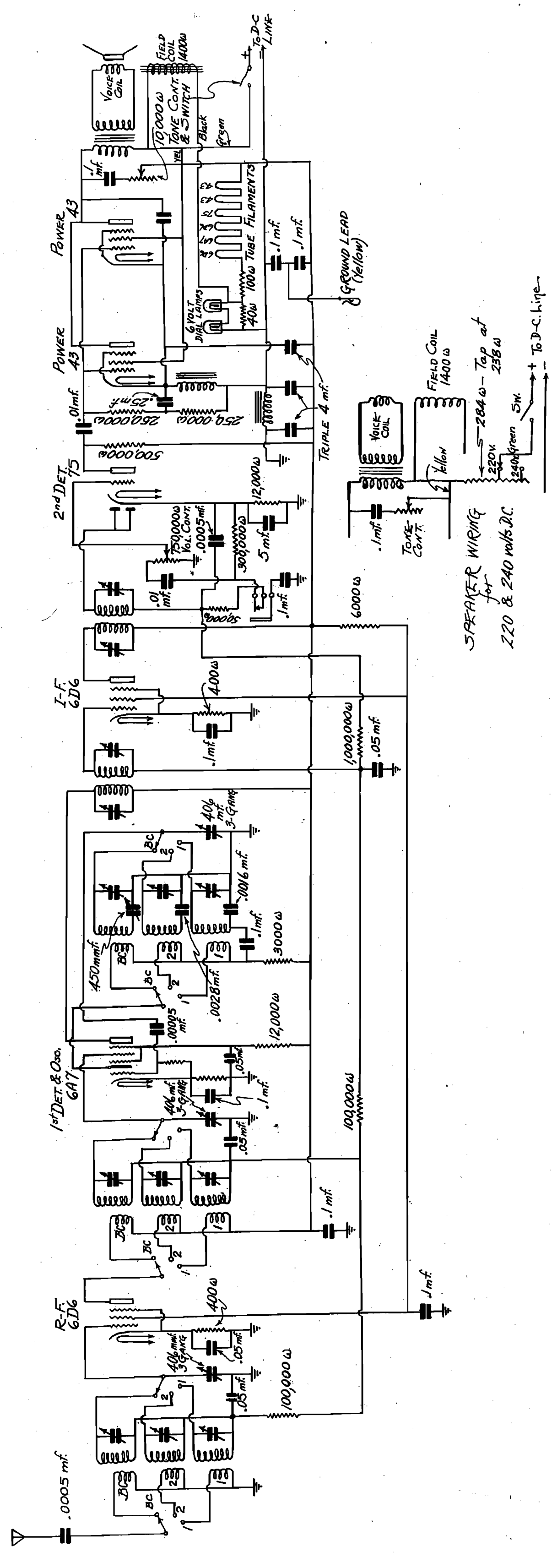
**MODEL 55**
**Schematic**
**Socket Layout**

# PILOT RADIO CO. (New Co.)



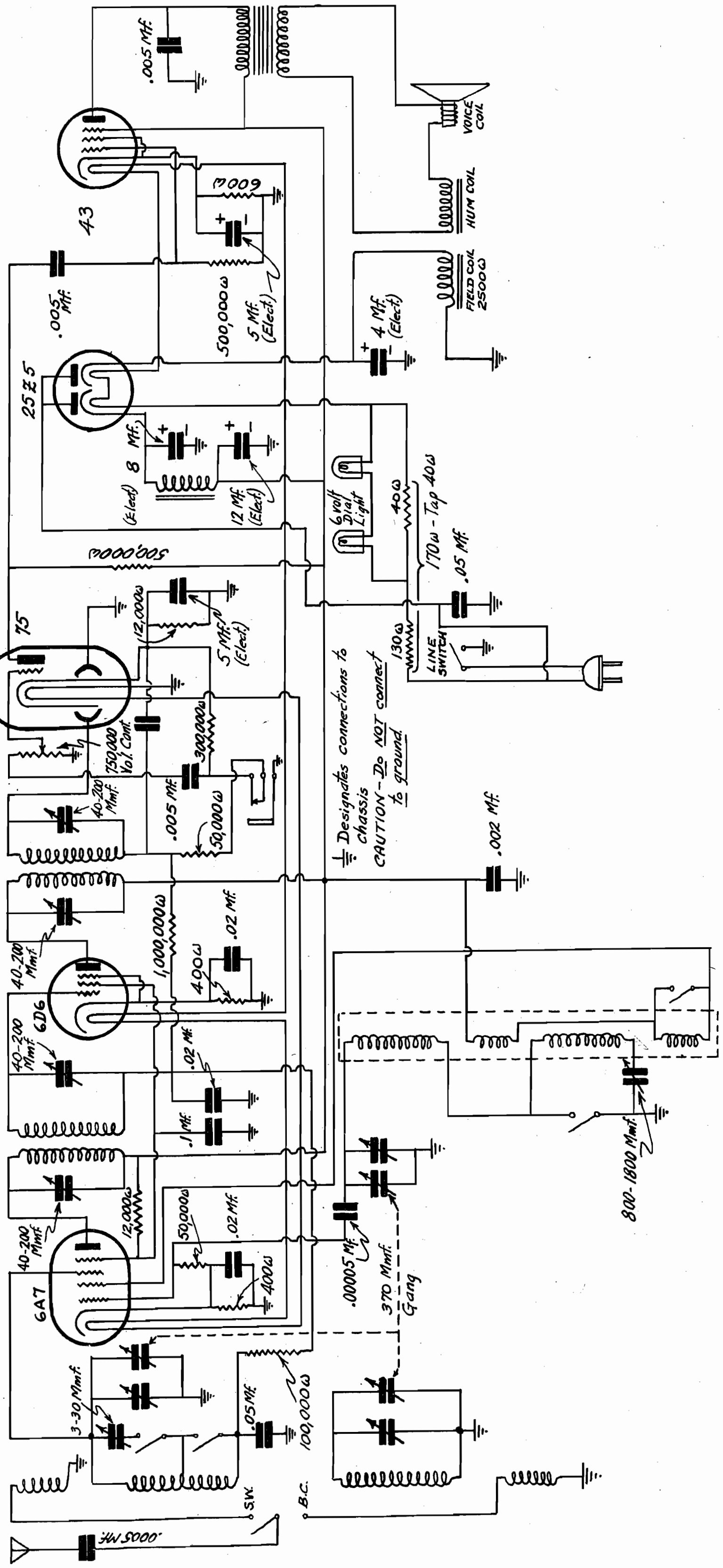
MODEL 68
Schematic

# PILOT RADIO CO. (New Co.)



MODEL 93
Schematic

# PILOT RADIO CO. (New Co.)



**MODEL R-27, Revised**
**Schematic**
**Chassis Wiring**

# RCA-VICTOR CO., INC.

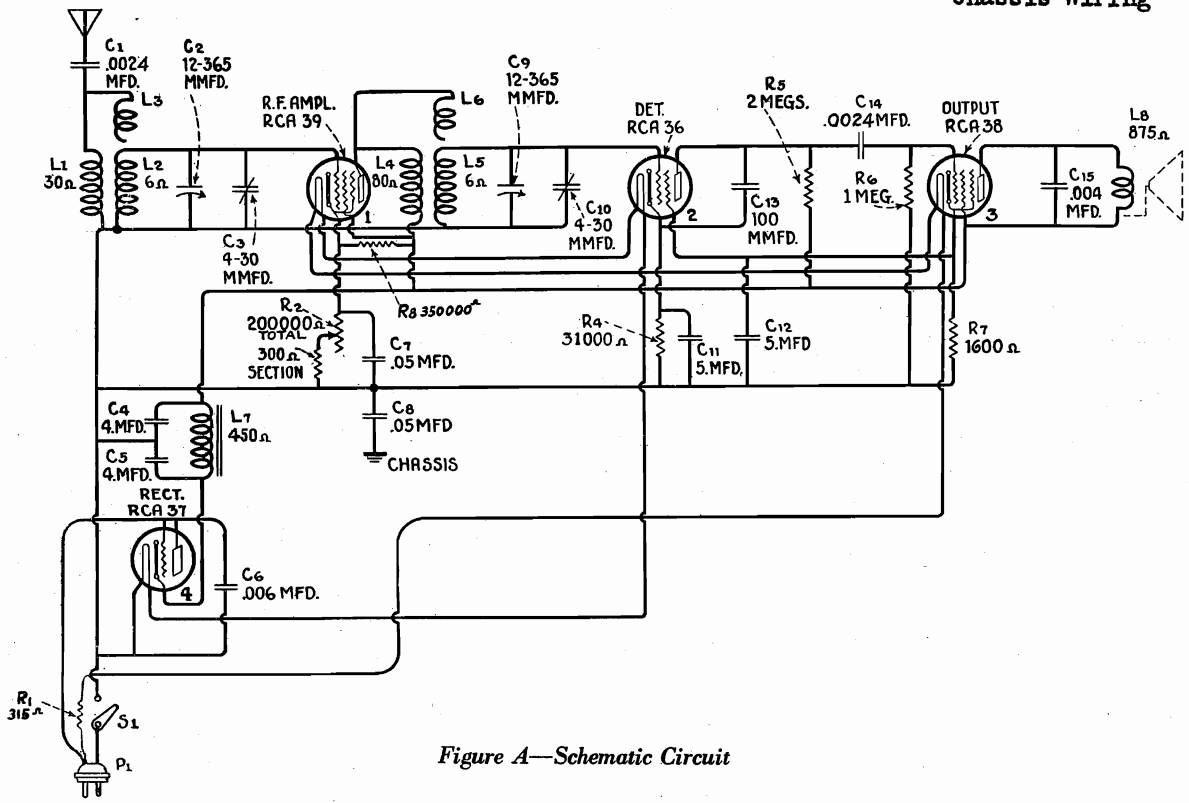



*Figure A—Schematic Circuit*

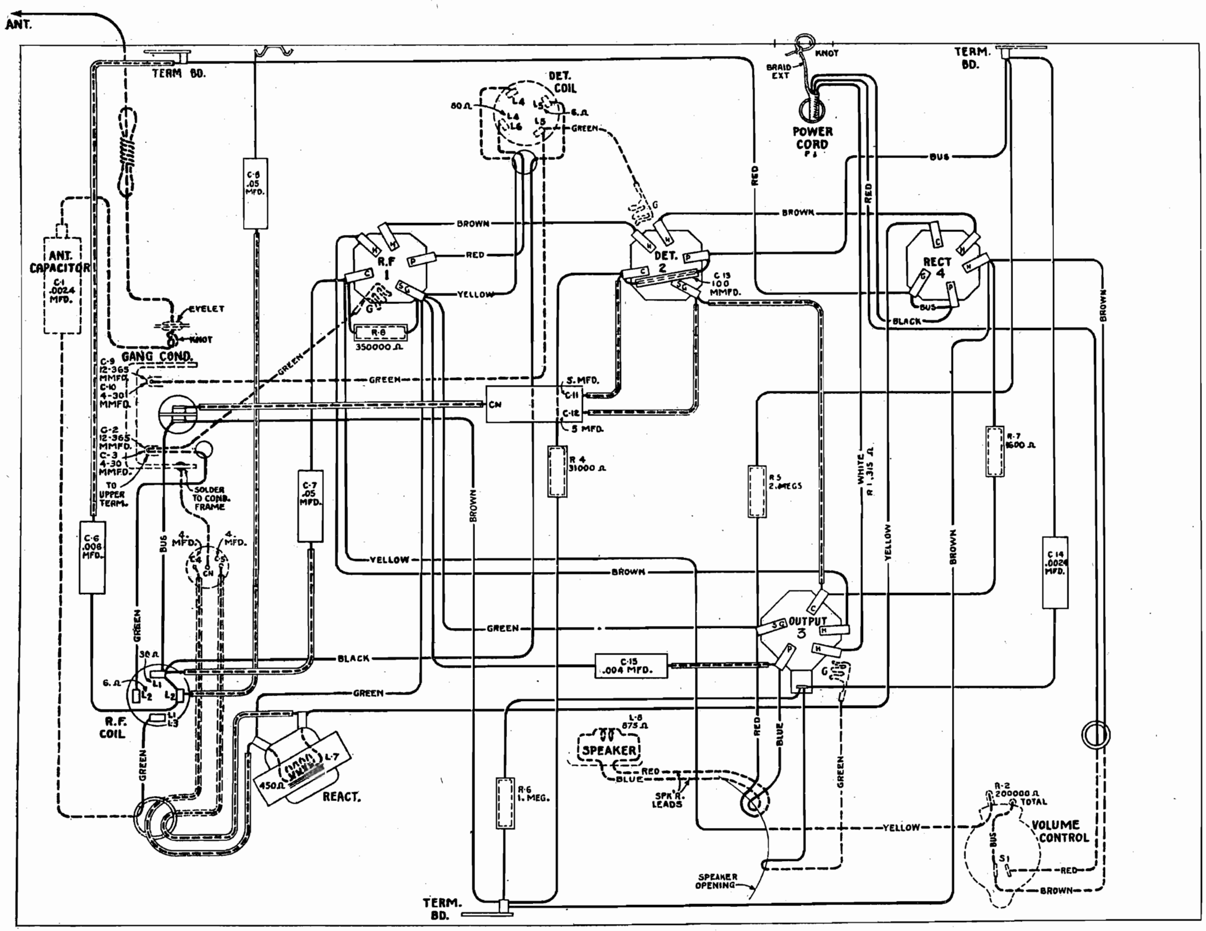



*Figure B—Wiring Diagram*

MODEL R-27, Revised
Voltage
Parts List

RCA-VICTOR CO., INC.

# SERVICE DATA

## Electrical Specifications

Voltage Rating—
105–120 Volts, 25–133 Cycles A. C. or D. C.
Power Consumption....................40 Watts
Frequency Range...........540 K. C.–1712 K. C.
Type and Number of Radiotrons.......1 RCA-36, 1 RCA-37, 1 RCA-38, 1 RCA-39—Total 4

This receiver is an A. C.–D. C. table model tuned R. F. broadcast receiver. Features such as universal operation of both A. C. and D. C., wide tuning range, excellent performance and compact construction characterize this instrument. Figures A and B show the schematic and wiring diagrams respectively. The voltage readings and replacement parts are given below.

# RADIOTRON SOCKET VOLTAGES

Measured at Maximum Volume—115 Volt A. C. Line
All Voltages on D. C. will be slightly lower

| Radiotron No. | Cathode or Filament to Control Grid, Volts | Cathode or Filament to Screen Grid, Volts | Cathode or Filament to Plate, Volts | Plate Current M. A. | Filament or Heater Volts |
|---|---|---|---|---|---|
| 1. RCA-39 R. F. | 3.0 | 105 | 105 | 7.0 | 6.0 |
| 2. RCA-36 Det. | *0.75 | 11.0 | *60 | .025 | 6.0 |
| 3. RCA-38 Output | 11.0 | 100 | 95 | 5 | 6.0 |
| 4. RCA-37 Rect. | — | — | 115 | 15 | 6.0 |

* Impossible to measure on ordinary voltmeter

# REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | RECEIVER ASSEMBLIES | |
| 3076 | Resistor—1 megohm—Carbon type (R6)—Package of 5 | $1.00 |
| 3537 | Reactor—Filter reactor (L7) | 1.10 |
| 3542 | Volume control—Complete with mounting nut (R2, S1) | 1.18 |
| 3559 | Resistor—31,000 ohms—Carbon type—½ watt (R4)—Package of 5 | 1.00 |
| 3560 | Resistor — 1,600 ohms — Carbon type — ½ watt (R7)—Package of 5 | 1.00 |
| 3567 | Escutcheon — Station selector escutcheon—Package of 2 | .42 |
| 3568 | Escutcheon — Volume control escutcheon—Package of 2 | .42 |
| 3569 | Knob—Station selector or volume control knob—Package of 5 | .65 |
| 3713 | Capacitor—0.05 mfd. (C7, C8) | .32 |
| 3714 | Coil—Detector coil (L4, L5, L6) | .98 |
| 3715 | Coil—R. F. coil complete (L1, L2, L3) | 1.08 |
| 4007 | Capacitor—2,400 mmfd. (C1, C14) | .35 |
| 4070 | Capacitor—0.004 mfd. (C15) | .42 |
| 4071 | Capacitor—0.006 mfd. (C6) | $0.42 |
| 4073 | Resistor—350,000 ohms—Carbon type—½ watt—(R8)—Package of 5 | 1.00 |
| 6188 | Resistor—2 megohm—Carbon type—½ watt (R5)—Package of 5 | 1.00 |
| 6451 | Condenser—2-gang variable tuning condenser (C2, C3, C9, C10) | 2.04 |
| 6819 | Resistor—Filament resistor—Power cord—315 ohms (R1) | 1.00 |
| 6844 | Capacitor—Filter capacitor—Two 5.0 mfd. capacitors (C11, C12) | 1.10 |
| 6845 | Capacitor—Filter capacitor—Two 4.0 mfd. (C4, C5) | 1.18 |
| 7484 | Socket—Radiotron socket—5-contact | .35 |
| 10820 | Capacitor—100 mmfd. (C13) | .40 |
| | LOUDSPEAKER ASSEMBLIES—MAGNETIC TYPE | |
| 7594 | Cone—Speaker cone—Package of 5 | 5.00 |
| 7595 | Support—Cone support | .60 |
| 7596 | Mechanism—Speaker mechanism complete with magnet (L8) | 3.00 |
| 9426 | Loudspeaker complete | 4.38 |

# RCA-VICTOR CO., INC.

MODEL R-28-BW
Schematic
Chassis Wiring

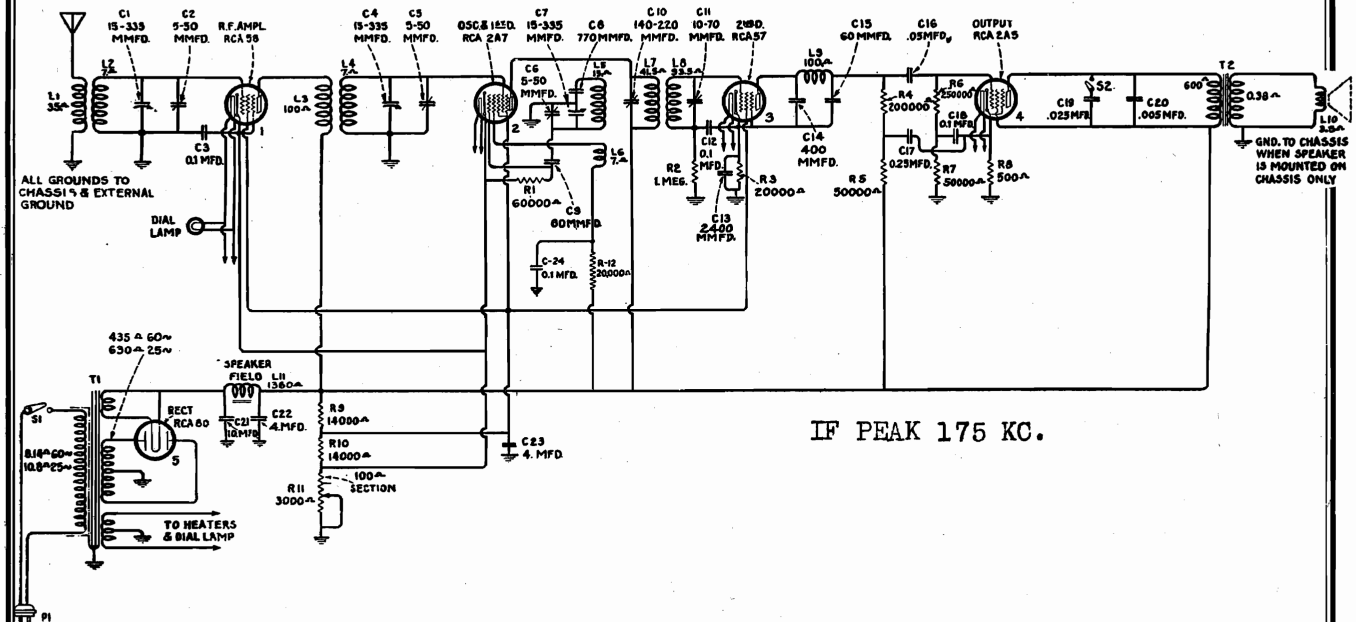



*Figure 1—Schematic Circuit Diagram*

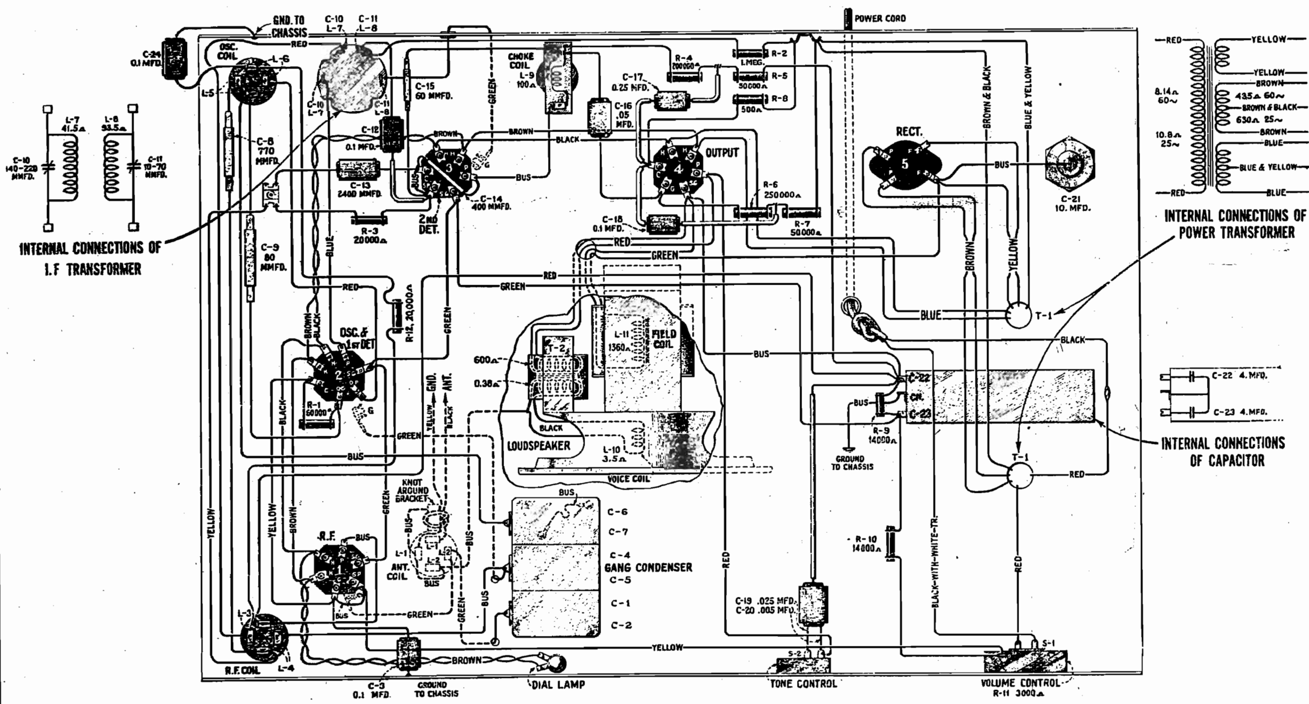



*Figure 2—Wiring Diagram*

MODEL R-28-BW
Voltage
Parts List

RCA-VICTOR CO., INC.

# SERVICE DATA

Voltage Rating..........................105–125 Volts
Frequency Rating...........25–40 Cycles and 50–60 Cycles
Power Consumption..........................70 Watts
Number and Types of Radiotrons...............1 UX-280, 1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7—Total, 5
Undistorted Output..........................1.75 Watts
Frequency Range.................540 K. C. to 1500 K. C.

This receiver is a five-tube Super-Heterodyne incorporating a Dynamic Loudspeaker as a part of the chassis; two-point tone control; single heater type Pentode Output and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

The circuit consists of an R. F. stage, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage consisting of a transformer only using two tuned circuits, a second detector, an output tube and a rectifier.

Service work in conjunction with this receiver will be similar to that of other Super-Heterodyne receivers of the small compact type construction. The line-up adjustments are made in conjunction with an external oscillator and an output meter. The line-up capacitors on the gang capacitor are adjusted for maximum output when the oscillator is coupled to the antenna and the set and oscillator are both set at 1400 K. C. The I. F. frequency is 175 K. C. and the two circuits that comprise it are adjusted for maximum output at 175 K. C.

## RADIOTRON SOCKET VOLTAGES

### 115 Volt A. C. Line

### MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

| Radiotron No. | Cathode to Control Grid, Volts | Cathode to Screen Grid, Volts | Cathode to Plate, Volts | Plate Current, M. A. | Heater Volts |
|---|---|---|---|---|---|
| 1. RCA-58 R. F. Amplifier | 3.0 | 95 | 250 | 5.0 | 2.33 |
| 2. RCA-2A7 First Detector Oscillator | 3.0 | 95 | 250 | 3.0 | 2.33 |
| 3. RCA-57 Second Detector | 6.0 | 89 | 170 | 0.3 | 2.33 |
| 4. RCA-2A5 Power Amplifier | 18.0 | 235 | 220 | 32.0 | 2.33 |
| 5. RCA-80 Rectifier | 725 Volts PLATE TO PLATE—60 M. A. TOTAL | | | | 4.82 |
| TOTAL CATHODE CURRENT—11 M. A. | | | | | |

## REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.**

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | RECEIVER ASSEMBLIES | |
| 2747 | Contact cap—Package of 5 | $0.50 |
| 2749 | Capacitor—2,400 mmfd. | 1.50 |
| 3050 | Resistor—14,000 ohms—Carbon type—3 watts | .60 |
| 3456 | Capacitor—0.05 mfd. | .44 |
| 3459 | Capacitor—80 mmfd. | .44 |
| 3472 | Capacitor—0.0024 mfd. | .32 |
| 3514 | Resistor—250,000 ohms—Carbon type—½ watt—Package of 5 | 1.00 |
| 3555 | Capacitor—0.1 mfd. | .36 |
| 3572 | Socket—Radiotron 7 contact socket | .38 |
| 3573 | Socket—Radiotron 4 contact socket | .32 |
| 3574 | Coil—Choke coil | .68 |
| 3584 | Ring—R. F. or oscillator coil retaining ring—Package of 5 | .40 |
| 3586 | Scale—Dial scale | .50 |
| 3587 | Socket—Dial lamp socket and bracket | .32 |
| 3588 | Volume control—Complete with mounting nut | 1.40 |
| 3589 | Switch—Tone control switch | .54 |
| 3592 | Knob—Station selector, operating switch or volume control knob—Package of 5 | .80 |
| 3593 | Screw—Chassis mounting screw—Package of 10 | .30 |
| 3594 | Resistor—50,000 ohms—Carbon type—½ watt—Package of 5 | 1.00 |
| 3596 | Capacitor—60 mmfd. | .36 |
| 3597 | Capacitor—0.25 mfd. | .40 |
| 3598 | Capacitor—0.1 mfd. | .36 |
| 3601 | Coil—Choke coil | .68 |
| 3602 | Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5 | 1.00 |
| 3603 | Resistor—500 ohms—Carbon type—1 watt—Package of 5 | 1.10 |
| 3604 | Capacitor—400 mmfd. | .30 |
| 3605 | Capacitor—770 mmfd. | $0.30 |
| 3606 | Capacitor—Comprising one 0.005 mfd. and one .025 mfd. capacitors | .40 |
| 6143 | Resistor—40,000 ohms—Carbon type—¼ watt—Package of 5 | 2.00 |
| 6228 | Resistor—200,000 ohms—Carbon type—½ watt—Package of 5 | 2.50 |
| 6303 | Resistor—20,000 ohms—Carbon type—½ watt—Package of 5 | 2.50 |
| 6306 | Resistor—14,000 ohms—Carbon type—1 watt—Package of 5 | 2.50 |
| 6443 | Capacitor—10 mfd. | 1.50 |
| 6464 | Transformer—I. F. transformer | 1.88 |
| 6470 | Coil—Antenna coil | 1.08 |
| 6471 | Coil—Oscillator coil assembly | .74 |
| 6472 | Coil—R. F. coil assembly | .94 |
| 7485 | Socket—Radiotron 6 contact socket | .70 |
| 7487 | Shield—Radiotron tube shield | .50 |
| 7589 | Capacitor—Filter capacitor—Two 4.0 mfd. in container | 1.64 |
| 7592 | Condenser—3 gang variable tuning condenser | 3.35 |
| 8985 | Transformer—Power transformer—105–125 volts—50–60 cycles | 4.26 |
| 8986 | Transformer — Power transformer — 200–250 volts — 60 cycles | 4.38 |
| 9002 | Transformer—Power transformer—105–125 volts—25–50 cycles | 6.00 |
| | REPRODUCER ASSEMBLIES | |
| 6467 | Transformer—Output transformer | 1.44 |
| 8987 | Cone—Reproducer cone—Package of 5 | 5.00 |
| 9004 | Coil assembly—Comprising field coil, magnet and cone support | 2.35 |

RCA-VICTOR CO., INC.

MODEL R-28-BWC
Schematic
Chassis Wiring

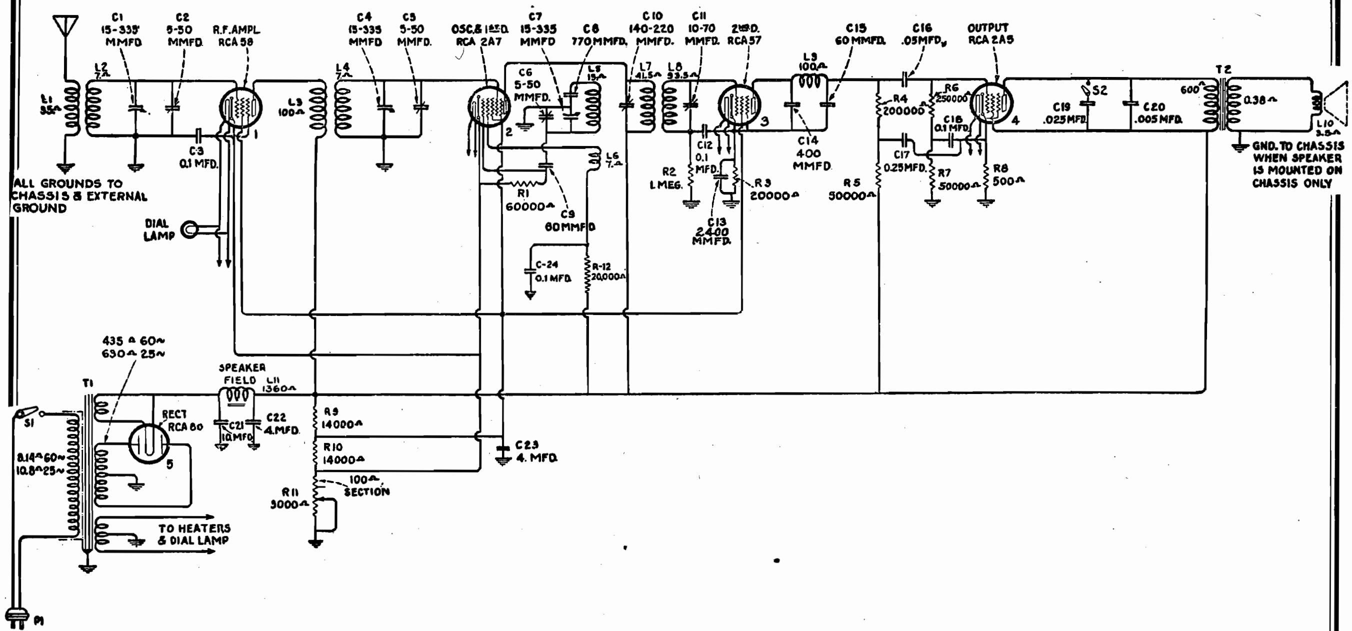


*Figure 1—Schematic Circuit Diagram—Note—Sign lamps are connected across R. F. heater*

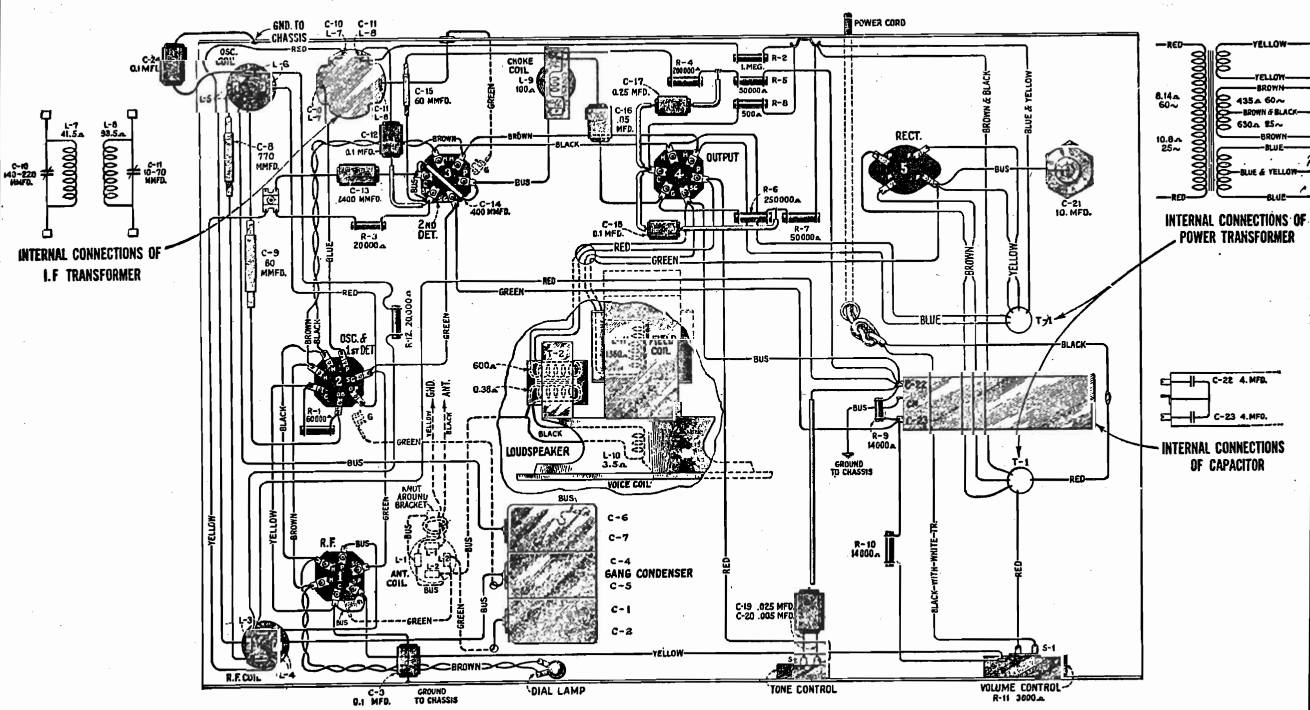


*Figure 2—Wiring Diagram—Note—Speaker is not mounted on chassis and sign lamps are connected to R. F. heater*

MODEL R-28-BWC
Voltage
Parts List

RCA-VICTOR CO., INC.

# SERVICE DATA

Voltage Rating . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .115 Volts

Frequency Rating . . . . . . . . . . .25–40 Cycles and 50–60 Cycles

Power Consumption . . . . . . . . . . . . . . . . . . . . . . . . . . .70 Watts

Number and Types of Radiotrons . . . . . . . . . . . . . . .1 UX-280, 1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7—Total, 5

Undistorted Output . . . . . . . . . . . . . . . . . . . . . . . . . . .1.75 Watts

Frequency Range . . . . . . . . . . . . . . . . .540 K. C. to 1500 K. C.

This receiver is a five-tube Super-Heterodyne incorporating a Dynamic Loudspeaker, two-point tone control, single heater type Pentode Output and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

The circuit consists of an R. F. stage, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage consisting of a transformer only using two tuned circuits, a second detector, an output tube and a rectifier.

Service work in conjunction with this receiver will be similar to that of other Super-Heterodyne receivers of the small compact type construction. The line-up adjustments are made in conjunction with an external oscillator and an output meter. The line-up capacitors on the gang capacitor are adjusted for maximum output when the oscillator is coupled to the antenna and the set and oscillator are both set at 1400 K. C. The I. F. frequency is 175 K. C. and the two circuits that comprise it are adjusted for maximum output at 175 K. C.

## RADIOTRON SOCKET VOLTAGES

### 115 Volt A. C. Line

### MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

| Radiotron No. | Cathode to Control Grid, Volts | Cathode to Screen Grid, Volts | Cathode to Plate, Volts | Plate Current, M. A. | Heater Volts |
|---|---|---|---|---|---|
| 1. RCA-58 R. F. Amplifier | 3.0 | 95 | 250 | 5.0 | 2.33 |
| 2. RCA-2A7 First Detector Oscillator | 3.0 | 95 | 250 | 3.0 | 2.33 |
| 3. RCA-57 Second Detector | 6.0 | 89 | 170 | 0.3 | 2.33 |
| 4. RCA-2A5 Power Amplifier | 18.0 | 235 | 220 | 32.0 | 2.33 |
| 5. RCA-80 Rectifier | 725 Volts PLATE TO PLATE—60 M. A. TOTAL | | | | 4.82 |
| TOTAL CATHODE CURRENT—11 M. A. | | | | | |

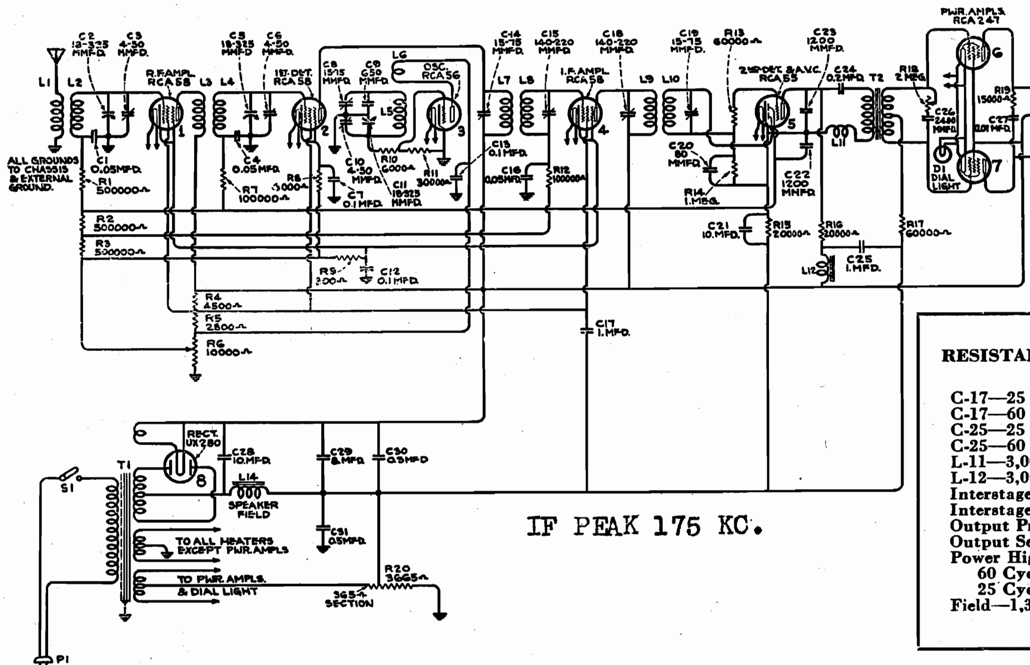
## REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.**

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | RECEIVER ASSEMBLIES | |
| 2269 | Capacitor—720 mmfd. | $0.75 |
| 2747 | Contact cap—Package of 5 | .50 |
| 3050 | Resistor—14,000 ohms—Carbon type—3 watts | .25 |
| 3076 | Resistor—1 megohm—Carbon type—½ watt—Package of 5 | 1.00 |
| 3456 | Capacitor—0.05 mfd. | .44 |
| 3459 | Capacitor—80 mmfd. | .44 |
| 3472 | Capacitor—0.0024 mfd. | .32 |
| 3514 | Resistor—250,000 ohms—Carbon type—½ watt—Package of 5 | 1.00 |
| 3555 | Capacitor—0.1 mfd. | .36 |
| 3572 | Socket—Radiotron 7 contact socket | .38 |
| 3573 | Socket—Radiotron 4 contact socket | .32 |
| 3574 | Coil—Choke coil | .68 |
| 3575 | Socket—Dial lamp socket and bracket | .34 |
| 3584 | Ring—R. F. or oscillator coil retaining ring—Package of 5 | .40 |
| 3588 | Volume control—Complete with mounting nut | 1.40 |
| 3589 | Switch—Tone control switch | .54 |
| 3593 | Screw—Chassis mounting screw—Package of 10 | .30 |
| 3594 | Resistor—50,000 ohms—Carbon type—½ watt—Package of 5 | 1.00 |
| 3596 | Capacitor—60 mmfd. | .36 |
| 3597 | Capacitor—0.25 mfd. | .40 |
| 3598 | Capacitor—0.1 mfd. | .36 |
| 3602 | Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5 | 1.00 |
| 3603 | Resistor—500 ohms—Carbon type—1 watt—Package of 5 | 1.10 |
| 3604 | Capacitor—400 mmfd. | .30 |
| 3605 | Capacitor—770 mmfd. | .30 |
| 3606 | Capacitor—Comprising one 0.005 mfd. and one .025 mfd. capacitors | .40 |
| 3623 | Shield—Antenna or R. F. Coil Shield | .30 |
| 3624 | Socket—Lamp socket and bracket—Located behind aperture wings | .40 |
| 3739 | Knob—Station selector or volume control knob—Package of 5 | $0.80 |
| 3740 | Knob—Operating switch knob—Package of 5 | .75 |
| 3741 | Escutcheon—Station selector escutcheon | .30 |
| 3742 | Screen—Ivory colored screen—Located behind front panel covering aperture "wings"—Package of 2 | .54 |
| 6228 | Resistor—200,000 ohms—Carbon type—½ watt—Package of 5 | 1.00 |
| 6303 | Resistor—20,000 ohms—Carbon type—½ watt—Package of 5 | 1.00 |
| 6306 | Resistor—14,000 ohms—Carbon type—1 watt—Package of 5 | 1.10 |
| 6464 | Transformer—I. F. transformer | 1.88 |
| 6470 | Coil—Antenna coil | 1.08 |
| 6471 | Coil—Oscillator coil assembly | .74 |
| 6472 | Coil—R. F. coil assembly | .94 |
| 6473 | Scale—Dial scale | .50 |
| 7485 | Socket—Radiotron 6 contact socket | .40 |
| 7487 | Shield—Radiotron tube shield | .25 |
| 7589 | Capacitor—Filter capacitor—Two 4. 0 mfd. in container | 1.64 |
| 7590 | Capacitor—10 mfd. | 1.40 |
| 7592 | Condenser—3 gang variable tuning condenser | 3.35 |
| 8986 | Transformer — Power transformer — 200–250 volts — 60 cycles | 4.38 |
| 9002 | Transformer—Power transformer—105–125 volts—25–50 cycles | 6.00 |
| 9025 | Transformer—Power transformer—105–125 volts—50–60 cycles | 4.26 |
| | REPRODUCER ASSEMBLIES | |
| 6467 | Transformer—Output transformer | 1.44 |
| 8987 | Cone—Reproducer cone—Package of 5 | 5.00 |
| 9004 | Coil assembly—Comprising field coil, magnet and cone support | 2.35 |

# RCA-VICTOR CO., INC.

MODEL R-73
Schematic
Chassis Wiring




**RESISTANCE AND CAPACITOR VALUES**

C-17—25 Cycles, 8.0 Mfd.
C-17—60 Cycles, 1.0 Mfd.
C-25—25 Cycles, 4.0 Mfd.
C-25—60 Cycles, 1.0 Mfd.
L-11—3,000 Ohms
L-12—3,000 Ohms
Interstage Primary—1,650 Ohms
Interstage Secondary—7,900 Ohms
Output Primary—875 Ohms
Output Secondary—0.375 Ohm
Power High Voltage—
60 Cycles, 375 Ohms
25 Cycles, 590 Ohms
Field—1,300 Ohms

*Figure 3—Schematic Circuit.*

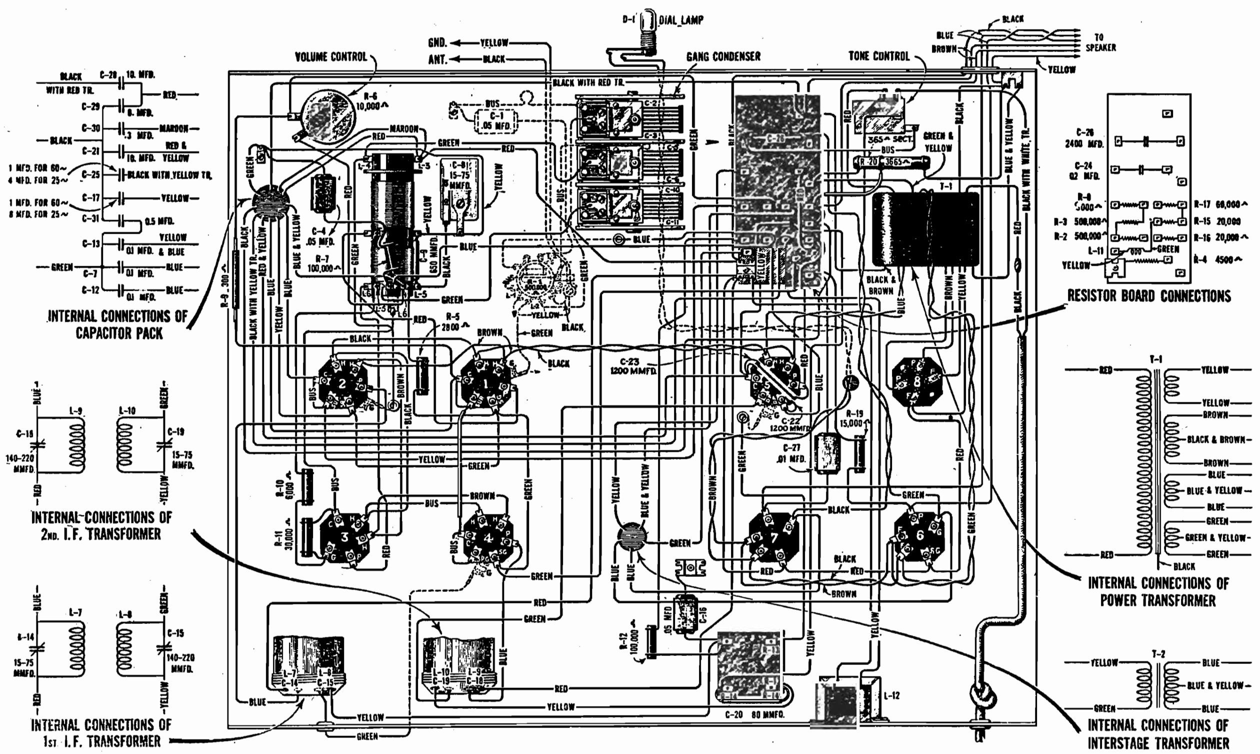



*Figure 4—Chassis Wiring Diagram*

MODEL R-73
Alignment Data
Voltage

RCA-VICTOR CO., INC.

# SERVICE DATA

## Electrical Specifications

Voltage Rating............................105–125 Volts
Power Consumption............................100 Watts
Type and Number of Radiotrons......3 RCA-58, 1 RCA-56, 1 RCA-55, 2 RCA-247, 1 UX-280—Total, 8
Type of Circuit........................Super-Heterodyne with A. V. C., tone control and push-pull Pentode Output
Undistorted Output..............................3 Watts
R. F. and Oscillator Alignment Frequency 600 K. C. and 1400 K. C.
Intermediate Frequency........................175 K. C.

This receiver is an eight tube Super-Heterodyne incorporating Automatic volume control, tone control and Push-Pull Pentode Output. Service Data will be found to be similar to that of other Super-Heterodyne receivers incorporating similar features.

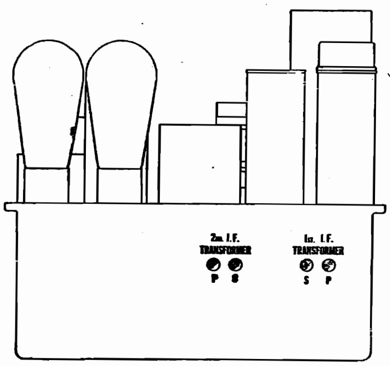



*Figure 5—I. F. Alignment Location*

## Line-up Adjustments

**I. F. Tuning Adjustments**—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from the rear of the chassis. See Figure 5 for location of the adjustment screws and proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Remove the oscillator tube and connect a ground to the chassis.

(c) Connect the oscillator output between the 1st detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a *slight deflection* is obtained in the output meter.

(d) Adjust the secondary and then the primary of the second and then the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. Adjustments.

**R. F. and Oscillator Adjustments**—The three gang capacitor screws are accessible through the bottom cover and the 600 K. C. oscillator trimmer through the top of the chassis adjacent to the R. F. coil. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

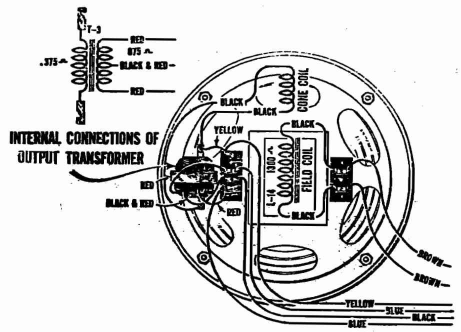



*Figure 6—Loudspeaker Wiring*

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the short line on the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) Adjust the three line-up capacitors accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.

(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, accessible through the top, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.

(e) Then realign at 1400 K. C. This completes the adjustments.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

## RADIOTRON SOCKET VOLTAGES

**120 Volts, 60 Cycles A. C. Line—V. C. At Maximum and no Signal**

| Radiotron No. | Control Grid to Filament or Cathode Volts | Screen Grid to Filament or Cathode Volts | Plate to Filament or Cathode Volts | Plate Current M. A. | Heater or Filament Volts |
|---|---|---|---|---|---|
| 1. R. F. RCA-58 | 4.5 | 100 | 165 | 6.0 | 2.37 |
| 2. 1st Det. RCA-58 | 11.0 | 95 | 155 | 1.5 | 2.37 |
| 3. Oscillator RCA-56 | — | — | 70 | 4.5 | 2.37 |
| 4. I. F. RCA-58 | 4.5 | 100 | 165 | 6.0 | 2.37 |
| 5. 2nd Det. RCA-55 and A.V.C. | — | — | 55 | 4.7 | 2.37 |
| 6. Power RCA-247 | 19.0 | 235 | 225 | 20.0 | 2.37 |
| 7. Power RCA-247 | 19.0 | 235 | 225 | 20.0 | 2.37 |

## OTHER IMPORTANT VOLTAGES

2nd Detector and A.V.C. Cathode to Low Side of Field.105 Volts
Chassis to Low Side of Field......................90 Volts
Voltage Across Field..........................120 Volts
Rectifier..370 Volts R.M.S. Each Plate—80 M.A. Each Plate

RCA-VICTOR CO., INC.

MODEL R-73
Parts List

# REPLACEMENT PARTS

(Replacement parts may be purchased from authorized Distributors or Dealers Only)

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | **RECEIVER ASSEMBLIES** | |
| 2746 | Socket—Dial lamp socket | $0.50 |
| 2747 | Cap—Contact cap—Package of 5 | .50 |
| 2749 | Capacitor—2,400 mmfd. capacitor | 1.50 |
| 3003 | Cushion—Sponge rubber chassis support cushions—Package of 4 | .50 |
| 3048 | Resistor—500,000 ohms—Carbon type—½ watt—Package of 5 | 2.50 |
| 3076 | Resistor—1 megohm—Carbon type—½ watt—Package of 5 | 2.50 |
| 3077 | Resistor—30,000 ohms—½ watt—Carbon type—Package of 5 | 2.50 |
| 3252 | Resistor—100,000 ohms—½ watt—Carbon type—Package of 5 | 2.75 |
| 3369 | Resistor—4,500 ohms—Porcelain type—20 watts | 1.00 |
| 3437 | Knob—Noise suppressor knob | .60 |
| 3449 | Coil—Choke coil mounted on resistor board | 1.12 |
| 3450 | Capacitor—0.2 mfd. mounted on resistor board | .46 |
| 3451 | Bracket—Dial lamp bracket and indicator—Package of 2 | .38 |
| 3455 | Capacitor—0.01 mfd. | .44 |
| 3456 | Capacitor—0.05 mfd. | .44 |
| 3457 | Resistor — Porcelain type — 3,665 ohms — Tapped at 365 ohms | .78 |
| 3458 | Resistor — 2,800 ohms — Carbon type — ½ watt—Package of 5 | 1.00 |
| 3459 | Capacitor—80 mmfd. capacitor | .44 |
| 3460 | Capacitor—1,200 mmfd. capacitor | .54 |
| 3468 | Resistor—300 ohms—Flexible type—Pk. of 5 | .60 |
| 6142 | Resistor—6,000 ohms—½ watt—Carbon type—Package of 5 | 2.00 |
| 6192 | Spring—3 gang tuning capacitor drive cord tension spring—Package of 10 | .50 |
| 6279 | Resistor—15,000 ohms—½ watt—Carbon type—Package of 5 | 2.50 |
| 6282 | Resistor—60,000 ohms—Carbon type—½ watt—Package of 5 | 2.50 |
| 6288 | Knob—Station selector, tone control or volume control knob—Package of 5 | 1.50 |
| 6298 | Cord—3 gang variable tuning capacitor drive cord—Package of 5 | 1.00 |
| 6300 | Socket—4 contact Radiotron socket | .55 |
| 6301 | Reactor—Filter reactor | 2.00 |
| 6303 | Resistor—20,000 ohms—½ watt—Carbon type—Package of 5 | 2.50 |
| 6308 | Coil—R. F. coil complete with mounting bracket | 1.90 |
| 6323 | Shaft—Tuning condenser drive shaft with one flat washer and 2 "C" washers—Package of 2 | .85 |
| 6367 | Transformer—First intermediate frequency transformer | 2.14 |
| 6368 | Transformer — Second intermediate frequency transformer | 2.14 |
| 6369 | Volume control—Complete with mounting nut | 1.16 |
| 6370 | Tone control—Complete with mounting nut | $1.34 |
| 7054 | Cord—Power cord | 1.00 |
| 7062 | Capacitor—Adjustable trimming capacitor—Capacity 15 to 70 mmfd. | 1.00 |
| 7065 | Screw driver—Micarta screw driver for I. F., R. F. and oscillator condensers | 1.10 |
| 7439 | Drum—Dial drum with 3 dial mounting nuts | .50 |
| 7440 | Scale—Dial and dial scale | .75 |
| 7481 | Coil—Detector and oscillator coil complete with mounting bracket | 3.50 |
| 7484 | Socket—UY type Radiotron socket | .65 |
| 7485 | Socket—6 contact Radiotron socket | .70 |
| 7510 | Shield — Radiotron tube shield — Maroon finish | .50 |
| 7511 | Shield—Radiotron tube shield top—Maroon finish | .50 |
| 7549 | Transformer—Interstage audio transformer | 2.48 |
| 7550 | Capacitor pack—Comprising two 10.0 mfd., one 8.0 mfd., one 0.3 mfd., two 1.0 mfd., one 0.5 mfd., and three 0.1 mfd. capacitors in metal container—For 60 cycle operation | 7.40 |
| 7551 | Transformer—Power transformer—105–125 volts—50–60 cycles | 6.40 |
| 7552 | Capacitor—3 gang variable tuning capacitor complete with mounting screws and washers | 4.52 |
| 7556 | Transformer—Power transformer—105–125 volts—25–50 cycles | 8.50 |
| 7564 | Capacitor pack—Comprising two 10.0 mfd., two 8.0 mfd., one 0.3 mfd., one 4.0 mfd., one 0.5 mfd. and three 0.1 mfd. capacitors in metal container—For 25 cycle operation | 7.24 |
| 7565 | Shield—Radiotron tube shield top—Red | .36 |
| 7566 | Shield—Radiotron tube shield—Red | .38 |
| | **REPRODUCER ASSEMBLIES** | |
| 3237 | Screw assembly—Comprising 4 screws, 8 nuts, 4 washers, and 4 eyelets—Package of 1 set | .50 |
| 6184 | Board—Terminal board complete with 3 terminals—Package of 5 | .50 |
| 6371 | Transformer—Output transformer | 1.90 |
| 8920 | Ring—Cone retaining ring | .50 |
| 8935 | Cone—Reproducer cone complete with voice coil—Package of 5 | 12.50 |
| 9421 | Coil assembly—Comprising field coil, magnet and cone support | 4.32 |
| | **CABINET ASSEMBLIES** | |
| 6113 | Foot—Cabinet felt foot—Package of 5 | |
| 7523 | Escutcheon—Station selector escutcheon | |
| X181 | Cabinet—Complete less equipment | |
| X182 | Baffle board and grille cloth | |

# MODEL R-75 (47s Output)
# MODEL R-75 (2A5s Output)
# Parts Lists

# RCA-VICTOR CO., INC.

## MODEL R-75

### ('47 OUTPUT TUBES)

## REPLACEMENT PARTS

(Replacement parts may be purchased from authorized Distributors or Dealers only)

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | RECEIVER ASSEMBLIES | |
| 2746 | Socket—Dial lamp socket | $0.50 |
| 2747 | Cap—Contact cap—Package of 5 | .50 |
| 2749 | Capacitor—2,400 mmfd. capacitor | 1.50 |
| 3003 | Cushion—Sponge rubber chassis support cushions—Package of 4 | .50 |
| 3048 | Resistor—500,000 ohms—Carbon type—½ watt—Package of 5 | 2.50 |
| 3076 | Resistor—1 megohm—Carbon type—½ watt—Package of 5 | 2.50 |
| 3077 | Resistor—30,000 ohms—½ watt—Carbon type—Package of 5 | 2.50 |
| 3252 | Resistor—100,000 ohms—½ watt—Carbon type—Package of 5 | 2.75 |
| 3369 | Resistor—4,500 ohms—Porcelain type—20 watts | 1.00 |
| 3437 | Knob—Noise suppressor knob | .60 |
| 3449 | Coil—Choke coil mounted on resistor board | 1.12 |
| 3450 | Capacitor—0.2 mfd. mounted on resistor board | .46 |
| 3451 | Bracket—Dial lamp bracket and indicator—Package of 2 | .38 |
| 3455 | Capacitor—0.01 mfd. | .44 |
| 3456 | Capacitor—0.05 mfd. | .44 |
| 3457 | Resistor — Porcelain type — 3,665 ohms — Tapped at 365 ohms | .78 |
| 3458 | Resistor — 2,800 ohms — Carbon type — ½ watt—Package of 5 | 1.00 |
| 3459 | Capacitor—80 mmfd. capacitor | .44 |
| 3460 | Capacitor—1,200 mmfd. capacitor | .54 |
| 3468 | Resistor—300 ohms—Flexible type—Pk. of 5 | .60 |
| 6142 | Resistor—6,000 ohms—½ watt—Carbon type—Package of 5 | 2.00 |
| 6192 | Spring—3 gang tuning capacitor drive cord tension spring—Package of 10 | .50 |
| 6279 | Resistor—15,000 ohms—½ watt—Carbon type—Package of 5 | 2.50 |
| 6282 | Resistor—60,000 ohms—Carbon type—½ watt—Package of 5 | 2.50 |
| 6288 | Knob—Station selector, tone control or volume control knob—Package of 5 | 1.50 |
| 6298 | Cord—3 gang variable tuning capacitor drive cord—Package of 5 | 1.00 |
| 6300 | Socket—4 contact Radiotron socket | .55 |
| 6301 | Reactor—Filter reactor | 2.00 |
| 6303 | Resistor—20,000 ohms—½ watt—Carbon type—Package of 5 | 2.50 |
| 6308 | Coil—R. F. coil complete with mounting bracket | 1.90 |
| 6323 | Shaft—Tuning condenser drive shaft with one flat washer and 2 "C" washers—Package of 2 | .85 |
| 6367 | Transformer—First intermediate frequency transformer | 2.14 |
| 6368 | Transformer — Second intermediate frequency transformer | 2.14 |
| 6369 | Volume or noise suppressor control—Complete with mounting nut | 1.16 |
| 6370 | Tone control—Complete with mounting nut | $1.34 |
| 7054 | Cord—Power cord | 1.00 |
| 7062 | Capacitor—Adjustable trimming capacitor—Capacity 15 to 70 mmfd. | 1.00 |
| 7065 | Screw driver—Micarta screw driver for I. F., R. F. and oscillator condensers | 1.10 |
| 7439 | Drum—Dial drum with 3 dial mounting nuts | .50 |
| 7440 | Scale—Dial and dial scale | .75 |
| 7481 | Coil—Detector and oscillator coil complete with mounting bracket | 3.50 |
| 7484 | Socket—UY type Radiotron socket | .65 |
| 7485 | Socket—6 contact Radiotron socket | .70 |
| 7510 | Shield — Radiotron tube shield — Maroon finish | .50 |
| 7511 | Shield—Radiotron tube shield top—Maroon finish | .50 |
| 7549 | Transformer—Interstage audio transformer | 2.48 |
| 7550 | Capacitor pack—Comprising two 10.0 mfd., one 8.0 mfd., one 0 3 mfd., two 1.0 mfd., one 0.5 mfd., and three 0.1 mfd. capacitors in metal container—For 60 cycle operation | 7.40 |
| 7551 | Transformer—Power transformer—105-125 volts—50-60 cycles | 6.40 |
| 7552 | Capacitor—3 gang variable tuning capacitor complete with mounting screws and washers | 4.52 |
| 7556 | Transformer—Power transformer—105-125 volts—25-50 cycles | 8.50 |
| 7564 | Capacitor pack—Comprising two 10.0 mfd., two 8.0 mfd., one 0.3 mfd., one 4.0 mfd., one 0.5 mfd. and three 0.1 mfd. capacitors in metal container—For 25 cycle operation | 7.24 |
| 7565 | Shield—Radiotron tube shield top—Red | .36 |
| 7566 | Shield—Radiotron tube shield—Red | .38 |
| | REPRODUCER ASSEMBLIES | |
| 3237 | Screw assembly—Comprising 4 screws, 8 nuts, 4 washers, and 4 eyelets—Package of 1 set | .50 |
| 6184 | Board—Terminal board complete with 3 terminals—Package of 5 | .50 |
| 6371 | Transformer—Output transformer | 1.90 |
| 8920 | Ring—Cone retaining ring | .50 |
| 8935 | Cone—Reproducer cone complete with voice coil—Package of 5 | 12.50 |
| 9421 | Coil assembly—Comprising field coil, magnet and cone support | 4.32 |
| | CABINET ASSEMBLIES | |
| 7441 | Escutcheon—Station selector escutcheon | |
| X-174 | Cabinet—Complete less equipment | |
| X-175 | Stretcher assembly—Comprising front, side, and back rails | |
| X-176 | Top—Cabinet top | |
| X-177 | Foot—Cabinet foot | |
| X-178 | Leg—Cabinet center leg | |
| X-179 | Panel—Control panel | |

## MODEL R-75

### (2A5 OUTPUT TUBES)

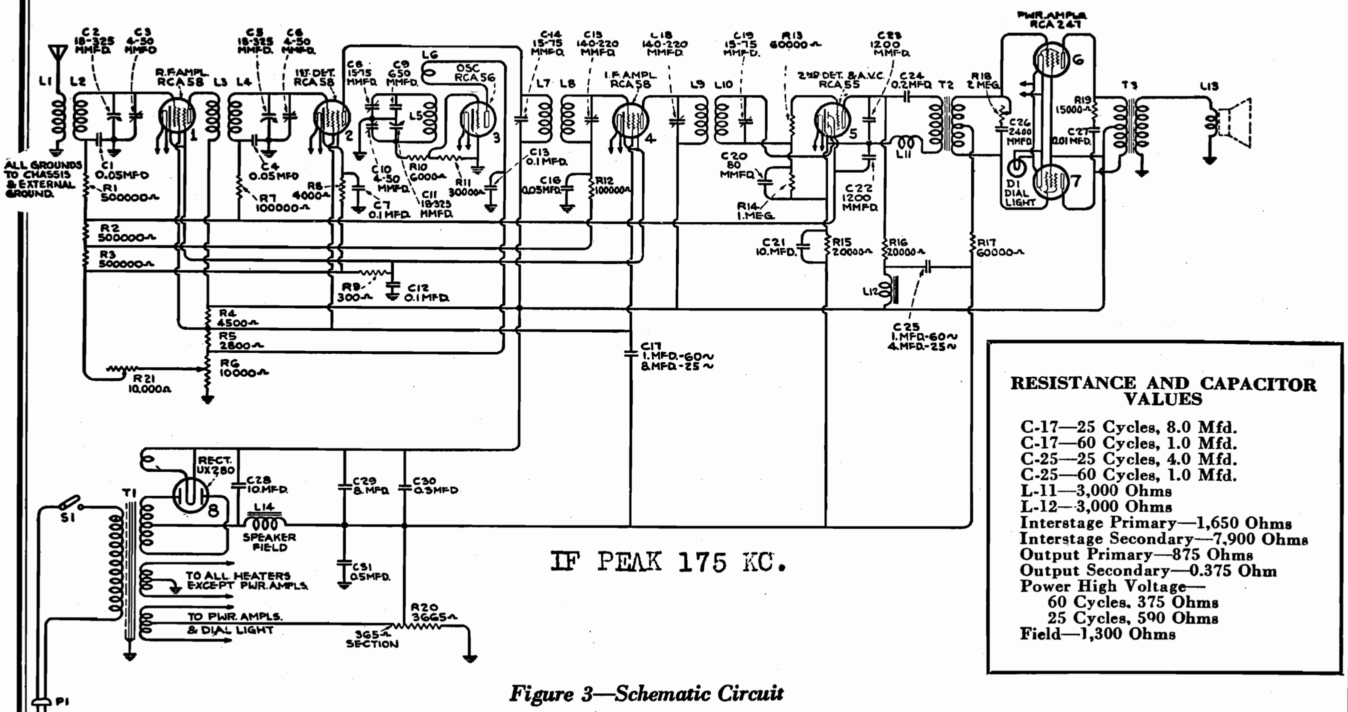
## REPLACEMENT PARTS

(Replacement parts may be purchased from authorized Distributors or Dealers Only)

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | RECEIVER ASSEMBLIES | |
| 2747 | Cap—Contact cap—Package of 5 | $0.50 |
| 3003 | Cushion—Sponge rubber chassis support cushions—Package of 4 | .50 |
| 3076 | Resistor—1 megohm—Carbon type—½ watt—Package of 5 | 2.50 |
| 3077 | Resistor—30,000 ohms—½ watt—Carbon type—Package of 5 | 2.50 |
| 3078 | Resistor—10,000 ohms—½ watt—Carbon type—Package of 5 | 2.50 |
| 3241 | Resistor—300,000 ohms—Carbon type—½ watt—Package of 5 | 2.50 |
| 3252 | Resistor—100,000 ohms—½ watt—Carbon type—Package of 5 | 2.75 |
| 3449 | Coil—Choke coil mounted on resistor board | 1.12 |
| 3450 | Capacitor—0.2 mfd. | .46 |
| 3451 | Bracket—Dial lamp bracket and indicator—Package of 2 | .38 |
| 3455 | Capacitor—0.01 mfd. | .44 |
| 3453 | Resistor — 2,800 ohms — Carbon type — ½ watt—Package of 5 | 1.00 |
| 3460 | Capacitor—1200 mmfd. | .54 |
| 3472 | Capacitor—0.0024 mfd. | .32 |
| 3548 | Knob—Noise suppressor knob | .24 |
| 3549 | Capacitor—400 mmfd. | .34 |
| 3550 | Resistor—370 ohms—Flexible type—Package of 5 | .80 |
| 3556 | Capacitor—0.05 mfd. | .34 |
| 3565 | Socket—Dial lamp socket | .50 |
| 6142 | Resistor—6,000 ohms—½ watt—Carbon type—Package of 5 | 2.00 |
| 6188 | Resistor — 2 megohm — Carbon type — ½ watt—Package of 5 | 2.00 |
| 6192 | Spring—3 gang tuning capacitor drive cord tension spring—Package of 10 | .50 |
| 6250 | Resistor — 4,000 ohms — Carbon type — ½ watt—Package of 5 | 2.00 |
| 6279 | Resistor—15,000 ohms—½ watt—Carbon type—Package of 5 | 2.50 |
| 6282 | Resistor—60,000 ohms—Carbon type—½ watt—Package of 5 | 2.50 |
| 6288 | Knob—Station selector, tone control or volume control knob—Package of 5 | 1.50 |
| 6298 | Cord—3 gang variable tuning capacitor drive cord—Package of 5 | 1.00 |
| 6300 | Socket—4 contact Radiotron socket | .55 |
| 6303 | Resistor—20,000 ohms—½ watt—Carbon type—Package of 5 | 2.50 |
| 6312 | Capacitor—650 mmfd.—Located on detector oscillator coil—Package of 5 | 2.50 |
| 6318 | Resistor—10,000 ohms—Porcelain type—20 watt | 1.00 |
| 6323 | Shaft—Tuning condenser drive shaft with one flat washer and 2 "C" washers—Package of 2 | $0.85 |
| 6367 | Transformer—First intermediate frequency transformer | 2.14 |
| 6368 | Transformer—Second intermediate frequency transformer | 2.14 |
| 6370 | Tone control—Complete with mounting nut | 1.34 |
| 6452 | Volume control—Complete with mounting nut | 1.40 |
| 6453 | Rheostat—Noise suppressor rheostat | 1.10 |
| 6454 | Coil—R. F. coil complete with mounting bracket | .90 |
| 7054 | Cord—Power cord | 1.00 |
| 7062 | Capacitor—Adjustable trimming capacitor—Capacity 15 to 70 mmfd. | 1.00 |
| 7065 | Screw driver—Micarta screw driver for I. F., R. F., and oscillator condensers | 1.10 |
| 7439 | Drum—Dial drum with 3 dial mounting nuts | .50 |
| 7440 | Scale—Dial and dial scale | .75 |
| 7481 | Coil—Detector and oscillator coil complete with mounting bracket | 3.50 |
| 7484 | Socket—UY type Radiotron socket | .65 |
| 7485 | Socket—6 contact Radiotron socket | .70 |
| 7501 | Capacitor—3 gang variable tuning capacitor complete with mounting screws and washers | 5.20 |
| 7549 | Transformer—Interstage audio transformer | 2.48 |
| 7582 | Capacitor pack—Comprising two 10.0 mfd., one 8.0 mfd., two 1.0 mfd., and three 0.1 mfd. capacitors in metal container—For 60 cycle operation | 8.06 |
| 7583 | Capacitor pack—Comprising two 10.0 mfd., two 8.0 mfd., one 4.0 mfd., capacitors in metal container—For 25 cycle operation | 10.00 |
| 7584 | Transformer—Power transformer 105-125 volts—50-60 cycles | 5.72 |
| 7585 | Transformer—Power transformer—105-125 volts—25-50 cycles | 9.86 |
| 7586 | Transformer—Power transformer 200-250 volts—50-60 cycles | 5.88 |
| | REPRODUCER ASSEMBLIES | |
| 3237 | Screw assembly—Comprising 4 screws, 8 nuts, 4 washers, and 4 eyelets | .50 |
| 6184 | Board—Terminal board complete with 3 terminals | .50 |
| 6455 | Transformer—Output transformer | 1.95 |
| 8920 | Ring—Cone retaining ring | .50 |
| 8969 | Cone—Reproducer cone complete with voice coil | 6.35 |
| 9421 | Coil assembly—Comprising field coil, magnet, and cone support | 4.32 |

# RCA-VICTOR CO., INC.

**MODEL R-75 (47s Output)**
Schematic
Chassis Wiring




## RESISTANCE AND CAPACITOR VALUES

C-17—25 Cycles, 8.0 Mfd.
C-17—60 Cycles, 1.0 Mfd.
C-25—25 Cycles, 4.0 Mfd.
C-25—60 Cycles, 1.0 Mfd.
L-11—3,000 Ohms
L-12—3,000 Ohms
Interstage Primary—1,650 Ohms
Interstage Secondary—7,900 Ohms
Output Primary—875 Ohms
Output Secondary—0.375 Ohm
Power High Voltage—
60 Cycles, 375 Ohms
25 Cycles, 590 Ohms
Field—1,300 Ohms

*Figure 3—Schematic Circuit*

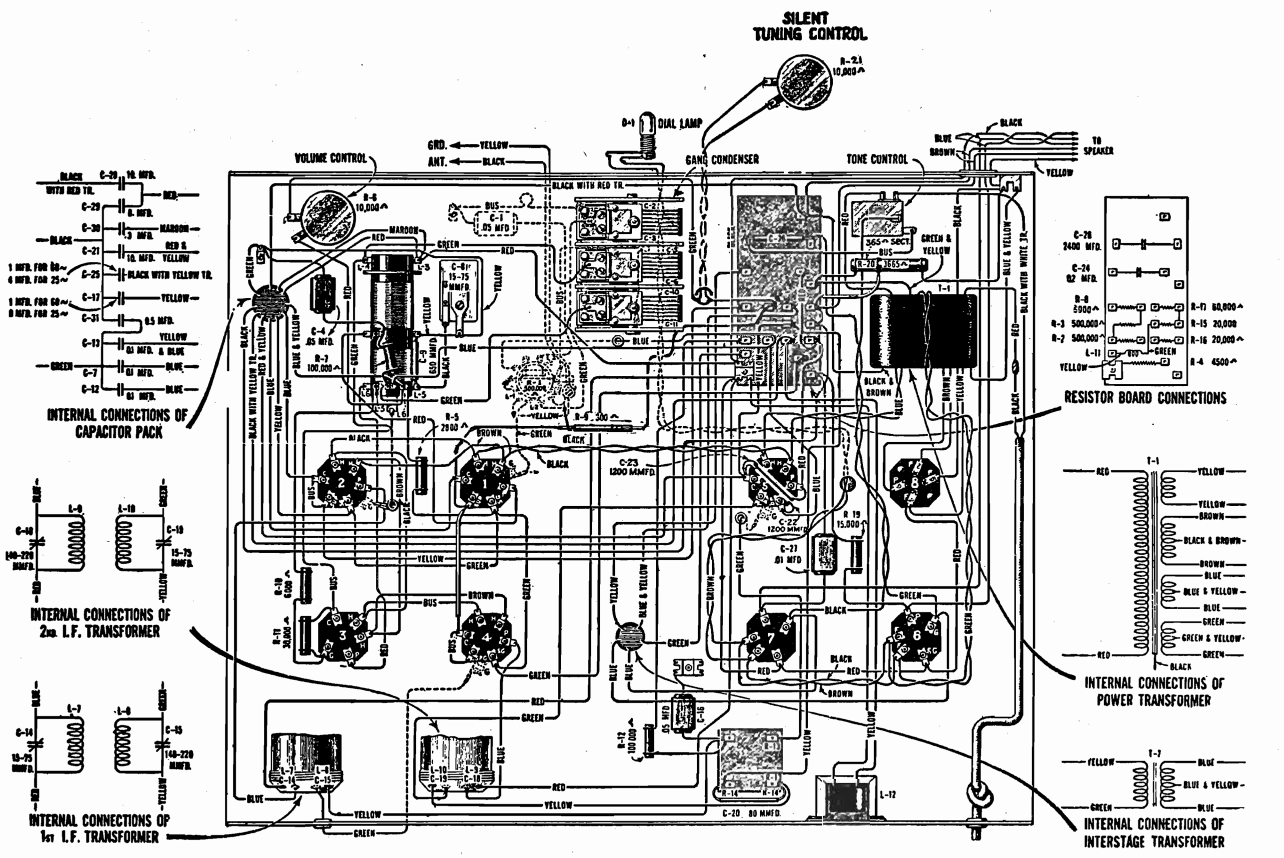



*Figure 4—Chassis Wiring Diagram*

MODEL R-75 (47s Output)
Alignment Data
Voltage

RCA-VICTOR CO., INC.

# SERVICE DATA

## Electrical Specifications

Voltage Rating........................105–125 Volts
Power Consumption........................100 Watts
Type and Number of Radiotrons......3 RCA-58, 1 RCA-56, 1 RCA-55, 2 RCA-247, 1 UX-280—Total, 8
Type of Circuit........................Super-Heterodyne with A. V. C., tone control and push-pull Pentode Output
Undistorted Output........................3 Watts
R. F. and Oscillator Alignment Frequency 600 K. C. and 1400 K. C.
Intermediate Frequency....................175 K. C.

This receiver is an eight tube Super-Heterodyne incorporating Automatic volume control, tone control and Push-Pull Pentode Output. Service Data will be found to be similar to that of other Super-Heterodyne receivers incorporating similar features.

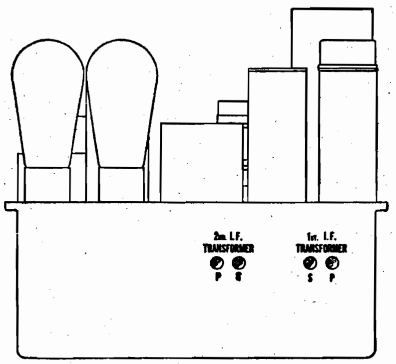



*Figure 5—I. F. Alignment Location*

## Line-up Adjustments

**I. F. Tuning Adjustments**—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from the rear of the chassis. See Figure 5 for location of the adjustment screws and proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Remove the oscillator tube and connect a ground to the chassis.

(c) Connect the oscillator output between the 1st detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a *slight deflection* is obtained in the output meter.

(d) Adjust the secondary and then the primary of the second and then the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. Adjustments.

**R. F. and Oscillator Adjustments**—The three gang capacitor screws are accessible through the bottom cover and the 600 K. C. oscillator trimmer through the top of the chassis adjacent to the R. F. coil. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

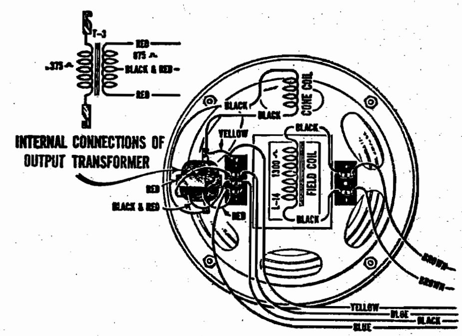



*Figure 6—Loudspeaker Wiring*

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the short line on the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) Adjust the three line-up capacitors accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.

(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, accessible through the top, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.

(e) Then realign at 1400 K. C. This completes the adjustments.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

## RADIOTRON SOCKET VOLTAGES

**120 Volts, 60 Cycles A. C. Line—V. C. At Maximum and No Signal**

| Radiotron No. | Control Grid to Filament or Cathode Volts | Screen Grid to Filament or Cathode Volts | Plate to Filament or Cathode Volts | Plate Current M. A. | Heater or Filament Volts |
|---|---|---|---|---|---|
| 1. R. F. RCA-58 | 4.5 | 100 | 165 | 6.0 | 2.37 |
| 2. 1st Det. RCA-58 | 11.0 | 95 | 155 | 1.5 | 2.37 |
| 3. Oscillator RCA-56 | — | — | 70 | 4.5 | 2.37 |
| 4. I. F. RCA-58 | 4.5 | 100 | 165 | 6.0 | 2.37 |
| 5. 2nd Det. RCA-55 and A.V.C. | — | — | 55 | 4.7 | 2.37 |
| 6. Power RCA-247 | 19.0 | 235 | 225 | 20.0 | 2.37 |
| 7. Power RCA-247 | 19.0 | 235 | 225 | 20.0 | 2.37 |

## OTHER IMPORTANT VOLTAGES

2nd Detector and A.V.C. Cathode to Low Side of Field.105 Volts
Chassis to Low Side of Field....................90 Volts
Voltage Across Field..........................120 Volts
Rectifier..370 Volts R.M.S. Each Plate—80 M.A. Each Plate

# RCA-VICTOR CO., INC.

## MODEL R-75 (2A5s Output)
## Schematic
## Chassis Wiring

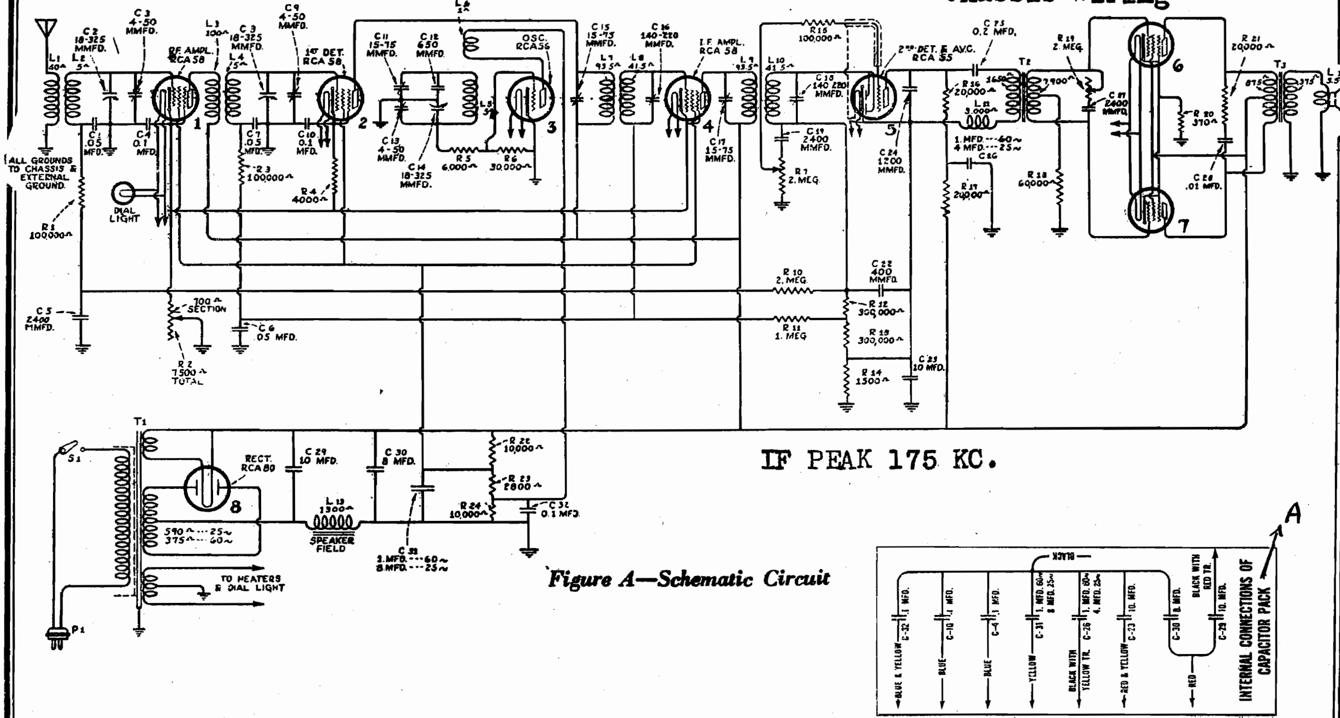



*Figure A—Schematic Circuit*

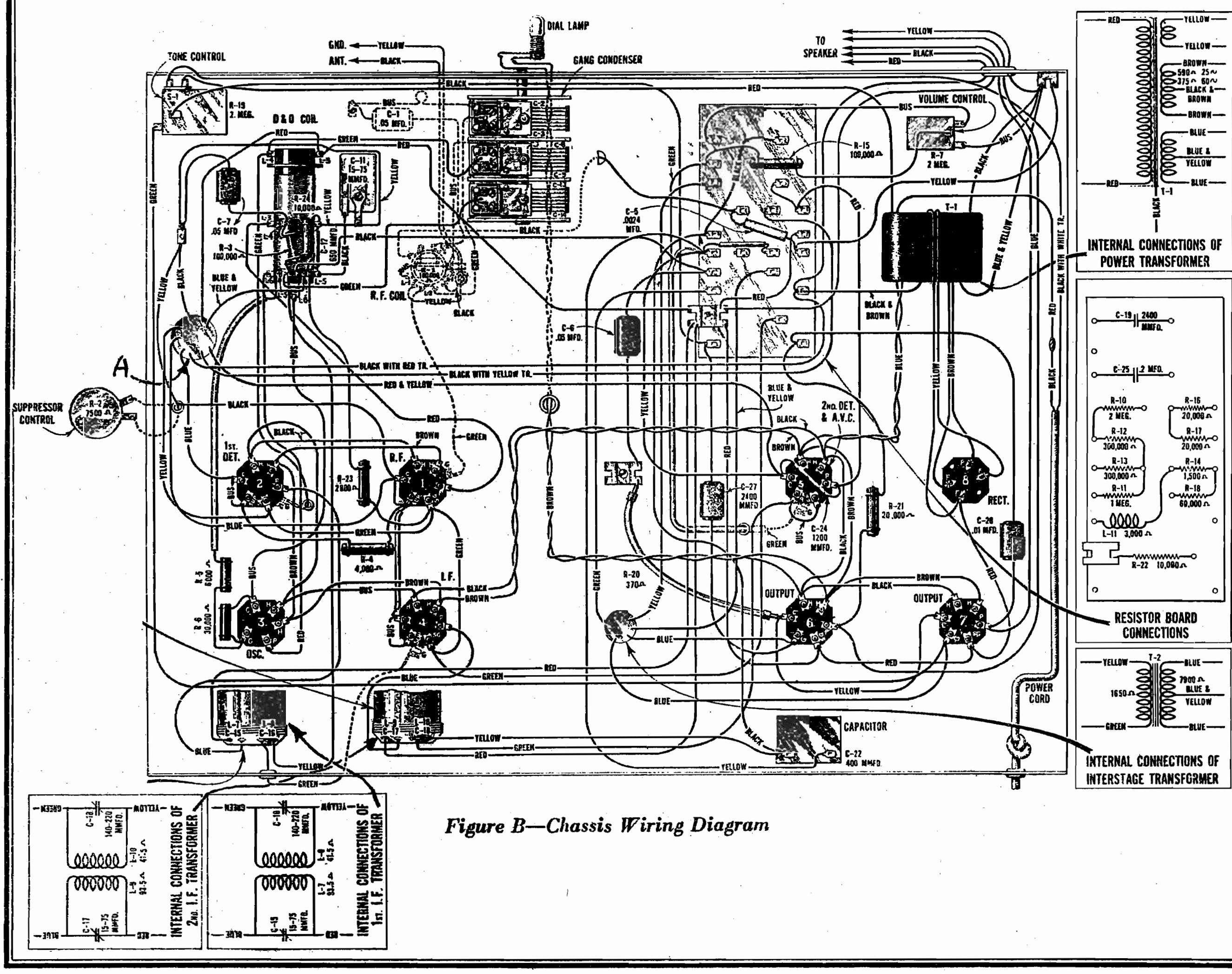



*Figure B—Chassis Wiring Diagram*

RCA-VICTOR CO., INC.

# SERVICE DATA

## Electrical Specifications

Voltage Rating.........................105–125 Volts
Power Consumption........................100 Watts
Type and Number of Radiotrons..3 RCA-58, 1 RCA-56, 1 RCA-55, 2 RCA-2A5, 1 UX-280—Total, 8
Type of Circuit..Super-Heterodyne with A.V.C., tone control and push-pull Universal Output Tubes
Undistorted Output..........................3 Watts
R. F. and Oscillator Alignment Frequency 600 K. C., and 1400 K. C.
Intermediate Frequency.....................175 K. C.

This receiver is an eight tube Super-Heterodyne incorporating Automatic volume control, tone control and Universal Output tubes operated as a push-pull pentode stage. Service Data will be found to be similar to that of other Super-Heterodyne receivers incorporating similar features.

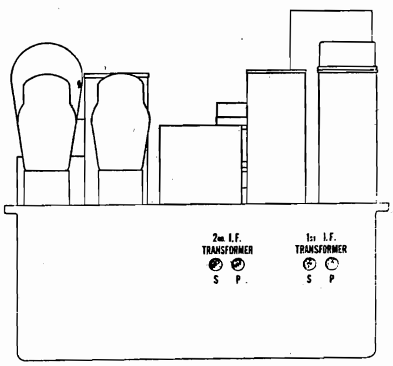



*Figure C—I. F. Alignment Location*

## Line-up Adjustments

**I. F. Tuning Adjustments**—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 175 K. C., and the adjustment screws are accessible from the rear of the chassis. See Figure C for location of the adjustment screws and proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 7065 and an output meter.

(b) Remove the oscillator tube and connect a ground to the chassis.

(c) Connect the oscillator output between the 1st detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the secondary and then the primary of the second and then the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. Adjustments.

**R. F. and Oscillator Adjustments**—The three gang capacitor screws are accessible through the bottom cover and the 600 K. C. oscillator trimmer through the top of the chassis adjacent to the R. F. coil. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screwdriver such as Stock No. 7065 and an output meter.

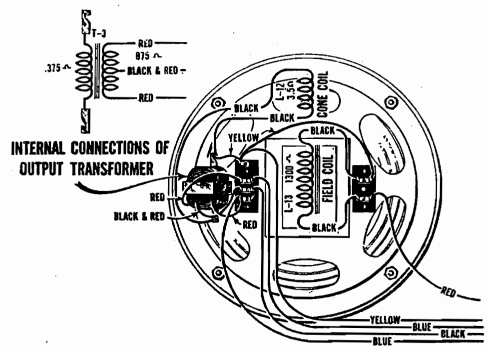



*Figure D—Loudspeaker Wiring*

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the short line on the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) Adjust the three line-up capacitors, accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.

(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, accessible through the top, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.

(e) Then realign at 1400 K. C. This completes the adjustments.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

## RADIOTRON SOCKET VOLTAGES

**120 Volts, 60 Cycles A. C. Line—V. C. at Maximum and No Signal**

| Radiotron No. | Control Grid to Cathode, Volts | Screen Grid to Filament or Cathode, Volts | Plate to Filament or Cathode, Volts | Plate Current, M. A. | Heater or Filament, Volts |
|---|---|---|---|---|---|
| 1. R. F. RCA-58 | 4.0 | 100 | 240 | 6.0 | 2.4 |
| 2. 1st Det. RCA-58 | 10.0 | 90 | 230 | 2.0 | 2.4 |
| 3. Osc. RCA-56 | — | — | 75 | 4.5 | 2.4 |
| 4. I. F. RCA-58 | 4.0 | 100 | 240 | 6.0 | 2.4 |
| 5. 2nd Det. RCA-55 and A.V.C. | 5.8 | — | 100 | 4.0 | 2.4 |
| 6. PWR. RCA-2A5 | 19.0 | 230 | 220 | 20.0 | 2.4 |
| 7. PWR. RCA-2A5 | 19.0 | 230 | 220 | 20.0 | 2.4 |

Rectifier—370 Volts R.M.S. Each Plate

RCA-VICTOR CO., INC.

MODEL 91-B
Schematic
Chassis Wiring

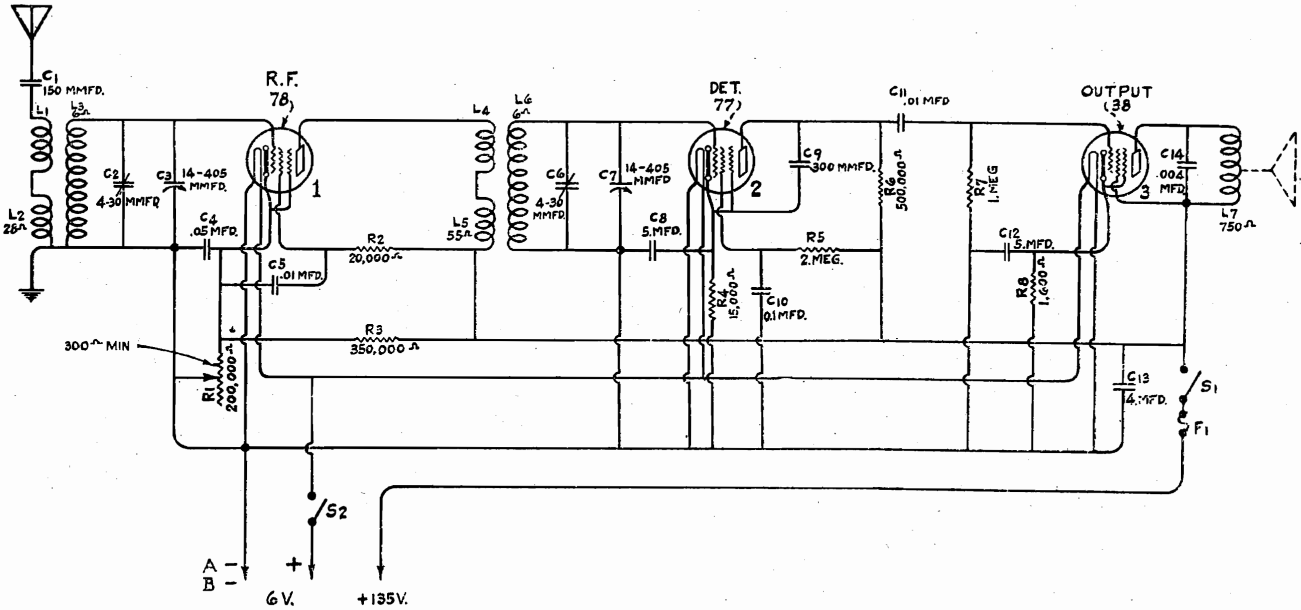



*Figure A—Schematic Circuit Diagram*

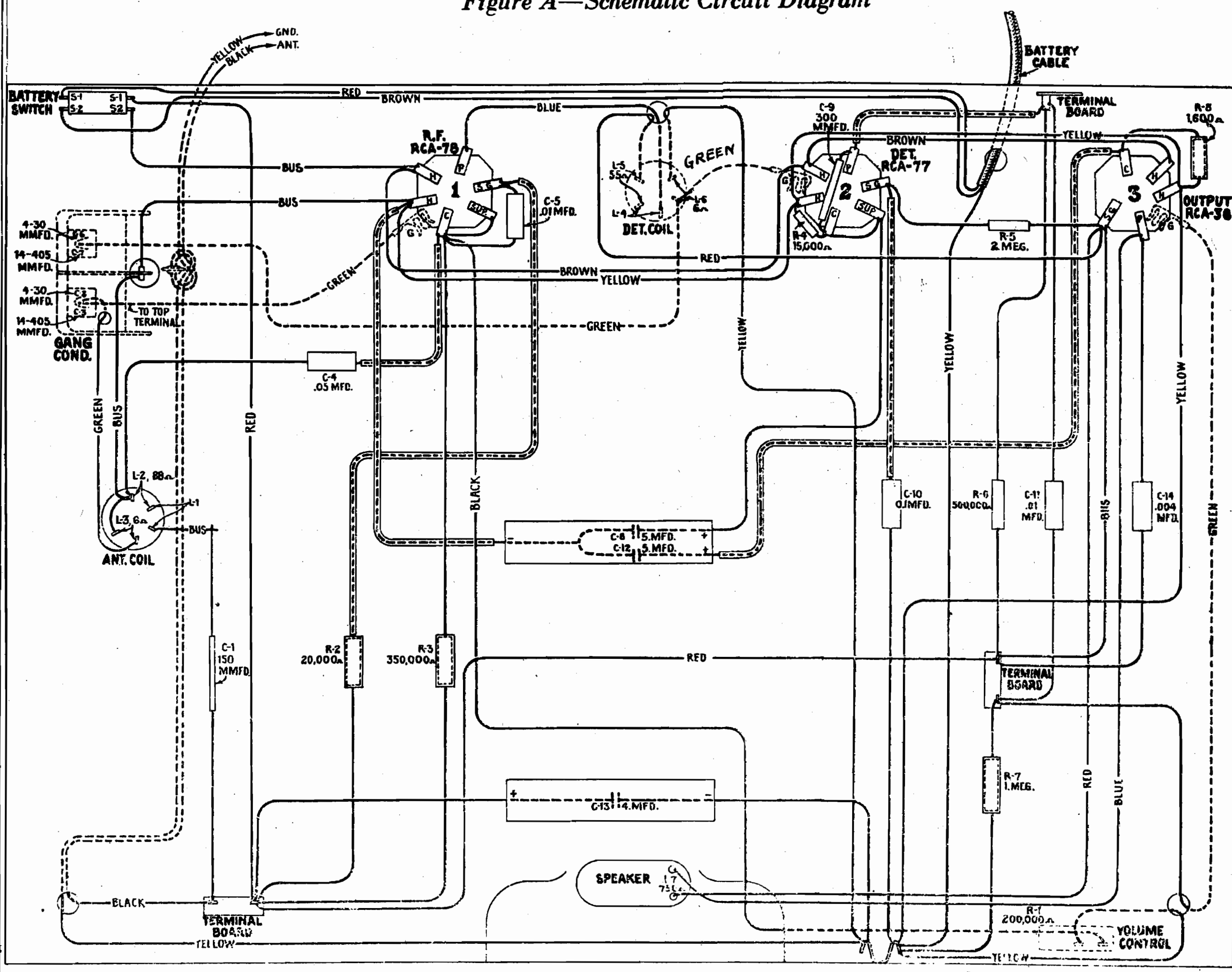



*Figure B—Wiring Diagram*

MODEL 91-B
Capacitor Adjustment
Voltage
Parts List

RCA-VICTOR CO., INC.

# SERVICE DATA

"A" Battery Required............Six-Volt Storage Battery
"B" Battery Required...............Three 45-Volt Blocks
"A" Current....................................0.9 Ampere
"B" Current............... (Maximum Volume) 18 M. A / (Minimum Volume) 9 M. A.
Type and Number of Radiotrons
1 RCA-78, 1 RCA-77, 1 RCA-38, Total 3
Undistorted Output..............................0.2 Watts
Tuning Range.........................540–1712 K. C.
Type of Loudspeaker...........................Magnetic

This battery type tuned R. F. receiver incorporates excellent performance in conjunction with minimum cost and up-keep requirements. Service work consists principally of replacements and line-up adjustments. The proper method of aligning the receiver follows.

## R. F. Line-up Capacitor Adjustments

Two adjustable capacitors are provided for adjusting the R. F. circuits to maximum electrical alignment. In order to properly adjust the capacitors, a Stock No. 9050 Test Oscillator and 7065 adjustment screwdriver are required. Also an output meter should be connected across or in place of the loudspeaker winding. Proceed as follows:

(A) Place the oscillator in operation at 1400 K. C. and connect its output to the antenna and ground of the receiver. Connect the output meter and place the receiver in operation.

(B) Tune in the signal from the oscillator and adjust the volume control and oscillator output until a deflection is obtained in the output meter. Adjust each trimmer until maximum output is obtained. The proper adjustment is when a minimum value of trimmer capacity is used. Readjusting the dial may be necessary to arrive at such a condition. Then slightly reduce the setting of the detector trimmer by turning it clockwise. This compensates for a slight increase in the capacity of this circuit that occurs when the chassis is returned to its case. A little experimenting will disclose the proper amount of this reduction.

# RADIOTRON SOCKET VOLTAGES

## Maximum Volume Control Setting

| Radiotron No. | Cathode to Control Grid, Volts | Cathode to Screen Grid, Volts | Cathode to Plate, Volts | Plate Current, M. A. | Filament or Heater, Volts |
|---|---|---|---|---|---|
| 1. RCA-78 R. F. | 2.5 | 95 | 132.5 | 7.0 | 6.0 |
| 2. RCA-77 Detector | 2.5* | 27* | 50* | 0.135 | 6.0 |
| 3. RCA-38 Output | 12.0 | 123 | 115 | 7.5 | 6.0 |

* Cannot be measured with ordinary voltmeter.

# REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.**

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | RECEIVER ASSEMBLIES | |
| 3546 | Capacitor—150 mmfd. (C1) | $0.32 |
| 3560 | Resistor—1,600 ohms—Carbon type—½ watt (R8)—Package of 5 | 1.00 |
| 3602 | Resistor—60,000 ohms—Carbon type—¼ watt (R7)—Package of 5 | 1.00 |
| 3640 | Capacitor—0.05 mfd. (C4) | .25 |
| 3701 | Capacitor—0.01 mfd. (C5, C11) | .30 |
| 3748 | Fuse—0.5 ampere (F1)—Package of 5 | .40 |
| 3848 | Capacitor—300 mmfd. (C9) | .30 |
| 3860 | Socket—5-contact Radiotron socket | .32 |
| 3877 | Capacitor—0.1 mfd. (C10) | .32 |
| 3998 | Resistor—15,000 ohms—Carbon type—¼ watt (R4)—Package of 5 | 1.00 |
| 4070 | Capacitor—0.004 mfd. (C14) | .42 |
| 4073 | Resistor—350,000 ohms—Carbon type—½ watt (R3)—Package of 5 | 1.00 |
| 4076 | Escutcheon—Volume control escutcheon—Package of 2 | .26 |
| 4077 | Escutcheon—Station selector escutcheon—Package of 2 | .26 |
| 4078 | Knob—Station selector knob—Package of 5 | .76 |
| 4079 | Foot—Rubber foot—Package of 4 | .22 |
| 4096 | Knob—Volume control knob—Package of 5 | .75 |
| 4097 | Switch—Operating switch—Double pole—Single throw (S1, S2) | .94 |
| 6114 | Resistor—20,000 ohms—Carbon type—1 watt (R2)—Package of 5 | $1.10 |
| 6186 | Resistor—500,000 ohms—Carbon type—¼ watt (R6)—Package of 5 | 1.00 |
| 6242 | Resistor—2 megohms—Carbon type—¼ watt (R5)—Package of 5 | 1.00 |
| 6516 | Connector—Fuse connector | .16 |
| 6820 | Coil—Antenna coil (L1, L2, L3) | .86 |
| 6821 | Coil—Detector coil (L4, L5, L6) | .96 |
| 6822 | Condenser—2-gang variable tuning condenser (C2, C3, C6, C7) | 2.34 |
| 6829 | Volume control (R1) | 1.05 |
| 6830 | Cable—Battery cable | 1.12 |
| 6831 | Capacitor—Two 5.0 mfd. (C8, C12) | .94 |
| 6832 | Capacitor—4.0 mfd. (C13) | .85 |
| 7485 | Socket—6-contact Radiotron socket | .40 |
| | REPRODUCER ASSEMBLIES | |
| 7712 | Support—Cone support | .50 |
| 7713 | Mechanism—Speaker mechanism complete (L7) | 3.72 |
| 9470 | Reproducer—Complete | 4.62 |
| 9471 | Cone—Speaker cone—Package of 5 | 3.50 |

MODEL R-92 Recorder
Schematic
Voltage

RCA-VICTOR CO., INC.

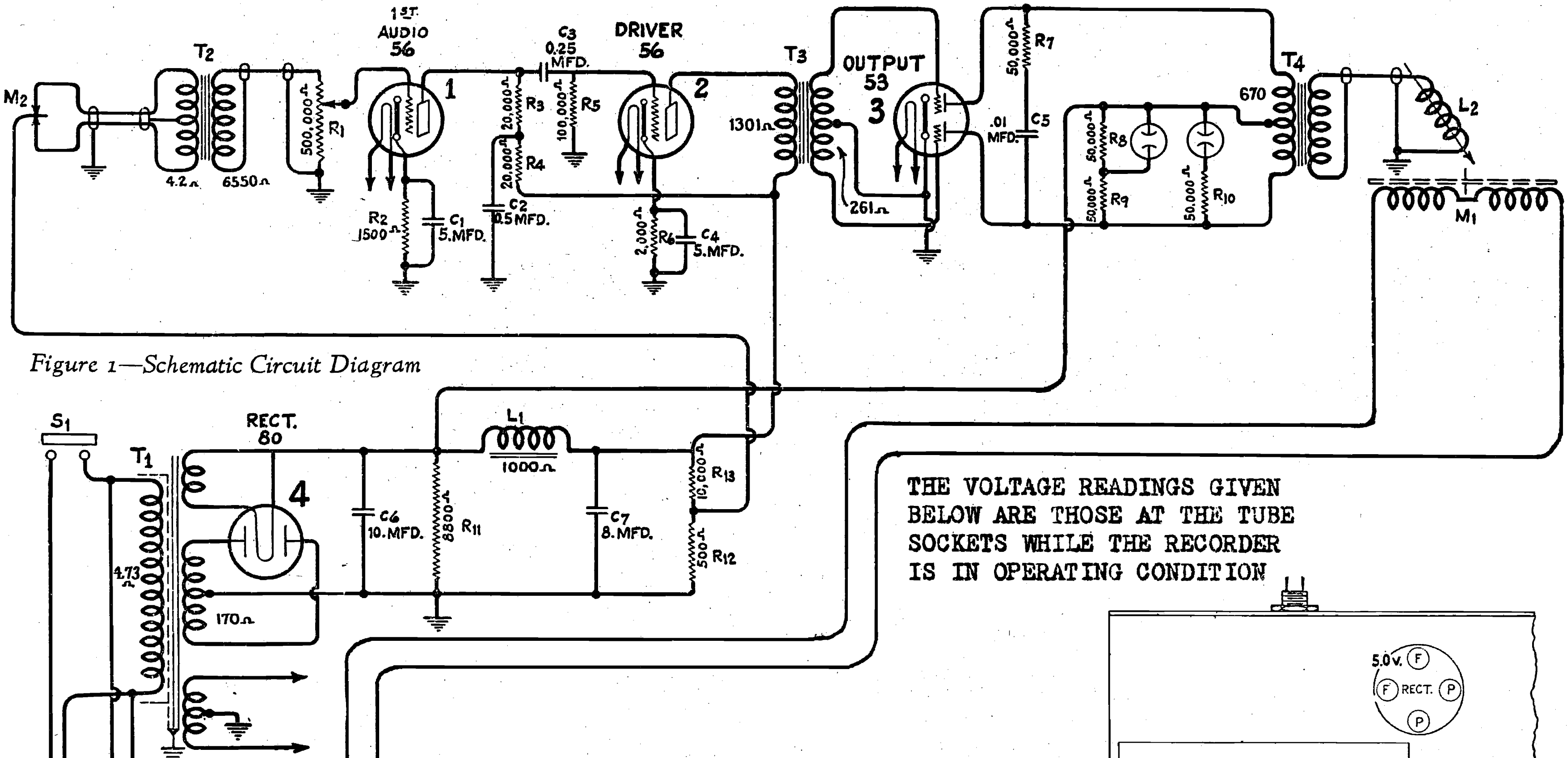



Figure 1—Schematic Circuit Diagram

THE VOLTAGE READINGS GIVEN BELOW ARE THOSE AT THE TUBE SOCKETS WHILE THE RECORDER IS IN OPERATING CONDITION

## RADIOTRON SOCKET VOLTAGES

| Radiotron No. | Cathode to Ground, Volts | Plate to Ground, Volts | Plate Current, M. A. | Heater Volts |
|---|---|---|---|---|
| RCA-56—1st A. F. | 5.0 | 100* | 3.8 | 2.5 |
| RCA-56—2nd A. F. | 11.5 | 245 | 5.0 | 2.5 |
| RCA-53—Power | — | 285 | 30.0 | 2.5 |
| RCA-80—Rectifier | Total Rectified Voltage—290 Volts | | | 5.0 |

*Calculated—High Resistance Circuit.

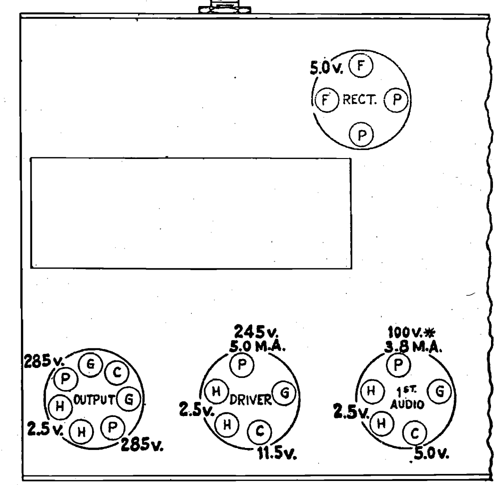



Figure 3—Voltage Readings at Radiotron Sockets

# MODEL R-92 Recorder
## Chassis Wiring

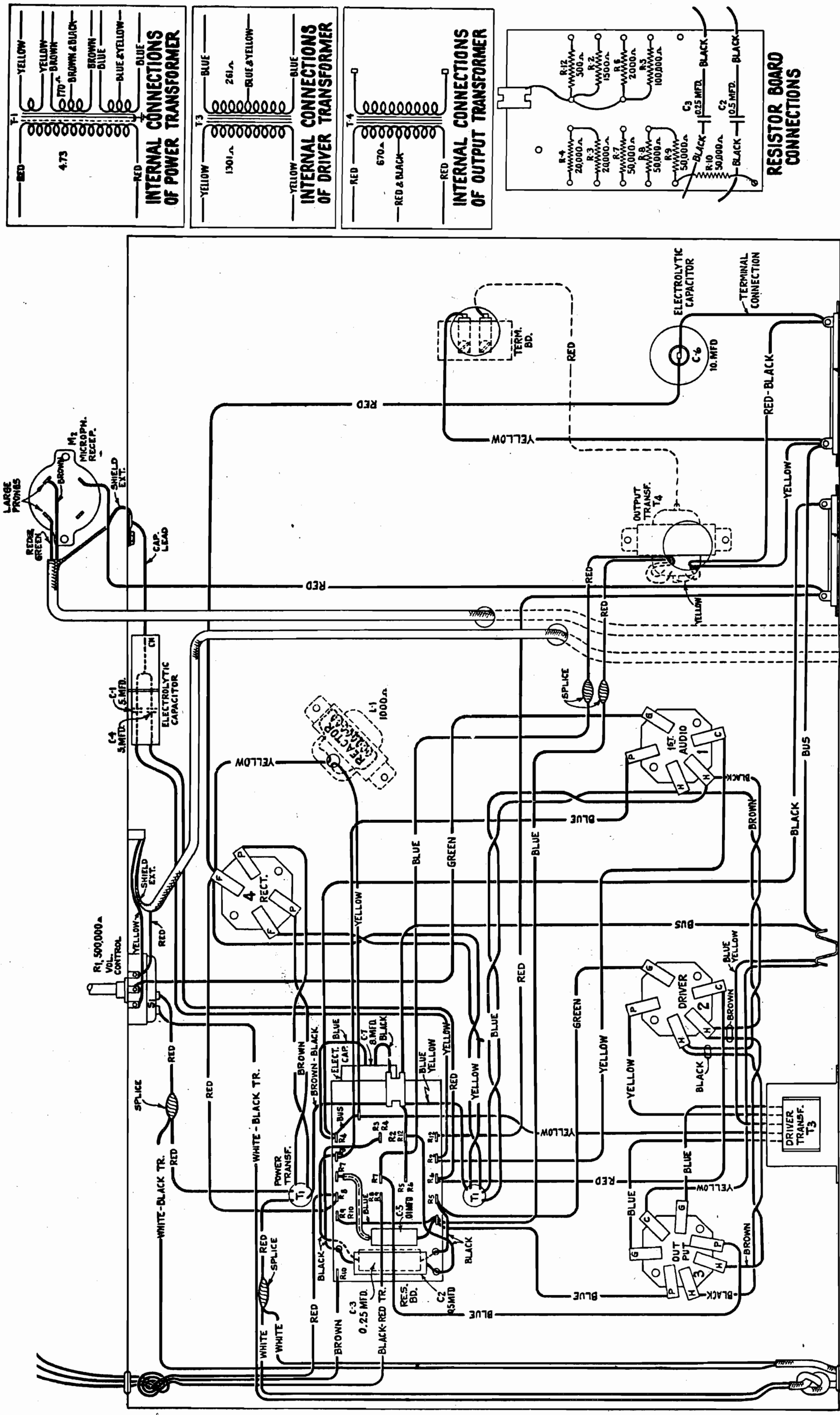



*Figure 2—Wiring Diagram*

RCA-VICTOR CO., INC.

# RCA VICTOR MODEL R-92

## STORE RECORDER

## SERVICE DATA

Except for the replacement of defective Radiotrons, very little service work will be required in conjunction with this instrument. Figure 1 shows the schematic circuit diagram, Figure 2 the wiring diagram, and Figure 3 the various socket voltages. Figure 4 shows the assembly wiring diagram.

### Service Data on Magnetic Pickup

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

### Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or the hardened pivot rubbers (see Figure 6), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

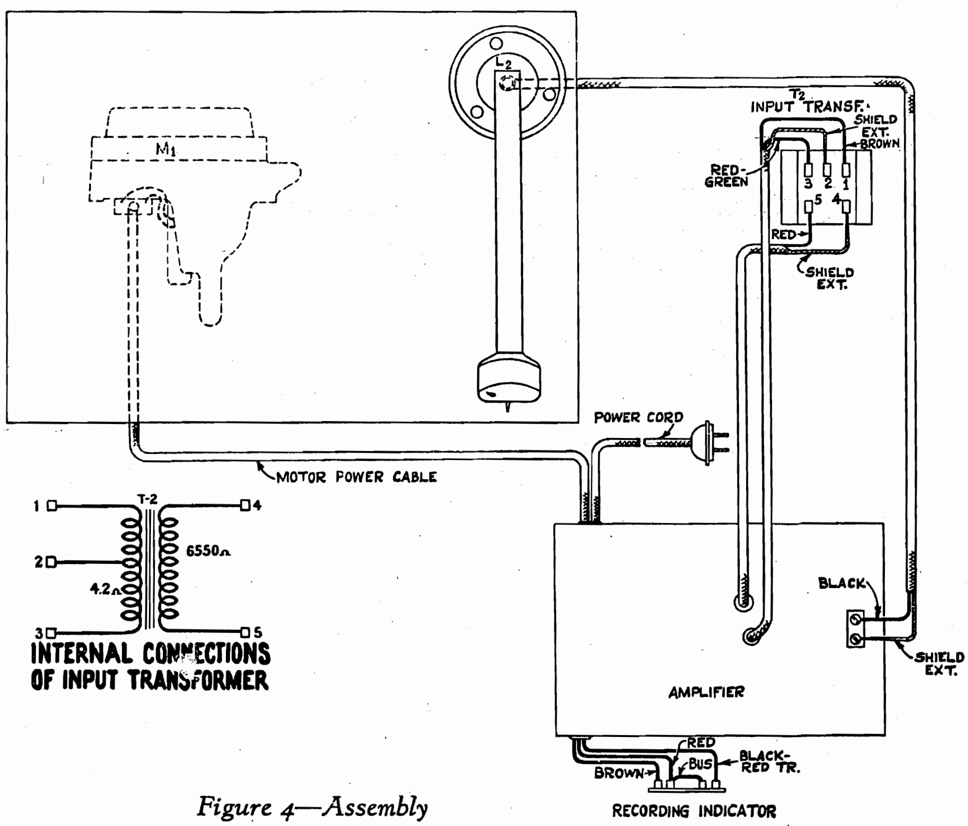



*Figure 4—Assembly*

**MODEL R-92 Recorder**
**Pickup Adjustments**
**Parts List**

**RCA-VICTOR CO., INC.**

(d) Remove screws A and B, Figure 6, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

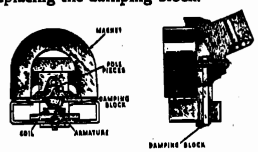



*Figure 5*

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure 6), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be .009" on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

**(4) Replacing the Damping Block**

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

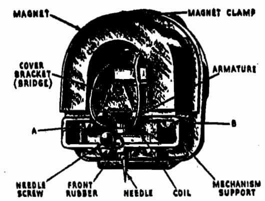



*Figure 6*

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure 7, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly

*Figure 7*

called acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the air gap as explained under (h).

## REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | Description | List Price |
|---|---|---|
| | AMPLIFIER ASSEMBLIES | |
| 3787 | Capacitor—0.01 mfd. (C5) | $0.30 |
| 6648 | Capacitor—0.25 mfd. (C3) | .42 |
| 3772 | Capacitor—0.5 mfd. (C2) | .32 |
| 4498 | Capacitor—8.0 mfd. (C7) | 1.25 |
| 7590 | Capacitor—10.0 mfd. (C6) | 1.40 |
| 3787 | Capacitor pack—Comprising two 5.0 mfd. (C1, C4) | .94 |
| 6552 | Reactor—Filter reactor (L1) | 1.04 |
| 3114 | Resistor—500,000 ohms—Carbon type—¼ watt (R8, R9, R10)—Package of 5 | 1.00 |
| 4396 | Resistor—500 ohms—Carbon type—½ watt (R12)—Package of 10 | 2.00 |
| 3047 | Resistor — 1500 ohms — Carbon type — ½ watt (R2)—Package of 5 | 1.00 |
| 3526 | Resistor — 2000 ohms — Carbon type — ½ watt (R6)—Package of 5 | 1.00 |
| 6303 | Resistor—20,000 ohms—Carbon type—½ watt (R3, R4)—Package of 5 | 1.00 |
| 3594 | Resistor—50,000 ohms—Carbon type—½ watt (R7)—Package of 5 | 1.00 |
| 3252 | Resistor—100,000 ohms—Carbon type—½ watt (R5)—Package of 5 | 1.00 |
| 4398 | Resistor—10,000 ohms—6.5 watts (R13) | .74 |
| 4400 | Resistor—8800 ohms—10.5 watts (R11) | .68 |
| 4399 | Socket—4-contact socket | .44 |
| 6300 | Socket—4-contact Radiotron socket | .35 |
| 7484 | Socket—5-contact Radiotron socket | .35 |
| 3719 | Socket—7-contact Radiotron socket | .35 |
| 6551 | Transformer—Driver transformer (T3) | 1.48 |
| 6556 | Transformer—Output transformer (T4) | 1.50 |
| 9026 | Transformer—Power transformer (T1) | 4.80 |
| 4401 | Volume control (R1) | 1.10 |
| | MICROPHONE ASSEMBLIES | |
| 4403 | Cord—Microphone cord | .62 |
| 3216 | Cushions—Microphone rubber cushions—Package of 6 | .24 |
| 4500 | Housing—Microphone housing | 3.15 |
| 4499 | Mechanism—Microphone mechanism | 6.80 |
| 4501 | Microphone complete | 7.50 |
| 4402 | Plug—Microphone cord plug | .28 |
| | RECORDING INDICATOR ASSEMBLIES | |
| 4381 | Escutcheon—Recorder indicator escutcheon | .72 |
| 4161 | Lamp—Neon lamp | .56 |
| 4164 | Screen—Recording indicator lamp screen | .18 |
| 4382 | Screw—Screen escutcheon and terminal board mounting screw assembly—Comprising two screws, two spacers, two nuts and two lockwashers | .20 |
| | PICKUP AND ARM ASSEMBLIES | |
| 4196 | Arm—Pickup arm complete | 4.70 |
| 3417 | Armature—Pickup armature | .72 |
| 3733 | Back—Pickup housing back | .60 |

| Stock No. | Description | List Price |
|---|---|---|
| 3385 | Coil—Pickup coil | $0.50 |
| 4383 | Cover—Pickup cover | .34 |
| 3836 | Cover—Pickup back cover | .34 |
| 4497 | Pickup—Magnetic pickup unit complete (L2) | 4.60 |
| 4384 | Plate—Pickup lifter adjustment plate, spring and screw—Located in arm | .20 |
| 3387 | Screw—Pickup mounting screw assembly—Comprising one screw, one nut and one washer—Package of 10 | .40 |
| 3388 | Screw—Pickup needle holding screw—Package of 10 | .60 |
| 3419 | Screw—Pickup cover holding screw—Package of 10 | .40 |
| | TURNTABLE ASSEMBLIES | |
| 3346 | Bushing—Speed shifter lever bushing—Package of 4 | 66 |
| 3344 | Cover—Grease retainer cover—Package of 2 | .70 |
| 4394 | Lever—Speed shifter lever | .38 |
| 3341 | Pin—Groov-pin—Package of 2 | .56 |
| 3338 | Ring—Clamp ring assembly—Comprising spring, latch lever and stud | .50 |
| 3343 | Sleeve—Sleeve complete with ball race | 2.86 |
| 3347 | Spring—Speed shifter lever spring—Package of 2 | .30 |
| 7668 | Turntable—Complete less shift lever | 8.34 |
| 3340 | Washer—Thrust washer—Package of 2 | .56 |
| | MOTOR ASSEMBLIES | |
| 4395 | Mounting assembly—Motor mounting assembly—Comprising 3 studs, 9 washers, 3 cushions | .38 |
| 9510 | Motor—105-120 volt 60-cycle motor complete | 27.44 |
| 8942 | Rotor and shaft for motor | 7.00 |
| 8945 | Spindle—Turntable spindle and fibre gear for motor | 4.68 |
| | MISCELLANEOUS ASSEMBLIES | |
| 4391 | Box—Needle box | .70 |
| 3261 | Bushing—Record drive bushing—Package of 5 | .40 |
| 4392 | Knob—Volume control knob—Package of 5 | .75 |
| 4385 | Lifter—Pickup lifter mechanism complete | 3.00 |
| 4387 | Screw—No. 6-32-¼" headless set screw for pickup lifter cam—Package of 10 | .25 |
| 4388 | Screw—No. 6-32-5/16" headless set screw for pickup lifter cam—Package of 10 | 25 |
| 4389 | Screw—No. 6-32-3/16" headless set screw for pickup lifter cam—Package of 10 | .25 |
| 4390 | Screw—No. 6-32-⅛" headless set screw for pickup lifter cam—Package of 10 | .25 |
| 4393 | Screw—No. 8-32-5/16" headless set screw for volume control knob—Package of 10 | .25 |
| 4386 | Spring—Pickup lifter spring—Package of 10 | .20 |
| 6226 | Transformer—Input transformer (T2) | 2.75 |

# RCA VICTOR DUO JUNIOR MODEL R-93

## SERVICE NOTES

### Electrical Specifications

| | |
|---|---|
| Voltage Rating | 105–125 Volts |
| Frequency Rating | 25, 50 and 60 Cycles |
| Power Consumption | 4 Watts |
| Type of Motor | Synchronous Reaction |
| Turntable Speed | 78 R.P.M. |
| Pickup Impedance at 1000 Cycles | 2450 Ohms |
| Pickup Output Voltage | 0.4 Volt at 400 Cycles |
| Volume Control Resistance | 20,000 Ohms |

### Physical Specifications

| | |
|---|---|
| Turntable Diameter | 7 Inches |
| Height | 5 Inches |
| Width | 11 Inches |
| Depth | 8 Inches |

This phonograph turntable and pickup assembly is designed to provide record reproduction to the owner of a modern radio receiver. Use of the audio amplifying system and loudspeaker of the radio receiver provides a quality of reproduction equal to or better than that obtained from radio stations. A switch is provided for changing from radio to record reproduction, or vice-versa. Simplicity, compact size and ease of connections are outstanding features of this instrument.

Electrically, the instrument consists of a magnetic pickup—for transforming the mechanical variations of the record grooves to voltage variations—a volume control for adjusting the output voltage to any desired level and a radio-record switch for shifting the connections to the receiver so that either radio or record reproduction may be obtained as desired by the user.

Figure 1 shows a typical layout for an ideal installation. Figure 2 shows the proper connections to be made between the pickup unit and the switch assembly. Figure 3 shows the schematic diagram, while Figures 4 and 5 show the chassis and cable wiring diagrams respectively.

### Connecting Phonograph to the Radio Receiver

When connecting a phonograph unit to a radio receiver, there are a few fundamental facts to be considered. First, the output of the pickup must be connected to the receiver at a point where sufficient audio gain between it and the speaker is available to give normal sound output. Second, when doing this some attention should be given to the possibilities of introducing hum and other undesired noise, both in the audio and in the radio circuits.

In general, it will be found that the grid or cathode circuits of the second detector of a super-heterodyne circuit are suitable for phonograph input. On tuned R. F. receivers, either the detector cathode or the first audio transformer primary circuit may be employed, depending upon the amount of audio gain and the type of detector used.

It is fairly common to find radio receivers employing a volume control located in the audio circuit. In these cases, it is advisable to run the phonograph volume control at maximum and use the radio receiver volume control for adjusting the phonograph output. In circuits using aurally compensated volume controls, advantage of this feature is not taken unless the radio receiver volume control is used.

Investigation of a large number of receivers has shown that four general types of connections, all of which may be made without removing the chassis from the cabinet, cover practically every type of receiver. These connections are as follows:

(1) Receivers having phonograph input jacks and Radio-Record Switches. With these receivers the cable and switch supplied with the R-93 is not used. The phonograph output is connected direct to the phonograph input jack and the Radio-Record Switch on the Receiver is used for changing from Record to Radio reproduction. The 1929 Victor Receiver and numerous Stromberg-Carlson Receivers are typical examples of this type of connection.

(2) Receivers having phonograph terminal board connections. Such connections are made in accordance with the instructions pertaining to that particular instrument.

(3) Receivers using the 2B7 or 6B7 Second Detectors. With receivers of this type, the yellow and green leads are connected in series with the grid cap connection of this tube.

(4) Receivers not having any of the foregoing features. On receivers of this type, an adaptor having a split cathode connection is necessary. Stock No. 4611, five-prong adaptor, or Stock No. 4612, six-prong adaptor, may be used. In such cases, the yellow and green leads are connected in series with the cathode, which is placed under the tube used in the second detector socket of the receiver.

It will be noted that red and blue leads are brought out from the switch for "killing" the radio during record reproduction With most receivers, these may be connected in series with the antenna lead. However, in event this does not work satisfactorily, then one of the split cathode adaptors must be used in the oscillator socket and the leads connected in series with the cathode. This will effectually "kill" the radio on any super-heterodyne receiver. On the following page, a list of numerous receivers and their proper connections are given.

# PHONOGRAPH MOTOR SERVICE DATA

The synchronous motor used in this instrument is of simple design and fool-proof construction. Among its many features are low power consumption, single moving part, ease of starting, oilless main bearing, resilient bumper, and long life with freedom from service repairs.

Figure 6 shows the main parts of the motor and the points that may require attention.

**Operation:**

The two stator coils are connected as shown in Figure 2 and the motor is started by giving it a clockwise spin with the hand. If it is found to be difficult of starting, or if it runs at a sub-synchronous speed such as at 70 R.P.M., such action may result from one of the following causes:

*Difficult to Start*—This may be due to the stator failing to rotate on the outer bearing. This can be caused by the lug being bent and rubbing in the slot, or sticking to the resilient bumper. The outer bearing not being properly lubricated may also cause this condition. It is important that the ball bearing be at the bottom of the main bearing assembly.

*Slow Speed*—If the turntable is jarred or slowed down, the motor may run at a sub-synchronous speed, such as 70 R.P.M. This is remedied by merely lifting the tone arm from the turntable, thereby removing the load. The turntable speed will then immediately increase to normal.

**Excessive Vibration and Hum:**

A small amount of hum when starting, decreasing to a negligible amount while running, is normal. If excessive vibration occurs either at starting or running, it may be due to one of the following:

(1) Insufficient lubricant in outer bearing or any other failure that will cause the stator to bind.

(2) Metal washer not above the leather washer at the bottom of the main bearing.

(3) Motor not properly supported from motor board. Unless the motor is properly supported from the motor board, normal vibration will be excessive.

**Removing Rotor from Stator:**

The rotor which includes the turntable may be removed by loosening the screw shown in Figure 7 until it clears the rotor and then lifting the turntable. Be careful not to lose the ball end-bearing when this is removed. After replacing the rotor, tighten the retaining screw securely to eliminate the possibility of rattle in operation.

**Power Consumption:**

The motor consumes 4 watts. It should never be turned on when the rotor is removed, as in this condition excessive current will be drawn with consequent increase in temperature.

Note—The above values of power consumption are average for a 60-cycle motor at 125 volts. At lower voltages the power consumption will be less.

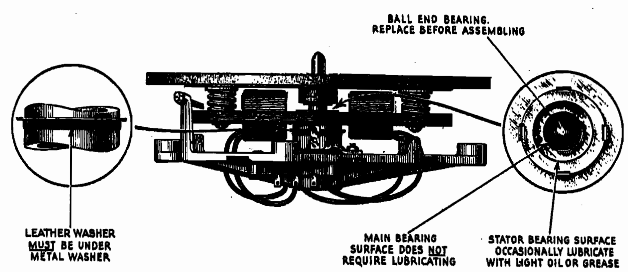



*Figure 7—Details of Motor*

MODEL R-93 Phonograph
Pickup Data
Parts List

RCA-VICTOR CO., INC.

# PICKUP UNIT SERVICE DATA

The magnetic pickup and tone arm assembly of this instrument is of new design and unique construction. Service work will consist of centering the armature and replacing the rubber pivots, damping block and replacing the magnet coil.

**Disassembling the Pickup:**

The pickup may be disassembled in the following manner:

(a) Unsolder the two cable connections to the terminal strip.

(b) Remove the needle screw and screws "A" and "B."

(c) Remove the pickup assembly from the arm and housing.

(d) Unsolder the two magnet coil leads attached to the terminals and then remove screw E. This will allow the removal of the terminal board.

(e) If centering the pickup armature is the only adjustment required, such centering can be done without removing the terminal board indicated in (d). The armature is centered by loosening screw F, accessible through the hole shown, and holding the armature with the finger in proper position while screw F is tightened. "Feeling" the armature while deflecting it between its two extremes is the best manner of ascertaining proper centering. When centering, after work has been done or the magnet removed, it is important that the magnet be remagnetized while in place.

(f) If the coil or pivot rubbers are to be replaced, the pickup must be further disassembled. This is done by removing the magnet and then removing screws C and D. The pole piece may now be removed and the old coil and sleeve disassembled. Acetone will be found helpful for dissolving the old cement that holds the coil in place. The new coil, with its sleeve, may now be replaced and cemented in a similar position to that occupied by the old coil. Duco household or Ambroid cement may be used to hold the coil in place. Be careful to center the coil with its paper sleeve before cementing. Only rosin core solder should be used for soldering the coil leads in the pickup.

(g) The pivot rubbers are replaced by loosening the armature adjusting screw F and removing screw G, clamp H and washer I and removing the armature from its bracket. Damping block J must be removed from the armature. After putting the new pivot rubbers in place, a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block. The rubbers can then be removed by slipping them from each end of the pivot shaft.

**Replacing the Damping Block**

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

(b) Remove the damping block from the armature and clean the armature shaft with emery paper.

(c) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the shaft diameter. This is done so that a snug fit will be obtained.

(d) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure 9, will prove desirable for fusing the block in place. The iron should be applied only long enough to melt the block sufficiently to cause a small bulge on each side, and must be removed before any bubbling occurs. The pickup should then be reassembled.

It is important to remember that in all operations after reassembling but before placing in the tone arm, the pickup should be magnetized and the armature centered after remagnetizing. Magnetizing should be done by placing the pickup magnet on the magnetizer and sliding it onto the pole pieces, after magnetizing being careful not to break the magnetic circuit.

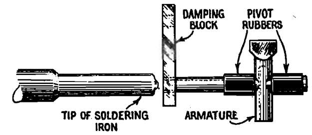



*Figure 9—Replacing Damping Block*

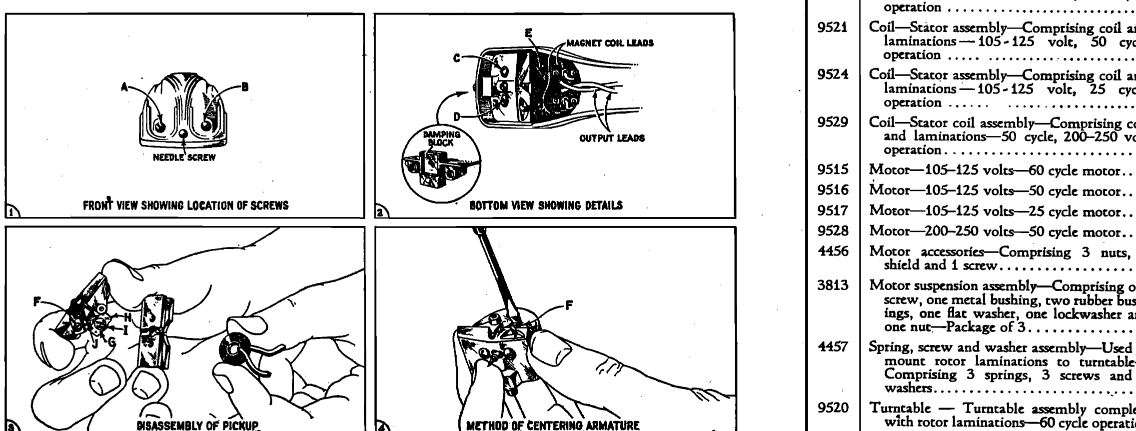



*Figure 8—Details of Pickup Assembly*

# REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | Description | List Price |
|---|---|---|
| | MOTOR ASSEMBLIES | |
| 10194 | Ball—Steel ball bearing—Package of 20 | $0.25 |
| 7657 | Base—Motor base and bearing assembly—50–60 cycle—105–125/200–250 volt operation | 1.20 |
| 9523 | Base—Motor base and bearing assembly—25 cycle operation | 1.20 |
| 9519 | Coil—Stator assembly—Comprising coil and laminations—105–125 volt, 60 cycle operation | 2.50 |
| 9521 | Coil—Stator assembly—Comprising coil and laminations—105–125 volt, 50 cycle operation | 2.35 |
| 9524 | Coil—Stator assembly—Comprising coil and laminations—105–125 volt, 25 cycle operation | 2.25 |
| 9529 | Coil—Stator coil assembly—Comprising coil and laminations—50 cycle, 200–250 volt operation | 2.50 |
| 9515 | Motor—105–125 volts—60 cycle motor | 8.80 |
| 9516 | Motor—105–125 volts—50 cycle motor | 8.42 |
| 9517 | Motor—105–125 volts—25 cycle motor | 9.00 |
| 9528 | Motor—200–250 volts—50 cycle motor | 9.60 |
| 4456 | Motor accessories—Comprising 3 nuts, 1 shield and 1 screw | .10 |
| 3813 | Motor suspension assembly—Comprising one screw, one metal bushing, two rubber bushings, one flat washer, one lockwasher and one nut—Package of 3 | .56 |
| 4457 | Spring, screw and washer assembly—Used to mount rotor laminations to turntable—Comprising 3 springs, 3 screws and 9 washers | .15 |
| 9520 | Turntable — Turntable assembly complete with rotor laminations—60 cycle operation | 4.45 |
| 9525 | Turntable — Turntable assembly complete with rotor laminations—25 cycle operation | 4.85 |

| Stock No. | Description | List Price |
|---|---|---|
| 9522 | Turntable — Turntable assembly complete with rotor laminations—105–125/200–250 volt—50 cycle operation | $4.25 |
| 4083 | Washer—Leather washer—Package of 10 | .20 |
| 4084 | Washer—Metal washer—Package of 10 | .26 |
| | PICKUP AND ARM ASSEMBLIES | |
| 3812 | Armature—Pickup armature | .32 |
| 4462 | Cable—Pickup cable | .20 |
| 3810 | Coil—Pickup coil | .32 |
| 4543 | Damper — Damper block complete with damper clamp, washer | .10 |
| 4503 | Pickup and arm assembly complete | 4.95 |
| 3811 | Screw—Needle holding screw—Package of 10 | .46 |
| | CABINET ASSEMBLIES | |
| X-249 | Bottom—Lower section of wood cabinet | 2.95 |
| X-248 | Cover—Top half of wood cabinet | 3.00 |
| | MISCELLANEOUS ASSEMBLIES | |
| 4611 | Adaptor—Five-prong split cathode adaptor | 1.00 |
| 4612 | Adaptor—Six-prong split cathode adaptor | 1.00 |
| 4461 | Cable — 5-conductor—Radio-Record switch cable | .28 |
| 4459 | Bracket—Volume control mounting bracket | .10 |
| 4463 | Foot—Felt foot for bottom cover—Package of 10 | .20 |
| 3829 | Knob—Radio-Record switch knob—Package of 5 | 1.10 |
| 3961 | Knob—Volume control knob—Package of 5 | .60 |
| 4458 | Post—Binding post—Package of 10 | 2.50 |
| 4507 | Rest—Pickup rest—Package of 5 | .60 |
| 4119 | Screw—No. 8-32-¼-inch headless set screw for knob—Package of 20 | .38 |
| 4460 | Switch—Radio-Record switch | .40 |
| 4502 | Volume control (R1) | 1.16 |

RCA-VICTOR CO., INC.

**MODEL R-93 Phonograph**
**Models Listing**
**Connection Diagram**

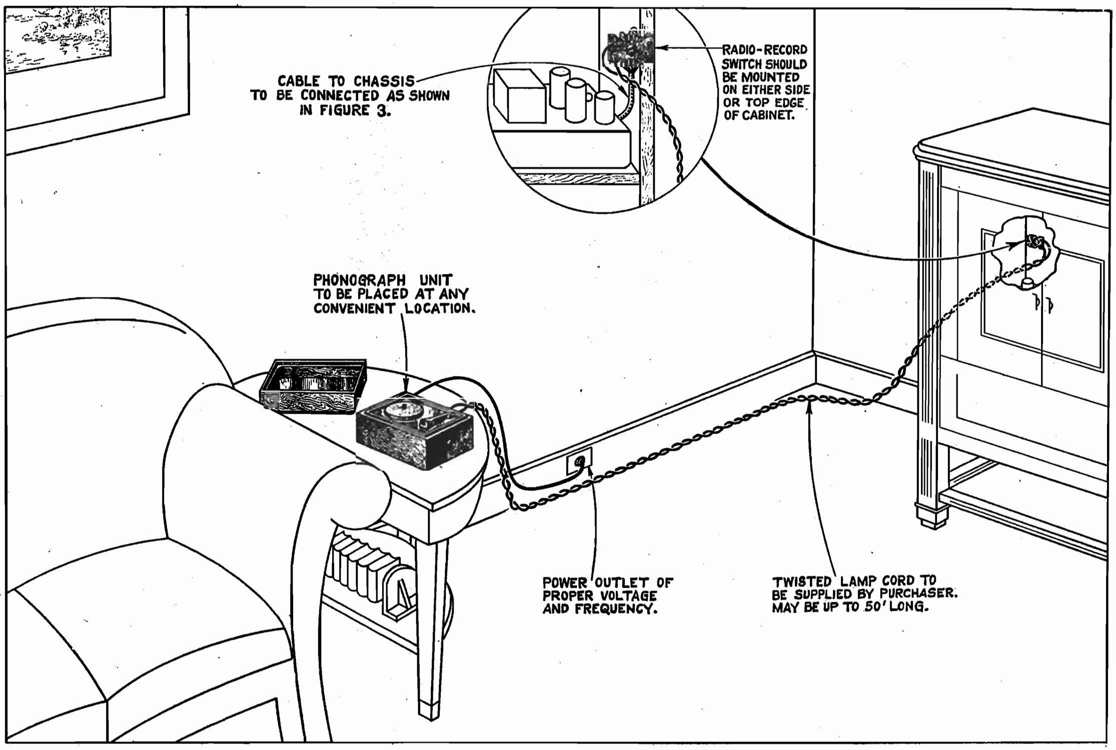



*Figure 1—Typical Layout and Connections for Model R-93*

## RCA VICTOR RECEIVERS — DETAILS OF LEAD CONNECTIONS

| *Model* | *Method of Connection* | *Green* | *Yellow* | *Red* | *Blue* | *Shield* |
|---|---|---|---|---|---|---|
| R-4, 6 | 4. Adaptor | Det. Cathode | Cathode Socket Contact | Ant. | Ant. Lead | Chassis |
| R-5 | 4. Adaptor | Det. Cathode | Cathode Socket Contact | Ant. | Ant. Lead | Det. Cathode (Yellow) |
| R-7 | 2. Term. Board | Term. 2 (Open Link) | Term. 1 | Ant. | Ant. Lead | Term. 4 |
| R-7A | 2. Term. Board | Term. 2 (Open Link) | Term. 1 | Ant. | Ant. Lead | Term. 4 |
| R-8, 10, 12 | 4. Adaptor | Det. Cathode | Cathode Socket Contact | Ant. | Ant. Lead | Chassis |
| R-11 | 2. Term. Board | Term. 2 (Open Link) | Term. 3 | Term. 4 | Term. 5 | Term. 6 |
| R-17M | 4. Adaptor | Det. Cathode | Cathode Socket Contact | Ant. | Ant. Lead | Det. Cathode (Yellow) |
| R-18W | 4. Adaptor | Det. Cathode | Cathode Socket Contact | Ant. | Ant. Lead | Det. Cathode (Yellow) |
| R-21 | 2. Term. Board | Term. 2 (Open Link) | Term. 3 | Term. 4 | Term. 5 | Term. 6 |
| R-22 | 4. Adaptor | Det. Cathode | Cathode Socket Contact | Ant. | Ant. Lead | Det. Cathode (Yellow) |
| RO-23 | 4. Adaptor | Det. Cathode | Cathode Socket Contact | Ant. | Ant. Lead | Chassis |
| R-27 | 4. Adaptor | Det. Cathode | Cathode Socket Contact | Ant. | Ant. Lead | Det. Cathode (Yellow) |
| R-28 | 4. Adaptor | Det. Cathode | Cathode Socket Contact | Ant. | Ant. Lead | Chassis |
| R-37, 38 | 3. Grid Clip | Grid Cap of Tube | Grid Clip Contact | Ant. | Ant. Lead | Chassis |
| Rad. 48 | 2. Term. Board | Term. 4 (Open Link) | Term. 5 | Term. 2 | Term. 3 | Term. 5 |
| R-50, 55 | 2. Term. Board | Term. 3 (Open Link) | Term. 4 | Term. 1 (Open Link) | Term. 2 | Term. 6 |
| R-70 | 4 Adaptor | Det. Cathode | Cathode Socket Contact | Ant. | Ant. Lead | Chassis |
| R-71, 72 | 4. Adaptor | Det. Cathode | Cathode Socket Contact | Ant. | Ant. Lead | Chassis |
| R-73, 75 | 3. Grid Clip | Grid Cap of Tube | Grid Clip | Ant. | Ant. Lead | Chassis |
| R-73A, 75A | 3. Grid Clip | Grid Cap of Tube | Grid Clip | Ant. | Ant. Lead | Chassis |
| R-74, 76, 77 | 4. Adaptor | Det. Cathode | Cathode Socket Contact | Ant. | Ant. Lead | Chassis |
| R-78 | 2. Term. Board | Term. 7 (Open Link) | Term. 8 | Term. 1 | Term. 2 | Chassis |
| Rad. 80 | 4. Adaptor | Det. Cathode | Cathode Socket Contact | Ant. | Ant. Bind. Post | Chassis |
| Rad. 82 | 2. Term. Board | Term. 2 (Open Link) | Term. 3 (Tie-in Term. 1 to Term. 3) | Term. 1 | Term. 3 | Term. 3 |
| R-90, 260, 261 | 4. Adaptor | Det. Cathode | Cathode Socket Contact | Osc. Cathode* | Osc. Cathode Socket Contact | Chassis |
| 110, 111, 115, 210 | 4. Adaptor | Det. Cathode | Cathode Socket Contact | Ant. | Ant. Lead or Bind. Post | Cathode Socket Contact |
| 114 | 4. Adaptor | Det. Cathode | Cathode Socket Contact | Ant. | Ant. Lead | Det. Cathode (Yellow) |
| 120, 124, 220 | 3. Grid Clip | Grid Cap of Tube | Grid Clip | Ant. | Ant. Lead on Bind. Post | Chassis |
| 121, 122, 221 | 3. Grid Clip | Grid Cap of Tube | Grid Clip | Ant. | Ant. Lead on Bind. Post | Chassis |
| 140, 141, 240 | 2. Term. Board | Term. 3 | Term. 1 (Open Link) | Term. 1 | Term. 2 | Term. 1 |
| 280 | 4. Adaptor | Det. Cathode | Cathode Socket Contact | Osc. Cathode* | Osc. Cathode Socket Cont. | Chassis |

MODEL R-93 Phonograph
Schematics

RCA-VICTOR CO., INC.

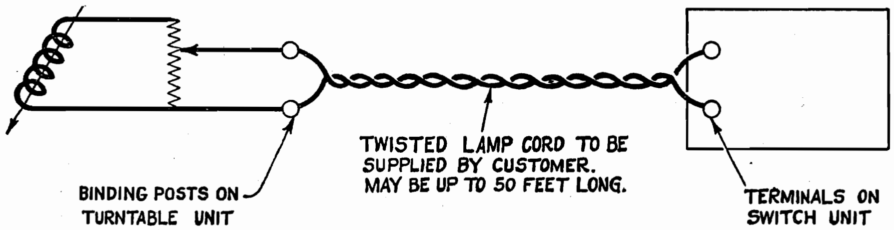



*Figure 2—Connections from Pickup to Switch Unit*

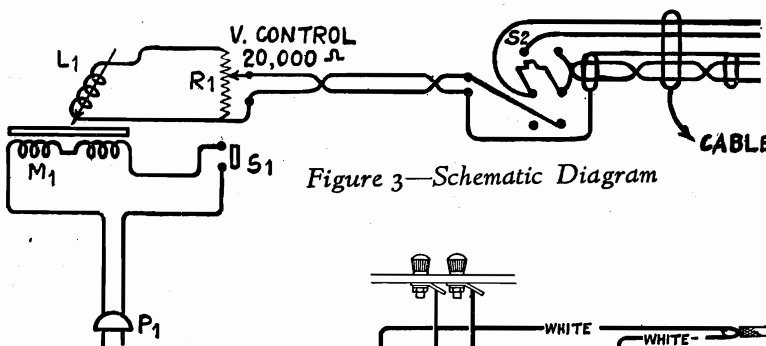



*Figure 3—Schematic Diagram*

*25 and 50 cycle connections*

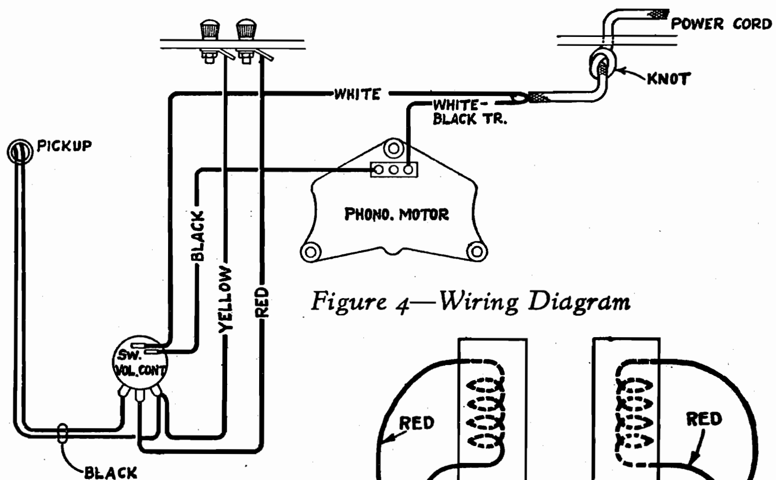



*Figure 4—Wiring Diagram*

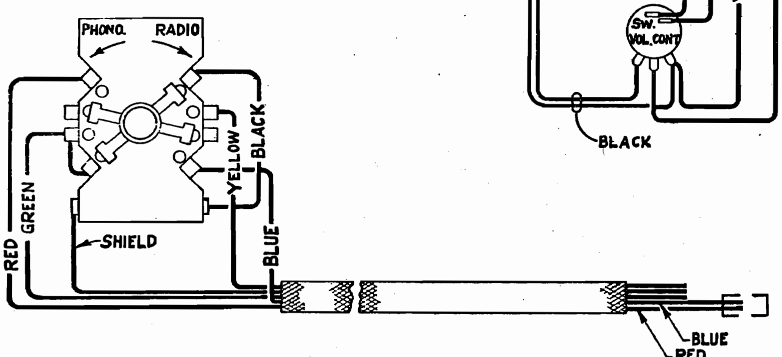
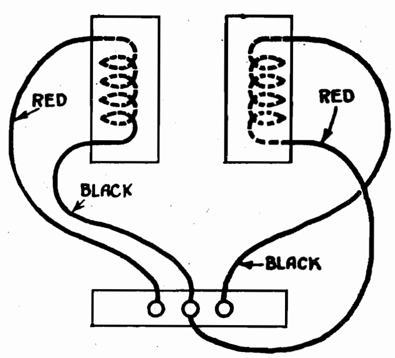
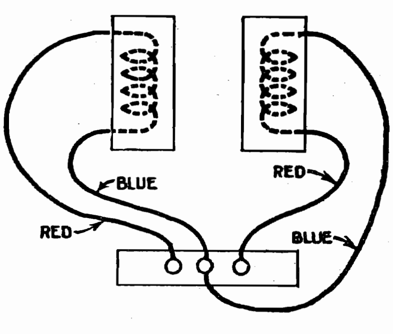


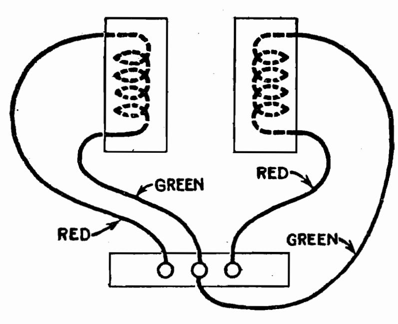

*Figure 5—Cable Connections*



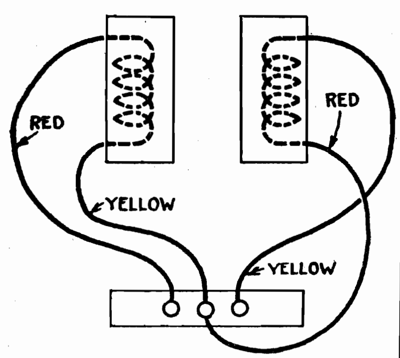

*220 Volt—50 Cycle*




*110 Volt—25 Cycle*




*110 Volt—50 Cycle*




*110 Volt—60 Cycle*

*Figure 6—Motor Wiring Connections*

# RCA-VICTOR CO., INC.

MODEL 102
Schematic
Chassis Wiring

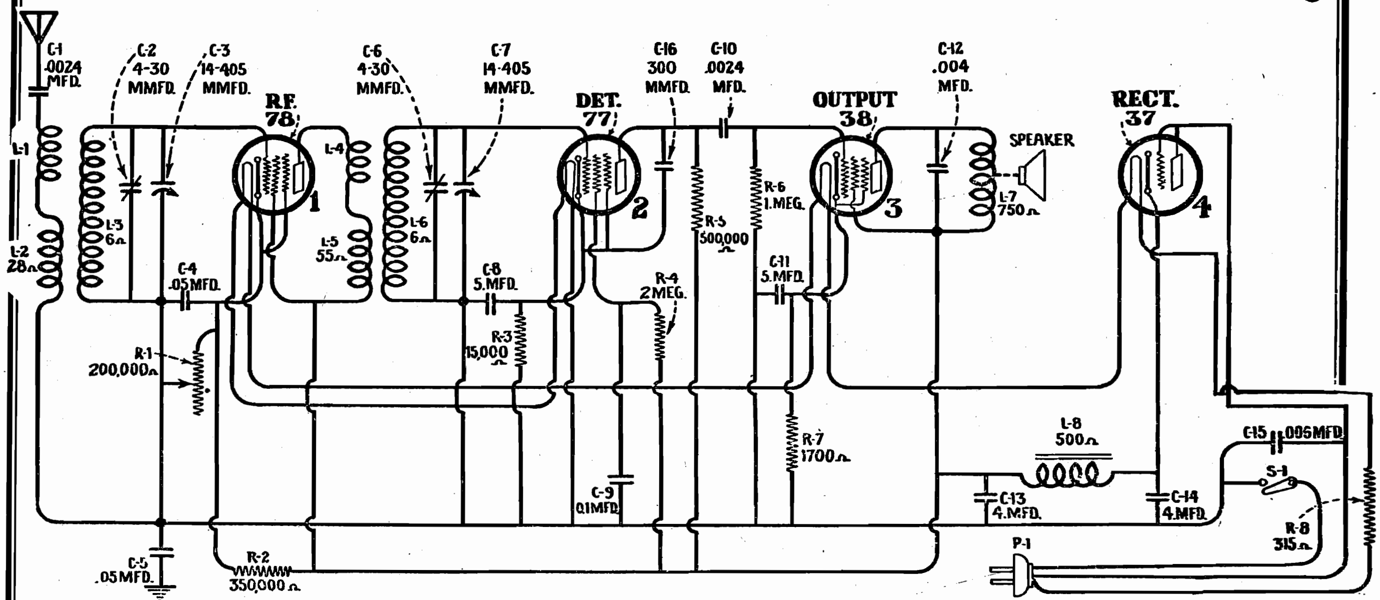
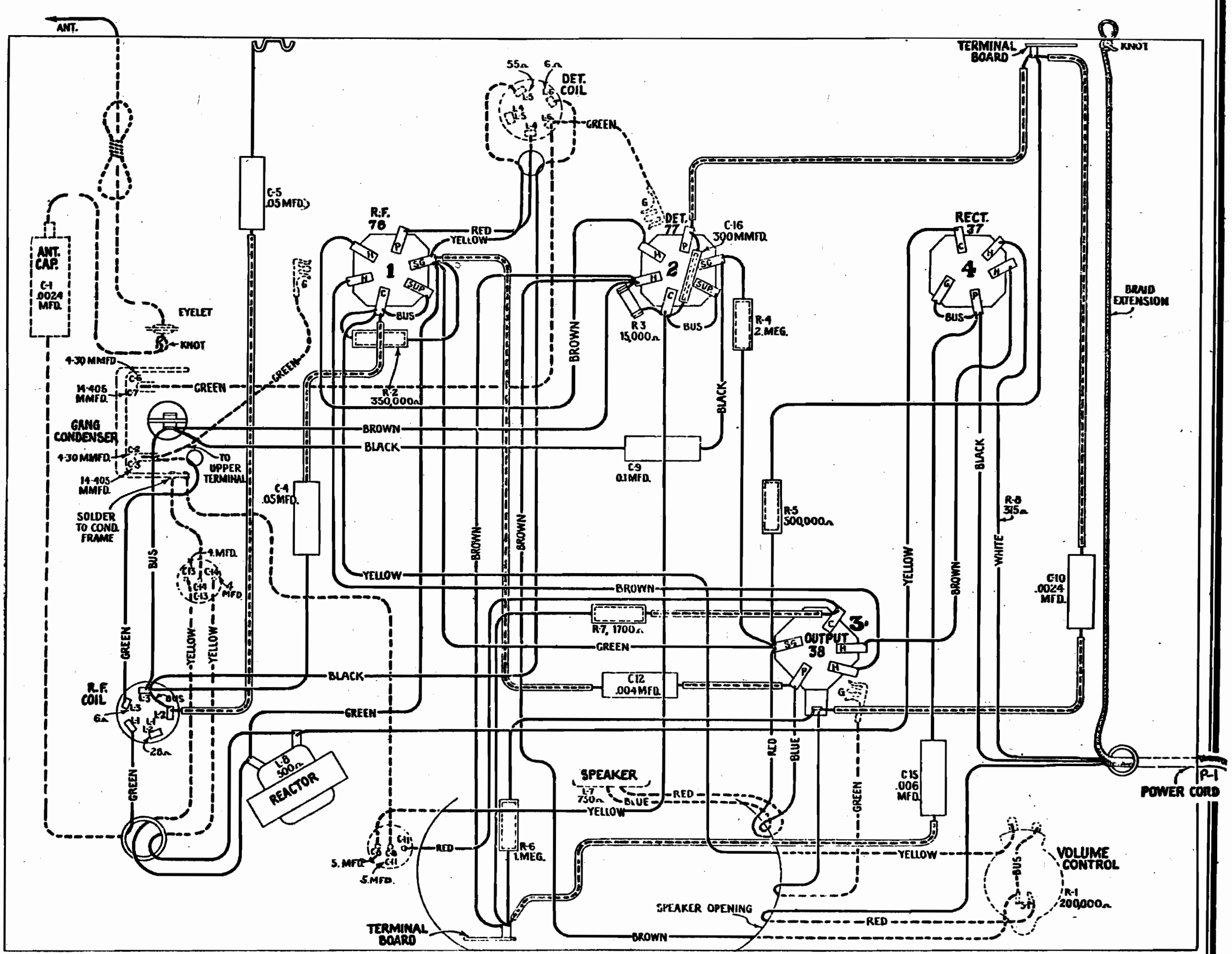



*Figure A—Schematic Circuit Diagram*



MODEL 102
Voltage
Parts List

RCA-VICTOR CO., INC.

# SERVICE DATA

## Electrical Specifications

Voltage Rating..105–120 Volts, 25–133 Cycles A. C. or D. C.
Power Consumption............................40 Watts
Frequency Range....................540 K. C.–1712 K. C.
Type and Number of Radiotrons—
1 RCA-77, 1 RCA-37, 1 RCA-38, 1 RCA-78—Total 4
Undistorted Output..........................0.18 Watts

This receiver is an A. C.–D. C. table model tuned R. F. broadcast receiver. Features such as universal operation on both A. C. and D. C., wide tuning range, excellent performance and compact construction characterize this instrument. Figures A and B show the schematic and wiring diagrams respectively. The voltage readings and replacement parts are given below.

The receiver is aligned at 1400 K. C. by means of the two trimmer capacitors located on the main tuning capacitor. The proper alignment is made by adjusting the trimmers for maximum output after tuning in a 1400 K. C. signal. This adjustment should be made when they are near their extreme minimum position. After alignment a check to make sure that a 1712 K. C. signal can be heard when the main tuning capacitor is near its extreme minimum position should be made. Stock No. 9050 Test Oscillator and Stock No. 7065 non-metallic screwdriver are desirable for making this adjustment.

# RADIOTRON SOCKET VOLTAGES

Measured at Maximum Volume—115 Volt A. C. Line
All Voltages on D. C. will be slightly lower

| Radiotron No. | Cathode or Filament to Control Grid Volts | Cathode or Filament to Screen Grid, Volts | Cathode or Filament to Plate, Volts | Plate Current M. A. | Filament or Heater Volts |
|---|---|---|---|---|---|
| 1. RCA-78 R. F. | 2.5 | 105 | 105 | 7.0 | 6.0 |
| 2. RCA-77 Det. | *2.0 | 17.0* | *40 | 0.1 | 6.0 |
| 3. RCA-38 Output | 10.0 | 100 | 95 | 5.5 | 6.0 |
| 4. RCA-37 Rect. | — | — | 115 RMS | 16.0 | 6.0 |

* Impossible to measure on ordinary voltmeter.
Note—Above voltages will be approximately 5% lower on 115 volts D. C. except for heater voltages which will be the same.

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | CHASSIS ASSEMBLIES | |
| 2747 | Cap—Contact Cap—Package of 5 | $0.50 |
| 3048 | Resistor—500,000 ohms—Carbon type—½ watt (R5)—Package of 5 | 1.00 |
| 3076 | Resistor—1 megohm—Carbon type—½ watt (R6)—Package of 5 | 1.00 |
| 3537 | Reactor—Filter reactor (L8) | 1.10 |
| 3542 | Volume control (R1, S1) | 1.18 |
| 3713 | Capacitor—0.05 mfd. (C4, C5) | .32 |
| 3860 | Socket—5-contact Radiotron socket | .32 |
| 3932 | Capacitor—2400 mmfd. (C10) | .30 |
| 3998 | Resistor—15,000 ohms—Carbon type—¼ watt (R3)—Package of 5 | 1.00 |
| 4007 | Capacitor—2400 mmfd. (C1) | .35 |
| 4046 | Resistor—2 megohm—Carbon type—½ watt (R4)—Package of 5 | 1.00 |
| 4068 | Lead—Antenna lead | .30 |
| 4069 | Capacitor—0.1 mfd. (C9) | .36 |
| 4070 | Capacitor—0.004 mfd. (C12) | .42 |
| 4071 | Capacitor—0.006 mfd. (C15) | .42 |
| 4072 | Capacitor—300 mmfd. (C16) | .26 |
| 4073 | Resistor—350,000 ohms—Carbon type—½ watt (R2)—Package of 5 | 1.00 |
| 4074 | Resistor—1700 ohms—Carbon type—1 watt (R7)—Package of 5 | .88 |
| 6819 | Cord—Power cord—315 ohms (R8, P1) | $1.00 |
| 6820 | Coil—RF coil (L1, L2, L3) | .86 |
| 6821 | Coil—Detector coil (L4, L5, L6) | .96 |
| 6822 | Condenser—2-gang variable tuning condenser (C2, C3, C6, C7) | 2.34 |
| 6823 | Capacitor—Two 4. mfd. capacitors (C13, C14) | 1.14 |
| 6824 | Capacitor—Two 5. mfd. capacitors (C8, C11) | .94 |
| 7485 | Socket—6-contact Radiotron socket | .40 |
| | REPRODUCER ASSEMBLIES | |
| 7712 | Support—Cone support | 50 |
| 7713 | Mechanism—Speaker mechanism complete (L7) | 3 72 |
| 9470 | Reproducer—Complete | 4 62 |
| 9471 | Cone—Speaker cone—Package of 5 | 3.50 |
| | MISCELLANEOUS PARTS | |
| 4076 | Escutcheon—Volume control escutcheon—Package of 2 | .26 |
| 4077 | Escutcheon—Station selector escutcheon—Package of 2 | .26 |
| 4078 | Knob—Station selector knob—Package of 5 | .75 |
| 4079 | Foot—Rubber foot—Package of 4 | .22 |
| 4096 | Knob—Volume control knob—Package of 5 | .75 |

MODEL M-105
Alignment Data
Voltage, Service Data

RCA-VICTOR CO., INC.

# SERVICE DATA

Type and Number of Radiotrons Used..........1 RCA-41, 1 RCA-78, 1 RCA-6A7, 1 RCA-6B7—Total, 4
Total Battery Current (With 6.3 volts between chassis and A (hot) terminal) 5.35 Amperes
Undistorted Output..........................1.35 Watts
Loudspeaker Field Current..................1.35 Amperes
Filtered D. C. Voltage from Rectifier............227 Volts
Total Plate Current..........................47.5 M. A.

This four tube Superheterodyne Automobile Receiver is of compact construction and gives excellent performance. Features such as unit construction (one unit contains the receiver, "B" battery eliminator and loudspeaker), ease of installation, freedom from ignition noise and excellent sensitivity, selectivity and tone quality characterize this instrument.

## "B" Battery Eliminator

This receiver uses a vibrator-type Inverter-Rectifier that provides a source of direct current voltage for use as plate and grid supply for all Radiotrons. *This unit is accurately adjusted and sealed at the factory and service adjustments should not be attempted.*

## Line-up Capacitor Adjustments

The three R. F. line-up capacitors and two I. F. tuning capacitors are accessible and may require adjustments. The R. F. adjustments are made at 1400 K. C. and the I. F. adjustments at 175 K. C. The R. F. adjustments can be made with the receiver in its case, access to the adjusting screws being obtained through a slot in the bottom of the case. For the I. F. adjustments, however, it is necessary to remove the rear cover in order to couple the oscillator to the first detector. The following procedure should be used for these adjustments:

**R. F. Adjustment**

A satisfactorily accurate and rapid adjustment of the three R. F. line-up capacitors can be made by ear, although, for optimum results, the use of an output meter connected across the loudspeaker voice coil is recommended. The latter method however, involves removal of the rear cover to connect the meter, thus in turn eliminating the shielding effect of the case. Temporary shielding for the bottom and Radiotron sides of the chassis and for the transformer therefore must be provided to prevent vibrator interference.

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and a non-metallic screw driver.

(b) Couple the output of the oscillator from antenna to ground, set the dial at 140, and the oscillator at 1400 K. C.

(c) Place the oscillator and receiver in operation and adjust the oscillator output so that a weak signal is obtained in the loudspeaker when the volume control is at its maximum position.

(d) Then adjust the three line-up capacitors until maximum sound in the speaker or maximum deflection of the output meter is obtained. Readjust these capacitors a second time as there is a slight interlocking of adjustments.

**I. F. Adjustments**

In order to make the I. F. adjustments, it is necessary to remove the rear cover, due to the fact that the external oscillator must be connected between the control grid of the first detector and ground. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver and an output meter.

(b) Remove the receiver from its case, shield the transformer and Radiotrons as described under R. F. adjustments, place the receiver in operation and connect the oscillator output between the first detector grid and ground. Connect the output meter across the voice coil of the loudspeaker. Then connect the antenna lead to ground and adjust the tuning capacitor so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the external oscillator output until a small deflection is obtained. Unless this is done, the action of the A. V. C. will make it impossible to obtain correct adjustments.

(c) Each transformer has but one winding that is tuned by means of an adjustable capacitor, the other windings being untuned. The capacitors should be adjusted for maximum output.

At the time I. F. adjustments are made it is good practice to follow this adjustment with the R. F. adjustments, due to the interlocking that always occurs. The reverse of this, however, is not always true.

## Practical Hints on Installation

The following suggestions may prove useful when making installations on the particular cars mentioned.

**Chevrolet 1933**—Mount chassis on left side, end against car bulkhead and use short flexible shaft. Use both capacitors, one on the ammeter and one on the generator. Use all suppressors. Place a copper screen under the toe board on right side, 10" x 10" to prevent the body from radiating ignition interference which may be picked up by the antenna. This screen must be grounded.

**Plymouth 1933**—Mount chassis on left side, back against car bulkhead and use 33⅞" flexible shaft. Use both capacitors, one on the ammeter and one on the generator. Use all suppressors.

**Ford V-8 1932 or 1933**—Mount chassis on left side, end against car frame and use short flexible shaft. Use one capacitor, connected to the generator. Install eight spark plug type suppressors only, no distributor suppressor being necessary.

The majority of cars will be found to be entirely free from ignition noise when the standard equipment is used. Usually mounting the chassis on the right side of the bulkhead will be found most desirable, although if a heater is used, the left side will be preferable.

## RADIOTRON SOCKET VOLTAGES

6.3 Volt Battery—No Signal

| Radiotron No. | | Cathode to Ground | Cathode to Screen Grid Volts | Cathode to Plate Volts | Cathode Current M. A. | Heater Volts |
|---|---|---|---|---|---|---|
| RCA-78 R. F. | | 4.42 | 83 | 222 | 5.25 | 6.0 |
| RCA-6A7 | First Detector | 4.42 | 83 | 222 | 11.0 | 6.0 |
| | Oscillator | 4.42 | — | 223 | Total | |
| RCA-6B7 Second Detector | | 3.22 | 84 | 218 | 5.25 | 6.0 |
| RCA-41 Power | | 13.0 | 214 | 200 | 26.0 | 6.0 |

## Equipment

**A. Equipment Furnished:**

1. *Receiver Package*—Includes the receiver and remote control units joined by the wiring cable:

(a) The receiver contains one each of the following Radiotrons installed in sockets: RCA-78, RCA-6A7, RCA-6B7, RCA-41.

(b) The remote control unit contains one dial lamp (6-8 volts).

(c) The wiring cable includes one fuse (20 amperes) installed in attached fuse receptacle.

2. *Outfit Package*—Containing:

(a) Flexible shaft (33⅞ inches long).

(b) Receiver unit mounting bolt (7/16 inch diameter), dash support plate, and nuts (2).

(c) Self-tapping screws, washers and rubber bumpers (4 each).

(d) Steering column bracket for remote control unit with strap, screws (2), plain washer (1) and lockwasher (1).

(e) Shield clamp for antenna lead-in wire with screw (1), lockwasher (1) and nut (1).

(f) Key (1) and knob (1) for remote control unit and eyelets (2) for antenna connector packed in small envelope.

(g) Ignition Interference Suppression Equipment:

- 6 Spark plug type suppressors (additional obtain able from your dealer).
- 1 Distributor type suppressor.
- 2 Capacitors.

(h) Instruction Book.

**B. Additional Equipment Required:**

1. *Antenna*—One of the following types:

(a) Roof (built-in) type—recommended.

(b) Roof (interior) type for attachment to head-lining inside car—also recommended. A special antenna of this type complete with pin-hooks and lead-in wire may be purchased from your dealer.

(c) Plate (sub-mounted) type for attachment to channel members of car chassis—alternative. An efficient plate antenna completely equipped for mounting and a specially-designed shielded lead-in wire also are obtainable from the dealer.

## Location of Units

**Receiver and Remote Control Units**—The arrangement of units shown in Figure 1 is recommended and will be found applicable to the majority of automobiles. Consideration should be given to the possibility of interference of the receiver with other equipment beneath the instrument panel or of the mounting bolt with apparatus on the engine side of the dash. By placing the receiver unit toward the right-hand side of the dash, the flexible shaft will be of correct length as furnished in practically all cases. This position, however, may be considered impractical because of its universal preference for heating devices, necessitating installation of the receiver unit either near the center or at the extreme left-hand side of the dash and the use of a shorter flexible shaft. In such cases, the shaft may be either shortened (as described under "Mounting of Units") or exchanged for one of proper length by the dealer.

NOTE—Two support brackets are attached to the receiver case, one on the rear surface and the other on the right-hand side viewing the loud speaker opening. The side bracket must be used when the unit is mounted at the extreme left-hand end of the dash in order to avoid sharp bends in the flexible shaft and resultant unsatisfactory operation.

As furnished, the remote control unit is equipped for attachment to the steering column of the car. Its clamp bracket is so designed that the driver may select from a wide variety of possible mounting positions for maximum accessibility. The associated bracket strap will be found to accommodate practically any diameter steering column. If considered desirable, however, the remote control unit may be supported upon the instrument panel by means of an accessory bracket procurable from the dealer.

**Antenna:**

(a) *Roof (Built-in) Type*—Best results will be obtained by use of a built-in roof antenna. The majority of modern automobiles (closed body types only) are already equipped with such an antenna installed at the factory, the lead-in wire from which will usually be found coiled-up beneath the instrument panel. Many other earlier cars employ a piece of metallic screen—for top material support—which, if ungrounded (not in electrical contact with the metallic frame), may be readily utilized as an antenna.

NOTE—The presence of a top support screen and of grounds in that screen may be determined without removing any portion of the inside fabric (head-lining). First procure any sharp-pointed metallic tool, push the point through the fabric (at several points if necessary) and feel around in an attempt to scrape the screen surface—being careful not to puncture the weather-proof top. If a screen is found, connect an ordinary dash or head-lamp between either terminal of the automobile ammeter and the tool, re-insert the tool through the head-lining and make contact with the screen. If the lamp lights, however dimly, it shall be assumed that the screen is grounded.

In order to use an ungrounded support screen, first release the head-lining at the front corner nearest the receiver. Then connect a flexible rubber-insulated lead to the corner of the screen and solder the joint. Feed the free end of the lead down the adjacent pillar-post of the car into the driving compartment and replace the head-lining.

If the top support screen is grounded, or if no screen is present, it will be necessary to drop the entire head-lining (see Figure 2). In the former case, the screen may be insulated by removal of a strip several inches from all edges and from the dome

light fixture. The possibility of subsequent shifting may be eliminated by tacking the screen to one or more of the ribs and by lacing the sides with cord. Where no support screen is used, a copper screen having a total area of at least ten square feet should be inserted. It should be located as far to the rear as possible and insulated from all metallic parts grounded to the frame of the car. The antenna finally should be tested for grounds (see the foregoing "NOTE" for test procedure). If satisfactory, attach the lead-in wire and replace the head-lining of the car.

NOTE—Since a degree of skill—only acquired by experience—is necessary in removing and replacing the top fabric material, such work should be allotted to a competent "trim" man.

(b) *Roof* (*Interior*) *Type*—The accessory interior-type roof antenna also will provide very satisfactory performance and, in addition, is extremely simple to install. It may be quickly attached to the head-lining inside the car (preferably as far to the rear as possible) by means of pin-hooks, thereby precluding removal of the fabric. An antenna of this type, however, should not be used in any automobile having a *grounded* top material support screen since the proximity of that screen would seriously reduce its efficiency. Before purchase, therefore, it will be advisable to check this possibility, following the test procedure described under "*Roof* (*Built-in*) *Type.*"

As furnished, the interior-type antenna is equipped with a sufficient length of lead-in wire ready-attached. The effective antenna wire is enclosed by long-wearing paper procurable either in "gray" or "tan" finish as desired to harmonize with the car upholstery.

(c) *Plate Type*—For those cases where the installation of a built-in roof antenna is considered too costly and the interior roof antenna impractical, good reception from local or semi-distant powerful stations may be procured with the special plate-type antenna also obtainable as an accessory. This unit should be clamped to the frame of the chassis as far to the rear as possible. It is adjustable in length and may be mounted either lengthwise or crosswise of the chassis, which position should be selected with due regard to the prevention of over-crowding. The plate must be placed as close to the ground as possible, but not below the lowest portion of the chassis at the desired location, as sufficient road clearance must be retained. It is also important to avoid any position in which the plate will impede free motion of chassis parts such as springs, drive shaft, or axles in order to prevent damage to the antenna.

## Mounting of Units

Details of mounting the various units are shown in Figure 1. The following procedures are recommended:

**Receiver Unit**—It is necessary first to determine the electrical polarity of the storage battery supply. This may be done most conveniently by making an examination of the battery connections and ascertaining which terminal is grounded (that is, connected to the frame of the car). The positive terminal is usually marked (+) and tends to form corrosion far more rapidly than the negative (—). If the positive terminal is grounded, no change in the electrical connections of the receiver unit will be required. However, if the opposite is true, the cover of the receiver case must be removed and the *red* and *green* leads (attached by spade-type connectors to the two terminals nearest the bottom of the chassis terminal board) shown in Figure 1 must be reversed.

Now replace the case cover and support the assembled unit against the dash in the chosen position. Allowing a clearance of at least two inches above the top surface, where possible, to permit subsequent removal of the case from the mounting bolt head, mark with a pencil or crayon on the dash four points corresponding to the corners of the adjacent case surface. Then determine the exact center of the area bounded by those four points (by drawing diagonal lines between opposite corners) and mark that position with a center-punch. Next drill a ½ inch hole at the center-punch mark and insert the mounting bolt. The support plate and the two nuts then should be assembled upon the bolt from the engine side of the dash as shown but should not be tightened. Attach the four rubber bumpers, by means of the washers and self-tapping screws, at the four small holes on the selected mounting surface of the case. Finally hang the receiver over the bolt head, align sides vertically and tighten the nuts in place.

**Remote Control Unit**—In attaching the remote control unit to the steering column of the car, it will be advisable first to examine the detailed view (in Figure 1) showing the assembly of its mounting bracket. Four small holes are contained in the associated flexible strap at distances proper for use with steering columns of the most common diameters (1½, 1⅝, 1¾, 1⅞ inches) but the strap length will be found sufficient to permit the insertion of an additional hole if necessary to accommodate a 2 inch column. The proper hole may be determined by wrapping the clamp strap tightly around the column, inserting the machine screw furnished through that hole found to be nearest in alignment with the tapped hole in the clamp bracket. Three tapped holes are provided in the back of the remote control unit, permitting support of that unit either at the right- or left-hand side or above the steering column.

**Flexible Shaft**—Insert that end of the flexible shaft to which is attached the slotted coupling through the bushed opening in the left side of the receiver unit. Then rotate the shaft from the free end until the coupling slot is felt to engage over the pin contained in the tuning mechanism and slide the shaft forward to the full depth of the slot. With the shaft held in this position, insert the opposite end of the shaft through the bushing at the rear of the remote control unit and push forward until the flatted portion of the shaft protrudes through the front cover. Then proceed to tighten the external set-screw (located at the bottom of the case—see Figure 3) adjusting the shaft position as necessary until the screw is felt to engage in the groove. Tighten the screw fully to the bottom of the slot and then loosen it approximately one-quarter of a turn. Finally, secure the flexible casing in place by tightening the set-screws at each end *firmly*, so as to provide good electrical contact as well as solid mechanical support.

NOTE—In many installations it will be found necessary or desirable to use a flexible shaft of shorter length than 33⅛ inches. While it is simplest to procure a shaft of proper length from the dealer as mentioned heretofore, very little difficulty should be experienced in shortening the original part if deemed expedient. To shorten the shaft, refer to Figure 3 and proceed as follows:

1. Determine the minimum shaft length permissible for the installation.
2. Remove the slotted coupling (using a soldering iron) and withdraw the shaft from its casing.
3. Cut the shaft only at the center of a swaged joint, selecting that joint which allows at least the required length.
4. Cut from the shaft casing a length equal to the amount of shaft removed. (This operation may be simplified by placing the casing between wooden blocks in a vise so that the block ends will serve to guide the hack saw blade.)
5. Replace the shaft in its casing and solder the slotted coupling to the end of the shaft.

## Connections

Refer to Figure 1 and make connections as follows:

**Antenna to Receiver**—For least ignition interference, any portion of the antenna lead-in wire which extends behind the instrument panel or into the engine compartment of the car should be fully shielded and cut to eliminate excessive slack when attached to the receiver antenna connector. Before connecting the antenna to the receiver, the following comments applying to the particular type of antenna adopted should be observed:

(a) *Roof Antenna* (Built-in Type)—The lead-in wire from a factory-installed built-in roof antenna usually is unshielded and often is of insufficient length to reach the receiver. If necessary, an extra length of insulated wire may be spliced to the existing lead-in, in which case the joint must be soldered and wrapped with tape. In general, it will be advisable to shield the exposed length of lead-in wire, procuring for this purpose from your dealer a length of shield braid and an equivalent length of insulating loom (or rubber tubing) sufficient to extend between the end of the lead-in wire and its point of entrance from the body pillar post. Slip the loom over the lead-in wire and the shield braid over the loom.

(b) *Roof Antenna* (*Interior Type*)—If an interior type antenna is used, the lead-in wire should be brought down the outside of that front pillar post nearest the receiver.

(c) *Plate Type Antenna*—With the plate type antenna, the full-shielded end of the special cable should be brought into the automobile driving compartment through a ½ inch hole drilled in the toe-board (if no other opening is available). This end is to be connected to the receiver unit antenna lead (as explained in following paragraphs) and the opposite (unshielded) end then cut off as required to eliminate excessive slack upon connection to the plate. The pigtail extension from the end of the shield must be soldered or bonded to the frame of the car.

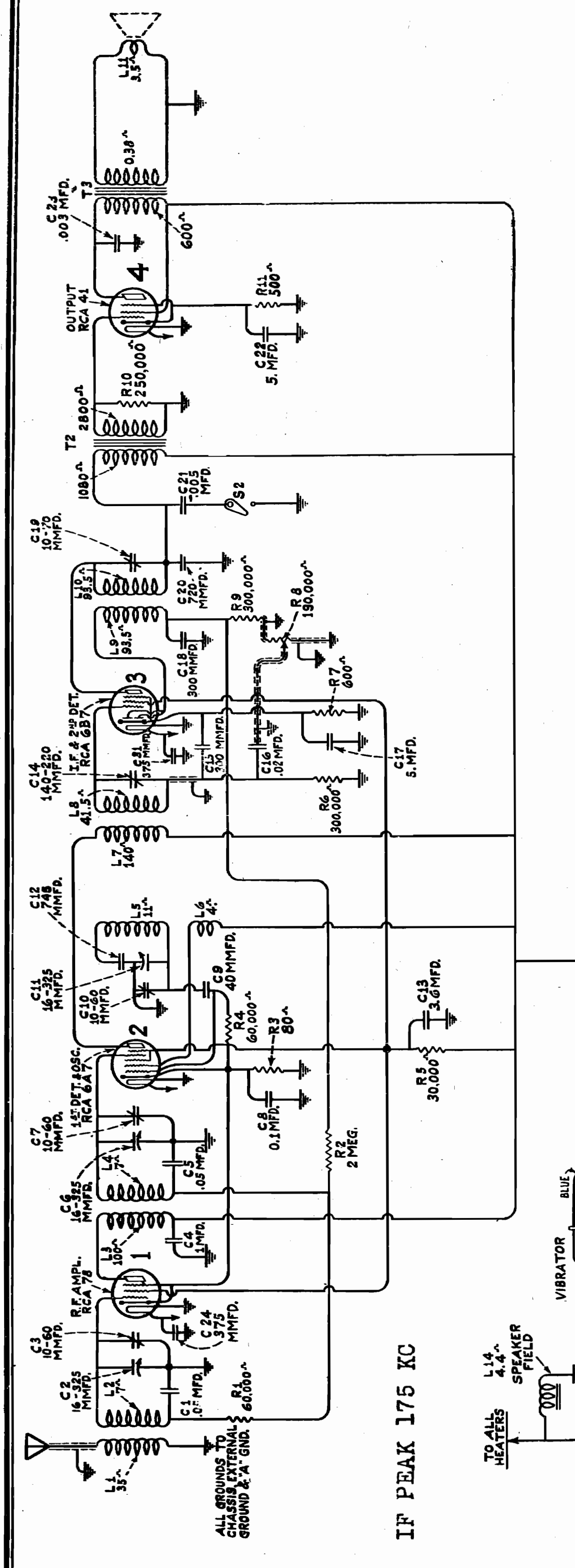
Refer to the detailed view of the antenna connector shown in Figure 1 and proceed to attach the lead-in wire (if shielded) as follows: First, cut the end of the lead-in so that the internal insulated wire and loom (if present) are flush with the end of the shield covering and push back the shield approximately 1½ inches. Cut the loom to the end of the shield and then remove sufficient insulation to expose one inch of clean bare-conductor. Now disconnect the female portion of the connector attached to the receiver antenna lead and remove the small internal bushing and spring.

To assemble, slip the bared conductor through the female portion of the connector and then through the spring and bushing, making certain that the insulation enters the end of the connector. Bend over and spread the strands of the conductor against the forward end of the bushing and then force one of the eyelets (packed in small envelope in outfit package) into the bushing to hold the conductor in position. Cut off the ends of the conductor strands approximately ⅛ inch beyond the edge of the eyelet and bend the strands over toward the center of the eyelet. The assembly may be now attached to the receiver portion of the connector and the shield covering on the lead-in wire pushed forward to cover the adjacent end of the female portion. Finally, bond the shield to the connector by means of the small clamp furnished. **No soldering operations are required.**

NOTE—An unshielded lead-in wire (as in the case of the interior-type antenna) may be attached to the antenna connector as described above except that all references to the shield braid and loom may be neglected.

# RCA-VICTOR CO., INC.

**MODEL M-105**
**Schematic**
**Installation Details**



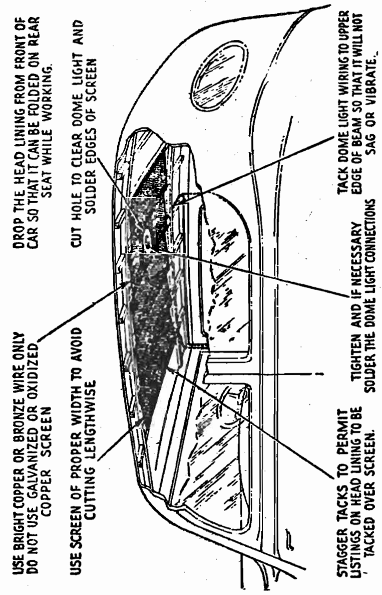




*Figure 2*

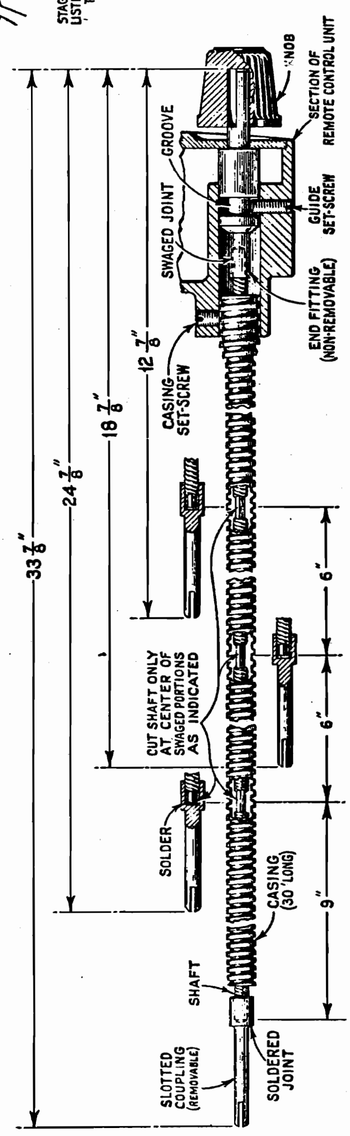
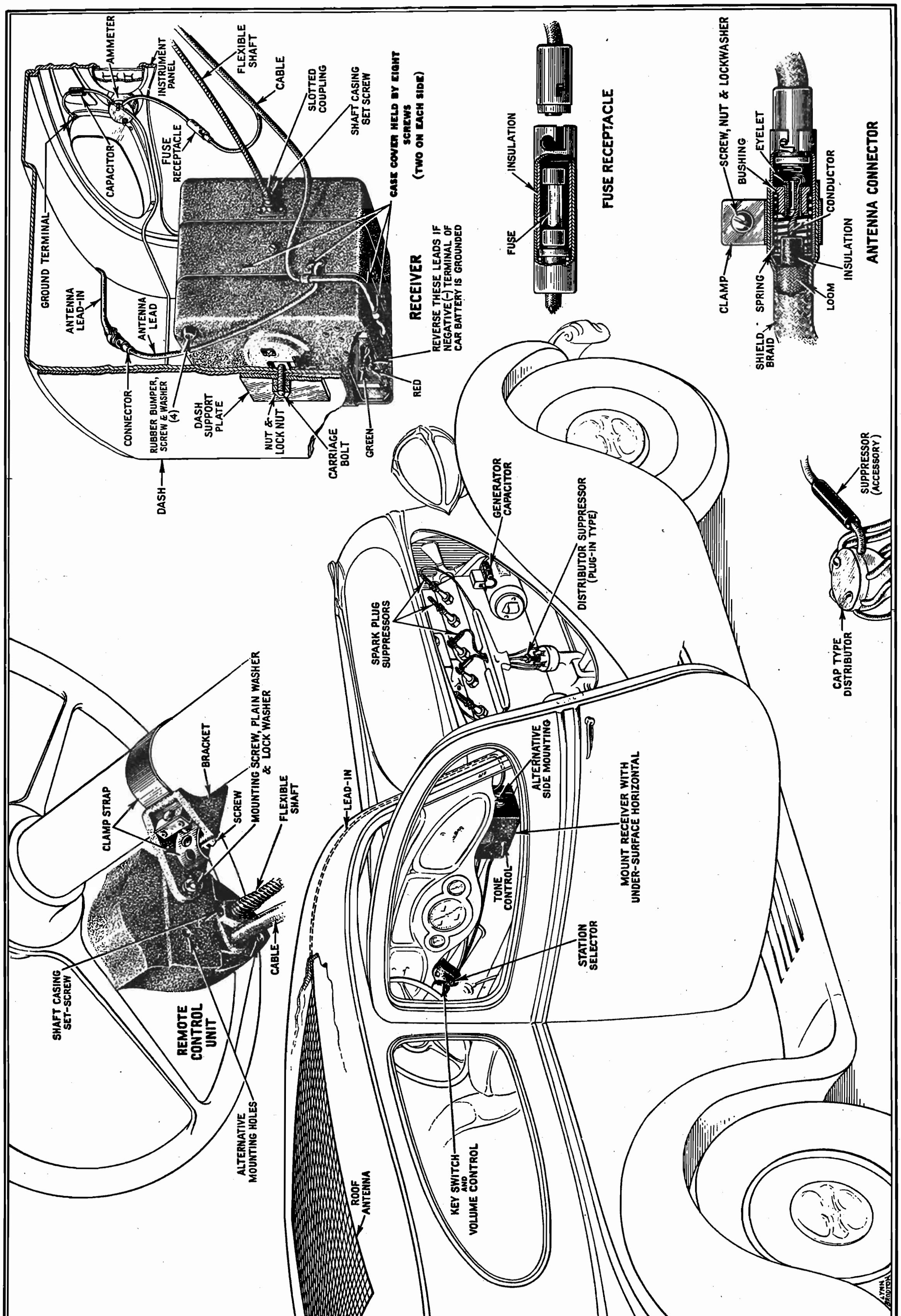



*Figure 3*

MODEL M-105
Installation Details

RCA-VICTOR CO., INC.



# RCA-VICTOR CO., INC.

**MODEL M-105**
**Chassis Wiring**

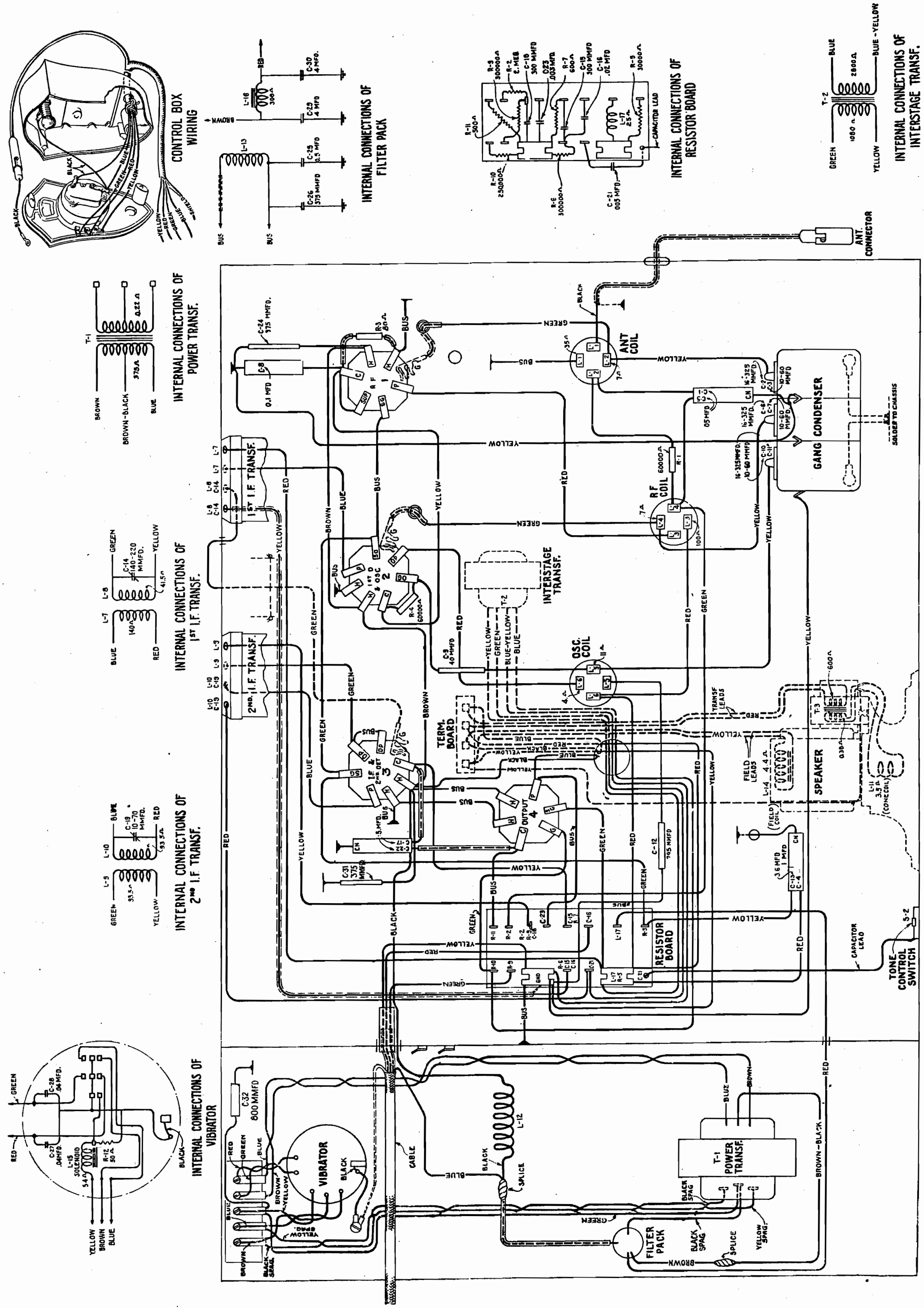



*Figure B—Wiring Diagram*

MODEL M-105
Parts List

RCA-VICTOR CO., INC.

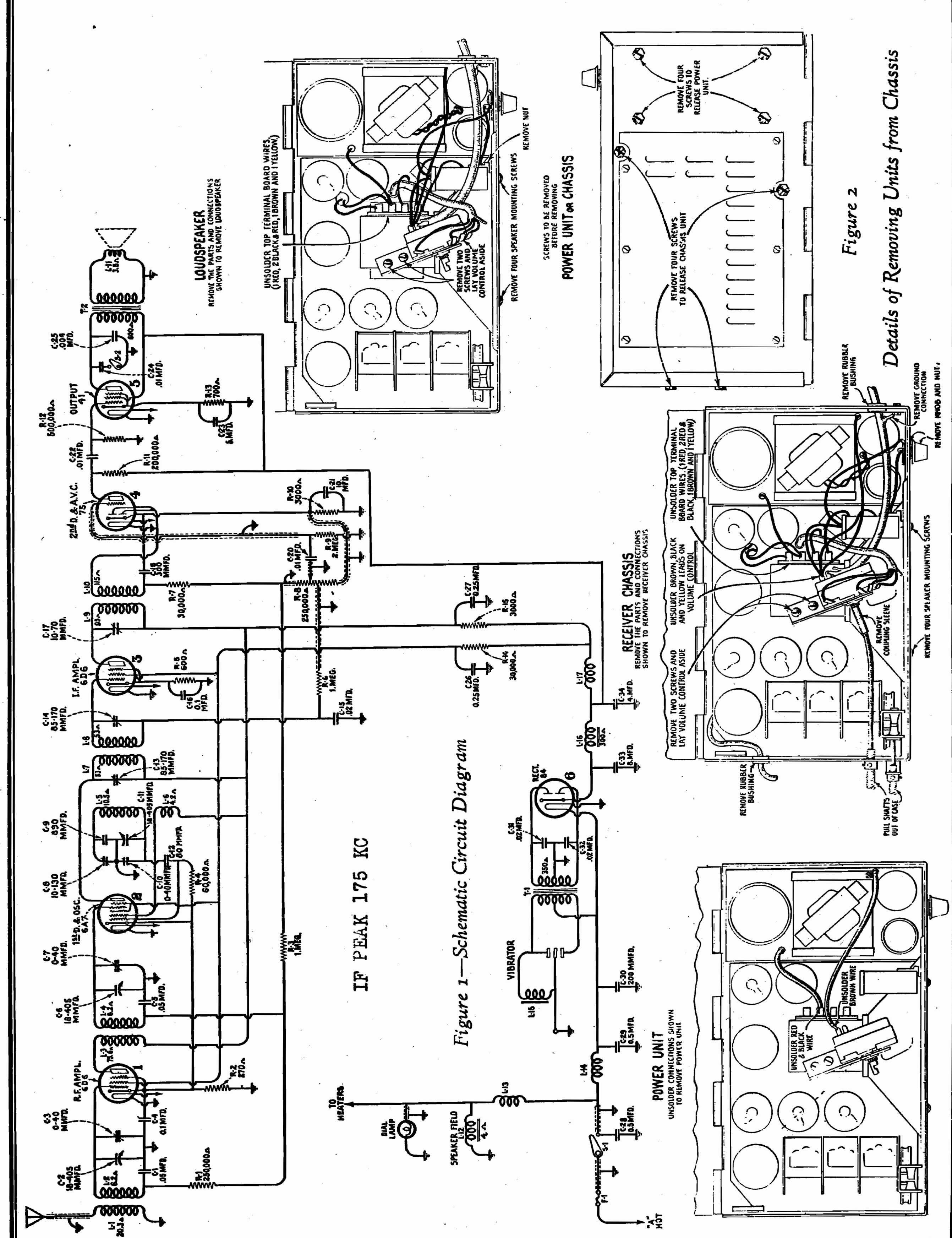
# REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | **RECEIVER ASSEMBLIES** | |
| 2240 | Resistor—30,000 ohms—Carbon type—1 watt (R5) | $0.22 |
| 2747 | Cap—Contact cap—Package of 5 | .50 |
| 3218 | Resistor—600 ohms—Carbon type—¼ watt (R7)—Package of 5 | 1.00 |
| 3536 | Capacitor—Comprising two 5.0 mfd. capacitors (C17, C22) | 1.10 |
| 3572 | Socket—Radiotron 7-contact socket | .38 |
| 3584 | Ring—Antenna R. F. or oscillator coil retaining ring—Package of 5 | .40 |
| 3602 | Resistor—60,000 ohms—Carbon type—¼ watt (R1, R4)—Package of 5 | 1.00 |
| 3616 | Capacitor—300 mmfd. (C15, C18) | .34 |
| 3617 | Capacitor—0.005 mfd. (C21) | .38 |
| 3618 | Capacitor—0.02 mfd. (C16) | .38 |
| 3621 | Coil—Choke coil—Located on resistor board (L17) | .35 |
| 3623 | Shield—Antenna R. F. or oscillator coil shield | .30 |
| 3632 | Resistor—500 ohms—Carbon type—1 watt (R11)—Package of 5 | 1.10 |
| 3636 | Transformer—First intermediate frequency transformer (L7, L8, C14) | 1.74 |
| 3637 | Transformer—Second intermediate frequency transformer (L9, L10, C19) | 1.65 |
| 3641 | Capacitor—0.1 mfd. (C8) | .35 |
| 3645 | Knob—Tone control knob—Package of 5 | .90 |
| 3695 | Capacitor—375 mmfd. (C24, C31) | .22 |
| 3696 | Capacitor—40 mmfd. (C9) | .22 |
| 3699 | Capacitor—720 mmfd. (C20) | .40 |
| 3744 | Resistor—250,000 ohms—Carbon type—¼ watt (R10)—Package of 5 | 1.00 |
| 3745 | Capacitor—745 mmfd. (C12) | .34 |
| 3746 | Capacitor—800 mmfd. (C32) | .34 |
| 3920 | Capacitor—.003 mfd. (C23) | .25 |
| 3921 | Mounting screws, washer and bushing assembly—For 3-gang variable tuning condenser—Comprising three spacers, three screws, three washers and three lock-washers | .34 |
| 3922 | Resistor—300,000 ohms—Carbon type—¼ watt (R6, R9)—Package of 5 | 1.00 |
| 4091 | Resistor—80 ohms—Carbon type—¼ watt (R3)—Package of 5 | 1.00 |
| 6192 | Spring—Tuning condenser drive cord tension spring—Package of 10 | .30 |
| 6242 | Resistor—2 megohm—Carbon type—¼ watt (R2)—Package of 5 | 1.00 |
| 6298 | Cord—Tuning condenser drive cord—Package of 5 | .60 |
| 6471 | Coil—Oscillator coil assembly (L5, L6) | .74 |
| 6490 | Tone control switch | .35 |
| 6492 | Capacitor—Comprising one 3.6 mfd. and one 1.0 mfd. capacitor (C4, C13) | 1.08 |
| 6493 | Drum—Tuning condenser drive drum | .40 |
| 6514 | Capacitor—Comprising two 0.05 mfd. capacitors (C1, C5) | .28 |
| 6515 | Cable—Shielded cable with antenna connector | .32 |
| 6516 | Connector—Fuse connector | .16 |
| 6517 | Cable—Main cable complete with fuse connector | 1.40 |
| 6540 | Coil—R. F. coil assembly (L3, L4) | .94 |
| 6731 | Coil—Antenna coil (L1, L2) | .88 |
| 6732 | Transformer—Interstage audio transformer (T2) | 2.00 |
| 7485 | Socket—Radiotron 6-contact socket | .40 |
| 7600 | Filter pack—Comprising one reactor, one choke coil, one 0.5 mfd., two 4.0 mfd. and one 375 mmfd. capacitors (L13, L16, C25, C26, C29, C30) | 4.06 |
| 7601 | Condenser—3-gang variable tuning condenser | 2.84 |
| 9049 | Transformer—Power transformer (T1) | 3.75 |
| | **CONTROL BOX ASSEMBLIES** | |
| 3649 | Key—Volume control and switch key | $0.18 |
| 3650 | Screw—Self locking No. 10–32–3/16" fulldog point set screw—Package of 10 | .32 |
| 3651 | Screw—Self locking No. 10–32–3/16" cupped point set screw—Package of 10 | .32 |
| 3652 | Screw—Self locking No. 10–32–¼" cupped point set screw—For flexible drive shaft—Package of 10 | .32 |
| 3690 | Strap and bracket assembly—Comprising one bracket, two screws, one lockwasher and one strap | .40 |
| 3718 | Bracket—Control box dash mounting bracket | .25 |
| 3757 | Coupling—Slotted coupling for end of flexible drive shaft—Package of 5 | .40 |
| 3758 | Connector—For control box end of flexible drive shaft—Package of 5 | .68 |
| 6161 | Knob—Station selector knob—Package of 5 | .90 |
| 6496 | Shaft—Flexible drive shaft complete with connectors—Approximately 24⅞" long | 1.60 |
| 6497 | Shaft—Flexible drive shaft complete with connectors—Standard length—Approximately 33⅞" long | 1.75 |
| 6499 | Volume control—Combination volume control and switch (R8) | 1.36 |
| 6500 | Nut—Volume control and switch lock nut | .24 |
| 6531 | Shaft—Flexible drive shaft complete with connectors—Approximately 12⅞" long | .85 |
| 6532 | Shaft—Flexible drive shaft—Complete with connectors—Approximately 18⅞" long | 1.24 |
| 6784 | Scale—Dial scale | .58 |
| 7695 | Box—Control box complete | 3.70 |
| 7698 | Cover—Control box cover | .44 |
| | **MISCELLANEOUS PARTS** | |
| 3466 | Connector—Antenna lead-in connector | .60 |
| 3646 | Fuse—20 amperes—Package of 5 | .40 |
| 3647 | Nut—Cap nut and lock washer—Package of 10 | .35 |
| 3648 | Screw—No. 10–32–3/16" cap screw and lockwasher—Package of 10 | .32 |
| 3689 | Bracket—Receiver mounting bracket, bolt and nut assembly—One set | .30 |
| 3791 | Bushing and plate assembly—Flexible drive shaft bushing with plate, mounting screws, rubber bushings, and washers—Located on main case | .30 |
| 3827 | Cable—From fuse connector to ammeter | .10 |
| 3856 | Clip—Spring clip—Grounds receiver chassis to metal housing—Package of 10 | .30 |
| 3884 | Clamp—Cable clamp—Package of 10 | .20 |
| 4051 | Bumper—Rubber bumper used in mounting receiver chassis—Package of 4 | .20 |
| 6151 | Suppressor—Spark plug suppressor | .56 |
| 6152 | Suppressor—Distributor suppressor | .56 |
| 6175 | Suppressor—Distributor splice-in suppressor | .56 |
| 6494 | Capacitor—Ammeter capacitor—0.5 mfd. | .46 |
| 6495 | Capacitor—Generator capacitor—0.5 mfd. | .72 |
| 6670 | Suppressor—Spark plug suppressor—"Elbow type" | .56 |
| 7065 | Screw-driver—For R. F. and I. F. adjustments | .80 |
| 7621 | Antenna—Roof antenna—Paper type (Brown) | 1.50 |
| 7622 | Antenna—Roof antenna—Paper type (Gray) | 1.50 |
| 7686 | Housing—Front section of housing complete with mounting screws | 3.48 |
| 7689 | Vibrator Complete | 7.84 |
| 7699 | Housing—Rear section of housing complete with mounting screws | 1.92 |
| 9050 | Oscillator—Test oscillator—150–25,000 K. C. | 33.50 |
| | **REPRODUCER ASSEMBLIES** | |
| 3688 | Transformer—Output transformer (T3) | 1.50 |
| 7607 | Screen—Metal screen | .44 |
| 7608 | Coil assembly—Comprising field coil, magnet and cone support (L14) | 2.40 |
| 9023 | Cone—Reproducer cone complete (L11)—Package of 5 | 5.00 |

# RCA-VICTOR CO., INC.

**MODEL M-107**
**Schematic**
**Service Details**




IF PEAK 175 KC

Figure 1—Schematic Circuit Diagram

Figure 2
Details of Removing Units from Chassis

MODEL M-107
Chassis Wiring

RCA-VICTOR CO., INC.

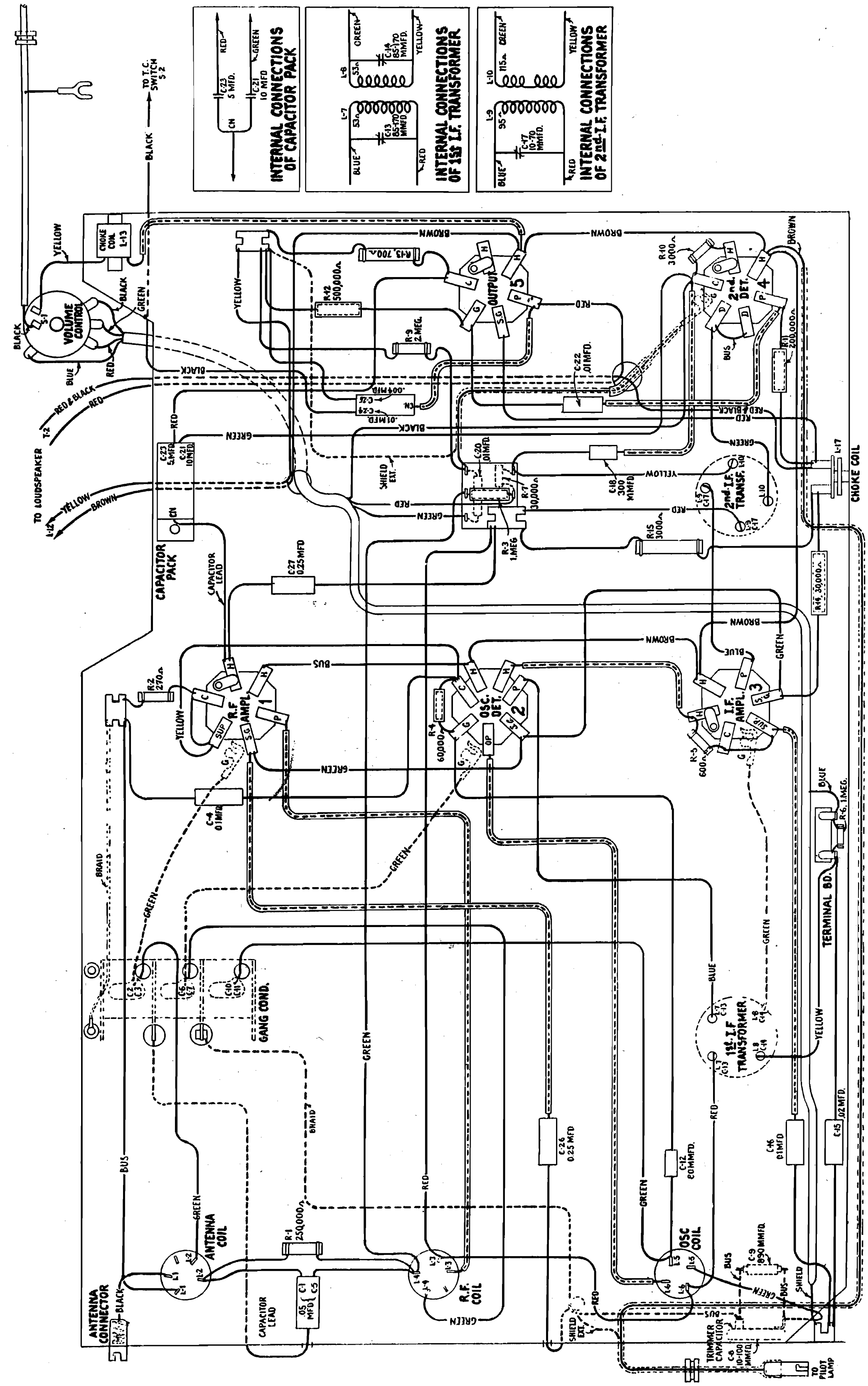



*Figure 5—Receiver Assembly Wiring Diagram*

RCA-VICTOR CO., INC.

# SERVICE DATA

**(1) Removing Units from Chassis:**

The three major units, the power unit, the loudspeaker and the receiver chassis, are easily removed independently without disturbing the other units not removed. To do this, the use of a screwdriver and soldering iron are the only tools required. Figure 2 shows the details of the screws and terminals to be removed in each individual case.

**(2) Line-Up Capacitor Adjustments:**

Adjustable capacitors are provided in the R. F. oscillator and intermediate frequency amplifier to provide a means of properly aligning the receiver. A modulated R. F. oscillator such as Full-Range Test Oscillator, type TMV-97-B (Stock No. 9050), a non-metallic screwdriver such as alignment wrench Stock No. 4160 and an output meter are required for properly aligning this receiver. Refer to Figure 3 for the location of the line-up capacitors.

**I. F. Tuning Adjustments:**

Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from beneath the chassis as shown in Figure 3. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 4160 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the primary and secondary of the first I. F. transformers, until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

**R. F. and Oscillator Adjustments:**

The three-gang capacitor trimmer screws are located on the main tuning capacitor, accessible at the top of the chassis. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screwdriver such as Stock No. 4160 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Place the receiver in operation and attach the control box as in normal operation. Turn the tuning control until the tuning capacitors are fully meshed. Then set the indicator on the dial at the 530 K. C. reading. Turn the tuning control until the dial reads 1400. Then set the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the three-gang capacitor trimmer screws until maximum output is obtained. Be careful not to disturb the relation of the control box to the receiver after setting the dial.

(c) After making the 1400 K. C. adjustment, shift the oscillator to 600 K. C. and tune in the signal. Adjust the 600 K. C. trimmer, accessible from the side of the chassis for maximum output while rocking the gang-capacitor back and forth. Then again check the adjustment described in (b).

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

**(4) R. F. Interference from Vibrator with Shielded Lead-In Disconnected from Antenna:**

In event R. F. interference originating with the vibrator inverter-rectifier unit is encountered, check the following points:

(a) Vibrator not properly seated. The vibrator must be pushed tight against its socket at all times.

(b) The various by-pass capacitors, such as C-28, C-29 and C-30 and chokes L-13, L-14 and L-16, must be properly connected, and in operating condition. It is well to remember that some of the interference produced by the vibrator is of a frequency as high as one meter and any replacement of capacitors must always be made with one of similar mechanical as well as electrical construction.

MODEL M-107
Vibrator Data
Trimmer Locations
Socket Layout

RCA-VICTOR CO., INC.

**(5) Voltage Readings:**

The following voltages are those at the tube socket while the receiver is in operating condition. No allowance has been made for currents drawn by the meter and if low resistance meters are used, such allowances must be made.

**(6) Vibrator Inverter:**

The Vibrator Inverter unit used in this receiver is of advanced design and construction. It is adjusted by means of special equipment at the factory and then sealed to prevent tampering. The unit is provided with a special plug-in base so that in event of suspected failure it may be easily interchanged with one of known condition.

With the seals unbroken, the Vibrator carries the standard ninety-day guarantee, which also applies to all parts of the receiver. Vibrator defects should be remedied by replacement, not by attempted adjustment.

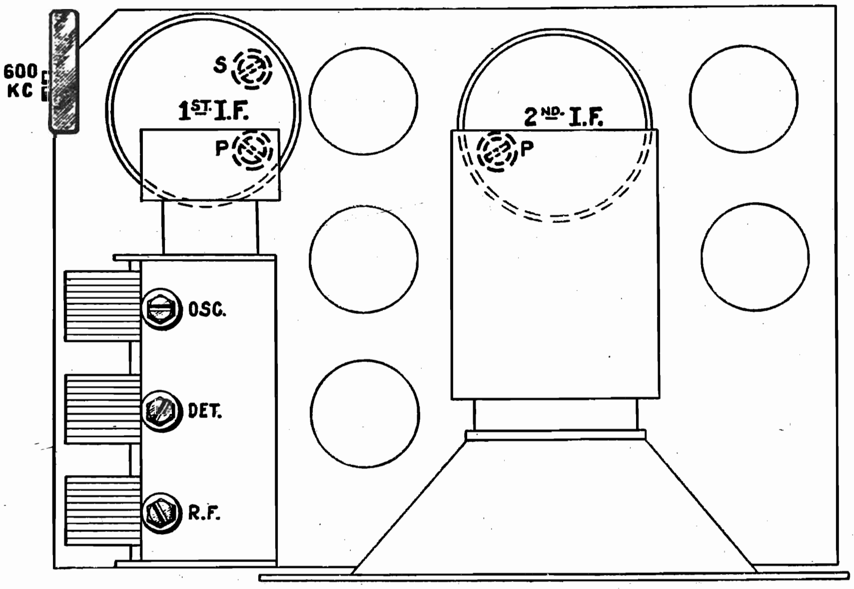



*Figure 3—Location of Line-Up Capacitors*

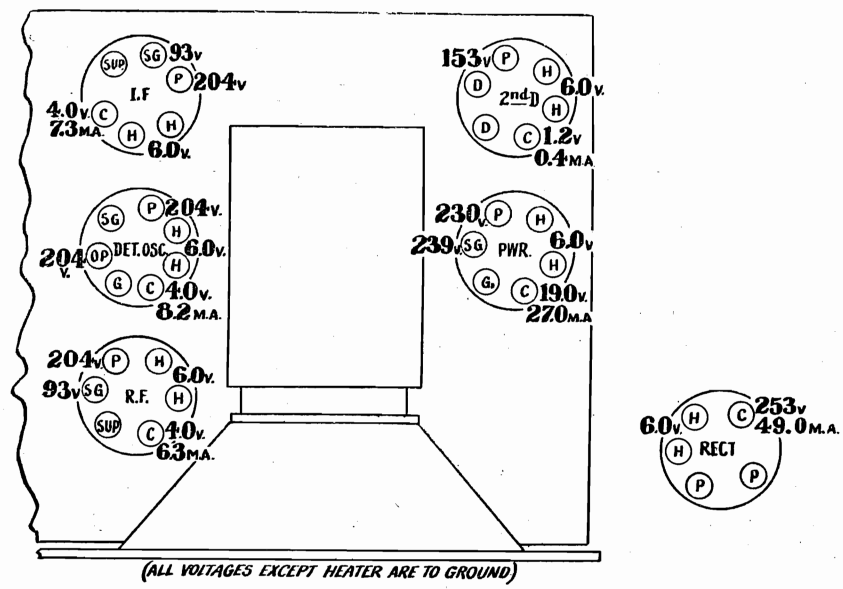



*Figure 4—Voltages at Individual Socket Contacts*

MODEL M-107
Voltage
Chassis Wiring

RCA-VICTOR CO., INC.

# RADIOTRON SOCKET VOLTAGES

## 6.3 Volt Battery—No Signal—Minimum Volume

| Radiotron No. | | Cathode to Ground Volts, D. C. | Screen Grid to Ground Volts, D. C. | Plate to Ground Volts, D. C. | Cathode Current, M. A. | Heater Volts, D. C. |
|---|---|---|---|---|---|---|
| RCA-6D6—R. F. | | 4.0 | 93 | 204 | 6.3 | 6.0 |
| RCA-6A7 | 1st Det. | 4.0 | 93 | 204 | 8.2 | 6.0 |
| | Osc. | — | — | 204 | | |
| RCA-6D6—I. F. | | 4.0 | 93 | 204 | 7.3 | 6.0 |
| RCA-75—2nd Det. | | 1.2 | — | 153* | 0.4 | 6.0 |
| RCA-41—Pwr. | | 19.0 | 239 | 230 | 27.0 | 6.0 |
| RCA-84—Rect. | | 253 | — | — | 49.0 | 6.0 |

* Voltage impossible to measure with ordinary voltmeter.

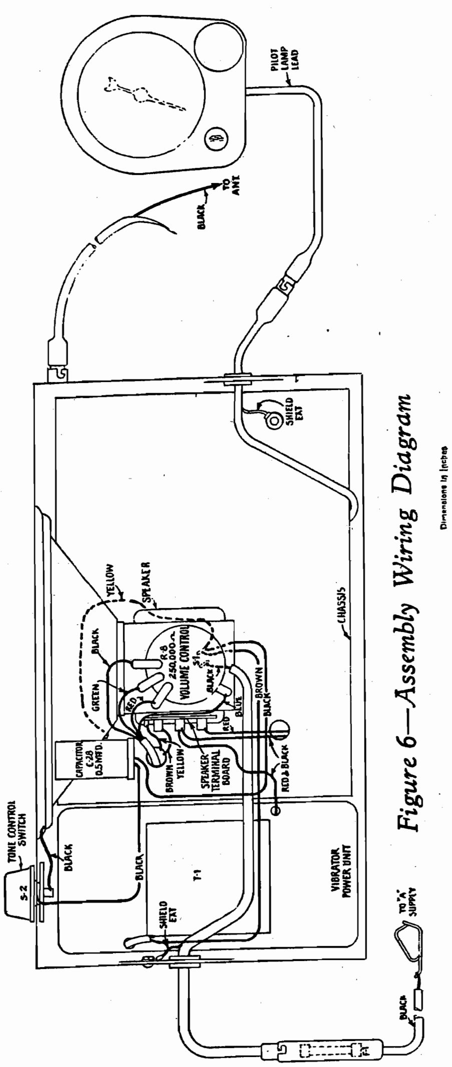



Figure 6—Assembly Wiring Diagram

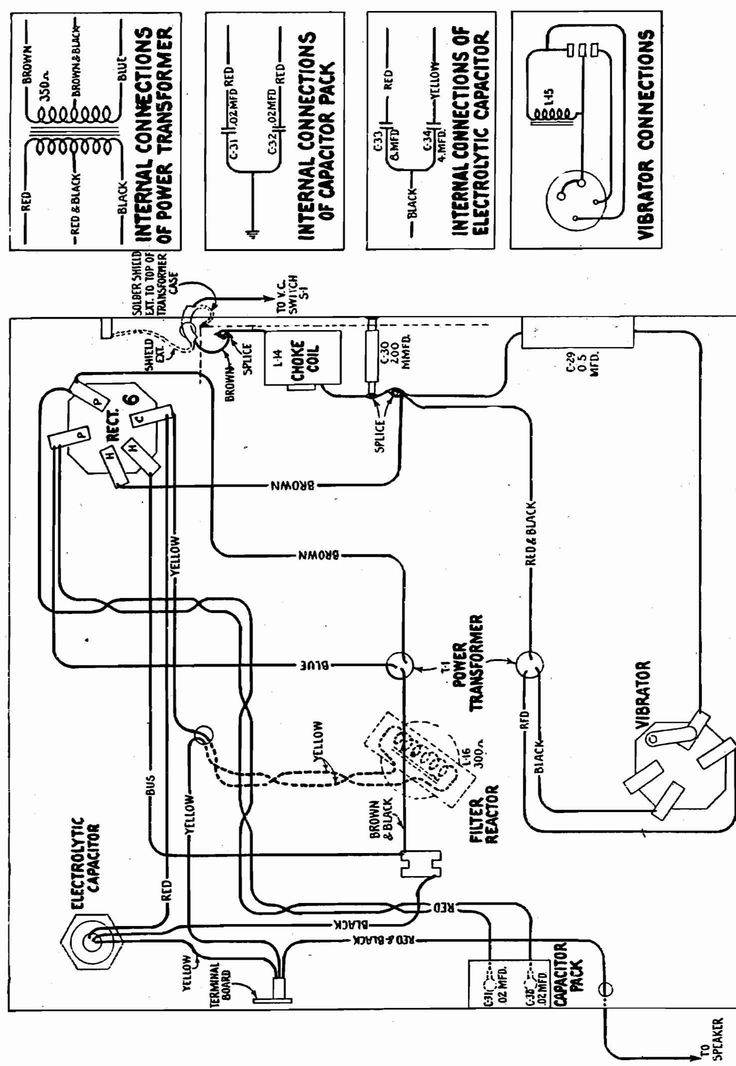



Figure 7—Power Unit Wiring Diagram

RCA-VICTOR CO., INC.

## REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | Description | List Price |
|---|---|---|
| | REPRODUCER ASSEMBLIES | |
| 4305 | Bracket—Tuning condenser drive bracket assembly | $0.45 |
| 6981 | Cable—4-conductor shielded volume control cable | .42 |
| 4300 | Cable—Single-conductor—Power input cable | .56 |
| 4301 | Cable—Single-conductor—Dial lamp cable | .38 |
| 3861 | Capacitor—Adjustable trimmer capacitor (C8) | .78 |
| 4246 | Capacitor—80 mmfd. (C12) | .24 |
| 4248 | Capacitor—300 mmfd. (C18) | .22 |
| 4245 | Capacitor—890 mmfd. (C9) | .26 |
| 3639 | Capacitor—.02 mfd. (C15) | .25 |
| 3701 | Capacitor—.01 mfd. (C20, C22) | .30 |
| 3877 | Capacitor—0.1 mfd. (C4, C16) | .32 |
| 3597 | Capacitor—.25 mfd. (C26, C27) | .40 |
| 4304 | Capacitor—0.5 mfd. (C28) | .72 |
| 6979 | Capacitor pack—Comprising one .01 and one .004 mfd. (C24, C25) | .28 |
| 6963 | Capacitor pack—Comprising one 5. mfd. and one 10 mfd. capacitor (C21, C23) | 1.10 |
| 4243 | Capacitor pack—Comprising two .05 mfd. capacitors (C1, C5) | .35 |
| 6965 | Coil—Antenna coil (L1, L2) | .70 |
| 4299 | Coil—Choke coil (L13) | .35 |
| 4298 | Coil—Choke coil (L17) | .28 |
| 6967 | Coil—Oscillator coil (L5, L6) | .52 |
| 6966 | Coil—R. F. coil assembly (L3, L4) | .80 |
| 7768 | Condenser—3-gang variable tuning condenser (C2, C3, C6, C7, C10, C11) | 4.75 |
| 4306 | Cord—Tuning condenser drive cord—Package of 10 | 1.05 |
| 6493 | Drum—Tuning condenser dial drum and hub with set screws | .40 |
| 3584 | Ring—Antenna, R. F. or oscillator coil retaining ring—Package of 5 | .40 |
| 4307 | Roller—Tuning condenser idler roller—Package of 5 | .25 |
| 6135 | Resistor—270 ohms—Carbon type—¼ watt (R2)—Package of 5 | 1.00 |
| 3218 | Resistor—600 ohms—Carbon type—¼ watt (R5)—Package of 5 | 1.00 |
| 4242 | Resistor—3,000 ohms—Carbon type—¼ watt (R10)—Package of 5 | 1.00 |
| 3152 | Resistor—30,000 ohms—Carbon type—¼ watt (R7)—Package of 5 | 1.00 |
| 3602 | Resistor—60,000 ohms—Carbon type—¼ watt (R4)—Package of 5 | 1.00 |
| 3116 | Resistor—200,000 ohms—Carbon type—¼ watt (R11)—Package of 5 | 1.00 |
| 3744 | Resistor—250,000 ohms—Carbon type—¼ watt (R1)—Package of 5 | 1.00 |
| 6186 | Resistor—500,000 ohms—Carbon type—¼ watt (R12)—Package of 5 | 1.00 |
| 3033 | Resistor — 1 megohm — Carbon type — ¼ watt (R3, R6)—Package of 5 | 1.00 |
| 6242 | Resistor — 2 megohms — Carbon type — ¼ watt (R9)—Package of 5 | 1.00 |

| Stock No. | Description | List Price |
|---|---|---|
| 4302 | Resistor—700 ohms—Carbon type—1 watt (R13)—Package of 10 | $2.00 |
| 2240 | Resistor—30,000 ohms—Carbon type—1 watt (R14) | .22 |
| 4239 | Resistor—3,000 ohms—Carbon type—3 watt (R15) | .25 |
| 3623 | Shield—Antenna, R. F. or oscillator coil shield | .30 |
| 4233 | Shield—Detector oscillator or output Radiotron shield | .22 |
| 4236 | Shield—I. F. or R. F. amplifier Radiotron shield | .22 |
| 4232 | Socket—6-contact Radiotron socket | .35 |
| 3572 | Socket—7-contact Radiotron socket | .38 |
| 6192 | Spring—Tuning condenser drive cord tension spring—Package of 10 | .30 |
| 6960 | Transformer—First intermediate frequency transformer (L7, L8, C13, C14) | 1.80 |
| 6962 | Transformer—Second intermediate frequency transformer (L9, L10, C17) | 1.85 |
| 6978 | Volume control (R8) | 1.20 |
| | CONTROL BOX ASSEMBLIES | |
| 6976 | Back—Control box back | .75 |
| 7769 | Box—Control box complete | 3.90 |
| 3690 | Bracket and strap assembly—Comprising one bracket, two screws, one lockwasher and one strap | .40 |
| 7770 | Cover—Control box front cover | .86 |
| 4259 | Cover—Station selector dial cover—Transparent celluloid—Package of 5 | .92 |
| 4261 | Dial—Station selector dial | .15 |
| 4258 | Key—Volume control key | .20 |
| 4256 | Lamp—Dial lamp | .30 |
| 4260 | Pointer—Station selector indicator | .18 |
| 4257 | Ring—Station selector dial cover ring (escutcheon) | .75 |
| 4262 | Screen—Dial light screen—Package of 5 | .26 |
| 4255 | Screw—No. 4-40-¼ inch oval head machine screw for holding cover to control box back—Package of 10 | .16 |
| 4252 | Screw—No. 10-32-1⁵⁄₁₆-inch fillister head set screw for holding condenser drive and pinion gear and volume coupling control shaft—Package of 10 | .32 |
| 3652 | Screw—No. 10-32-¼-inch cupped point set screw for holding station selector or volume control flexible drive shaft to control box—Package of 10 | .32 |
| 4254 | Shaft—Volume control coupling shaft | .36 |
| 4250 | Shaft and gear—Station selector pointer shaft and gear | .56 |
| 4251 | Shaft and gear—Station selector drive shaft and pinion gear | .20 |
| 4253 | Spring—Volume control key holding spring—Package of 10 | .32 |

## REPLACEMENT PARTS—Continued

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | Description | List Price |
|---|---|---|
| | FLEXIBLE SHAFT AND CABLE ASSEMBLIES | |
| 7762 | Cable—Dial lamp cable with socket and section of connector | $.76 |
| 4264 | Clamp—Metal clamp for holding flexible shafts—Package of 10 | .35 |
| 4295 | Screw—No. 10-32-¼-inch cupped point set screw—Fastens flexible shaft housing to metal case—Package of 10 | .20 |
| 7771 | Shaft—Station selector flexible drive shaft approximately 28 inches long | 1.44 |
| 7773 | Shaft—Station selector flexible drive shaft approximately 23 inches long | 1.32 |
| 7772 | Shaft—Volume control flexible drive shaft approximately 32 inches long | 1.68 |
| 7774 | Shaft—Volume control flexible drive shaft approximately 27 inches long | 1.56 |
| 4265 | Sleeve—Coupling sleeve for volume control shaft—Package of 5 | .15 |
| 4263 | Socket—Dial lamp socket | .20 |
| | POWER SUPPLY UNIT | |
| 4013 | Capacitor—200 mmfd. (C30) | .30 |
| 4293 | Capacitor—0.5 mfd. (C29) | .60 |
| 7779 | Capacitor—Comprising two .02 mfd. capacitors (C31, C32) | .96 |
| 7776 | Capacitor—Comprising one 8. mfd. and one 4 mfd. capacitors (C33, C34) | 1.90 |
| 3956 | Clamp—Capacitor mounting clamp—Package of 5 | .32 |
| 7778 | Coil—Filter reactor choke coil (L14) | .45 |
| 7777 | Reactor—Filter reactor (L16) | 1.14 |
| 4308 | Screw—Binder head No. 6-32-¼-inch screw for mounting capacitor pack—package of 10 | .18 |
| 6980 | Socket—4-contact vibrator socket | .20 |
| 7484 | Socket—5-contact Rectifier socket | .35 |
| 7775 | Transformer—Vibrator transformer (T1) | 3.78 |
| 7780 | Vibrator complete (L15) | 4.96 |
| | REPRODUCER ASSEMBLIES | |
| 9496 | Coil—Field coil, magnet and cone support (L12) | 2.95 |
| 9492 | Cone—Reproducer cone (L11)—Package of 5 | 3.70 |
| 6982 | Transformer—Output transformer (T2) | 1.35 |
| 9494 | Reproducer complete | 5.65 |
| 4277 | Screw—No. 8-32-⅜-inch binder head reproducer mounting screw—Package of 10 | .22 |
| | HOUSING ASSEMBLIES | |
| 4322 | Bracket assembly—Station selector drive shaft bracket and bushing | .28 |
| 4321 | Cloth—Grille cloth | .22 |
| 7781 | Housing—Front section of housing complete—Less hinge pin | 3.38 |

| Stock No. | Description | List Price |
|---|---|---|
| 7782 | Housing—Rear section of housing complete—Less hinge pin | $2.68 |
| 4320 | Nut—Wing nut—Package of 10 | .38 |
| 4266 | Pin—Hinge pin—Package of 5 | .42 |
| 4318 | Screw—Wing screw—Package of 10 | .98 |
| 4319 | Screw—No. 6-¼-inch slotted hex head self tapping—Fastens case bottom to front section of housing—Package of 10 | .50 |
| 4295 | Screw—No. 10-32-¼-inch headless set screw—Used to fasten drive shafts to housing—Package of 10 | .20 |
| | MISCELLANEOUS ASSEMBLIES | |
| 4287 | Body—Antenna connector body—Package of 10 | .40 |
| 4289 | Body—Fuse connector body—Package of 10 | .35 |
| 3689 | Bracket—Receiver mounting bracket, bolt and nut assembly | .30 |
| 4283 | Cable — Antenna lead-in cable — Approximately 35 inches long | .80 |
| 4288 | Cap—Antenna or fuse connector cap—Package of 10 | .36 |
| 4293 | Capacitor—Ammeter capacitor—.5 mfd. | .60 |
| 4292 | Capacitor—Generator capacitor—.5 mfd. | .90 |
| 4291 | Clip—"A" supply clip—Package of 10 | .70 |
| 4286 | Ferrule—Antenna or fuse connector ferrule and bushing—Package of 10 | .38 |
| 3646 | Fuse—20 ampere (F1)—Package of 5 | .40 |
| 4290 | Insulator—Fuse connector insulator—Package of 10 | .35 |
| 4323 | Knob—Tone control switch knob—Package of 5 | .70 |
| 4282 | Knob—Station selector knob—Package of 5 | .65 |
| 7766 | Lead—Power lead with female section of fuse connector—From power cable to battery | .30 |
| 4492 | Plate—Ornamental plate located on housing front—Package of 2 | .58 |
| 4494 | Plate—RCA Victor name plate | .94 |
| 4493 | Screw—No. 4 self-tapping screw for mounting ornamental plates—Package of 10 | .56 |
| 4495 | Screw—No. 8 self-tapping screw for mounting station selector drive shaft and bushing—Package of 10 | .52 |
| 4294 | Screw—No. 10-32-5⁄16-inch hex head used to mount receiver chassis to housing—Package of 10 | .45 |
| 4303 | Screw—No. 10-32-1⁄16-inch hex head used to mount power unit to housing—Package of 10 | .22 |
| 4284 | Spring—Antenna or fuse connector spring—Package of 10 | .30 |
| 6152 | Suppressor—Distributor suppressor | .56 |
| 6151 | Suppressor—Spark plug suppressor | .56 |
| 6669 | Switch—Tone control switch (S2) | .50 |
| 4285 | Washer—Antenna or fuse connector insulating washer—Package of 10 | .22 |

# RCA-VICTOR CO., INC.

Power Requirements......................105–125 volt, 50–60 Cycle A. C. or 6-volt Storage Battery
Power Consumption..115 Volts, 60 Cycles A. C.—40 Watts, Battery—5.7 Amperes at 6.3 Volts
Number and Types of Radiotrons..............1 RCA-78, 1 RCA-6A7, 1 RCA-6B7, 1 RCA-41, 1 RCA-1-V—Total 5
Maximum Undistorted Power Output............1.8 Watts
Maximum Output...........................3.6 Watts
Type of Rectifier..............A. C.—Radiotron RCA-1-V Battery—Vibrator Inverter-Rectifier
Tuning Frequency Range............540 K. C.–1500 K. C.

This automobile receiver is of unique design and construction. Among its many features is its adaptability to either battery or 110-volt alternating current operation. This is accomplished by having a separate power transformer and a

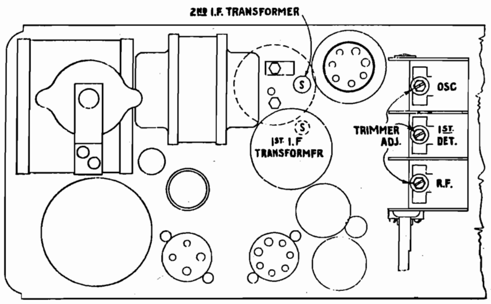



*Figure C—Location of Line-up Capacitors*

tube rectifier for alternating current, while the conventional vibrator inverter-rectifier with its associated transformer is used for battery operation.

Other important features include its compact portable size, full vision "airplane" type dial, tone control, sensitivity switch, electro-dynamic loudspeaker and the inherent sensitivity, selectivity and tone quality characteristic of the superheterodyne.

Figure A shows the schematic diagram, Figure B the wiring diagram, Figure C the location of the line-up capacitors and Figure D the wiring of the battery cable. A brief description of the circuit follows:

**Radio Circuit**—The radio circuit consists of four Radiotrons; namely, an RCA-78 R. F. stage, an RCA-6A7 first detector-oscillator, an RCA-6B7 intermediate frequency amplifier, second detector and A. V. C. and an RCA-41 output amplifier.

**Power Circuit**—The power circuit for battery operation consists of a vibrator inverter-rectifier with its associated transformer and filter circuits. The heaters of the various Radiotrons are powered direct from the car storage battery. The operating switch is so arranged that at one position battery operation is obtained, while at the other position, proper connections are made for A. C. operation.

When the switch is at the A. C. position, the A. C. input current is connected to the primary of the A. C. transformer. Two secondaries are provided, one for furnishing power to the Radiotron heaters and the dial lamp, the other for plate supply to Rectifier RCA-1-V. The output of the rectifier is then filtered by the same filtering system as that used for battery operation. The loudspeaker field is used as a filter reactor.

## Inverter-Rectifier Adjustments

This receiver uses a vibrator inverter-rectifier for supplying all plate and grid voltages when operated from a battery source. *This unit is accurately adjusted and sealed at the factory and service adjustment should not be attempted.*

## Line-up Capacitor Adjustments

The three R. F. line-up capacitors and two I. F. tuning capacitors are accessible and may require adjustments. The R. F. adjustments are made at 1400 K. C. and the I. F. adjustments at 175 K. C. In order to make these adjustments, it is first necessary to remove the cover of the instrument. The following procedure should be used:

### R. F. Adjustment:

(a) Check the position of the dial pointer. It should be aligned with the low-frequency end graduation, as indicated by the small arrow marked "Max. Cap." when the tuning capacitor rotor is fully meshed with the stator.

(b) Procure a modulated oscillator giving a signal at 1400 K. C. (Stock No. 9050), a non-metallic screw driver (Stock No. 7065) and an output meter. Connect the output meter across the cone coil of the loudspeaker.

(c) Couple the output of the oscillator from antenna to ground, set the dial at 140, and the oscillator at 1400 K. C.

(d) Place the oscillator and receiver in operation and adjust the oscillator output so that a small deflection is obtained in the output meter when the volume control is at its maximum position.

(e) Then adjust the three line-up capacitors until a maximum deflection in the output meter is obtained. Readjust these capacitors a second time, as there is a slight interlocking of adjustments.

### I. F. Adjustments:

(a) Procure a modulated oscillator giving a signal at 175 K. C. (Stock No. 9050), a non-metallic screw driver (Stock No. 7065) and an output meter.

(b) Connect the oscillator between the control grid of the first detector and ground.

(c) Connect the output meter across the voice coil of the loudspeaker. Then connect the antenna lead to ground and adjust the tuning capacitor so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the external oscillator output until a small deflection is obtained. Unless this is done, the action of the A. V. C. will make it impossible to obtain correct adjustments.

(d) Each transformer has but one winding that is tuned by means of an adjustable capacitor, the other windings being untuned. The capacitors should be adjusted for maximum output. At the time I. F. adjustments are made it is good practice to follow this adjustment with the R. F. adjustments, due to the interlocking that always occurs. The reverse of this, however, is not always true.

## RADIOTRON SOCKET VOLTAGES

**115 Volts A. C. or 6.3 Volt Battery—No Signal—Max. Sensitivity**

| Radiotron No. | | Cathode to Ground | Cathode to Screen Grid Volts | Cathode to Plate Volts | Cathode Current M. A. | Heater Volts |
|---|---|---|---|---|---|---|
| RCA-78 R. F. | | 4.2 | 86 | 216 | 5.5 | 5.9 |
| RCA-6A7 | First Detector | 4.2 | 86 | 216 | 10.0 Total | 5.9 |
| | Oscillator | | — | 216 | | |
| RCA-6B7 Second Det. | | 2.7 | 87 | 207 | 4.5 | 5.9 |
| RCA-41 Power | | 15.0 | 255 | 235 | 30.0 | 5.9 |
| RCA-1-V | | — | — | 325 RMS | 50.0 | 5.9 |

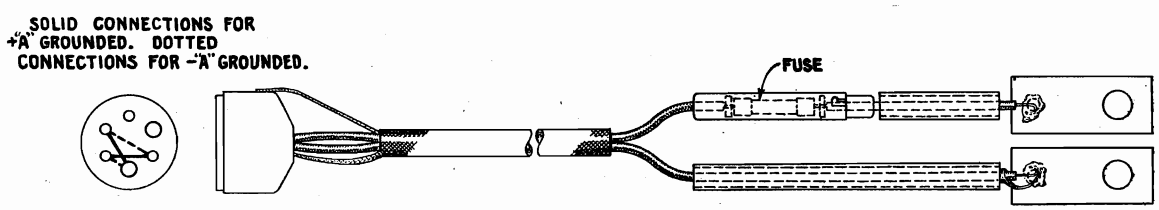



*Figure D—Internal Connections of Cable*

MODEL M-116
Chassis Wiring

# RCA-VICTOR CO., INC.

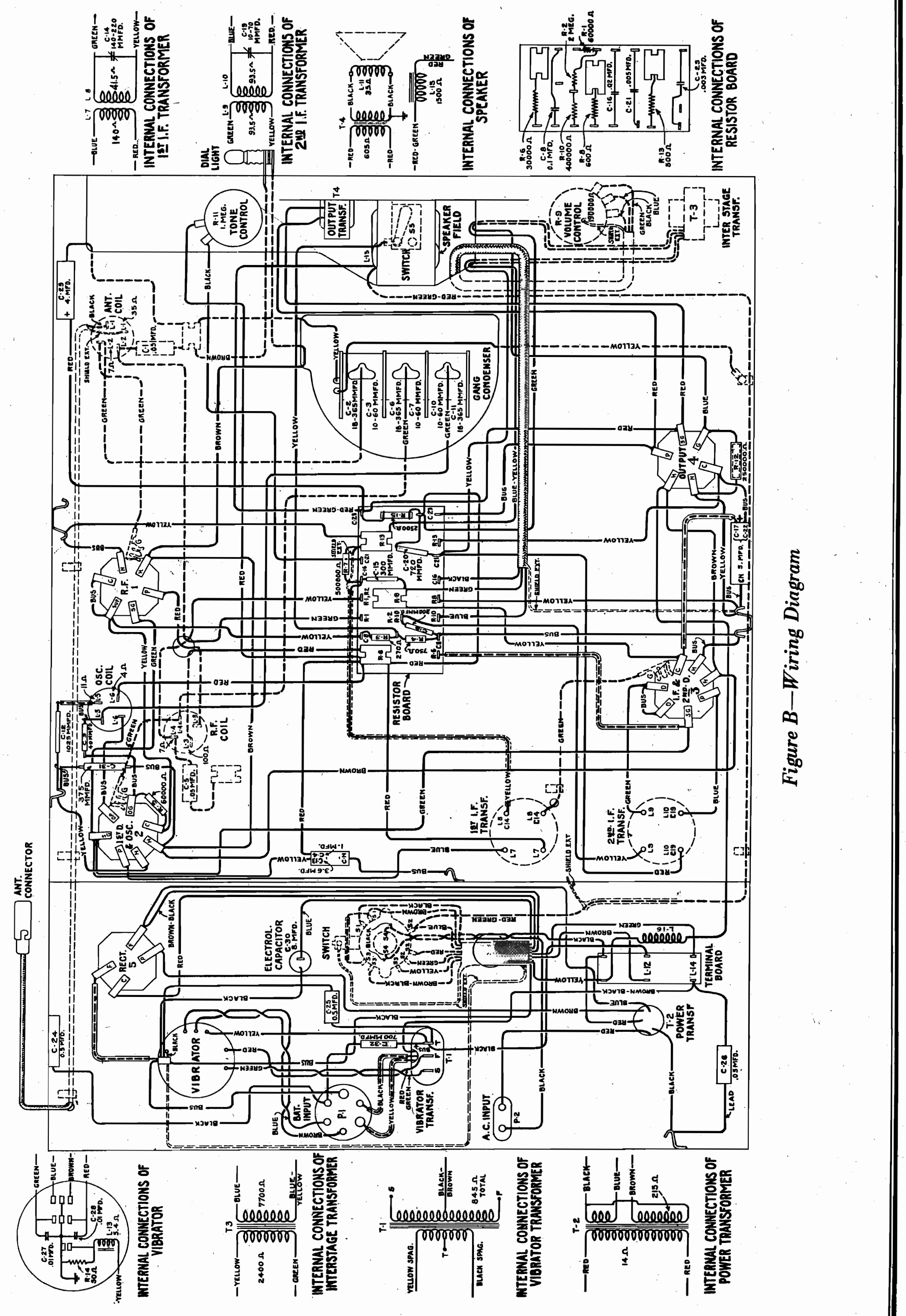


Figure B—Wiring Diagram

MODEL M-116
Schematic

# RCA-VICTOR CO., INC.

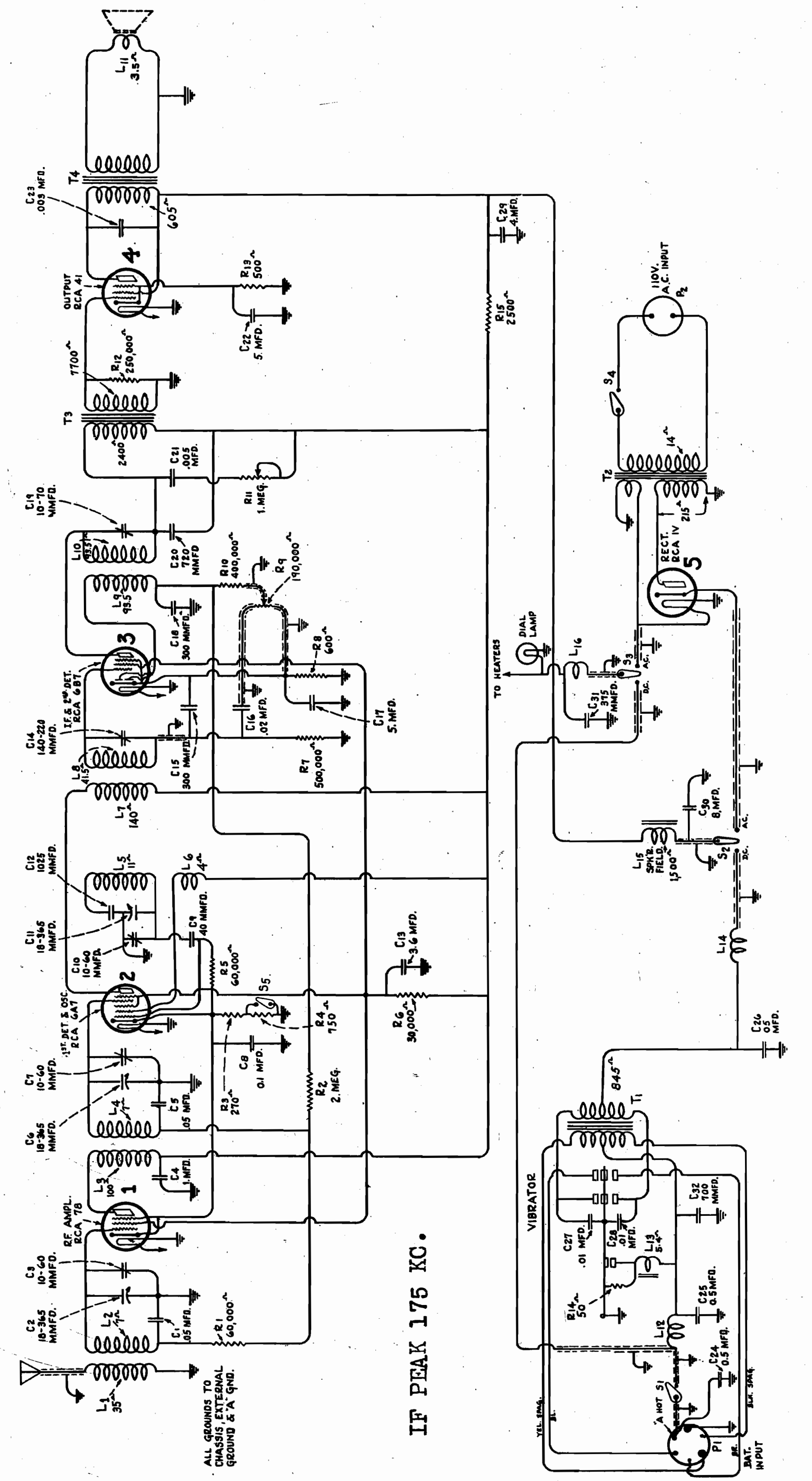



*Figure A—Schematic Circuit Diagram*

**MODEL M-116**
**Installation Notes**
**Parts List**

# RCA-VICTOR CO., INC.

# INSTALLATION

## Automobile Installation

A typical installation of this receiver in an auto is accomplished in the following manner: Lift the seat upon which the instrument will rest, lay the battery cable and antenna shielded lead-in wire in position and then replace the seat. In cases where the automobile battery is mounted beneath that seat, however, it will be necessary to connect the battery cable to the battery (as described in the subsequent paragraph entitled "Connection to Battery") before replacing the seat. Finally, mount the receiver on the seat, attach the connector of the lead-in wire to the short (antenna) lead extending from the rear of the instrument and, with the power switch "off" (in AC position), insert the battery cable plug in the receptacle located adjacent to the antenna lead entrance.

**Connection to Antenna**—Feed the antenna lead-in wire beneath floor mat to the side of car nearest the wire extending from the antenna. The wire from a factory-installed roof antenna ordinarily is brought down one of the front pillar posts and left in a coil behind the instrument panel. In such cases, therefore, the lead-in wire after leaving the floor mat should be concealed behind the kick-board, then soldered to the wire extending from the antenna at the lower end of the body pillar post, after cutting the necessary length from each wire to eliminate excessive slack. Insulate the joint with tape and then solder or bond the pig-tail extension from the lead-in shield braid to the car frame.

A similar procedure is followed when either alternative form of antenna ("interior" roof or plate type) is employed except that the lead-in wire probably will follow a different route in each case. Such antennas should be mounted as far to the rear of the car as possible to insure minimum ignition interference. The lead-in wire for the interior type unit thus may be carried down the rear quarter of top and then behind the back cushion of seat in open and convertible models or may be anchored to any convenient pillar post in closed models. With the plate antenna, the lead-in wire should be fed through any opening in the floor board.

**Connection to Battery**—Since, in most cars, the storage battery is located below the floor boards of the driving compartment, the battery cable has been made sufficiently long to reach the battery after passing beneath the driver's seat (see note concerning longer cable available for rear seat operation—Equipment, "Battery Cable Package"). Run the cable under the floor mat and through the floor opening provided above the battery and connect the cable lugs to the battery terminal clamps as illustrated. The lug stamped "BATT. GROUND" must be connected to that side of the battery grounded to the car frame and the remaining lug (on lead with fuse receptacle) attached to the supply side of the battery. Finally, replace the floor cover, notching the side of the opening if necessary to provide clearance for the battery cable.

**Suppression of Ignition Interference—**

1. Disconnect all wires from the spark plugs. Fasten one spark-plug suppressor to the top of each plug and re-attach the wires to the free ends of the suppressors. These suppressors may be mounted either in line with or at right angles to the plugs in order to avoid interference with metallic parts grounded to the engine or frame.

2. If the distributor is of the plug-in type, disconnect the center wire from the head. Plug the distributor suppressor into the distributor head and insert the wire in the free end of the suppressor.

NOTE—For cap-type distributors, exchange the distributor suppressor at your dealer's for one of a special type. Cut the wire leading from the distributor to the coil and screw the suppressor into the end attached to the distributor. Screw the other end of the wire (leading to the coil) into the opposite end of the suppressor.

3. Clamp the generator capacitor against the generator frame. The screw holding the cut-out ordinarily may be utilized for securing this unit. Connect the capacitor lead to the terminal on the generator side of the cut-out switch. (In some cases, however, less interference will be encountered with this lead connected to the opposite side of the cutout; the most suitable position therefore should be determined by trial.)

4. The ignition capacitor (unit with two leads) must be connected between the battery terminal of the ammeter and any convenient screw on the instrument panel. In certain cars, interference will be reduced still further by connecting an additional capacitor (obtainable from your dealer) between the battery side of the ignition coil and the car frame.

## Home Installation

The circular insert on the frontispiece illustrates a typical installation of this receiver on lighting-circuit operation. Simply place the instrument upon a table or other level surface, attach the antenna lead-in wire (using the small connector furnished) and, with the power switch "off" (in "AUTO" position), connect the power cord to an electrical outlet supplying *alternating current* at the voltage and frequency (cycles) specified on the rating label inside the case.

# REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | **RECEIVER ASSEMBLIES** | |
| 2240 | Resistor—30,000 ohms—Carbon type—¼ watt (R6) | $0.22 |
| 2734 | Capacitor—745 mfd. (C-36)—Package of 5 | 1.50 |
| 2747 | Cap—Contact cap—Package of 5 | .50 |
| 2917 | Washer—"C" washer for condenser drum and shaft assembly—Package of 10 | .25 |
| 3218 | Resistor—600 ohms—Carbon type—¼ watt (R8)—Package of 5 | 1.00 |
| 3469 | Resistor—2,500 ohms—Carbon type—1 watt (R15)—Package of 5 | 1.10 |
| 3536 | Capacitor—Comprising two 5.0 mfd. (C17, C22) | 1.10 |
| 3572 | Socket—7-contact Radiotron socket | .38 |
| 3584 | Ring—Antenna, R. F. or oscillator coil retaining ring—Package of 5 | .40 |
| 3597 | Capacitor—0.25 mfd. (C33) | .40 |
| 3602 | Resistor—60,000 ohms—Carbon type—¼ watt (R1, R5)—Package of 5 | 1.00 |
| 3619 | Resistor—400,000 ohms—Carbon type—¼ watt (R10)—Package of 5 | 1.00 |
| 3621 | Coil—Choke coil—Located on terminal board (L14) | .35 |
| 3623 | Shield—Antenna, R. F. or oscillator coil shield | .30 |
| 3632 | Resistor—500 ohms—Carbon type (R13)—Package of 5 | 1.10 |
| 3639 | Capacitor—0.02 mfd. (C16) | .25 |
| 3696 | Capacitor—40 mmfd. (C9) | .22 |
| 3699 | Capacitor—720 mmfd. (C20) | .40 |
| 3744 | Resistor—250,000 ohms—Carbon type—¼ watt (R12)—Package of 5 | 1.00 |
| 3751 | Capacitor—0.5 mfd. (C25) | .40 |
| 3877 | Capacitor—0.1 mfd. (C8) | .32 |
| 3888 | Capacitor—0.05 mfd. (C1, C5) | .25 |
| 3920 | Capacitor—0.003 mfd. (C23) | .25 |
| 3937 | Capacitor—300 mmfd. (C15, C18) | .34 |
| 3950 | Shield—Radiotron shield | .26 |
| 3954 | Screw—Chassis mounting screw and washer assembly—Package of 10 | .32 |
| 3955 | Coil—Choke coil—Located on terminal board (L12) | .68 |
| 3956 | Clamp—Capacitor mounting clamp—Package of 5 | .32 |
| 3957 | Indicator—Station selector indicator pointer—Package of 5 | .42 |
| 3958 | Plug—2-contact "AC" connection plug | .50 |
| 3959 | Plug—6-contact "DC" connection plug | .40 |
| 3968 | Spring—Tuning condenser drive cord tension spring—Package of 10 | .30 |
| 3969 | Cord—Tuning condenser drive cord—Package of 10 | 1.22 |
| 3970 | Drum and shaft assembly—Small—For tuning condenser drive | .24 |
| 3971 | Escutcheon—Switch escutcheon engraved "AC–DC" | .24 |
| 3972 | Drum and bushing assembly—Large—For tuning condenser drive | .34 |
| 3993 | Screw—Set screw for tuning condenser drive drum—Package of 10 | .25 |
| 4001 | Capacitor—1,02 5mmfd. (C12) | .32 |
| 4002 | Capacitor—375 mmfd. (C31) | .30 |
| 4003 | Capacitor—700 mmfd. (C32) | .30 |
| 4020 | Resistor—750 ohms—Carbon type—¼ watt (R4)—Package of 5 | 1.00 |
| 4089 | Capacitor—Two 0.05 mfd. (C34, C35) | .40 |
| 6135 | Resistor—270 ohms—Carbon type—¼ watt (R3)—Package of 5 | 1.00 |
| 6165 | Lamp—Station selector dial lamp—Package of 5 | 1.75 |
| 6186 | Resistor—500,000 ohms—Carbon type—¼ watt (R7)—Package of 5 | 1.00 |
| 6242 | Resistor—2 megohms—Carbon type—¼ watt (R2)—Package of 5 | 1.00 |
| 6282 | Resistor—60,000 ohms—Carbon type—½ watt (R5)—Package of 5 | 1.00 |
| 6300 | Socket—4-contact Radiotron socket | .35 |
| 6512 | Capacitor—0.005 mfd. (C21) | .28 |
| 6738 | Capacitor—8.0 mfd. (C30) | 1.54 |
| 6739 | Condenser—3-gang variable tuning condenser assembly (C2, C3, C6, C7, C10, C11) | 5.16 |
| 6740 | Transformer—First intermediate frequency transformer (L7, L8, C14) | 2.16 |
| 6741 | Transformer—Second intermediate frequency transformer (L9, L10, C19) | 1.78 |
| 6742 | Coil—Antenna coil assembly (L1, L2) | .88 |
| 6743 | Coil—R. F. coil assembly (L3, L4) | .98 |
| 6744 | Capacitor—0.05 mfd. (C26) | .30 |
| 6745 | Coil—Oscillator coil assembly (L5, L6) | .62 |
| 6746 | Volume control (R9) | 1.20 |
| 6747 | Tone control (R11) | 1.20 |
| 6748 | Switch—Noise suppressor switch (S5) | .40 |
| 6749 | Switch—AC–DC switch (S1, S2, S3, S4) | 2.14 |
| 6759 | Transformer—Interstage transformer (T3) | 2.55 |
| 6781 | Capacitor—Comprising one 3.6 mfd. and one 1.0 mfd. (C4, C13) | 1.10 |
| 6782 | Capacitor—4.0 mfd. (C29) | 1.10 |
| 7485 | Socket—6-contact Radiotron socket | .40 |

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| 9456 | Transformer—Power transformer—105–125 volts, 50–60 cycles (T2) | $4.00 |
| 9457 | Transformer—Power transformer—9 volts (T1) | 4.78 |
| | **CABLE ASSEMBLIES** | |
| 3466 | Connector—Antenna lead-in connector | .60 |
| 3646 | Fuse—20 amperes—Package of 5 | .40 |
| 4008 | Shield—Metal shield for cable plug—Package of 5 | .58 |
| 4009 | Terminal—Metal terminal (plain) for battery connection—Package of 5 | .44 |
| 4010 | Terminal—Metal terminal engraved "Batt–Ground"—For battery connection—Package of 5 | .44 |
| 6150 | Plug—Battery cable plug | .50 |
| 6516 | Connector—Fuse connector | .16 |
| 6760 | Cable—7-conductor shielded—Switch cable | .40 |
| 6761 | Cable—2-conductor shielded—Approximately 10½ inches long, from resistor board to volume control | .26 |
| 6762 | Lead—Antenna lead-in—Approximately 15¾ inches long—With connector | .44 |
| 6773 | Cable—Battery cable—Plus A grounded—Overall length approximately 61 inches—Complete with plug, fuse, fuse connector and terminal | 2.36 |
| 6774 | Cable—Battery cable—Minus A grounded—Overall length approximately 61 inches—Complete with plug, fuse, fuse connector and terminal | 2.36 |
| 6775 | Cable—Battery cable—Plus A grounded—Overall length approximately 105 inches—Complete with plug, fuse, fuse connector and terminal | 3.30 |
| 6776 | Cable—Battery cable—Minus A grounded—Overall length approximately 105 inches—Complete with plug, fuse, fuse connector and terminal | 3.30 |
| 6777 | Cable—Antenna lead-in cable—Shielded—Approximately 98 inches long—With connector | 1.26 |
| 6778 | Cable—7-conductor shielded cable | .42 |
| 6779 | Cable—2-conductor shielded cable—Approximately 58 inches long | 1.10 |
| 6780 | Cable—2-conductor shielded cable—Approximately 102 inches long | 2.04 |
| 6834 | Cable—Battery cable—Minus "A" grounded—Overall length approximately 185 inches—Complete with plug, fuse, fuse connector and terminal | 3.92 |
| 6835 | Cable—Battery cable—Plus "A" grounded—Overall length approximately 185 inches—Complete with plug, fuse, fuse connector and terminal | 3.92 |
| 6836 | Lacquer—Touch up lacquer (1 pint of lacquer and 1 pint of thinner) | 2.25 |
| | **MISCELLANEOUS PARTS** | |
| 3960 | Handle—Carrying handle | .44 |
| 3961 | Knob—Tone control, volume control or suppressor switch knob—Package of 5 | .60 |
| 3962 | Knob—Station selector knob—Package of 5 | 1.00 |
| 3963 | Knob—"AC–DC" switch knob—Package of 5 | .60 |
| 3964 | Bezel—Metal bezel for station selector dial glass | .54 |
| 3965 | Glass—Station selector dial glass | .22 |
| 3966 | Spring—Contact spring—Grounds vibrator shield to case—Package of 10 | .92 |
| 4011 | Capacitor—0.5 mfd. (C24) | .60 |
| 4017 | Scale—Station selector dial scale—Package of 5 | 1.38 |
| 6151 | Suppressor—Spark plug suppressor | .56 |
| 6152 | Suppressor—Distributor suppressor | .56 |
| 6175 | Suppressor—Distributor suppressor—Splice in type | .56 |
| 6494 | Capacitor—0.5 mfd.—Ammeter capacitor | .46 |
| 6495 | Capacitor—0.5 mfd.—Generator capacitor | .72 |
| 6670 | Suppressor—Spark plug suppressor—"Elbow" type | .56 |
| 6763 | Cord—Power cord with connectors | .94 |
| 7694 | Vibrator—Complete (C27, C28, L13, R14) | 10.04 |
| 7696 | Housing—Metal housing—Top section | 5.44 |
| 7697 | Base—Housing base | .90 |
| 9050 | Oscillator—Test oscillator—150 to 25,000 K. C. | 33.50 |
| | **REPRODUCER ASSEMBLIES** | |
| 6750 | Screen—Dust screen | .28 |
| 6751 | Screen—Metal screen | .46 |
| 6764 | Transformer—Output transformer (T4) | 1.42 |
| 6772 | Ring—Felt ring—Used between speaker and metal housing—Package of 5 | 1.20 |
| 8987 | Cone—Reproducer cone (L11)—Package of 5 | 5.00 |
| 9458 | Reproducer complete | 5.20 |
| 9459 | Coil—Comprising field coil, magnet and cone support (L15) | 3.34 |

# RCA-VICTOR CO., INC.

**MODEL 118,211**
**Schematic**
**Trimmer Locations**

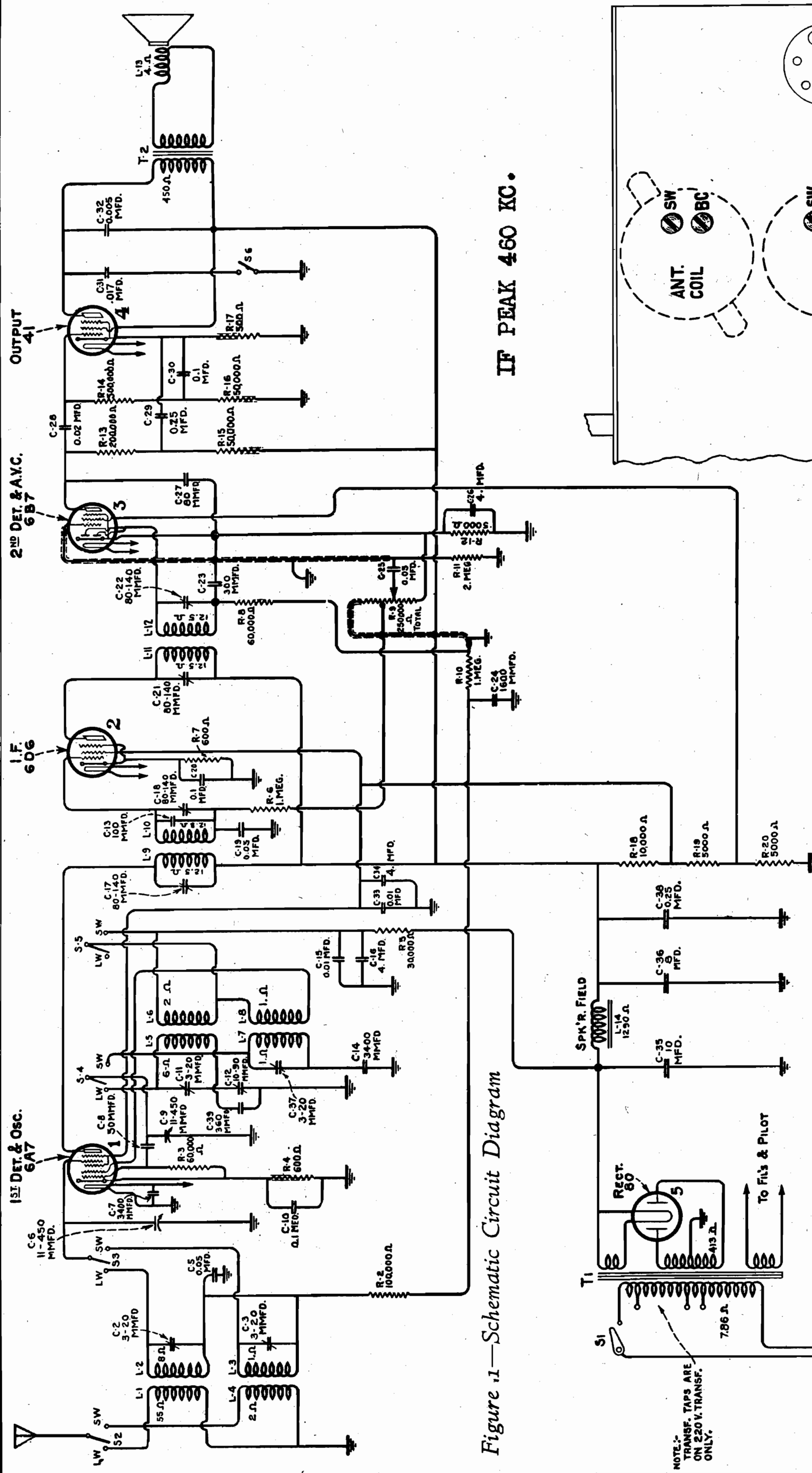



Figure 1—Schematic Circuit Diagram

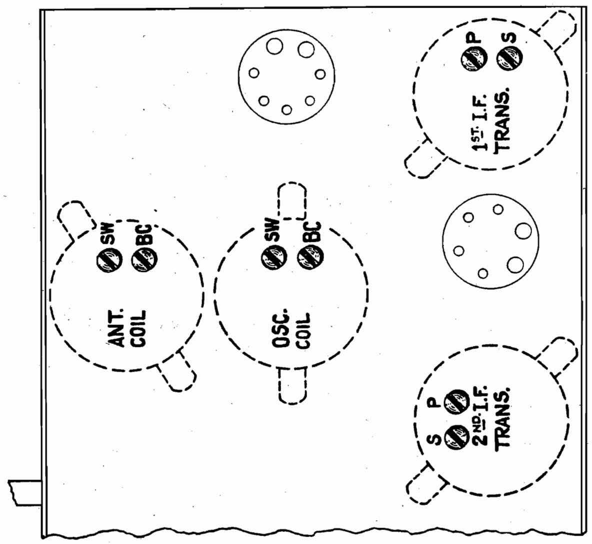



Figure 6—Location of Line-Up Capacitors

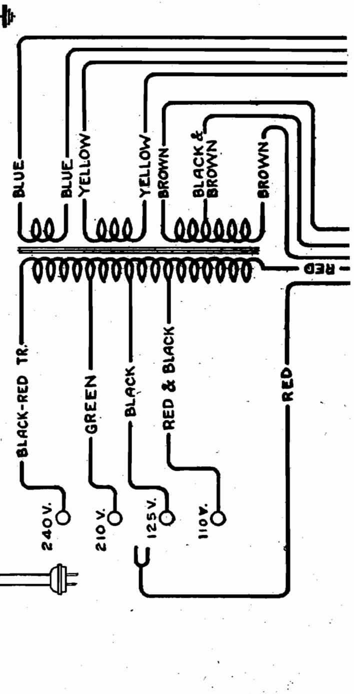



Figure 5—Power Transformer Connections

MODEL 118,211
Chassis Wiring

# RCA-VICTOR CO., INC.

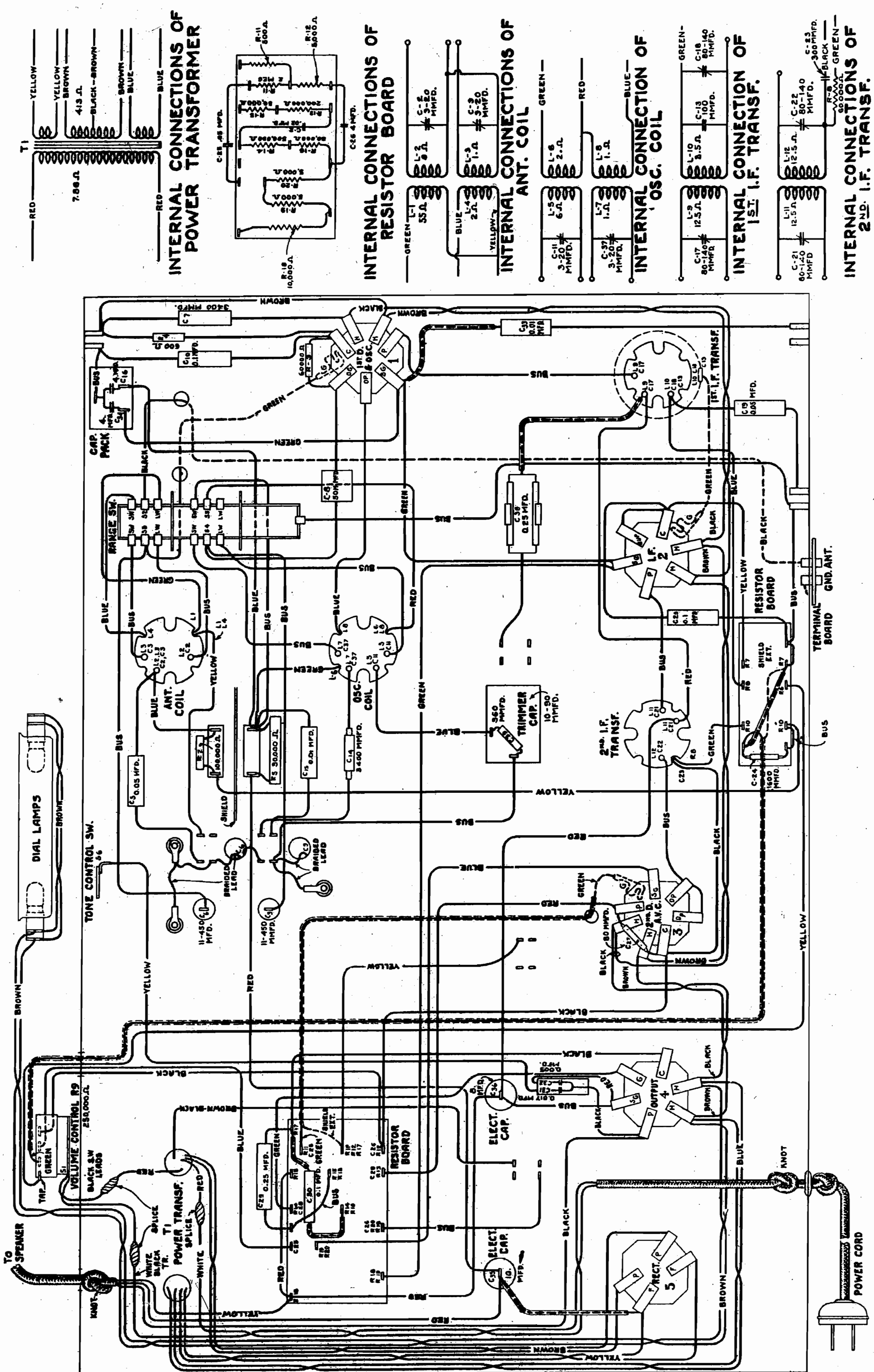


Figure 2—Wiring Diagram

MODEL 118,211
Voltage
Socket Layout
Loud Speaker Wiring

RCA-VICTOR CO., INC.

# RADIOTRON SOCKET VOLTAGES

## 115-Volt, A. C. Line—Maximum Volume Control—No Signal

| | | Cathode to Grid Volts | Screen Grid to Ground | Plate to Ground | Plate M.A. | Heater Volts |
|---|---|---|---|---|---|---|
| 6A7 | Detector | 6.0 | 105 | 265 | 3.5 | 6.3 |
| | Oscillator | | --- | 220 | 4.5 | |
| 6D6 | I.F. | 6.0 | 105 | 265 | 9.0 | 6.3 |
| 6B7 | 2nd Det. AVC | 3.0 | 50* | 90* | 0.7 | 6.3 |
| 41 | Power Output | 16.5 | 265 | 245 | 30.0 | 6.3 |
| 80 | Rectifier | --- | --- | 690** | 64.0 | 5.0 |

* = Voltage calculated from 265 v. +B
** = Plate to plate

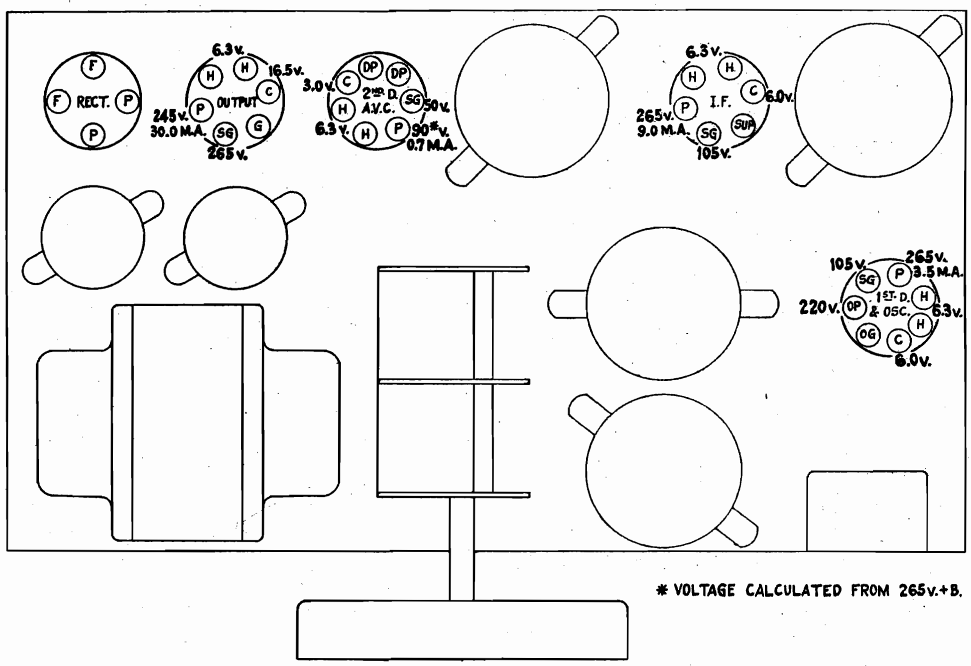



*Figure 7—Radiotron Socket Voltages*

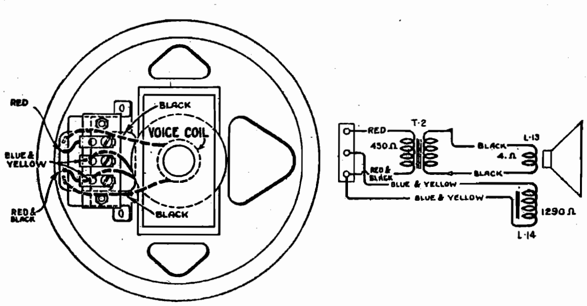



*Figure 3—Table Model Loudspeaker Wiring*

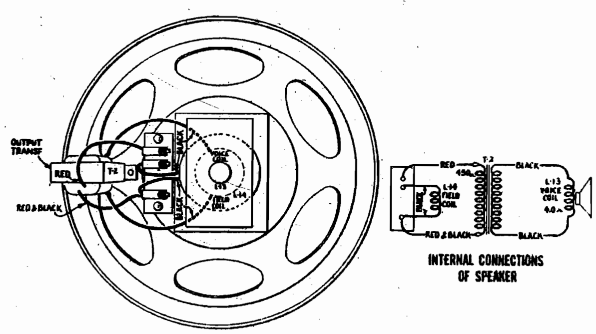



*Figure 4—Console Model Loudspeaker Wiring*

MODEL 118,211
Alignment Data
Parts List

# RCA-VICTOR CO., INC.

## SERVICE DATA

**(1) Line-Up Capacitor Adjustments:**

To properly align this receiver, it is essential that a modulated R. F. oscillator, such as Stock No. 9050, an output indicator and an alignment tool (Stock No. 4160) be available. Figure 5 shows the location of the various line-up capacitors.

**I. F. Tuning Adjustments:**

Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 460 K. C. and the adjustment screws are accessible as shown in Figure 6. Proceed as follows:

(a) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the ground terminal.

(b) Connect the test oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

**R. F. and Oscillator Adjustments:**

The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K. C. series capacitor, which is accessible from the top of he chassis. Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the position of the indicator pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 540. Then set the Test Oscillator at 1720 K. C., the dial indicator at 1720 and the oscillator output so that a slight deflection will be obtained in the output meter when the volume control is at its maximum position.

(b) With the Range Switch at the "in" position, adjust the two trimmers under the two R. F. coils, designated as BC in Figure 6, until a maximum deflection is obtained in the output meter. Then shift the Test Oscillator frequency to 600 K. C. The trimmer capacitor, accessible from the top of the chassis, should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1720 K. C. adjustment.

(c) Now place the Range Switch at the "out" position, shift the Test Oscillator to 18,000 K. C. and set the dial at 18M. Adjust the two trimmer capacitors designated as SW in Figure 5 for maximum output, beginning with the oscillator trimmer. It will be noted that the oscillator and first detector trimmers will have two positions at which the signal will give maximum output. The position which uses the lower trimmer capacitance, obtained by turning the screw counter-clockwise, is the proper adjustment for the oscillator, while the position that uses a higher capacitance is correct for the detector. The detector trimmer *must* be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Both of these adjustments must be made as indicated irrespective of output.

The important points to remember are the need for using the minimum oscillator output to obtain a deflection in the output meter with the volume control at its maximum position and the manner of obtaining the proper high frequency oscillator and detector adjustments.

**(2) Radiotron Socket Voltages:**

The following voltages are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if lower resistance meters are used, such allowances must be made:

**(3) Power Transformer Connections:**

Models supplied for 220-volt power supply, use a power transformer having a tapped primary. The tapped primary permits it to be used either on lines of 100–130 volts or 195–250 volts. Figure 5 shows the internal connections of the transformer and the voltages to be used with the various taps. The taps are located on a terminal strip at the top of the transformer so that necessary changes may be made without removing the receiver from the cabinet.

## REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | Description | List Price |
|---|---|---|
| | RECEIVER ASSEMBLIES | |
| 10194 | Ball—Steel ball for condenser drive assembly—Package of 20 | $0.25 |
| 4358 | Bracket—Capacitor mounting bracket | .15 |
| 4427 | Bracket—Volume control mounting bracket | .18 |
| 2747 | Cap—Contact cap—Package of 5 | .50 |
| 4428 | Capacitor—8 mfd. (C36) | 1.05 |
| 7790 | Capacitor—10 mfd. (C35) | 1.05 |
| 4442 | Capacitor—50 mmfd. (C8) | .22 |
| 4509 | Capacitor—80 mmfd. (C27) | .15 |
| 4413 | Capacitor—360 mmfd. (C39) | .22 |
| 4441 | Capacitor—1600 mmfd. (C24) | .35 |
| 4439 | Capacitor—3400 mmfd. (C14) | .35 |
| 4471 | Capacitor—3400 mmfd. (C7) | .44 |
| 4443 | Capacitor—0.01 mfd. (C15) | .25 |
| 4444 | Capacitor—0.01 mfd. (C33) | .22 |
| 4435 | Capacitor—0.02 mfd. (28) | .25 |
| 3888 | Capacitor—0.05 mfd. (C25) | .25 |
| 4417 | Capacitor—0.05 mfd. (C5) | .25 |
| 3901 | Capacitor—0.05 mfd. (C19) | .36 |
| 3877 | Capacitor—0.1 mfd. (C20, C30) | .32 |
| 4415 | Capacitor—0.1 mfd. (C10) | .22 |
| 3597 | Capacitor—0.25 mfd. (C29, C38) | .40 |
| 3796 | Capacitor—4.0 mfd. (C26) | .60 |
| 3861 | Capacitor — Adjustable trimmer capacitor (C12) | .78 |
| 6787 | Capacitor pack—Comprising one 0.005 and one 0.017 mfd. capacitors (C31, C32) | .30 |
| 7589 | Capacitor pack—Comprising two 4.0 mfd. capacitors (C16, C34) | 1.64 |
| 4422 | Clutch—Condenser drive clutch assembly complete | .88 |
| 4430 | Coil—Antenna coil (L1, L2, L3, L4, C2, C3) | 1.92 |
| 4432 | Coil—Oscillator coil (L5, L6, L7, L8, C11, C37) | 1.65 |
| 4504 | Condenser—2-gang variable tuning condenser (C6, C9) | 2.78 |
| 4434 | Drive—Tuning condenser drive assembly complete | 2.42 |
| 3632 | Resistor—500 ohms—Carbon type—¼ watt (R17)—Package of 5 | 1.10 |
| 3218 | Resistor—600 ohms—Carbon type—¼ watt (R4, R7)—Package of 5 | 1.00 |
| 4436 | Resistor—5,000 ohms—Carbon type—¼ watt (R12)—Package of 10 | 2.00 |
| 3114 | Resistor—50,000 ohms—Carbon type—¼ watt (R16)—Package of 5 | 1.00 |
| 3602 | Resistor—60,000 ohms—Carbon type—¼ watt (R3)—Package of 5 | 1.00 |
| 3118 | Resistor—100,000 ohms—Carbon type—¼ watt (R2)—Package of 5 | 1.00 |
| 6186 | Resistor—500,000 ohms—Carbon type—¼ watt (R14)—Package of 5 | 1.00 |
| 3033 | Resistor—1 megohm—Carbon type—¼ watt (R6, R10)—Package of 5 | 1.00 |
| 6242 | Resistor — 2 megohms — Carbon type — ¼ watt (R11)—Package of 5 | 1.00 |
| 3594 | Resistor—50,000 ohms—Carbon type—½ watt (R15)—Package of 5 | 1.00 |
| 6228 | Resistor—200,000 ohms—Carbon type—½ watt (R13)—Package of 5 | 1.00 |
| 3891 | Resistor—5,000 ohms—Carbon type—1 watt (R19, R20)—Package of 5 | 1.10 |
| 2240 | Resistor—30,000 ohms—Carbon type—1 watt (R5) | .22 |
| 6318 | Resistor—10,000 ohms—Porcelain type (R18) | .80 |
| 3943 | Screen—Translucent screen for dial lamps—Package of 2 | .18 |
| 4446 | Screen—Chassis mounting screw assembly—Comprising 4 screws, 4 lockwashers, 4 washers, 4 spacers and 4 cushions | .28 |
| 3993 | Screw—No. 6–32–5/32" square head set screw for condenser drive—Package of 10 | $0.25 |
| 7800 | Shield—Antenna, oscillator or I. F. transformer coil shield | .45 |
| 4145 | Shield—First detector and oscillator Radiotron shield | .30 |
| 4103 | Shield—I. F. Radiotron shield | .20 |
| 4438 | Shield—Second detector—AVC Radiotron shield | .25 |
| 3529 | Socket—Dial lamp socket | .32 |
| 3859 | Socket—4-contact Radiotron socket | .30 |
| 7485 | Socket—6-contact Radiotron socket | .40 |
| 6676 | Socket—6-contact output Radiotron socket | .40 |
| 3572 | Socket—7-contact Radiotron socket | .38 |
| 4426 | Switch—Tone control switch (S6) | .35 |
| 4437 | Switch—Range switch (SW-BC) (S2, S3, S4, S5) | 2.35 |
| 9511 | Transformer—105–125 volts—50–60 cycles | 4.78 |
| 4431 | Transformer—First intermediate frequency transformer (L9, L10, C13, C17, C18) | 2.28 |
| 9512 | Transformer—Power transformer—105–125 volts—25–40 cycles | 6.58 |
| 9513 | Transformer—Power transformer—200–230 volts—50–60 cycles (T1) | 4.85 |
| 4433 | Transformer—Second intermediate frequency transformer (L11, L12, R8, C21, C22, C23) | 2.15 |
| 4429 | Volume control (R9) | 1.40 |
| | REPRODUCER ASSEMBLIES (CONSOLE) | |
| 4473 | Board—Reproducer terminal board | .26 |
| 4445 | Cable—3-conductor-reproducer cable | .36 |
| 9460 | Coil—Field coil—Magnet and cone support | 6.00 |
| 8935 | Cone—Reproducer cone—Package of 5 | 5.25 |
| 9527 | Reproducer complete | 8.00 |
| 4472 | Transformer—Output transformer | 1.40 |
| | REPRODUCER ASSEMBLIES (TABLE) | |
| 4448 | Board—Reproducer terminal board | .25 |
| 4445 | Cable—3-conductor-reproducer cable | .36 |
| 9531 | Coil—Field coil magnet and cone support | 2.75 |
| 9492 | Cone—Reproducer cone (L13)—Package of 5 | 3.70 |
| 9514 | Reproducer complete | 6.00 |
| 4447 | Shield—Terminal board shield | .18 |
| 4505 | Transformer—Output transformer (T2) | 1.55 |
| | MISCELLANEOUS ASSEMBLIES | |
| 6706 | Bezel—Station selector dial escutcheon bezel—Model 118 | .42 |
| 4450 | Dial—Station selector dial—Model 211 | .52 |
| 4474 | Dial—Station selector dial—Model 118 | .76 |
| 6840 | Escutcheon—Station selector escutcheon—Model 211 | .56 |
| 6707 | Glass—Station selector dial glass—Model 118 | .20 |
| 6614 | Glass—Station selector dial glass—Model 211 | .30 |
| 4449 | Knob—Station selector, volume control, tone or range switch knob—Package of 5 | .60 |
| 4348 | Lamp—Pilot lamp | .38 |
| 4363 | Pointer—Station selector indicator pointer—Model 211 | .18 |
| 4475 | Pointer—Station selector indicator pointer—Model 118 | .18 |
| 6708 | Ring—Spring retaining ring for dial glass—Package of 5—Model 118 | .44 |
| 6615 | Ring—Spring retaining ring for dial glass—Package of 5—Model 211 | .34 |
| 4613 | Screw—8–32–1/16" headless set screw for knob—Package of 10 | .25 |

RCA-VICTOR CO., INC.

# SERVICE DATA

## Electrical Specifications

Type and Number of Radiotrons Used—2 RCA-6D6, 1 RCA-6A7, 1 RCA-75, 1 RCA-41, 1 RCA-79 —Total, 6

Battery Current (6.3 Volt Battery):
- Speaker Field (Cold) .............. 1.35 Amperes
- Tubes .............. 2.2 Amperes
- Dial Lamp .............. 0.15 Ampere
- Power Supply (No Signal) .............. 2.8 Amperes
- Total (No Signal) .............. 6.5 Amperes
- Total (Maximum Output) .............. 8.0 Amperes (Average)

Tuning Frequency Range ..... 540 K. C.–1600 K. C.
Maximum Undistorted Output .............. 4.2 Watts
Maximum Output .............. 6.8 Watts
Line-up Frequencies .............. 175 K. C., 600 K. C., 1400 K. C.

### (1) Removing Units from Chassis:

The three major units, the power unit, the loudspeaker and the receiver chassis, are easily removed independently without disturbing the other units not removed. To do this, the use of a screwdriver is the only tool required. Figure 2 shows the details of the screws and terminals to be removed in each individual case.

### (2) Loose or Tight Tuning Action:

An adjustment screw is provided at the worm drive unit, so that proper tension may be provided for the particular worm being used. The instruction book accompanying the instrument describes the proper manner of turning the drive assembly when using either right or left hand drives. However, whenever this change is made, the adjusting screw located on the front of the drive unit should be loosened or tightened until a satisfactory amount of tension and elimination of backlash is obtained.

### (3) Line-up Capacitor Adjustments:

Adjustable capacitors are provided in the R. F. oscillator and intermediate frequency amplifier to provide a means of properly aligning the receiver. A modulated R. F. oscillator such as Full Range Test Oscillator, Type TMV-97-B (Stock No. 9050), a non-metallic screwdriver such as alignment wrench Stock No. 4160 and an output meter are required for properly aligning this receiver. Refer to Figure 3 for the location of the line-up capacitors.

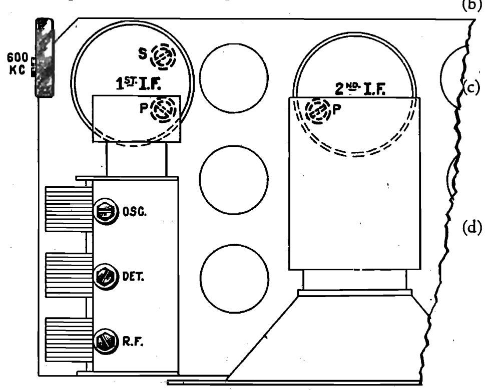



*Figure 3—Location of Line-up Capacitors*

### I. F. Tuning Adjustments:

Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from beneath the chassis as shown in Figure 3. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 4160 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers, until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

### R. F. and Oscillator Adjustments:

The three-gang capacitor screws are located on the main tuning capacitor, accessible at the top of the chassis. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screwdriver such as Stock No. 4160 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Place the receiver in operation and attach the control box as in normal operation. Turn the tuning control until the tuning capacitors are fully meshed. Then set the indicator on the dial at the 530 K. C. reading. Turn the tuning control until the dial reads 1400. Then set the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the three-gang capacitor trimmer screws until maximum output is obtained. Be careful not to disturb the relation of the control box to the receiver after setting the dial.

(c) After making the 1400 K. C. adjustment, shift the oscillator to 600 K. C. and tune in the signal. Adjust the 600 K. C. trimmer, accessible from the side of the chassis for maximum output while rocking the gang-capacitor back and forth. Then again check the adjustment described in (b).

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

### (4) R. F. Interference from Vibrator:

In event R. F. interference originating with the vibrator inverter-rectifier unit is encountered, check the following points:

(a) Vibrator not properly seated. The vibrator must be pushed tight against its socket at all times.

(b) The clip from the top of the R. F. tube shield to the gang-capacitor must be in place.

(c) The various by-pass capacitors, such as C-29, C-30, C-31, C-34, C-37, and chokes L-16 and L-14, L-13, must be properly connected, and in operating condition. It is well to remember that some of the interference produced by the vibrator is of a frequency as high as one meter and any replacement of capacitors must always be made with ones of similar mechanical as well as electrical construction.

### (5) Voltage Readings:

The following voltages are those at the tube socket while the receiver is in operating condition. No allowance has been made for currents drawn by the meter and if low resistance meters are used, such allowances must be made.

### (6) Vibrator Inverter-Rectifier:

The Vibrator Inverter-Rectifier unit used in this receiver is of advanced design and construction. It is adjusted by means of special equipment at the factory and then sealed to prevent tampering. The unit is provided with a special plug-in base so that in event of suspected failure it may be easily interchanged with one of known condition.

With the seals unbroken, the Vibrator carries the standard ninety-day guarantee, which also applies to all parts of the receiver. Vibrator defects should be remedied by replacement, not by attempted adjustment.

### (7) Stiff Tuning Mechanism:

In event the station selector turns hard or stiff, it is probably due to excessive pressure between the worm and drive gear. Proper tension between these units exists when the gear is pushed 1/64" beyond the point of contact with the worm, before being tightened.

### (8) Antenna Lead Clamp

A clamp has been provided for holding the antenna lead securely to the side of case. This clamp is held by one of the chassis mounting screws and prevents the antenna lead from interfering with the operation of the brake pedal or starter button. When making an installation it is important to see that this lead is securely clamped.

## RADIOTRON SOCKET VOLTAGES

**6.3 Volt Battery—No Signal—Maximum Sensitivity**

| Radiotron No. | | Cathode to Ground Volts, D. C. | Screen Grid to Ground Volts, D. C. | Plate to Ground Volts, D. C. | Cathode Current, M. A. | Heater Volts, D. C. |
|---|---|---|---|---|---|---|
| RCA-6D6—R. F. | | 3.9 | 76 | 192 | 4.5 | 5.9 |
| RCA-6A7 | 1st Det. | 3.9 | 76 | 192 | 7.5 | 5.9 |
| | Osc. | | — | 192 | | |
| RCA-6D6—I. F. | | 3.6 | 76 | 192 | 5.3 | 5.9 |
| RCA-75—2nd Det. | | 1.25 | — | 165 | .46 | 5.9 |
| RCA-41—A. F. | | 22.0 | — | 235 | 14.5 | 5.9 |
| RCA-79—Pwr. | | 0 | — | 256 | 10.5 | 5.9 |

MODEL M-123
Schematic
Socket Layout

RCA-VICTOR CO., INC.

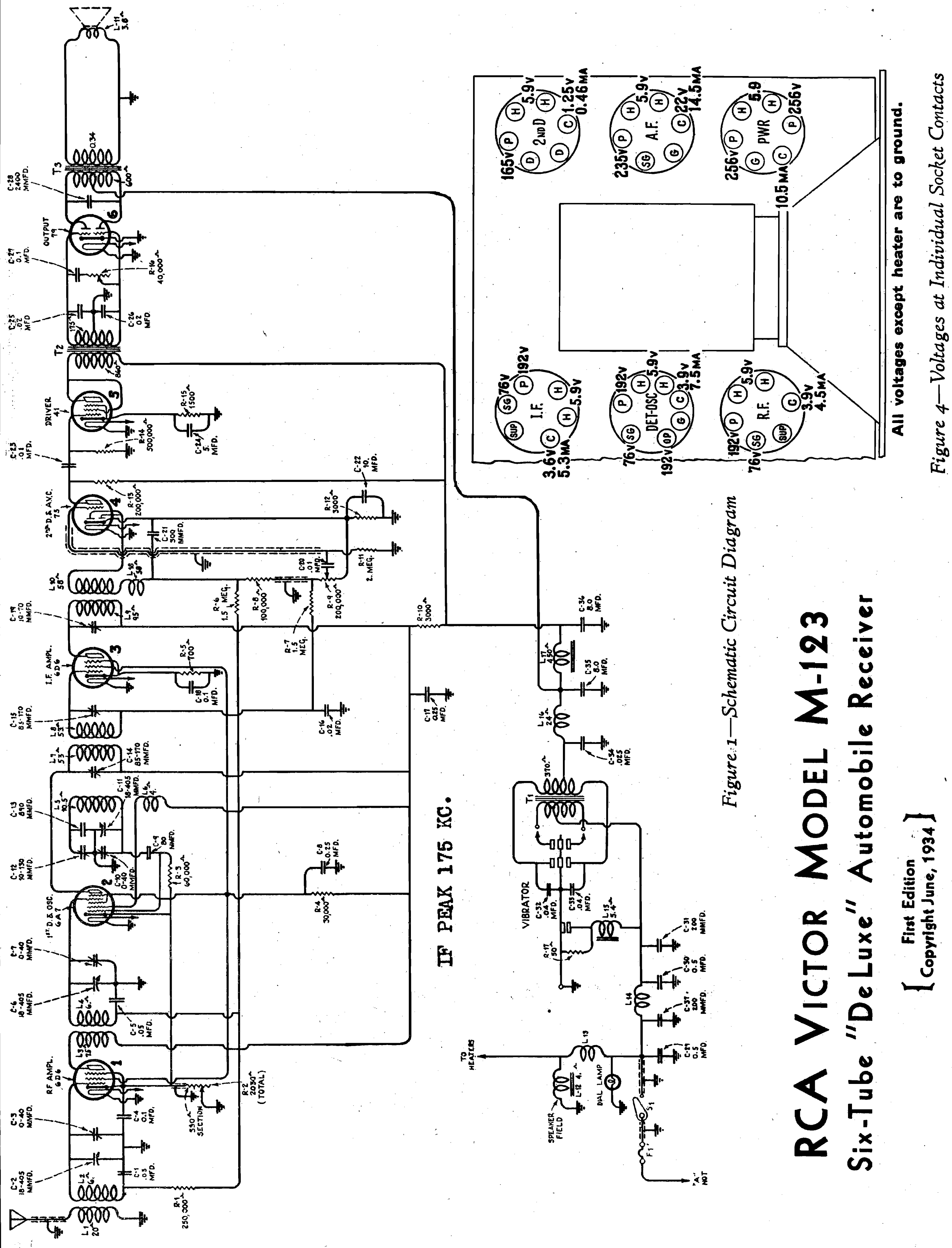



Figure 1—Schematic Circuit Diagram

Figure 4—Voltages at Individual Socket Contacts

# RCA Victor Model M-123
## Six-Tube "DeLuxe" Automobile Receiver

[First Edition
Copyright June, 1934]

# RCA-VICTOR CO., INC.

**MODEL M-123**
**Service Details**

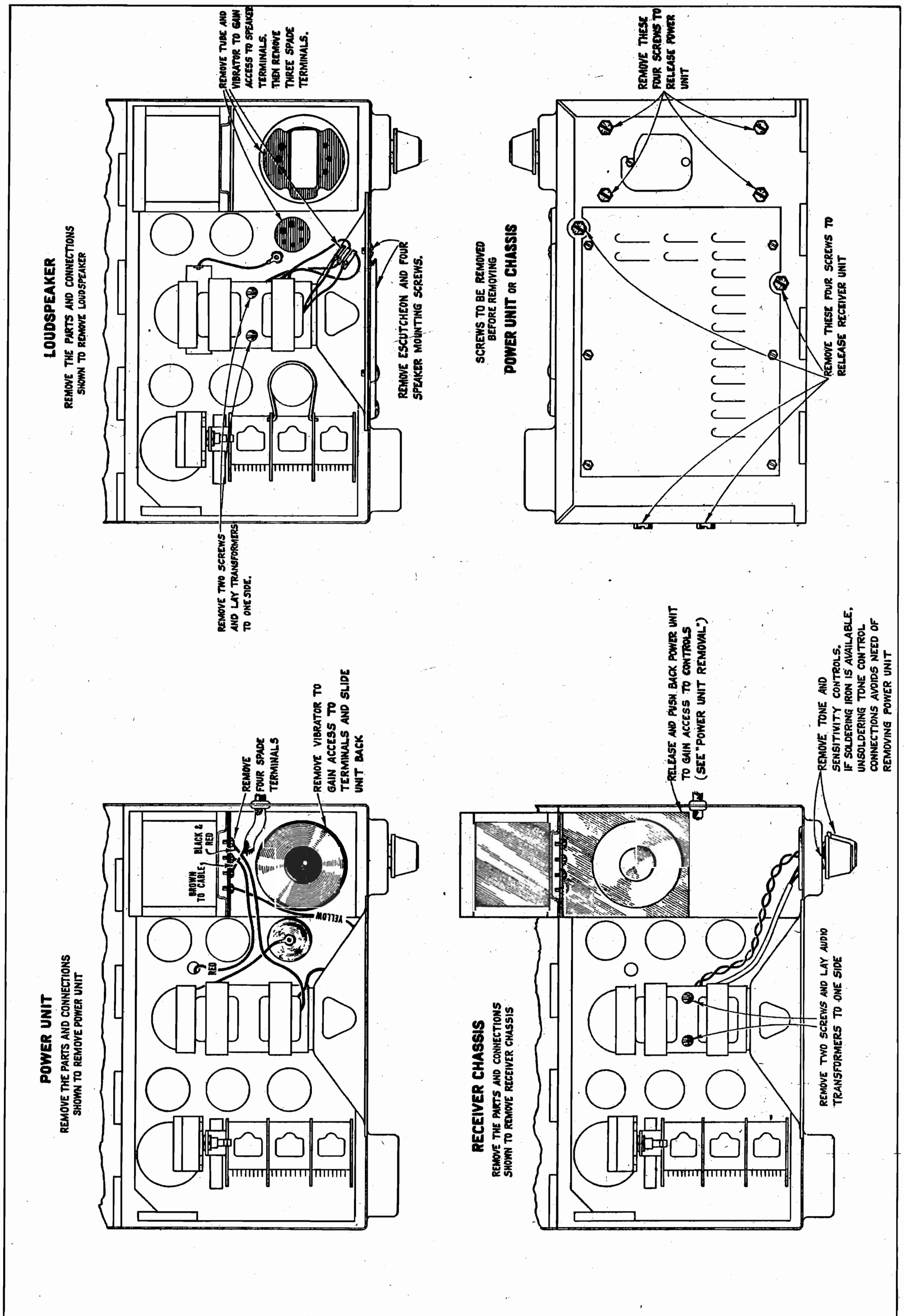



*Figure 2—Details of removing units individually from chassis*

**MODEL M-123**
**Chassis Wiring**

# RCA-VICTOR CO., INC.

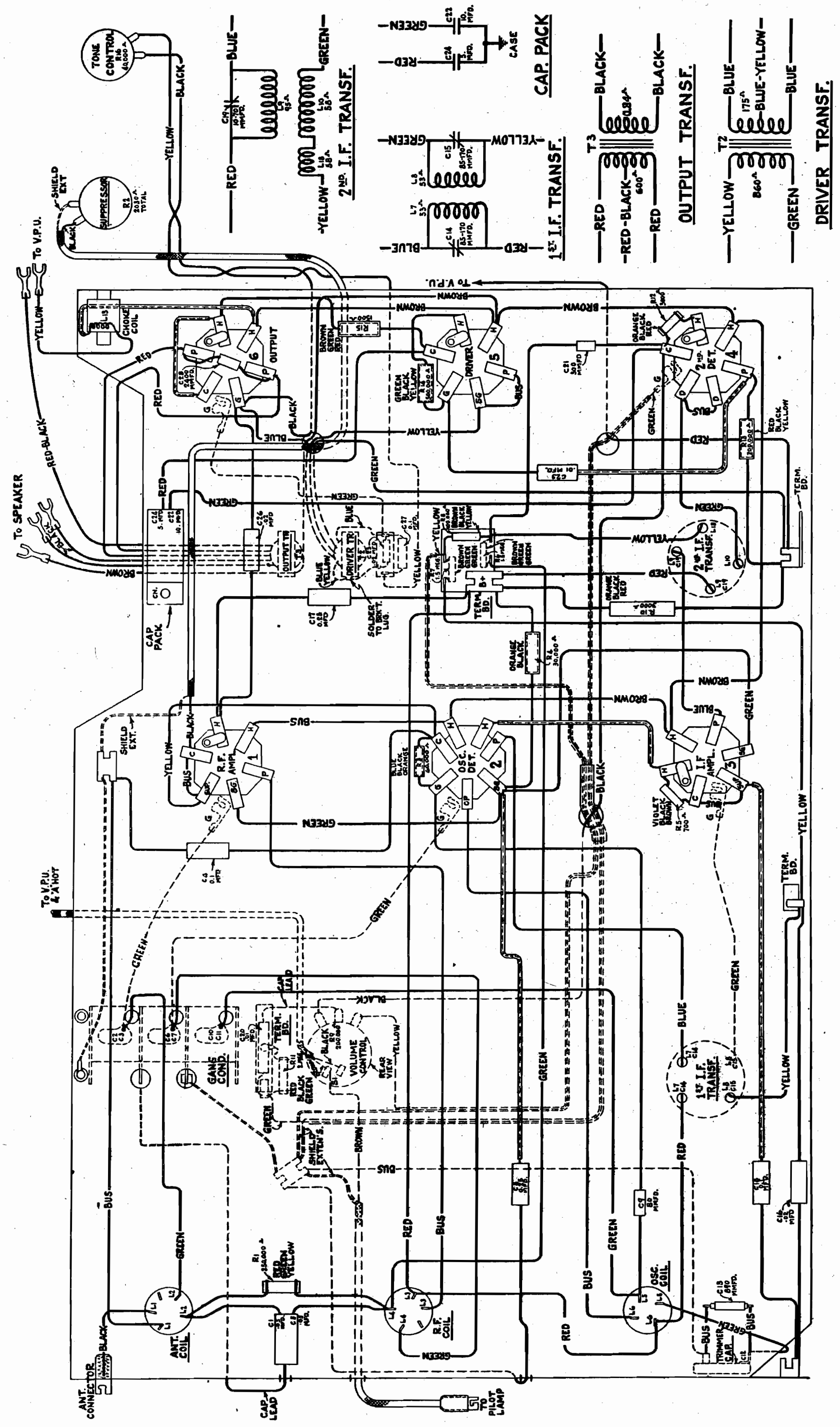



*Figure 5—Receiver Assembly Wiring Diagram*

RCA-VICTOR CO., INC.

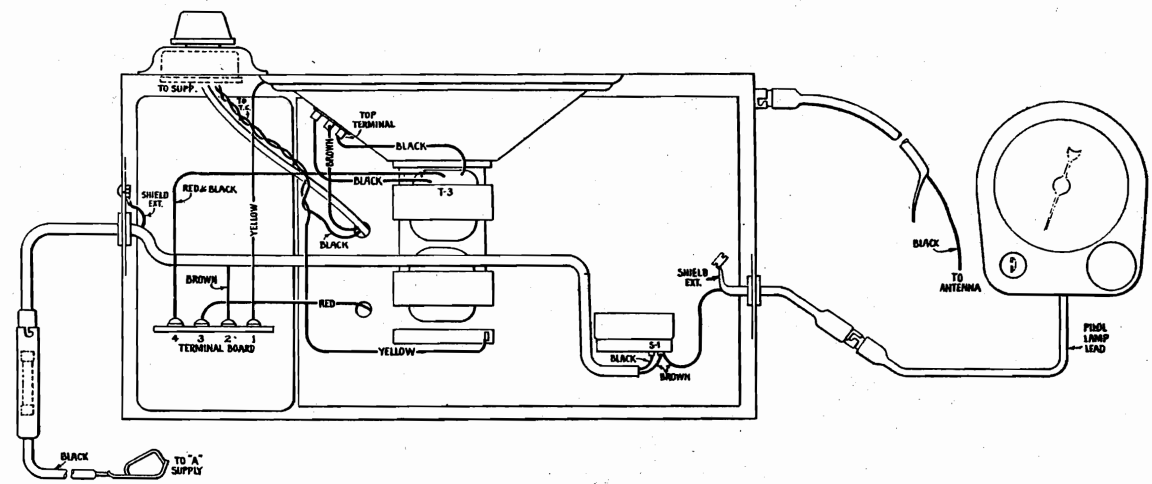



*Figure 6—Assembly Wiring Diagram*

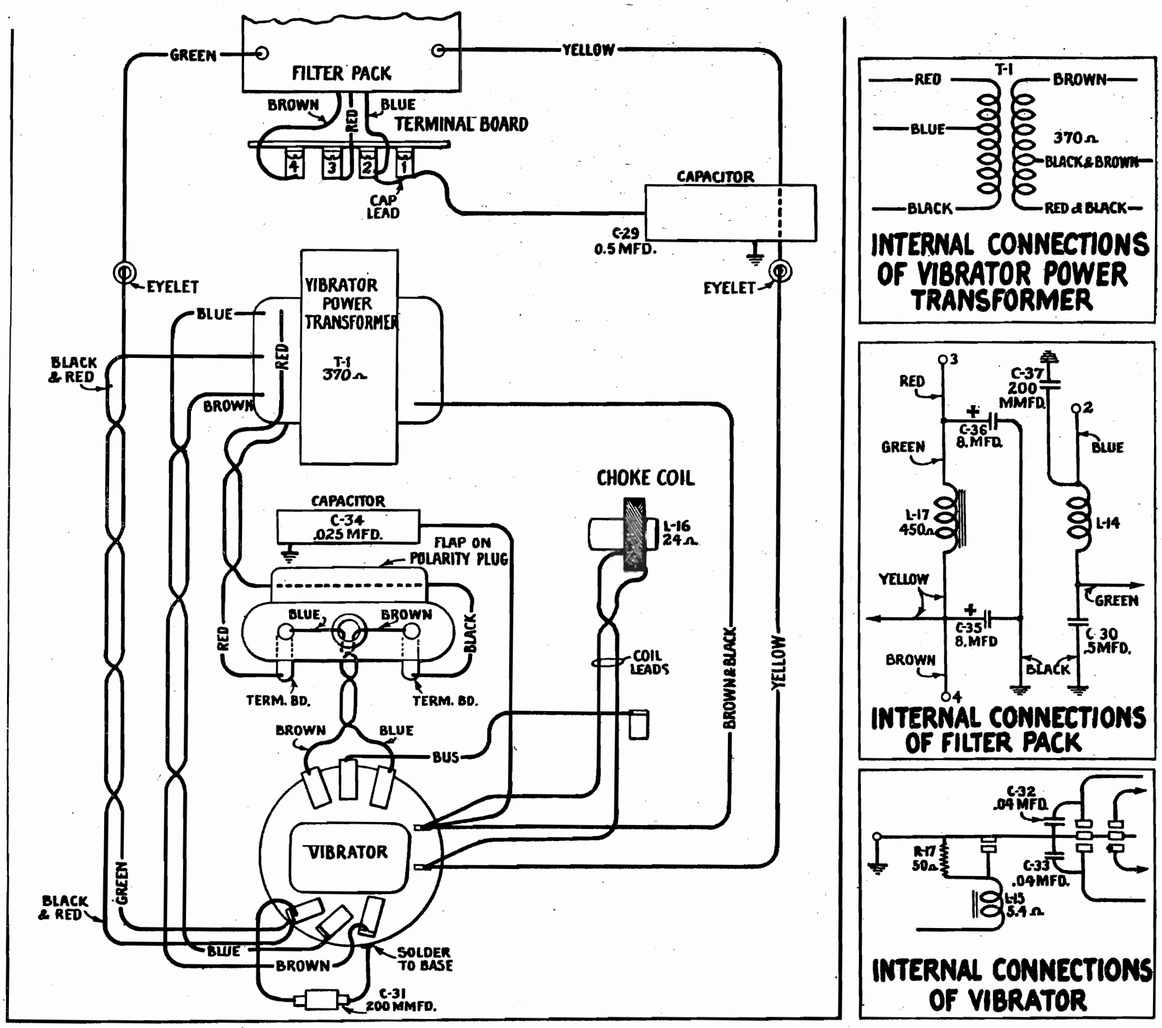



*Figure 7—Vibrator Inverter-Rectifier Unit Wiring*

**MODEL M-123**
**Parts List**

# RCA-VICTOR CO., INC.

## REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | Description | List Price |
|---|---|---|
| | RECEIVER ASSEMBLIES | |
| 4237 | Cable—Single-conductor shielded cable with female section of connector—From volume control switch to pilot lamp cable | $0.35 |
| 4238 | Cable—Two-conductor power cable from S1 to power lead connector | .95 |
| 4244 | Cap—Contact cap—Package of 5 | .20 |
| 3861 | Capacitor—Adjustable capacitor (C12) | .78 |
| 4246 | Capacitor—80 mmfd. (C9) | .24 |
| 4248 | Capacitor—300 mmfd. (C21) | .22 |
| 4245 | Capacitor—890 mmfd. (C13) | .26 |
| 4247 | Capacitor—2,400 mmfd. (C28) | .34 |
| 3702 | Capacitor—0.25 mfd. (C8) | .42 |
| 3639 | Capacitor—.02 mfd. (C16, C25, C26) | .25 |
| 3701 | Capacitor—.01 mfd. (C20, C23) | .30 |
| 3641 | Capacitor—0.1 mfd. (C27) | .35 |
| 3877 | Capacitor—0.1 mfd. capacitor (C4, C18) | .32 |
| 3597 | Capacitor—0.25 mfd. (C17) | .40 |
| 4243 | Capacitor pack—Comprising two 0.05 mfd. capacitors (C1, C5) | .35 |
| 6963 | Capacitor pack—Comprising one 10. and one 5. mfd. capacitors (C22, C24) | 1.10 |
| 6965 | Coil—Antenna coil (L1, L2) | .70 |
| 6967 | Coil—Oscillator coil (L5, L6) | .52 |
| 6966 | Coil—R. F. coil (L3, L4) | .80 |
| 6961 | Condenser—3-gang variable tuning condenser (C2, C3, C6, C7, C10, C11) | 3.85 |
| 6973 | Drive assembly—Variable tuning condenser drive assembly | .40 |
| 4249 | Drive bracket and worm assembly—For variable tuning condenser drive | 1.20 |
| 6968 | Reactor (L13) | .35 |
| 4240 | Resistor—700 ohms—Carbon type—¼ watt (R5)—Package of 5 | 1.00 |
| 4242 | Resistor — 3,000 ohms — Carbon type — ¼ watt (R12)—Package of 5 | 1.00 |
| 3602 | Resistor — 60,000 ohms — Carbon type — ¼ watt (R3)—Package of 5 | 1.00 |
| 3118 | Resistor—100,000 ohms—Carbon type—¼ watt (R8)—Package of 5 | 1.00 |
| 3116 | Resistor—200,000 ohms—Carbon type—¼ watt (R13)—Package of 5 | 1.00 |
| 3744 | Resistor—250,000 ohms—Carbon type—¼ watt (R1)—Package of 5 | 1.00 |
| 6186 | Resistor—500,000 ohms—Carbon type—¼ watt (R14)—Package of 5 | 1.00 |
| 4241 | Resistor—1.5 megohms—Carbon type—¼ watt (R6, R7)—Package of 5 | 1.00 |
| 6242 | Resistor — 2 megohms — Carbon type — ¼ watt (R11)—Package of 5 | 1.00 |
| 3047 | Resistor—1,500 ohms—Carbon type—½ watt (R15)—Package of 5 | 1.00 |
| 2240 | Resistor — 30,000 ohms — Carbon type — 1 watt (R4) | .22 |

| Stock No. | Description | List Price |
|---|---|---|
| 4239 | Resistor — 3,000 ohms — Carbon type — 3 watts (R10) | $0.25 |
| 6972 | Rheostat—Noise suppressor rheostat (R2) | .90 |
| 3584 | Ring—Retaining ring for antenna, radio frequency or oscillator coils—Package of 5 | .40 |
| 3993 | Screw—No. 6-32-¾-inch square head set screw—For mounting condenser drive assembly to shaft—Package of 10 | .25 |
| 3623 | Shield—Antenna, radio frequency or oscillator coil shield | .30 |
| 4233 | Shield—Oscillator or second detector Radiotron shield | .22 |
| 4235 | Shield — Intermediate frequency Radiotron shield | .24 |
| 4236 | Shield—Radio frequency Radiotron shield | .22 |
| 4232 | Socket—6-contact Radiotron socket | .35 |
| 3572 | Socket—7-contact Radiotron socket | .38 |
| 6971 | Tone control (R16) | .90 |
| 6969 | Transformer—Audio driver transformer (T2) | 1.50 |
| 6970 | Transformer—Audio output transformer (T3) | 1.52 |
| 6960 | Transformer — First intermediate frequency transformer (L7, L8, C14, C15) | 1.80 |
| 6962 | Transformer—Second intermediate frequency transformer (L9, L10, L18, C19) | 1.85 |
| 6964 | Volume control (R9, S1) | 1.20 |
| | CONTROL BOX ASSEMBLIES | |
| 6974 | Box—Control box complete | 3.80 |
| 6976 | Back—Control box back | .75 |
| 6975 | Cover—Control box front cover | .86 |
| 4259 | Cover—Station selector dial cover—Transparent celluloid—Package of 5 | .92 |
| 4261 | Dial—Station selector dial | .15 |
| 4258 | Key—Volume control key | .20 |
| 4256 | Lamp—Dial lamp | .30 |
| 4260 | Pointer—Station selector indicator | .18 |
| 4257 | Ring—Station selector dial cover ring | .75 |
| 4262 | Screen—Dial light screen—Package of 5 | .26 |
| 4252 | Screw—No. 10-32-11/32-inch fillister head set screw for holding condenser drive and pinion gear and volume coupling control shaft—Package of 10 | .32 |
| 3652 | Screw—No. 10-32-¼-inch cupped point set screw for holding station selector or volume control flexible drive shaft to control box—Package of 10 | .32 |
| 4255 | Screw—No. 4-40-¼-inch oval head machine screw for holding control box cover—Package of 10 | .16 |
| 4254 | Shaft—Volume control coupling shaft | .36 |
| 4250 | Shaft and gear—Station selector pointer shaft and gear | .56 |
| 4251 | Shaft and gear—Station selector drive shaft and pinion gear | .20 |

## REPLACEMENT PARTS—(Continued)

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | Description | List Price |
|---|---|---|
| 4253 | Spring—Volume control key holding spring—Package of 10 | $0.32 |
| 3690 | Strap and bracket assembly—For mounting control box to steering column—Comprising one bracket, two screws, one lockwasher and one strap | .40 |
| | FLEXIBLE SHAFT AND CABLE ASSEMBLIES | |
| 7762 | Cable—Dial lamp cable with socket and section of connector | .76 |
| 4264 | Clamp—Metal clamp—Package of 10 | .35 |
| 4295 | Screw—No. 10-32-¼-inch cupped point set screw—Fastens flexible shaft housing to shaft bushing—Package of 10 | .20 |
| 7760 | Shaft—Station selector flexible drive shaft—Approximately 31½ inches long | 1.60 |
| 7764 | Shaft—Station selector flexible drive shaft—Approximately 27 inches long | 1.55 |
| 7761 | Shaft—Volume control flexible shaft—Approximately 29 inches long | 1.60 |
| 7763 | Shaft—Volume control flexible drive shaft—Approximately 24 inches long | 1.55 |
| 4265 | Sleeve—Coupling sleeve for volume control shaft—Package of 5 | .15 |
| 4263 | Socket—Dial lamp socket | .20 |
| | REPRODUCER ASSEMBLIES | |
| 9493 | Coil—Field coil magnet and cone support (L12) | 2.70 |
| 9492 | Cone—Reproducer cone (L11)—Package of 5 | 3.70 |
| 9491 | Reproducer complete | 4.16 |
| | VIBRATOR ASSEMBLIES | |
| 4280 | Board—Terminal board—Located on filter pack | .35 |
| 4013 | Capacitor—200 mmfd. (C31) | .30 |
| 4274 | Capacitor—.025 mfd. (C34) | .80 |
| 4273 | Capacitor—0.5 mfd. (C29) | .90 |
| 4275 | Coil—Choke coil (L16) | .30 |
| 7758 | Filter pack—Comprising one reactor, one choke coil, two 8. mfd. capacitors, one 0.5 and one 200 mmfd. capacitors (C30, C35, C36, C37, L14, L17) | 6.00 |
| 4276 | Plug—2-prong plug | .25 |
| 4279 | Screw—Binder head No. 6-32-¼-inch screw—Fastens shield to cover—Package of 10 | .22 |
| 4278 | Socket—Vibrator mounting socket | .26 |
| 7759 | Transformer—Vibrator transformer (T1) | 3.95 |
| 7757 | Vibrator assembly complete (R17, C32, C33, L15) | 8.50 |
| | HOUSING ASSEMBLIES | |
| 4272 | Bracket—Volume control shaft bracket—For left-hand mounting located on front of receiver housing | .28 |

| Stock No. | Description | List Price |
|---|---|---|
| 4270 | Cover—Tuning condenser drive bracket and worm assembly cover | $0.25 |
| 7755 | Housing—Front section of housing complete—Less hinge pin | .80 |
| 7756 | Housing—Rear section of housing complete—Less hinge pin | .54 |
| 4267 | Nut—Wing nut—Package of 10 | .46 |
| 4266 | Pin—Hinge pin—Package of 5 | .42 |
| 4268 | Screw—Wing screw—Package of 10 | .68 |
| 4269 | Screw—No. 6 self-tapping screw for fastening front and bottom sections of housing—Package of 10 | .50 |
| 4271 | Screw—Self-tapping No. 6 screw for fastening tuning condenser drive bracket and worm cover to housing—Package of 10 | .50 |
| 4295 | Screw—No. 10-32-¼-inch headless set screw—Located in worm gear cover and bracket used to fasten drive shafts—Package of 10 | .20 |
| | MISCELLANEOUS ASSEMBLIES | |
| 4287 | Body—Antenna connector body—Package of 10 | .40 |
| 4289 | Body—Fuse connector body—Package of 10 | .35 |
| 4283 | Cable — Antenna lead-in cable — Approximately 35 inches long | .80 |
| 4288 | Cap—Antenna or fuse connector cap—Package of 10 | .36 |
| 4293 | Capacitor—Ammeter capacitor—0.5 mfd. | .60 |
| 4292 | Capacitor—Generator capacitor—0.5 mfd. | .90 |
| 4291 | Clip—"A" supply clip—Package of 10 | .70 |
| 7767 | Escutcheon—Grille escutcheon and name plate | 1.06 |
| 4286 | Ferrule—Antenna or fuse connector ferrule and bushing—Package of 10 | .38 |
| 3646 | Fuse—20 ampere—Package of 5 | .40 |
| 7765 | Grille—Baffle board and grille cloth | .38 |
| 4290 | Insulator—Fuse connector insulator—Package of 10 | .35 |
| 4132 | Knob—Noise suppressor or tone control knob—Package of 5 | .55 |
| 4282 | Knob—Station selector knob—Package of 5 | .65 |
| 7766 | Lead—Power lead with female section of fuse connector—From power cable to battery | .30 |
| 4284 | Spring—Antenna or fuse connector spring—Package of 10 | .30 |
| 6152 | Suppressor—Distributor suppressor | .56 |
| 6151 | Suppressor—Spark-plug suppressor | .56 |
| 4277 | Screw—No. 8-32-⅜-inch binder head screw used to mount escutcheon—Package of 10 | .22 |
| 4294 | Screw—No. 10-32-5/16-inch hexagon head screw—Used to mount chassis to housing—Package of 10 | .45 |
| 4285 | Washer—Antenna or fuse connector insulating washer—Package of 10 | .22 |

MODEL 124
Alignment Data
Voltage

RCA-VICTOR CO., INC.

# SERVICE DATA

## ELECTRICAL SPECIFICATIONS

Voltage Rating............................105–125 Volts
Frequency Rating..................25–60 and 50–60 Cycles
Power Consumption...60 Cycle 75 Watts, 25 Cycle 80 Watts
Number and Types of Radiotrons..............2 RCA-58, 1 RCA-2A7, 1 RCA-2B7, 1 RCA-2A5, 1 RCA-80—Total 6
Undistorted Output..............................1.75 Watts
Frequency Range..................540 K. C. to 1500 K. C. and 1400 to 2800 K. C.

This receiver is a six tube Superheterodyne incorporating features such as Dynamic Loudspeaker, automatic volume control, single heater type Pentode output tube, continuously variable type tone control and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

A special feature is a Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure A shows the schematic circuit, Figure B the wiring diagram and Figure C the loudspeaker wiring. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

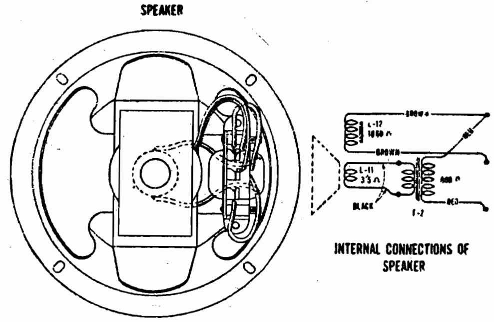



*Figure C—Loudspeaker Wiring*

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage using Radiotron RCA-58, an RCA-2B7 functioning a combined second detector and automatic volume control, an output stage using the new heater Pentode RCA-2A5 and the RCA-80 functioning as a rectifier.

Service work in conjunction with this receiver will be similar to that of other Superheterodyne receivers incorporating a similar type automatic volume control.

## LINE-UP ADJUSTMENTS

**I. F. Tuning Adjustments**—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

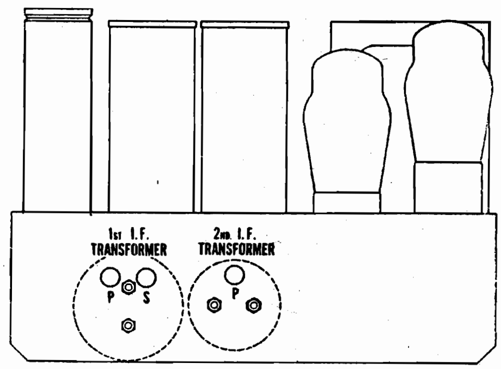



*Figure D—Location of I. F. Line-up Adjustment Screws*

**R. F. and Oscillator Adjustments**—The three gang capacitor screws are accessible at the bottom of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 and 2440 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be opposite the last division of the low frequency end of scale with the indicator at its center position. Then set the dial at 140, the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) With the Range Switch at the counter-clockwise position, adjust the three tuning condenser line-up capacitors until maximum deflection is obtained in the output meter. Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 120. The three line-up capacitors located on the Range Switch should then be adjusted for maximum output.

When making both the I. F. and R. F. adjustments, the important points to remember are that the receiver volume control must be at its maximum position and that the input signal from the external oscillator must be no greater than necessary.

# TUBE SOCKET VOLTAGES

**115 Volts, A. C. Line—No Signal**

| Radiotron No. | Cathode to Control Grid, Volts | Cathode to Screen Grid, Volts | Cathode to Plate, Volts | Plate Current M. A. | Heater Volts |
|---|---|---|---|---|---|
| 1. RCA-58 R. F. | 4.0 | 95 | 255 | 5.0 | 2.31 |
| 2. RCA-2A7 1st Det. Osc. | 5.0* | 95* | 255* | 3.0* | 2.31 |
| 3. RCA-58 I. F. | 4.0 | 95 | 255 | 5.0 | 2.31 |
| 4. RCA-2B7 2nd Det. A. V. C. | 7.5 | 92 | 60 | 2.0 | 2.31 |
| 5. RCA-2A5 Power | 20.0 | 250 | 235 | 33.0 | 2.81 |
| 6. RCA-80 Rectifier | 700–350 Volts—75 M. A. Total Current | | | | 4.82 |

*The voltages and current refer to the detector part of the tube. The total cathode current is 10 M. A.

MODEL 124
Schematic
Chassis Wiring

RCA-VICTOR CO., INC.

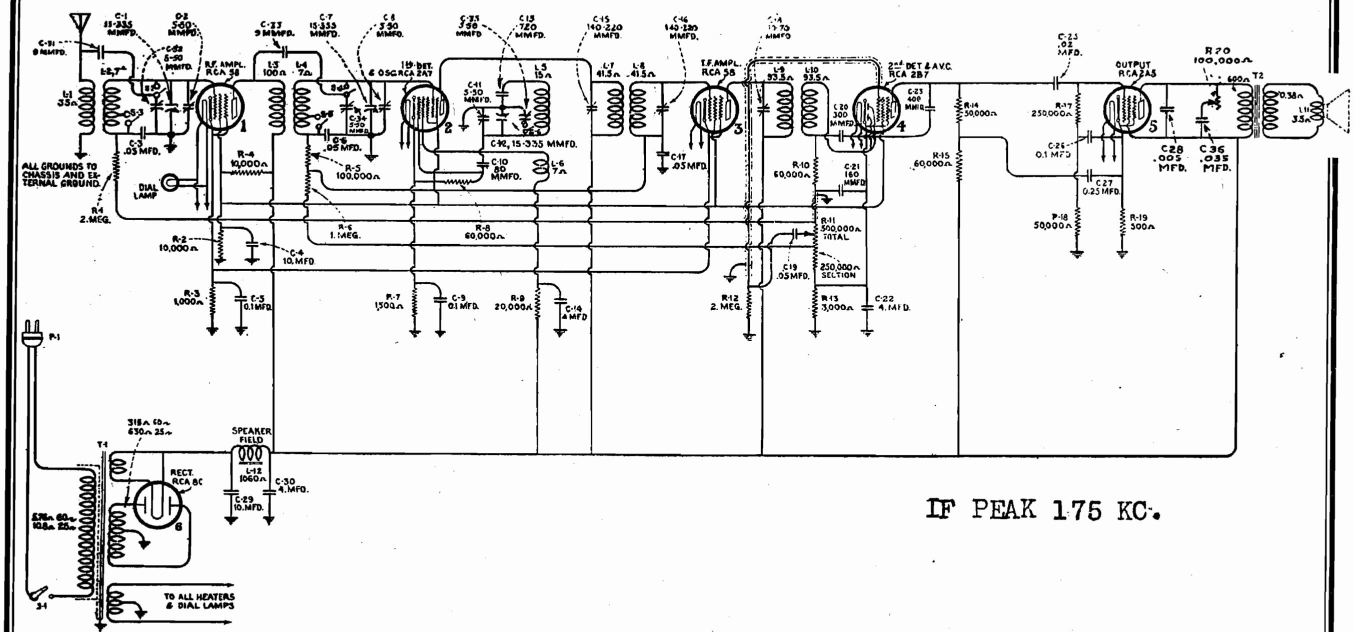



*Figure A—Schematic Circuit Diagram*

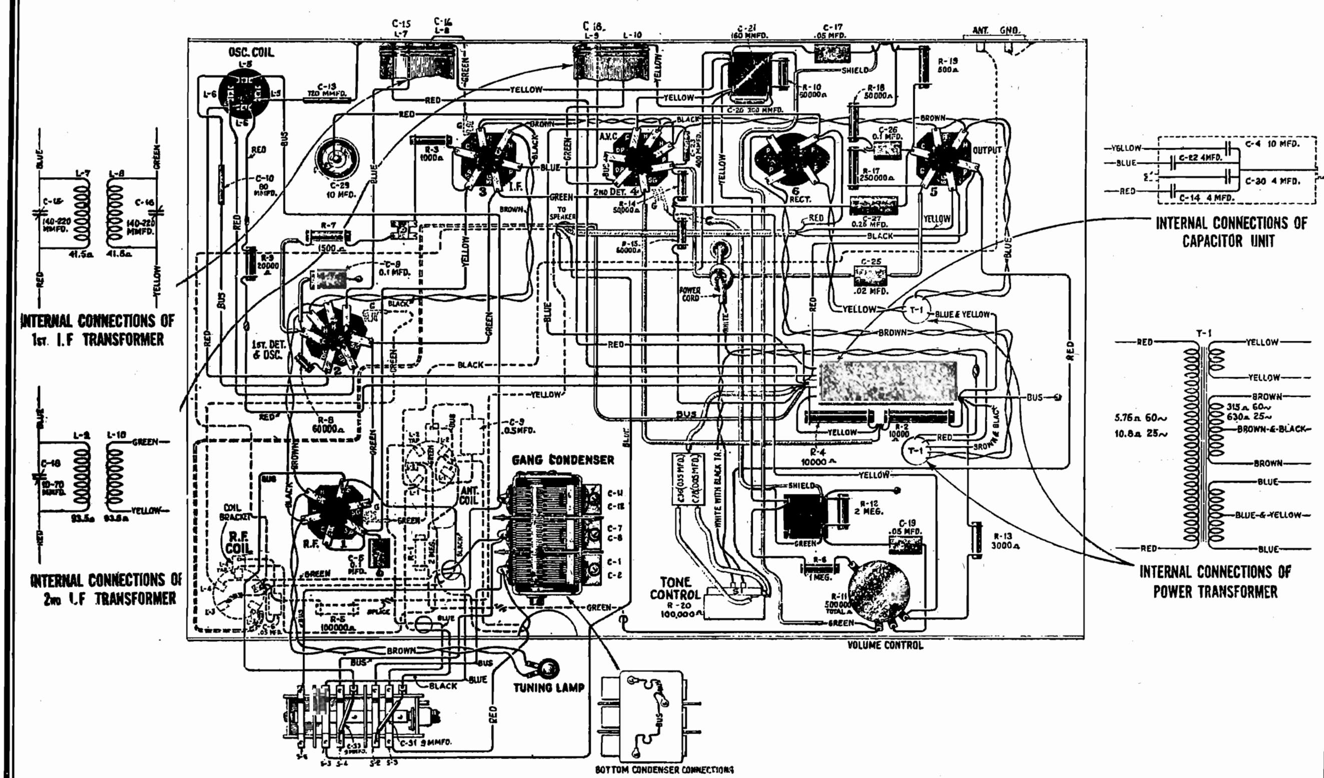



*Figure B—Wiring Diagram*

RCA-VICTOR CO., INC.

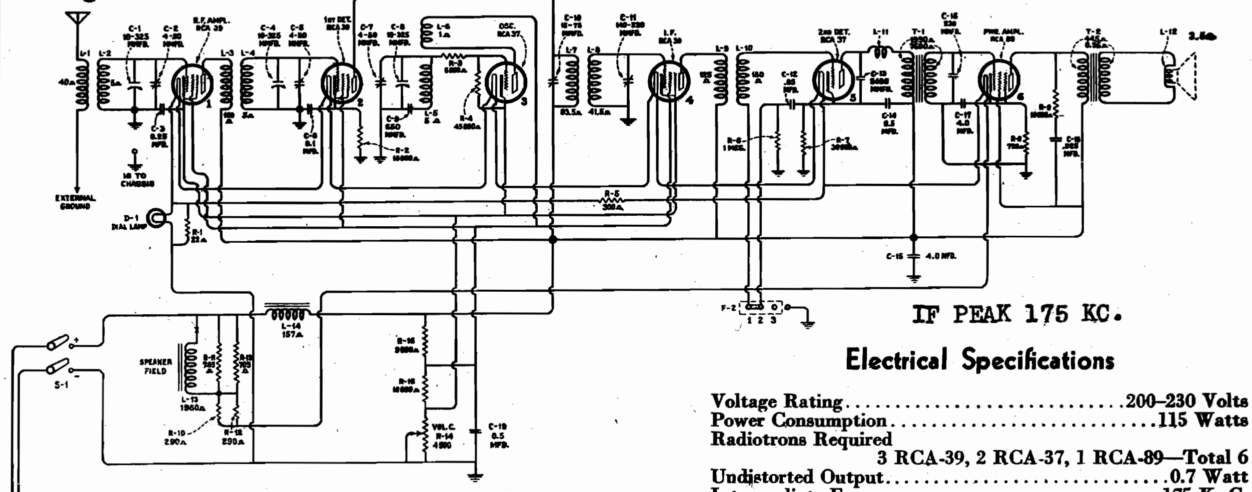
# REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | RECEIVER ASSEMBLIES | |
| 2269 | Capacitor—720 mmfd. (C13) | $0.75 |
| 2747 | Cap—Contact cap—Package of 5 | .50 |
| 3047 | Resistor — 1500 ohms — Carbon type — ½ watt (R7)—Package of 5 | 1.00 |
| 3076 | Resistor — 1 megohm — Carbon type — ½ watt (R6)—Package of 5 | 1.00 |
| 3252 | Resistor—100,000 ohms—Carbon type—½ watt (R5)—Package of 5 | 1.00 |
| 3358 | Resistor — 3,000 ohms — Carbon type — ½ watt (R13)—Package of 5 | 1.00 |
| 3459 | Capacitor—80 mmfd. (C10) | .44 |
| 3514 | Resistor—250,000 ohms—Carbon type—½ watt (R17)—Package of 5 | 1.00 |
| 3572 | Socket—Radiotron 7-contact socket | .38 |
| 3584 | Ring—R. F. or oscillator coil retaining ring—Package of 5 | .40 |
| 3594 | Resistor—50,000 ohms—Carbon type—½ watt (R14, R18)—Package of 5 | 1.00 |
| 3597 | Capacitor—0.25 mfd. (C27) | .40 |
| 3598 | Capacitor—0.1 mfd.—R. F. and I. F. by-pass (C5) | .36 |
| 3616 | Capacitor—300 mmfd. (C20) | .34 |
| 3623 | Shield—Antenna or R. F. coil shield | .30 |
| 3626 | Shield—Oscillator coil shield | .22 |
| 3630 | Resistor — 10,000 ohms — Carbon type — 3 watt (R2, R4) | .25 |
| 3632 | Resistor — 500 ohms — Carbon type — 1 watt (R19)—Package of 5 | 1.10 |
| 3633 | Capacitor—400 mmfd. (C23) | .38 |
| 3634 | Capacitor—160 mmfd. (C21) | .34 |
| 3639 | Capacitor—0.02 mfd. (C25) | .25 |
| 3640 | Capacitor—0.05 mfd. (C3, C6, C17, C19) | .25 |
| 3641 | Capacitor—0.1 mfd. (C9, C26) | .35 |
| 3721 | Resistor — 1,000 ohms — Carbon type — ½ watt (R3)—Package of 5 | 1.00 |
| 3783 | Capacitor—9 mmfd. (C31, C33)—Package of 2 | .50 |
| 4103 | Shield—Radiotron shield—I. F. or R. F. | .20 |
| 4133 | Knob—Station selector, volume control, tone control or range switch knob—Package of 5 | .80 |
| 4135 | Socket—Dial lamp socket and bracket | $0.25 |
| 4140 | Shield—Radiotron shield—1st detector | .30 |
| 4141 | Shield—Radiotron shield—2nd detector | .36 |
| 6188 | Resistor — 2 megohm — Carbon type — ½ watt (R1, R12)—Package of 5 | 1.00 |
| 6282 | Resistor—60,000 ohms—Carbon type—½ watt (R8, R10, R15)—Package of 5 | 1.00 |
| 6300 | Socket—Radiotron 4-contact socket | .35 |
| 6303 | Resistor—20,000 ohms—Carbon type—½ watt (R9)—Package of 5 | 1.00 |
| 6471 | Coil—Oscillator coil (L5, L6) | .74 |
| 6483 | Transformer—1st intermediate frequency transformer (L7, L8, C15, C16) | 1.84 |
| 6484 | Transformer—2nd intermediate frequency transformer (L9, L10, C18) | 1.70 |
| 6485 | Volume control—With mounting nut (R11) | 1.20 |
| 6487 | Capacitor assembly—Comprising three 4.0 mfd. and one 10.0 mfd. capacitors (C4, C14, C22, C30) | 2.90 |
| 6527 | Coil—Antenna coil (L1, L2) | 1.08 |
| 6528 | Coil—R. F. coil (L3, L4) | .94 |
| 6534 | Switch—Range switch (S2, S3, S4, S5, S6, C32, C34, C35) | 1.25 |
| 6598 | Condenser—3-gang variable tuning condenser (C1, C2, C7, C8, C11, C12) | 3.00 |
| 6619 | Tone control with mounting nut (R20) | 1.44 |
| 6620 | Capacitor—Comprising one .005 and one .035 mfd. (C28, C36) | .50 |
| 6851 | Scale—Dial scale and drive assembly | 1.22 |
| 6853 | Escutcheon—Station selector escutcheon | .34 |
| 7485 | Socket—Radiotron 6-contact socket | .40 |
| 7590 | Capacitor—10.0 mfd. (C29) | 1.40 |
| 9005 | Transformer—Power transformer—105–125 volts, 50–60 cycles (T1) | 4.80 |
| 9006 | Transformer—Power transformer—200–250 volts, 50–60 cycles | 5.05 |
| 9024 | Transformer—Power transformer—105–125 volts, 25–40 cycles | 5.85 |
| | REPRODUCER ASSEMBLIES | |
| 6476 | Transformer—Output transformer (T2) | 1.44 |
| 6852 | Cable—3-conductor reproducer cable | .26 |
| 9032 | Coil assembly—Comprising coil, magnet and cone support (L12) | 2.35 |
| 9428 | Cone—Reproducer cone (L11)—Package of 5 | 5.00 |
| 9440 | Reproducer complete | 4.75 |

MODEL 25 DC
Schematic
Chassis Wiring
Voltage

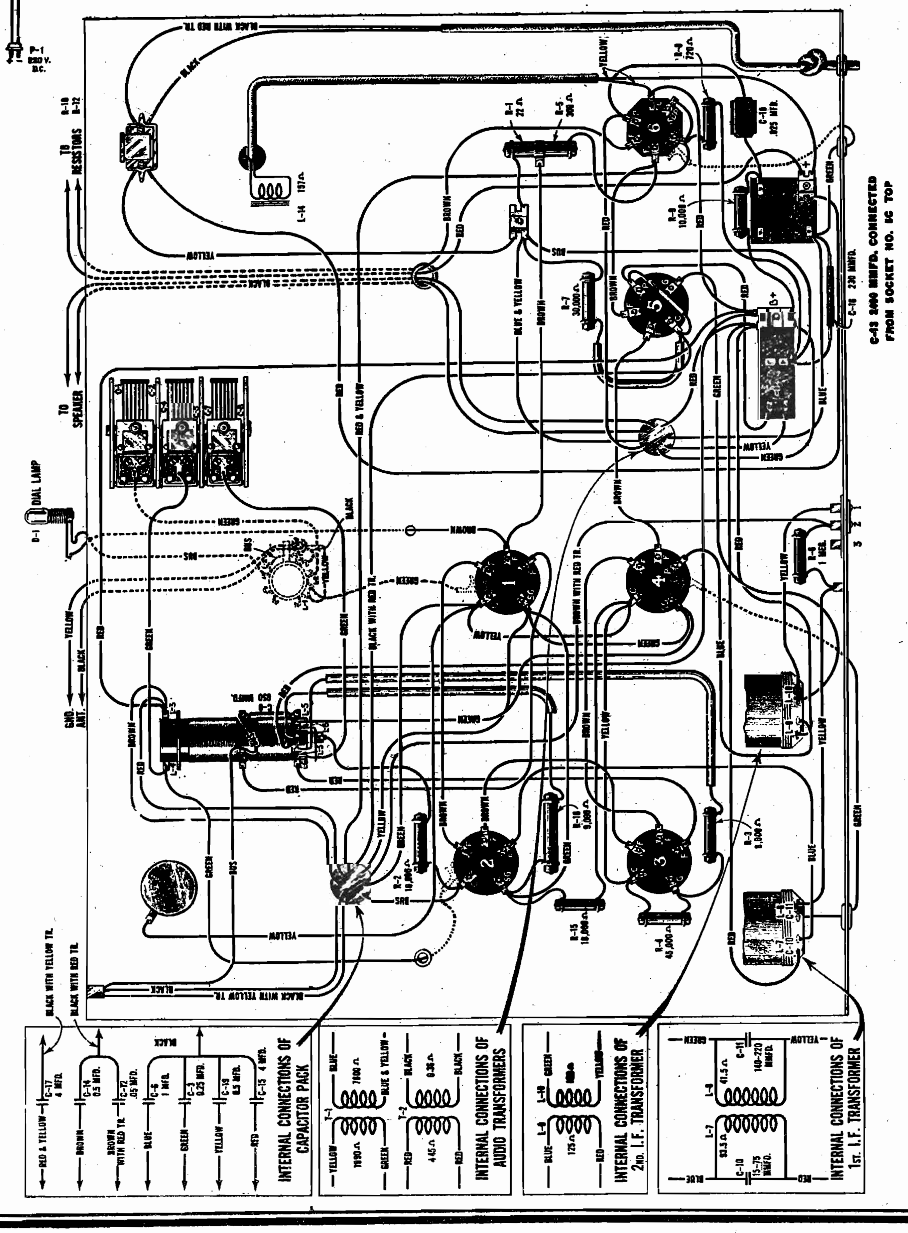
# RCA-VICTOR CO., INC.



IF PEAK 175 KC.

## Electrical Specifications

Voltage Rating............................200–230 Volts
Power Consumption............................115 Watts
Radiotrons Required
3 RCA-39, 2 RCA-37, 1 RCA-89—Total 6
Undistorted Output..............................0.7 Watt
Intermediate Frequency........................175 K. C.
R. F. and Oscillator Line-up Frequency.....1400 K. C. Only




| Radiotron No. | Cathode or Filament to Control Grid, Volts | Cathode or Filament to Screen Grid, Volts | Cathode or Filament to Plate, Volts | Plate Current M. A. | Heater or Filament, Volts | Radiotron Socket Voltages |
|---|---|---|---|---|---|---|
| 1. R. F. RCA-39 | 3.5 | 90 | 205 | 5.0 | 6.0 | |
| 2. 1st Detector RCA-39 | 10 | 83 | 200 | 1.0 | 6.0 | |
| 3. Oscillator RCA-37 | — | — | 90 | 4.5 | 6.0 | |
| 4. I. F. RCA-39 | 3.5 | 90 | 205 | 5.0 | 6.0 | |
| 5. 2nd Detector RCA-37 | 20 | — | 185 | .75 | 6.0 | |
| 6. Power RCA-89 | 18.5 | 190 | 180 | 15.0 | 6.0 | |

All above voltages measured at maximum volume control setting with no signal impressed on input. 220 Volt, D. C. source used.

# RCA-VICTOR CO., INC.

MODEL 126-B
Schematic
Socket Layout

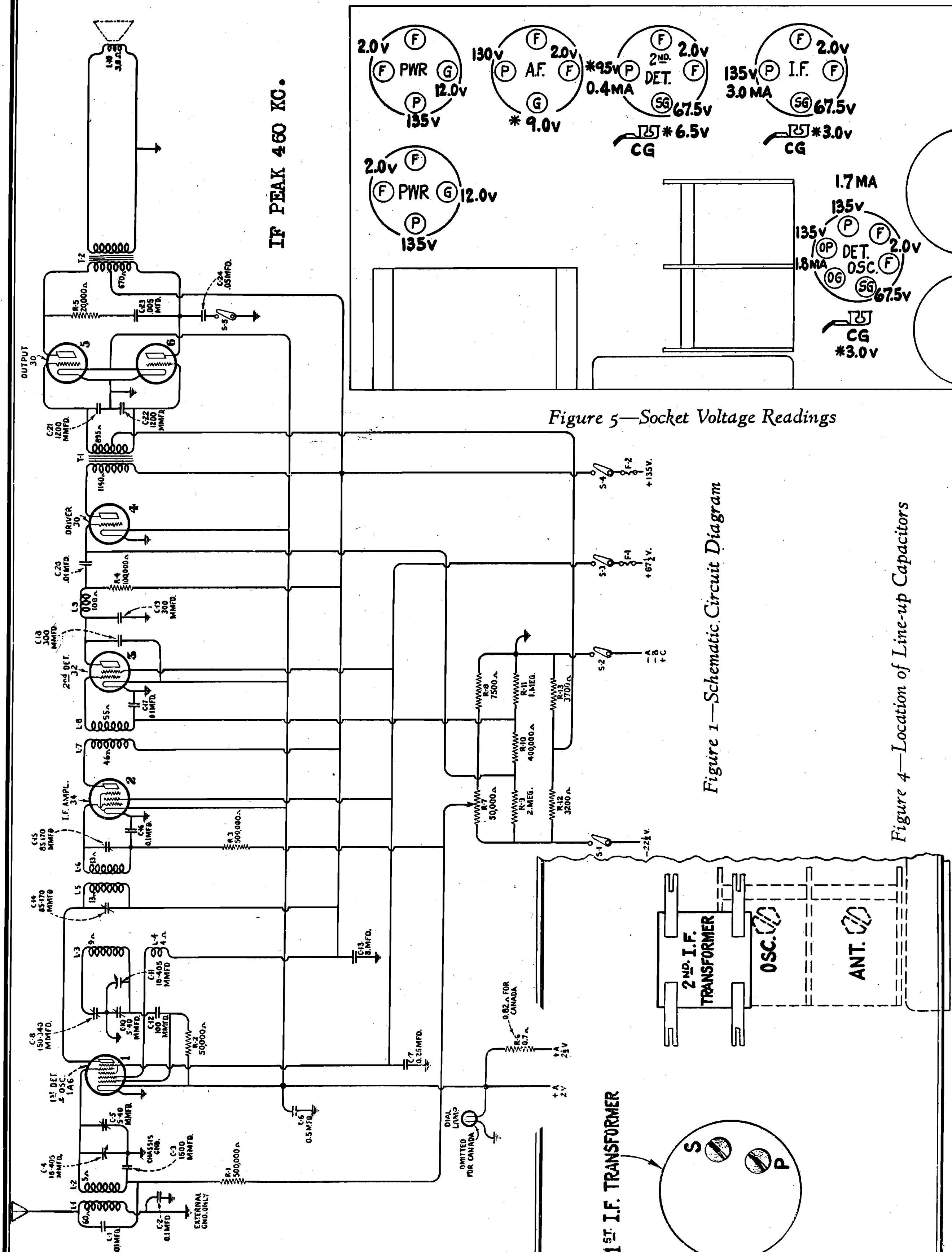



*Figure 5—Socket Voltage Readings*

*Figure 1—Schematic Circuit Diagram*

*Figure 4—Location of Line-up Capacitors*

MODEL 126-B
Chassis Wiring

# RCA-VICTOR CO., INC.

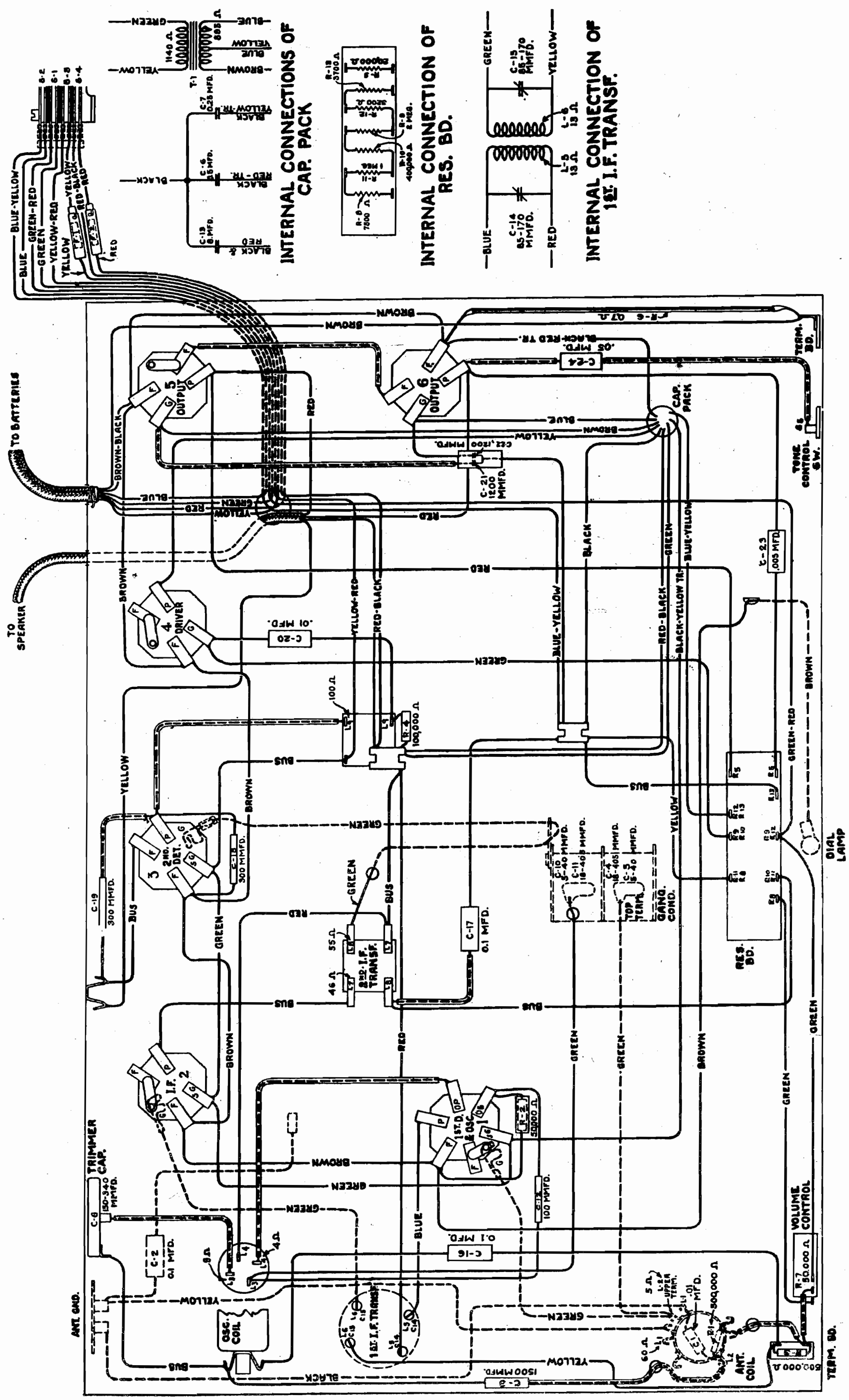



*Figure 2—Chassis Wiring Diagram*

MODEL 126-B
Alignment Data
Voltage

RCA-VICTOR CO., INC.

# SERVICE DATA

### (1) Important

Always disconnect the batteries before attempting to remove the chassis from the cabinet. Always turn the operating switch "off" before changing tubes, batteries or fuses.

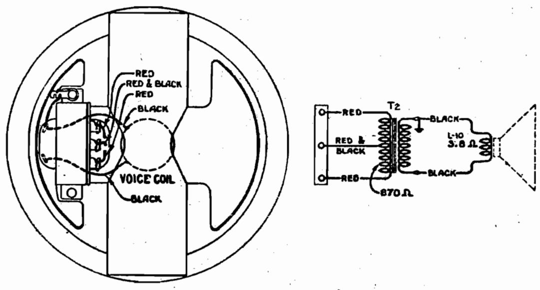



*Figure 3—Loudspeaker Wiring*

### (2) Line-up Capacitor Adjustments

Line-up capacitors are provided in the first detector, oscillator and intermediate amplifier to provide a means of properly aligning the receiver. A modulated R. F. oscillator, such as Full Range Test Oscillator, type TMV-97-B (Stock No. 9050), a non-metallic screw driver, such as alignment wrench (Stock No. 4160), and an output indicator are required for properly aligning this receiver. Refer to Figure 4 for the location of the line-up capacitors.

### I. F. Adjustments

Two transformers comprising four circuits, two of which have trimmer capacitors, are used in the I. F. amplifier. Proceed as follows:

(a) Short-circuit the antenna and ground terminals and connect the output of the oscillator between the control grid cap of the first detector (RCA-1A6) and ground. Connect an output indicator across the voice coil leads of the loudspeaker. Place the oscillator in operation at 460 K. C. and adjust its output and the receiver volume control until a deflection is obtained in the output indicator.

(b) Adjust the secondary and then the primary of the first I. F. transformer (see Figure 4) until a maximum deflection is obtained in the output indicator.

This completes the I. F. adjustments. It is good practice to always follow the I. F. adjustments with the detector and oscillator adjustment, as there is an interlocking of adjustments that always occurs.

### Detector-Oscillator Adjustments

The two-gang capacitor trimmer screws are accessible at the top of chassis. The series (600 K. C.) trimmer is accessible from the rear. Proceed as follows:

(a) Connect the oscillator between the antenna and ground terminals of the receiver. Connect the output meter across the voice coil leads of the loudspeaker.

(b) Place the oscillator in operation at 1400 K. C., set the dial at 140 and adjust the oscillator output and receiver volume control until a deflection is obtained in the output indicator.

(c) Adjust each trimmer on the gang capacitor until a maximum deflection is obtained.

(d) Set the oscillator at 600 K. C. and tune in the signal on the receiver. Then adjust the series trimmer, located on the rear of the chassis, until maximum output is obtained. While making this adjustment, rock the tuning capacitor back and forth through the signal. Then again check the adjustments in (b).

### (3) Voltage Readings

The following voltages are those at the tube sockets while the receiver is in operating condition. No allowance has been made for current drawn by the meter and if low resistance meters are used, such allowances must be made.

## RADIOTRON SOCKET VOLTAGES

**135-Volt "B" Supply—No Signal—Maximum Volume Control**

| Radiotron No. | | Control Grid to Ground Volts, D. C. | Screen Grid to Ground Volts, D. C. | Plate to Ground Volts, D. C. | Plate, M. A. | Filament Volts, D. C. |
|---|---|---|---|---|---|---|
| RCA-1A6 | 1st Det. | *3.0 | 67.5 | 135 | 1.7 | 2.0 |
| | Osc. | — | — | 135 | 1.8 | |
| RCA-34—I. F. | | *3.0 | 67.5 | 135 | 3.0 | 2.0 |
| RCA-32—2nd Det. | | *6.5 | 67.5 | *95 | 0.4 | 2.0 |
| RCA-30—Driver | | *9.0 | — | 130 | 3.5 | 2.0 |
| RCA-30—Output | | 12.0 | — | 135 | 1.0 | 2.0 |
| RCA-30—Output | | 12.0 | — | 135 | 1.0 | 2.0 |

*These voltages cannot be measured with ordinary voltmeter, as they are obtained by means of high resistance bleeders across a 22½-volt "C" battery.

MODEL 126-B
Parts List

RCA-VICTOR CO., INC.

# REPLACEMENT PARTS

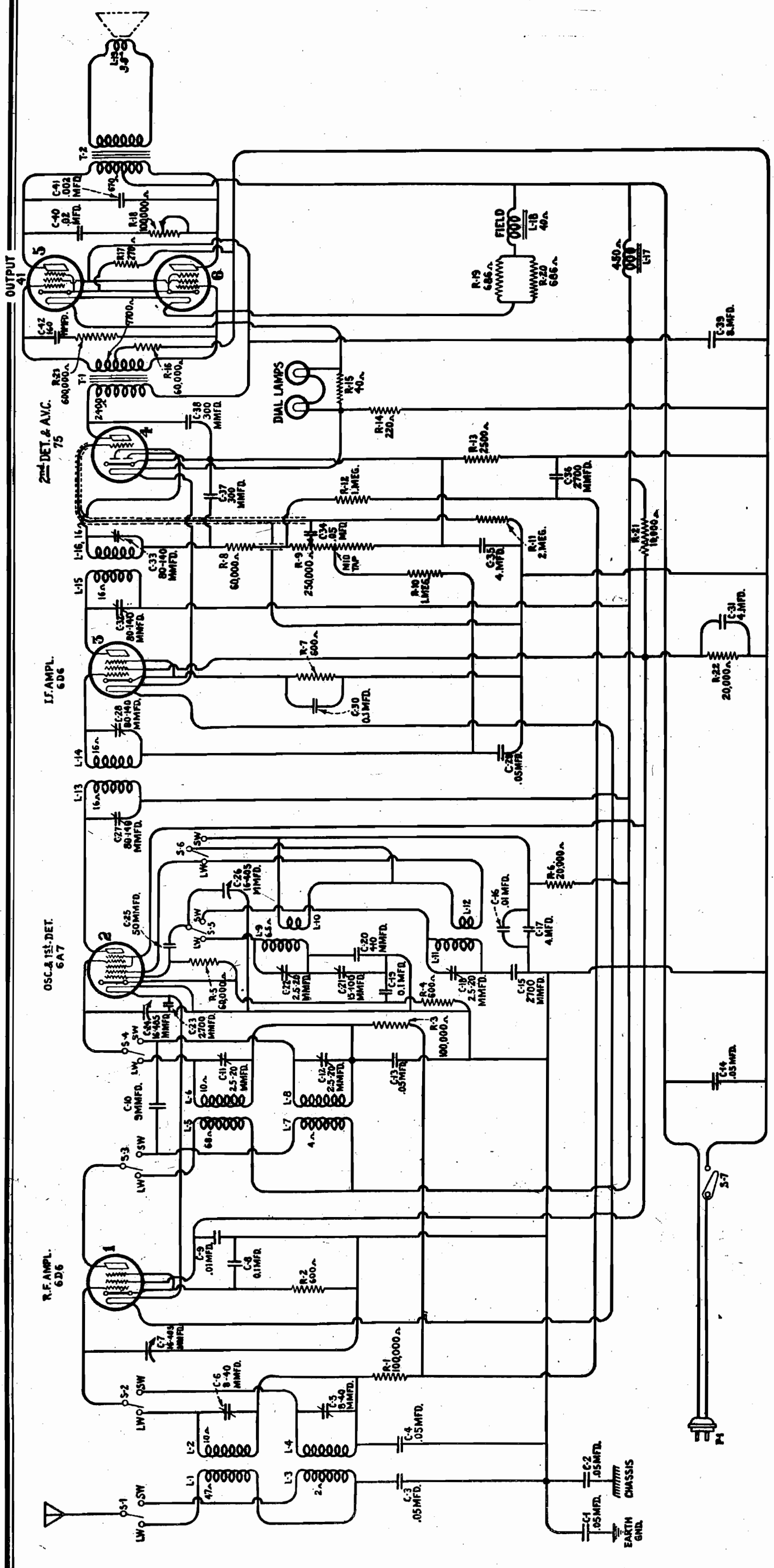
**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.**

| Stock No. | Description | List Price |
|---|---|---|
| | **RECEIVER ASSEMBLIES** | |
| 2747 | Cap—Contact cap—Package of 5 | $0.50 |
| 4000 | Capacitor—Adjustable trimmer capacitor (C8) | .78 |
| 4353 | Capacitor—100 mmfd. (C12) | .30 |
| 4354 | Capacitor—1500 mmfd. (C3) | .36 |
| 4352 | Capacitor—300 mmfd. (C18, C19) | .25 |
| 6512 | Capacitor—0.005 mfd. (C23) | .28 |
| 3888 | Capacitor—0.05 mfd. (C24) | .25 |
| 3701 | Capacitor—0.01 mfd. (C1, C20) | .30 |
| 3877 | Capacitor—0.1 mfd. (C2, C16, C17) | .32 |
| 4355 | Capacitor pack—Comprising two 1200 mmfd. capacitors (C21, C22) | .26 |
| 4349 | Capacitor and transformer pack—Comprising one 8.0 mfd., one 0.5, one 0.25 mfd. capacitor and driver transformer (C7, C6, C13, T1) | 3.95 |
| 6992 | Coil—Antenna coil (L1, L2, R1, C1) | .98 |
| 4343 | Coil—Choke coil (L9) | .60 |
| 6664 | Coil—Oscillator coil (L3, L4) | .94 |
| 6660 | Condenser—2-gang variable tuning condenser (C4, C5, C10, C11) | 2.78 |
| 4356 | Resistor—0.7 ohm—Flexible type (R6)—Package of 10 | 1.50 |
| 4345 | Resistor—3200 ohms—Carbon type—¼ watt (R12)—Package of 10 | 2.00 |
| 4346 | Resistor—3700 ohms—Carbon type—¼ watt (R13)—Package of 10 | 2.00 |
| 4344 | Resistor—7500 ohms—Carbon type—¼ watt (R8)—Package of 10 | 2.00 |
| 6303 | Resistor—20,000 ohms—Carbon type—½ watt (R5)—Package of 5 | 1.00 |
| 3114 | Resistor—50,000 ohms—Carbon type—¼ watt (R2)—Package of 5 | 1.00 |
| 3118 | Resistor—100,000 ohms—Carbon type—¼ watt (R4)—Package of 5 | 1.00 |
| 3619 | Resistor—400,000 ohms—Carbon type—¼ watt (R10)—Package of 5 | 1.00 |
| 6186 | Resistor—500,000 ohms—Carbon type—¼ watt (R1, R3)—Package of 5 | 1.00 |
| 3033 | Resistor—1 megohm—Carbon type—¼ watt (R11)—Package of 5 | 1.00 |
| 6242 | Resistor—2 megohm—Carbon type—¼ watt (R9)—Package of 5 | 1.00 |
| 3584 | Ring—Oscillator coil retaining ring—Package of 5 | .40 |
| 3682 | Shield—First detector and oscillator—Radiotron shield | .22 |
| 4351 | Shield—I. F. Radiotron socket shield | .25 |
| 6665 | Shield—Oscillator coil shield | .34 |
| 3056 | Shield—Second detector—Radiotron shield—Package of 2 | .40 |
| 3858 | Socket—Dial lamp socket | .26 |
| 6300 | Socket—4-contact second detector—Radiotron socket | .35 |
| 6980 | Socket—4-contact output (No. 5) Radiotron socket | $0.20 |
| 3859 | Socket—4-contact output (No. 6) Radiotron socket | .30 |
| 4232 | Socket—6-contact—1st detector and oscillator—Radiotron socket | .35 |
| 6669 | Switch—Tone control switch (S5) | .50 |
| 4347 | Terminal strip—Engraved "ANT-GND" | .25 |
| 6993 | Transformer—First intermediate frequency transformer (L5, L6, C14, C15) | 2.10 |
| 6994 | Transformer—Second intermediate frequency transformer (L7, L8) | 1.05 |
| 6995 | Volume control (R7) | 1.10 |
| | **REPRODUCER ASSEMBLIES** | |
| 4350 | Cable—4-conductor—Reproducer cable | .54 |
| 9428 | Cone—Reproducer cone (L10)—Package of 5 | 5.00 |
| 9503 | Housing—Cone housing and core assembly | 2.70 |
| 3949 | Magnet | 1.40 |
| 9502 | Reproducer assembly complete | 8.40 |
| 6996 | Transformer—Output transformer (T2) | 1.68 |
| | **MISCELLANEOUS ASSEMBLIES** | |
| 4289 | Body—Fuse connector body—Package of 10 | .35 |
| 4357 | Cable—Battery cable—6-conductor | 1.52 |
| 4288 | Cap—Fuse connector cap—Package of 10 | .36 |
| 6516 | Connector—Fuse connector complete | .16 |
| 4468 | Dial—Station selector dial | .22 |
| 6176 | Escutcheon—Operating switch escutcheon—Package of 5 | .50 |
| 4286 | Ferrule—Fuse connector ferrule and bushing—Package of 10 | .38 |
| 3748 | Fuse—0.5 ampere (F1, F2)—Package of 5 | .40 |
| 4290 | Insulator—Fuse connector insulator—Package of 10 | .35 |
| 3088 | Knob—Operating switch knob—Package of 5 | .50 |
| 4085 | Knob—Station selector knob and pointer—Package of 5 | .60 |
| 4132 | Knob—Volume control or tone control switch knob—Package of 5 | .55 |
| 4348 | Lamp—Dial lamp | .38 |
| 9050 | Oscillator—Test oscillator—90 to 25,000 K.C. | 29.50† |
| 3886 | Reflector—Dial light reflector | .30 |
| 3238 | Screw—Set screw for operating switch knob—Package of 10 | .25 |
| 4393 | Screw—No. 8-32-5/16-inch headless set screw for knobs—Package of 10 | .25 |
| 4160 | Screw driver—Combination insulated screw driver and socket wrench for I. F. and R. F. adjustments | 1.00 |
| 4284 | Spring—Fuse connector spring—Package of 10 | .30 |
| 4540 | Switch—Operating switch (S1, S2, S3, S4) | 2.28 |
| 4285 | Washer—Fuse connector insulating washer—Package of 10 | .22 |

† Full Discount Not Allowed

MODEL 127
Schematic
Trimmer Locations

# RCA-VICTOR CO., INC.



IF PEAK 370 KC.

Figure 1
Schematic Circuit

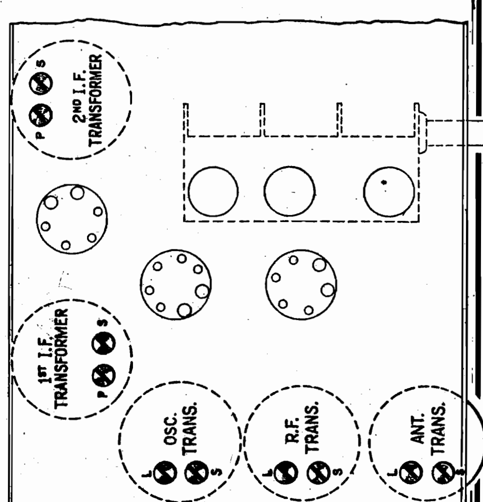


Figure 4—Location of Line-up Capacitors—Viewing bottom of chassis

MODEL 127
Chassis Wiring

RCA-VICTOR CO., INC.

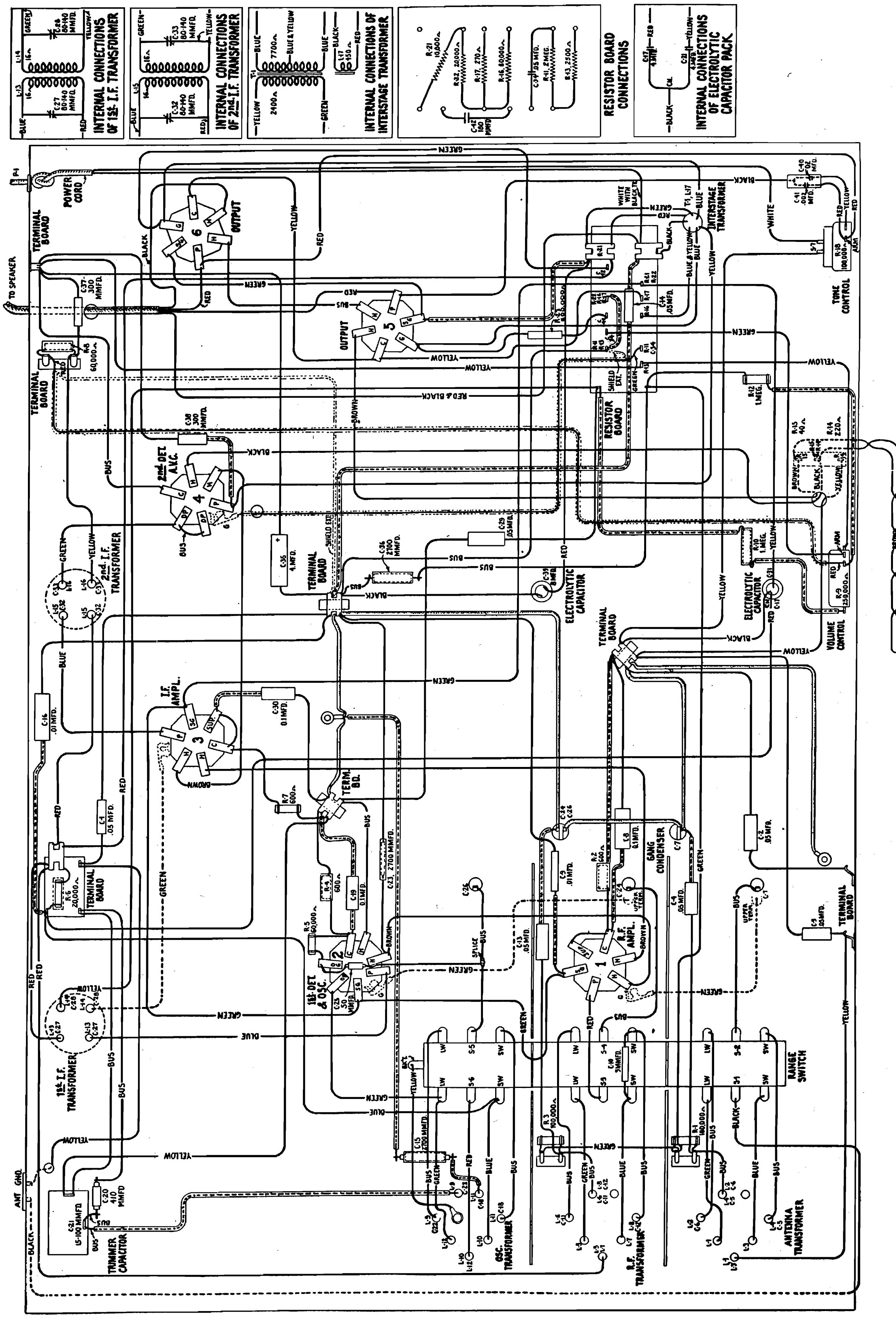
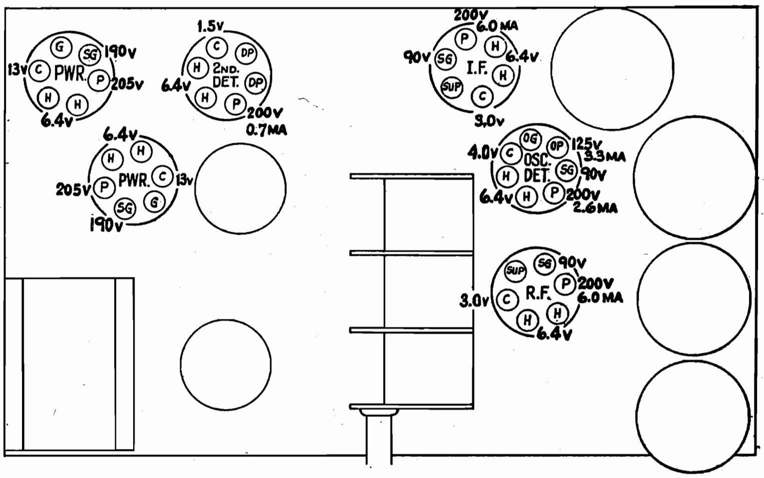


Figure 2—Wiring Diagram

RCA-VICTOR CO., INC.

**MODEL 127**
**Socket Layout**
**Voltage**



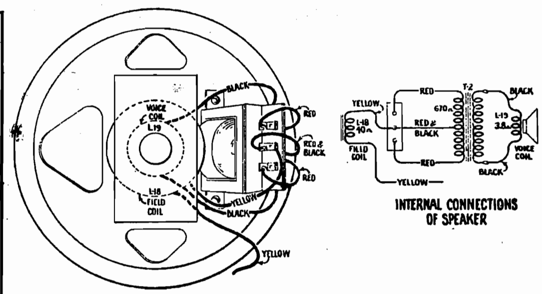




*Figure 3—Loudspeaker Wiring*

ALL VOLTAGES ARE TO—B

*Figure 5—Radiotron Socket Voltages*

The following voltages are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if lower resistance meters are used, such allowances must be made.

## RADIOTRON SOCKET VOLTAGES

**220-Volt, D. C. Line—No Signal**

| Radiotron No. | | Cathode to B— Volts, D. C. | Screen Grid to B— Volts, D. C. | Plate to B— Volts, D. C. | Plate Current, M. A. | Heater Volts, A. C. |
|---|---|---|---|---|---|---|
| RCA-6D6 R. F. | | 3.0 | 90 | 200 | 6.0 | 6.4 |
| RCA-6A7 | 1st Detector | 4.0 | 90 | 200 | 2.6 | 6.4 |
| | Oscillator | — | — | 125 | 3.3 | |
| RCA-6D6 I. F. | | 3.0 | 90 | 200 | 6.0 | 6.4 |
| RCA-75 2nd Detector | | 1.5 | — | 200 | 0.7 | 6.4 |
| RCA-41 Power | | 13.0 | 190 | 205 | 25.0 | 6.4 |
| RCA-41 Power | | 13.0 | 190 | 205 | 25.0 | 6.4 |

**MODEL 127**
**Alignment Data**
**Parts List**

# RCA-VICTOR CO., INC.

## REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | Description | List Price |
|---|---|---|
| | RECEIVER ASSEMBLIES | |
| 10194 | Ball—Steel ball for condenser drive assembly—Package of 20 | $0.25 |
| 2747 | Cap—Contact cap—Package of 5 | .50 |
| 3938 | Capacitor—9 mmfd. (C10) | .25 |
| 3849 | Capacitor—50 mmfd. (C25) | .30 |
| 6314 | Capacitor—160 mmfd. (C23)—Package of 5 | 2.00 |
| 4352 | Capacitor—300 mmfd. (C37, C38) | .25 |
| 4297 | Capacitor—410 mmfd. (C20) | .30 |
| 4031 | Capacitor—2700 mmfd. (C15, C23, C36) | .50 |
| 3701 | Capacitor—0.01 mfd. (C9, C16) | .30 |
| 4211 | Capacitor—0.05 mfd. (C1, C2, C3, C14, C34) | .30 |
| 3901 | Capacitor—0.05 mfd. (C4, C13) | .36 |
| 3888 | Capacitor—0.05 mfd. (C29) | .25 |
| 3877 | Capacitor—0.1 mfd. (C8, C19, C30) | .32 |
| 3796 | Capacitor—4.0 mmfd. (C35) | .60 |
| 6986 | Capacitor—8.0 mmfd. (C39) | 1.60 |
| 3861 | Capacitor—Adjustable trimmer capacitor (C21) | .78 |
| 6985 | Capacitor—Comprising two 4.0 mmfd. capacitors (C17, C31) | 1.50 |
| 4373 | Capacitor pack—Comprising one 0.002 mfd. and one 0.02 mfd. capacitors (C40, C41) | .30 |
| 6983 | Coil—Antenna coil (L1, L2, L3, L4, C5, C6) | 2.68 |
| 6700 | Coil—Oscillator coil (L9, L10, L11, L12, C18, C22) | 2.30 |
| 6699 | Coil—R. F. coil (L5, L6, L7, L8, C11, C12) | 2.44 |
| 6694 | Condenser—3-gang variable tuning condenser (C7, C24, C26) | 3.75 |
| 3941 | Dial—Station selector dial scale—Package of 5 | 1.75 |
| 4467 | Drive—Variable tuning condenser drive assembly complete | 2.40 |
| 4340 | Lamp—Dial lamp—Package of 5 | .60 |
| 3906 | Mounting assembly—Variable condenser mounting assembly—Comprising 3 bushings, 3 lock-washers, 3 nuts and 3 washers—Package of 1 set | .28 |
| 3940 | Pointer—Station selector indicator—Package of 5 | .50 |
| 3218 | Resistor—600 ohms—Carbon type—¼ watt (R2, R4, R7)—Package of 5 | 1.00 |
| 4338 | Resistor—2500 ohms—Carbon type—¼ watt (R13)—Package of 10 | 2.00 |
| 3602 | Resistor—60,000 ohms—Carbon type—¼ watt (R5, R8, R16)—Package of 5 | 1.00 |
| 3118 | Resistor—100,000 ohms—Carbon type—¼ watt (R1, R3)—Package of 5 | 1.00 |
| 3439 | Resistor—600,000 ohms—Carbon type—¼ watt (R23)—Package of 5 | 1.00 |
| 3033 | Resistor—1 megohm—Carbon type—¼ watt (R10, R12)—Package of 5 | 1.00 |
| 6242 | Resistor—2 megohms—Carbon type—¼ watt (R11)—Package of 5 | 1.00 |
| 4337 | Resistor—270 ohms—Carbon type—1 watt (R17)—Package of 10 | 2.20 |
| 6114 | Resistor—20,000 ohms—Carbon type—1 watt (R6, R22)—Package of 5 | 1.10 |
| 4339 | Resistor—260 ohms—Porcelain type—Tapped at 220 ohms (R14, R15) | .52 |
| 3991 | Resistor—10,000 ohms—Porcelain type (R21) | $0.60 |
| 3943 | Screen—Translucent celluloid screen—For dial lamps—Package of 2 | .18 |
| 3878 | Screw—No. 8-32—$\frac{3}{16}$ headless cup point set screw for fastening station selector pointer—Package of 20 | .25 |
| 3768 | Screw—Square head No. 6-32—¼ set screw for condenser drive—Package of 10 | .35 |
| 6704 | Shaft—Tuning condenser drive shaft assembly | .64 |
| 4145 | Shield—First detector and oscillator Radiotron shield | .30 |
| 4103 | Shield—I. F. amplifier Radiotron shield | .20 |
| 3950 | Shield—R. F. amplifier Radiotron shield | .26 |
| 4216 | Shield—Radiotron shield top | .10 |
| 4215 | Shield—Second detector Radiotron shield | .15 |
| 3529 | Socket—Dial lamp socket | .32 |
| 6676 | Socket—6-contact Radiotron socket | .40 |
| 7485 | Socket—6-contact second detector and AVC Radiotron socket | .40 |
| 3572 | Socket—7-contact Radiotron socket | .38 |
| 6696 | Switch—Range switch (S1, S2, S3, S4, S5, S6) | 2.24 |
| 6697 | Transformer—First intermediate frequency transformer (L13, L14, C27, C28) | 1.80 |
| 6698 | Transformer—Second intermediate frequency transformer (L15, L16, C32, C33) | 1.78 |
| 6987 | Transformer pack—Audio transformer pack—Comprising one reactor and one inter-stage transformer (T1, L17) | 4.50 |
| 6705 | Tone control (R18, S7) | 1.20 |
| 6695 | Volume control (R9) | 1.20 |
| | REPRODUCER ASSEMBLIES | |
| 7811 | Cable—Reproducer cable | .45 |
| 9498 | Coil—Field coil, magnet and cone support (L18) | 3.50 |
| 9499 | Cone—Reproducer cone (L19)—Package of 5 | 6.10 |
| 9497 | Reproducer complete | 6.75 |
| 6988 | Transformer—Output transformer (T2) | 1.60 |
| | MISCELLANEOUS ASSEMBLIES | |
| 6706 | Bezel—Metal bezel for station selector dial | .42 |
| 6707 | Glass—Station selector dial glass | .20 |
| 6989 | Knob—Range switch or tone control knob—Package of 5 | .65 |
| 6991 | Knob—Station selector knob—Package of 5 | 1.15 |
| 6990 | Knob—Volume control knob—Package of 5 | 1.15 |
| 9050 | Oscillator—Test oscillator—90–25,000 K. C. | 29.50† |
| 4341 | Resistor—Porcelain type—686 ohms (R19, R20) | 2.12 |
| 6708 | Ring—Retaining ring for dial glass—Package of 5 | .44 |
| 4342 | Screw—Receiver mounting screw assembly—Comprising four bushings, four screws and four washers | .30 |
| 4160 | Screwdriver—Combination insulated screw-driver and socket wrench for I. F. and R. F. adjustments | 1.00 |

† Full discount not allowed.

## SERVICE DATA

*CAUTION—This receiver operates on 220-volt direct current without a transformer between the line and the various parts of the receiver, such as A. C. receivers use. It is therefore extremely important to use the utmost caution when operating the receiver outside of the cabinet. Also a knob must always be placed on the shaft of the main tuning capacitor, as under certain conditions the full line voltage is obtained between this point and ground.*

### (1) Line-up Capacitor Adjustments

To properly align this receiver, it is essential that a modulated R. F. oscillator, such as Stock No. 9050, an output indicator and an alignment tool (Stock No. 4160) be available. Figure 4 shows the location of the various line-up capacitors.

### I. F. Tuning Adjustments

Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 370 K. C. and the adjustment screws are accessible as shown in Figure 4. Proceed as follows:

(a) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the ground terminal.

(b) Connect the test oscillator output between the first detector control grid and chassis ground, preferably through a series condenser. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

### R. F. and Oscillator Adjustments

The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K. C. series capacitor, which is accessible from the rear of the chassis.

Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the position of the indicator pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 54. Then set the Test Oscillator at 1400 K. C., the dial indicator at 140 and the oscillator output so that a slight deflection will be obtained in the output meter when the volume control is at its maximum position.

(b) With the Range Switch at the "in" position, adjust the three trimmers under the three R. F. coils, designated as L in Figure 4, until a maximum deflection is obtained in the output meter. Then shift the Test Oscillator frequency to 600 K. C. The trimmer capacitor, accessible from the rear of the chassis, should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1400 K. C. adjustment.

(c) Now place the Range Switch at the "out" position, shift the Test Oscillator to 15,000 K. C. and set the dial at 150. Adjust the three trimmer capacitors designated as S in Figure 4 for maximum output, beginning with the oscillator trimmer. It will be noted that the oscillator and first detector trimmers will have two positions at which the signal will give maximum output. The position which uses the lower trimmer capacitance, obtained by turning the screw counter-clockwise, is the proper adjustment for the oscillator, while the position that uses a higher capacitance is correct for the detector. *Both of these adjustments must be made as indicated irrespective of output.* The R. F. is merely peaked. In conjunction with the detector adjustment, it is necessary to rock the main tuning capacitor back and forth while making the adjustment. This completes the line-up adjustments.

The important points to remember are the need for using the minimum oscillator output to obtain a deflection in the output meter with the volume control at its maximum position and the manner of obtaining the proper high frequency oscillator and detector adjustments.

MODEL 128,224
Schematic
Transformer Data

# RCA-VICTOR CO., INC.

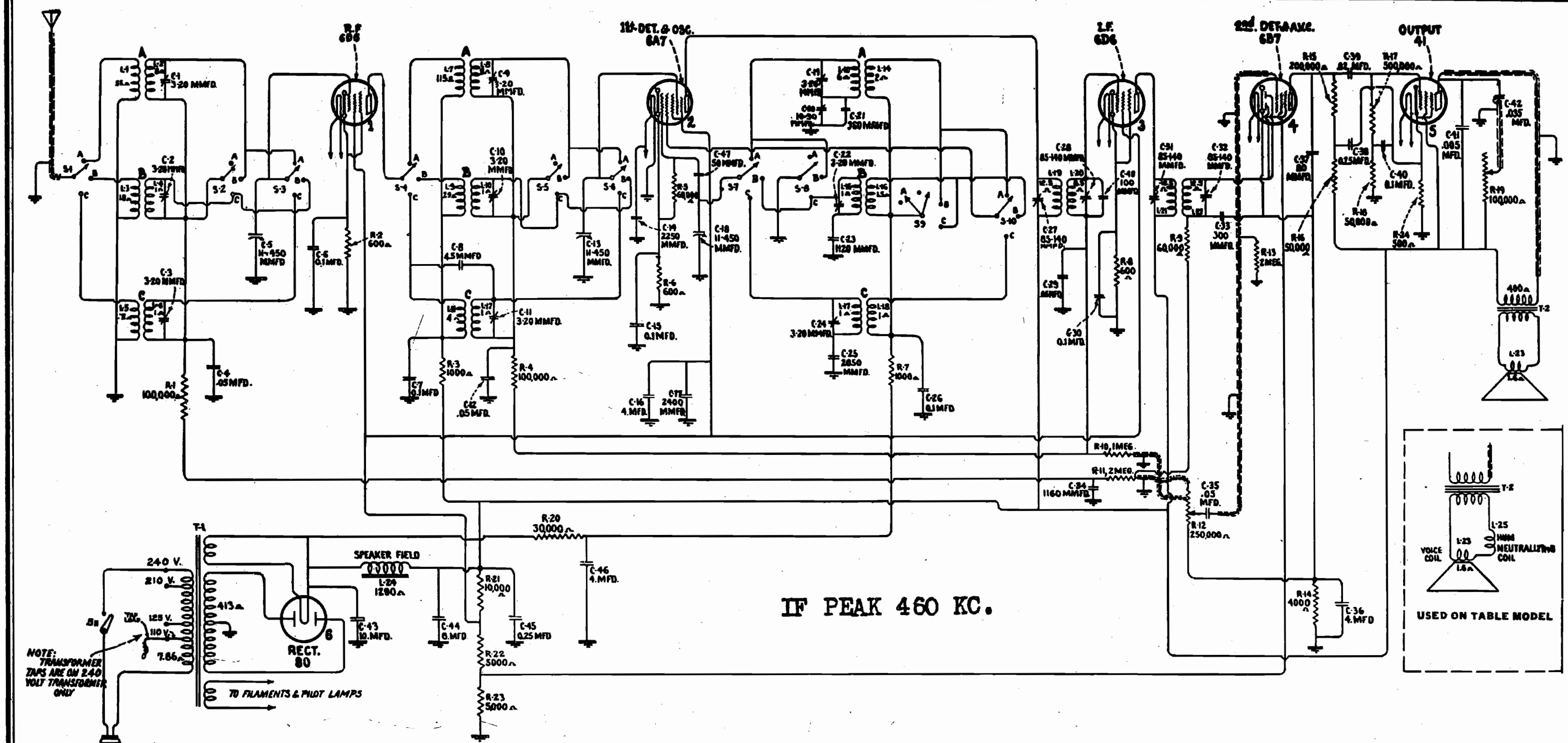
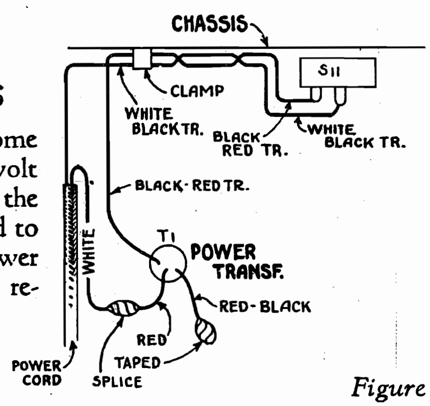
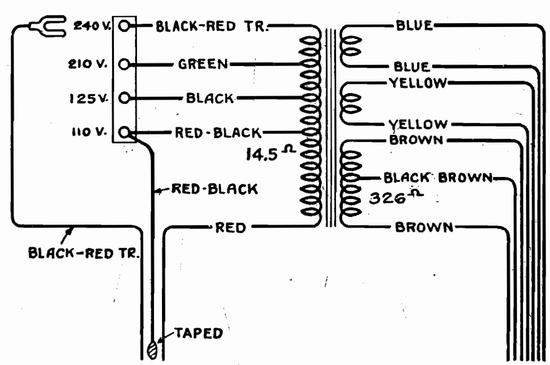



*Figure 1—Schematic Circuit Diagram*

## POWER TRANSFORMER CONNECTIONS

The 220-volt power transformer furnished with some instruments includes taps for operating on 110-volt lines. Figure 5 shows the schematic circuit of the transformer and the proper voltage to be applied to the various taps. The taps are located on the power transformer assembly and are accessible without removing the chassis from the cabinet.




INTERNAL CONNECTIONS OF POWER TRANSF.

*Figure 5—Universal Transformer Connections*

MODEL 128, 224
Chassis Wiring

RCA-VICTOR CO., INC.

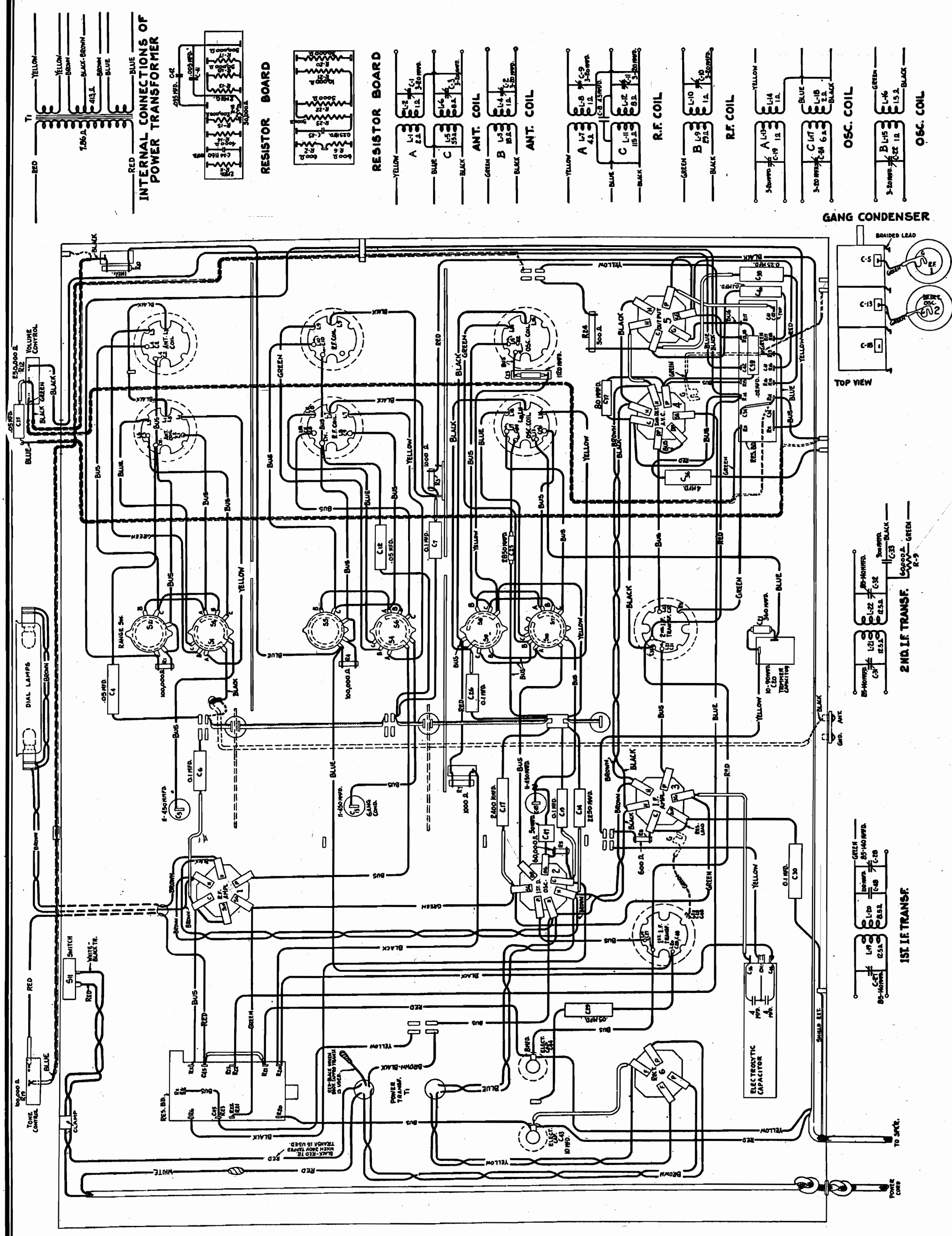


*Figure 2—Chassis Wiring Diagram*

RCA-VICTOR CO., INC.

# DESCRIPTION OF ELECTRICAL CIRCUIT

The general circuit arrangement consists of an R. F. stage, a combined oscillator and first detector, an I. F. stage, a combined second detector and automatic volume control and a single Pentode output stage. An RCA-80 rectifier, together with a suitable filtering system, provides plate and grid voltages for all tubes and field excitation for the loudspeaker. Figure 1 shows the schematic circuit diagram, Figure 2 the chassis wiring, and Figures 3 and 4 the loudspeaker wiring.

The signal enters the receiver through a shielded antenna lead and is applied to the grid of the R. F. tube through the antenna coupling transformer. The secondary of this transformer is tuned to the signal frequency by means of one unit of the gang-capacitor. The output of this stage is transformer coupled to the grid circuit of the first detector, which is also tuned to the signal frequency by a unit of the gang-capacitor.

Combined with the signal in the first detector is the local oscillator, which is always at a 460 K. C. frequency difference (higher) from the signal frequency. A separate coil system and the third unit of the gang-capacitor are used in this circuit.

In conjunction with these three tuned circuits, it is well to point out that three different groups of tuned circuits are used, one for each tuning band. A three-position selector switch is provided for selecting the band in which the desired signal is located. In addition to selecting the desired coil system, additional groups of contacts are provided for short-circuiting the preceding lower frequency R. F. and detector coils and the two preceding oscillator coils. This is to prevent "dead" spots due to the absorption effects caused by the coils, the natural period of which, with tuning capacitor disconnected, fall in the next higher frequency band.

The output of the first detector, which is the I. F. signal (460 K. C.), is fed directly through two tuned circuits to the grid of the I. F. amplifier stage. The I. F. stage, which utilizes Radiotron RCA-6D6, uses two transformers, which consist of four tuned circuits, all of which are tuned to 460 K. C.

The output of the I. F. amplifier is then applied to the diode electrodes of the RCA-6B7, which is a combined second detector, automatic volume control and A. F. amplifier. The direct current component of the rectified signal produces a voltage drop across resistor

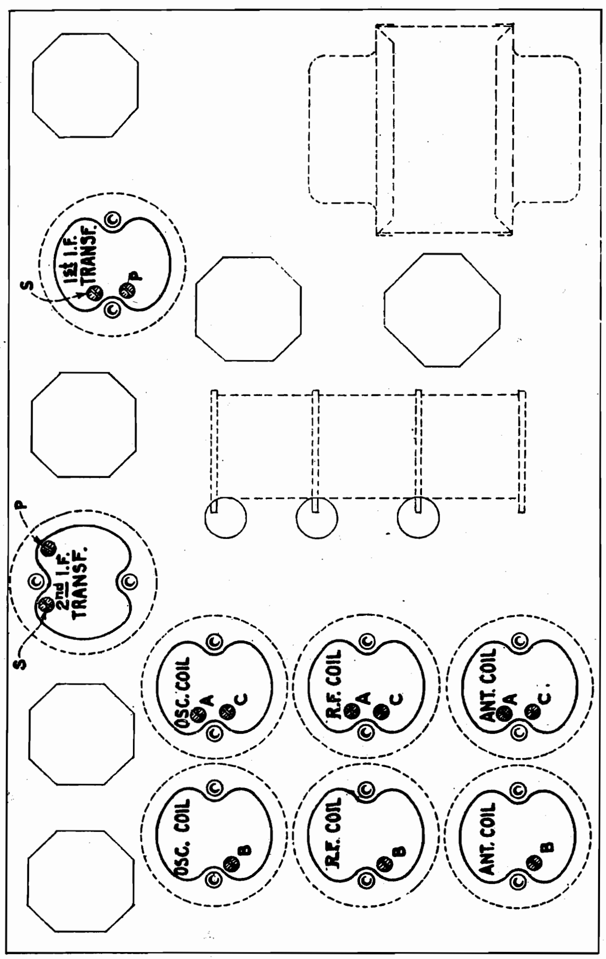



*Figure 6—Location of Line-up Capacitors*

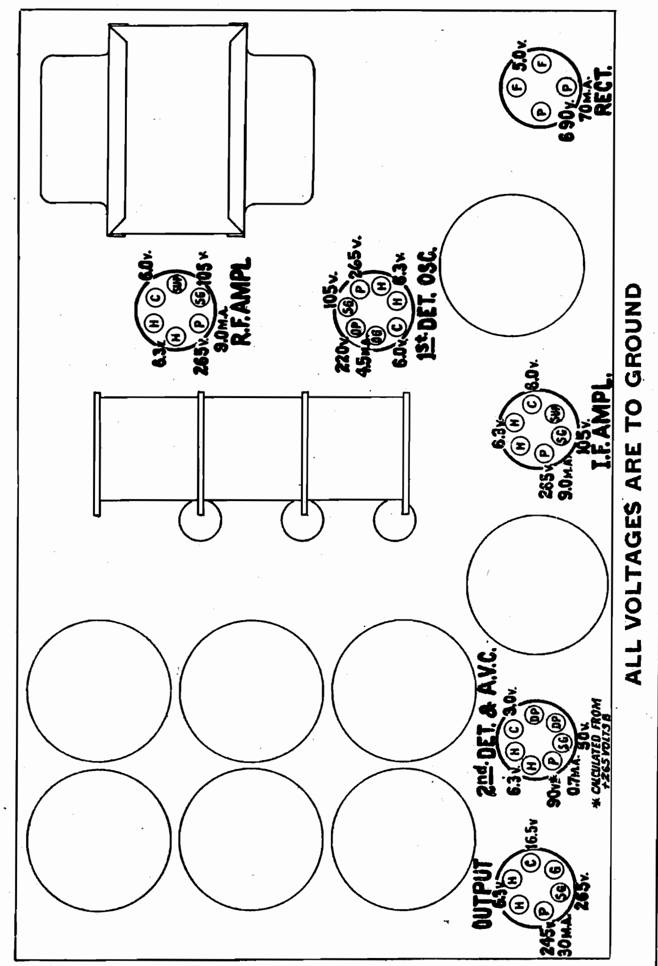



*Figure 7—Tube Socket Voltages*

R-12. The full voltage drop constitutes the automatic bias voltage for the R. F. while a tap is provided for the first detector and I. F. voltage. These automatic bias voltages for the R. F. first detector and I. F. give

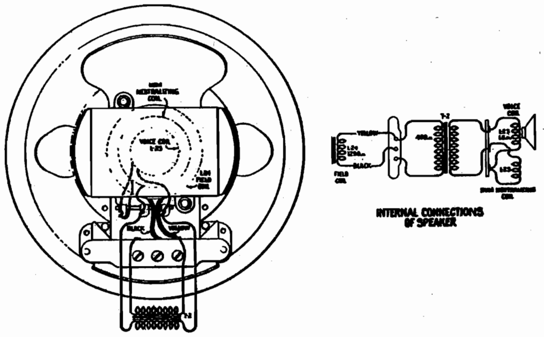



*Figure 3—Table Loudspeaker Wiring*

the automatic volume control action of the receiver. The volume control selects the amount of audio voltage that is applied to the grid of the RCA-6B7 and thereby regulates the audio output of the entire receiver.

The output of the RCA-6B7 is resistance coupled to the grid of the RCA-41 tube, which is the power output amplifier. This tube is operated as a Pentode and provides high audio gain and satisfactory output power. The plate circuit of the output stage is matched to the cone coil of the reproducer by means of a step-down transformer.

The tone control consists of a variable resistor and fixed capacitor connected in series across the primary of the output transformer. At the minimum resistance position of the variable resistor, maximum attenuation of the high audio frequencies is obtained.

Plate and grid voltages for all tubes are supplied from the output of the rectifier-filter system. An RCA-80 is used as a rectifier and a suitable network of capacitors and resistors gives the necessary filtering and voltages. The loudspeaker field is used as a filter reactor.

## (1) LINE-UP PROCEDURE

The line-up procedure of this receiver is somewhat involved and it is important that these instructions be carefully followed when making adjustments. Properly aligned, this receiver has outstanding performance; improperly aligned, it may be impossible to receive signals on all bands.

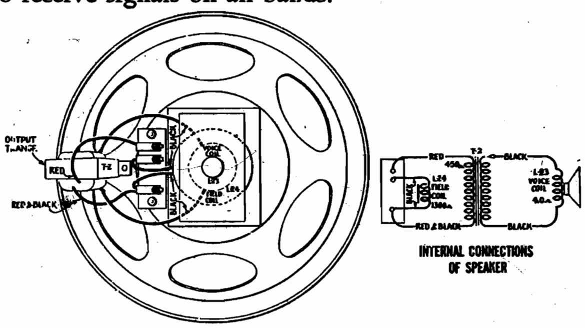



*Figure 4—Console Loudspeaker Wiring*

### Checking with Tuning Wand

Before making any R. F., oscillator or first detector adjustments, the accuracy of the present adjustments may be checked by means of the tuning wand (Stock No. 6679). The tuning wand consists of a bakelite rod having a brass cylinder at one end and a special finely divided iron insert at the other end. Inserting the cylinder into the center of a coil lowers its inductance, while inserting the iron end increases its inductance. From this, it is seen that unless the trimmer adjustment for a particular coil is perfect at alignment frequencies, inserting one end of the wand may increase the output of a particular signal. A perfect adjustment is evidenced by a lowering of output when either end of the wand is inserted into a coil.

The shields over the R. F. coil assembly have a hole at their top for entrance of the tuning wand. The location of the various coils inside of the shield is shown in Figure 8. An example of the proper manner of using the tuning wand would be to assume the external oscillator were set at 1720 and the signal tuned in, and the output indicator should be connected across the voice coil of the loudspeaker. Then the tuning wand would be inserted, first one end and then the other end, into the top of the three transformers at the left of the R. F. assembly, facing the front of the chassis. A perfect adjustment of the trimmer would be evidenced by a reduction in output when each end of the wand is inserted in each of the three transformers. If one end—for example, the iron end—when inserted in one coil caused an increase in output, then that circuit is low. An increase in the trimmer capacitance would be the proper remedy.

## (2) I. F. TUNING CAPACITOR ADJUSTMENTS

Although this receiver has one I. F. stage, two transformers having four adjustable capacitors may require adjustment. The transformers are all peaked, being tuned to 460 K. C.

A detailed procedure for making this adjustment follows:

(a) Connect the output of an external oscillator tuned to 460 K. C. between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker.

(b) Place the oscillator in operation at 460 K. C. Place the receiver in operation and adjust the station selector until a point is reached (Band A) where no signals are heard and turn the volume control to its maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

(c) Refer to Figure 6. Adjust each trimmer of the I. F. transformers until a maximum output is obtained. Go over the adjustments a second time.

This completes the I. F. adjustments. However, it is good practice to follow the I. F. adjustments with the R. F. and oscillator adjustments due to interlocking which always occurs.

### (3) R. F. OSCILLATOR AND FIRST DETECTOR ADJUSTMENTS

Four R. F., oscillator and first detector adjustments are required in band "A." Three are required in bands "B" and "C."

To properly align the various bands, each band must be aligned individually in the order given. This is "A," "B" and "C." The preliminary set-up requires the external oscillator to be connected between the antenna and ground terminals of the receiver and the output indicator must be connected across the voice coil of the loudspeaker. The volume control must be at its maximum position and the input from the oscillator must be at the minimum value possible to get an output indication under these conditions. In the high frequency bands, it may be necessary to disconnect the oscillator from the receiver and place it at a distance in order to get a sufficiently low input to the receiver.

The dial pointer must be properly set before starting any actual adjustments. This is done by turning the variable capacitor until it is at its maximum capacity position. One end of the pointer should point exactly at the horizontal line at the lowest frequency end of band "A," while the other end should point to within 1/64-inch of the horizontal line at the highest frequency end of band "A."

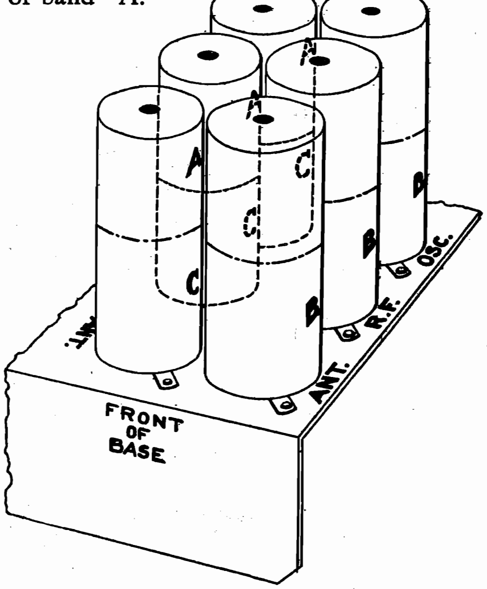



*Figure 8—Location of Coils in Shields*

Figure 6 shows the location of the trimmers for each band. Care must be exercised to merely adjust the trimmers in the band under test.

#### Band "A"

(a) Set the Band Switch at "A."

(b) The oscillator series capacitor, located on the rear apron of the chassis, should be set at about the center of its range.

(c) Tune the external oscillator to 1,720 K. C., set the pointer at 1,720 K. C. and adjust the oscillator, detector and R. F. trimmers for maximum output.

(d) Shift the external oscillator frequency to 600 K. C. Tune in the 600 K. C. signal, irrespective of scale calibration, and adjust the series trimmers, located on rear apron of chassis, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 1,720 K. C. as described in (c).

#### Band "B"

(a) Set the Band Switch at "B."

(b) The detector and antenna trimmers should first be tightened to approximately 3/4 maximum capacity (turned 3/4 inch).

(c) Tune the external oscillator to 5,160 K. C., set the pointer at 5,160 K. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(d) Check for the image signal which should be received at approximately 4,240 K. C. on the dial. It may be necessary to increase the external oscillator output for this check.

(e) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then aligned with the oscillator circuit and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(f) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

#### Band "C"

(a) Set the Band Switch at "C."

(b) The detector and antenna trimmers should first be tightened to approximately 3/4 maximum capacity (turned 3/4 in.)

(c) Tune the external oscillator to 18,000 K. C., set the pointer at 18 M. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(d) Check for the image signal, which should be received at approximately 17,080 on the dial. It may be necessary to increase the external oscillator output for this check.

(e) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then aligned with the oscillator circuit and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(f) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

# RCA-VICTOR CO., INC.

## VOLTAGE READINGS

The following voltages are those at the various tube sockets while the receiver is in operating condition.

**115-Volt A. C. Line—No Signal—Volume Control Maximum**

| Radiotron Number | | Cathode to Ground, Volts, D. C. | Screen Grid to Ground, Volts, D. C. | Plate to Ground, Volts, D. C. | Plate Current, M. A. | Heater Volts, A. C. |
|---|---|---|---|---|---|---|
| RCA-6D6—R. F. | | 6.0 | 105 | 265 | 9.0 | 6.3 |
| RCA-6A7 | Det. | 6.0 | 105 | 265 | 3.5 | 6.3 |
| | Osc. | — | — | 220 | 4.5 | |
| RCA-6D6—I. F. | | 6.0 | 105 | 265 | 9.0 | 6.3 |
| RCA-6B7—2nd Detector | | 3.0 | 50 | 90* | 0.7 | 6.3 |
| RCA-41—Pwr | | 16.5 | 265 | 245 | 30.0 | 6.3 |
| RCA-80—Rectifier | | — | — | 690 (RMS) | 70.0 | 5.0 |

*Voltage calculated from 265 V. + B.

## REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | Description | List Price |
|---|---|---|
| 9511 | Transformer—Power transformer 105–125 volts, 50–60 cycles (T1) | $4.78 |
| 9512 | Transformer—Power transformer 105–125 volts, 25–40 cycles | 6.58 |
| 9513 | Transformer—Power transformer—105–250 volts—40–60 cycles | 4.85 |
| 4519 | Volume control (R12) | 1.25 |
| | DRIVE ASSEMBLIES | |
| 4362 | Arm—Band indicator operating arm | .28 |
| 10194 | Ball—Steel ball for condenser drive assembly—Package of 20 | .25 |
| 4422 | Clutch—Clutch drive assembly for variable condenser drive | .22 |
| 4510 | Drive—Tuning condenser drive assembly | 2.42 |
| 4361 | Indicator—Band indicator (celluloid) | .12 |
| 3943 | Screen—Dial light screen (celluloid)—Package of 2 | .18 |
| 3993 | Screw—Number 6-32-5/32 square head set screws for band indicator operating arm—Package of 10 | .25 |
| 4669 | Screw—Number 8-32-5/32 set screw for variable condenser drive assembly—Package of 10 | .25 |
| 4377 | Spring—Band indicator and arm tension spring—Package of 5 | .25 |
| 4378 | Stud—Band indicator operating arm stud—Package of 5 | .25 |
| | REPRODUCER ASSEMBLY TABLE MODEL | |
| 4526 | Cable—3-conductor—Reproducer cable | $0.32 |
| 7818 | Reproducer complete | 6.58 |
| | REPRODUCER ASSEMBLY CONSOLE MODEL | |
| 4473 | Board—Terminal board assembly | .26 |
| 9460 | Coil—Field coil, magnet and cone support (L24) | 6.00 |
| 8935 | Cone—Reproducer cone (L23)—Package of 5 | 5.25 |
| 9527 | Reproducer—Complete | 8.00 |
| 4472 | Transformer—Output transformer (T2) | 1.40 |
| | MISCELLANEOUS ASSEMBLY | |
| 4677 | Bezel—Station selector dial (escutcheon) bezel | .56 |
| 4661 | Dial—Station selector dial | .62 |
| 6614 | Glass—Station selector dial glass | .30 |
| 4520 | Indicator—Station selector indicator pointer | .18 |
| 4449 | Knob—Station selector, volume control, tone control, range switch or operating switch knob—Package of 5 | .60 |
| 4678 | Ring—Dial glass retaining ring—Package of 5 | .34 |
| 4527 | Screw—Chassis mounting screw assembly comprising 4 spacers, 4 screws, 4 lockwashers, 4 washers, 8 cushions—For table model | .40 |
| 4685 | Screw—Chassis mounting screw assembly—Comprising 4 spacers, 4 screws, 4 lockwashers, 4 washers and 8 cushions—For console model | .40 |
| 4613 | Screw—Number 8-32-7/16 headless set screw for knobs—Package of 10 | .25 |

## REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | Description | List Price |
|---|---|---|
| | RECEIVER ASSEMBLIES | |
| 4427 | Bracket—Volume control or tone control mounting bracket | $0.18 |
| 2747 | Cap—Contact cap—Package of 5 | .50 |
| 3861 | Capacitor—Adjustable trimmer capacitor (C20) | .78 |
| 4442 | Capacitor—50 mmfd. (C47) | .22 |
| 4662 | Capacitor—80 mmfd. (C37) | .28 |
| 4413 | Capacitor—360 mmfd. (C21) | .22 |
| 4412 | Capacitor—1120 mmfd. (C23) | .25 |
| 4515 | Capacitor—1160 mmfd. (C34) | .22 |
| 4670 | Capacitor—2250 (C14) | .30 |
| 4523 | Capacitor—2400 mmfd. (C17) | .26 |
| 4524 | Capacitor—2850 mmfd. (C25) | .35 |
| 4435 | Capacitor—.02 mfd. (C39) | .25 |
| 4518 | Capacitor—.05 mfd. (C35) | .52 |
| 4417 | Capacitor—.05 mfd. (C4, C12, C29) | .25 |
| 3877 | Capacitor—.1 mfd. (C40) | .32 |
| 4415 | Capacitor—.1 mfd. (C6, C15, C30) | .30 |
| 4645 | Capacitor—.1 mfd. (C7, C26) | .25 |
| 3597 | Capacitor—.25 mfd. (C38, C45) | .40 |
| 4525 | Capacitor—4.0 mfd. (C36) | .70 |
| 4428 | Capacitor—8 mfd. (C44) | 1.05 |
| 7790 | Capacitor—10 mfd. (C43) | 1.05 |
| 4692 | Capacitor pack—Comprising one 0.035 mfd. and one 0.005 mfd. capacitors (C41, C42) | .30 |
| 7589 | Capacitor Pack—Comprising two 4. mfd. capacitors (C16, C46) | 1.64 |
| 4358 | Clamp—Capacitor mounting clamp | .15 |
| 4516 | Coil—Antenna coil "PB" (L3, L4, C2) | 1.65 |
| 7803 | Coil—Antenna coil "B & SW" (L1, L2, L5, L6, C1, C3) | 1.82 |
| 4514 | Coil—Detector Coil "PB" (L9, L10, C10) | 1.65 |
| 7805 | Coil—Detector coil "B & SW" (L7, L8, L11, L12, C8, C9, C11) | 2.15 |
| 7807 | Coil—Oscillator coil "B & SW" (L13, L14, L17, L18, C19, C24) | 1.62 |
| 4511 | Coil—Oscillator coil "PB" (L15, L16, C22) | 1.52 |
| 7801 | Condenser—3-gang variable tuning condenser (C5, C13, C18) | 4.42 |
| 4340 | Lamp—Dial lamp—Package of 5 | .60 |
| 3632 | Resistor—500 ohms—Carbon type—1 watt (R24)—Package of 5 | 1.10 |
| 3218 | Resistor—600 ohms—Carbon type—¼ watt (R2, R6, R8)—Package of 5 | $1.00 |
| 4370 | Resistor—1000 ohms—Carbon type—¼ watt (R3, R7)—Package of 10 | 2.00 |
| 3997 | Resistor—4000 ohms—Carbon type—¼ watt (R14)—Package of 5 | 1.00 |
| 6318 | Resistor—10,000 ohms (R21) | .80 |
| 3114 | Resistor—50,000 ohms—Carbon type—¼ watt (R16, R18)—Package of 5 | 1.00 |
| 3602 | Resistor—60,000 ohms—Carbon type—¼ watt (R5)—Package of 5 | 1.00 |
| 3118 | Resistor—100,000 ohms—Carbon type—¼ watt (R1, R4)—Package of 5 | 1.00 |
| 3116 | Resistor—200,000 ohms—Carbon type—¼ watt (R15)—Package of 5 | 1.00 |
| 6186 | Resistor—500,000 ohms—Carbon type—¼ watt (R17)—Package of 5 | 1.00 |
| 3033 | Resistor—1 megohm—Carbon type—¼ watt (R10)—Package of 5 | 1.00 |
| 6242 | Resistor—2 megohms—Carbon type—¼ watt (R11, R13)—Package of 5 | 1.00 |
| 3413 | Resistor—5000 ohms—Carbon type—½ watt (R22, R23)—Package of 5 | 1.00 |
| 4513 | Resistor—30,000 ohms—Carbon type—3 watt (R20) | .25 |
| 4521 | Shield—Antenna R. F. or oscillator coil shield | .42 |
| 4145 | Shield—First detector or output Radiotron shield | .30 |
| 4103 | Shield—I. F. amplifier Radiotron shield | .20 |
| 6955 | Shield—R. F. amplifier Radiotron shield | .25 |
| 3782 | Shield—Second detector Radiotron shield | .26 |
| 3529 | Socket—Dial lamp socket | .32 |
| 3859 | Socket—4-contact Radiotron socket | .30 |
| 6676 | Socket—6-contact output Radiotron socket | .40 |
| 7485 | Socket—6-contact Radiotron socket | .40 |
| 3572 | Socket—7-contact Radiotron socket | .38 |
| 4379 | Strip—Antenna terminal engraved "ANT-GND" | .20 |
| 6466 | Switch—Operating switch (S11) | .45 |
| 4512 | Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10) | 3.42 |
| 4517 | Tone control (R19) | .90 |
| 4431 | Transformer—First intermediate frequency transformer (L19, L20, C27, C28, C48) | 2.28 |
| 4433 | Transformer—Second intermediate frequency transformer (L21, L22, C31, C32, C33, R9) | 2.15 |

# RCA-VICTOR CO., INC.

**MODEL 135-B, 235-B**
**Schematic**
**Trimmer Layout**

IF PEAK 460 KC.

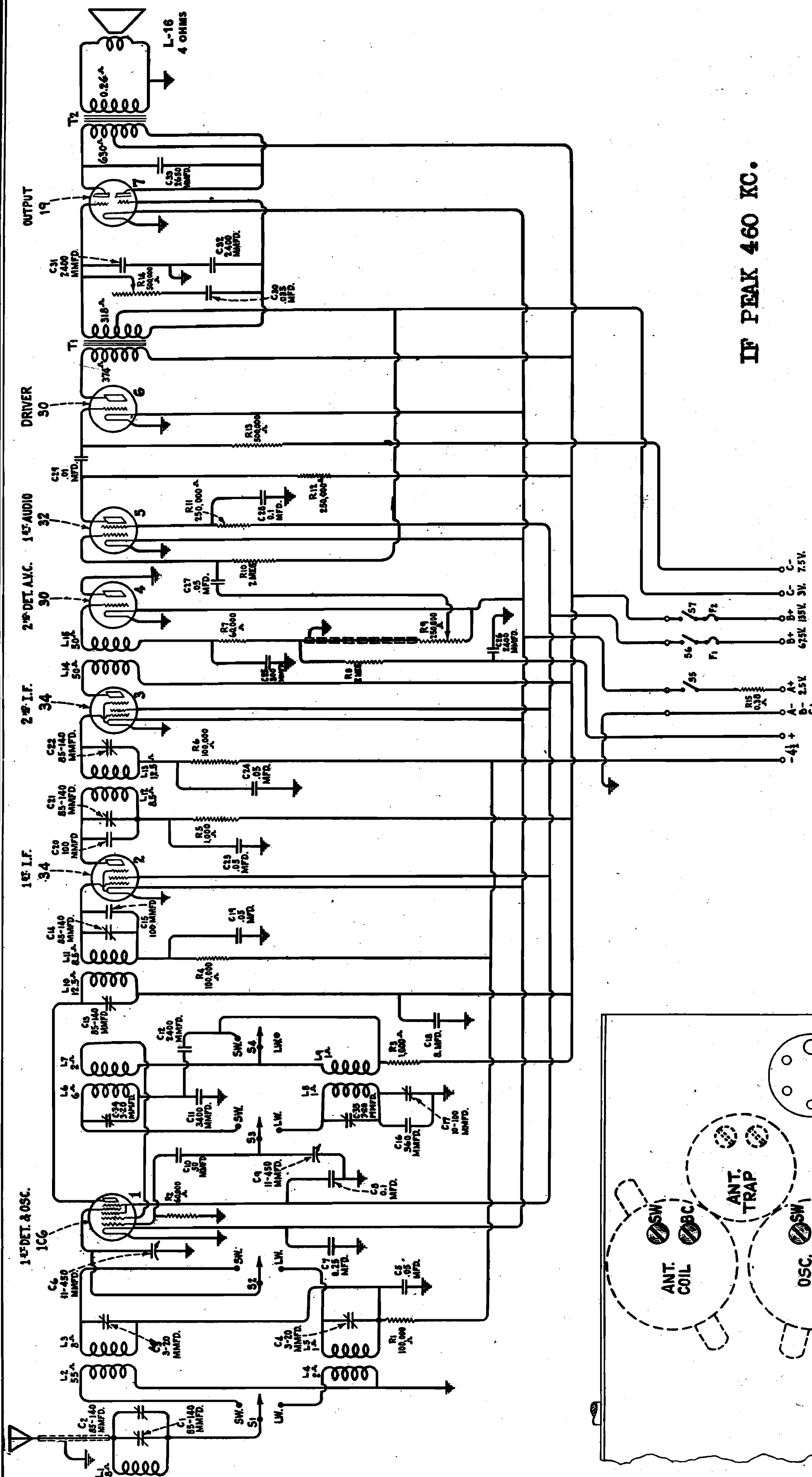



*Figure 1—Schematic Circuit Diagram*

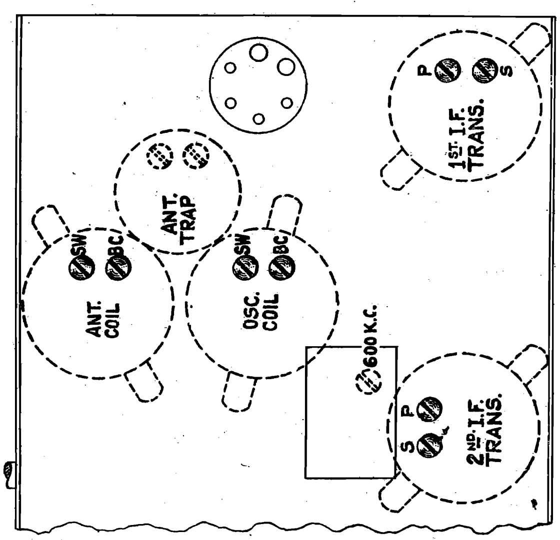



*Figure 4—Location of Line-Up Capacitors*

MODEL 135-B,235-B
Socket Layout
Voltage

## RCA-VICTOR CO., INC.

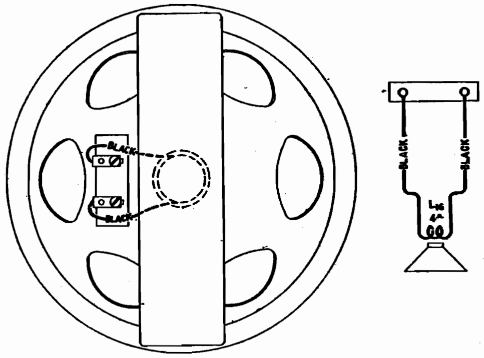



*Figure 3—Loudspeaker Wiring*

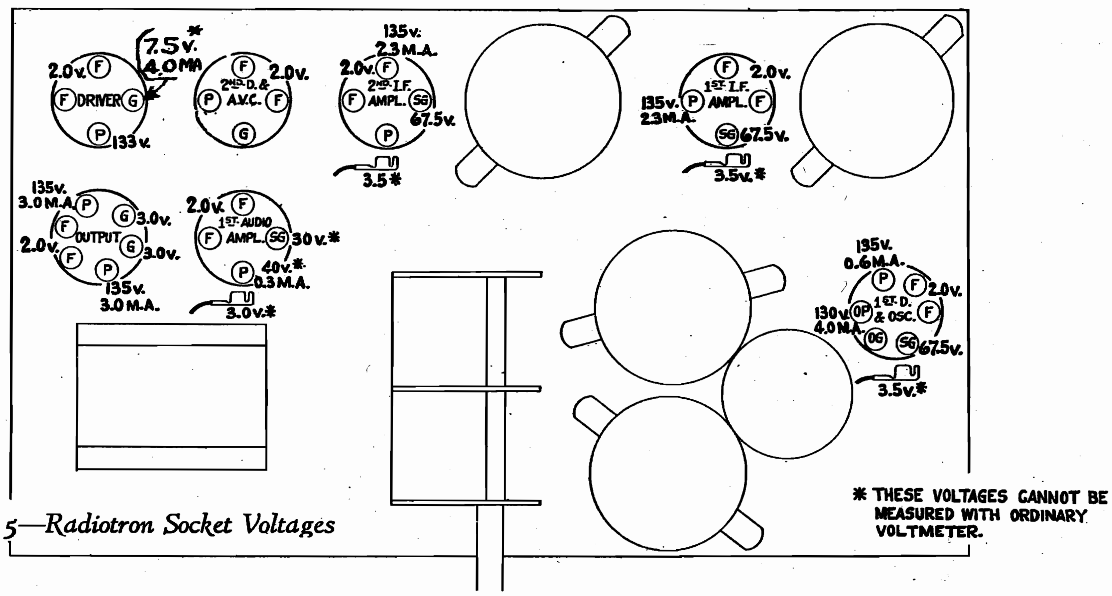



*Figure 5—Radiotron Socket Voltages*

**Volume Control at Maximum—No Signal—135 Volt "B" Battery—4.5 and 7.5-Volt Bias Batteries**

| Radiotron No. | | Control Grid to Ground | Screen Grid to Ground | Plate to Ground | Plate, M. A. | Filament Volts |
|---|---|---|---|---|---|---|
| RCA-1C6 | 1st Detector | 3.5* | 67.5 | 135 | 0.6 | 2.0 |
| | Oscillator | — | — | 130 | 4.0 | |
| RCA-34—I. F. | | 3.5* | 67.5 | 135 | 2.3 | 2.0 |
| RCA-34—I. F. | | 3.5* | 67.5 | 135 | 2.3 | 2.0 |
| RCA-30—Detector AVC | | — | — | — | — | 2.0 |
| RCA-32—Audio | | 3.0* | 30* | 40* | 0.3 | 2.0 |
| RCA-30—Driver | | 7.5* | — | 133 | 4.0 | 2.0 |
| RCA-19—Power | | 3.0 | — | 135 | 3.0 | 2.0 |

*These voltages cannot be measured with ordinary voltmeter.

# RCA-VICTOR CO., INC.

**MODEL 135-B, 235-B**
**Chassis Wiring**

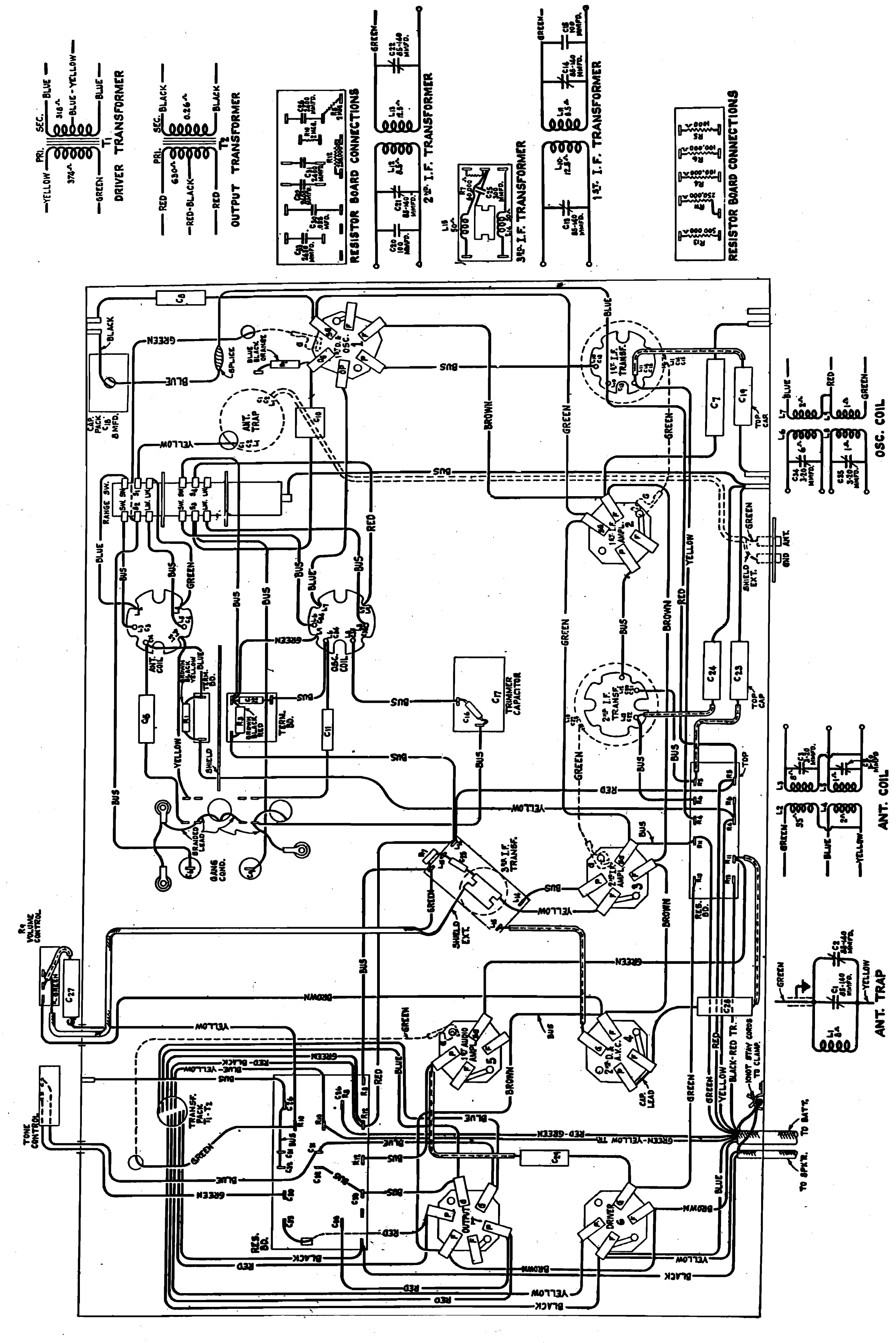



*Figure 2—Wiring Diagram*

MODEL 135-B,235-B
Alignment Data
Parts List

# RCA-VICTOR CO., INC.

## SERVICE DATA

**(1) Line-Up Capacitor Adjustments**

To properly align this receiver, it is essential that a modulated R. F. oscillator of suitable frequency range such as Stock No. 9050, an output indicator, Stock No. 4317, and an alignment tool, Stock No. 4160, be available. Figure 4 shows the location of the various line-up capacitors.

### I. F. Tuning Adjustments

The I. F. amplifier comprises two stages which have three transformers. The third transformer is untuned so that only a total of four tuned circuits is used. Refer to Figure 4 and proceed as follows:

(a) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the ground terminal.

(b) Connect the test oscillator output between the first detector control grid and chassis ground. Connect the output indicator across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. The third transformer is untuned and does not require adjusting. Keep the oscillator output at a low value so that only a slight indication is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

### R. F. and Oscillator Adjustments

The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K. C. series capacitor, which is accessible from the top of the chassis. Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the position of the indicator pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 540.

(b) Then set the Test Oscillator at 1720 K. C., the dial indicator at 1720, the Range Switch at the "in" position, and adjust the oscillator output so that a slight deflection will be obtained in the output meter when the volume control is at its maximum position. Adjust the two trimmers under the two R. F. coils, designated as BC in Figure 4, until a maximum deflection is obtained in the output meter. Then shift the Test Oscillator frequency to 600 K. C. The trimmer capacitor, accessible from the top of the chassis, should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1720 K. C. adjustment.

(c) Now place the Range Switch at the "out" position, shift the Test Oscillator to 18,000 K. C. and set the dial at 18M. Adjust the two trimmer capacitors designated as SW in Figure 4 for maximum output, beginning with the oscillator trimmer. It will be noted that the oscillator and first detector trimmers will have two positions at which the signal will give maximum output. The position which uses the lower trimmer capacitance, obtained by turning the screw counter-clockwise, is the proper adjustment for the oscillator, while the position that uses a higher capacitance is correct for the detector. The detector trimmer *must* be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. *Both of these adjustments must be made as indicated.*

### Trap Circuit Adjustment

A trap circuit, tuned to the I. F. frequency (460 K. C.) is used in the antenna circuit to reduce interference from signals approximately the same frequency as that of the I. F. amplifier. Two parallel trimmers are used and adjustment may be made by means of either or both. Proceed as follows:

(a) Place the receiver in operation and connect the test oscillator output from the antenna to ground terminals of the receiver. Adjust the test oscillator frequency to 460 K. C. and connect the output indicator across the cone coil of the reproducer.

(b) Adjust either or both of the trap circuit trimmers, accessible from the top of the chassis, Figure 4, until a *minimum* output from the receiver is obtained. The point of minimum output is the proper adjustment.

It should be remembered that the trimmers provide an adjustment over a small range. However, in event constant interference is experienced at a slightly different frequency from 460 K. C., adjusting the trap to the frequency of the interference will materially reduce its effect.

## REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | Description | List Price |
|---|---|---|
| | RECEIVER ASSEMBLIES | |
| 4427 | Bracket—Volume or tone control mounting bracket | $0.18 |
| 2747 | Cap—Contact cap—Package of 5 | .50 |
| 4498 | Capacitor—8 mfd. (C18) | 1.25 |
| 4442 | Capacitor—50 mmfd. (C10) | .22 |
| 3981 | Capacitor—300 mmfd. (C25) | .30 |
| 4413 | Capacitor—360 mmfd. (C16) | .22 |
| 2749 | Capacitor—2400 mmfd. (C26) | .35 |
| 4440 | Capacitor—2400 mmfd. (C12, C31, C32) | .26 |
| 4529 | Capacitor—2650 mmfd. (C33) | .32 |
| 4439 | Capacitor—3400 mmfd. (C11) | .35 |
| 4212 | Capacitor—0.01 mfd. (C29) | .30 |
| 4518 | Capacitor—0.05 mfd. (C27) | .52 |
| 4417 | Capacitor—0.05 mfd. (C5, C19, C23, C24) | .25 |
| 4643 | Capacitor—0.035 mfd. (C30) | .30 |
| 3877 | Capacitor—0.1 mfd. (C8, C28) | .32 |
| 4537 | Capacitor—0.25 mfd. (C7) | .38 |
| 3861 | Capacitor — Adjustable trimmer capacitor (C17) | .78 |
| 4430 | Coil—Antenna coil (L2, L3, L4, L5, C3, C4) | 1.92 |
| 4432 | Coil—Oscillator coil (L6, L7, L8, L9) | 1.65 |
| 4539 | Coil and shield assembly—Antenna trap circuit (L1, C1, C2) | 2.05 |
| 4504 | Condenser—2-gang variable tuning condenser (C6, C9) | 2.78 |
| 4370 | Resistor—1,000 ohms—Carbon type—¼ watt—Package of 10 (R3, R5) | 2.00 |
| 3602 | Resistor—60,000 ohms—Carbon type—¼ watt (R2, R7)—Package of 5 | 1.00 |
| 3118 | Resistor—100,000 ohms—Carbon type—¼ watt (R1, R4, R6)—Package of 5 | 1.00 |
| 3744 | Resistor—250,000 ohms—Carbon type—¼ watt (R11, R12)—Package of 5 | 1.00 |
| 6186 | Resistor—500,000 ohms—Carbon type—¼ watt (R13)—Package of 5 | 1.00 |
| 6242 | Resistor — 2 megohms — Carbon type — ¼ watt (R8, R10)—Package of 5 | 1.00 |
| 4521 | Shield—Antenna, oscillator or I. F. transformer shield | .42 |
| 4103 | Shield—Driver Radiotron shield | .20 |
| 4145 | Shield—First detector and oscillator Radiotron shield | .30 |
| 3056 | Shield—First I. F. amplifier Radiotron shield —Package of 2 | .40 |
| 4530 | Socket—4-contact Radiotron socket | .28 |
| 4532 | Socket—4-contact audio amplifier—Radiotron socket | .28 |
| 4232 | Socket—6-contact Radiotron socket | .35 |
| 4531 | Socket—6-contact output Radiotron socket | .30 |
| 4534 | Switch—Range switch (S1, S2, S3, S4, SW, LW) | 3.64 |
| 4536 | Tone control (R14) | .95 |
| 4431 | Transformer—First intermediate transformer (L10, L11, C13, C14, C15) | 2.28 |
| 7840 | Transformer — Second intermediate transformer (L12, L13, C20, C21, C22) | 2.35 |
| 4538 | Transformer—Third intermediate frequency transformer (L14, L15) | 2.15 |
| 4533 | Transformer pack—Audio transformer pack —Comprising driver and output transformer (T1, T2) | 3.98 |
| 4535 | Volume control (R9) | 1.40 |
| | REPRODUCER ASSEMBLIES (CONSOLE MODEL) | |
| 4541 | Cable—2-conductor reproducer cable | .38 |
| 9432 | Cone—Reproducer cone (L16) | 1.88 |
| 7820 | Magnet—Cone housing and magnet assembly | 8.98 |
| 7819 | Reproducer complete | 12.18 |
| 4234 | Rivet—Cone mounting rivet—Package of 100 | .66 |
| | REPRODUCER ASSEMBLIES (TABLE MODEL) | |
| 9539 | Cone—Reproducer cone—Package of 5 | $4.30 |
| 9540 | Magnet assembly—Comprising cone bracket core and magnet | 5.72 |
| 9538 | Reproducer complete | 7.65 |
| | DRIVE ASSEMBLY | |
| 4422 | Clutch—Condenser drive clutch assembly complete | .88 |
| 4641 | Dial—Station selector dial (console model) | .80 |
| 4588 | Dial—Station selector dial (table model) | .80 |
| 4586 | Drive—Variable tuning condenser drive assembly complete | 2.42 |
| 4587 | Pointer—Station selector pointer (table model) | .18 |
| 4363 | Pointer—Station selector pointer (console model) | .18 |
| | MISCELLANEOUS ASSEMBLIES | |
| 6706 | Bezel—Metal bezel (escutcheon) for station selector dial glass (table model) | .42 |
| 6840 | Bezel—Metal bezel (escutcheon) for station selector dial glass (console model) | .56 |
| 4289 | Body—Fuse connector body—Package of 10 | .35 |
| 4642 | Cable—Battery cable—8-conductor—Complete with switch and connectors (table model) | 3.60 |
| 4542 | Cable—8-conductor battery cable complete with switch and connectors (console model) | 3.82 |
| 4288 | Cap—Fuse connector cap—Package of 10 | .36 |
| 6516 | Connector—Fuse connector complete | .16 |
| 6176 | Escutcheon—"OFF-ON" operating switch escutcheon—Package of 5 | .50 |
| 4286 | Ferrule—Fuse connector ferrule and bushing —Package of 10 | .38 |
| 3748 | Fuse—0.5 ampere—Package of 5 | .40 |
| 6614 | Glass—Station selector dial glass (console model) | .30 |
| 6707 | Glass—Station selector dial glass (table model) | .20 |
| 4290 | Insulator—Fuse connector insulator—Package of 10 | .35 |
| 3088 | Knob—Operating switch knob—Package of 5 | .50 |
| 4449 | Knob—Station selector, volume control, tone control or range switch knob—Package of 5 | .60 |
| 4644 | Resistor—0.42 ohms—Flexible type—Filament series (R15)—Package of 5 | .80 |
| 6615 | Ring—Retaining ring for dial glass—Package of 5 (console model) | .34 |
| 6708 | Ring—Retaining ring for dial glass—Package of 5 (table model) | .44 |
| 4638 | Screw—Chassis mounting screw assembly—Comprising eight cushions, four screws, four washers, four lockwashers and four spacers | .52 |
| 3238 | Screw—6-40-$1\frac{7}{32}$" knurled head—Set screw for operating switch knob No. 3088—Package of 10 | .25 |
| 4613 | Screw—8-32-$\frac{7}{16}$" headless set screw for station selector volume control, tone control or range switch knob—Package of 10 | .25 |
| 4284 | Spring—Fuse connector spring—Package of 10 | .30 |
| 4540 | Switch—Operating switch | 2.28 |
| 4285 | Washer—Fuse connector insulating washer—Package of 10 | .22 |

MODEL 140, 141, 141-E, 240 Revised
Circuit Data
Alignment Data

RCA-VICTOR CO., INC.

# SERVICE DATA

## Electrical Specifications

Voltage Rating............100–125 Volts and 200–250 Volts
Frequency Rating
25–60 (100–125 Volts Only) and 50–60 Cycles
Power Consumption..........................110 Watts
Type and Number of Radiotrons
3 RCA-58, 1 RCA-2A7, 1 RCA-2B7, 1 RCA-56, 1 RCA-53, 1 RCA-80—Total, 8
Type of Circuit
Straight Super-Heterodyne for all frequencies with Class "B" Output Stage.
Undistorted Output............................6 Watts

This all-wave super-heterodyne receiver is of the continuous tuning type, utilizing a straight super-heterodyne circuit in all bands. The bands are as follows:

| *Selector Switch Position* | *Frequency Range (Kilocycles)* | *Wave-Length Range (Meters)* |
|---|---|---|
| X | 150–410 | 2000–732 |
| A | 540–1500 | 555–200 |
| B | 1500–3900 | 200–77.0 |
| C | 3900–10000 | 77.0–300 |
| D | 8000–18000 | 37.5–16.7 |

This receiver will be supplied in two models, one including all bands and one with band X omitted. These instructions, however, will cover both types of the receiver. The variations in the wiring for the two models are plainly shown in the illustrations. Figures A, B and C show the schematic circuit and wiring diagrams.

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector using Radiotron RCA-2A7, an I. F. stage using RCA-58, a second detector and A. V. C. using RCA-2B7, an A. F. driver using RCA-56, and a Class "B" output stage using an RCA-53. The RCA-80 functions as the rectifier in the power supply circuits.

The foregoing tubes and circuit functions apply to bands X, A, B and C only. In the case of band D, an additional R. F. stage utilizing an additional Radiotron RCA-58 is used. This is to increase the sensitivity and image frequency selectivity and to reduce the interference caused by tube hiss and signals corresponding to the intermediate frequency.

The intermediate frequency is 445 K. C. The use of this frequency gives an especially good image frequency ratio and facilitates alignment of the oscillator at the higher frequency bands.

## Mechanical Construction

The chassis consists of two major assemblies, which must be disassembled for certain repair work. These assemblies consist of the chassis proper, including the main frame, power transformer, etc., and the coil assembly. The coil assembly consists of fifteen transformers supported upon individual tubular bakelite forms, each fastened to a separate porcelain strip upon which the coil terminals are mounted with their associate trimmer capacitor. This entire assembly, with the selector switch, is grouped in a shielded compartment which is mounted in the base of the main chassis assembly.

In order to remove this assembly it is necessary to remove the four nuts shown in Figure D and unsolder the connections of the fifteen leads shown in Figure C at the points where they connect to the main chassis. The leads should be allowed to remain on the coil assembly. After this is done, the coil assembly may be removed and repairs to it or to the main chassis may be easily made. If a coil or its associated trimmer is to be replaced, then only the bottom shield of the coil assembly must be removed. This is done by removing the four nuts that hold it to the chassis studs. This is shown in Figure D.

## Line-Up Capacitor Adjustments

This receiver is aligned in a similar manner to that of a standard broadcast band receiver. That is, the three main tuning capacitors are aligned by means of three trimmers in each band and, on the three lowest frequency bands, a series trimmer is adjusted for aligning the oscillator circuit. The other two bands do not require this low-frequency trimmer, it being fixed in value. In the case of band D, it is necessary to adjust four trimmers, due to the additional F. R. stage used.

The intermediate frequency amplifier is aligned in a similar manner to that of standard broadcast receivers except that it is aligned at 445 K. C. In order to properly align the receiver, it is essential that the Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 90 K. C. to 25,000 K. C., continuously, has good stability and includes an attenuator. In addition to the oscillator, a 300-ohm resistor, for use as a "dummy" antenna, a non-metallic screw-driver such as Stock No. 4160, and an output meter are required. The output meter should be preferably a thermocouple galvanometer connected either across or in place of the cone coil of the loudspeaker.

To align the intermediate frequency circuits, connect the output of the external oscillator to the grid of the first detector. For the R. F. and oscillator adjustments, the oscillator output should be connected to the antenna and ground terminals of the receiver with a 300-ohm resistor inserted in series with the antenna lead. In many cases, however, the signal strength obtained with this direct connection will be too great to permit proper alignment, even at the minimum setting of the oscillator attenuator. When this is true, the external oscillator must be loose-coupled to the receiver. This is done by connecting the 300-ohm resistor between the antenna and ground terminals of the receiver and attaching a short length of wire to the antenna post. Lay the free end of this wire across the oscillator case, adjusting its position as necessary to obtain the degree of pickup required.

The output of the external oscillator should be at the minimum value necessary to obtain a deflection in the output meter when the volume control is at its maximum position. All adjustments are made for a maximum deflection in the output meter.

The accuracy of line-up of each band may be checked without touching the trimmer condensers, by the use of the tuning wand, Stock No. 6679.

One end of the wand consists of a brass cylinder. When this is inserted in a coil the effective inductance of the coil is lowered.

The other end of the wand contains a special finely divided iron suitable for use at radio frequencies. When this is inserted in a coil the inductance is raised.

To use the tuning wand a signal is first tuned in at the frequency at which a check is desired on alignment. The wand is then inserted slowly in the Antenna and R. F. transformers, using first one end and then the other end of the wand. Unless the alignment is perfect, it will be found that the power output indicated by the meter will be increased to a peak for a critical position of the wand in the coils.

The end of the wand required indicates whether the coil is high or low.

MODEL 140,141,141-E,
240 Revised
Voltage
Wave Band Data

RCA-VICTOR CO., INC.

**Power Supply**—The instruments in this series are supplied in either of two alternating current power supply ratings: (1) 100–125/200–250 volts, 50–60 cycles and (2) 100–125 volts, 25–60 cycles (see rating label inside cabinet). To insure correct Radiotron operating voltages, both types are equipped to permit rearrangement of the internal connections to conform with the actual voltage available. Thus, the 50–60 cycle models may be adapted for 100–115, 115–125, 200–230 or 230–250 volts; and the 25–60 cycle models for either 100–115 or 115–125 volts.

Of course, alignment correction at the high-frequency end of a tuning range should be accomplished by the use of the trimmer condenser. If alignment correction should be required at the low-frequency end of a tuning range, it may be accomplished by sliding the end coil of the transformer. The winding farthest from the trimmer panel is pushed toward the trimmer panel to increase the inductance, and farther away to decrease the inductance. On band D coils, the last two or three turns may be pushed in a similar manner to obtain the proper inductance.

*This adjustment should not be attempted unless a quite appreciable improvement will result (as shown by the tuning wand).*

The following chart gives the details of all line-up adjustments. The receiver should be lined up in the order of the adjustments given on the chart. Refer to Figure E for the location of the line-up capacitors.

## Pickup Connections

A terminal board is provided at the rear of the chassis for attaching a magnetic pickup to this instrument. Such connections are shown in Figures F, G and H.

## Transformer Connections

The power transformer of the 50–60 cycle receiver uses two tapped primary windings. By connecting them in parallel or in series, the receiver may be used either on 110 or 220 volt lines. Figure J shows the proper manner of making the various connections possible for this transformer.

The 25–60 cycle transformer uses only one 100–125-volt winding, a tap being provided for the lower voltages. Normally the transformer is connected for 115–125-volt lines, but the connection shown in Figure I may be used for 100–115-volt lines.

# TUBE SOCKET VOLTAGES

## 120 Volt A. C. Line

| Radiotron No. | Control Grid to Cathode, Volts | Screen Grid to Cathode, Volts | Plate to Cathode Volts | Plate Current M. A. | Filament or Heater Volts |
|---|---|---|---|---|---|
| RCA-58, R. F. | **2.0 | 100 | 255 | 6.0 | 2.6 |
| RCA-58, S. W. R. F. | **2.0 | 100 | 255 | 6.0 | 2.6 |
| RCA-2A7, Det.-Osc. | **2.5 | 100 | 250 | *5.0 | 2.6 |
| RCA-58, I. F. | **2.0 | 100 | 255 | 6.0 | 2.6 |
| RCA-2B7, 2nd Det.-AVC | **1.5 | 35 | 105 | 1.5 | 2.6 |
| RCA-56, A. F. Driver | **12.0 | — | 245 | 6.0 | 2.6 |
| RCA-53, Output | 0 | — | 300 | 36.0 | 2.6 |
| RCA-80, Rectifier | 640 R. M. S. Plate to Plate | | | 130 per Plate | 5.0 |

* Voltages and current apply to detector portion of tube.
** These voltages cannot be measured because of the high resistance of the circuits.

| External Oscillator Frequency | Dial Setting | Location of Line-Up Capacitors | Position of Selector Switch | Adjust for | Number of Adjustments To be Made |
|---|---|---|---|---|---|
| 445 K. C. | Any setting that does not bring in station. | At rear of chassis. | Any position that does not bring in station. | Maximum output. | 4 |
| 370 K. C. | 370 K. C. | Bottom of chassis. | X | Maximum output. | 3 |
| 175 K. C. | Set for signal. | Top of chassis. | X | Maximum output while rocking dial back and forth. | 1 |
| 1400 K. C. | 1400 K. C. | Bottom of chassis. | A | Maximum output. | 3 |
| 600 K. C. | Set for signal. | Top of chassis. | A | Maximum output while rocking dial back and forth. | 1 |
| 3900 K. C. | 3900 K. C. | Bottom of chassis. | B | Maximum output. | 3 |
| 1710 K. C. | Set for signal. | Top of chassis. | B | Maximum output while rocking dial back and forth. | 1 |
| 10 M. C. | 10 M. C. | Bottom of chassis. | C | Maximum output. (See Note.) | 3 |
| 15 or 18 M. C. | 15 or 18 M. C. | Bottom and top. | D | Maximum output. (See Note.) | 4 |

NOTE—It is important to note, when aligning bands C and D, that two peaks will be observed on the trimmers for the oscillator and for the first detector. The correct oscillator peak is the one obtained using the lower trimmer capacitance, whereas the correct detector peak is the one obtained with the greater capacitance. It is essential that the proper peak be chosen, as otherwise tracking and sensitivity will be very poor at other frequencies. When adjusting the detector trimmer, the tuning capacitor should be rocked, since there is a reaction on the oscillator tuning.

**MODEL 140, 141, 141-E, 240 Revised**
**Schematic, Trimmers**

# RCA-VICTOR CO., INC.

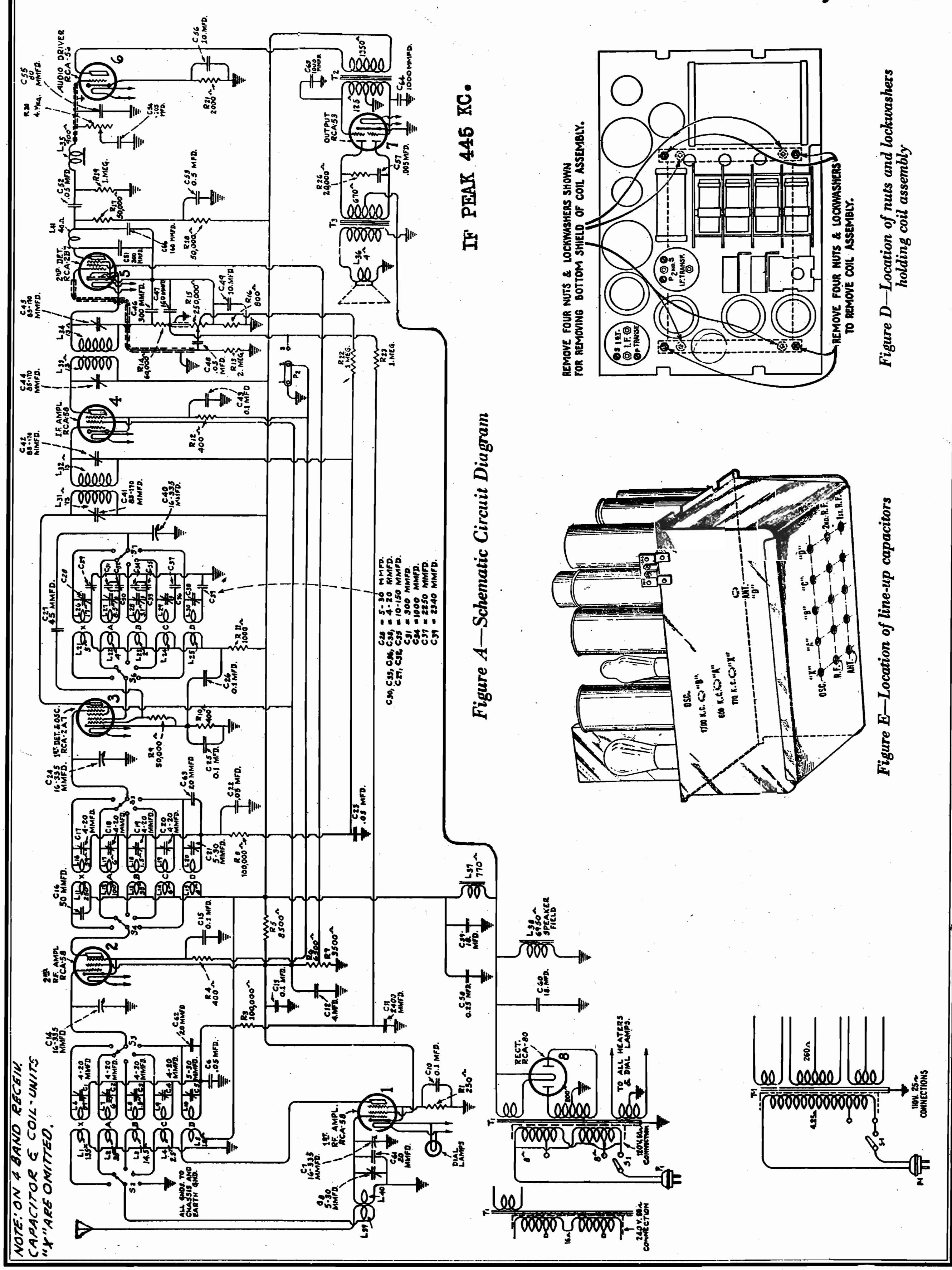



*Figure A—Schematic Circuit Diagram*

*Figure D—Location of nuts and lockwashers holding coil assembly*

*Figure E—Location of line-up capacitors*

MODEL 140, 141, 141-E, 240 Revised
Chassis Wiring

# RCA-VICTOR CO., INC.

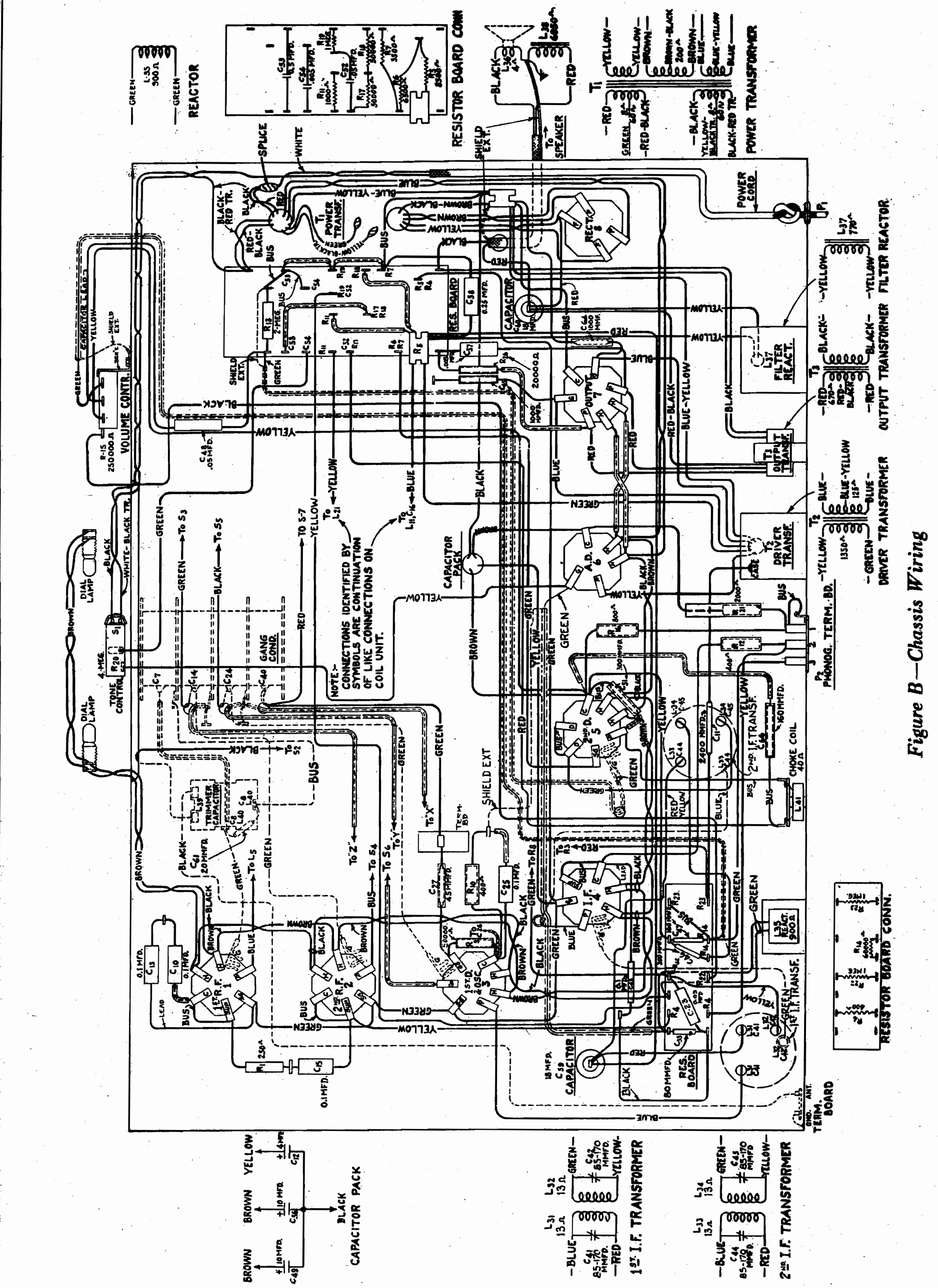



*Figure B—Chassis Wiring*

# RCA-VICTOR CO., INC.

**MODEL 140,141,141-E, 240 Revised**
**Coils Connections**

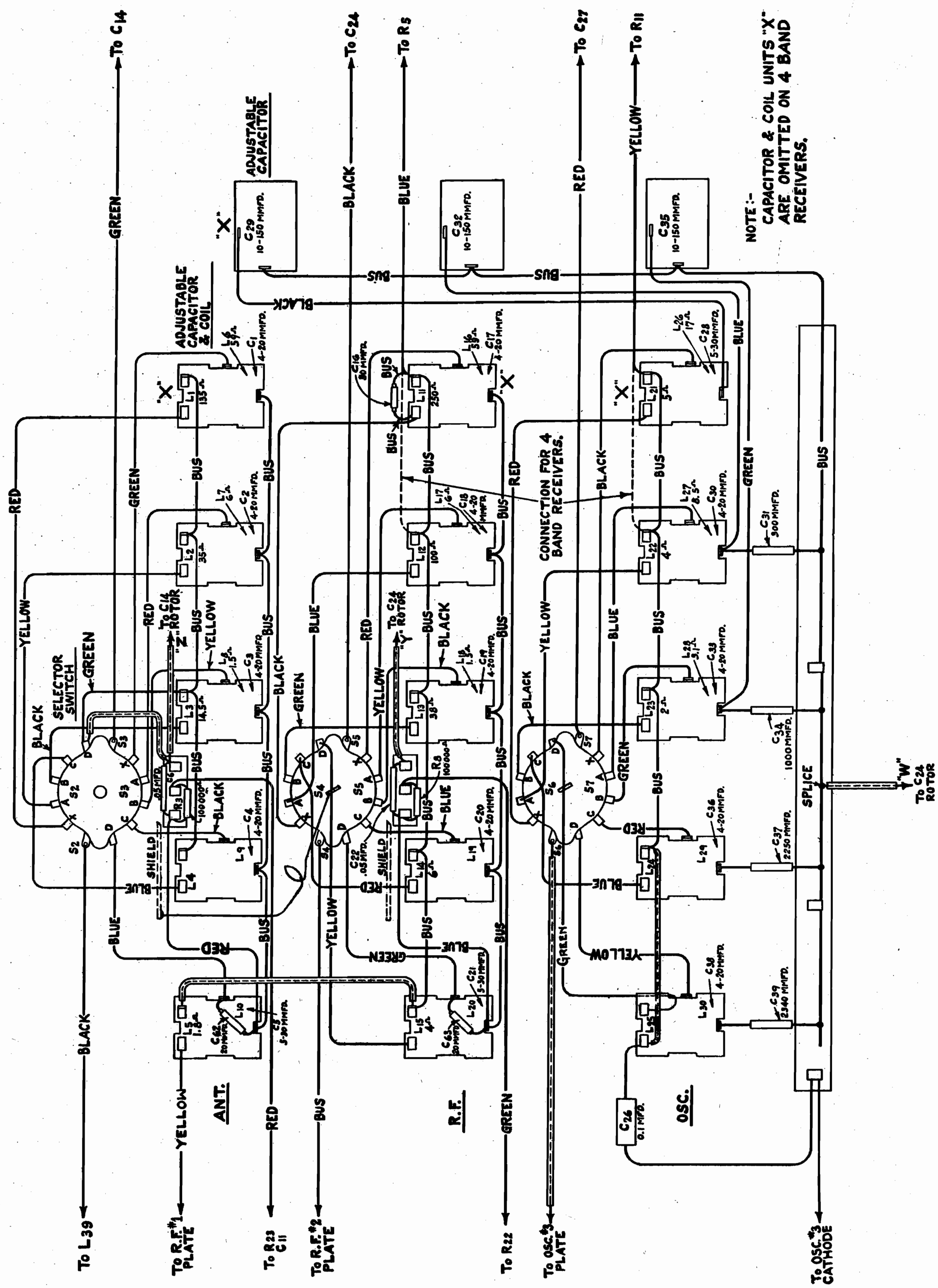



*Figure C—Wiring Diagram of Coil Assembly*

MODEL 140,141,141-E,
240 Revised
Parts List

RCA-VICTOR CO., INC.

# REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | RECEIVER ASSEMBLIES | |
| 2747 | Contact cap—Package of 5 | $0.50 |
| 2816 | Resistor—1,000 ohms—Carbon type—½ watt (R11)—Package of 5 | 1.00 |
| 3056 | Shield—Output Radiotron shield—Package of 2 | .40 |
| 3076 | Resistor—1 megohm—Carbon type—½ watt (R19, R22, R23)—Package of 5 | 1.00 |
| 3114 | Resistor—50,000 ohms—Carbon type—¼ watt (R9)—Package of 5 | 1.00 |
| 3118 | Resistor—100,000 ohms—Carbon type—¼ watt (R3, R8)—Package of 5 | 1.00 |
| 3435 | Resistor—250 ohms—Carbon type—½ watt (R1)—Package of 5 | 1.00 |
| 3470 | Resistor—6,500 ohms—Carbon type—1 watt (R6)—Package of 5 | 1.10 |
| 3526 | Resistor—2,000 ohms—Carbon type—½ watt (R21)—Package of 5 | 1.00 |
| 3527 | Resistor—800 ohms—Carbon type—½ watt (R16) Pkg. of 5 | 1.00 |
| 3529 | Socket—Dial lamp socket | .32 |
| 3555 | Capacitor—0.1 mfd. (C26) | .36 |
| 3572 | Socket—7-contact Radiotron socket—First detector and oscillator | .38 |
| 3594 | Resistor—50,000 ohms—Carbon type—½ watt (R17, R18)—Package of 5 | 1.00 |
| 3597 | Capacitor—0.25 mfd. (C58) | .40 |
| 3602 | Resistor—60,000 ohms—Carbon type—¼ watt (R14)—Package of 5 | 1.00 |
| 3616 | Capacitor—300 mmfd. (C51) | .34 |
| 3622 | Shield—Second detector Radiotron shield | .36 |
| 3641 | Capacitor—0.1 mfd. (C10, C15, C25) | .35 |
| 3643 | Capacitor—.005 mfd. (C57) | .25 |
| 3711 | Capacitor—80 mmfd. (C55) | .40 |
| 3719 | Socket—7-contact Radiotron socket | .30 |
| 3771 | Resistor—8,500 ohms—Carbon type—3 watt (R5) | .25 |
| 3845 | Capacitor—2,340 mmfd. (C39) | .50 |
| 3846 | Capacitor—2,250 mmfd. (C37) | .50 |
| 3848 | Capacitor—300 mmfd. (C31) | .30 |
| 3849 | Capacitor—50 mmfd. (C16) | .30 |
| 3861 | Capacitor—Adjustable trimmer (C29, C32, C35) | .78 |
| 3863 | Resistor—400 ohms—Carbon type—½ watt (R4, R10, R12)—Package of 5 | 1.00 |
| 3864 | Capacitor—300 mmfd. (C46) | .30 |
| 3865 | Capacitor—160 mmfd. (C47) | .30 |
| 3888 | Capacitor—.05 mfd. (C6, C22, C23, C52) | .25 |
| 3901 | Capacitor—.05 mfd. (C48) | .36 |
| 3931 | Capacitor—45 mmfd. (C27) | .30 |
| 3932 | Capacitor—.0024 mfd. (C11) | .30 |
| 3973 | Capacitor—1,000 mmfd. (C64, C65) | .34 |
| 4019 | Capacitor—1,000 mmfd. (C34) | .34 |
| 4030 | Bracket—Tone or volume control mounting bracket | .10 |
| 4033 | Capacitor—20 mmfd. (C61, C62, C63) | .34 |
| 4103 | Shield—First detector and R. F. Radiotron shield | .20 |
| 4104 | Shield—I. F. Radiotron shield | .20 |
| 4205 | Coil—Second detector choke (L41) | .50 |
| 4207 | Capacitor—0.1 mfd. (C13, C43) | .34 |
| 6136 | Resistor—3,500 ohms—Carbon type—1 watt (R7)—Package of 5 | 1.10 |
| 6188 | Resistor—2 megohms—Carbon type—½ watt (R13)—Package of 5 | 1.00 |
| 6300 | Socket—4-contact Radiotron socket | .35 |
| 6303 | Resistor—20,000 ohms—Carbon type—½ watt (R26)—Package of 5 | 1.00 |
| 6512 | Capacitor—.005 mfd. (C54) | .28 |
| 6603 | Condenser—4-gang variable tuning condenser (C7, C14, C24, C40) | 3.80 |
| 6604 | Capacitor—0.5 mfd. (C53) | .50 |
| 6605 | Transformer—Output transformer (T3) | 1.48 |
| 6606 | Reactor—Filter reactor (L37) | 1.66 |
| 6607 | Reactor—Tone control reactor (L35) | 1.14 |
| 6608 | Transformer—Audio driver transformer (T2) | 2.04 |
| 6609 | Capacitor—18. mfd. (C59) | 1.10 |
| 6612 | Volume control (R15) | 1.20 |
| 6613 | Drive—Variable condenser drive assembly—Complete | 1.00 |
| 6626 | Capacitor pack—Comprising one 4. mfd., and two 10. mfd., capacitors (C12, C49, C56) | 1.86 |
| 6628 | Capacitor and coil—Antenna coil and capacitor assembly—8,000–18,000 kilocycles—4- or 5- band (L39, L40, C8) | 1.50 |
| 6629 | Switch—5-band selector switch | 3.48 |
| 6630 | Switch—4-band selector switch | 3.48 |

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| 6631 | Coil and capacitor assembly—Antenna coil and capacitor—150–410 kilocycles—5-band (L1, L6, C1) | $2.16 |
| 6632 | Coil and capacitor—R. F. coil and capacitor assembly—150–410 kilocycles—5-band (L11, L16, C17) | 2.10 |
| 6633 | Coil and capacitor—Oscillator coil and capacitor assembly—150–410 kilocycles—5-band (L21, L26, C28) | 1.40 |
| 6634 | Coil and capacitor—Antenna coil and capacitor assembly—540–1,500 kilocycles—4- or 5-band (L2, L7, C2) | 1.86 |
| 6635 | Coil and capacitor—R. F. coil and capacitor assembly—540–1,500 kilocycles—4- or 5-band (L12, L17, C18) | 2.00 |
| 6636 | Coil and capacitor—Oscillator coil and capacitor assembly—540–1,500 kilocycles—4- or 5-band (L22, L27, C30) | 1.40 |
| 6637 | Coil and capacitor—Antenna coil and capacitor assembly—1,500–4,000 kilocycles—4- or 5-band (L3, L8, C3) | 1.56 |
| 6638 | Coil and capacitor—R. F. coil and capacitor assembly—1,500–4,000 kilocycles—4- or 5-band (L13, L18, C19) | 1.66 |
| 6639 | Coil and capacitor—Oscillator coil and capacitor assembly—1,500–4,000 kilocycles—4- or 5-band (L23, L28, C33) | 1.40 |
| 6640 | Coil and capacitor—Antenna coil and capacitor assembly—4,000–10,000 kilocycles—4- or 5-band (L4, L9, C4) | 1.54 |
| 6641 | Coil and capacitor—R. F. coil and capacitor assembly—4,000–10,000 kilocycles—4- or 5-band (L14, L19, C20) | 1.60 |
| 6642 | Coil and capacitor—Oscillator coil and capacitor assembly—4,000–10,000 kilocycles—4- or 5-band (L24, L29, C36) | 1.34 |
| 6643 | Coil and capacitor—Antenna or R. F. coil and capacitor assembly—8,000–18,000 kilocycles—4- or 5-band (L5, L10, C5—L15, L20, C21) | 1.52 |
| 6644 | Coil and capacitor—Oscillator coil and capacitor assembly—8,000–18,000 kilocycles—4- or 5-band (L25, L30, C38) | 1.54 |
| 6675 | Shaft—Shaft for condenser drive assembly—Comprising shaft, ball race with retainer and set screw | .35 |
| 6679 | Wand—Tuning wand for R. F. and oscillator adjustments | |
| 6889 | Capacitor—18. mfd. (C60) | 1.55 |
| 6890 | Transformer—First intermediate frequency transformer (L31, L32, C41, C42) | 2.40 |
| 6891 | Transformer—Second intermediate frequency transformer (L33, L34, C44, C45) | 2.40 |
| 6892 | Tone control (R20) | 1.50 |
| 6955 | Shield—Second R. F. Radiotron shield | .25 |
| 6956 | Shield—Radiotron shield top | .15 |
| 7065 | Screwdriver—Combination insulated screwdriver and alligator jaw end wrench for R. F. or I. F. adjustment | .80 |
| 7484 | Socket—5-contact Radiotron socket | .35 |
| 7485 | Socket—6-contact Radiotron socket | .40 |
| 9042 | Transformer—Power transformer—105–250 volts—50–60 cycles (T1) | 6.84 |
| 9046 | Transformer—Power transformer—105–125 volts—25–40 cycles | 9.22 |
| 9050 | Oscillator—Test oscillator—150 to 25,000 K. C. | 33.50† |
| 10194 | Ball—Steel ball for condenser drive assembly—Package of 20 | .25 |
| | MISCELLANEOUS | |
| 3829 | Knob—Volume control or tone control knob—Package of 5 | 1.10 |
| 3830 | Knob—Station selector knob—Package of 5 | 1.08 |
| 3831 | Knob—Range switch knob—Package of 5 | 1.08 |
| 3876 | Cable—3-conductor for loudspeaker—4-band | .60 |
| 3878 | Screws—No. 4-40-$\frac{3}{16}$ fillister head screw and washer for fastening station selector pointer—Package of 20 | .25 |
| 3952 | Escutcheon—Volume control escutcheon | .10 |
| 3953 | Escutcheon—Range switch escutcheon—5-band | .10 |
| 3992 | Escutcheon—Range switch escutcheon—4-band | .10 |
| 4160 | Screwdriver—Combination insulated screwdriver and socket wrench for I. F. and R. F. adjustments | 1.00 |
| 6112 | Cushions—Rubber cushions for chassis—Package of 4 | .25 |
| 6614 | Glass—Station selector dial glass | .30 |
| 6615 | Ring—Retaining ring for dial glass—Package of 5 | .34 |
| 6616 | Bezel—Metal bezel for station selector dial (RCA) | .50 |
| 6671 | Cable—2-conductor shielded for loudspeaker—5-band | .36 |
| 6672 | Screen—Translucent celluloid screen—For dial lamps—Package of 5 | .30 |
| 6673 | Pointer—Station selector pointer—Package of 5 | .64 |
| 6677 | Dial—Station selector dial—5-band—Package of 5 | 1.42 |
| 6678 | Dial—Station selector dial—4-band—Package of 5 | 1.42 |
| 6756 | Bezel—Metal bezel for station selector dial (Plain) | .50 |
| | REPRODUCER ASSEMBLIES | |
| 8969 | Cone—Reproducer cone complete (L36)—Package of 5 | 6.35 |
| 9438 | Reproducer complete | 6.88 |
| 9439 | Coil assembly—Field coil, magnet and cone support (L38) | 5.22 |

.0869 † Full discount not allowed.

RCA-VICTOR CO., INC.

# RCA VICTOR MODELS 143 AND 242

## SERVICE NOTES

## ELECTRICAL SPECIFICATIONS

Voltage Rating .......... 105–125 Volts and 100–130/195–250 Volts (Double Range)
Frequency Rating .......... 25–60 and 50–60 Cycles
Power Consumption .......... 130 Watts (All Frequencies)
Type and Number of Radiotrons .......... 2 RCA-6D6, 1 RCA-6A7, 1 RCA-75, 1 RCA-76, 2 RCA-42, 1 RCA-5Z3—Total, 8
Tuning Frequency Range .......... Band X— 140 K. C.– 410 K. C.; Band A— 540 K. C.– 1720 K. C.; Band B—1720 K. C.– 5400 K. C.; Band C—5400 K. C.–18000 K. C.
Line-up Frequencies ...... 175 K. C., 410 K. C , 460 K. C., 600 K. C., 1720 K. C., 5160 K. C., 18000 K. C.
Maximum Undistorted Output .......... 4.0 Watts
Maximum Output .......... 5.0 Watts

## PHYSICAL SPECIFICATIONS

| | *Model 143* | *Model 242* |
|---|---|---|
| Height | 20 5/16 Inches | 41 1/2 Inches |
| Width | 17 7/8 Inches | 26 Inches |
| Depth | 14 1/2 Inches | 14 Inches |

This eight-tube, four-band Superheterodyne receiver is of the "all-wave" type, having a continuous tuning range extending from 140 K. C. to 18,000 K. C., except for one break between 410 K. C. and 540 K. C. Such a tuning range permits the listener to receive all of the important broadcasting, police, aircraft and amateur call bands used throughout the world.

Excellent sensitivity, selectivity and tone quality, together with a high output (4 watts undistorted), Class A amplifier gives the receiver outstanding performance. Operating features include an "airplane" type dial, a double-ratio vernier drive, a visual band indicator, and a special "second hand" on the dial for logging short-wave stations. Other important features include automatic volume control, sensitivity control, large loudspeaker unit and a terminal board for easily attaching a magnetic pickup.

## DESCRIPTION OF ELECTRICAL CIRCUIT

The general circuit arrangement consists of an R. F. stage, a combined oscillator and first detector, an I. F. stage, a combined second detector and automatic volume control, a first audio stage and a push-pull Pentode output stage. An RCA-80 rectifier, together with a suitable filtering system, provides plate and grid voltages for all tubes and field excitation for the loudspeaker. Figures 1 and 2 show the schematic diagrams, Figures 5 and 7 the chassis wiring, and Figures 3 and 4 the loudspeaker wiring.

The signal enters the receiver through a shielded antenna lead and is applied to the grid of the R. F. tube through the antenna coupling transformer. The secondary of this transformer is tuned to the signal frequency by means of one unit of the gang capacitor. The output of this stage is transformer coupled to the grid circuit of the first detector, which is also tuned to the signal frequency by a unit of the gang capacitor.

Combined with the signal in the first detector is the local oscillator, which is always at a 460 K. C. frequency difference (higher) from the signal frequency. A separate coil system and the third unit of the gang capacitor are used in this circuit.

In conjunction with these three tuned circuits, it is well to point out that four different groups of tuned circuits are used, one for each tuning band. A four-position selector switch is provided for selecting the band in which the desired signal is located. In addition to selecting the desired coil system, additional groups of contacts are provided for short-circuiting the preceding lower frequency R. F. and detector coils and the two preceding oscillator coils. This is to prevent "dead" spots due to the absorption effects caused by the coils, the natural period of which, with the tuning capacitor disconnected, falls in the next higher frequency band.

The output of the first detector, which is the I. F. signal (460 K. C.), is fed directly through two tuned circuits to the grid of the I. F. amplifier stage. The I. F. stage, which utilizes Radiotron RCA-6D6, uses two transformers, which consist of four tuned circuits, all of which are tuned to 460 K. C.

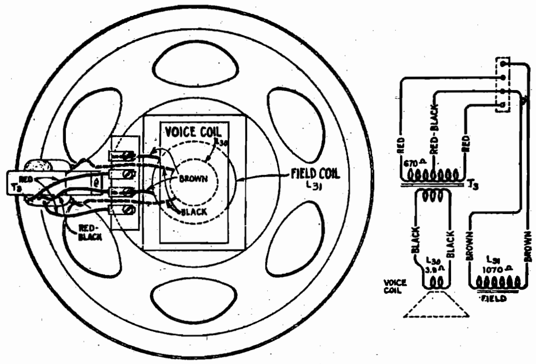



*Figure 3—Console Loudspeaker Wiring*

The output of the I. F. amplifier is then applied to the diode electrodes of the RCA-75, which is a combined second detector, automatic volume control and A. F. amplifier. The direct current component of the rectified signal produces a voltage drop across resistor R-32. The full voltage drop constitutes the automatic bias voltage for the R. F. while a tap is provided for the first detector and I. F. voltage. These automatic bias voltages for the R. F., first detector and I. F. give the automatic volume control action of the receiver. The volume control selects the amount of audio voltage that is applied to the grid of the RCA-75 and thereby regulates the audio output of the entire receiver.

The output of the detector is resistance coupled to the grid of the RCA-76, first audio stage, which is transformer coupled to the push-pull output stage. On some models the grid coupling resistor between the detector and audio stage is 1 megohm (R-21, Figure 1). Other models have two resistors, R-59, 400,000 ohms, and R-21, 2 megohms (Figure 2), with the band selector switch shorting out R-21 in bands B and C. The purpose of this latter type of connection is to reduce the low frequency output in bands B and C, thereby improving the performance of the receiver in these bands.

The output stage uses two RCA-42's, which give a low distortion, high audio output to the loudspeaker. A high frequency tone control, which consists of a variable resistor and capacitor, is connected across the grids of the output stage. At the minimum resistance position of the variable resistor, maximum attenuation of the high audio frequencies is obtained.

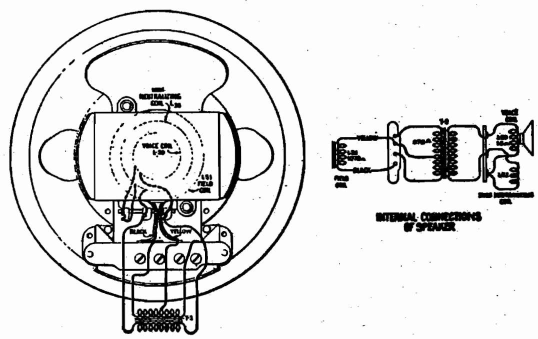


*Figure 4—Table Loudspeaker Wiring*

The plate circuit of the output stage is matched to the cone coil of the reproducer by means of a step-down transformer.

Plate and grid voltages for all tubes are supplied from the output of the rectifier-filter system. An RCA-5Z3 is used as a rectifier and a suitable network of capacitors and resistors gives the necessary filtering and voltages. The loudspeaker field is used as a filter reactor.

# SERVICE DATA

## (1) LINE-UP PROCEDURE

The line-up procedure of this receiver is somewhat involved and it is important that these instructions be carefully followed when making adjustments. Properly aligned, this receiver has outstanding performance; improperly aligned, it may be impossible to receive signals on all bands.

### Equipment

To properly align this receiver, proper test equipment must be used. This consists of a modulated R. F. oscillator having proper frequency range, an output indicator, an alignment tool and a tuning wand. These parts, which are shown on page 15, have been developed by the manufacturer of this receiver for use by service men to duplicate the original factory adjustments.

### Checking With Tuning Wand

Before making any R. F., oscillator or first detector adjustments, the accuracy of the present adjustments may be checked by means of the tuning wand (Stock No. 6679). The tuning wand consists of a bakelite rod having a brass cylinder at one end and a special finely divided iron insert at the other end. Inserting the cylinder into the center of a coil lowers its inductance,

# RCA-VICTOR CO., INC.

while inserting the iron end increases its inductance. From this, it is seen that unless the trimmer adjustment for a particular coil is perfect at alignment frequencies, inserting one end of the wand may increase the output of a particular signal. A perfect adjustment is evidenced by a lowering of output when either end of the wand is inserted into a coil.

The shields over the R. F. coil assembly have a hole at their top for entrance of the tuning wand. The location of the various coils inside of the shield is shown in Figure 6. An example of the proper manner of using the tuning wand would be to assume the external oscillator were set at 1720 K. C. and the signal tuned in, and the output indicator connected across the voice coil of the loudspeaker. Then the tuning wand should be inserted, first one end and then the other end, into the top of the three transformers at the left of the R. F. assembly, facing the front of the chassis. A perfect adjustment of the trimmer would be evidenced by a reduction in output when each end of the wand is inserted in each of the three transformers. If one end—for example, the iron end—when inserted in one coil caused an increase in output, then that circuit is low. An increase in the trimmer capacitance would be the proper remedy.

## (2) I. F. TUNING CAPACITOR ADJUSTMENTS

This receiver has one I. F. stage with two transformers having four adjustable capacitors that may require adjustment. The transformers are all peaked at 460 K. C.

A detailed procedure for making this adjustment follows:

(a) Connect the output of an external oscillator tuned to 460 K. C. between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker.

(b) Place the oscillator in operation at 460 K. C. Place the receiver in operation and adjust the station selector until a point is reached (Band A) where no signals are heard and turn the volume control to its maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

(c) Refer to Figure 8. Adjust each trimmer of the I. F. transformers until maximum output is obtained. Go over the adjustments a second time.

This completes the I. F. adjustments. However, it is good practice to follow the I. F. adjustments with the R. F. and oscillator adjustments due to interlocking which always occurs.

## (3) R. F., OSCILLATOR AND FIRST DETECTOR ADJUSTMENTS

Four R. F., oscillator and first detector adjustments are required in Bands "A" and "X." Three are required in Bands "B" and "C."

To properly align the various bands, each band must be aligned individually. The preliminary set-up requires the external oscillator to be connected between the antenna and ground terminals of the receiver and the output indicator across the voice coil of the loudspeaker. The volume and sensitivity controls must be at the maximum position and the input from the oscillator must be at the minimum value possible to get an output indication under these conditions. In the high frequency bands, it may be necessary to disconnect the oscillator from the receiver and place it at a distance in order to get a sufficiently low input to the receiver.

The dial pointer must be properly set before starting any actual adjustments. This is done by turning the variable capacitor until it is at its maximum capacity position. One end of the pointer should point exactly at the horizontal line at the lowest frequency end of Band "A," while the other end should point to within 1/64 inch of the horizontal line at the highest frequency end of Band "A."

Figure 8 shows the location of the trimmers for each band. Care must be exercised to only adjust the trimmers in the band under test.

### Band "X"

(a) Set the band switch at "X."

(b) Tune the external oscillator to 410 K.C., set the dial pointer at 410 K.C. and adjust the oscillator, detector and R.F. trimmers for maximum output.

(c) Shift the external oscillator frequency to 175 K.C. Tune in the 175 K.C. signal irrespective of scale calibration and adjust the series trimmer, marked 175 K.C. on Figure 8, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 410 K.C. as described in (b).

### Band "A"

(a) Set the band switch at "A."

(b) Tune the external oscillator to 1,720 K.C., set the pointer at 1,720 K.C. and adjust the oscillator, detector and R.F. trimmers for maximum output.

(c) Shift the external oscillator frequency to 600 K.C. Tune in the 600 K.C. signal, irrespective of scale calibration, and adjust the series trimmers, marked 600 K.C., Figure 8, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 1,720 K.C. as described in (b).

### Band "B"

(a) Set the band switch at "B."

(b) Tune the external oscillator to 5,160 K.C. and set the pointer at 5,160 K.C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(c) Check for the image signal, which should be received at approximately 4,240 K.C. on the dial. It will be necessary to increase the external oscillator output for this check.

(d) The antenna and detector trimmers should now be peaked for maximum output.

### Band "C"

(a) Set the band switch at "C."

(b) Tune the external oscillator to 18,000 K.C. and set the pointer at 18 M. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(c) Check for the image signal, which should be received at approximately 17,080 on the dial. It may be necessary to increase the external oscillator output for this check.

(d) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then at the oscillator frequency and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(e) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

## (4) POWER TRANSFORMER CONNECTIONS

The 220-volt power transformer furnished with some instruments includes taps for operating on 110-volt lines. Figure 9 shows the schematic circuit of the transformer and the proper voltage to be applied to the various taps. The taps are located on the power transformer assembly and are accessible without removing the chassis from the cabinet.

## (5) MAGNETIC PICKUP CONNECTIONS

A Terminal Board is provided at the rear of the chassis for adding phonograph facilities to this instrument. Figure 11 shows the various types of connections that will be required for the different turntable assemblies.

## (6) VARIATIONS IN MODELS

There are four slight variations in the electrical circuits of these receivers, which should be noted in event service work is necessary in the circuits that differ from the diagrams.

| | | |
|---|---|---|
| Group 1— | C-52 | 1120 mmfd. |
| | R-18 | 60,000 ohms |
| | R-19 | 100,000 ohms |
| | R-20 | 15,000 ohms |
| Group 2— | C-52 | 200 mmfd. |
| | R-18 | 100,000 ohms |
| | R-19 | 60,000 ohms |
| | R-20 | 10,000 ohms |

## RADIOTRON SOCKET VOLTAGES

**120-Volt A.C. Line—Maximum Volume and Sensitivity—No Signal**

| Radiotron No. | | Cathode to Ground Volts, D. C. | Screen Grid to Ground Volts, D. C. | Plate to Ground Volts, D. C. | Cathode Current, M. A. | Heater Volts, A. C. |
|---|---|---|---|---|---|---|
| RCA-6D6 R. F. | | 4.2 | 110 | 272 | 10.5 | 6.3 |
| RCA-6A7 | Oscillator | — | — | 225 | 11.4 | 6.3 |
| | 1st Detector | 4.6 | 110 | 282 | | |
| RCA-6D6 I. F. | | 4.2 | 110 | 272 | 10.5 | 6.3 |
| RCA-75 2nd Det. | | 1.2 | — | 170* | 0.4 | 6.3 |
| RCA-76 A. F. | | 14.0 | — | 252 | 2.8 | 6.3 |
| RCA-42 Power | | 22.0 | 295 | 290 | 24.5 | 6.3 |
| RCA-42 Power | | 22.0 | 295 | 290 | 24.5 | 6.3 |
| RCA-5Z3 Rectifier | | — | — | 768/384 R. M. S. | 110.0 | 5.0 |

*Cannot be measured with ordinary voltmeter.

MODEL 143,242
Trimmer Layout
Alignment Data

RCA-VICTOR CO., INC.

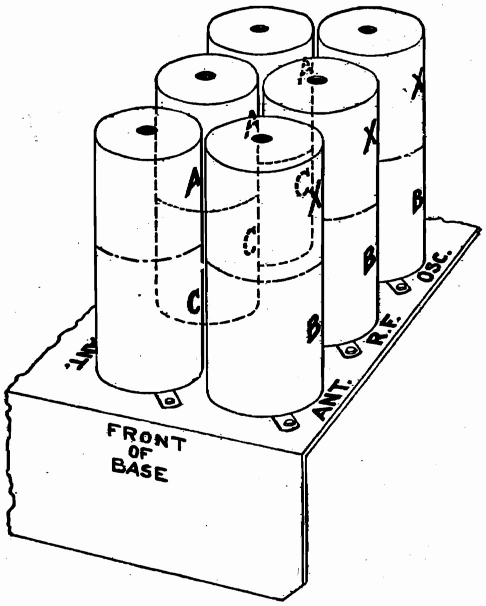



*Figure 6—Location of Coils in Shields*

Group 3—R-28 and C-52 are removed from the resistor board inside of chassis and mounted externally on phonograph terminal board. No. 3 terminal has been added to terminal board. Electrically, this group is identical with Group 2, the schematic and wiring diagrams being shown in Figures 1 and 5.

Group 4—Resistor R-10 has been removed. Resistor R-59 has been added and Resistor R-21 has been changed to 2 megohms. Capacitors C-52 and C-43 have been changed to 1120 mmfd. Figures 2 and 7 show the schematic and wiring diagrams of the models having these changes.

## (7) FIDELITY LINK

It will be noted that a small link is mounted on the rear apron of the chassis which is closed on table models and open on console models. The purpose of the link is to increase the low frequency output of the receiver when open.

## (8) VOLTAGE READINGS

The following voltages are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if low-resistance meters are used, such allowances must be made.

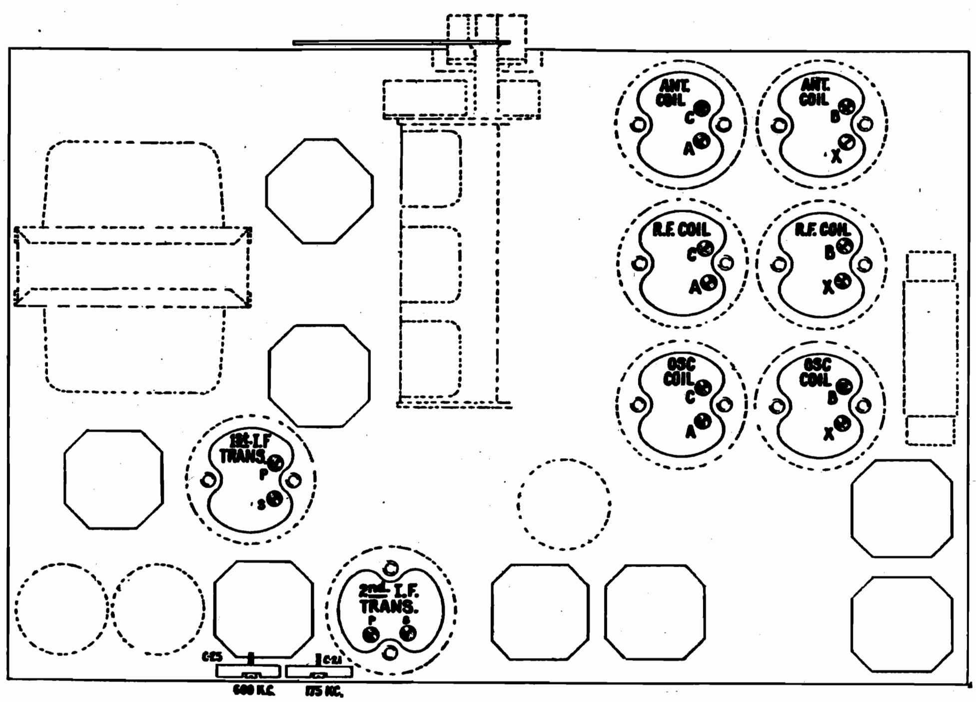
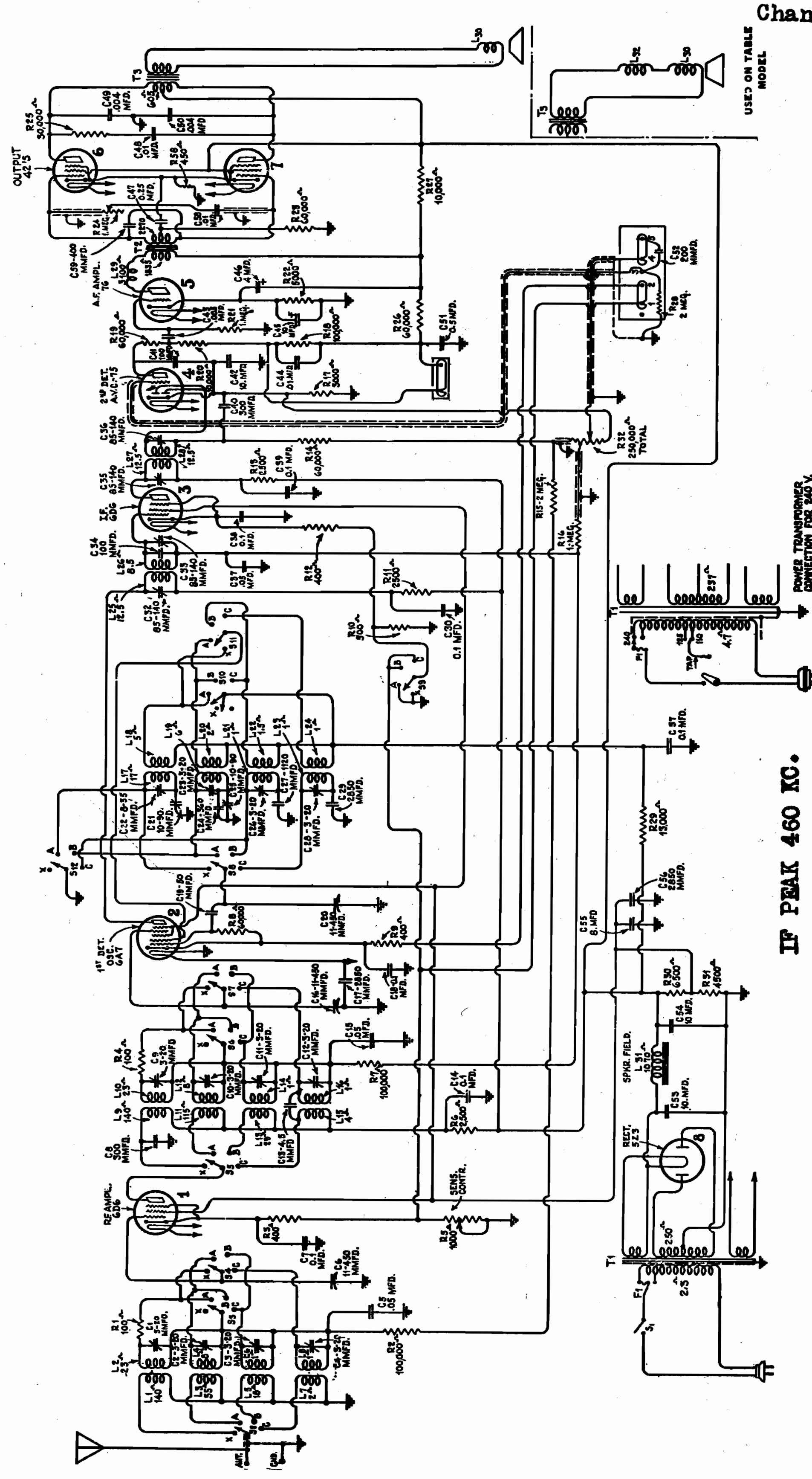



*Figure 8—Location of Trimmer Capacitors*

**MODEL 143,242**
**Schematic with Sensitivity Cont. Change**

# RCA-VICTOR CO., INC.

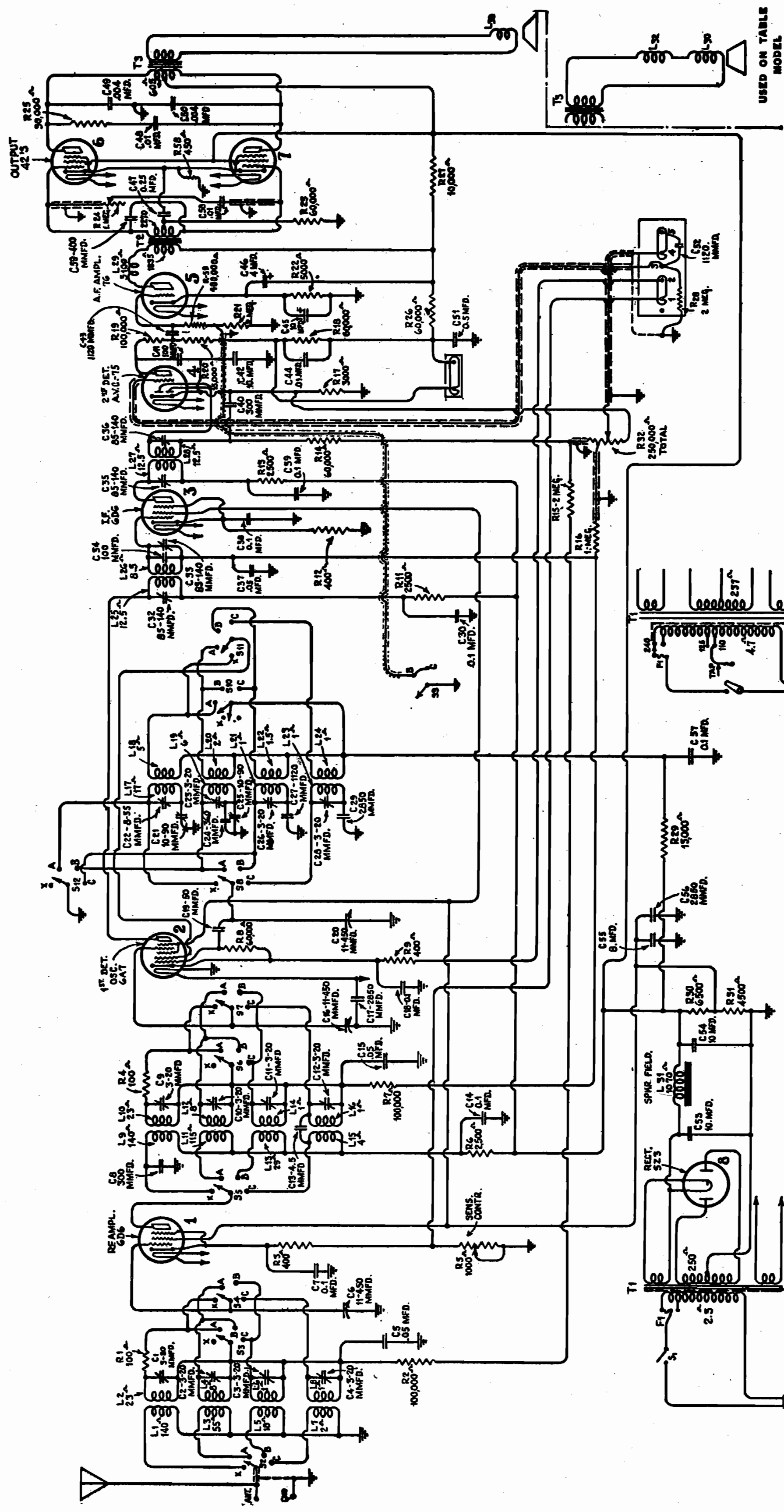


IF PEAK 460 KC.

*Figure 1—Schematic Circuit Diagram—Sensitivity Control Change with Band position*

**MODEL 143,242**
**Schematic with**
**Fidelity Change**

# RCA-VICTOR CO., INC.




IF PEAK 460 KC.

*Figure 2—Schematic Circuit Diagram—Fidelity Change with Band position*

MODEL 143,242
Socket Layout
Parts Schematics

# RCA-VICTOR CO., INC.

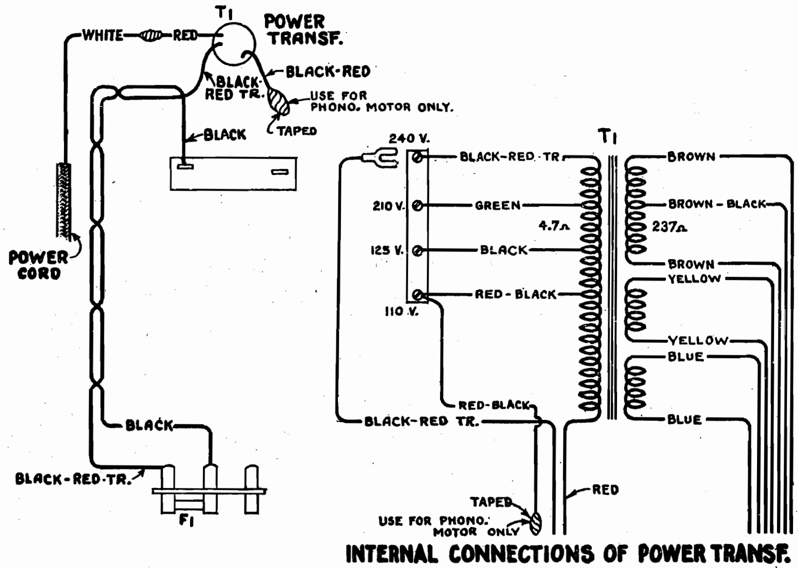
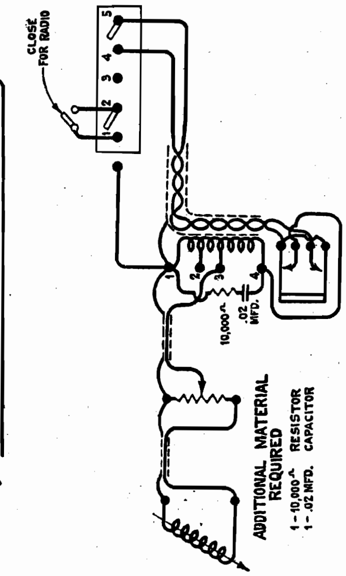
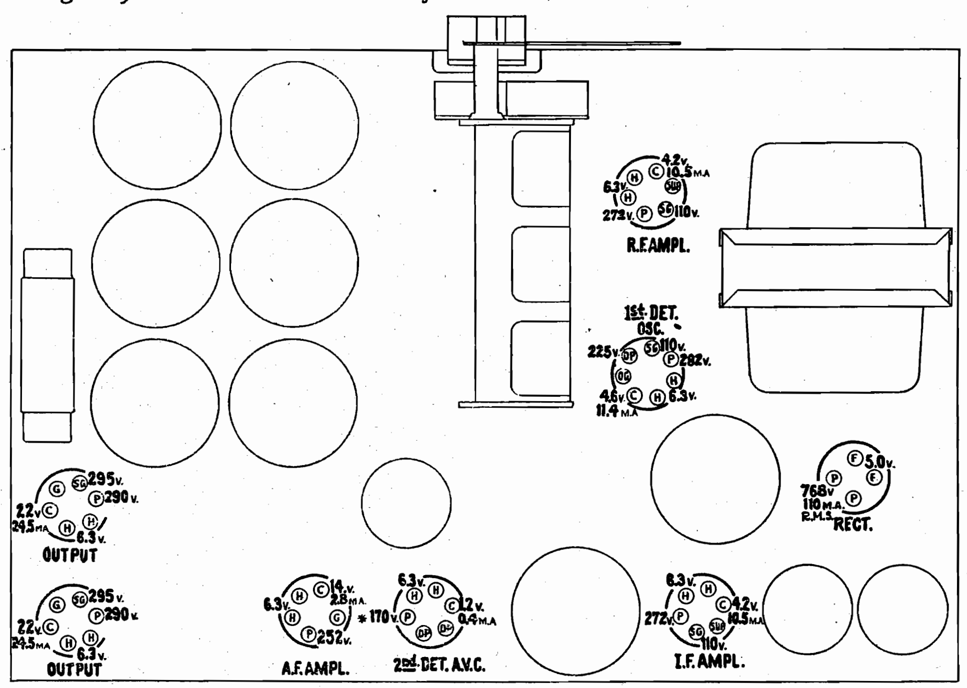



Figure 9—Universal Power Transformer Connections



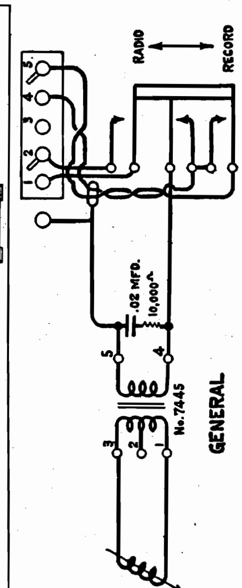

End-Table Connections




* CANNOT BE MEASURED WITH ORDINARY VOLTMETER

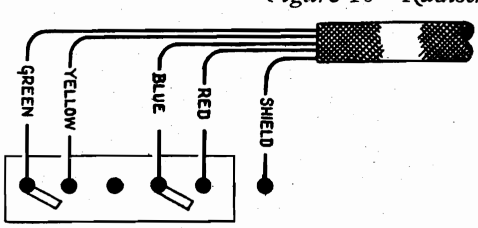
ALL VOLTAGES ARE TO GROUND

Figure 10—Radiotron Socket Voltages

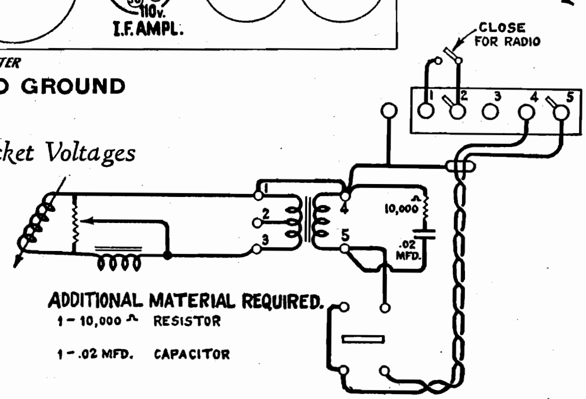



General Connections

*Figure 11—Magnetic Pickup Connections—Place Range Switch in A or X position during record reproduction for models with fidelity switching*




Junior "Duo" Connections




Portable Turntable Connections

MODEL 143, 242
Chassis Wiring
with Fidelity Change

RCA-VICTOR CO., INC.

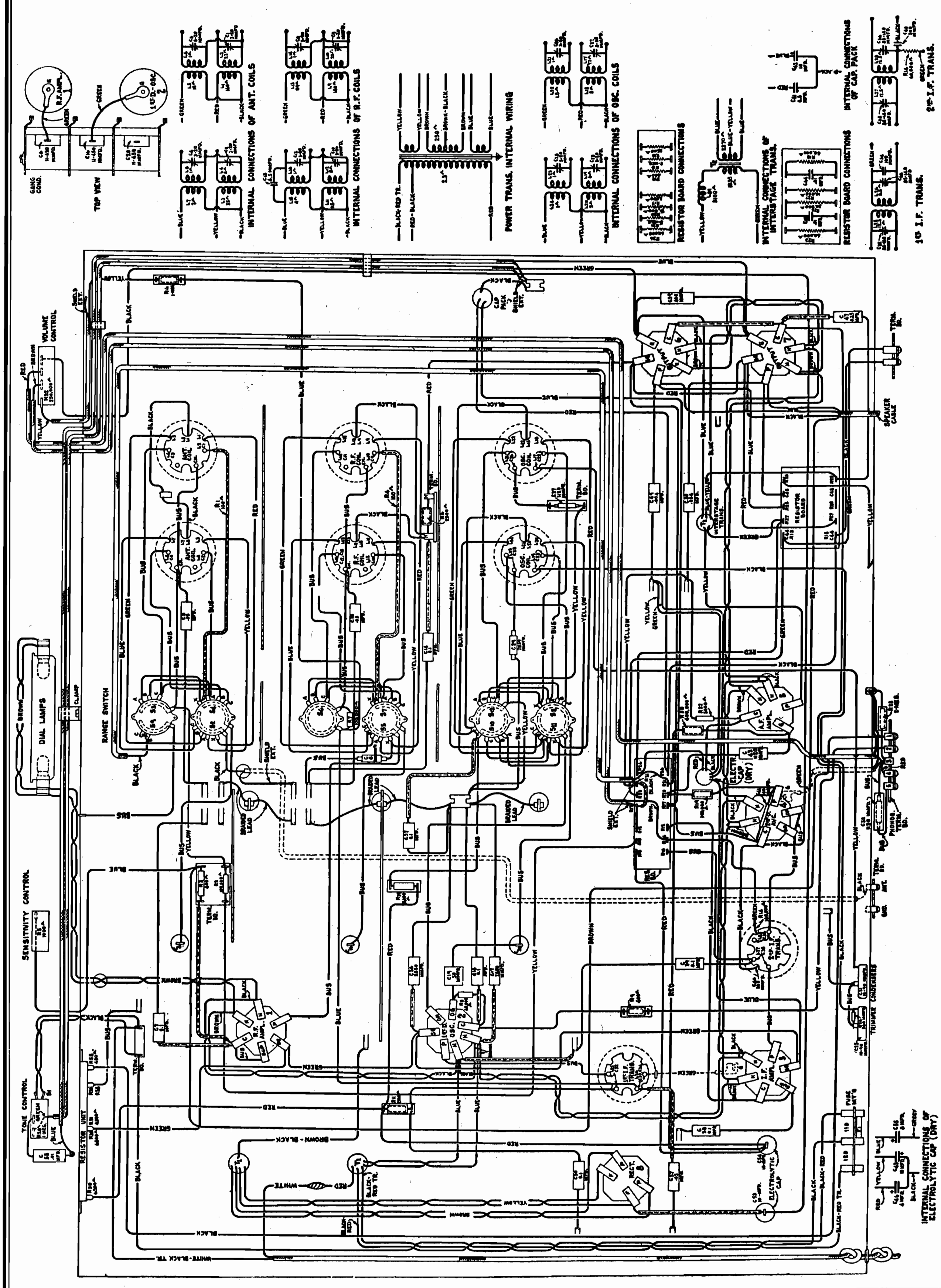


*Figure 7—Wiring Diagram—Fidelity Change with Band position*

# RCA-VICTOR CO., INC.

**MODEL 143,242**
**Chassis Wiring with Sensitivity Change**

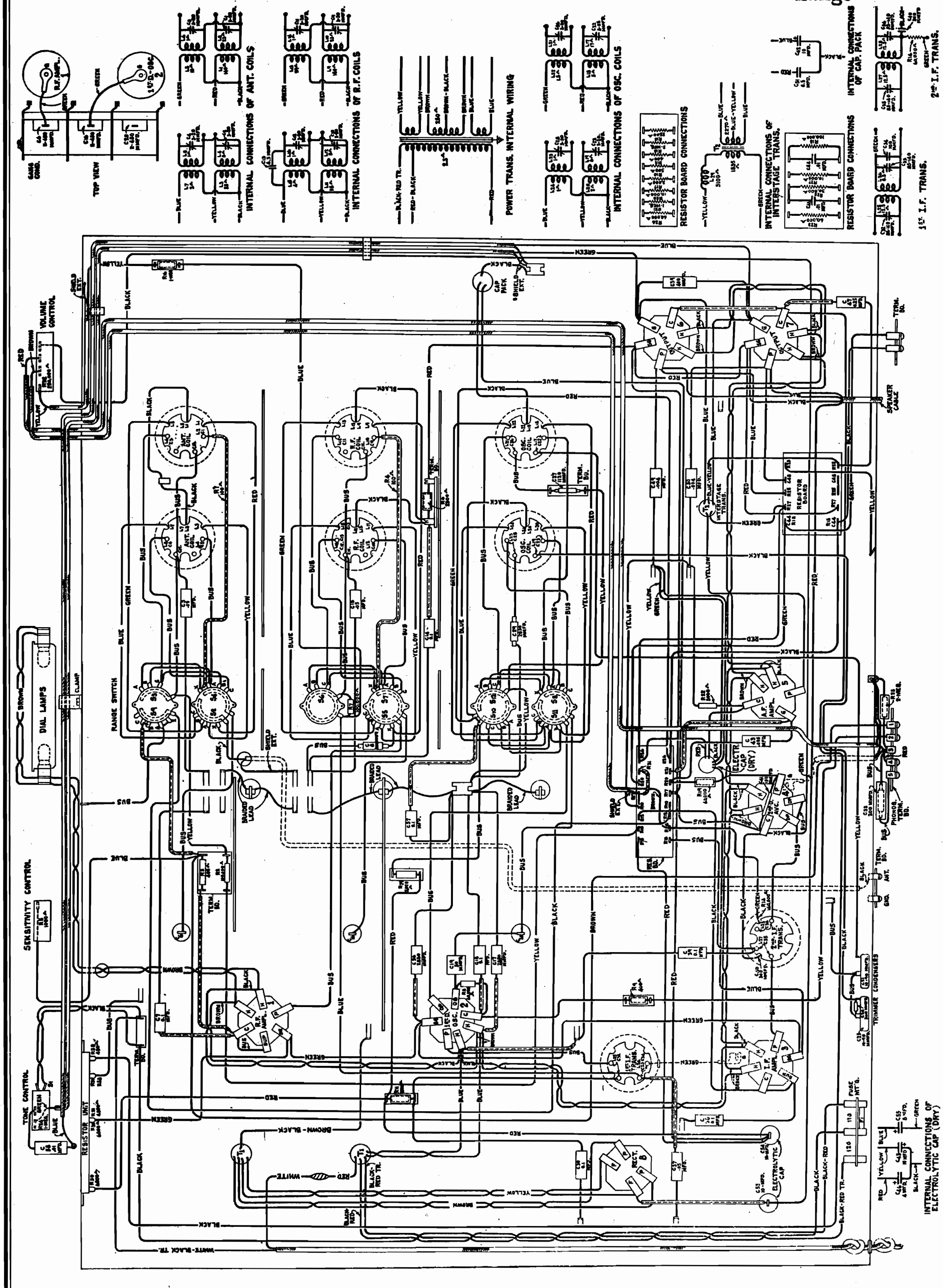



*Figure 5—Wiring Diagram—Sensitivity Control Change with Band position*

# RCA-VICTOR CO., INC.

## REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

| Stock No. | Description | List Price |
|---|---|---|
| | RECEIVER ASSEMBLIES | |
| 4632 | Board—Terminal board—Two terminals and link—For changing fidelity | $0.25 |
| 4379 | Board—Antenna terminal board | .20 |
| 4427 | Bracket—Volume control, tone control or noise suppressor mounting bracket | .18 |
| 4244 | Cap—Contact cap—Package of 5 | .20 |
| 3861 | Capacitor — Oscillator trimmer capacitor (C21, C25) | .78 |
| 4633 | Capacitor—50 mmfd. (C19) | .25 |
| 4635 | Capacitor—100 mmfd. (C41) | .25 |
| 4697 | Capacitor—200 mmfd. (C52) | .35 |
| 3937 | Capacitor—300 mmfd. (C8) | .34 |
| 4413 | Capacitor—360 mmfd. (C24) | .22 |
| 4183 | Capacitor—400 mmfd. (C59) | .26 |
| 4412 | Capacitor—1120 mmfd. (C27) | .25 |
| 4409 | Capacitor—1120 mmfd. (C43)* | .35 |
| 4634 | Capacitor—1120 mmfd. (C52)* | .35 |
| 4524 | Capacitor—2850 mmfd. (C29) | .35 |
| 4615 | Capacitor—2850 mmfd. (C17, C56) | .34 |
| 4628 | Capacitor—0.004 mfd. (C49, C50) | .28 |
| 6512 | Capacitor—0.005 mfd. (C43) | .28 |
| 3787 | Capacitor—0.01 mfd. (C48) | .30 |
| 4212 | Capacitor—0.01 mfd. (C44) | .30 |
| 4624 | Capacitor—0.01 mfd. (C58) | .54 |
| 3888 | Capacitor—0.05 mfd. (C37) | .25 |
| 4417 | Capacitor—0.05 mfd. (C5, C15) | .25 |
| 3877 | Capacitor—0.1 mfd. (C38) | .32 |
| 4415 | Capacitor—0.1 mfd. (C18) | .30 |
| 4645 | Capacitor—0.1 mfd. (C7, C14, C30, C39, C57) | .25 |
| 3750 | Capacitor—0.25 mfd. (C47) | .36 |
| 7790 | Capacitor—10 mfd. (C53, C54) | 1.05 |
| 4619 | Capacitor pack—Comprising one 0.5 mfd., one 10 mfd. capacitor (C42, C51) | 1.44 |
| 4626 | Capacitor pack—Comprising one 4 mfd., one 10 mfd. and one 8 mfd. capacitor (C45, C46, C55) | 2.82 |
| 4358 | Clamp—Electrolytic capacitor clamp—For capacitor stock No. 7790 | .15 |
| 4693 | Clamp—Electrolytic capacitor clamp—For capacitor stock No. 4626 | .15 |
| 7810 | Coil—Antenna coil "PB-LW" (L1, L2, L5, L6, C1, C3) | 2.10 |
| 7803 | Coil—Antenna coil "B.S.W." (L3, L4, L7, L8, C2, C4) | 1.82 |

| Stock No. | Description | List Price |
|---|---|---|
| 7808 | Coil—Detector coil "P.B.-L.W." (L9, L10, L13, L14, C9, C11) | $2.05 |
| 7805 | Coil—Detector coil "B.-S.W." (L11, L12, L15, L16, C10, C12, C13) | 2.15 |
| 7807 | Coil—Oscillator coil "B.S.W." (L19, L20, L23, L24, C23, C28) | 1.62 |
| 7809 | Coil—Oscillator coil "P.B.-L.W." (L17, L18, L21, L22, C22, C26) | 1.70 |
| 7801 | Condenser—3-gang variable tuning condenser (C6, C16, C20) | 4.42 |
| 4371 | Cover—Fuse mount cover | .15 |
| 4631 | Cover—Terminal strip cover | .15 |
| 10907 | Fuse—3-ampere—Package of 5 | .40 |
| 3376 | Mount — Fuse mount — 105–125-volt instrument | .40 |
| 4604 | Mount—Fuse mount for 200–250-volt instrument | .35 |
| 4625 | Resistor—Wire wound resistor—Comprising one 6500-ohm–4500-ohm and 450 section (R30, R31, R58) | .70 |
| 3704 | Resistor—400 ohms—Carbon type—¼ watt—Package of 5 (R9, R3, R12) | 1.00 |
| 4622 | Resistor—500 ohms—Carbon type—¼ watt—Package of 10 (R10) | 2.00 |
| 4338 | Resistor — 2500 ohms — Carbon type — ¼ watt—Package of 10 (R6, R11, R13) | 2.00 |
| 4242 | Resistor — 3000 ohms — Carbon type — ¼ watt—Package of 5 (R17) | 1.00 |
| 4436 | Resistor — 5000 ohms — Carbon type — ¼ watt—Package of 10 (R22) | 2.00 |
| 3881 | Resistor—10,000 ohms—Carbon type—¼ watt (R20)—Package of 5 | 1.00 |
| 3998 | Resistor—15,000 ohms—Carbon type—¼ watt—Package of 5 (R20) | 1.00 |
| 3602 | Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5 (R8, R18*, R19, R23, R26) | 1.00 |
| 3118 | Resistor—100,000 ohms—Carbon type—¼ watt—Package of 5 (R2, R7, R18, R19*) | 1.00 |
| 3619 | Resistor—400,000 ohms—Carbon type—¼ watt (R59)—Package of 5 | 1.00 |
| 3033 | Resistor — 1 megohm — Carbon type — ¼ watt—Package of 5 (R16, R21) | 1.00 |
| 6242 | Resistor — 2 megohms — Carbon type — ¼ watt—Package of 5 (R15, R21,* R28) | 1.00 |
| 3078 | Resistor—10,000 ohms—Carbon type—½ watt—Package of 5 (R27) | 1.00 |
| 4623 | Resistor—13,000 ohms—Carbon type—½ watt—Package of 10 (R29) | 2.00 |
| 2240 | Resistor—30,000 ohms—Carbon type—1 watt (R25) | .22 |
| 4418 | Resistor—100 ohms—Flexible type—Package of 10 (R1, R4) | 1.50 |
| 4618 | Rheostat—Sensitivity control (R5) | 1.25 |

* R18—60,000 ohms—Some models.
* R19—100,000 ohms—Some models.

* R20—15,000 ohms—Some models.
* R21—2 megohms—Some models.
* C52—1120 mmfd.—Some models.

## REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

| Stock No. | Description | List Price |
|---|---|---|
| 7800 | Shield—Antenna, detector or oscillator coil shield | $0.45 |
| 4627 | Shield—First detector—Oscillator Radiotron shield | .36 |
| 7488 | Shield—First detector—Oscillator Radiotron shield top | .20 |
| 4452 | Shield—I. F. amplifier Radiotron shield | .35 |
| 4629 | Shield—I. F. amplifier Radiotron shield top | .15 |
| 4663 | Shield—Oscillator coil wiring shield—Shields oscillator coil wiring from R. F. coil—Complete with terminal board, clamp and resistor | .32 |
| 4664 | Shield—Oscillator wiring shield—Shields oscillator coil wiring from R. F. coil—Complete with terminal strip and resistor | .36 |
| 4630 | Shield—R. F. amplifier—Radiotron shield | .36 |
| 4665 | Shield—R. F. coil wiring shield with two resistors and terminal board | .50 |
| 3529 | Socket—Dial lamp socket | .32 |
| 3859 | Socket—4-contact Radiotron socket | .30 |
| 7484 | Socket—5-contact Radiotron socket | .35 |
| 7485 | Socket—6-contact Radiotron socket | .40 |
| 3572 | Socket—7-contact Radiotron socket | .38 |
| 4617 | Switch—Range switch (S2, S3, S4, S5, S6, S7, S8, S9, S10, S11, S12) | 3.32 |
| 4616 | Tone control (R24, S1) | 1.28 |
| 4431 | Transformer—First intermediate frequency transformer (L25, L26, C32, C33, C34) | 2.28 |
| 9505 | Transformer—Power transformer—105–125 volts—50–60 cycles (T1) | 6.35 |
| 9506 | Transformer—Power transformer—105–125 volts—25–40 cycles | 8.90 |
| 9507 | Transformer—Power transformer—105–250 volts—40–60 cycles | 6.40 |
| 4433 | Transformer—Second intermediate frequency transformer (L27, L28, C35, C36, C40, R14) | 2.15 |
| 4620 | Transformer and reactor—Interstage transformer and reactor (T2, L29) | 2.98 |
| 4519 | Volume control (R32) | 1.25 |
| | DRIVE ASSEMBLIES | |
| 4362 | Arm—Band indicator operating arm | .28 |
| 10194 | Ball—Steel ball for variable condenser drive assembly—Package of 20 | .25 |
| 4422 | Clutch—Tuning condenser drive clutch assembly—Comprising drive shaft, balls, ring, spring and washers assembled | .88 |
| 7799 | Drive—Variable tuning condenser drive complete | 2.45 |

| Stock No. | Description | List Price |
|---|---|---|
| 4364 | Gear—Spring gear assembly complete with hub, pinion, gear, cover and spring | $0.96 |
| 4704 | Indicator—Band indicator—Celluloid | .12 |
| 4367 | Indicator—Station selector vernier pointer—Small | .15 |
| 4520 | Indicator—Station selector main pointer—Large | .18 |
| 3943 | Screen—Translucent screen for dial light—Package of 2 | .18 |
| 3993 | Screw—No. 6-32-5/32" square head set screw for band indicator operating arm or condenser drive—Package of 10 | .25 |
| 4377 | Spring — Band indicator and arm tension spring—Package of 5 | .25 |
| 4360 | Stem—Station selector pointer stem | .35 |
| 4378 | Stud—Band indicator operating arm stud—Package of 5 | .25 |
| | REPRODUCER ASSEMBLY (TABLE MODEL) | |
| 9534 | Coil—Field coil (L31) | 1.90 |
| 9533 | Cone—Cone mounted and centered on housing (L30) | 3.50 |
| 9532 | Reproducer complete | 7.50 |
| 9535 | Transformer—Output transformer (T3) | 1.50 |
| | REPRODUCER ASSEMBLY (CONSOLE MODEL) | |
| 4636 | Cable—4-conductor—Reproducer cable | .50 |
| 9537 | Coil—Field coil magnet and cone support (L31) | 3.85 |
| 8969 | Cone—Reproducer cone—Package of 5 (L30) | 6.35 |
| 9536 | Reproducer complete | 8.40 |
| 4637 | Transformer—Output transformer (T3) | 1.50 |
| | MISCELLANEOUS PARTS | |
| 4677 | Bezel—Metal bezel (escutcheon) for station selector dial | .56 |
| 4621 | Dial—Station selector dial | .65 |
| 6614 | Glass—Station selector dial glass | .30 |
| 4449 | Knob—Station selector, volume control, tone control, noise suppressor rheostat on range switch knob—Package of 5 | .60 |
| 4340 | Lamp—Dial lamp—Package of 5 | .60 |
| 4678 | Ring—Retaining ring for dial glass—Package of 5 | .35 |
| 4446 | Screw assembly—Chassis mounting screw assembly—Comprising four screws, four lockwashers, four washers, four spacers and eight cushions | 28 |
| 4613 | Screw—No. 8-32-1/16" headless set screw for knobs—Package of 10 | .25 |

# RCA-VICTOR CO., INC.

MODEL 221
Trimmer Data
Alignment Data
Voltage

## Electrical Specifications

Voltage Rating....................................100–125 Volts
Frequency Rating...........................25–60 and 50–60 Cycle
Power Consumption.............60 Cycle, 75 Watts; 25 Cycle, 80 Watts
Number and Type of Tubes..............................2 RCA-58, 1 RCA-2A7, 1 RCA-2B7, 1 RCA-2A5, 1 RCA-80—Total 6
Tuning Ranges.........540 K. C.–1500 K. C.—5400 K. C.–15,350 K. C.
Undistorted Output.......................................1.75 Watts

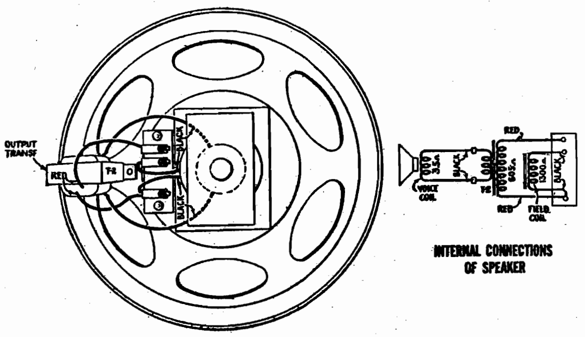



*Figure C—Loudspeaker Wiring*

This receiver is a six-tube two-band A. C. operated Superheterodyne Receiver combining the standard and short-wave broadcasting bands. The frequency ranges are selected by means of a two-position switch. Other features include a double reduction vernier drive using two concentric knobs giving a 10–1 and a 55–1 ratio of speed reduction, a continuously variable tone control, ten-inch electrodynamic loudspeaker, automatic volume control, single Pentode output tube and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

The chassis is of compact construction, affording unusual accessibility to all parts and adjustments. An "Airplane" type dial calibrated in frequency and showing the location of the short-wave bands is a special feature of this instrument. Figure A shows the schematic circuit, Figure B the wiring diagram and Figure C the loudspeaker wiring.

## Line-Up Capacitor Adjustments

In order to properly align this receiver, it is essential that Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 150 K. C. to 20,000 K. C. continuously, has good stability and includes an attenuator. In addition to the oscillator, a non-metallic screwdriver such as Stock No. 7065 and an output meter are required. The output meter should be preferably a thermo-couple galvanometer connected across or in place of the cone coil of the loudspeaker.

**I. F. Tuning Adjustments**—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 370 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

(a) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(b) Connect the test oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

**R. F. and Oscillator Adjustments**—The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K. C. series capacitor, which is accessible from the rear of the chassis. Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the position of the indicator pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 540. Then set the Test Oscillator at 1400 K. C., the dial indicator at 1400 and the oscillator output so that a slight deflection will be obtained in the output meter when the volume control is at its maximum position.

(b) With the Range Switch at the "in" position, adjust the three trimmers under the three R. F. coils, designated as L. W. in Figure D, until a maximum deflection is obtained in the output meter. Then shift the Test Oscillator frequency to 600 K. C. The trimmer capacitor, accessible from the rear of the chassis, should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1400 K. C. adjustment.

(c) Now place the Range Switch at the "out" position, shift the Test Oscillator to 15,000 K. C. and set the dial at 15 on the megacycle scale. Adjust the three trimmer capacitors designated as S. W. in Figure D for maximum output, beginning with the oscillator trimmer. It will be noted that the oscillator and first detector trimmers will have two positions at which the signal will give maximum output. The position which uses the lower trimmer capacitance, obtained by turning the screw counter-clockwise, is the proper adjustment for the oscillator, while the position that uses a higher capacitance is correct for the detector. *Both of these adjustments must be made as indicated irrespective of output.* The R. F. is merely peaked. In conjunction with the detector adjustment, it is necessary to rock the main tuning capacitor back and forth while making the adjustment. This completes the line-up adjustments.

The important points to remember are the need for using the minimum oscillator output to obtain a deflection in the output meter with the volume control at its maximum position and the manner of obtaining the proper high frequency oscillator and detector adjustments.

## Power Transformer Connections

The power transformer used in this model has a tapped primary winding. The transformer is normally connected for lines ranging in voltage from 110 to 125 volts. If for any reason the line is normally below 110 volts, the connections should be changed so the tap will be used. This is done by unsoldering the black with red tracer transformer lead connected to the power switch (on tone control) and substituting the red and black lead normally taped up. The black with red tracer lead should then be carefully taped to prevent short-circuit.

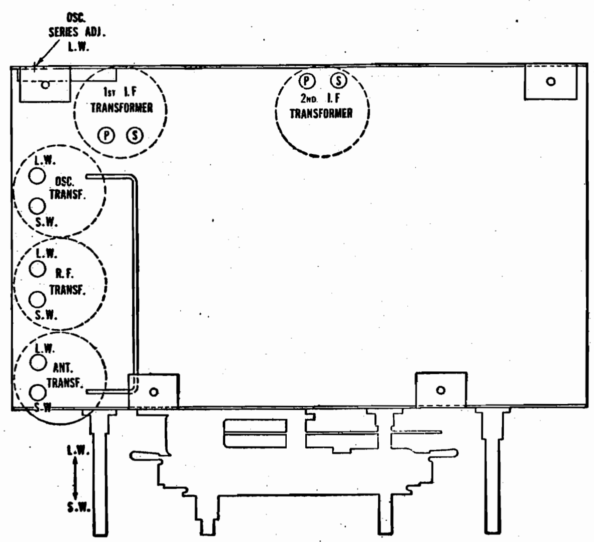



*Figure D—Location of Line-Up Capacitors*

## 115 Volts, A. C. Line—No Signal

| Type No. | Cathode to Control Grid, Volts | Cathode to Screen Grid, Volts | Cathode to Plate, Volts | Plate Current M. A. | Heater Volts |
|---|---|---|---|---|---|
| 1. RCA-58 R. F. | 3.0 | 100 | 265 | 6.0 | 2.42 |
| 2. RCA-2A7 1st Det. Osc. | 3.0 | 100* | 265* | 2.0* | 2.42 |
| 3. RCA-58 I. F. | 3.0 | 100 | 265 | 6.0 | 2.42 |
| 4. RCA-2B7 2nd Det. A. V. C. | 1.5 | 35 | 100 | 1.5 | 2.42 |
| 5. RCA-2A5 Power | 16.0 | 255 | 240 | 35.0 | 2.42 |
| 6. RCA-80 Rectifier | 725 Volts R. M. S.—75 M. A. Total Current | | | | 4.80 |

* The voltages and current refer to the detector part of the tube.

MODEL 221
Chassis Wiring

# RCA-VICTOR CO., INC.

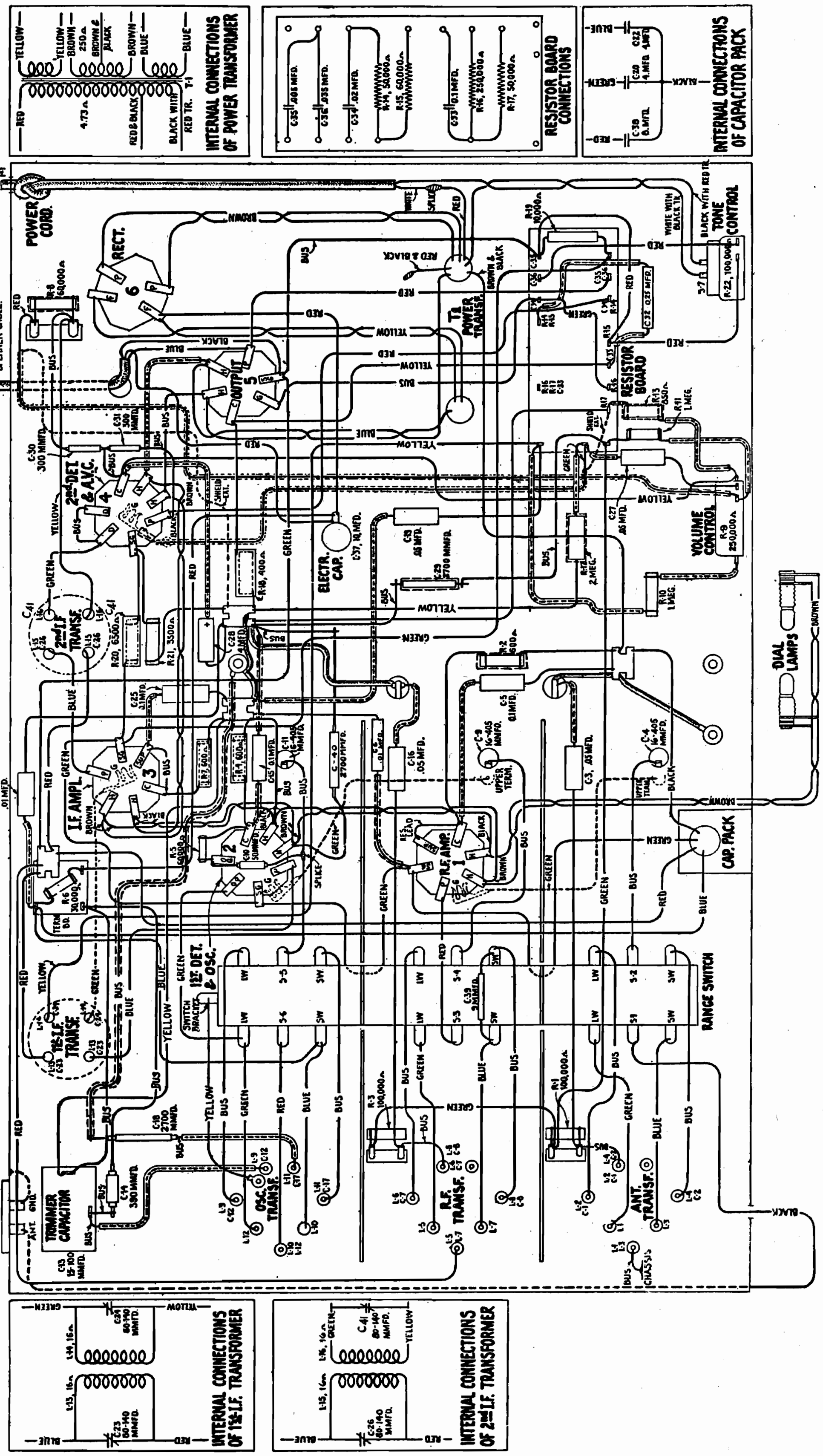
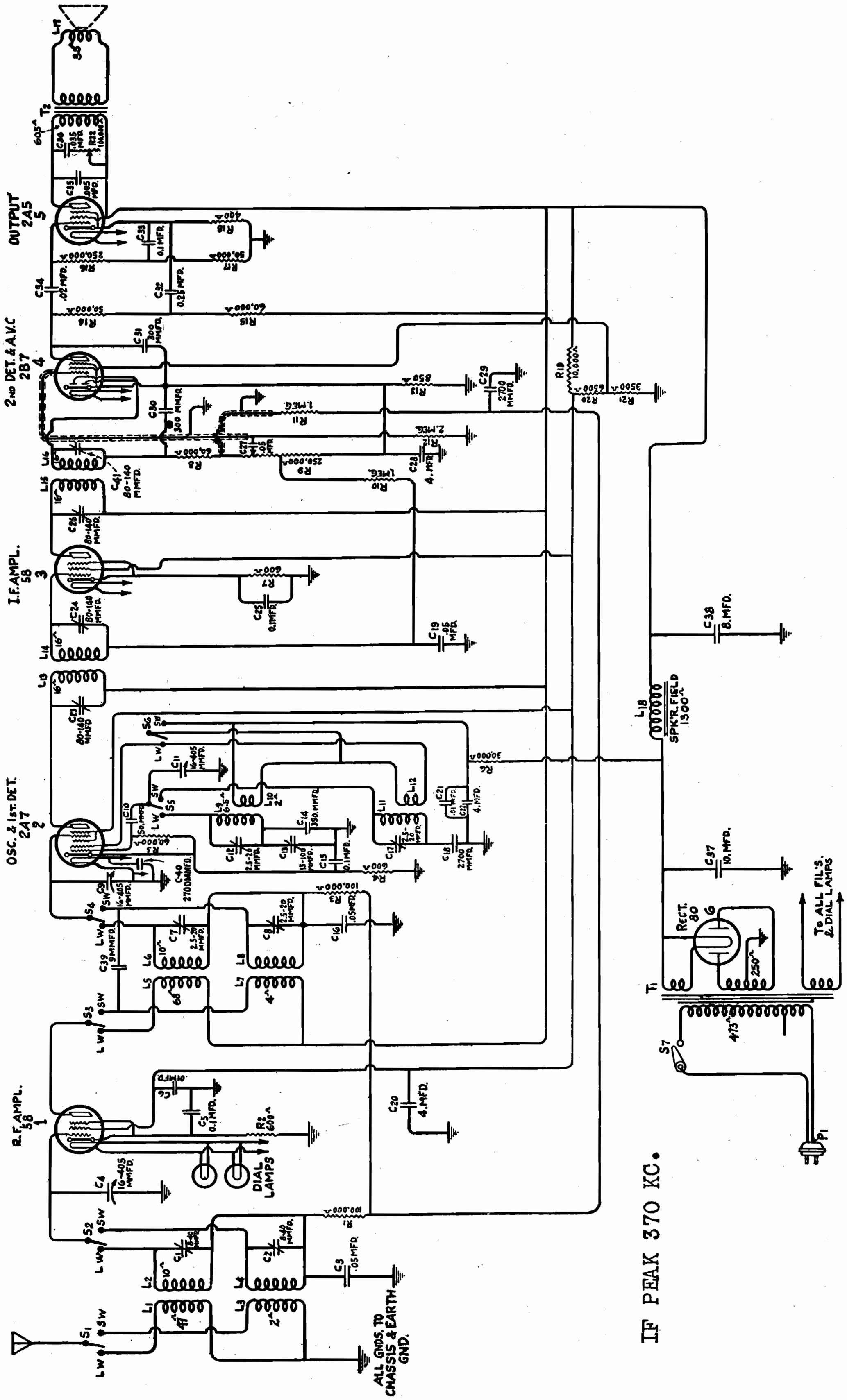



*Figure B—Wiring Diagram*

MODEL 221
Schematic

# RCA-VICTOR CO., INC.




IF PEAK 370 KC.

*Figure A—Schematic Circuit Diagram*

MODEL 221
Parts List

RCA-VICTOR CO., INC.

# REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | **RECEIVER ASSEMBLIES** | |
| 2240 | Resistor — 30,000 ohms — Carbon type — 1 watt (R6) | |
| 2747 | Cap—Contact cap | |
| 3056 | Shield—2nd detector Radiotron shield | |
| 3076 | Resistor—1 megohm—Carbon type—½ watt (R10, R11) | |
| 3252 | Resistor—100,000 ohms—Carbon type—½ watt (R1, R3) | |
| 3470 | Resistor—6,500 ohms—Carbon type—1 watt (R20) | |
| 3514 | Resistor—250,000 ohms—Carbon type—½ watt (R16) | |
| 3529 | Socket—Dial lamp socket | |
| 3572 | Socket—7-contact Radiotron socket | |
| 3594 | Resistor—50,000 ohms—Carbon type—½ watt (R14, R17) | |
| 3631 | Resistor—850 ohms—Carbon type—½ watt (R13) | |
| 3639 | Capacitor—.02 mfd. (C34) | |
| 3683 | Shield—Radiotron shield top | |
| 3701 | Capacitor—.01 mfd. (C6, C21) | |
| 3702 | Capacitor—.25 mfd. (C32) | |
| 3768 | Screw—Square head No. 6–32–¼" set screw for condenser drive | |
| 3796 | Capacitor—4. mfd. (C28) | |
| 3849 | Capacitor—50 mmfd. (C10) | |
| 3859 | Socket—4-contact Radiotron socket | |
| 3861 | Capacitor—Adjustable capacitor (C13) | |
| 3877 | Capacitor—.1 mfd. (C5, C15, C25, C33) | |
| 3878 | Screw—No. 4–40–3/16" screw for fastening station selector pointer | |
| 3888 | Capacitor—.05 mfd. (C19, C27) | |
| 3892 | Resistor—600 ohms—Carbon type—½ watt (R2, R4, R7) | |
| 3897 | Resistor—400 ohms—Carbon type—1 watt (R18) | |
| 3901 | Capacitor—.05 mfd. (C3, C16) | |
| 3905 | Screw—Chassis mounting screw assembly comprising 4 screws, 4 washers, and 4 cushions | |
| 3906 | Mounting assembly — Variable condenser mounting assembly comprising 3 bushings, 3 lockwashers, 3 nuts, and 3 washers | |
| 3937 | Capacitor—300 mmfd. (C30, C31) | |
| 3938 | Capacitor—9 mmfd. (C39) | |
| 3939 | Resistor — 3,500 ohms — Carbon type — ½ watt (R21) | |
| 3942 | Shield—1st detector Radiotron shield | |
| 3943 | Screen—Translucent screen for dial light | |
| 3944 | Shield—Antenna, R. F. or oscillator coil shield | |
| 3991 | Resistor—10,000 ohms—Porcelain type (R19) | |
| 4031 | Capacitor—2,700 mmfd. (C18, C29, C40) | |
| 4032 | Capacitor—390 mmfd. (C14) | |
| 4075 | Knob—Range switch or tone control knob | |
| 4119 | Screw—No. 8–32–¼" headless cup point set screw for station selector knob | |
| 4120 | Knob—Volume control knob | |
| 4121 | Knob—Station selector knob | |
| 6188 | Resistor—2 megohm—Carbon type—½ watt (R12) | |
| 6282 | Resistor—60,000 ohms—Carbon type—½ watt (R5, R8, R15) | |
| 6571 | Capacitor—10 mfd. (C37) | |
| 6614 | Glass—Station selector dial glass | |
| 6615 | Ring—Retaining ring for dial glass | |
| 6620 | Capacitor—Comprising one .005 mfd. and one .035 mfd. (C35, C36) | |
| 6676 | Socket—6-contact Radiotron socket—Output | |
| 6694 | Condenser—3-gang variable tuning condenser (C4, C9, C11) | |
| 6695 | Volume control (R9) | |
| 6696 | Switch—Range switch (S1, S2, S3, S4) | |
| 6697 | Transformer—First intermediate frequency transformer (L13, L14, C23, C24) | |
| 6698 | Transformer—Second intermediate frequency transformer (L15, L16, C26, C41) | |
| 6699 | Coil—R. F. coil (L5, L6, L7, L8, C7, C8) | |
| 6700 | Coil—Oscillator coil (L9, L10, L11, L12, C12, C17) | |
| 6701 | Coil—Antenna coil (L1, L2, L3, L4, C1, C2) | |
| 6702 | Drive—Variable tuning condenser drive assembly complete | |
| 6703 | Capacitor pack—Comprising one 8. mfd. and two 4. mfd. capacitors (C20, C22, C38) | |
| 6704 | Shaft—Tuning condenser drive assembly shaft | |
| 6705 | Tone control complete (R22) | |
| 6841 | Dial—Station selector dial | |
| 6842 | Pointer—Station selector pointer | |
| 7485 | Socket—6-contact Radiotron socket | |
| 7487 | Shield—I. F. and R. F. amplifier Radiotron shield | |
| 9446 | Transformer—Power transformer—105–125 volts 50–60 cycles (T1) | |
| 9451 | Transformer—Power transformer—105–125 volts 25–40 cycles | |
| 10194 | Ball—Steel ball for condenser drive assembly | |
| | **REPRODUCER ASSEMBLIES** | |
| 6770 | Transformer—Output transformer (T2) | |
| 6843 | Cable—3-conductor reproducer cable | |
| 8935 | Cone—Reproducer cone (L17) | |
| 9460 | Coil—Field coil, Magnet and cone support (L18) | |
| 9461 | Reproducer complete | |

# RCA VICTOR MODEL 223
## SERVICE NOTES

### Electrical Specifications

Voltage Rating...............26–40 Volts D. C.
Power Consumption.........60 Watts at 32 Volts
Number and Types of Radiotrons.....2 RCA-6D6, 1 RCA-6A7, 1 RCA-6B7, 1 RCA-38, 1 RCA-84 —Total, 6
Type of Ballast Lamp..............Amperite 5-16
Undistorted Output....1.1 Watts (Max. 1.6 Watts)
Tuning Frequency Range.....540 K. C.–1500 K. C. and 1400 K. C.–2800 K. C.

This receiver is a six-tube, 32-volt D. C. superheterodyne designed primarily for operation from 32-volt farm lighting circuits. Excellent sensitivity and selectivity, large undistorted output and excellent tone quality are inherent features of this receiver. Other outstanding features include 10-inch electro-dynamic loudspeaker, wide tuning range (police, aviation and broadcast), ballast lamp for voltage fluctuations, and a separate power supply with a newly designed filter units.

Figure 1 shows the schematic circuit diagram, Figures 2 and 3 the chassis and power unit wiring, and Figure 5 the assembly wiring diagram. The replacement parts are given on page 9.

### Description of Circuit

The circuit of this receiver is similar in many ways to the usual six-tube superheterodyne, although the power supply differs in several respects. Chiefly among the differences is the use of a vibrator interrupter for obtaining alternating current and a tube rectifier for rectifying it at a higher voltage.

The R. F. stage uses Radiotron RCA-6D6, which is a six-volt heater type super-control R. F. amplifying tube. The function of this stage is to select and amplify the desired incoming signal and apply it to the first detector.

The next tube is a combined oscillator-detector which is known as the RCA-6A7 and which provides a local signal and a detector for obtaining an I. F. frequency. The local oscillator, due to the bridge circuits used, provides a signal that has a constant frequency difference from the incoming R. F. signal (175 K. C. higher) at all points throughout the tuning range. The detector portion of the tube serves to extract the beat frequency from the combined signals (oscillator and signal) and apply it to the grid of the I. F. stage.

The plate circuit of the first detector and the grid and plate circuits of the I. F. tube are all tuned by means of small adjustable capacitors to 175 K. C. This group of tuned circuits, together with the R. F. circuits, provides the high selectivity of the receiver. Radiotron RCA-6D6 is used in the I. F. stage.

Radiotron RCA-6B7 is used as a diode second detector, automatic volume control and audio amplifier. The D. C. component of the rectified I. F. signal on the second detector diode is used for automatic bias on the R. F., first detector and I. F. tubes. The audio component of the rectified signal is applied to the pentode section of the RCA-6B7 for further amplification at audio frequencies.

The output of the second detector is applied to the grid of Radiotron RCA-38, pentode output amplifier. Resistance coupling is used between the detector and the output tube while a step-down transformer serves as an impedance matching device between the plate circuit of the RCA-38 and the voice coil of the loudspeaker.

Field excitation for the loudspeaker is obtained by connecting it directly across the 32-volt direct current supply. Heater excitation for the tubes described is obtained by connecting them in series and placing the entire circuit across the 32-volt line.

Plate and grid voltages for all tubes are obtained from a special plate supply unit which consists of a vibrator, a tube rectifier, a thermal voltage regulator and a special filter network for reducing hum or vibrator interference to a negligible degree. The purpose of the vibrator is to interrupt the direct current and apply it first in one direction and then in the opposite direction across individual sections of the primary of the power transformer. The transformer steps the voltage up several times and applies it to the plates of the full-wave rectifier, Radiotron RCA-84. The filament of this tube is connected in series with the Amperite 5-16 voltage regulating tube. This regulating tube maintains a constant current through the rectifier filament over a wide variation of line voltages.

The range switch provides a quick means of shifting from one frequency band to the other. The regular band covers from 540 K. C. to 1500 K. C., while the police band covers from 1400 K. C. to 2800 K. C. This shift is accomplished in the following manner.

A tap is provided on the grid coils of the R. F. and first detector circuits. Also additional coupling capacitors are connected from the antenna to the R. F. grid and from the R. F. plate to the first detector grid. In the oscillator, R. F. and detector circuits, an extra trimmer capacitor is available for paralleling to the main tuning condenser. The effect of these various taps and capacitors is to change the tuning range as follows:

1. At the broadcast position all of the additional circuits are open as shown in Figure 1.

2. At the police band position, all of the additional switches are closed. Shorting of turns in the grid coils reduces their inductance so that the tuning capacitors cover the high frequency range. Connecting the two coupling capacitors increases the coupling and thereby the sensitivity at the higher frequency position. The trimmer capacitor on the oscillator circuit provides proper tracking with the R. F. circuits.

### Line-up Adjustments

Inoperation, poor tone quality, or lack of proper sensitivity and selectivity are direct results of lack of alignment. In event the receiver is to be aligned, carefully use the following procedure:

I. F. TUNING ADJUSTMENTS—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure 4. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 4160 and an output meter. Test Oscillator, Stock No. 9050, is suitable and recommended for making these adjustments.

(b) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. AND OSCILLATOR ADJUSTMENTS—The three-gang capacitor screws are accessible at the bottom of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 and 2440 K. C. (Stock No. 9050), a non-metallic screwdriver such as Stock No. 4160, and an output meter.

(b) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the last division. Then set the dial at 140, the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) With the Range Switch at the counter-clockwise position, adjust the three tuning condenser line-up capacitors until maximum deflection is obtained in the output meter. Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 120. The three line-up capacitors located on the Range Switch should then be adjusted for maximum output.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position. Also the minimum input signal necessary from the oscillator will permit a more accurate adjustment.

## TUBE SOCKET VOLTAGES

**32-Volt D.C. Input — No Signal — Volume Control at Minimum**

| RADIOTRON No. | CATHODE TO GROUND, VOLTS | CATHODE TO SCREEN GRID, VOLTS | CATHODE TO PLATE, VOLTS | PLATE CURRENT M. A | HEATER VOLTS |
|---|---|---|---|---|---|
| RCA-6D6 R. F. | 8.4 | 77 | 216 | 4.2 | 6.2 |
| RCA-6A7—Osc. Det. | 9.7 | 76 | 215 | 6.5 | 6.2 |
| RCA-6D6 I. F. | 8.4 | 77 | 216 | 4.2 | 6.2 |
| RCA-6B7—2nd Det. | 5.7 | 80 | 52 | 1.9 | 6.2 |
| RCA-38 Pwr. | 19.5 | 205 | 197 | 21.5 | 6.2 |
| RCA-84 Rect. | 244 | | | 50 | 6.5–7.0* |

*Varies with ballast tubes and with time.

MODEL 223
Noise Suppression
Assembly Wiring

RCA-VICTOR CO., INC.

## SUPPRESSION OF GENERATOR AND IGNITION INTERFERENCE

Operating this receiver while the 32-volt generator is running may present difficulties caused by the radiation of radio-frequency interference from the generator and gasoline engine. This interference usually travels over the lighting lines and is picked up by the antenna system of the receiver. There are two methods of reducing this interference, both of which may be required in bad cases.

1. Suppression of the interference at its source by means of the accessories furnished with the receiver.
2. Placing the antenna in such a position that the interference will not be picked up, and using a Stock No. 7718 Shield Kit for transmitting the signal from the antenna to the receiver without picking up noise on the lead-in.

Figure 4 shows a typical installation of the suppression equipment. This equipment is connected as follows:

Suppressor:—In single-cylinder installations, the suppressor is connected to the spark-plug for the suppression of the high-tension interference generated at this point. In twin-cylinder installations, the single-distributor type suppressor should be installed and should eliminate this interference. However, in some cases it may be necessary to install both distributor and plug suppressors.

Generator Capacitor:—A capacitor is connected from each brush of the generator to the generator frame, which must be grounded. This reduces the interference caused by sparking at the commutator of the generator. If excessive sparking occurs, it is very unlikely that the capacitors will reduce the noise sufficiently. In this case, the commutator must be thoroughly cleaned and sanded and the brushes reseated. In bad cases it is usually best to clean the foreign matter from between the commutator segments by means of a three-cornered file, and then sand the commutator by placing the sand-paper around a small block and holding it squarely against the commutator while it is running. *Never use emery cloth.*

Coil Capacitor:—Some installations will require a capacitor connected from the battery side of the ignition coil to ground. This reduces the interference caused by the primary breaker.

Grounds:—It is important that the frame of the generator be thoroughly grounded. A steel ground-rod, driven at least six feet in moist earth, provides a good ground. In event one side of the line is grounded, it is important that the ground be a good one. The ground should be applied at the generator, at the point where the line enters the building where the radio receiver is located and at the extreme far end of the line.

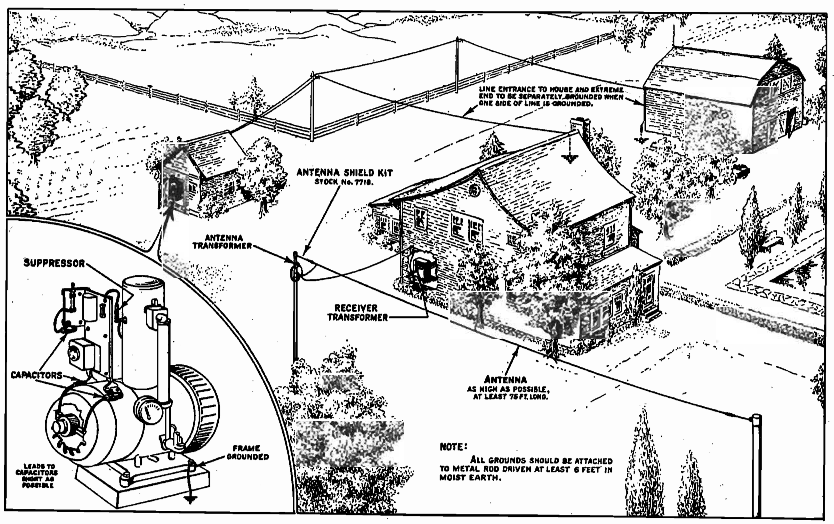



*Figure 4—Typical Installation showing suppression equipment and proper antenna system*

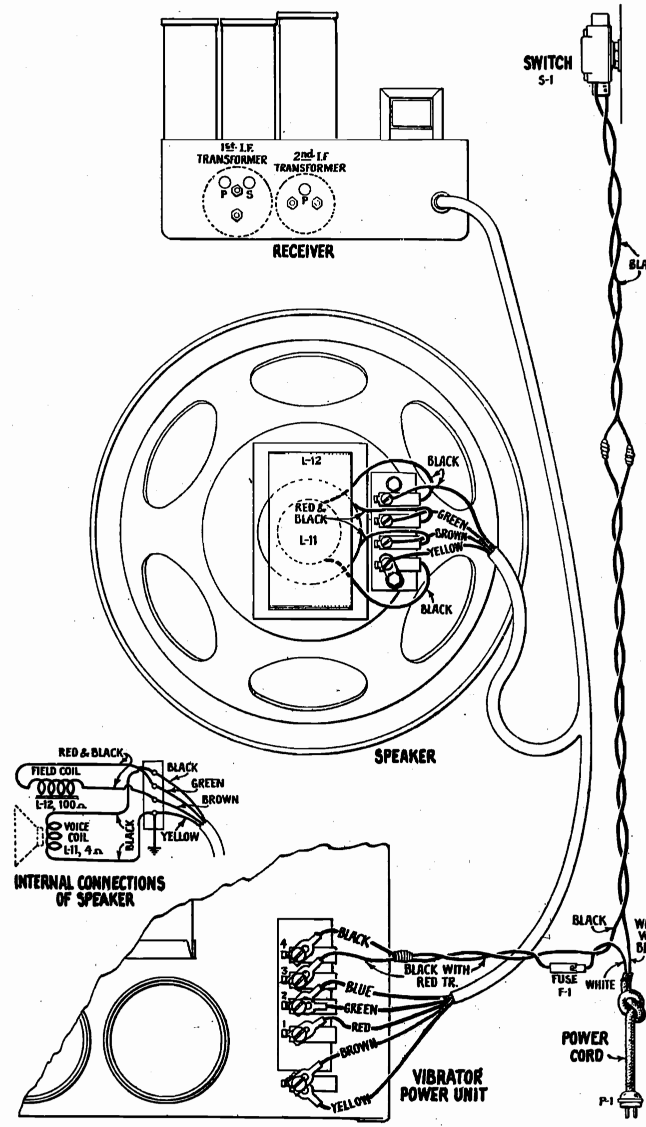



*Figure 5—Assembly Wiring Diagram*

**MODEL 223**
**Schematic**

# RCA-VICTOR CO., INC.

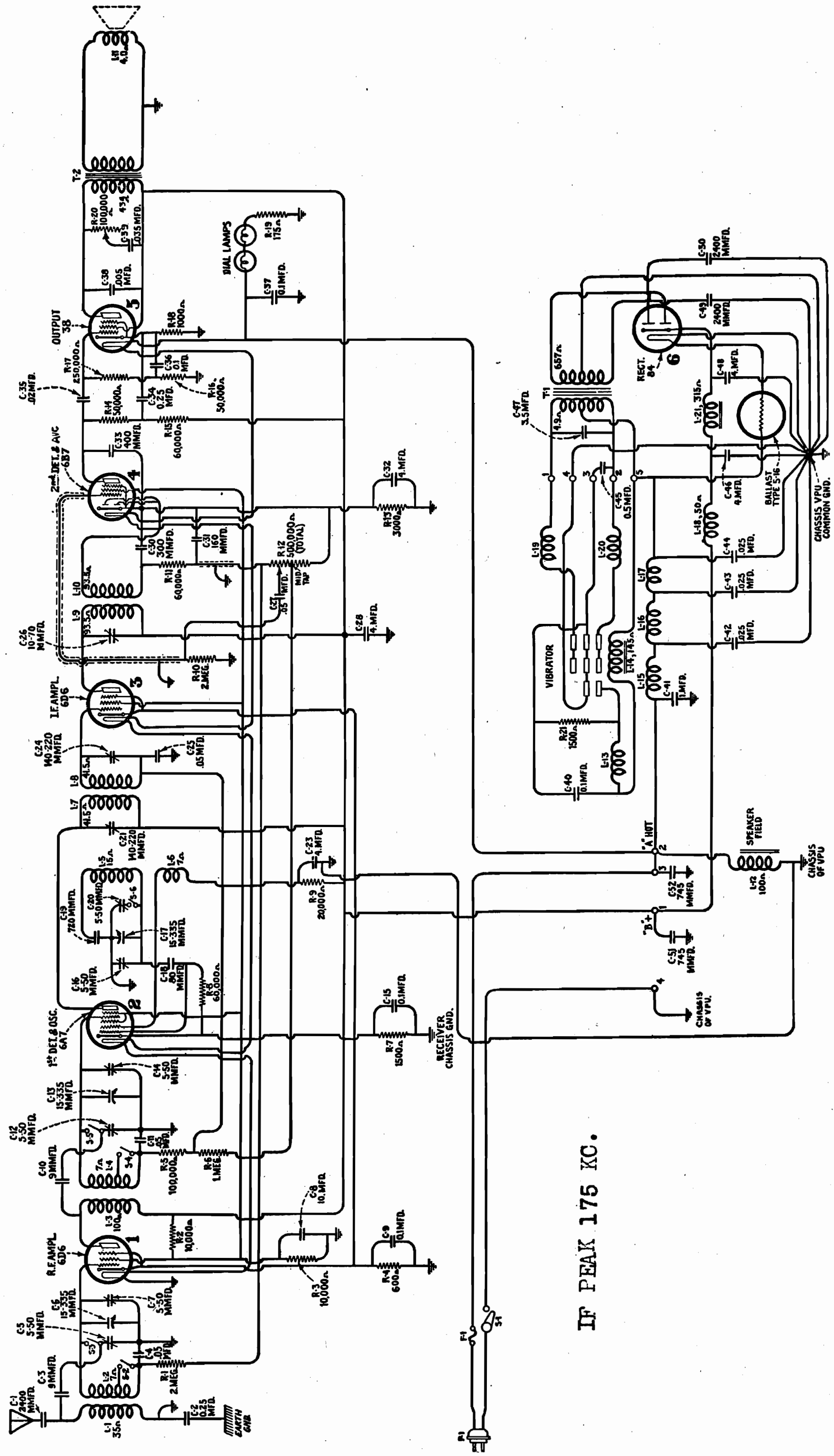



*Figure 1—Schematic Circuit Diagram*

MODEL 223
Chassis Wiring

RCA-VICTOR CO., INC.

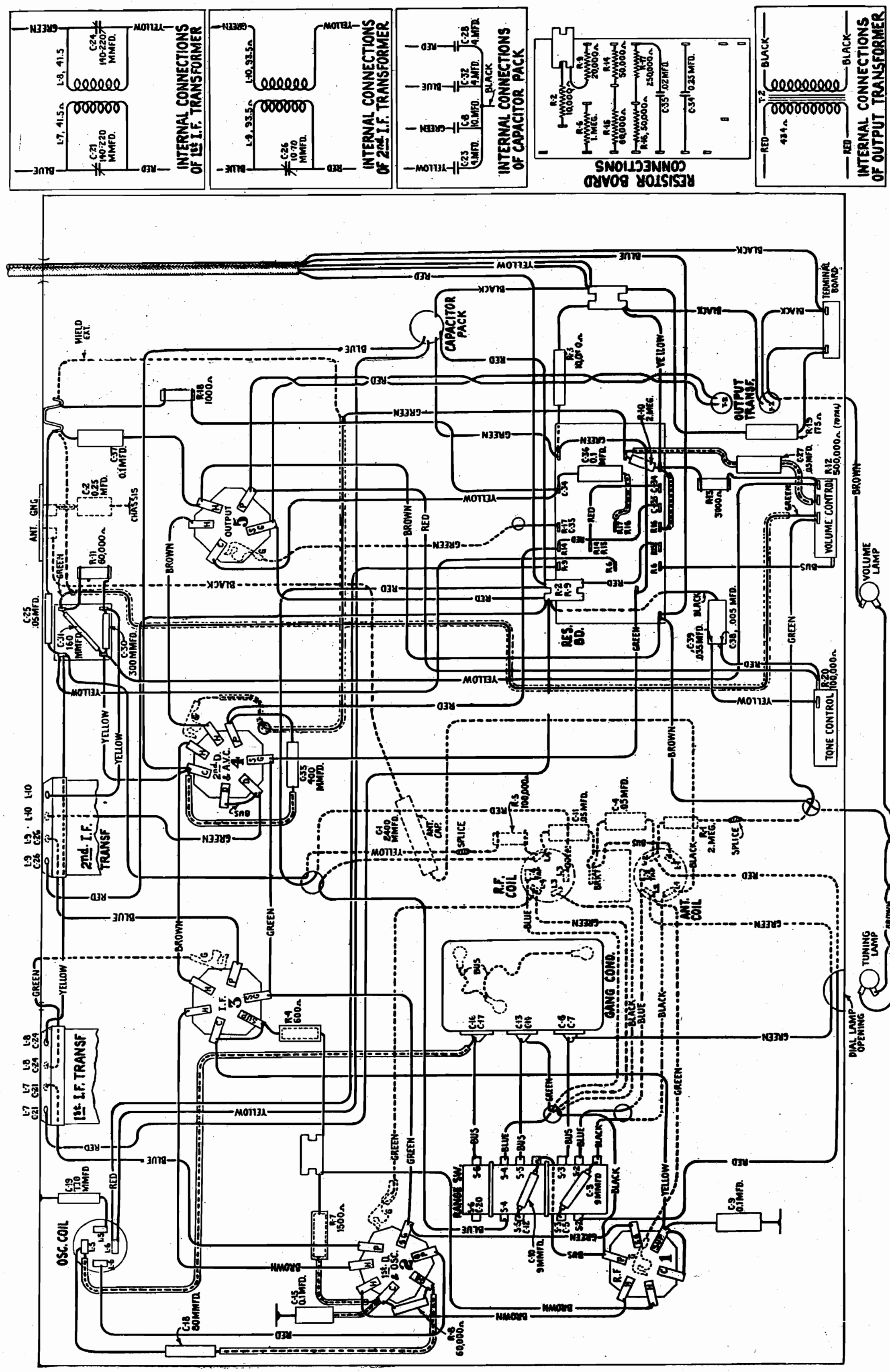



Figure 2—Chassis Wiring Diagram

MODEL 223
SPU Chassis Wiring

RCA-VICTOR CO., INC.

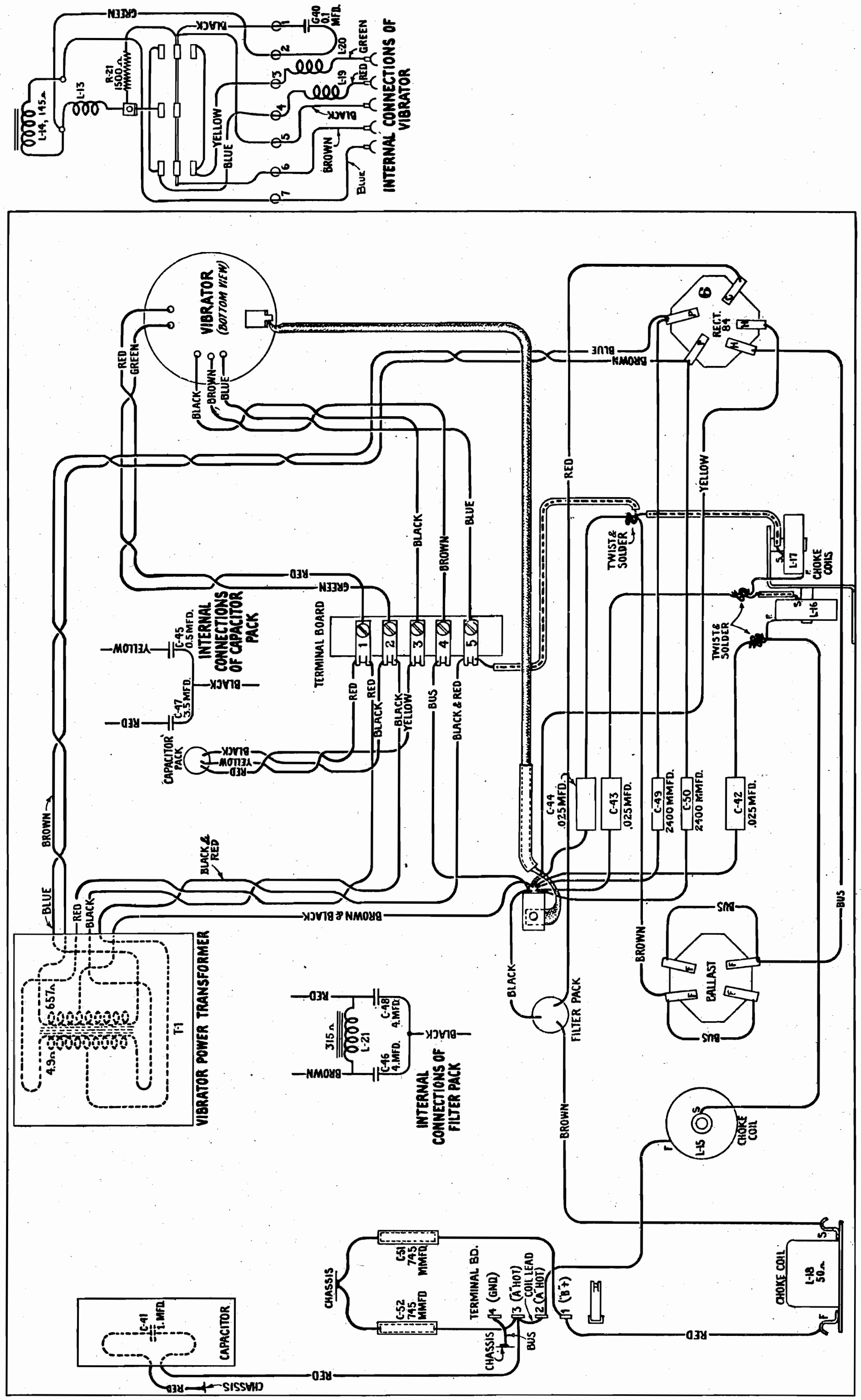



Figure 3—Power Unit Wiring Diagram

MODEL 223
Parts List

RCA-VICTOR CO., INC.

# REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | Description | List Price |
|---|---|---|
| | RECEIVER ASSEMBLIES | |
| 2816 | Resistor — 1,000 ohms — Carbon type — ½ watt (R18)—Package of 5 | $1.00 |
| 3047 | Resistor — 1,500 ohms — Carbon type — ½ watt (R7)—Package of 5 | 1.00 |
| 3076 | Resistor—1 megohm—Carbon type—½ watt (R6)—Package of 5 | 1.00 |
| 3252 | Resistor—100,000 ohms—Carbon type—½ watt (R5)—Package of 5 | 1.00 |
| 3358 | Resistor — 3,000 ohms — Carbon type — ½ watt (R13)—Package of 5 | 1.00 |
| 3514 | Resistor—250,000 ohms—Carbon type—½ watt (R17)—Package of 5 | 1.00 |
| 3572 | Socket—Contact Radiotron socket | .38 |
| 3584 | Ring—Antenna, R. F. or oscillator coil retaining ring—Package of 5 | .40 |
| 3594 | Resistor—50,000 ohms—Carbon type—½ watt (R14, R16)—Package of 5 | 1.00 |
| 3597 | Capacitor—.25 mfd. (C34) | .40 |
| 3602 | Resistor—60,000 ohms—Carbon type—¼ watt (R8, R11)—Package of 5 | 1.00 |
| 3616 | Capacitor—300 mmfd. (C30) | .34 |
| 3622 | Shield—Antenna or R. F. coil shield | .36 |
| 3624 | Socket—Dial lamp socket and bracket | .40 |
| 3625 | Scale—Volume indicator scale assembly | .40 |
| 3626 | Shield—Oscillator coil shield | .22 |
| 3630 | Resistor—10,000 ohms—Carbon type—3 watt (R2, R3) | .25 |
| 3634 | Capacitor—160 mmfd. (C31) | .34 |
| 3639 | Capacitor—.02 mfd. (C35) | .25 |
| 3750 | Capacitor—.25 mfd. (C2) | .36 |
| 3783 | Capacitor—9 mmfd. (C3, C10)—Package of 2 | .50 |
| 3877 | Capacitor—.1 mfd. (C9, C15, C36, C37) | .32 |
| 3888 | Capacitor—.05 mfd. (C4, C11, C25, C27) | .25 |
| 3892 | Resistor—600 ohms—Carbon type—½ watt (R4)—Package of 5 | 1.00 |
| 3993 | Screw—Set screw for volume control dial Package of 10 | .25 |
| 4046 | Resistor—2 megohm—Carbon type—½ watt (R1)—Package of 5 | 1.00 |
| 4142 | Mounting assembly for receiver chassis—Comprising 8 cushions, 8 washers, 4 spacers, 4 lockwashers and 4 screws | .38 |
| 4143 | Capacitor—2400 mmfd. (C1) | .25 |
| 4144 | Clamp—Capacitor mounting clamp—Package of 5 | .20 |
| 4145 | Shield—Radiotron shield | .30 |
| 4181 | Capacitor—720 mmfd. (C19) | .30 |
| 4182 | Capacitor—80 mmfd. (C18) | .25 |
| 4183 | Capacitor—400 mmfd. (C33) | .26 |
| 4184 | Capacitor pack—Comprising one .035 and one .005 mfd. capacitors (C38, C39) | .30 |
| 4185 | Resistor—175 ohms—Wire wound (R19) | .78 |
| 6242 | Resistor — 2 megohms — Carbon type — ¼ watt (R10)—Package of 5 | 1.00 |
| 6282 | Resistor—60,000 ohms—Carbon type—½ watt (R15)—Package of 5 | 1.00 |
| 6303 | Resistor—20,000 ohms—Carbon type—½ watt (R9)—Package of 5 | 1.00 |
| 6471 | Coil—Oscillator coil (L5, L6) | .74 |
| 6483 | Transformer—First intermediate frequency transformer (L7, L8, C21, C24) | 1.84 |
| 6484 | Transformer—Second intermediate frequency transformer (L9, L10, C26) | 1.70 |
| 6485 | Volume control with mounting nut (R12) | $1.20 |
| 6527 | Coil—Antenna coil (L1, L2) | 1.08 |
| 6528 | Coil—R. F. coil (L3, L4) | .94 |
| 6534 | Switch—Range switch (S2, S3, S4, S5, S6, C5, C12, C20) | 1.25 |
| 6598 | Condenser—3-gang variable tuning condenser (C6, C7, C13, C14, C16, C17) | 3.00 |
| 6622 | Dial—Station selector dial scale and drive assembly | .95 |
| 6859 | Capacitor—Comprising three 4 mfd. and one 10 mfd. capacitors (C8, C23, C28, C32) | 2.85 |
| 6860 | Tone control with mounting nut (R20) | 1.15 |
| 6851 | Transformer—Output transformer (T2) | 1.36 |
| 7484 | Socket—5-contact Radiotron socket | .35 |
| 7485 | Socket—6-contact Radiotron socket | .40 |
| | VIBRATOR POWER UNIT ASSEMBLIES | |
| 3765 | Capacitor—.025 mfd. (C42, C43, C44) | .34 |
| 3859 | Socket—4-contact Radiotron socket | .30 |
| 3860 | Socket—5-contact Radiotron socket | .32 |
| 4145 | Shield—Radiotron shield—Rectifier | .30 |
| 4148 | Suspension assembly—Comprising one bolt assembly, one "C" washer, two cup washers, two springs, two damping bushings | .40 |
| 4150 | Clamp assembly—Vibrator mounting clamp assembly | .22 |
| 4186 | Capacitor—2400 mmfd. (C49, C50) | .28 |
| 4187 | Capacitor—745 mmfd. (C51, C52) | .25 |
| 6862 | Filter pack—Comprising one reactor and two 4.0 mfd. capacitors (C46, C48, L21) | 3.34 |
| 6863 | Capacitor—Comprising one 3.5 mfd. and one .5 mfd. capacitors (C45, C47) | 3.46 |
| 6864 | Tube—Regulator tube | 3.00 |
| 6865 | Shield—Regulator tube shield | .22 |
| 6866 | Coil—Line R. F. choke coil (L15) | .96 |
| 6867 | Coil—Line R. F. choke coil | .54 |
| 6868 | Coil—Line R. F. choke coil (L16) | .78 |
| 6869 | Capacitor—1.0 mfd. capacitor (C41) | .88 |
| 6870 | Shield—Outer shield with felt pad for vibrator assembly | .60 |
| 6871 | Coil—Filter coil (L18) | .76 |
| 7734 | Transformer—Power transformer (T1) | 3.60 |
| 7735 | Vibrator complete (L13, L14, L19, L20, C40, R21) | 8.20 |
| | REPRODUCER ASSEMBLIES | |
| 4149 | Shield—Terminal board shield | .20 |
| 8935 | Cone—Reproducer cone (L11) Package of 5 | 5.25 |
| 9474 | Reproducer complete | 7.10 |
| 9475 | Coil—Field coil magnet and cone support (L12) | 4.55 |
| | MISCELLANEOUS PARTS | |
| 3592 | Knob—Station selector—Volume control or tone control knob—Package of 5 | .80 |
| 3615 | Knob—Range switch knob—Package of 5 | .60 |
| 3881 | Escutcheon—Station selector escutcheon | .42 |
| 3899 | Escutcheon—Volume control escutcheon | .42 |
| 4292 | Capacitor—Generator capacitor—.5 mfd. | .90 |
| 6151 | Suppressor—Spark plug suppressor | .56 |
| 6152 | Suppressor—Distributor suppressor | .56 |
| 6516 | Connector—Fuse connector complete | .16 |

RCA-VICTOR CO., INC.

# DESCRIPTION OF ELECTRICAL CIRCUIT

The general circuit arrangement consists of an R. F. stage, a combined oscillator and first detector, and I. F. stage, a combined second detector and automatic volume control, an audio stage, a push-pull driver stage and a push-pull Pentode output stage. Plate and grid voltages are supplied by the RCA-5Z3 heavy duty rectifier combined with a suitable filtering stage, of which the loudspeaker field is a part. Figures 1 and 2 show the schematic circuit diagrams.

The signal enters the receiver through a shielded antenna lead and is applied to the grid of the R. F. tube through the antenna coupling transformer. The secondary of this transformer is tuned to the signal frequency by means of one unit of the gang-capacitor. The output of this stage is transformer coupled to the grid circuit of the first detector, which is also tuned to the signal frequency by a unit of the gang-capacitor.

Combined with the signal in the first detector is the local oscillator signal, which is always at a 460 KC frequency difference (higher) from the signal frequency. A separate coil system and the third unit of the gang-capacitor are used in the oscillator circuit.

In conjunction with these three tuned circuits it is well to point out that five different groups of tuned circuits are used, one group for each tuning band. A five-position selector switch is provided for selecting the band in which the desired signal is located. In addition to selecting the desired coil system, additional groups of contacts are provided for short-circuiting the preceding lower frequency R. F. and detector coils and the two preceding oscillator coils. This is to prevent "dead" spots due to absorption effects caused by the coils, the natural period of which without the gang-capacitor connected falls in the next higher frequency band. This gang-switch also has additional contacts for changing the sensitivity in the various bands.

The sensitivity control in bands X and A controls the R. F. and first detector while in bands B, C and D it controls the R. F., first detector and I. F. stage. This is caused by the action of the selector switch. It should also be noted that the sensitivity control is paralleled with a 500-ohm resistor (R-12, Figure 1) in bands B, C and D.

The output of the first detector, which is the I. F. signal (460 KC), is fed directly through two tuned circuits to the grid of the I. F. amplifier stage. The I. F. stage, which utilizes Radiotron RCA-6D6, uses two transformers, which consist of four tuned circuits, all of which are tuned to 460 KC.

The output of the I. F. amplifier is then applied to the grid of the RCA-76 second detector. The plate of this tube is connected to its cathode and the tube operated as a diode detector and automatic volume control. The direct current component of the rectified signal produces a voltage drop across resistors R-32 and R-17. The voltage drop across both resistors constitutes the automatic bias voltage for the R. F. stage, while the drop across R-17 alone constitutes the bias voltage for the first detector and I. F. stage. These automatic bias voltages for the R. F., first detector and I. F. stages give the automatic volume control action of the receiver. It should be noted that resistor R-33 is connected in parallel across resistors R-32 and R-17. This reduces the total amount of resistance in the circuit to a proper value. Resistor R-34 and capacitor C-43, which are connected in series and from a tap on the volume control to ground, provide low frequency, low volume compensation.

The volume control selects the amount of audio voltage that is applied to the grid of the RCA-76 A. F. stage and thereby regulates the volume of the entire receiver. The first audio stage is coupled through a high and low frequency tone control system and transformer to the grid circuit of the push-pull drive stage. It should be noted that a link has been provided in series with the cathode of this stage, so that phonograph connections may be easily made if required.

The driver stage is transformer coupled to the output stage, which consists of two Radiotrons, RCA-42, connected in push-pull. A feature of the output stage is the use of fixed bias, which reduces distortion and increases the available output. This is accomplished by the use of the drop across R-29, which carries the entire DC output from the rectifier. Naturally the output stage uses but a portion of the total rectified current and current variations in it have but little effect on the drop across the resistor.

The output of the power stage is coupled through a step-down transformer to the voice coil of the loudspeaker. A separate winding, which is shunted by a capacitor, has been provided in this transformer which gives a very sharp, high-frequency cut-off for the entire audio system. This greatly reduces the reproduction of any high-frequency interchannel interference or other disturbance of a high-frequency character which is outside of the useful musical range.

## VARIATIONS IN MODELS

The preceding description of the electrical circuit applies to numerous models of this receiver. However, there are other models in which a change from the foregoing has been made. This change consists of using the section of the band selector switch that formerly changed the sensitivity control, for changing the fidelity in various bands, the sensitivity remaining the same in all bands. This permits the receiver to maintain the utmost fidelity in bands X and A while reducing the low frequency output in bands B, C and D. Such a change results in improved performance.

The sensitivity control in these models operates as formerly in bands X and A. That is, the sensitivity control adjusts the residual bias for the R. F. and first detector stages.

MODEL 262
Schematic with
Sensitivity Change

## RCA-VICTOR CO., INC.

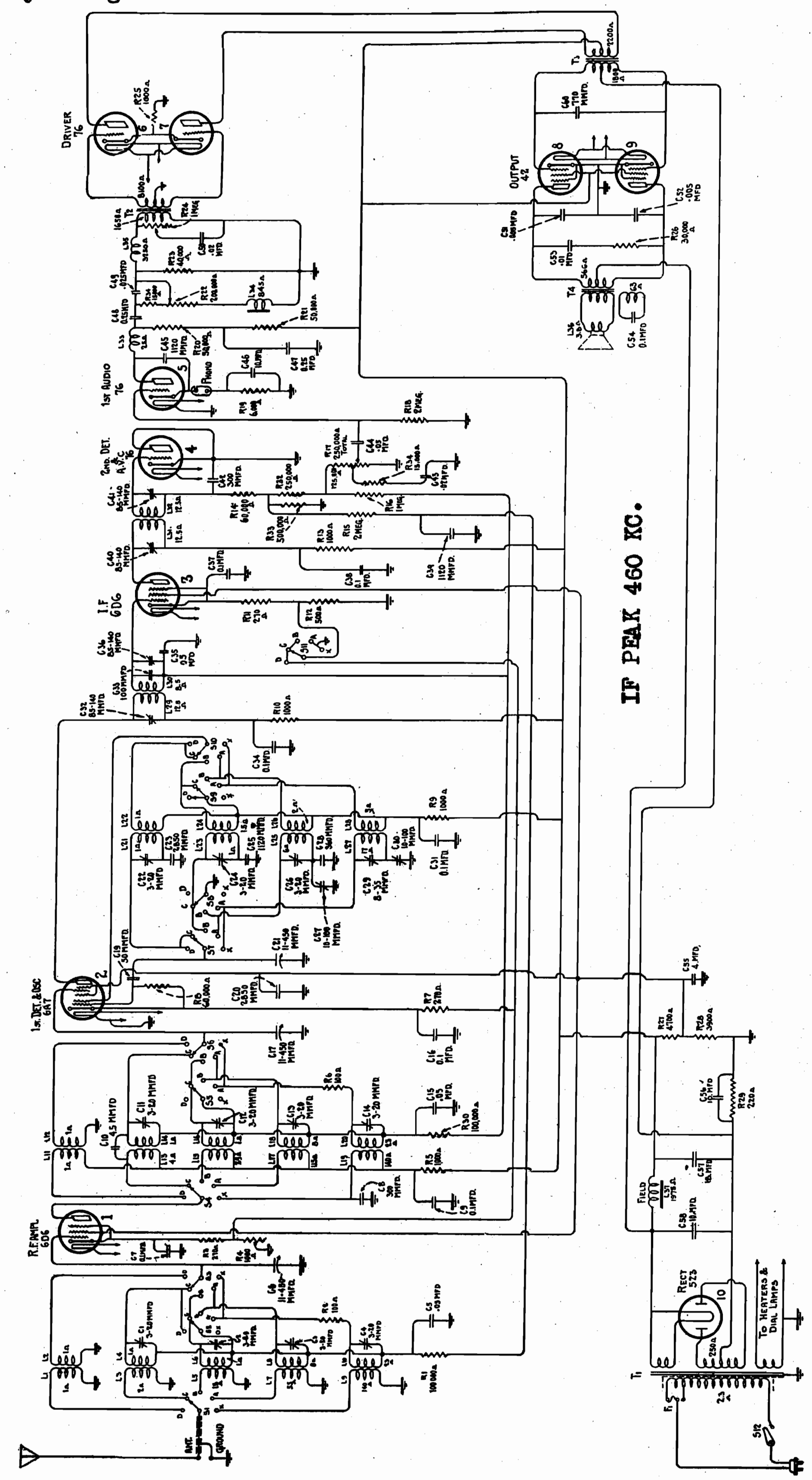



*Figure 1—Schematic Circuit Diagram—Models with sensitivity control change for band position*

**MODEL 262**
**Schematic with Fidelity Change**

# RCA-VICTOR CO., INC.

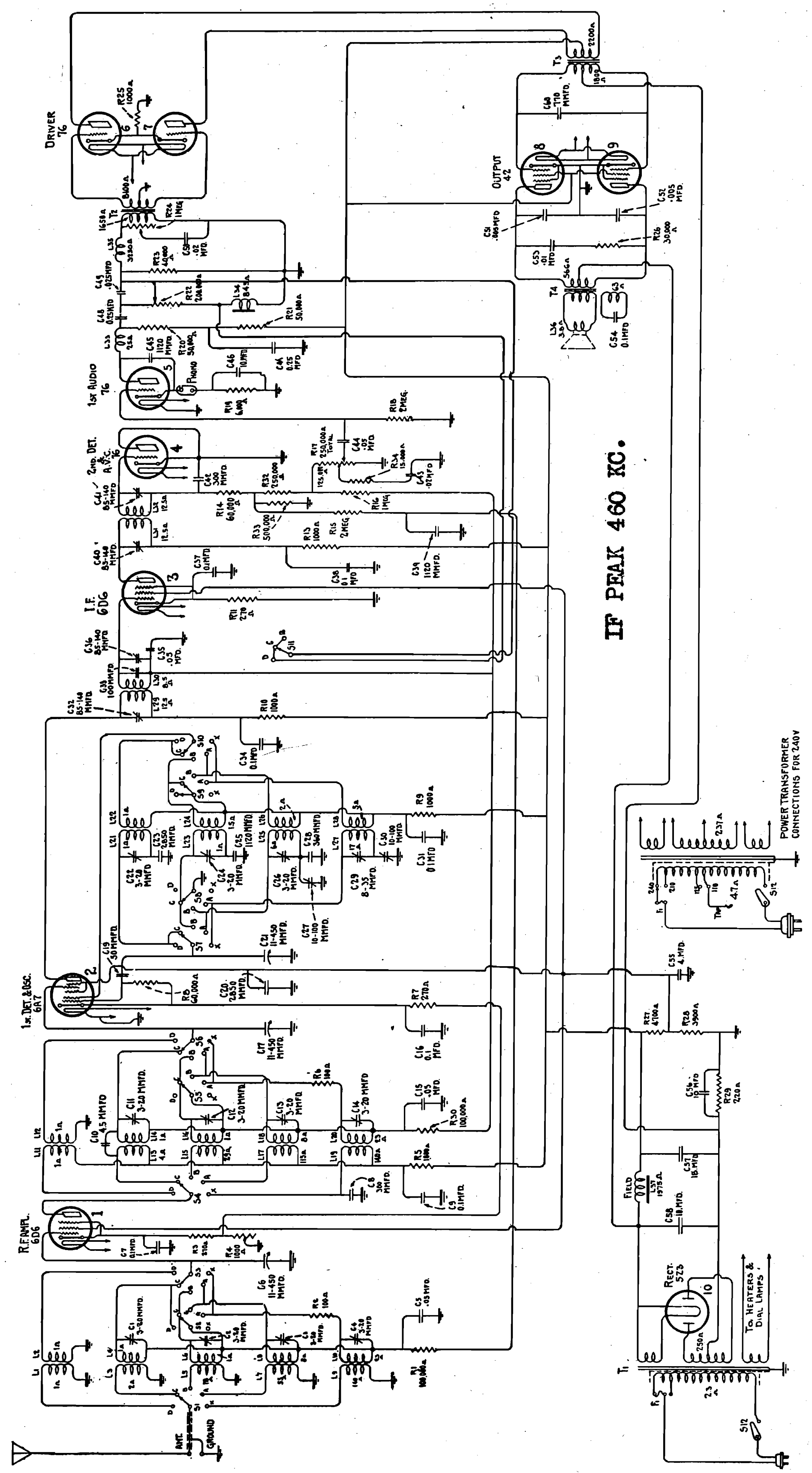



*Figure 2—Schematic Circuit Diagram—Models with fidelity change for band position*

MODEL 262
Chassis Wiring
with Senitivity
Change

# RCA-VICTOR CO., INC.

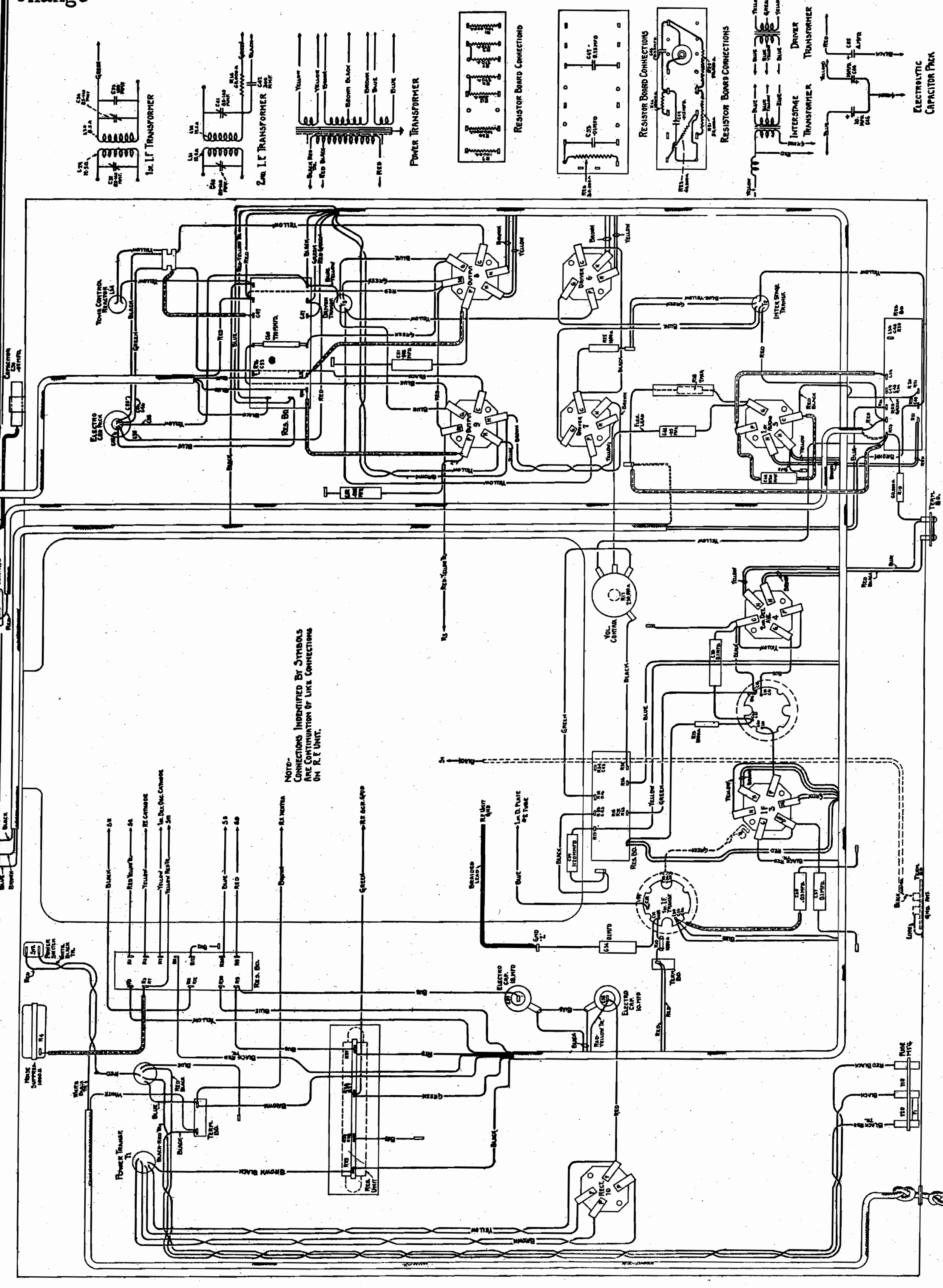


Figure 4—Chassis Wiring Diagram—Models with sensitivity control change for band position

# RCA-VICTOR CO., INC.

**MODEL 262**
**Chassis Wiring with Fidelity Change**

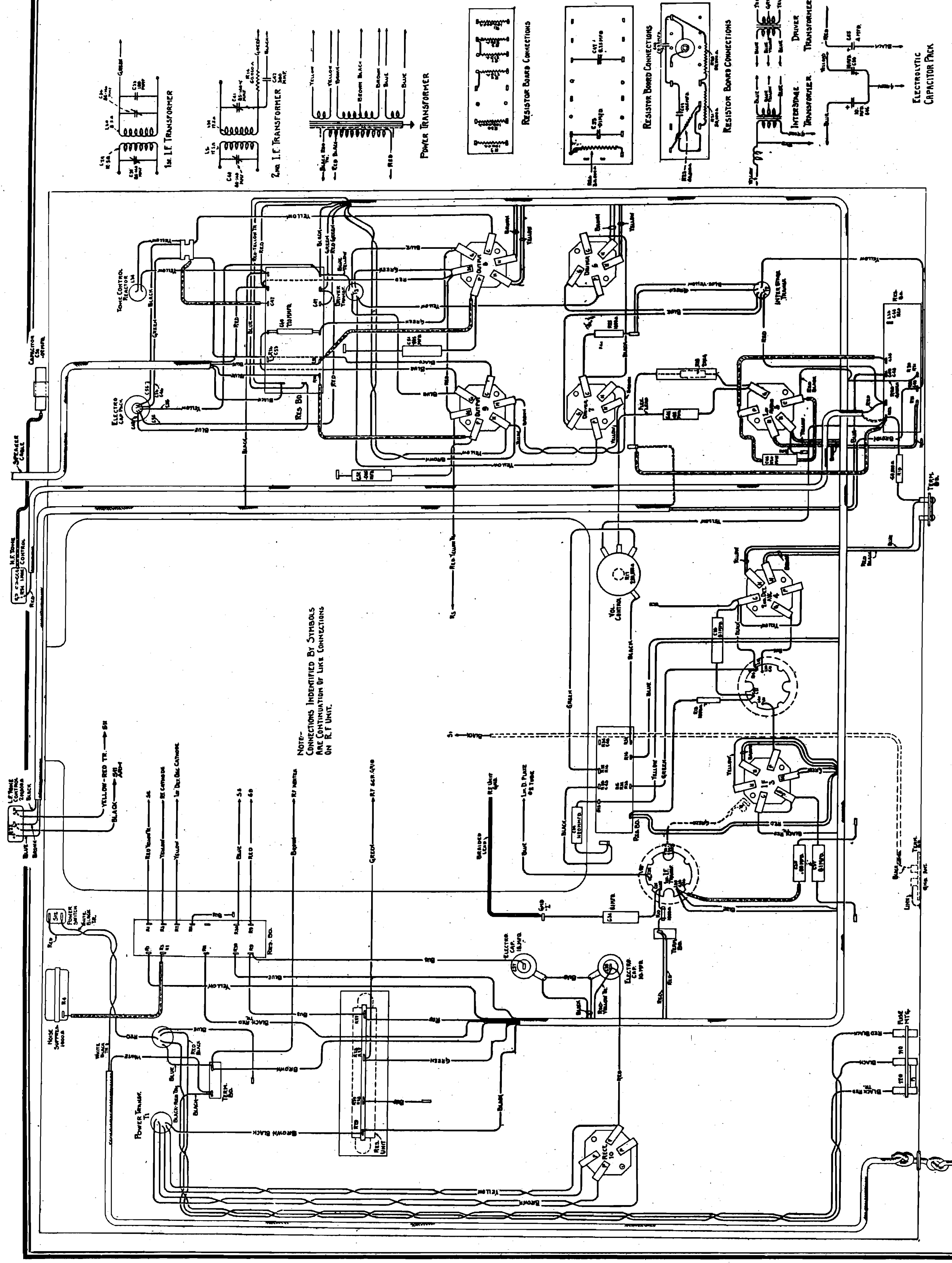


*Figure 6—Chassis Wiring Diagram—Models with fidelity change for band position*

MODEL 262
RF Unit Wiring with
Sensitivity Change

RCA-VICTOR CO., INC.

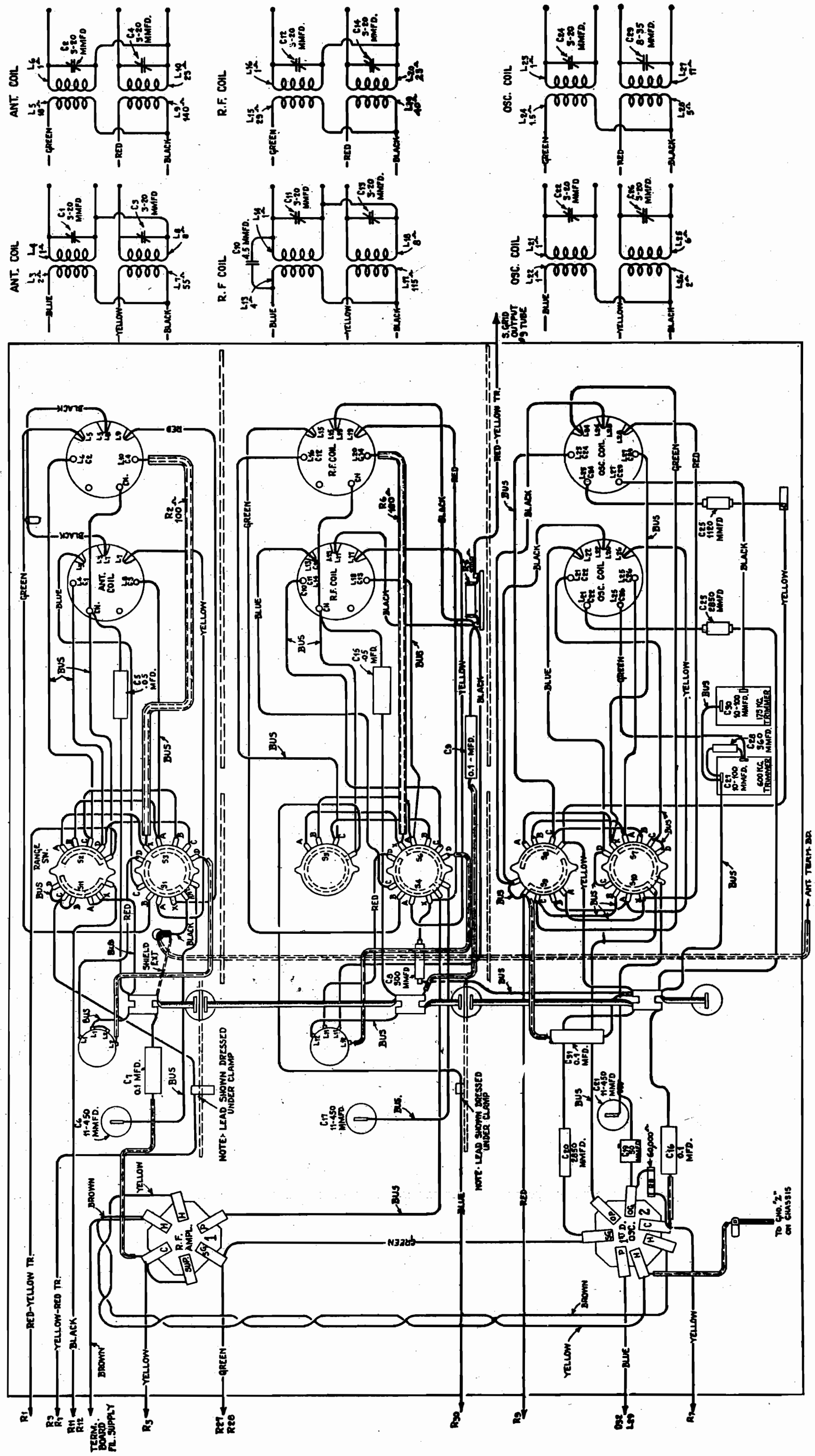


*Figure 8—R. F. Unit Wiring Diagram—Models with sensitivity control change for band position*

RCA-VICTOR CO., INC.

**MODEL 262**
**RF Unit Wiring with Fidelity Change**

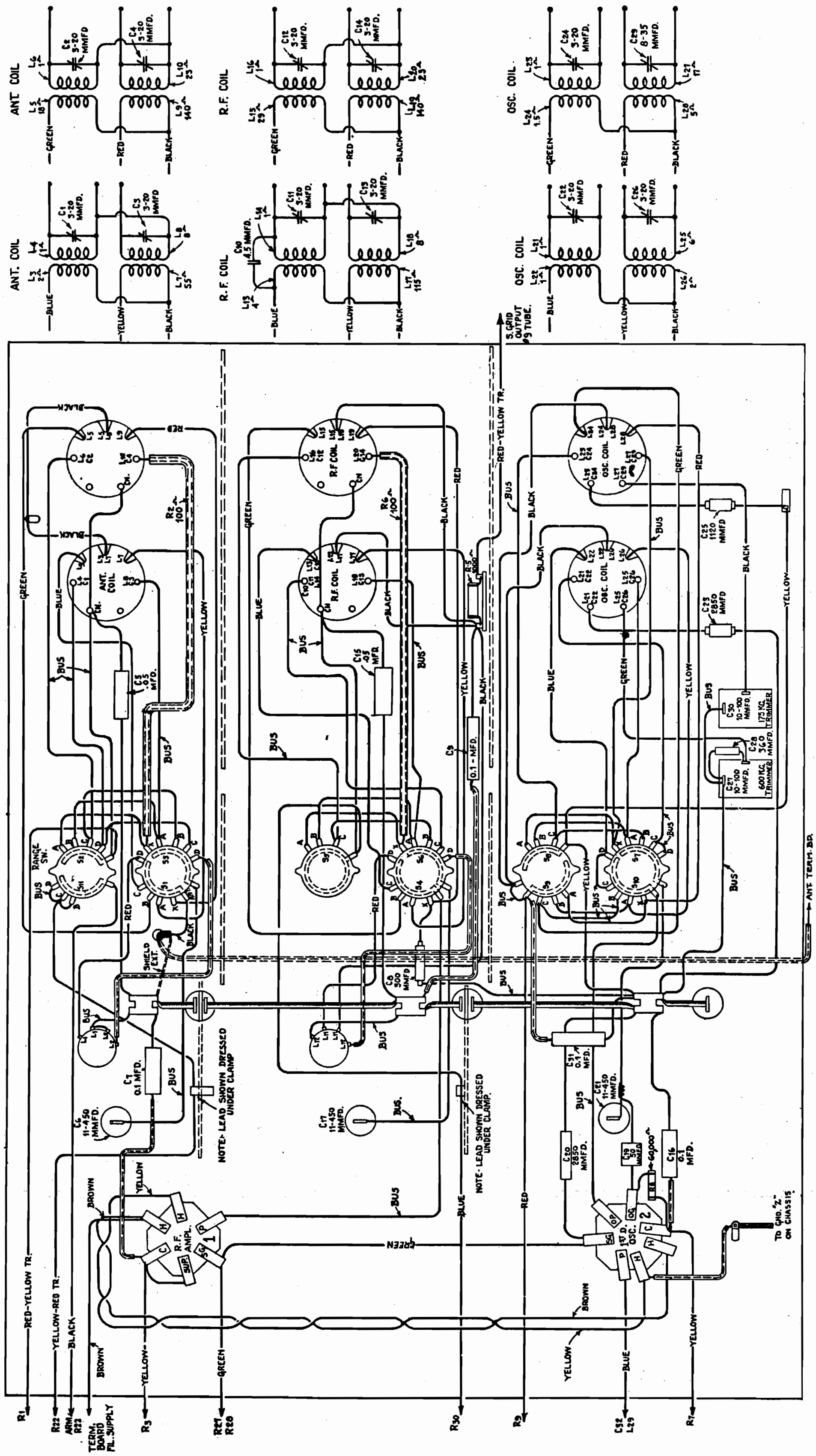


*Figure 10—R. F. Unit Wiring Diagram—Models with fidelity change for band position*

MODEL 262

Socket and Trimmer Layouts RCA-VICTOR CO., INC.

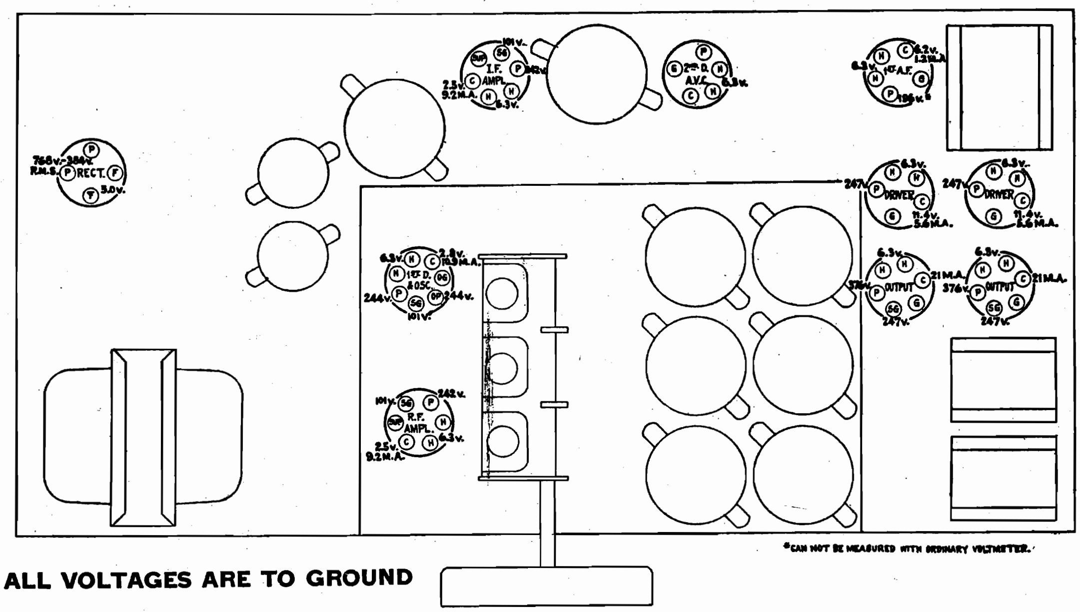



*Figure 11—Radiotron Socket Voltages*

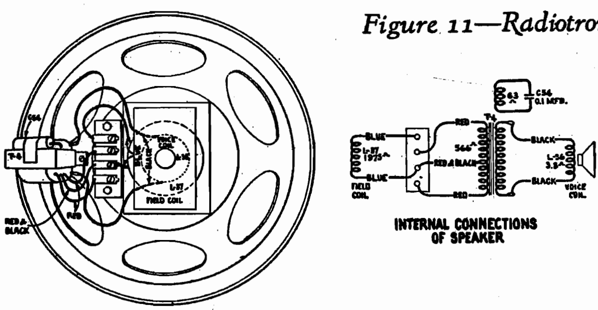



*Figure 3—Loudspeaker Wiring*

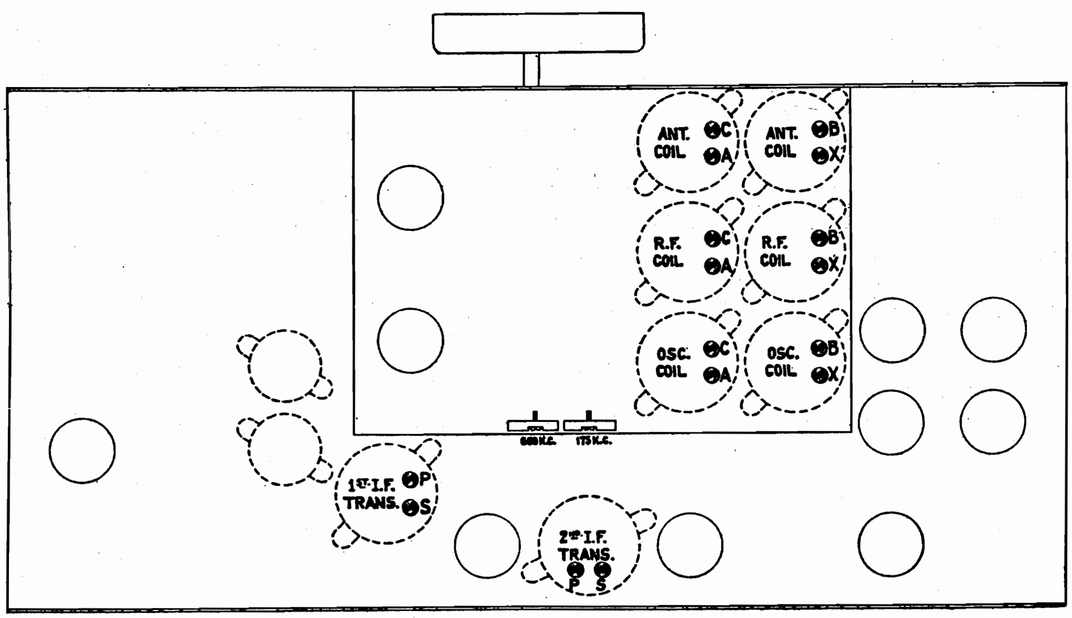



*Figure 7—Location of Trimmer Capacitors*

# RCA-VICTOR CO., INC.

| | | |
|---|---|---|
| Tuning Frequency Range | Band X— | 140 KC – 410 KC |
| | Band A— | 540 KC – 1720 KC |
| | Band B— | 1720 KC – 5400 KC |
| | Band C— | 5400 KC – 18,000 KC |
| | Band D— | 18,000 KC – 36,000 KC |

Line-up Frequencies....175 KC, 410 KC, 460 KC, 600 KC, 1720 KC, 5160 KC, 18,000 KC
Maximum Undistorted Output....7 Watts
Maximum Output....14 Watts

## SERVICE DATA

### (1) LINE-UP PROCEDURE

The line-up procedure of this receiver is somewhat involved and it is important that these instructions be carefully followed when making adjustments. Properly aligned, this receiver has outstanding performance; improperly aligned, it may be impossible to receive signals on all bands.

#### Equipment

To align this receiver, proper test equipment must be used. This consists of a modulated R. F. oscillator having proper frequency range, an output indicator, an alignment tool and a tuning wand. These parts, which are shown on page 15, have been developed by the manufacturer of this receiver for use by service men to duplicate the original factory adjustments.

#### Checking with Tuning Wand

Before making any R. F., oscillator or first detector adjustments, the accuracy of the present adjustments may be checked by means of the tuning wand (Stock No. 6679). The tuning wand consists of a bakelite rod having a brass cylinder at one end and a special finely divided iron insert at the other end. Inserting the cylinder into the center of a coil lowers its inductance, while inserting the iron end increases its inductance. From this, it is seen that unless the trimmer adjustment for a particular coil is perfect at alignment frequencies, inserting one end of the wand may increase the output of a particular signal. A perfect adjustment is evidenced by a lowering of output when either end of the wand is inserted into a coil.

The shields over the R. F. coil assembly have a hole at their top for entrance of the tuning wand. The location of the various coils inside of the shield is shown in Figure 5. An example of the proper manner of using the tuning wand would be to assume the external oscillator were set at 1720 KC and the signal tuned in. The output indicator should be connected across the voice coil of the loudspeaker. Then insert the tuning wand, first one end and then the other end, into the top of the three transformers at the left of the R. F. assembly, facing the front of the chassis. A perfect adjustment of the trimmer would be evidenced by a reduction in output when each end of the wand is inserted in each of the three transformers. If one end—for example, the iron end—when inserted in one coil caused an increase in output, then that circuit is low. An increase in the trimmer capacitance would be the proper remedy.

### (2) I. F. TUNING CAPACITOR ADJUSTMENTS

This receiver has one I. F. stage, and two transformers having four adjustable capacitors which may require adjustment. The transformers are all peaked at 460 KC.

A detailed procedure for making this adjustment follows:

(a) Connect the output of an external oscillator tuned to 460 KC between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker.

(b) Place the oscillator in operation at 460 KC. Place the receiver in operation and adjust the station selector until a point is reached (Band A) where no signals are heard and turn the volume control to its maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

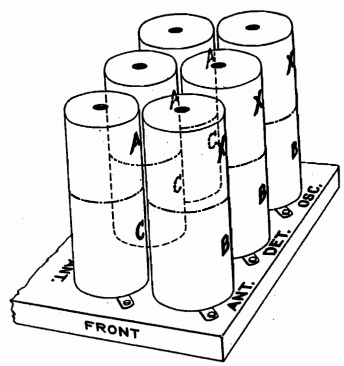



Figure 5—Location of Coils in Shields

(c) Refer to Figure 7. Adjust each trimmer of the I. F. transformers until a maximum output is obtained. Go over the adjustments a second time.

This completes the I. F. adjustments. However, it is good practice to follow the I. F. adjustments with the R. F. and oscillator adjustments due to interlocking which always occurs.

### (3) R. F. OSCILLATOR AND FIRST DETECTOR ADJUSTMENTS

Four R. F., oscillator and first detector adjustments are required in bands "A" and "X." Three are required in bands "B" and "C." None are required in band "D."

To properly align the various bands, each band must be aligned individually. The preliminary set-up requires the external oscillator to be connected between the antenna and ground terminals of the receiver and the output indicator must be connected across the voice coil of the loudspeakers. The volume control must be at its maximum position and the input from the oscillator must be at the minimum value possible to get an output indication under these conditions. In the high-frequency bands, it may be necessary to disconnect the oscillator from the receiver and place it at a distance in order to get a sufficiently low input to the receiver.

The dial pointer must be properly set before starting any actual adjustments. This is done by turning the variable capacitor until it is at its maximum capacity position. One end of the pointer should point exactly at the horizontal line at the lowest frequency end of band "A," while the other end should point to within 1/64 inch of the horizontal line at the highest frequency end of band "A."

Figure 7 shows the location of the trimmers for each band. Care must be exercised to only adjust the trimmers in the band under test.

#### Band "X"

(a) Tune the external oscillator to 410 KC, set the pointer at 410 KC and adjust the oscillator, detector and R. F. trimmers for maximum output.

(b) Shift the external oscillator to 175 KC. Tune in the 175 KC signal irrespective of scale calibration and adjust the series trimmer marked 175 KC on Figure 7, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 410 KC as described in (a).

#### Band "A"

(a) Tune the external oscillator to 1720 KC, set the pointer at 1720 KC and adjust the oscillator, detector and R. F. trimmers for maximum output.

(b) Shift the external oscillator to 600 KC. Tune in the 600 KC signal irrespective of scale calibration and adjust the series trimmer, marked 600 KC on Figure 7, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 1720 KC as described in (a).

#### Band "B"

(a) Tune the external oscillator to 5160 KC, and set the pointer at 5160 KC. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(b) Check for the image signal, which should be received at approximately 4240 on the dial. It will be necessary to increase the external oscillator output for this check.

(c) The antenna and detector trimmers should now be peaked for maximum output.

#### Band "C"

(a) Tune the external oscillator to 18,000 KC, and set the pointer at 18 M. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacity from minimum to maximum.

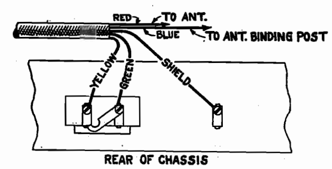



Figure 9—Junior "Duo" Connections

(b) Check for the image signal, which should be received at approximately 17,080 on the dial. It may be necessary to increase the external oscillator output for this check.

(c) Reduce the capacity of the detector trimmer while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then aligned with the oscillator circuit and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(d) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

#### Band "D"

No adjustments are required for band "D."

### (4) MAGNETIC PICKUP CONNECTIONS

A terminal board (link in series with first audio stage cathode) is provided at the rear of the chassis for adding phonograph facilities to this instrument. Figure 9 shows the connections that will be required for the Junior "Duo" turntable assembly.

### (5) VOLTAGE READINGS

The following voltages are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if low-resistance meters are used, such allowances must be made. Figure 11 shows a chart in which the various voltages of the tube contacts are shown.

MODEL 262
Voltage
Parts List

# RCA-VICTOR CO., INC.

## RADIOTRON SOCKET VOLTAGES

120-Volt A. C. Input—Volume and Sensitivity Controls Maximum—Band Switch at "A"—No Signal

| Radiotron No. | | Cathode to Ground Volts, D. C. | Screen Grid to Ground Volts, D. C. | Plate to Ground Volts, D. C. | Cathode Current, M. A. | Heater Volts, A. C. |
|---|---|---|---|---|---|---|
| RCA-6D6—R. F. | | 2.5 | 101 | 242 | 9.2 | 6.3 |
| RCA-6A7 | Detector | 2.8 | 101 | 244 | 10.9 | 6.3 |
| | Oscillator | — | — | 244 | | |
| RCA-6D6—I. F. | | 2.5 | 101 | 242 | 9.2 | 6.3 |
| RCA-76—2nd Det. AVC | | 0 | — | — | 0 | 6.3 |
| RCA-76—A. F. | | 6.2 | — | 196* | 1.2 | 6.3 |
| RCA-76—Driver | | 11.4 | — | 247 | 5.6 | 6.3 |
| RCA-76—Driver | | 11.4 | — | 247 | 5.6 | 6.3 |
| RCA-42—Power | | 0 | 247 | 376 | 21.0 | 6.3 |
| RCA-42—Power | | 0 | 247 | 376 | 21.0 | 6.3 |
| RCA-5Z3—Rectifier | | — | — | 768/384 R. M. S. | 112 | 5.0 |

*Cannot be measured with ordinary voltmeter.

## REPLACEMENT PARTS

| Stock No. | Description | List Price |
|---|---|---|
| | RECEIVER ASSEMBLIES | |
| 4372 | Bracket—Bass tone control mounting bracket | $0.20 |
| 4683 | Bracket—Treble tone control mounting bracket | .25 |
| 4406 | Bracket—Volume control mounting bracket | .25 |
| 3794 | Capacitor—100 mmfd.—Located on first I. F. transformer (C33) | .30 |
| 3981 | Capacitor—300 mmfd.—Located on second I. F. transformer (C42) | .30 |
| 4668 | Capacitor—770 mmfd. (C60) | .30 |
| 4409 | Capacitor—1120 mmfd. (C39, C45) | .35 |
| 3643 | Capacitor—0.005 mfd. (C51, C52) | .25 |
| 3787 | Capacitor—0.01 mfd. (C53) | .30 |
| 3639 | Capacitor—0.02 mfd. (C43) | .25 |
| 4652 | Capacitor—0.02 mfd. (C50) | .60 |
| 3888 | Capacitor—0.05 mfd. (C35) | .25 |
| 4694 | Capacitor—0.05 mfd. (C44) | .30 |
| 3765 | Capacitor—0.025 mfd. (C49) | .34 |
| 3877 | Capacitor—0.1 mfd. (C37) | .32 |
| 4354 | Capacitor—0.1 mfd. (C34, C38) | .36 |
| 3597 | Capacitor—0.25 mfd. (C47) | .40 |
| 3702 | Capacitor—0.25 mfd. (C48) | .42 |
| 7790 | Capacitor—10. mfd. (C58) | 1.05 |
| 7788 | Capacitor—18. mfd. (C57) | 1.10 |
| 7833 | Capacitor pack—Comprising two 10. mfd. and one 4. mfd. capacitor (C46, C55, C56) | 2.00 |
| 4420 | Clamp—Antenna lead clamp and screw—Package of 10 | .40 |
| 4358 | Clamp—Mounting clamp for capacitor—Stock No. 7788 or No. 7790 | .15 |
| 7806 | Coil—First audio plate choke (L33) | .30 |
| 4371 | Cover—Fuse mount cover | .15 |
| 10907 | Fuse—3 amperes—Package of 5 | .40 |
| 3376 | Mount—Fuse mount—105-125 volt operation | .40 |
| 4604 | Mount—Fuse mount for 200-250 volt operation | $0.35 |
| 7784 | Reactor—Tone control reactor (L34) | 1.30 |
| 6135 | Resistor—270 ohms—Carbon type—¼ watt—Package of 5 (R3, R7, R11) | 1.00 |
| 4622 | Resistor—500 ohms—Carbon type—¼ watt—Package of 10 (R12)* | 2.00 |
| 4370 | Resistor—1,000 ohms—Carbon type—¼ watt—Package of 10 (R9, R10, R13, R25) | 2.00 |
| 6243 | Resistor—6,000 ohms—Carbon type—¼ watt—Package of 5 (R19) | 1.00 |
| 3998 | Resistor—15,000 ohms—Carbon type—¼ watt—Package of 5 (R34) | 1.00 |
| 6143 | Resistor—40,000 ohms—Carbon type—¼ watt—Package of 5 (R23) | 1.00 |
| 3602 | Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5 (R14) | 1.00 |
| 3118 | Resistor—100,000 ohms—Carbon type—¼ watt—Package of 5 (R1, R30) | 1.00 |
| 3744 | Resistor—250,000 ohms—Carbon type—¼ watt—Package of 5 (R32) | 1.00 |
| 6186 | Resistor—500,000 ohms—Carbon type—¼ watt—Package of 5 (R33) | 1.00 |
| 3033 | Resistor—1 megohm—Carbon type—¼ watt—Package of 5 (R16) | 1.00 |
| 6242 | Resistor—2 megohms—Carbon type—¼ watt—Package of 5 (R15, R18) | 1.00 |
| 3594 | Resistor—50,000 ohms—Carbon type—½ watt—Package of 5 (R20, R21) | 1.00 |
| 2240 | Resistor—30,000 ohms—Carbon type—1 watt (R26) | .22 |
| 4649 | Resistor—Flat type—Total resistance 8820 ohms—Divided as follows: one 220 ohms, one 3,900 ohms and one 4,700 ohms section (R27, R28, R29) | 1.05 |
| 7804 | Rheostat—Sensitivity control rheostat (R4) | 1.30 |

*R12 Resistor—500 ohms—Some Models

## REPLACEMENT PARTS (Continued)

| Stock No. | Description | List Price |
|---|---|---|
| 4656 | Screw—Volume control mounting assembly—Comprising one bushing, one washer, one shakeproof washer and one nut | $0.18 |
| 4452 | Shield—First audio, second detector A.V.C. or driver Radiotron shield | .35 |
| 3683 | Shield—Second detector—A.V.C. Radiotron shield top | .20 |
| 4453 | Shield—I. F. Radiotron shield | .32 |
| 7800 | Shield—Intermediate frequency transformer shield | .45 |
| 3859 | Socket—4-contact rectifier Radiotron socket | .30 |
| 7484 | Socket—5-contact first audio, second detector A.V.C. or driver Radiotron socket | .35 |
| 7485 | Socket—6-contact I. F. Radiotron socket | .40 |
| 6676 | Socket—6-contact output Radiotron socket | .40 |
| 4686 | Strip—"ANT-GND" terminal strip—Two terminals and link | .20 |
| 7796 | Switch—Operating switch (S12) | .62 |
| 7795 | Tone control—Bass tone control (R22) | 1.30 |
| 4648 | Tone control—Treble tone control (R24) | 1.25 |
| 7841 | Transformer—Audio transformer pack comprising interstage transformer and reactor (T2, L35) | 4.05 |
| 4431 | Transformer—First intermediate frequency transformer (L29, L30, C32, C33, C36) | 2.28 |
| 4433 | Transformer—Second intermediate frequency transformer (L31, L32, C40, C41, C42) | 2.15 |
| 7832 | Transformer—Driver transformer (T3) | 2.85 |
| 9505 | Transformer—Power transformer—105-125 volts—50-60 cycles (T1) | 6.35 |
| 9506 | Transformer—Power transformer—105-125 volts—25-40 cycles | 8.90 |
| 9507 | Transformer—Power transformer—105-250 volts—40-60 cycles | 6.40 |
| 4650 | Volume control (R17) | 1.38 |
| | R. F. UNIT ASSEMBLIES | |
| 2747 | Cap—Contact cap—Package of 5 | .50 |
| 4646 | Capacitor—4.5 mmfd. (C10) | .20 |
| 4633 | Capacitor—50 mmfd. (C19) | .25 |
| 3981 | Capacitor—300 mmfd. (C8) | .30 |
| 4413 | Capacitor—360 mmfd. (C28) | .22 |
| 4412 | Capacitor—1,120 mmfd. (C25) | .25 |
| 4524 | Capacitor—2,850 mmfd. (C23) | .35 |
| 4615 | Capacitor—2,850 mmfd. (C20) | .34 |
| 4417 | Capacitor—0.05 mfd. (C5, C15) | .25 |
| 4415 | Capacitor—0.1 mfd. (C7, C16) | .30 |
| 4645 | Capacitor—0.1 mfd. (C9, C31) | .25 |
| 3861 | Capacitor—Adjustable capacitor (C27, C30) | .78 |
| 4420 | Clamp—Antenna lead clamp and screw—Package of 10 | .40 |
| 4410 | Coil—Antenna coil—Band "D" (L1, L2) | .70 |
| 7803 | Coil—Antenna coil—B.-S.W. (L3, L4, L7, L8, C1, C3) | 1.82 |
| 7810 | Coil—Antenna coil—P.B.-L.W. (L5, L6, L9, L10, C2, C4) | 2.10 |
| 7805 | Coil—Detector coil—B.-S.W. (L13, L14, L17, L18, C11, C13) | 2.15 |
| 7808 | Coil—Detector coil—P.B.-L.W. (L15, L16, L19, L20, C12, C14) | 2.05 |
| 4421 | Coil—Detector coil—Band "D" (L11, L12) | .70 |
| 7807 | Coil—Oscillator coil—B.-S.W. (L21, L22, L25, L26, C22, C26) | 1.62 |
| 7809 | Coil—Oscillator coil—P.B.-L.W. (L23, L24, L27, L28, C24, C29) | 1.70 |
| 7801 | Condenser—3-gang variable tuning condenser (C6, C17, C21) | 4.42 |
| 4340 | Lamp—Dial lamp—Package of 5 | .60 |
| 4370 | Resistor—1,000 ohms—Carbon type—¼ watt—Package of 10 (R5) | 2.00 |
| 3602 | Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5 (R8) | 1.00 |
| 4418 | Resistor—100 ohms—Flexible type—Package of 10 (R2, R6) | 1.50 |
| 4656 | Screw—Chassis mounting screw assembly—Comprising one bushing, one washer, one shakeproof washer, and one nut (four sets required to mount chassis) | $0.18 |
| 7800 | Shield—Antenna, detector or oscillator coil shield | .45 |
| 4452 | Shield—First detector-oscillator Radiotron shield | .35 |
| 3683 | Shield—Radiotron shield top | .20 |
| 4454 | Shield—R. F. amplifier Radiotron shield | .44 |
| 3529 | Socket—Dial lamp socket | .32 |
| 7485 | Socket—6-contact R. F. amplifier Radiotron socket | .40 |
| 3572 | Socket—7-contact first detector-oscillator Radiotron socket | .38 |
| 7836 | Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S11) | 3.05 |
| | DRIVE ASSEMBLIES | |
| 4362 | Arm—Band indicator operating arm | .28 |
| 10194 | Ball—Steel ball for variable condenser drive assembly—Package of 20 | .25 |
| 4422 | Clutch—Tuning condenser drive clutch assembly—Comprising drive shafts, balls, ring, spring and washers—Assembled | .88 |
| 4455 | Dial—Station selector dial | .60 |
| 7799 | Drive—Variable tuning condenser drive assembly complete | 2.45 |
| 4364 | Gear—Spring gear assembly complete with hub, pinion, gear cover and spring | .96 |
| 4361 | Indicator—Band indicator—Celluloid lettered—D. C. B. A. X. | .12 |
| 4363 | Pointer—Station selector main (large) pointer | .18 |
| 4367 | Pointer—Station selector vernier (small) pointer | .15 |
| 3943 | Screen—Celluloid screen for dial light—Package of 2 | .18 |
| 3993 | Screw—No. 6-32-5/32" square head set screw for band indicator operating arm or variable condenser drive—Package of 10 | .25 |
| 4377 | Spring—Band indicator and arm tension spring—Package of 5 | .25 |
| 4378 | Stud—Band indicator operating arm stud—Package of 5 | .25 |
| | CABLE ASSEMBLIES | |
| 4653 | Cable—Main cable | 1.90 |
| 4654 | Cable—4-conductor—Reproducer cable | .58 |
| 4655 | Cable—Shielded cable—From low-frequency tone control to resistor boards | .58 |
| | REPRODUCER ASSEMBLY | |
| 4645 | Capacitor—0.1 mfd.—Located on output transformer (C54) | .25 |
| 7835 | Coil—Field coil, magnet and cone support (L37) | 4.55 |
| 8969 | Cone—Reproducer cone (L36)—Package of 5 | 6.35 |
| 9543 | Reproducer—Reproducer complete | 10.36 |
| 6999 | Screen—Dust (cloth) screen—Package of 6 | .12 |
| 7834 | Transformer—Output transformer and capacitor (T4, C54) | 3.75 |
| | MISCELLANEOUS PARTS | |
| 4677 | Bezel—Metal bezel (escutcheon) for station selector dial glass | .56 |
| 6614 | Glass—Station dial glass | .30 |
| 3829 | Knob—Bass or treble tone control, volume or sensitivity control range switch or operating switch knob—Package of 5 | 1.10 |
| 4657 | Knob—Knob station selector knob—Package of 5 | .65 |
| 4678 | Ring—Retaining ring for dial glass—Pkg. of 5 | .34 |
| 4119 | Screw—8-32-¼" headless set screw for knob—Stock No. 4657—Package of 20 | .38 |
| 4393 | Screw—8-32-5/16" headless set screw for knob—Stock No. 3829—Package of 10 | .25 |

RCA-VICTOR CO., INC.

# DESCRIPTION OF ELECTRICAL CIRCUIT

The general circuit arrangement consists of an R. F. stage, a combined oscillator and first detector stage, two I. F. stages, a combined second detector and automatic volume control, a push-pull audio driver stage and a push-pull Class A output stage. Plate and grid voltages are supplied by the RCA-5Z3 heavy duty rectifier combined with a suitable filtering system. In addition, a double channel A. V. C. stage is provided which uses two additional tubes. Figure 1 shows the over-all schematic circuit diagram while Figure 2 shows the R. F. assembly wiring.

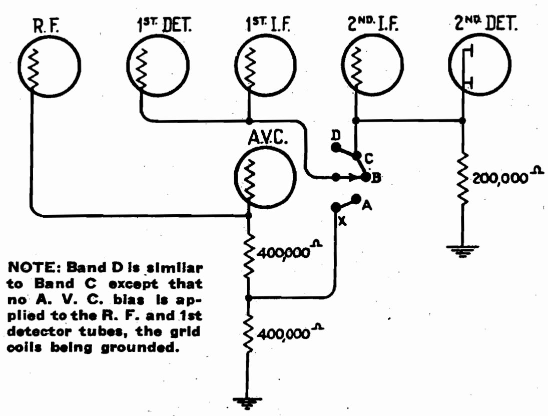



*Figure 3—Switching Arrangement of Automatic Volume Control Systems*

The signal enters the receiver through a shielded antenna lead and is applied to the grid of the R. F. tube through the antenna coupling transformer. The secondary of this transformer is tuned to the signal frequency by means of one unit of the gang-capacitor. The output of this stage is transformer coupled to the grid circuit of the first detector, which is also tuned to the signal frequency by a unit of the gang-capacitor.

Combined with the signal in the first detector is the local oscillator signal, which is always at a 460 K. C. frequency difference (higher) from the signal frequency. A separate coil system and the third unit of the gang-capacitor are used in the oscillator circuit.

In conjunction with these three tuned circuits it is well to point out that five different groups of tuned circuits are used, one group for each tuning band. A five-position selector switch is provided for selecting the band in which the desired signal is located. In addition to selecting the desired coil system, additional groups of contacts are provided for short-circuiting the preceding lower frequency R. F. and detector coils and the two preceding oscillator coils. This is to prevent "dead" spots due to absorption effects caused by the coils, the natural period of which without the gang capacitor connected falls in the next higher frequency band. This gang switch also has additional contacts for performing other functions which will be discussed.

The output of the first detector which is the I. F. signal (460 K. C.) is fed directly through two tuned circuits to the grid of the automatic volume control I. F. amplifier stage. A coupling coil adjacent to the secondary of this transformer is connected directly to the signal I. F. stage, which is in effect parallel to the A. V. C., I. F. stage. Examining the signal amplifier further we find that the output of the first signal I. F. stage is applied through a transformer to the second I. F. stage and thence through a second transformer to the second detector. Both circuits of each transformer are accurately tuned to the I. F. signal, which is 460 K. C.

Further examining the A. V. C., I. F. stage it will be seen that the output of this stage is applied to the A. V. C. tube through an untuned I. F. transformer. The A. V. C. stage, which is an RCA-76, is operated as a straight rectifier, its plate being grounded and only the grid being used. This tube is shielded in the usual manner. A small grid voltage, approximately 5.0 volts, is maintained so that rectification does not occur until the signal level exceeds this grid voltage. When this occurs, a portion of the rectified signal produces a voltage drop across resistors R-18 and R-19. The drop across both of these resistors constitutes the automatic bias voltage for the R. F. stage. The drop across R-19 alone gives the automatic bias voltage for the first detector and first I. F. stage on bands X and A.

Examining the second detector, the diode electrodes provide the detector action while the grid and plate give audio amplification. A portion of the rectified signal also gives a voltage drop across R-23 which is a second automatic volume control system for the receiver. The voltage drop is applied to the second I. F. stage in all bands and to the first detector and first I. F. stage in bands B and C. The change in automatic volume control systems is made by an additional group of contacts on the band selector switch. Figure 3 shows the switching arrangements for changing the A. V. C. system in the various bands.

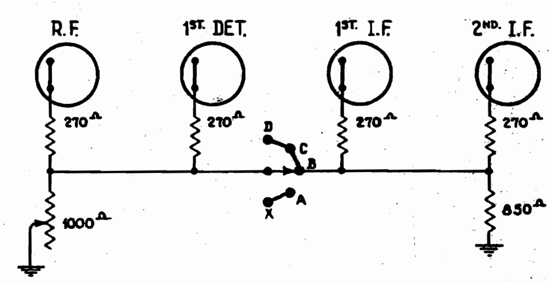



*Figure 4—Sensitivity Control Switching Arrangement*

MODEL 281
Schematic
Pickup Connections

# RCA-VICTOR CO., INC.

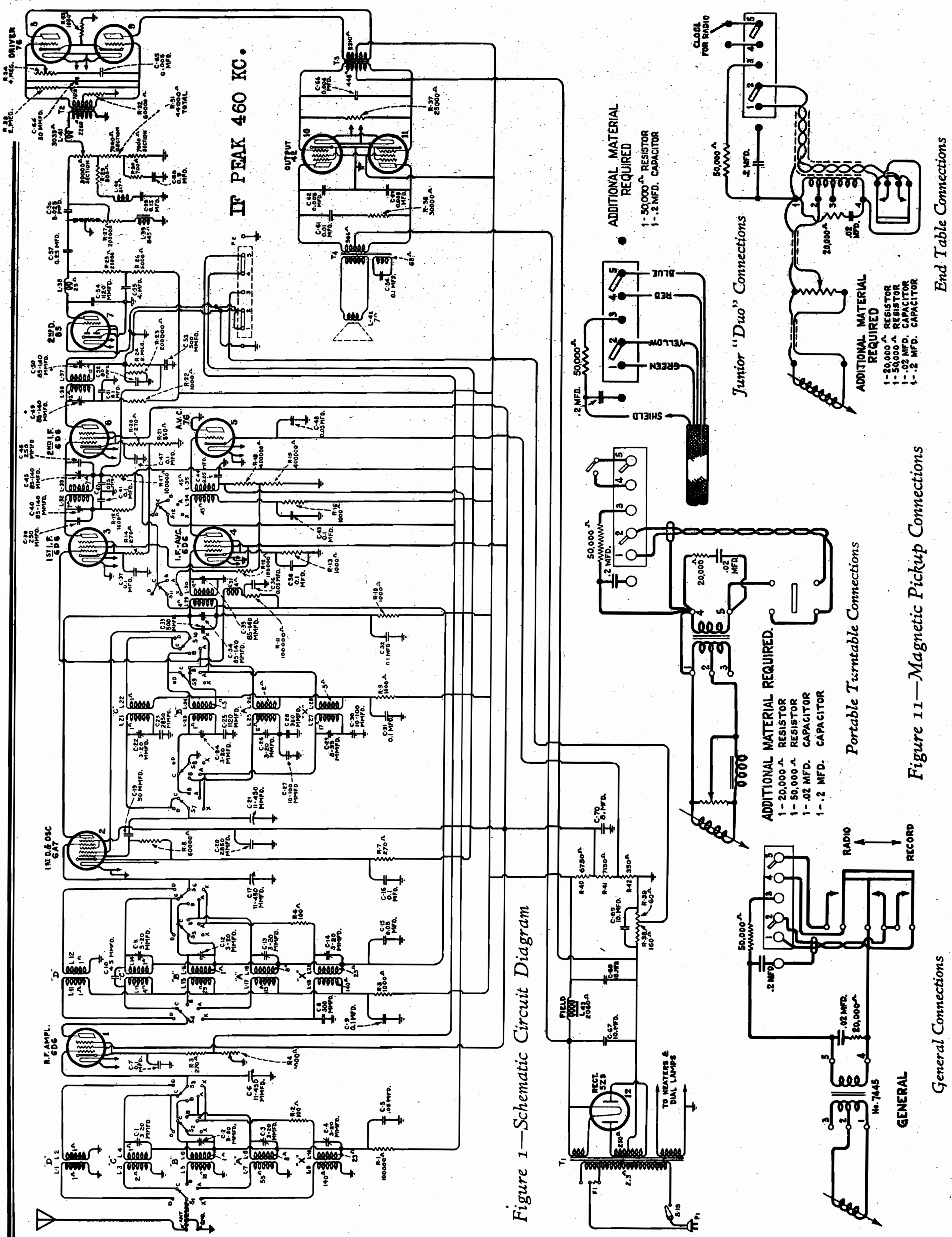



Figure 1—Schematic Circuit Diagram

Figure 11—Magnetic Pickup Connections

**MODEL 281**
**Chassis Wiring**

# RCA-VICTOR CO., INC.

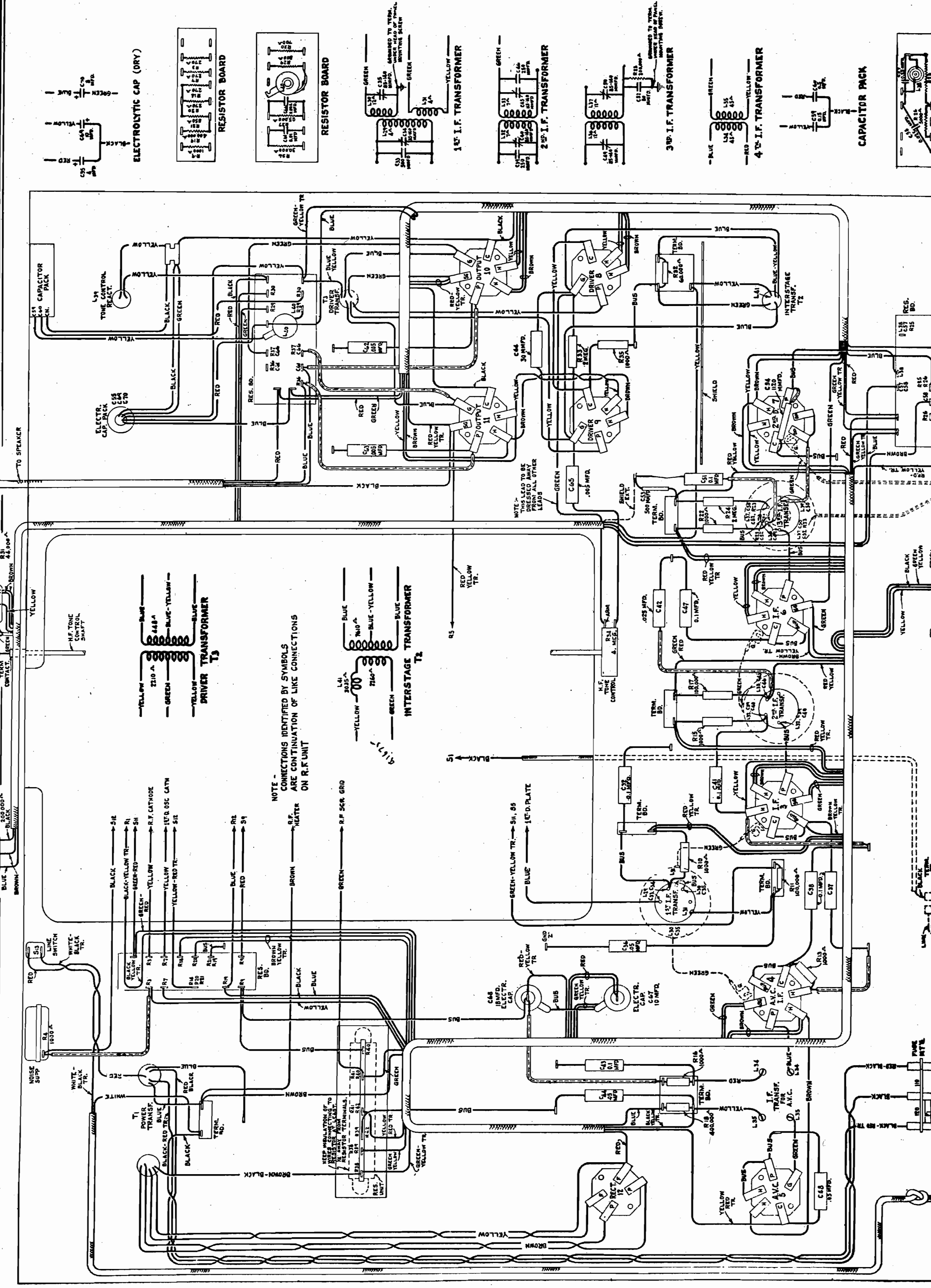


*Figure 5—Chassis Assembly Wiring Diagram*

MODEL 281
RF Wiring

RCA-VICTOR CO., INC.

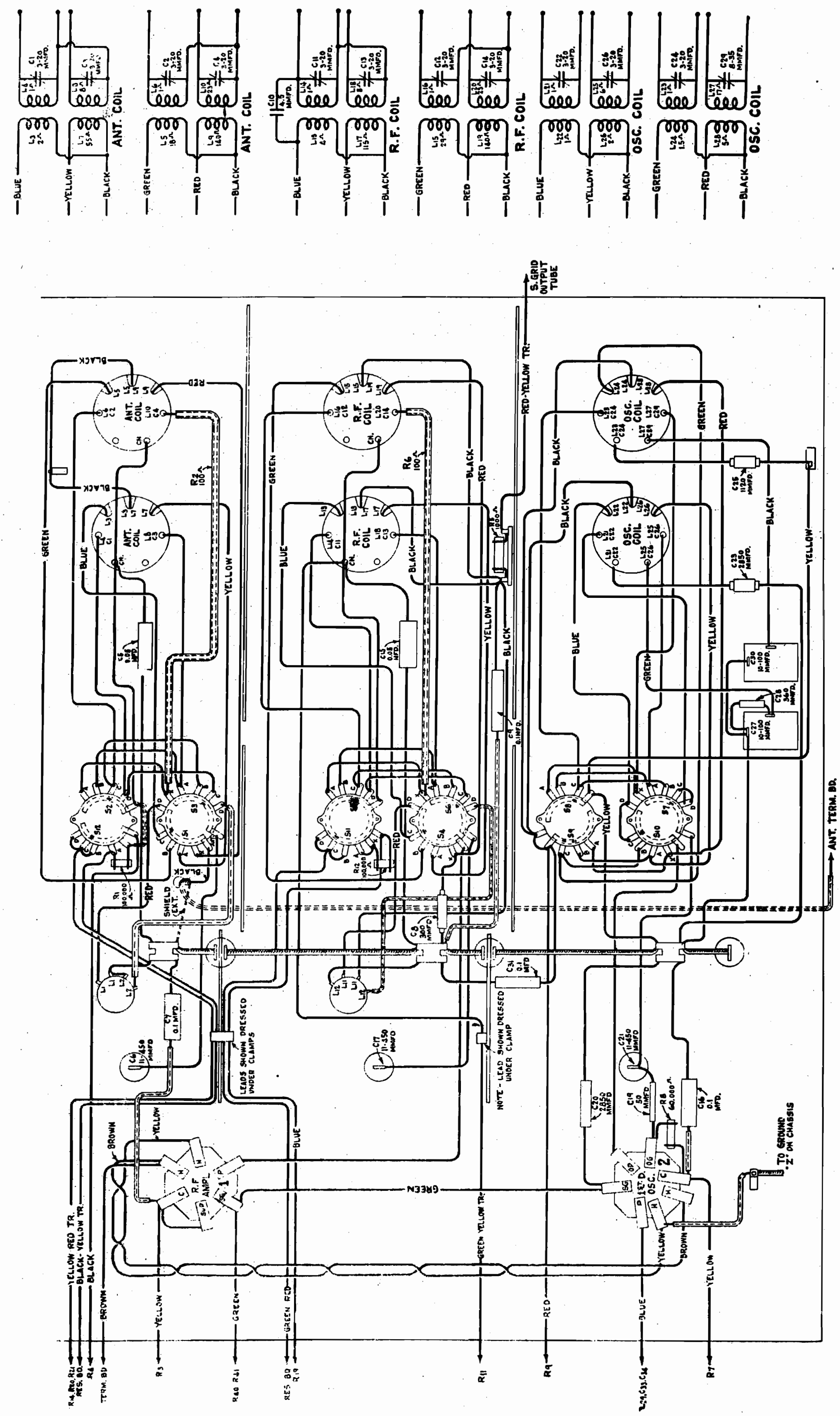



*Figure 2—R. F. Assembly Wiring Diagram*

Tuning Frequency Range

| | |
|---|---|
| Band X | 140 K. C.–410 K. C. |
| Band A | 540 K. C.–1720 K. C. |
| Band B | 1720 K. C.–5400 K. C. |
| Band C | 5400 K. C.–18,000 K. C. |
| Band D | 18,000 K. C.–36,000 K. C. |

MODEL 281
Socket and
Trimmer Layouts

RCA-VICTOR CO., INC.

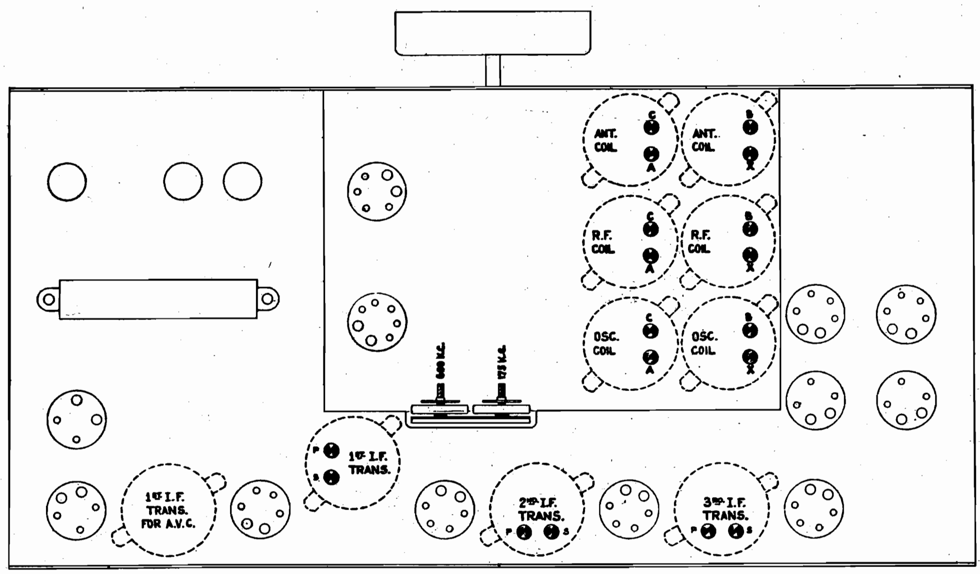



*Figure 9—Location of Various Trimmer Capacitors*

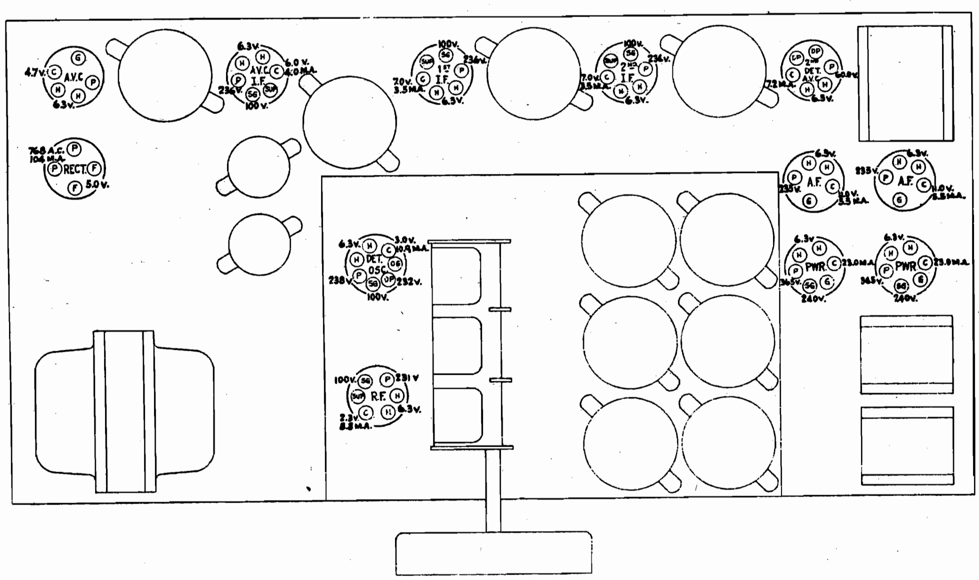


*Figure 10—Radiotron Socket Voltages*

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At this point, an explanation as to why two automatic volume control systems are used and why the sensitivity control is changed in different bands may be in order.

Two automatic volume control systems are used because of the different receiving conditions in different bands. For example, in the broadcast and long-wave band (X and A) signal levels are very high. Also due to the use of an aurally compensated volume control, a constant input to the second detector must be maintained. From this, it is evident that the double channel I. F. automatic volume control is ideal. It maintains a constant input to the second detector and yet does not function on an extremely weak signal. In the short-wave bands, however, conditions are different. Signal strengths are always very low and fluctuate widely. For this reason it is important to have some automatic volume control action below the level at which the double channel system works. This is provided by the diode A. V. C. of the second detector, which functions on the first detector and two I. F. stages on the short-wave bands. It should be noted that this action is present on the second I. F. stage on all bands. This further flattens the action of the double-channel system in bands X and A.

At this point it is well to examine the sensitivity control which also changes on different bands. The sensitivity control adjusts the residual bias on the R. F. and first detector stages in bands X and A while it controls the R. F., 1st detector and both I. F. stages on bands B, C, and D. Figure 4 shows the switching arrangement used.

The sensitivity control is changed so that in bands X and A it controls the R. F. and 1st detector while in bands B, C, and D it controls the R. F., 1st detector, 1st I. F. and 2nd I. F. stages. The reason for this is that for a given degree of sensitivity in bands X and A the residual bias will be considerably higher in the R. F. and 1st detector stages than in the bands B, C, and D used. This is to prevent possible overloading of these stages due to the high-signal strengths encountered in bands X and A. Also, in bands B, C, and D, for a given degree of sensitivity the R. F. stage operates at a higher gain, which gives an improved signal to noise ratio. This is caused by the paralleling of the sensitivity control with an 850-ohm resistor in these bands.

Returning to the second detector, we find its output circuit is coupled to the grid circuit of the driver stage through a compensated volume control system, tone control system and transformer. The volume control uses two stages of compensation, which serves to increase the high and low frequencies as the volume is reduced. This compensates for the natural loss in sensitivity of the human ear to the high and low frequencies at low sound levels. A low and a high frequency tone control enables the listener to alter the fidelity of the receiver to his individual taste.

The driver stage, which is a pair of RCA-76 Radiotrons connected in push-pull, is transformer coupled to a pair of RCA-42's which are the output stage. A feature of the output stage is the use of fixed bias, which reduces distortion and increases the available output. This is accomplished by the use of the drop across R-38 and R-39, which carries the entire D. C. output from the rectifier. Naturally the output stage uses but a portion of the total rectified current and current variations in it will have but little effect on the drop across the resistor.

The output of the power stage is coupled through a step-down transformer to the voice coil of the loudspeaker. A separate winding, which is shunted by a capacitor, has been provided in this transformer which gives a very sharp, high-frequency cut-off for the entire audio system. This greatly reduces the reproduction of any high-frequency interchannel interference or other disturbance of a high-frequency character which is outside of the useful musical range.

The loudspeaker used is of the large field ten-inch type. It is fully capable of handling the high-power, high-quality output of the receiver and converting it into faithful sound reproduction.

Figure 5 shows the chassis wiring while Figure 6 shows the loudspeaker wiring.

## (1) LINE-UP PROCEDURE

The line-up procedure of this receiver is somewhat involved and it is important that these instructions be carefully followed when making adjustments. Properly aligned, this receiver has outstanding performance; improperly aligned, it may be impossible to receive signals on all bands.

### Equipment

To properly align this receiver, the following equipment must be used. This is a modulated R. F. oscillator having proper frequency range, an output indicator, an alignment tool, a tuning wand, and a "dummy" Radiotron RCA-76. These parts, which are shown in Figure 8, have been developed by the manufacturer of this receiver for use by service men to duplicate the original factory adjustments. The "dummy" Radiotron, RCA-76, is obtained by removing one heater prong from an otherwise perfect tube.

### Checking with Tuning Wand

Before making any R. F., oscillator or first detector adjustments, the accuracy of the present adjustments may be checked by means of the tuning wand (Stock No. 6679). The tuning wand consists of a bakelite rod having a brass cylinder at one end and a special finely divided iron insert at the other end. Inserting the cylinder into the center of a coil lowers its inductance, while inserting the iron end increases its inductance. From this it is seen that unless the trimmer adjustment for a particular coil is perfect at alignment frequencies, inserting one end of the wand may increase the output of a particular signal. A perfect adjustment is evidenced by a lowering of output when either end of the wand is inserted into a coil.

The shields over the R. F. coil assembly have a hole at their top for entrance of the tuning wand. The location of the various coils inside of the shield is shown in Figure 7. An example of the proper manner of using the tuning wand would be to assume the external oscillator were set at 1720 and the signal tuned in. The A. V. C. tube would be replaced by the "dummy" RCA-76 and the output indicator could be connected across the voice coil of the loudspeaker. Then the tuning wand would be inserted, first one end and then the other end, into the top of the three transformers at the left of the R. F. assembly, facing the front of the chassis. A perfect adjustment of the trimmer would be evidenced by a reduction in output when each end of the wand is inserted in each of the three transformers. If one end—for example, the iron end—when inserted in one coil caused an increase in output, then that circuit is low. An increase in the trimmer capacitance would be the proper remedy.

## (2) I. F. TUNING CAPACITOR ADJUSTMENTS

Although this receiver has three I. F. stages, two for the signal and one for the A. V. C., only three transformers having six adjustable capacitors require adjustment. The fourth transformer is in the A. V. C. circuit and is broadly tuned, not requiring adjustments. The transformers are all peaked, being tuned to 460 K. C.

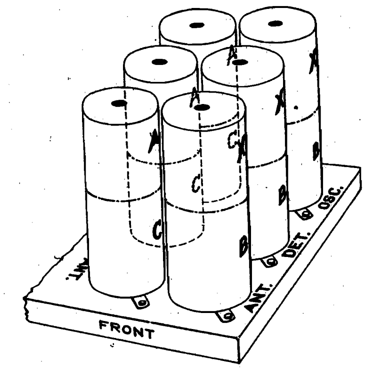


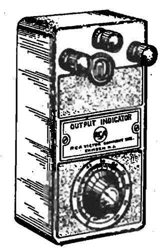

*Figure 7—Location of Various Coils in Shields*

A detailed procedure for making this adjustment follows:

(a) Connect the output of an external oscillator tuned to 460 K. C. between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker. Replace the A. V. C. tube in the receiver with the "dummy" RCA-76.

(b) Place the oscillator in operation at 460 K. C.; place the receiver in operation and adjust the station selector until a point is reached (Band A) where no signals are heard and turn both the volume and sensitivity controls to their maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

(c) Refer to Figure 9. Adjust each trimmer of the I. F. tuning capacitors until a maximum output is obtained. Go over the adjustments a second time.

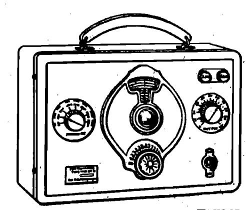



TMV-121-A

*Stock No. 4317—Output Indicator*

*Stock No. 4160—Alignment Tool*

*Stock No. 6679—Tuning Wand*



TMV-97-B

*Stock No. 9050—Full Range Test Oscillator*

*Figure 8—Equipment Required for Aligning Receiver*

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This completes the I. F. adjustments. However, it is good practice to follow the I. F. adjustments with the R. F. and Oscillator adjustments due to interlocking which always occurs.

## (3) R. F. OSCILLATOR AND FIRST DETECTOR ADJUSTMENTS

Four R. F., oscillator and first detector adjustments are required in bands "X" and "A." Three are required in bands "B" and "C" while none are required in band "D." Band "D" uses the second harmonic of the oscillator while the detector and R. F. coils do not have trimmers.

To properly align the various bands, each band must be aligned individually in the order given. This is "X," "A," "B," "C," and "D." The preliminary set-up requires the external oscillator to be connected between the antenna and ground terminals of the receiver. The output indicator must be connected across the voice coil of the loudspeaker while the "dummy" RCA-76 must be placed in the A. V. C. socket. The sensitivity and volume controls must be at their maximum position and the input from the oscillator must be at the minimum value possible to get an output indication under these conditions. In the high-frequency bands, it may be necessary to disconnect the oscillator from the receiver and place it at a distance in order to get a sufficiently low input to the receiver.

The Dial Pointer must be properly set before starting any actual adjustments. This is done by turning the variable capacitor until it is at its maximum capacity position. One end should point exactly at the horizontal line at the lowest frequency end of band "A," while the other end should point to within 1/64" of the horizontal line at the highest frequency end of band "A."

Figure 9 shows the location of the trimmers for each band. Care must be exercised to only adjust the trimmers in the band under test.

### Band "X"

(a) The oscillator series capacitor, marked 175 K. C., Figure 9, is first tightened to near its maximum capacity position (screwed "in").

(b) Tune the external oscillator to 410 K. C., set the pointer at 410 K. C. and adjust the oscillator, detector and R. F. trimmers for maximum output.

(c) Shift the external oscillator to 175 K. C. Tune in the 175 K. C. signal irrespective of scale calibration and adjust the series trimmer marked 175 K. C. on Figure 9, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 410 K. C. as described in (b).

### Band "A"

(a) The oscillator series capacitor, marked 600 K. C., Figure 9, should be set at about the center of its range.

(b) Tune the external oscillator to 1720 K. C., set the pointer at 1720 K. C. and adjust the oscillator, detector and R. F. trimmers for maximum output.

(c) Shift the external oscillator to 600 K. C. Tune in the 600 K. C. signal irrespective of scale calibration and adjust the series trimmer, marked 600 K. C. on Figure 9, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 1720 K. C. as described in (b).

### Band "B"

(a) The detector and antenna trimmers should first be tightened to approximately 3/4 maximum capacity (turned 3/4 in).

(b) Tune the external oscillator to 5160 K. C., and set the pointer at 5160 K. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(c) Check for the image signal, which should be received at approximately 4240 on the dial. It may be necessary to increase the external oscillator output for this check.

(d) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then aligned with the oscillator circuit and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(e) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

### Band "C"

(a) The detector and antenna trimmers should first be tightened to approximately 3/4 maximum capacity (turned 3/4 in).

(b) Tune the external oscillator to 18,000 K. C., and set the pointer at 18 M. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacity from minimum to maximum.

(c) Check for the image signal, which should be received at approximately 17,080 on the dial. It may be necessary to increase the external oscillator output for this check.

(d) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then aligned with the oscillator circuit and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(e) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

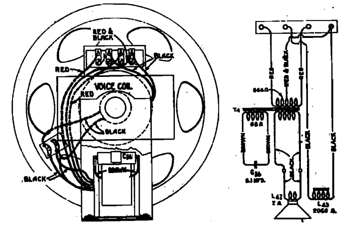



*Figure 6—Loudspeaker Wiring*

### Band "D"

No adjustments are required for Band D.

## (4) MAGNETIC PICKUP CONNECTIONS

A Terminal Board is provided at the rear of the chassis for adding phonograph facilities to this instrument. In general, it is best to operate the phonograph with its volume control at its maximum output position and use the radio receiver volume control for adjusting volume. The radio volume control is compensated and will result in much better tone quality at low volume than will be obtained if it is operated open and the volume adjusted from the pickup volume control. Figure 11 shows the various types of connections that will be required for the different turntable assemblies.

## (5) VOLTAGE READINGS

The following voltages are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if low-resistance meters are used, such allowances must be made.

## RADIOTRON SOCKET VOLTAGES

**Maximum Sensitivity—No Signal—120-Volt A. C. Input**

| Radiotron No. | | Cathode to Ground, Volts | Screen Grid to Ground, Volts | Plate to Ground, Volts | Cathode Current, M. A. | Heater Volts, A. C. |
|---|---|---|---|---|---|---|
| RCA-6D6—R. F. | | 2.3 | 100 | 231 | 8.8 | 6.3 |
| RCA-6A7 | Osc. | 3.0 | — | 232 | 10.9 | 6.3 |
| | Det. | | 100 | 238 | | |
| RCA-6D6—1st I. F. | | 7.0 | 100 | 236 | 3.5 | 6.3 |
| RCA-6D6—2nd I. F. | | 7.0 | 100 | 236 | 3.5 | 6.3 |
| RCA-6D6—A. V. C.-I. F. | | 6.0 | 100 | 236 | 4.0 | 6.3 |
| RCA-76—A. V. C. | | 4.7 | — | 0 | 0 | 6.3 |
| RCA-85—2nd Det. | | 0 | — | 60 | 7.2 | 6.3 |
| RCA-76—A. F. | | 11.0 | — | 235 | 5.5 | 6.3 |
| RCA-76—A. F. | | 11.0 | — | 235 | 5.5 | 6.3 |
| RCA-42—Power | | 0 | 240 | 365 | 23.0 | 6.3 |
| RCA-42—Power | | 0 | 240 | 365 | 23.0 | 6.3 |
| RCA-5Z3—Rectifier | | — | — | 768/384 RMS | 104.0 | 5.0 |

Power Transformer connected to 120-volt Tap.

# RCA-VICTOR CO., INC.

## REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | Description | List Price |
|---|---|---|
| | RECEIVER ASSEMBLIES | |
| 4372 | Bracket—Low frequency tone or volume control mounting bracket | $0.20 |
| 4406 | Bracket—High frequency tone control mounting bracket | .25 |
| 2747 | Cap—Contact cap—Package of 5 | .50 |
| 4407 | Capacitor—30 mmfd. (C64) | .25 |
| 4405 | Capacitor—80 mmfd. (C52)—Package of 5 | .85 |
| 4376 | Capacitor—250 mmfd.—Located on second intermediate frequency transformer (C39, C46)—Package of 5 | .80 |
| 4404 | Capacitor—500 mmfd. (C33, C53)—Package of 5 | .85 |
| 4409 | Capacitor—1120 mmfd. (C54) | .35 |
| 4070 | Capacitor—.004 mfd. (C66) | .42 |
| 3643 | Capacitor—.005 mfd. (C62, C63) | .25 |
| 6512 | Capacitor—.005 mfd. (C65) | .28 |
| 3787 | Capacitor—.01 mfd. (C61) | .30 |
| 3888 | Capacitor—.05 mfd. (C36, C44, C48) | .25 |
| 3765 | Capacitor—.025 mfd. (C42, C58) | .34 |
| 4645 | Capacitor—.1 mfd. (C32, C41, C43, C51) | .25 |
| 3877 | Capacitor—.1 mfd. (C37, C38, C47) | .32 |
| 3702 | Capacitor—.25 mfd. (C57) | .42 |
| 7790 | Capacitor—10 mfd. (C67) | 1.05 |
| 7788 | Capacitor—18 mfd. (C68) | 1.10 |
| 7787 | Capacitor pack—Comprising one .15 mfd. and one .5 mfd. capacitors (C59, C60) | 1.10 |
| 7789 | Capacitor pack—Comprising one 4., one 8. and one 10. mfd. capacitors (C55, C69, C70) | 2.68 |
| 4358 | Clamp—Electrolytic capacitor clamp | .15 |
| 7806 | Coil—Second detector plate choke coil (L38) | .30 |
| 4371 | Cover—Fuse mount cover | .15 |
| 4359 | Cover—Terminal board cover | .15 |
| 10907 | Fuse—3-ampere—Package of 5 | .40 |
| 3376 | Mount—Fuse mount 105-125-volt instrument | .40 |
| 7784 | Reactor—Tone control reactor (L39) | 1.30 |
| 7483 | Reactor—Volume control compensating reactor (L40) | .68 |
| 6135 | Resistor—270 ohms—Carbon type—¼ watt (R3, R7, R14, R20)—Package of 5 | 1.00 |
| 4240 | Resistor—700 ohms—Carbon type—¼ watt (R30)—Package of 5 | 1.00 |
| 4375 | Resistor—800 ohms—Carbon type—¼ watt (R29)—Package of 10 | 2.00 |
| 6247 | Resistor—850 ohms—Carbon type—¼ watt (R21)—Package of 5 | 1.00 |

| Stock No. | Description | List Price |
|---|---|---|
| 4370 | Resistor—1,000 ohms—Carbon type—¼ watt (R9, R10, R15, R16, R22, R35)—Package of 10 | $2.00 |
| 4687 | Resistor—1,000 ohms—Carbon type—¼ watt (R13)—Package of 10 | 2.00 |
| 3110 | Resistor—25,000 ohms—Carbon type—¼ watt (R37)—Package of 5 | 1.00 |
| 3602 | Resistor—60,000 ohms—Carbon type—¼ watt (R32)—Package of 5 | 1.00 |
| 3118 | Resistor—100,000 ohms—Carbon type—¼ watt (R11, R17)—Package of 5 | 1.00 |
| 3116 | Resistor—200,000 ohms—Carbon type—¼ watt—Located on third I. F. transformer (R23)—Package of 5 | 1.00 |
| 4368 | Resistor—400,000 ohms—Carbon type—¼ watt (R18, R19)—Package of 10 | 2.00 |
| 6242 | Resistor—2 megohms—Carbon type—¼ watt (R24, R33)—Package of 5 | 1.00 |
| 3413 | Resistor—5,000 ohms—Carbon type—½ watt (R26)—Package of 5 | 1.00 |
| 2240 | Resistor—30,000 ohms—Carbon type—1 watt (R36) | .22 |
| 5817 | Resistor—20,000 ohms—Carbon type—3 watt (R25) | .25 |
| 6997 | Resistor—Total resistance 14,470 ohms with 160-60-350-7150 and 6750 ohm sections (R38, R39, R40, R41, R42) | .95 |
| 7804 | Rheostat—Noise suppressor rheostat (R4) | 1.30 |
| 4453 | Shield—First I. F., AVC—I. F. or second I. F. Radiotron shield | .32 |
| 3683 | Shield—Radiotron shield top | .20 |
| 4452 | Shield—Second detector or AVC Radiotron shield | .35 |
| 7800 | Shield—Shield for intermediate frequency coils | .45 |
| 3859 | Socket—4-contact rectifier Radiotron socket | .30 |
| 7484 | Socket—5-contact AVC Radiotron socket | .35 |
| 6676 | Socket—6-contact output Radiotron socket | .40 |
| 7485 | Socket—6-contact driver Radiotron socket | .40 |
| 7796 | Switch—Operating switch (S13) | .62 |
| 7795 | Tone control—Low frequency (R27) | 1.30 |
| 7797 | Tone control—High frequency (R34) | 1.35 |
| 7794 | Transformer—AVC intermediate frequency transformer (L34, L35) | .82 |
| 7785 | Transformer—Driver transformer (T3) | 2.40 |
| 7791 | Transformer—First intermediate frequency transformer (L29, L30, L31, C33, C34, C35) | 2.35 |
| 9505 | Transformer—Power transformer 105-125-volt, 50-60 cycle (T1) | 6.35 |
| 9506 | Transformer—Power transformer 105-125 volts, 25-40 cycles | 8.90 |
| 7792 | Transformer—Second intermediate frequency transformer (L32, L33, C39, C40, C45, C46) | 2.22 |

## REPLACEMENT PARTS—(Continued)

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | Description | List Price |
|---|---|---|
| 7793 | Transformer—Third intermediate frequency transformer (L36, L37, C49, C50, C52, R23) | $2.50 |
| 7786 | Transformer pack—Comprising one reactor and interstage transformer (L41, T2) | 4.25 |
| 7798 | Volume control (R31) | 2.05 |
| | R. F. UNIT ASSEMBLIES | |
| 4646 | Capacitor—4.5 mmfd. (C10) | .20 |
| 4416 | Capacitor—50 mmfd. (C19)—Package of 5 | 1.25 |
| 3981 | Capacitor—300 mmfd. (C8) | .30 |
| 4413 | Capacitor—360 mmfd. (C28) | .22 |
| 4412 | Capacitor—1120 mmfd. (C25) | .25 |
| 4524 | Capacitor—2850 mmfd. (C23) | .35 |
| 4615 | Capacitor—2850 mmfd. (C20) | .34 |
| 4417 | Capacitor—0.05 mfd. (C5, C15) | .25 |
| 4415 | Capacitor—0.1 mfd. (C7, C16) | .30 |
| 4645 | Capacitor—0.1 mfd. (C9, C31) | .36 |
| 3851 | Capacitor—Adjustable capacitor (C27, C30) | .78 |
| 4420 | Clamp—Antenna lead clamp and screw—Package of 10 | .40 |
| 4410 | Coil—Antenna coil—Band "D" (L1, L2) | .70 |
| 7803 | Coil—Antenna coil—"B"—"SW" (L3, L4, L7, L8, C1, C3) | 1.82 |
| 7810 | Coil—Antenna coil—"PB"—"LW" (L5, L6, L9, L10, C2, C4) | 2.10 |
| 7805 | Coil—Detector coil—"B-SW" (L13, L14, L17, L18, C11, C13) | 2.15 |
| 7808 | Coil—Detector coil—"PB-LW" (L15, L16, L19, L20, C12, C14) | 2.05 |
| 4421 | Coil—Detector coil—Band "D" (L11, L12) | .70 |
| 7807 | Coil—Oscillator coil—"B-SW" (L21, L22, L25, L26, C22, C26) | 1.62 |
| 7809 | Coil—Oscillator coil—"PB-LW" (L23, L24, L27, L28, C24, C29) | 1.70 |
| 7801 | Condenser—3-gang variable tuning condenser (C6, C17, C21) | 4.42 |
| 4419 | Lead—Shield single-conductor antenna lead | .45 |
| 4370 | Resistor—1,000 ohms—Carbon type—¼ watt (R5)—Package of 10 | 2.00 |
| 3602 | Resistor—60,000 ohms—Carbon type—¼ watt (R8)—Package of 5 | 1.00 |
| 3118 | Resistor—100,000 ohms—Carbon type—¼ watt (R1, R12)—Package of 5 | 1.00 |
| 4418 | Resistor—100 ohms—Flexible type (R2, R6)—Package of 10 | 1.50 |
| 7800 | Shield—Antenna, detector or oscillator coil shield | .45 |
| 4452 | Shield—First detector oscillator coil shield | .35 |
| 3683 | Shield—Radiotron shield top | .20 |
| 4454 | Shield—R. F. amplifier Radiotron shield | .44 |
| 3529 | Socket—Dial lamp socket | .32 |
| 7485 | Socket—6-contact Radiotron socket | .40 |
| 3572 | Socket—7-contact Radiotron socket | .38 |
| 4585 | Strip—Terminal strip engraved "ANT-GND" | .20 |
| 7802 | Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S11, S12) | 4.05 |

| Stock No. | Description | List Price |
|---|---|---|
| | CABLE ASSEMBLIES | |
| 7815 | Cable—Audio cable | $0.62 |
| 7813 | Cable—From L. F. tone control, volume control to resistor boards | .72 |
| 7812 | Cable—Main cable | 1.30 |
| 7814 | Cable—Reproducer cable—4-conductor | .45 |
| | REPRODUCER ASSEMBLIES | |
| 4193 | Board—Terminal board | .32 |
| 9509 | Coil—Field coil, magnet and cone support (L43) | 11.46 |
| 7000 | Cone—Reproducer cone (L42)—Package of 5 | 9.45 |
| 9508 | Reproducer complete | 17.40 |
| 6999 | Screen—Dust screen—Package of 6 | .12 |
| 4506 | Transformer—Output transformer and capacitor (T4, C56) | 2.85 |
| | MISCELLANEOUS ASSEMBLIES | |
| 4677 | Bezel—Metal bezel (escutcheon) for station selector dial | .56 |
| 6614 | Glass—Station selector dial glass | .30 |
| 4425 | Knob—Station selector knob—Package of 5 | .75 |
| 3829 | Knob—Volume control, tone control, noise suppressor or range switch knob—Package of 5 | 1.10 |
| 4340 | Lamp—Dial lamp—Package of 5 | .60 |
| 4678 | Ring—Station selector dial glass retaining ring—Package of 5 | .34 |
| 4119 | Screw—8-32—¼" headless set screw for knob—Stock Number 4425—Package of 20 | .38 |
| 4393 | Screw—8-32—5/16" headless set screw for knob—Stock Number 3829—Package of 10 | .25 |
| | DRIVE ASSEMBLIES | |
| 4362 | Arm—Band indicator operating arm | .28 |
| 10194 | Ball—Steel ball for variable condenser drive assembly—Package of 20 | .25 |
| 4422 | Clutch—Tuning condenser drive clutch assembly—Comprising drive shaft, balls, ring, spring and washers assembled | .88 |
| 4455 | Dial—Station selector dial | .60 |
| 7799 | Drive—Variable tuning condenser drive assembly complete | 2.45 |
| 4364 | Gear—Spring gear assembly complete with hub pinion, gear cover and spring | .96 |
| 4361 | Indicator—Band indicator—Celluloid-lettered D-C-B-A-X | .12 |
| 4363 | Pointer—Station selector main pointer—Large | .18 |
| 4367 | Pointer—Station selector vernier pointer—Small | .15 |
| 3993 | Screw—No. 6-32—5/32" square head set screw for variable condenser drive assembly—Package of 10 | .25 |
| 4377 | Spring—Band indicator and arm tension spring—Package of 5 | .25 |
| 4360 | Stem—Pointer stem assembly | .35 |
| 4378 | Stud—Band indicator operating arm stud—Package of 5 | .25 |

MODEL 301
Schematic
Chassis Wiring

RCA-VICTOR CO., INC.

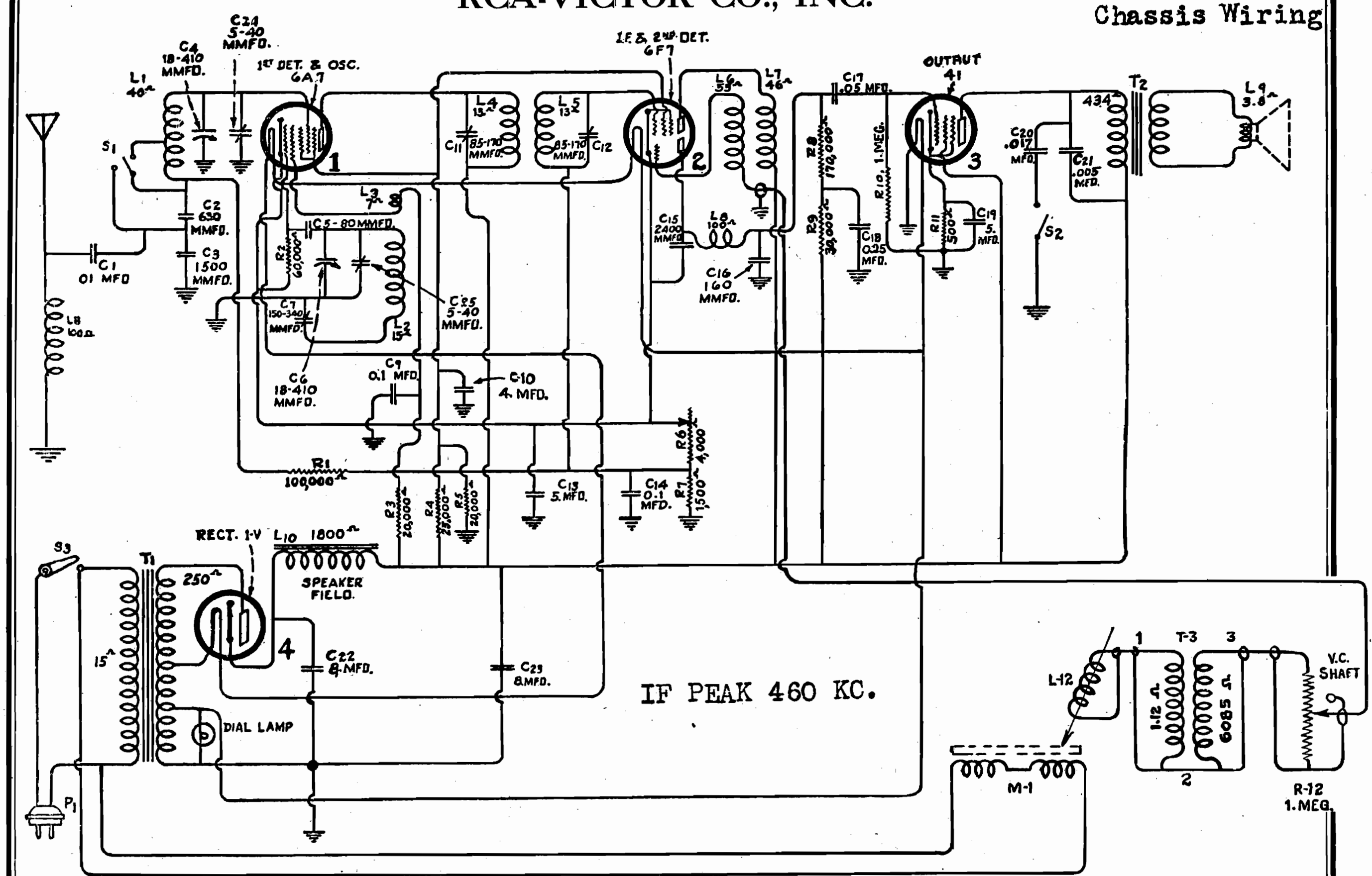



*Figure C—Schematic Circuit Diagram*

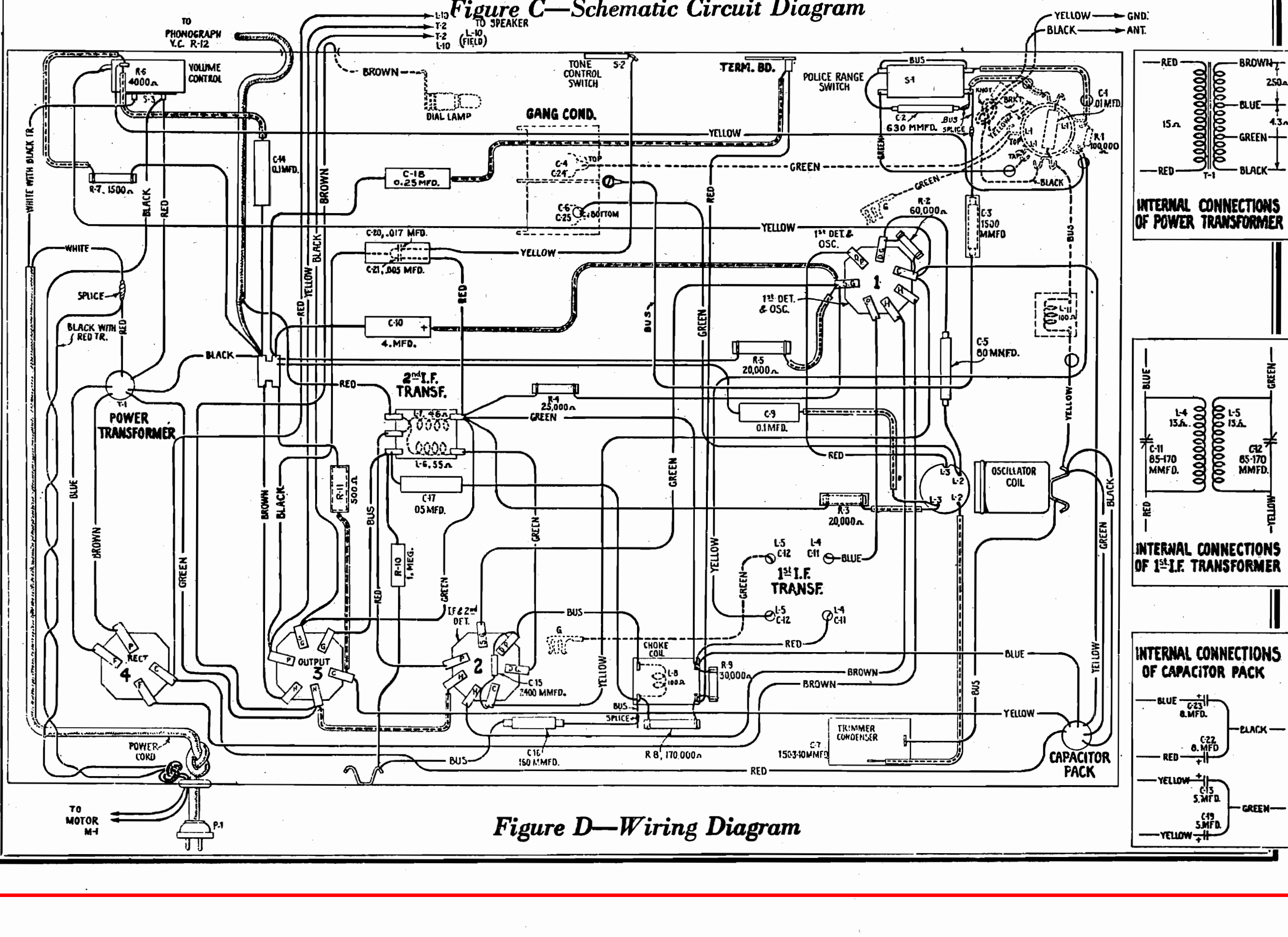



*Figure D—Wiring Diagram*

MODEL 301
Voltage, Alignment
Pickup Data

# RCA-VICTOR CO., INC.

# SERVICE DATA

Voltage Rating........................................105–125 Volts
Frequency Rating..................................25, 50 and 60 Cycles
Power Consumption........................................45 Watts
Number and Types of Radiotrons—
1 RCA-6A7, 1 RCA-6F7, 1 RCA-41, 1 RCA-1-V
Undistorted Output........................................1.9 Watts
Frequency Range..................540–1500 K. C. and 1600–3500 K. C.

This table type combination instrument consists of a four tube superheterodyne chassis and a new compactly constructed motor board assembly. The receiver incorporates features such as wide tuning range, electrodynamic loudspeaker, two-point tone control, illuminated dial and the inherent sensitivity, selectivity and tone quality of the super-heterodyne.

The following description of the circuit describes several new design features which are incorporated in this receiver.

The first tube is a combined first detector and oscillator using Radiotron RCA-6A7. Separate tuned circuits are provided for each function. The detector coil is tapped so that the tuning range may be extended merely by shorting out a portion of the coil. The oscillator circuit is not tapped, the high frequency range being obtained by use of its second harmonic instead of the fundamental for obtaining the I. F. frequency.

The next tube is a combined I. F. stage and second detector using Radiotron RCA-6F7. It has two sets of elements, one being used as a screen grid I. F. amplifier and one as a triode detector. The I. F. frequency in this receiver is 460 K. C. The output stage is a single Pentode RCA-41.

The rectifier is an RCA-1-V used in a half-wave rectifying circuit. A feature of this circuit is that only one transformer secondary is used. This is accomplished by having a cathode type rectifier, a series arrangement of filaments and a tapped secondary winding.

Figure A shows the pickup details, Figure B the assembly wiring, Figure C the schematic circuit and Figure D the wiring diagram and Figure E the loudspeaker wiring.

## RADIOTRON SOCKET VOLTAGES

### 120 Volt, 60 Cycle Line—Maximum Volume Control Setting—No Signal

| Radiotron No. | | Cathode to Control Grid, Volts D. C. | Cathode to Screen Grid, Volts D. C. | Cathode to Plate, Volts D.C. | Plate Current, M.A. | Heater or Filament, Volts |
|---|---|---|---|---|---|---|
| RCA-6A7 | First Detector | 1.25 | 70 | 235 | 2.5 | 6.3 |
| | Oscillator | — | — | 180 | 3.5 | |
| RCA-6F7 | I. F. | 1.25 | 70 | 235 | 5.5 | 6.3 |
| | Second Det. | 19 | — | 145* | 0.4 | |
| RCA-41 | Output | 17 | 240 | 230 | 26.5 | 6.3 |
| RCA-1-V | Rectifier | — | — | 335 RMS | 50 | 6.3 |

* Actual voltage cannot be measured with ordinary voltmeter.

## Line-Up Adjustments

The detector and oscillator line-up trimmer capacitors are adjusted by setting both the dial and an external oscillator first at 1400 K. C. and adjusting the tuning capacitor trimmer capacitors for maximum output, then changing the oscillator frequency and dial setting to 600 K. C. and adjusting the submounted trimmer capacitor for maximum output. The I. F. adjustments are made by adjusting the two trimmer capacitors located on the first I. F. transformer for maximum output when a 460 K. C. signal is connected between the control grid of the first detector and ground. Be sure and set the station selector at a point where no signal is being received when making I. F. adjustments.

## Pickup Service Data

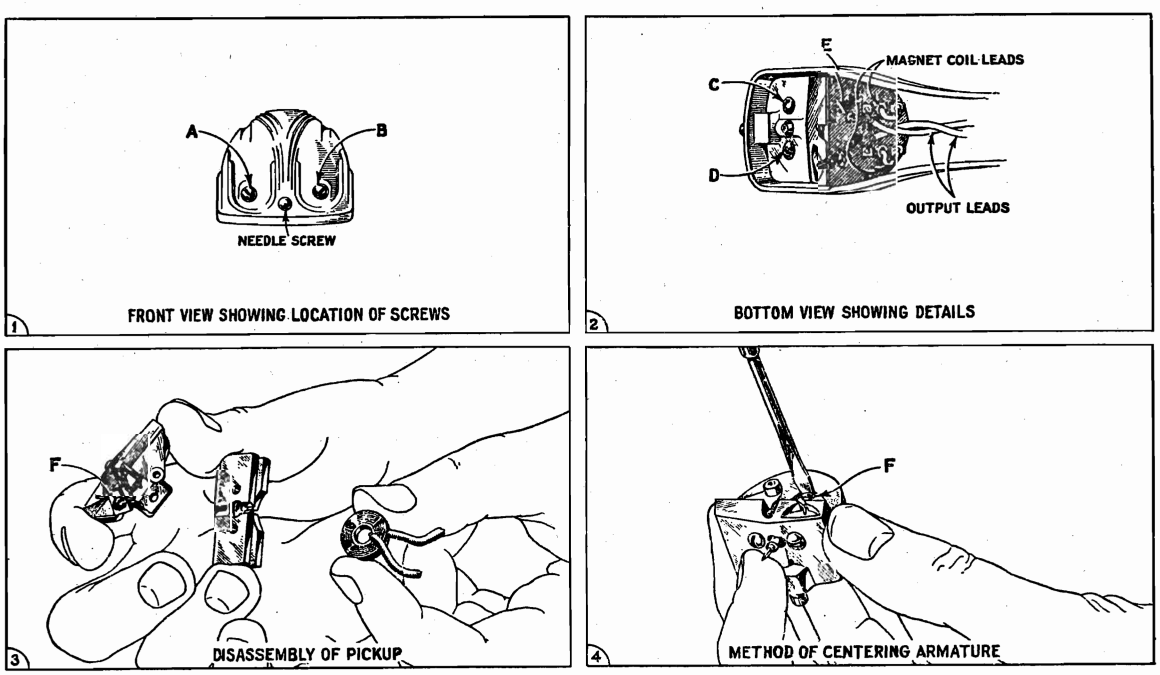
The magnetic pickup and tone-arm assembly of this instrument is of new design and unique construction. Service work will consist of centering the armature, replacing the rubber pivots and replacing the magnet coil.

## Disassembling the Pickup

The pickup may be disassembled in the following manner:

(a) Unsolder the two cable connections to the terminal strip.
(b) Remove the needle screw and screws "A" and "B."
(c) Remove the pickup assembly from the arm and housing.
(d) Unsolder the two magnet coil leads attached to the terminals and then remove screw E. This will allow the removal of the fibre terminal board.
(e) If centering the pickup armature is the only adjustment required, such centering can be done without removing the fibre terminal board indicated in (d). The armature is centered by loosening screw F, accessible through the hole shown, and holding the armature with the finger in proper position while screw F is tightened. "Feeling" the armature while deflecting it between its two extremes is the best manner of ascertaining proper centering. When centering, after work has been done or the magnet removed, it is important that the magnet be remagnetized while in place.
(f) If the coil or pivot rubbers are to be replaced, the pickup must be further disassembled. This is done by removing the magnet and then removing screws C and D. The pole piece may now be removed and the old coil and sleeve disassembled. Acetone will be found helpful for dissolving the old cement that holds the coil in place. The new coil, with its sleeve, may now be replaced and cemented in a similar position to that occupied by the old coil. Duco household or Ambroid cement may be used to hold the coil in place. Be careful to center the coil with its paper sleeve before cementing.
(g) The pivot rubbers are replaced by loosening the armature adjusting screw F and removing the armature from its bracket. The rubbers can then be removed by slipping them from each end of the pivot shaft.

It is important to remember that in all operations after reassembling but before placing in the tone arm, the pickup should be magnetized and the armature centered after remagnetizing. Magnetizing should be done by placing the pickup magnet on the magnetizer and sliding it onto the pole pieces, after magnetizing being careful not to break the magnetic circuit.



FRONT VIEW SHOWING LOCATION OF SCREWS
BOTTOM VIEW SHOWING DETAILS
DISASSEMBLY OF PICKUP
METHOD OF CENTERING ARMATURE

*Figure A—Pickup Details*

MODEL 301
Assembly Wiring
Phonograph Data

RCA-VICTOR CO., INC.

# PHONOGRAPH MOTOR SERVICE DATA

The synchronous motor used in this instrument is of simple design and foolproof construction. Among its many features are low power consumption, single moving part, ease of starting, oilless main bearing, resilient bumper, and long life with freedom from service repairs.

Figure E shows the main parts of the motor and the points that may require attention.

**Operation**—The two stator coils are connected in series and the motor is started by giving it a clockwise spin with the hand. If it is found to be difficult of starting, or if it runs at a sub-synchronous speed such as at 70 R. P. M., such action may result from one of the following causes:

*Difficult to Start*—This may be due to the stator failing to rotate on the outer bearing. This can be caused by the spaghetti sleeve being jammed in the slot, or sticking to the resilient bumper. The outer bearing not being properly lubricated may also cause this condition. It is important that the ball bearing be at the bottom of the main bearing assembly.

*Slow Speed*—If the turntable is jarred or slowed down, the motor may run at a sub-synchronous speed, such as 70 R. P. M. This is remedied by merely lifting the tone arm from the turntable, thereby removing the load. The turntable speed will then immediately increase to normal.

**Excessive Vibration and Hum**—A small amount of hum when starting decreasing to a negligible amount while running is normal. If excessive vibration occurs either at starting or running, it may be due to one of the following:

(1) Insufficient lubricant in outer bearing or any other failure that will cause the stator to bind.

(2) The metal washer should be above the leather washer at the bottom of the main bearing.

(3) Motor not properly supported from motor board. Unless the motor is properly supported from the motor board, normal vibration will be excessive.

**Removing Rotor from Stator**—The rotor which includes the turntable may be removed by loosening the screw shown in Figure E until it clears the rotor and then lifting the turntable. Be careful not to lose the ball end-bearing when this is removed. After replacing the rotor, tighten the restraining screw securely to eliminate the possibility of rattle in operation.

**Power Consumption**—The motor consumes 4 watts. It should never be turned on when the rotor is removed, as in this condition excessive current will be drawn with consequent increase in temperature.

NOTE: The above values of power consumption are average for a 60 cycle motor at 125 volts. At lower voltages the power consumption will be less.

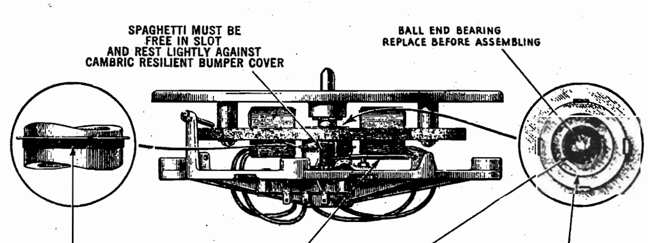



*Figure E—Details of Motor*

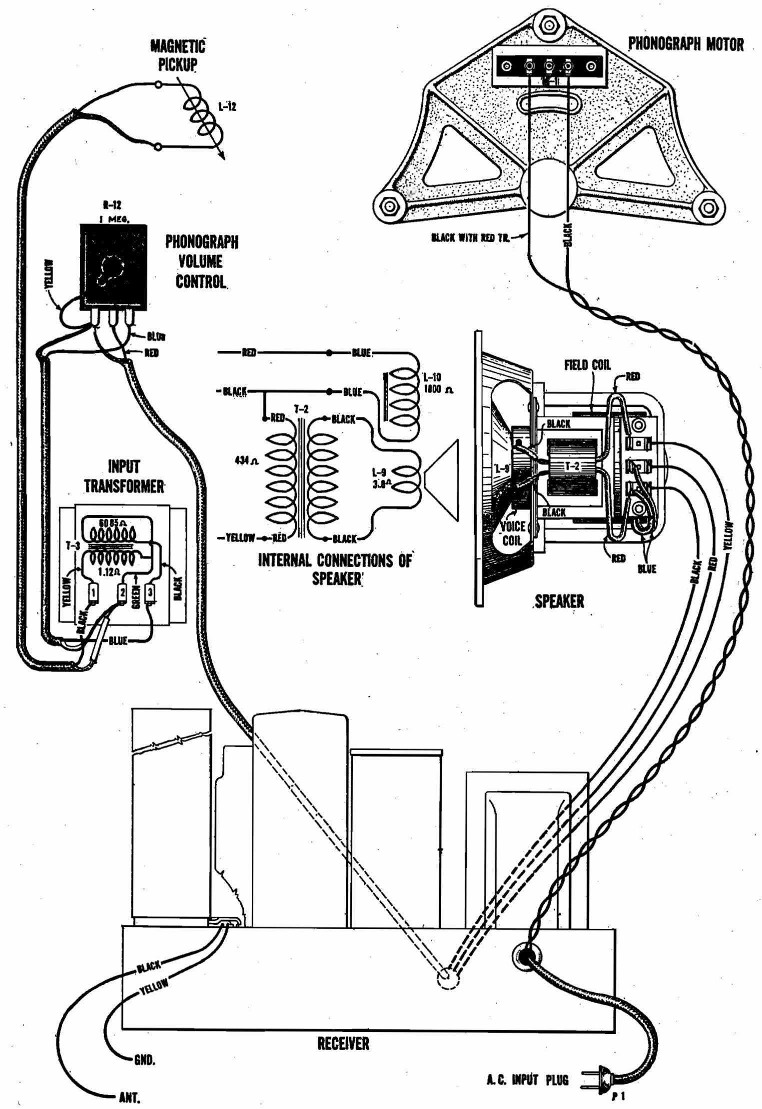



*Figure B—Assembly Wiring*

MODEL 301
Parts List

RCA-VICTOR CO., INC.

# REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | **RECEIVER ASSEMBLIES** | |
| 2747 | Contact cap—Package of 5 | $0.50 |
| 3047 | Resistor—1500 ohms—Carbon type—½ watt (R7)—Package of 5 | 1.00 |
| 3076 | Resistor—1 megohm—Carbon type—½ watt (R10)—Package of 5 | 1.00 |
| 3118 | Resistor—100,000 ohms—Carbon type—¼ watt (R1)—Package of 5 | 1.00 |
| 3077 | Resistor—30,000 ohms—Carbon type—½ watt (R9)—Package of 5 | 1.00 |
| 3459 | Capacitor—80 mmfd. (C5) | .44 |
| 3597 | Capacitor—0.25 mfd. (C18) | .40 |
| 3572 | Socket—7-contact Radiotron socket | .38 |
| 3584 | Ring—Oscillator coil retaining ring—Package of 5 | .40 |
| 3602 | Resistor—60,000 ohms—Carbon type—¼ watt (R2)—Package of 5 | 1.00 |
| 3603 | Resistor—500 ohms—Carbon type—1 watt (R11)—Package of 5 | 1.10 |
| 3641 | Capacitor—0.1 mfd. (C9) | .35 |
| 3682 | Shield—Radiotron shield | .22 |
| 3701 | Capacitor—0.01 mfd. (C1) | .30 |
| 3713 | Capacitor—0.05 mfd. (C17) | .32 |
| 3857 | Coil—Detector choke coil (L8) | .90 |
| 3858 | Socket—Dial lamp socket and bracket | .26 |
| 3859 | Socket—4-contact Radiotron socket | .30 |
| 3862 | Screw—Chassis mounting screw and washer—Package of 4 | .24 |
| 3865 | Capacitor—160 mmfd. (C16) | .30 |
| 3869 | Resistor—170,000 ohms—Carbon type—½ watt (R8)—Package of 5 | 1.00 |
| 3873 | Capacitor—1500 mmfd. (C3) | .30 |
| 3877 | Capacitor—0.1 mfd. (C14) | .32 |
| 3886 | Reflector—Dial light reflector | .30 |
| 3887 | Scale—Dial scale—Package of 5 | .60 |
| 3889 | Resistor—25,000 ohms—Carbon type—3 watt (R4) | .25 |
| 3917 | Capacitor—0.25 mfd. (C18) | .40 |
| 3932 | Capacitor—2400 mmfd. (C15) | .30 |
| 3933 | Capacitor—630 mmfd. (C2) | .32 |
| 4000 | Capacitor—Adjustable capacitor (C7) | .78 |
| 4018 | Coil—Choke coil (L11) | .90 |
| 6676 | Socket—6-contact socket | .40 |
| 6787 | Capacitor—Comprising one .005 mfd. and one .017 mfd. capacitors (C20, C21) | .30 |
| 6114 | Resistor—20,000 ohms—Carbon type—1 watt (R3, R5)—Package of 5 | 1.10 |
| 6660 | Condenser—2-gang variable condenser (C4, C6, C24, C25) | 2.78 |
| 6661 | Capacitor pack—Comprising two 5.0 mfd. and two 8.0 mfd. capacitors (C13, C19, C22, C23) | 2.70 |
| 6662 | Transformer—First intermediate frequency transformer (L4, L5, C11, C12) | 2.34 |
| 6663 | Transformer—Second intermediate frequency transformer (L6, L7) | 1.06 |
| 6664 | Coil—Oscillator coil (L2, L3) | .94 |
| 6665 | Shield—Oscillator coil shield and mounting bracket | .34 |
| 6666 | Coil—Antenna coil (L1, C1, R1) | 1.08 |
| 6667 | Volume control (R6, S3) | 1.58 |
| 6668 | Switch—Range switch (S1) | .58 |
| 6669 | Switch—Tone control switch (S2) | $0.50 |
| 6832 | Capacitor—4.0 mfd. (C10) | .86 |
| 9464 | Transformer—Power transformer—105-125 volts—50-60 cycles (T1) | 3.20 |
| 9465 | Transformer—Power transformer—105-125 volts—25-40 cycles | 4.38 |
| | **REPRODUCER ASSEMBLIES** | |
| 6788 | Transformer—Output transformer (T2) | 1.60 |
| 8987 | Cone—Reproducer cone complete (L9)—Package of 5 | 5.00 |
| 9437 | Coil assembly—Comprising field coil, magnet and cone support (L10) | 2.72 |
| 9467 | Reproducer complete | 5.15 |
| | **TURNTABLE AND MOTOR ASSEMBLIES** | |
| 3808 | Board—Motor terminal board | .20 |
| 4052 | Spring—Package of 5 | .40 |
| 3813 | Motor suspension assembly—Comprising one screw, one metal bushing, two rubber bushings, one flat washer, one lockwasher and one nut—3 sets | .56 |
| 4083 | Washer—Leather washer—Package of 10 | .20 |
| 4084 | Washer—Metal washer—Package of 10 | .26 |
| 7651 | Coil—Stator coil—60 cycle operation | .48 |
| 7652 | Coil—Stator coil—50 cycle operation | .48 |
| 7653 | Lamination—Stator laminations—Assembled—60 cycle operation—110 or 220 volts | .66 |
| 7654 | Lamination—Stator laminations—Assembled—50 cycle operation | .66 |
| 7655 | Lamination—Rotor lamination assembly—60 cycle operation | 1.00 |
| 7656 | Lamination—Rotor lamination assembly—50 cycle operation | 1.00 |
| 7657 | Base—Motor base and bearing assembly | 1.20 |
| 7714 | Lamination—Rotor laminations—Assembled—60 cycles—220 volts | 1.76 |
| 7715 | Coil—Stator coil—60 cycles—220 volts | .68 |
| 9038 | Motor complete—105-125 volts—60 cycles | 4.20 |
| 9039 | Motor complete—105-125 volts—50 cycles | 4.20 |
| 9040 | Turntable complete—With spindle for 50 or 60 cycle operation | 1.16 |
| 10194 | Ball—Steel ball bearing—Package of 20 | .25 |
| | **PICKUP AND ARM ASSEMBLIES** | |
| 3811 | Screw—Needle holding screw—Package of 10 | .46 |
| 3812 | Armature | .32 |
| 6825 | Pickup and arm assembly complete | 4.82 |
| 6826 | Coil—Pickup coil (L12) | .64 |
| | **MISCELLANEOUS PARTS** | |
| 3961 | Knob—Phonograph volume control knob—Package of 5 | .60 |
| 4075 | Knob—Range switch or volume control knob—Package of 5 | 1.00 |
| 4086 | Knob—Tone control switch knob—Package of 5 | 1.00 |
| 4087 | Screw and washer—Chassis mounting screw and washer assembly—Package of 4 | .20 |
| 6827 | Volume control—Phonograph volume control (R12) | 1.46 |
| 6828 | Transformer—Phonograph input transformer (T3) | 2.60 |

RCA-VICTOR CO., INC.

## Electrical Specifications

Voltage Rating......................................105–125 Volts
Frequency Rating..............................25, 50 and 60 Cycles
Power Consumption....50 and 60 Cycle, 100 Watts; 25 Cycle 105 Watts
Number and Type of Radiotrons..........................2 RCA-58
1 RCA-2A7 1 RCA-2B7 1 RCA-2A5 1 RCA-80—Total 6.
Tuning Ranges.........540 K. C.–1500 K. C.—5400 K. C.–15,350 K. C.
Undistorted Output.....................................1.75 Watts

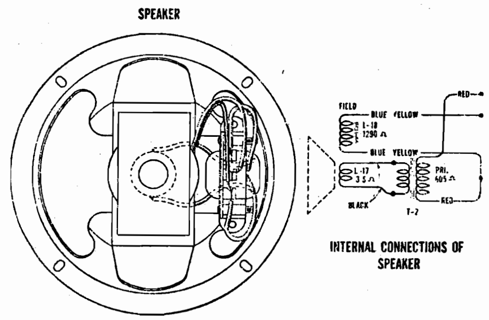



*Figure D—Loudspeaker Wiring*

This "Selective Short-Wave" combination instrument utilizes the new six tube double band superheterodyne together with the standard two-speed motor board assembly. Excellent quality of record reproduction together with unusual radio performance characterize this instrument.

The receiver is a six-tube two-band A. C. operated Superheterodyne receiver combining the standard and short-wave broadcasting bands. The frequency ranges are selected by means of a two position switch. Other features include a double reduction vernier tuning drive using two concentric knobs giving a 10–1 and a 55–1 ratio of speed reduction, a continuously variable tone control, six-inch electrodynamic loudspeaker, automatic volume control, single Pentode output tube and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

The chassis is of compact construction, affording unusual accessibility to all parts and adjustments. An "Airplane" type dial calibrated in frequency and showing the location of the short-wave bands is a special feature of this instrument. Figure A shows the schematic circuit, Figure B the wiring diagram, Figure C the assembly wiring and Figure D the loudspeaker wiring. Service data on the magnetic pickup is given on one of the following pages.

## Line-Up Capacitor Adjustments

In order to properly align this receiver it is essential that Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 150 K. C. to 25,000 K. C. continuously, has good stability and includes an attenuator. In addition to the oscillator, a non-metallic screwdriver such as Stock No. 7065 and an output meter are required. The output meter should be preferably a thermo-couple galvanometer connected across or in place of the cone coil of the loudspeaker.

**I. F. Tuning Adjustments**—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 370 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

(a) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(b) Connect the test oscillator output between the first detector control grid, and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

**R. F. and Oscillator Adjustments**—The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K. C. series capacitor, which is accessible from the rear of the chassis. Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the position of the indicator pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 54. Then set the Test Oscillator at 1400 K. C., the dial indicator at 140 and the oscillator output so that a slight deflection will be obtained in the output meter when the volume control is at its maximum position.

(b) With the Range Switch at the "in" position, adjust the three trimmers under the three R. F. coils designated as L. W. in Figure D, until a maximum deflection is obtained in the output meter. Then shift the Test Oscillator frequency to 600 K. C. The trimmer capacitor accessible from the rear of the chassis should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1400 K. C. adjustment.

(c) Now place the Range Switch at the "out" position, shift the Test Oscillator to 15,000 K. C. and set the dial at 150. Adjust the three trimmer capacitors designated as SW in Figure D for a peak, beginning with the oscillator trimmer. It will be noted that the oscillator and first detector trimmers will have two peaks. The position which uses the lower trimmer capacitance, obtained by turning the screw counter-clockwise, is the proper adjustment for the oscillator while the position that uses a higher capacitance is correct for the detector. *Both of these adjustments must be made as indicated irrespective of output.* The R. F. is merely peaked. In conjunction with the detector adjustment, it is necessary to rock the main tuning capacitor back and forth while making the adjustment. This completes the line-up adjustments.

The important points to remember are the need for using the minimum oscillator output to obtain a deflection in the output meter with the volume control at its maximum position and the manner of obtaining the proper high frequency oscillator and detector adjustments.

## Power Transformer Connections

The power transformer used in this model has a tapped primary winding. The transformer is normally connected for lines ranging in voltage from 110 to 125 volts. If for any reason the line is normally below 110 volts, the connections should be changed so the tap will be used. This is done by unsoldering the black with red tracer transformer lead connected to the power switch (on tone control) and substituting the red and black lead normally taped up. The black with red tracer lead should then be carefully taped to prevent short-circuit.

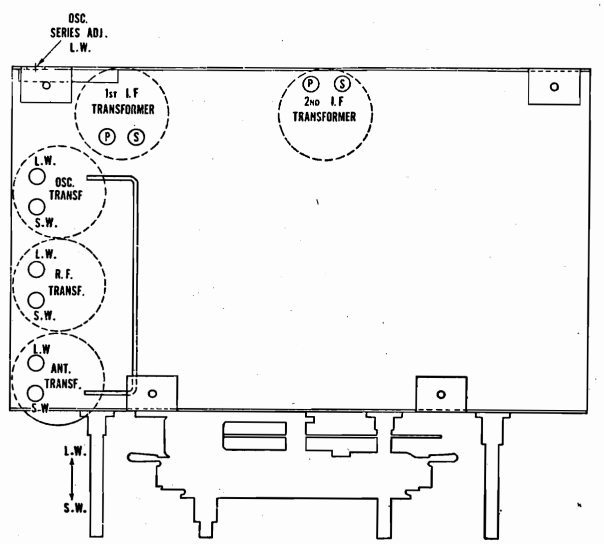



*Figure E—Location of Line-Up Capacitors*

## TUBE SOCKET VOLTAGES (RADIO OPERATION)

### 115 VOLTS, A. C. Line—No Signal

| Radiotron No. | Cathode to Control Grid, Volts | Cathode to Screen Grid, Volts | Cathode to Plate, Volts | Plate Current M. A. | Heater Volts |
|---|---|---|---|---|---|
| 1. RCA-58 R. F. | 3.0 | 100 | 265 | 6.0 | 2.32 |
| 2. RCA-2A7 1st Det. Osc. | 3.0 | 100* | 265* | 2.0* | 2.32 |
| 3. RCA-58 I. F. | 3.0 | 100 | 265 | 6.0 | 2.32 |
| 4. RCA-2B7 2nd Det. A. V. C. | 1.5 | 35 | 100 | 1.5 | 2.32 |
| 5. RCA-2A5 Power | 16.0 | 255 | 240 | 35.0 | 2.32 |
| 6. RCA-80 Rectifier | 725 Volts R. M. S.—75 M. A. Total Current | | | | 4.80 |

* The voltages and current refer to the detector part of the tube.

MODEL Duo 320
Schematic

# RCA-VICTOR CO., INC.

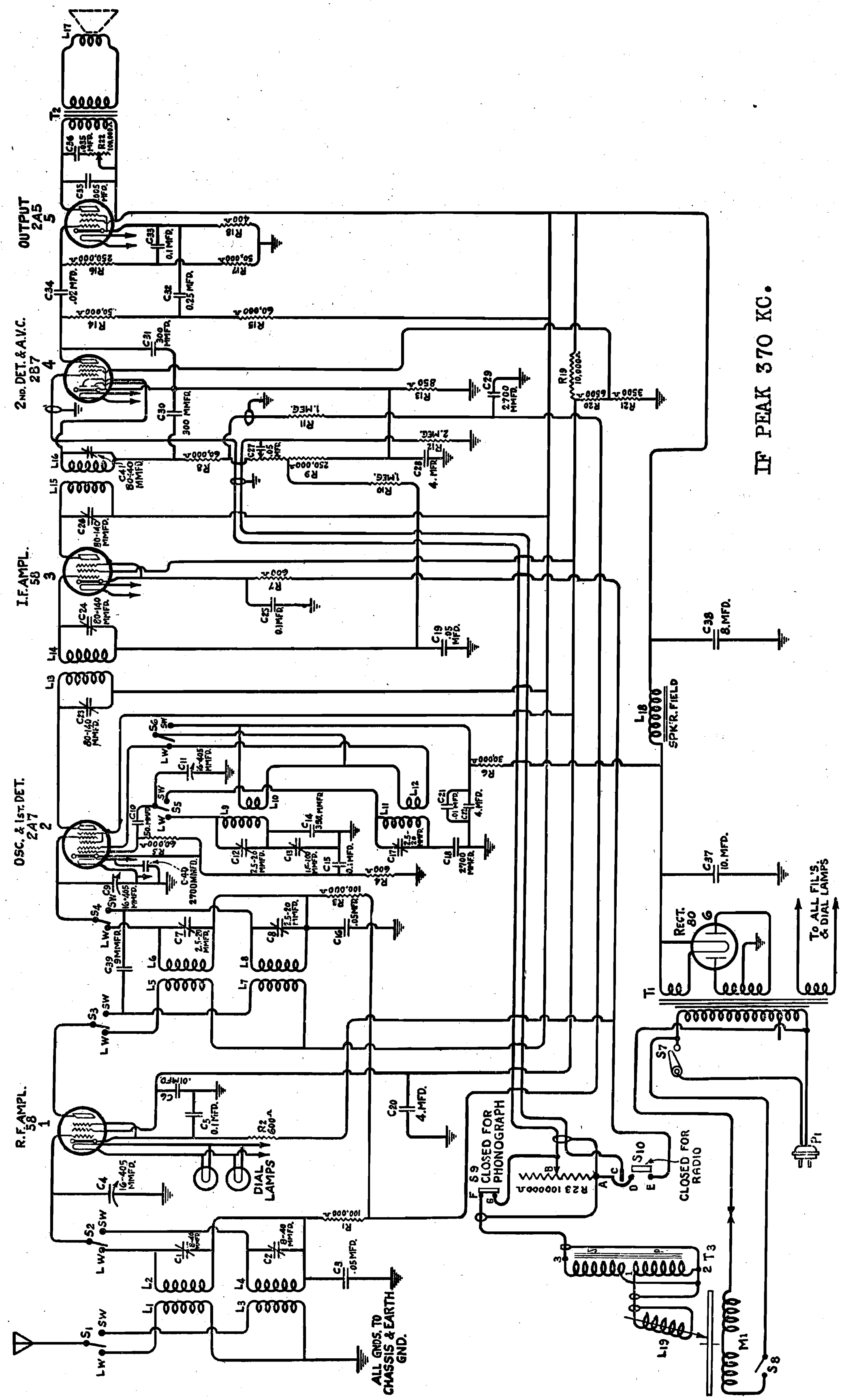



*Figure A—Schematic Circuit Diagram*

**MODEL Duo 320**
**Chassis Wiring**

# RCA-VICTOR CO., INC.

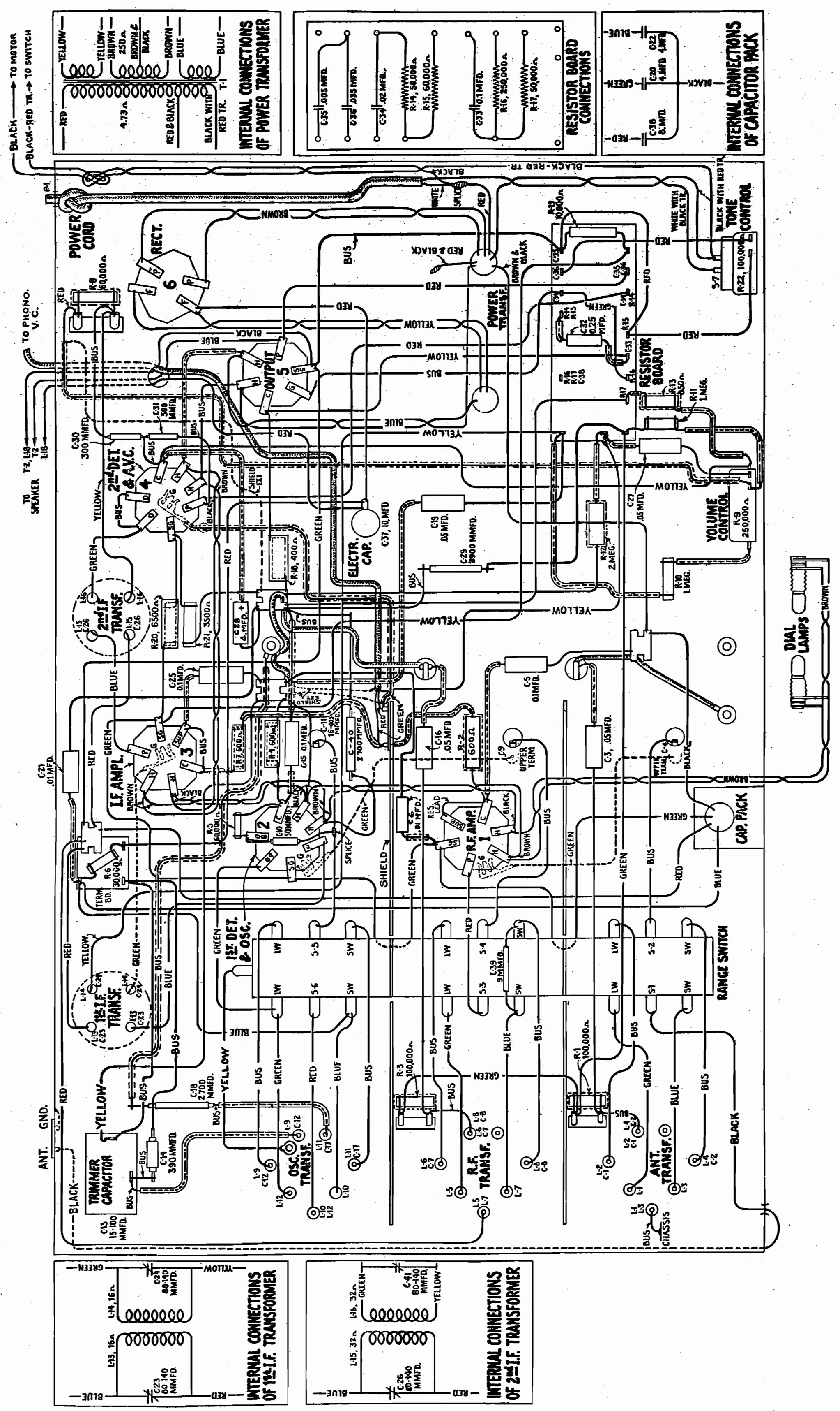



*Figure B—Wiring Diagram*

MODEL Duo 320
Assembly Wiring

RCA-VICTOR CO., INC.

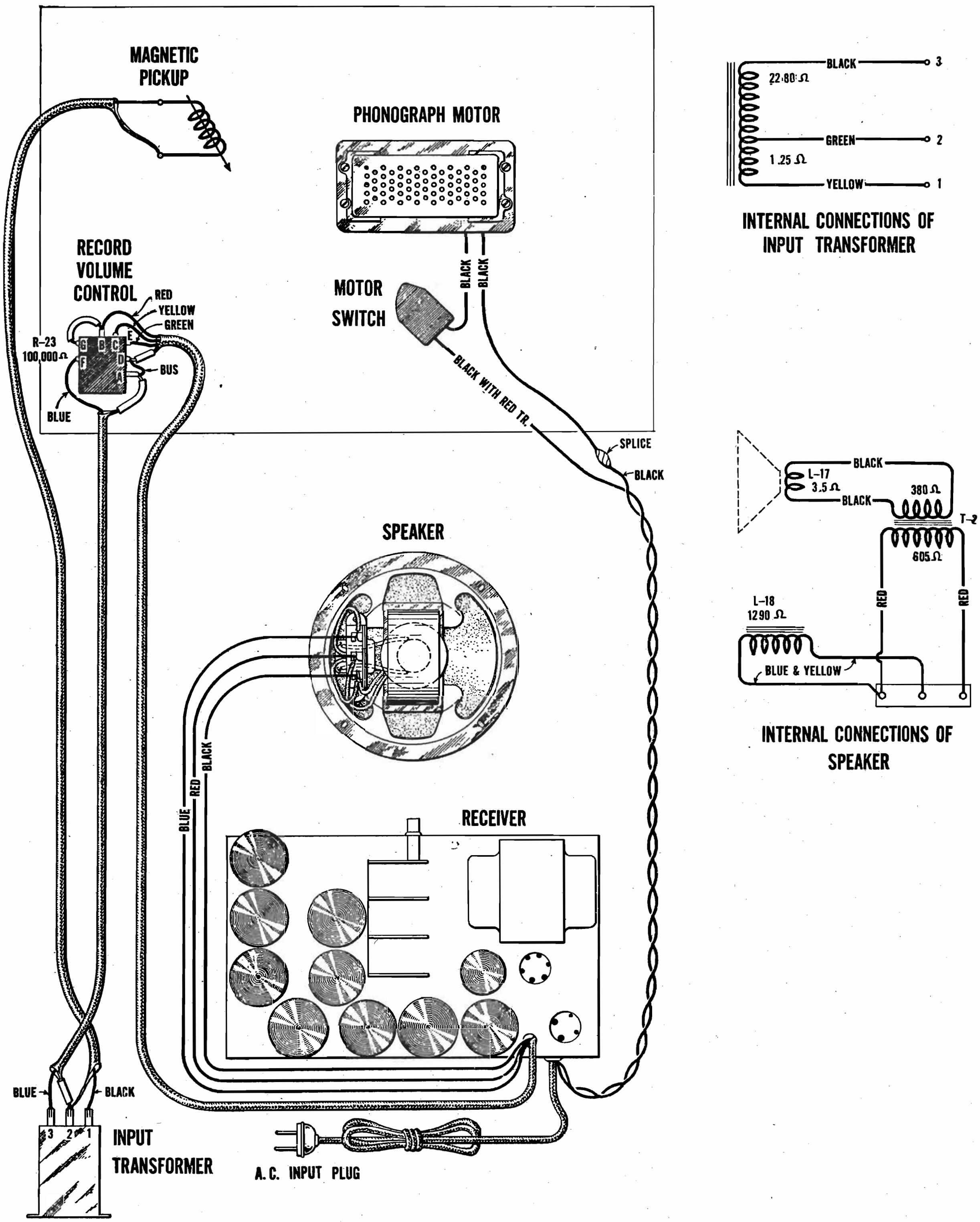



*Figure C—Assembly Wiring Diagram*

RCA-VICTOR CO., INC.

# SERVICE DATA FOR MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

## Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or the hardened pivot rubbers (see Figure G), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

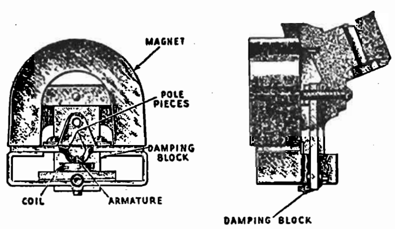



*Figure F*

(d) Remove screws A and B, Figure G, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure G), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

## Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

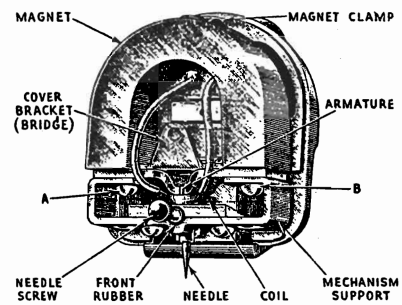



*Figure G*

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure H, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called

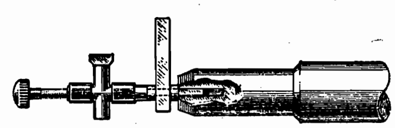


*Figure H*

acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the airgap as explained under (h).

MODEL Duo 320
Parts List

RCA-VICTOR CO., INC.

# REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | **RECEIVER ASSEMBLIES** | |
| 2240 | Resistor—30,000 ohms—Carbon type—1 watt (R6) | $0.22 |
| 2747 | Cap—Contact cap—Package of 5 | .50 |
| 3056 | Shield—Second detector Radiotron shield—Package of 2 | .40 |
| 3076 | Resistor—1 megohm—Carbon type—½ watt (R10, R11)—Package of 5 | 1.00 |
| 3118 | Resistor—100,000 ohms—Carbon type—¼ watt (R1, R3)—Package of 5 | 1.00 |
| 3470 | Resistor—6,500 ohms—Carbon type—1 watt (R20)—Package of 5 | 1.10 |
| 3514 | Resistor—250,000 ohms—Carbon type—½ watt (R16)—Package of 5 | 1.00 |
| 3529 | Socket—Dial lamp socket | .32 |
| 3572 | Socket—7-contact Radiotron socket | .38 |
| 3594 | Resistor—50,000 ohms—Carbon type—½ watt (R14, R17)—Package of 5 | 1.00 |
| 3631 | Resistor—850 ohms—Carbon type—½ watt (R13)—Package of 5 | 1.00 |
| 3639 | Capacitor—0.02 mfd. (C34) | .25 |
| 3683 | Shield—Radiotron shield top | .20 |
| 3701 | Capacitor—0.01 mfd. (C6, C21) | .30 |
| 3702 | Capacitor—0.25 mfd. (C32) | .42 |
| 3768 | Screw—Square head No. 6–32–¼″ set screw for condenser drive—Package of 10 | .35 |
| 3796 | Capacitor—4.0 mmfd. (C28) | .60 |
| 3849 | Capacitor—50 mmfd. (C10) | .30 |
| 3859 | Socket—4-contact Radiotron socket | .30 |
| 3861 | Capacitor—Adjustable capacitor (C13) | .78 |
| 3877 | Capacitor—0.1 mfd. (C5, C15, C25, C33) | .32 |
| 3878 | Screw—No. 4–40–3/16″ screw for fastening station selector pointer—Package of 20 | .25 |
| 3881 | Escutcheon—Volume control escutcheon | .42 |
| 3888 | Capacitor—0.05 mfd. (C19, C27) | .25 |
| 3892 | Resistor—600 ohms—Carbon type—½ watt (R2, R4, R7)—Package of 5 | 1.00 |
| 3897 | Resistor—400 ohms—Carbon type—1 watt (R18)—Package of 5 | 1.10 |
| 3899 | Escutcheon—Station selector escutcheon | .42 |
| 3901 | Capacitor—0.05 mfd. (C3, C16) | .36 |
| 3902 | Knob—Station selector knob complete | .44 |
| 3903 | Screw—No. 8–32–3/16″ headless cup point set screw for station selector knob—Package of 20 | .36 |
| 3904 | Knob—Volume control knob—Package of 5 | .88 |
| 3905 | Screw—Chassis mounting screw assembly—Comprising 4 screws, 4 washers and 4 cushions | .46 |
| 3906 | Mounting assembly—Variable condenser mounting assembly—Comprising 3 bushings, 3 lockwashers, 3 nuts and 3 washers | .28 |
| 3935 | Capacitor—340 mmfd. (C14) | .34 |
| 3936 | Capacitor—3,900 mmfd. (C18, C29, C40) | .68 |
| 3937 | Capacitor—300 mmfd. (C30, C31) | .34 |
| 3938 | Capacitor—9 mmfd. (C39) | .25 |
| 3939 | Resistor—3,500 ohms—Carbon type—½ watt (R21)—Package of 5 | 1.00 |
| 3940 | Pointer—Station selector pointer—Package of 5 | .50 |
| 3941 | Dial—Station selector dial—Package of 5 | 1.75 |
| 3942 | Shield—First detector Radiotron shield | .18 |
| 3943 | Screen—Translucent screen for dial light—Package of 2 | .18 |
| 3944 | Shield—Antenna, R. F. or oscillator coil shield | .28 |
| 3991 | Resistor—10,000 ohms—Porcelain type (R19) | .60 |
| 6188 | Resistor—2 megohm—Carbon type—½ watt (R12)—Package of 5 | 1.00 |
| 6282 | Resistor—60,000 ohms—Carbon type—½ watt (R5, R8, R15)—Package of 5 | 1.00 |
| 6571 | Capacitor—10 mmfd. (C37) | 1.20 |
| 6620 | Capacitor—Comprising one .005 mfd. and one .035 mfd. (C35, C36) | .50 |
| 6676 | Socket—6-contact Radiotron socket—Output | .40 |
| 6694 | Condenser—3-gang variable tuning condenser (C4, C9, C11) | 3.75 |
| 6695 | Volume control (R9) | 1.20 |
| 6696 | Switch—Range switch (S1, S2, S3, S4) | 2.24 |
| 6697 | Transformer—First intermediate frequency transformer (L13, L14, C23, C24) | 1.80 |
| 6698 | Transformer—Second intermediate frequency transformer (L15, L16, C26) | 1.78 |
| 6699 | Coil—R. F. coil (L5, L6, L7, L8, C7, C8) | 2.44 |
| 6700 | Coil—Oscillator coil (L9, L10, L11, L12, C12, C17) | 2.30 |
| 6701 | Coil—Antenna coil (L1, L2, L3, L4, C1, C2) | 2.64 |
| 6702 | Drive—Variable tuning condenser drive assembly complete | 1.86 |
| 6703 | Capacitor pack—Comprising one 8.0 mmfd. and two 4.0 mmfd. capacitors (C20, C22, C38) | 2.46 |
| 6704 | Shaft—Tuning condenser drive assembly shaft | .64 |
| 6705 | Tone control complete (R22) | 1.20 |
| 6707 | Glass—Station selector dial glass | .20 |
| 6708 | Ring—Retaining ring for dial glass—Package of 5 | .44 |
| 6755 | Bezel—Metal bezel for station selector dial | .50 |
| 7065 | Screw driver—For I. F. and R. F. adjustments | .80 |

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| 7485 | Socket—6-contact Radiotron socket | $0.40 |
| 7487 | Shield—I. F. and R. F. amplifier Radiotron shield | .25 |
| 9446 | Transformer—Power transformer—105–125 volts—50–60 cycles (T1) | 5.40 |
| 9451 | Transformer—Power transformer—105–125 volts—25–40 cycles | 5.40 |
| 10194 | Ball—Steel ball for condenser drive assembly—Pkg. of 20 | .25 |
| | **PICKUP, PICKUP ARM ASSEMBLIES** | |
| 3385 | Coil—Pickup coil | .50 |
| 3386 | Cover—Pickup cover | .56 |
| 3387 | Screw assembly—Pickup mounting screw assembly—Comprising one screw, one nut and one washer—10 sets | .40 |
| 3388 | Screw—Pickup needle holding screw—Pkg. of 10 | .60 |
| 3389 | Rod—Automatic brake trip rod with lock nut—Package of 5 | .40 |
| 3390 | Escutcheon—Pickup arm escutcheon complete with mounting rivets | .46 |
| 3417 | Armature—Pickup armature | .72 |
| 3418 | Cushions—Pickup rubber cushions—Comprising one damper and two spacer cushions and one damper bushing—Package of 5 sets | 1.10 |
| 3419 | Screw—Pickup cover mounting screw—Package of 10 | .40 |
| 6335 | Pickup—Pickup unit complete | 4.00 |
| 6346 | Back—Pickup housing back | .45 |
| 7693 | Arm—Pickup arm complete less escutcheon, pickup, pickup mounting screw, nut and washer | 6.00 |
| | **TURNTABLE ASSEMBLIES** | |
| 3261 | Bushing—Rubber bushing—Used on turntable spindle for long-playing records—Package of 5 | .40 |
| 3338 | Ring—Clamp ring assembly—Comprising spring, latch lever and stud | .50 |
| 3340 | Washer—Thrust washer—Package of 2 | .56 |
| 3341 | Pin—Groov-Pin—Package of 2 | .56 |
| 3342 | Spring—Latch spring—Located on clamping ring—Package of 2 | .56 |
| 3343 | Sleeve—Sleeve complete with ball race | 2.86 |
| 3344 | Cover—Grease retainer cover—Package of 2 | .70 |
| 3346 | Bushing—Speed shifter lever bushing—Package of 4 | .66 |
| 3347 | Spring—Speed shifter lever spring—Package of 2 | .30 |
| 3399 | Lever—Speed shifter lever with mounting screws | .50 |
| 7084 | Cover—Suede cover for turntable | .40 |
| 8948 | Turntable—Complete | 5.50 |
| | **MOTOR ASSEMBLIES** | |
| 3599 | Motor mounting washer assembly—Comprising one screw, one washer and one lockwasher—Package of 3 sets | .30 |
| 8989 | Motor—Motor complete—105–125 volts—60 cycles | 18.52 |
| 8990 | Motor—Motor complete—105–125 volts—50 cycles | 18.52 |
| 8991 | Motor—Motor complete—105–125 volts—40 cycles | 23.36 |
| 8992 | Motor—Motor complete—105–125 volts—25 cycles | 23.36 |
| 8993 | Rotor and shaft for 105–125 volts, 60 cycles motor | 7.00 |
| 8994 | Spindle—Turntable spindle with fibre gear for 60 cycles motor | 4.75 |
| 8995 | Rotor and shaft for 105–125 volts, 50 cycles motor | 7.00 |
| 8996 | Spindle—Turntable spindle with fibre gear for 50 cycles motor | 4.75 |
| 8997 | Rotor and shaft for 105–125 volts, 40 cycles motor | 8.00 |
| 8998 | Spindle—Turntable spindle with fibre gear for 40 cycles motor | 5.50 |
| 8999 | Rotor and shaft for 105–125 volts, 25 cycles motor | 8.00 |
| 9001 | Spindle—Turntable spindle with fibre gear for 25 cycles motor | 5.50 |
| | **MISCELLANEOUS PARTS** | |
| 2947 | Leather—Friction leather—Package of 20 | .50 |
| 3322 | Switch—Automatic brake switch with mounting screws (S8) | .75 |
| 3430 | Box—Needle box with lid—Package of 2 | .90 |
| 3615 | Knob—Tone control, range switch, or phonograph volume control knob—Package of 5 | .60 |
| 3994 | Cover—Motor starting switch cover | .26 |
| 6757 | Volume control—Phonograph volume control (R23, S9, S10) | 2.70 |
| 6758 | Transformer—Phonograph input transformer (T3) | 2.70 |
| 9050 | Oscillator—Test oscillator—150 to 25,000 K. C. | 33.50 |
| 10174 | Springs—Automatic brake springs—One set of 4 springs | .50 |
| 10184 | Plate—Automatic brake latch trip plate with mounting screws—Package of 5 | .40 |
| | **REPRODUCER ASSEMBLIES** | |
| 6476 | Transformer—Output transformer (T2) | 1.44 |
| 9428 | Cone—Reproducer cone complete (L17)—Package of 5 | 5.00 |
| 9449 | Reproducer complete | 5.20 |
| 9450 | Coil—Field coil magnet and cone support (L18) | 2.80 |

MODEL Duo 321
Alignment Data
Voltage

RCA-VICTOR CO., INC.

# SERVICE DATA

## Electrical Specifications

Voltage Rating........................................105–125 Volts
Frequency Rating ...........................25, 30, 50 and 60 Cycles
Power Consumption..30, 50 and 60 Cycle, 105 Watts; 25 Cycle, 110 Watts
Number and Type of Radiotrons.............................2 RCA-58
1 RCA-2A7, 1 RCA-2B7, 1 RCA-2A5, 1 RCA-80—Total 6
Tuning Ranges...... 540 K. C.–1500 K. C. and 5400 K. C.–15,350 K. C.
Undistorted Output.........................................1.75 Watts

This "Selective Short-Wave" combination instrument utilizes the new six tube double band superheterodyne together with the standard two-speed motor board assembly. Excellent quality of record reproduction together with unusual radio performance characterize this instrument.

The receiver is a six-tube two-band A. C. operated Superheterodyne receiver combining the standard and short-wave broadcasting bands. The frequency ranges are selected by means of a two position switch. Other features include a double reduction vernier tuning drive using two concentric knobs giving a 10–1 and a 55–1 ratio of speed reduction, a continuously variable tone control, eight-inch electrodynamic loudspeaker, automatic volume control, single Pentode output tube and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

The chassis is of compact construction, affording unusual accessibility to all parts and adjustments. An "Airplane" type dial calibrated in frequency and showing the location of the short-wave bands is a special feature of this instrument. Figure A shows the schematic circuit, Figure B the wiring diagram, Figure C the assembly wiring and Figure D the location of the line-up capacitors. Service data on the magnetic pickup is given on one of the following pages.

## Line-Up Capacitor Adjustments

In order to properly align this receiver it is essential that Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 150 K. C. to 25,000 K. C. continuously, has good stability and includes an attenuator. In addition to the oscillator, a non-metallic screwdriver such as Stock No. 7065 and an output meter are required. The output meter should be preferably a thermo-couple galvanometer connected across or in place of the cone coil of the loudspeaker.

**I. F. Tuning Adjustments**—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 370 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

(a) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(b) Connect the test oscillator output between the first detector control grid, and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

**R. F. and Oscillator Adjustments**—The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K. C. series capacitor, which is accessible from the rear of the chassis. Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the position of the indicator pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 540. Then set the Test Oscillator at 1400 K. C., the dial indicator at 1400 and the oscillator output so that a slight deflection will be obtained in the output meter when the volume control is at its maximum position.

(b) With the Range Switch at the "in" position, adjust the three trimmers under the three R. F. coils designated as L. W. in Figure D, until a maximum deflection is obtained in the output meter. Then shift the Test Oscillator frequency to 600 K. C. The trimmer capacitor accessible from the rear of the chassis should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1400 K. C. adjustment.

(c) Now place the Range Switch at the "out" position, shift the Test Oscillator to 15,000 K. C. and set the dial at 15 on megacycle scale. Adjust the three trimmer capacitors designated as S.W. in Figure D for a peak, beginning with the oscillator trimmer. It will be noted that the oscillator and first detector trimmers will have two peaks. The position which uses the lower trimmer capacitance, obtained by turning the screw counter-clockwise, is the proper adjustment for the oscillator while the position that uses a higher capacitance is correct for the detector. *Both of these adjustments must be made as indicated irrespective of output.* The R. F. is merely peaked. In conjunction with the detector adjustment, it is necessary to rock the main tuning capacitor back and forth while making the adjustment. This completes the line-up adjustments.

The important points to remember are the need for using the minimum oscillator output to obtain a deflection in the output meter with the volume control at its maximum position and the manner of obtaining the proper high frequency oscillator and detector adjustments.

## Power Transformer Connections

The power transformer used in this model has a tapped primary winding. The transformer is normally connected for lines ranging in voltage from 110 to 125 volts. If for any reason the line is normally below 110 volts, the connections should be changed so the tap will be used. This is done by unsoldering the black with red tracer transformer lead connected to the power switch (on tone control) and substituting the red and black lead normally taped up. The black with red tracer lead should then be carefully taped to prevent short-circuit.

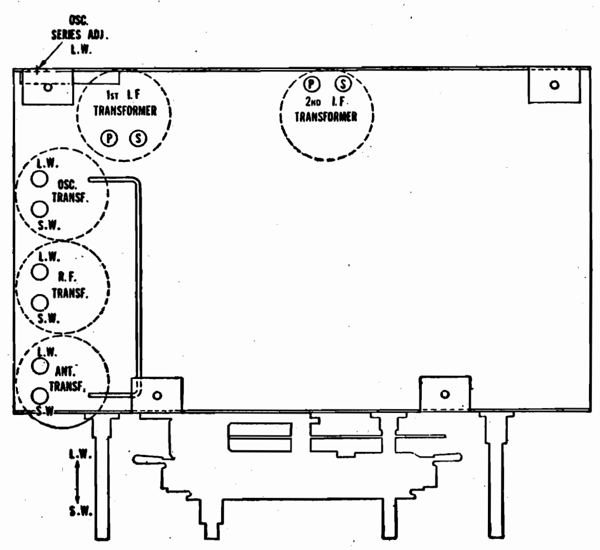



*Figure D—Location of Line-Up Capacitors*

# TUBE SOCKET VOLTAGES (RADIO OPERATION)

### 115 VOLTS, A. C. Line—No Signal

| Radiotron No. | Cathode to Control Grid, Volts | Cathode to Screen Grid, Volts | Cathode to Plate, Volts | Plate Current M. A. | Heater Volts |
|---|---|---|---|---|---|
| 1. RCA-58 R. F. | 3.0 | 100 | 265 | 6.0 | 2.32 |
| 2. RCA-2A7 1st Det. Osc. | 3.0 | 100* | 265* | 2.0* | 2.32 |
| 3. RCA-58 I. F. | 3.0 | 100 | 265 | 6.0 | 2.32 |
| 4. RCA-2B7 2nd Det. A. V. C. | 1.5 | 35 | 100 | 1.5 | 2.32 |
| 5. RCA-2A5 Power | 16.0 | 255 | 240 | 35.0 | 2.32 |
| 6. RCA-80 Rectifier | 725 Volts R. M. S.—75 M. A. Total Current | | | | 4.80 |

* The voltages and current refer to the detector part of the tube.

MODEL Duo 321
Schematic

# RCA-VICTOR CO., INC.

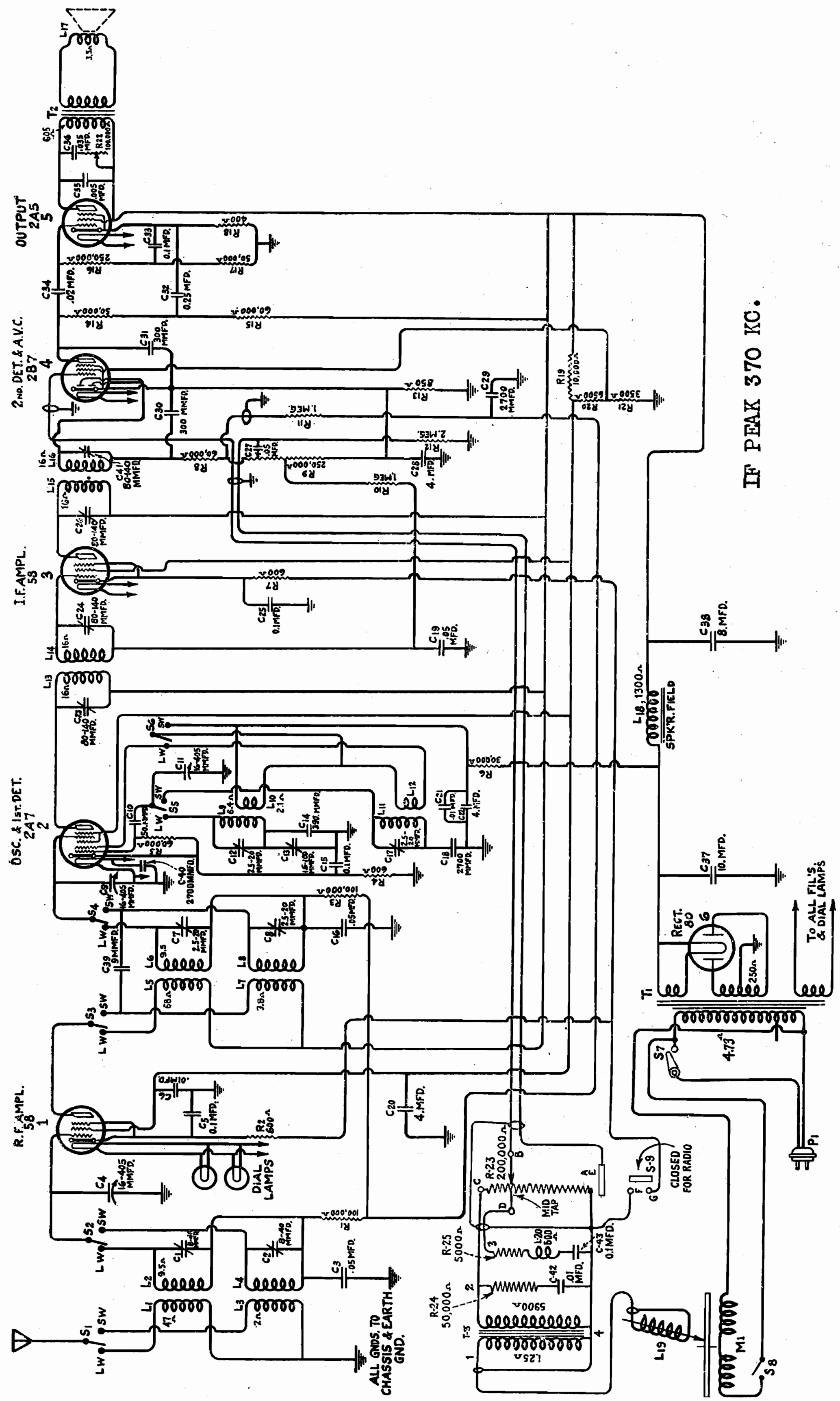



*Figure A—Schematic Circuit Diagram*

MODEL Duo 321
Chassis Wiring

# RCA-VICTOR CO., INC.

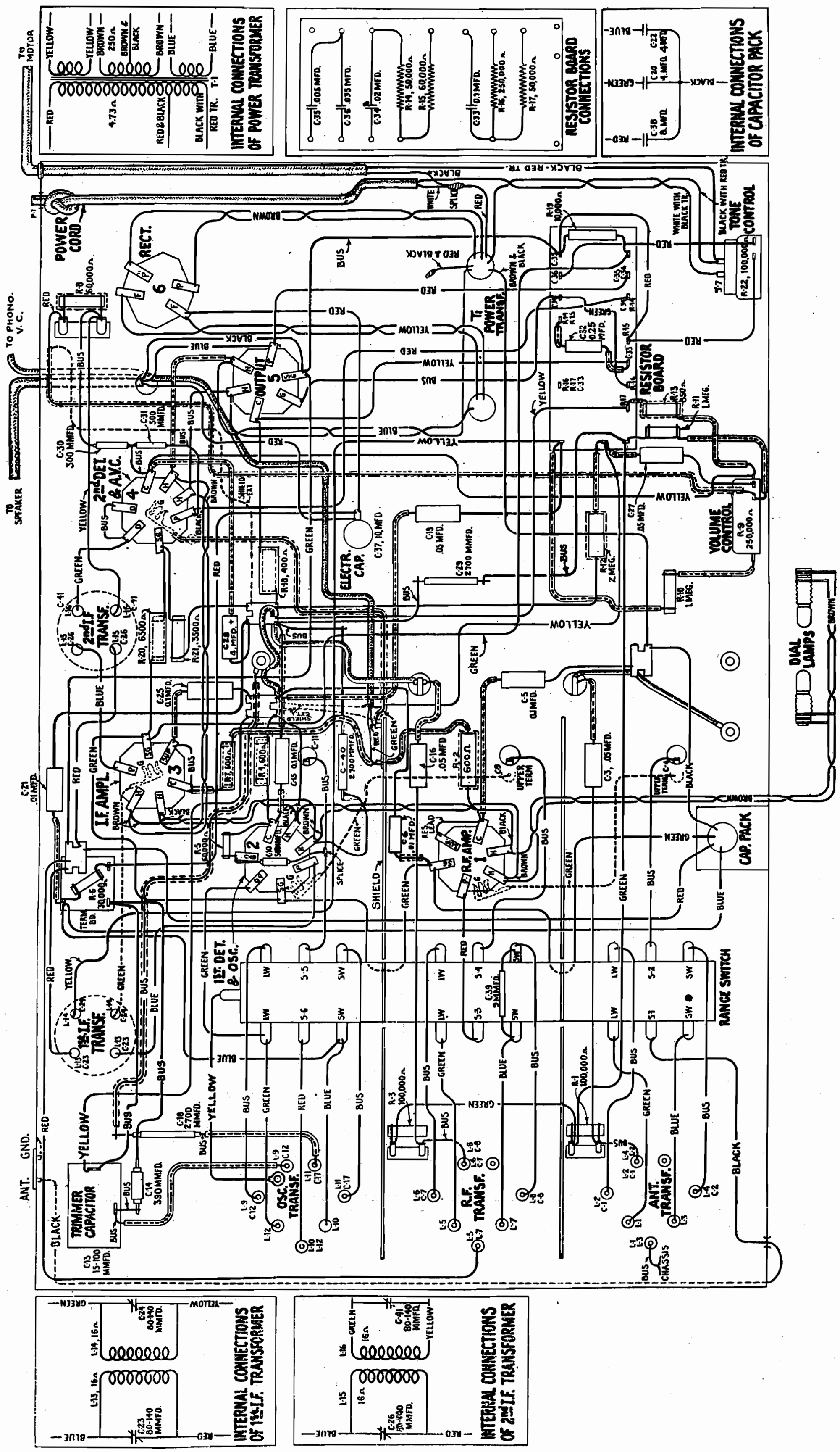



*Figure B—Chassis Wiring Diagram*

MODEL Duo 321
Assembly Wiring

RCA-VICTOR CO., INC.

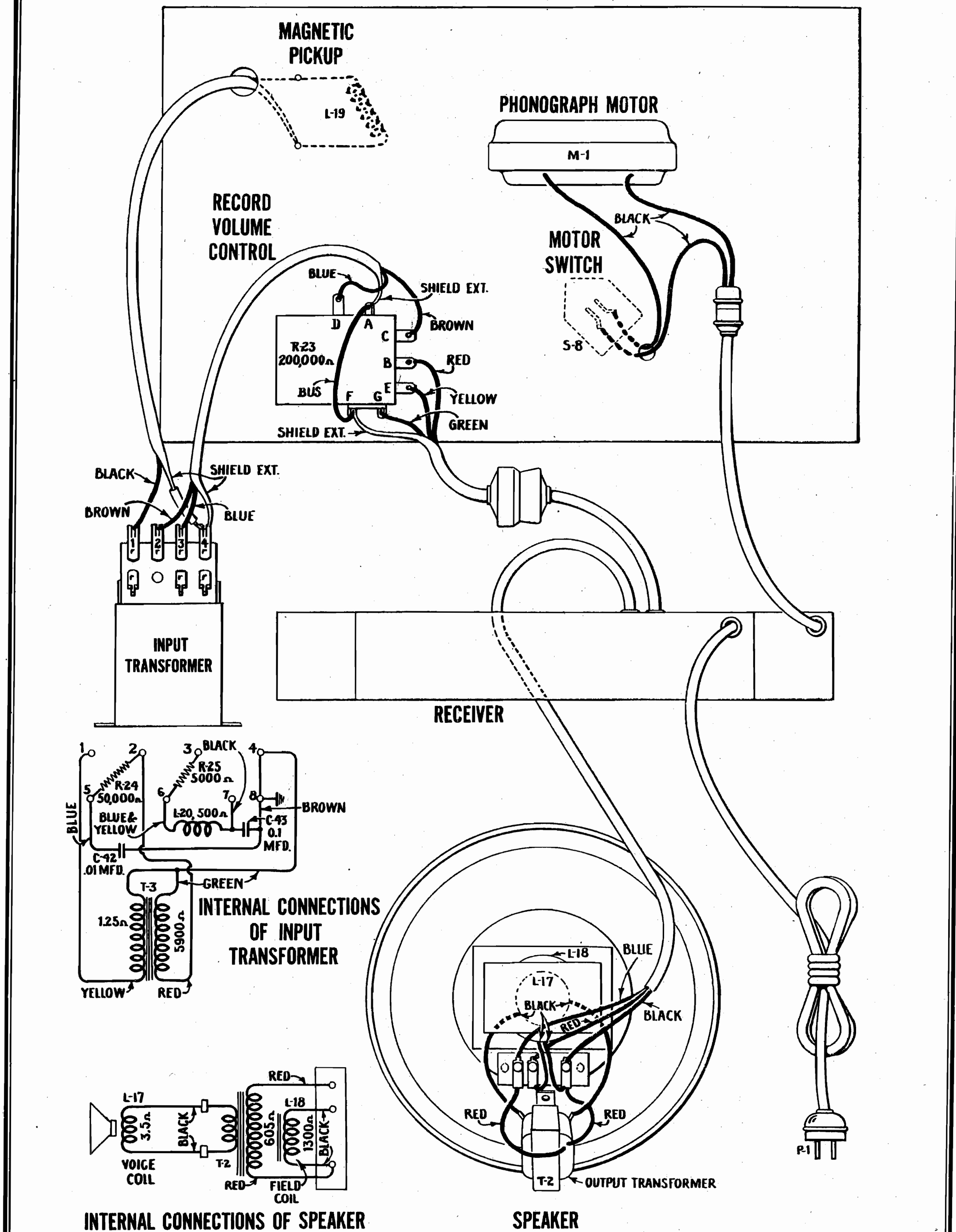



*Figure C—Assembly Wiring Diagram*

RCA-VICTOR CO., INC.

# SERVICE DATA ON MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance, it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

## Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or the hardened pivot rubbers (see Figure F), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

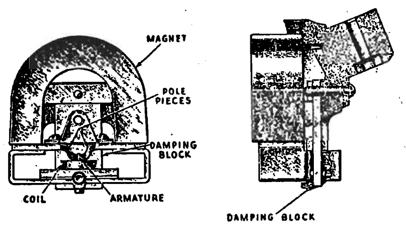



*Figure E*

(d) Remove screws A and B, Figure F, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure F), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

## Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

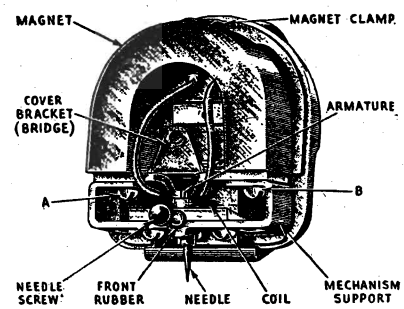



*Figure F*

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure G, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called

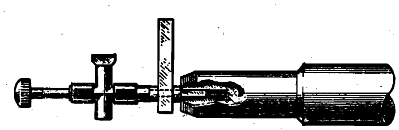


*Figure G*

acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the airgap as explained under (h).

**MODEL Duo 321**
**Parts List**

RCA-VICTOR CO., INC.

# REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

### RECEIVER ASSEMBLIES

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| 2240 | Resistor—30,000 ohms—Carbon type—1 watt (R6) | $0.22 |
| 2747 | Cap—Contact cap—Package of 5 | .50 |
| 3056 | Shield—2nd detector Radiotron shield—Package of 2 | .40 |
| 3076 | Resistor—1 megohm—Carbon type—½ watt (R10, R11)—Package of 5 | 1.00 |
| 3252 | Resistor—100,000 ohms—Carbon type—½ watt (R1, R3)—Package of 5 | 1.00 |
| 3470 | Resistor—6,500 ohms—Carbon type—1 watt (R20)—Package of 5 | 1.10 |
| 3514 | Resistor—250,000 ohms—Carbon type—½ watt (R16)—Package of 5 | 1.00 |
| 3529 | Socket—Dial lamp socket | .32 |
| 3572 | Socket—7-contact Radiotron socket | .38 |
| 3594 | Resistor—50,000 ohms—Carbon type—½ watt (R14, R17)—Package of 5 | 1.00 |
| 3631 | Resistor—850 ohms—Carbon type—½ watt (R13)—Package of 5 | 1.00 |
| 3639 | Capacitor—.02 mfd. (C34) | .25 |
| 3683 | Shield—Radiotron shield top | .20 |
| 3701 | Capacitor—.01 mfd. (C6, C21) | .30 |
| 3702 | Capacitor—.25 mfd. (C32) | .42 |
| 3768 | Screw—Square head No. 6-32-¼" set screw for condenser drive—Package of 10 | .35 |
| 3796 | Capacitor—4. mfd. (C28) | .60 |
| 3849 | Capacitor—50 mmfd. (C10) | .30 |
| 3859 | Socket—4-contact Radiotron socket | .30 |
| 3861 | Capacitor—Adjustable capacitor (C13) | .78 |
| 3877 | Capacitor—.1 mfd. (C5, C15, C25, C33) | .32 |
| 3878 | Screw—No. 4-40-3/16" screw for fastening station selector pointer—Package of 20 | .25 |
| 3888 | Capacitor—.05 mfd. (C19, C27) | .25 |
| 3892 | Resistor—600 ohms—Carbon type—½ watt (R2, R4, R7)—Package of 5 | 1.00 |
| 3897 | Resistor—400 ohms—Carbon type—1 watt (R18)—Package of 5 | 1.10 |
| 3901 | Capacitor—.05 mfd. (C3, C16) | .36 |
| 3906 | Mounting assembly—Variable condenser mounting assembly comprising 3 bushings, 3 lockwashers, 3 nuts, and 3 washers | .28 |
| 3937 | Capacitor—300 mmfd. (C30, C31) | .34 |
| 3938 | Capacitor—9 mmfd. (C39) | .25 |
| 3939 | Resistor—3,500 ohms—Carbon type—½ watt (R21)—Package of 5 | 1.00 |
| 3942 | Shield—1st detector Radiotron shield | .18 |
| 3943 | Screen—Translucent screen for dial light—Package of 2 | .18 |
| 3944 | Shield—Antenna, R. F. or oscillator coil shield | .28 |
| 3991 | Resistor—10,000 ohms—Porcelain type (R19) | .60 |
| 4031 | Capacitor—2,700 mmfd. (C18, C29, C40) | .50 |
| 4032 | Capacitor—390 mmfd. (C14) | .34 |
| 4119 | Screw—No. 8-32-¼" headless cup point set screw for station selector knob—Package of 20 | .38 |
| 6188 | Resistor—2 megohm—Carbon type—½ watt (R12)—Package of 5 | 1.00 |
| 6282 | Resistor—60,000 ohms—Carbon type—½ watt (R5, R8, R15)—Package of 5 | 1.00 |
| 6571 | Capacitor—10 mfd. (C37) | 1.20 |
| 6620 | Capacitor—Comprising one .005 mfd. and one .035 mfd. (C35, C36) | .50 |
| 6676 | Socket—6-contact Radiotron socket—Output | .40 |
| 6694 | Condenser—3-gang variable tuning condenser (C4, C9, C11) | 3.75 |
| 6695 | Volume control (R9) | 1.20 |
| 6696 | Switch—Range switch (S1, S2, S3, S4) | 2.24 |
| 6697 | Transformer—First intermediate frequency transformer (L13, L14, C23, C24) | 1.80 |
| 6698 | Transformer—Second intermediate frequency transformer (L15, L16, C26, C41) | 1.78 |
| 6699 | Coil—R. F. coil (L5, L6, L7, L8, C7, C8) | 2.44 |
| 6700 | Coil—Oscillator coil (L9, L10, L11, L12, C12, C17) | 2.30 |
| 6701 | Coil—Antenna coil (L1, L2, L3, L4, C1, C2) | 2.64 |
| 6702 | Drive—Variable tuning condenser drive assembly complete | 1.86 |
| 6703 | Capacitor pack—Comprising one 8. mfd. and two 4. mfd. capacitors (C20, C22, C38) | 2.46 |
| 6704 | Shaft—Tuning condenser drive assembly shaft | .64 |
| 6705 | Tone control complete (R22) | 1.20 |
| 6841 | Dial—Station selector dial—Package of 5 | 2.74 |
| 6842 | Pointer—Station selector pointer—Package of 5 | .46 |
| 7485 | Socket—6-contact Radiotron socket | .40 |
| 7487 | Shield—I. F. and R. F. amplifier Radiotron shield | .25 |
| 9446 | Transformer—Pow ertransformer—105-125 volts—50-60 cycles (T1) | 5.40 |
| 9451 | Transformer—Power transformer—105-125 volts—25-50 cycles | 5.40 |
| 10194 | Ball—Steel ball for condenser drive assembly—Package of 20 | .25 |

### PICKUP AND PICKUP ARM ASSEMBLIES

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| 3386 | Cover—Pickup cover | .56 |
| 3387 | Screw assembly—Pickup mounting screw assembly comprising one screw, one nut and one washer—Package of 10 | .40 |
| 3388 | Screw—Pickup needle holding screw—Package of 10 | .60 |
| 3389 | Rod—Automatic brake trip rod—Package of 5 | .40 |
| 3417 | Armature—Pickup armature | $0.72 |
| 3419 | Screw—Cover mounting screw—Package of 10 | .40 |
| 3516 | Damper assembly—Comprising 1 upper and 1 lower damper 1 upper and 1 lower bearing—For pickup base | .14 |
| 3521 | Cover—Pickup back cover | .18 |
| 3737 | Damper—Viscoloid damping block—Package of 5 | .65 |
| 6346 | Back—Pickup housing back | .45 |
| 6601 | Pickup—Magnetic pickup complete | 4.54 |
| 6602 | Coil—Pickup coil (L19) | .65 |
| 7731 | Arm—Pickup arm complete less pickup and escutcheon | 5.40 |

### TURNTABLE ASSEMBLIES

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| 3261 | Bushing—Rubber bushing—Used on turntable spindle for long playing records—Package of 5 | .50 |
| 3338 | Ring—Clamp ring assembly—Comprising spring, latch lever and stud | .50 |
| 3340 | Washer—Thrust washer—Package of 2 | .56 |
| 3341 | Pin—Groov-Pin—Package of 2 | .56 |
| 3342 | Spring—Latch spring—Located on clamping ring—Package of 2 | .56 |
| 3343 | Sleeve—Sleeve complete with ball race | 2.86 |
| 3344 | Cover—Grease retainer cover—Package of 2 | .70 |
| 3346 | Bushing—Speed shifter lever bushing—Package of 4 | .66 |
| 3347 | Spring—Speed shifter lever spring—Package of 2 | .30 |
| 3399 | Lever—Speed shifter lever with mounting screws | .50 |
| 8948 | Turntable—Complete | 5.50 |

### MOTOR ASSEMBLIES

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| 3398 | Motor mounting assembly—Comprising 2 cup washers, 4 springs and 1 "C" washer | .48 |
| 3817 | Stud—Motor mounting stud—Package of 3 | .18 |
| 8989 | Motor—Motor complete—105-125 volts—60 cycle | 18.52 |
| 8990 | Motor—Motor complete—105-125 volts—50 cycle | 18.52 |
| 8991 | Motor—105-125 volts—40 cycles | 23.36 |
| 8992 | Motor—Motor complete—105-125 volts—25 cycle | 23.36 |
| 8993 | Rotor and shaft for 105-125 volts, 60 cycle motor | 7.00 |
| 8994 | Spindle—Turntable spindle with fibre gear for 60 cycle motor | 4.75 |
| 8995 | Rotor and shaft for 105-125 volts—50 cycle motor | 7.00 |
| 8996 | Spindle—Turntable spindle with fibre gear for 50 cycle motor | 4.75 |
| 8997 | Rotor and shaft for 105-125 volts—40 cycle motor | 8.00 |
| 8998 | Spindle—Turntable spindle with fibre gear for 40 cycle motor | 5.50 |
| 8999 | Rotor and shaft for 105-125 volts—25 cycle motor | 8.00 |
| 9001 | Spindle—Turntable spindle with fibre gear for 25 cycle motor | 5.50 |

### MISCELLANEOUS PARTS

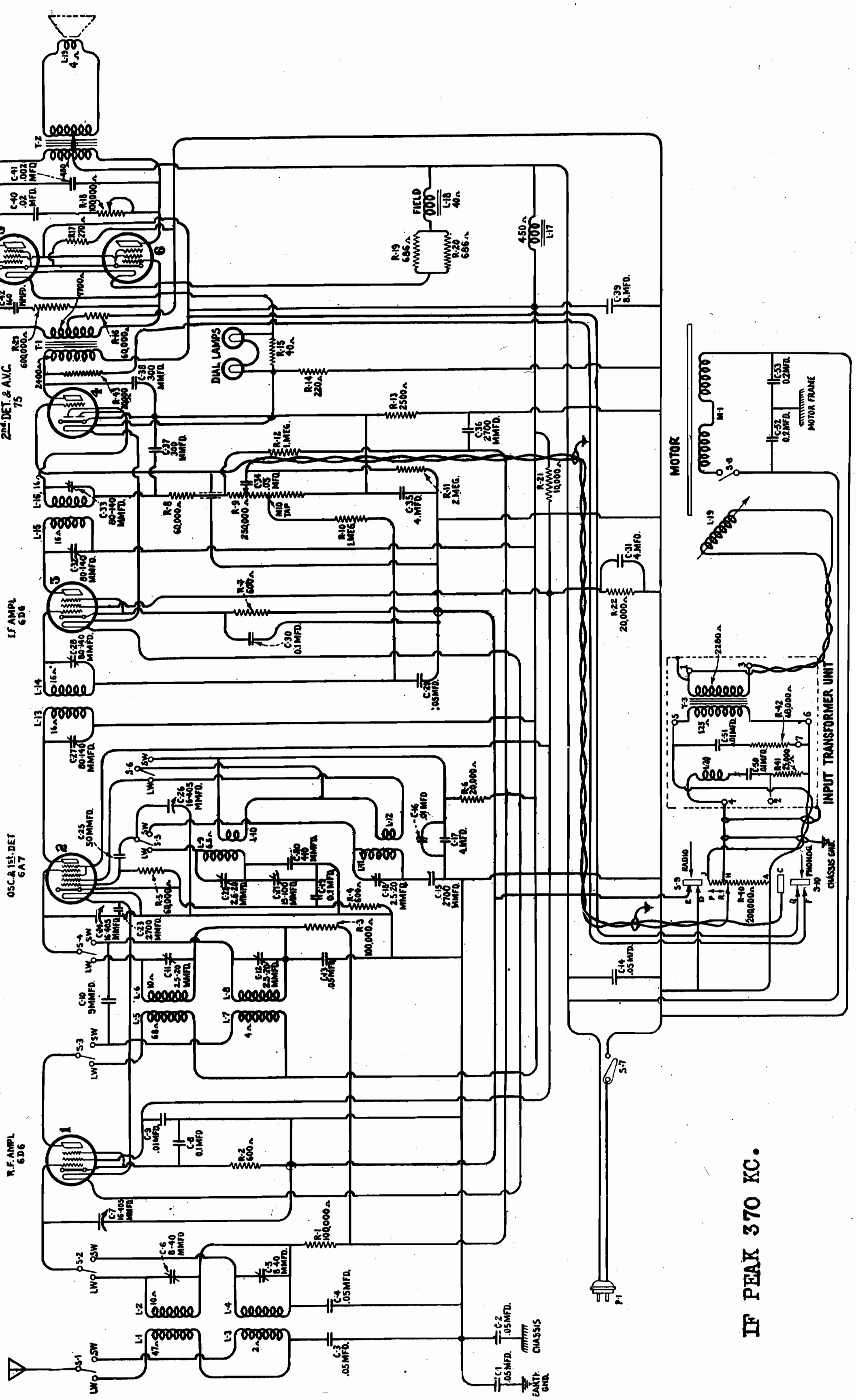
| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| 2947 | Leather—Friction leather—Package of 20 | .50 |
| 3322 | Switch—Automatic brake switch with mounting screws (S8) | .75 |
| 3391 | Suspension spring and washer assembly for motor board—Comprising one bolt, one top spring, one bottom spring, 2 cup washers, one "C" washer, and one nut | .50 |
| 3430 | Box—Needle box with lid—Package of 2 | .90 |
| 3994 | Cover—Automatic switch brake cover | .26 |
| 4075 | Knob—Tone control or range switch knob—Package of 5 | 1.00 |
| 4120 | Knob—Volume control knob—Package of 5 | 1.18 |
| 4121 | Knob—Station selector knob—Package of 5 | 1.18 |
| 4136 | Screw—Chassis mounting screw assembly—Comprising four screws, four washers, eight cushions | .62 |
| 6614 | Glass—Station selector dial glass | .30 |
| 6615 | Ring—Retaining ring for dial glass—Package of 5 | .34 |
| 6288 | Knob—Phonograph volume control knob—Package of 5 | 1.00 |
| 6614 | Glass—Station selector dial glass | .30 |
| 6615 | Ring—Retaining ring for dial glass—Package of 5 | .34 |
| 6766 | Volume control—Phonograph volume control (R23, S9) | 2.28 |
| 6840 | Bezel—Metal bezel for station selector dial | .56 |
| 6855 | Cable—3-conductor cable with spade terminals—Reproducer cable | .44 |
| 6856 | Cable—3-conductor shielded with male section of connection plug—Phonograph volume control | .85 |
| 6857 | Cable—2-conductor motor cable | 1.24 |
| 6858 | Transformer—Phonograph input transformer—Comprising one transformer, one reactor, one .01 mfd. and 0.1 mfd. capacitors, one 5,000 and one 50,000 ohm resistor (T3, R24, R25, C42, C43, L20) | 2.50 |
| 10174 | Spring—Automatic brake springs—One set of 4 springs—Package of 2 sets | .50 |
| 10184 | Plate—Automatic brake latch trip plate with mounting screws—Package of 5 | .40 |

### REPRODUCER ASSEMBLIES

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| 6770 | Transformer—Output transformer (T2) | 2.00 |
| 8969 | Cone—Reproducer cone (L17)—Package of 5 | 6.35 |
| 9460 | Coil assembly—Comprising field coil magnet and cone support (L18) | 6.00 |
| 9473 | Reproducer complete | 8.00 |

**MODEL 327**
**Schematic**

# RCA-VICTOR CO., INC.




IF PEAK 370 KC.

*Figure 1—Schematic Circuit Diagram*

MODEL 327
Chassis Wiring

## RCA-VICTOR CO., INC.

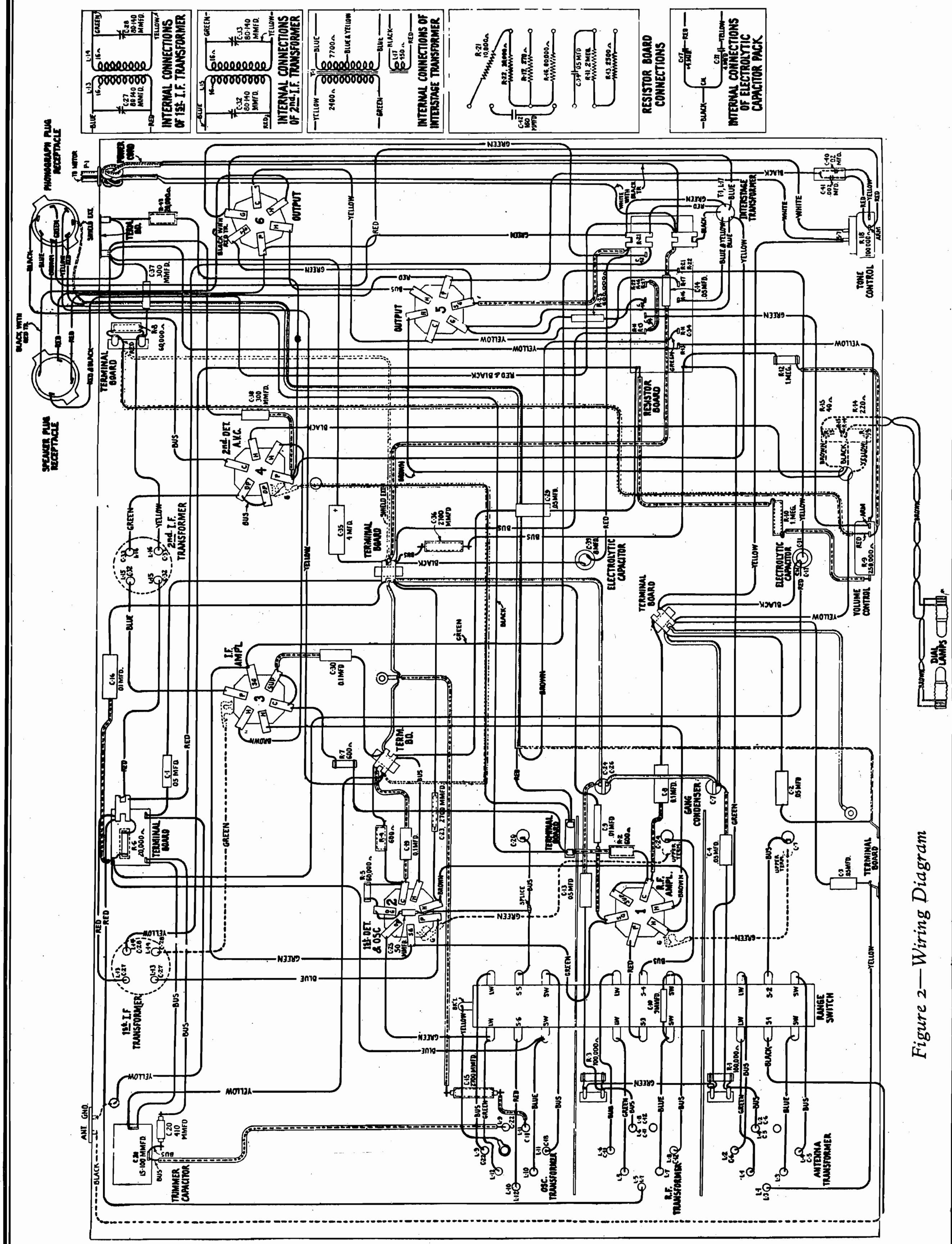


*Figure 2—Wiring Diagram*

MODEL 327
Voltage
Alignment Data
Assembly Wiring

# RCA-VICTOR CO., INC.

## SERVICE DATA

*CAUTION—This receiver operates on 220-volt direct current without a transformer between the line and the various parts of the receiver, such as A. C. receivers use. It is therefore extremely important to use the utmost caution when operating the receiver outside of the cabinet. Also a knob must always be placed on the shaft of the main tuning capacitor, as under certain conditions the full line voltage is obtained between this point and ground.*

### (1) Line-Up Capacitor Adjustments

To properly align this receiver, it is essential that a modulated R. F. oscillator, such as Stock No. 9050, an output indicator (Stock No. 4317) and an alignment tool (Stock No. 4160) be available. Figure 4 shows the location of the various line-up capacitors.

### I. F. Tuning Adjustments

Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 370 K. C. and the adjustment screws are accessible as shown in Figure 4. Proceed as follows:

(a) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the ground terminal.

(b) Connect the test oscillator output between the first detector control grid and chassis ground, preferably through a series condenser. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

### R. F. and Oscillator Adjustments

The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K. C. series capacitor, which is accessible from the rear of the chassis. Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the position of the indicator pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 54. Then set the Test Oscillator at 1400 K. C., the dial indicator at 140 and the oscillator output so that a slight deflection will be obtained in the output meter when the volume control is at its maximum position.

(b) With the Range Switch at the "in" position, adjust the three trimmers under the three R. F. coils, designated as L in Figure 4, until a maximum deflection is obtained in the output meter. Then shift the Test Oscillator frequency to 600 K. C. The trimmer capacitor, accessible from the rear of the chassis, should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1400 K. C. adjustment.

(c) Now place the Range Switch at the "out" position, shift the Test Oscillator to 15,000 K. C. and set the dial at 150. Adjust the three trimmer capacitors designated as S in Figure 4 for maximum output, beginning with the oscillator trimmer. It will be noted that the oscillator and first detector trimmers will have two positions at which the signal will give maximum output. The position which uses the lower trimmer capacitance, obtained by tuning the screw counter-clockwise, is the proper adjustment for the oscillator, while the position that uses a higher capacitance is correct for the detector. *Both of these adjustments must be made as indicated irrespective of output.* The R. F. is merely peaked. In conjunction with the detector adjustments, it is necessary to rock the main tuning capacitor back and forth while making the adjustment. This completes the line-up adjustments.

### (3) Service Data on Magnetic Pickup

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

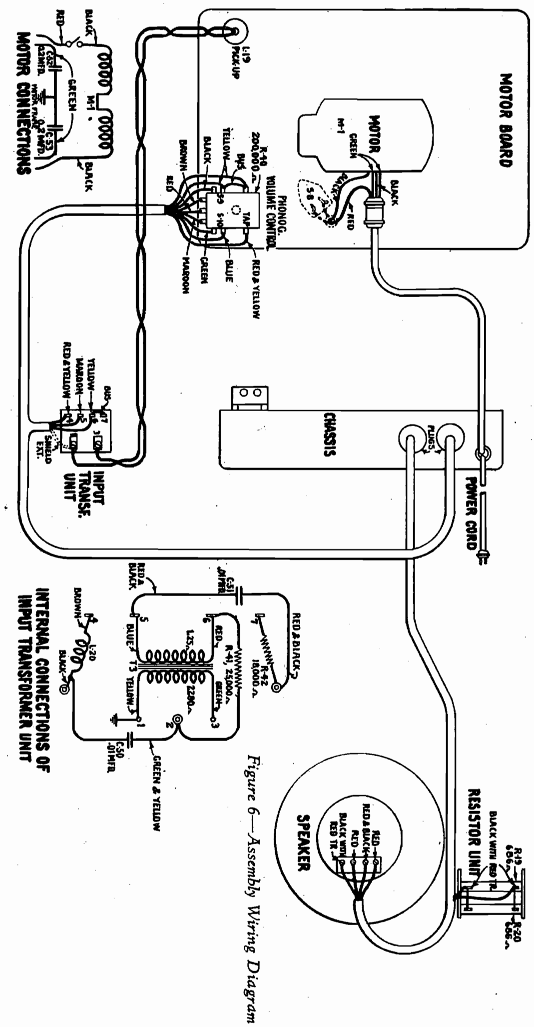



*Figure 6—Assembly Wiring Diagram*

## RADIOTRON SOCKET VOLTAGES

220-Volt, D. C. Line—No Signal

| Radiotron No. | | Cathode to B— Volts, D. C. | Screen Grid to B— Volts, D. C. | Plate to B— Volts, D. C. | Plate Current, M. A. | Heater Volts, A. C. |
|---|---|---|---|---|---|---|
| RCA-6D6 R. F. | | 3.0 | 90 | 200 | 6.0 | 6.4 |
| RCA-6A7 | 1st Detector | 4.0 | 90 | 200 | 2.6 | 6.4 |
| | Oscillator | — | — | 125 | 3.3 | |
| RCA-6D6 I. F. | | 3.0 | 90 | 200 | 6.0 | 6.4 |
| RCA-75 2nd Detector | | 1.5 | — | 200 | 0.7 | 6.4 |
| RCA-41 Power | | 13.0 | 190 | 205 | 25.0 | 6.4 |
| RCA-41 Power | | 13.0 | 190 | 205 | 25.0 | 6.4 |

The voltages at the right are those taken while the set is in operating condition. No allowance has been made for currents drawn by the meter, and if lower resistance meters are used, such allowances must be made.

MODEL 327
Pickup Data,
Trimmer and
Socket Layouts

RCA-VICTOR CO., INC.

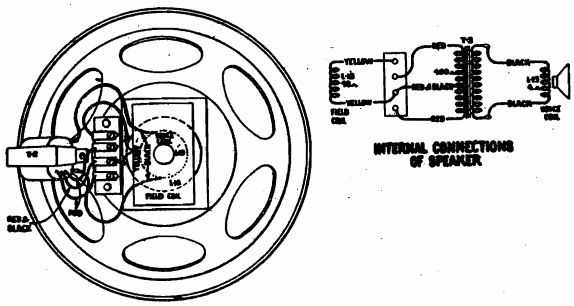



*Figure 3—Loudspeaker Wiring*

**(4) Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block**

In order to replace a defective coil or the hardened pivot rubbers (see Figure 8), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

(d) Remove screws A and B, Figure 8, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is

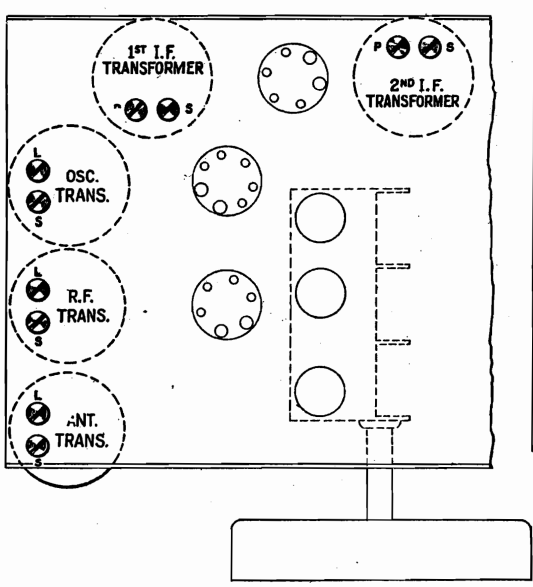
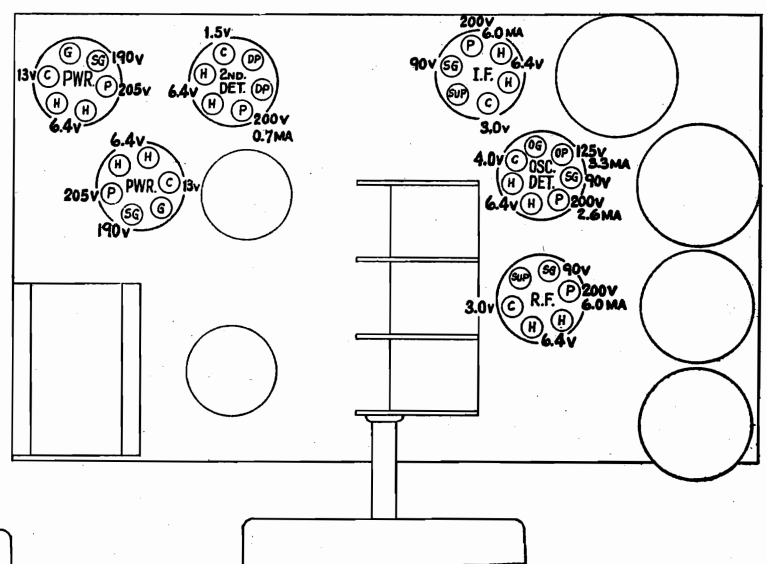



*Figure 4—Location of Line-Up Capacitors Viewing bottom of chassis*




ALL VOLTAGES ARE TO – B

*Figure 5—Radiotron Socket Voltages*

inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure 8), and sliding the mechanism slightly in relation to the pole pieces.

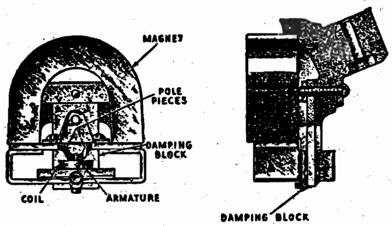



*Figure 7*

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be .009" on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

**(5) Replacing the Damping Block**

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure 9, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the

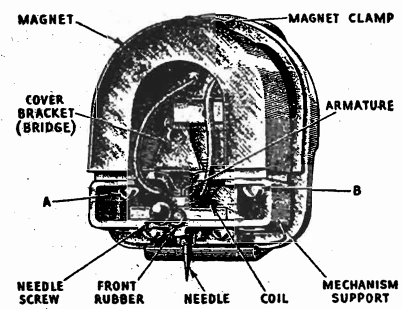



*Figure 8*

end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious

*Figure 9*

subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the air gap as explained under (h).

**MODEL 327**
**Parts List**

# RCA-VICTOR CO., INC.

## REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | Description | List Price |
|---|---|---|
| | RECEIVER ASSEMBLIES | |
| 10194 | Ball—Steel ball for condenser drive assembly —Package of 20 | $0.25 |
| 2747 | Cap—Contact cap—Package of 5 | .50 |
| 3938 | Capacitor—9 mmfd. (C10) | .25 |
| 3849 | Capacitor—50 mmfd. (C25) | .30 |
| 6314 | Capacitor—160 mmfd. (C42)—Package of 5 | 2.00 |
| 4352 | Capacitor—300 mmfd. (C37, C38) | .25 |
| 4297 | Capacitor—410 mmfd. (C20) | .30 |
| 4031 | Capacitor—2700 mmfd. (C15, C23, C36) | .50 |
| 3701 | Capacitor—0.01 mfd. (C9, C16) | .30 |
| 4211 | Capacitor—0.05 mfd. (C1, C2, C3, C14, C34) | .30 |
| 3901 | Capacitor—0.05 mfd. (C4, C13) | .36 |
| 3888 | Capacitor—0.05 mfd. (C29) | .25 |
| 3877 | Capacitor—0.1 mfd. (C8, C19, C30) | .32 |
| 3796 | Capacitor—4.0 mmfd. (C35) | .60 |
| 6986 | Capacitor—8.0 mmfd. (C39) | 1.60 |
| 3861 | Capacitor—Adjustable trimmer capacitor (C21) | .78 |
| 6985 | Capacitor — Comprising two 4.0 mmfd. capacitors (C17, C31) | 1.50 |
| 4373 | Capacitor pack—Comprising one 0.002 mfd. and one 0.02 mfd. capacitors (C40, C41) | .30 |
| 6983 | Coil—Antenna coil (L1, L2, L3, L4, C5, C6) | 2.68 |
| 6700 | Coil—Oscillator coil (L9, L10, L11, L12, C18, C22) | 2.30 |
| 6699 | Coil—R. F. coil (L5, L6, L7, L8, C11, C12) | 2.44 |
| 6694 | Condenser—3-gang variable tuning condenser (C7, C24, C26) | 3.75 |
| 6841 | Dial—Station selector dial scale—Package of 5 | 2.74 |
| 4467 | Drive—Variable tuning condenser drive assembly complete | 2.40 |
| 4340 | Lamp—Dial lamp—Package of 5 | .60 |
| 3906 | Mounting assembly — Variable condenser mounting assembly—Comprising 3 bushings, 3 lock-washers, 3 nuts and 3 washers —Package of 1 set | .28 |
| 3940 | Pointer—Station selector indicator—Package of 5 | .50 |
| 3218 | Resistor—600 ohms—Carbon type—¼ watt (R2, R4, R7)—Package of 5 | 1.00 |
| 4338 | Resistor — 2500 ohms — Carbon type — ¼ watt (R13)—Package of 10 | 2.00 |
| 3602 | Resistor—60,000 ohms—Carbon type—¼ watt (R5, R8, R16)—Package of 5 | 1.00 |
| 3118 | Resistor—100,000 ohms—Carbon type—¼ watt (R1, R3)—Package of 5 | 1.00 |
| 3439 | Resistor—600,000 ohms—Carbon type—¼ watt (R23)—Package of 5 | 1.00 |
| 3033 | Resistor—1 megohm—Carbon type—¼ watt (R10, R12)—Package of 5 | 1.00 |
| 6242 | Resistor — 2 megohms — Carbon type — ¼ watt (R11)—Package of 5 | $1.00 |
| 6303 | Resistor—20,000 ohms—Carbon type—½ watt (R43)—Package of 5 | 1.00 |
| 4337 | Resistor—270 ohms—Carbon type—1 watt (R17)—Package of 10 | 2.20 |
| 6114 | Resistor — 20,000 ohms — Carbon type — 1 watt (R6, R22)—Package of 5 | 1.10 |
| 4339 | Resistor — 260 ohms — Porcelain type — Tapped at 220 ohms (R14, R15) | .52 |
| 3991 | Resistor — 10,000 ohms — Porcelain type (R21) | .60 |
| 3943 | Screen—Translucent celluloid screen—For dial lamps—Package of 2 | .18 |
| 3878 | Screw—No. 8-32-3/16 headless cup point set screw for fastening station selector pointer —Package of 20 | .25 |
| 3768 | Screw—Square head No. 6-32-¼ set screw for condenser driver—Package of 10 | .35 |
| 6704 | Shaft—Tuning condenser drive shaft assembly | .64 |
| 4145 | Shield—First detector and oscillator Radiotron shield | .30 |
| 4103 | Shield—I. F. amplifier Radiotron shield | .20 |
| 3950 | Shield—R. F. amplifier Radiotron shield | .26 |
| 4216 | Shield—Radiotron shield top | .10 |
| 4215 | Shield—Second detector Radiotron shield | .15 |
| 3529 | Socket—Dial lamp socket | .32 |
| 6676 | Socket—6-contact Radiotron socket | .40 |
| 7485 | Socket—6-contact second detector and AVC Radiotron socket | .40 |
| 3572 | Socket—7-contact Radiotron socket | .38 |
| 6696 | Switch—Range switch (S1, S2, S3, S4, S5, S6) | 2.24 |
| 6697 | Transformer—First intermediate frequency transformer (L13, L14, C27, C28) | 1.80 |
| 6698 | Transformer—Second intermediate frequency transformer (L15, L16, C32, C33) | 1.78 |
| 6987 | Transformer pack—Audio transformer pack —Comprising one reactor and one interstage transformer (T1, L17) | 4.50 |
| 6705 | Tone control (R18, S7) | 1.20 |
| 6695 | Volume control (R9) | 1.20 |
| | REPRODUCER ASSEMBLIES | |
| 4600 | Cable—Reproducer cable—4-conductor with male section of connector—From receiver to resistors and reproducer | .60 |
| 7825 | Coil—Field coil, magnet and cone support (L18) | 4.38 |
| 8969 | Cone—Reproducer cone (L19)—Package of 5 | 6.35 |
| 7824 | Reproducer complete | 8.00 |
| 4599 | Transformer—Output transformer (T2) | 1.34 |

## REPLACEMENT PARTS—Continued

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | Description | List Price |
|---|---|---|
| | MOTOR ASSEMBLIES | |
| 3524 | Brush—Motor brush—Package of 2 | $0.60 |
| 3525 | Cap—Brush holder cap for motor brush—Package of 2 | .64 |
| 4598 | Capacitor—Motor capacitor—Two 2.0 mfd. capacitors (C52, C53) | .98 |
| 4596 | Escutcheon—Speed regulator escutcheon | .36 |
| 3487 | Governor assembly—Comprising friction disc, two springs and two balls—Assembled and mounted | 2.00 |
| 3489 | Indicator pointer—Speed indicator pointer complete, with mounting screws and washers | 1.65 |
| 7823 | Motor—220—volt D. C. motor complete (M1) | 34.66 |
| 3488 | Pin—Governor (speed) regulator pin | .30 |
| 4597 | Screw—Motor mounting screw assembly—Comprising four screws, four spacers, four lockwashers and four nuts | .22 |
| | PICKUP AND ARM ASSEMBLIES | |
| 7821 | Arm—Pickup arm complete, less escutcheon and pickup | 5.36 |
| 3417 | Armature—Pickup armature | .72 |
| 6346 | Back—Pickup housing back | .45 |
| 3385 | Coil—Pickup coil (L30) | .50 |
| 3386 | Cover—Pickup cover | .56 |
| 3418 | Cushions—Pickup rubber cushions—Comprising one damper and two spacer cushions and one damper bushing—5 sets | 1.10 |
| 3390 | Escutcheon—Pickup arm escutcheon complete with mounting rivets | .46 |
| 6335 | Pickup—Pickup unit complete | 4.00 |
| 3389 | Rod—Automatic brake trip rod with lock nut —Package of 5 | .40 |
| 3387 | Screw assembly—Pickup mounting screw assembly comprising one screw, one nut and one washer—10 sets | .40 |
| 3388 | Screw—Pickup needle holding screw—Package of 10 | .60 |
| 3419 | Screw—Pickup cover mounting screw—Package of 10 | .40 |
| | SWITCH ASSEMBLIES | |
| 3994 | Cover—Motor switch cover | .26 |
| 10184 | Plate—Automatic brake latch plate—Package of 5 | .40 |
| 10174 | Springs—Automatic brake springs—Package of 4 | .50 |
| 6896 | Switch—Eccentric automatic switch complete | 2.50 |
| 3322 | Switch—Motor switch (S8) | .75 |
| | TURNTABLE ASSEMBLIES | |
| 7084 | Cover—Turntable cover | $0.40 |
| 7838 | Turntable complete | 2.15 |
| | MISCELLANEOUS ASSEMBLIES | |
| 4677 | Bezel—Metal bezel (escutcheon) for station selector dial glass | .56 |
| 4594 | Box—Needle box | .30 |
| 4592 | Cable—Phonograph input cable—9-conductor —From chassis to input transformer and volume control | 2.25 |
| 6614 | Glass—Station selector dial glass | .30 |
| 3829 | Knob—Phonograph volume control knob—Package of 5 | 1.10 |
| 6989 | Knob—Range switch or tone control knob—Package of 5 | .65 |
| 6991 | Knob—Station selector knob—Package of 5 | 1.15 |
| 6990 | Knob—Volume control knob—Package of 5 | 1.15 |
| 3824 | Nut—Cap nut for motor board suspension assembly—Package of 4 | .82 |
| 9050 | Oscillator—Test oscillator 90-25,000 K. C. | 29.50 |
| 4601 | Plug—4-prong male section of connector plug for reproducer cable | .54 |
| 4602 | Plug—7-prong male section of connector plug for reproducer cable | .56 |
| 4341 | Resistor—Porcelain type—686 ohms (R19, R20) | 2.12 |
| 4678 | Ring—Retaining ring for dial glass—Package of 5 | .34 |
| 4342 | Screw—Receiver mounting screw assembly—Comprising four bushings, four screws and four washers | .30 |
| 4591 | Screw assembly—Receiver chassis mounting assembly—Comprising eight cushions, four screws, four washers and four spacers | .44 |
| 4160 | Screwdriver—Combination insulated screwdriver and socket wrench for I. F. and R. F. adjustments | 1.00 |
| 4593 | Socket—4-contact socket for reproducer cable plug | .42 |
| 4595 | Socket—7-contact socket for phonograph input cable plug | .52 |
| 3391 | Suspension spring and washer assembly—For motor board—Comprising one bolt, one top spring, one bottom spring, two cup washers, one "C" washer and one nut | .50 |
| 4603 | Transformer — Input transformer pack — Comprising one input transformer, one choke coil, one 18,000 ohm resistor, one 25,000 ohm resistor and two 0.01 mfd. capacitors (T3, L20, R41, R42, C50, C51) | 4.65 |
| 4590 | Volume control — Phonograph volume control (R40, S9, S10) | 2.18 |

† Full discount not allowed.

MODEL "All Wave Duo"
340, 340-E
Schematic

RCA-VICTOR CO., INC.

IF PEAK 445 KC

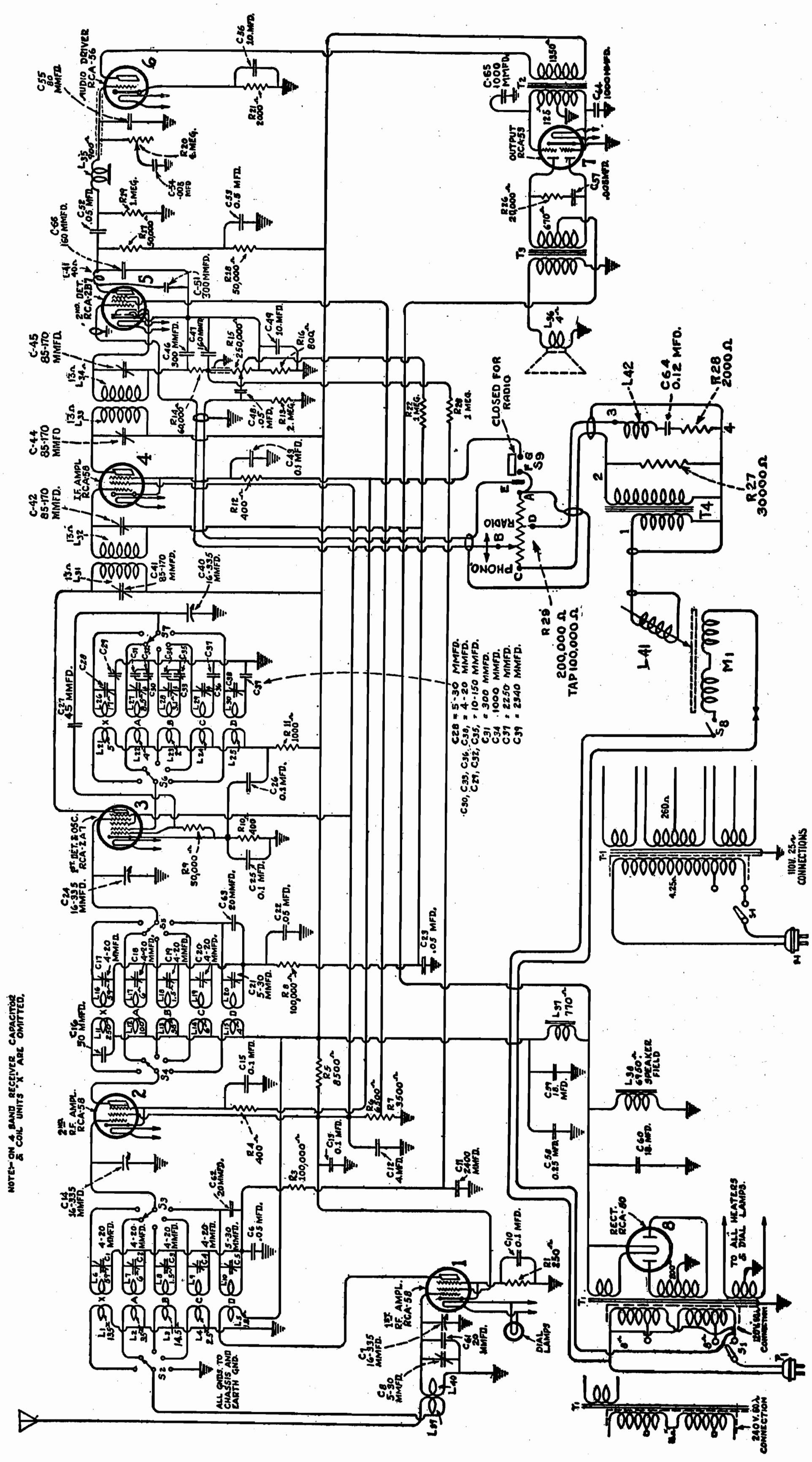



*Figure A—Schematic Circuit Diagram*

MODEL "All Wave Duo"
340,340-E
Chassis Wiring

RCA-VICTOR CO., INC.

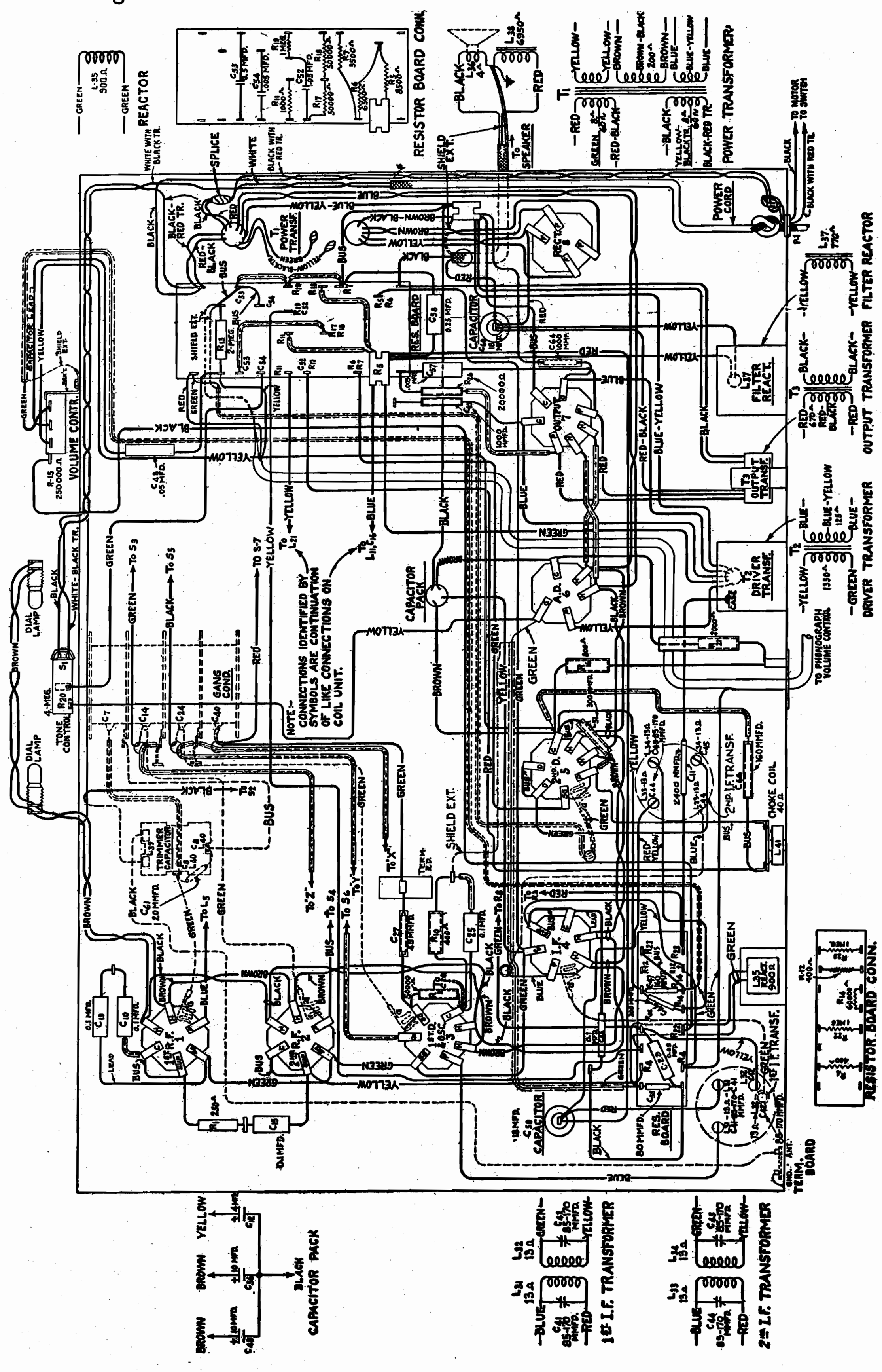



*Figure B—Chassis Wiring*

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MODEL "All Wave Duo"
340, 340-E
Coils Wiring Diagram

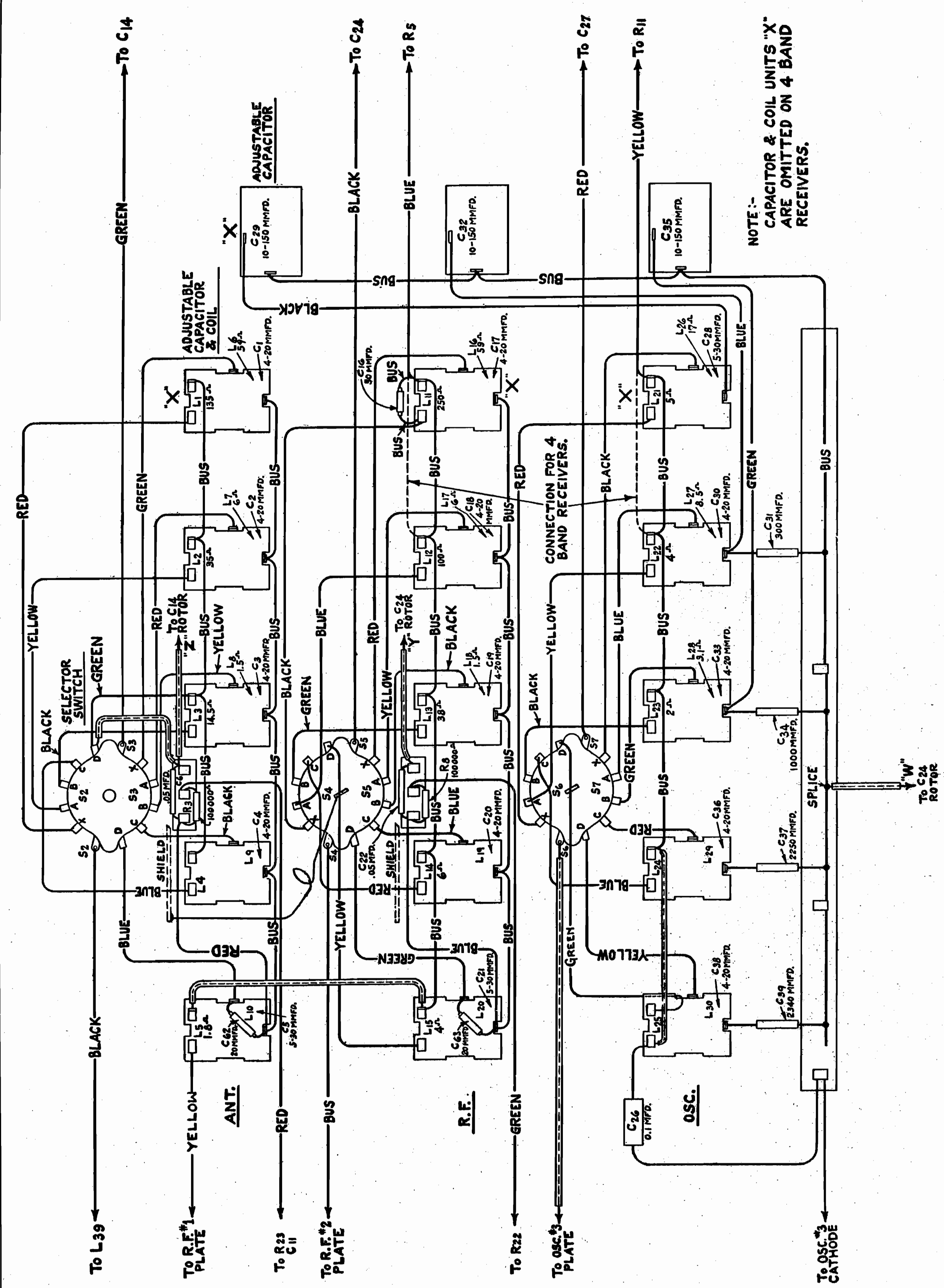


*Figure C—Wiring Diagram of Coil Assembly*

MODEL "All Wave Duo"
340, 340-E
Assembly Wiring
Voltage, Alignment

# RCA-VICTOR CO., INC.

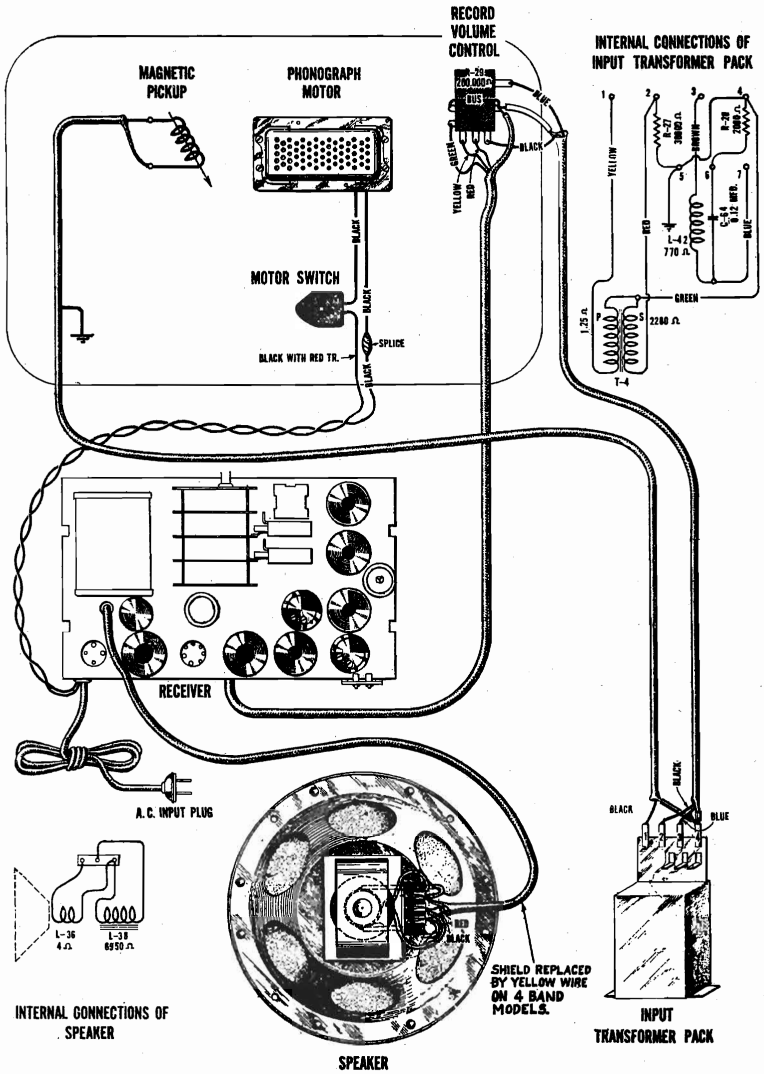


*Figure D—Assembly Wiring*

## SERVICE DATA

### Electrical Specifications

Voltage Rating............................105–125 Volts
Frequency Rating.................25, 30, 50 and 60 Cycles
Power Consumption..............................140 Watts
Type and Number aof Rdiotrons....3 RCA-58, 1 RCA-2A7, 1 RCA-2B7, 1 RCA-56, 1 RCA-53, 1 RCA-80—Total 8
Type of Circuit.................Straight Superheterodyne for all frequencies with Class "B" output
Undistorted Output.............................6 Watts

This all-wave combination instrument utilizes the new perfected continuous tuning superheterodyne chassis and the standard two speed motor-board assembly. Excellent quality of record reproduction, together with unusual radio performance, characterizes this instrument.

Service data for the magnetic pickup used on the tone arm of the motor-board assembly is given on the following pages. Service data for the radio receiver follows.

The tuning bands for the receiver chassis are as follows:

| *Selector Switch Position* | *Frequency Range (Kilocycles)* | *Wave-Length Range (Meters)* |
|---|---|---|
| X | 150–410 | 2000–732 |
| A | 540–1500 | 555–200 |
| B | 1500–3900 | 200–77.0 |
| C | 3900–10000 | 77.0–30.0 |
| D | 8000–18000 | 37.5–16.7 |

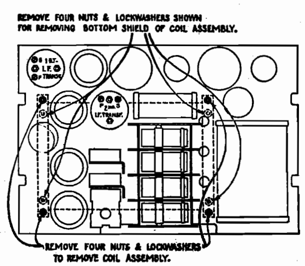


*Figure E—Location of nuts and lockwashers holding coil assembly*

This receiver will be supplied in two models, one including all bands and one with band X omitted. These instructions, however, will cover both types of the receiver. The variations in the wiring for the two models are plainly shown in the illustrations. Figures A, B and C show the schematic circuit and wiring diagrams.

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector using Radiotron RCA-2A7, an I. F. stage using RCA-58, a second detector and A. V. C. using RCA-2B7, an A. F. driver using RCA-56, and a Class "B" output stage using an RCA-53. The RCA-80 functions as the rectifier in the power supply circuits.

The foregoing tubes and circuit functions apply to bands X, A, B and C only. In the case of band D, an additional R. F. stage utilizing an additional Radiotron RCA-58 is used. This is to increase the sensitivity and image frequency selectivity and to reduce the interference caused by tube hiss, static and signals corresponding to the intermediate frequency.

The intermediate frequency is 445 K. C. The use of this frequency gives an especially good image frequency ratio and facilitates alignment of the oscillator at the higher frequency bands.

### Mechanical Construction

The chassis consists of two major assemblies, which must be disassembled for certain repair work. These assemblies consist of the chassis proper, including the main frame, power transformer, etc., and the coil assembly. The coil assembly consists of fifteen transformers supported upon individual tubular bakelite forms, each fastened to a separate porcelain strip upon which the coil terminals are mounted with their associate trimmer capacitor. This entire assembly with the selector switch is grouped in a shielded compartment which is mounted in the base of the main chassis assembly.

In order to remove this assembly it is necessary to remove the four nuts shown in Figure E and unsolder the connections of the fifteen leads shown in Figure C at the points where they connect to the main chassis. The leads should be allowed to remain on the coil assembly. After this is done, the coil assembly may be removed and repairs to it or to the main chassis may be easily made. If a coil or its associated trimmer is to be replaced, then only the bottom shield of the coil assembly must be removed. This is done by removing the four nuts that hold it to the chassis studs. This is shown in Figure E.

### Line-Up Capacitor Adjustments

This receiver is aligned in a similar manner to that of a standard broadcast band receiver. That is, the three main tuning capacitors are aligned by means of three trimmers in each band and on the three lowest frequency bands a series trimmer is adjusted for aligning the oscillator circuit. The other two bands do not require this low frequency trimmer, it being fixed in value. In the case of band D, it is necessary to adjust four trimmers due to the additional R. F. stage used.

## TUBE SOCKET VOLTAGES (RADIO OPERATION)

120 Volt A. C. Line

| Radiotron No. | Control Grid to Cathode Volts | Screen Grid to Cathode Volts | Plate to Cathode Volts | Plate Current M. A. | Filament or Heater Volts |
|---|---|---|---|---|---|
| RCA-58, R. F. | **3.0 | 100 | 255 | 6.0 | 2.6 |
| RCA-58, S. W. R. F. | **2.0 | 100 | 255 | 6.0 | 2.6 |
| RCA-2A7, Det.-Osc. | **2.5 | 100 | 250 | *5.0 | 2.6 |
| RCA-58, I. F. | **2.0 | 100 | 255 | 6.0 | 2.6 |
| RCA-2B7, 2nd Det.-AVC | **1.5 | 35 | 105 | 1.5 | 2.6 |
| RCA-56, A. F. Driver | **12.0 | — | 245 | 6.0 | 2.6 |
| RCA-53, Output | 0 | — | 300 | 36.0 | 2.6 |
| RCA-80, Rectifier | 640 R. M. S. Plate to Plate | | | 130 per Plate | 5.0 |

* Voltages and current apply to detector portion of tube.
** These voltages cannot be measured because of the high resistance of the circuits.

# RCA-VICTOR CO., INC.

The intermediate frequency amplifier is aligned in a similar manner to that of standard broadcast receivers except that it is aligned at 445 K. C. In order to properly align the receiver, it is essential that the Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 90 K. C. to 25,000 K. C. continuously, has good stability and includes an attenuator. In addition to the oscillator, a 300-ohm resistor for use as a "dummy" antenna, a non-metallic screwdriver (such as Stock No. 4160), and an output meter are required. The output meter should be preferably a thermocouple galvanometer connected either across or in place of the cone coil of the loudspeaker.

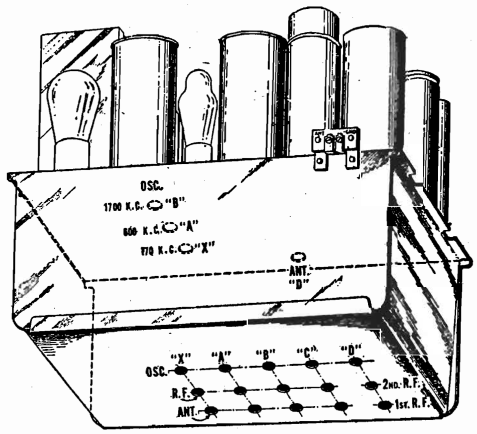


*Figure F—Location of line-up capacitors*

To align the intermediate frequency circuits, connect the output of the external oscillator to the grid of the first detector. For the R. F. and oscillator adjustments, the oscillator output should be connected to the antenna and ground terminals of the receiver with a 300-ohm resistor inserted in series with the antenna lead. In many cases, however, the signal strength obtained with this direct connection will be too great to permit proper alignment, even at the minimum setting of the oscillator attenuator. When this is true, the external oscillator must be loose-coupled to the receiver. This is done by connecting the 300-ohm resistor between the antenna and ground terminals of the receiver and attaching a short length of wire to the antenna post. Lay the free end of this wire across the oscillator case, adjusting its position as necessary to obtain the degree of pickup required.

The output of the external oscillator should be at the minimum value necessary to obtain a deflection in the output meter when the volume control is at its maximum position. All adjustments are made for a maximum deflection in the output meter.

The accuracy of line-up of each band may be checked without touching the trimmer condensers, by the use of the tuning wand, Stock No. 6679.

One end of the wand consists of a brass cylinder. When this is inserted in a coil the effective inductance of the coil is lowered.

The other end of the wand contains a special finely divided iron suitable for use at radio frequencies. When this is inserted in a coil the inductance is raised.

To use the tuning wand a signal is first tuned in at the frequency at which a check is desired on alignment. The wand is then inserted slowly in the Antenna and R. F. transformers, using first one end and then the other end of the wand. Unless the alignment is perfect, it will be found that the power output indicated by the meter will be increased to a peak for a critical position of the wand in the coils.

The end of the wand required indicates whether the coil is high or low.

Of course, alignment correction at the high-frequency end of a tuning range should be accomplished by the use of the trimmer condenser. If alignment correction should be required at the low-frequency end of a tuning range it may be accomplished by sliding the end coil of the transformer. The winding farthest from the trimmer panel is pushed toward the trimmer panel to increase the inductance, and farther away to decrease the inductance. On band D coils, the last two or three turns may be pushed in a similar manner to obtain the proper inductance.

*This adjustment should not be attempted unless a quite appreciable improvement will result (as shown by the tuning wand).*

The following chart gives the details of all line-up adjustments. The receiver should be lined up in the order of the adjustments given on the chart. Refer to Figure F for the location of the line-up capacitors.

## Transformer Connections

The power transformer of the 50–60 cycle receiver uses two tapped primary windings. By connecting them in parallel or in series, the receiver may be used either on 110 or 220 volt lines. Figure H shows the proper manner of making the various connections possible for this transformer. Note: The transformer is normally connected for 115–125-volt lines, and a 100-volt motor supplied. The 220-volt connections must not be used unless the motor is also changed. However, 220-volt operation of the standard equipment may be obtained by using the Stock No. 9034 step-down line transformer.

The 25–60 cycle transformer uses only one 105–125-volt winding, a tap being provided for the lower voltages. Normally the transformer is connected for 115–125-volt lines, but the connection shown in Figure G may be used for 100–115-volt lines.

| External Oscillator Frequency | Dial Setting | Location of Line-Up Capacitors | Position of Selector Switch | Adjust for | Number of Adjustments to be Made |
|---|---|---|---|---|---|
| 445 K. C. | Any setting that does not bring in station. | At rear of chassis. | Any position that does not bring in station. | Maximum output. | 4 |
| 370 K. C. | 370 K. C. | Bottom of chassis. | X | Maximum output. | 3 |
| 175 K. C. | Set for signal. | Top of chassis. | X | Maximum output while rocking dial back and forth. | 1 |
| 1400 K. C. | 1400 K. C. | Bottom of chassis. | A | Maximum output. | 3 |
| 600 K. C. | Set for signal. | Top of chassis. | A | Maximum output while rocking dial back and forth. | 1 |
| 3900 K. C. | 3900 K. C. | Bottom of chassis. | B | Maximum output. | 3 |
| 1710 K. C. | Set for signal. | Top of chassis. | B | Maximum output while rocking dial back and forth. | 1 |
| 10 M. C. | 10 M. C. | Bottom of chassis. | C | Maximum output. (See Note.) | 3 |
| 15 or 18 M. C. | 15 or 18 M. C. | Bottom and top. | D | Maximum output. (See Note.) | 4 |

NOTE—It is important to note, when aligning bands C and D, that two peaks will be observed on the trimmers for the oscillator and for the first detector. The correct oscillator peak is the one obtained using the lower trimmer capacitance, whereas the correct detector peak is the one obtained with the greater capacitance. It is essential that the proper peak be chosen, as otherwise tracking and sensitivity will be very poor at other frequencies. When adjusting the detector trimmer, the tuning capacitor should be rocked, since there is a reaction on the oscillator tuning.

MODEL "All Wave Duo"
340,340-E
Controls Data
Transformer Data

# RCA-VICTOR CO., INC.

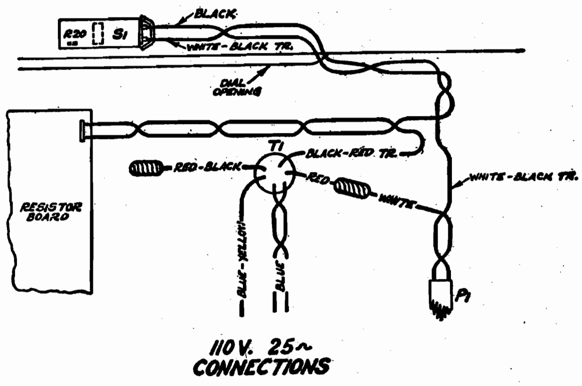


*Figure G—100–115 Volt Connection of 25–60 Cycles Transformer*

## Controls

The four control knobs on the front panel of the cabinet serve the following purposes:

(1) ***Range Switch*** (Left-hand Knob)—This switch converts the receiver for operation within any of the tuning ranges provided. As indicated on the selector dial, the letters on the switch escutcheon signify:

X—*Long-Wave Range*—150 to 410 kilocycles (2000 to 732 meters). This range is included only in certain models of the instrument (see "Introduction").

A—*Standard Broadcast Band*—540 to 1500 kilocycles (555 to 200 meters).

B—*Police Band*—1500 to 3900 kilocycles (200 to 77 meters). Services available within this band include police calls at 1574, 1712 and 2450 kilocycles, amateur radio "phone" communications between 1800 and 2000 kilocycles, and aviation communications (phone) between 2500 and 3500 kilocycles.

C—*Short-Wave Range*—3900 to 10,000 kilocycles (77 to 30 meters). Within the limits of this range are included two of the internationally-assigned short-wave broadcast bands. These are known as the 49 and 31 meter bands. (The portion of this range from 8000 to 10,000 kilocycles, which includes the latter band, is preferably received on range D.)

D—*Short-Wave Range*—8,000 to 18,000 kilocycles (37.5 to 16.7 meters). This range embraces four of the standardized short-wave broadcast bands located at 31, 25, 19 and 16 meters, respectively.

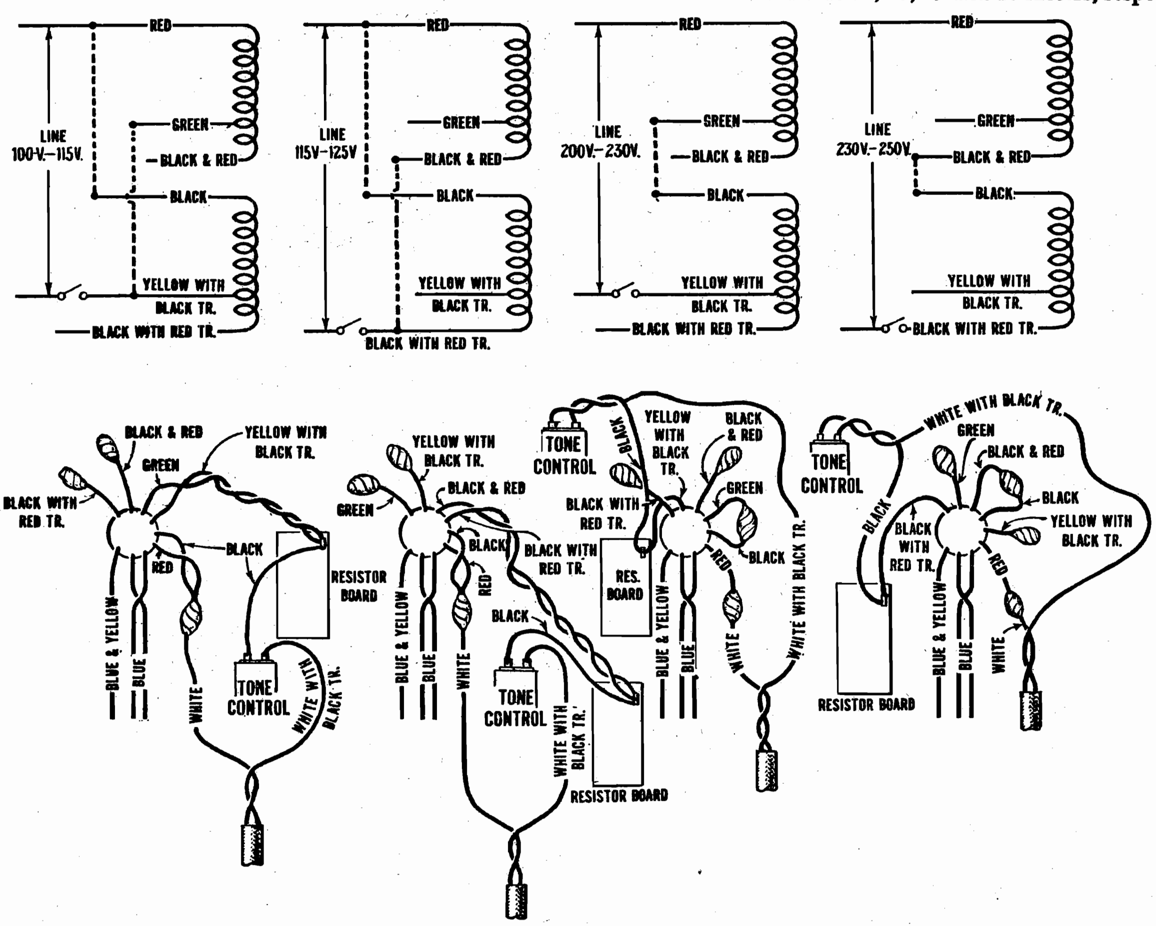


*Figure H—Power Transformer Connections (50–60 cycles)*

MODEL "All Wave Duo"
340,340-E
Pickup Data

RCA-VICTOR CO., INC.

# SERVICE DATA ON MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance, it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

## Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or the hardened pivot rubbers (see Figure K), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

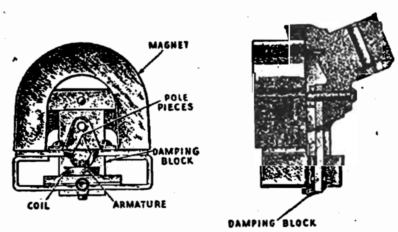


*Figure I*

(d) Remove screws A and B, Figure J, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure J), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

## Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

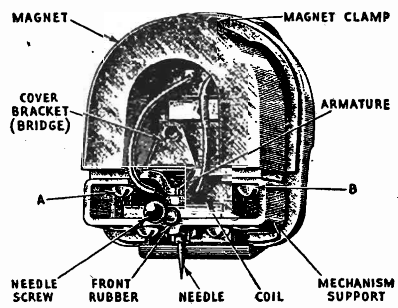


*Figure J*

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure K, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both side, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called

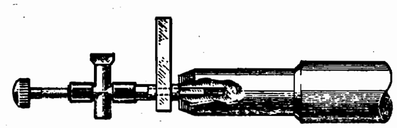

*Figure K*

acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the airgap as explained under (h).

MODEL "All Wave Duo"
340,340-E
Parts List

RCA-VICTOR CO., INC.

## REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | **RECEIVER ASSEMBLIES** | |
| 2747 | Contact cap—Package of 5 | $0.50 |
| 2816 | Resistor — 1,000 ohms— Carbon type — ½ watt (R11)—Package of 5 | 1.00 |
| 3056 | Shield—Output Radiotron shield—Pkg. of 2 | .40 |
| 3076 | Resistor—1 megohm—Carbon type—½ watt (R19, R22, R23)—Package of 5 | 1.00 |
| 3114 | Resistor—50,000 ohms—Carbon type—¼ watt (R9)—Package of 5 | 1.00 |
| 3118 | Resistor—100,000 ohms—Carbon type—¼ watt (R3, R8)—Package of 5 | 1.00 |
| 3435 | Resistor—250 ohms—Carbon type—½ watt (R1)—Package of 5 | 1.00 |
| 3470 | Resistor—6,500 ohms—Carbon type—1 watt (R6)—Package of 5 | 1.10 |
| 3526 | Resistor — 2,000 ohms — Carbon type — ½ watt (R21)—Package of 5 | 1.00 |
| 3527 | Resistor—800 ohms—Carbon type—½ watt (R16)—Package of 5 | 1.00 |
| 3529 | Socket—Dial lamp socket | .32 |
| 3555 | Capacitor—0.1 mfd. (C26) | .36 |
| 3572 | Socket—7-contact Radiotron socket—First detector and oscillator | .38 |
| 3594 | Resistor—50,000 ohms—Carbon type—½ watt (R17, R18)—Package of 5 | 1.00 |
| 3597 | Capacitor—0.25 mfd. (C58) | .40 |
| 3602 | Resistor—60,000 ohms—Carbon type—¼ watt (R14)—Package of 5 | 1.00 |
| 3616 | Capacitor—300 mmfd. (C51) | .34 |
| 3622 | Shield—Second detector Radiotron shield | .36 |
| 3641† | Capacitor—0.1 mfd. (C10, C15, C25) | .35 |
| 3643 | Capacitor—.005 mfd. (C57) | .25 |
| 3711 | Capacitor—80 mmfd. (C55) | .40 |
| 3719 | Socket—7-contact Radiotron socket | .30 |
| 3771 | Resistor—8,500 ohms—Carbon type—3 watt (R5) | .25 |
| 3845 | Capacitor—2,340 mmfd. (C39) | .50 |
| 3846 | Capacitor—2,250 mmfd. (C37) | .50 |
| 3848 | Capacitor—300 mmfd. (C31) | .30 |
| 3849 | Capacitor—50 mmfd. (C16) | .30 |
| 3861 | Capacitor—Adjustable trimmer (C29, C32, C35) | .78 |
| 3863 | Resistor—400 ohms—Carbon type—½ watt (R4, R10, R12)—Package of 5 | 1.00 |
| 3864 | Capacitor—300 mmfd. (C46) | .30 |
| 3865 | Capacitor—160 mmfd. (C47) | .30 |
| 3888 | Capacitor—.05 mfd. (C6, C22, C23, C52) | .25 |
| 3901 | Capacitor—.05 mfd. (C48) | .36 |
| 3931 | Capacitor—45 mmfd. (C27) | .30 |
| 3932 | Capacitor—.0024 mfd. (C11) | .30 |
| 3973 | Capacitor—1,000 mmfd. (C64, C65) | .34 |
| 4019 | Capacitor—1,000 mmfd. (C34) | .34 |
| 4030 | Bracket—Tone or volume control mounting bracket | .10 |
| 4033 | Capacitor—20 mmfd. (C61, C62, C63) | .34 |
| 4103 | Shield—First detector and R. F. Radiotron shield | .20 |
| 4104 | Shield—I. F. Radiotron shield | .20 |
| 4205 | Coil—Second detector choke (L41) | .50 |
| 4207 | Capacitor—0.1 mfd. (C13, C43) | .34 |
| 6136 | Resistor—3,500 ohms—Carbon type—1 watt (R7)—Package of 5 | 1.10 |
| 6188 | Resistor — 2 megohms — Carbon type — ½ watt (R13)—Package of 5 | 1.00 |
| 6300 | Socket—4-contact Radiotron socket | .35 |
| 6303 | Resistor—20,000 ohms—Carbon type—½ watt (R26)—Package of 5 | 1.00 |
| 6512 | Capacitor—.005 mfd. (C54) | .28 |
| 6603 | Condenser—4-gang variable tuning condenser (C7, C14, C24, C40) | 3.80 |
| 6604 | Capacitor—0.5 mfd. (C53) | .50 |
| 6605 | Transformer—Output transformer (T3) | 1.48 |
| 6606 | Reactor—Filter reactor (L37) | $1.66 |
| 6607 | Reactor—Tone control reactor (L35) | 1.14 |
| 6608 | Transformer—Audio driver transformer (T2) | 2.04 |
| 6609 | Capacitor—18. mfd. (C59) | 1.10 |
| 6612 | Volume control (R15) | 1.20 |
| 6613 | Drive—Variable condenser drive assembly—Complete | 1.00 |
| 6626 | Capacitor pack—Comprising one 4. mfd., and two 10. mfd. capacitors (C12, C49, C56) | 1.86 |
| 6628 | Capacitor and coil—Antenna coil and capacitor assembly—8,000–18,000 kilocycles—4- or 5-band (L39, L40, C8) | 1.50 |
| 6629 | Switch—5-band selector switch | 3.48 |
| 6630 | Switch—4-band selector switch | 3.48 |
| 6631 | Coil and capacitor assembly—Antenna coil and capacitor—150–410 kilocycles—5-band (L1, L6, C1) | 2.16 |
| 6632 | Coil and capacitor—R. F. coil and capacitor assembly — 150–410 kilocycles — 5-band (L11, L16, C17) | 2.10 |
| 6633 | Coil and capacitor—Oscillator coil and capacitor assembly—150–410 kilocycles—5-band (L21, L26, C28) | 1.40 |
| 6634 | Coil and capacitor—Antenna coil and capacitor assembly—540–1,500 kilocycles—4- or 5-band (L2, L7, C2) | 1.86 |
| 6635 | Coil and capacitor—R. F. coil and capacitor assembly—540–1,500 kilocycles—4- or 5-band (L12, L17, C18) | 2.00 |
| 6636 | Coil and capacitor—Oscillator coil and capacitor assembly—540–1,500 kilocycles—4- or 5-band (L22, L27, C30) | 1.40 |
| 6637 | Coil and capacitor—Antenna coil and capacitor assembly—1,500–4,000 kilocycles—4- or 5-band (L3, L8, C3) | 1.56 |
| 6638 | Coil and capacitor—R. F. coil and capacitor assembly—1,500–4,000 kilocycles—4- or 5-band (L13, L18, C19) | 1.66 |
| 6639 | Coil and capacitor—Oscillator coil and capacitor assembly—1,500–4,000 kilocycles—4- or 5-band (L23, L28, C33) | 1.40 |
| 6640 | Coil and capacitor—Antenna coil and capacitor assembly—4,000–10,000 kilocycles—4- or 5-band (L4, L9, C4) | 1.54 |
| 6641 | Coil and capacitor—R. F. coil and capacitor assembly—4,000–10,000 kilocycles—4- or 5-band (L14, L19, C20) | 1.60 |
| 6642 | Coil and capacitor—Oscillator coil and capacitor assembly—4,000–10,000 kilocycles—4- or 5-band (L24, L29, C36) | 1.34 |
| 6643 | Coil and capacitor—Antenna or R. F. coil and capacitor assembly — 8,000–18,000 kilocycles—4- or 5-band (L5, L10, C5—L15, L20, C21) | 1.52 |
| 6644 | Coil and capacitor—Oscillator coil and capacitor assembly—8,000–18,000 kilocycles—4- or 5-band (L25, L30, C38) | 1.54 |
| 6675 | Shaft—Shaft for condenser drive assembly—Comprising shaft, ball race with retainer and set screw | .35 |
| 6679 | Wand—Tuning wand for R. F. and oscillator adjustments | 1.10† |
| 6889 | Capacitor—18 mfd. (C60) | 1.55 |
| 6890 | Transformer—First intermediate frequency transformer (L31, L32, C41, C42) | 2.40 |
| 6891 | Transformer—Second intermediate frequency transformer (L33, L34, C44, C45) | 2.40 |
| 6892 | Tone control (R20) | 1.50 |
| 6955 | Shield—Second R. F. Radiotron shield | .25 |
| 6956 | Shield—Radiotron shield top | .15 |
| 7065 | Screwdriver—For R. F. or I. F. adjustment | .80 |
| 7484 | Socket—5-contact Radiotron socket | .35 |

† Full discount not allowed.

## REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| 7485 | Socket—6-contact Radiotron socket | $0.40 |
| 9042 | Transformer—Power transformer—105–250 volts—50–60 cycles (T1) | 6.84 |
| 9046 | Transformer—Power transformer—105–125 volts—25–40 cycles | 9.22 |
| 10194 | Ball—Steel ball for condenser drive assembly—Package of 20 | .25 |
| | **MOTOR ASSEMBLIES** | |
| 3398 | Motor mounting washer and spring assembly—Comprising 2 cup washers, 4 springs and 1 "C" washer | .48 |
| 3817 | Stud—Motor mounting stud—Package of 3 | .18 |
| 8989 | Motor—Motor complete 105–125 volts—60 cycle | 18.52 |
| 8990 | Motor—Motor complete 105–125 volts—50 cycle | 18.52 |
| 8991 | Motor—105–125 volts—40 cycle | 23.36 |
| 8992 | Motor—Motor complete 105–125 volts—25 cycle | 23.36 |
| 8993 | Rotor and shaft for 105–125 volts, 60 cycle motor | 7.00 |
| 8994 | Spindle—Turntable spindle with fibre gear for 60 cycle motor | 4.75 |
| 8995 | Rotor and shaft for 105–125 volts, 50 cycle motor | 7.00 |
| 8996 | Spindle—Turntable spindle with fibre gear for 50 cycle motor | 4.75 |
| 8997 | Rotor and shaft for 105–125 volts, 40 cycle motor | 8.00 |
| 8998 | Spindle—Turntable spindle with fibre gear for 40 cycle motor | 5.50 |
| 8999 | Rotor and shaft for 105–125 volts, 25 cycle motor | 8.00 |
| 9001 | Spindle—Turntable spindle with fibre gear for 25 cycle motor | 5.50 |
| | **PICKUP, PICKUP ARM ASSEMBLIES** | |
| 3386 | Cover—Pickup cover | .56 |
| 3387 | Screw assembly—Pickup mounting screw assembly, comprising one screw, one nut and one washer—10 sets | .40 |
| 3388 | Screw—Pickup needle holding screw—Package of 10 | .60 |
| 3389 | Rod—Automatic brake trip rod with lock nut—Package of 5 | .40 |
| 3390 | Escutcheon—Pickup arm esctucheon complete with mounting rivets | .46 |
| 3417 | Armature—Pickup armature | .72 |
| 3419 | Screw—Pickup cover mounting screw—Package of 10 | .40 |
| 3516 | Damper and bushing assembly—Comprising one upper and one lower damper, one upper bushing and one lower bearing—Located in bottom of pickup arm base | .14 |
| 3521 | Cover—Pickup back cover | .18 |
| 3728 | Coil—Pickup coil (L41) | .50 |
| 6346 | Back—Pickup housing back | .45 |
| 6601 | Pickup—Pickup unit complete | 4.54 |
| 7706 | Arm—Pickup arm complete less escutcheon, pickup, pickup mounting screw, nut and washer | 4.30 |
| | **TURNTABLE ASSEMBLIES** | |
| 3261 | Bushing—Rubber bushing—Used on turntable spindle for long-playing records—Package of 5 | .40 |
| 3338 | Ring—Clamp ring assembly—Comprising spring, latch lever and stud | .50 |
| 3340 | Washer—Thrust washer—Package of 2 | .56 |
| 3341 | Pin—Groov-Pin—Package of 2 | .56 |
| 3342 | Spring—Latch spring—Located on clamping ring—Package of 2 | .56 |
| 3343 | Sleeve—Sleeve complete with ball race | 2.86 |
| 3344 | Cover—Grease retainer cover—Package of 2 | $0.70 |
| 3346 | Bushing—Speed shifter lever bushing—Package of 4 | .66 |
| 3347 | Spring—Speed shifter lever spring—Pkg. of 2 | .30 |
| 3399 | Lever—Speed shifter lever with mounting screws | .50 |
| 7084 | Cover—Suede cover for turntable | .40 |
| 8948 | Turntable—Complete | 5.50 |
| | **MISCELLANEOUS PARTS** | |
| 2947 | Leather—Friction leather—Package of 20 | .50 |
| 3322 | Switch — Automatic brake switch with mounting screws | .75 |
| 3391 | Suspension spring and washer for motor board—Comprising one bolt, one top spring, one bottom spring, 2 cup washers, one "C" washer and one nut | .50 |
| 3430 | Box—Needle box with lid—Package of 2 | .90 |
| 3829 | Knob—Radio or phonograph volume or tone control knob—Package of 5 | 1.10 |
| 3830 | Knob—Station selector knob—Package of 5 | 1.08 |
| 3831 | Knob—Range switch knob—Package of 5 | 1.08 |
| 3876 | Cable—3-conductor cable for loudspeaker—4-band | .60 |
| 3878 | Screws—No. 4-40—5⁄16" fillister head screw and washer for fastening station selector pointer—Package of 20 | .25 |
| 3952 | Escutcheon—Volume control escutcheon | .10 |
| 3953 | Escutcheon—Range switch excutcheon—5-band | .10 |
| 3992 | Escutcheon—Range switch escutcheon—4-band | .10 |
| 3994 | Cover—Automatic brake switch cover | .26 |
| 4053 | Cable — 3-conductor cable — From phonograph volume control to resistor boards | .90 |
| 4160 | Screwdriver— Combination insulated screwdriver and socket wrench for I. F. and R. F. adjustments | 1.00 |
| 6112 | Cushion—Chassis support cushion—Package of 4 | .25 |
| 6614 | Glass—Station selector dial glass | .30 |
| 6615 | Ring—Retaining ring for dial glass—Package of 5 | .34 |
| 6616 | Bezel—Metal bezel for station selector dial | .50 |
| 6671 | Cable—2-conductor shielded for loudspeaker—5-band | .36 |
| 6672 | Screen—Translucent celluloid screen—For dial lamps—Package of 5 | .30 |
| 6673 | Pointer—Station selector pointer—Pkg. of 5 | .64 |
| 6677 | Dial—Station selector dial—5-band—Pkg. of 5 | 1.42 |
| 6678 | Dial—Station selector dial—4-band—Pkg. of 5 | 1.42 |
| 6766 | Volume control—Phonograph volume control and switch (R29, S9) | 2.28 |
| 6767 | Transformer—Input transformer—Comprising one 30,000 ohm resistor, one 2,000 ohm resistor, one .12 mfd. capacitor, one compensating reactor and one transformer (T4, R27, R28, C64, L42) | 5.62 |
| 6768 | Cable—3-conductor shielded—From phonograph volume control to input transformer | .40 |
| 8837 | Support—Metal support for chassis—Pkg. of 4 | .48 |
| 9050 | Oscillator—Test oscillator—150–25,000 K.C. | 33.50† |
| 10174 | Springs—Automatic brake springs—One set of 4 springs | .50 |
| 10184 | Plate—Automatic brake latch trip plate with mounting screws—Package of 5 | .40 |
| | **REPRODUCER ASSEMBLIES** | |
| 8969 | Cone—Reproducer cone complete (L36)—Package of 5 | 6.35 |
| 9438 | Reproducer complete | 6.88 |
| 9439 | Coil assembly—Field coil, magnet and cone support (L38) | 5.22 |

† Full discount not allowed.

**MODEL 340, 340-E**
**Schematic**

# RCA-VICTOR CO., INC.

IF PEAK 445 KC.

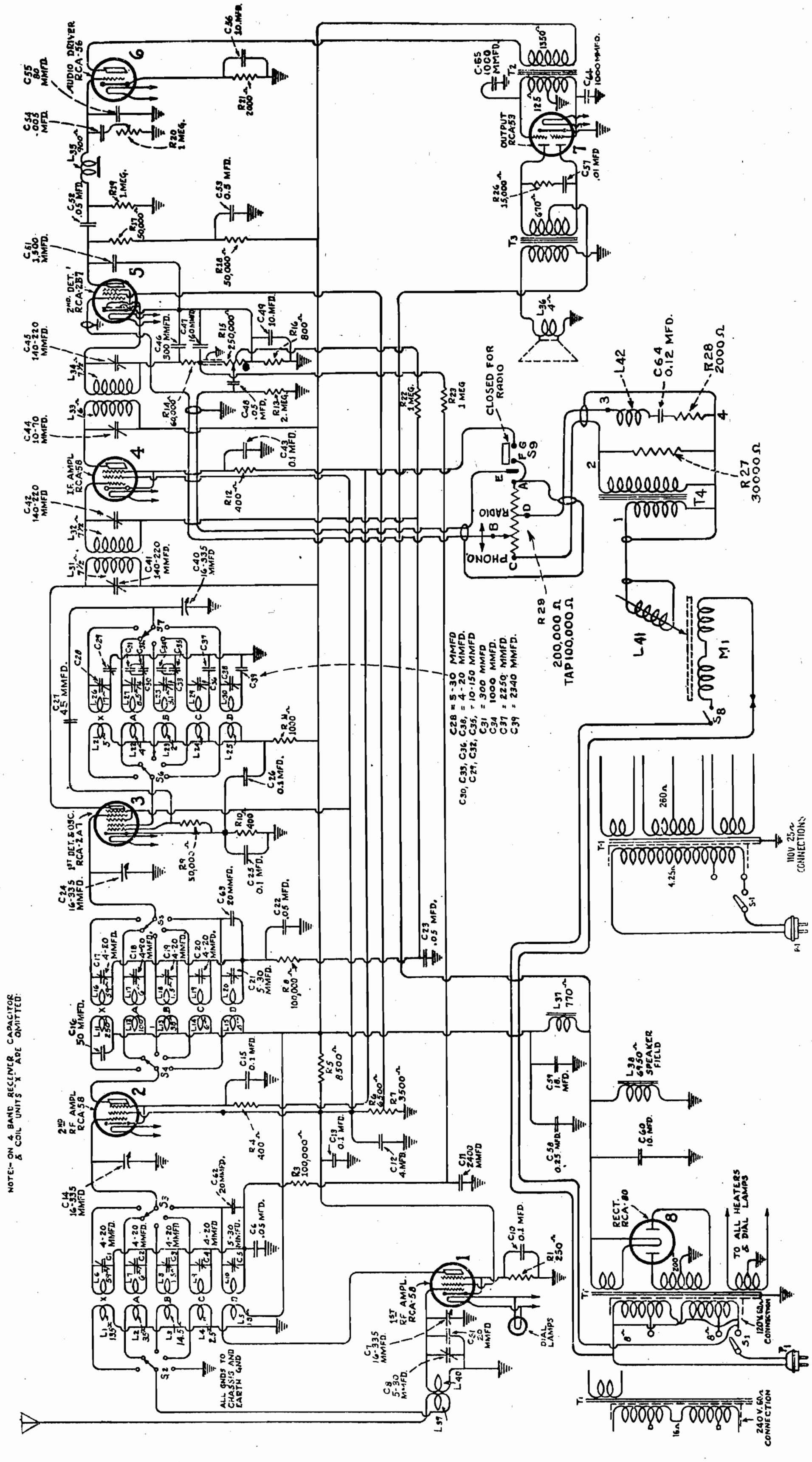

*Figure A—Schematic Circuit*

MODEL 340, 340-E
Chassis Wiring

# RCA-VICTOR CO., INC.

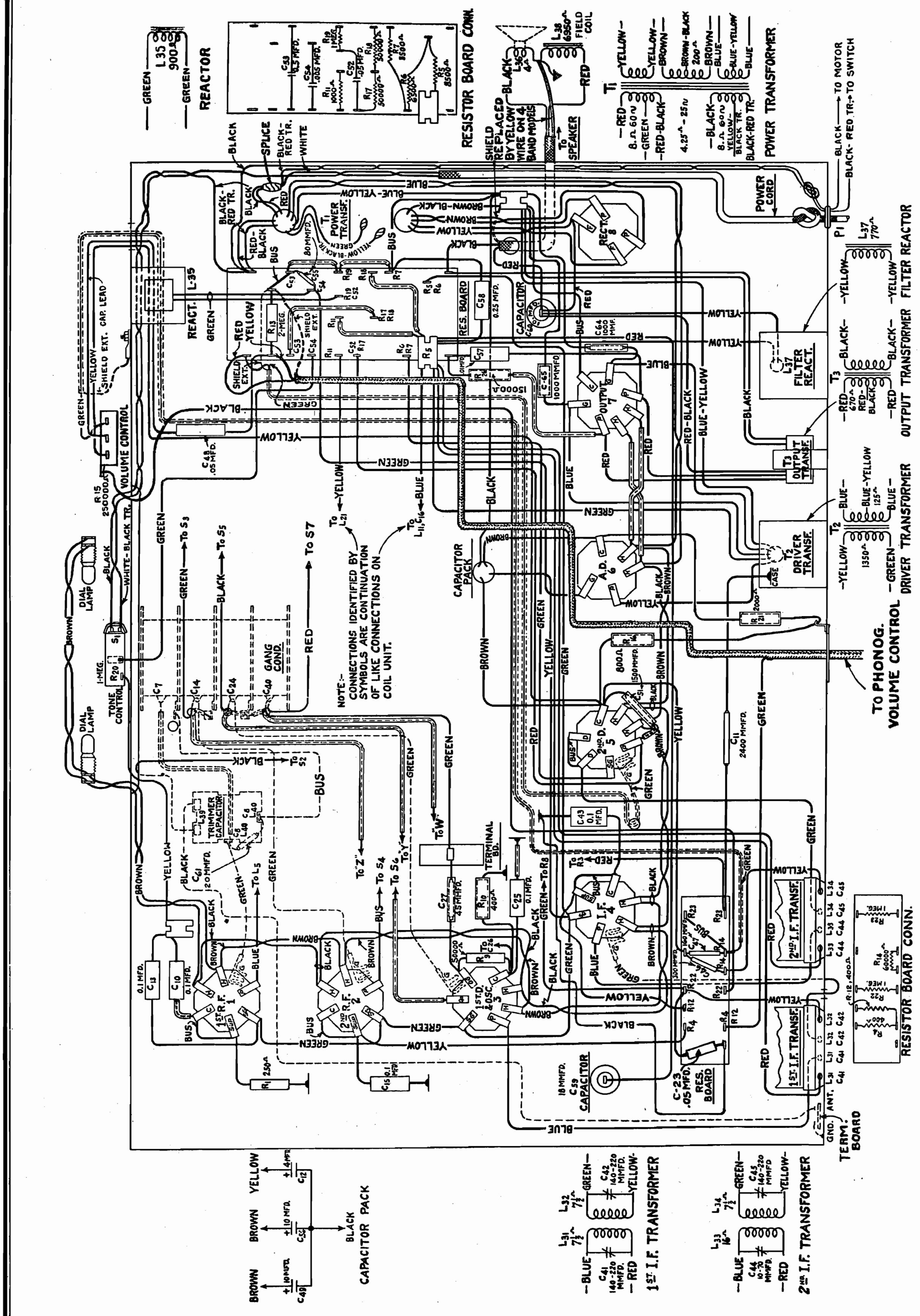


*Figure B—Chassis Wiring Diagram*

**MODEL 340, 340-E
Coils Wiring Diagram**

# RCA-VICTOR CO., INC.

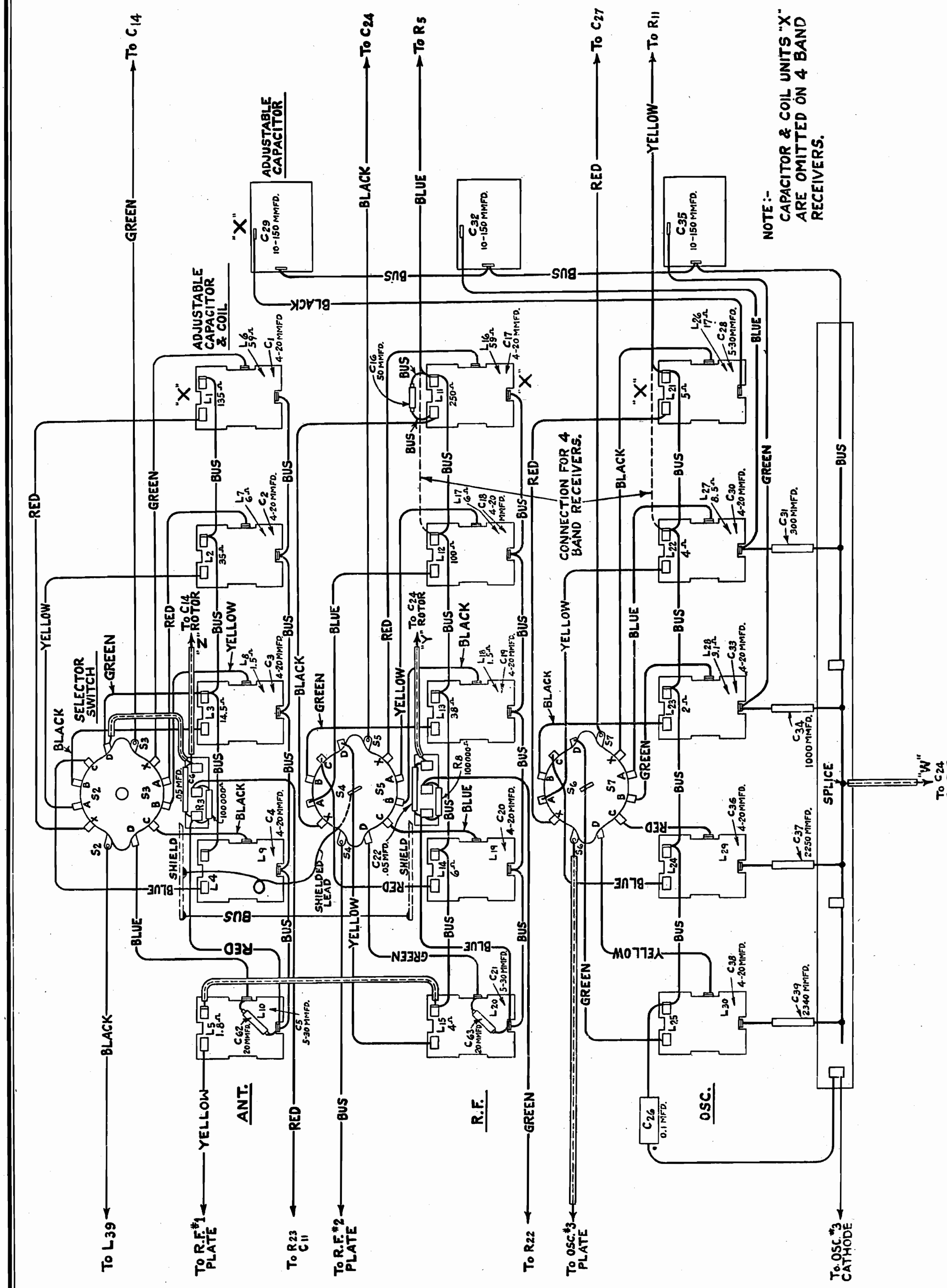


*Figure C—Wiring Diagram of Coil Assembly*

MODEL 340, 340-E
Assembly Wiring
Voltage, Circuit Data

# RCA-VICTOR CO., INC.

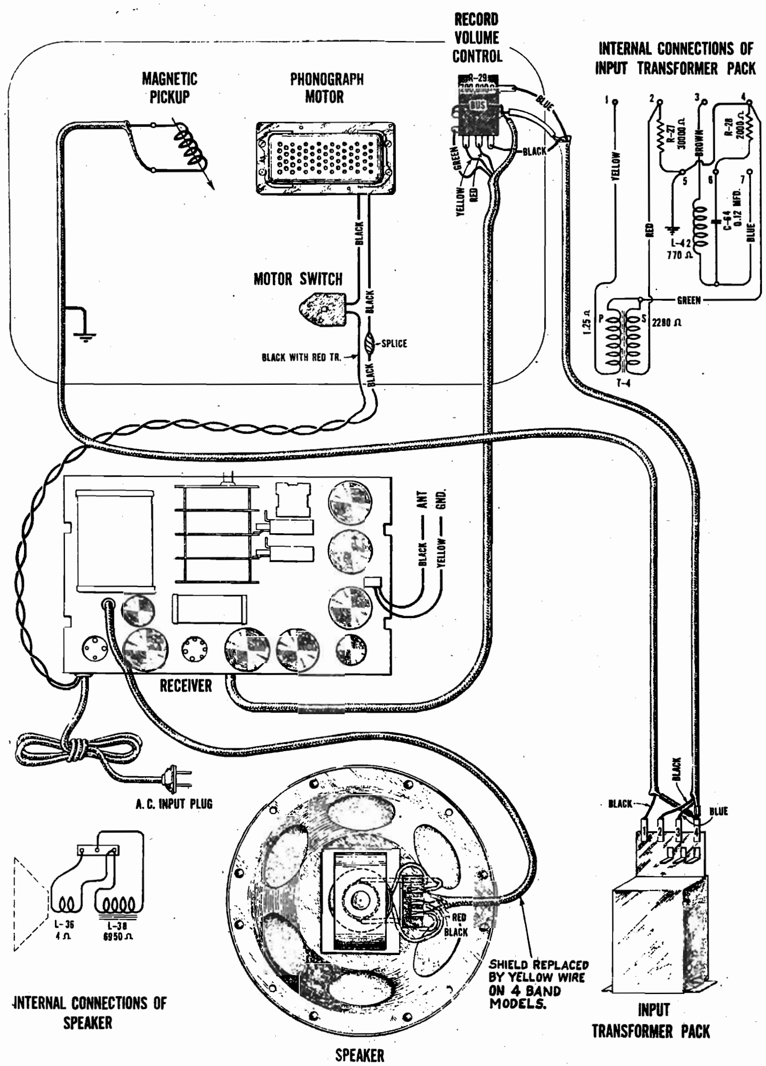


*Figure D—Assembly Wiring Diagram*

## SERVICE DATA

### Electrical Specifications

Voltage Rating....................105–125 Volts
Frequency Rating................25, 30, 50 and 60 Cycles
Power Consumption....................140 Watts
Type and Number of Radiotrons....3 RCA-58, 1 RCA-2A7, 1 RCA-2B7, 1 RCA-56, 1 RCA-53, 1 RCA-80—Total 8
Type of Circuit..........Straight Superheterodyne for all frequencies with Class "B" output
Undistorted Output....................6 Watts

This all-wave combination instrument utilizes the new perfected continuous tuning superheterodyne chassis and the standard two speed motor-board assembly. Excellent quality of record reproduction, together with unusual radio performance, characterizes this instrument.

Service data for the magnetic pickup used on the tone arm of the motor-board assembly is given on the following pages. Service data for the radio receiver follows.

The tuning bands for the receiver chassis are as follows:

| *Selector Switch Position* | *Frequency Range (Kilocycles)* | *Wave Length Range (Meters)* |
|---|---|---|
| X | 150–410 | 2000–732 |
| A | 540–1500 | 555–200 |
| B | 1500–3900 | 200–77.0 |
| C | 3900–10000 | 77.0–30.0 |
| D | 8000–18000 | 37.5–16.7 |

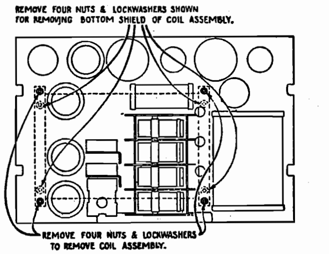


*Figure E—Location of nuts and lockwashers holding coil assembly*

This receiver will be supplied in two models, one including all bands and one with band X omitted. These instructions, however, will cover both types of the receiver. The variations in the wiring for the two models are plainly shown in the illustrations. Figures A, B and C show the schematic circuit and wiring diagrams.

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector using Radiotron RCA-2A7, an I. F. stage using RCA-58, a second detector and A. V. C. using RCA-2B7, an A. F. driver using RCA-56, and a Class "B" output stage using an RCA-53. The RCA-80 functions as the rectifier in the power supply circuits.

The foregoing tubes and circuit functions apply to bands X, A, B and C only. In the case of band D, an additional R. F. stage utilizing an additional Radiotron RCA-58 is used. This is to increase the sensitivity and image frequency selectivity and to reduce the interference caused by tube hiss, static and signals corresponding to the intermediate frequency.

The intermediate frequency is 445 K. C. The use of this frequency gives an especially good image frequency ratio and facilitates alignment of the oscillator at the higher frequency bands.

### Mechanical Construction

The chassis consists of two major assemblies, which must be disassembled for certain repair work. These assemblies consist of the chassis proper, including the main frame, power transformer, etc., and the coil assembly. The coil assembly consists of fifteen transformers supported upon individual tubular bakelite forms, each fastened to a separate porcelain strip upon which the coil terminals are mounted with their associate trimmer capacitor. This entire assembly with the selector switch is grouped in a shielded compartment which is mounted in the base of the main chassis assembly.

In order to remove this assembly it is necessary to remove the four nuts shown in Figure E and unsolder the connections of the fifteen leads shown in Figure C at the points where they connect to the main chassis. The leads should be allowed to remain on the coil assembly. After this is done, the coil assembly may be removed and repairs to it or to the main chassis may be easily made. If a coil or its associated trimmer is to be replaced, then only the bottom shield of the coil assembly must be removed. This is done by removing the four nuts that hold it to the chassis studs. This is shown in Figure E.

### Line-Up Capacitor Adjustments

This receiver is aligned in a similar manner to that of a standard broadcast band receiver. That is, the three main tuning capacitors are aligned by means of three trimmers in each band and on the three lowest frequency bands a series trimmer is adjusted for aligning the oscillator circuit. The other two bands do not require this low frequency trimmer, it being fixed in value. In the case of band D, it is necessary to adjust four trimmers due to the additional R. F. stage used.

## TUBE SOCKET VOLTAGES (RADIO OPERATION)

### 120 Volt A. C. Line

| Radiotron No. | Control Grid to Cathode, Volts | Screen Grid to Cathode, Volts | Plate to Cathode Volts | Plate Current M. A. | Filament or Heater Volts |
|---|---|---|---|---|---|
| RCA-58, R. F. | **2.0 | 100 | 255 | 6.0 | 2.6 |
| RCA-58, S. W. R. F. | **2.0 | 100 | 255 | 6.0 | 2.6 |
| RCA-2A7, Det.-Osc. | **2.5 | 100 | 250 | *5.0 | 2.6 |
| RCA-58, I. F. | **2.0 | 100 | 255 | 6.0 | 2.6 |
| RCA-2B7, 2nd Det.-AVC | **1.5 | 35 | 105 | 1.5 | 2.6 |
| RCA-56, A. F. Driver | **12.0 | — | 245 | 6.0 | 2.6 |
| RCA-53, Output | 0 | — | 300 | 36.0 | 2.6 |
| RCA-80, Rectifier | 640 R. M. S. Plate to Plate | | | 130 per Plate | 5.0 |

* Voltages and current apply to detector portion of tube.
** These voltages cannot be measured because of the high resistance of the circuits.

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**The intermediate frequency amplifier is aligned in a similar manner to that of standard broadcast receivers except that it is aligned at 445 K. C. In order to properly align the receiver, it is essential that the Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 150 K. C. to 20,000 K. C. continuously, has good stability and includes an attenuator. In addition to the oscillator, a 300 ohm resistor for use as a "dummy" antenna, a non-metallic screwdriver (such as Stock No. 7065), and an output meter are required. The output meter should be preferably a thermocouple galvanometer connected either across or in place of the cone coil of the loudspeaker.**

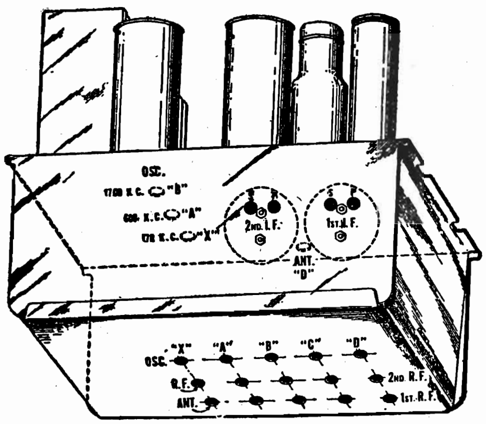



*Figure F—Location of line-up capacitors.*

**To align the intermediate frequency circuits, connect the output of the external oscillator to the grid of the first detector. For the R. F. and oscillator adjustments, the oscillator output should be connected to the antenna and ground terminals of the receiver with the 300 ohm resistor inserted in series with the antenna lead. In many cases, however, the signal strength obtained with this direct connection will be too great to permit proper alignment, even at the minimum setting of the oscillator attenuator. When this is true, the external oscillator must be loose-coupled to the receiver in the following manner: Connect the 300 ohm resistor between the antenna and ground terminals of the receiver and attach a short length of wire to the antenna post. Lay the free end of this wire across the oscillator case, adjusting its position as necessary to obtain the degree of pickup required.**

**The output of the external oscillator should be at the minimum value necessary to obtain a deflection in the output meter when the volume control is at its maximum position. All adjustments are made for a maximum deflection in the output meter.**

**The accuracy of line-up of each band may be checked without touching the trimmer condensers, by the use of the tuning wand, Stock No. 6679.**

**One end of the wand consists of a brass cylinder. When this is inserted in a coil the effective inductance of the coil is lowered.**

**The other end of the wand contains a special finely divided iron suitable for use at radio frequencies. When this is inserted in a coil the inductance is raised.**

**To use the tuning wand a signal is first tuned in at the frequency at which a check is desired on alignment. The wand is then inserted slowly in the Antenna and R. F. transformers, using first one end and then the other end of the wand. Unless the alignment is perfect, it will be found that the power output indicated by the meter will be increased to a peak for a critical position of the wand in the coils.**

**The end of the wand required indicates whether the coil is high or low.**

**Of course, alignment correction at the high frequency end of a tuning range should be accomplished by the use of the trimmer condenser. If alignment correction should be required at the low frequency end of a tuning range it may be accomplished by sliding the end coil of the transformer. The winding farthest from the trimmer panel is pushed toward the trimmer panel to increase the inductance, and farther away to decrease the inductance. On band D coils, the last two or three turns may be pushed in a similar manner to obtain the proper inductance.**

***This adjustment should not be attempted unless a quite appreciable improvement will result (as shown by the tuning wand).***

**The following chart gives the details of all line-up adjustments. The receiver should be lined up in the order of the adjustments given on the chart. Refer to Figure F for the location of the line-up capacitors.**

| External Oscillator Frequency | Dial Setting | Location of Line-Up Capacitors | Position of Selector Switch | Adjust for | Number of Adjustments To Be Made |
|---|---|---|---|---|---|
| 445 K. C. | Any setting that does not bring in station. | At rear of chassis. | Any position that does not bring in station. | Maximum output. | 4 |
| 370 K. C. | 370 K. C. | Bottom of chassis. | X | Maximum output. | 3 |
| 175 K. C. | Set for signal. | Top of chassis. | X | Maximum output while rocking dial back and forth. | 1 |
| 1400 K. C. | 1400 K. C. | Bottom of chassis. | A | Maximum output. | 3 |
| 600 K. C. | Set for signal. | Top of chassis. | A | Maximum output while rocking dial back and forth. | 1 |
| 3900 K. C. | 3900 K. C. | Bottom of chassis. | B | Maximum output. | 3 |
| 1710 K. C. | Set for signal. | Top of chassis. | B | Maximum output while rocking dial back and forth. | 1 |
| 10 M. C. | 10 M. C. | Bottom of chassis. | C | Maximum output. (See Note) | 3 |
| 15 or 18 M. C. | 15 or 18 M. C. | Bottom and top. | D | Maximum output. (See Note) | 4 |

**NOTE—It is important to note, when aligning bands C and D, that two peaks will be observed on the trimmers for the oscillator and for the first detector. The correct oscillator peak is the one obtained using the lower trimmer capacitance, whereas the correct detector peak is the one obtained with the greater capacitance. It is essential that the proper peak be chosen, as otherwise tracking and sensitivity will be very poor at other frequencies. When adjusting the detector trimmer, the tuning capacitor should be rocked, since there is a reaction on the oscillator tuning.**

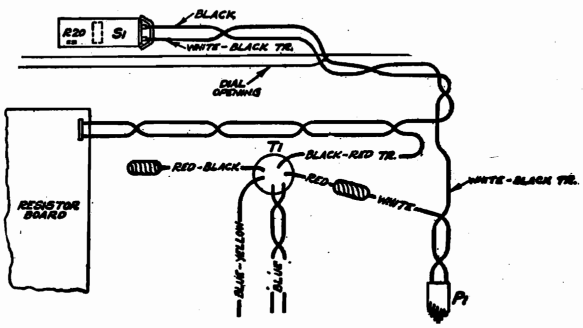
**MODEL 340, 340-E**
**Transformer Data**

RCA-VICTOR CO., INC.

## Transformer Connections

The power transformer of the 50–60 cycle receiver uses two tapped primary windings. By connecting them in parallel or in series, the receiver may be used either on 110 or 220 volt lines. Figure H shows the proper manner of making the various connections possible for this transformer. Note: The transformer is normally connected for 115–125-volt lines and a 110-volt motor supplied. The 220-volt connections must not be used unless the motor is also changed. However, 220-volt operation of the standard equipment may be obtained by using the Stock No. 9034 step-down line transformer.

The 25–60 cycle transformer uses only one 105–125-volt winding, a tap being provided for the lower voltages. Normally the transformer is connected for 115–125-volt lines, but the connection shown in Figure G may be used for 100–115-volt lines.




110 V. 25~ CONNECTIONS *Figure G—100–115 Volt Connection of 25–60 Cycles Transformer*

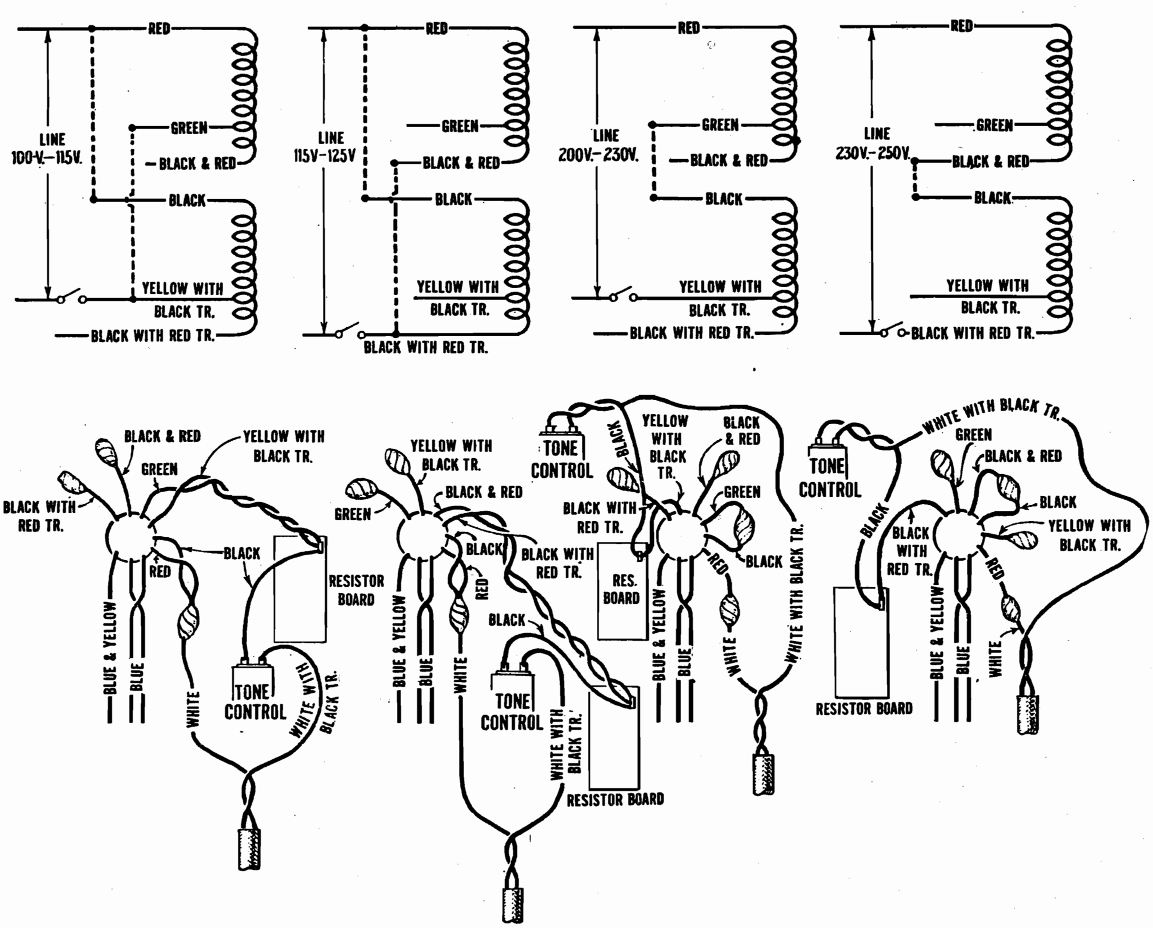



*Figure H—Power Transformer Connections (50–60 cycles)*

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# SERVICE DATA ON MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance, it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

## Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or the hardened pivot rubbers (see Figure K), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

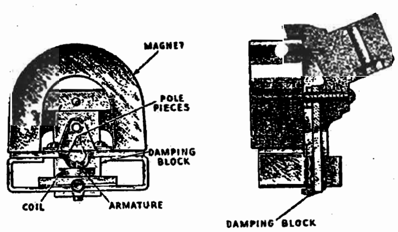



*Figure I*

(d) Remove screws A and B, Figure J, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure J), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

## Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

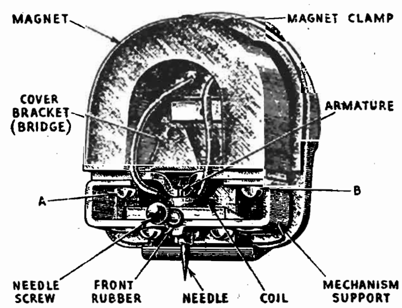



*Figure J*

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure K, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both side, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called

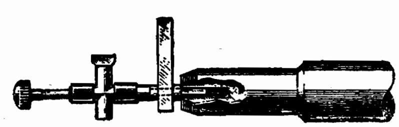


*Figure K*

acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the airgap as explained under (h).

MODEL 340, 340-E
Parts List

# RCA-VICTOR CO., INC.

## REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | RECEIVER ASSEMBLIES | |
| 2747 | Contact cap—Package of 5 | $0.50 |
| 2816 | Resistor—1,000 ohms—Carbon type—½ watt (R11)—Package of 5 | 1.00 |
| 3056 | Shield—Output Radiotron shield—Package of 2 | .40 |
| 3076 | Resistor—1 megohm—Carbon type—½ watt (R19, R22, R23)—Package of 5 | 1.00 |
| 3114 | Resistor—50,000 ohms—Carbon type—½ watt (R9)—Package of 5 | 1.00 |
| 3118 | Resistor—100,000 ohms—Carbon type—½ watt (R3, R8)—Package of 5 | 1.00 |
| 3435 | Resistor—250 ohms—Carbon type—½ watt (R1)—Package of 5 | 1.00 |
| 3470 | Resistor—6,500 ohms—Carbon type—1 watt (R6)—Package of 5 | 1.10 |
| 3472 | Capacitor—.0024 mfd. (C11) | .32 |
| 3526 | Resistor—2,000 ohms—Carbon type—½ watt (R21)—Package of 5 | 1.00 |
| 3527 | Resistor—800 ohms—Carbon type—½ watt (R16) | 1.00 |
| 3529 | Socket—Dial lamp socket | .32 |
| 3555 | Capacitor—0.1 mfd. (C26) | .36 |
| 3572 | Socket—7-contact Radiotron socket—First detector and oscillator | .38 |
| 3594 | Resistor—50,000 ohms—Carbon type—½ watt (R17, R18)—Package of 5 | 1.00 |
| 3597 | Capacitor—0.25 mfd. (C58) | .40 |
| 3602 | Resistor—60,000 ohms—Carbon type—½ watt (R14)—Package of 5 | 1.00 |
| 3622 | Shield—Second detector Radiotron shield | .36 |
| 3641 | Capacitor—0.1 mfd. (C10, C15, C25) | .35 |
| 3683 | Shield—Radiotron shield top | .20 |
| 3711 | Capacitor—80 mmfd. (C55) | .40 |
| 3719 | Socket—7-contact Radiotron socket | .30 |
| 3771 | Resistor—8,500 ohms—Carbon type—3 watt (R5) | .25 |
| 3787 | Capacitor—.01 mfd. (C57) | .30 |
| 3845 | Capacitor—2,340 mmfd. (C39) | .50 |
| 3846 | Capacitor—2,250 mmfd. (C37) | .50 |
| 3848 | Capacitor—300 mmfd. (C31) | .30 |
| 3849 | Capacitor—50 mmfd. (C16) | .30 |
| 3861 | Capacitor—Adjustable trimmer (C29, C32, C35) | .78 |
| 3863 | Resistor—400 ohms—Carbon type—½ watt (R4, R10, R12)—Package of 5 | 1.00 |
| 3864 | Capacitor—300 mmfd. (C46) | .30 |
| 3865 | Capacitor—160 mmfd. (C47) | .30 |
| 3866 | Capacitor—1,500 mmfd. (C51) | .34 |
| 3867 | Capacitor—0.1 mfd. (C13, C43) | .32 |
| 3888 | Capacitor—.05 mfd. (C6, C22, C23, C52) | .25 |
| 3901 | Capacitor—.05 mmfd. (C48) | .36 |
| 3931 | Capacitor—45 mmfd. (C27) | .30 |
| 3973 | Capacitor—1,000 mmfd. (C64, C65) | .34 |
| 4019 | Capacitor—1,000 mmfd. (C34) | .34 |
| 4030 | Bracket—Tone or volume control mounting bracket | .10 |
| 4033 | Capacitor—20 mmfd. (C61, C62, C63) | .34 |
| 4103 | Shield—First detector and R. F. Radiotron shield | .20 |
| 4104 | Shield—I. F. Radiotron shield | .22 |
| 6112 | Cushion—Rubber cushions for chassis—Package of 4 | .25 |
| 6136 | Resistor—3,500 ohms—Carbon type—1 watt (R7)—Package of 5 | 1.10 |
| 6188 | Resistor—2 megohms—Carbon type—½ watt (R13)—Package of 5 | 1.00 |
| 6279 | Resistor—15,000 ohms—Carbon type—½ watt (R26)—Package of 5 | 1.00 |
| 6300 | Socket—4-contact Radiotron socket | .35 |
| 6512 | Capacitor—.005 mfd. (C54) | .28 |
| 6571 | Capacitor—10 mfd. (C60) | 1.20 |
| 6603 | Condenser—4-gang variable tuning condenser (C7, C14, C24, C40) | 3.80 |
| 6604 | Capacitor—0.5 mfd. (C53) | .50 |
| 6605 | Transformer—Output transformer (T3) | 1.48 |
| 6606 | Reactor—Filter reactor (L37) | 1.66 |
| 6607 | Reactor—Tone control reactor (L35) | $1.14 |
| 6608 | Transformer—Audio driver transformer (T2) | 2.04 |
| 6609 | Capacitor—18. mfd. (C59) | 1.10 |
| 6610 | Transformer—First intermediate frequency transformer (L31, L32, C41, C42) | 1.55 |
| 6611 | Transformer—Second intermediate frequency transformer (L33, L34, C44, C45) | 1.62 |
| 6612 | Volume control (R15) | 1.20 |
| 6613 | Drive—Variable condenser drive assembly—Complete | 1.00 |
| 6626 | Capacitor pack—Comprising one 4. mfd., and two 10. mfd., capacitors (C12, C49, C56) | 1.86 |
| 6627 | Tone control (R20) | 1.44 |
| 6628 | Capacitor and coil—Antenna coil and capacitor assembly—8,000–18,000 kilocycles—4 or 5 band (L39, L40, C8) | 1.50 |
| 6629 | Switch—5-band selector switch | 3.48 |
| 6630 | Switch—4-band selector switch | 3.48 |
| 6631 | Coil and capacitor assembly—Antenna coil and capacitor—150–410 kilocycles—5-band (L1, L6, C1) | 2.16 |
| 6632 | Coil and capacitor—R. F. coil and capacitor assembly—150–410 kilocycles—5-band (L11, L16, C17) | 2.10 |
| 6633 | Coil and capacitor—Oscillator coil and capacitor assembly—150–410 kilocycles—5-band (L21, L26, C28) | 1.40 |
| 6634 | Coil and capacitor—Antenna coil and capacitor assembly—540–1,500 kilocycles—4 or 5 band (L2, L7, C2) | 1.86 |
| 6635 | Coil and capacitor—R. F. coil and capacitor assembly—540–1,500 kilocycles—4 or 5 band (L12, L17, C18) | 2.00 |
| 6636 | Coil and capacitor—Oscillator coil and capacitor assembly—540–1,500 kilocycles—4 or 5 band (L22, L27, C30) | 1.40 |
| 6637 | Coil and capacitor—Antenna coil and capacitor assembly—1,500–4,000 kilocycles—4 or 5 band (L3, L8, C3) | 1.56 |
| 6638 | Coil and capacitor—R. F. coil and capacitor assembly—1,500–4,000 kilocycles—4 or 5 band (L13, L18, C19) | 1.66 |
| 6639 | Coil and capacitor—Oscillator coil and capacitor assembly—1,500–4,000 kilocycles—4 or 5 band (L23, L28, C33) | 1.40 |
| 6640 | Coil and capacitor—Antenna coil and capacitor assembly—4,000–10,000 kilocycles—4 or 5 band (L4, L9, C4) | 1.54 |
| 6641 | Coil and capacitor—R. F. coil and capacitor assembly—4,000–10,000 kilocycles—4 or 5 band (L14, L19, C20) | 1.60 |
| 6642 | Coil and capacitor—Oscillator coil and capacitor assembly—4,000–10,000 kilocycles—4 or 5 band (L24, L29, C36) | 1.34 |
| 6643 | Coil and capacitor—Antenna or R. F. coil and capacitor assembly—8,000–18,000 kilocycles—4 or 5 band (L5, L10, C5—L15, L20, C21) | 1.52 |
| 6644 | Coil and capacitor—Oscillator coil and capacitor assembly—8,000–18,000 kilocycles—4 or 5 band (L25, L30, C38) | 1.54 |
| 6675 | Shaft—Shaft for condenser drive assembly—Comprising shaft, ball race with retainer and set screw | .35 |
| 6679 | Wand—Tuning wand for R. F. and oscillator adjustments. | |
| 7065 | Screwdriver—For R. F. or I. F. adjustment | .80 |
| 7484 | Socket—5-contact Radiotron socket | .35 |
| 7485 | Socket—6-contact Radiotron socket | .40 |
| 9042 | Transformer—Power transformer—105–250 volt—50–60 cycles (T1) | 6.84 |
| 9046 | Transformer—Power transformer—105–125 volts—25–40 cycles | 9.22 |
| 9050 | Oscillator—Test oscillator—150 to 25,000 K. C. | 33.50 |
| 10194 | Ball—Steel ball for condenser drive assembly—Package of 20 | .35 |

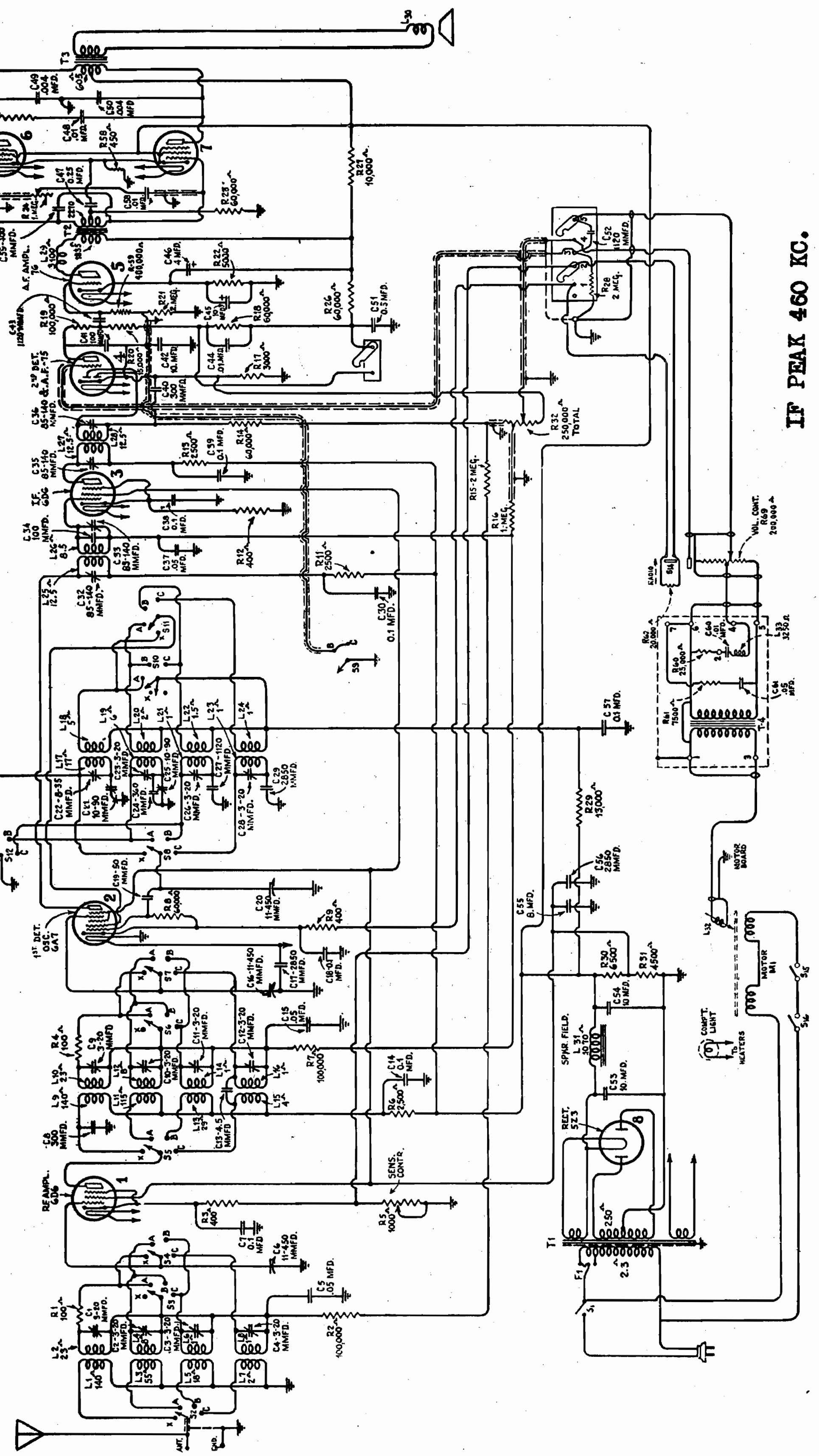
## REPLACEMENT PARTS—Continued

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | MOTOR ASSEMBLIES | |
| 3398 | Motor mounting washer and spring assembly—Comprising 2 cup washers, 4 springs and 1 "C" washer | $0.48 |
| 3817 | Stud—Motor mounting stud—Package of 3 | .18 |
| 8989 | Motor—Motor complete 105–125 volts—60 cycle | 18.52 |
| 8990 | Motor—Motor complete 105–125 volts—50 cycle | 18.52 |
| 8991 | Motor—105–125 volts—40 cycle | 23.36 |
| 8992 | Motor—Motor complete 105–125 volts—25 cycle | 23.36 |
| 8993 | Rotor and shaft for 105–125 volts, 60 cycle motor | 7.00 |
| 8994 | Spindle—Turntable spindle with fibre gear for 60 cycle motor | 4.75 |
| 8995 | Rotor and shaft for 105–125 volts, 50 cycle motor | 7.00 |
| 8996 | Spindle—Turntable spindle with fibre gear for 50 cycle motor | 4.75 |
| 8997 | Rotor and shaft for 105–125 volts, 40 cycle motor | 8.00 |
| 8998 | Spindle—Turntable spindle with fibre gear for 40 cycle motor | 5.50 |
| 8999 | Rotor and shaft for 105–125 volts, 25 cycle motor | 8.00 |
| 9001 | Spindle—Turntable spindle with fibre gear for 25 cycle motor | 5.50 |
| | PICKUP, PICKUP ARM ASSEMBLIES | |
| 3386 | Cover—Pickup cover | .56 |
| 3387 | Screw assembly—Pickup mounting screw assembly, comprising one screw, one nut and one washer—10 sets | .40 |
| 3388 | Screw—Pickup needle holding screw—Package of 10 | .60 |
| 3389 | Rod—Automatic brake trip rod with lock nut—Package of 5 | .40 |
| 3390 | Escutcheon—Pickup arm escutcheon complete with mounting rivets | .46 |
| 3417 | Armature—Pickup armature | .72 |
| 3419 | Screw—Pickup cover mounting screw—Package of 10 | .40 |
| 3516 | Damper and bushing assembly—Comprising one upper and one lower damper, one upper bushing and one lower bearing—Located in bottom of pickup arm base | .14 |
| 3521 | Cover—Pickup back cover | .18 |
| 3728 | Coil—Pickup coil (L41) | .50 |
| 6346 | Back—Pickup housing back | .45 |
| 6601 | Pickup—Pickup unit complete | 4.54 |
| 7706 | Arm—Pickup arm complete less escutcheon, pickup, pickup mounting screw, nut and washer | 4.30 |
| | MISCELLANEOUS PARTS | |
| 2947 | Leather—Friction leather—Package of 20 | .50 |
| 3322 | Switch—Automatic brake switch with mounting screws | .75 |
| 3391 | Suspension spring and washer for motor board—Comprising one bolt, one top spring, one bottom spring, 2 cup washers, one "C" washer and one nut | .50 |
| 3430 | Box—Needle box with lid—Package of 2 | .90 |
| 3829 | Knob—Radio or phonograph volume or tone control knob—Package of 5 | 1.10 |
| 3830 | Knob—Station selector knob—Package of 5 | 1.08 |
| 3831 | Knob—Range switch knob—Package of 5 | $1.08 |
| 3876 | Cable—3-conductor cable for loudspeaker—4-band | .60 |
| 3878 | Screws—No. 4-40-5/16" fillister head screw and washer for fastening station selector pointer—Package of 20 | .25 |
| 3952 | Escutcheon—Volume control escutcheon | .10 |
| 3953 | Escutcheon—Range switch escutcheon—5-band | .10 |
| 3992 | Escutcheon—Range switch escutcheon—4-band | .10 |
| 3994 | Cover—Automatic brake switch cover | .26 |
| 4053 | Cable—3-conductor cable—From phonograph volume control to resistor boards | .90 |
| 6112 | Cushion—Chassis support cushion—Package of 4 | .25 |
| 6614 | Glass—Station selector dial glass | .30 |
| 6615 | Ring—Retaining ring for dial glass—Package of 5 | .34 |
| 6616 | Bezel—Metal bezel for station selector dial | .50 |
| 6671 | Cable—2-conductor shielded for loudspeaker—5-band | .36 |
| 6672 | Screen—Translucent celluloid screen—For dial lamps—Package of 5 | .30 |
| 6673 | Pointer—Station selector pointer—Package of 5 | .64 |
| 6677 | Dial—Station selector dial—5-band—Package of 5 | 1.42 |
| 6678 | Dial—Station selector dial—4-band—Package of 5 | 1.42 |
| 6766 | Volume Control—Phonograph volume control and switch (R29, S9) | 2.28 |
| 6767 | Transformer—Input transformer—Comprising one 30,000 ohm resistor, one 2,000 ohm resistor, one .12 mfd. capacitor, one compensating reactor and one transformer (T4, R27, R28, C64, L42) | 5.62 |
| 6768 | Cable—3-conductor shielded—From phonograph volume control to input transformer | .40 |
| 8837 | Support—Metal support for chassis—Package of 4 | .48 |
| 10174 | Springs—Automatic brake springs—One set of 4 springs | .50 |
| 10184 | Plate—Automatic brake latch trip plate with mounting screws—Package of 5 | .40 |
| | TURNTABLE ASSEMBLIES | |
| 3261 | Bushing—Rubber bushing—Used on turntable spindle for long playing records—Package of 5 | .40 |
| 3338 | Ring—Clamp ring assembly—Comprising spring, latch lever and stud | .50 |
| 3340 | Washer—Thrust washer—Package of 2 | .56 |
| 3341 | Pin—Groov-Pin—Package of 2 | .56 |
| 3342 | Spring—Latch spring—Located on clamping ring—Package of 2 | .56 |
| 3343 | Sleeve—Sleeve complete with ball race | 2.86 |
| 3344 | Cover—Grease retainer cover—Package of 2 | .70 |
| 3346 | Bushing—Speed shifter lever bushing—Package of 4 | .66 |
| 3347 | Spring—Speed shifter lever spring—Package of 2 | .30 |
| 3399 | Lever—Speed shifter lever with mounting screws | .50 |
| 7084 | Cover—Suede cover for turntable | .40 |
| 8948 | Turntable—Complete | 5.50 |
| | REPRODUCER ASSEMBLIES | |
| 8969 | Cone—Reproducer cone complete (L36)—Package of 5 | 6.35 |
| 9438 | Reproducer complete | 6.88 |
| 9439 | Coil assembly—Field coil, magnet and cone support (L38) | 5.22 |

MODEL 341
Schematic

RCA-VICTOR CO., INC.



MODEL 341
Chassis Wiring

# RCA-VICTOR CO., INC.

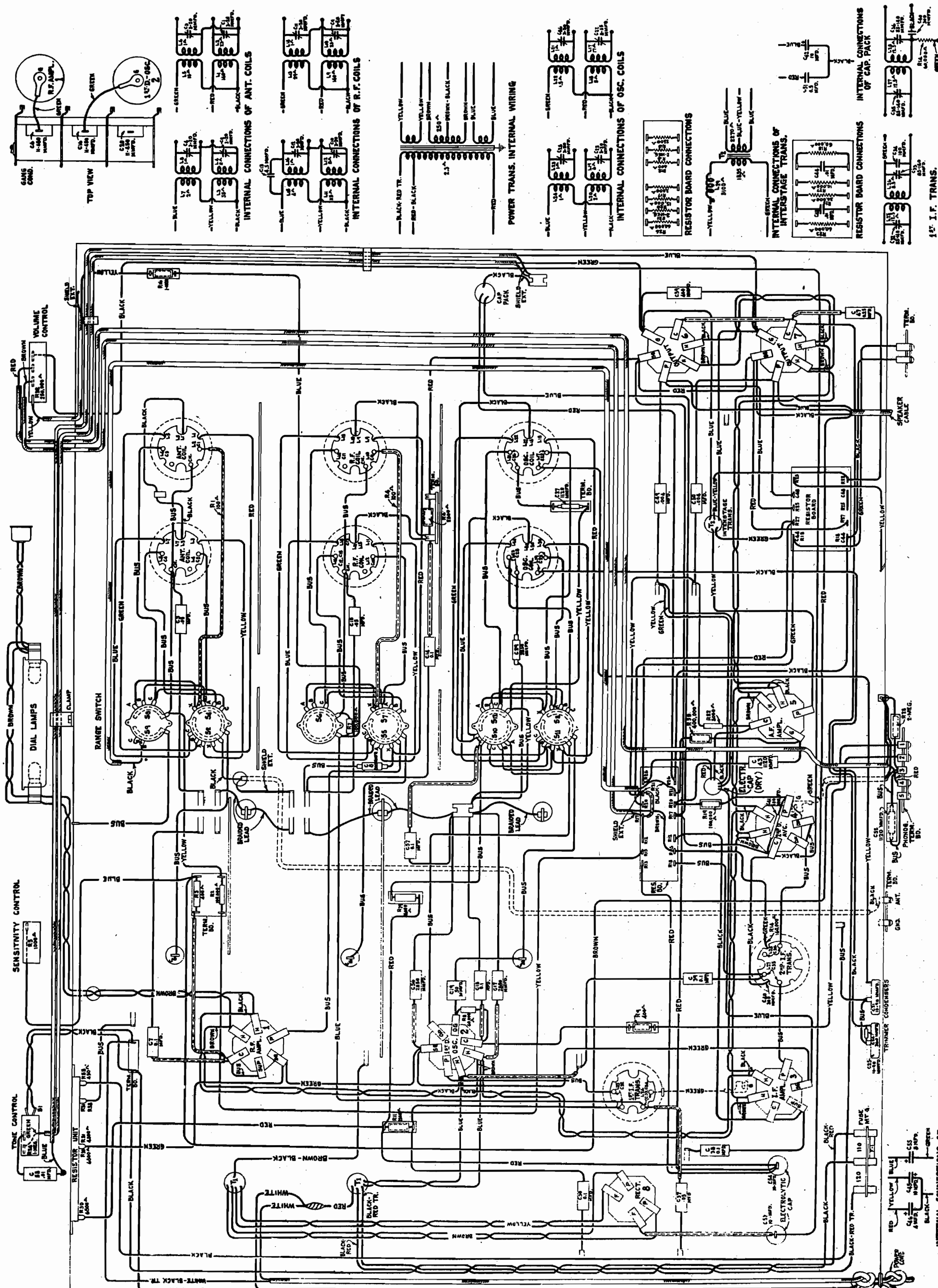


FIGURE 2 - CHASSIS WIRING

**MODEL 341**
**Socket and Trimmer Layouts**

## RCA-VICTOR CO., INC.

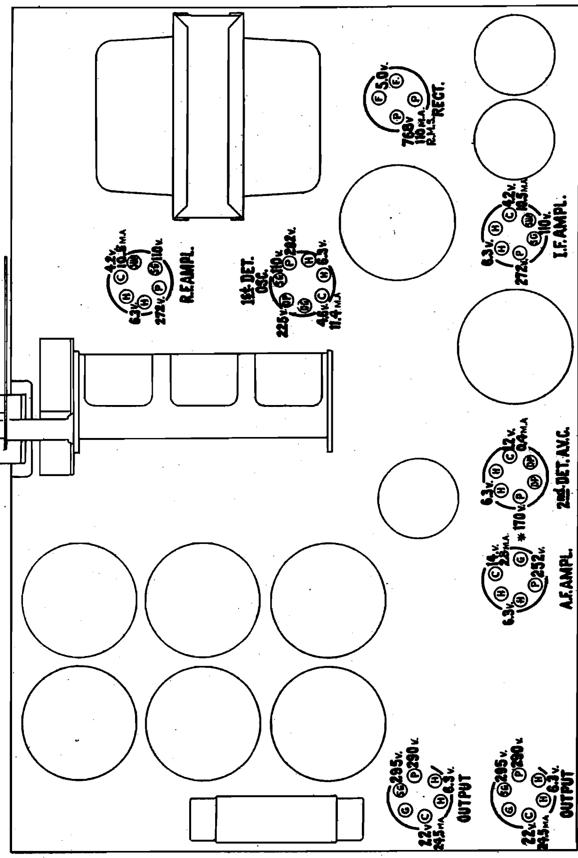



Figure 8- Radiotron Socket Voltages

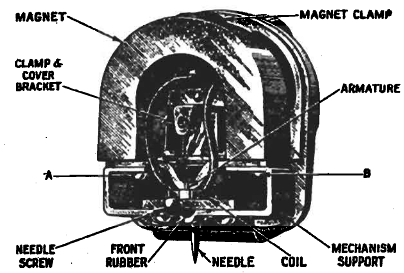



Figure 10—Pickup Nomenclature

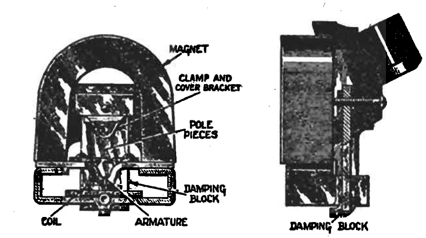



Figure 9—Details of Pickup

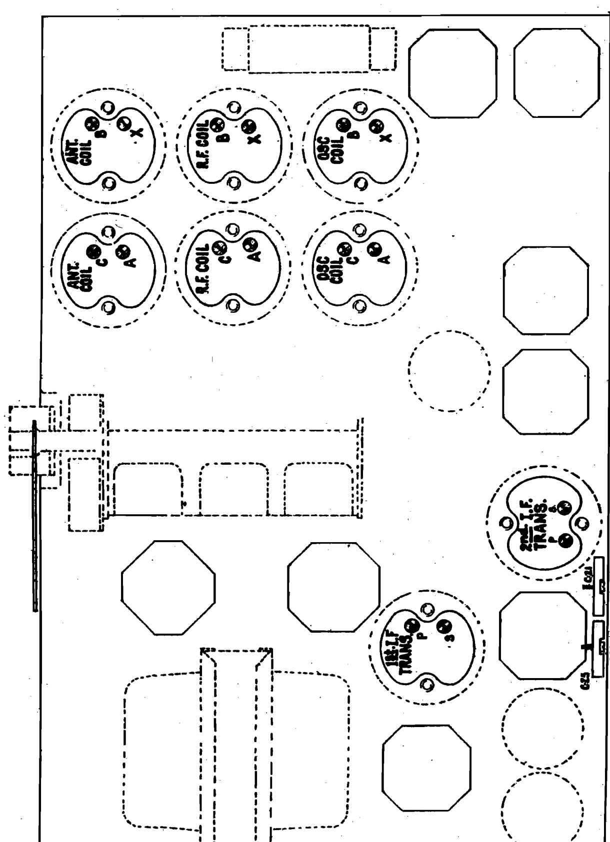



Figure 6—Location of Trimmer Capacitors

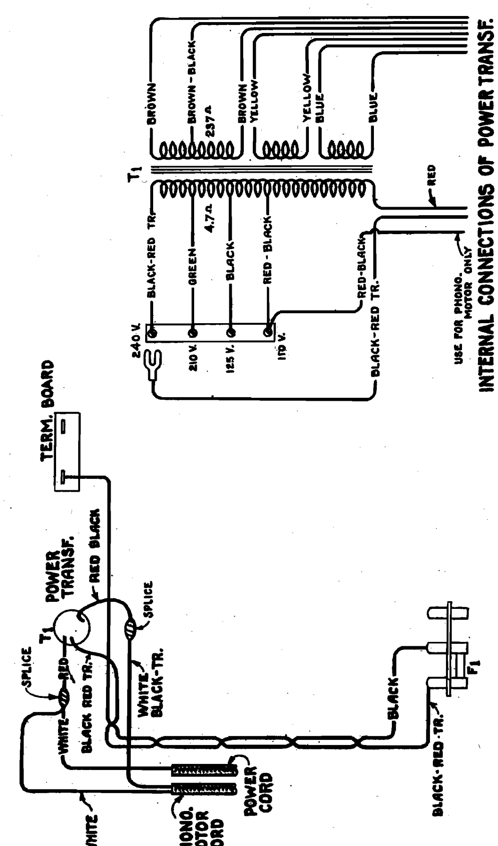



Figure 7—Universal Power Transformer Connections

MODEL 341
Assembly Wiring
Circuit Data

# RCA-VICTOR CO., INC.

## DESCRIPTION OF ELECTRICAL CIRCUIT

The general circuit arrangement consists of an R. F. stage, a combined oscillator and first detector, an I. F. stage, a combined second detector, A. F. amplifier and automatic volume control, a driver audio stage and a push-pull Pentode output stage. An RCA-5Z3 rectifier, together with a suitable filtering system, provides plate and grid voltages for all tubes and field excitation for the loudspeaker. Figure 1 shows the schematic diagram, Figure 2 the chassis wiring, Figure 3 the loudspeaker wiring and Figure 4 the assembly wiring.

The signal enters the receiver through a shielded antenna lead and is applied to the grid of the R. F. tube through the antenna coupling transformer. The secondary of this transformer is tuned to the signal frequency by means of one unit of the gang capacitor. The output of this stage is transformer coupled to the grid circuit of the first detector, which is also tuned to the signal frequency by a unit of the gang capacitor.

Combined with the signal in the first detector is the local oscillator, which is always at a 460 K. C. frequency difference (higher) from the signal frequency. A separate coil system and the third unit of the gang capacitor are used in this circuit.

In conjunction with these three tuned circuits, it is well to point out that four different groups of tuned circuits are used, one for each tuning band. A four-position selector switch is provided for selecting the band in which the desired signal is located. In addition to selecting the desired coil system, additional groups of contacts are provided for short-circuiting the preceding lower frequency R. F. and detector coils and the two preceding oscillator coils. This is to prevent "dead" spots due to the absorption effects caused by the coils, the natural period of which, with the tuning capacitor disconnected, falls in the next higher frequency band.

The output of the first detector, which is the I. F. signal (460 K. C.), is fed directly through two tuned circuits to the grid of the I. F. amplifier stage. The I. F. stage, which utilizes Radiotron RCA-6D6, uses two transformers, which consist of four tuned circuits, all of which are tuned to 460 K. C.

The output of the I. F. amplifier is then applied to the input electrodes of the RCA-75, which is a combined second detector, A. F. amplifier and automatic volume control. The direct current component of the rectified signal produces a voltage drop across resistor R-32. The full voltage drop constitutes the automatic bias voltage for the R. F. while a tap is provided for the first detector and I. F. voltage. These automatic bias voltages for the R. F., first detector and I. F. give the automatic volume-control action of the receiver. The volume control selects the amount of audio voltage that is applied to the grid of the RCA-75 and thereby regulates the audio output of the entire receiver.

The output of the A. F. section of the RCA-75 is resistance coupled to the grid of the RCA-76, first audio stage, which is transformer coupled to the push-pull output stage.

The output stage uses two RCA-42's, which give a low distortion, high audio output to the loudspeaker. A high-frequency tone control, which consists of a variable resistor and capacitor, is connected across the grids of the output stage. At the minimum resistance position of the variable resistor, maximum attenuation of the high audio frequencies is obtained.

The plate circuit of the output stage is matched to the cone coil of the reproducer by means of a step-down transformer.

Plate and grid voltages for all tubes are supplied from the output of the rectifier-filter system. An RCA-5Z3 is used as a rectifier and a suitable network of capacitors and resistors gives the necessary filtering and voltages. The loudspeaker field is used as a filter reactor.

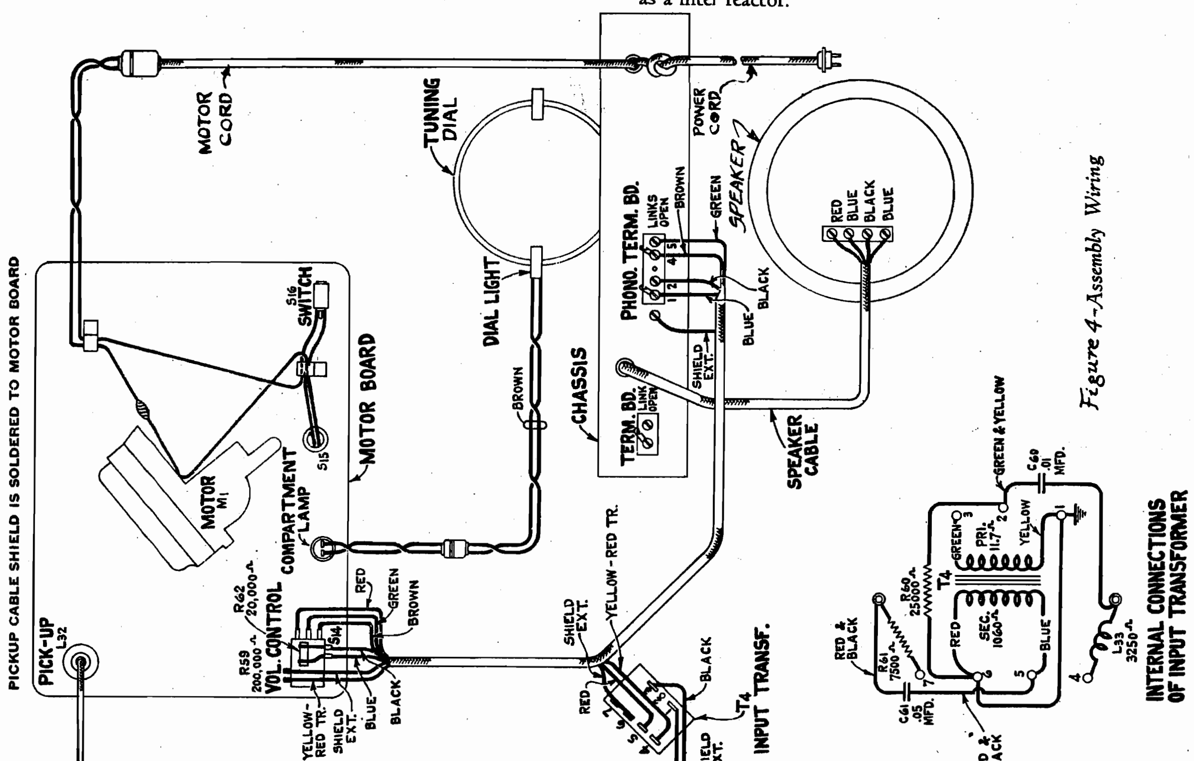


*Figure 4—Assembly Wiring*

RCA-VICTOR CO., INC.

# SERVICE DATA

## (1) LINE-UP PROCEDURE

The line-up procedure of this receiver is somewhat involved and it is important that these instructions be carefully followed when making adjustments. Properly aligned, this receiver has outstanding performance; improperly aligned, it may be impossible to receive signals on all bands.

### Equipment

To properly align this receiver, proper test equipment must be used. This consists of a modulated R. F. oscillator having proper frequency range, an output indicator, an alignment tool and a tuning wand. These parts, which are shown have been developed by the manufacturer of this receiver for use by service men to duplicate the original factory adjustments.

### Checking with Tuning Wand

Before making any R. F., oscillator or first detector adjustments, the accuracy of the present adjustments may be checked by means of the tuning wand (Stock No. 6679). The tuning wand consists of a bakelite rod having a brass cylinder at one end and a special finely divided iron insert at the other end. Inserting the cylinder into the center of a coil lowers its inductance, while inserting the iron end increases its inductance. From this, it is seen that unless the trimmer adjustment for a particular coil is perfect at alignment frequencies, inserting one end of the wand may increase the output of a particular signal. A perfect adjustment is evidenced by a lowering of output when either end of the wand is inserted into a coil.

The shields over the R. F. coil assembly have a hole at their top for entrance of the tuning wand. The location of the various coils inside of the shield is shown in Figure 5. An example of the proper manner of using the tuning wand would be to assume the external oscillator were set at 1720 K. C. and the signal tuned in, and the output indicator connected across the voice coil of the loudspeaker. Then the tuning wand should be inserted, first one end and then the other end, into the top of the three transformers at the left of the R. F. assembly, facing the front of the chassis. A perfect adjustment of the trimmer would be evidenced by a reduction in output when each end of the wand is inserted in each of the three transformers. If one end—for example, the iron end—when inserted in one coil caused an increase in output, then that circuit is low. An increase in the trimmer capacitance would be the proper remedy.

## (2) I. F. TUNING CAPACITOR ADJUSTMENTS

This receiver has one I. F. stage with two transformers having four adjustable capacitors that may require adjustment. The transformers are all peaked at 460 K. C.

A detailed procedure for making this adjustment follows:

(a) Connect the output of an external oscillator tuned to 460 K. C. between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker.

(b) Place the oscillator in operation at 460 K. C. Place the receiver in operation and adjust the station selector until a point is reached (Band A) where no signals are heard and turn the volume control to its maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

(c) Refer to Figure 6. Adjust each trimmer of the I. F. transformers until maximum output is obtained. Go over the adjustments a second time.

This completes the I. F. adjustments. However, it is good practice to follow the I. F. adjustments with the R. F. and oscillator adjustments due to to interlocking which always occurs.

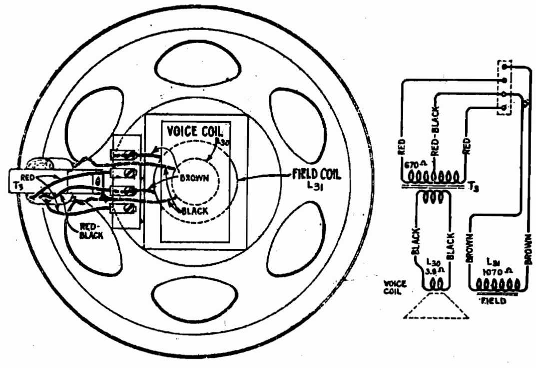



*Figure 3—Loudspeaker Wiring*

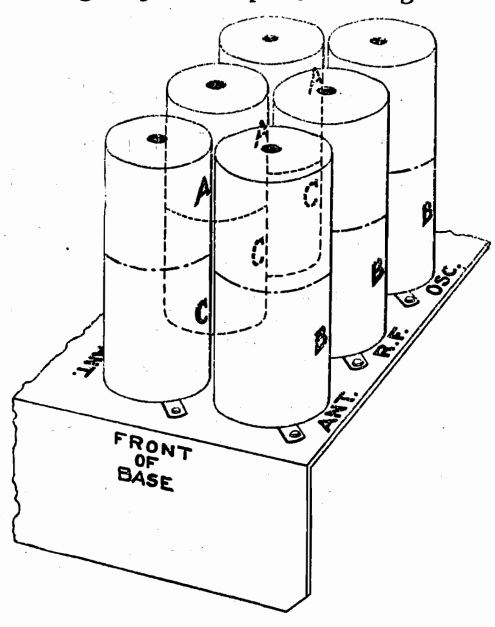



*Figure 5—Location of Coils in Shields*

**MODEL 341**
**Alignment Data**
**Pickup Data**

# RCA-VICTOR CO., INC.

### (3) R. F. OSCILLATOR AND FIRST DETECTOR ADJUSTMENTS

Four R. F., oscillator and first detector adjustments are required in Bands "A" and "X." Three are required in Bands "B" and "C."

To properly align the various bands, each band must be aligned individually. The preliminary set-up requires the external oscillator to be connected between the antenna and ground terminals of the receiver and the output indicator across the voice coil of the loudspeaker. The volume and sensitivity controls must be at the maximum position and the input from the oscillator at the minimum value possible to get an output indication under these conditions. In the high frequency bands, it may be necessary to disconnect the oscillator from the receiver and place it at a distance in order to get a sufficiently low input to the receiver.

The dial pointer must be properly set before starting any actual adjustments. This is done by turning the variable capacitor until it is at its maximum capacity position. One end of the pointer should point exactly at the horizontal line at the lowest frequency end of Band "A," while the other end should point to within 1/64 inch of the horizontal line at the highest frequency end of Band "A."

Figure 6 shows the location of the trimmers for each band. Care must be exercised to only adjust the trimmers in the band under test.

**Band "A"**

(a) Set the band switch at "A."

(b) Tune the external oscillator to 1,720 K. C., set the pointer at 1,720 K. C. and adjust the oscillator, detector and R. F. trimmers for maximum output.

(c) Shift the external oscillator frequency to 600 K. C. Tune in the 600 K. C. signal, irrespective of scale calibration, and adjust the series trimmers, marked 600 K. C., Figure 6, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 1,720 K. C. as described in (b).

**Band "B"**

(a) Set the band switch at "B."

(b) Tune the external oscillator to 5,160 K. C. and set the pointer at 5,160 K. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(c) Check for the image signal, which should be received at approximately 4,240 K. C. on the dial. It will be necessary to increase the external oscillator output for this check.

(d) The antenna and detector trimmers should now be peaked for maximum output.

**Band "C"**

(a) Set the band switch at "C."

(b) Tune the external oscillator to 18,000 K. C. and set the pointer at 18 M. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(c) Check for the image signal, which should be received at approximately 17,080 on the dial. It may be necessary to increase the external oscillator output for this check.

(d) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then at the oscillator frequency and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(e) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

**Band "X"**

(a) Set the band switch at "X."

(b) Tune the external oscillator to 410 K. C., set the dial pointer at 410 K. C. and adjust the oscillator, detector and R. F. trimmers for maximum output.

(c) Shift the external oscillator frequency to 175 K. C. Tune in the 175 K. C. signal irrespective of scale calibration and adjust the series trimmer, marked 175 K. C. on Figure 6, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 410 K. C. as described in (b).

### (4) POWER TRANSFORMER CONNECTIONS

The 220-volt power transformer furnished with some instruments includes taps for operating on 110-volt lines. Figure 7 shows the schematic circuit of the transformer and the proper voltage to be applied to the various taps. The taps are located on the power transformer assembly and are accessible without removing the chassis from the cabinet.

### (5) FIDELITY LINK

It will be noted that a small link is mounted on the rear apron of the chassis which is open. Closing the link reduces the low frequency output of the receiver.

### (6) VOLTAGE READINGS

The following voltages are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if low-resistance meters are used, such allowances must be made. Figure 8 shows the voltages at each individual socket contact.

### (7) SERVICE DATA ON MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

### (8) REPLACING MAGNET COIL, PIVOT RUBBERS, ARMATURE OR DAMPING BLOCK

In order to replace a defective coil or the hardened pivot rubbers (see Figure 10), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

(d) Remove screws A and B, Figure 10, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization. The magnetizer shown on page 18 is useful for magnetizing pickups.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure 10), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be .009" on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the air gap as explained under (h), section (8).

### (9) REPLACING THE DAMPING BLOCK

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

# RCA-VICTOR CO., INC.

**MODEL 341**
**Pickup Data**
**Record Changer Data**

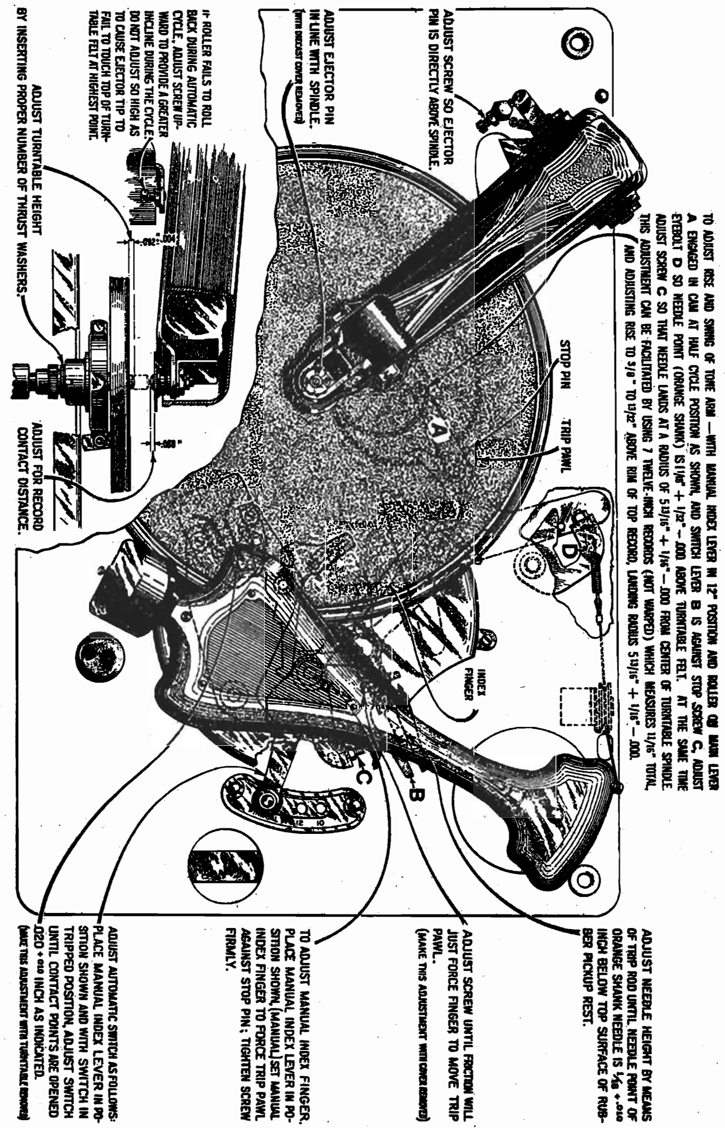



*Figure 12—Automatic Record Changer Adjustments*

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure 11, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

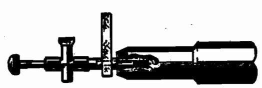


*Figure 11—Special Soldering-Iron Tip*

(f) Turn the dial to each extreme and to its center position and check the backlash of the back gear (closest to reflector). There should be definite backlash in each direction at each of these three positions.

(g) If this backlash is not obtained, loosen the nut on the back of the reflector which holds the shaft of these gears and slide the shaft toward the outer edge of the reflector. The hole is elongated to permit this adjustment.

(h) After making sure there is backlash at the three check points mentioned, turn the outside gear in a clockwise direction 1½ turns. Hold it at this position and replace the stem gear.

(i) Turn the dial throughout its range. If the gears become noisy, move the gear further toward the reflector edges described in (g).

(j) Replace the dial scale, making sure the hole clears the spindle.

(k) Replace the vernier hand. It should point at zero when the tuning capacitor is fully meshed.

(l) Replace the large hand. One end of the pointer should point exactly at the horizontal line at the lowest frequency end of Band "A" when the tuning capacitor is fully meshed.

The above covers the proper manner of making adjustments, assuming all parts are in normal condition. Of course, if any part is defective, it must be replaced. The spring gear may be checked by turning it until the spring is tight and unwinding it slowly. It should unwind 4¼ turns.

## (10) AUTOMATIC RECORD CHANGER

The automatic record changer used in this instrument is of simple design and fool-proof construction. Under normal operating conditions service difficulties should be negligible. However, in event adjustments are required, a reference to Figure 12 will disclose the proper method of making all adjustments.

## (11) ADJUSTMENT OF DIAL VERNIER MECHANISM

A small vernier indicator is provided for giving a simple means of band spread. Under normal conditions, adjustment of this mechanism will not be required. However, in event the initial adjustment is not satisfactory or adjustment is required because of replacement, the following procedure should be used:

(a) Remove the chassis from the cabinet to a place convenient for work.

(b) Check the tension on the vernier hand by pushing it in a clockwise direction. There should be considerable tension against such a push. If this tension does not exist, the action of the hand may be erratic and possibly fail to return to the same position for a particular station.

(c) Pull off the long hand with a pair of long-nose pliers.

(d) Straighten the lugs that hold the dial in place. Then remove the dial "vernier" hand and stem gear together.

(e) Then remove the "vernier" hand from the stem gear.

## PHONOGRAPH

The record reproducing facilities consist of a low impedance magnetic pickup with its associated inertia type tone arm, a compensated volume control, the audio amplifier of the receiver and the loudspeaker of the receiver. The radio receiver is made inoperative by the switch used for changing from radio to record reproduction. The turntable assembly consists of the perfected automatic record changer, which is simple and fool-proof in operation.

MODEL 341
Voltage
Parts List

# RCA-VICTOR CO., INC.

## ELECTRICAL SPECIFICATIONS

Voltage Rating............105–125 Volts and 105–130/200–250 Volts (Double Range)
Frequency Rating............25, 30, 50 and 60 Cycles
Power Consumption............170 Watts, 60 Cycles
Type and Number of Radiotrons
2 RCA-6D6, 1 RCA-6A7, 1 RCA-75, 1 RCA-76, 2 RCA-42, 1 RCA-5Z3—Total, 8

Tuning Frequency Range............
Band X— 140 K. C.– 410 K. C.
Band A— 540 K. C.– 1720 K. C.
Band B—1720 K. C.– 5400 K. C.
Band C—5400 K. C.–18,000 K. C.

Line-up Frequencies......175 K. C., 410 K. C., 460 K. C., 600 K. C., 1720 K. C., 5160 K. C., 18,000 K. C.
Maximum Undistorted Output............4.0 Watts
Maximum Output............5.0 Watts
Type of Magnetic Pickup............Low Impedance, Viscoloid
Type of Record Changer............Record Ejector Type
Capacity of Record Changer............Eight 10″ or seven 12″ Records
Turntable Speed............33⅓ R. P. M. and 78 R. P. M.

This eight-tube, four-band all-wave combination radio-phonograph instrument provides entertainment either from the perfected all-wave radio receiver or from records of all types. Record or radio reproduction is characterized by unusual tone quality. The perfected phonograph enables one to play a number of selections without any attention whatever, due to its automatic record-changing feature.

The eight-tube, four-band Superheterodyne receiver is of the "all-wave" type, having a continuous tuning range extending from 140 K. C. to 18,000 K. C., except for one break between 410 K. C. and 540 K. C. Such a tuning range permits the listener to receive all of the important broadcasting, police, aircraft and amateur call bands throughout the world.

Excellent sensitivity, selectivity and tone quality, together with a high output (4 watts undistorted), Class A amplifier gives the receiver outstanding performance. Operating features include an "airplane" type dial, a double-ratio vernier drive, a visual band indicator, and a special "second hand" on the dial for logging short-wave stations. Other important features include automatic volume control, sensitivity control and a large loudspeaker unit.

## RADIOTRON SOCKET VOLTAGES

### 120-Volt A. C. Line—Maximum Volume and Sensitivity—No Signal

| Radiotron No. | | Cathode to Ground Volts, D. C. | Screen Grid to Ground Volts, D. C. | Plate to Ground Volts, D. C. | Cathode Current, M. A. | Heater Volts, A. C. |
|---|---|---|---|---|---|---|
| RCA-6D6 R. F. | | 4.2 | 110 | 272 | 10.5 | 6.3 |
| RCA-6A7 | Oscillator | — | — | 225 | 11.4 | 6.3 |
| | 1st Detector | 4.6 | 110 | 282 | | |
| RCA-6D6 I. F. | | 4.2 | 110 | 272 | 10.5 | 6.3 |
| RCA-75 2nd Detector | | 1.2 | — | 170* | 0.4 | 6.3 |
| RCA-76 A. F. | | 14.0 | — | 252 | 2.8 | 6.3 |
| RCA-42 Power | | 22.0 | 295 | 290 | 24.5 | 6.3 |
| RCA-42 Power | | 22.0 | 295 | 290 | 24.5 | 6.3 |
| RCA-5Z3 Rectifier | | — | — | 768/384 R. M. S. | 110.0 | 5.0 |

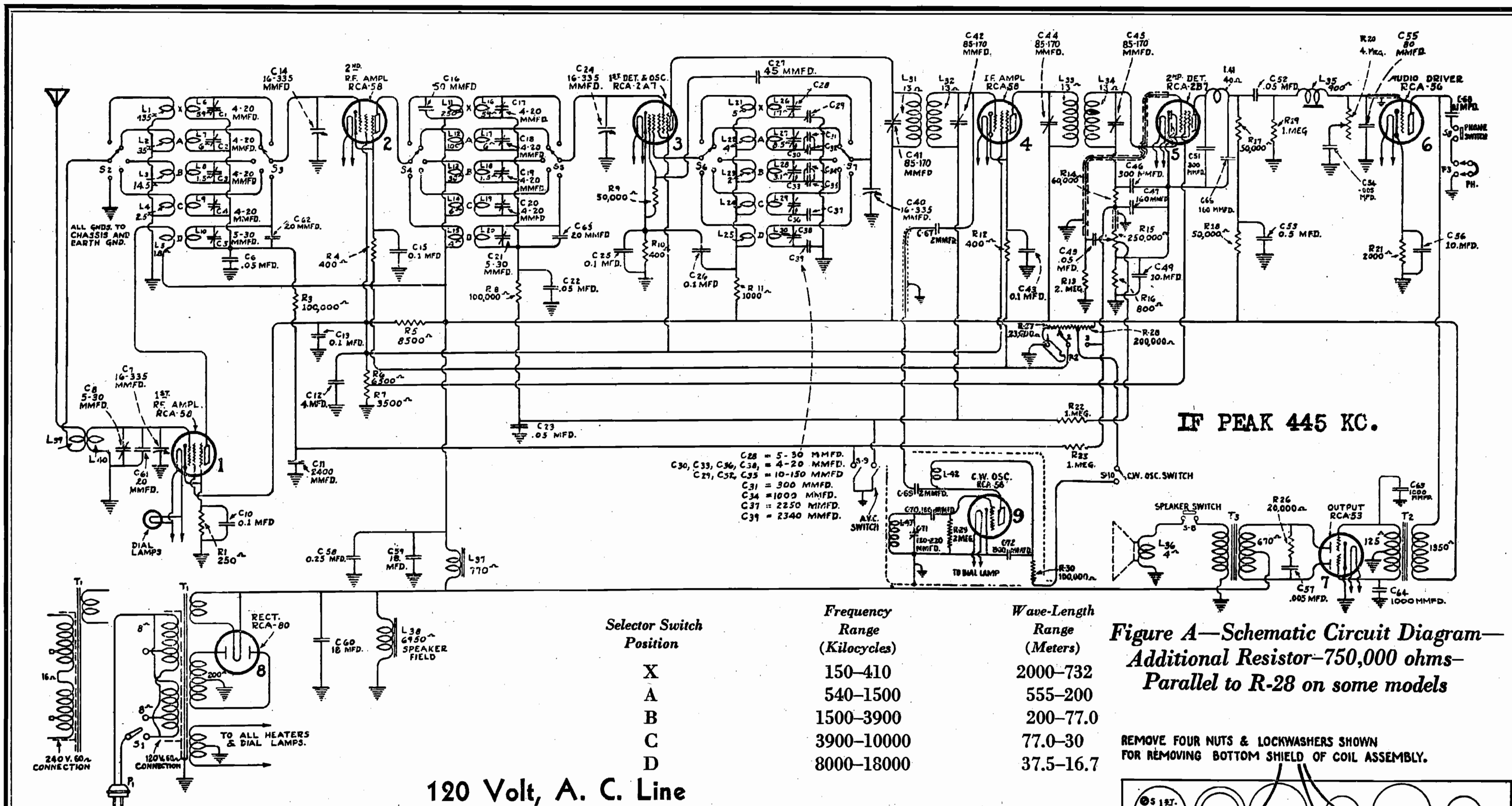
*Cannot be measured with ordinary voltmeter.

## REPLACEMENT PARTS

| Stock No. | Description | List Price |
|---|---|---|
| 3861 | Capacitor—Oscillator trimmer capacitor (C21, C25) | .78 |
| 4633 | Capacitor—50 mmfd. (C19) | .25 |
| 4635 | Capacitor—100 mmfd. (C41) | .25 |
| 3937 | Capacitor—300 mmfd. (C8) | .34 |
| 4413 | Capacitor—360 mmfd. (C24) | .22 |
| 4183 | Capacitor—400 mmfd. (C59) | .26 |
| 4412 | Capacitor—1120 mmfd. (C27) | .25 |
| 4409 | Capacitor—1120 mmfd. (C43) | .35 |
| 4634 | Capacitor—1120 mmfd. (C52) | .35 |
| 4524 | Capacitor—2850 mmfd. (C29) | .35 |
| 4615 | Capacitor—2850 mmfd. (C17, C56) | .34 |
| 4628 | Capacitor—0.004 mfd. (C49, C50) | .28 |
| 3787 | Capacitor—0.01 mfd. (C48) | .30 |
| 4212 | Capacitor—0.01 mfd. (C44) | .30 |
| 4624 | Capacitor—0.01 mfd. (C58) | .54 |
| 3888 | Capacitor—0.05 mfd. (C37) | .25 |
| 4417 | Capacitor—0.05 mfd. (C5, C15) | .25 |
| 3877 | Capacitor—0.1 mfd. (C38) | .32 |
| 4415 | Capacitor—0.1 mfd. (C18) | .30 |
| 4645 | Capacitor—0.1 mfd. (C7, C14, C30, C39, C57) | .25 |
| 3750 | Capacitor—0.25 mfd. (C47) | .36 |
| 7790 | Capacitor—10 mfd. (C53, C54) | 1.05 |
| 4619 | Capacitor pack—Comprising one 0.5 mfd., one 10 mfd. capacitor (C42, C51) | 1.44 |
| 4626 | Capacitor pack—Comprising one 4 mfd., one 10 mfd. and one 8 mfd. capacitor (C45, C46, C55) | 2.82 |
| 7810 | Coil—Antenna coil "PB-LW" (L1, L2, L5, L6, C1, C3) | 2.10 |
| 7803 | Coil—Antenna coil "B.S.W." (L3, L4, L7, L8, C2, C4) | 1.82 |
| 7808 | Coil—Detector coil "P.B.-L.W." (L9, L10, L13, L14, C9, C11) | 2.05 |
| 7805 | Coil—Detector coil "B.-S.W." (L11, L12, L15, L16, C10, C12, C13) | 2.15 |
| 7807 | Coil—Oscillator coil "B.S.W." (L19, L20, L23, L24, C23, C28) | 1.62 |
| 7809 | Coil—Oscillator coil "P.B.-L.W." (L17, L18, L21, L22, C22, C26) | 1.70 |
| 7801 | Condenser—3-gang variable tuning condenser (C6, C16, C20) | 4.42 |
| 4616 | Tone control (R24, S1) | 1.28 |
| 4431 | Transformer—First intermediate frequency transformer (L25, L26, C32, C33, C34) | 2.28 |
| 9505 | Transformer—Power transformer—105–125 volts—50–60 cycles (T1) | 6.35 |
| 9506 | Transformer—Power transformer—105–125 volts—25–40 cycles | 8.90 |
| 9507 | Transformer—Power transformer—105–250 volts—40–60 cycles | 6.40 |
| 4433 | Transformer—Second intermediate frequency transformer (L27, L28, C35, C36, C40, R14) | 2.15 |
| 4620 | Transformer and reactor—Interstage transformer and reactor (T2, L29) | 2.98 |
| 4519 | Volume control (R32) | 1.25 |
| 4625 | Resistor—Wire wound resistor—Comprising one 6500-ohm-4500-ohm and 450 section (R30, R31, R58) | .70 |
| 3704 | Resistor—400 ohms—Carbon type—¼ watt (R9, R3, R12)—Package of 5 | 1.00 |
| 4338 | Resistor — 2500 ohms — Carbon type — ¼ watt (R6, R11, R13)—Package of 10 | 2.00 |
| 4242 | Resistor — 3000 ohms — Carbon type — ¼ watt (R17)—Package of 5 | 1.00 |
| 4436 | Resistor — 5000 ohms — Carbon type — ¼ watt (R22)—Package of 10 | 2.00 |
| 3998 | Resistor—15,000 ohms—Carbon type—¼ watt (R20)—Package of 5 | 1.00 |
| 3602 | Resistor—60,000 ohms—Carbon type—¼ watt (R8, R18, R23, R26)—Package of 5 | 1.00 |
| 3118 | Resistor—100,000 ohms—Carbon type—¼ watt (R2, R7, R19)—Package of 5 | 1.00 |
| 3619 | Resistor—400,000 ohms—Carbon type—¼ watt (R59)—Package of 5 | 1.00 |
| 3033 | Resistor — 1 megohm — Carbon type — ¼ watt (R16)—Package of 5 | 1.00 |
| 6242 | Resistor — 2 megohms — Carbon type — ¼ watt (R15, R21, R28)—Package of 5 | 1.00 |
| 3078 | Resistor—10,000 ohms—Carbon type—½ watt (R27)—Package of 5 | 1.00 |
| 4623 | Resistor—13,000 ohms—Carbon type—½ watt (R29)—Package of 10 | 2.00 |
| 2240 | Resistor—30,000 ohms—Carbon type—1 watt (R25) | .22 |
| 4418 | Resistor—100 ohms—Flexible type (R1, R4)—Package of 10 | 1.50 |
| 4618 | Rheostat—Sensitivity control (R5) | 1.25 |
| 9011 | Motor—105–125 volts—60 cycles | 19.72 |
| 9014 | Motor—105–125 volts—50 cycles | 19.72 |
| 9012 | Motor—105–125 volts—25 cycles | 24.16 |
| 9537 | Coil—Field coil magnet and cone support (L31) | 3.85 |
| 8969 | Cone—Reproducer cone—Package of 5 (L30) | 6.35 |
| 9536 | Reproducer complete | 8.40 |
| 4637 | Transformer—Output transformer (T3) | 1.50 |
| 6303 | Resistor—20,000 ohms—Carbon type—¼ watt (R62)—Package of 5 | 1.00 |
| 4678 | Ring—Dial retaining ring—Package of 5 | .34 |
| 4613 | Screw—8-32-7/16″ headless set screw for knob | .25 |
| 4557 | Shade—Phonograph compartment lamp shade | .35 |
| 4671 | Switch—Toggle type—Motor starting switch (S16) | .72 |
| 4672 | Transformer—Input transformer pack comprising one transformer, one reactor, one 0.01 mfd., one 0.05 mfd. capacitor, one 7500-ohm and one 25,000-ohm resistor (T4, L33, C60, C61, R60, R61) | 5.42 |
| 6766 | Volume control—Phonograph volume control (R69, S14) | 2.28 |

**MODEL 9-Tube General Purpose A-W.**
**Schematic, Voltage**

# RCA-VICTOR CO., INC.




| Selector Switch Position | Frequency Range (Kilocycles) | Wave-Length Range (Meters) |
|---|---|---|
| X | 150–410 | 2000–732 |
| A | 540–1500 | 555–200 |
| B | 1500–3900 | 200–77.0 |
| C | 3900–10000 | 77.0–30 |
| D | 8000–18000 | 37.5–16.7 |

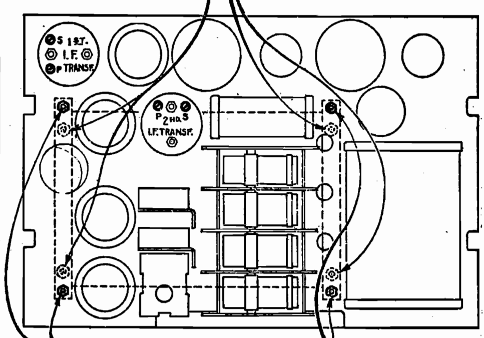
*Figure A—Schematic Circuit Diagram—Additional Resistor–750,000 ohms–Parallel to R-28 on some models*

## 120 Volt, A. C. Line

| Radiotron No. | Control Grid to Cathode, Volts | Screen Grid to Cathode, Volts | Plate to Cathode, Volts | Plate Current, M. A. | Filament or Heater, Volts |
|---|---|---|---|---|---|
| RCA-58, R. F. | **2.0 | 100 | 255 | 6.0 | 2.6 |
| RCA-58, S. W. R. F. | **2.0 | 100 | 255 | 6.0 | 2.6 |
| RCA-2A7, Det.-Osc. | **2.5 | 100 | 250 | *5.0 | 2.6 |
| RCA-58, I. F. | **2.0 | 100 | 255 | 6.0 | 2.6 |
| RCA-2B7, 2nd Det.-AVC | **1.5 | 35 | 105 | 1.5 | 2.6 |
| RCA-56, A. F. Driver | **12.0 | — | 245 | 6.0 | 2.6 |
| RCA-53, Output | 0 | — | 300 | 36.0 | 2.6 |
| RCA-80, Rectifier | 640 R. M. S. Plate to Plate | | | 130 per Plate | 5.0 |
| RCA-56, CW-Osc. | ** | — | 20 | 0.1 | 2.6 |

* Voltages and current apply to detector portion of tube.
** These voltages cannot be measured because of the high resistance of the circuits.

REMOVE FOUR NUTS & LOCKWASHERS SHOWN FOR REMOVING BOTTOM SHIELD OF COIL ASSEMBLY.




REMOVE FOUR NUTS & LOCKWASHERS TO REMOVE COIL ASSEMBLY.

*Figure D—Location of nuts and lockwashers holding coil assembly*

MODEL 9-Tube General Purpose A-W.
Chassis Wiring

RCA-VICTOR CO., INC.

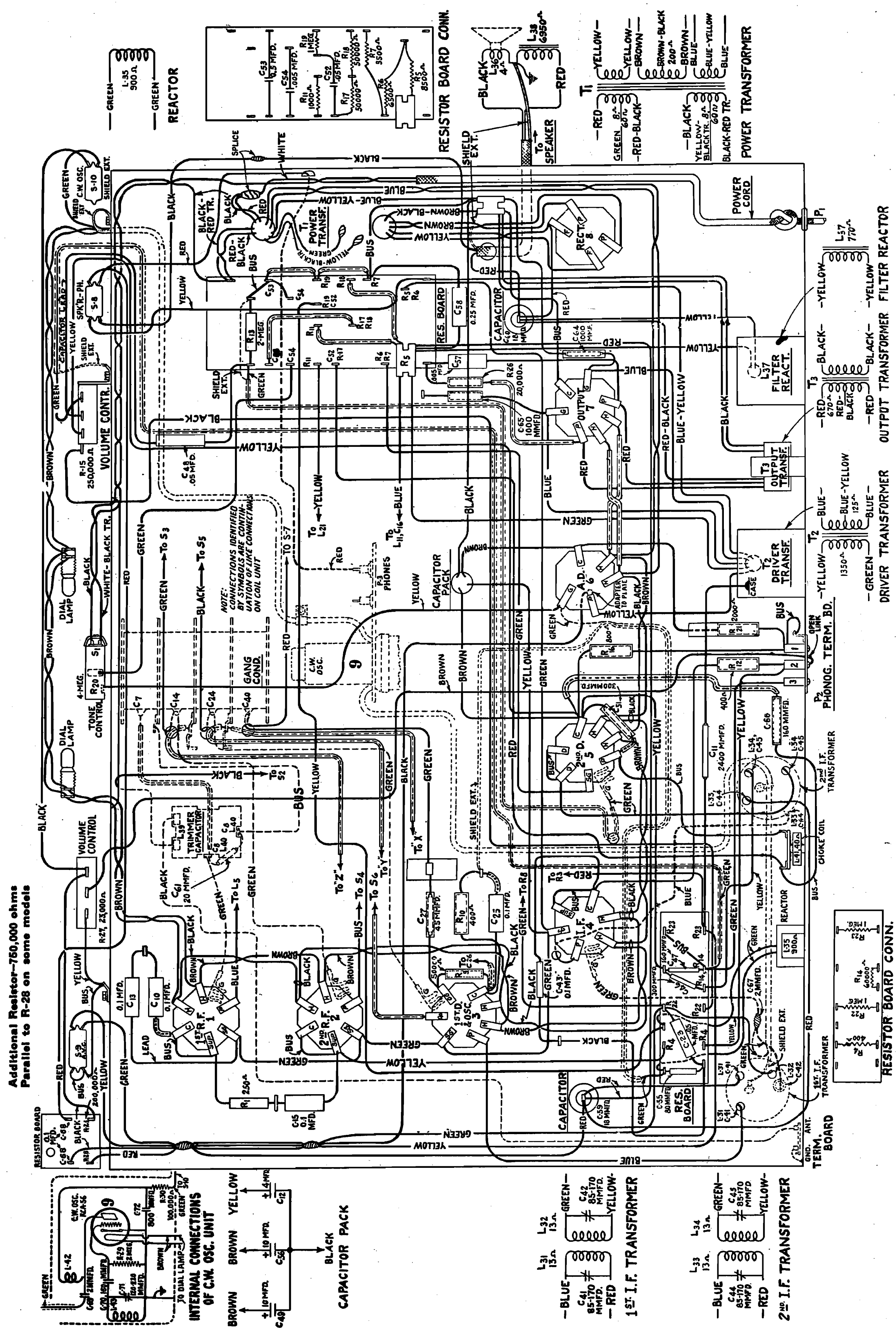



*Figure B—Chassis Wiring*

RCA-VICTOR CO., INC.

MODEL 9-Tube General Purpose A-W.
Coils Wiring Diagram

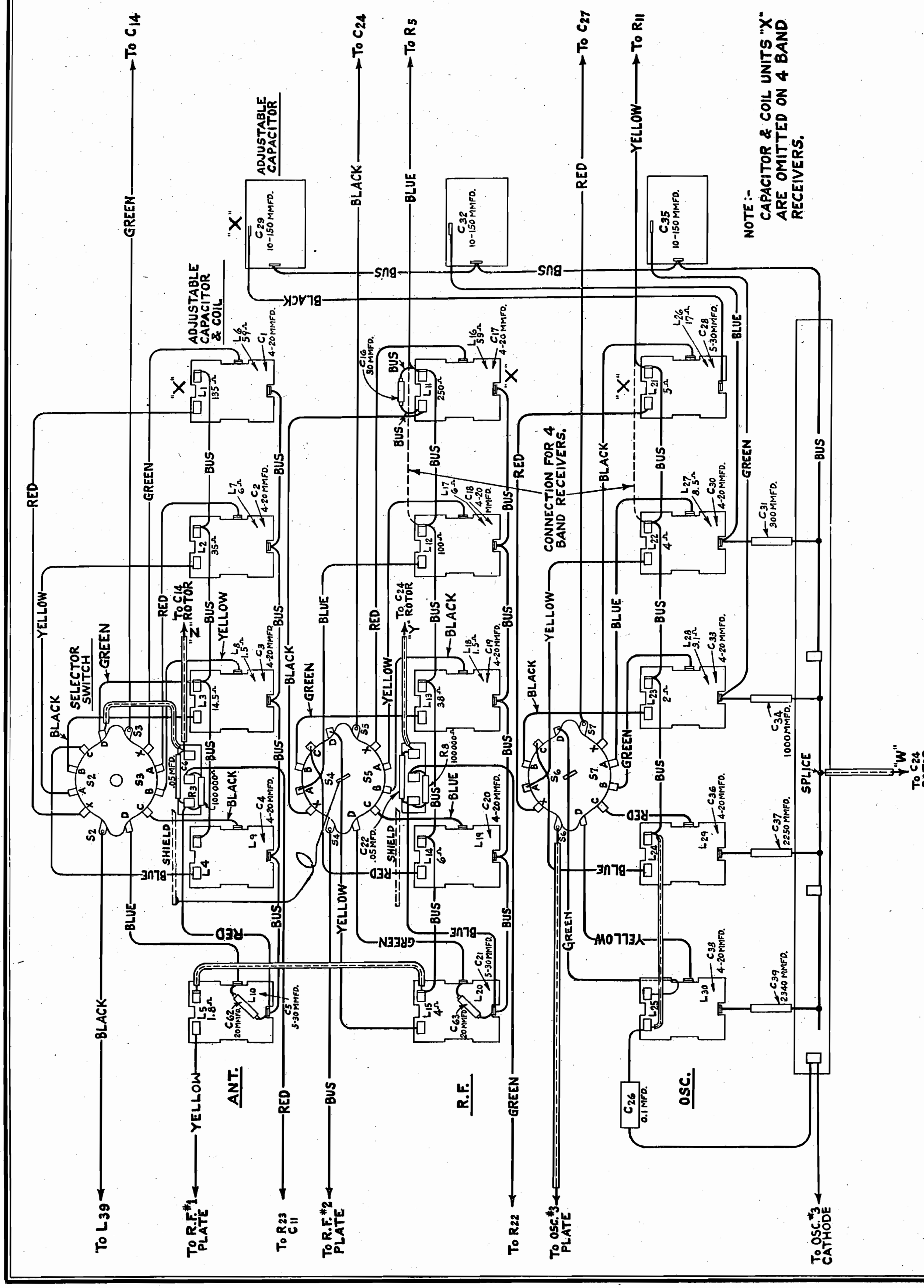



*Figure C—Wiring Diagram of Coil Assembly*

MODEL 9-Tube General Purpose A-W.
Alignment Data

RCA-VICTOR CO., INC.

# SERVICE DATA

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector using Radiotron RCA-2A7, an I. F. stage using RCA-58, a second detector and A. V. C. using RCA-2B7, an A. F. driver using RCA-56, and a Class "B" output stage using an RCA-53. The RCA-80 functions as the rectifier in the power supply circuits.

The foregoing Radiotrons and circuit functions apply to bands X, A, B and C only. In the case of band D, an additional R. F. stage utilizing an additional Radiotron RCA-58 is used. This is to increase the sensitivity and image frequency selectivity and to reduce the interference caused by tube hiss and 445 K. C. signals or static.

The intermediate frequency is 445 K. C. The use of this frequency gives an especially good image frequency ratio and makes easier alignment of the oscillator at the higher frequency bands.

In order to receive pure C W signals, an I. F. heterodyne oscillator has been provided. This oscillator is an RCA-56 that operates at a 1000-cycle higher frequency than the I. F. An adjustable capacitor is provided so that the pitch of the heterodyne frequency may be varied throughout the audible range.

The intermediate frequency amplifier is aligned in a similar manner to that of standard broadcast receivers except that it is aligned at 445 K. C. In order to properly align the receiver, it is essential that the Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 90 K. C. to 25,000 K. C. continuously, has good stability and includes an attenuator. In addition to the oscillator, a 300 ohm resistor for use as a "dummy" antenna, a non-metallic screwdriver (such as Stock No. 4160), and an output meter are required. The output meter should be preferably a thermocouple galvanometer connected either across or in place of the cone coil of the loudspeaker.

To align the intermediate frequency circuits, connect the output of the external oscillator to the grid of the first detector. For the R. F. and oscillator adjustments, the oscillator output should be connected to the antenna and ground terminals of the receiver with a 300 ohm resistor inserted in series with the antenna lead. In many cases, however, the signal strength obtained with this direct connection will be too great to permit proper alignment, even at the minimum setting of the oscillator attenuator. When this is true, the external oscillator must be loose-coupled to the receiver. This is done by connecting the 300 ohm resistor between the antenna and ground terminals of the receiver and attaching a short length of wire to the antenna post. Lay the free end of this wire across the oscillator case, adjusting its position as necessary to obtain the degree of pickup required.

The output of the external oscillator should be at the minimum value necessary to obtain a deflection in the output meter when the volume control is at its maximum position. All adjustments are made for a maximum deflection in the output meter.

The accuracy of line-up of each band may be checked without touching the trimmer condensers, by the use of the tuning wand, Stock No. 6679.

One end of the wand consists of a brass cylinder. When this is inserted in a coil the effective inductance of the coil is lowered.

The other end of the wand contains a special finely divided iron suitable for use at radio frequencies. When this is inserted in a coil the inductance is raised.

To use the tuning wand a signal is first tuned in at the frequency at which a check is desired on alignment. The wand is then inserted slowly in the Antenna and R. F. transformers, using first one end and then the other end of the wand. Unless the alignment is perfect, it will be found that the power output indicated by the meter will be increased to a peak for a critical position of the wand in the coils.

The end of the wand required indicates whether the coil is high or low.

Of course, alignment correction at the high frequency end of a tuning range should be accomplished by the use of the trimmer condenser. If alignment correction should be required at the low frequency end of a tuning range it may be accomplished by sliding the end coil of the transformer. The winding farthest from the trimmer panel is pushed toward the trimmer panel to increase the inductance, and farther away to decrease the inductance. On band D coils, the last two or three turns may be pushed in a similar manner to obtain the proper inductance.

*This adjustment should not be attempted unless a quite appreciable improvement will result* (*as shown by the tuning wand*).

The following chart gives the details of all line-up adjustments. The receiver should be lined up in the order of the adjustments given on the chart. Refer to Figure E for the location of the line-up capacitors.

The CW oscillator beat frequency may be adjusted by means of the trimmer capacitor shown in Figure E. (It may be necessary to slightly loosen the shielding cover to gain access to this screw.) A weak modulated or telephone signal should be accurately tuned-in with the oscillator "off" The oscillator should then be turned "On" and the trimmer screw adjusted until a 1000 cycle note is obtained.

## Line-up Capacitor Adjustments

This receiver is aligned in a similar manner to that of a standard broadcast band receiver. That is, the three main tuning capacitors are aligned by means of three trimmers in each band and on the three lowest frequency bands a series trimmer is adjusted for aligning the oscillator circuit. The other two bands do not require this low frequency trimmer, it being fixed in value. In the case of band D, it is necessary to adjust four trimmers due to the additional R. F. stage used.

| External Oscillator Frequency | Dial Setting | Location of Line-Up Capacitors | Position of Selector Switch | Adjust for | Number of Adjustments To Be Made |
|---|---|---|---|---|---|
| 445 K. C. | Any setting that does not bring in station. | Top of chassis. | Any position that does not bring in station. | Maximum output. | 4 |
| 370 K. C. | 370 K. C. | Bottom of chassis. | X | Maximum output. | 3 |
| 175 K. C. | Set for signal. | Top of chassis. | X | Maximum output while rocking dial back and forth. | 1 |
| 1400 K. C. | 1400 K. C. | Bottom of chassis. | A | Maximum output. | 3 |
| 600 K. C. | Set for signal. | Top of chassis. | A | Maximum output while rocking dial back and forth. | 1 |
| 3900 K. C. | 3900 K. C. | Bottom of chassis. | B | Maximum output. | 3 |
| 1710 K. C. | Set for signal. | Top of chassis. | B | Maximum output while rocking dial back and forth. | 1 |
| 10 M. C. | 10 M. C. | Bottom of chassis. | C | Maximum output. (See Note) | 3 |
| 15 or 18 M. C. | 15 or 18 M. C. | Bottom and top. | D | Maximum output. (See Note) | 4 |

NOTE—It is important to note, when aligning bands C and D, that two peaks will be observed on the trimmers for the oscillator and for the first detector. The correct oscillator peak is the one obtained using the lower trimmer capacitance, whereas the correct detector peak is the one obtained with the greater capacitance. It is essential that the proper peak be chosen, as otherwise tracking and sensitivity will be very poor at other frequencies. When adjusting the detector trimmer, the tuning capacitor should be rocked, since there is reaction on the oscillator tuning.

MODEL 9-Tube General Purpose A-W.
Transformer Data
Trimmer Locations

RCA-VICTOR CO., INC.

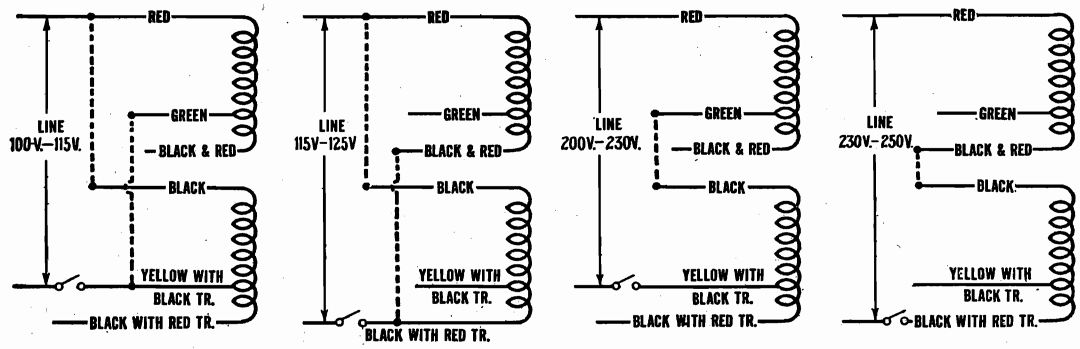
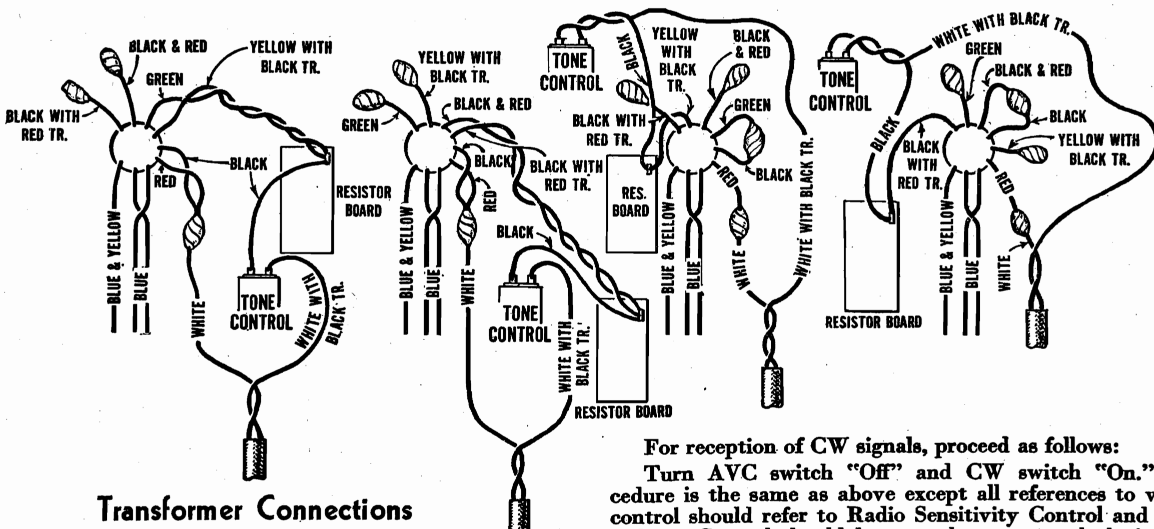



*Figure F—Power Transformer Connections (50–60 cycles)*




## Transformer Connections

The power transformer of the 50–60 cycle receiver uses two tapped primary windings. By connecting them in parallel or in series, the receiver may be used either on 110 or 220 volt lines. Figure F shows the proper manner of making the various connections possible for this transformer.

(1) **Range Switch (Upper Left-hand Knob)**—This switch converts the receiver for operation within any of the tuning ranges provided. As indicated on the selector dial, the letters on the switch escutcheon signify:

X—*Long-Wave Range*—150 to 410 kilocycles (2000 to 732 meters). Airport band.

A—*Standard Broadcast Band*—540 to 1500 kilocycles (555 to 200 meters).

B—*Police Band*—1500 to 3900 kilocycles (200 to 77 meters). Services available within this band include police calls at 1574, 1712 and 2450 kilocycles, amateur radio "phone" communications between 1800 and 2000 kilocycles, and aviation communications (phone) between 2500 and 3500 kilocycles.

C—*Short-Wave Range*—3900 to 10,000 kilocycles (77 to 30 meters). Within the limits of this range are included two of the internationally-assigned short-wave broadcast bands. These are known as the 49 and 31 meter bands. (The portion of this range from 8000 to 10,000 kilocycles, which includes the 31 meter band, is preferably received on range D.)

D—*Short-Wave Range*—8,000 to 18,000 kilocycles (37.5 to 16.7 meters). This range embraces four of the standardized short-wave broadcast bands located at 31, 25, 19 and 16 meters, respectively.

For reception of CW signals, proceed as follows:

Turn AVC switch "Off" and CW switch "On." Procedure is the same as above except all references to volume control should refer to Radio Sensitivity Control and Audio Volume Control should be near the extreme clockwise position. Each station tuned in will be indicated by a whistle caused by the beating of the CW oscillator frequency with the signal frequency. This feature provides unmistakable signal indication and may also be used when tuning signals other than CW, noting the presence of the signal with the oscillator "On" and tuning the station in finally with the oscillator turned "Off."

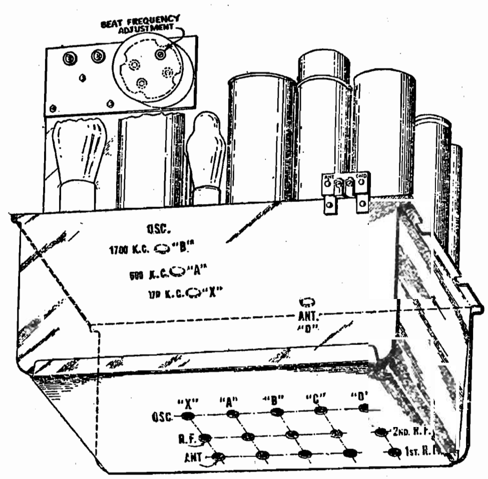



*Figure E—Location of line-up capacitors.*

MODEL 9-Tube General Purpose A-W.
Parts List

RCA-VICTOR CO., INC.

# REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | **RECEIVER ASSEMBLIES** | |
| 2747 | Contact cap—Package of 5 | $0.50 |
| 2816 | Resistor—1,000 ohms—Carbon type—½ watt (R11)—Package of 5 | 1.00 |
| 3056 | Shield—Output Radiotron shield—Package of 2 | .40 |
| 3076 | Resistor—1 megohm—Carbon type—½ watt (R19, R22, R23)—Package of 5 | 1.00 |
| 3114 | Resistor—50,000 ohms—Carbon type—¼ watt (R9)—Package of 5 | 1.00 |
| 3118 | Resistor—100,000 ohms—Carbon type—¼ watt (R3, R8)—Package of 5 | 1.00 |
| 3435 | Resistor—250 ohms—Carbon type—½ watt (R1)—Package of 5 | 1.00 |
| 3470 | Resistor—6,500 ohms—Carbon type—1 watt (R6)—Package of 5 | 1.10 |
| 3526 | Resistor—2,000 ohms—Carbon type—½ watt (R21)—Package of 5 | 1.00 |
| 3527 | Resistor—800 ohms—Carbon type—½ watt (R16)—Package of 5 | 1.00 |
| 3529 | Socket—Dial lamp socket | .32 |
| 3555 | Capacitor—0.1 mfd. (C26, C68) | .36 |
| 3572 | Socket—7-contact Radiotron socket—First detector and oscillator | .38 |
| 3594 | Resistor—50,000 ohms—Carbon type—½ watt (R17, R18)—Package of 5 | 1.00 |
| 3597 | Capacitor—0.25 mfd. (C58) | .40 |
| 3602 | Resistor—60,000 ohms—Carbon type—¼ watt (R14—Package of 5 | 1.00 |
| 3616 | Capacitor—300 mmfd. (C51) | .34 |
| 3622 | Shield—Second detector Radiotron shield | .36 |
| 3641 | Capacitor—0.1 mfd. (C10, C15, C25) | .35 |
| 3643 | Capacitor—.005 mfd. (C57) | .25 |
| 3711 | Capacitor—80 mmfd. (C55) | .40 |
| 3719 | Socket—7-contact Radiotron socket | .30 |
| 3771 | Resistor—8,500 ohms—Carbon type—3 watt (R5) | .25 |
| 3845 | Capacitor—2,340 mmfd. (C39) | .50 |
| 3846 | Capacitor—2,250 mmfd. (C37) | .50 |
| 3848 | Capacitor—300 mmfd. (C31) | .30 |
| 3849 | Capacitor—50 mmfd. (C16) | .30 |
| 3861 | Capacitor—Adjustable trimmer (C29, C32, C35) | .78 |
| 3863 | Resistor—400 ohms—Carbon type—½ watt (R4, R10, R12)—Package of 5 | 1.00 |
| 3864 | Capacitor—300 mmfd. (C46) | .30 |
| 3865 | Capacitor—160 mmfd. (C47) | .30 |
| 3888 | Capacitor—.05 mfd. (C6, C22, C23, C52) | .25 |
| 3901 | Capacitor—.05 mmfd. (C48) | .36 |
| 3931 | Capacitor—45 mmfd. (C27) | .30 |
| 3932 | Capacitor—.0024 mfd. (C11) | .30 |
| 3973 | Capacitor—1,000 mmfd. (C64, C65) | .34 |
| 4019 | Capacitor—1,000 mmfd. (C34) | .34 |
| 4030 | Bracket—Tone or volume control mounting bracket | .10 |
| 4033 | Capacitor—20 mmfd. (C61, C62, C63) | .34 |
| 4103 | Shield—First detector and R. F. Radiotron shield | .20 |
| 4104 | Shield—I. F. Radiotron shield | .20 |
| 4205 | Coil—Second detector choke coil (L41) | .50 |
| 4207 | Capacitor—0.1 mfd. (C13, C43) | .34 |
| 4217 | Switch—Single pole—Single throw—"CW-OSC" (S10) | 1.15 |
| 4218 | Switch—Double pole—Single throw—"AVC" (S9) | 1.00 |
| 4219 | Switch—Single pole—Double throw—"Speaker-Phone" (S8) | 1.90 |
| 4220 | Resistor—200,000 ohms—Carbon type—1 watt (R28)—Package of 5 | 1.10 |
| 6112 | Cushion—Rubber cushions for chassis—Package of 4 | .25 |
| 6136 | Resistor—3,500 ohms—Carbon type—1 watt (R7)—Package of 5 | 1.10 |
| 6188 | Resistor—2 megohms—Carbon type—½ watt (R13)—Package of 5 | 1.00 |
| 6278 | Resistor—750,000 ohms—Carbon type—½ watt (R31)—Package of 5 | 1.00 |
| 6300 | Socket—4-contact Radiotron socket | .35 |
| 6303 | Resistor—20,000 ohms—Carbon type—½ watt (R26)—Package of 5 | 1.00 |
| 6512 | Capacitor—.005 mfd. (C54) | .28 |
| 6603 | Condenser—4-gang variable tuning condenser (C7, C14, C24, C40) | 3.80 |
| 6604 | Capacitor—0.5 mfd. (C53) | .50 |
| 6605 | Transformer—Output transformer (T3) | 1.48 |
| 6606 | Reactor—Filter reactor (L37) | 1.66 |
| 6607 | Reactor—Tone control reactor (L35) | 1.14 |
| 6608 | Transformer—Audio driver transformer (T2) | 2.04 |
| 6609 | Capacitor—18. mfd. (C59) | 1.10 |
| 6612 | Volume control—Audio volume control (R15) | 1.20 |
| 6613 | Drive—Variable condenser drive assembly—Complete | 1.00 |
| 6626 | Capacitor pack—Comprising one 4. mfd., and two 10. mfd., capacitors (C12, C49, C56) | 1.86 |
| 6628 | Capacitor and coil—Antenna coil and capacitor assembly—8,000–18,000 kilocycles—4- or 5-band (L39, L40, C8) | 1.50 |
| 6629 | Switch—5-band selector switch | 3.48 |
| 6630 | Switch—4-band selector switch | 3.48 |
| 6631 | Coil and capacitor assembly—Antenna coil and capacitor—150–410 kilocycles—5-band (L1, L6, C1) | 2.16 |
| 6632 | Coil and capacitor—R. F. coil and capacitor assembly—150–410 kilocycles—5-band (L11, L16, C17) | 2.10 |
| 6633 | Coil and capacitor—Oscillator coil and capacitor assembly—150–410 kilocycles—5-band (L21, L26, C28) | $1.40 |
| 6634 | Coil and capacitor—Antenna coil and capacitor assembly—540–1,500 kilocycles—4- or 5-band (L2, L7, C2) | 1.86 |
| 6635 | Coil and capacitor—R. F. coil and capacitor assembly—540–1,500 kilocycles—4- or 5-band (L12, L17, C18) | 2.00 |
| 6636 | Coil and capacitor—Oscillator coil and capacitor assembly—540–1,500 kilocycles—4- or 5-band (L22, L27, C30) | 1.40 |
| 6637 | Coil and capacitor—Antenna coil and capacitor assembly—1,500–4,000 kilocycles—4- or 5-band (L3, L8, C3) | 1.56 |
| 6638 | Coil and capacitor—R. F. coil and capacitor assembly—1,500–4,000 kilocycles—4- or 5-band (L13, L18, C19) | 1.66 |
| 6639 | Coil and capacitor—Oscillator coil and capacitor assembly—1,500–4,000 kilocycles—4- or 5-band (L23, L28, C33) | 1.40 |
| 6640 | Coil and capacitor—Antenna coil and capacitor assembly—4,000–10,000 kilocycles—4- or 5-band (L4, L9, C4) | 1.54 |
| 6641 | Coil and capacitor—R. F. coil and capacitor assembly—4,000–10,000 kilocycles—4- or 5-band (L14, L19, C20) | 1.60 |
| 6642 | Coil and capacitor—Oscillator coil and capacitor assembly—4,000–10,000 kilocycles—4- or 5-band (L24, L29, C36) | 1.34 |
| 6643 | Coil and capacitor—Antenna or R. F. coil and capacitor assembly—8,000–18,000 kilocycles—4- or 5-band (L5, L10, C5—L15, L20, C21) | 1.52 |
| 6644 | Coil and capacitor—Oscillator coil and capacitor assembly—8,000–18,000 kilocycles—4- or 5-band (L25, L30, C38) | 1.54 |
| 6675 | Shaft—Shaft for condenser drive assembly—Comprising shaft, ball race with retainer and set screw | .35 |
| 6679 | Wand—Tuning wand for R. F. and oscillator adjustments | 1.10† |
| 6889 | Capacitor—18. mfd. (C60) | 1.55 |
| 6890 | Transformer—First intermediate frequency transformer (L31, L32, C41, C42) | 2.40 |
| 6891 | Transformer—Second intermediate frequency transformer (L33, L34, C44, C45) | 2.40 |
| 6892 | Tone control (R20) | 1.50 |
| 6953 | Volume control—Radio sensitivity control (R27) | 1.25 |
| 6955 | Shield—Second R. F. Radiotron Shield | .25 |
| 6956 | Shield—Radiotron shield top | .15 |
| 7065 | Screwdriver—For R. F. or I. F. adjustment | .80 |
| 7484 | Socket—5-contact Radiotron socket | .35 |
| 7485 | Socket—6-contact Radiotron socket | .40 |
| 9042 | Transformer—Power transformer—105–250 volts—50–60 cycles (T1) | 6.84 |
| 9046 | Transformer—Power transformer—105–125 volts—25–40 cycles | 9.22 |
| 9050 | Oscillator—Test oscillator—150–25,000 K. C. | 33.50† |
| 10194 | Ball—Steel ball for condenser drive assembly—Package of 20 | .25 |
| | **MISCELLANEOUS PARTS** | |
| 4224 | Bezel—Station selector dial bezel | .50 |
| 4225 | Ring—Dial glass retaining ring—Package of 5 | .95 |
| 4226 | Escutcheon — Engraved — "AVC-on-off" — "Radio Sensitivity" — "Power Tone-off-on" — "Speaker-Phone" —"CW-OSC-off-on" | .85 |
| 4227 | Escutcheon—Audio sensitivity control escutcheon | .70 |
| 4228 | Escutcheon—Range switch escutcheon | .35 |
| 4229 | Knob—Audio volume control tone control or radio sensitivity control knob—Package of 5 | 1.15 |
| 4230 | Knob—"AVC" — "CW-OSC" — "Speaker-Phone" and range switch knob—Package of 5 | 1.15 |
| 4231 | Knob—Station selector knob—Package of 5 | 1.15 |
| 6614 | Glass—Station selector dial glass | .30 |
| 6954 | Adapter—5-prong adapter | .82 |
| | **OSCILLATOR ASSEMBLIES** | |
| 3118 | Resistor—100,000 ohms—Carbon type—¼ watt (R30)—Package of 5 | 1.00 |
| 3634 | Capacitor—160 mmfd. (C70) | .34 |
| 3682 | Shield—Radiotron shield | .22 |
| 4027 | Capacitor—800 mmfd. (C72) | .44 |
| 4221 | Jack—Pinjack—Package of 2 | .45 |
| 4222 | Shield—Coil shield | .28 |
| 6242 | Resistor—2 megohms—Carbon type—¼ watt (R29)—Package of 5 | 1.00 |
| 6700 | Coil—Oscillator coil (L42, L43, C69) | 2.30 |
| 6899 | Capacitor—Adjustable capacitor—120–220 mmfd. (C71) | .70 |
| 6951 | Cable—3-conductor shielded cable | .32 |
| 6952 | Cable—Single conductor shielded | .24 |
| 7484 | Socket—5-contact Radiotron socket | .35 |
| | **REPRODUCER ASSEMBLIES** | |
| 8969 | Cone—Reproducer cone complete (L36)—Package of 5 | 6.35 |
| 9438 | Reproducer complete | 6.88 |
| 9439 | Coil assembly—Field coil, magnet and cone support (L38) | 5.22 |

† Full Discount not allowed.

RCA-VICTOR CO., INC.

## Electrical Specifications

Voltage Rating............................105–125 Volts
Power Consumption (60 Cycle)................175 Watts
Type and Number of Radiotrons......4 RCA-56, 4 RCA-58, 1 RCA-55, 2 RCA-59, 1 RCA-5Z3—Total 12
Frequency Range.540 K.C.-1500 K.C.—1400 K.C.-2800 K.C.
Undistorted Output.........................10.0 Watts

This combination instrument utilizes the new perfected automatic record changing mechanism and the twelve-tube Deluxe Super-Heterodyne receiver. Excellent fidelity on both radio and record reproduction is an inherent feature of this instrument. Other features include double tuning range (540 K. C.–1500 K. C. and 1400 K. C.–2800 K. C.), high and low frequency tone control, compensated volume control and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

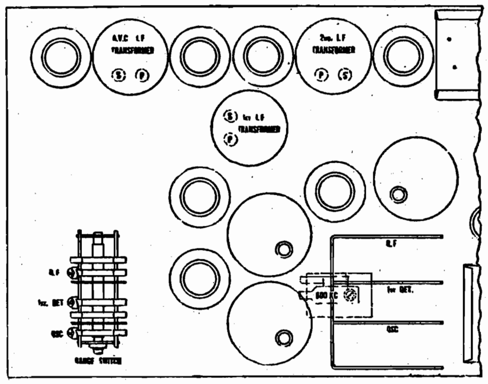


*Figure B—Location of Line-up Capacitors*

Figure A shows the schematic circuit, Figure B the location of the adjustable capacitors, Figure C the chassis wiring, and Figure D the assembly wiring diagram. The Radiotron socket voltages, the line-up procedure and the replacement parts are given on the following pages.

## R. F. and Oscillator Line-up Capacitor Adjustments

Four adjustable capacitors are provided for aligning the R. F. circuits and adjusting the oscillator frequency so that the oscillator will maintain a constant frequency—175 K. C. —difference from that of the incoming signal. Poor quality, insensitivity, poor A. V. C. action and possible inoperation of the receiver may be caused by these capacitors being out of adjustment.

If the other adjustments have not been tampered with—the intermediate transformer tuning capacitors—the following procedure may be used for aligning these capacitors.

(a) Procure an R. F. Oscillator, such as Stock No. 9050, giving a modulated signal at 600 K. C., 1400 K. C., and 2440 K. C. Also procure a non-metallic screw driver such as Stock No. 7065.
(b) An output meter is necessary. This should be a 0-10 milliammeter connected in series with the plate supply to the second detector.
(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket. This should be a tube that is otherwise normal in all respects, but having one heater prong removed. Insert this tube in the A. V. C. socket.
(d) First check the chassis and carefully ascertain that the dial pointer reads exactly at the first line on the scale when the tuning capacitor rotor plates are fully meshed with the stator plates.
(e) Place the oscillator in operation at exactly 1400 K. C. and couple its output to the antenna. Set the Range Switch counter-clockwise and the dial scale at exactly 1400. Connect the output meter to the set and place the volume control and suppressor control, if noise level will permit, at its maximum position. Adjust the oscillator input so that only a slight reduction in current is obtained in the output meter.
(f) With a suitable socket wrench—the nuts are at ground potential—adjust the oscillator, first detector and R. F. line-up capacitors, until a minimum deflection is obtained in the output meter.
(g) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 1200 and the Range Switch in the clockwise position. The line-up capacitors on the Range Switch are adjusted for minimum output at this frequency.
(h) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a slight deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor, Figure B, until a minimum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment, as the tuning capacitor and oscillator series capacitor adjustments interlock.
(i) Change the frequency of the oscillator to 1400 K. C. and set the dial at 1400. Again make the adjustments given under (f), (g), and then (h).

So adjusted, the R. F. circuits are properly aligned and the oscillator will maintain a constant frequency difference from the incoming R. F. signal.

## I. F. Tuning Capacitor Adjustments

Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only two of the three I. F. transformers are tuned by adjustable capacitors and require adjustment. The stage used for the A. V. C. is broadly tuned and does not require any adjustment.

The transformers are all tuned to 175 K. C. and the circuits broadly peaked.

A detailed procedure for making this adjustment follows:

(a) Procure a modulated R. F. Oscillator, such as Stock No. 9050, that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.
(b) An output meter is necessary. This should be a 0-10 milliammeter connected in series with the plate supply to the second detector.
(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.
(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a slightly reduced deflection is obtained in the output meter.
(e) Refer to Figure B. Adjust the secondary and primary of the second and then the first I. F. transformer until a minimum deflection is obtained in the output meter. Go through these adjustments a second time, as a slight readjustment may be necessary.

When the adjustments are made the set should perform at its maximum efficiency. However, due to the interlocking of adjustments, it is good practice to follow the I. F. adjustments with the R. F. and oscillator line-up capacitor adjustments. The correct method of doing this is given in the preceding section.

**Antenna Connections**—It will be noted that three antenna terminals are provided at the rear of the receiver chassis. Two of these will normally be used for the usual antenna and ground connections, while the third one is for use in connection with a shielded antenna system. The tap eliminates the need of the transformer usually used for coupling the shielded line to the radio receiver.

Stock No. 7717 shield kit, which comprises a lightning arrester, transformer assembly, a 200 mmfd. capacitor, and 100 feet of shielded wire, is recommended. When such an antenna system is used, it is necessary to connect the 200 mmfd. capacitor between terminals 1 and 2. This prevents the first R. F. circuit from being detuned and results in maximum gain from the antenna. This capacitor is included with the Stock No. 7717 Kit.

**Automatic Record Changer**—The automatic record changer used in this instrument is of simple design and excellent construction. The various adjustments that may be required are shown in Figure E. A point to remember with this instrument is that it must always be level, otherwise proper operation will not be obtained.

| Radiotron No. | Cathode to Control Grid, Volts | Cathode to Screen Grid, Volts | Cathode to Plate, Volts | Plate Current, M. A. | Heater Volts |
|---|---|---|---|---|---|
| RCA-58 R. F. | 3.1 | 97 | 212 | 7.5 | 2.5 |
| RCA-56 Osc. | — | — | 100 | 6.0 | 2.5 |
| RCA-58 1st Det. | 9.5 | 91 | 206 | 2.8 | 2.5 |
| RCA-58 I. F. | 7.5 | 93 | 208 | 4.0 | 2.5 |
| RCA-58 A. V. C.–I. F. | 8.5 | 92 | 207 | 3.0 | 2.5 |
| RCA-56 A. V. C. | 12.0 | — | — | 0 | 2.5 |
| RCA-55 2nd Det. | 0 | — | 74 | 8.0 | 2.5 |
| RCA-56 A. F. Driver | 11.0 | — | 205 | 5.0 | 2.5 |
| RCA-56 A. F. Driver | 11.0 | — | 205 | 5.0 | 2.5 |
| RCA-59 Power | 0 | — | 394 | 13.0 | 2.5 |
| RCA-59 Power | 0 | — | 394 | 13.0 | 2.5 |
| RCA-5Z3 Rect. | 990–495 R. M. S. | | | 92 Total | 5.0 |

MODEL Duo 380
Phonograph Data

RCA-VICTOR CO., INC.

# OPERATION—PHONOGRAPH

## Automatic Operation

**Important Precautions**—The following precautions must be observed during operation:

***1. In loading the turntable, make certain that the first record inserted (last to be played) is flat—that is, essentially free from warpage.***

***2. Before starting the turntable, make certain that the reject pocket (at the left of the phonograph compartment) is either empty or sufficiently clear to permit proper disposal of records by the automatic mechanism.***

***3. Never restrain by force the normal motion of any part of the automatic mechanism while it is changing records.***

**Procedure**—The phonograph operating controls are located on the front panel and in the playing compartment as shown in Figures 1 and 2. Proceed as follows:

1. Set the Transfer Switch counter-clockwise for record reproduction.

2. Apply power by turning the Radio Volume Control clockwise from the "off" position. Set the two Tone Controls for full-range reproduction (see paragraph 7 under "Operation—Radio").

3. With the Motor Switch in the "off" position (Record Volume Control fully counter-clockwise), load the turntable with records, as follows:

(a) Set the Index Lever at "Manual." *Always do this before loading or unloading records.*

(b) Place the electric pickup on the rubber rest.

(c) Raise the Record Ejector arm (*very slowly*, at first, until the internal weight has rolled to the rear of the arm, then as rapidly as desired) to its upper position of rest. *Always raise the ejector arm in this manner.*

(d) Select the records to be played. *All records for one loading must be of the same diameter (either ten or twelve inches), close to standard thickness and operable at the same speed (either 78 or 33⅓ R. P. M.).*

**CAUTION**—***Do not use thin flexible-type records for automatic operation.***

(e) Place the records, one at a time, on the turntable (see paragraph 1 under "Important Precautions"). The spindle should resume its normal height after each record is added. The turntable is fully loaded when the top surface of the uppermost record is nearly flush with the top of the spindle. (It should not be possible to slide off the top record without lifting its edge or depressing the spindle.)

(f) Lower the Record Ejector arm gently onto the spindle.

4. Insert a *new* needle in the pickup as far as it will go and tighten the needle screw. For long-playing (33⅓ R. P. M.) records, use *only* the *orange Chromium* needle. For standard (78 R. P. M.) records, use the latter needle or, if preferred, either the *green Chromium* or the full volume (full tone) *Tungstone* needle. Transparent-faced (illustrated) records, however, should not be reproduced with *Tungstone* needles.

NOTE—With care, the orange Chromium needle should play 75, the green Chromium 100, and the Tungstone 100 to 150 records. *Never re-insert in the pickup a Chromium needle which has been used (however slightly) as damage to the record grooves would result.*

5. Place the pickup needle on the smooth outer rim of the record, near the first groove. Then move the Index Lever to the position (12 or 10) corresponding to the diameter (inches) of the records on the turntable. Be careful not to move the lever *beyond* the proper index hole. Push the index pin firmly into the hole.

**CAUTION**—***Never attempt to move the Index Lever from the Manual position when the pickup is on the rubber rest.***

6. Start the turntable by turning the Motor Switch clockwise; then set the Speed Shifter for the

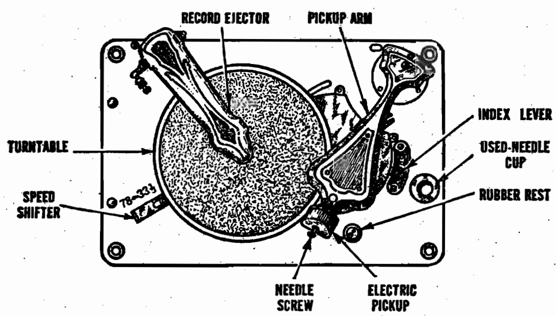



*Figure 2*

speed (78 or 33⅓ R. P. M.) corresponding to the records on the turntable.

NOTE—The speed shifter should not be moved inward (from the 78 to the 33⅓ R. P. M. position) while the turntable is at rest.

7. Adjust the Record Volume Control to obtain the desired volume.

8. Close the cabinet doors to extinguish the compartment lamp and to render less prominent the mechanical noises incident to record playing and changing. If needle scratch reproduction (particularly noticeable with old records) is considered excessive, turn the *treble* Tone Control slightly counter-clockwise. For most faithful reproduction, however, both Tone Controls should be left in the positions which provide full illumination of the tone color indicator.

NOTE 1—When a record has been played, the ejector arm slides it off into the record pocket and the pickup moves to the outside of the next record. The records on the turntable are thus played consecutively until only one

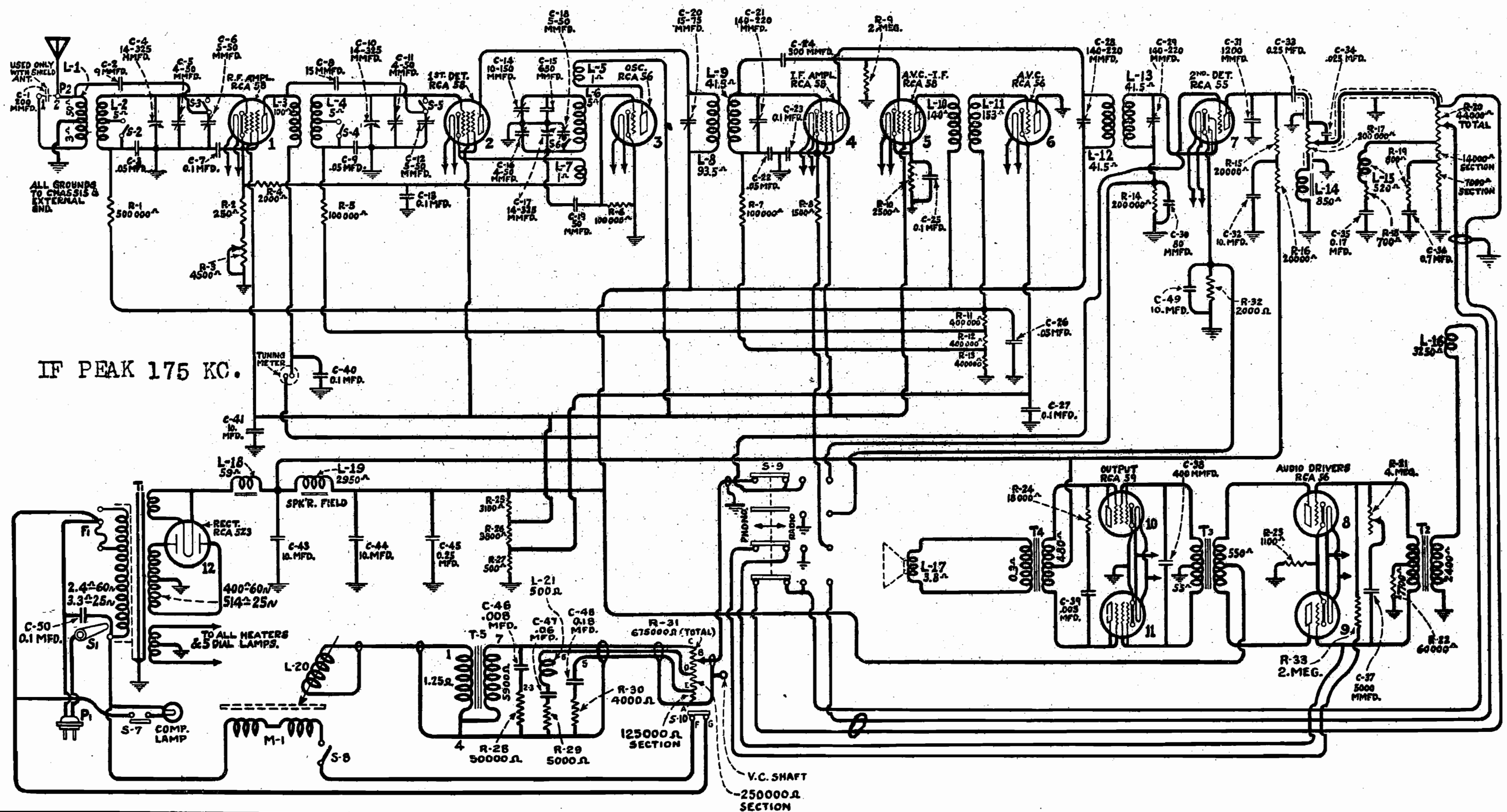
RCA-VICTOR CO., INC.

record remains on the turntable. This record will be played repeatedly until the motor is stopped by means of the Motor Switch.

NOTE 2—After a record has been played and changed, the needle is lowered automatically onto the smooth rim of the next record and is fed by gravity into the starting groove. After the instrument has been leveled with reference to the top of the cabinet, further slight compensation may be necessary, thus: (1) If the needle fails to enter the playing groove, the right-hand side of the instrument must be raised by inserting thin blocks under the front and rear legs on that side; or (2) If the needle slides over several grooves, thus failing to reproduce the beginning of the selection, the left-hand side of the instrument must be similarly raised.

9. To reject a record while playing, lift the pickup arm and move it to the extreme left. Hold the pickup lightly until it is moved by the mechanism.

10. Before reloading or when through operating, turn the Motor Switch to the "off" position, set the index lever at "Manual" and place the pickup on the rubber rest. Never leave the pickup resting on a record (or on the turntable) when not in use. Turn the power switch "off" and close the cabinet doors when discontinuing operation of the instrument.



MODEL Duo 380
Pickup Data

RCA-VICTOR CO., INC.

# SERVICE DATA FOR MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

## Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or the hardened pivot rubbers (see Figure G), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

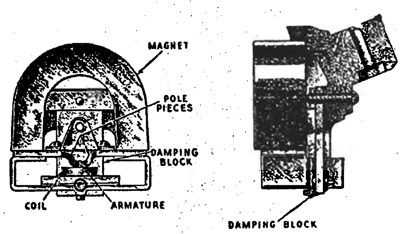



*Figure F*

(d) Remove screws A and B, Figure G, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure G), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

## Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

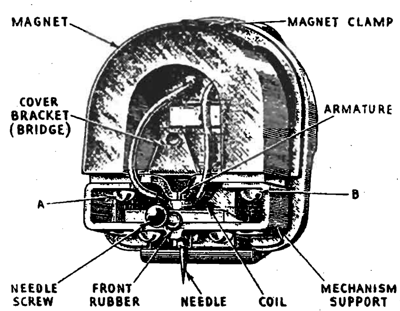



*Figure G*

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure H, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called

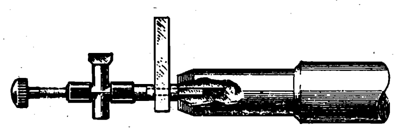


*Figure H*

acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the airgap as explained under (h).

# RCA-VICTOR CO., INC.

**MODEL Duo 380**
**Chassis Wiring**

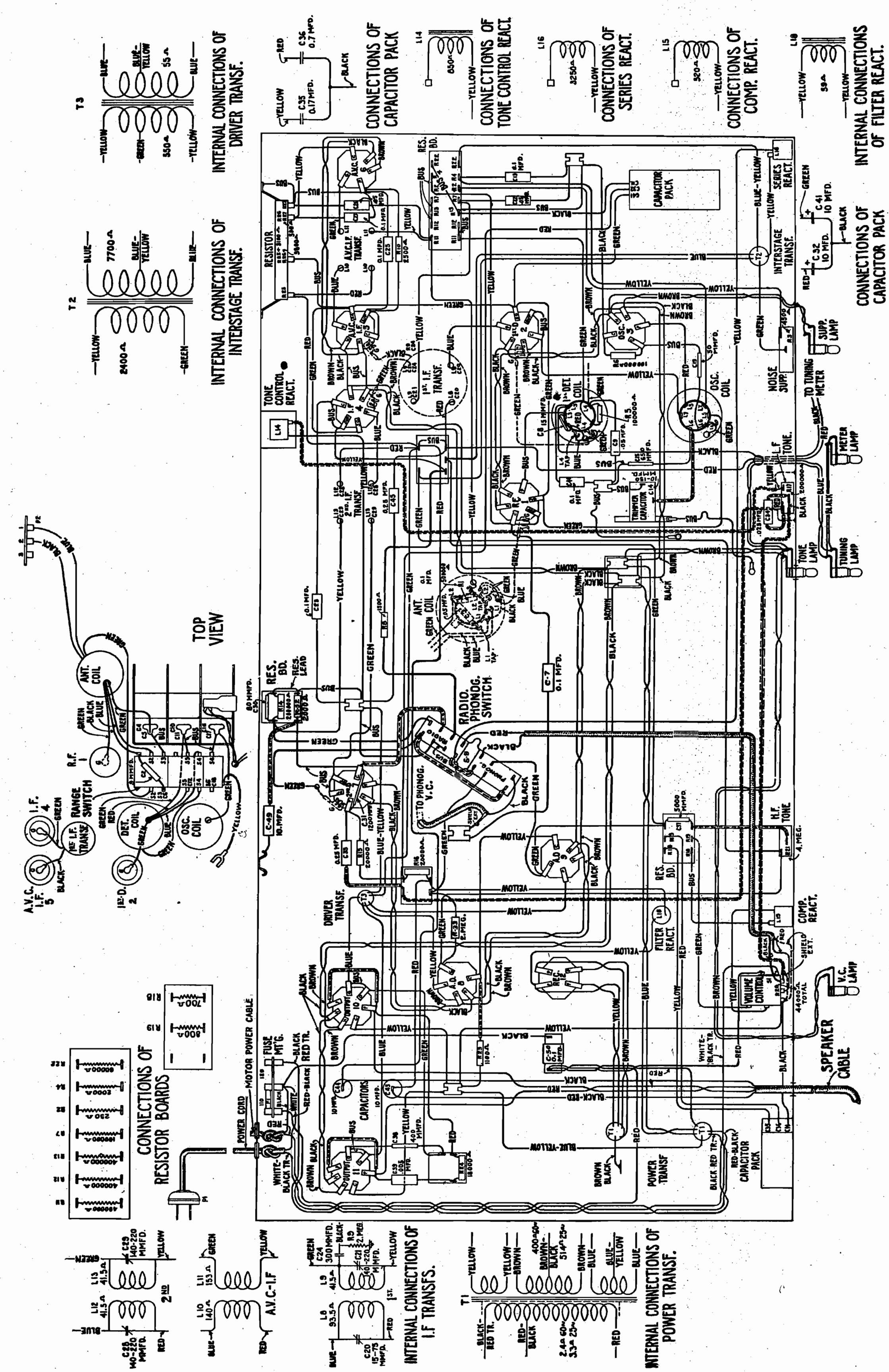



*Figure C—Chassis Wiring Diagram*

**MODEL Duo 380**
**Parts List**

# RCA-VICTOR CO., INC.

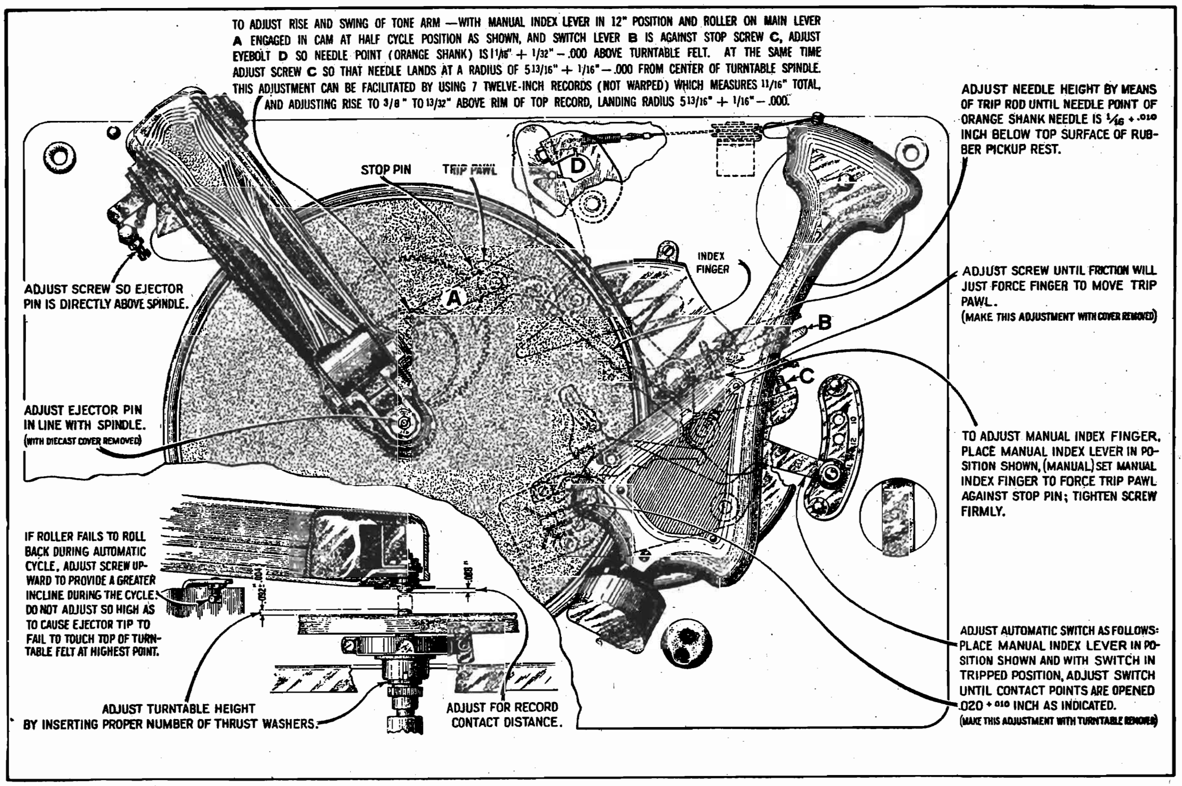



*Figure E—Automatic Record Changer Adjustments*

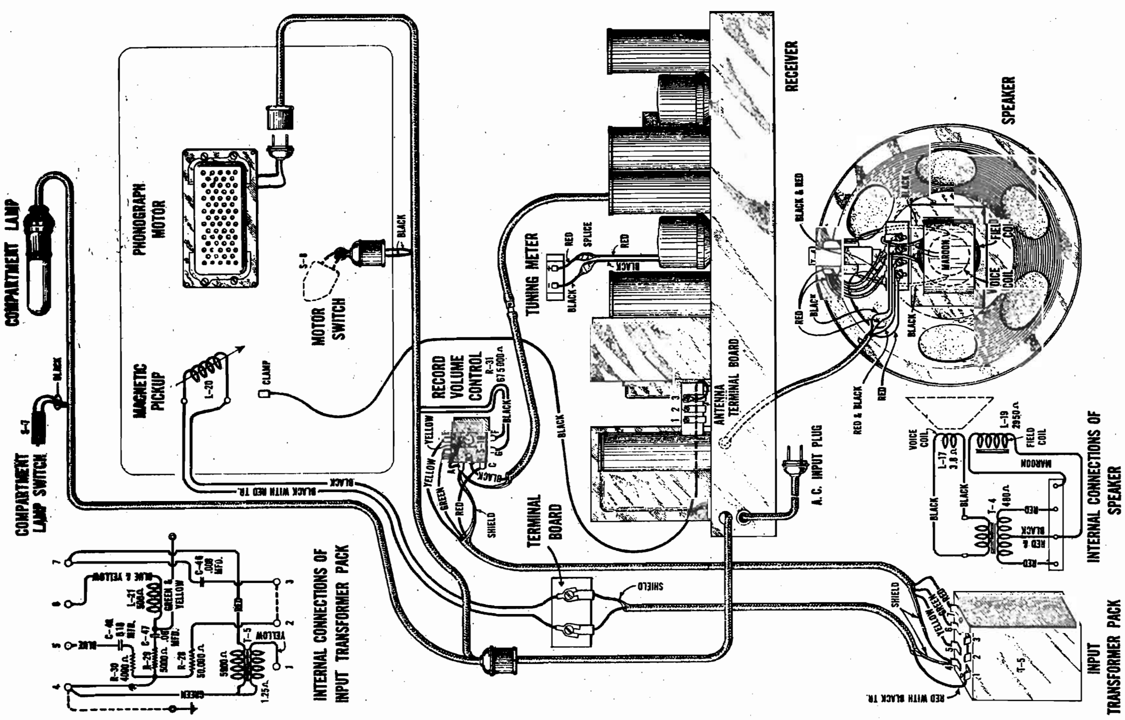



*Figure D—Assembly Wiring Diagram*

MODEL Duo 380
Assembly Wiring
Record Changer Data

RCA-VICTOR CO., INC.

# REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | RECEIVER ASSEMBLIES | |
| 2730 | Resistor—18,000 ohms—Carbon type—1 watt (R24)—Package of 5 | $1.10 |
| 2747 | Cap—Contact cap—Package of 5 | .50 |
| 3024 | Capacitor—9 mmfd. (C2)—Package of 2 | .50 |
| 3047 | Resistor—1,500 ohms—Carbon type—½ watt (R8)—Package of 5 | 1.00 |
| 3085 | Capacitor—400 mmfd. (C38) | .30 |
| 3118 | Resistor—100,000 ohms—Carbon type—¼ watt (R5)—Package of 5 | 1.00 |
| 3252 | Resistor—100,000 ohms—Carbon type—½ watt (R6, R7)—Package of 5 | 1.00 |
| 3376 | Mount—Fuse mount | .40 |
| 3435 | Resistor—250 ohms—Carbon type—½ watt (R2)—Package of 5 | 1.00 |
| 3460 | Capacitor—1,200 mmfd. (C31) | .30 |
| 3526 | Resistor—2,000 ohms—Carbon type—½ watt (R4, R32)—Package of 5 | 1.00 |
| 3527 | Resistor—800 ohms—Carbon type—½ watt (R19)—Package of 5 | 1.00 |
| 3528 | Bracket—Noise suppressor or volume control lamp bracket | .18 |
| 3529 | Socket—Noise suppressor or volume control lamp socket | .32 |
| 3533 | Shutter—High frequency tone control shutter | .50 |
| 3534 | Shutter—Low frequency tone control shutter | .50 |
| 3535 | Socket—High or low frequency tone control lamp socket | .32 |
| 3556 | Capacitor—0.05 mfd.—Located on antenna coil (C3) | .34 |
| 3558 | Capacitor—50 mmfd. (C19) | .36 |
| 3564 | Bracket—Station selector dial lamp—Mounting bracket | .25 |
| 3565 | Socket—Station selector dial lamp socket | .50 |
| 3597 | Capacitor—0.25 mfd. (C33, C45) | .40 |
| 3640 | Capacitor—0.05 mfd. (C9, C22, C26) | .25 |
| 3641 | Capacitor—0.1 mfd. (C7, C13, C23, C25, C27) | .35 |
| 3643 | Capacitor—0.005 mfd. (C39) | .25 |
| 3652 | Screw—No. 10-32-¼ set screw for bracket and bushing assembly—Package of 10 | .32 |
| 3719 | Socket—7-contact Radiotron socket | .30 |
| 3726 | Arm—Range switch operating arm assembly—Comprising arm, link, studs and set screws | .45 |
| 3727 | Shaft—Shaft and bushing assembly for range switch operating arm—Comprising two washers, shaft, bushing and nut | .30 |
| 3747 | Capacitor—15 mmfd. (C8) | .36 |
| 3749 | Capacitor—0.1 mfd. (C40) | .30 |
| 3765 | Capacitor—0.025 mfd. (C34) | .34 |
| 3774 | Resistor—7,400 ohms—Tapped at 3,800 and 500 ohms (R25, R26, R27) | .80 |
| 3797 | Reactor—Volume control compensating reactor (L15) | .64 |
| 3798 | Resistor—700 ohms—Carbon type—½ watt (R18)—Package of 5 | 1.00 |
| 3799 | Capacitor—80 mmfd. (C30) | .70 |
| 3883 | Fuse—2-ampere (F1)—Package of 5 | .40 |
| 4035 | Switch—Radio-Phonograph switch (S9) | 2.10 |
| 4036 | Shield—Low or high frequency tone control light shield | .30 |
| 4037 | Shield—Antenna, detector or oscillator shield | .55 |
| 4038 | Shield—Radiotron shield | .30 |
| 4039 | Shield—Radiotron shield—Second detector shield | .30 |
| 4040 | Shield—Radiotron tube shield top | .25 |
| 4041 | Cover—Fuse cover | .25 |
| 4042 | Reactor—Volume control series reactor (L16) | 1.20 |
| 4046 | Resistor—2-megohm—Carbon type—½ watt (R33)—Package of 5 | 1.00 |
| 4129 | Bracket—Bracket and bushing assembly for radio-phonograph switch shaft—Located on receiver chassis | .28 |
| 4130 | Shield—R. F. Radiotron shield | .30 |
| 5817 | Resistor—20,000 ohms—Carbon type—3 watt (R15, R16) | .25 |
| 6186 | Resistor—500,000 ohms—Carbon type—¼ watt—Located on antenna coil (R1)—Package of 5 | 1.00 |
| 6192 | Spring—3-gang tuning condenser drive cord tension spring—Package of 10 | .30 |
| 6228 | Resistor—200,000 ohms—Carbon type—½ watt (R14)—Package of 5 | 1.00 |
| 6277 | Capacitor—0.1 mfd.—Located on rectifier socket shield (C50) | .35 |
| 6280 | Resistor—400,000 ohms—Carbon type—½ watt (R11, R12, R13)—Package of 5 | 1.00 |
| 6281 | Resistor—1,100 ohms—Carbon type—½ watt (R23)—Package of 5 | 1.00 |
| 6282 | Resistor—60,000 ohms—Carbon type—¼ watt (R22)—Package of 5 | $1.00 |
| 6298 | Cord—3-gang tuning condenser drive cord—Package of 5 | .60 |
| 6300 | Socket—4-contact Radiotron socket | .35 |
| 6312 | Capacitor—650 mmfd. (C15)—Package of 5 | 1.50 |
| 6316 | Resistor—2,500 ohms—Carbon type—½ watt (R10)—Package of 5 | 1.00 |
| 6437 | Coil—Oscillator coil (L5, L6, L7) | 1.24 |
| 6447 | Volume control (R20, S1) | 1.92 |
| 6448 | Tone control—Low frequency (R17) | 1.04 |
| 6449 | Tone control—High frequency (R21) | 1.06 |
| 6450 | Rheostat—Noise suppressor rheostat (R3) | 1.24 |
| 6512 | Capacitor—0.005 mfd. (C37) | .28 |
| 6537 | Switch—Range switch | 1.30 |
| 6539 | Coil—Detector coil (L3, L4) | 1.44 |
| 6541 | Dial—Tuning condenser dial and scale | .75 |
| 6561 | Coil—Antenna coil (L1, L2, R1, C3) | 1.65 |
| 6562 | Transformer—Audio driver transformer (T3) | 3.04 |
| 6564 | Transformer—First intermediate frequency transformer (L8, L9, C20, C21, C24) | 2.30 |
| 6565 | Transformer—Second intermediate frequency transformer (L12, L13, C28, C29) | 2.10 |
| 6566 | Transformer—Third intermediate frequency transformer (L10, L11) | 1.72 |
| 6567 | Capacitor pack—Comprising one 0.17 mfd., and one 0.7 mfd. capacitors (C35, C36) | .95 |
| 6568 | Transformer—Interstage audio transformer (T2) | 3.10 |
| 6571 | Capacitor—10 mfd. (C43, C44) | 1.20 |
| 6572 | Reactor—Tone control reactor (L14) | .90 |
| 6574 | Capacitor pack—Comprising two 10.0 mfd. capacitors (C32, C41) | 1.80 |
| 6578 | Reactor—Filter reactor (L18) | 3.22 |
| 6797 | Capacitor—10.0 mfd. (C49) | 1.04 |
| 6847 | Shield—Rectifier socket shield and capacitor | .65 |
| 7062 | Capacitor—Adjustable capacitor (C14) | .50 |
| 7439 | Drum—Dial drum with set screw and three dial mounting nuts | .35 |
| 7484 | Socket—5-contact Radiotron socket | .35 |
| 7485 | Socket—6-contact Radiotron socket | .40 |
| 7700 | Condenser—3-gang variable tuning condenser (C4, C5, C6, C10, C11, C12, C16, C17, C18, S2, S3, S4, S5, S6) | 7.44 |
| 9468 | Transformer—Power transformer—105-125 volts—50-60 cycles (T1) | 7.75 |
| 9469 | Transformer—Power transformer—105-125 volts—25-40 cycles | 11.75 |
| | CABLE ASSEMBLIES | |
| 6793 | Cable—2-conductor shielded—From radio volume control to Radio-Phonograph switch | .30 |
| 6794 | Cable—Single conductor shielded—From Radio-Phonograph switch to Phonograph volume control (R31) | .38 |
| 6795 | Cable—Phonograph motor cable—3-conductor with female section of connector plug | 1.10 |
| 6796 | Cable—2-conductor—Compartment lamp cable | .80 |
| 6798 | Cable—Compartment lamp and switch cable | 2.85 |
| 6848 | Cable—Tapped cable with two connectors—From Phonograph Motor connector to motor starting switch plug and Phonograph volume control | 2.12 |
| 6849 | Cable—Single-conductor shielded cable with male section of connector—From Phonograph volume control to receiver chassis | .38 |
| 6850 | Cable—Single-conductor shielded cable—From input transformer to terminal board | .50 |
| | MOTOR BOARD ASSEMBLIES | |
| 2893 | Spring—Trip lever latch tension spring—Package of 10 | .30 |
| 2917 | Washer—Spring washer, "U" type—Package of 10 | .25 |
| 3654 | Roller—Guide roller assembly—Comprising bracket roller and guide pin | .34 |

MODEL Duo 380
Parts List

RCA-VICTOR CO., INC.

# REPLACEMENT PARTS (Continued)

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| 3666 | Spring—Cable lever tension spring—Package of 10 | $0.44 |
| 3670 | Finger—Friction finger | .32 |
| 3672 | Pin—Manual index lever pin | .42 |
| 3673 | Screw—Manual index lever adjustment screw and nut—Package of 5 | .20 |
| 3676 | Spring—Cam and gear pawl carrier tension spring—Package of 10 | .52 |
| 3677 | Lever—Cable lever assembly | .40 |
| 4059 | Screw—Trip lever clutch tension adjustment screw—Package of 10 | .22 |
| 4060 | Escutcheon—Manual—12–10 | .28 |
| 4061 | Spring—Main spring | .38 |
| 4124 | Plate—Actuating plate assembly | .50 |
| 4127 | Spring—Actuating plate spring—Package of 10 | .24 |
| 6502 | Cam—Cam and gear assembly | 1.18 |
| 6503 | Pawl—Trip pawl assembly | .40 |
| 6806 | Lever—Manual index lever—Less pin | .55 |
| 6807 | Lever—Trip lever assembly | 1.16 |
| 6808 | Clutch—Trip lever friction clutch | .30 |
| 6809 | Finger—Manual index finger assembly | .25 |
| 6810 | Lever—Main spring lever | .44 |
| 6846 | Lever—Main lever and link assembly | 1.45 |
| 7710 | Cover—Metal cover for trip lever and friction finger assemblies | .28 |

### MOTOR ASSEMBLIES

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| 3777 | Motor mounting spring washers and stud assembly—Comprising three upper and three lower springs, six cup washers, three spring washers, and three studs | .62 |
| 9011 | Motor—Motor complete—105–125 volts—60 cycles | 19.72 |
| 9012 | Motor—Motor complete—105–125 volts—25 cycles | 24.16 |
| 9013 | Motor—Motor complete—105–125 volts—40 cycles | 24.16 |
| 9014 | Motor—Motor complete—105–125 volts—50 cycles | 19.72 |

### EJECT ARM ASSEMBLIES

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| 3655 | Retainer—Ball retainer with three ball bearings | .45 |
| 3656 | Bearing—Ejector tip bearing | .48 |
| 3657 | Tip—Ejector tip | .30 |
| 3658 | Ball—Ball bearing—Package of 20 | .30 |
| 3662 | Plate—Ejector plate—Package of 5 | .95 |
| 3665 | Screw—Eject arm horizontal adjustment screw and nut—Package of 5 | .25 |
| 3729 | Roller—Counter balance roller—Located inside of eject arm | .45 |
| 3930 | Cushion—Counter balance cushion and bracket—Located inside of eject arm | .18 |
| 4054 | Bracket—Eject arm bracket assembly | 1.35 |
| 4055 | Post—Vertical adjustment post—Located on eject arm | .30 |
| 4056 | Yoke—Eject arm yoke assembly | 1.04 |
| 4057 | Shaft and collar—For eject arm | .24 |
| 4058 | Collar—Eject arm shaft collar | .18 |
| 4067 | Spring—Eject arm bracket spring—Package of 10 | .30 |
| 4125 | Spring—Eject arm horizontal action tension spring—60 cycle operation—Package of 10 | .42 |
| 4126 | Spring—Eject arm horizontal action tension spring—For 25 cycle operation—Package of 10 | .60 |
| 7708 | Arm—Eject arm complete | 7.74 |
| 7709 | Cover—Eject arm cover | 1.38 |

### SWITCH ASSEMBLIES

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| 3322 | Switch—Motor switch (S8) | .75 |
| 6805 | Switch assembly—Automatic switch complete | 1.90 |
| 10174 | Springs—Automatic brake springs—Package of 4 | .50 |
| 10184 | Plate—Automatic brake latch plate—Package of 5 | .40 |

### PICKUP AND ARM ASSEMBLIES

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| 3388 | Screw—Pickup needle holding screw—Package of 10 | $0.60 |
| 3728 | Coil—Pickup coil (L20) | .50 |
| 3737 | Damper—Package of 5 | .65 |
| 4062 | Rod—Automatic brake trip rod | .20 |
| 4063 | Screw—Pickup mounting screw assembly—Comprising one screw, one nut, and one washer—Package of 10 | .54 |
| 4064 | Cable—Pickup arm cable—Package of 5 | 1.00 |
| 4128 | Armature—Pickup armature | .96 |
| 6811 | Pickup—Pickup unit complete | 4.30 |
| 6812 | Cover—Pickup cover | .34 |
| 6813 | Back—Pickup housing back | .68 |
| 6814 | Cover—Pickup back cover | .34 |
| 6815 | Escutcheon—Pickup arm escutcheon with mounting rivets | .64 |
| 7707 | Arm—Pickup arm complete, less escutcheon, pickup, pickup mounting screw, nut and washer | 4.12 |

### TURNTABLE ASSEMBLIES

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| 3340 | Washer—Thrust washer—Package of 2 | .56 |
| 3341 | Pin—Groov-pin—Package of 2 | .56 |
| 3342 | Spring—Latch spring—Located on clamping ring—Package of 2 | .56 |
| 3344 | Cover—Grease retainer cover—Package of 2 | .70 |
| 3347 | Spring—Speed shifter lever spring—Package of 2 | .30 |
| 4065 | Bushing—Speed shifter lever bushing—Package of 4 | .82 |
| 6816 | Ring—Clamp ring assembly—Comprising spring, latch lever, and stud | .42 |
| 6817 | Sleeve—Sleeve complete with ball race | 2.25 |
| 6818 | Lever—Speed shifter lever | .38 |
| 7711 | Turntable—Complete | 5.10 |

### MISCELLANEOUS PARTS

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| 3638 | Scale—Tuning meter scale—Package of 5 | .60 |
| 3763 | Motor mounting board spring, washer and stud assembly—Comprising one bolt, two "C" washers, one bottom spring, one top spring, two cup washers, one shakeproof washer, and one nut | .42 |
| 3780 | Shutter—Noise suppressor shutter | .30 |
| 3781 | Shutter—Volume control shutter | .30 |
| 4043 | Switch—Operating switch (S7) | .80 |
| 4044 | Socket—Compartment lamp socket | 1.28 |
| 4045 | Shade—Compartment lamp shade | .50 |
| 4047 | Receptacle—Needle receptacle | .55 |
| 4066 | Rest—Pickup rest | .14 |
| 4080 | Knob—Range switch knob—Package of 5 | .75 |
| 4081 | Knob—Station selector, volume control or noise suppressor knob—Package of 5 | 1.08 |
| 4082 | Knob—High or low frequency tone control, radio-phonograph switch or phonograph volume control knob—Package of 5 | 1.08 |
| 6456 | Escutcheon—Volume control escutcheon and color screen | .50 |
| 6457 | Escutcheon—Noise suppressor escutcheon and color screen | .50 |
| 6458 | Escutcheon—High and low frequency escutcheon and color screen | .92 |
| 6461 | Meter—Tuning meter | 2.14 |
| 6547 | Bezel—Tuning meter bezel | .45 |
| 6799 | Volume control—Phonograph volume control (R31, S10) | 3.00 |
| 6800 | Transformer—Phonograph input transformer—Comprising one transformer, one .008 mfd., one 0.06 mfd., and one 0.18 mfd. capacitors, one 50,000 ohm, one 4,000 ohm, and one 5,000 ohm resistors, and one choke coil (R28, R29, R30, C46, C47, C48, L21, T5) | 6.30 |
| 6801 | Shaft—Flexible drive shaft for Radio-Phonograph switch | 1.15 |
| 6802 | Bearing and plate assembly—For Radio-Phonograph switch shaft—Located on cabinet | .34 |

### REPRODUCER ASSEMBLIES

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| 4131 | Mounting assembly for reproducer—Comprising two plates, two bolts, two nuts, and two lockwashers | .44 |
| 6569 | Transformer—Output transformer (T4) | 1.95 |
| 6618 | Cable—4-conductor—Reproducer cable | .54 |
| 8969 | Cone—Reproducer cone (L17)—Package of 5 | 6.35 |
| 9031 | Coil—Field coil magnet and cone support (L19) | 4.90 |
| 9472 | Reproducer complete | 8.50 |

RCA-VICTOR CO., INC.

# SERVICE DATA

## Electrical Specifications

Voltage Rating............................105–125 Volts
Power Consumption (60 Cycle)..................175 Watts
Type and Number of Radiotrons......4 RCA-56, 4 RCA-58, 1 RCA-55, 2 RCA-59, 1 RCA-5Z3—Total 12
Frequency Range. 540 K.C.-1500 K.C.—1400 K.C.-2800 K.C.
Undistorted Output..........................10.0 Watts

This combination home recording instrument utilizes the new perfected automatic record changing mechanism and the twelve-tube Deluxe Super-Heterodyne receiver. Excellent fidelity on both radio and record reproduction, together with facilities for recording either programs or voice are inherent features of this instrument. Other features include double tuning range (540 K. C.–1500 K. C. and 1400 K. C.–2800 K. C.), high and low frequency tone control, compensated volume control and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

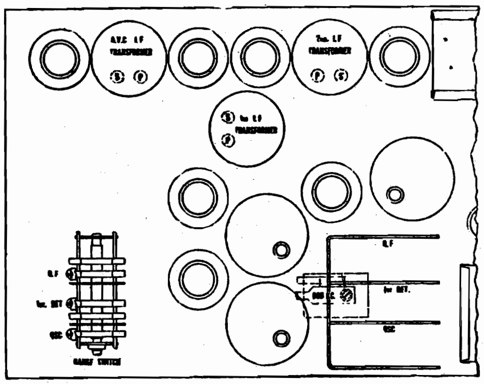


*Figure D—Location of Line- Up Capacitors*

Figure A shows the schematic circuit, Figure B the chassis wiring, and Figure C the assembly wiring diagram. The Radiotron socket voltages, the line-up procedure, special service hints and the replacement parts are given on the following pages.

## R. F. and Oscillator Line-up Capacitor Adjustments

Four adjustable capacitors are provided for aligning the R. F. circuits and adjusting the oscillator frequency so that the oscillator will maintain a constant frequency—175 K. C. —difference from that of the incoming signal. Poor quality, insensitivity, poor A. V. C. action and possible inoperation of the receiver may be caused by these capacitors being out of adjustment.

If the other adjustments have not been tampered with—the intermediate transformer tuning capacitors—the following procedure may be used for aligning these capacitors:

(a) Procure an R. F. Oscillator, such as Stock No. 9050, giving a modulated signal at 600 K. C., 1400 K. C., and 2440 K. C. Also procure a non-metallic screw driver such as Stock No. 7065.
(b) An output meter is necessary. This should be a 0-10 milliammeter connected in series with the plate supply to the second detector.
(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket. This should be a tube that is otherwise normal in all respects, but having one heater prong removed. Insert this tube in the A. V. C. socket.
(d) First check the chassis and carefully ascertain that the dial pointer reads exactly at the first line on the scale when the tuning capacitor rotor plates are fully meshed with the stator plates.
(e) Place the oscillator in operation at exactly 1400 K. C. and couple its output to the antenna. Set the Range Switch counter-clockwise and the dial scale at exactly 1400. Connect the output meter to the set and place the volume control and suppressor control, if noise level will permit, at its maximum position. Adjust the oscillator input so that only a slight reduction in current is obtained in the output meter.
(f) With a suitable socket wrench—the nuts are at ground potential—adjust the oscillator, first detector and R. F. line-up capacitors, until a minimum deflection is obtained in the output meter.
(g) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 1250 and the Range Switch in the clockwise position. The line-up capacitors on the Range Switch are adjusted for minimum output at this frequency.
(h) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a slight deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor, Figure D, until a minimum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment, as the tuning capacitor and oscillator series capacitor adjustments interlock.
(i) Change the frequency of the oscillator to 1400 K. C. and set the dial at 1400. Again make the adjustments given under (f), (g), and then (h).

So adjusted, the R. F. circuits are properly aligned and the oscillator will maintain a constant frequency difference from the incoming R. F. signal.

## I. F. Tuning Capacitor Adjustments

Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only two of the three I. F. transformers are tuned by adjustable capacitors and require adjustment. The stage used for the A. V. C. is broadly tuned and does not require any adjustment.

The transformers are all tuned to 175 K. C. and the circuits broadly peaked.

A detailed procedure for making this adjustment follows:

(a) Procure a modulated R. F. Oscillator, such as Stock No. 9050, that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.
(b) An output meter is necessary. This should be a 0-10 milliammeter connected in series with the plate supply to the second detector.
(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.
(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a slightly reduced deflection is obtained in the output meter.
(e) Refer to Figure D. Adjust the secondary and primary of the second and then the first I. F. transformer until a minimum deflection is obtained in the output meter. Go through these adjustments a second time, as a slight readjustment may be necessary.

When these adjustments are made, the set should perform at its maximum efficiency. However, due to the interlocking of adjustments, it is good practice to repeat the R. F. and oscillator line-up capacitor adjustments after completing alignment of the I. F. system. The correct method of doing this is given in the preceding section.

**Antenna Connections**—It will be noted that three antenna terminals are provided at the rear of the receiver chassis. Two of these are used for the normal antenna and ground connections, while the third one is for use in connection with a shielded antenna system. The tap eliminates the need for the transformer usually used for coupling the shielded line to the radio receiver.

Stock No. 7717 shield kit, which comprises a lightning arrester, transformer assembly, a 200 mmfd. capacitor, and 100 feet of shielded wire, is recommended. When such an antenna system is used, it is necessary to connect the 200 mmfd. capacitor between terminals 1 and 2. This prevents the first R. F. circuit from being detuned and results in maximum gain from the antenna. This capacitor is included with the Stock No. 7717 Kit.

**Automatic Record Changer**—The automatic record changer used in this instrument is of simple design and excellent construction. The various adjustments that may be required are shown in Figure G. A point to remember with this instrument is that it must always be level, otherwise proper operation will not be obtained.

MODEL Duo 380-HR
Schematic

RCA-VICTOR CO., INC.

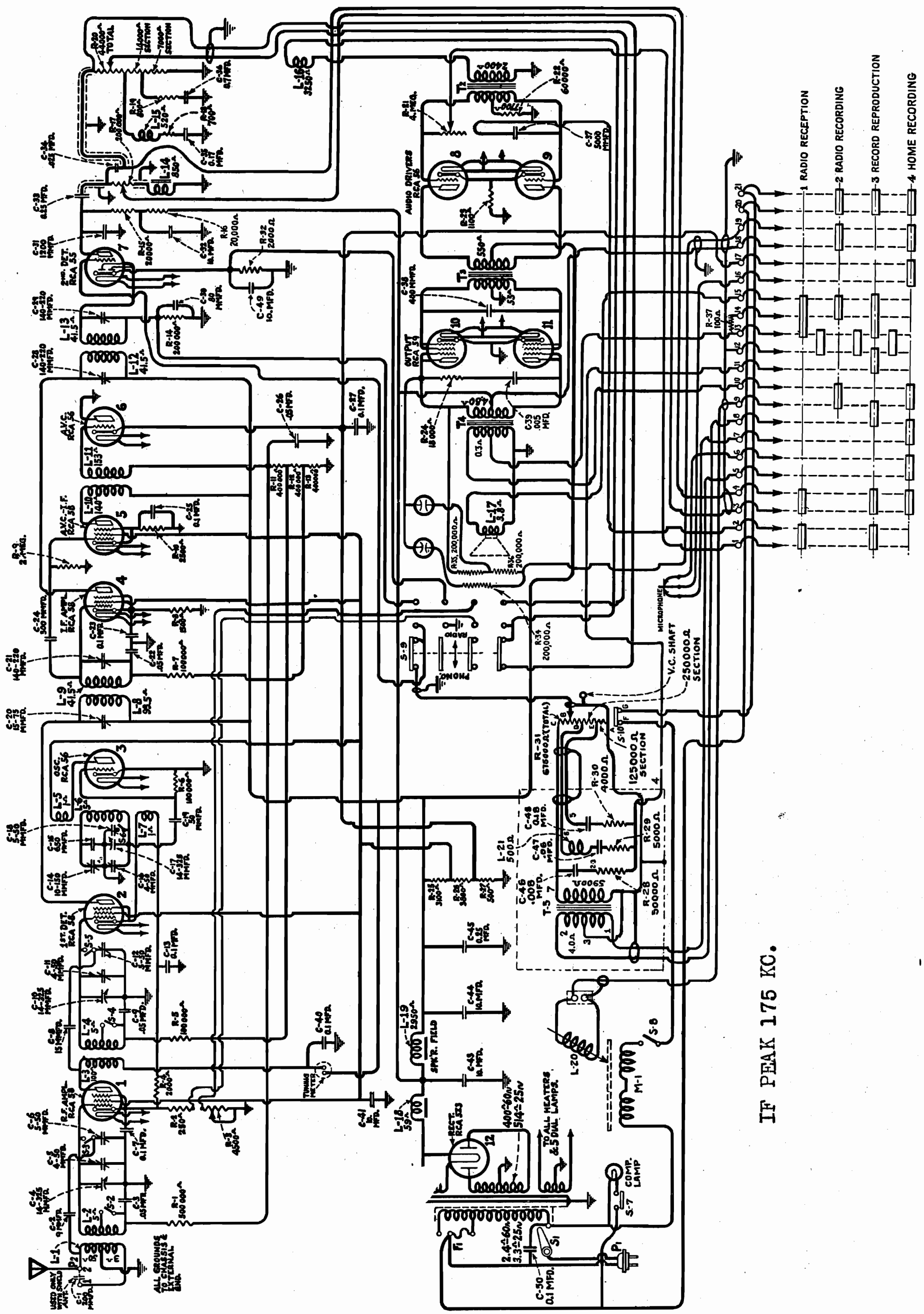



*Figure A—Schematic Circuit Diagram*

MODEL Duo 380-HR
Chassis Wiring

RCA-VICTOR CO., INC.

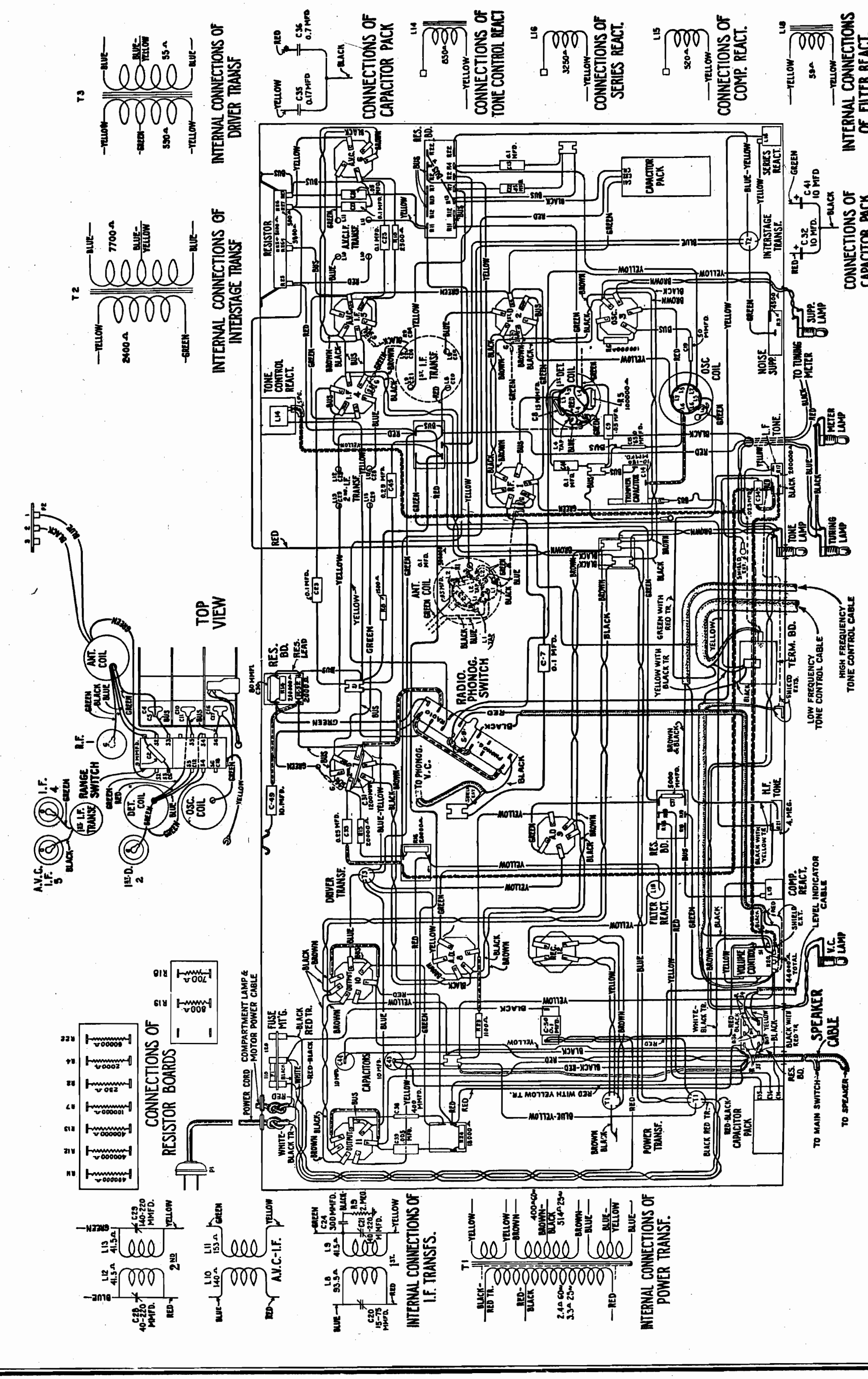
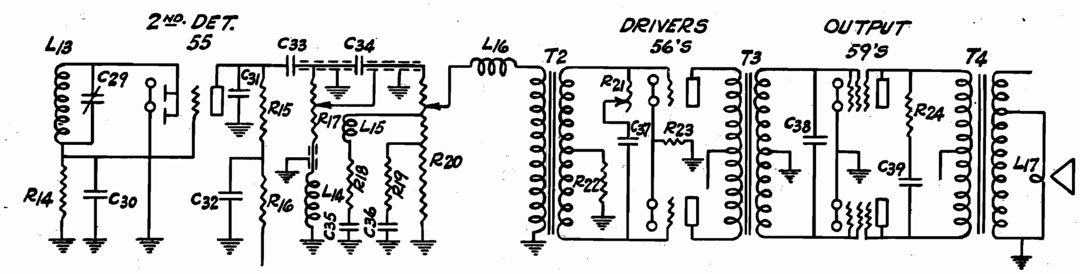


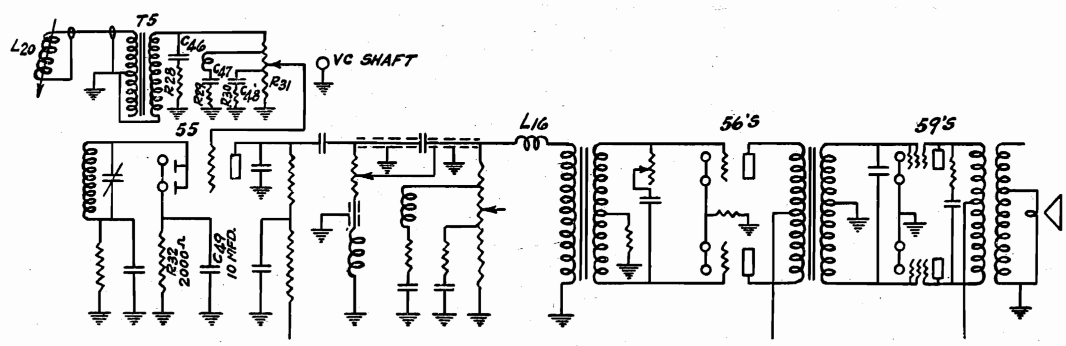

*Figure B—Chassis Wiring Diagram*

MODEL Duo 380-HR
A-F. Circuits

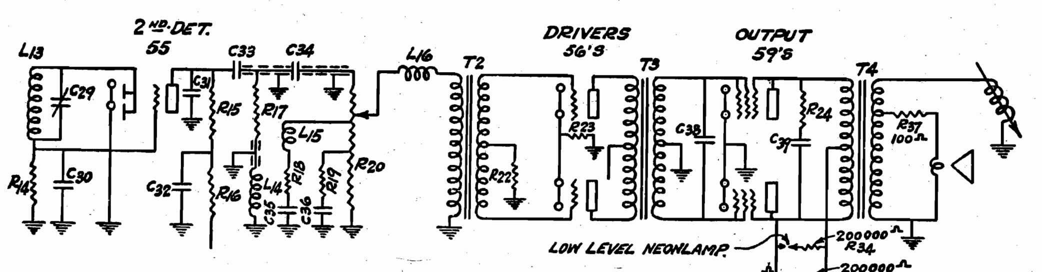
# RCA-VICTOR CO., INC.



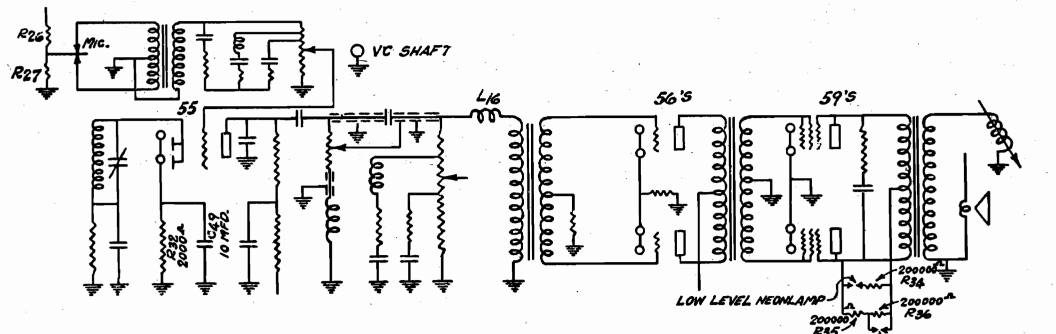

Radio Reproduction




Record Reproduction




Radio Recording




Home Recording

MODEL Duo 380-HR
Assembly Wiring

RCA-VICTOR CO., INC.

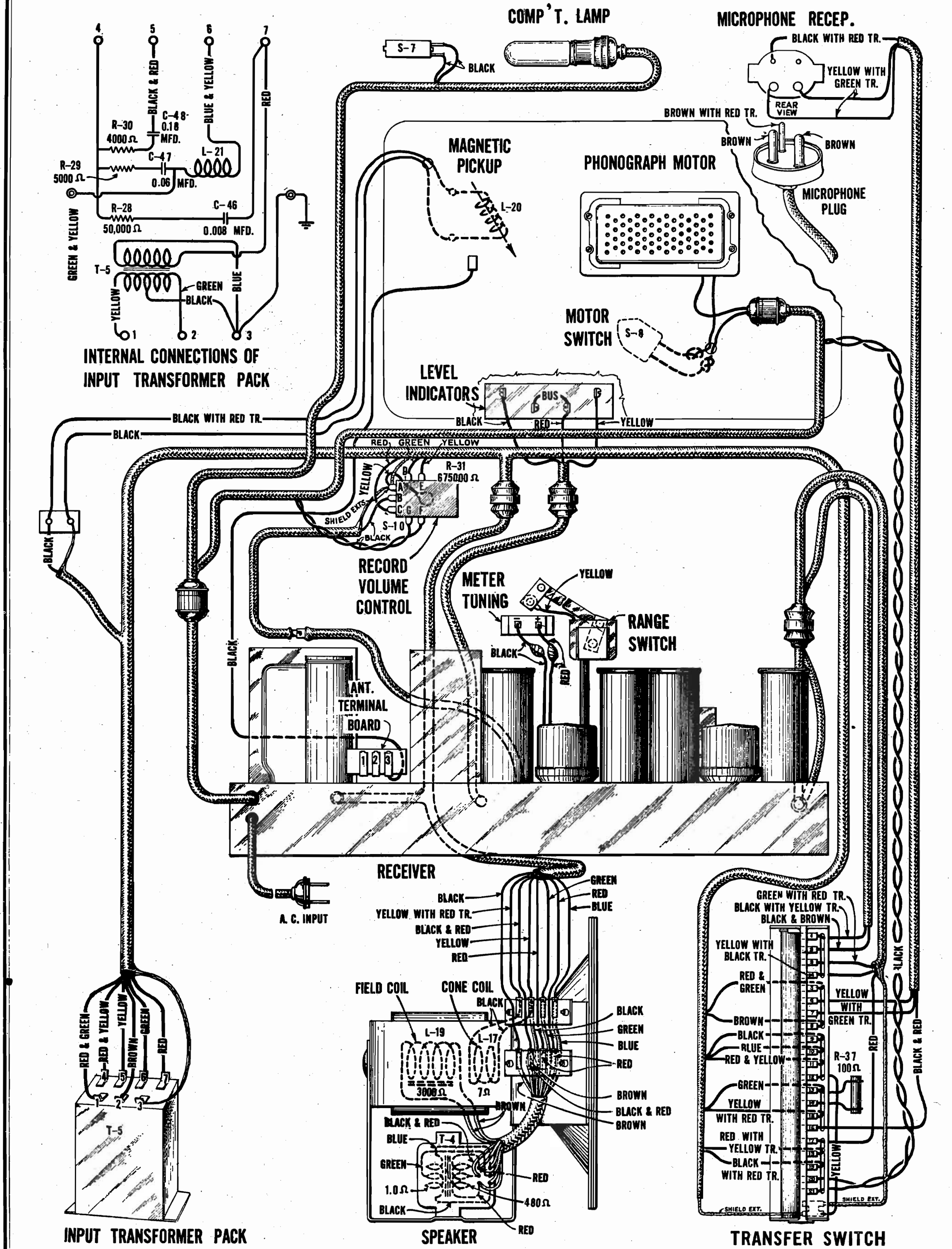



*Figure C—Assembly Wiring Diagram*

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# SERVICE DATA ON MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

## Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or the hardened pivot rubbers (see Figure *J*), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

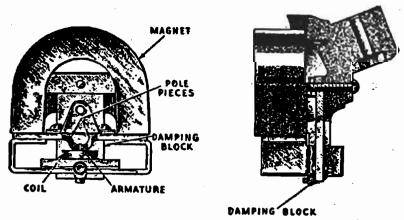



*Figure I*

(d) Remove screws A and B, Figure *J*, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure *J*), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

## Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

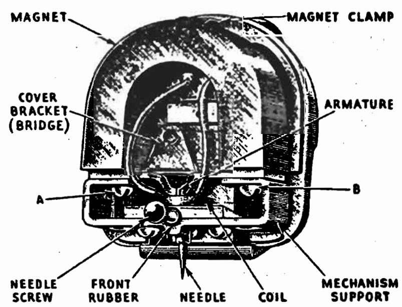



*Figure J*

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure *K*, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called

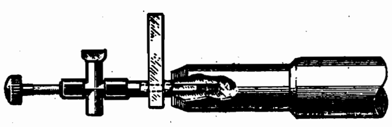


*Figure K*

acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the air gap as explained under (h).

RCA-VICTOR CO., INC.

# OPERATION—PHONOGRAPH

## Automatic Operation

Important Precautions—The following precautions must be observed during operation:

*1. In loading the turntable, make certain that the first record inserted (last to be played) is flat—that is, essentially free from warpage.*

*2. Before starting the turntable, make certain that the reject pocket (at the left of the phonograph compartment) is either empty or sufficiently clear to permit proper disposal of records by the automatic mechanism.*

*3. Never restrain by force the normal motion of any part of the automatic mechanism while it is changing records.*

Procedure—The phonograph operating controls are located on the front panel and in the playing compartment as shown in Figures 1 and 2. Proceed as follows:

1. Set the Transfer Switch for "Record Reproduction."

2. Apply power by turning the Radio Volume Control clockwise from the "off" position. Set the two Tone Controls for full-range reproduction (see paragraph 7 under "Operation—Radio").

3. With the Motor Switch in the "off" position (Record Volume Control fully counter-clockwise), load the turntable with records, as follows:

(a) Set the Index Lever at "Manual." *Always do this before loading or unloading records.*

(b) Place the electric pickup on the rubber rest.

(c) Raise the Record Ejector arm (*very slowly*, at first, until the internal weight has rolled to the rear of the arm, then as rapidly as desired) to its upper position of rest. *Always raise the ejector arm in this manner.*

(d) Select the records to be played. *All records for one loading must be of the same diameter (either ten or twelve inches), close to standard thickness and operable at the same speed (either 78 or 33⅓ R. P. M.).*

*CAUTION—Do not use thin flexible-type records for automatic operation.*

(e) Place the records, one at a time, on the turntable (see paragraph 1 under "Important Precautions"). The spindle should resume its normal height after each record is added. The turntable is fully loaded when the top surface of the uppermost record is nearly flush with the top of the spindle. (It should not be possible to slide off the top record without lifting its edge or depressing the spindle.)

(f) Lower the Record Ejector arm gently onto the spindle.

4. Insert a *new* needle in the pickup as far as it will go and tighten the needle screw. For long-playing (33⅓ R. P. M.) records, use *only* the *orange Chromium* needle. For standard (78 R. P. M.) records, use the latter needle or, if preferred, either the *green Chromium* or the full volume (full tone) *Tungstone* needle. Transparent-faced (illustrated) records, however, should not be reproduced with *Tungstone* needles.

NOTE—With care, the orange Chromium needle should play 75, the green Chromium 100, and the Tungstone 100 to 150 records. *Never re-insert in the pickup a Chromium needle which has been used (however slightly) as damage to the record grooves would result.*

5. Place the pickup needle on the smooth outer rim of the record, near the first groove. Then move the Index Lever to the position (12 or 10) corresponding to the diameter (inches) of the records on the turntable. Be careful not to move the lever *beyond* the proper index hole. Push the index pin firmly into the hole.

*CAUTION—Never attempt to move the Index Lever from the Manual position when the pickup is on the rubber rest.*

6. Start the turntable by turning the Motor Switch clockwise; then set the Speed Shifter for the speed (78 or 33⅓ R. P. M.) corresponding to the records on the turntable.

NOTE—The speed shifter should not be moved inward (from the 78 to the 33⅓ R. P. M. position) while the turntable is at rest.

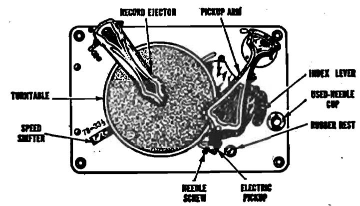



*Figure 2*

7. Adjust the Record Volume Control to obtain the desired volume.

8. Close the cabinet doors to extinguish the compartment lamp and to render less prominent the mechanical noises incident to record playing and changing. If needle scratch reproduction (particularly noticeable with old records) is considered excessive, turn the *treble* Tone Control slightly counter-clockwise. For most faithful reproduction, however, both Tone Controls should be left in the positions which provide full illumination of the tone color indicator.

NOTE 1—When a record has been played, the ejector arm slides it off into the record pocket and the pickup moves to the outside of the next record. The records on the turntable are thus played consecutively until only one record remains on the turntable. This record will be played repeatedly until the motor is stopped by means of the Motor Switch.

NOTE 2—After a record has been played and changed, the needle is lowered automatically onto the smooth rim of the next record and is fed by gravity into the starting groove. After the instrument has been leveled with reference to the top of the cabinet, further slight compensation may be necessary, thus: (1) If the needle fails to enter the playing groove, the right-hand side of the instrument must be raised by inserting thin blocks under the front and rear legs on that side: or (2) If the needle slides over several grooves, thus failing to reproduce the beginning of the selection, the left-hand side of the instrument must be similarly raised.

9. To reject a record while playing, lift the pickup arm and move it to the extreme left. Hold the pickup lightly until it is moved by the mechanism.

10. Before reloading or when through operating, turn the Motor Switch to the "off" position, set the Index Lever at "Manual" and place the pickup on the rubber rest. Never leave the pickup resting on a record (or on the turntable) when not in use. Turn the power switch "off" and close the cabinet doors when discontinuing operation of the instrument.

## Manual Operation

Records may be played individually as follows:

1. Set the Transfer Switch for "Record Reproduction" and apply the power with the Radio Volume Control as directed for automatic operation. Adjust the two Tone Controls for full-range reproduction.

2. Make sure that the Index Lever is at "Manual," that the electric pickup is on its rubber rest, and that the Motor Switch is in the "off" position.

3. Raise the Record Ejector arm to the upper rest position (see paragraph 3 (c) under "Automatic Operation").

4. Place the record on the turntable and insert a needle in the pickup. For needle information, see paragraph 4 under "Automatic Operation."

NOTE—Ordinary steel needles (full volume or full tone) can be used with standard (78 R. P. M.) records, provided a new needle is inserted for each selection. Do not use *Tungstone* needles with either thin flexible type or transparent-faced (illustrated )records.

5. Start the turntable by turning the Motor Switch clockwise, then set the Speed Shifter for the speed corresponding to the record on the turntable. Lower the needle gently onto the smooth outer rim of the record.

6. Adjust the Record Volume Control and close the cabinet doors (see paragraph 8 under "Automatic Operation").

7. After the record has been played, stop the turntable by turning the Motor Switch to the "off" position (motor stops automatically at the end of any record having the *eccentric* final groove). Lift the electric pickup from the record and place it on the rubber rest.

8. When through operating, turn the power "off" and close the cabinet doors.

# OPERATION—RECORDING

## Recording Precautions

When using the home-recording facilities of this instrument, the following precautions must be observed:

1. Always place a flat (unwarped) 10- or 12-inch record of the commercial variety beneath the home-recording record when recording.

2. To prevent surface slippage, always record with the felt recording pad inserted between the home-recording and standard records. This pad need not be removed for "playing-back" purposes but must never be left on the turntable when automatic operation is intended.

3. Use only the special *home-recording* needle (identified by its yellow shank and blunt-point) for both recording and reproducing. Such needles, however, must not be used for playing other than home-recorded records.

4. For *recording*, the needle pressure on the record must be increased by placing the recording weight on the electric pickup. This weight must be removed for *reproducing* either the home-recorded or any other record.

## Radio Recording

To record radio programs, refer to Figures 1 and 2, and proceed as follows:

1. Tune the receiver for the desired radio program as described under "Operation—Radio." Make sure that the Index Lever is at "Manual," that the electric pickup is on its rubber rest, and that the Motor Switch is in the "off" position.

2. Raise the Record Ejector arm to its upper position of rest (see paragraph 3 (c) under "Procedure—Automatic Operation—Phonograph").

3. Place a blank home-recording record on the turntable (see paragraphs 1 and 2 of preceding section "Recording Precautions") and lower the Record Ejector arm.

4. Insert a *home-recording* needle in the electric pickup and place the recording weight on the pickup head.

5. Set the Transfer Switch for "Radio Recording." In this position, the radio program should be heard at reduced volume.

6. Adjust the Radio Volume Control to obtain the correct recording volume as determined by observing the flashing of the two neon-lamp indicators located at the front of the playing compartment. The setting is correct when the left-hand lamp is at or near fixed illumination and the right-hand lamp is either "off" or flashing only at intervals. When both lamps are "off," the volume is too low and when both are flashing continuously, the volume is too high.

7. Start the turntable by turning the Motor Switch "on," then set the Speed Shifter for the desired turntable speed.

NOTE—For best results, always record at 78 R. P. M. If a record of longer duration is desired, recording may be done at 33⅓ R. P. M. Such records should be so marked, and must of course be reproduced at the same speed.

8. Place the needle in the outer groove of the blank record and recording will proceed automatically. During this process, however, watch the volume indicators and adjust the Radio Volume Control (if necessary) to compensate for changes in the program level.

9. Recording may be interrupted at any time by simply lifting the pickup from the record. It may be resumed on the same record if desired, provided care is taken to enter the needle in a *new* groove—that is, one slightly nearer the center than the last recorded groove.

10. Upon completing a recording, lift the electric pickup from the record, turn the Motor Switch "off" and place the pickup on the rubber rest.

## Microphone Recording

To record voice or musical entertainment originating in the home, the procedure is essentially the same as for the recording of radio programs except that the microphone is employed. Remove this unit from the cabinet (leaving the cord connected) and place it in an *upright* position on a table or any other horizontal surface conveniently near the sound source.

For best results, special attention must be given to the location and arrangement of the person or persons presenting the program. All sounds to be recorded must be directed toward the *front* of the microphone, never toward the *rear* which is designated by the word "BACK" cast on the pedestal. Further, the microphone should be located at a height approximately the same distance from the floor as the sound source. Such conditions may be fulfilled easily in the case of the average adult (speaker or singer) by placing the microphone on the top of the cabinet.

When recording speech, the microphone should be spaced from three to six inches from the speaker's mouth; the speaker should talk in a normal even tone and enunciate clearly. The microphone should be at a somewhat greater distance (one to two feet) when recording musical vocal selections, the proper spacing naturally being dependent upon the number of singers present. For instrumental music, the most desirable distance between the artists and the microphone will depend upon the type (wind or string), as well as the number of instruments and may be from three to ten feet. In the case of a small

MODEL 380-HR
Phonograph Data
Voltage

RCA-VICTOR CO., INC.

orchestra, it would be preferable to group the members in a semi-circle with the stringed instruments nearest the microphone and the horns at the rear.

**Adjustment of Recording Volume**—Before the actual recording is undertaken, it will be advisable to test for the proper volume as follows:

1. Set the Transfer Switch for "Home Recording."

2. Turn the power "on" (Radio Volume Control rotated slightly clockwise). As for radio recording, make certain that the Index Lever is at "Manual," that the electric pickup is on its rubber rest and that the Motor Switch is "off."

3. Raise the Record Ejector arm and load the turntable with a blank home-recording record, first inserting a standard record and the felt recording pad, then lower the Record Ejector arm.

4. Set the Record Volume Control fully clockwise (turntable now should be rotating) and commence the program which is to be recorded.

5. Regulate the distance between the sound source and the microphone, while observing the flashing action of the neon-lamp indicators at the front of the playing compartment, until both lamps are illuminated continuously or at approximately the same intervals.

6. Turn the Record Volume Control counter-clockwise until the right-hand lamp is either "off" or flashing infrequently; however, do not reduce the setting sufficiently to change the action of the left-hand lamp. The instrument is now properly adjusted and the test program may be discontinued while making final preparations for recording.

**Procedure**—After the recording volume is adjusted, leave the Record Volume Control setting intact permitting the turntable to remain in rotation, and proceed as follows:

1. Insert a *home-recording* needle in the electric pickup and place the recording weight on the pickup head.

2. Set the Speed-Shifter for the desired turntable speed (see note in paragraph 7 under "Radio Recording").

3. Place the needle in the outer groove of the blank record and commence without delay the program to be recorded.

4. When the recording is complete (see paragraph 9 under "Radio Recording"), lift the electric pickup from the record, turn the Motor Switch "off" and place the pickup on its rubber rest.

## Reproduction of Home Recordings

Home-recorded records (either radio or microphone recordings) may be reproduced in the manner described for manual operation of standard records under "Operation—Phonograph." Such records, however, must not be employed with the automatic record changer and always must be reproduced with the special *home-recording* needle. Always make certain to remove the recording weight from the electric pickup when "playing-back" recordings.

## GENERAL

**Fuse**—This instrument is protected by a fuse located at the rear of the chassis, under the metal cover marked "Caution: Remove Power Supply Before Removing Cover." If the fuse burns out, check the power supply connections and rating, and have all tubes tested by your dealer before installing a new fuse. This is a special fuse—obtain replacement fuses from your dealer—*do not use any substitute for this fuse.*

In districts where the line voltage is always below 115 (225 for 200–250 volt models), the fuse should be set in the "110" position ("213" position for 200–250 volt models). Always disconnect the power cord from the a-c outlet before removing the fuse cover.

**Maintenance**—With normal use and handling, trouble-free service is to be expected. The automatic phonograph mechanism and associated parts, however, should be kept clean and well-lubricated. To insure continued efficient operation, it is recommended that the entire instrument be thoroughly inspected and adjusted by an experienced service man once each year.

## RADIOTRON SOCKET VOLTAGES (RADIO OPERATION)

### 120 Volt A. C. Line—Volume Control and Sensitivity Control at Maximum—No signal being received

| Radiotron No. | Cathode to Control Grid, Volts | Cathode to Screen Grid, Volts | Cathode to Plate, Volts | Plate Current, M. A. | Heater Volts |
|---|---|---|---|---|---|
| RCA-58 R. F. | 3.1 | 97 | 212 | 7.5 | 2.5 |
| RCA-56 Osc. | — | — | 100 | 6.0 | 2.5 |
| RCA-58 1st Det. | 9.5 | 91 | 206 | 2.8 | 2.5 |
| RCA-58 I. F. | 7.5 | 93 | 208 | 4.0 | 2.5 |
| RCA-58 A. V. C.–I. F. | 8.5 | 92 | 207 | 3.0 | 2.5 |
| RCA-56 A. V. C. | 12.0 | — | — | 0 | 2.5 |
| RCA-55 2nd Det. | 0 | — | 74 | 8.0 | 2.5 |
| RCA-56 A. F. Driver | 11.0 | — | 205 | 5.0 | 2.5 |
| RCA-56 A. F. Driver | 11.0 | — | 205 | 5.0 | 2.5 |
| RCA-59 Power | 0 | — | 394 | 13.0 | 2.5 |
| RCA-59 Power | 0 | — | 394 | 13.0 | 2.5 |
| RCA-5Z3 Rect. | 990–495 R. M. S. | | | 92 Total | 5.0 |

# RCA-VICTOR CO., INC.

**MODEL 380-HR**
**Neon Lamp and Switching Data**
**Record Changer Data**

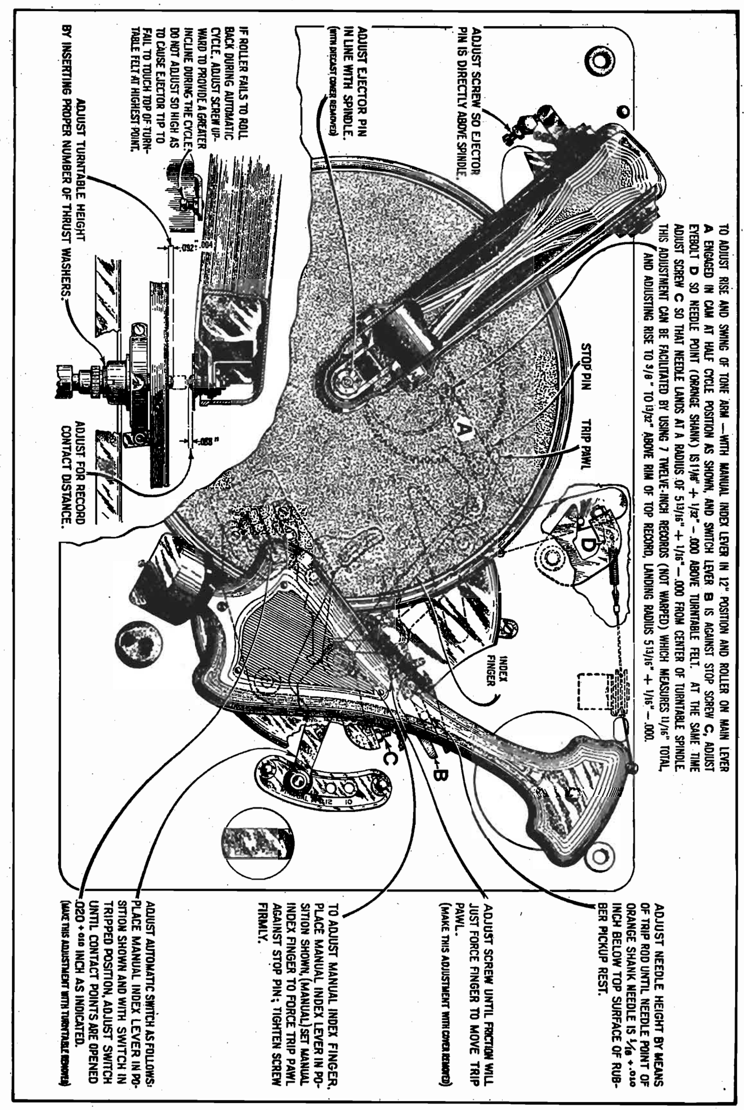



*Figure H—Automatic Record Changer Adjustments*

## Testing Neon Level Indicating Lamps

Two Neon Level Indicating Lamps are provided so that a visual indication of the recording level may be obtained at all times. These lamps normally give long service without attention. However, if failure occurs, and all circuits have been checked and eliminated as possible source of failure, the

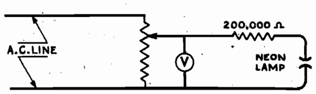



*Figure E—Testing Circuit*

lamps may be easily checked as indicated in the circuit shown in Figure E. The method for checking involves testing for lighting between certain voltages. The lamps must not light before 52 volts have been applied and must not require a voltage greater than 64 volts to cause them to light. Lamps requiring different voltages from these are defective and must not be used.

## Transfer Switch Mechanism

The transfer switch used in this model is a special four-position rotory switch located on the front panel and operated in conjunction with a two-position switch located in the chassis. The switches are coupled mechanically by means of a flexible shaft and operate as a single unit.

In event that any part of the switching system is removed, in order to replace or reconnect the assembly, the following procedure should be observed. Refer to Figure F.

(a) Set the two-position switch located in the chassis to its extreme clockwise position, and attach the transfer switch to front panel of the cabinet in proper position as shown. Set the transfer switch at position 1.

(b) Assemble the transfer switch end of the flexible shaft into the switch bracket. Place the "V" link loosely on end of shaft and tighten the pilot screw into its groove.

(c) Assemble the other end of the flexible shaft to the two-position switch (on chassis) so that one set screw points directly back, when facing the chassis from the rear, and the other to the left. Then tighten one set screw.

(d) Set the "V" link, at rear of large switch, so that the lower corner is approximately flush with the lower side of the switch. Tighten one set screw.

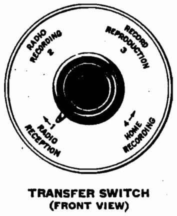
(e) Note the position of the pin as it approaches the "V" link when turning transfer switch clockwise toward position 2 and also when the pin approaches the "V" link when turning the transfer switch counter clockwise toward position 3 from position 4. In these positions the pin must contact the "V" at approximately the same points.

(f) Tighten all remaining set screws at each end of the shaft.

It will now be found that the transfer switch turns with maximum smoothness and the two-position chassis switch operates midway between positions 2 and 3 in either direction.

## Audio Circuits

Figure G shows the schematic diagrams of the audio circuits that occur at each position of the transfer switch. A reference to these diagrams will enable the serviceman to quickly diagnose trouble in these circuits.



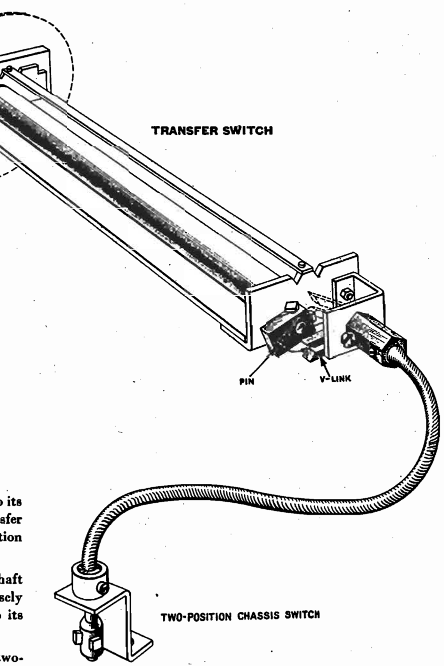




*Figure F—Transfer Switch Mechanism*

MODEL 380-HR
Parts List

RCA-VICTOR CO., INC.

# REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | RECEIVER ASSEMBLIES | |
| 2730 | Resistor—18,000 ohms—Carbon type—1 watt (R24)—Package of 5 | $1.10 |
| 2747 | Cap—Contact cap—Package of 5 | .50 |
| 3024 | Capacitor—9 mmfd. (C2)—Package of 2 | .50 |
| 3047 | Resistor—1,500 ohms—Carbon type—½ watt (R8)—Package of 5 | 1.00 |
| 3085 | Capacitor—400 mmfd. (C38) | .30 |
| 3118 | Resistor—100,000 ohms—Carbon type—¼ watt (R5)—Package of 5 | 1.00 |
| 3252 | Resistor—100,000 ohms—Carbon type—½ watt (R6, R7)—Package of 5 | 1.00 |
| 3376 | Mount—Fuse mount | .40 |
| 3435 | Resistor—250 ohms—Carbon type—½ watt (R2)—Package of 5 | 1.00 |
| 3460 | Capacitor—1,200 mmfd. (C31) | .30 |
| 3526 | Resistor—2,000 ohms—Carbon type—½ watt (R4, R32)—Package of 5 | 1.00 |
| 3527 | Resistor—800 ohms—Carbon type—½ watt (R19)—Package of 5 | 1.00 |
| 3528 | Bracket—Noise suppressor or volume control lamp bracket | .18 |
| 3529 | Socket—Noise suppressor or volume control lamp socket | .32 |
| 3533 | Shutter—High frequency tone control shutter | .50 |
| 3534 | Shutter—Low frequency tone control shutter | .50 |
| 3535 | Socket—High or low frequency tone control lamp socket | .32 |
| 3556 | Capacitor—0.05 mfd.—Located on antenna coil (C3) | .34 |
| 3558 | Capacitor—50 mmfd. (C19) | .36 |
| 3564 | Bracket—Station selector dial lamp—Mounting bracket | .25 |
| 3565 | Socket—Station selector dial lamp socket | .50 |
| 3597 | Capacitor—0.25 mfd. (C33, C45) | .40 |
| 3640 | Capacitor—0.05 mfd. (C9, C22, C26) | .25 |
| 3641 | Capacitor—0.1 mfd. (C7, C13, C23, C25, C27) | .35 |
| 3643 | Capacitor—0.005 mfd. (C39) | .25 |
| 3652 | Screw—No. 10-32-¼ set screw for bracket and bushing assembly—Package of 10 | .32 |
| 3719 | Socket—7-contact Radiotron socket | .30 |
| 3726 | Arm—Range switch operating arm assembly—Comprising arm, link, studs and set screws | .45 |
| 3727 | Shaft—Shaft and bushing assembly for range switch operating arm—Comprising two washers, shaft, bushing and nut | .30 |
| 3747 | Capacitor—15 mmfd. (C8) | .36 |
| 3749 | Capacitor—0.1 mfd. (C40) | .30 |
| 3765 | Capacitor—0.025 mfd. (C34) | .34 |
| 3774 | Resistor—7,400 ohms—Tapped at 3,800 and 500 ohms (R25, R26, R27) | .80 |
| 3797 | Reactor—Volume control compensating reactor (L15) | .64 |
| 3798 | Resistor—700 ohms—Carbon type—½ watt (R18)—Package of 5 | 1.00 |
| 3799 | Capacitor—80 mmfd. (C30) | .70 |
| 3883 | Fuse—2-ampere (F1)—Package of 5 | .40 |
| 4013 | Capacitor—200 mmfd (C1) | .30 |
| 4035 | Switch—Radio-Phonograph switch (S9) | 2.10 |
| 4036 | Shield—Low or high frequency tone control light shield | .30 |
| 4037 | Shield—Antenna, detector or oscillator shield | .55 |
| 4038 | Shield—Radiotron shield | .30 |
| 4039 | Shield—Radiotron shield—Second detector shield | .30 |
| 4040 | Shield—Radiotron tube shield top | .25 |
| 4041 | Cover—Fuse cover | .25 |
| 4042 | Reactor—Volume control series reactor (L16) | 1.20 |
| 4129 | Bracket—Bracket and bushing assembly for radio-phonograph switch shaft—Located on receiver chassis | .28 |
| 4130 | Shield—R. F. Radiotron shield | .30 |
| 5817 | Resistor—20,000 ohms—Carbon type—3 watt (R15, R16) | .25 |
| 6186 | Resistor—500,000 ohms—Carbon type—¼ watt—Located on antenna coil (R1)—Package of 5 | 1.00 |
| 6192 | Spring—3-gang tuning condenser drive cord tension spring—Package of 10 | .30 |
| 6228 | Resistor—200,000 ohms—Carbon type—½ watt (R14, R34, R35, R36)—Package of 5 | 1.00 |
| 6277 | Capacitor—0.1 mfd.—Located on rectifier socket shield (C50) | .35 |
| 6280 | Resistor—400,000 ohms—Carbon type—½ watt (R11, R12, R13)—Package of 5 | 1.00 |
| 6281 | Resistor—1,100 ohms—Carbon type—½ watt (R23)—Package of 5 | 1.00 |
| 6282 | Resistor—60,000 ohms—Carbon type—½ watt (R22)—Package of 5 | 1.00 |
| 6298 | Cord—3-gang tuning condenser drive cord—Package of 5 | .60 |
| 6300 | Socket—4-contact Radiotron socket | .35 |
| 6312 | Capacitor—650 mmfd. (C15)—Package of 5 | 1.50 |
| 6316 | Resistor—2,500 ohms—Carbon type—½ watt (R10)—Package of 5 | 1.00 |
| 6437 | Coil—Oscillator coil (L5, L6, L7) | 1.24 |
| 6447 | Volume control (R20, S1) | $1.92 |
| 6448 | Tone control—Low frequency (R17) | 1.04 |
| 6449 | Tone control—High frequency (R21) | 1.06 |
| 6450 | Rheostat—Noise suppressor rheostat (R3) | 1.24 |
| 6512 | Cpacitor—0.005 mfd. (C37) | .28 |
| 6537 | Switch—Range switch | 1.30 |
| 6539 | Coil—Detector coil (L3, L4) | 1.44 |
| 6541 | Dial—Tuning condenser dial and scale | .75 |
| 6561 | Coil—Antenna coil (L1, L2, R1, C3) | 1.65 |
| 6562 | Transformer—Audio driver transformer (T3) | 3.04 |
| 6564 | Transformer—First intermediate frequency transformer (L8, L9, R9, C20, C21, C24) | 2.30 |
| 6565 | Transformer—Second intermediate frequency transformer (L12, L13, C28, C29) | 2.10 |
| 6566 | Transformer—Third intermediate frequency transformer (L10, L11) | 1.72 |
| 6567 | Capacitor pack—Comprising one 0.17 mfd., and one 0.7 mfd. capacitors (C35, C36) | .95 |
| 6568 | Transformer—Interstage audio transformer (T2) | 3.10 |
| 6571 | Capacitor—10 mfd. (C43, C44) | 1.20 |
| 6572 | Reactor—Tone control reactor (L14) | .90 |
| 6574 | Capacitor pack—Comprising two 10.0 mfd. capacitors (C32, C41) | 1.80 |
| 6578 | Reactor—Filter reactor (L18) | 3.22 |
| 6797 | Capacitor—10.0 mfd. (C49) | 1.04 |
| 6847 | Shield—Rectifier socket shield and capacitor | .65 |
| 7062 | Capacitor—Adjustable capacitor (C14) | .50 |
| 7439 | Drum—Dial drum with set screw and three dial mounting nuts | .35 |
| 7484 | Socket—5-contact Radiotron socket | .35 |
| 7485 | Socket—6-contact Radiotron socket | .40 |
| 7700 | Condenser—3-gang variable tuning condenser (C4, C5, C6, C10, C11, C12, C16, C17, C18, S2, S3, S4, S5, S6) | 7.44 |
| 9468 | Transformer—Power transformer—105–125 volts—50–60 cycles (T1) | 7.75 |
| 9469 | Transformer—Power transformer—105–125 volts—25–40 cycles | 11.75 |
| | MOTOR BOARD ASSEMBLIES | |
| 2893 | Spring—Trip lever latch tension spring—Package of 10 | .30 |
| 2917 | Washer—Spring washer, "U" type—Package of 10 | .25 |
| 3654 | Roller—Guide roller assembly—Comprising bracket roller and guide pin | .34 |
| 3666 | Spring—Cable lever tension spring—Package of 10 | .44 |
| 3670 | Finger—Friction finger | .32 |
| 3672 | Pin—Manual index lever pin | .42 |
| 3673 | Screw—Manual index lever adjustment screw and nut—Package of 5 | .20 |
| 3676 | Spring—Cam and gear pawl carrier tension spring—Package of 10 | .52 |
| 3677 | Lever—Cable lever assembly | .40 |
| 4059 | Screw—Trip lever clutch tension adjustment screw—Package of 10 | .22 |
| 4060 | Escutcheon—Manual—12–10 | .28 |
| 4061 | Spring—Main spring—Package of 10 | .38 |
| 4124 | Plate—Actuating plate assembly | .50 |
| 4127 | Spring—Actuating plate spring—Package of 10 | .24 |
| 6502 | Cam—Cam and gear assembly | 1.18 |
| 6503 | Pawl—Trip pawl assembly | .40 |
| 6806 | Lever—Manual index lever—Less pin | .55 |
| 6807 | Lever—Trip lever assembly | 1.16 |
| 6808 | Clutch—Trip lever friction clutch | .30 |
| 6809 | Finger—Manual index finger assembly | .25 |
| 6810 | Lever—Main spring lever | .44 |
| 6846 | Lever—Main lever and link assembly | 1.45 |
| 7710 | Cover—Metal cover for trip lever and friction finger assemblies | .28 |
| | MOTOR ASSEMBLIES | |
| 3777 | Motor mounting spring washers and stud assembly—Comprising three upper and three lower springs, six cup washers, three spring washers, and three studs | .62 |
| 9477 | Motor—Motor complete—105–125 volts—60 cycles | 25.88 |
| 9479 | Motor—Motor complete—105–125 volts—25 cycles | 36.48 |
| 9478 | Motor—Motor complete—105–125 volts—50 cycles | 25.88 |
| | EJECT ARM ASSEMBLIES | |
| 3655 | Retainer—Ball retainer with three ball bearings | .45 |
| 3656 | Bearing—Ejector tip bearing | .48 |
| 3657 | Tip—Ejector tip | .30 |
| 3658 | Ball—Ball bearing—Package of 20 | .30 |
| 3662 | Plate—Ejector plate—Package of 5 | .95 |
| 3665 | Screw—Eject arm horizontal adjustment screw and nut—Package of 5 | .25 |
| 3729 | Roller—Counter balance roller—Located inside of eject arm | .45 |

**MODEL Duo 381**
**Schematic**

# RCA-VICTOR CO., INC.

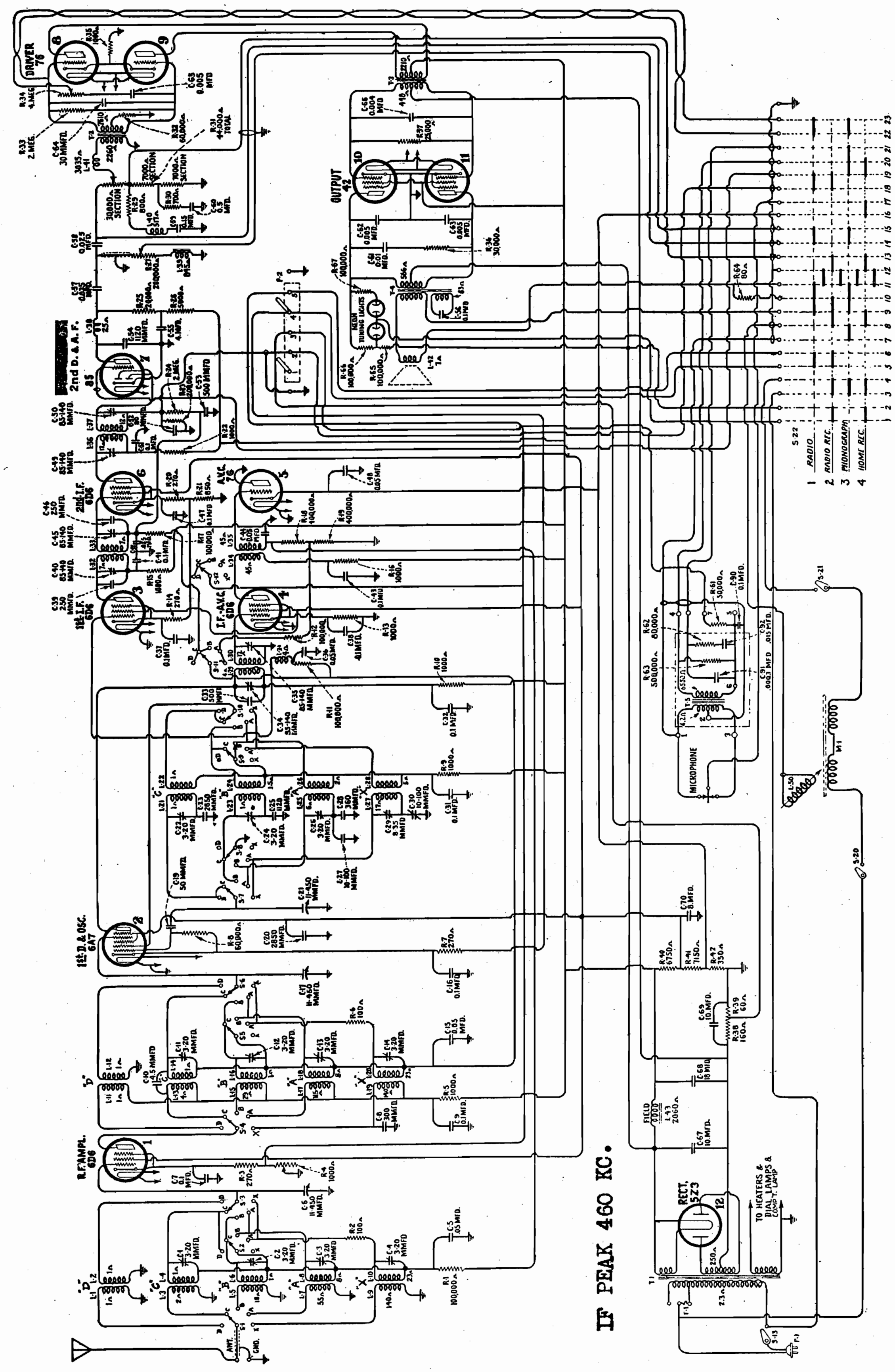



*Figure 1—Schematic Circuit Diagram*

MODEL Duo 381
RF Assembly Wiring

## RCA-VICTOR CO., INC.

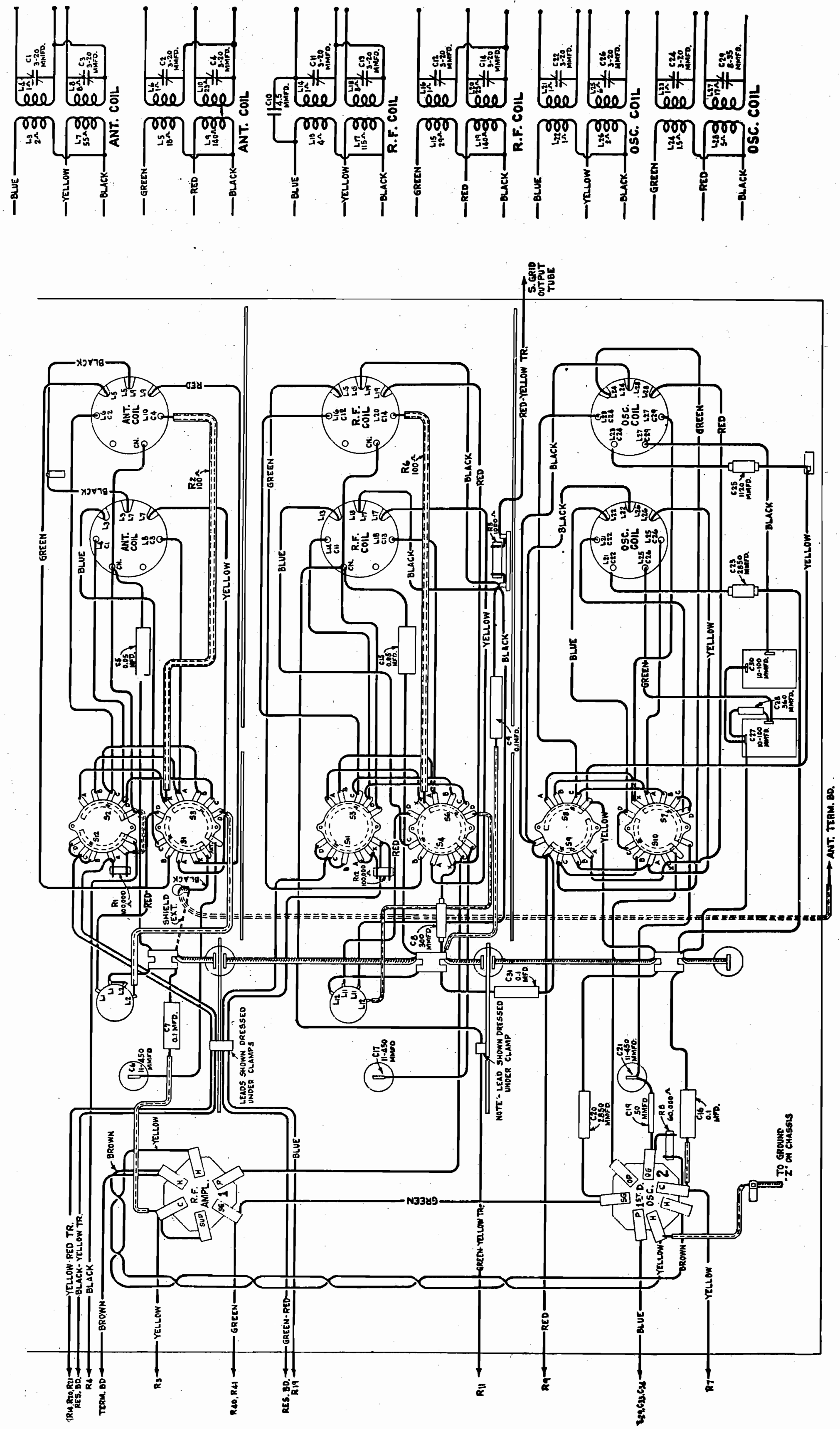



*Figure 2—R. F. Assembly Wiring Diagram*

# RCA-VICTOR CO., INC.

MODEL Duo 381
Chassis Wiring

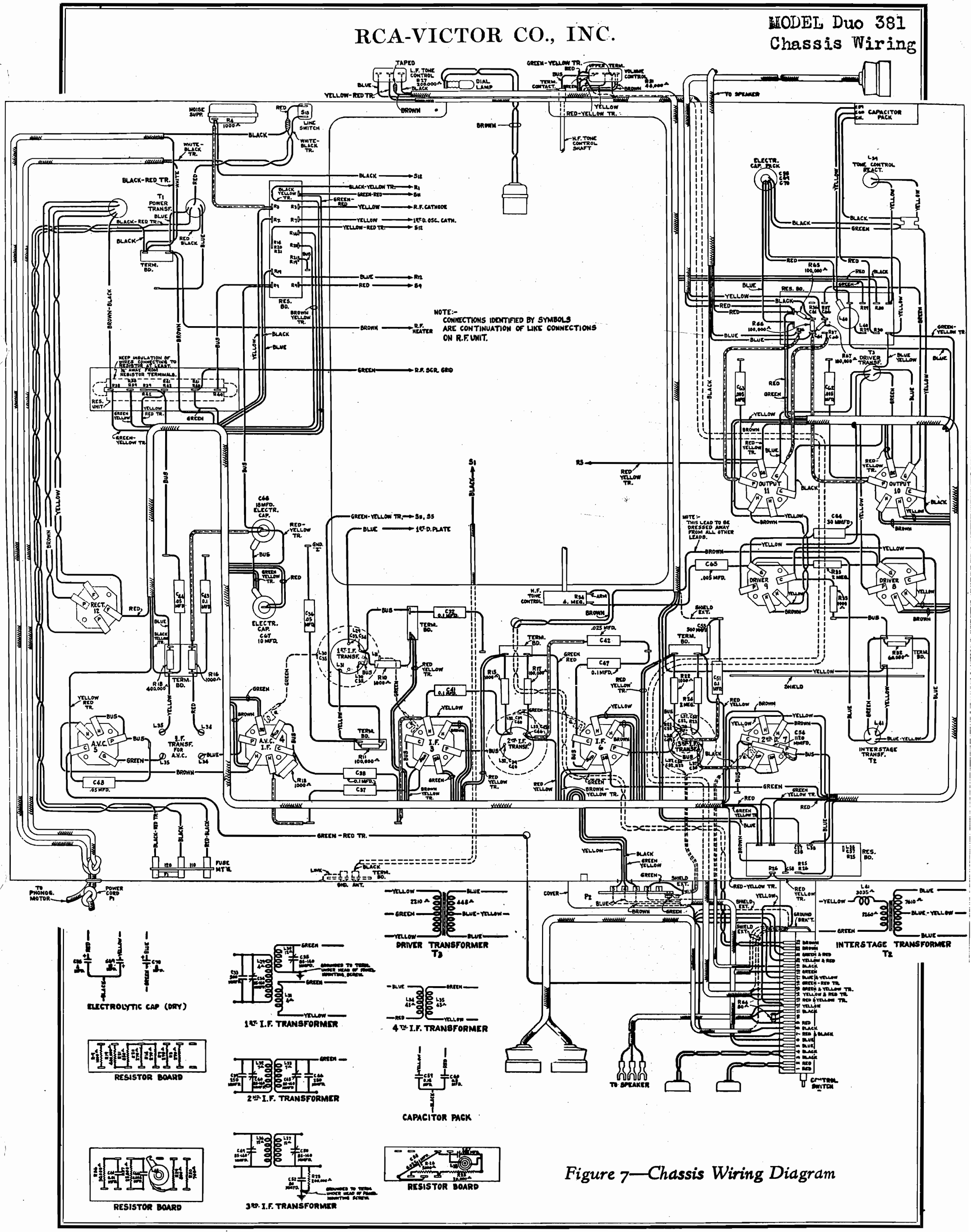
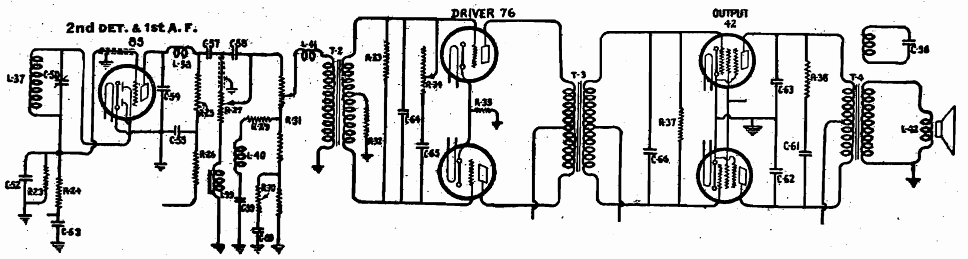


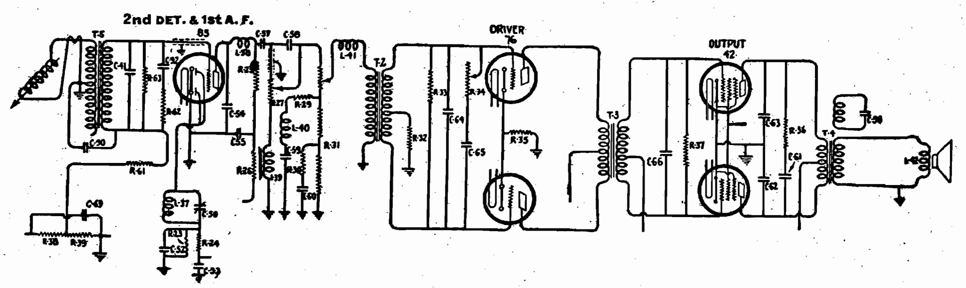

*Figure 7—Chassis Wiring Diagram*

MODEL Duo 381
A-F. Circuits

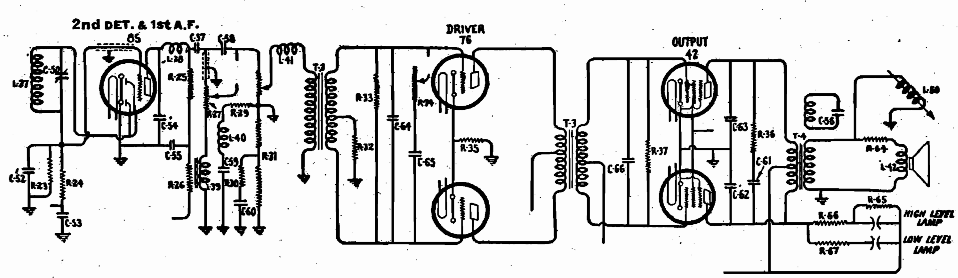
# RCA-VICTOR CO., INC.



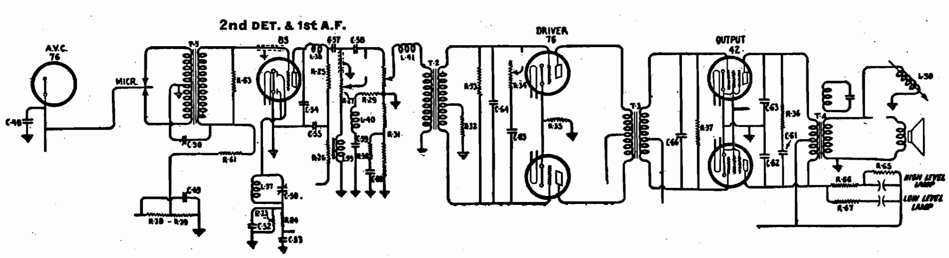

*Radio Receiving*




*Record Reproduction*




*Radio Recording*




*Home Recording*

*Figure 5—Schematic Circuits of Audio Amplifier at each Selector Switch Position*

MODEL Duo 381
Assembly Wiring

RCA-VICTOR CO., INC.

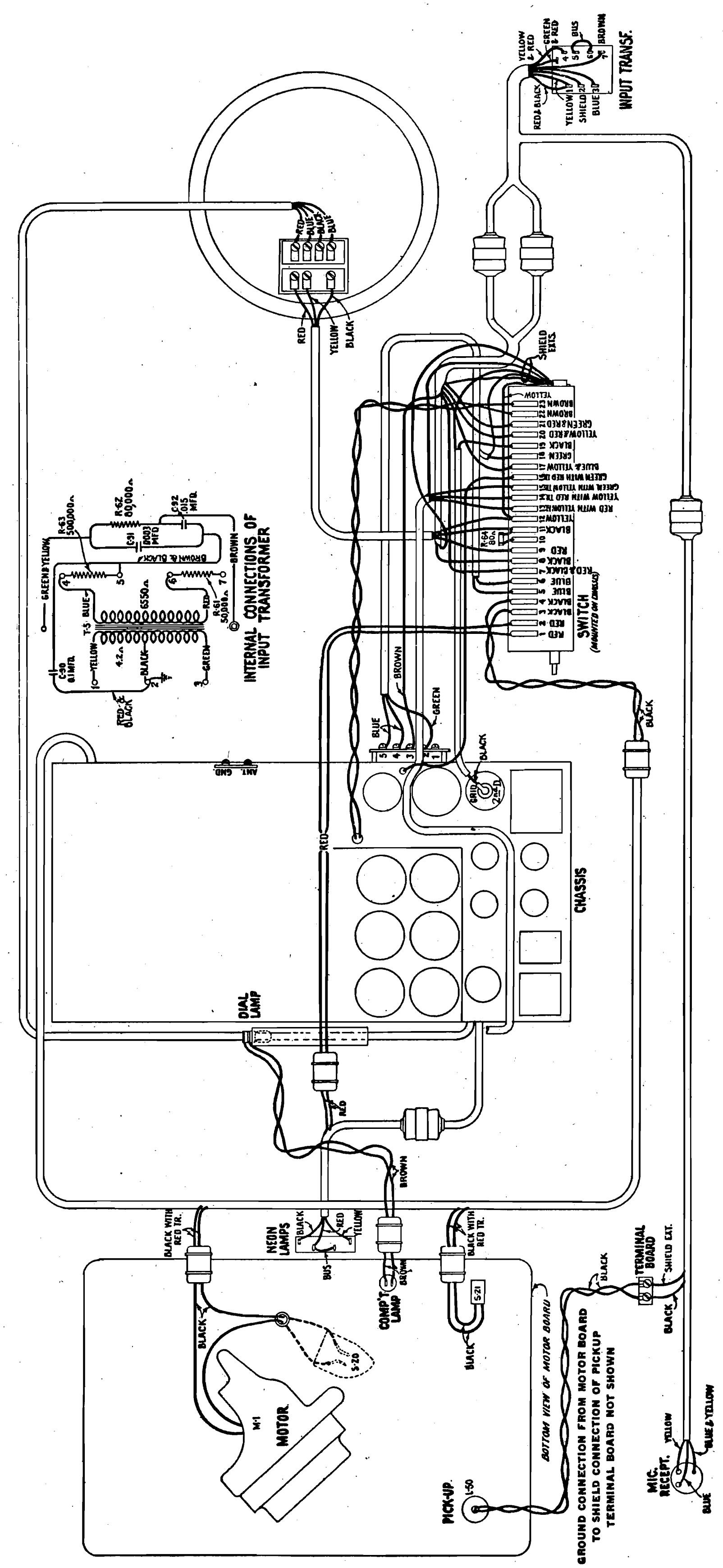



Figure 9—Assembly Wiring Diagram

MODEL Duo 381
Circuit Data
Record Changer Data

RCA-VICTOR CO., INC.

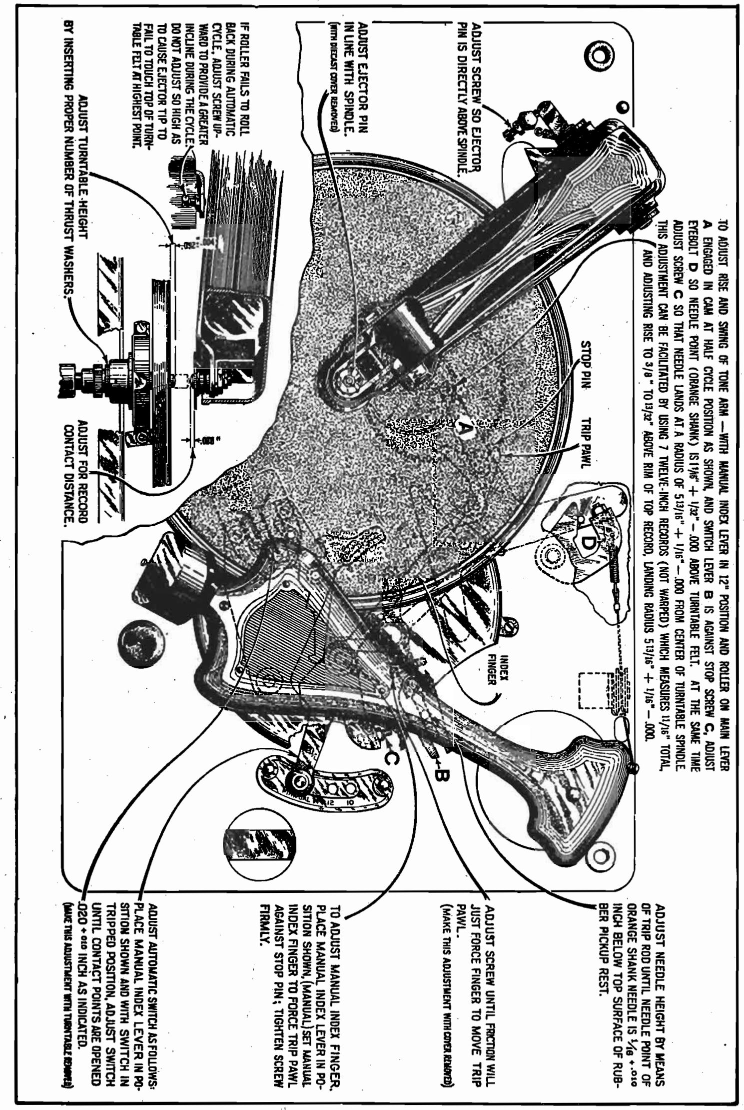



*Figure 14—Automatic Record Changer Adjustments*

# DESCRIPTION OF ELECTRICAL CIRCUIT

## RADIO

The general circuit arrangement consists of an R. F. stage, a combined oscillator and first detector stage, two I. F. stages, a combined second detector, automatic volume control and 1st A. F. amplifier, a push-pull audio driver stage and a push-pull Class A output stage. Plate and grid voltages are supplied by the RCA-5Z3 heavy duty rectifier combined with a suitable filtering system. In addition, a double channel A.V.C. stage is provided which uses two additional tubes. Figure 1 shows the over-all schematic circuit diagram while Figure 2 shows the R. F. assembly wiring.

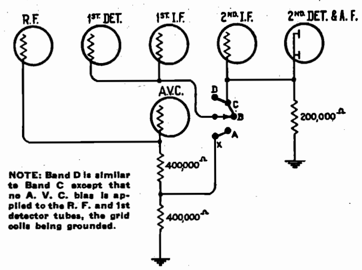



*Figure 3—Switching Arrangement of Automatic Volume Control Systems*

The signal enters the receiver through a shielded antenna lead and is applied to the grid of the R. F. tube through the antenna coupling transformer. The secondary of this transformer is tuned to the signal frequency by means of one unit of the gang-capacitor. The output of this stage is transformer coupled to the grid circuit of the first detector, which is also tuned to the signal frequency by a unit of the gang-capacitor.

Combined with the signal in the first detector is the local oscillator signal, which is always at a 460 K. C. frequency difference (higher) from the signal frequency. A separate coil system and the third unit of the gang-capacitor are used in the oscillator circuit.

In conjunction with these three tuned circuits it is well to point out that five different groups of tuned circuits are used, one group for each tuning band. A five-position selector switch is provided for selecting the band in which the desired signal is located. In addition to selecting the desired coil system, additional groups of contacts are provided for short-circuiting the preceding lower frequency R. F. and detector coils and the two preceding oscillator coils. This is to prevent "dead" spots due to absorption effects caused by the coils, the natural period of which without the gang-capacitor connected falls in the next higher frequency band. This gang switch also has additional contacts for performing other functions which will be discussed.

The output of the first detector, which is the I. F. signal (460 K. C.), is fed directly through two tuned circuits to the grid of the automatic volume control I. F. amplifier stage. A coupling coil adjacent to the secondary of this transformer is connected directly to the signal I. F. stage, which is in effect parallel to the A. V. C., I. F. stage. Examining the signal amplifier further we find that the output of the first signal I. F. stage is applied through a transformer to the second I. F. stage and thence through a second transformer to the second detector. Both circuits of each transformer are accurately tuned to the I. F. signal, which is 460 K. C.

Further examining the A. V. C., I. F. stage it will be seen that the output of this stage is applied to the A. V. C. tube through an untuned I. F. transformer. The A. V. C. stage, which is an RCA-76, is operated as a straight rectifier, its plate being grounded and only the grid being used. This tube is shielded in the usual manner. A small grid voltage, approximately 5.0 volts, is maintained so that rectification does not occur until the signal level exceeds this grid voltage. When this occurs, a portion of the rectified signal produces a voltage drop across resistors R-18 and R-19. The drop across both of these resistors constitutes the automatic bias voltage for the R. F. stage. The drop across R-19 alone gives the automatic bias voltage for the first detector and first I. F. stage on bands X and A.

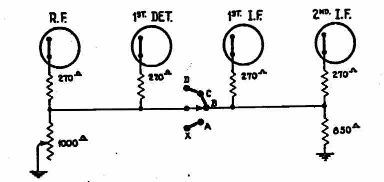



*Figure 4—Sensitivity Control Switching Arrangement*

Examining the second detector, the diode electrodes provide the detector action while the grid and plate give audio amplification. A portion of the rectified signal also gives a voltage drop across R-23, which is a second automatic volume control system for the receiver. The voltage drop is applied to the second I. F. stage in all bands and to the first detector and first I. F. stage in bands B and C. The change in automatic volume control systems is made by an additional group of contacts on the band selector switch. Figure 3 shows the switching arrangements for changing the A. V. C. system in the various bands.

At this point, an explanation as to why two automatic volume control systems are used and why the sensitivity control is changed in different bands may be in order.

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Two automatic volume control systems are used because of the different receiving conditions in the various bands. For example, in the broadcast and long-wave band (X and A) signal levels are very high. Also due to the use of an aurally compensated volume control, a constant input to the second detector must be maintained. From this it is evident that the double channel I. F. automatic volume control is ideal. It maintains a constant input to the second detector and yet does not function on an extremely weak signal. In the short-wave bands, however, conditions are different. Signal strengths are always very low and fluctuate widely. For this reason it is important to have some automatic volume control action below the level at which the double channel system works. This is provided by the tube marked 2nd detector and 1st A. F. which functions on the first detector and two I. F. stages on the short-wave bands. It should be noted that this action is present on the second I. F. stage on all bands. This further flattens the action of the double-channel system in bands X and A.

At this point it is well to examine the sensitivity control, which also changes on different bands. The sensitivity control adjusts the residual bias on the R. F. and first detector stages in bands X and A while it controls the R. F., 1st detector and both I. F. stages on bands B, C, and D. Figure 4 shows the switching arrangement used.

The sensitivity control is changed so that in bands X and A it controls the R. F. and 1st detector while in bands B, C, and D it controls the R. F., 1st detector, 1st I. F. and 2nd I. F. stages. The reason for this is that for a given degree of sensitivity in bands X and A the residual bias will be considerably higher in the R. F. and 1st detector stages than in the bands B, C, and D used. This is to prevent possible overloading of these stages due to the high-signal strengths encountered in bands X and A. Also, in bands B, C, and D, for a given degree of sensitivity the R. F. stage operates at a higher gain, which gives an improved signal to noise ratio. This is caused by the paralleling of the sensitivity control with an 850-ohm resistor in these bands.

Returning to the second detector, we find its output circuit is coupled to the grid circuit of the driver stage through a compensated volume control system, tone control system and transformer. The volume control uses two stages of compensation, which serves to increase the high and low frequencies as the volume is reduced. This compensates for the natural loss in sensitivity of the human ear to the high and low frequencies at low sound levels. A low and a high frequency tone control enables the listener to alter the fidelity of the receiver to his individual taste.

The driver stage, which is a pair of RCA-76 Radiotrons connected in push-pull, is transformer coupled to a pair of RCA-42's which are the output stage. A feature of the output stage is the use of fixed bias, which reduces distortion and increases the available output. This is accomplished by the use of the drop across R-38 and R-39, which carries the entire D. C. output from the rectifier. Naturally the output stage uses but a portion of the total rectified current and current variations in it will have but little effect on the drop across the resistor.

The output of the power stage is coupled through a step-down transformer to the voice coil of the loudspeaker. A separate winding, which is shunted by a capacitor, has been provided in this transformer which gives a very sharp, high-frequency cut-off for the entire

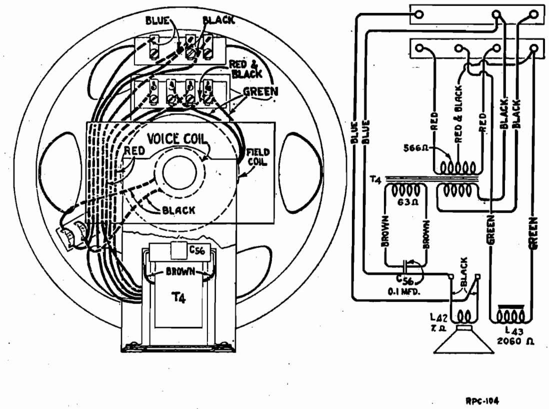


*Figure 6—Loudspeaker Wiring*

audio system. This greatly reduces the reproduction of any high-frequency interchannel interference or other disturbance of a high-frequency character which is outside of the useful musical range.

The loudspeaker used is of the large-field ten-inch type. It is fully capable of handling the high-power, high-quality output of the receiver and converting it into faithful sound reproduction.

Figure 6 shows the loudspeaker wiring while Figure 7 shows the chassis wiring diagram. Figure 9 shows the assembly wiring diagram.

## PHONOGRAPH AND RECORDING

The record reproducing facilities consist of a low impedance magnetic pickup with its associated inertia type tone arm, a compensated volume control, the audio amplifier of the receiver and the loudspeaker of the receiver. The radio receiver is made inoperative by the switch used for changing to record reproduction.

The recording facilities use the audio amplifier of the radio receiver, the output of which is connected to the magnetic pickup instead of the voice coil of the loudspeaker. The input to the amplifier may be either from the microphone or from the radio receiver, depending on whether radio recording or home recording is desired. It should be noted that when radio recording is being used, the loudspeaker is connected across the output through a resistor so that the program being recorded may be monitored at the same time.

Figure 7 shows schematic circuit diagram of the audio circuits at each of the four selection switch positions.

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# SERVICE DATA

## (1) LINE-UP PROCEDURE

The line-up procedure of this receiver is somewhat involved and it is important that these instructions be carefully followed when making adjustments. Properly aligned, this receiver has outstanding performance; improperly aligned, it may be impossible to receive signals on all bands.

### Equipment

To properly align this receiver, the following equipment must be used. This is a modulated R. F. oscillator having proper frequency range, an output indicator, an alignment tool, a tuning wand, and a "dummy" Radiotron RCA-76. These parts, which are shown on page 20, have been developed by the

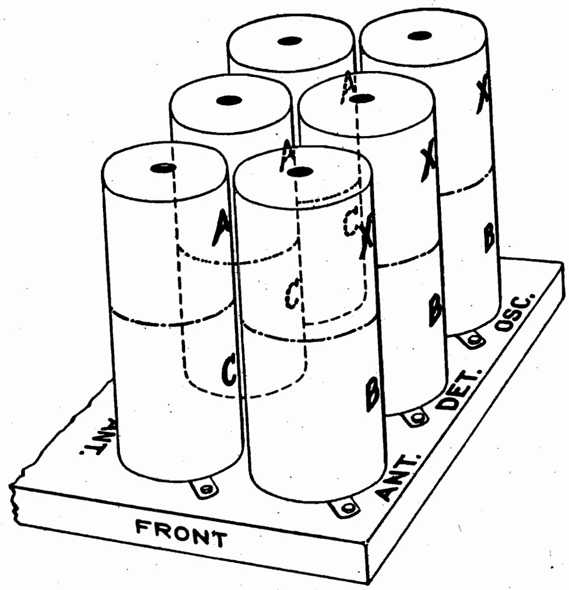


*Figure 8—Location of Various Coils in Shields*

manufacturer of this receiver for use by service men to duplicate the original factory adjustments. The "dummy" Radiotron, RCA-76, is obtained by removing one heater prong from an otherwise perfect tube.

### Checking with Tuning Wand

Before making any R. F., oscillator or first detector adjustments, the accuracy of the present adjustments may be checked by means of the tuning wand (Stock No. 6679). The tuning wand consists of a bakelite rod having a brass cylinder at one end and a special finely divided iron insert at the other end. Inserting the cylinder into the center of a coil lowers its inductance, while inserting the iron end increases its inductance. From this it is seen that unless the trimmer adjustment for a particular coil is perfect at alignment frequencies, inserting one end of the wand may increase the output of a particular signal. A perfect adjustment is evidenced by a lowering of output when either end of the wand is inserted into a coil.

The shields over the R. F. coil assembly have a hole at their top for entrance of the tuning wand. The location of the various coils inside of the shield is shown in Figure 8. An example of the proper manner of using the tuning wand would be to assume the external oscillator were set at 1720 and the signal tuned in. The A. V. C. tube would be replaced by the "dummy" RCA-76 and the output indicator connected across the voice coil of the loudspeaker. Then the tuning wand should be inserted, first one end and then the other end, into the top of the three transformers at the left of the R. F. assembly, facing the front of the chassis. A perfect adjustment of the trimmer would be evidenced by a reduction in output when each end of the wand is inserted in each of the three transformers. If one end—for example, the iron end—when inserted in one coil caused an increase in output, then that circuit is low. An increase in the trimmer capacitance would be the proper remedy.

## (2) I. F. TUNING CAPACITOR ADJUSTMENTS

Although this receiver has three I. F. stages, two for the signal and one for the A. V. C. only three transformers having six adjustable capacitors require adjustment. The fourth transformer is in the A. V. C. circuit and is broadly tuned, not requiring adjustments. The transformers are all peaked, being tuned to 460 K. C.

A detailed procedure for making this adjustment follows:

(a) Connect the output of an external oscillator tuned to 460 K. C. between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker. Replace the A. V. C. tube in the receiver with the "dummy" RCA-76.

(b) Place the oscillator in operation at 460 K. C.; place the receiver in operation and adjust the station selector until a point is reached (Band A) where no signals are heard and turn both the volume and sensitivity controls to their maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

(c) Refer to Figure 10. Adjust each trimmer of the I. F. transformers until a maximum output is obtained. Go over the adjustments a second time.

This completes the I. F. adjustments. However, it is good practice to follow the I. F. adjustments with the R. F. and Oscillator adjustments due to interlocking which always occurs.

## (3) R. F. OSCILLATOR AND FIRST DETECTOR ADJUSTMENTS

Four R. F., oscillator and first detector adjustments are required in bands "X" and "A." Three are required in bands "B" and "C" while none are required in band "D." Band "D" uses the second harmonic of the oscillator while the detector and R. F. coils do not have trimmers.

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To properly align the various bands, each band must be aligned individually. The preliminary set-up requires the external oscillator to be connected between the antenna and ground terminals of the receiver. The output indicator must be connected across the voice coil of the loudspeaker while the "dummy" RCA-76 must be placed in the A. V. C. socket. The sensitivity and volume controls must be at their maximum position and the input from the oscillator must be at the minimum value possible to get an output indication under these conditions. In the high-frequency bands, it may be necessary to disconnect the oscillator from the receiver and place it at a distance in order to get a sufficiently low input to the receiver.

The Dial Pointer must be properly set before starting any actual adjustments. This is done by turning the variable capacitor until it is at its maximum capacity position. One end should point exactly at the horizontal line at the lowest frequency end of band "A," while the other end should point to within 1/64" of the horizontal line at the highest frequency end of band "A."

Figure 10 shows the location of the trimmers for each band. Care must be exercised to only adjust the trimmers in the band under test.

## Band "X"

(a) Tune the external oscillator to 410 K. C., set the pointer at 410 K. C. and adjust the oscillator, detector and R. F. trimmers for maximum output.

(b) Shift the external oscillator to 175 K. C. Tune in the 175 K. C. signal irrespective of scale calibration and adjust the series trimmer marked 175 K. C. on Figure 10, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 410 K. C. as described in (a).

## Band "A"

(a) Tune the external oscillator to 1720 K. C., set the pointer at 1720 K. C. and adjust the oscillator, detector and R. F. trimmers for maximum output.

(b) Shift the external oscillator to 600 K. C. Tune in the 600 K. C. signal irrespective of scale calibration and adjust the series trimmer, marked 600 K. C. on Figure 10, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 1720 K. C. as described in (a).

## Band "B"

(a) Tune the external oscillator to 5160 K. C., and set the pointer at 5160 K. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(b) Check for the image signal, which should be received at approximately 4240 on the dial. It will be necessary to increase the external oscillator output for this check.

(c) The antenna and detector trimmers should now be peaked for maximum output.

## Band "C"

(a) Tune the external oscillator to 18,000 K. C., and set the pointer at 18 M. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacity from minimum to maximum.

(b) Check for the image signal, which should be received at approximately 17,080 on the dial. It may be necessary to increase the external oscillator output for this check.

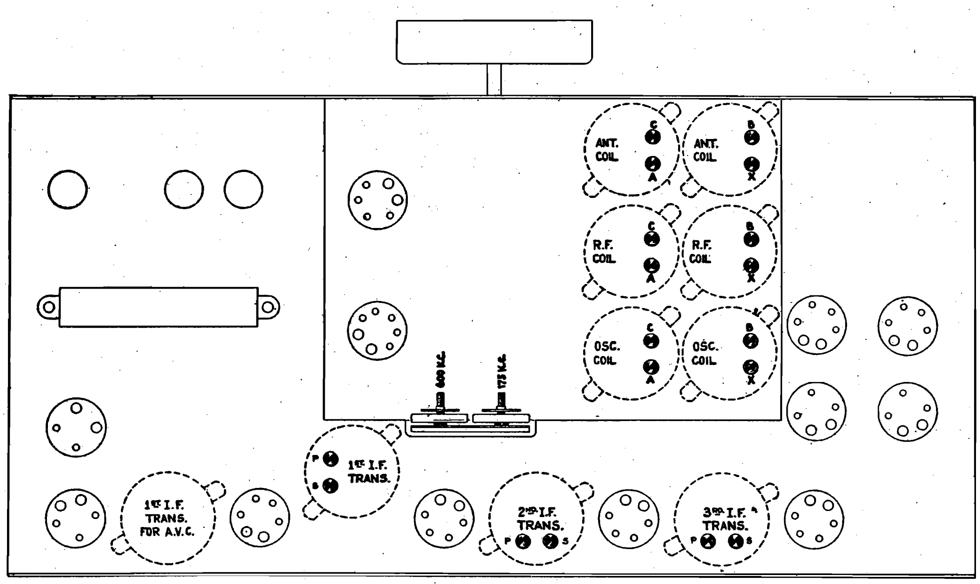


*Figure 10—Location of Various Trimmer Capacitors*

MODEL Duo 381
Neon Lamp Test
Voltage

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(c) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then at the oscillator frequency and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(d) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

### Band "D"

No adjustments are required for Band D.

## (5) VOLTAGE READINGS

The following voltages are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if low-resistance meters are used, such allowances must be made. Figure 13 shows the location and voltage at each socket contact.

## (6) TESTING NEON LEVEL INDICATING LAMPS

Two Neon Level Indicating Lamps are provided so that a visual indication of the recording level may be obtained at all times. These lamps normally give long service without attention. However, if failure occurs, and all circuits have been checked and eliminated as possible source of failure, the lamps may be

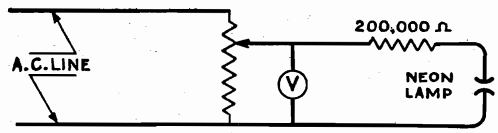


*Figure 11—Testing Circuit*

easily checked as indicated in the circuit shown in Figure 11. The method for checking involves testing for lighting between certain voltages. The lamps must not light before 52 volts have been applied and must not require a voltage greater than 64 volts to cause them to light. Lamps requiring different voltages from these are defective and must not be used.

# RADIOTRON SOCKET VOLTAGES

**Maximum Sensitivity—No Signal—120-Volt A. C. Input**

| Radiotron No. | | Cathode to Ground, Volts | Screen Grid to Ground, Volts | Plate to Ground, Volts | Cathode Current, M. A. | Heater Volts, A. C. |
|---|---|---|---|---|---|---|
| RCA-6D6—R. F. | | 2.3 | 100 | 231 | 8.8 | 6.3 |
| RCA-6A7 | Osc. | 3.0 | — | 232 | 10.9 | 6.3 |
| | Det. | | 100 | 238 | | |
| RCA-6D6—1st I. F. | | 7.0 | 100 | 236 | 3.5 | 6.3 |
| RCA-6D6—2nd I. F. | | 7.0 | 100 | 236 | 3.5 | 6.3 |
| RCA-6D6—A. V. C.-I. F. | | 6.0 | 100 | 236 | 4.0 | 6.3 |
| RCA-76—A. V. C. | | 4.7 | — | 0 | 0 | 6.3 |
| RCA-85—2nd Det. | | 0 | — | 60 | 7.2 | 6.3 |
| RCA-76—A. F. | | 11.0 | — | 235 | 5.5 | 6.3 |
| RCA-76—A. F. | | 11.0 | — | 235 | 5.5 | 6.3 |
| RCA-42—Power | | 0 | 240 | 365 | 23.0 | 6.3 |
| RCA-42—Power | | 0 | 240 | 365 | 23.0 | 6.3 |
| RCA-5Z3—Rectifier | | — | — | 768–384 RMS | 104.0 | 5.0 |

Power Transformer connected to 120-volt Tap.

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## (7) SERVICE DATA ON MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance it is similar to that of the older type, details of construction are considerably different. It consists essentially of a

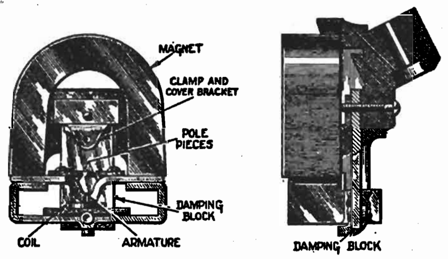



*Figure 12—Details of Magnetic Pickup*

chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

## (8) REPLACING MAGNET COIL, PIVOT RUBBERS, ARMATURE OR DAMPING BLOCK

In order to replace a defective coil or the hardened pivot rubbers (see Figure 15), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

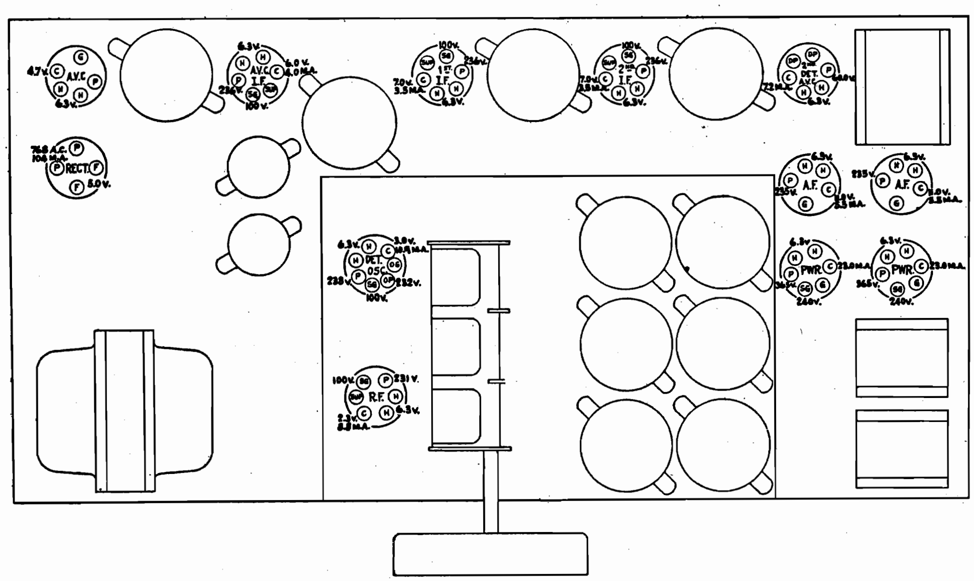
(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

(d) Remove screws A and B, Figure 15 and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At



**ALL VOLTAGES ARE TO GROUND**

*Figure 13—Radiotron Socket Voltages*

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the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure 15), and sliding the mechanism slightly in relation to the pole pieces.

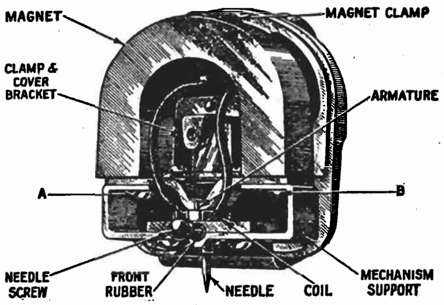



*Figure 15—Pickup Nomenclature*

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be .009″ on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

## (9) REPLACING THE DAMPING BLOCK

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure 16, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the air gap as explained under (h), section (8).

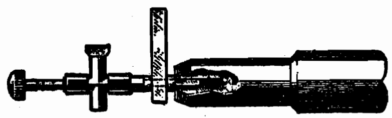


*Figure 16—Special Soldering-Iron Tip*

## (10) AUTOMATIC RECORD CHANGING MECHANISM

The automatic record changer used in this instrument is of simple design and fool-proof construction. Under normal operating conditions service difficulties should be negligible. However, in event adjustments are required, a reference to Figure 14 will disclose the proper method of making all adjustments.

# RCA-VICTOR CO., INC.

## REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | Description | List Price |
|---|---|---|
| | RECEIVER ASSEMBLIES | |
| 4372 | Bracket—Low frequency tone or volume control mounting bracket | $0.20 |
| 4406 | Bracket—High frequency tone control mounting bracket | .25 |
| 2747 | Cap—Contact cap—Package of 5 | .50 |
| 4407 | Capacitor—30 mmfd. (C64) | .25 |
| 4405 | Capacitor—80 mmfd. (C52)—Package of 5 | .85 |
| 4376 | Capacitor—250 mmfd.—Located on second intermediate frequency transformer (C39, C46)—Package of 5 | .80 |
| 4404 | Capacitor—500 mmfd. (C33, C53)—Package of 5 | .85 |
| 4409 | Capacitor—1120 mmfd. (C54) | .35 |
| 4070 | Capacitor—.004 mfd. (C66) | .42 |
| 3643 | Capacitor—.005 mfd. (C62, C63) | .25 |
| 6512 | Capacitor—.005 mfd. (C65) | .28 |
| 3787 | Capacitor—.01 mfd. (C61) | .30 |
| 3888 | Capacitor—.05 mfd. (C36, C44, C48) | .25 |
| 3765 | Capacitor—.025 mfd. (C42, C58) | .34 |
| 4645 | Capacitor—.1 mfd. (C32, C41, C43, C51) | .25 |
| 3877 | Capacitor—.1 mfd. (C37, C38, C47) | .32 |
| 4720 | Capacitor—.035 mfd. (C57) | .42 |
| 7790 | Capacitor—10 mfd. (C67) | 1.05 |
| 7788 | Capacitor—18 mfd. (C68) | 1.10 |
| 7787 | Capacitor pack—Comprising one .15 mfd. and one .5 mfd. capacitors (C59, C60) | 1.10 |
| 7789 | Capacitor pack—Comprising one 4., one 8. and one 10. mfd. capacitors (C55, C69, C70) | 2.68 |
| 4358 | Clamp—Electrolytic capacitor clamp | .15 |
| 7806 | Coil—Second detector plate choke coil (L38) | .30 |
| 4371 | Cover—Fuse mount cover | .15 |
| 4359 | Cover—Terminal board cover | .15 |
| 10907 | Fuse—3-ampere—Package of 5 | .40 |
| 3376 | Mount—Fuse mount 105-125-volt instrument | .40 |
| 7784 | Reactor—Tone control reactor (L39) | 1.30 |
| 7483 | Reactor—Volume control compensating reactor (L40) | .68 |
| 6135 | Resistor—270 ohms—Carbon type—¼ watt (R3, R7, R14, R20)—Package of 5 | 1.00 |
| 4240 | Resistor—700 ohms—Carbon type—¼ watt (R30)—Package of 5 | 1.00 |
| 4375 | Resistor—800 ohms—Carbon type—¼ watt (R29)—Package of 10 | 2.00 |
| 6247 | Resistor—850 ohms—Carbon type—¼ watt (R21)—Package of 5 | 1.00 |
| 4687 | Resistor—1,000 ohms—Carbon type—¼ watt (R9, R10, R13, R15, R16, R22, R35)—Package of 10 | 2.00 |
| 3110 | Resistor—25,000 ohms—Carbon type—¼ watt (R37)—Package of 5 | 1.00 |
| 3602 | Resistor—60,000 ohms—Carbon type—¼ watt (R32)—Package of 5 | 1.00 |
| 3118 | Resistor—100,000 ohms—Carbon type—¼ watt (R11, R17)—Package of 5 | 1.00 |
| 3116 | Resistor—200,000 ohms—Carbon type—¼ watt—Located on third I. F. transformer (R23)—Package of 5 | 1.00 |
| 4368 | Resistor—400,000 ohms—Carbon type—¼ watt (R18, R19)—Package of 10 | 2.00 |

| Stock No. | Description | List Price |
|---|---|---|
| 6242 | Resistor—2 megohms—Carbon type—¼ watt (R24, R33)—Package of 5 | $1.00 |
| 3413 | Resistor—5,000 ohms—Carbon type—½ watt (R26)—Package of 5 | 1.00 |
| 2240 | Resistor—30,000 ohms—Carbon type—1 watt (R36) | .22 |
| 5817 | Resistor—20,000 ohms—Carbon type—3 watt (R25) | .25 |
| 6997 | Resistor—Total resistance 14,470 ohms with 160-60-350-7150 and 6750 ohm sections (R38, R39, R40, R41, R42) | .95 |
| 7804 | Rheostat—Noise suppressor rheostat (R4) | 1.30 |
| 4453 | Shield—First I. F., AVC—I. F. or second I. F. Radiotron shield | .32 |
| 3683 | Shield—Radiotron shield top | .20 |
| 4452 | Shield—Second detector or AVC Radiotron shield | .35 |
| 7800 | Shield—Shield for intermediate frequency coils | .45 |
| 3859 | Socket—4-contact rectifier Radiotron socket | .30 |
| 7484 | Socket—5-contact AVC Radiotron socket | .35 |
| 6676 | Socket—6-contact output Radiotron socket | .40 |
| 7485 | Socket—6-contact driver Radiotron socket | .40 |
| 7796 | Switch—Operating switch (S13) | .62 |
| 7795 | Tone control—Low frequency (R27) | 1.30 |
| 7797 | Tone control—High frequency (R34) | 1.35 |
| 7794 | Transformer—AVC intermediate frequency transformer (L34, L35) | .82 |
| 7785 | Transformer—Driver transformer (T3) | 2.40 |
| 7791 | Transformer—First intermediate frequency transformer (L29, L30, L31, C33, C34, C35) | 2.35 |
| 9505 | Transformer—Power transformer 105-125-volt, 50-60 cycle (T1) | 6.35 |
| 9506 | Transformer — Power transformer 105-125 volts, 25-40 cycles | 8.90 |
| 7792 | Transformer—Second intermediate frequency transformer (L32, L33, C39, C40, C45, C46) | 2.22 |
| 7793 | Transformer—Third intermediate frequency transformer (L36, L37, C49, C50, C52, R23) | 2.50 |
| 7786 | Transformer pack—Comprising one reactor and interstage transformer (L41, T2) | 4.25 |
| 7798 | Volume control—Radio and Phonograph (R31) | 2.05 |
| | R. F. UNIT ASSEMBLIES | |
| 4646 | Capacitor—4.5 mmfd. (C10) | .20 |
| 4416 | Capacitor—50 mmfd. (C19)—Package of 5 | 1.25 |
| 3981 | Capacitor—300 mmfd. (C8) | .30 |
| 4413 | Capacitor—360 mmfd. (C28) | .22 |
| 4412 | Capacitor—1120 mmfd. (C25) | .25 |
| 4524 | Capacitor—2850 mmfd. (C23) | .35 |
| 4615 | Capacitor—2850 mmfd. (C20) | .34 |
| 4417 | Capacitor—0.05 mfd. (C5, C15) | .25 |
| 4415 | Capacitor—0.1 mfd. (C7, C16) | .30 |
| 4645 | Capacitor—0.1 mfd. (C9, C31) | .25 |
| 3861 | Capacitor—Adjustable capacitor (C27, C30) | .78 |
| 4420 | Clamp—Antenna lead clamp and screw—Package of 10 | .40 |
| 4410 | Coil—Antenna coil—Band "D" (L1, L2) | .70 |
| 7803 | Coil—Antenna coil—"B"—"SW" (L3, L4, L7, L8, C1, C3) | 1.82 |

## REPLACEMENT PARTS—(Continued)

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | Description | List Price |
|---|---|---|
| 7810 | Coil—Antenna coil—"PB"—"LW" (L5, L6, L9, L10, C2, C4) | $2.10 |
| 7805 | Coil—Detector coil—"B-SW" (L13, L14, L17, L18, C11, C13) | 2.15 |
| 7808 | Coil—Detector coil—"PB-LW" (L15, L16, L19, L20, C12, C14) | 2.05 |
| 4421 | Coil—Detector coil—Band "D" (L11, L12) | .70 |
| 7807 | Coil—Oscillator coil—"B-SW" (L21, L22, L25, L26, C22, C26) | 1.62 |
| 7809 | Coil—Oscillator coil—"PB-LW" (L23, L24, L27, L28, C24, C29) | 1.70 |
| 7801 | Condenser—3-gang variable tuning condenser (C6, C17, C21) | 4.42 |
| 4419 | Lead—Shield single-conductor antenna lead | .45 |
| 4687 | Resistor—1,000 ohms—Carbon type—¼ watt (R5)—Package of 10 | 2.00 |
| 3602 | Resistor—60,000 ohms—Carbon type—¼ watt (R8)—Package of 5 | 1.00 |
| 3118 | Resistor—100,000 ohms—Carbon type—¼ watt (R1, R12)—Package of 5 | 1.00 |
| 4418 | Resistor—100 ohms—Flexible type (R2, R6)—Package of 10 | 1.50 |
| 7800 | Shield—Antenna, detector or oscillator coil shield | .45 |
| 4452 | Shield—First detector oscillator coil shield | .35 |
| 3683 | Shield—Radiotron shield top | .20 |
| 4454 | Shield—R. F. amplifier Radiotron shield | .44 |
| 3529 | Socket—Dial lamp socket | .32 |
| 7485 | Socket—6-contact Radiotron socket | .40 |
| 3572 | Socket—7-contact Radiotron socket | .38 |
| 4686 | Strip—Terminal strip engraved "ANT-GND" | .20 |
| 7802 | Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S11, S12) | 4.05 |
| | CABLE AND PLUG ASSEMBLIES | |
| 4547 | Cable — 3-conductor — Recording indicator cable—With female section of connector plug—Stock No. 4153—One end connected to resistor board | .85 |
| 4548 | Cable—3-conductor with spade terminals—Phonograph chassis cable—One end connected to selector switch, other end to terminal board | .50 |
| 4553 | Cable—3-conductor—Reproducer cable with spade terminals | .45 |
| 4549 | Cable—Input transformer cable—3 branches—With 2 male and one female section of connector plugs—Stock Nos. 4571, 4574 and 6123 | 2.30 |
| 4576 | Cable—Input transformer—One end connected to selector switch—With two female sections of connector plugs—Stock Nos. 4153 and 4571 | 1.84 |
| 4550 | Cable—Microphone cable—One end connected to microphone receptacle—3-conductor with male section of connector plug—Stock No. 4574 | 1.00 |
| 4551 | Cable—Recording indicator cable—One end connected to indicator with one male and one female section of connector plug—Stock Nos. 4573 and 6123 | 1.88 |

| Stock No. | Description | List Price |
|---|---|---|
| 4552 | Cable—2-conductor—Motor power cable—With three female sections of connector—Stock No. 4573 | $3.36 |
| 4554 | Cable—Volume control cable—One end connected to selector switch, other end to volume control and low frequency tone control | .50 |
| 4153 | Plug—Female section of 4-contact connector plug—Used with following cables—Stock No. 4547 and 4576 | .48 |
| 4573 | Plug—Female section of 2-contact connector plug—Used with dial lamp cord and following cables—Stock Nos. 4551 and 4552 | .30 |
| 4571 | Plug—Female section of 6-contact connector plug—Used with cables—Stock Nos. 4549 and 4576 | .65 |
| 6123 | Plug—Male section of 4-prong connector plug—Used with the following cables—Stock Nos. 4549 and 4551 | .30 |
| 4577 | Plug—Male section of 2-prong connector plug—Connected to terminals Nos. 1, 2, 3 and 4 of selector switch | .30 |
| 4574 | Plug—Male section of 6-prong connector plug—Used with cables Stock Nos. 4550 and 4549 | .48 |
| | DRIVE ASSEMBLIES | |
| 4362 | Arm—Band indicator operating arm | .28 |
| 10194 | Ball—Steel ball for variable condenser drive assembly—Package of 20 | .25 |
| 4422 | Clutch—Tuning condenser drive clutch assembly—Comprising drive shaft, balls, ring, spring and washers assembled | .88 |
| 4455 | Dial—Station selector dial | .60 |
| 7799 | Drive—Variable tuning condenser drive assembly complete | 2.45 |
| 4364 | Gear—Spring gear assembly complete with hub pinion, gear cover and spring | .96 |
| 4361 | Indicator—Band indicator—Celluloid-lettered D-C-B-A-X | .12 |
| 4363 | Pointer—Station selector main pointer—Large | .18 |
| 4367 | Pointer—Station selector vernier pointer—Small | .15 |
| 3993 | Screw—No. 6-32-5/8" square head set screw for variable condenser drive assembly—Package of 10 | .25 |
| 4377 | Spring—Band indicator and arm tension spring—Package of 5 | .25 |
| 4360 | Stem—Pointer stem assembly | .35 |
| 4378 | Stud—Band indicator operating arm stud—Package of 5 | .25 |
| | EJECT ARM ASSEMBLIES | |
| 4713 | Arm—Eject arm complete | 7.74 |
| 3658 | Ball—Steel ball bearing—Package of 20 | .30 |
| 3656 | Bearing—Ejector tip bearing | .48 |
| 4054 | Bracket—Eject arm bracket assembly | 1.35 |
| 4058 | Collar—Eject arm shaft collar and set screw | .18 |
| 4714 | Cover—Eject arm cover | 1.38 |

**MODEL Duo 381**
**Parts List**

# RCA-VICTOR CO., INC.

## REPLACEMENT PARTS—(Continued)

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | Description | List Price |
|---|---|---|
| 3930 | Cushion—Counter balance cushion and bracket—Located inside of eject arm | $0.18 |
| 3662 | Plate—Ejector plate—Package of 5 | .95 |
| 4055 | Post—Vertical adjustment post—Located on eject arm bracket | .30 |
| 3655 | Retainer—Ball retainer with three balls | .45 |
| 3729 | Roller—Counterbalance roller—Located inside of eject arm | .45 |
| 3665 | Screw—Eject arm horizontal adjustment screw and nut—Package of 5 | .25 |
| 4057 | Shaft and collar—For eject arm | .24 |
| 4067 | Spring—Eject arm bracket spring—Package of 10 | .30 |
| 4125 | Spring—Eject arm horizontal action tension spring—60 cycle operation—Package of 10 | .42 |
| 4126 | Spring—Eject arm—Horizontal action tension spring—For 25 cycle operation—Package of 10 | .60 |
| 3657 | Tip—Ejector tip | .30 |
| 4056 | Yoke—Eject arm yoke assembly | 1.04 |
| | **MICROPHONE ASSEMBLIES** | |
| 7534 | Cord—Microphone cord | .70 |
| 6883 | Cover—Microphone cover—Two sides | 1.96 |
| 3216 | Cushion—Microphone rubber cushions—Pkg. of 6 | .24 |
| 6884 | Frame—Microphone frame | 1.19 |
| 7533 | Mechanism—Microphone mechanism | 6.80 |
| 6882 | Microphone complete | 7.50 |
| 4171 | Plug—3-contact microphone plug | .30 |
| 4158 | Socket—Microphone socket | .40 |
| | **MOTOR ASSEMBLIES** | |
| 9477 | Motor—105-125 volts—60 cycles | 25.88 |
| 9478 | Motor—105-125 volts—50 cycles | 25.88 |
| 9479 | Motor—105-125 volts—25 cycles | 36.48 |
| 4562 | Motor mounting spring, washer and stud assembly—Comprising six springs, six cup washers, three spring washers and three studs | .58 |
| | **MOTOR BOARD ASSEMBLIES** | |
| 4060 | Escutcheon — Index escutcheon engraved "Manual 10-21" | .28 |
| 3764 | Nut—Cap nut for motor board—Package of 4 | .40 |
| 3672 | Pin—Manual index pin | .42 |
| 4066 | Rest—Pickup rest | .14 |
| 3654 | Roller—Pickup arm guide roller assembly—Comprising bracket and guide pin | .34 |
| 3763 | Suspension spring, washer and bolt assembly for motor board—Comprising one bolt, two cup washers, two springs, one "C" washer and one cap nut | .42 |
| | **OPERATING MECHANISM ASSEMBLIES** | |
| 6502 | Cam—Cam and gear assembly | 1.18 |
| 6808 | Clutch—Trip lever friction clutch | .30 |
| 4719 | Cover—Metal cover for trip lever and friction finger assembly | $0.28 |
| 3670 | Finger—Friction finger assembly | .32 |
| 6809 | Finger—Manual index lever finger assembly | .25 |
| 6846 | Lever—Main lever and link assembly | 1.45 |
| 6810 | Lever—Main spring lever | .44 |
| 6806 | Lever—Manual control index lever—Less pin | .55 |
| 3677 | Lever—Pickup arm cable lever assembly complete—Comprising lever with cable screw spring and nut | .40 |
| 6807 | Lever—Trip lever and friction clutch assembly | 1.16 |
| 6503 | Pawl—Trip pawl assembly | .40 |
| 4124 | Plate—Eject arm actuating plate assembly | .50 |
| 4563 | Screw—Cable lever cable screw and nut—Package of 10 | .60 |
| 4564 | Screw—Manual index lever finger set screw—Package of 10 | .20 |
| 4567 | Screw—Manual index lever assembly—Adjustment screw and nut—Package of 10 | .32 |
| 4566 | Screw—Special screw used to fasten main lever and link assembly bushing—Package of 10 | .30 |
| 4059 | Screw—Trip lever clutch tension adjustment screw—Package of 10 | .22 |
| 4127 | Spring—Actuating plate tension spring—Package of 10 | .24 |
| 3666 | Spring—Cable lever tension spring—Package of 10 | .44 |
| 3676 | Spring—Cam and gear, pawl carrier tension spring—Package of 10 | .52 |
| 4061 | Spring—Main spring | .38 |
| 4565 | Spring—Manual index lever finger tension spring—Package of 10 | .30 |
| 2893 | Spring—Trip lever latch plate tension spring—Package of 10 | .30 |
| 2917 | Washer—Spring washer "U" type—Package of 10 | .25 |
| | **PICKUP AND ARM ASSEMBLIES** | |
| 4581 | Arm—Pickup arm complete less escutcheon and pickup unit | 5.72 |
| 4128 | Armature—Pickup armature | .96 |
| 6813 | Back—Pickup housing back | .68 |
| 4064 | Cable—Pickup arm cable—Package of 5 | 1.00 |
| 4583 | Coil—Pickup coil (L50) | .80 |
| 4711 | Cover—Pickup cover | .34 |
| 4709 | Cover—Pickup back cover with two mounting screws | .34 |
| 3737 | Damper—Pickup damper—Package of 5 | .65 |
| 6815 | Escutcheon—Piackup arm escutcheon | .64 |
| 4561 | Pad—Cork pad—Used when making home recordings | .45 |
| 4582 | Pickup unit complete | 4.30 |
| 4062 | Rod—Automatic brake trip rod | .20 |

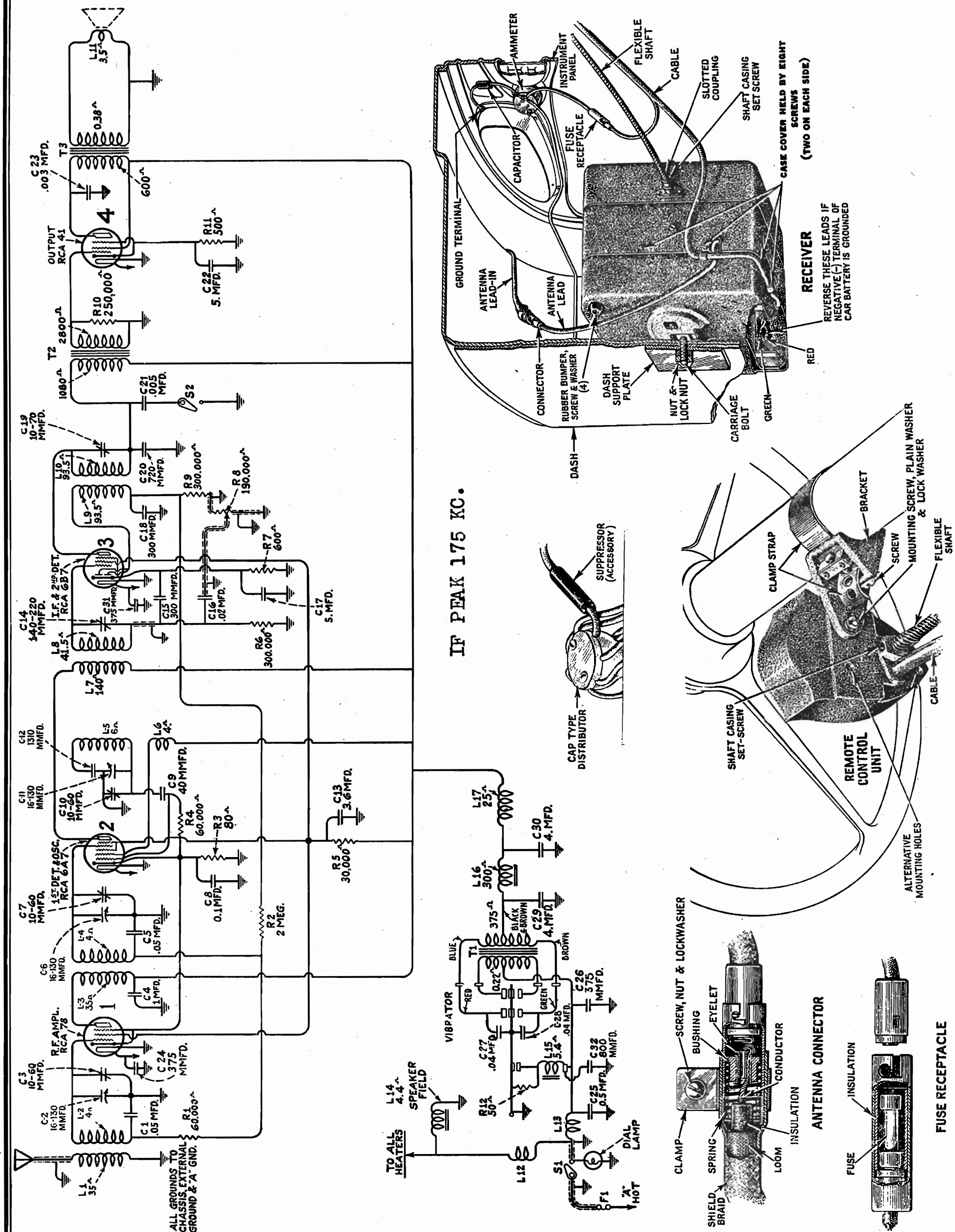
## REPLACEMENT PARTS—(Continued)

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | Description | List Price |
|---|---|---|
| 4063 | Screw assembly—Pickup mounting screw assembly—Comprising one screw, one washer and one nut—Package of 10 | $0.54 |
| 3388 | Screw—Needle holding screw—Package of 10 | .60 |
| 3419 | Screw—Pickup cover holding screw—Package of 10 | .40 |
| 4157 | Weight—Home recording weight | 1.72 |
| | **RECORDING INDICATOR ASSEMBLIES** | |
| 4162 | Escutcheon—Recording indicator escutcheon | .34 |
| 4161 | Lamp—Neon lamp | .56 |
| 4164 | Screen—Indicator lamp screen | .18 |
| 4163 | Screw—Screen, escutcheon and terminal board mounting screw assembly—Comprising two screws, two spacers, two nuts and two lockwashers | .20 |
| | **REPRODUCER ASSEMBLIES** | |
| 4706 | Board—Terminal board—Three terminals | .30 |
| 4568 | Bolt assembly—Reproducer mounting bolt assembly—Comprising one bolt, one lockwasher, one washer and one nut—Package of 10 | .55 |
| 9542 | Coil—Field coil, magnet and cone support (L43) | 11.16 |
| 7000 | Cone—Reproducer cone (L42)—Package of 5 | 9.45 |
| 9541 | Reproducer complete | 17.32 |
| 6999 | Screen—Dust screen—Package of 6 | .12 |
| 7826 | Transformer—Output transformer and capacitor (T4, C56) | 2.80 |
| | **SWITCH ASSEMBLIES** | |
| 3994 | Cover—Motor switch cover | .26 |
| 10184 | Plate—Automatic brake latch plate—Package of 5 | .40 |
| 10174 | Springs—Automatic brake springs—Package of 4 | .50 |
| 6805 | Switch assembly—Automatic switch complete | 1.90 |
| 3322 | Switch—Motor switch (S20) | .75 |
| | **TURNTABLE ASSEMBLIES** | |
| 4065 | Bushing—Speed shifter lever bushing—Package of 4 | .82 |
| 3344 | Cover—Grease retainer cover—Package of 2 | .70 |
| 6818 | Lever—Speed shifter lever | .38 |
| 3341 | Pin—Groov pin—Package of 2 | .56 |
| 6816 | Ring—Clamp ring assembly—Comprising spring, latch lever and stud | .42 |
| 4708 | Turntable complete | 5.10 |
| 6817 | Sleeve—Sleeve complete with ball race | 2.25 |
| 3342 | Spring—Latch spring—Located on clamping ring—Package of 2 | .56 |
| 3347 | Spring—Speed shifter lever spring—Package of 2 | .30 |
| 3340 | Washer—Thrust washer—Package of 2 | .56 |
| | **MISCELLANEOUS PARTS** | |
| 4556 | Base—Phonograph compartment lamp base and socket | $0.55 |
| 4546 | Bearing—Selector flexible shaft bearing and nut and set screw—Fastened to motor board | .50 |
| 4677 | Bezel—Metal bezel (escutcheon) for station selector dial | .56 |
| 4555 | Box—Needle box complete with lid | .40 |
| 4559 | Bracket and bushing—Selector switch flexible shaft bracket and bushing—Fastened to selector switch | .52 |
| 4572 | Escutcheon—Selector switch escutcheon | .46 |
| 6614 | Glass—Station sele...or dial glass | .30 |
| 4425 | Knob—Station selector or Radio-phonograph—Recording switch knob—Package of 5 | .75 |
| 3829 | Knob—Volume control, tone control, noise suppressor or range switch knob—Package of 5 | 1.10 |
| 4340 | Lamp—Dial lamp—Package of 5 | .60 |
| 4190 | Pointer—Selector switch pointer—Package of 5 | .72 |
| 4710 | Receptacle—Needle receptacle | .35 |
| 4091 | Resistor—80 ohms—Carbon type—¼ watt—Located on selector switch (R64)—Package of 5 | 1.00 |
| 3118 | Resistor—100,000 ohms—Carbon type—¼ watt (R65, R66, R67)—Package of 5 | 1.00 |
| 4678 | Ring—Station selector dial glass retaining ring—Package of 5 | .34 |
| 4119 | Screw—8-32-¼" headless set screw for knob—Stock Number 4425—Package of 20 | .38 |
| 4393 | Screw—8-32-5/16" headless set screw for knob—Stock Number 3829—Package of 10 | .25 |
| 4191 | Screw—10-32-7/16" dog point fillister head set screw—Used with flexible shaft bearing—Package of 10 | .50 |
| 3651 | Screw—10-32-3/16" self-locking headless set screw—Used with flexible shaft bearing—Package of 10 | .32 |
| 3652 | Screw—10-32-¼" self-locking set screw for selector switch, flexible shaft bracket and bushing—Package of 10 | .32 |
| 4580 | Screw—6-32-3/16 square head set screw for selector switch flexible shaft—Package of 10 | .25 |
| 4560 | Screw assembly—Receiver chassis mounting screw and washer assembly—Package of 10 | .30 |
| 4557 | Shade—Phonograph compartment lamp shade | .35 |
| 4558 | Shaft—Selector switch flexible shaft | 1.10 |
| 4544 | Switch—Radio-phonograph, or home recording selector switch (S22) | 7.10 |
| 4579 | Switch—Toggle type—Motor starting switch (S21) | 1.55 |
| 4545 | Transformer — Input transformer pack — Comprising one input transformer, one 50,000 ohm, one 500,000 ohm and one 80,000 ohm resistor, one .0003 mfd. and one 0.1 mfd. and one .015 mfd. capacitors (T5, C90, C91, C92, R61, R62, R63) | 5.40 |

# RCA-VICTOR CO., INC.

**MODEL AR-4229**
**Schematic**
**Chassis Details**



**MODEL AR-4229**
**Chassis Wiring**

# RCA-VICTOR CO., INC.

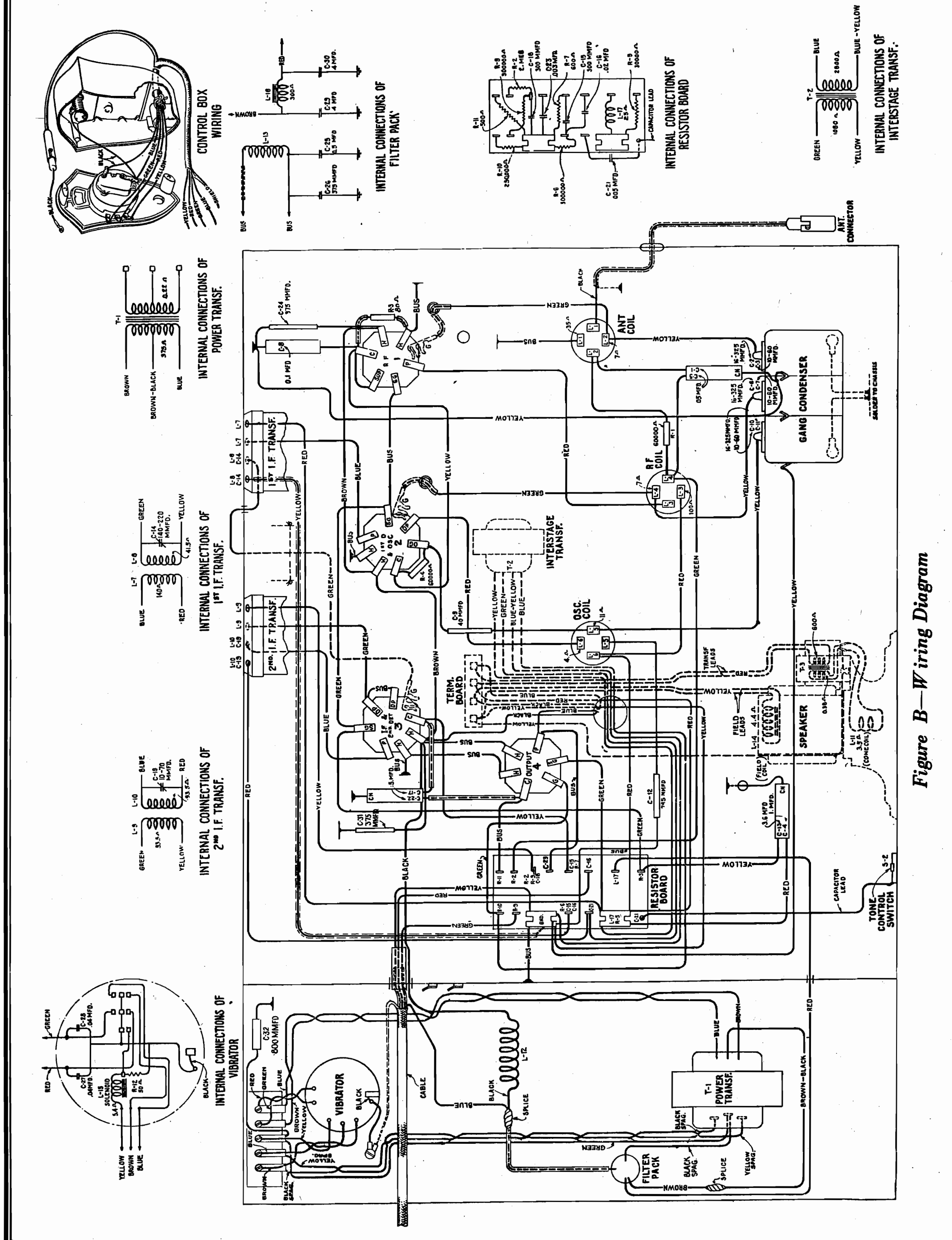



*Figure B—Wiring Diagram*

RCA-VICTOR CO., INC.

# PART IV—SERVICE DATA

Type and Number of Tubes Used...............1 RCA-41, 1 RCA-78, 1 RCA-6A7, 1 RCA-6B7—Total, 4
Total Battery Current (With 6.3 volts between chassis and A (hot) terminal) 5.35 Amperes
Undistorted Output..........................1.35 Watts
Loudspeaker Field Current..................1.35 Amperes
Filtered D. C. Voltage from Rectifier............227 Volts
Total Plate Current..........................47.5 M. A.

This four tube Superheterodyne Police Receiver is of compact construction and gives excellent performance. Features such as unit construction (one unit contains the receiver, "B" battery eliminator and loudspeaker), ease of installation, freedom from ignition noise and excellent sensitivity, selectivity and tone quality characterize this instrument.

## "B" Battery Eliminator

This receiver uses a vibrator-type Inverter-Rectifier that provides a source of direct current voltage for use as plate and grid supply for all tubes. *This unit is accurately adjusted and sealed at the factory and service adjustments should not be attempted.*

## Line-up Capacitor Adjustments

The three R. F. line-up capacitors and two I. F. tuning capacitors are accessible and may require adjustments. The R. F. adjustments are made at 2508 K. C. and the I. F. adjustments at 175 K. C. The R. F. adjustments can be made with the receiver in its case, access to the adjusting screws being obtained through a slot in the bottom of the case. For the I. F. adjustments, however, it is necessary to remove the rear cover in order to couple the oscillator to the first detector. The following procedure should be used for these adjustments:

### R. F. Adjustment

A satisfactorily accurate and rapid adjustment of the three R. F. line-up capacitors can be made by ear, although, for optimum results, the use of an output meter connected across the loudspeaker voice coil is recommended. The latter method however, involves removal of the rear cover to connect the meter, thus in turn eliminating the shielding effect of the case. Temporary shielding for the bottom and tube sides of the chassis and for the transformer therefore must be provided to prevent vibrator interference.

(a) Procure a modulated oscillator giving a signal at 2508 K. C. and a non-metallic screw driver. Stock No. 9050 oscillator and 7065 screw driver are suitable.

(b) Couple the output of the oscillator from antenna to ground, set the dial at 97, and the oscillator at 2508 K. C.

(c) Place the oscillator and receiver in operation and adjust the oscillator output so that a weak signal is obtained in the loudspeaker when the volume control is at its maximum position.

(d) Then adjust the three line-up capacitors until maximum sound in the speaker or maximum deflection of the output meter is obtained. Readjust these capacitors a second time as there is a slight interlocking of adjustments.

### I. F. Adjustments

In order to make the I. F. adjustments, it is necessary to remove the rear cover, due to the fact that the external oscillator must be connected between the control grid of the first detector and ground. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver and an output meter.

(b) Remove the receiver from its case, shield the transformer and tubes as described under R. F. adjustments, place the receiver in operation and connect the oscillator output between the first detector and ground. Connect the output meter across the voice coil of the loudspeaker. Then connect the antenna lead to ground and adjust the tuning capacitor so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the external oscillator output until a small deflection is obtained. Unless this is done, the action of the A. V. C. will make it impossible to obtain correct adjustments.

(c) Each transformer has but one winding that is tuned by means of an adjustable capacitor, the other windings being untuned. The capacitors should be adjusted for maximum output.

At the time I. F. adjustments are made it is good practice to follow this adjustment with the R. F. adjustments, due to the interlocking that always occurs. The reverse of this, however, is not always true.

## Practical Hints on Installation

The following suggestions may prove useful when making installations on the particular cars mentioned.

**Chevrolet 1933**—Mount chassis on left side, end against car bulkhead and use short flexible shaft. Use both capacitors, one on the ammeter and one on the generator. Use all suppressors. Place a copper screen under the toe board on right side, 10" x 10" to prevent the body from radiating ignition interference which may be picked up by the antenna. This screen must be grounded.

**Plymouth 1933**—Mount chassis on left side, back against car bulkhead and use 33⅞" flexible shaft. Use both capacitors, one on the ammeter and one on the generator. Use all suppressors.

**Ford V-8 1932 or 1933**—Mount chassis on left side, end against car frame and use short flexible shaft. Use one capacitor, connected to the generator. Install eight spark plug type suppressors only, no distributor suppressor being necessary.

The majority of cars will be found to be entirely free from ignition noise when the standard equipment is used. Usually mounting the chassis on the right side of the bulkhead will be found most desirable, although if a heater is used, the left side will be preferable.

# TUBE SOCKET VOLTAGES

## 6.3 Volt Battery—No Signal

| Tube No. | | Cathode to Ground | Cathode to Screen Grid Volts | Cathode to Plate Volts | Cathode Current M. A. | Heater Volts |
|---|---|---|---|---|---|---|
| RCA-78 R. F. | | 4.42 | 83 | 222 | 5.25 | 6.0 |
| RCA-6A7 | First Detector | 4.42 | 83 | 222 | 11.0 | 6.0 |
| | Oscillator | 4.42 | — | 223 | Total | |
| RCA-6B7 Second Detector | | 3.22 | 84 | 218 | 5.25 | 6.0 |
| RCA-41 Power | | 13.0 | 214 | 200 | 26.0 | 6.0 |

MODEL AR-4229
Parts List

RCA-VICTOR CO., INC.

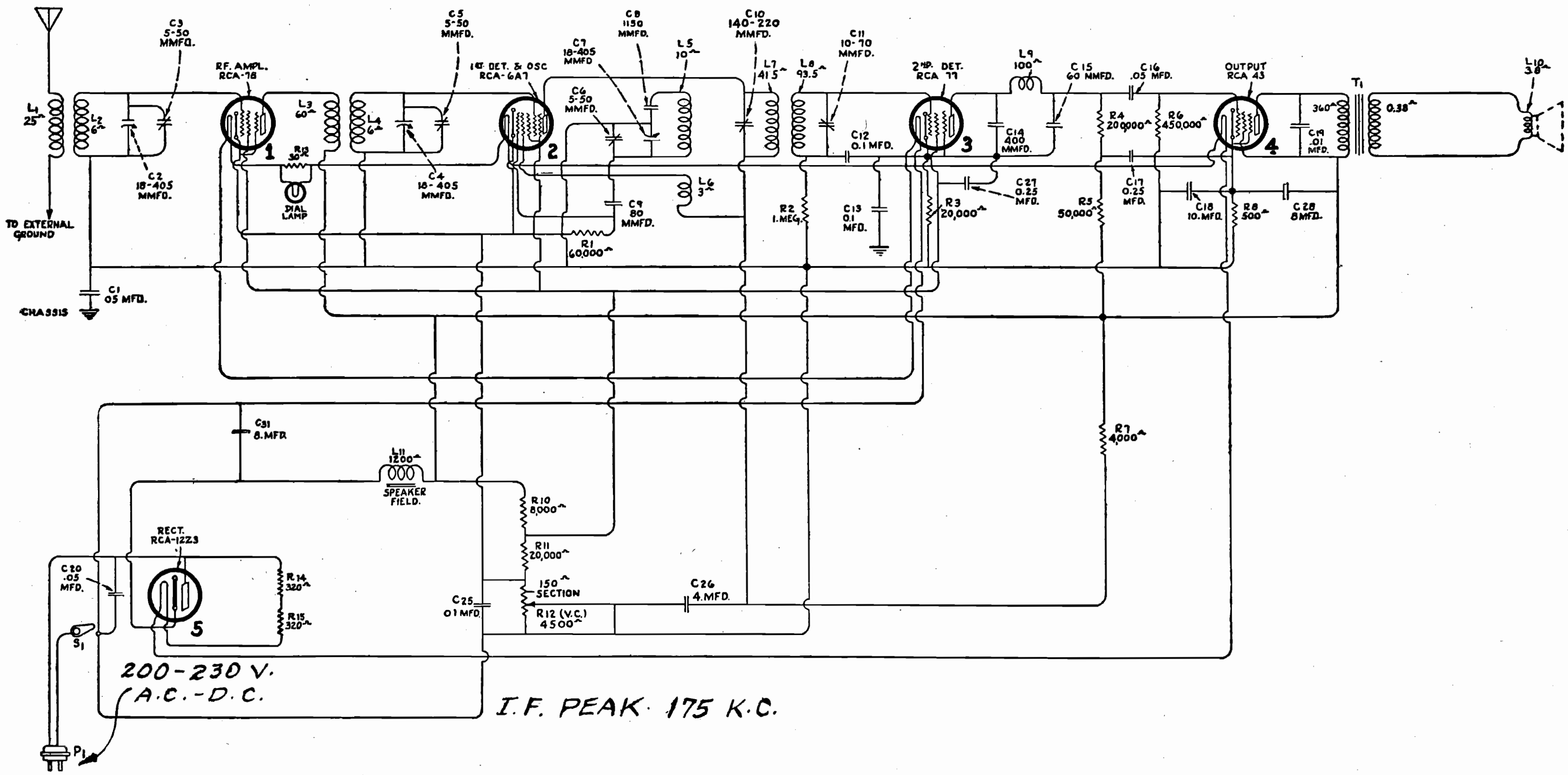
# REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | **RECEIVER ASSEMBLIES** | |
| 2240 | Resistor—30,000 ohms—Carbon type—1 watt (R5) | $0.22 |
| 2747 | Cap—Contact cap—Package of 5 | .50 |
| 3218 | Resistor—600 ohms—Carbon type—¼ watt (R7)—Package of 5 | 1.00 |
| 3536 | Capacitor—Comprising two 5.0 mfd. capacitors (C17, C22) | 1.10 |
| 3572 | Socket—Radiotron 7-contact socket | .38 |
| 3584 | Ring—Antenna R. F. or oscillator coil retaining ring—Package of 5 | .40 |
| 3602 | Resistor—60,000 ohms—Carbon type—¼ watt (R1, R4)—Package of 5 | 1.00 |
| 3616 | Capacitor—300 mmfd. (C15, C18) | .34 |
| 3617 | Capacitor—0.005 mfd. (C21) | .38 |
| 3618 | Capacitor—0.02 mfd. (C16) | .38 |
| 3621 | Coil—Choke coil—Located on resistor board (L17) | .35 |
| 3623 | Shield—Antenna R. F. or oscillator coil shield | .30 |
| 3632 | Resistor—500 ohms—Carbon type—1 watt (R11)—Package of 5 | 1.10 |
| 3636 | Transformer—First intermediate frequency transformer (L7, L8, C14) | 1.74 |
| 3637 | Transformer—Second intermediate frequency transformer (L9, L10, C19) | 1.65 |
| 3641 | Capacitor—0.1 mfd. (C8) | .35 |
| 3645 | Knob—Tone control knob—Package of 5 | .90 |
| 3695 | Capacitor—375 mmfd. (C24, C31) | .22 |
| 3696 | Capacitor—40 mmfd. (C9) | .22 |
| 3699 | Capacitor—720 mmfd. (C20) | .40 |
| 3744 | Resistor—250,000 ohms—Carbon type—¼ watt (R10)—Package of 5 | 1.00 |
| 3745 | Capacitor—745 mmfd. (C12) | .34 |
| 3746 | Capacitor—800 mfd. (C-32) | .34 |
| 3920 | Capacitor—.003 mfd. (C23) | .25 |
| 3921 | Mounting screws, washer and bushing assembly—For 3-gang variable tuning condenser—Comprising three spacers, three screws, three washers and three lockwashers | .34 |
| 3922 | Resistor—300,000 ohms—Carbon type—¼ watt (R6, R9)—Package of 5 | 1.00 |
| 6135 | Resistor—270 ohms—Carbon type—¼ watt (R3)—Package of 5 | 1.00 |
| 6192 | Spring—Tuning condenser drive cord tension spring—Package of 10 | .30 |
| 6242 | Resistor—2 megohm—Carbon type—¼ watt (R2)—Package of 5 | 1.00 |
| 6298 | Cord—Tuning condenser drive cord—Package of 5 | .60 |
| 6471 | Coil—Oscillator coil assembly (L5, L6) | .74 |
| 6490 | Tone control switch | .35 |
| 6492 | Capacitor—Comprising one 3.6 mfd. and one 1.0 mfd. capacitor (C4, C13) | 1.08 |
| 6493 | Drum—Tuning condenser drive drum | .40 |
| 6514 | Capacitor—Comprising two 0.05 mfd. capacitors (C1, C5) | .28 |
| 6515 | Cable—Shielded cable with antenna connector | .32 |
| 6516 | Connector—Fuse connector | .16 |
| 6517 | Cable—Main cable complete with fuse connector | 1.40 |
| 6540 | Coil—R. F. coil assembly (L3, L4) | .94 |
| 6731 | Coil—Antenna coil (L1, L2) | .88 |
| 6732 | Transformer—Interstage audio transformer (T2) | 2.00 |
| 7485 | Socket—Radiotron 6-contact socket | .40 |
| 7600 | Filter pack—Comprising one reactor, one choke coil, one 0.5 mfd., two 4.0 mfd. and one 375 mmfd. capacitors (L13, L16, C25, C26, C29, C30) | 4.06 |
| 7601 | Condenser—3-gang variable tuning condenser | 2.84 |
| 9049 | Transformer—Power transformer (T1) | 3.75 |
| | **CONTROL BOX ASSEMBLIES** | |
| 3649 | Key—Volume control and switch key | .18 |
| 3650 | Screw—Self locking No. 10-32-1/16" fulldog point set screw—Package of 10 | .32 |
| 3651 | Screw—Self locking No. 10-32-1/16" cupped point set screw—Package of 10 | .32 |
| 3652 | Screw—Self locking No. 10-32-¼" cupped point set screw—For flexible drive shaft—Package of 10 | $0.32 |
| 3690 | Strap and bracket assembly—Comprising one bracket, two screws, one lockwasher and one strap | .40 |
| 3718 | Bracket—Control box dash mounting bracket | .25 |
| 3757 | Coupling—Slotted coupling for end of flexible drive shaft—Package of 5 | .40 |
| 3758 | Connector—For control box end of flexible drive shaft—Package of 5 | .68 |
| G5021 | Knob—Station selector knob—Package of 5 | .90 |
| 6496 | Shaft—Flexible drive shaft complete with connectors—Approximately 24 7/8" long | 1.60 |
| 6497 | Shaft—Flexible drive shaft complete with connectors—Standard length—Approximately 33 7/8" long | 1.75 |
| 6499 | Volume control—Combination volume control and switch (R8) | 1.36 |
| 6500 | Nut—Volume control and switch lock nut | .24 |
| 6531 | Shaft—Flexible drive shaft complete with connectors—Approximately 12 7/8" long | .85 |
| 6532 | Shaft—Flexible drive shaft—Complete with connectors—Approximately 18 7/8" long | 1.24 |
| 6784 | Scale—Dial scale | .58 |
| G7850 | Box—Control box complete | 3.70 |
| G7851 | Cover—Control box cover | .44 |
| | **MISCELLANEOUS PARTS** | |
| 3466 | Connector—Antenna lead-in connector | .60 |
| 3646 | Fuse—20 amperes—Package of 5 | .40 |
| 3647 | Nut—Cap nut and lock washer—Package of 10 | .35 |
| 3648 | Screw—No. 10-32-⅝" cap screw and lockwasher—Package of 10 | .32 |
| 3689 | Bracket—Receiver mounting bracket, bolt and nut assembly—One set | .30 |
| 3791 | Bushing and plate assembly—Flexible drive shaft bushing with plate, mounting screws, rubber bushings, and washers—Located on main case | .30 |
| 3827 | Cable—From fuse connector to ammeter | .10 |
| 4051 | Bumper—Rubber bumper used in mounting receiver chassis—Package of 4 | .20 |
| 3856 | Clip—Spring clip—Grounds receiver chassis to metal housing—Package of 10 | .30 |
| 3884 | Clamp—Cable clamp—Package of 10 | .20 |
| G5046 | Escutcheon—Metal label for central box—Package of 10 | .70 |
| G5047 | Escutcheon—Metal label for receiver—Package of 10 | .50 |
| 6151 | Suppressor—Spark plug suppressor | .56 |
| 6152 | Suppressor—Distributor suppressor | .56 |
| 6175 | Suppressor—Distributor splice-in suppressor | .56 |
| 6494 | Capacitor—Ammeter capacitor—0.5 mfd. | .46 |
| 6495 | Capacitor—Generator capacitor—0.5 mfd. | .72 |
| 6670 | Suppressor—Spark plug suppressor—"Elbow type" | .56 |
| 7065 | Screwdriver—For R. F. and I. F. adjustments | .80 |
| 7621 | Antenna—Roof antenna—Paper type (Brown) | 1.50 |
| 7622 | Antenna—Roof antenna—Paper type (Gray) | 1.50 |
| 7686 | Housing—Front section of housing complete with mounting screws | 3.48 |
| 7689 | Vibrator complete | 7.84 |
| 7699 | Housing—Rear section of housing complete with mounting screws | 1.92 |
| G9050 | Oscillator—Test oscillator—150 to 25,000 K. C. | 33.50 |
| | **REPRODUCER ASSEMBLIES** | |
| 3688 | Transformer—Output transformer (T3) | 1.50 |
| 7607 | Screen—Metal screen | .44 |
| 7608 | Coil assembly—Comprising field coil, magnet and cone support (L14) | 2.40 |
| 9023 | Cone—Reproducer cone complete (L11)—Package of 5 | 5.00 |

MODEL 23590-2
Schematic
Voltage

RCA-VICTOR CO., INC.




## RADIOTRON SOCKET VOLTAGES

***Measured at 220 Volts A. C., 60 cycles (Maximum Volume Control)**

| Radiotron No. | Cathode to Control Grid, Volts DC | Cathode to Screen Grid, Volts DC | Cathode to Plate, Volts DC | Plate Current M. A. | Heater Volts |
|---|---|---|---|---|---|
| RCA-78 R. F. | 3.0 | 100 | 165 | 5.5 | 6.0 |
| RCA-6A7 Oscillator 1st Detector | — | — | 145 | 1.7 | 6.0 |
| | 3.0 | 100 | 145 | 2.5 | — |
| RCA-77 2nd Detector | Plate and Bias Supply 165 Volts | | | — | 6.0 |
| RCA-43 Power | 21.0 | 140 | 130 | 35.0 | 25.0 |
| RCA-12Z3 Rectifier | 220 RMS | | | — | 12.0 |

*Voltages with 220 Volts D. C. supply will be approximately 10 per cent less than tabulated values

MODEL 23590-2
Alignment Data
Parts List

# RCA-VICTOR CO., INC.

## Electrical Specifications

Voltage Rating ................................ 200–230 AC or DC
Frequency Rating (AC) ................................ 50–60 Cycles
Power Consumption ............ AC 60 Cycles–105 Watts—DC–85 Watts
Number and Types of Radiotrons ........................ 1 RCA-78, 1 RCA-6A7, 1 RCA-77, 1 RCA-43, 1 RCA-12Z3—Total, 5
Undistorted Output ................................ 1.5 Watts
Frequency Range ................................ 540 KC–1500 KC

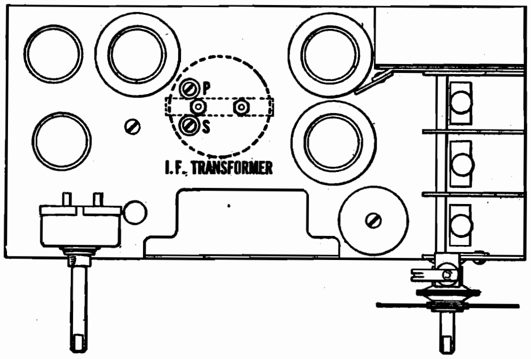



*Figure C—Location of Line-Up Capacitors*

This receiver is a five-tube Super-Heterodyne designed to operate on AC or DC over the voltage and frequency range indicated. Features such as compact construction, dynamic speaker, single Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne are included in this instrument.

The circuit consists of an R. F. stage using Radiotron RCA-78, a combined oscillator and first detector using Radiotron 6A7, an I. F. transformer using two tuned circuits, a second detector using Radiotron RCA-77 and a power stage using Radiotron RCA-43. The rectifier is Radiotron RCA-12Z3, which is used in a half-wave circuit.

## Line-Up Capacitor Adjustments

The line-up capacitor adjustments for the I. F. stage and for the R. F. circuits should be made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 KC and 1400 KC. An output meter and non-metallic screw driver are also necessary. The Stock No. 9050 test oscillator and Stock No. 7065 screw driver are suitable for this purpose. Figure C shows the location of the I. F. capacitors.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 KC, coupling its output between the control grid of the first detector and ground, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the R. F. and oscillator circuits are adjusted at 1400 KC. Prior to making the adjustment, however, the dial should be checked. This is done by making sure the dial indicator reads 530 (indicator in center position) when the tuning capacitor rotor plates are fully meshed with the stator plates. The adjustments are then made in similar manner as that of the I. F. except that the oscillator is set at 1400 KC, its output is connected from antenna to ground of the receiver, and the dial is set at 140. The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

# REPLACEMENT PARTS

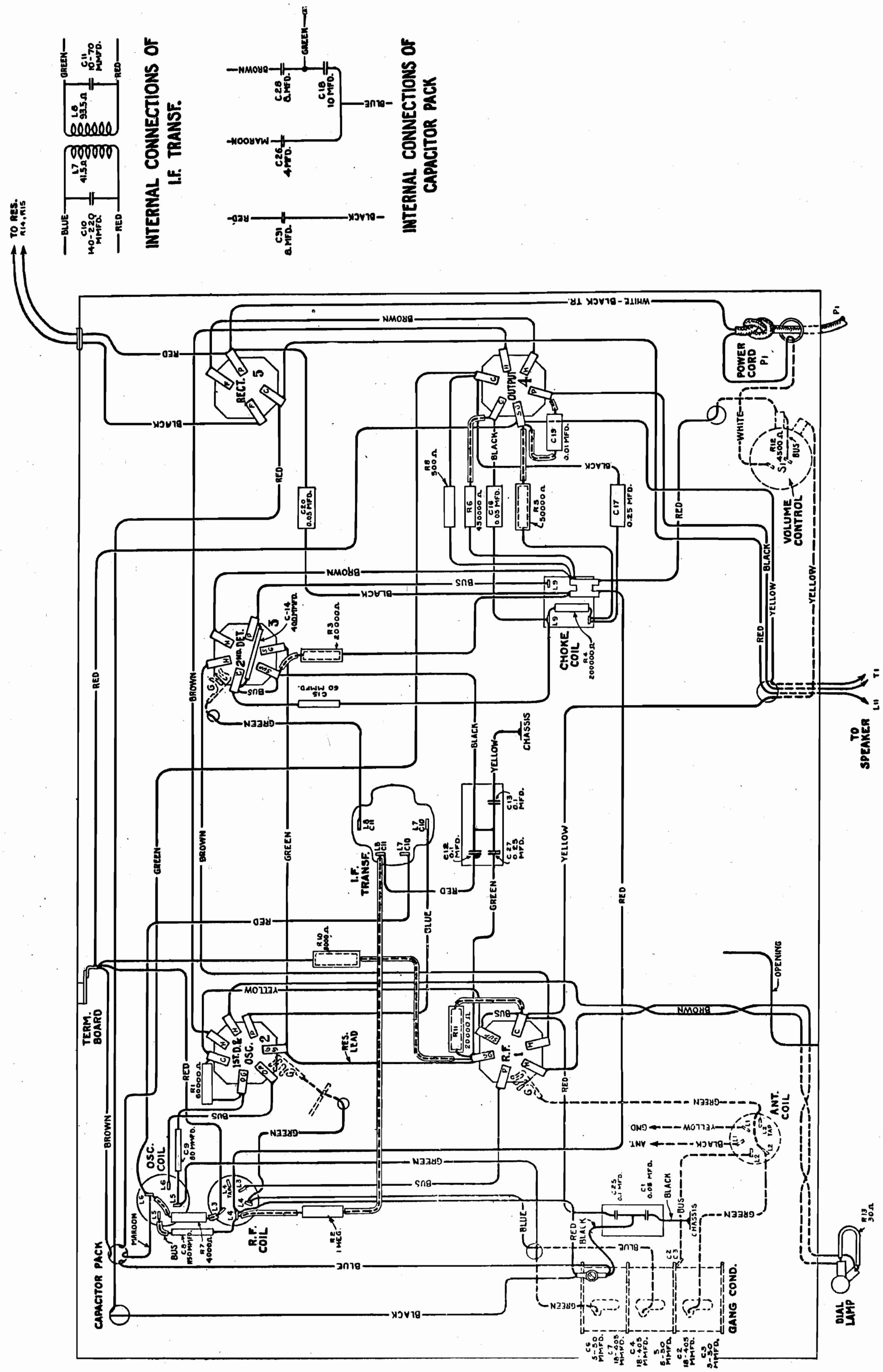
**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | **RECEIVER ASSEMBLIES** | |
| 2747 | Cap—Contact cap—Package of 5 | $0.50 |
| 3710 | Capacitor—60 mmfd. (C15) | .36 |
| 3711 | Capacitor—80 mmfd. (C9) | .40 |
| 3712 | Capacitor—400 mmfd. (C14) | .40 |
| 3754 | Capacitor—1150 mmfd. (C8) | .50 |
| 3701 | Capacitor—0.01 mfd. (C19) | .30 |
| 3888 | Capacitor—0.05 mfd. (C16) | .25 |
| 3916 | Capacitor—0.05 mfd. (C20) | .32 |
| 3917 | Capacitor—0.25 mfd. (C17) | .40 |
| 3755 | Capacitor—Comprising two 0.1 mfd. and one 0.25 mfd. (C12, C13, C27) | .60 |
| 6621 | Capacitor—Comprising one 0.05 and one 0.1 mfd. (C1, C25) | .46 |
| 6728 | Capacitor—Comprising one 4.0 mfd., one 10.0 mfd. and two 8.0 mfd. (C18, C26, C28, C31) | 2.94 |
| 6726 | Coil—Choke coil (L9) | .62 |
| 6519 | Coil—Antenna coil (L1, L2) | .88 |
| 6521 | Coil—Oscillator coil (L5, L6) | .60 |
| 6520 | Coil—R. F. coil (L3, L4) | .94 |
| 6723 | Condenser—3-gang variable tuning condenser (C2, C3, C4, C5, C6, C7) | 4.15 |
| 4701 | Dial—Tuning condenser dial and drive assembly | 1.50 |
| 4703 | Escutcheon—Station selector escutcheon | .35 |
| 4449 | Knob—Volume control or station selector knob—Package of 5 | .60 |
| 3602 | Resistor—60,000 ohms—Carbon type—¼ watt (R1)—Package of 5 | 1.00 |
| 3033 | Resistor—1 megohm—Carbon type—¼ watt (R2)—Package of 5 | 1.00 |
| 6250 | Resistor—4000 ohms—Carbon type—½ watt (R7)—Package of 5 | 1.00 |
| 6303 | Resistor—20,000 ohms—Carbon type—½ watt (R3)—Package of 5 | 1.00 |
| 3594 | Resistor—50,000 ohms—Carbon type—½ watt (R5)—Package of 5 | 1.00 |

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| 6228 | Resistor—200,000 ohms—Carbon type—½ watt (R4)—Package of 5 | $1.00 |
| 3700 | Resistor—450,000 ohms—Carbon type—½ watt (R6)—Package of 5 | 1.00 |
| 3632 | Resistor—500 ohms—Carbon type—1 watt (R8)—Package of 5 | 1.10 |
| 2963 | Resistor—8,000 ohms—Carbon type—1 watt (R10)—Package of 5 | 1.10 |
| 6114 | Resistor—20,000 ohms—Carbon type—1 watt (R11)—Package of 5 | 1.10 |
| 3914 | Resistor—30 ohms—Flexible type (R13) | .28 |
| 4718 | Resistor—205 ohms—Porcelain type—(R15) | .90 |
| 3915 | Resistor—320 ohms—Porcelain type—(RR14) | .88 |
| 3584 | Ring—Antenna R. F. or oscillator coil retaining ring—Package of 5 | .40 |
| 3993 | Screw—No. 6-32 square head set screw for condenser dial and drive assembly—Package of 10 | .25 |
| 7065 | Screwdriver—Insulated screwdriver and socket wrench—For I. F., R. F. and oscillator condenser adjustment | 1.00 |
| 3623 | Shield—Antenna R. F. or oscillator coil shield | .30 |
| 3950 | Shield—Radiotron shield | .26 |
| 4700 | Socket—Dial lamp socket | .35 |
| 3859 | Socket—4-contact Radiotron socket | .30 |
| 6676 | Socket—6-contact Radiotron socket | .40 |
| 7485 | Socket—6-contact Radiotron socket—Second detector | .40 |
| 6727 | Transformer—Intermediate frequency transformer (L7, L8, C10, C11) | 1.68 |
| 4702 | Volume control (R12, S1) | 1.30 |
| | **REPRODUCER ASSEMBLIES** | |
| 7845 | Coil—Field coil magnet and cone support (L11) | 2.50 |
| 9492 | Cone—Reproducer cone (L10)—Package of 5 | 3.70 |
| 7847 | Reproducer complete | 6.30 |
| 7846 | Transformer—Output transformer (T1) | 1.65 |

MODEL 23590-2
Chassis Wiring

# RCA-VICTOR CO., INC.



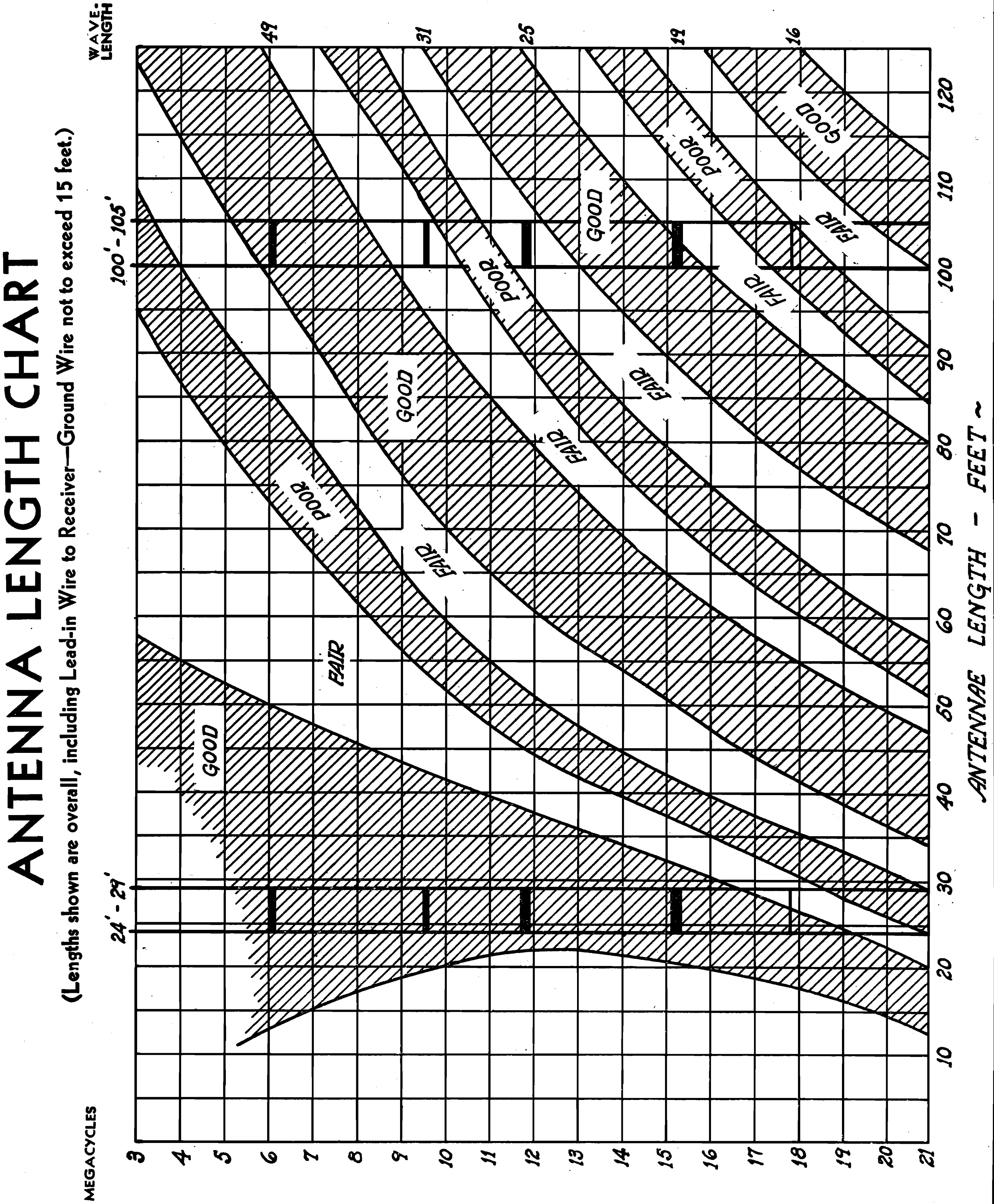
Antenna Length Chart

# RCA-VICTOR CO., INC.

From the chart shown, it can be seen that a wide variation in signal strength can be obtained with various length antennas. This data applies particularly to the six-tube receiver and in general to the eight-tube receivers but does not necessarily apply to competitive instruments. The various degrees of reception are approximately equal for various antenna lengths. For example, the "good" sections give about four times as much sensitivity as the "poor" sections. As this is also an equal gain over noise, proper choice of antenna length can often make the difference between satisfactory and unsatisfactory reception.

In conjunction with the question of the relative merits of a short or long antenna for the frequencies that fall in the "good" sections of each, either length will be equally good, assuming that neither is shielded by buildings of metallic construction or other such objects. If, for example, part of the antenna or lead-in is shielded by the building, then the longer antenna will give better results. Also the longer antenna will give better results in the broadcast band.

The solid black rectangular blocks indicate both the frequencies of, and the antenna lengths recommended particularly for the short-wave broadcast bands.



# RCA-VICTOR CO., INC.

## World Wide Antenna Installation Data

### General Considerations

To insure the greatest possible benefits from the RCA "World-Wide" Antenna System, three important considerations should be observed during its installation:

(a) Height above ground.

(b) Distance from local sources of noise interference, such as power lines, street railroads and automobile highways.

(c) Direction of span.

**Height above Ground** — This consideration probably is the most important since it directly affects the strength at which signals will be received. Ordinarily, the antenna will be erected either upon the roof of a building or suspended between that roof and a nearby tree or pole. For the usual dwelling having a roof and framework of non-metallic materials, the height will be measured with respect to the actual surface of the earth. However, if the opposite condition exists, as in the case of a modern apartment house or hotel, effective ground shall be assumed as at the metal roof. For good results, the horizontal wires of the antenna should be at least 30 feet above the effective ground.

**Distance from Sources of Interference**—Since the antenna system excludes from the receiver all interference signals "picked-up" by the transmission line, the antenna should be erected as far as possible from sources of interference in the immediate locality. The antenna proper may be located up to 500 feet distant from the receiver, adding one or more lengths of transmission line to the length furnished, as required. To maintain the correct *electrical matching*, any excess length of transmission line should not be removed unless two or more full lengths have been added. Where the required length of line is less than one or two full lengths, the excess line should be coiled up neatly at the end nearest the receiver.

**Direction of Span**—This antenna system exhibits a slight directional effect—that is, the geographical position of the span may have some effect upon the intensity of incoming signals. Wherever possible, therefore, the antenna should point in a direction at right angles to that of the transmission path from favored broadcasting stations. If the antenna must be located near a street railroad or a much-traveled highway, direct "pick-up" of interference signals on the doublets can be minimized by erecting the span to point toward the source of interference.

### Mounting Procedure

The actual set-up of the antenna system is very simple and can be performed by practically anyone. Since the means of supporting the antenna will of necessity be different in almost every case, that portion of the installation will not be discussed herein. General recommendations in this respect, however, are contained in Figure 1. Insofar as possible, the intent of such recommendations should be observed, even for different forms of mounting.

**Assembly**—As shown in Figure 1, the two doublet antennas which comprise this system are formed by the two stranded wires supplied with the kit. By means of the porcelain crossover insulator, these wires are crossed to produce two horizontal sections, each 29 feet in length, and two angularly-displaced sections, each 16½ feet in length. An extra length of six inches is afforded at each end of both continuous wires for connection to the porcelain strain insulators, both (as noted under "Equipment") being 46½ feet long. In assembling these wires to the crossover insulator, be careful that the actual cross occurs on opposite sides of the insulator.

The transmission line finally should be connected to the antenna wires as indicated by the detail illustration of the crossover insulator in Figure 1. A tinned spot on each wire is provided to identify the points at which the transmission line should be attached. Make certain to insert the piece of cambric tubing at the insulator and to use only rosin-core solder for the connections as recommended. The antenna now may be suspended between the masts or intended points of support.

**Connection to Receiver**—The opposite end of the transmission line should be led to the receiver, using the porcelain insulator knobs (if required) and the porcelain entrance-tube insulator. Then install the coupling transformer upon the antenna-ground terminal board of the receiver, as shown in Detail A of Figure 1, and attach the transmission line to this transformer. A metal cleat and wood screw are provided to secure the transmission line to the receiver cabinet.

NOTE—For models having no terminal board, it is very important that the transformer be installed as near to the chassis as possible. To insure best noise elimination, this connection should be no longer than one inch. The connection to the antenna also should be kept as short as possible, although it is more important to avoid too close proximity of this wire to grid terminals of the receiver tubes.

**Connection to Ground**—A ground clamp is supplied for securing a tight and permanent connection of the ground wire from the receiver to a water pipe in the basement or to an external metallic stake driven from five to eight feet into the soil. The ground wire should be No. 14 or larger (rubber-covered) and should follow as short and direct a route as possible. Since the length required will be different for each installation, this wire is not furnished with the kit, but may be obtained locally.

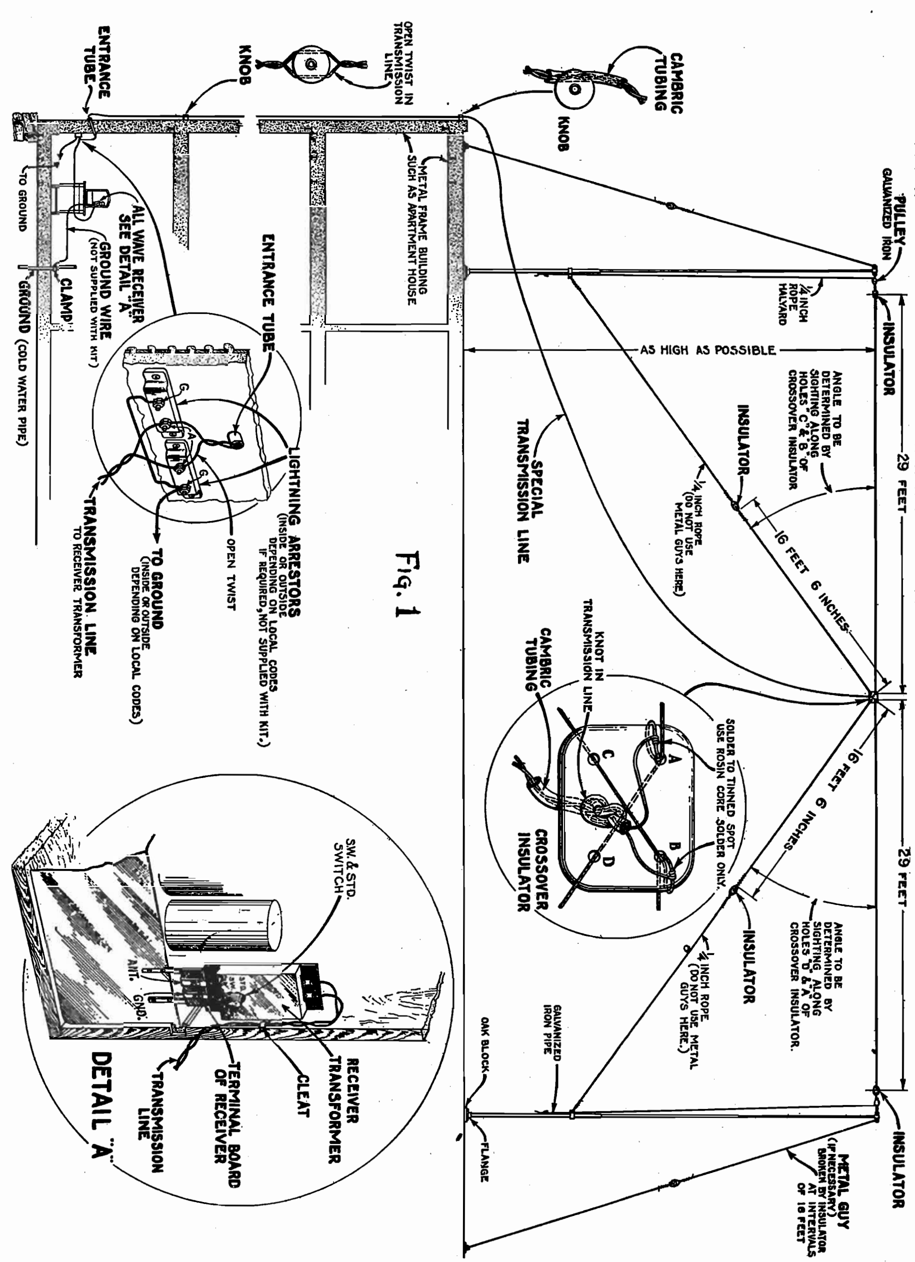



Fig. 1

RCA-VICTOR CO., INC.

# ALTERNATIVE ANTENNA ARRANGEMENTS

In certain installations, space limitations may prevent the use of the full antenna span—approximately 60 feet. Three alternative arrangements, listed in order of preference, are possible:

(a) Reduced overall length through the use of loading coils.

(b) Reduction of the horizontal angle from a straight line span (180 degrees) to any other of not less than 90 degrees.

(c) Vertical suspension.

The first arrangement (a), in which loading coils are inserted to replace lengths removed from the horizontal sections of the antenna as illustrated by Figure 2, is recommended as the preferred alternative. In this manner, the overall span is reduced to approximately 34 feet, without impairing the original tuning characteristics of the system except in the region of 31 meters. The loss encountered within the broadcast band at this wavelength, however, will not be serious.

Using the second alternative (b), the length of the antenna span is decreased by reducing the horizontal angle between the halves of the system (as viewed from above), rather than by shortening the lengths of the horizontal sections. While loading coils are not required, a third support for the antenna at the crossover insulator must be provided, the installation therefore being usually more difficult than for either *straight-line* arrangement. The antenna efficiency naturally will be lowered as the angle is decreased, resulting in a signal-strength loss on all bands of approximately 30 percent at an angle of 90 degrees.

If vertical suspension (c) is employed, much less ground space than for any horizontal form of antenna is necessary. Although somewhat inferior in noise ratio to the horizontal type, the vertical system enjoys an additional advantage of being practically non-directional. Such an installation, however, is usually both difficult and expensive, but can be simplified to a large extent through the use of loading coils.

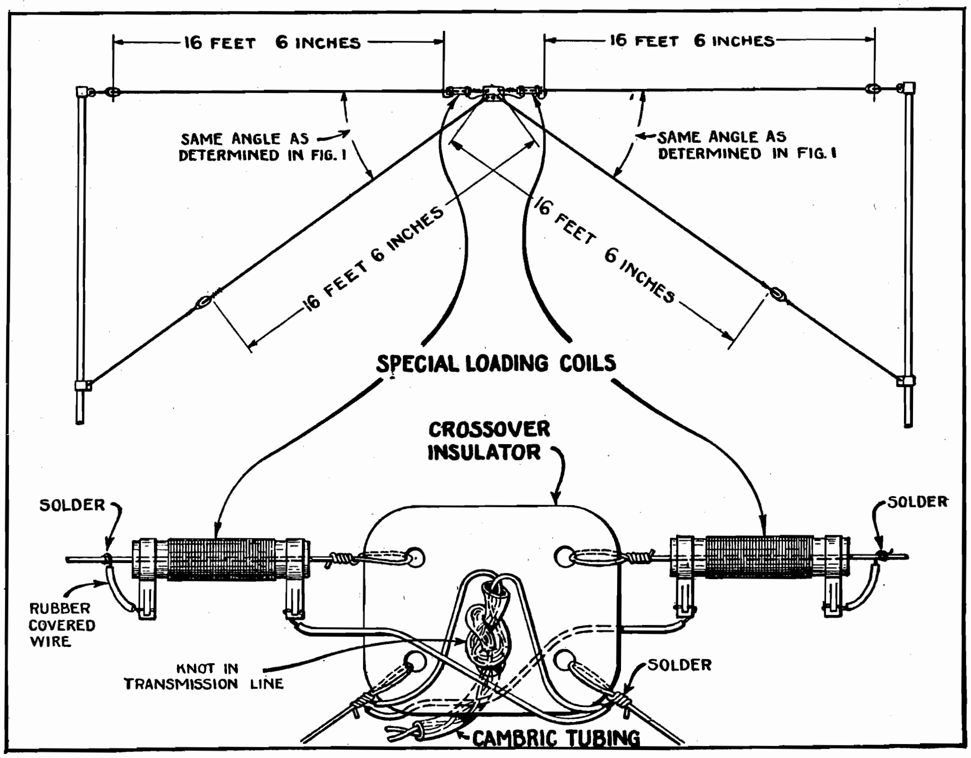



*Figure 2*

## REPLACEMENT PARTS

**Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | DESCRIPTION | List Price | Stock No. | DESCRIPTION | List Price |
|---|---|---|---|---|---|
| 4324 | Transformer (Coupling transformer and switch assembly)—For replacement purposes only; item to be replaced must be returned with order | $2.50 | 4327 | Insulator (Crossover insulator)—For replacement purposes only; item to be replaced must be returned with order | $0.10 |
| 4325 | Knob (Switch knob)—Package of 5 | 1.00 | 4328 | Transmission line (special lead-in—110 feet long) | 3.72 |
| 4326 | Wire (2 rolls stranded wire, each 46½ feet long) | 1.16 | 4329 | Transmission line (special lead-in—220 feet long) | 7.44 |
| | | | 4330 | Transmission line (special lead-in—330 feet long) | 11.16 |

MODEL 2-19
Portable Victrola
Notes

# RCA-VICTOR CO., INC.

# SERVICE DATA

This instrument is a small portable type mechanical phonograph built into a cabinet resembling a small suitcase. Excellent quality, high output and good mechanical construction are features of this instrument.

## LUBRICATION

Premature wear, noisy operation and failure of parts are direct results of failure to clean and lubricate the motor at necessary intervals. The various bearings and gears of the motor should be cleaned and lubricated at least once every six months. In addition to the regular lubrication, all motor parts should be covered with a light film of oil to prevent rusting. Use only Stock No. 7226 Motor Oil and Stock No. 7227 Motor Grease when lubricating this instrument.

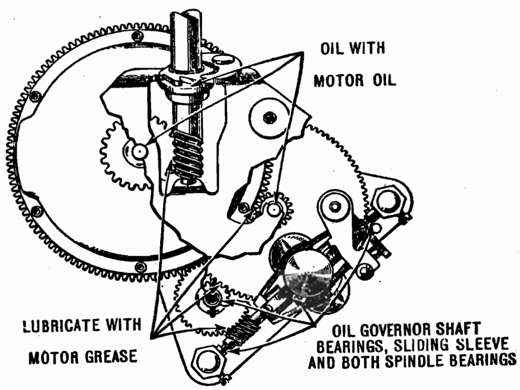



*Figure A—Lubrication Diagram*

**Motor.** Figure A shows a view of the motor with the top plate cut away. Before lubricating the parts shown in this illustration, a thorough cleaning with carbon tetrachloride (Carbona) or gasoline is necessary. If necessary disassemble the entire motor for such cleaning.

**Tone Arm.** The joint between the taper tube and the sound chamber must be free to swing easily without play and be sealed with grease. This bearing is accessible when the three mounting screws are removed. Failure to seal this joint will result in poor quality. Unnecessary friction will cause undue record wear.

## MOTOR

The motor used is of simple design and will give excellent performance. If kept clean and properly lubricated, little service attention will be required. The following points may prove useful when it is necessary to effect repairs. *Before doing any work on the motor the machine must be allowed to run down completely.*

**Removing Motor from Cabinet.** To remove the motor from the cabinet proceed as follows:

(*a*) Unscrew the spindle cap and remove the turntable.

(*b*) Remove the five screws that hold the motor board and lid-support to the cabinet and remove the motor-board assembly.

(*c*) Remove the speed-regulator lever.

(*d*) Remove the three machine screws that hold the motor in place. The motor may then be removed.

**Changing Motor Springs.** Should a spring break and require replacement the best method to make a repair is to replace the entire spring barrel. While the cost of the spring barrel is greater than that of the spring alone, the saving in labor will usually justify such replacement. Unless the serviceman is experienced in handling springs of this type, the following directions should be followed carefully:

(*a*) Disassemble the motor and remove the spring barrel. Remove the winding gear.

(*b*) Place the gear flat on a piece of metal and file off the ends of the six rivets. Remove the rivets and gear.

(*c*) Place the palm of the right hand over the closed end of the barrel, making sure that the fingers do not protrude beyond the open side. Firmly hold the barrel, open side downward, over a large can or barrel. With the left hand pull the center turns of the spring out. As soon as the spring starts, pull the left hand clear of the can, holding the spring barrel firmly until the spring is entirely clear.

(*d*) *A new coiled spring may prove extremely dangerous if not properly handled. Read these instructions and work very carefully, especially if not experienced in work of this kind.* The new spring is furnished coiled and with a heavy wire clamp holding the spring tightly wound. Pull out about one foot of the spring. Then with the spring flat on a table gently tap the ring until it comes to the edge. Do not push the clamp so close to the edge that it will not hold the spring.

Place the hook end of the spring over the barrel hook. Wind the exposed end into the barrel and then insert the entire spring in the barrel, allowing the clamp to be on the outer edge. Place a block over the entire spring and force the spring into the barrel, thereby releasing the clamp.

(*f*) Place a tablespoonful of spring lubricant between the spring leaves and in the center of the spring.

(*g*) Place the gear in position and rivet it with six rivets to the spring barrel. Use a small punch for flattening the ends of the rivets. Place the gear on a flat surface while re-riveting the barrel to it.

(*h*) Reassemble the motor in the reverse manner of that used to dismantle it.

**Winding Shaft Binding.** A heavy jar may cause the motor to shift slightly on the motor board and produce binding of the winding shaft against the motor board. Loosening the motor mounting screws and shifting the motor to its proper position (center of slot) will correct this condition.

MODEL 2-19
Portable Victrola
Parts List

RCA-VICTOR CO., INC.

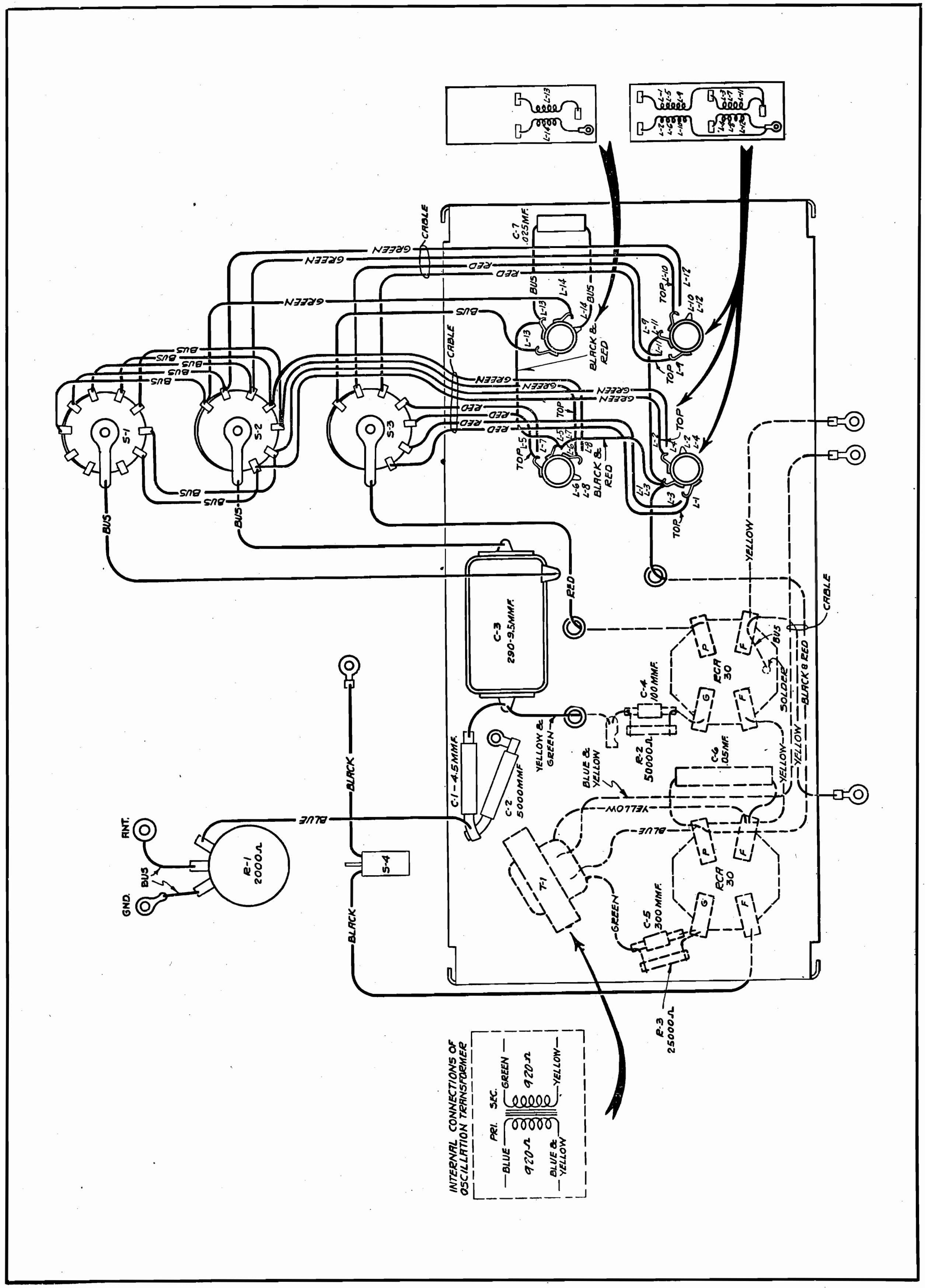
# REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| 2872 | Governor ball and spring assembly—Comprising ball, spring mounting screws, and washers—Package of 5 | $0.75 |
| 2937 | Gear—Winding gear and sleeve | .75 |
| 2947 | Leather—Friction leather for brake—Package of 20 | .50 |
| 4107 | Brake—Turntable brake and bracket | .55 |
| 4108 | Lever—Speed regulator lever | .45 |
| 4109 | Cup—Needle cup | .22 |
| 4110 | Holder—Needle holder | .45 |
| 4111 | Cap—Turntable spindle cap | .65 |
| 4112 | Plate—Speed regulator plate | .55 |
| 4113 | Bracket—Sound box rest bracket | .50 |
| 4114 | Support—Lid support | .25 |
| 4115 | Screw and washer—Motor board mounting screw and washer—Package of 3 | .25 |
| 4116 | Catch—Cabinet catch complete with mounting rivets—Package of 2 | .40 |
| 4117 | Strap—Record pocket strap assembly | .16 |
| 4118 | Screw—Needle holding screw—Package of 10 | .65 |
| 6837 | Key—Winding key | .70 |
| 6838 | Handle—Carrying handle | .82 |
| 6839 | Extension—Winding shaft extension | .45 |
| 6933 | Sound box—Complete with needle screw | 1.80 |
| 7210 | Spindle—Turntable spindle with pins and ball bearing—Less gear | .50 |
| 7211 | Gear—Turntable spindle gear complete, with set screw | .50 |
| 7214 | Governor assembly — Comprising governor spindle, disc, sleeve, collar, governor balls and springs | $2.50 |
| 7226 | RCA Victor motor grease—1 pint can | .40 |
| 7227 | RCA Victor motor oil—1 pint can | .50 |
| 7228 | RCA Victor spring lubricant—1 pint can | .65 |
| 7719 | Board—Motor board with horn—Less hardware and motor—Green | 3.90 |
| 7720 | Arm—Tone arm assembly | 3.26 |
| 7721 | Turntable—Green | 1.20 |
| 7722 | Turntable—Blue | 1.20 |
| 7723 | Board—Motor board and horn—Less hardware and motor—Blue | 3.90 |
| 7724 | Cabinet—Complete with handle and catches—Blue | 12.40 |
| 7725 | Cabinet—Complete with handle and catches—Green | 12.70 |
| 7726 | Pocket—Record pocket—Black | .98 |
| 7727 | Pocket—Record pocket—Green | .98 |
| 7729 | Plate—Top plate assembly | 3.96 |
| 7730 | Motor—Motor complete with spindle cap | 10.40 |
| 8655 | Barrel—Spring barrel assembly | 2.64 |
| 8656 | Spring—Mainspring | 1.15 |
| 8657 | Gear—Intermediate gear pinion and shaft | .70 |
| 8658 | Shaft — Winding shaft — Comprising shaft, collar, pin, ratchet, and washer — Less winding extension | .96 |
| 10116 | Spring—Brake spring—Package of 10 | .60 |

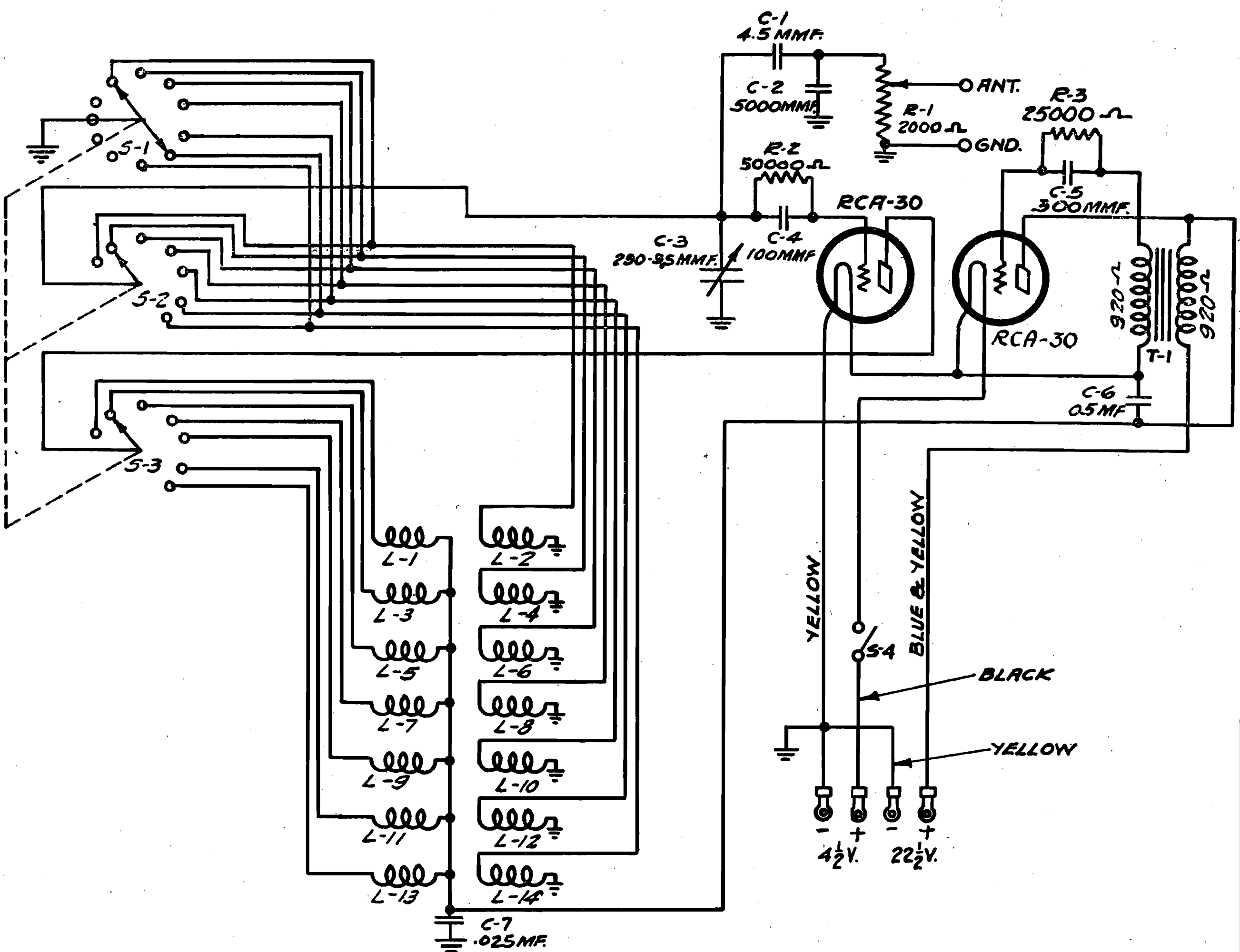
MODEL TMV-97-A
Oscillator
Chassis Wiring

# RCA-VICTOR CO., INC.



MODEL TMV-97-A
Schematic
Parts List

# RCA-VICTOR CO., INC.




## REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| 2039 | Switch—Single pole, single throw toggle switch | $0.72 |
| 2744 | Capacitor—4.5 mmfd. capacitor (C1)—Package of 5 | 1.60 |
| 2932 | Capacitor—5,000 mmfd. capacitor (C2) | .50 |
| 3110 | Resistor—25,000 ohm—¼ watt carbon resistor (R3)—Package of 5 | 1.00 |
| 3114 | Resistor—50,000 ohm—¼ watt carbon resistor (R2)—Package of 5 | 1.00 |
| 3640 | Capacitor—.05 mfd. capacitor (C6) | .25 |
| 3765 | Capacitor—.025 mfd. capacitor (C7) | .34 |
| 3794 | Capacitor—100 mmfd. capacitor (C4) | .30 |
| 3975 | Coil—R. F. oscillation coil (L1, L2, L3, L4) | 1.38 |
| 3976 | Coil—R. F. oscillation coil (L5, L6, L7, L8) | 1.38 |
| 3977 | Coil—R. F. oscillation coil (L9, L10, L11, L12) | 1.28 |
| 3978 | Coil—R. F. oscillation coil (L13, L14) | 1.28 |
| 3979 | Transformer—A. F. oscillation transformer (T1) | $1.94 |
| 3980 | Condenser—Tuning condenser (C3) | 1.40 |
| 3981 | Capacitor—300 mmfd. capacitor (C5) | .30 |
| 3982 | Handle—Carrying handle | .60 |
| 3983 | Switch—Range switch (S1, S2, S3) | 3.94 |
| 3984 | Knob—Moulded knob | .30 |
| 3985 | Scale—Range switch dial scale | .66 |
| 3986 | Scale—Attenuator potentiometer dial scale | .66 |
| 3987 | Potentiometer — Attenuator potentiometer (R1) | 1.70 |
| 3988 | Post—"Antenna-Ground" binding post | .32 |
| 3989 | Dial—Tuning condenser vernier dial | 4.15 |
| 3990 | Clip—Spring steel clip | .25 |
| 6300 | Socket—Radiotron socket | .35 |

# RCA-VICTOR CO., INC.

MODEL CRD-9
Schematic
Chassis Wiring

**NOTE**—If the maximum volume, obtained with the volume control in the extreme clockwise position, is insufficient to meet the requirements of a particular installation, the locking device may be re-adjusted as follows: (1) Remove volume control knob by pulling outward; (2) take off rear panel by removing screws at edges; (3) loosen lock nut holding right angled bracket which serves as stop for metal pointer on shaft; (4) turn shaft clockwise until volume is increased to desired level; (5) lock bracket in new position against pointer, by retightening lock nut; and (6) replace rear panel and knob.

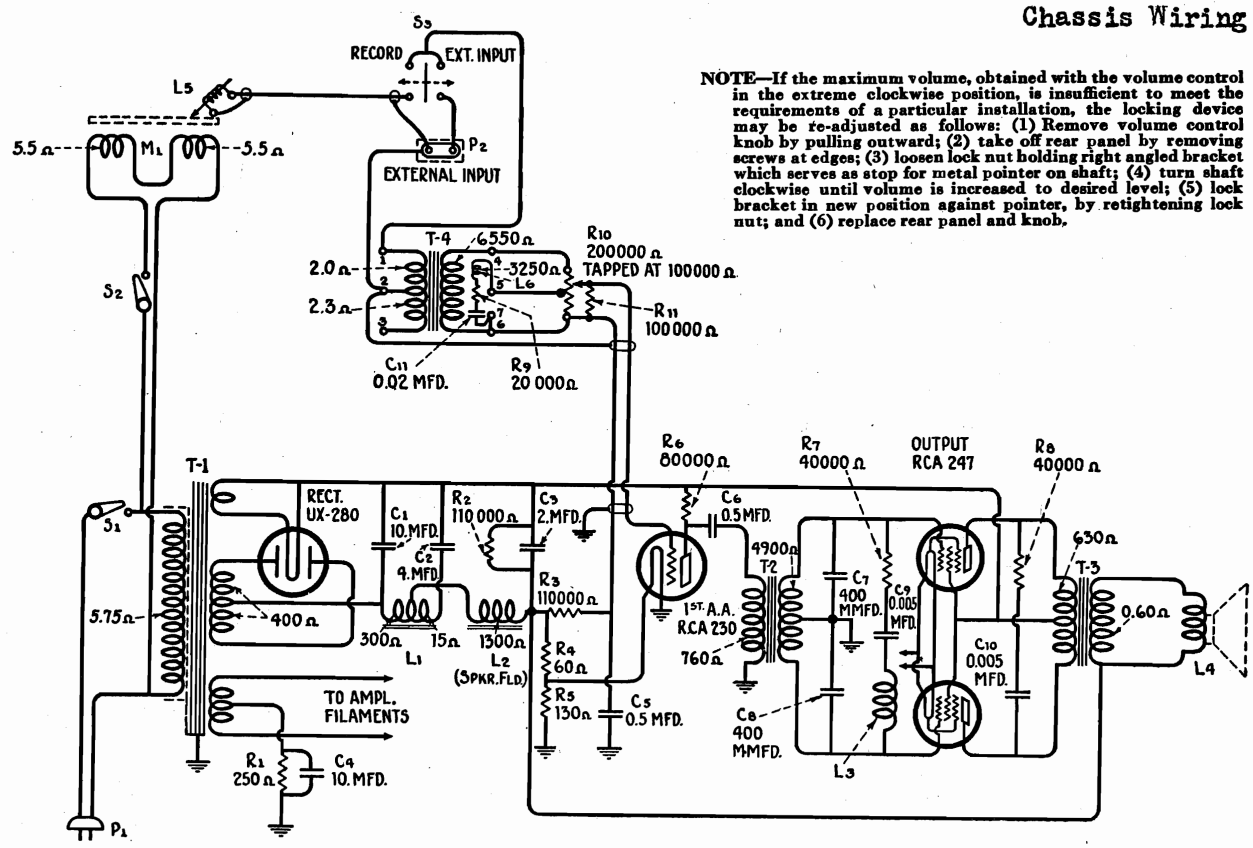



*Figure A—Schematic Circuit*

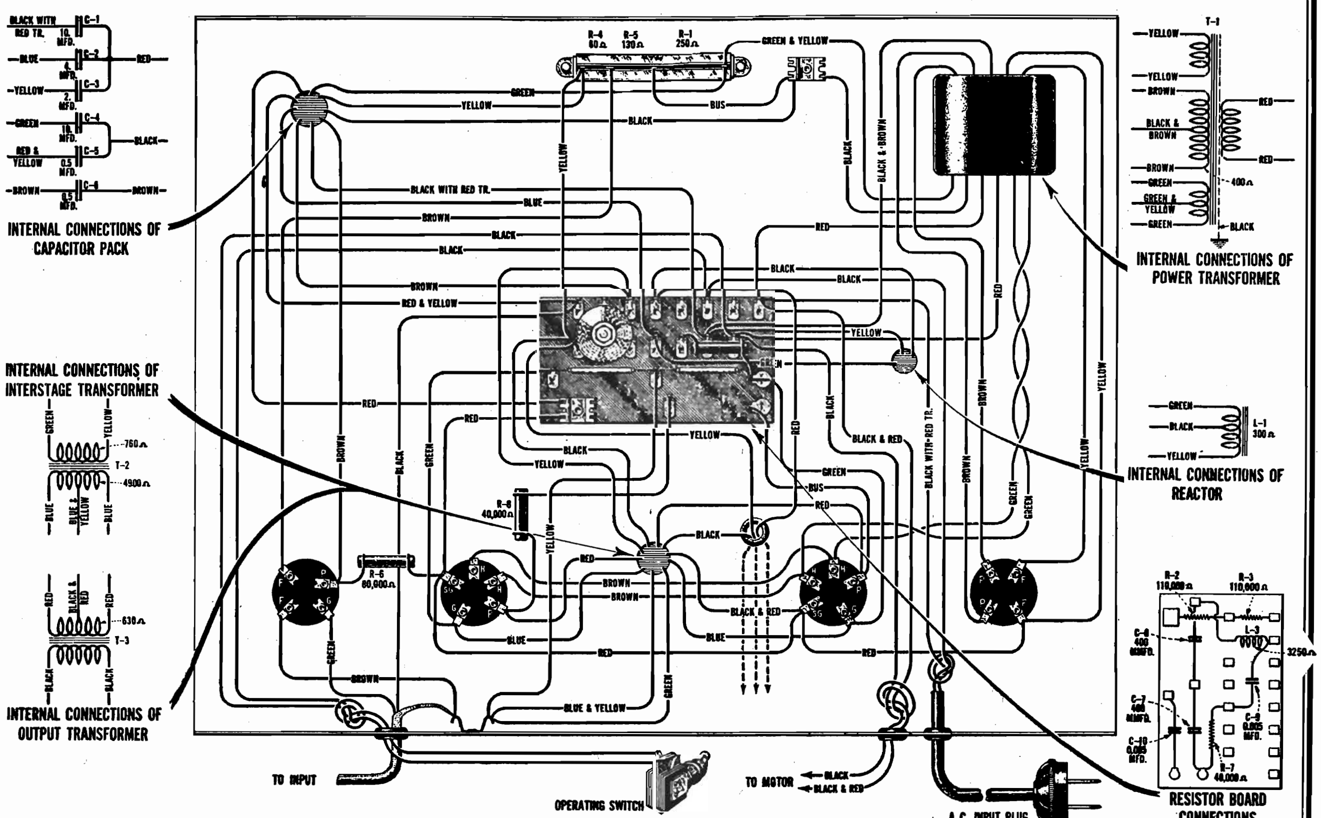
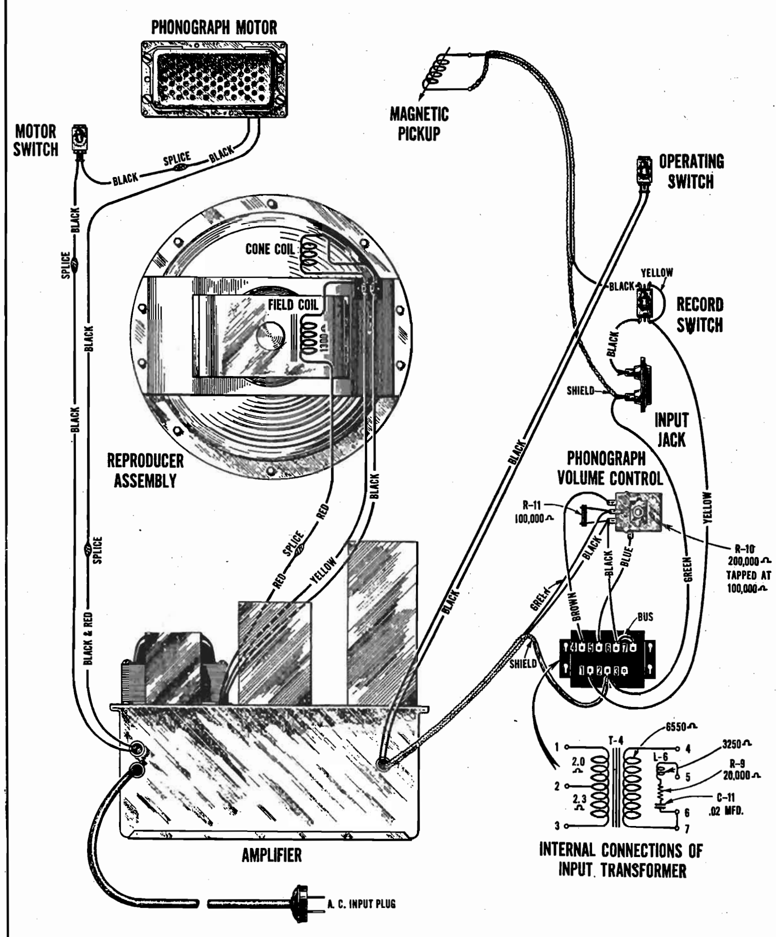



*Figure B—Amplifier Wiring*

**MODEL CRD-9**
**Assembly Wiring**
**Parts List**

# RCA-VICTOR CO., INC.




Radiotrons—*Always set the Power Switch in the "off" position before removing any Radiotron from its socket.*

*Figure C—Assembly Wiring*

**External Input**—To use the demonstrator amplifier and loudspeaker for reproduction from an external source of audio frequency input, proceed as follows:

1. Plug the two wires (which should be equipped with pin terminals) from the external source into the pin jacks located below the Transfer Switch.

   NOTE—The impedance of the external input circuit should match that of the demonstrator input, which is approximately 10 ohms at 1,000 cycles.

2. Set the Power Switch to the "on" position. The Motor Switch should be in the "off" position.
3. Set the Transfer Switch in the downward position. Signals originating in the external input circuit will now be heard through the demonstrator loudspeaker.
4. Adjust the volume to the desired level by means of the demonstrator Volume Control.
5. When through operating, set the Power Switch to the "off" position.

## SERVICE DATA

| Radiotron No. | Filament to Control Grid | Filament to Screen Grid | Filament to Plate | Plate Current M. A. | Filament Volts |
|---|---|---|---|---|---|
| RCA-230—A. F. | 4.5 | — | 260 | 2.0 | 2.0 |
| RCA-247—Pwr. | 17.0 | 260 | 250 | 30.0 | 2.5 |
| RCA-247—Pwr. | 17 | 260 | 250 | 30.0 | 2.5 |
| UX-280—Rect. | 375 volts each plate—80 M. A. total current | | | | |

| Stock No. | Description | List Price |
|---|---|---|
| | **PICKUP, ARM AND TURNTABLE ASSEMBLIES** | |
| 3385 | Coil—Pickup coil | $0.50 |
| 3386 | Cover—Pickup cover | .75 |
| 3387 | Screw assembly—Pickup mounting screw assembly comprising one screw, one nut, and one washer—Package of 10 | .60 |
| 3388 | Screw—Pickup needle holding screw—Package of 10 | .80 |
| 3389 | Rod—Automatic brake trip rod with lock nut—Package of 5 | .50 |
| 3390 | Escutcheon—Pickup arm escutcheon complete with mounting rivets | .65 |
| 3417 | Armature—Pickup armature | .75 |
| 3418 | Cushions—Pickup rubber cushions—Comprising one damper, two spacer cushions and one damper bushing—Package of 5 sets | 1.25 |
| 3419 | Screw—Pickup cover mounting screw—Package of 10 | .50 |
| 6335 | Pickup—Pickup unit complete | 12.00 |
| 6346 | Back—Pickup housing back | .65 |
| 7084 | Cover—Suede cover for turntable | .50 |
| 7530 | Arm—Pickup arm complete—Less escutcheon, pickup, pickup mounting screw, nut and washer | 6.00 |
| 8968 | Turntable complete | 2.58 |
| | **AMPLIFIER ASSEMBLIES** | |
| 2882 | Socket—5 contact Radiotron socket complete with insulator | .50 |
| 2968 | Socket—4 contact Radiotron socket complete with insulator—For Radiotron UX-280 | .50 |
| 3032 | Socket—4 contact Radiotron socket complete with insulator—For Radiotron RCA-230 | .50 |
| 3045 | Resistor—40,000 ohms—Carbon type—1 watt—Package of 5 | 2.50 |
| 3085 | Capacitor—400 mmfd.—Located on resistor board | .60 |
| 3099 | Capacitor—0.005 mfd.—Located on resistor board | .75 |
| 3295 | Resistor—110,000 ohms—Carbon type—½ watt—Package of 5 | 2.50 |
| 3297 | Resistor—80,000 ohms—Carbon type—1 watt—Package of 5 | 2.50 |
| 3475 | Switch—Phonograph and amplifier switch—Single pole, single throw—Toggle type | 1.28 |
| 3476 | Cable—Shielded two conductor cable—Approximately 13½ inches long | $0.36 |
| 3479 | Capacitor — 0.005 mfd. — Located nearest choke coil on resistor board | .80 |
| 3481 | Coil—Choke coil—Located on resistor board | .70 |
| 7270 | Reactor—Filter reactor | 4.00 |
| 7458 | Resistor—Flat type—440 ohms—Tapped at 60, 130 and 250 ohms—Complete with mounting rivets | 1.10 |
| 7568 | Transformer assembly—Comprising interstage and output transformer in metal container | 4.48 |
| 7569 | Capacitor pack—Comprising two 10.0 mfd., one 4.0 mfd., one 2.0 mfd. and two 0.5 mfd. | 4.68 |
| 8900 | Transformer—Power transformer | 9.00 |
| | **MOTOR ASSEMBLIES** | |
| 3398 | Motor mounting assembly—Comprising 2 cup washers, 4 springs and 1 "C" washer—One set | .75 |
| 7389 | Rotor and shaft for 105–125 volts—60 cycle motor | 9.00 |
| 8966 | Motor—Motor complete—105–125 volts—60 cycles | 18.26 |
| 8967 | Spindle—Turntable spindle with fibre gear for 60 cycle motor | 8.00 |
| | **MISCELLANEOUS PARTS** | |
| 2761 | Jack—Twin jack with mounting screws | 5.00 |
| 3101 | Switch—Phonograph switch—Double pole, single throw—Toggle type—Located on upper left side of cabinet | 1.25 |
| 3118 | Resistor—100,000 ohms—Carbon type—¼ watt—Package of 5 | 2.00 |
| 6288 | Knob—Volume control knob—Package of 5 | 1.50 |
| 6292 | Switch—Motor switch—Single pole, single throw—Toggle type | 1.25 |
| 6384 | Volume control—Complete with mounting washer and nut | 1.60 |
| 7054 | Cord—Power cord | 1.00 |
| | **REPRODUCER ASSEMBLIES** | |
| 3483 | Bolt—Reproducer mounting bolt assembly—Comprising 2 hook bolts, 2 washers, 2 lock washers and 2 nuts | .78 |
| 6382 | Transformer—Input transformer | 3.88 |
| 8916 | Cone—Reproducer cone—Package of 5 | 15.00 |
| 9423 | Coil assembly—Comprising field coil, magnet and cone support | 12.15 |

MODEL PT-16-A1
PT-16-A2
Schematic
Assembly Wiring

RCA-VICTOR CO., INC.

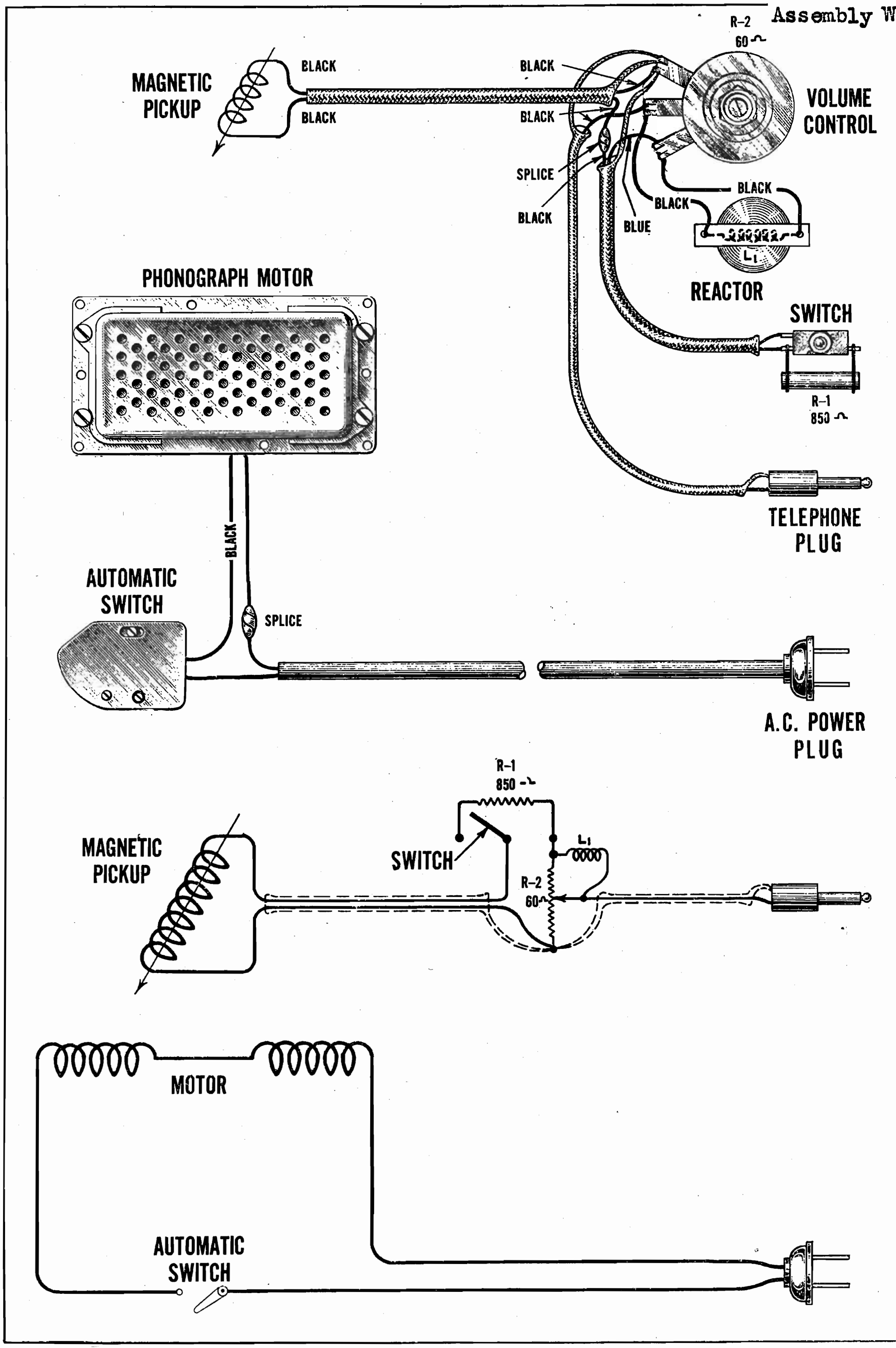



*Figure C—Wiring and Schematic Diagrams (PT16A1,A2)*

MODEL PT-16-A1
PT-16-A2
Parts List

RCA-VICTOR CO., INC.

# REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | **TURNTABLE—MODEL PT-16A1 AND PT-16A2** | |
| | **TURNTABLE ASSEMBLIES** | |
| 3261 | Bushing—Rubber bushing for turntable spindle—Package of 5 | $0.40 |
| 3338 | Ring—Clamp ring assembly | .50 |
| 3340 | Washer—Thrust washer—Package of 2 | .56 |
| 3341 | Pin—Groov pin—Package of 2 | .56 |
| 3342 | Spring—Latch spring on clamping ring—Package of 2 | .56 |
| 3343 | Sleeve—Sleeve complete with ball race | 2.86 |
| 3344 | Cover—Grease retainer cover—Package of 2 | .70 |
| 3346 | Bushing—Speed shifter lever bushing — Package of 4 | .66 |
| 3347 | Spring—Speed shifter lever spring—Package of 2 | .30 |
| 3838 | Lever—Speed shifter lever | .70 |
| 7084 | Cover—Suede cover for turntable | .40 |
| 8948 | Turntable—Turntable complete | 5.50 |
| | **PICKUP AND PICKUP ARM ASSEMBLIES** | |
| 3385 | Coil—Pickup coil | .50 |
| 3386 | Cover—Pickup cover | .56 |
| 3387 | Screw assembly—Pickup mounting screw, nut and washer | .40 |
| 3388 | Screw—Pickup needle holding screw | .60 |
| 3389 | Rod—Automatic brake trip rod | .40 |
| 3390 | Escutcheon—Pickup arm escutcheon | .46 |
| 3417 | Armature—Pickup armature | .72 |
| 3418 | Cushions—Pickup rubber cushions | 1.10 |
| 3419 | Screw—Pickup cover mounting screw | .40 |
| 3516 | Damper—Damper and bushing for pickup arm base | .14 |
| 6335 | Pickup—Pickup unit complete | 4.00 |
| 6346 | Back—Pickup housing back | .45 |
| 7593 | Arm—Pickup arm less pickup | 6.00 |

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | **MOTOR ASSEMBLIES** | |
| 3599 | Screw—Motor mounting screw and lock-washer—Package of 3 sets | $.30 |
| 8989 | Motor—105–125 volt—60 cycle motor | 18.52 |
| 8990 | Motor—105–125 volt—50 cycle motor | 18.52 |
| 8993 | Rotor—Rotor and shaft for motor 105–125 volt—60 cycle | 7.00 |
| 8994 | Spindle—Spindle and gear for motor 105–125 volt—60 cycle | 4.75 |
| 8995 | Rotor—Rotor and shaft for motor 105–125 volt—50 cycle | 7.00 |
| 8996 | Spindle—Spindle and gear for motor 105–125 volt—50 cycle | 4.75 |
| | **MOTOR BOARD ASSEMBLIES** | |
| 2779 | Pointer—Volume control pointer—Package of 10 | .50 |
| 2947 | Shoe—Leather brake shoe—Package of 20 | .50 |
| 3322 | Switch—Automatic brake switch | .75 |
| 4098 | Cord—Power cord and plug | 1.00 |
| 4099 | Cable—Shielded signal cable and plug | 1.25 |
| 4100 | Volume control—Turntable volume control | 2.50 |
| 4101 | Switch—Single pole—double throw—toggle switch | .75 |
| 6247 | Resistor—850 ohm—¼ watt—Carbon type resistor—Package of 5 | 1.00 |
| 6288 | Knob—Volume control knob—Package of 5 | 1.00 |
| 7387 | Reactor—Tone compensating reactor | .85 |
| 7691 | Support—Pickup support | 4.28 |
| 10174 | Springs—Automatic brake springs—Package of 2 sets | .50 |
| 10184 | Plate—Automatic brake latch trip plate—Package of 5 | .40 |
| 10241 | Box—Needle box with lid—Package of 2 | .60 |

RCA-VICTOR CO., INC.

# SERVICE DATA

Voltage Rating........................105–125 Volts A. C.
Frequency Rating.......................50 and 60 Cycles
Power Consumption.........{30 Watts Single Turntable / 60 Watts Double Turntable}

## WIRING

The schematic and assembly wiring diagrams are shown in Figure C.

## MAGNETIC PICKUP

### Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or hardened pivot rubbers, it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

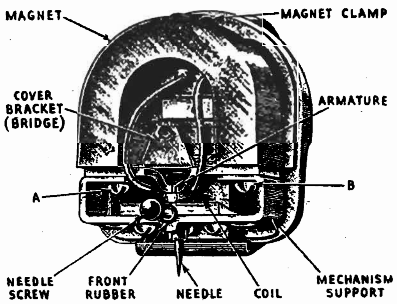



*Figure A*

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

(d) Remove screws A and B, Figure A, and then remove the mechanism assembly from the pole pieces.

(c) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled except for the magnet, which must be magnetized. After being magnetized the mechanism—with the pole pieces upward, should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B, Figure A, and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover now may be replaced over the entire assembly, and the pickup returned to the tone arm.

In reassembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

### Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

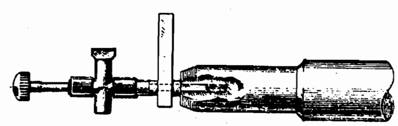


*Figure B*

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure B, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be assembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the airgap as explained under (h) above.

MODEL PT-17-A1
PT-17-A2
Schematic
Parts List

# RCA-VICTOR CO., INC.

## REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | TURNTABLE—MODEL PT-17A1 AND PT-17A2 | |
| | TURNTABLE ASSEMBLIES | |
| 3261 | Bushing—Rubber bushing for turntable spindle—Package of 5 | $0.40 |
| 3338 | Ring—Clamp ring assembly | .50 |
| 3340 | Washer—Thrust washer—Package of 2 | .56 |
| 3341 | Pin—Groov pin—Package of 2 | .56 |
| 3342 | Spring—Latch spring on clamping ring—Package of 2 | .56 |
| 3343 | Sleeve—Sleeve complete with ball race | 2.86 |
| 3344 | Cover—Grease retainer cover—Package of 2 | .70 |
| 3346 | Bushing—Speed shifter lever bushing—Package of 4 | .66 |
| 3347 | Spring—Speed shifter lever spring—Package of 2 | .30 |
| 3838 | Lever—Speed shifter lever | .70 |
| 7084 | Cover—Suede cover for turntable | .40 |
| 8948 | Turntable—Turntable complete | 5.50 |
| | PICKUP AND PICKUP ARM ASSEMBLIES | |
| 3385 | Coil—Pickup coil | .50 |
| 3386 | Cover—Pickup cover | .56 |
| 3387 | Screw assembly—Pickup mounting screw, nut and washer | .40 |
| 3388 | Screw—Pickup needle holding screw | .60 |
| 3389 | Rod—Automatic brake trip rod | .40 |
| 3390 | Escutcheon—Pickup arm escutcheon | .46 |
| 3417 | Armature—Pickup armature | .72 |
| 3418 | Cushions—Pickup rubber cushions | 1.10 |
| 3419 | Screw—Pickup cover mounting screw | .40 |
| 3516 | Damper—Damper and bushing for pickup arm base | .14 |
| 6335 | Pickup—Pickup unit complete | 4.00 |
| 6346 | Back—Pickup housing back | .45 |
| 7593 | Arm—Pickup arm less pickup | 6.00 |

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | MOTOR ASSEMBLIES | |
| 3599 | Screw—Motor mounting screw and lock-washer—Package of 3 sets | $0.30 |
| 8989 | Motor—105-125 volt—60 cycle motor | 18.52 |
| 8990 | Motor—105-125 volt—50 cycle motor | 18.52 |
| 8993 | Rotor—Rotor and shaft for motor 105-125 volt—60 cycle | 7.00 |
| 8994 | Spindle—Spindle and gear for motor 105-125 volt—60 cycle | 4.75 |
| 8995 | Rotor—Rotor and shaft for motor 105-125 volt—50 cycle | 7.00 |
| 8996 | Spindle—Spindle and gear for motor 105-125 volt—50 cycle | 4.75 |
| | MOTOR BOARD ASSEMBLIES | |
| 2779 | Pointer—Volume control pointer—Package of 10 | .50 |
| 2947 | Shoe—Leather brake shoe—Package of 20 | .50 |
| 3322 | Switch—Automatic brake switch | .75 |
| 4098 | Cord—Power cord and plug | 1.00 |
| 4099 | Cable—Shielded signal cable and plug | 1.25 |
| 4100 | Volume control—Turntable volume control | 2.50 |
| 4101 | Switch—Single pole—double throw—toggle switch | .75 |
| 6247 | Resistor—850 ohm—¼ watt—Carbon type resistor—Package of 5 | 1.00 |
| 6288 | Knob—Volume control knob—Package of 5 | 1.00 |
| 7387 | Reactor—Tone compensating reactor | .85 |
| 7691 | Support—Pickup support | 4.28 |
| 10174 | Springs—Automatic brake springs—Package of 2 sets | .50 |
| 10184 | Plate—Automatic brake latch trip plate—Package of 5 | .40 |
| 10241 | Box—Needle box with lid—Package of 2 | .60 |

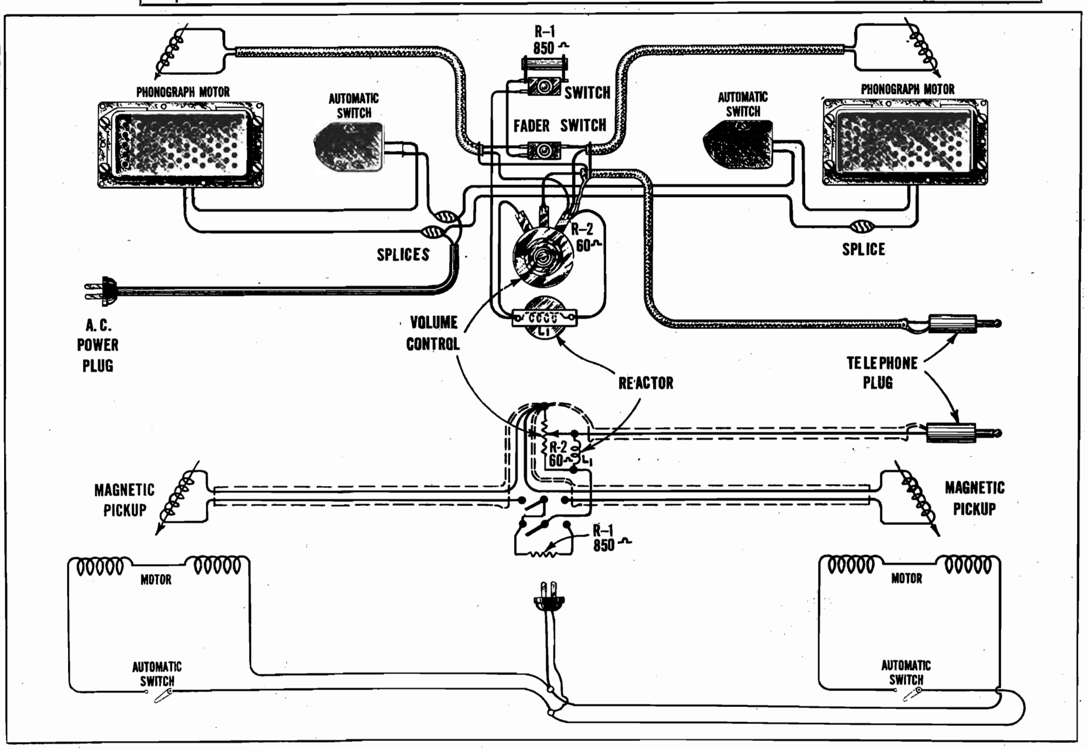



*Figure C—Wiring and Schematic Diagrams (PT17A1, A2)*

MODEL PT-17-B1
PT-17-B2
Schematic

RCA-VICTOR CO., INC.

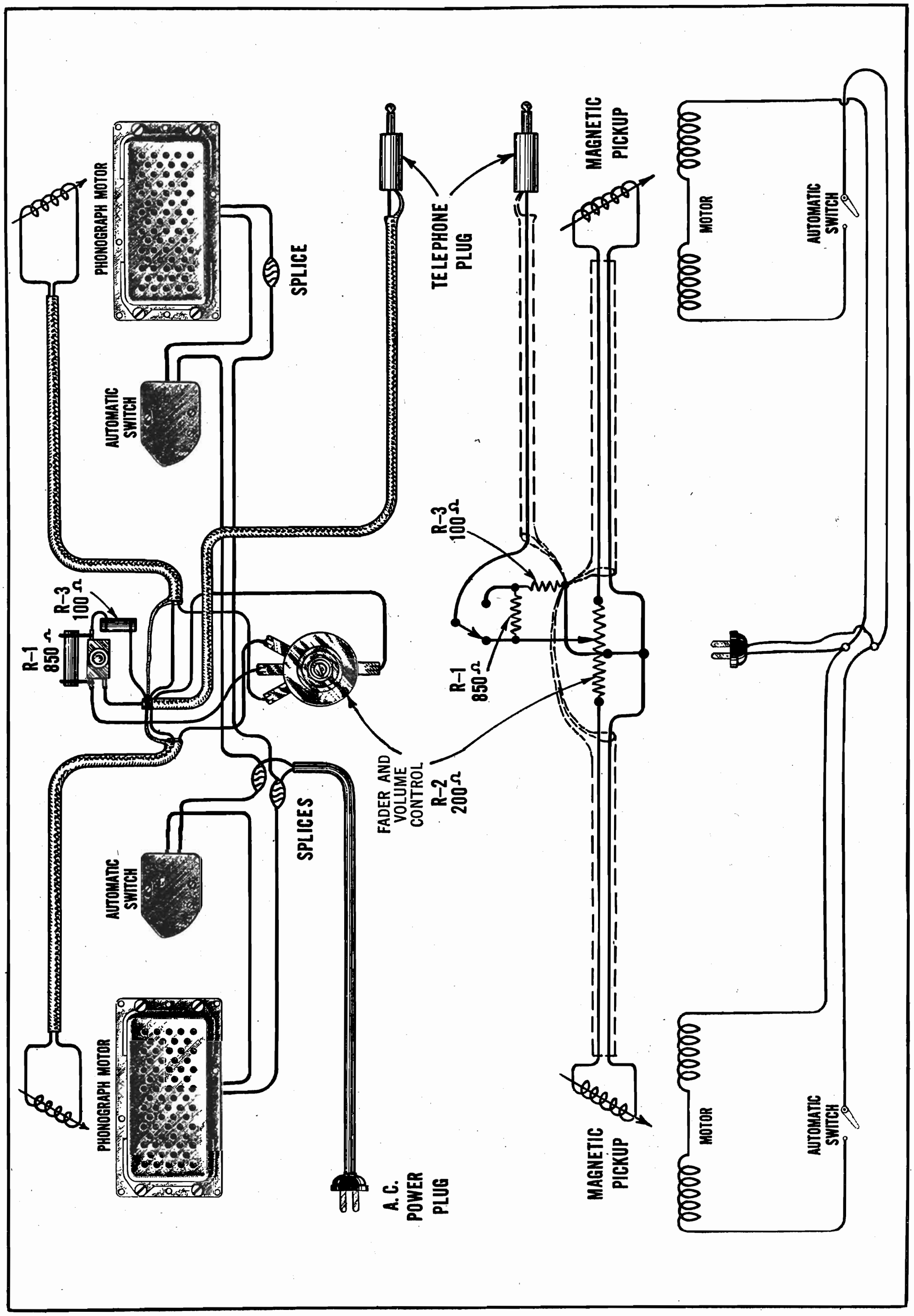



*Figure 1—Wiring and Schematic Diagrams (PT17B1, B2)*

MODEL PT-17-B1
PT-17-B2
Pickup Data, Parts List

RCA-VICTOR CO., INC.

# SERVICE DATA

Voltage Rating......................105–125 Volts A. C.
Frequency Rating......................50 and 60 Cycles
Power Consumption.........{ 30 Watts Single Turntable / 60 Watts Double Turntable

## WIRING

The schematic and assembly wiring diagrams are shown in Figure 1.

## MAGNETIC PICKUP

### Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or hardened pivot rubbers, it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

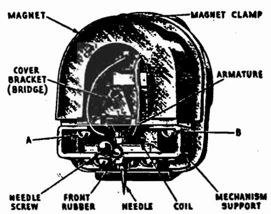



*Figure 2*

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

(d) Remove screws A and B, Figure 2, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled except for the magnet, which must be magnetized. After being magnetized the mechanism—with the pole pieces upward, should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B, Figure 2, and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover now may be replaced over the entire assembly, and the pickup returned to the tone arm.

In reassembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

### Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

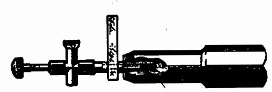


*Figure 3*

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure 3, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be assembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the airgap as explained under (h) above.

# REPLACEMENT PARTS

**Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers**

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | **TURNTABLE—MODEL PT-17A1 AND PT-17A2** | |
| | **TURNTABLE ASSEMBLIES** | |
| 3261 | Bushing—Rubber bushing for turntable spindle—Package of 5 | $0.40 |
| 3338 | Ring—Clamp ring assembly | .50 |
| 3340 | Washer—Thrust washer—Package of 2 | .56 |
| 3341 | Pin—Groove pin—Package of 2 | .56 |
| 3342 | Spring—Latch spring on clamping ring—Package of 2 | .56 |
| 3343 | Sleeve—Sleeve complete with ball race | 2.86 |
| 3344 | Cover—Grease retainer cover—Package of 2 | .70 |
| 3346 | Bushing—Speed shifter lever bushing—Package of 4 | .66 |
| 3347 | Spring—Speed shifter lever spring—Package of 2 | .30 |
| 3838 | Lever—Speed shifter lever | .70 |
| 7084 | Cover—Suede cover for turntable | .40 |
| 8948 | Turntable—Turntable complete | 5.50 |
| | **PICKUP AND PICKUP ARM ASSEMBLIES** | |
| 3385 | Coil—Pickup coil | .50 |
| 3386 | Cover—Pickup cover | .56 |
| 3387 | Screw assembly—Pickup mounting screw, nut and washer | .40 |
| 3388 | Screw—Pickup needle holding screw | .60 |
| 3389 | Rod—Automatic brake trip rod | .40 |
| 3390 | Escutcheon—Pickup arm escutcheon | .46 |
| 3417 | Armature—Pickup armature | .72 |
| 3418 | Cushions—Pickup rubber cushions | 1.10 |
| 3419 | Screw—Pickup cover mounting screw | .40 |
| 3516 | Damper—Damper and bushing for pickup arm base | .14 |
| 6335 | Pickup—Pickup unit complete | 4.00 |
| 6346 | Back—Pickup housing back | .45 |
| 7593 | Arm—Pickup arm less pickup | 6.00 |

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | **MOTOR ASSEMBLIES** | |
| 3599 | Screw—Motor mounting screw and lock-washer—Package of 3 sets | $0.30 |
| 8989 | Motor—105–125 volt—60 cycle motor | 18.52 |
| 8990 | Motor—105–125 volt—50 cycle motor | 18.52 |
| 8993 | Rotor—Rotor and shaft for motor 105–125 volt—60 cycle | 7.00 |
| 8994 | Spindle—Spindle and gear for motor 105–125 volt—60 cycle | 4.75 |
| 8995 | Rotor—Rotor and shaft for motor 105–125 volt—50 cycle | 7.00 |
| 8996 | Spindle—Spindle and gear for motor 105–125 volt—50 cycle | 4.75 |
| | **MOTOR BOARD ASSEMBLIES** | |
| 2779 | Pointer—Volume control pointer—Package of 10 | .50 |
| 2947 | Shoe—Leather brake shoe—Package of 20 | .50 |
| 3322 | Switch—Automatic brake switch | .75 |
| 3442 | Resistor—100 ohm—¼ watt—Carbon type resistor—Package of 5 | 1.00 |
| 4098 | Cord—Power cord and plug | 1.00 |
| 4099 | Cable—Shielded signal cable and plug | 1.25 |
| 4101 | Switch—Single pole—double throw—toggle switch | .75 |
| 4715 | Volume control—Turntable volume control | 3.00 |
| 6247 | Resistor—850 ohm—¼ watt—Carbon type resistor—Package of 5 | 1.00 |
| 6288 | Knob—Volume control knob—Package of 5 | 1.00 |
| 7691 | Support—Pickup support | 4.28 |
| 10174 | Springs—Automatic brake springs—Package of 2 sets | .50 |
| 10184 | Plate—Automatic brake latch trip plate—Package of 5 | .40 |
| 10241 | Box—Needle box with lid—Package of 2 | .60 |

RCA-VICTOR CO., INC.

# VOLTAGE AMPLIFIER PB23M1

## REPLACEMENT OF INPUT TRANSFORMER

Should it become necessary to replace the input transformer in the first stage of the voltage amplifier, care must be used to replace it in such a position that maximum shielding is obtained. The position of the transformer with respect to the amplifier panel which gives minimum hum is the correct position for maximum shielding.

## FIDELITY CHARACTERISTICS

In this voltage amplifier the low-frequency booster circuit is located in the plate circuit of the UY-224A, and the voice frequency filter in the cathode circuit of the RCA-56. The voltage amplifier is connected at the factory to operate with 50-inch baffles. The response at 60 cycles is approximately 90% of the 1000-cycle response and at 100 cycles the response is approximately 60 per cent. If it is desired to shift the low-frequency peak either to a lower frequency or higher frequency, or to change the value of the frequency response, proceed as follows:

(a) To shift the peak to 50 cycles, remove the .02 mfd capacitor C-41 from the low-frequency booster circuit by disconnecting the jumper wire between terminals No. 16 and No. 18 on the capacitor pack. Place the .03 mfd capacitor C-40 in the circuit by connecting a jumper between terminals No. 16 and No. 17.

(b) To shift the peak to 40 cycles, connect the capacitors C-40 (.03 mfd) and C-41 (.02 mfd) in parallel by connecting jumpers between terminals No. 16, No. 17 and No. 18.

(c) If 27-inch baffles or doublet baffles are used on the stage, it will be necessary to shift the low-frequency peak to 80 cycles. To do this, disconnect the jumper wires between terminals No. 16, No. 17 and No. 18 on the capacitor pack. Connect a .02 mfd capacitor (Catalog No. 3639) externally between terminals No. 16 and No. 17 on the capacitor pack. This will connect the .02 mfd capacitor in series with the .03 mfd capacitor C-40 to give .012 mfd across L-30.

(d) To increase the value of response at any of the peak values used in the foregoing, remove the 100,000 ohm resistor R-81 connected across reactor L-30, between terminals on the tube shelf connected to terminals No. 7 and No. 16 on the capacitor pack. If a still further increase, to a maximum of approximately 400 per cent, is desired, shunt the plate resistor R-18 (125,000 ohm) with the 100,000 ohm resistor.

(e) To increase the response at 100 cycles, decrease the value of the shunt resistor R-80, and if a decrease in response is desired increase the value of the shunt resistor R-80. If male voices sound boomy it will be necessary to increase the value of the shunt resistor.

## RADIOTRON SOCKET VOLTAGES

### 120-Volt A. C. Line

| Radiotron | Control Grid Volts | Screen Grid Volts | Plate Volts | Plate Current M. A. | Filament or Heater Volts |
|---|---|---|---|---|---|
| UY-224A | 1.3 | 45 | 185 | .7 | 2.5 |
| RCA-56 | 6.0 | — | 130 | 2.3 | 2.5 |
| UX-245 | 48.0 | — | 250 | 30.0 | 2.5 |
| UX-245 | 48.0 | — | 250 | 30.0 | 2.5 |

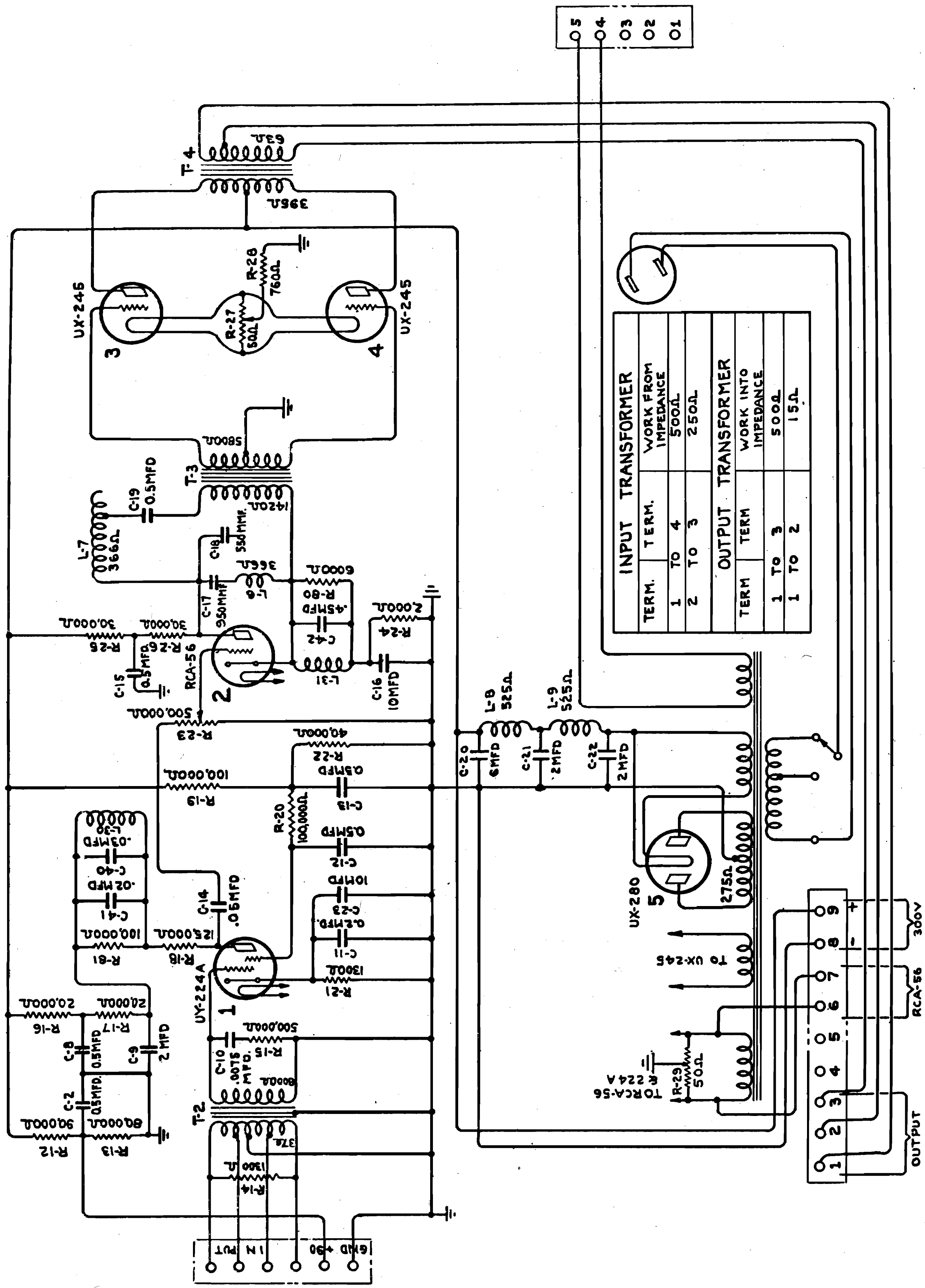
## REPLACEMENT PARTS

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| 20058 | Screws—One set of two special thumb-screws for securing perforated panel | $0.60 |
| 20096 | Screws—One set of two thumb-screws for fastening input shields | 1.00 |
| 21630 | Switch—Single pole, double throw toggle-type switch—mounted on tube shelf | 2.00 |
| 21632 | Cap—First stage Radiotron control grid cap | .75 |
| 22178 | Connector—2-contact male connector | .26 |
| 22186 | Resistor—760 ohm porcelain-type resistor | .90 |
| 22195 | Resistor—500,000 ohm carbon type resistor—½ watt | .50 |
| 22868 | Resistor—80,000 ohm carbon type resistor—½ watt | .50 |
| 22932 | Socket—UX type socket complete with two mounting screws, two lockwashers and two nuts | .60 |
| 23000 | Capacitor—550 mmfd. fixed capacitor | 1.20 |
| 23001 | Resistor—90,000 ohm carbon type resistor—½ watt | .50 |
| 23002 | Capacitor—950 mmfd. fixed capacitor | 1.20 |
| 23003 | Resistor—30,000 ohm carbon type resistor—½ watt | .50 |
| 23004 | Resistor—40,000 ohm carbon type resistor—½ watt | .50 |
| 23005 | Resistor—20,000 ohm carbon type resistor—½ watt | .50 |
| 23006 | Resistor—100,000 ohm carbon type resistor—½ watt | .50 |
| 23007 | Resistor—120,000 ohm carbon type resistor—½ watt | .50 |
| 23009 | Resistor—1,300 ohm carbon type resistor—½ watt | .50 |
| 23014 | Potentiometer—50 ohm hum control potentiometer complete with mounting nut | 2.50 |
| 23015 | Capacitor—.0075 mfd. fixed capacitor complete with two mounting screws (CX 43) | 2.50 |
| 23016 | Capacitor—.05 mfd. fixed capacitor (CX 45) | 2.00 |
| 23017 | Socket—UY type socket complete with insulator, two mounting screws, two lockwashers, and two nuts | .65 |
| 23018 | Knob—Volume control potentiometer push-on-type knob | 1.10 |
| 23019 | Cable—Remote volume control contact switch cable | 3.00 |
| 23118 | Capacitor—.2 mfd. fixed capacitor (CX 75) | 1.75 |
| 23122 | Resistor—2,000 ohm, ¼ watt, carbon resistor | .20 |
| 23123 | Resistor—1,300 ohm, ¼ watt, carbon resistor | .20 |
| 25065 | Reactor—Filter reactor in metal container complete with four mounting screws, four lockwashers, and four nuts (RT 77) | 25.00 |
| 25376 | Transformer—Output transformer in metal container complete with four mounting screws, four lockwashers, and four nuts (RT 165) | 35.00 |
| 25377 | Transformer—Interstage transformer in metal container complete with four mounting screws, four lockwashers, and four nuts (RT 166) | 25.00 |
| 25381 | Cushion—One set of two sponge rubber cushions for input transformer (¼" x 1" x 3⅜") | 2.25 |
| 25382 | Cushion—One set of three rubber cushions for input transformers (located in metal container) | 5.00 |

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| 25383 | Board—Terminal board engraved "1, 2, 3, 4, 5," complete with five terminals, two mounting screws, two lockwashers, two washers, and two spacers (located under power transformer) | $4.50 |
| 25553 | Resistor—200 ohm porcelain type resistor | 1.40 |
| 25587 | Transformer—Voltage amplifier input transformer—less container (RT 188) | 12.95 |
| 27328 | Capacitor pack—Capacitor pack comprising three 2 mfd. condensers and one 4 mfd. condenser in metal container complete with four mounting screws, four lockwashers, and four nuts (CP 31) | 24.00 |
| 27459 | Transformer—Power transformer (50–60 cycle) complete with four mounting screws, four lockwashers, and four nuts (RT 168) | 50.00 |
| 27514 | Board—Terminal board complete with nine terminals, two mounting screws, two lockwashers, two washers, and two spacers (located under capacitor pack) | 3.95 |
| 27515 | Board—Terminal board complete with six terminals, two mounting screws, two lockwashers, two washers, and two spacers | 3.65 |
| 27576 | Capacitor pack—Comprising four reactors, two 10 mfd. electrolytic condensers, one 2 mfd. capacitor, five ½ mfd., one .45 mfd., one .03 mfd., and one .02 mfd. capacitors in metal container complete with four mounting screws, four lockwashers, and four nuts | 45.00 |
| | **VOLUME CONTROL POTENTIOMETER** | |
| 22869 | Resistor—120,000 ohm, ¼ watt carbon type | .50 |
| 23123 | Resistor—1,300 ohm, ¼ watt carbon type | .20 |
| 23124 | Resistor—700 ohm, ¼ watt, carbon type | .20 |
| 23125 | Resistor—900 ohm, ¼ watt, carbon type | .20 |
| 23126 | Resistor—1,700 ohm, ¼ watt, carbon type | .20 |
| 23127 | Resistor—2,200 ohm, ¼ watt, carbon type | .20 |
| 23128 | Resistor—2,900 ohm, ¼ watt, carbon type | .20 |
| 23129 | Resistor—4,000 ohm, ¼ watt, carbon type | .20 |
| 23130 | Resistor—5,300 ohm, ¼ watt, carbon type | .20 |
| 23131 | Resistor—7,000 ohm, ¼ watt, carbon type | .20 |
| 23132 | Resistor—9,400 ohm, ¼ watt, carbon type | .20 |
| 23133 | Resistor—13,000 ohm, ¼ watt, carbon type | .20 |
| 23134 | Resistor—17,000 ohm, ¼ watt, carbon type | .20 |
| 23135 | Resistor—22,000 ohm, ¼ watt, carbon type | .20 |
| 23136 | Resistor—30,000 ohm, ¼ watt, carbon type | .20 |
| 23137 | Resistor—40,000 ohm, ¼ watt, carbon type | .20 |
| 23138 | Resistor—53,000 ohm, ¼ watt, carbon type | .20 |
| 23139 | Resistor—70,000 ohm, ¼ watt, carbon type | .20 |
| 23140 | Resistor—94,000 ohm, ¼ watt, carbon type | .20 |
| 23141 | Resistor—2,100 ohm, ¼ watt, carbon type | .20 |
| 27534 | Potentiometer—Volume control potentiometer complete | 16.25 |

MODEL PB-23-M1
Schematic

# RCA-VICTOR CO., INC.



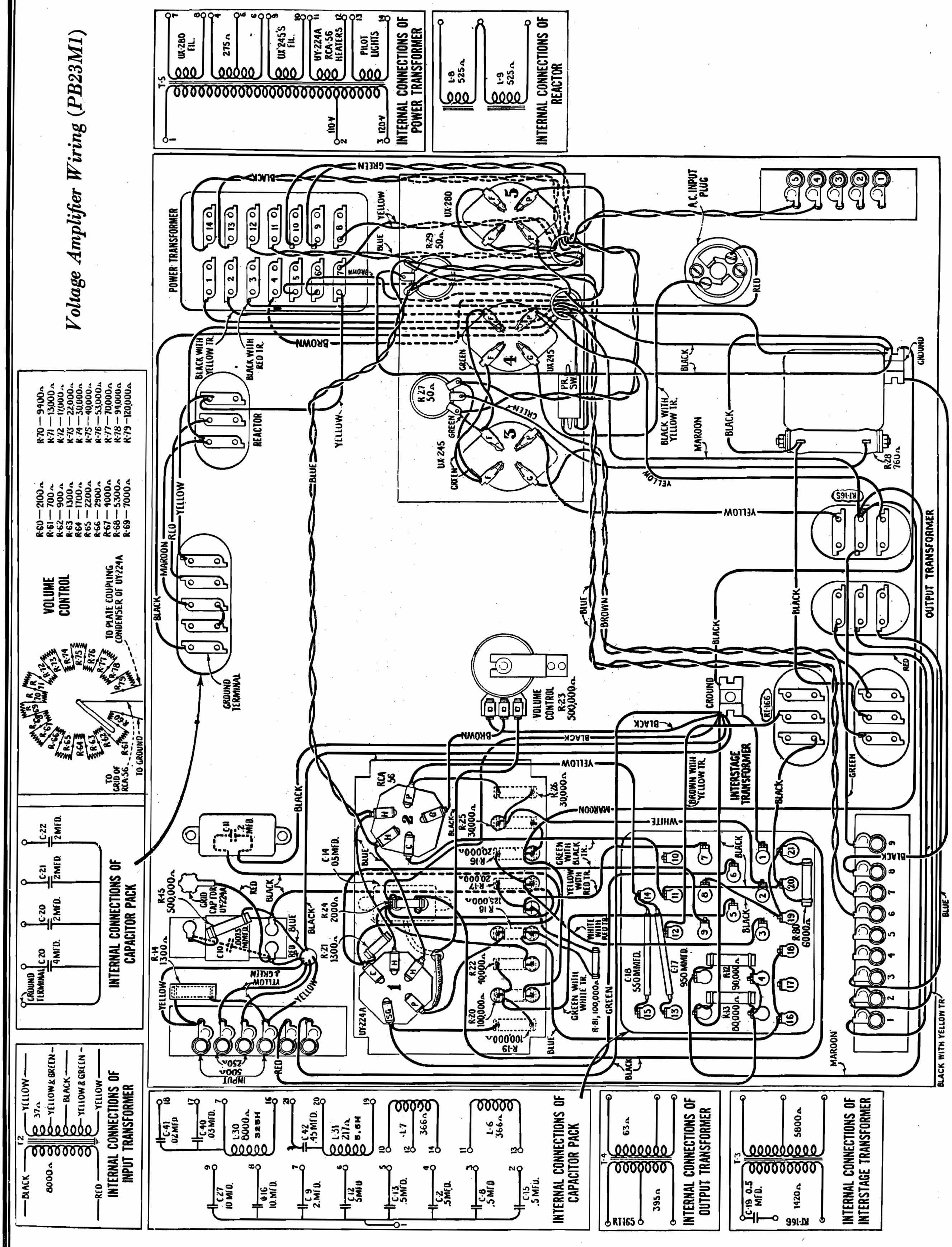
| INPUT TRANSFORMER | | |
| --- | --- | --- |
| TERM. | TERM. | WORK FROM IMPEDANCE |
| 1 | TO 4 | 500Ω |
| 2 | TO 3 | 250Ω |

| OUTPUT TRANSFORMER | | |
| --- | --- | --- |
| TERM | TERM | WORK INTO IMPEDANCE |
| 1 | TO 3 | 500Ω |
| 1 | TO 2 | 15Ω |

*Schematic Circuit Diagram (PB23M1)*

# RCA-VICTOR CO., INC.

**MODEL PB-23-M1**
**Chassis Wiring**



RCA-VICTOR CO., INC.

# Supplement No. 3 to
# RCA Victor Photophone Theatre Reproducing Equipment Type PG-59

## (High Fidelity)

### (1) PA83C1 AMPLIFIER RACK

The PA83C1 Amplifier rack is similar electrically to the PA83B2. The PA83C1 has heavier front panels than previous models of this amplifier type.

### (2) PA83C3 AMPLIFIER RACK—PB82C1 AMPLIFIER UNIT

The frequency response characteristic is a modification of that obtained on previous models. The amplifier is connected at the factory so that more pronounced low frequency response is obtained with the 27-inch baffles. The response is such that no loudspeaker filter is required in the loudspeaker voice coil circuit.

A fuse is connected in series with capacitor C-11 in the PK22 exciter lamp supply unit as a protection to the rectox rectifier and transformer.

Figure 1 shows the rack wiring and schematic diagram of the PA83C3 rack.

### (3) FIDELITY CHARACTERISTICS—PB82C1

#### For 27-inch Baffle

The amplifier unit is connected at the factory so that the response is approximately 160 per cent at 80 cycles, 64 per cent between 200 cycles and 300 cycles, 125 per cent between 2000 cycles and 4000 cycles and then drops off to approximately 40 per cent at 10,000 cycles.

To modify the frequency response characteristic, proceed as follows: See Figure 2.

(a) To reduce the frequency response between 100 cycles and 300 cycles, remove the short circuit which is connected across C-28 and R-40.

(b) Should the operation performed in (a) reduce the extreme low frequency response too much, remove the resistors R-32 and R33 (2 megohms each).

(c) To increase the frequency response between 100 cycles and 300 cycles, remove the 0.1 mfd capacitor C-27 which is shunted across C-3. Open up by-pass circuit on R-9.

(d) To reduce extreme low frequency response disconnect the resistors R-32 and R-33 (2 megohms each) and connect R-41 and R-42 (½ megohm each) in place of those removed.

#### For 50-inch Baffle

(a) If 50-inch Baffles are used with the PG-59 equipment, disconnect the resistors R-32 and R-33 (2 megohms each) and also replace C-25 and C-26 (.04 mfd each) by C-19 and C-20 (.07 mfd each). The frequency response characteristic will then be approximately 160 per cent at 60 cycles, 64 per cent between 200 cycles and 300 cycles, 125 per cent between 2000 cycles and 4000 cycles, and 40 per cent at 10,000 cycles.

(b) To reduce the frequency response between 100 cycles and 300 cycles, remove the short circuit which is connected across C-28 and R-40.

(c) To increase the frequency response between 100 cycles and 300 cycles, remove the 0.1 mfd capacitor C-27 which parallels C-3. Open up the by-pass circuit on R-9.

(d) To reduce the extreme low frequency response, connect resistors R-32 and R-33 (2 megohms each) across the reactors in the grid circuit of the Radiotrons RCA-2A3.

### (4) LOUDSPEAKER—PL52C2

The Model PL52C2 Loudspeaker mechanism has a new type of terminal board for the voice coil circuit as shown in Figure 3. The design of these terminals is such that they are more easily accessible for installation and service work.

# RCA-VICTOR CO., INC.

**MODEL PG-59**
**Chassis Wiring**

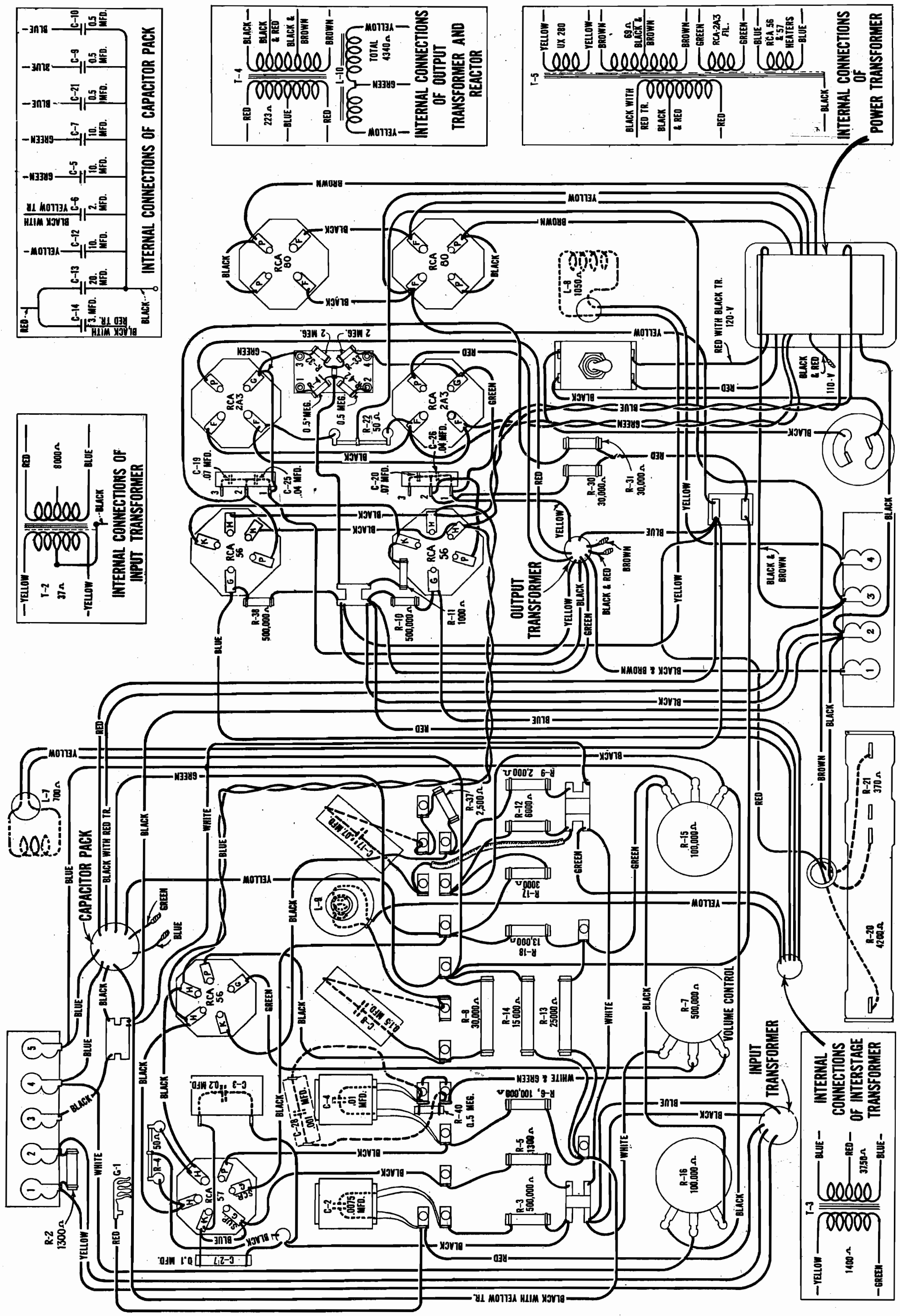



*Figure 2—Amplifier Panel Wiring (PB82C1)—Connected for use with 27 inch baffles*

MODEL PG-59
Schematic

RCA-VICTOR CO., INC.

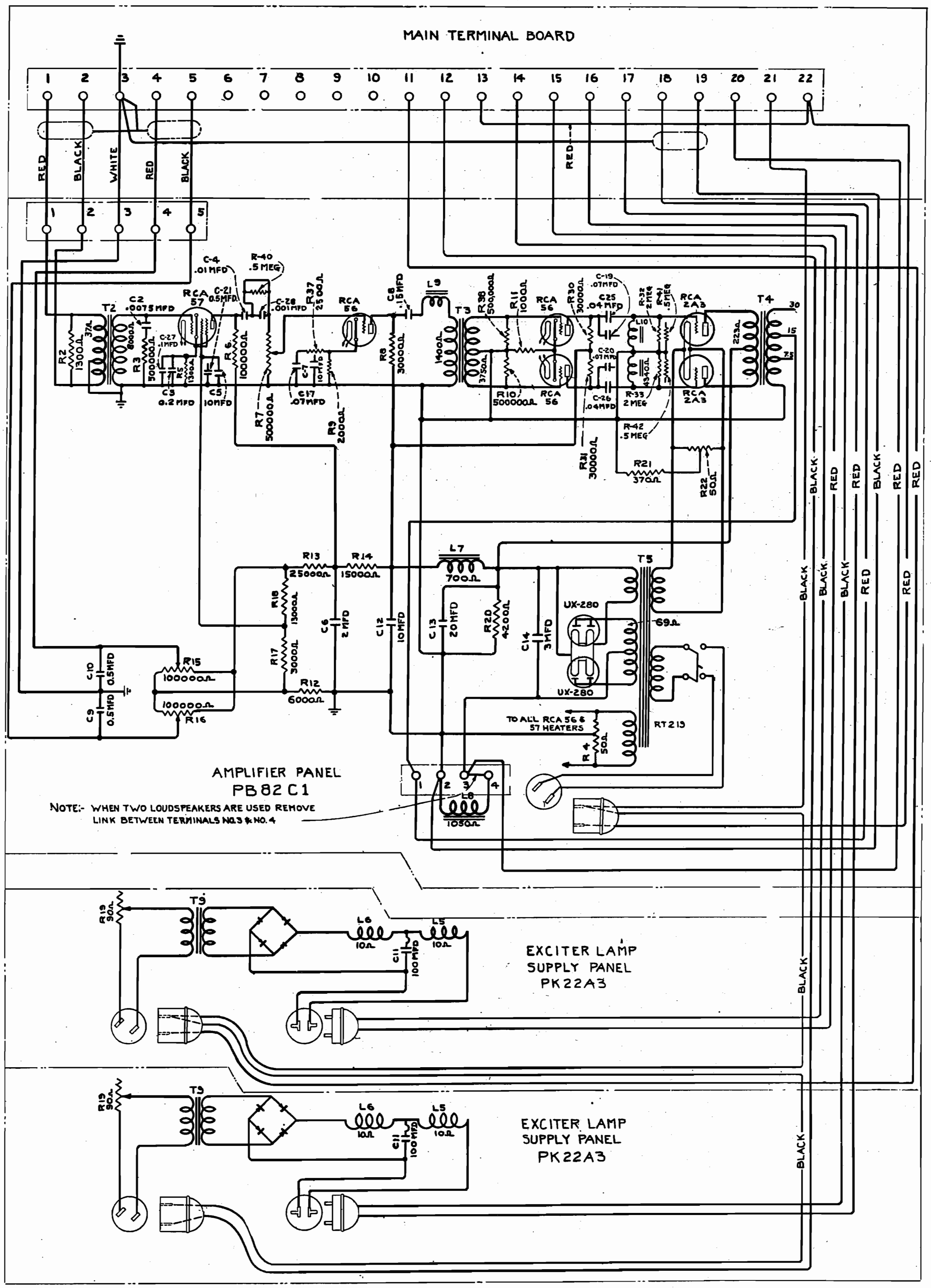
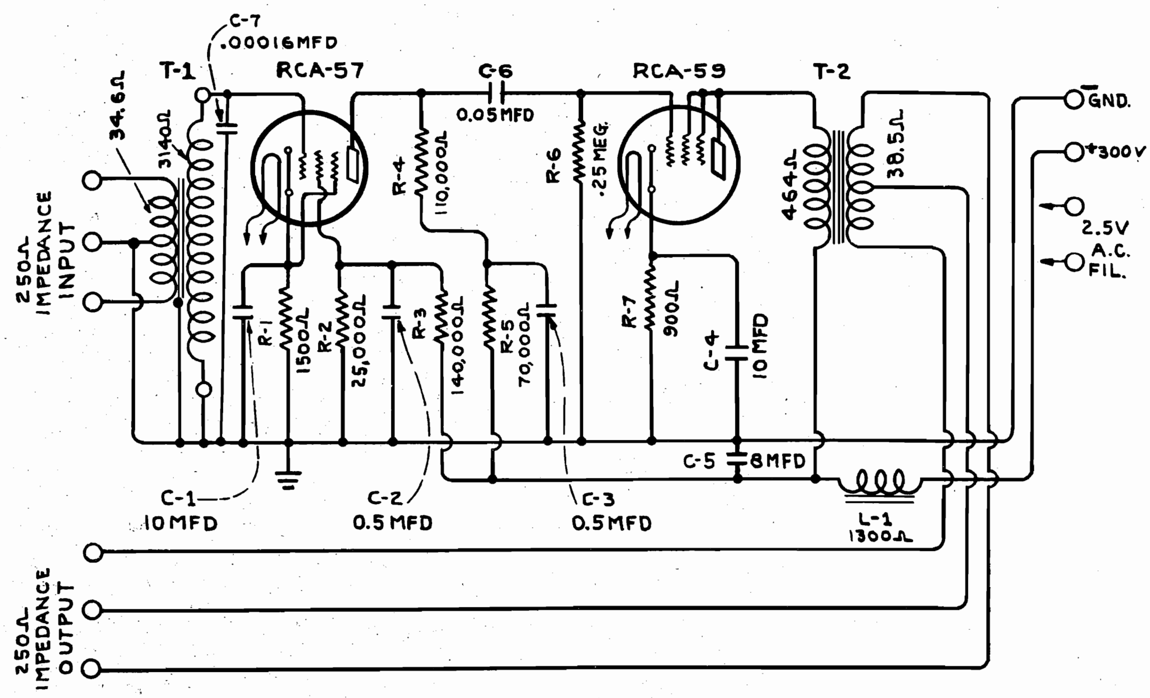



*Figure 1—Pack Assembly Wiring (PA83C3)*

MODEL PA-103-A1
Schematic
Voltage
Parts List

RCA-VICTOR CO., INC.

# PRE-AMPLIFIER PA103A1




*Schematic Wiring Diagram*

## PRE-AMPLIFIER

For program pickup, or where the velocity microphone is used for any purpose except close talking, a pre-amplifier is required for each microphone. The overall gain of this pre-amplifier is 58 DB. The Radiotron voltages for this pre-amplifier are obtained from a PK24B1 power supply unit.

The pre-amplifier is designed to work from a 250-ohm source and into a 250-ohm line.

## RADIOTRON SOCKET VOLTAGES

**120 Volt, A. C. Line**

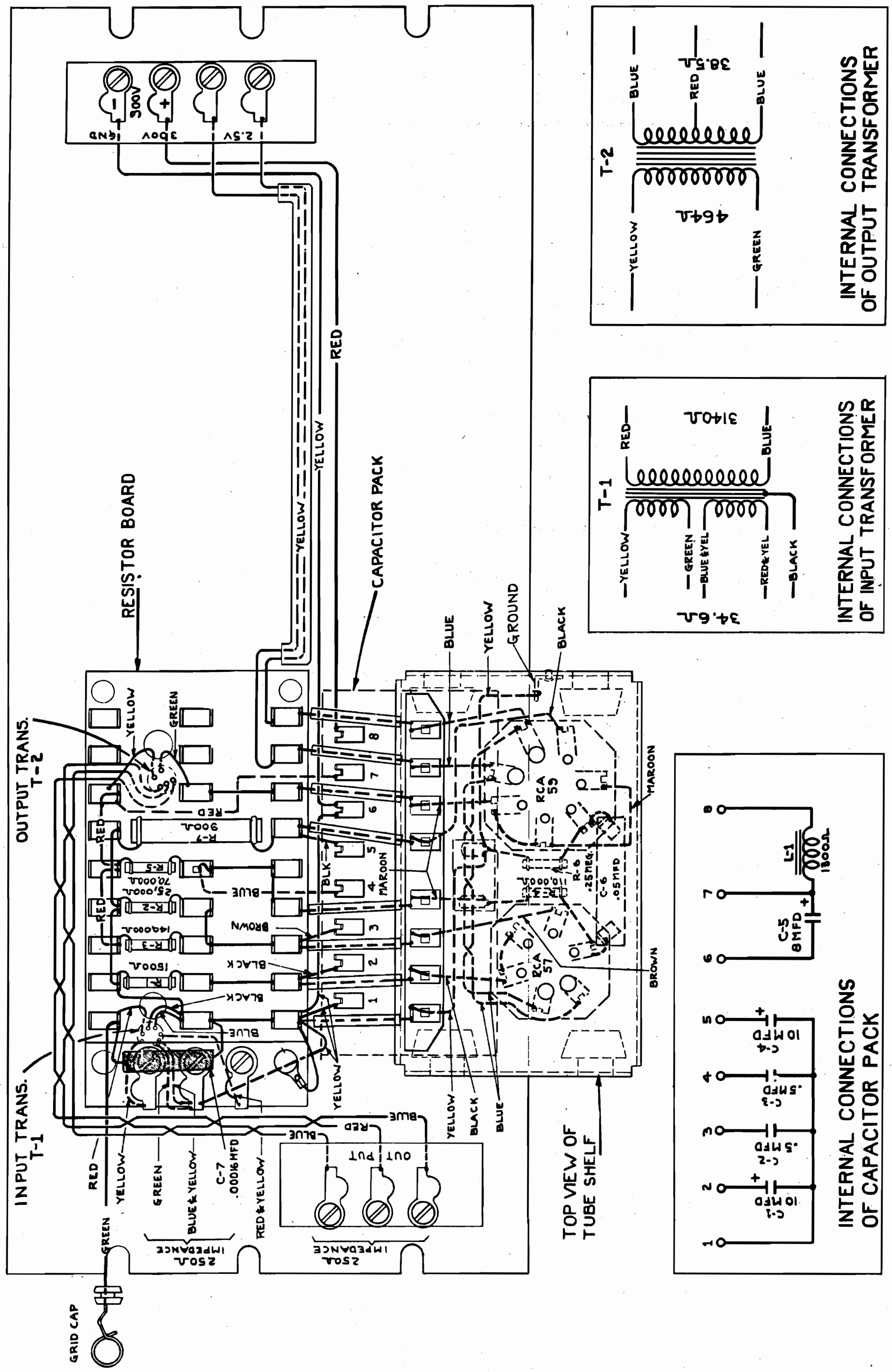
| Radiotron | Control Grid Volts | Screen Grid Volts | Plate Volts | Plate Current M. A. | Heater Volts |
|---|---|---|---|---|---|
| RCA-57 | 1.1 | 40 | 110 | .63 | 2.5 |
| RCA-59 | 22.5 | | 245 | 25.5 | 2.5 |

## REPLACEMENT PARTS

| Stock No. | DESCRIPTION | List Price | Stock No. | DESCRIPTION | List Price |
|---|---|---|---|---|---|
| | MICROPHONE PRE-AMPLIFIER Model PA103A1 | | 23178 | Resistor—110,000 ohm, ¼ watt carbon resistor (R4) | .20 |
| 2747 | Cap—Control grid cap | $0.10 | 25532 | Socket—6-contact Radiotron socket | .40 |
| 3110 | Resistor—25,000 ohm, ¼ watt carbon resistor (R2) | .20 | 25626 | Socket—7-contact Radiotron socket | .45 |
| 3634 | Capacitor—160 mmfd. fixed capacitor (C7) | .34 | 25840 | Board—Input terminal board complete with three terminals | 1.62 |
| 3713 | Capacitor—.05 mfd. fixed capacitor (C6) | .32 | 25841 | Board—Voltage supply terminal board with four terminals | 2.00 |
| 3744 | Resistor—250,000 ohm, ¼ watt carbon resistor (R6) | .20 | 25842 | Board—Output terminal board complete with three terminals | 1.56 |
| 3853 | Resistor—1,500 ohm, ¼ watt carbon resistor (R1) | .20 | 27586 | Transformer—Input transformer complete with three rubber cushions (RT-231) | 9.34 |
| 6241 | Resistor—140,000 ohm, ¼ watt carbon resistor (R3) | .20 | 27587 | Transformer—Output transformer (RT-232) | 30.00 |
| 23094 | Latch—Male section of shield cover latch | .35 | 27588 | Capacitor pack—Comprising two 10 mfd., one 8 mfd., two .5 mfd. capacitors, and one filter reactor in container (C1, C2, C3, C4, C5, L1) | 11.76 |
| 23176 | Resistor—70,000 ohm, ¼ watt carbon resistor (R5) | .20 | | | |
| 23177 | Resistor—900 ohm, 1 watt carbon resistor (R7) | $0.22 | | | |

MODEL PA-103-A1
Panel Wiring

RCA-VICTOR CO., INC.




*Pre-Amplifier Panel Wiring (PA103A1)*

# RCA-VICTOR CO., INC.

The RCA Victor Portable Public Address System, Type PG-62 is a complete amplifying system consisting of an amplifier, a microphone, and two loudspeakers. It is designed for use as a sound reinforcing system in auditoriums, theatres and churches or for outdoor gatherings. The equipment is entirely A. C. operated, power for its operation being obtained from any 50 or 60 cycle, 110 volt house lighting receptacle. The maximum undistorted power output of this equipment is 20 watts which is sufficient to meet the average requirements of sound reinforcement in auditoriums with a capacity up to 2,500 seats.

The amplifier consists of two units; the voltage and power amplifier units both mounted in a carrying case. The loudspeakers, two of which are supplied with the equipment, are each mounted in a wooden housing. A special carrying case is provided for the loudspeakers when they are to be transported.

A velocity type microphone, the latest type developed by the RCA Victor engineers, is also furnished as a standard part of the equipment. Provision is made for placing microphone and stand together with the microphone interconnecting cables in the amplifier carrying case when the equipment is to be transported. Figure 1 shows the equipment set up for operation.

All the controls except the power control switch are mounted on the voltage amplifier base and are easily accessible to the operator. The controls consist of the power control switch mounted on the power amplifier base, the microphone volume control, amplifier volume control, the speech clarifying switch and the tone switch. Figure 2 shows the location of the various controls.

Facilities are provided for operating the equipment with a phonograph turntable. If it is desired, phonograph music may be played as a background for the microphone pick-up, the volume of each being controlled independently of each other. In the Universal Amplifier Assembly a microphone selector switch is mounted on the voltage amplifier to permit the u[illegible] carbon type microphone with the equipment.

### MODEL PG62C1 EQUIPMENT

#### Amplifier (Model PA97A2)

| *Model* | *Amplifier* | *Number of Stages* |
|---|---|---|
| PB88A3 | Voltage | 3 |
| PB89A1 | Power | 2 |

#### Loudspeakers

| *Model* | *Field Resistance* |
|---|---|
| PL71A1 | 1,350 Ohms |
| PL71B1 | 1,950 Ohms |

#### Microphone

| *Model* | *Type* |
|---|---|
| PB90A1 | Velocity |

### UNIVERSAL AMPLIFIER ASSEMBLY

#### Voltage Amplifier

| *Model* | *Number of Stages* |
|---|---|
| PB88A2 | 3 |

#### Power Amplifier

| *Model* | *Number of Stages* |
|---|---|
| PB89B1 | 2 |

## PART I—SETTING UP THE EQUIPMENT

### (1) TYPE PG-62 EQUIPMENT

The equipment is set up for operation in the following manner:

1. Open the amplifier carrying case and lay the two halves on the floor or a table so that the Radiotrons will be in an upright position. Remove the microphone and microphone stand and support.

2. Check and make certain:

(a) That all Radiotrons are in their proper sockets and pressed down firmly. Never apply power to the instrument unless all Radiotrons are in place. See Figure 2.

(b) That the short flexible lead is connected to the top grid contact of the Radiotron RCA-57.

(c) That all shields are rigidly in place over all the tubes in the voltage amplifier and the cap is on the shield over the Radiotron RCA-57.

3. Open the loudspeaker carrying case and remove the two loudspeakers. Place the loudspeakers in a position so that the loudspeaker grilles face in the direction in which the sound beams are desired. Interconnect the two loudspeakers with the cable and plug provided. Connect the loudspeakers to the amplifier by means of the four-pole plug provided on the other loudspeaker cord.

4. Assemble the microphone and the microphone stand and support. Insert the three-pole plug on the end of the microphone cable into the three-pole receptacle on the voltage amplifier.

5. Plug the A. C. power cord into a 105–125 volt, 50–60 cycle A. C. power receptacle. The equipment is now ready for operation.

FUSE: A small cartridge type fuse is located on the end of the power amplifier base. Should it open and the equipment fail to function, replace the Rectifier Tube, RCA-83, and replace the fuse. A deposit of mercury between the elements may have caused the short that burnt out the fuse.

### (2) UNIVERSAL AMPLIFIER

Before the equipment may be set up for operation, certain accessories must be obtained. They are as follows:

1. Microphone, such as the Type PB-90.

2. Microphone stand, such as the table stand, Type PB-96 or the floor stand, Type AZ-4090.

3. One, two, or four loudspeakers having a voice coil impedance of 7½ ohms or 15 ohms each. Each loudspeaker should have its own source of supply for field current. The dry disc rectifier type or the vacuum tube rectifier type is suitable for this purpose.

4. A two conductor loudspeaker cable.

The equipment is set up for operation in the following manner:

1. Insert the Radiotrons in the sockets as shown in Figure 2.

2. Place both the voltage and power amplifiers on a table or on the floor so that the Radiotrons will be in an upright position. Check and make certain:

(a) That all Radiotrons are in their proper sockets and pressed down firmly. Never apply power to the instruments unless all Radiotrons are in place. Figure 2 shows the proper Radiotron locations.

(b) That the short flexible lead is connected to the top grid contact of the Radiotron RCA-57.

(c) That all shields are rigidly in place over all the tubes in the voltage amplifier and the cap is on the shield over the Radiotron RCA-57.

3. Connect the voltage and power amplifiers together by means of the interconnecting cable as shown in Figure 10.

4. Make connections between the loudspeakers and the four pole loudspeaker plug, furnished with the amplifier, as indicated in Figure 3. Insert the loudspeaker plug into the corresponding receptacle on the side of the power amplifier base.

NOTE: If a loudspeaker having a voice coil of 7½ ohms impedance is used, the link between the output transformer and the loudspeaker receptacle should remain connected between terminals 1 and 2, as indicated in Figure 10. If the voice coil impedance is 15 ohms, shift the link so that it connects terminals 2 and 3 on the link terminal board.

5. Insert the three-pole plug on the end of the microphone cable into the three-pole receptacle on the voltage amplifier.

6. Plug the A. C. power cord into a 105–125 volt, 50–60 cycle A. C. power receptacle. The equipment is now ready for operation.

FUSE: A small cartridge type fuse is located on the end of the power amplifier base. Should it open and the equipment fail to function, replace the rectifier tube, RCA-83, and replace the fuse. A deposit of mercury between the elements may have caused the short that burnt out the fuse.

## PART II—OPERATION

After the equipment has been properly located and connected, it may be operated in the following manner. (Refer to Figure 2.) This operating procedure applies to both the PG-62 equipment and the Universal Amplifier.

1. Apply power by turning the power control switch "on," located on the base of the power amplifier.

2. The microphone should be located adjacent to the person talking and to one side of the loudspeaker. It should preferably not be located either directly in front or at the rear of the loudspeaker as acoustic feedback will result. Turning the microphone, with both volume controls at maximum, until the position where the least sound is produced in the loudspeakers due to feedback, will allow best operation.

NOTE: The Universal Amplifier Assembly is equipped with a microphone selector switch located on one end of the voltage amplifier. Set this switch in the "Velocity" position when a Velocity Type Microphone is used. When a carbon type microphone is used, set the switch at the "Carbon" position.

Set the Microphone Volume Control, located on the voltage amplifier, at its mid-position. Talk into the microphone at a distance of ten to twenty inches and gradually rotate the Amplifier Volume Control until the desired volume is obtained from the loudspeakers.

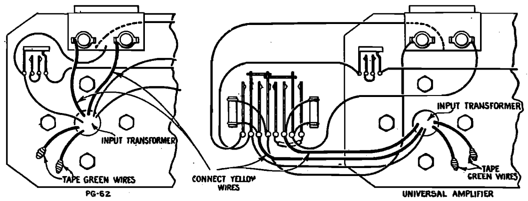



*Figure 4—Wiring changes for two microphone operation*

3. If voice only is to be picked up by the microphone, set the speech clarifying switch in the "speech" position. For musical pickup, the "music" position will give better reproduction. In either case, the "tone" dial, located on the base of the voltage amplifier, should be adjusted for most pleasing reproduction.

# PART III—SPECIAL OPERATION

In some instances, it may be desirable or necessary to use two velocity microphones or more than one power amplifier operated from one voltage amplifier. The following sections cover these special uses of the equipment.

## (1) TWO MICROPHONE OPERATION

In general, the use of more than one velocity microphone with either the PG-62 Equipment or Universal Amplifier is not recommended. This would presume a microphone mixer which is undesirable as the overall gain is insufficient to overcome the attenuation in the mixer.

If it is necessary to use two microphones (not more than two) and keep both in the circuit at the same time, using no fading or mixing arrangement, other than the volume controls on the voltage amplifier, the connections and changes in the amplifier wiring are as follows:

### PG-62 Equipment

(a) Disconnect and tape the two green leads between the microphone receptacle on the voltage amplifier and input transformer.

(b) Connect the two yellow transformer leads (500 ohms) to the microphone receptacle. See Figure 4.

(c) Connect the two microphones in series to the microphone plug as shown in Figure 5.

### Universal Amplifier

(a) Disconnect and tape the two green leads between the microphone selector switch on the voltage amplifier and the input transformer.

(b) Connect the two yellow transformer leads (500 ohms) to the microphone selector switch at the points from which the two green leads were removed. See Figure 4.

(c) Connect the two microphones in series to the microphone plug as shown in Figure 5.

## (2) MULTIPLE OPERATION OF POWER AMPLIFIERS

The Type PB-88 Voltage Amplifier may be used to operate as many as three Type PB-89 Power Amplifiers. The requirements for such operation are as follows:

(a) In each power amplifier, remove the resistor R-18 (50,000 ohms) and replace with a 100,000 ohm, one-watt resistor, Catalog No. 3058.

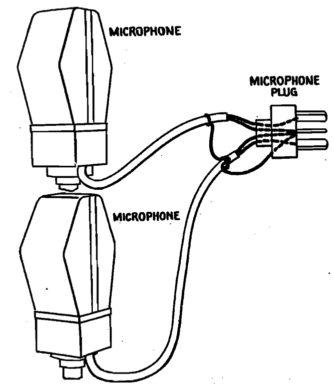



*Figure 5—Two microphones wired to one plug*

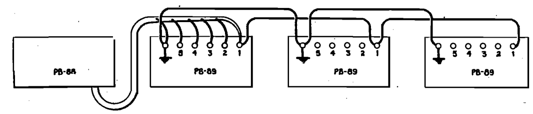



*Figure 6—Multiple Operation of Power Amplifier*

(b) Connect the power amplifiers to the voltage amplifier as shown in Figure 6.

(c) If the Model PB89A1 power amplifiers are used, connect a set of loudspeakers to each power amplifier as shown in Figure 8. If the Model PB89B1 power amplifiers are used, connect a set of loudspeakers to each power amplifier as shown in Figure 3.

(d) Each power amplifier must be connected to a source of A. C. 110 volt, 60 cycle power.

# PART IV—SERVICE DATA ON AMPLIFIER EQUIPMENT

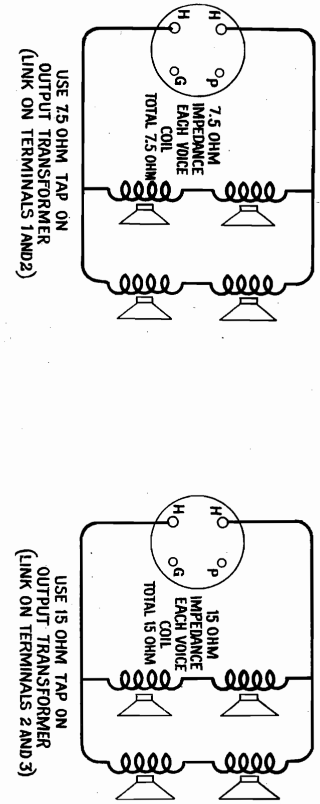
## (1) ELECTRICAL DESCRIPTION OF CIRCUIT

The velocity microphone is coupled to the first stage of the voltage amplifier (RCA-57) by means of an input transformer located on the amplifier base. The link circuit between the microphone transformer and the input transformer is of 250 ohms impedance. A potentiometer is provided in the grid circuit of the RCA-57 to vary the input voltage applied to the grid.

The RCA-57 is resistance coupled to the RCA-56 in the second stage. Another potentiometer is provided in the grid circuit of this RCA-56 to control the output volume of the entire equipment. The RCA-56 is in turn resistance coupled to the RCA-56 in the third stage of the voltage amplifier. The last stage of the voltage amplifier is coupled to the single RCA-59 which is the driver for two Radiotrons RCA-59 in the Class "B" output stage. The output stage supplies power to two loudspeakers through a step-down transformer. This transformer has an output impedance of 15 ohms with a tap at 7½ ohms.

# RCA-VICTOR CO., INC.

MODEL PG-62-C
Operating Notes
Chassis Views
Loud Speaker Data



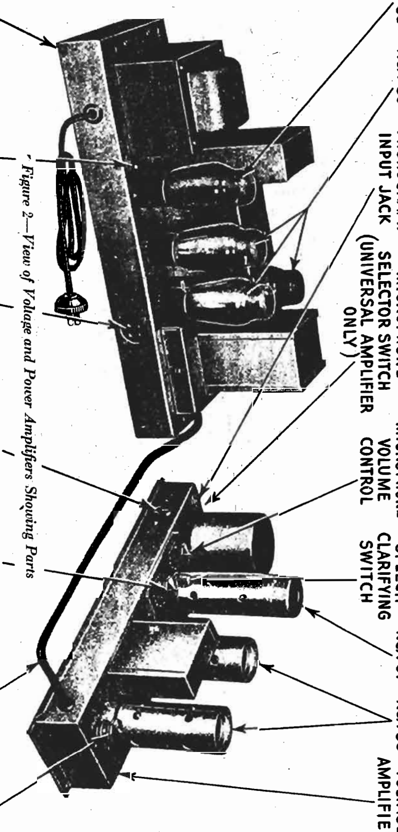
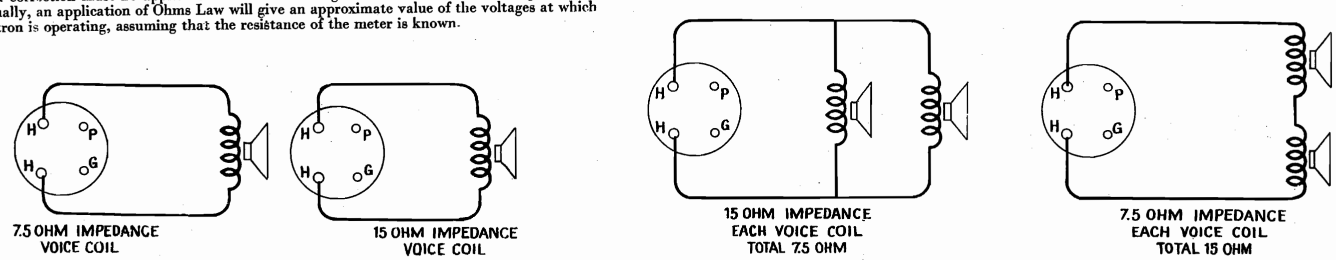




*Figure 2—View of Voltage and Power Amplifiers Showing Parts*

FIG. 3

LOUD SPEAKER WIRING FOR VARIOUS VOICE COIL IMPEDANCES.




## (6) PHASING LOUDSPEAKERS (PG-62 Equipment)

If either of the loudspeaker cones are replaced, the two loudspeakers must be properly phased after the replacement work is done. That is, the motion of both cones must be in the same direction at a given instant when a signal is impressed on them. The following procedure may be used to phase the loudspeakers.

1. Place the two loudspeakers side by side and connect them together by means of the cord and plug provided.

2. Turn the equipment on so that field coils are energized. Apply 6 volts D. C. intermittently to the voice coil terminals at one loudspeaker (black lead and yellow lead on PL71A1 or white lead and red lead on PL71B1). If both cones do not move in the same direction, reverse the voice coil leads to the terminal board of one loudspeaker only.

CAUTION: The loudspeaker fields are at approximately 400 volts above ground. Therefore care must be observed in making tests on the loudspeakers.

## (7) DIRECTIONAL BAFFLE LOUDSPEAKER

It is sometimes desirable to use a directional baffle type of loudspeaker with this amplifying equipment. In this case it is necessary to compensate for the difference between the response frequency characteristic of the flat baffle and the directional baffle. The compensation should consist of a .0005 MFD capacitor (Catalog No. 21648) connected in series with the .005 MFD capacitor C-1, and a 250,000 ohm resistor (Catalog No. 23114) shunted across the speech clarifying switch.

The power supply for both the voltage and power amplifiers is obtained from the RCA-83 and a filter system located on the power amplifier base. The field coil of one loudspeaker in the PG-62 Equipment is used as a filter reactor in the power supply system in the power amplifier. In the Universal Amplifier an additional reactor is used in the filter circuit in place of the loudspeaker field mentioned above.

## (2) CARBON MICROPHONE CONNECTIONS (Universal Amplifier Only)

The Universal Amplifier Equipment is designed so that it will operate with a double button carbon microphone of 250 ohms impedance. A three-pole plug, similar to that employed with the velocity microphone, should be used. Each button on the microphone should be connected to each of the symmetrical poles on the plug. The remaining pole on the plug should be used to connect to the mid-point of the microphone. When using the carbon microphone, the microphone selector switch should be placed at the "Carbon" position.

## (3) PHONOGRAPH CONNECTIONS

An input jack is provided in the grid circuit of the RCA-57 which permits the use of a phonograph turntable RCA Victor Type PT-14, Type PT-15, Type PT-16 or Type PT-17. The instructions for operation of the turntables are included with the phonograph equipment.

## (4) WIRING

The schematic wiring diagram for the PG-62 Equipment is shown in Figure 7. The wiring diagram for the complete PG-62 Equipment is shown in Figure 8. Figures 9 and 10 show the schematic and wiring diagrams respectively for the Universal Amplifier.

## (5) RADIOTRON SOCKET VOLTAGES

The Radiotron socket voltages given in the following tabulation are the actual values at which each Radiotron should operate. In circuits containing high resistance, voltages read on a set analyzer will not agree with the values in the table, due to the relatively low resistance of the meter employed. Therefore, a correction must be applied to the meter reading to obtain the correct voltage at each socket. Usually, an application of Ohms Law will give an approximate value of the voltages at which each Radiotron is operating, assuming that the resistance of the meter is known.

MODEL PG-62-C
Voltage
Parts List

RCA-VICTOR CO., INC.

# RADIOTRON SOCKET VOLTAGES

## 115 VOLT A. C. LINE—NO INPUT SIGNAL VOLTAGE

| Radiotron No. | Control Grid to Cathode or Filament Volts | Screen Grid to Cathode or Filament Volts | Plate to Cathode or Filament Volts | Plate Current M. A. | Filament or Heater Volts |
|---|---|---|---|---|---|
| 1. RCA-57 | 1.0 | 80 | 145 | .25 | 2.5 |
| 2. RCA-56 | 3.5 | — | 120 | 1.2 | 2.5 |
| 3. RCA-56 | 4.0 | — | 165 | 1.6 | 2.5 |
| 4. RCA-59 | 2.8 | — | 242 | 23.0 | 2.5 |
| 5. RCA-59 | 0 | — | 390 | 13.0 | 2.5 |
| 6. RCA-59 | 0 | — | 390 | 13.0 | 2.5 |

**CAUTION:** Whenever the Radiotron RCA-83 rectifier is removed from or installed in its socket, the A. C. power control switch should be in the "off" position.

# REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

| Stock No. | DESCRIPTION | List Price |
|---|---|---|
| | PORTABLE AMPLIFIER ASSEMBLY MODEL PA97A2 | |
| | Power Amplifier | |
| | Models PB89A1 and PB89B1 | |
| 2725 | Fuse—1½ ampere cartridge fuse—Package of 5 | $0.40 |
| 21581 | Resistor—50,000 ohms—Carbon type—1 watt | .50 |
| 21623 | Resistor—15,000 ohms—Carbon type—1 watt | .50 |
| 22451 | Switch—Single pole, single throw—Toggle type | .50 |
| 22853 | Plug—Four-contact male connector plug (for PB89B1) | .50 |
| 23113 | Resistor—1,200 ohms—Carbon type—1 watt | .65 |
| 23119 | Resistor—75 ohms—Carbon type—1 watt | .50 |
| 23120 | Resistor—5,000 ohms porcelain resistor | 2.00 |
| 25536 | Socket—Four-contact Radiotron socket | .35 |
| 25626 | Socket—Seven-contact Radiotron socket | .45 |
| 25627 | Capacitor—4.0 mfd. filter capacitor | 1.00 |
| 25628 | Board—Terminal board complete with five terminals | 1.50 |
| 25629 | Capacitor—0.003 mfd. capacitor | 1.30 |
| 25630 | Capacitor pack—Comprising two 10.0 mfd. capacitors in container | 9.30 |
| 25631 | Reactor—Filter reactor (for PB89A1) | 6.15 |
| 25633 | Cord—Two-conductor power cord and plug | 6.70 |
| 25634 | Reactor—Double filter reactor (RT-200) (for PB89B1) | 8.00 |
| 27526 | Transformer—Power transformer (RT-189) | 12.30 |
| 27527 | Transformer—Audio transformer pack—Interstage and output transformers (RT-190) | 15.30 |
| | Voltage Amplifier | |
| | Models PB88A3 and PB88A4 | |
| 3294 | Resistor—15 ohms—Flexible type resistor (for PB88A4) | .20 |
| 3471 | Capacitor—0.025 mfd. capacitor | .32 |
| 3555 | Capacitor—0.1 mfd. capacitor | .36 |
| 7487 | Shield—Metal shield for Radiotrons | .25 |
| 7488 | Cap—Radiotron shield cap for RCA-57 Radiotron | .20 |
| 21581 | Resistor—50,000 ohms—Carbon type—1 watt | .50 |
| 21632 | Cap—Control grid cap | .75 |
| 22197 | Resistor—2,500 ohms—Carbon type—1 watt | .50 |
| 22621 | Resistor—200,000 ohms—Carbon type—½ watt | .50 |
| 22859 | Switch—Single pole, single throw—Toggle switch | .65 |
| 23004 | Resistor—40,000 ohms—Carbon type—½ watt | .50 |
| 23006 | Resistor—100,000 ohms—Carbon type—½ watt | .50 |
| 23007 | Resistor—120,000 ohms—Carbon type—½ watt | .50 |
| 23008 | Resistor—3,000 ohms—Carbon type—½ watt | .50 |
| 23011 | Resistor—50,000 ohms—Carbon type—½ watt | .50 |
| 23115 | Resistor—60,000 ohms—Carbon type—½ watt | $ .50 |
| 23116 | Resistor—4,000 ohms—Carbon type—½ watt | .50 |
| 23117 | Resistor—100 ohms—Carbon type—¼ watt | .50 |
| 25531 | Socket—Five-contact Radiotron socket | .35 |
| 25615 | Transformer—Core and coil for input transformer | 10.60 |
| 25617 | Capacitor—0.05 mfd. capacitor | 1.25 |
| 25618 | Capacitor—0.005 mfd. capacitor | 1.40 |
| 25619 | Rheostat—100,000 ohms—Tone control rheostat | 3.70 |
| 25620 | Switch—Triple pole, double throw—Key type switch | 2.60 |
| 25621 | Receptacle—Three-contact female receptacle | 3.60 |
| 25622 | Jack—Phonograph input jack | 1.05 |
| 25623 | Knob—Moulded knob and pointer | .30 |
| 25624 | Cushion—One set of four rubber cushions for input transformer | 3.00 |
| 25625 | Cable—Six-conductor braid covered interconnecting cable | 5.80 |
| 25778 | Potentiometer—75,000 ohms—Microphone volume control potentiometer | 1.35 |
| 25779 | Potentiometer—150,000 ohms—Amplifier volume control potentiometer | 1.75 |
| 25827 | Socket—Six-contact Radiotron socket | .60 |
| 25828 | Cushion—One set of two rubber cushions for socket | .90 |
| 27529 | Capacitor pack—Comprising four 4.0 mfd. capacitors in container | 8.35 |
| | VELOCITY MICROPHONE MODEL PB90A1 | |
| 25782 | Guard—Front and rear guard for microphone | 11.00 |
| 25783 | Transformer—Microphone transformer | 18.00 |
| 25784 | Cable—30 foot, two-conductor, rubber covered, shielded cable | 7.30 |
| 25785 | Plug—Two-conductor male connector plug | 1.75 |
| | LOUDSPEAKER—MODEL PL71A1 | |
| 6184 | Board—Terminal board complete with three terminals | .10 |
| 8969 | Cone—Loudspeaker cone with voice coil | 1.27 |
| 9421 | Coil—Field coil—Comprising coil, cone housing and magnet | 4.32 |
| 25780 | Cable—30 foot, four-conductor, rubber covered cable—Complete with four-contact plug | 7.30 |
| | LOUDSPEAKER—MODEL PL71B1 | |
| 6184 | Board—Terminal board complete with three terminals | .10 |
| 8969 | Cone—Loudspeaker cone with voice coil | 1.27 |
| 9416 | Coil—Field coil comprising coil, cone housing and magnet | 4.00 |
| 25781 | Cable—50 foot, three-conductor, rubber covered, cable—Complete with three-contact plug | 11.00 |

MODEL PG-62-C
Schematic

# RCA-VICTOR CO., INC.

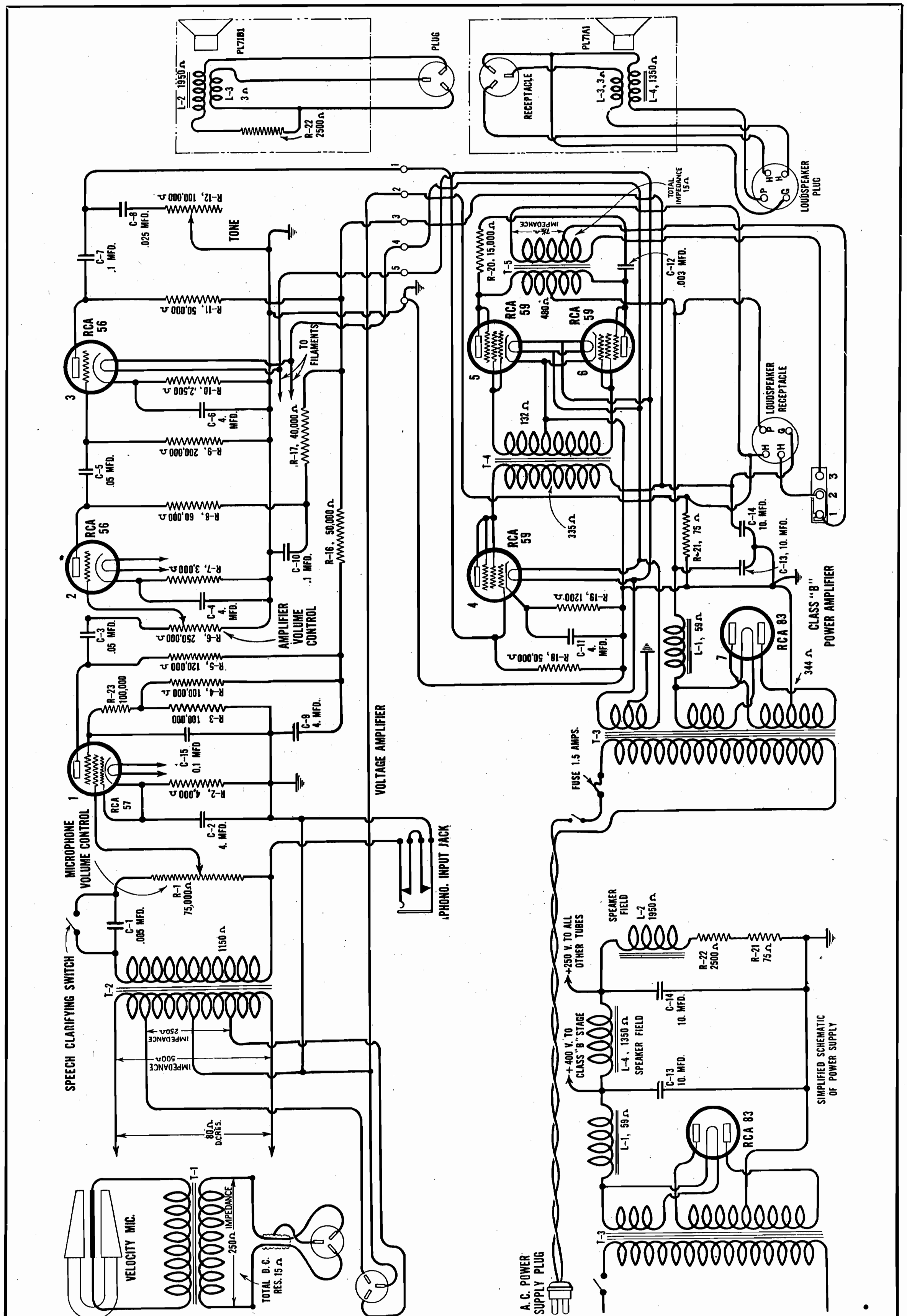



*Figure 7—Schematic Circuit Diagram—PG-62 Equipment*

MODEL PG-62-C
Chassis Wiring

RCA-VICTOR CO., INC.

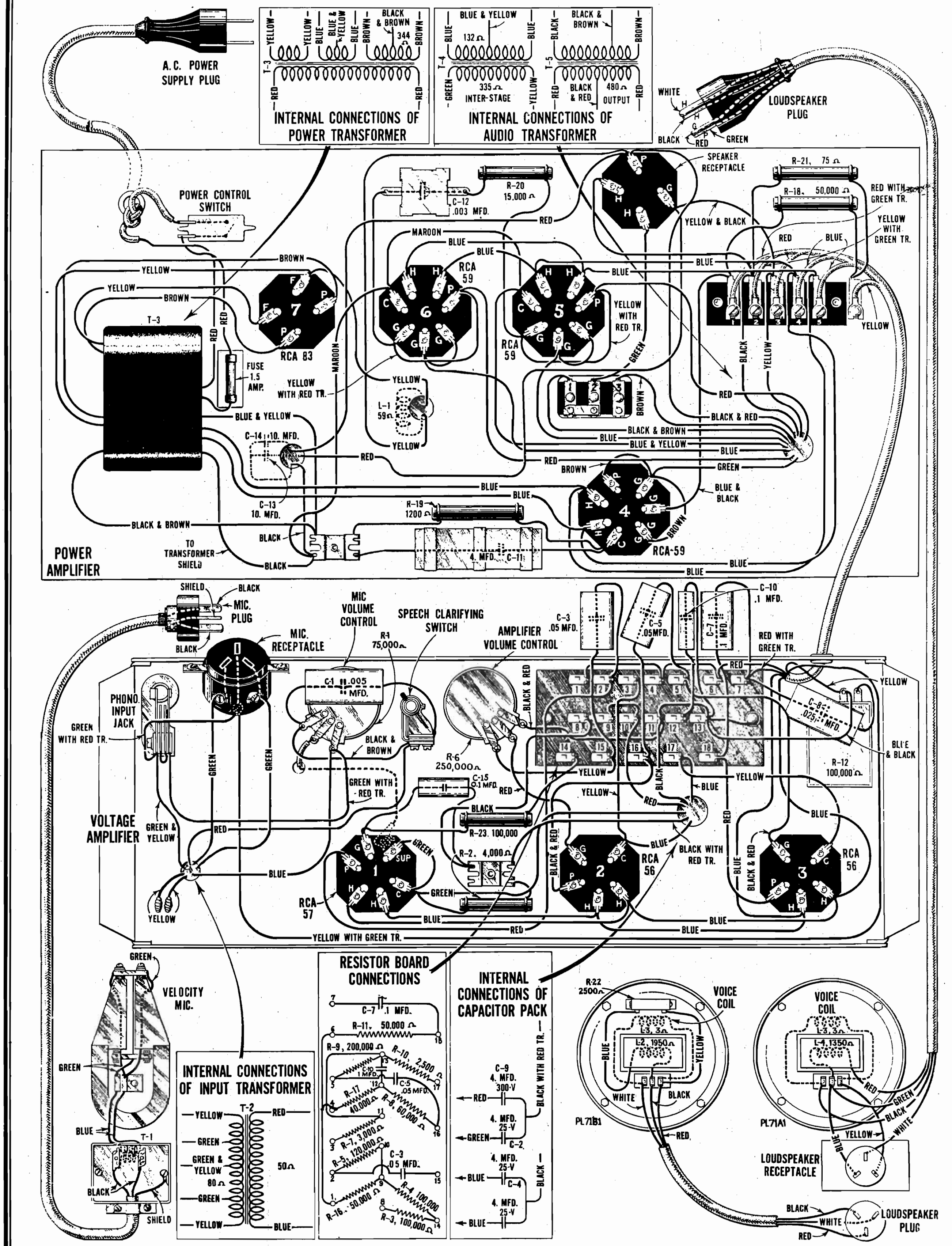



*Figure 8—Wiring Diagram—PG-62 Equipment*

RCA-VICTOR CO., INC.

MODEL PG-62-C
Universal Amplifier
Schematic

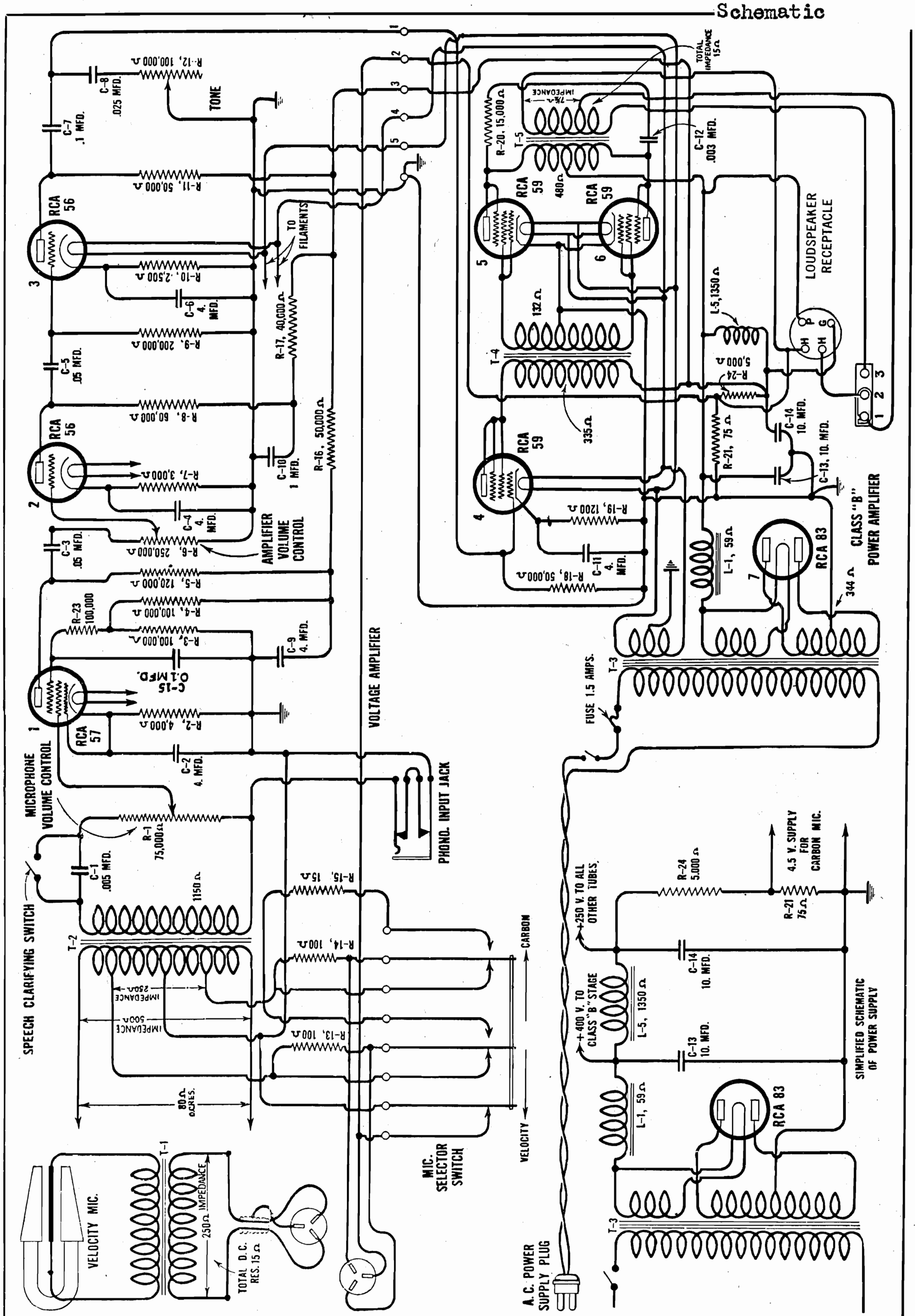



*Figure 9—Schematic Circuit Diagram—Universal Amplifier*

MODEL PG-62-C
Universal Amplifier
Chassis Wiring

RCA-VICTOR CO., INC.

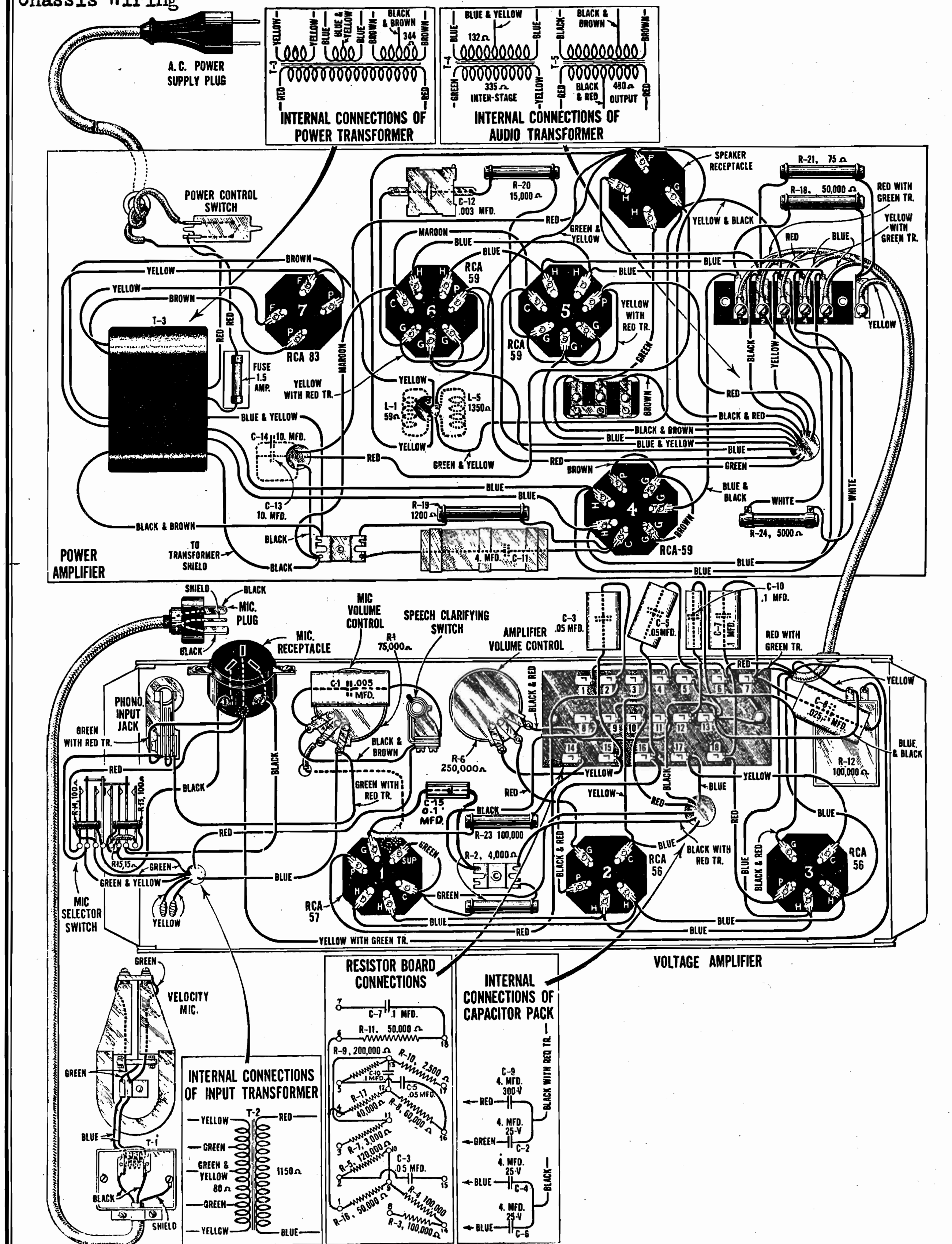



*Figure 10—Wiring Diagram—Universal Amplifier*

MODEL PG-65
Rack Assembly Wiring

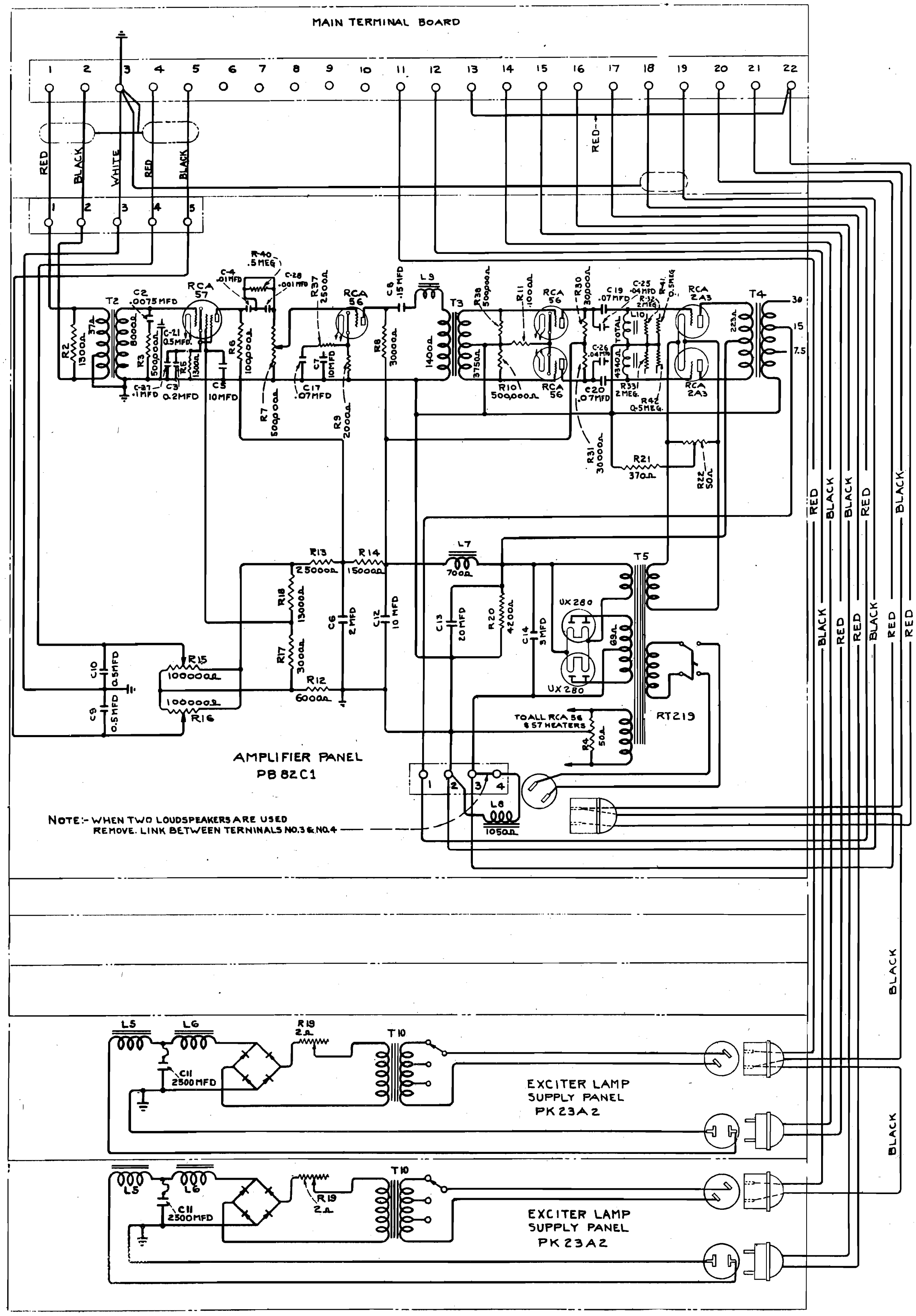



*Figure 1—Rack Assembly Wiring (PA96C1)*

MODEL PG-65
Panel Wiring

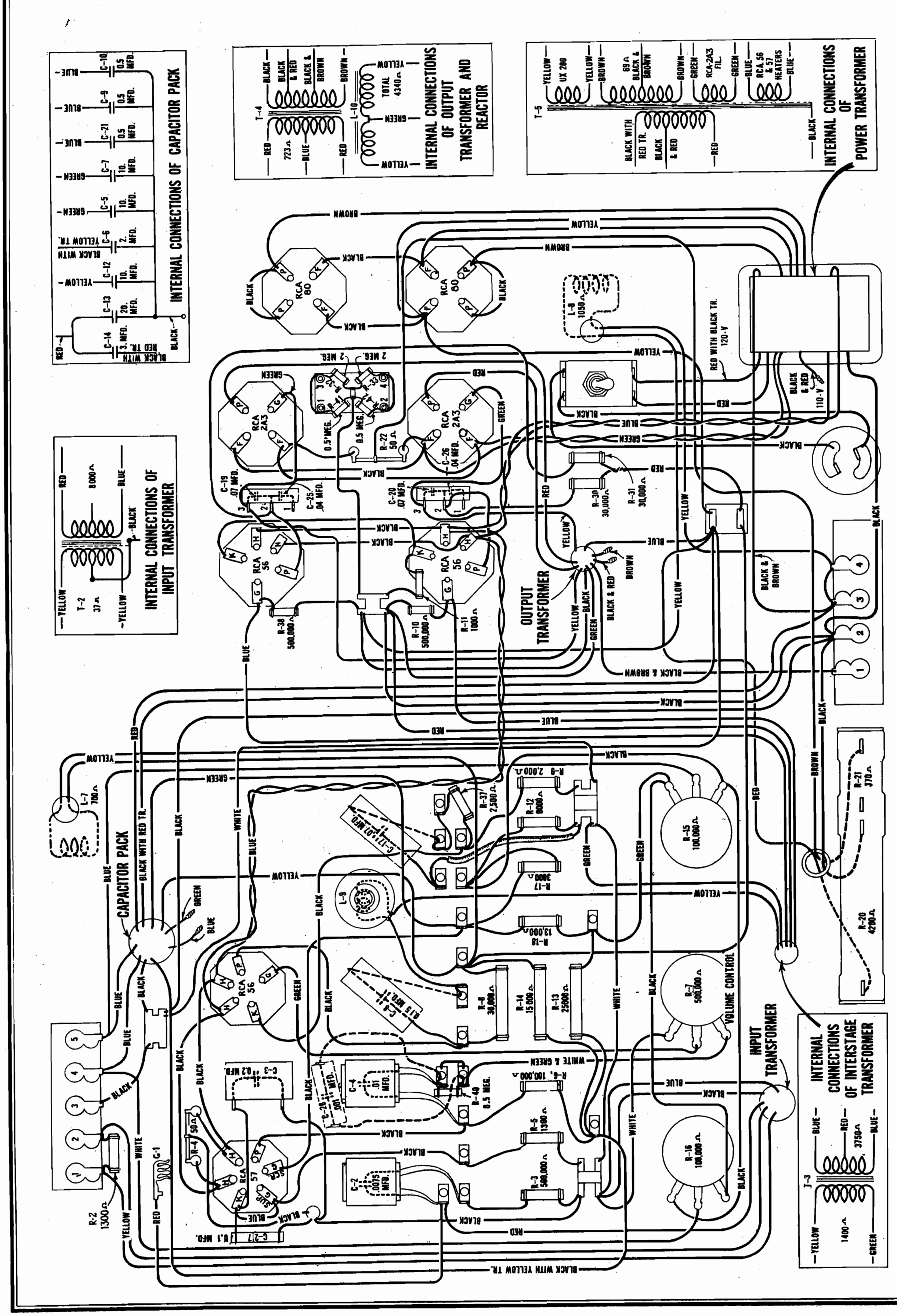



*Figure 2—Amplifier Panel Wiring (PB82C1)—Connected for use with 50 inch baffles*

# Sealed-Vibrator Test

In order to properly test the new sealed type vibrators, it is essential that certain test specifications be made. The following bench layout and test information will permit proper tests of vibrators for all important qualities except R.F. interference. R.F. interference must be tested by installing the vibrator in the instrument in which it is to be used and making an operating test. No other test for R.F. interference is conclusive.

The bench test set-up shown uses the following material:—

- 2 Six-volt storage batteries
- 3 Transformers, Stock Nos. 9457, 9049, 9430
- 1 Ammeter 0-20 (Low Resistance)
- 1 Voltmeter 0-10
- 1 Voltmeter 0-500 (1000 Ohm per volt)
- 1 7000 Ohm 75-Watt Resistor tapped at 5000 Ohms (10,000 Ohms standard stock size)
- 1 Capacitor, Stock No. 6738
- 1 Bracket

The following tabulation gives the proper transformer, load, resistance and other information for tests:

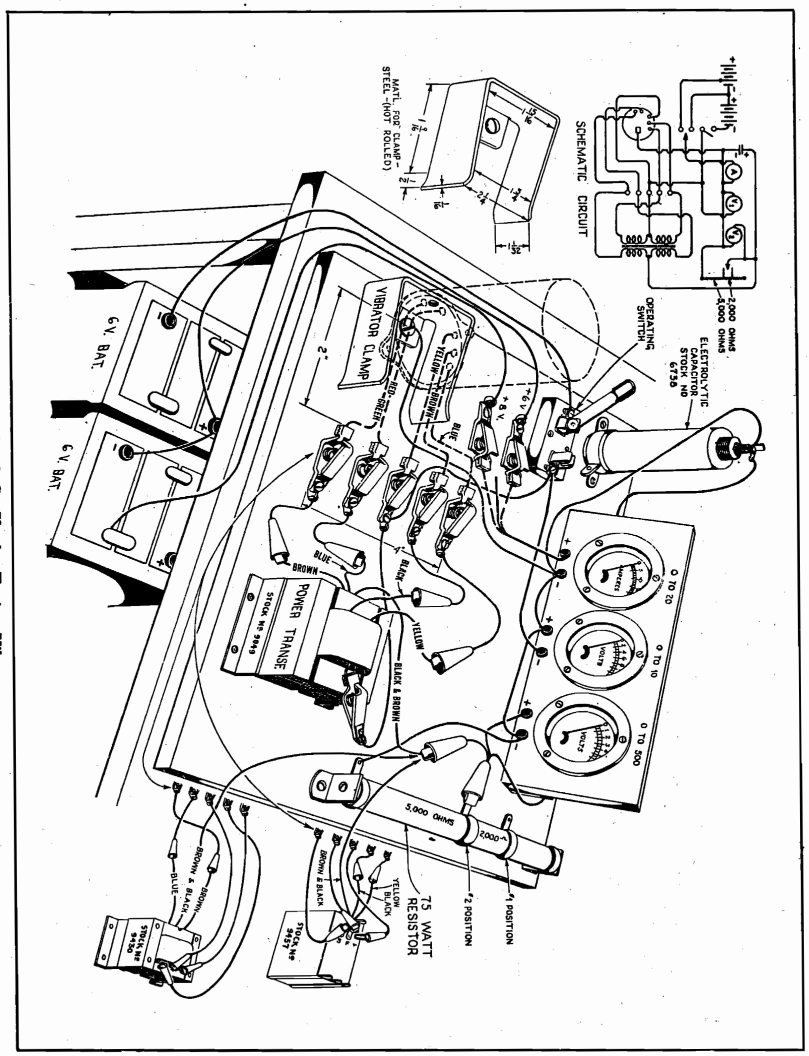
| Vibrator Under Test | Transformer To Be Used | Load Resistance (ohms) | Minimum Output Voltage At 6 Volts Input | Maximum Input Current (amperes) 8 Volts |
|---|---|---|---|---|
| M-34 (7604) | 9430 | 5000 | 210* | 6.25 |
| M-105 (7689) | 9049 | 5000 | 180* | 5.0 |
| M-116 (7694) | 9457 | 7000 | 240* | 5.0 |

*In event reading is reversed, interchange either green and red or brown and blue vibrator leads.

Using the test set-up shown, proceed as follows:—

1. The vibrator should start every time the circuit is properly connected across the 6-volt section of battery. Check starting by feeling for a slight vibration or listening for vibrator noise.
2. The output voltage should be above the values given in the table.
3. The input current should be below the values given in the table.

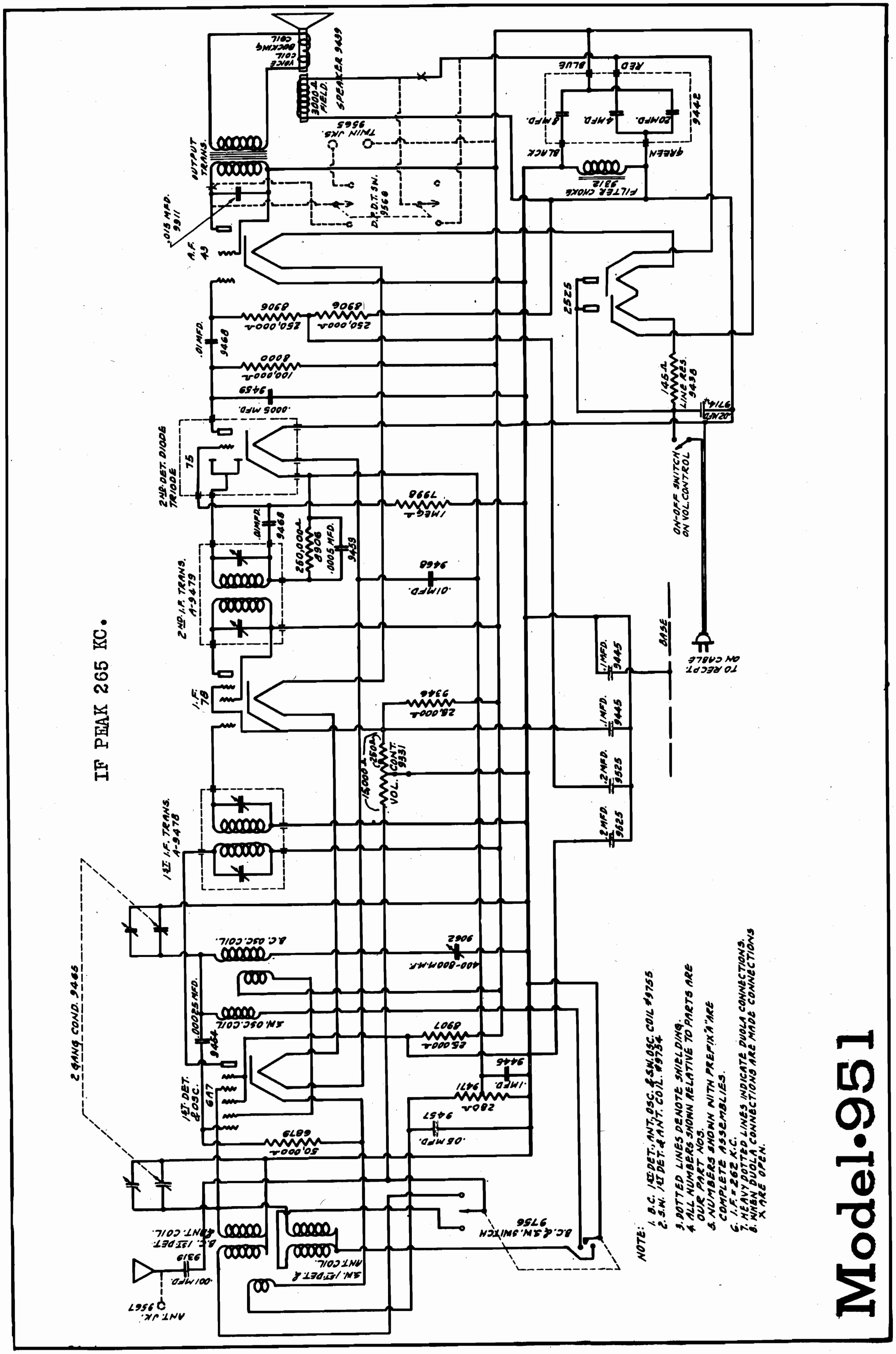
Failure to meet any of these three conditions is sufficient cause for rejection of a unit as defective.




*Typical Bench Set-Up for Testing Vibrators*

**MODEL 951**
**Schematic**

RADOLEK CO.



MODEL 951
Alignment
Voltage

# RADOLEK CO.

These service notes pertain to two receivers which are identical with the exception that one model had Duola connections incorporated in it. These connections are shown in the schematic drawing by the dotted lines. Where Duola provisions are provided connections marked "X" on the diagram are open. Receivers with Duola connections may be identified by the Duola switch and two tip jacks located on the back of the chassis. Receivers which do not have the Duola connections do not have the switch (Part #9566) or the tip jacks (Part #9565).

ALIGNMENT: Only when an antenna,oscillator or IF transformer has become defective due to an open or shorted winding should it be necessary to realign the receiver. For aligning either the intermediate transformer or the variable condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE TRANSFORMER ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 6A7 tube leaving the grid clip disconnected. CONNECT A 50,000 OHM RESISTOR FROM THE CONTROL GRID OF THE 6A7 TUBE TO THE ROTOR FRAME OF THE VARIABLE CONDENSER. The ground side of the test oscillator should be connected to the gang condenser frame and must not be otherwise grounded.

2. Set the oscillator at 265 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer up and down until maximum reading is obtained on the output meter. Then adjust the trimmer screw located inside of the brass hex nut in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer trimmer shields.

4. The second IF transformer should next be adjusted in the same manner as the first intermediate transformer.

TO ALIGN THE VARIABLE CONDENSER:

1. Place the band selector switch for operation on the 1500-540 kilocycle band (right hand position) and tune the receiver to exactly 1400 kilocycles on the dial and set the oscillator to this frequency. Next, adjust the trimmer screws of the oscillator and antenna section of the variable condenser to obtain maximum output reading. These trimmers are mounted on the top of the variable condenser.

2. Tune the receiver and set the oscillator frequency to approximately 600 kilocycles. Adjust the 600 kilocycle padding condenser which is located on the rear of and accessible through the small hole in the chassis for maximum output. Be sure to rock the variable condenser slightly to the right and left so as to obtain the position of greatest output.

NOTE: There is no short wave adjustment. After alignment has been properly made in accordance with the instructions given, the dial calibration will be correct and the receiver will properly track on short wave band.

VOLTAGE TABLE

| TYPE OF TUBE | POSITION OF TUBE | FILAMENT VOLTS | PLATE VOLTS | SCREEN VOLTS | CATHODE VOLTS | OSC. GRID NO.1 | ANODE GRID NO.2 | SCREEN GRID NO.3 & 5 |
|---|---|---|---|---|---|---|---|---|
| 6A7 | Oscillator & Modulator | 5.2 | 128 | | 2.00 | 1.5 | 125 | 76 |
| 78 | Intermediate Frequency | 5.1 | 128 | 128 | 2.25 | | | |
| 75 | 2nd Detector Diode & AVC | 5.0 | 82.5* | | 2.00 | | | |
| 43 | Output | 25 | 115 | 128 | 20** | | | |
| 25Z5 | Rectifier | 25 | | | | | | |

* Triode plate voltage. Comparative only is not the true voltage applied. The voltmeter, when readings are taken at this point, is in series with a very high resistance.

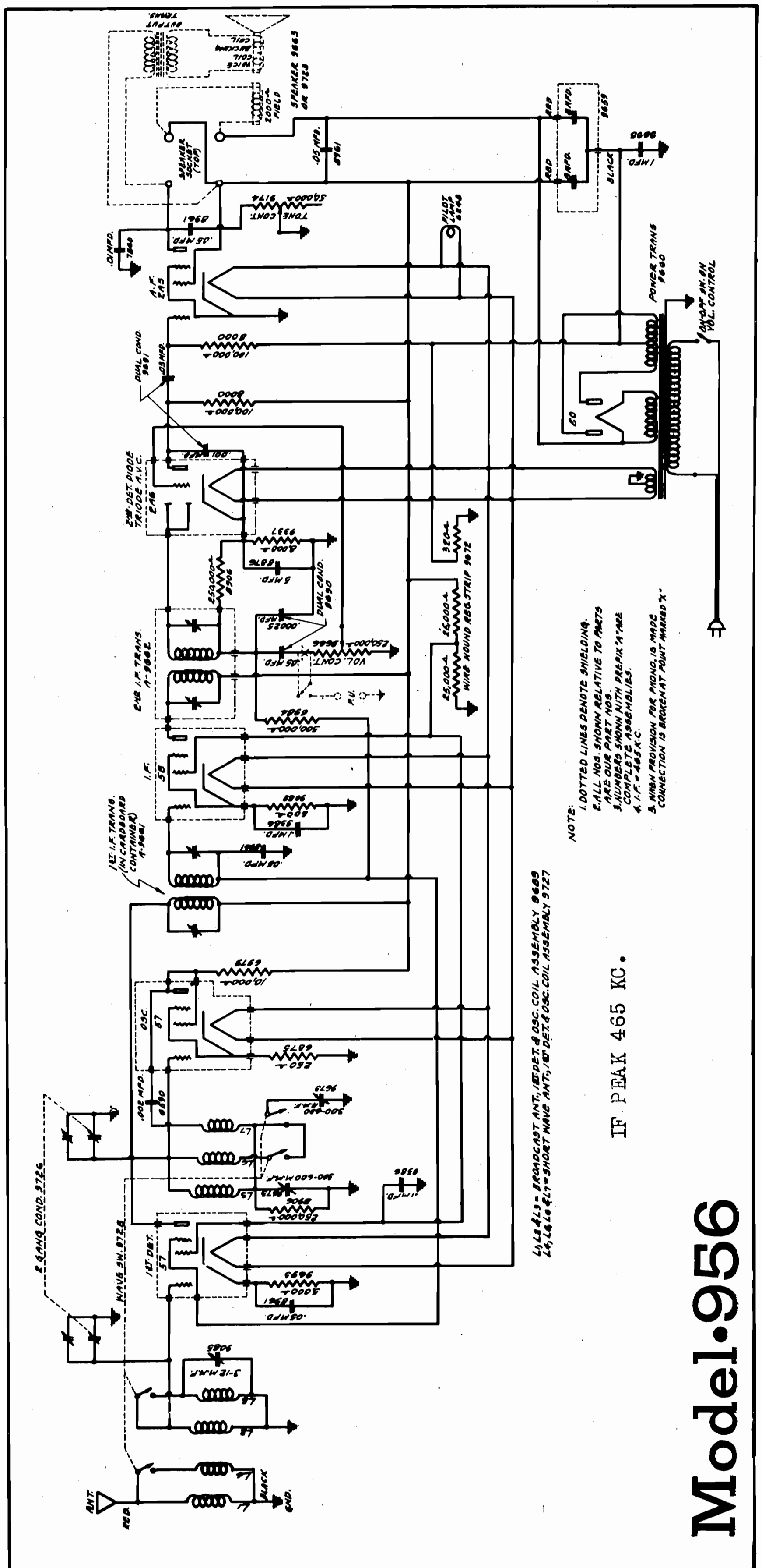
** Bias for the 43 output tube is obtained by the voltage drop across the filter choke. Read bias voltage from cathode to negative side of filter choke.

PARTS AND PRICE LIST

| PART NUMBER | | LIST PRICE |
|---|---|---|
| 9755 | BC Antenna, First Detector, Oscillator & SW Oscillator Coil | $2.14 |
| 9754 | SW Antenna and First Detector Coil | .74 |
| 9478 | First IF Transformer | 1.38 |
| 9479 | Second IF Transformer | 1.38 |
| 9756 | Band Selector Switch | .88 |
| 9465 | Gang Condenser | 2.69 |
| 9331 | Volume Control | 1.32 |
| 9062 | Padding Condenser | .50 |
| 9442 | Dry Electrolytic Condenser | 2.85 |
| 9438 | Wire Wound Resistor Strip 145 Ohms | .60 |

MODEL 956
Schematic

RADOLEK CO.



MODEL 956
Alignment
Voltage

# RADOLEK CO.

VOLTAGE TABLE:

Line Voltage : 115
Volume Control : Full on
Wave Band : Broadcast

| TUBE | FIL. | PLATE | SCREEN | CATHODE VOLTS |
|---|---|---|---|---|
| 57 1st Detector | 2.4 | 230 | 90 | 4.5 |
| 57 Oscillator | 2.4 | 175 | 175 | 1.7 |
| 58 I. F. | 2.4 | 230 | 90 | 4 |
| 2A6 2nd Detector | 2.45 | 160* | | 3 |
| 2A5 A. F. | 2.4 | 218 | 230 | 7** |
| 80 Rectifier | 4.8 | 340 ea.plate | | |

* Comparative voltage only. The voltmeter, when readings are taken at this point, is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

** Read from grid to chassis.

Only when the antenna, oscillator or I. F. transformer has become defective due to an open or shorted winding should it be necessary to realign the receiver. For aligning either the intermediate transformer or the variable condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the type 57 modulator tube (1st detector) leaving the grid cap disconnected. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer up and down until maximum reading is obtained on the output meter. Then adjust the trimmer screw located inside of the brass hex nut in the same manner The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

NOTE: Some of the IF intermediate transformers used do not have the brass hex nut and the trimmer screw inside of the brass hex nut, but have two parallel trimmers which are likewise accessible through two holes provided in the top of the I. F. shield can.

4. The second I. F. transformer should next be adjusted in the same manner as the first I. F. transformer.

VARIABLE CONDENSER ALIGNMENT: It is important when aligning the variable condenser to follow the procedure given carefully, otherwise the dial calibration will be incorrect.

1. Connect the high output side of the oscillator to the antenna and the ground to the chassis.

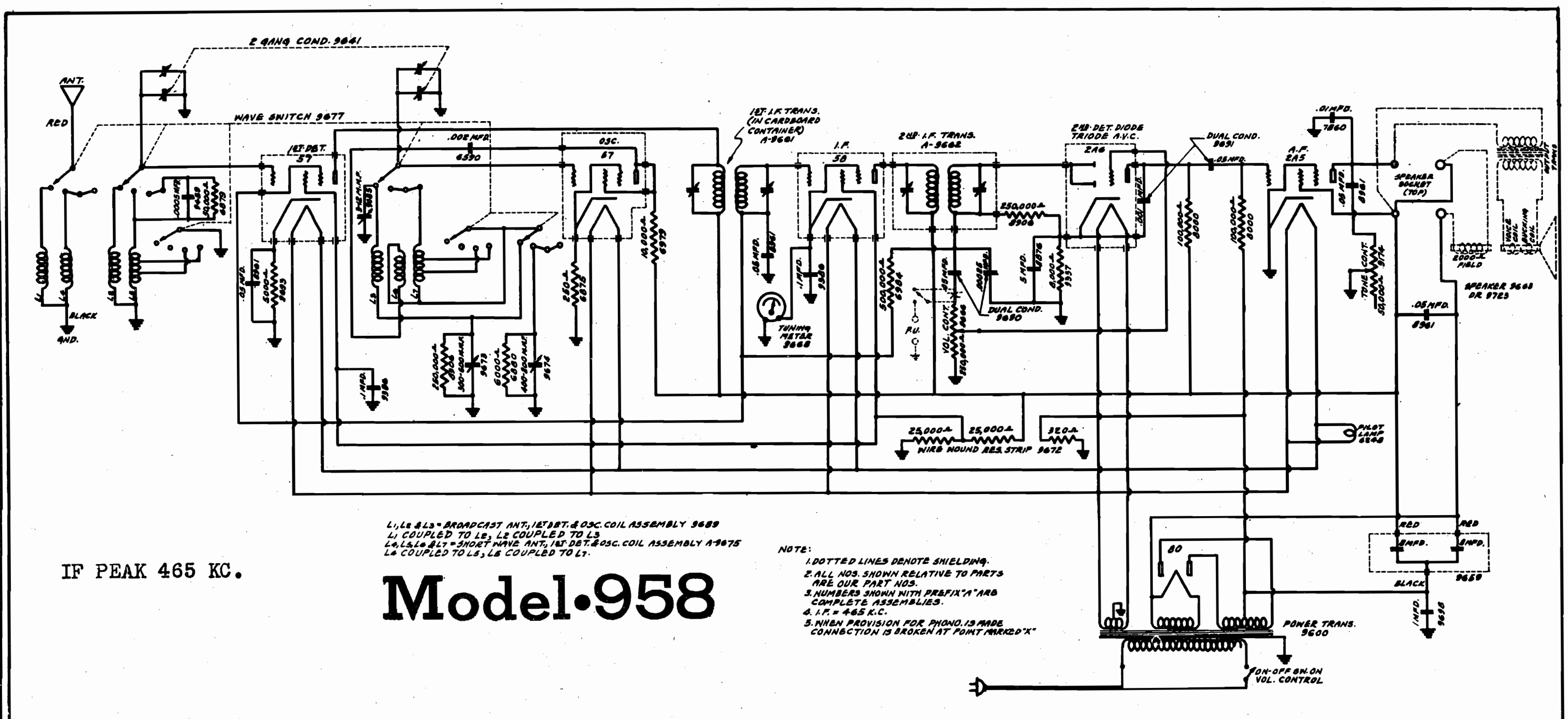
2. Tune the receiver to exactly 1400 kilocycles on the dial, adjust the band selector switch for operation on the broadcast band (1500-540 kilocycles) and set the oscillator to 1400 kilocycles. Then adjust the oscillator variable condenser section trimmer condenser TO BRING THIS SIGNAL IN (maximum output). The oscillator and antenna variable condenser trimmers are mounted on top of the variable condenser. Looking at the front of the receiver the first section of the variable condenser is the oscillator section and the other section tunes the antenna coil.

3. Leave the band selector switch for operation on the same band, set the oscillator at 600 kilocycles and tune the receiver to approximately 600 kilocycles on the dial. Then adjust the 600 kilocycle padding condenser which is the one located towards the front on the right hand side of the chassis and accessible through the small hole in the chassis for maximum output. It is necessary to rock the condenser slightly to the right and left to obtain the correct position. After aligning the 600 kilocycle padding condenser be sure to recheck the 1400 kilocycle adjustment as the 600 kilocycle alignment may have changed the alignment at 1400 kilocycles.

4. Adjust the short wave switch for operation on 1500 kilocycle to 4500 kilocycle band. Set the oscillator at 4 megacycles and the receiver to 4 megacycles on the dial. Turn the receiver on end and BRING THE 4 MEGACYCLE SIGNAL IN (TO MAXIMUM OUTPUT) BY ADJUSTING THE 4 MEGACYCLE TRIMMER located underneath the chassis and adjacent to the band selector switch. Next, tune the receiver to 1600 kilocycles on the dial and set the oscillator frequency to 1600 kilocycles after which adjust the 1600 kilocycle padding condenser which is located on the rear right hand side and accessible through the hole in the chassis for maximum output. It is imperative that after making this adjustment at 1600 kilocycles that the alignment at 4 megacycles be rechecked, as the 1600 kilocycle adjustment may throw the receiver out at 4 megacycles.

# RADOLEK CO.

**MODEL 958**
**Schematic**
**Voltage**




| TUBE | FIL. | PLATE | SCREEN | CATHODE VOLTS |
|---|---|---|---|---|
| 57 1st Detector | 2.4 | 230 | 90 | 4.5 |
| 57 Oscillator | 2.4 | 175 | 175 | 1.7 |
| 58 I.F. | 2.4 | 230 | 90 | 4 |
| 2A6 Second Detector | 2.45 | 160* | | 3 |
| 2A5 A.F. | 2.4 | 218 | 230 | 7** |
| 80 Rectifier | 4.8 | 340 each plate | | |

Line Voltage : 115
Volume Control : Full on
Wave Band : Broadcast

** Read from grid to chassis.

* Comparative voltage only. The voltmeter when readings are taken at this point is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

MODEL 958
Alignment Data

# RADOLEK CO.

TUBE EQUIPMENT: The receiver uses the following tubes:

One (1) type 57 First Detector
One (1) type 57 Oscillator
One (1) type 58 I.F. Amplifier
One (1) type 2A6 Second Detector Diode Triode, AVC.
One (1) type 2A5 Output.

Only when an antenna, oscillator or IF transformer has become defective due to an open or shorted winding should it be necessary to realign the receiver. For aligning either the intermediate transformer or variable condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the #57 Modulator tube (1st detector), leaving the grid clip disconnected. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the 1st intermediate transformer trimmer up and down until maximum reading is obtained on the output meter, then adjust the trimmer screw located inside of the brass hex nut in the same manner. The intermediate transformer screws are accessible through the small hole in the top of the intermediate transformer shields.

4. The second I.F. transformer should next be adjusted in the same manner as the first I.F. transformer.

TO ALIGN THE VARIABLE CONDENSER: It is important when aligning the variable condenser to follow the procedure given carefully, otherwise the dial calibration will be incorrect.

1. Connect the high output side of the oscillator to the antenna and the ground to the chassis.

2. Tune the receiver to exactly 4 megacycles on the dial and adjust the band selector switch for operation on this band.

   Set the short wave trimmer about one-half the distance between maximum clockwise and counter-clockwise rotation.

   Next set the test oscillator to exactly four megacycles and tune the signal in by adjustingthe oscillator variable condenser trimmer mounted on top of the variable condenser. Looking at the front of the receiver the first section of the variable condenser is the oscillator section and the other section tunes the antenna coil.

3. Leave the band selector switch for operation on the same band and tune the receiver to 1.6 megacycles on the dial.

   Set the oscillator to exactly 1.6 megacycles.

   Adjust the padding condenser accessible through the hole in the right hand side of the chassis and the closest to the rear of the chassis to obtain maximum output reading. After making this adjustment recheck the alignment at 4 megacycles. It is advisable to recheck the 1.6 and 4 megacycle adjustment several times.

4. Adjust the band selector switch for operation on the broadcast band.

   Tune the receiver to exactly 1400 kilocycles on the dial and set the oscillator to this frequency.

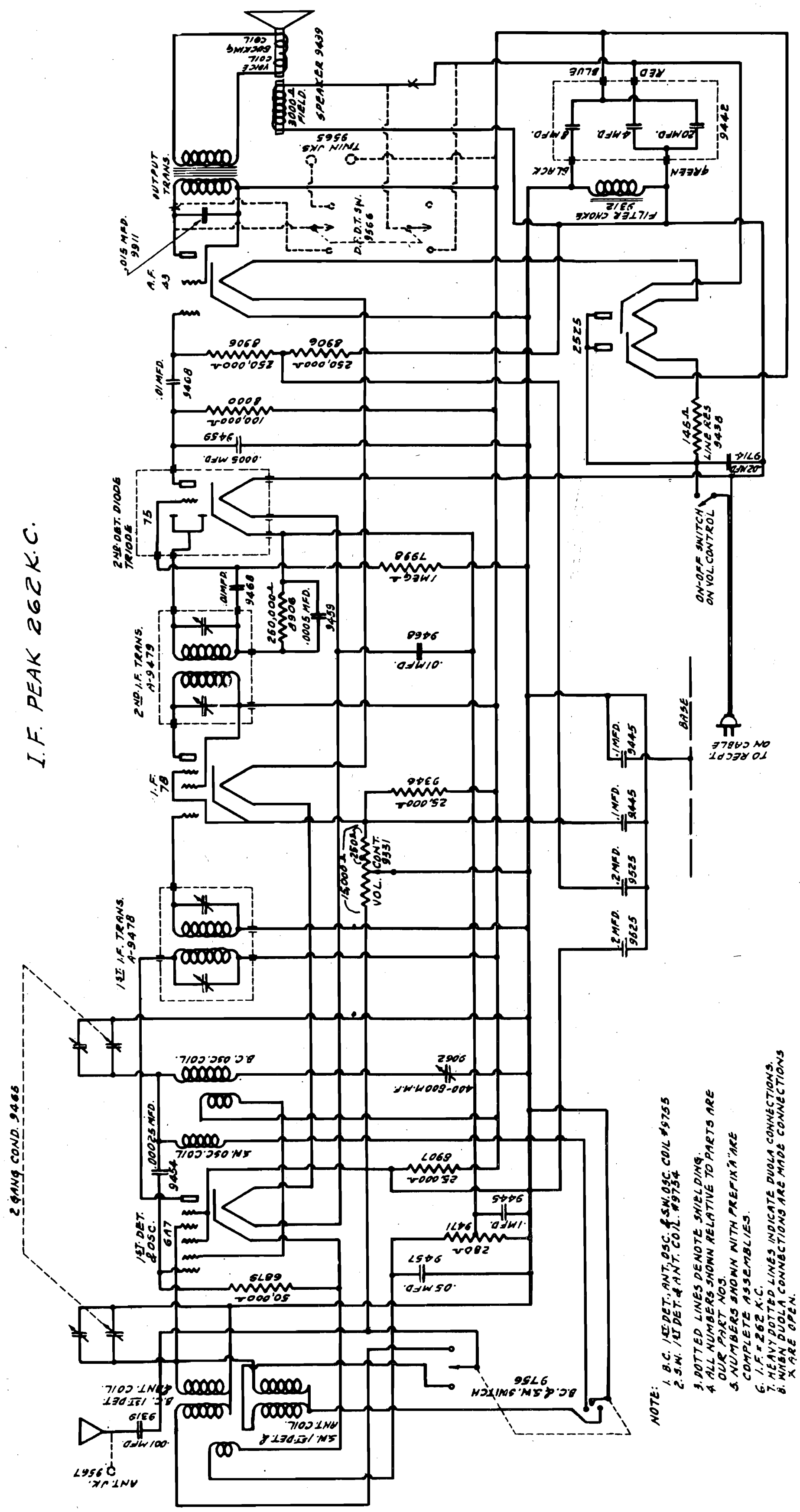
   Turn the receiver on end and adjust the trimmer screw on the small trimmer located adjacent to the short-wave switch underneath the chassis for maximum signal after which adjust the antenna variable condenser trimmer mounted on top of the variable condenser for maximum signal strength.

5. Leave the band selector switch for operation on the broadcast band and tune the receiver to approximately 600 kilocycles and adjust the oscillator to this frequency. Then adjust the 600 kilocycle padding condenser which is located on the righthand side next to the 1.6 megacycle padding condenser for maximum output reading. As this adjustment is quite critical it is necessary to rock the condenser slightly to obtain maximum sensitivity.

   NOTE: Always recheck the 1400 kilocycle alignment after making the adjustment at 600 kilocycles and the 600 kilocycle adjustment after aligning at 1400 kilocycles. All short-wave bands are properly aligned after correctly aligning at 4 megacycles.

MODEL 10951
Schematic

RADOLEK CO.



MODEL 10951
Alignment, Voltage

# RADOLEK CO.

These service notes pertain to two receivers which are identical with the exception that one model had Duola connections incorporated in it. These connections are shown in the schematic drawing by the dotted lines. Where Duola provisions are provided connections marked "X" on the diagram are open. Receivers with Duola connections may be identified by the Duola switch and two tip jacks located on the back of the chassis. Receivers which do not have the Duola connections do not have the switch (Part #9566) or the tip jacks (Part #9565).

ALIGNMENT: Only when an antenna, oscillator or IF transformer has become defective due to an open or shorted winding should it be necessary to realign the receiver. For aligning either the intermediate transformer or the variable condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE TRANSFORMER ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 6A7 tube leaving the grid clip disconnected. CONNECT A 50,000 OHM RESISTOR FROM THE CONTROL GRID OF THE 6A7 TUBE TO THE ROTOR FRAME OF THE VARIABLE CONDENSER. The ground side of the test oscillator should be connected to the gang condenser frame and must not be otherwise grounded.

2. Set the oscillator at 265 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer up and down until maximum reading is obtained on the output meter. Then adjust the trimmer screw located inside of the brass hex nut in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer trimmer shields.

4. The second IF transformer should next be adjusted in the same manner as the first intermediate transformer.

TO ALIGN THE VARIABLE CONDENSER:

1. Place the band selector switch for operation on the 1500-540 kilocycle band (right hand position) and tune the receiver to exactly 1400 kilocycles on the dial and set the oscillator to this frequency. Next, adjust the trimmer screws of the oscillator and antenna section of the variable condenser to obtain maximum output reading. These trimmers are mounted on the top of the variable condenser.

2. Tune the receiver and set the oscillator frequency to approximately 600 kilocycles. Adjust the 600 kilocycle padding condenser which is located on the rear of and accessible through the small hole in the chassis for maximum output. Be sure to rock the variable condenser slightly to the right and left so as to obtain the position of greatest output.

NOTE: There is no short wave adjustment. After alignment has been properly made in accordance with the instructions given, the dial calibration will be correct and the receiver will properly track on short wave band.

VOLTAGE TABLE

| TYPE OF TUBE | POSITION OF TUBE | FILAMENT VOLTS | PLATE VOLTS | SCREEN VOLTS | CATHODE VOLTS | OSC. GRID NO.1 | ANODE GRID NO.2 | SCREEN GRID NO.3 & 5 |
|---|---|---|---|---|---|---|---|---|
| 6A7 | Oscillator & Modulator | 5.2 | 128 | | 2.00 | 1.5 | 125 | 76 |
| 78 | Intermediate Frequency | 5.1 | 128 | 128 | 2.25 | | | |
| 75 | 2nd Detector Diode & AVC | 5.0 | 82.5* | | 2.00 | | | |
| 43 | Output | 25 | 115 | 128 | 20** | | | |
| 25Z5 | Rectifier | 25 | | | | | | |

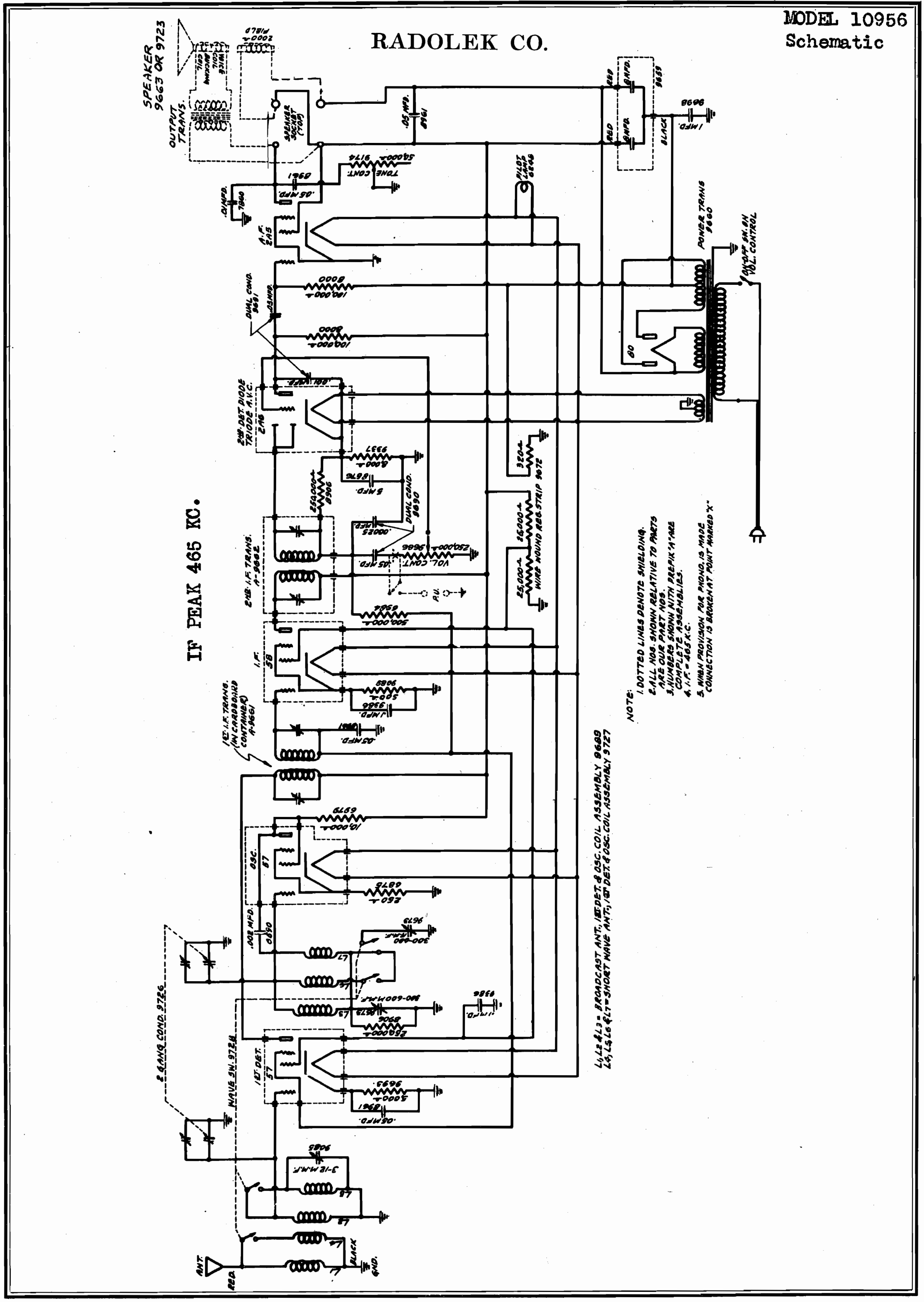
* Triode plate voltage. Comparative only is not the true voltage applied. The voltmeter, when readings are taken at this point, is in series with a very high resistance.

** Bias for the 43 output tube is obtained by the voltage drop across the filter choke. Read bias voltage from cathode to negative side of filter choke.

PARTS AND PRICE LIST

| PART NUMBER | |
|---|---|
| 9755 | BC Antenna, First Detector, Oscillator & SW Oscillator Coil |
| 9754 | SW Antenna and First Detector Coil |
| 9478 | First IF Transformer |
| 9479 | Second IF Transformer |
| 9658 | Power Transformer (110 Volt A.C. only) |
| 9465 | Gang Condenser |
| 9331 | Volume Control |
| 9062 | Padding Condenser |
| 9442 | Dry Electrolytic Condenser |
| 9023 | 6 Volt Pilot Light (110 Volt D.C. only) |
| 9083 | .01 Mfd. Condenser (110 Volt D.C. only) |
| 9569 | 8 Mfd. Condenser (110 Volt A.C. only) |
| 9196 | 25 Mfd. Condenser |
| 9459 | .0005 Mfd. Moulded Condenser |
| 9319 | .001 Mfd. Moulded Condenser |
| 9454 | .00025 Mfd. Moulded Condenser |
| 9465 | .01 Mfd. 400 Volt Condenser |
| 9445 | .1 Mfd. 200 Volt Condenser |
| 9525 | .2 Mfd. 200 Volt Condenser |
| 9417 | .02 Mfd. 400 Volt Condenser |
| 9457 | .05 Mfd. 400 Volt Condenser |
| 9911 | .015 Mfd. 400 Volt Condenser |
| 8906 | 200,000 Ohm 1/3 Watt Resistor |
| 8000 | 100,000 Ohm 1/3 Watt Resistor |
| 8907 | 25,000 Ohm 1/3 Watt Resistor |
| 7998 | 1 Meg Ohm 1/3 Watt Resistor |
| 6879 | 50,000 Ohm 1/3 Watt Resistor |
| 9346 | 25,000 Ohm 1/2 Watt Resistor |

MODEL 10956
Schematic



MODEL 10956

Alignment,Voltage

RADOLEK CO.

| TUBE | FIL. | PLATE | SCREEN | CATHODE VOLTS |
|---|---|---|---|---|
| 57 1st Detector | 2.4 | 230 | 90 | 4.5 |
| 57 Oscillator | 2.4 | 175 | 175 | 1.7 |
| 58 I. F. | 2.4 | 230 | 90 | 4 |
| 2A6 2nd Detector | 2.45 | 160* | | 3 |
| 2A5 A. F. | 2.4 | 218 | 230 | 7** |
| 80 Rectifier | 4.8 | 340 ea.plate | | |

* Comparative voltage only. The voltmeter, when readings are taken at this point, is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

** Read from grid to chassis.

Only when the antenna, oscillator or I. F. transformer has become defective due to an open or shorted winding should it be necessary to realign the receiver. For aligning either the intermediate transformer or the variable condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the type 57 modulator tube (1st detector) leaving the grid cap disconnected. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer up and down until maximum reading is obtained on the output meter. Then adjust the trimmer screw located inside of the brass hex nut in the same manner The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

NOTE: Some of the IF intermediate transformers used do not have the brass hex nut and the trimmer screw inside of the brass hex nut, but have two parallel trimmers which are likewise accessible through two holes provided in the top of the I. F. shield can.

4. The second I. F. transformer should next be adjusted in the same manner as the first I. F. transformer.

VARIABLE CONDENSER ALIGNMENT: It is important when aligning the variable condenser to follow the procedure given carefully, otherwise the dial calibration will be incorrect.

1. Connect the high output side of the oscillator to the antenna and the ground to the chassis.

2. Tune the receiver to exactly 1400 kilocycles on the dial, adjust the band selector switch for operation on the broadcast band (1500-540 kilocycles) and set the oscillator to 1400 kilocycles. Then adjust the oscillator variable condenser section trimmer condenser TO BRING THIS SIGNAL IN (maximum output). The oscillator and antenna variable condenser trimmers are mounted on top of the variable condenser. Looking at the front of the receiver the first section of the variable condenser is the oscillator section and the other section tunes the antenna coil.

3. Leave the band selector switch for operation on the same band, set the oscillator at 600 kilocycles and tune the receiver to approximately 600 kilocycles on the dial. Then adjust the 600 kilocycle padding condenser which is the one located towards the front on the right hand side of the chassis and accessible through the small hole in the chassis for maximum output. It is necessary to rock the condenser slightly to the right and left to obtain the correct position. After aligning the 600 kilocycle padding condenser be sure to recheck the 1400 kilocycle adjustment as the 600 kilocycle alignment may have changed the alignment at 1400 kilocycles.

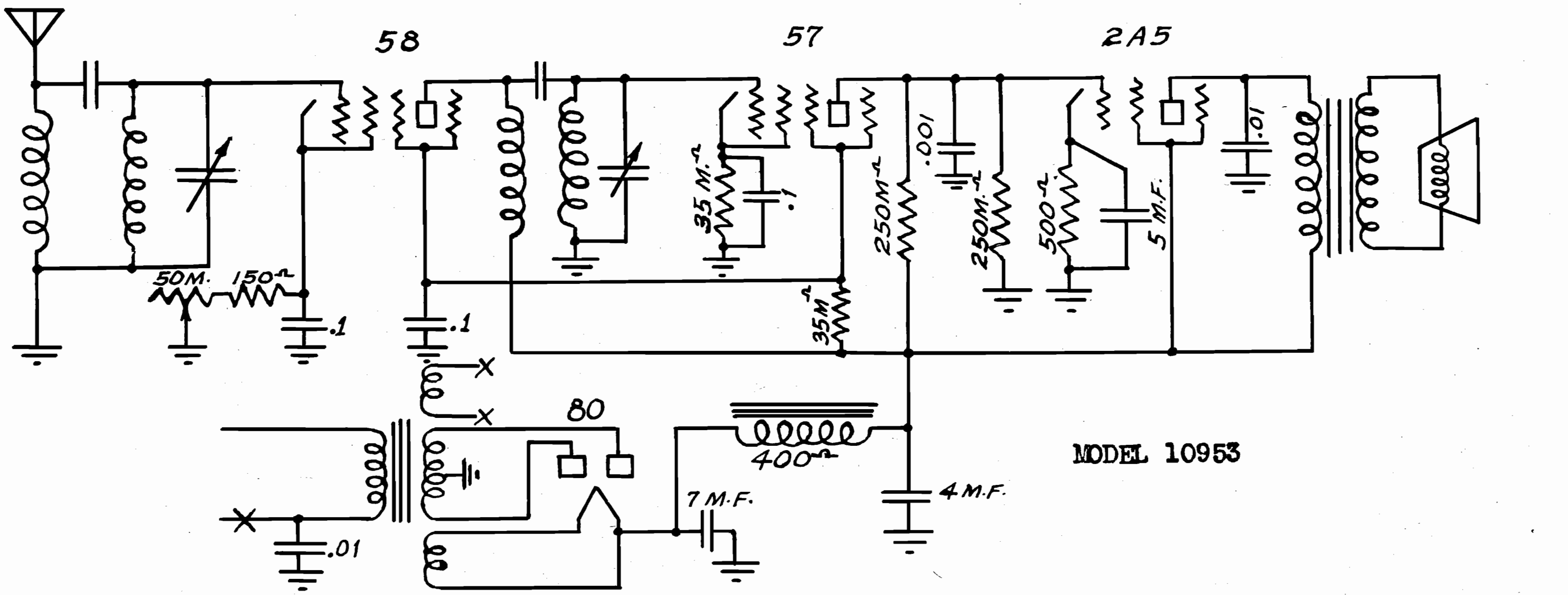
4. Adjust the short wave switch for operation on 1500 kilocycle to 4500 kilocycle band. Set the oscillator at 4 megacycles and the receiver to 4 megacycles on the dial. Turn the receiver on end and BRING THE 4 MEGACYCLE SIGNAL IN (TO MAXIMUM OUTPUT) BY ADJUSTING THE 4 MEGACYCLE TRIMMER located underneath the chassis and adjacent to the band selector switch.

Next, tune the receiver to 1600 kilocycles on the dial and set the oscillator frequency to 1600 kilocycles after which adjust the 1600 kilocycle padding condenser which is located on the rear right hand side and accessible through the hole in the chassis for maximum output. It is imperative that after making this adjustment at 1600 kilocycles that the alignment at 4 megacycles be rechecked, as the 1600 kilocvcle adjustment may throw the receiver out at 4 megacycles.

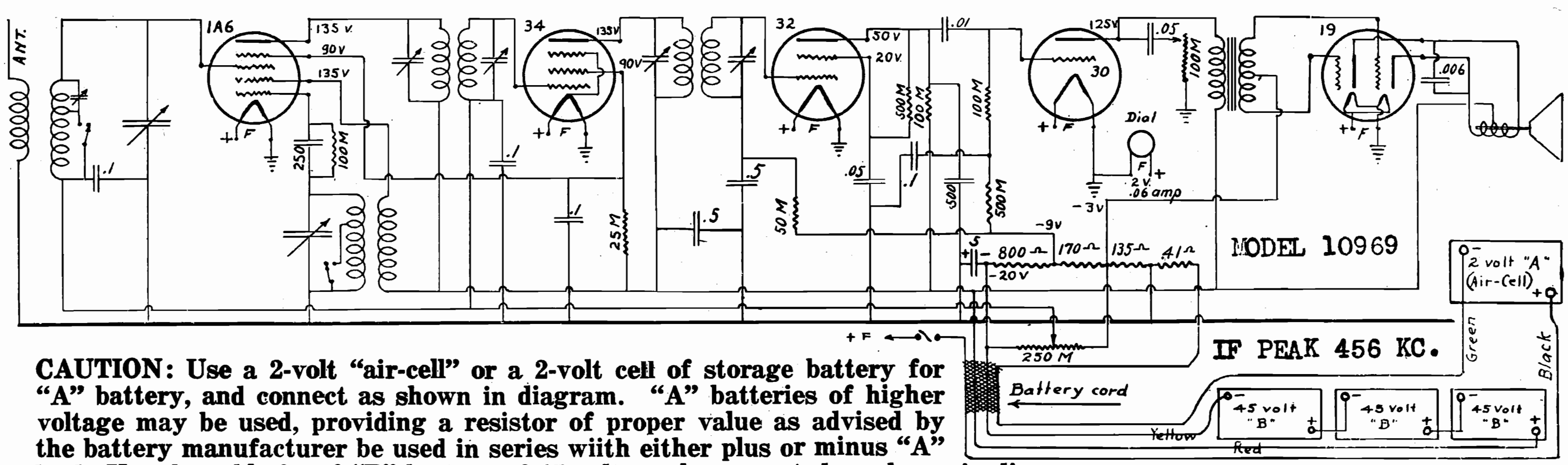
| | | | |
|---|---|---|---|
| 9666 | Volume Control | 8980 | Tube Shield |
| 9174 | Tone Control | 9083 | Tube Shield Caps |
| 9767 | Dial | 9386 | .1 Mfd. 200 Volt Condenser |
| 9726 | Two Gang Condenser | 8961 | .05 Mfd. 400 Volt Condenser |
| 9671 | Pilot Light Socket | 6590 | .002 Mfd. 400 Volt Condenser |
| 9660 | Power Transformer | 7860 | .01 Mfd. 400 Volt Condenser |
| 9659 | 2-8 Mfd. Electrolytic Cond | 9690 | .00025 Mfd. & .05 Mfd. Dual 400 Volt Cond |
| 8876 | 5 Mfd. Electrolytic Cond | 9691 | .05 Mfd. & .001 Mfd. Dual 400 Volt Cond |
| 9673 | Padding Condenser | 9698 | 1 Mfd. 100 Volt Condenser |
| 9799 | Trimmer Condenser | 6976 | 10,000 Ohm 1/3 Watt Resistor |
| 9672 | Wire Wound Resistance Strip | 9693 | 5,000 Ohm 1/3 Watt Resistor |
| 9642 | No. 80 Tube Socket | 8000 | 100,000 Ohm 1/3 Watt Resistor |
| 9643 | Speaker Socket | 8906 | 250,000 Ohm 1/3 Watt Resistor |
| 9644 | 2A5 Socket | 6875 | 250 Ohm 1/3 Watt Resistor |
| 9645 | 2A6 Socket | 6984 | 500,000 Ohm 1/3 Watt Resistor |
| 9646 | 58 Socket | 9337 | 8,000 Ohm 1/3 Watt Resistor |
| 9647 | 57 Socket | 9089 | 500 Ohm 1/3 Watt Resistor |
| 9063 | Tube Shield Base | | |

**MODEL 10953 Schematic**
**MODEL 10969 Schematic, Service Data**

# RADOLEK CO.




MODEL 10953




MODEL 10969

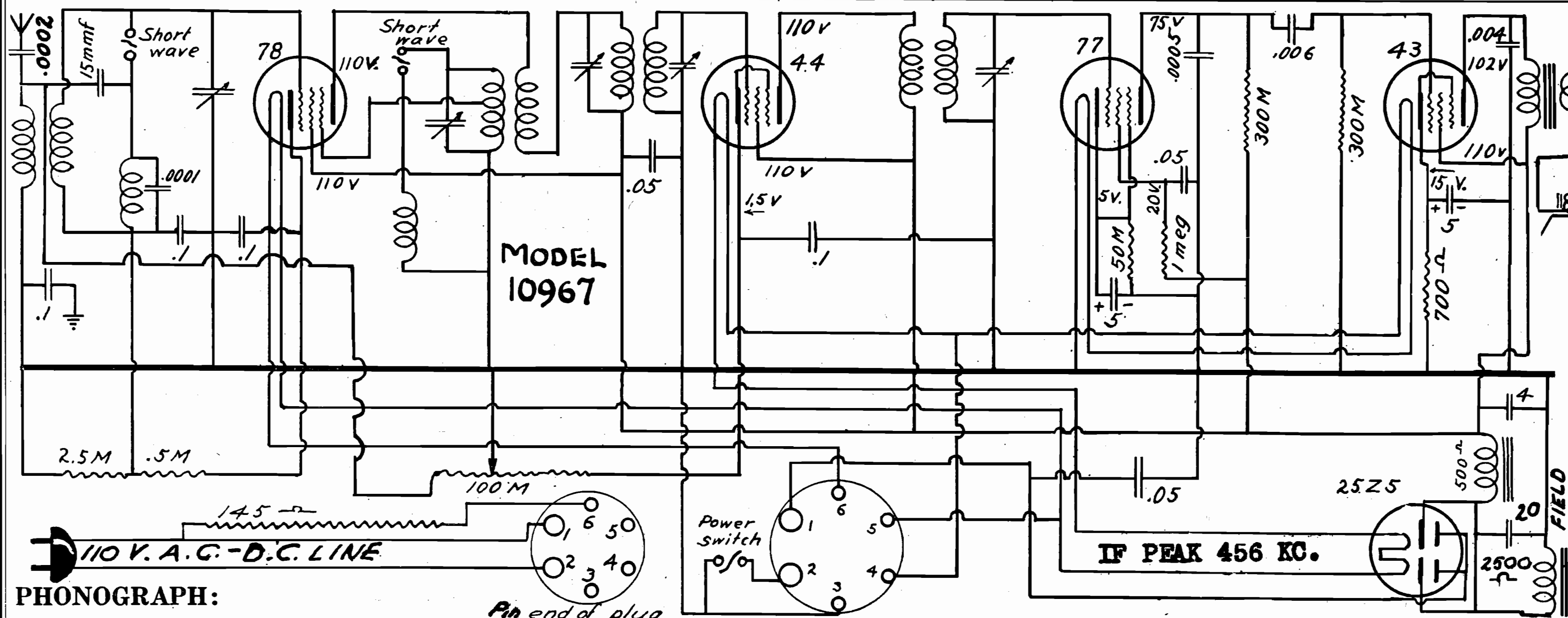
IF PEAK 456 KC.

**CAUTION: Use a 2-volt "air-cell" or a 2-volt cell of storage battery for "A" battery, and connect as shown in diagram. "A" batteries of higher voltage may be used, providing a resistor of proper value as advised by the battery manufacturer be used in series with either plus or minus "A" lead. Use three blocks of "B" battery of 45 volts each, connected as shown in diagram.**

**INSTALLATION:** A good outdoor aerial will give best results, especially on short wave. No ground wire is usually required.
**PHONOGRAPH:** Use single pole toggle switch mounted as near as possible to socket marked "32." Cut black wire coming from bottom of coil can adjacent to this tube and connect across switch. Connect phonograph pickup across switch.
**SERVICE NOTES:** Intermediate stage is carefully phased to 456 k.c. at the factory. Should rephasing be necessary, feed 456 k.c. signal into grid cap of "1A6" tube, and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400 k.c., carefully remove chassis from cabinet, feed 1400 k.c. signal into antenna lead and adjust trimmers on tuning condenser to loudest signal.

**MODEL 10962**
**Schematic, Voltage**
**MODEL 10967**
**Schematic, Alignment**
**Voltage**

# RADOLEK CO.



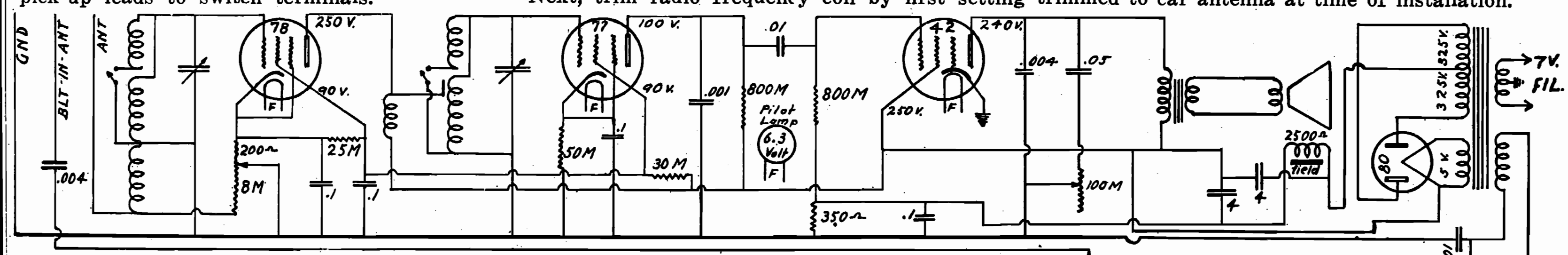

## PHONOGRAPH:

Trace wire from cap of tube in left rear socket to where it solders to bracket in chassis. Note that a black wire connects between the adjacent bracket and chassis. Disconnect black wire at the bracket, inserting small single pole switch between wire and bracket. Solder phonograph pick-up leads to switch terminals.

## SERVICE NOTES:

To balance set remove from cabinet. Inter-mediates are first balanced. Feed a 456 K. C. signal into grid of 78 tube. Adjust double and single trimmers through rear flange of chassis. Next, trim radio frequency coil by first setting tuning condenser to 1400 K. C. on dial, carefully remove from cabinet and attach test oscillator to antenna lead and feed 1400 K. C. signal to antenna coil. Adjust trimmers on tuning condenser to loudest signal.

If used in automobile, antenna stage should be trimmed to car antenna at time of installation.

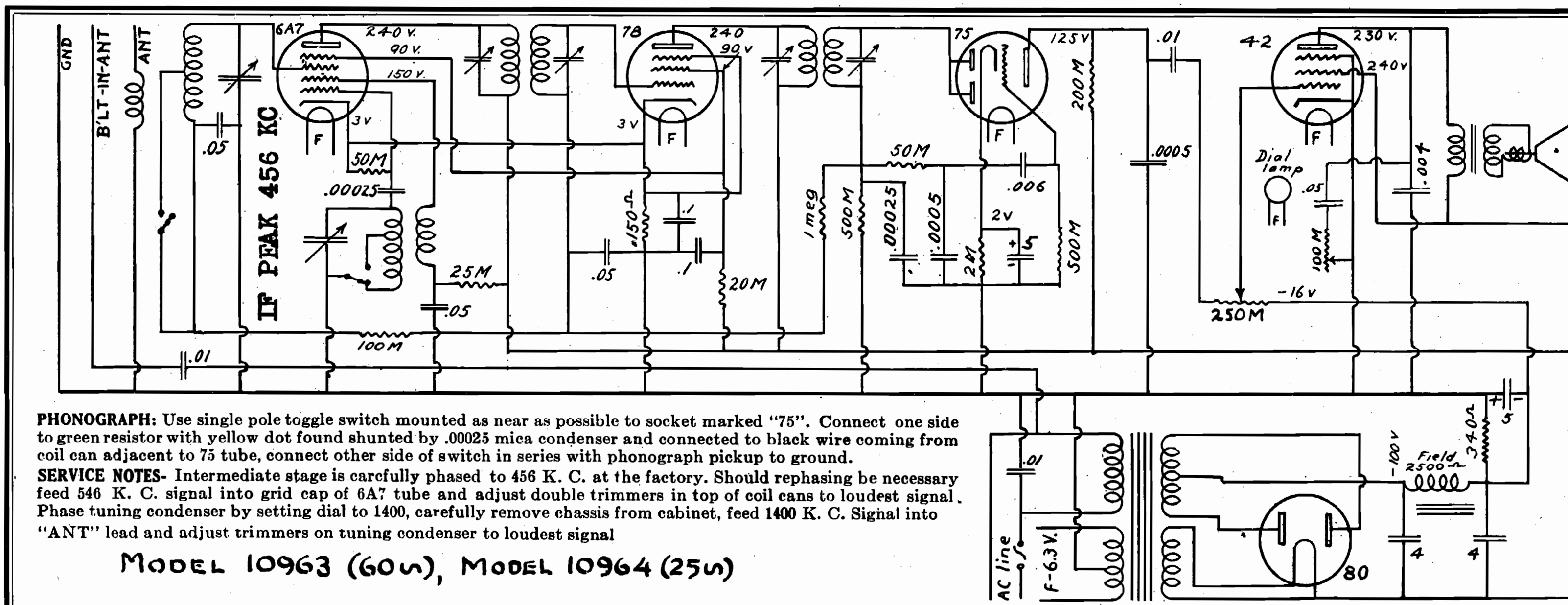



MODEL 10962

**PHONOGRAPH:** Use a single pole switch mounted as near as possible to detector socket, connect in series with lead from ground end of grid coil of detector tube. Solder phonograph pickup leads to switch terminals.
**SERVICE NOTES:** To balance, set dial to 1400 KC, remove from cabinet, feed 1400 KC signal from test oscillator into antenna lead and adjust trimmers on tuning condenser to loudest signal.

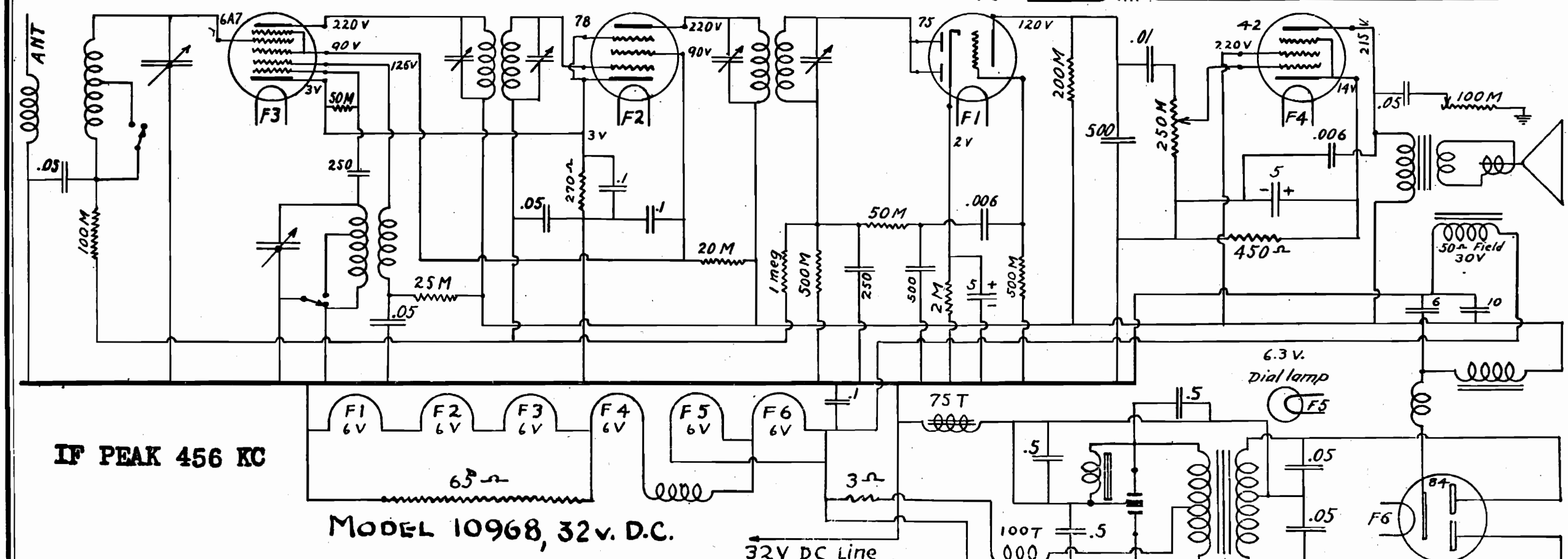
# RADOLEK CO.

**MODEL 10963 (60 Cycles)**
**MODEL 10964 (25 Cycles)**
**MODEL 10968 (32 v. DC.)**
**Schematic, Voltage Alignment Data**




**PHONOGRAPH:** Use single pole toggle switch mounted as near as possible to socket marked "75". Connect one side to green resistor with yellow dot found shunted by .00025 mica condenser and connected to black wire coming from coil can adjacent to 75 tube, connect other side of switch in series with phonograph pickup to ground.
**SERVICE NOTES-** Intermediate stage is carcfully phased to 456 K. C. at the factory. Should rephasing be necessary feed 546 K. C. signal into grid cap of 6A7 tube and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400, carefully remove chassis from cabinet, feed 1400 K. C. Signal into "ANT" lead and adjust trimmers on tuning condenser to loudest signal

MODEL 10963 (60~), MODEL 10964 (25~)




**IF PEAK 456 KC**

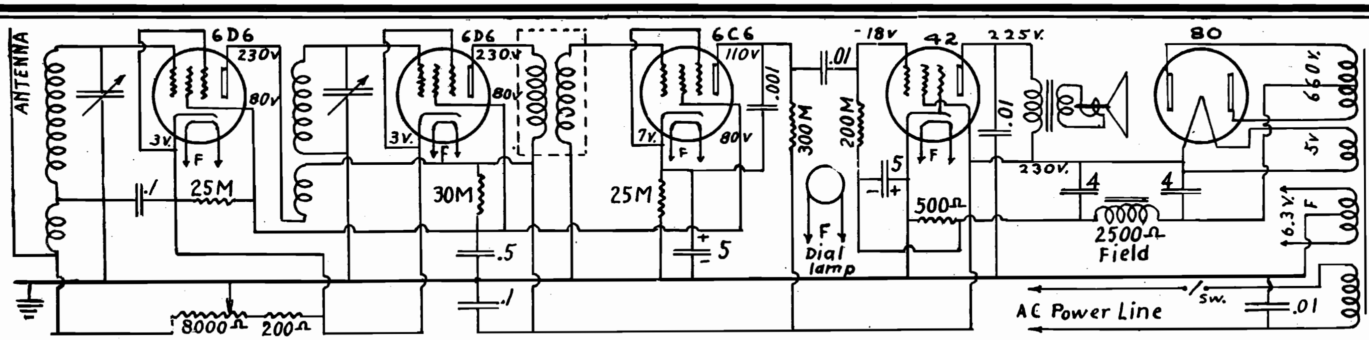
MODEL 10968, 32v. D.C.

**PHONOGRAPH:** Use single pole toggle switch mounted as near as possible to socket marked "75". Connect one side to green resistor with yellow dot found shunted by .00025 mica condenser and connected to black wire coming from coil can adjacent to 75 tube, connect other side of switch in series with phonograph pickup to ground.
**SERVICE NOTES-** Intermediate stage is carcfully phased to 456 K. C. at the factory. Should rephasing be necessary feed 456 K. C. signal into grid cap of 6A7 tube and adjust double trimmers in top of coil cans to loudest signal. Phase tuning condenser by setting dial to 1400, carefully remove chassis from cabinet, feed 1400 K. C. Signal into "ANT" lead and adjust trimmers on tuning condenser to loudest signal

**MODEL 10966**
**Schematic, Voltage**
**MODEL 10970**
**Schematic, Voltage**
**Alignment Data**

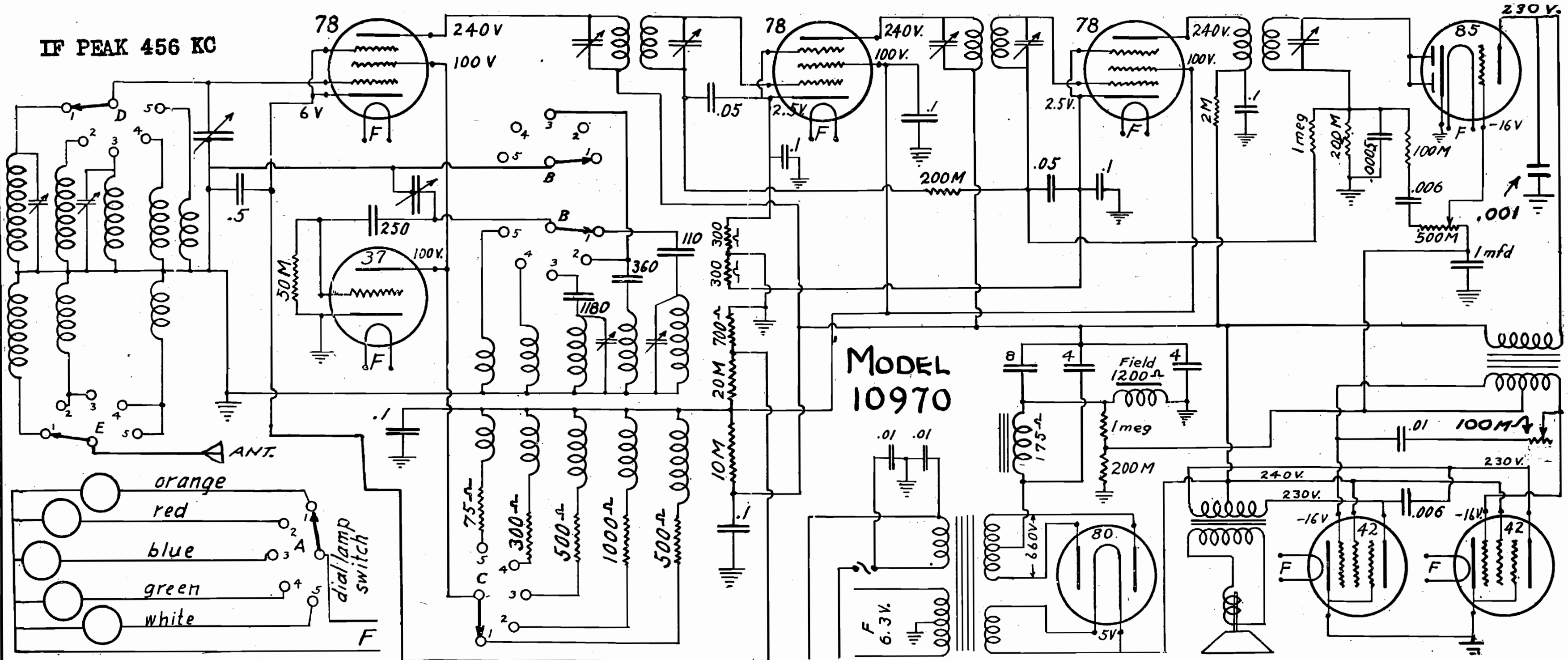
# RADOLEK CO.

MODEL 10966



PHONOGRAPH: Mount single pole toggle switch at any convenient point on rear flange of chassis, disconnect 5 mfd. condenser from "cathode" of 6C6 socket and connect it to one side of switch, connect other side of switch to "cathode" of socket and connect phonograph across switch.

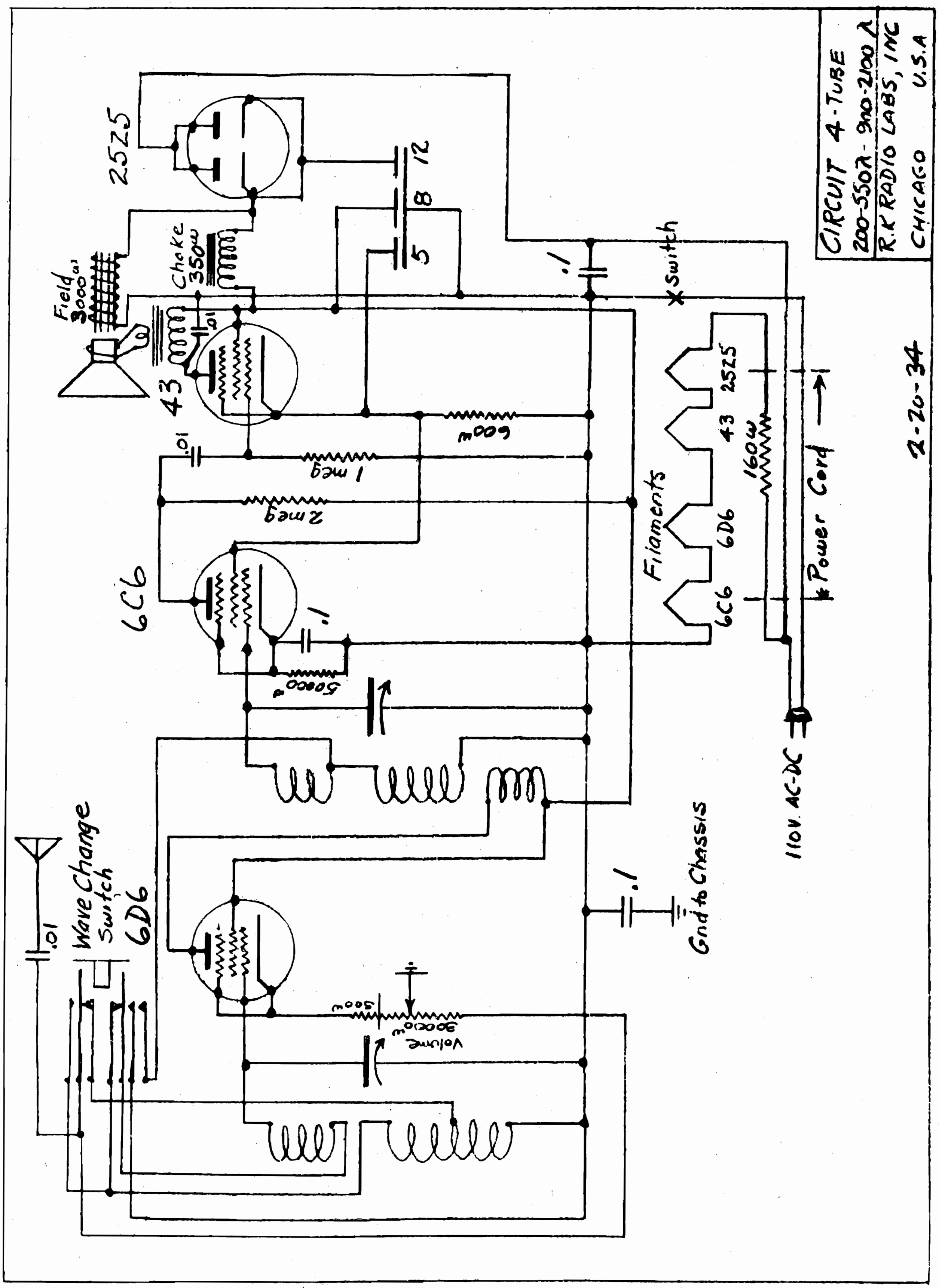
IF PEAK 456 KC




The intermediate stages are carefully phased to 456 kilocycles at the factory. Should rephasing be necessary, feed a 456 kilocycle signal from a test oscillator to the grid cap of the tube marked "78," located at the rear end of the tuning condenser, then adjust the double trimmers in the top of the coil cans nearest this tube, also the single trimmer in the top of the coil can near the "85" tube, to loudest volume, being sure to keep the oscillator signal at a low volume level. In trimming the frequency bands, first set the dial to the third group of figures from the right-hand end. Trim the "red" band first by adjusting the trimmers on the top of the tuning condenser until a signal of the proper frequency applied to the built-in aerial is heard at its loudest. Next, trim the "orange" band by adjusting the three-plate trimmers, located on the underside of the chassis, to loudest volume with proper signal frequency applied to the antenna. Next, trim the "blue" band by adjusting the two-plate trimmers located adjacent to the three-plate trimmers, to loudest volume with the proper signal frequency applied to the antenna. In trimming the various bands be sure that the band switch is set to the proper band as indicated by the color of the dial lamp. Also, keep the oscillator signal to as low volume level as possible for accuracy.

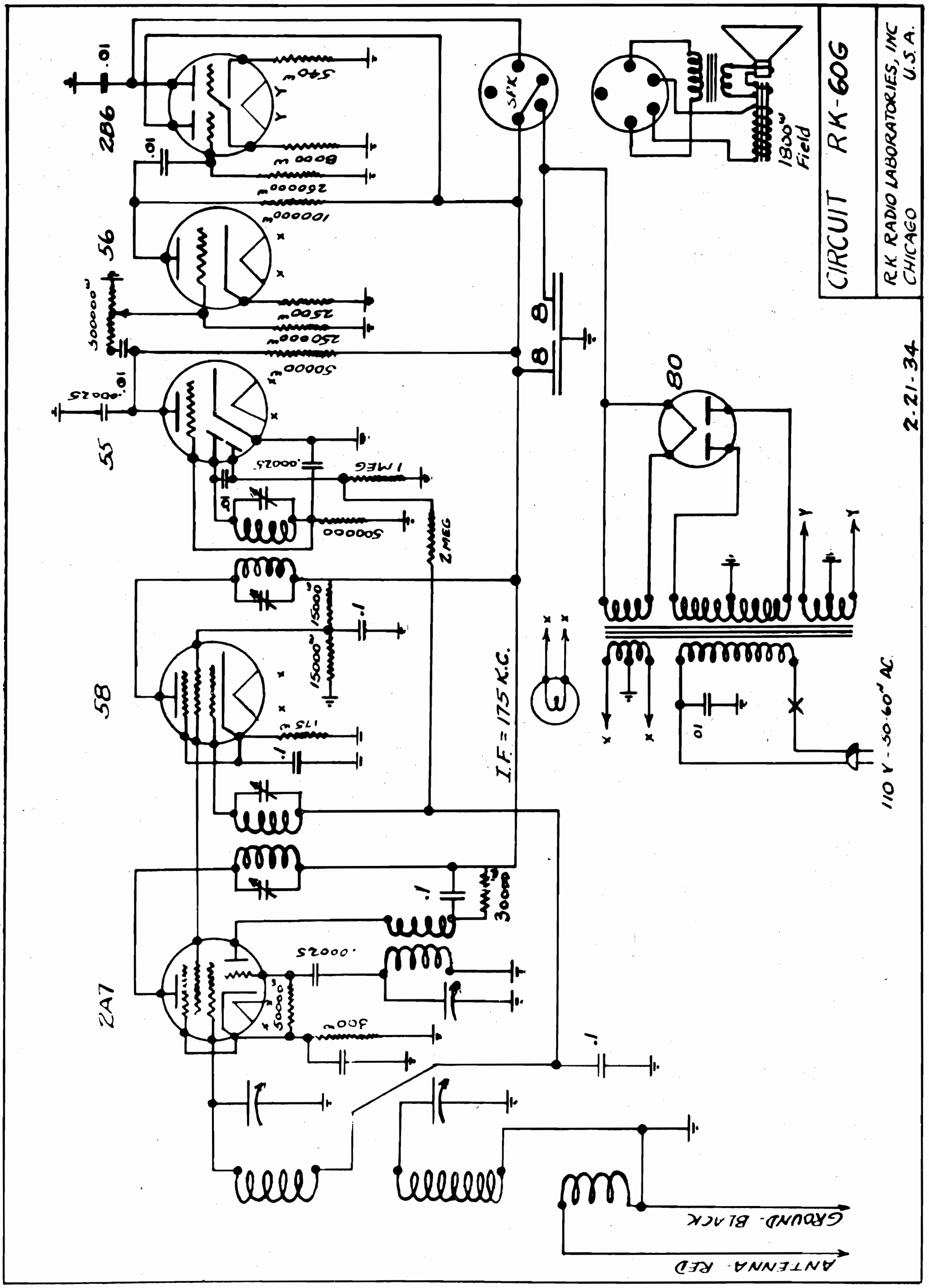
**MODEL 4-Tube**
**Schematic**

# RK RADIO LABORATORIES, INC.



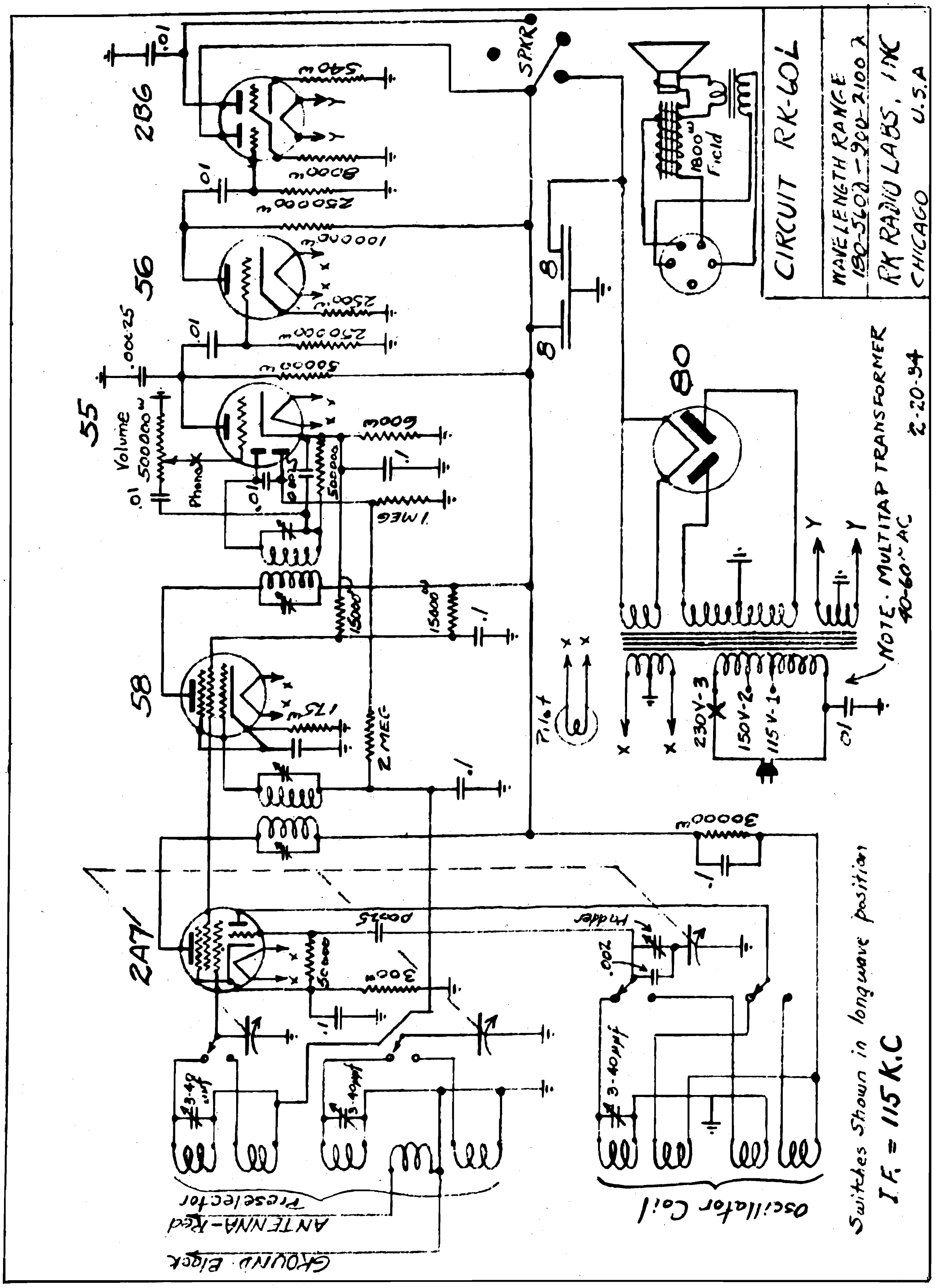
MODEL RK-60 G
Schematic

# RK RADIO LABORATORIES, INC.



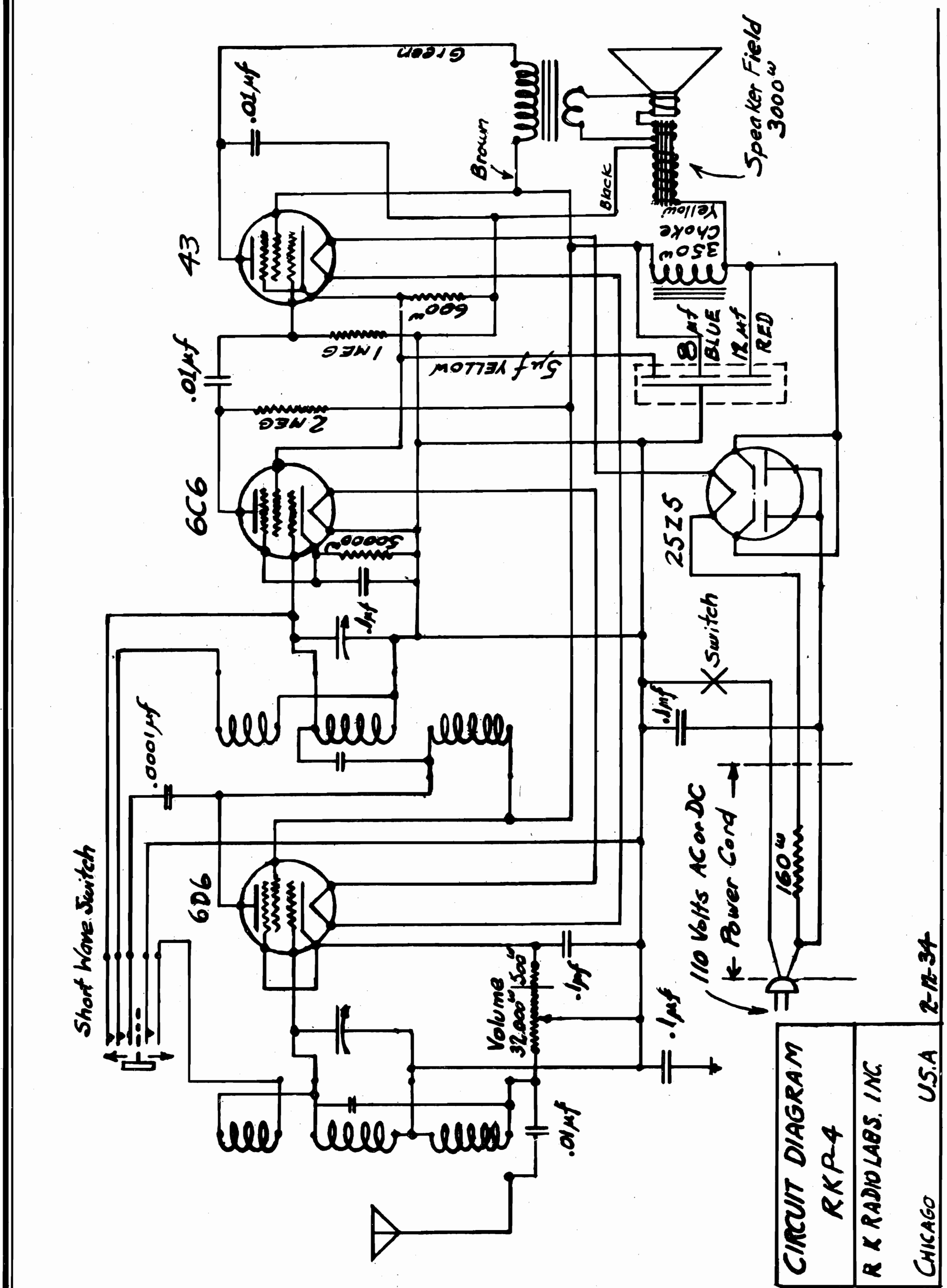
**MODEL RK-60 L**
**Schematic**

# RK RADIO LABORATORIES, INC.



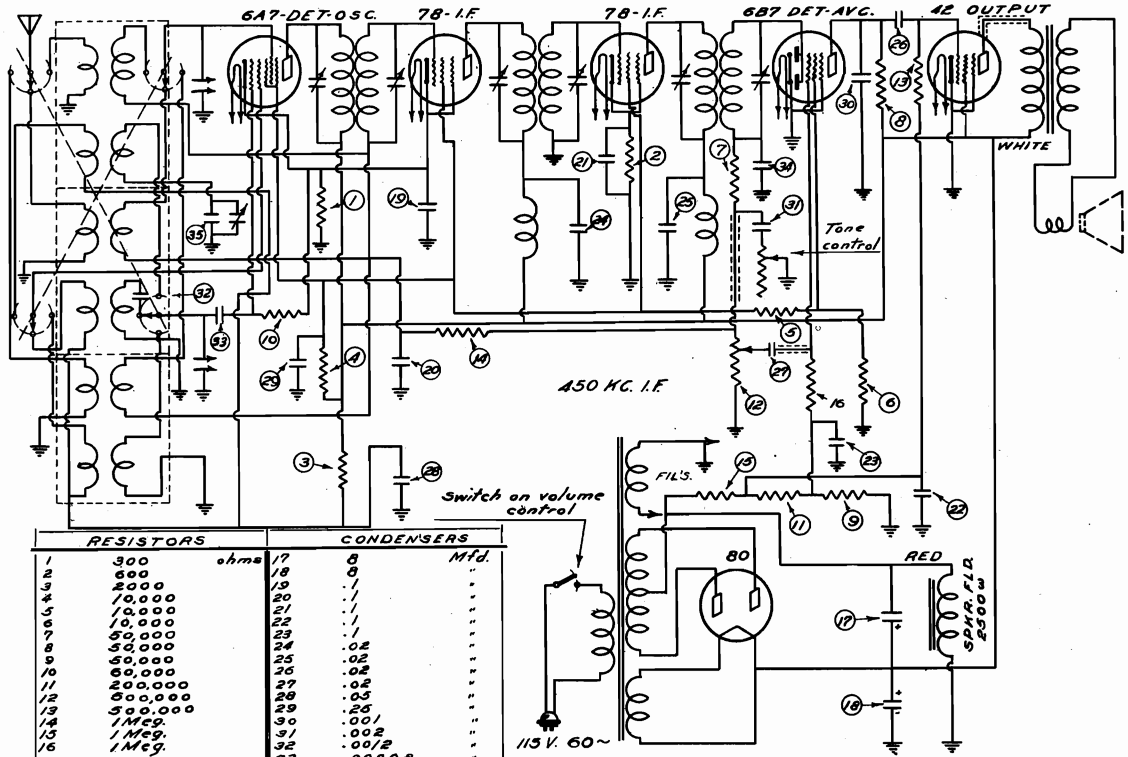
MODEL RKP-4
Schematic

# RK RADIO LABORATORIES, INC.



# REMLER COMPANY, LTD.

**MODEL 10-4**
**Schematic, Voltage Socket, Alignment**




| RESISTORS | ohms | CONDENSERS | Mfd. |
|---|---|---|---|
| 1 | 300 | 17 | 8 |
| 2 | 600 | 18 | 8 |
| 3 | 2000 | 19 | .1 |
| 4 | 10,000 | 20 | .1 |
| 5 | 10,000 | 21 | .1 |
| 6 | 10,000 | 22 | .1 |
| 7 | 50,000 | 23 | .1 |
| 8 | 50,000 | 24 | .02 |
| 9 | 50,000 | 25 | .02 |
| 10 | 60,000 | 26 | .02 |
| 11 | 200,000 | 27 | .02 |
| 12 | 500,000 | 28 | .05 |
| 13 | 500,000 | 29 | .25 |
| 14 | 1 Meg. | 30 | .001 |
| 15 | 1 Meg. | 31 | .002 |
| 16 | 1 Meg. | 32 | .0012 |
| | | 33 | .00008 |
| | | 34 | .0009 |
| | | 35 | .0003 |

**INSTALLATION:**

This set is designed to operate from a 110 to 125 volt, 50 or 60 cycle alternating current supply.

An outdoor antenna should be used, having a length of from 60 to 100 feet. The antenna should be kept clear of all metal objects, such as pipes and electric circuits. This also applies to the lead-in wire. Shielded wire should not be used for the lead-in. Connect the lead-in to the red wire extending from the back of the set. The ground connection should be made to the black wire. This lead should be as short as possible and preferably connected to a cold waterpipe, scraped clean, and a ground clamp used.

Loosen the chassis hold-down screws one turn when installing the set.

The knob on the left controls the volume and also operates the ON and OFF switch.

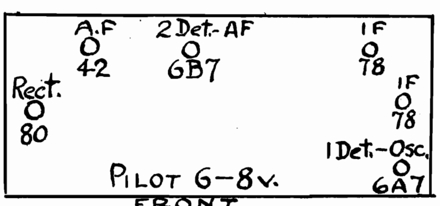
The center knob controls the station selector, or tuning. This knob operates through a DUAL-RATIO reducing mechanism. When pressed in, the ratio is three and a half to one. This position may be used on the broadcast band, or when it is desired to turn quickly from one band to another. When the knob is pulled out, a ratio of seventeen to one is obtained. This position should be used for tuning on the short wave bands.

The dial is divided into three ranges. The outer range is from 540 to 1900 kilocycles, and is calibrated in tens of kilocycles, or broadcast channels. The bands included in this range are: the regular broadcast band from 540 to 1500 K.C., the police band from 1534 to 1712 K.C., and amateurs from 1715 to 1900 K.C. The middle range covers from 1900 to 6400 K.C. This range includes: amateurs 1900 to 2000 K.C., police stations 2308 to 2490 K.C., aviation 2608 to 3485 and 4110 to 5700 K.C., amateurs 3500 to 4000 K.C., and short wave broadcast 6010 to 6150 K.C. This range is calibrated in hundreds of kilocycles.

The inner range covers the higher frequency bands, extending from 6 to 18 megacycles (6000 to 18,000 kilocycles).

The principal short wave broadcast ranges included are: 6 to 6.15 megacycles, 9.5 to 9.6 megacycles, 11.7 to 11.9 megacycles, 15.1 to 15.35 megacycles, and 17.7 to 17.8 megacycles. Amateur phone transmissions may be tuned in from 14 to 14.4 megacycles. This range on the dial is marked in megacycles, which are thousands of kilocycles. The knob on the right controls the range switch and the pointer, which automatically indicates the range position on the dial.

A continuous type tone control is adjustable from the back of the receiver. This may be adjusted to modify the tone or to reduce noise or static disturbances.




**SERVICE DATA:**

This is a six tube superheterodyne receiver with automatic volume control. The following tubes are used:

6A7 Converter (mixer-oscillator)
78 Super-control amplifier, 1st I.F. stage
78 Super-control amplifier, 2nd I.F. stage
6B7 Diode detector - AF amplifier, Av.C.
42 Power amplifier
80 Full wave rectifier
Dial light 6-8 volt Mazda 50

The oscillator, antenna, and mixer coils are wound on the same form for each band. The short wave coils are mounted directly on the switch together with the trimmer capacities. A variable series trimmer is provided for the broadcast band oscillator circuit. This is accessible from the bottom of the chassis, and is mounted near the broadcast oscillator coil. The I.F. transformers are in the aluminum shields mounted on top of the chassis. The trimmers for these coils may be adjusted from the tops of the shields. The intermediate frequency is 450 kilocycles. Use a weak signal or oscillator input when adjusting the trimmers.

In removing the chassis from the cabinet, take the set screw, spring and brass pin from the tuning knob so that it may be removed from the shaft. The switch and volume knobs may be removed by prying with a wooden screw driver with a piece of cardboard against the cabinet.

Voltage readings for servicing purposes follow:

**A. C. VOLTAGES:**

| | |
|---|---|
| Line | 120 volts |
| Filaments - 6A7, 78s, 6B7 and 42 | 6.3 " |
| Filaments - 80 | 5.2 " |

**D. C. VOLTAGES:** (No signal)

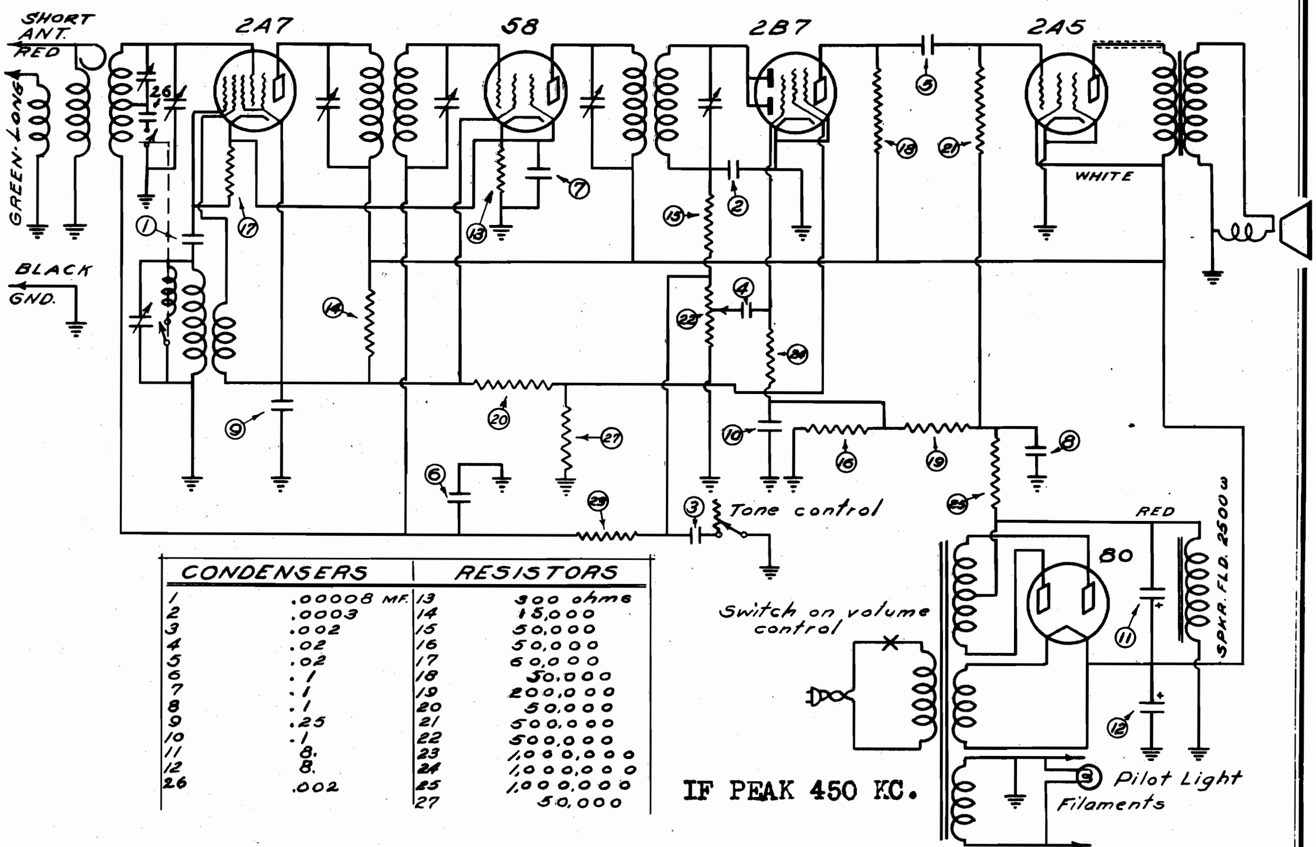
From ground to:

| | |
|---|---|
| 80 Rectifier filament | 240 volts |
| 42 Plate | 230 " |
| 42 Screen grid | 240 " |
| 42 Grid | 17 " |
| 6B7 Plate | 165 " |
| 6B7 Screen grid | 70 " |
| 6B7 Grid | 4 " |
| 78 2nd I.F. plate | 240 " |
| 78 2nd I.F. screen grid | 125 " |
| 78 2nd I.F. cathode | 4.5 " |
| 78 1st I.F. plate | 240 " |
| 78 1st I.F. screen grid | 125 " |
| 78 1st I.F. cathode | 6 " |
| 6A7 Plate (mixer) | 240 " |
| 6A7 Screen grid | 125 " |
| 6A7 Cathode | 6 " |
| 6A7 Plate (oscillator) | 220 " |
| Speaker field (red lead) | 115 " |

Due to current taken by voltmeter used, readings of 6B7 and 42 grid voltages will be less than those above.

**MODEL 21-4**
**Schematic**
**Voltage,Alignment**

# REMLER COMPANY, LTD.




| CONDENSERS | | RESISTORS | |
|---|---|---|---|
| 1 | .00008 MF. | 13 | 300 ohms |
| 2 | .0003 | 14 | 15,000 |
| 3 | .002 | 15 | 50,000 |
| 4 | .02 | 16 | 50,000 |
| 5 | .02 | 17 | 60,000 |
| 6 | .1 | 18 | 50,000 |
| 7 | .1 | 19 | 200,000 |
| 8 | .1 | 20 | 50,000 |
| 9 | .25 | 21 | 500,000 |
| 10 | .1 | 22 | 500,000 |
| 11 | 8. | 23 | 1,000,000 |
| 12 | 8. | 24 | 1,000,000 |
| 26 | .002 | 25 | 1,000.000 |
| | | 27 | 50,000 |

REMLER MODEL #21-4

This radio receiver is of the superheterodyne type with automatic volume control.

TUBES:

2A7 - Converter (mixer - oscillator)
58 - I. F. amplifier
2B7 - Diode detector - audio amplifier
2A5 - Power amplifier
80 - Rectifier
Dial light, 3.8 volt

INSTALLATION:

This set is designed to operate from a power supply of 110 to 125 volts, 50 or 60 cycle alternating current.

Two antenna connections are provided. The red wire should be connected when the antenna is less than 100 feet in length, and the green wire should be used when the antenna is longer. A good ground connection to the black lead is necessary for best results.

CONTROLS:

The knob at left controls the volume and also operates the ON and OFF switch.

The knob in the center is the station selector. The dial is calibrated in kilocycles for both broadcast and short wave bands. The tone control is operated by the knob on the right. The short wave switch is located on the back of the chassis. In the long wave or broadcast position the receiver covers a band from 540 to 1750 kilocycles. When the switch is moved to the right, or short wave position, the receiver covers from 1700 to 4500 kilocycles. This band includes police, amateur and airport stations as indicated on the dial. The lower frequency band for police calls is from 1714 to 1500 kilocycles. This range is covered with the switch moved to the left or normal broadcast position.

SERVICE DATA:

The antenna and mixer coils are in the aluminum shield nearest the back of the chassis. The trimmer condenser, adjustable through the top of the shield, is for trimming the high frequency end of the short wave position. Trimmers for the broadcast band are located on the variable condenser.

The shield nearest the front of the chassis contains the oscillator coil and first I.F. transformer. The trimmers for this transformer are at the top of this shield.

The second I.F. transformer is within the chassis and is trimmed by the condensers mounted thereon. The intermediate frequency is 450 kilocycles.

A. C. VOLTAGES:

| | | |
|---|---|---|
| Line | - | 120 volts |
| Filaments - 2A7, 58, 2B7 and 2A5 | | 2.5 " |
| " - 80 | | 5.2 " |

D. C. VOLTAGES:

From ground to:

| | | |
|---|---|---|
| 80 Rectifier filament | - | 250 volts |
| 2A5 Plate | | 235 " |
| 2A5 Screen grid | | 250 " |
| 2A5 Grid | | 19 " |
| 2B7 Plate | | 175 " |
| 2B7 Screen grid | | 45 " |
| 2B7 Grid | | 5 " |
| 58 Plate | | 250 " |
| 58 Screen grid | | 95 " |
| 58 Cathode | | 5 " |
| 2A7 Plate | | 250 " |
| 2A7 Screen grid | | 95 " |
| 2A7 Cathode | | 5 " |
| 2A7 Triode plate | | 95 " |
| Speaker field (red lead) | | 105 " |

Due to current taken by voltmeter used, readings of 2B7 and 2A5 grid voltages will be less than values shown above.

# REMLER COMPANY, LTD.

**MODEL 35 Auto Schematic, Socket Voltage, Installation**

INSTALLATION:

The receiver unit is intended to be mounted on the bulkhead of the car by the single mounting stud which requires the drilling of one 1/2 inch hole through the bulkhead. When locating the position of this hole consideration should be given to possible interference of the set with the position of control cables and other apparatus between the dash and the bulkhead and also of the mounting stud with apparatus on the motor side of the bulkhead. Preferably the receiver should be mounted so as to allow long easy curves of the flexible control cables and a short lead connection to the antenna.

The location of antenna leads from factory installed antennas depends on the make and model of the car. Usually this lead is brought down one of the front body pillar posts and will be found coiled up at the end of the dash. Connect this lead to the shielded lead from the receiver and tape the joint. Where the car is not factory equipped with antenna, a roof type or plate type may be installed with lead brought to a convenient place for connection to the set. The lead and antenna should be kept as far as possible from wiring circuits and the metal body.

The flexible control cables for the tuning and volume control are fitted with special ends to lock in the control head. Insert the cable with the slotted end into the left or volume control bushing, and the cable with keyed end into the right, or tuning control bushing. Be sure the cable housing extends into the head at least three-eighths of an inch, then tighten the set screws on the bushings. Next insert the cables into the brackets and couplings on the set. The volume control cable in the lower coupling and the tuning cable in the upper coupling, but do not tighten the set screws on the shafts. Next clamp the control head to the steering column, tape the control cables to the column bracket or some solid object under the dash and tighten the clamps on the cable housings at the set. Now turn the volume knob to the position where it is removable from the key slot, and turn the tuning knob to the left till the pointer is on the white line at the low frequency end of the dial. Rotate the couplings projecting from the set to the left till the condenser is against the stop and the switch on the volume control is in the off position. Now the set screws on the shaft couplings may be tightened.

Plug the dial light into the opening at the rear of the control head. Connect the battery wire, the shielded wire with fuse holder and terminal, to the battery side of the ammeter. This terminal on the ammeter usually has only one wire attached.

IGNITION NOISE SUPPRESSION:

The spark plug suppressors should be connected in series with the plugs at each plug and the distributor suppressor should be plugged into the central distributor connection in series with the lead running to this point. The generator condenser should be mounted on the generator and the flexible lead connected to the terminal at the cutout where the wire from the generator is attached. Some cars require special work to further reduce noises due to peculiarities of the wiring systems.

OPERATION:

The left hand knob on the control head operates both the power switch and the volume control. Turn the knob clockwise to increase volume. The dial should become illuminated when the power is on.

Rotate the station selector, or tuning knob until the desired program is heard, reduce the volume, and readjust the selector to the position where quality is the best. The volume control may now be advanced to the desired volume level. The knob on the right side of the set is the tone control. This may be adjusted to modify the tone or to reduce noise and static disturbances.

SHORT WAVE:

The short wave switch is on the left of the speaker. When this knob is turned to the left the regular broadcast band is covered by the station selector dial as well as the lower frequency police band as noted on the dial. When the switch is turned to the right the selector dial covers from 2200 to 6500 K. C. The positions of the higher frequency police band, the 49 meter short wave broadcast band and the major airport and amateur bands are noted on the inner portion of the dial. Many automobile antenna installations are not suitable for receiving these short wave stations from any great distance. When better results or increased range is desired with the car parked, a fifty or sixty foot portable antenna wire, with the far end raised at least fifteen feet from the ground, may be used.

SERVICE DATA:

Tubes:

6A7 Converter (mixer-oscillator)
78 Super-control amplifier, 1st I.F. stage
78 Super-control amplifier, 2nd I.F. stage
75 Diode-detector-A F amplifier, A.V.C.
41 Power amplifier
84 Full wave rectifier
T-40 Dial light 6.3 v.

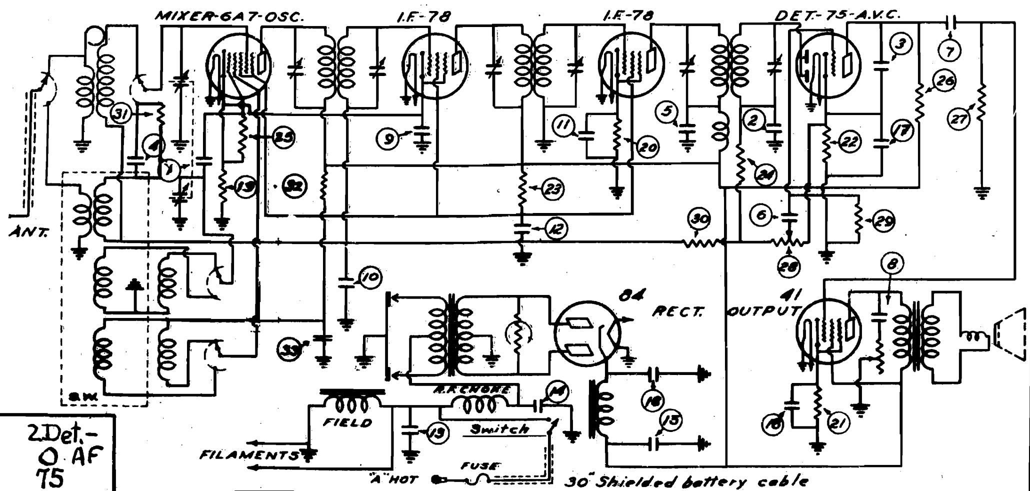
The antenna and mixer coils for the broadcast band are in the shield at the left side of the set. The short wave coils are mounted directly on the short wave switch with the oscillator coil for the broadcast band at the end of the switch. The I.F. transformers are in the aluminum shields adjacent to the antenna-mixer shield. These transformers are peaked at 450 K.C. by the trimmers located at the tops of the shields. Use a weak signal, or oscillator input, and an output meter when aligning the set.

The vibrator type interrupter and transformer are enclosed in the metal box at the right of the receiver. After several hundred hours use the vibrator contacts may require a slight adjustment due to wear. The necessity of this adjustment will be indicated by a marked reduction in plate supply voltage. Vibrator servicing should be done only by a service man with instructions and experience in this work.

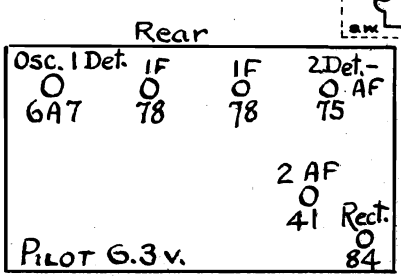
Voltages: To chassis - No signal.

| | | |
|---|---|---|
| Battery, hot side | | 6 volts |
| 84 Rectifier cathode | | 250 " |
| 41 Power | screen grid | 230 " |
| 41 " | plate | 220 " |
| 41 " | cathode | 18 " |
| 75 Detector amplifier | plate | 125 " |
| 75 " " | cathode | 1.5 " |
| 78 2nd I.F. " | plate | 230 " |
| 78 2nd I.F. " | screen grid | 100 " |
| 78 2nd I.F. " | cathode | 3.5 " |
| 78 1st I.F. " | plate | 230 " |
| 78 1st I.F. " | screen grid | 100 " |
| 78 1st I.F. " | cathode | 5 " |
| 6A7 Mixer plate | | 230 " |
| 6A7 Mixer screen grid | | 100 " |
| 6A7 Oscillator plate | | 200 " |
| 6A7 Mixer-oscillator cathode | | 5 " |

Battery current - 6 amperes




IF PEAK 450 KC.

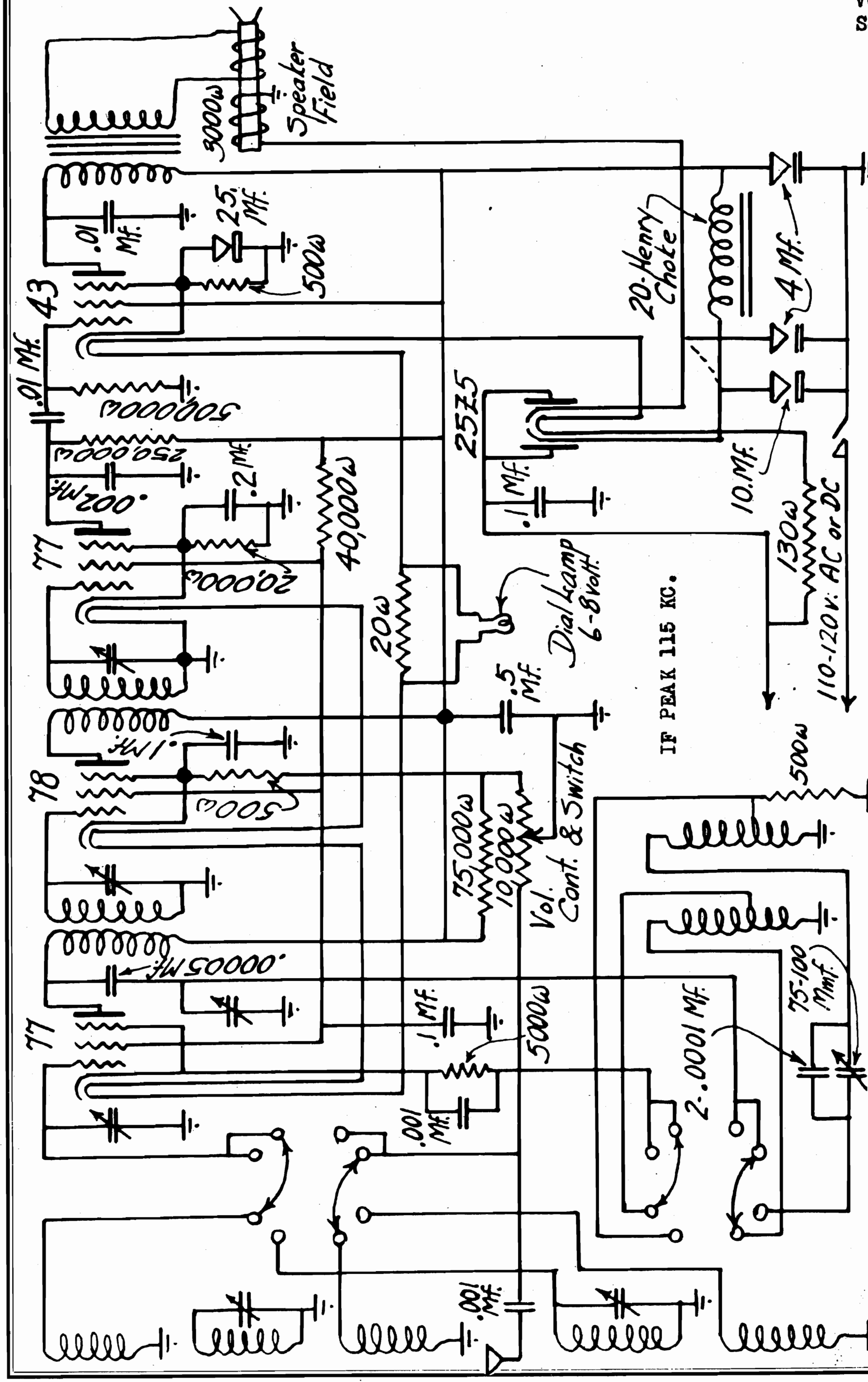



| CONDENSERS | | | | RESISTORS | | | |
|---|---|---|---|---|---|---|---|
| 1 | .00008 | 10 | .1 mfd. | 19 | 300 ohm | 28 | 500,000 |
| 2 | .0003 | 11 | .1 | 20 | 600 | 29 | 500,000 |
| 3 | .001 | 12 | .25 | 21 | 800 | 30 | 1 Meg. |
| 4 | .002 | 13 | .5 | 22 | 5000 | 31 | 25,000 |
| 5 | .02 | 14 | .5 | 23 | 12,000 | 32 | 2000 |
| 6 | .02 | 15 | 4. | 24 | 50,000 | | |
| 7 | .02 | 16 | 8. | 25 | 60,000 | | |
| 8 | .02 | 17 | 10. | 26 | 200,000 | | |
| 9 | .1 | 18 | 10. | 27 | 500,000 | | |
| | | 33 | .02 | | | | |

1934

# REPUBLIC INDUSTRIES

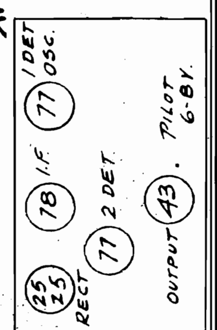
**MODEL BP-5E**
Schematic
Voltage
Socket Layout




IF PEAK 115 KC.

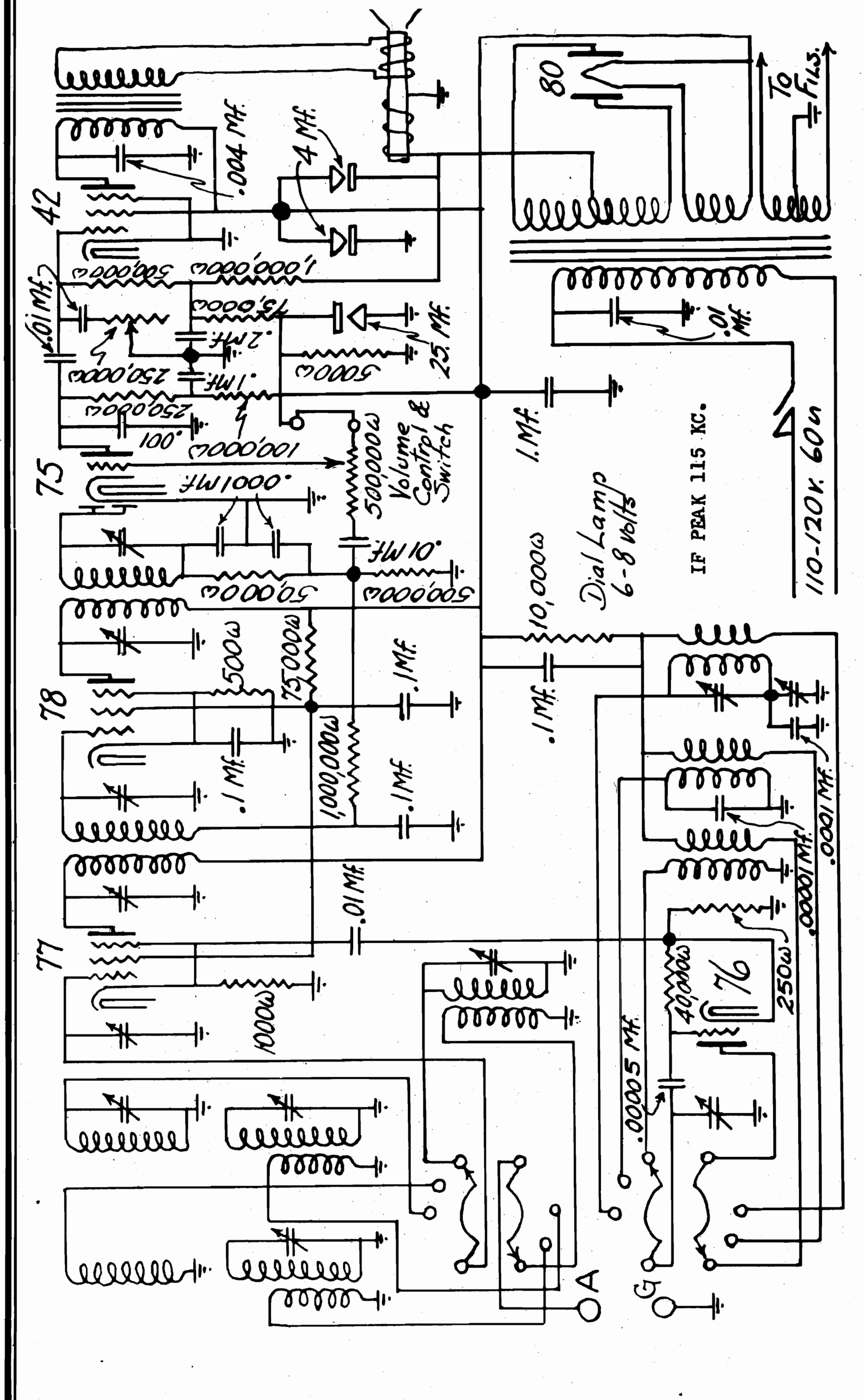
| TUBE | CIRCUIT | PLATE | SCREEN GRID | CATHODE |
|---|---|---|---|---|
| 77 | Det-Osc. | 118 | 65 | 3.6 |
| 78 | IF | 118 | 65 | 2.2 |
| 77 | 2nd Det. | 52 | 65 | 3.2 |
| 43 | Output | 111 | 118 | 17 |

Speaker Field Voltage 135 v.



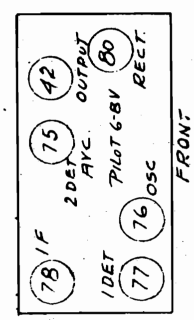
MODEL CS-6
Schematic
Voltage
Socket Layout

# REPUBLIC INDUSTRIES

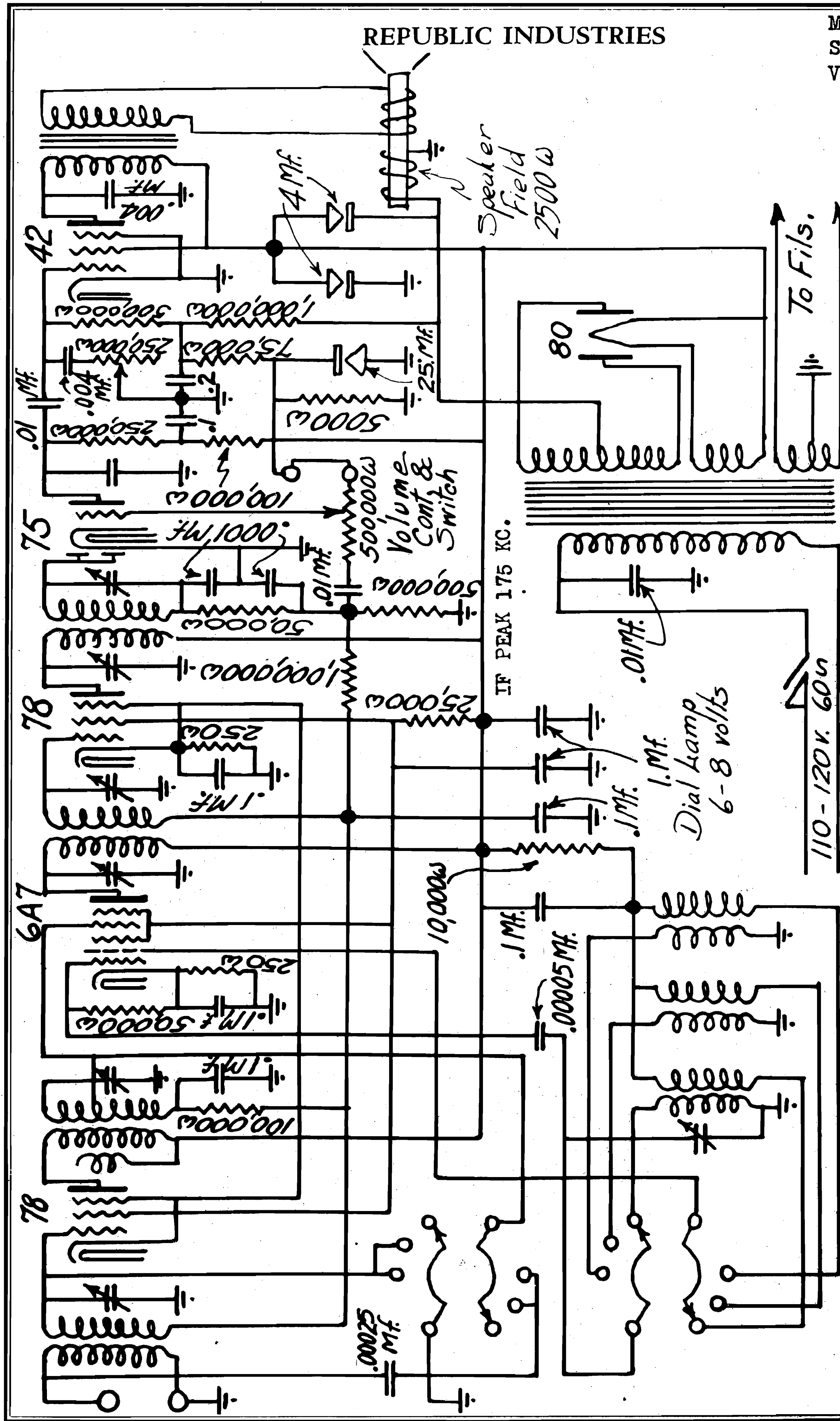



76 Grid to Ground -10 v.
Speaker Field Voltage
147 volts

| TUBE | CIRCUIT | PLATE | SCREEN GRID | CATHODE |
|---|---|---|---|---|
| 77 | 1st Det. | 195 | 80 | 2 |
| 76 | Oscill. | 127 | | 2 |
| 78 | IF | 195 | 80 | 2 |
| 75 | 2nd Det. | 55 | 0 | 0 |
| 42 | Output | 170 | 195 | -5 |



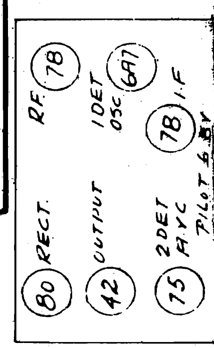
MODEL TL-6C
Schematic
Voltage, Socket




42 Cathode to Grid 4 volts

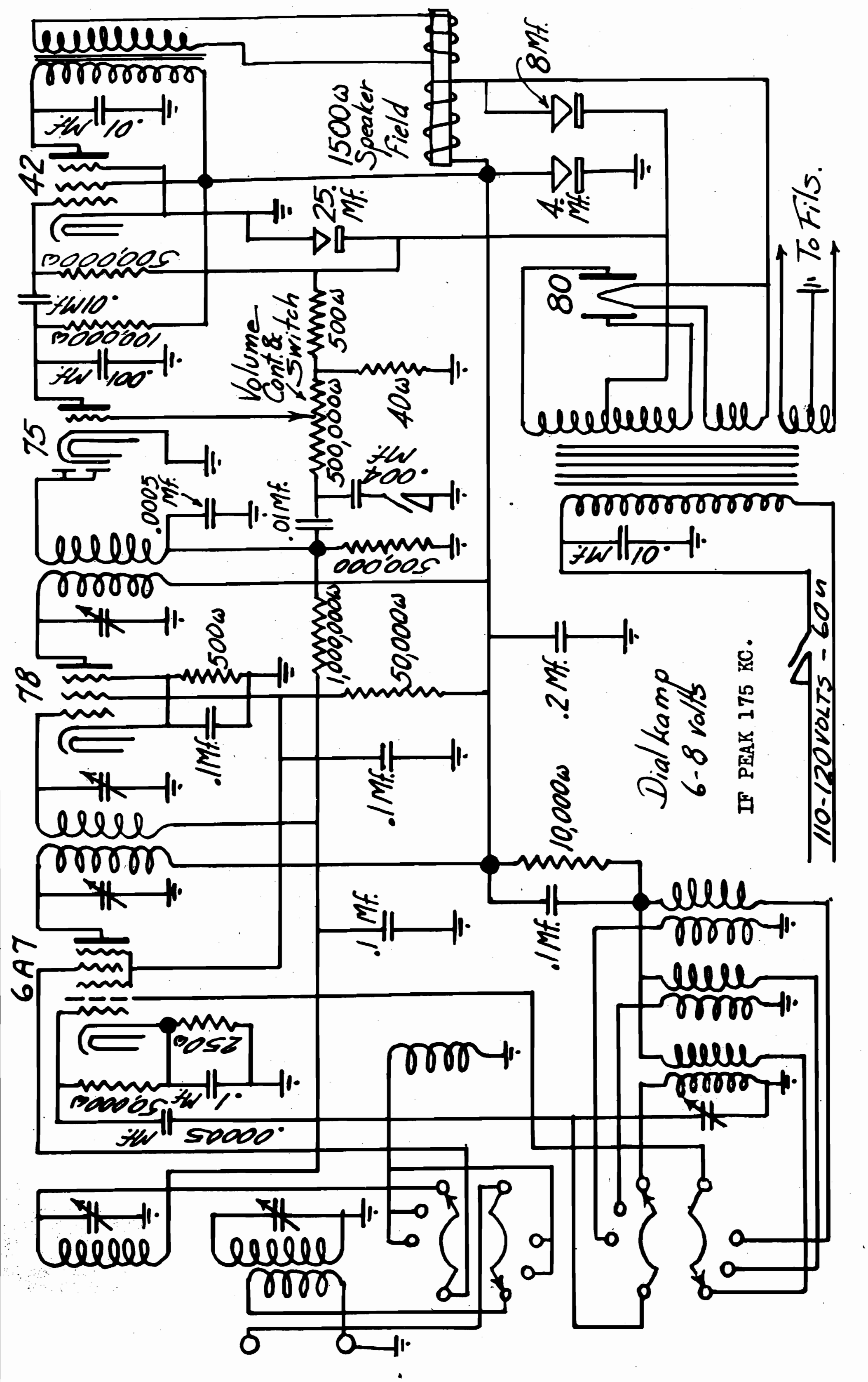
Speaker Field Voltage 150 v

| TUBE | CIRCUIT | PLATE | SCREEN GRID | CATHODE |
|---|---|---|---|---|
| 78 | RF | 200 | 100 | 3 |
| 6A7 | Det-Osc. | 200 | 100 | 2.25 |
| 78 | IF | 200 | 100 | 4 |
| 75 | 2nd Det. | 55 | | 0 |
| 42 | Output | 180 | 200 | |



MODEL TR-5B
Schematic
Voltage, Socket

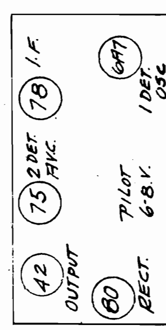
## REPUBLIC INDUSTRIES




IF PEAK 175 KC.

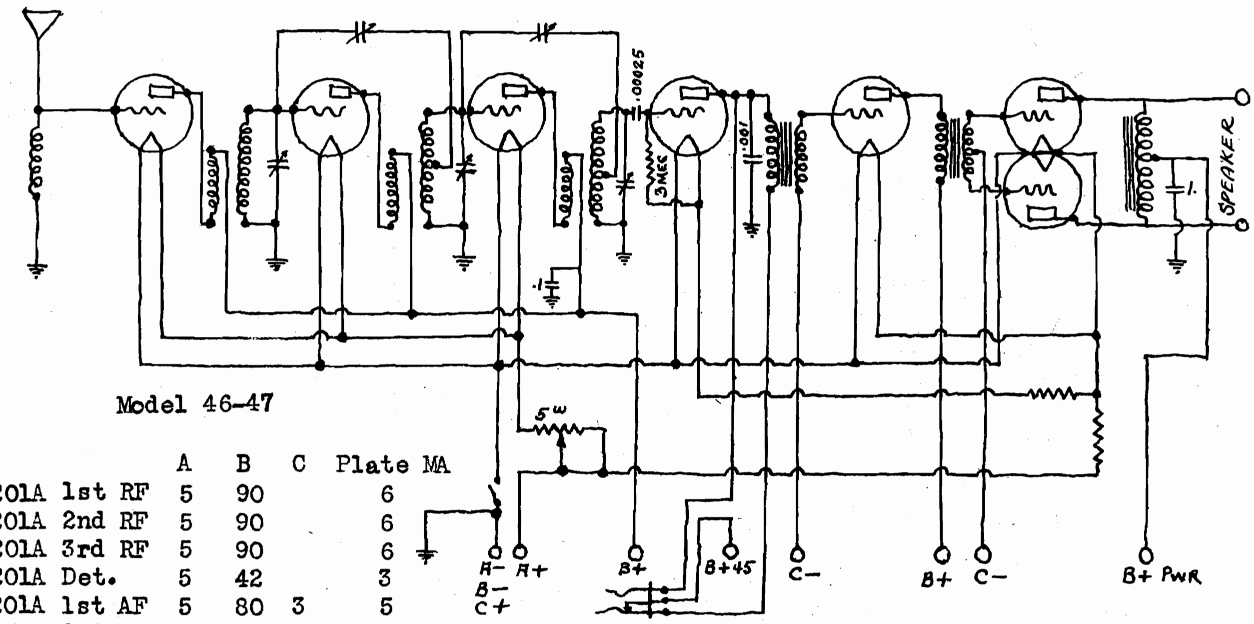
| TUBE | CIRCUIT | PLATE | SCREEN GRID | CATHODE |
|---|---|---|---|---|
| 6A7 | Det-Osc. | 220 | 90 | 2.25 |
| 78 | IF | 220 | 90 | 3 |
| 75 | 2nd Det. | 140 | - | 0 |
| 42 | Output | 216 | 220 | 0 |

42 Grid to Cathode 11 v.
Speaker Field Voltage 50 volts.



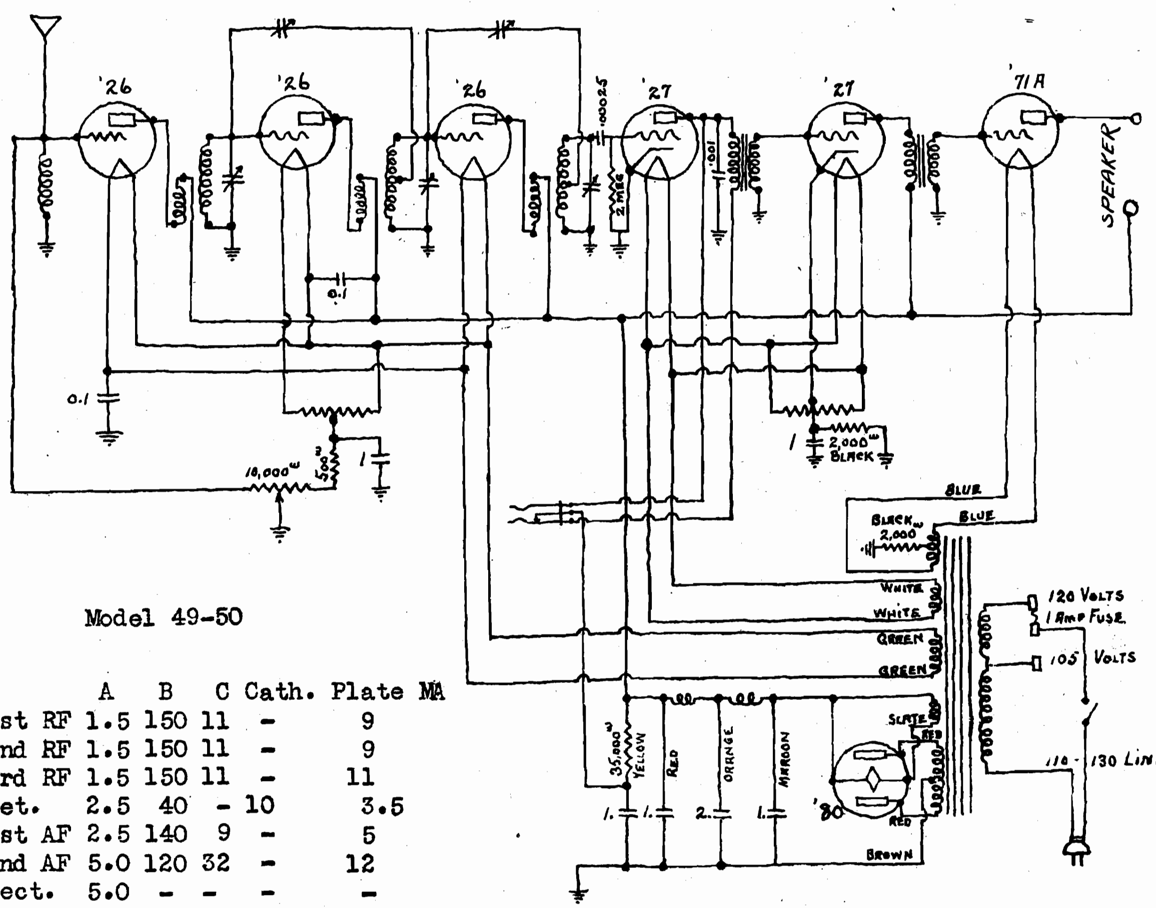
MODEL 46-47
MODEL 49-50
Schematic
Voltage

# SEARS-ROEBUCK & CO.




Model 46-47

| | | A | B | C | Plate MA |
|---|---|---|---|---|---|
| 201A | 1st RF | 5 | 90 | | 6 |
| 201A | 2nd RF | 5 | 90 | | 6 |
| 201A | 3rd RF | 5 | 90 | | 6 |
| 201A | Det. | 5 | 42 | | 3 |
| 201A | 1st AF | 5 | 80 | 3 | 5 |
| 171A | 2nd AF | 5 | 120 | 20 | 11.5 |
| 171A | 2nd AF | 5 | 120 | 20 | 11.5 |




Model 49-50

| | | A | B | C | Cath. | Plate MA |
|---|---|---|---|---|---|---|
| 226 | 1st RF | 1.5 | 150 | 11 | - | 9 |
| 226 | 2nd RF | 1.5 | 150 | 11 | - | 9 |
| 226 | 3rd RF | 1.5 | 150 | 11 | - | 11 |
| 227 | Det. | 2.5 | 40 | - | 10 | 3.5 |
| 227 | 1st AF | 2.5 | 140 | 9 | - | 5 |
| 171A | 2nd AF | 5.0 | 120 | 32 | - | 12 |
| 280 | Rect. | 5.0 | - | - | - | - |

## GENERAL NOTES ON ALIGNMENT

In the service notes on ALIGNMENT PROCEDURE, directions are to couple the test oscillator to the receiver. Since test oscillators of different makes vary considerably in their design and construction, it is not possible to give specific instructions for coupling any particular test oscillator to the receiver. However, the following general method can be applied with practically any test oscillator.

Most test oscillators have two output leads. One of them is the "hot" lead and the other the ground lead. The ground lead should be connected directly to the receiver chassis, except in the case of AC-DC receivers. The connection then should be made through a .1 mfd condenser since the chassis of such receivers is above ground potential. If the test oscillator has only one lead, this information about the ground lead may be disregarded.

As mentioned in all of the service notes, for IF alignment the test oscillator should be connected through a .1 mfd. condenser directly to the control grid cap of the IF or Translator tubes. It is important to leave the grid clip attached to the cap and to leave the tube shields in place. The oscillator tube of the receiver also should be in its socket.

For RF alignment, whether broadcast or short wave, the "hot" lead of the test oscillator should be coupled to the antenna lead of the receiver. The exact means of coupling will depend upon several factors. Among them are the power of the test oscillator, the sensitivity of the receiver, and the extent to which the receiver is out of alignment. If the test oscillator is quite powerful and the receiver one of high sensitivity, merely placing the test oscillator lead parallel to, and several inches away from the receiver's antenna lead may provide sufficient coupling. In some cases it may be necessary to bring the leads very close to each other, or it may even be necessary to twist the antenna lead and the oscillator lead together for several inches. (Of course, the two leads must be separated by their insulation and not make metallic contact.) As the receiver is brought into alignment, thereby increasing its sensitivity, it will be possible to decrease the amount of coupling between the test oscillator lead and the antenna lead. (Move the leads further apart.) Always use the lowest amount of coupling that still will provide a signal strong enough for working purposes. If the test oscillator has a variable control for its power output, it is better to turn this control to its high position and decrease the signal input to the receiver by decreasing the amount of coupling between the test oscillator and the receiver's antenna lead. This procedure will insure the greatest possible accuracy in alignment.

When adjusting the oscillator trimmer condenser, set the variable condenser to the frequency or condenser position indicated in the service notes. Do not change this position while adjusting the trimmer. However, when adjusting the antenna or translator trimmers, the proper method is to continually "rock" the variable condenser a degree or two both sides of the alignment frequency and, at the same time, adjust the trimmer.

## PREVENTING ADJUSTMENT AT THE IMAGE FREQUENCY

When adjusting trimmers for short wave alignment, it sometimes will be found that a peak can be obtained at two different positions of the trimmer. Only one of these peaks is the correct one to use. The other is the image response. The proper procedure follows:

### Oscillator Trimmer:

Screw the oscillator trimmer all the way in (maximum capacity). Then reduce the capacity until a peak is reached. Now continue to reduce the capacity until a second peak is reached. Almost always, this second peak is considerably louder than the first one. The first peak is the image frequency adjustment, and must be avoided.

### Antenna and Translator Trimmers:

Screw the trimmers all the way in and then reduce capacity until a peak is reached. If the capacity is reduced still further, a second peak will be obtained. However, the correct setting is the first one, the one using the greater amount of capacity. Note that this is exactly opposite to the procedure for the oscillator trimmer.

## ALIGNMENT PROCEDURE FOR RECEIVERS USING A WAVE TRAP

If a wave trap is used in Models 1821, 1827, 1828, 1804, 1805, 1820, 1826 or 1840, it must be disconnected before making any RF alignment adjustments on the receiver. This can be done as follows:

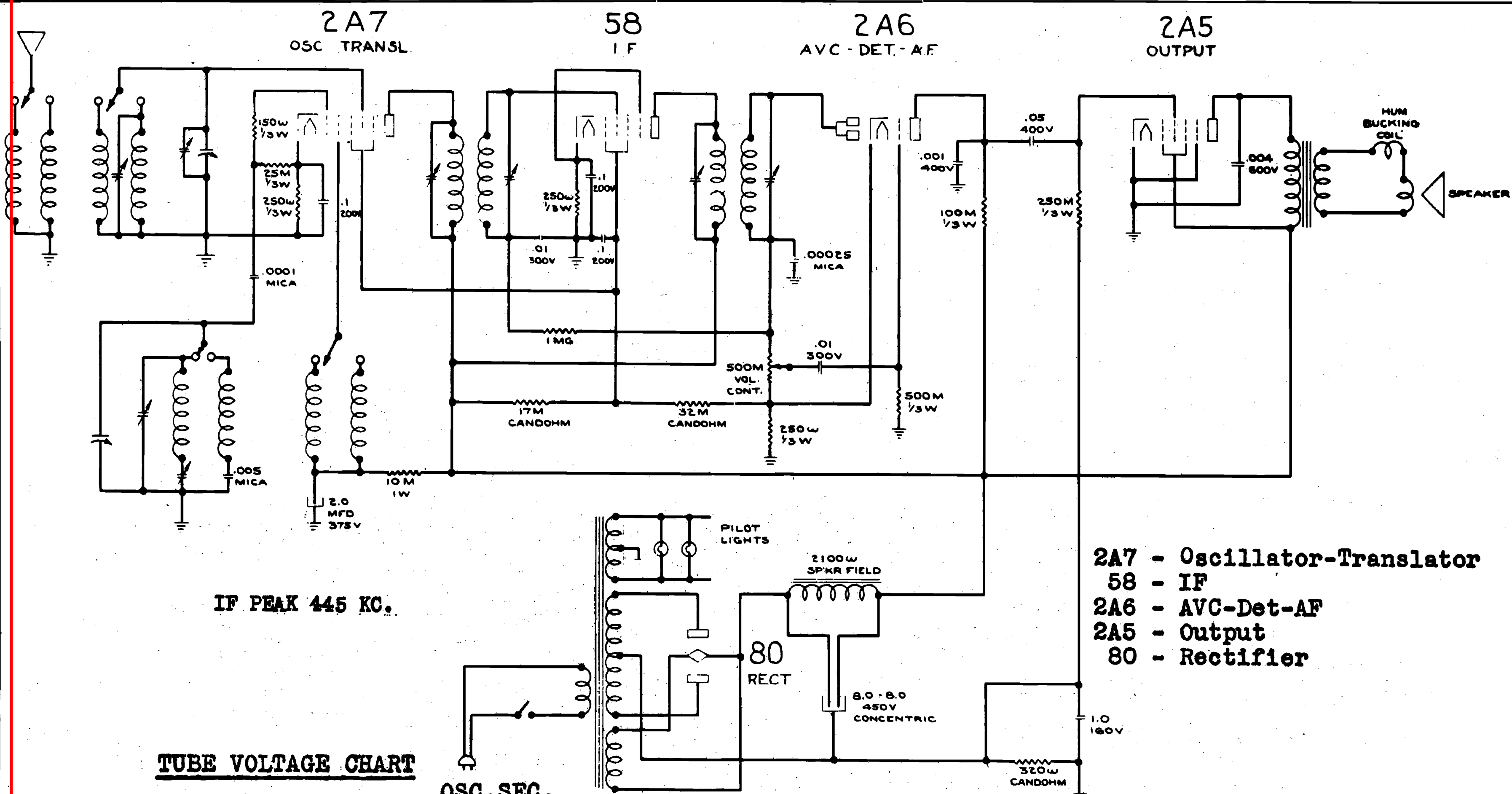
1. Connect a jumper between the yellow and blue leads of the wave trap.

2. Disconnect the white lead of the trap. IN SOME TRAPS A GREEN LEAD IS USED INSTEAD OF A WHITE ONE.

After the receiver has been aligned as instructed in the Service Manual for the particular model, reconnect the wave trap. Do not touch the alignment of the receiver after the trap has been reconnected.

MODEL 1802,1803
Schematic
Voltage

SEARS-ROEBUCK & CO.



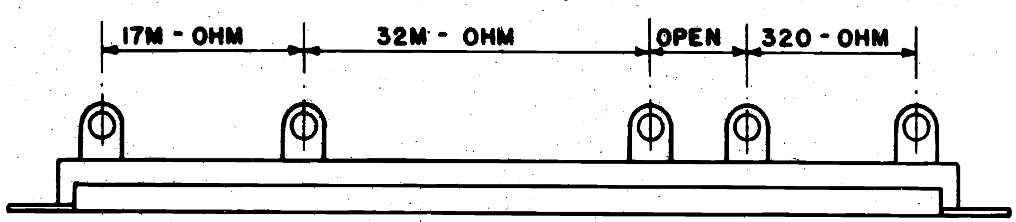

2A7 - Oscillator-Translator
58 - IF
2A6 - AVC-Det-AF
2A5 - Output
80 - Rectifier

IF PEAK 445 KC.

## TUBE VOLTAGE CHART

| TUBE | PLATE | SCREEN | OSC.SEC. PLATE |
|---|---|---|---|
| 2A7 - Osc-Transl | 195 | 90 | 155 |
| 58 - IF | 195 | 90 | |
| 2A6 - AVC-Det-AF | 115 | | |
| 2A5 - Output | 185 | 195 | |

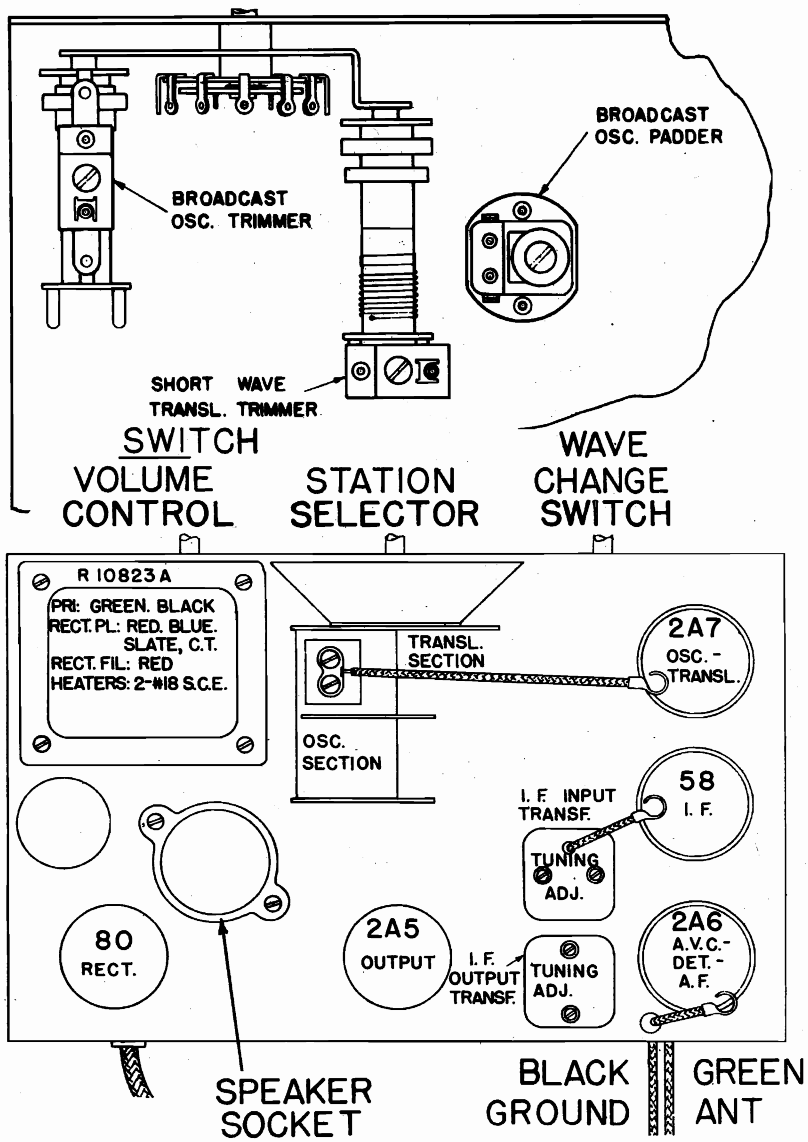
All readings should be taken between the chassis and the respective element of each tube.




CANDOHM RESISTOR

MODEL 1802,1803
Socket Layout
Alignment Data

SEARS-ROEBUCK & CO.




ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the low voltage scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the control grid cap of the 58 IF tube. Leave the clip attached to the cap and the tube shield in place.

4. Set the test oscillator to 445 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the control grid cap of the 2A7 and tune the IF input transformer.

6. Repeat the adjustments in order to secure greater accuracy. Always use as low an output as possible from the test oscillator, in order to render the AVC action of the receiver inoperative.

RF Alignment (Broadcast):

1. Screw the padding condenser to about three quarters of its maximum capacity.

2. Set the test oscillator to 1700 kc and couple its output to the green antenna lead of the receiver.

3. Open the variable condenser plates all the way and adjust the broadcast oscillator coil trimmer for maximum output meter reading.

4. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the trimmer on the translator section of the variable condenser for maximum output. The translator section is the one nearest the dial, as shown in the Service Illustration.

5. Set the test oscillator to 600 kc. and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two, and, at the same time, adjust the broadcast oscillator padding condenser for maximum output.

6. Repeat the 1700 kc and 1400 kc adjustments. Always use a low enough output from the test oscillator to render the AVC ineffective.

Short Wave Alignment:

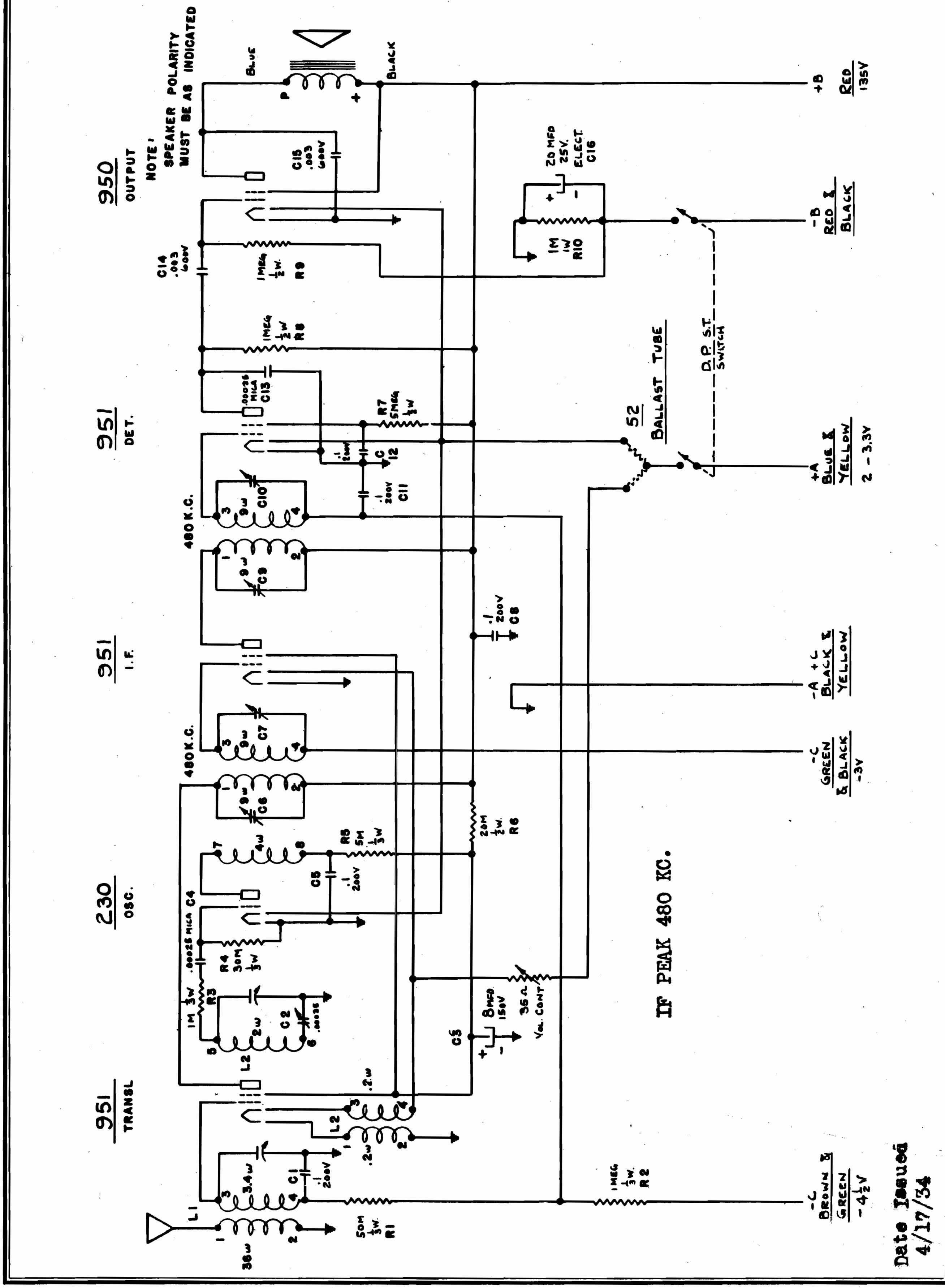
1. Leave the test oscillator loosely coupled to the green antenna lead as for broadcast alignment.

2. Set the test oscillator to 16,400 kc. Its signal should be heard when the condenser plates are all the way out. If the test oscillator cannot be tuned in, wires must be moved to reduce the capacity in the oscillator circuit until this frequency can be reached.

3. Set the test oscillator to 14,000 kc and tune in its signal. Then adjust the short wave translator trimmer for maximum output.

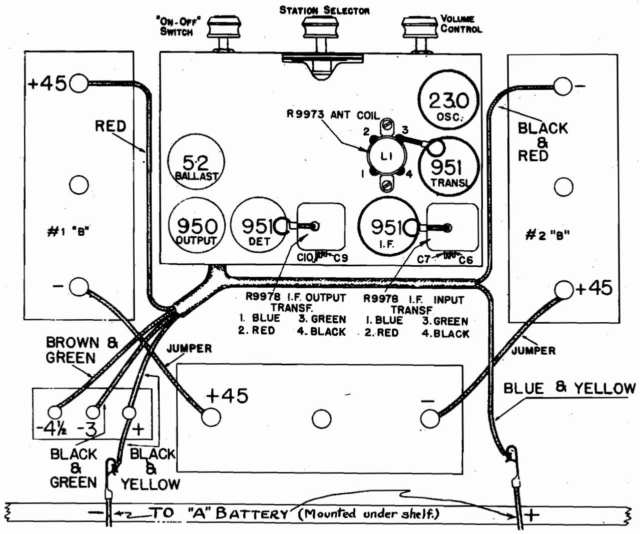
**MODEL 1711-A, 7090-A**
**Schematic**

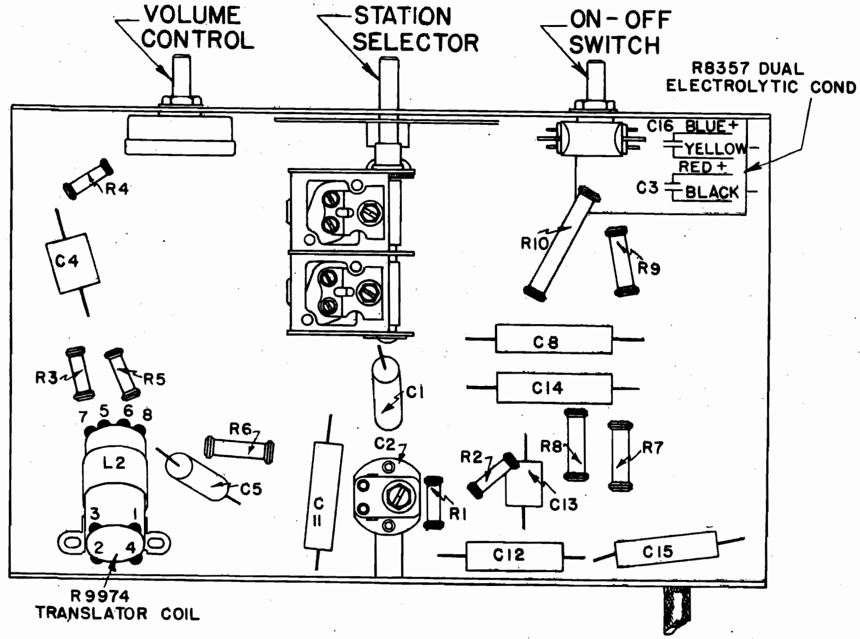
# SEARS-ROEBUCK & CO.



MODEL 1711-A, 7090-A
Voltage, Socket
Alignment Data
Parts List

# SEARS-ROEBUCK & CO.




SILVERTONE Models 1711A and 7090A are battery operated, automatic filament control superheterodynes. The circuit is shown in lock form in Fig. 1 and schematically in Fig. 2.

A type 951 translator tube creates a 480 kc signal in its plate circuit by mixing the incoming broadcast signal with the signal created by the type 230 oscillator. This 480 kc signal is amplified by the 951 IF stage and coupled to the 951 detector. The audio output of the detector is fed to the 950 output tube and then to the magnetic loudspeaker.

Volume is controlled by a 35 ohm rheostat in the IF and translator filament circuit. A type 52 ballast tube automatically adjusts the filament voltage to the proper value (2 volts) even though the A supply has a value anywhere between two and three volts. Always turn the set off before removing or inserting tubes.

When peaking the oscillator and translator stage, procede as follows:

1. Set the test oscillator to 1600 kc and adjust the two trimmers on the variable condenser.

2. Re-set the test oscillator to 1400 kc, retune the variable condenser to this frequency, and adjust the translator trimmer.

3. Tune to 600 kc and adjust the isolantite base padding condenser.

Since these adjustments interact on each other, it is advisable to repeat the complete operation two or three times.

| Part No. | Description |
|---|---|
| R-8308-A | Board - Terminal, triple |
| R-8350 | Cable - Battery |
| R-9388 | Cable - Bat'ery |
| R-4715 | Clamp - An'. & Gnd. leads |
| R-6318 | Clamp - Cable |
| R-6381 | Clip - Grid |
| R-9973 | Coil - Antenna |
| R-9974 | Coil - Oscillator |
| R-9985 | Condenser - Variable |
| R-8357 | Condenser - Dual electrolytic |
| R-9975 | Condenser - Padding |
| R-6444 | Condenser - .1 Mfd, 200 volt |
| R-7681 | Condenser - .003 Mfd. 600 volt |
| R-4592 | Condenser - .00025 Mfd. Mica |
| R-10097-A | Dial and Indicator |
| R-9981 | Escutcheon |
| R-9993 | Instruction |
| R-8896 | Knob |
| R-9982 | Knob with pointer |
| R-8363 | Resistor - 5 megohms, 1/2 watt |
| R-5823 | Resistor - 1 megohm, 1/2 watt |
| R-7585 | Resistor - 1 megohm, 1/3 watt |
| R-6637 | Resistor - 50 M ohms, 1/3 watt |
| R-6110 | Resistor - 30 M ohms, 1/3 watt |
| R-5821 | Resistor - 20 M ohms, 1/2 watt |
| R-7226 | Resistor - 5 M ohms, 1/2 watt |
| R-6793 | Resistor - 1 M ohms, 1 watt |
| R-6636 | Resistor - 1 M ohms, 1/8 watt |
| R-8366 | Socket - 4 prong |
| R-8367 | Socket - 5 prong |
| S-9969 | Speaker - 6" Utah |
| 3-10120 | Speaker - 6" Best |
| S-10001 | Speaker - 8" Utah |
| R-9978-A | Transformer - IF |

TUBE VOLTAGE & CURRENT CHART

Models 1711A and 7090A

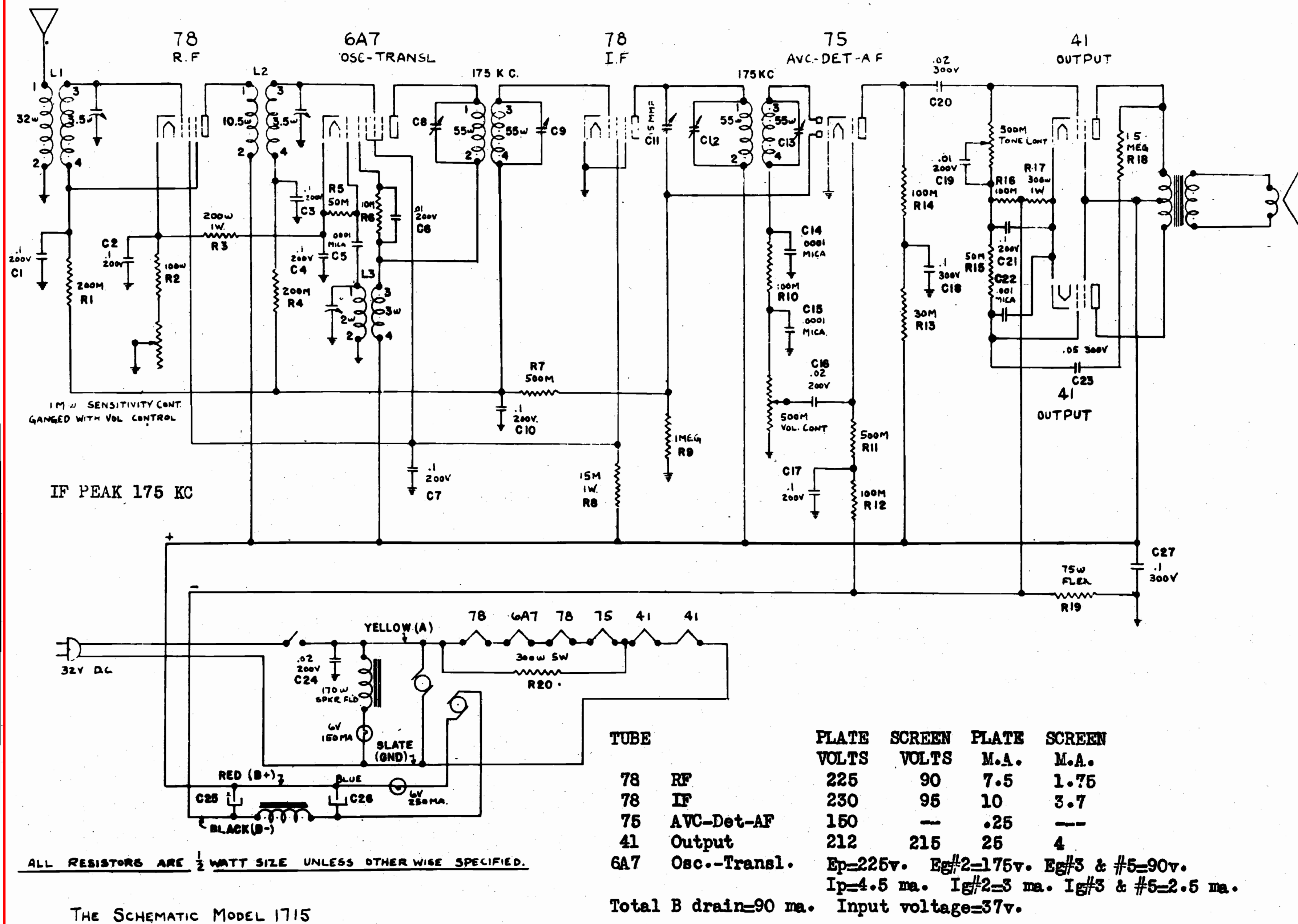
| TUBE | PLATE VOLTAGE | SCREEN VOLTAGE | PLATE M. A. | SCREEN M. A. |
|---|---|---|---|---|
| 230 - Osc. | 50 | | 2.8 | |
| 951 - Transl. | 135 | 65 | 1.25 | 1.5 |
| 951 - IF | 135 | 65 | 1.8 | 2 |
| 951 - Det. | 25* | 5* | .03 | .01 |
| 950 - Output | 135 | 135 | 5 | 1 |

* Indicates high series resistor

Readings taken with 1000 ohms, per voltmeter. Care must be used if measurements are made with an analyzer since the capacity of the cables may cause circuits to oscillate giving rise to erratic readings. Usually, touching the finger to grid or plate is sufficient to stop oscillation. If an analyzer is not used, voltage readings can be made from cathode to the respective elements of each tube. Ordinarily, a 20% deviation from the chart value may be allowed.

MODEL 1715
Schematic
Voltage

# SEARS-ROEBUCK & CO.

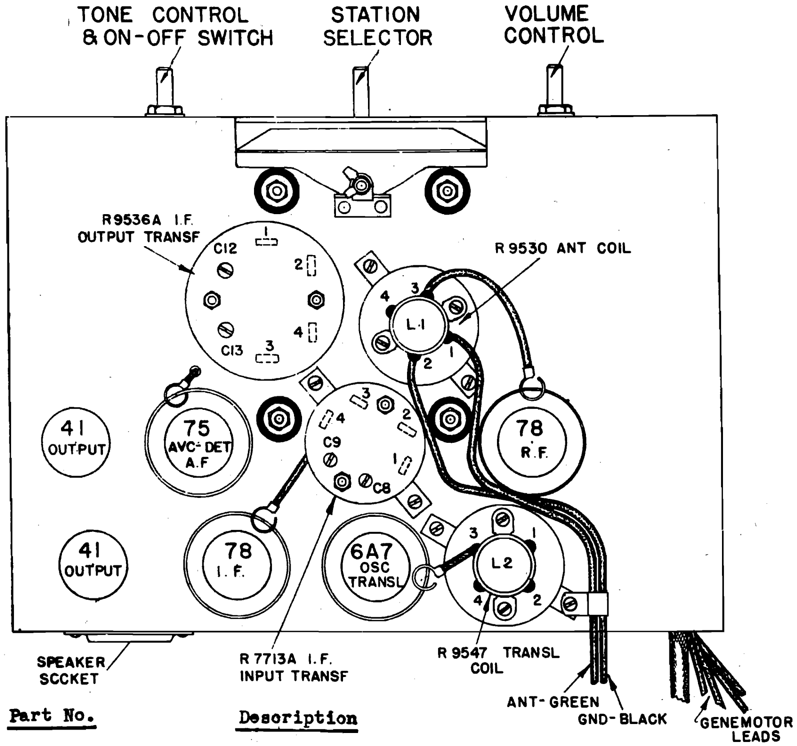


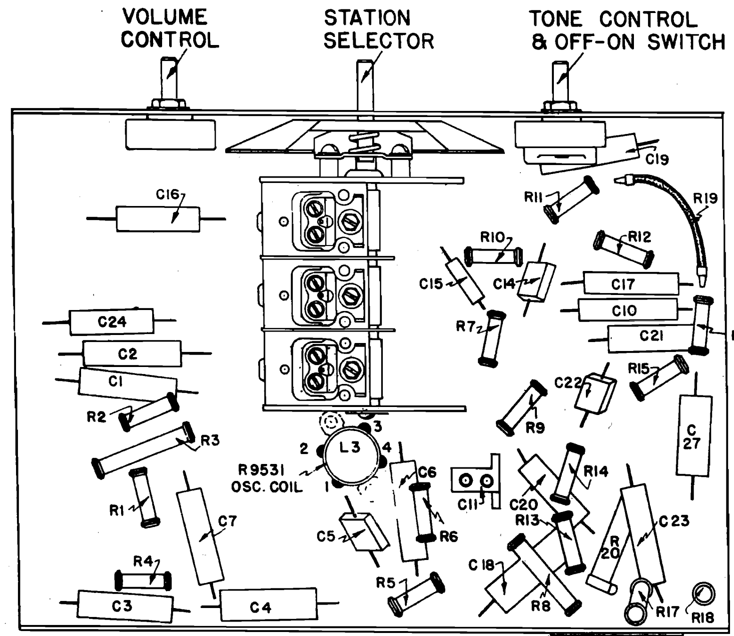

| TUBE | | PLATE VOLTS | SCREEN VOLTS | PLATE M.A. | SCREEN M.A. |
|---|---|---|---|---|---|
| 78 | RF | 225 | 90 | 7.5 | 1.75 |
| 78 | IF | 230 | 95 | 10 | 3.7 |
| 75 | AVC-Det-AF | 150 | — | .25 | — |
| 41 | Output | 212 | 215 | 25 | 4 |
| 6A7 | Osc.-Transl. | Ep=225v. Eg#2=175v. Eg#3 & #5=90v. | | | |
| | | Ip=4.5 ma. Ig#2=3 ma. Ig#3 & #5=2.5 ma. | | | |

Total B drain=90 ma. Input voltage=37v.

**MODEL 1715**
Socket Layout
Trimmers Locations
Parts List

# SEARS-ROEBUCK & CO.

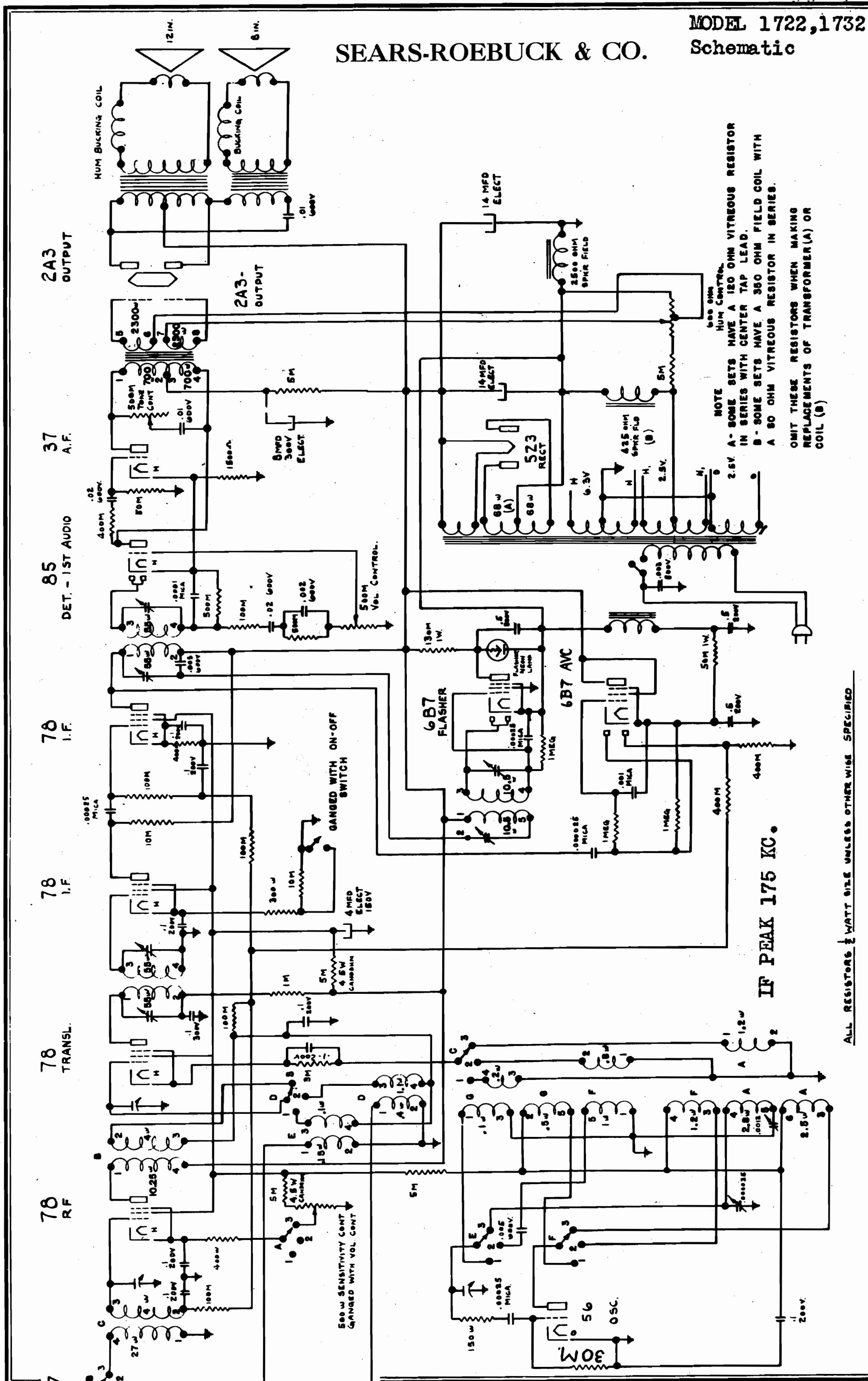



| Part No. | Description |
|---|---|
| R-5509A | Board - Terminal |
| R-8297A | Board - Terminal, double |
| R-8308A | Board - Terminal, triple |
| R-7409 | Card - Operating |
| R-7011A | Clip - Antenna lead |
| R-6381 | Clip - Grid |
| R-7031 | Clip - Pilot light |
| R-9530 | Coil - Antenna |
| R-9531 | Coil - Oscillator |
| R-9547A | Coil - Translator |
| R-7833 | Condenser - Variable |
| R-6565 | Condenser - Tuning, IF input |
| R-9532 | Condenser - Tuning, IF output |
| R-6138 | Condenser - .1 mfd., 300 volt |
| R-6444 | Condenser - .1 mfd., 200 volt |
| R-7857 | Condenser - .05 mfd., 300 volt |
| R-7680 | Condenser - .02 mfd., 300 volt |
| R-6629 | Condenser - .02 mfd., 200 volt |
| R-8432 | Condenser - .01 mfd., 200 volt |
| R-6759 | Condenser - .001 mfd., mica |
| R-4303 | Condenser - .0001 mica |
| R-8042 | Condenser - .000015 mfd. mica |
| R-8679 | Control - Volume |
| R-6571 | Control - Tone |
| R-6989 | Cord - Extension |
| R-6003G | Dial and indicator |
| R-6923 | Escutcheon |
| R-9537 | Instructions |
| R-8893 | Knob - Large |
| R-8896 | Knob - Medium |
| R-9769 | Lamp - Genemotor "Tell-tale" |
| R-2288 | Lamp - Pilot |
| R-6324 | Pin - Escutcheon |
| R-7074 | Resistor - 1.5 megohms, 1/2 watt carbon |
| R-5823 | Resistor - 1 megohms, 1/2 watt carbon |
| R-6179 | Resistor - 500 M ohms, 1/2 watt carbon |
| R-5830 | Resistor - 200 M ohms, 1/2 watt carbon |
| R-5819 | Resistor - 100 M ohms, 1/2 watt carbon |
| R-6445 | Resistor - 50 M ohms. 1/2 watt carbon |
| R-7707A | Shield - Oscillator |

| Part No. | Description |
|---|---|
| S-9568 | Speaker - Complete |
| S-7776B | Speaker - cone and voice coil |
| S-9566 | Speaker - field coil |
| S-9567AS | Speaker - transformer |
| S-7415 | Speaker - plug, 5 prong |
| R-7713 | Transformer - IF input, coils and core only |
| R-7713A | Transformer - IF input complete, less shield |
| R-9536 | Transformer - IF output, coils and core only |
| R-9536A | Transformer - IF output complete, less shield |
| R-6235 | Tube - Rubber, Genemotor mtg. |
| R-6156 | Resistor - 30 M ohms, 1/2 watt |
| R-6504 | Resistor - 15 M ohms, 1 watt |
| R-9533 | Resistor - 300 ohms, 1 watt |
| R-7273 | Resistor - 200 ohms, 1 watt |
| R-5830 | Resistor - 200 ohms, 1/2 watt |
| R-6976 | Resistor - 100 ohms, 1/2 watt |
| R-9534 | Resistor - 75 ohms, flexible |
| R-9160 | Resistor - 300 ohms, 5 watt |
| R-6006B | Shaft - Dial drive |
| R-6018A | Shield - Antenna coil |
| R-8687A | Shield - Translator coil |

MODEL 1722,1732 Revised Schematic




ALL RESISTORS ½ WATT SIZE UNLESS OTHER WISE SPECIFIED

FIG. 2. THE CIRCUIT DIAGRAM- REVISED MODELS 1722 & 1732

Date Issued: 5/18/34

**MODEL 1722,1732 Revised Voltage,Socket Changes in Circuit**

## SEARS-ROEBUCK & CO.

TUBE VOLTAGE AND CURRENT CHART

REVISED MODELS 1722 and 1732

| TUBE | PLATE VOLTAGE | SCREEN VOLTAGE | PLATE M. A. | SCREEN M. A. |
|---|---|---|---|---|
| 78 - RF | 200 | 75 | 6.5 | 1.5 |
| 56 - Osc | 60 | | 4.5 | |
| 78 - Transl | 200 / 180 - BC | 75 | 2 / .6-BC | .2 / .1 - BC |
| 78 - 1st IF | 140 - SW | 75 | 5 - SW | 1.5 - SW |
| 78 - 2nd IF | 200 | 75 | 6 | 1.25 |
| 85 - Det - AF | 150 | | 5 | |
| 37 - AF | 150 | | 2.75 | |
| 6B7 - AVC | 60 | 60 | 4 | 1 |
| 6B7 - Flasher | 7-No signal<br>90-With signal | | | |
| 83V - Rect | DC voltage = 350 V. Plate current = 85 m.a. per plate | | | |

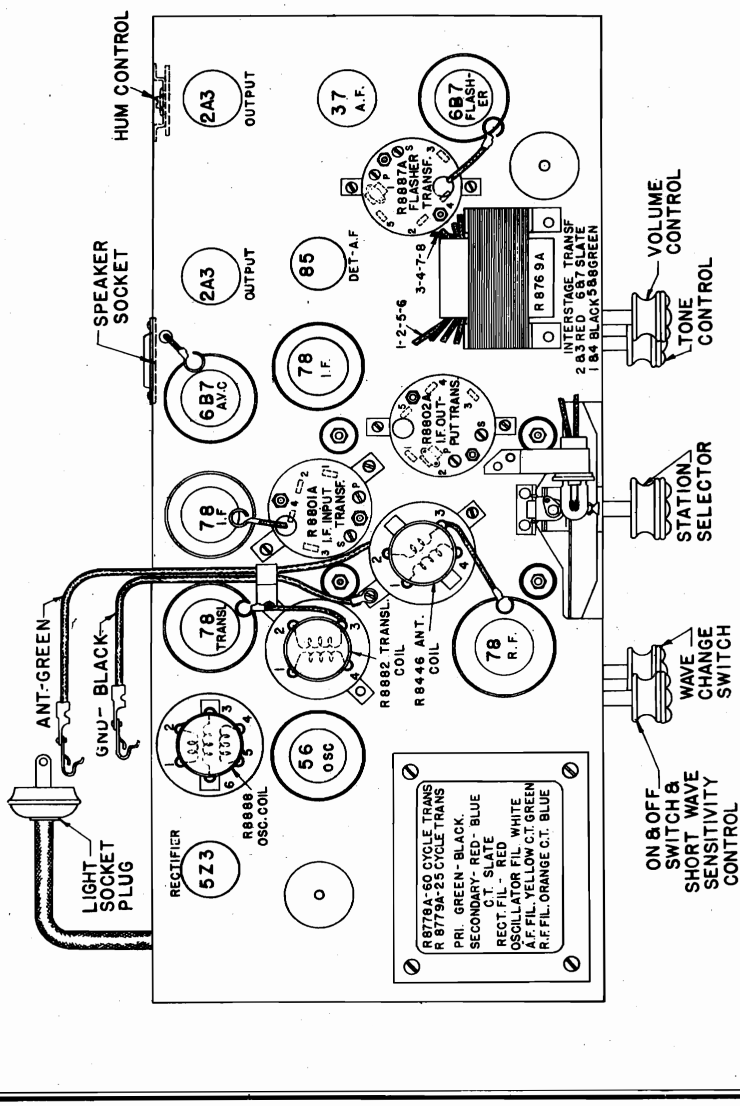


FIG 3 SERVICE ILLUSTRATION REVISED MODELS 1722 AND 1732

In order to increase the short wave sensitivity of the 1722 and 1732 receivers, certain changes were incorporated in the chassis.

1. A 78 resistance-capacity coupled IF stage was added. However, this stage is used on the short wave bands only.

2. The off-on switch was replaced with a duplex switch combining the functions of off-on switch and the switch to short out the added IF stage on the broadcast band. This shorting out of the stage is accomplished by biasing the 78 IF tube so far negative by means of a 30 M ohm cathode resistor that the amplification of the stage is reduced to a 1:1 ratio. For short wave reception, this duplex control is turned all the way on, shorting out the 30 M ohm cathode resistor, leaving only a 300 ohm bias resistor in the circuit.

3. The 37 detector and 37 first audio tubes are replaced by an 85 tube which fills the same functions.

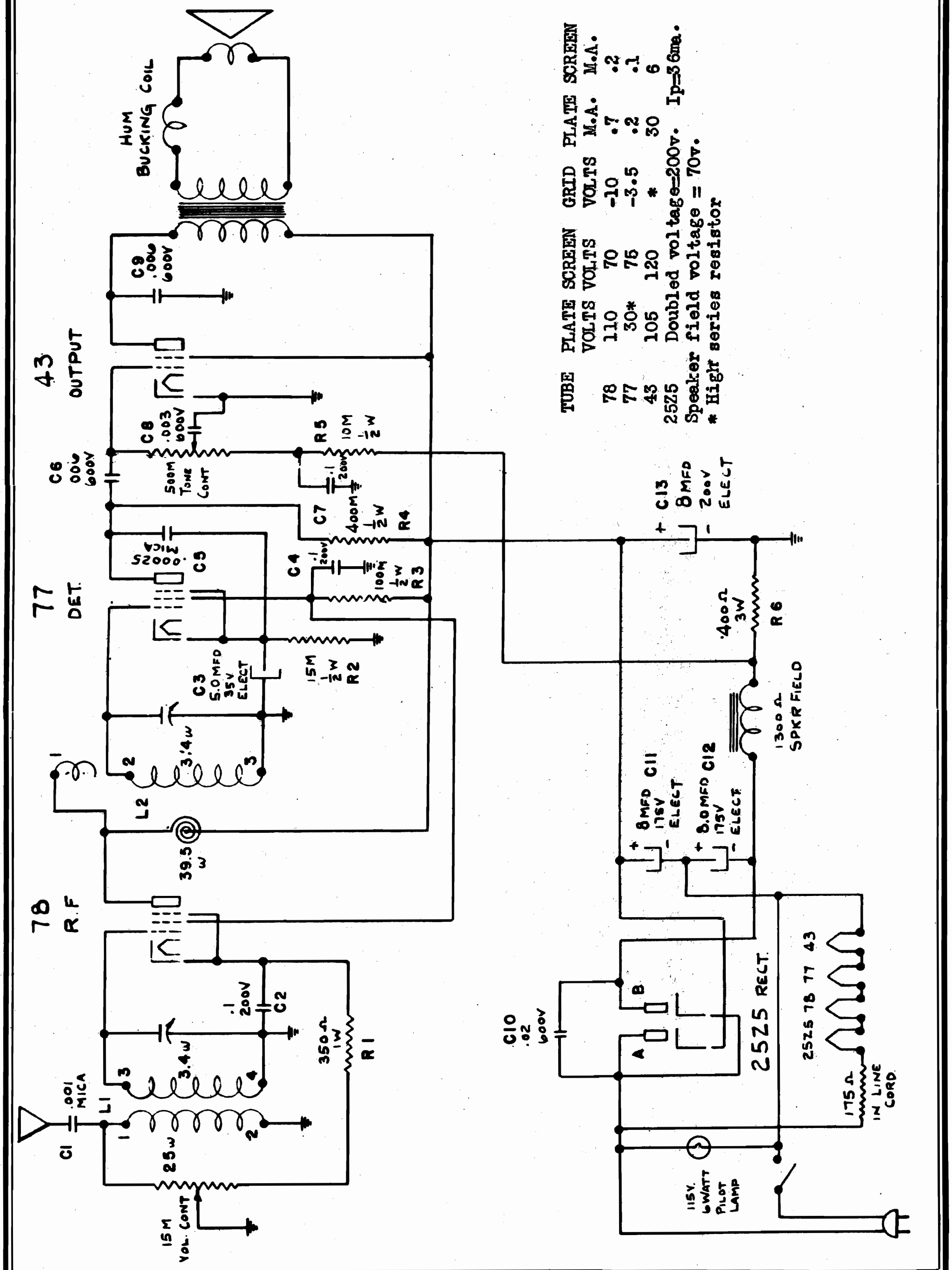
The new block diagram is shown in Fig. 1, the revised schematic in Fig. 2, and the changed top view of the chassis layout in Fig. 3. The rest of the description, explanations, and illustrations given in the original 1722 and 1732 manual, supplement #2, are correct for the revised models.

ADDITIONS TO THE REPLACEMENT PARTS LIST ARE:

| PART NO. | DESCRIPTIONS |
|---|---|
| R-6138 | Condenser - .1 mfd. 300 volts |
| R-6152 | Resistor - 10 M ohms - 1/2 watt carbon |
| R-6154 | Resistor - 1 M ohm - 1/2 watt carbon |
| R-6447 | Resistor - 300 ohms - 1/2 watt carbon |
| R-6571 | Switch - off-on - short wave sensitivity |

# SEARS-ROEBUCK & CO.

MODEL 1724
Schematic
Voltage

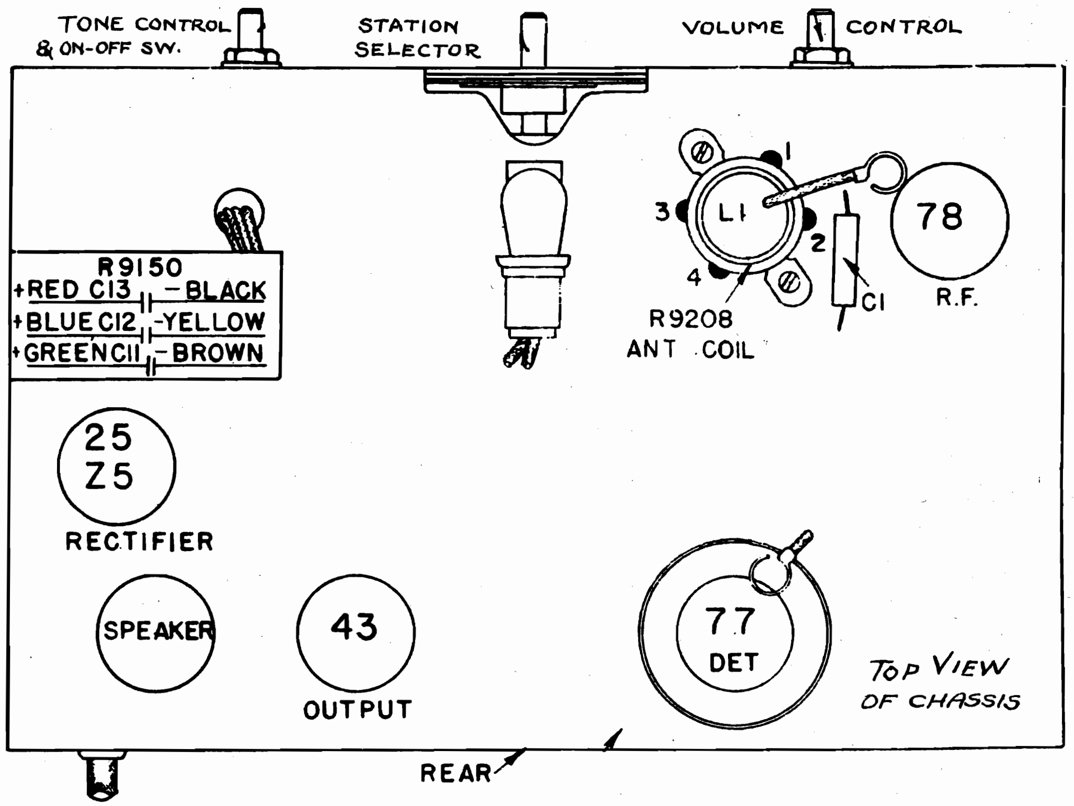


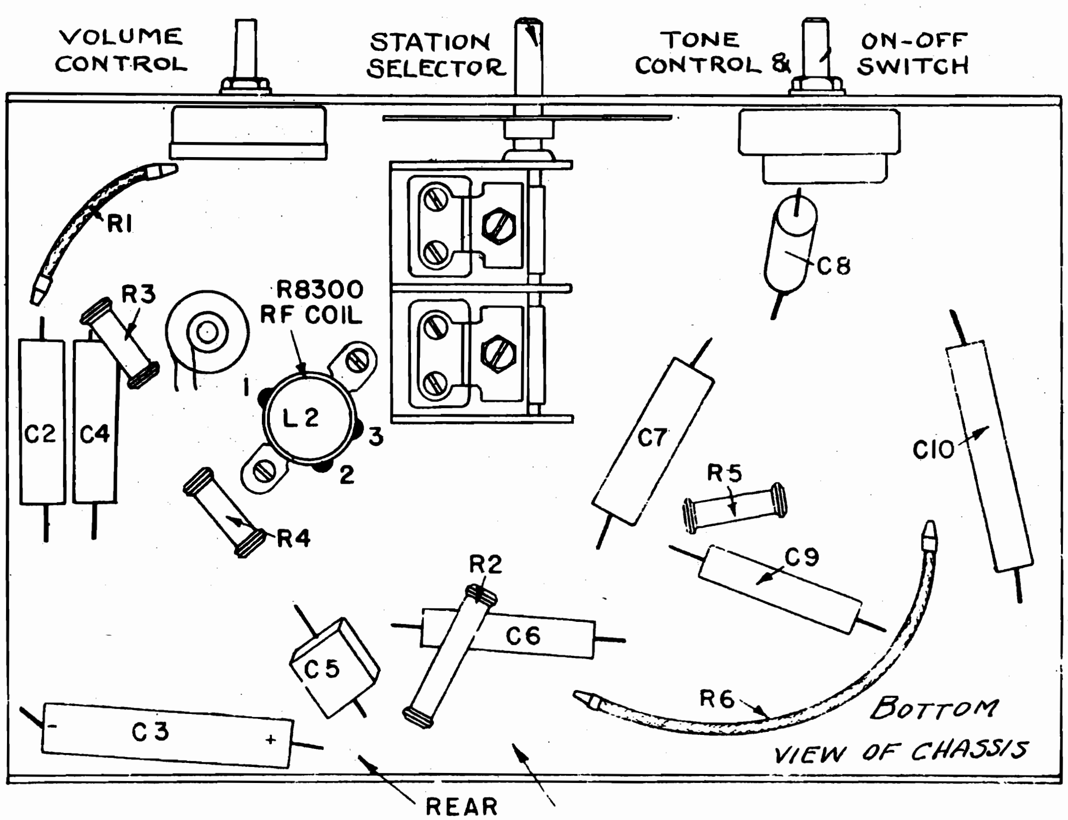

| TUBE | PLATE VOLTS | SCREEN VOLTS | GRID VOLTS | PLATE M.A. | SCREEN M.A. |
|---|---|---|---|---|---|
| 78 | 110 | 70 | -10 | .7 | .2 |
| 77 | 30* | 75 | -3.5 | .2 | .1 |
| 43 | 105 | 120 | * | 30 | 6 |

2525 Doubled voltage=200v. Ip=36ma.
Speaker field voltage = 70v.
* High series resistor

MODEL 1724
Socket Layout
Chassis

SEARS-ROEBUCK & CO.



SEARS-ROEBUCK & CO.

<u>ELIMINATION OF HUM</u>

<u>in</u>

<u>MODELS 1720, 1725 and 7065</u>

Any trouble due to hum in these models can be eliminated by performing the following operations. The purpose is to add an additional section of filtering to the power supply.

1. Enlarge the hole in the chassis near the power transformer to about 1/4" diameter, as indicated in the illustration.

2. Remove the cover of the power transformer. To do so, it is necessary first to remove the four nuts on the under side of the chassis and then to unscrew the bolts that pass through the laminations. The tone control and switch will have to be demounted in order to get at one of the power transformer nuts.

3. Mount a Part #R10793A choke on top of the power transformer in place of the original transformer cover. Be sure to mount the choke so that its leads can come down through the enlarged hole in the chassis. Also be sure to tighten the bolts well, in order to prevent hum. Then remount the transformer and choke assembly on the chassis and remount the tone control.

4. Make the wiring changes indicated in the illustration. The dotted lines represent the original wiring which is to be changed. The solid lines show the new connections. Note that a new part, a 2 mfd., 440 volt, dry electrolytic condenser, Part #R11114, is added.

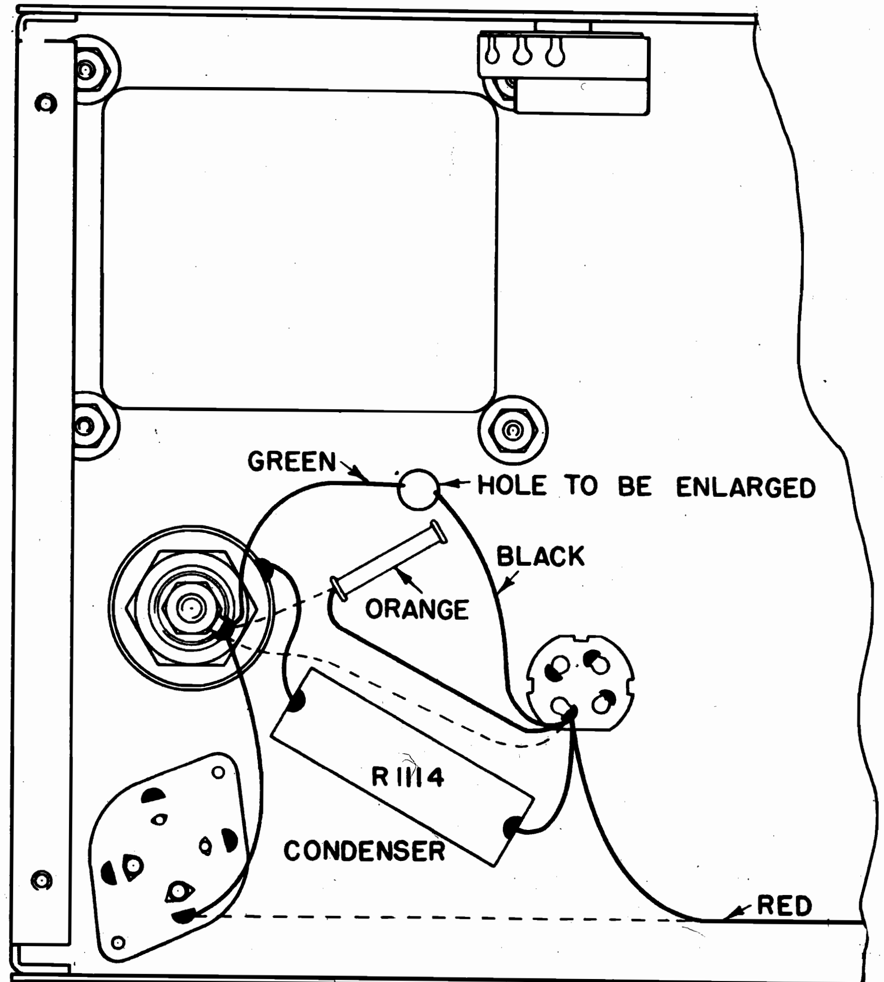
<u>PARTS NEEDED</u>

1 - R10793A - Audio Choke

1 - R11114 - 2 mfd. 440 volt, dry electrolytic condenser.

SPECIAL NOTICE: - The filter system outlined above should be necessary in only a small percentage of the Model #1725 in which the hum condition cannot be corrected by matching the output tubes. Where the condition exists, the trouble is caused by the center tap of the transformer being off. Only in these cases should the filter system be necessary. Dept. 657, Chicago, will ship this filter system out "No Charge", providing the quantity ordered is reasonable.

In ordering, use F-#14326 and mail to Dept. 657, Chicago.




DOTTED LINES INDICATE ORIGINAL WIRING, TO BE REMOVED.
SOLID LINES INDICATE CHANGED WIRING.

Loud Speakers
Repair Notes

## SEARS-ROEBUCK & CO.

RADIO SERVICE MANUAL

Date Issued
1/4/34

### SPEAKER REPAIRS

Speaker repairs fall into two general classifications; those involving replacement of the cone and voice coil assembly and those involving replacement of the field or hum bucking coil. Although there are many models of speakers, all fall into one of four types.

1. INSIDE suspension of voice coil and cone, and pole plate RIVETED to yoke.

2. INSIDE suspension of voice coil and cone, and cone plate WELDED to yoke.

3. OUTSIDE suspension of voice coil and cone, and pole plate BOLTED to yoke.

4. OUTSIDE suspension of voice coil and cone, and pole plate RIVETED to yoke.

CONE REPLACEMENT OF INSIDE SUSPENSION TYPE SPEAKERS (see Fig. 1)

1. Unsolder the voice coil leads from their terminals.

2. Remove the cone mounting screw.

3. Drill out the cone mounting eyelets or cut off the small head ends with a cold chisel and hammer. If care is used the cardboard mounting rings will not be damaged.

(The 5" Speakers have the cone glued in place instead of being fastened with eyelets. They will have to be torn out).

4. Remove the cone and blow out any dirt or metal chips from the air gap.

5. Replace the new cone and the cardboard mounting rings in their original order.

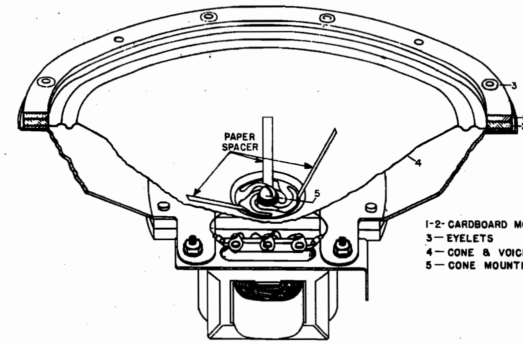
6. Insert three strips about 3" long, 1/8" wide and .01" thick (cut from a calling card) between the voice coil and the pole stem. They should be spaced evenly around the pole stem. Spacers can be obtained from the factory; part No. S-9177 .0075" thick for 5" and 6" speakers; part No. S-7391 - .01" thick for all other speakers.

7. Replace and tighten the cone mounting screw.

8. Replace the eyelets around the edge of the cone, leaving blank any holes that were originally left blank for speaker to baffle mounting screws. The eyeleting tool illustrated is recommended. (Part No. R-8033).

9. Remove the three inserted spacer strips.
10. Solder the voice coil leads to their terminals.
11. If it should happen that the cone is not properly centered after completing the replacement, loosen the cone mounting screw and move the cone around until proper centering is secured. Then re-tighten the screw. Sometimes several attempts are necessary before proper centering can be had.

Fig. 1




1-2- CARDBOARD MOUNTING RINGS
3 — EYELETS
4 — CONE & VOICE COIL ASSEMBLY
5 — CONE MOUNTING SCREW

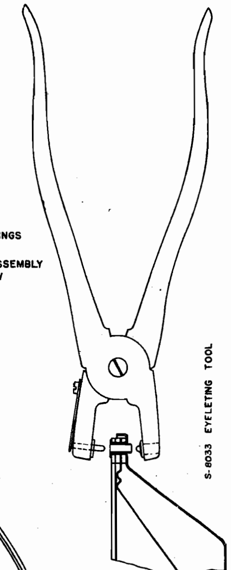
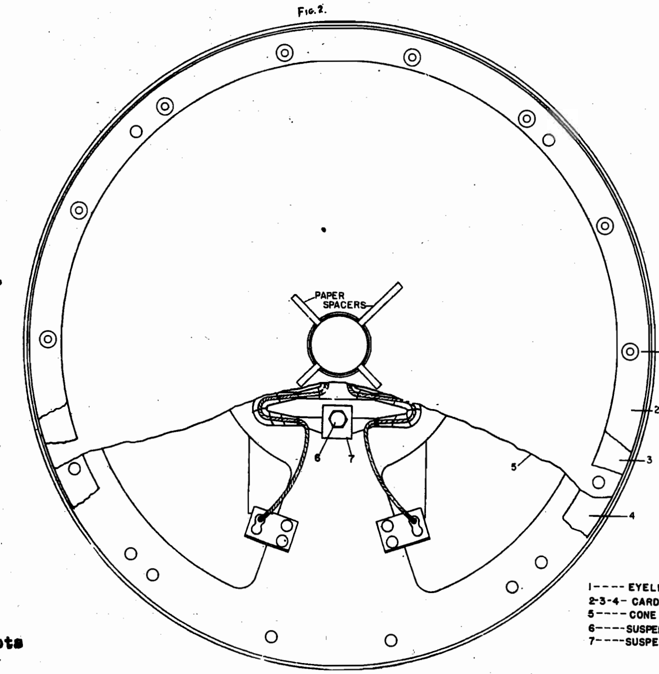


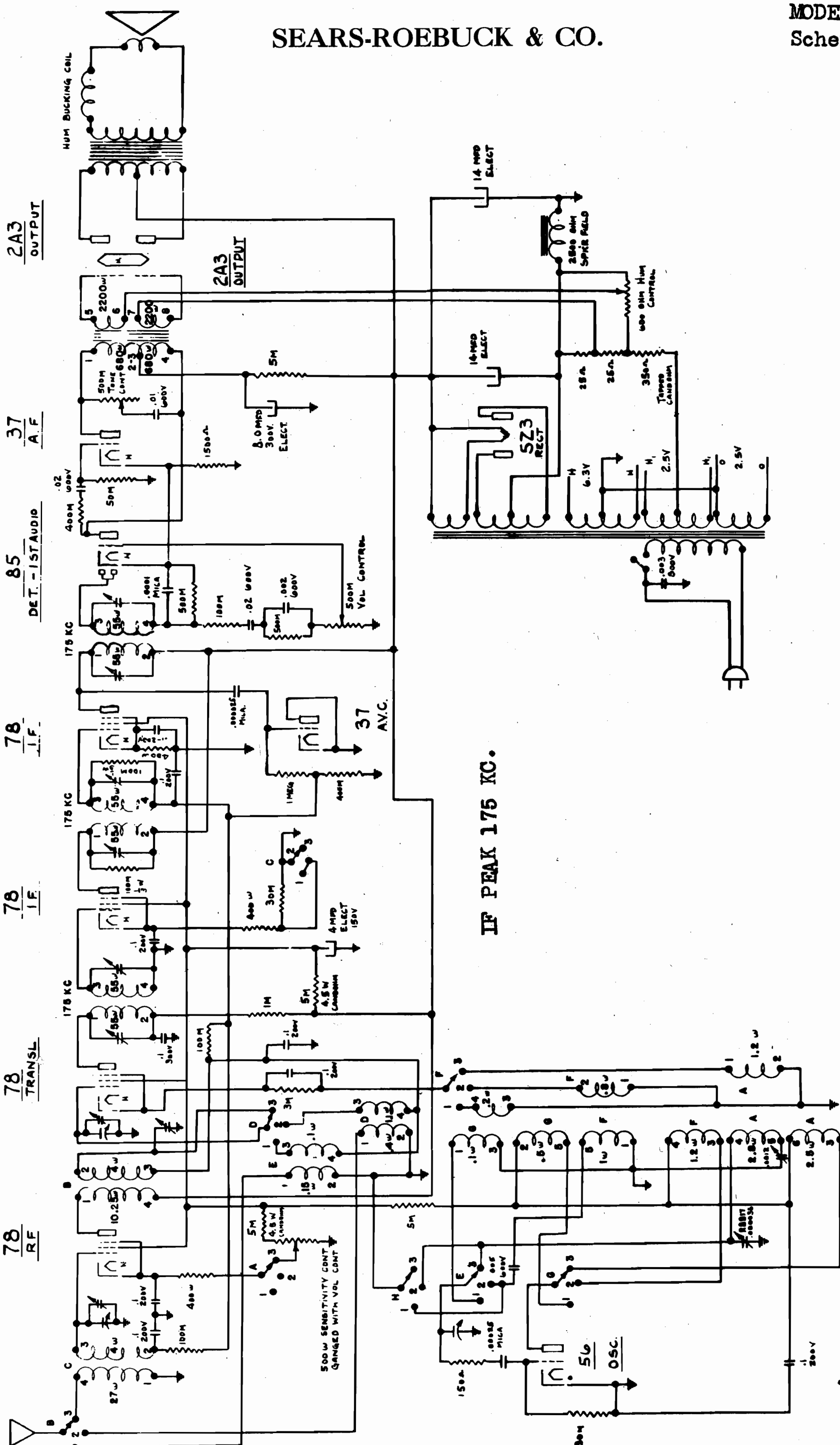

Fig. 2




1 ---- EYELETS
2-3-4- CARDBOARD MOUNTING RINGS
5 ---- CONE & VOICE COIL ASSEMBLY
6 ---- SUSPENSION SCREW
7 ---- SUSPENSION CLAMP

# SEARS-ROEBUCK & CO.

MODEL 1726-X
Schematic




ALL RESISTORS 1/2 WATT SIZE UNLESS OTHERWISE SPECIFIED

FIG. 2. CIRCUIT DIAGRAM - MODEL 1726 X

**MODEL 1726-X**
**Voltage**
**Alignment Data**
**Parts List**

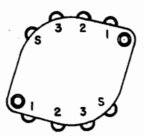
# SEARS-ROEBUCK & CO.

When peaking the IF stages, use a signal from the test oscillator just strong enough to give an audible response from the speaker or readable deflection on an output meter.

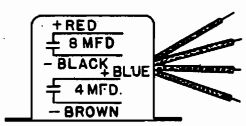
The sensitivity control is connected only in the broadcast position. Current is bled through it and the movable arm picks off a portion of the voltage to bias the cathode of the 78 RF tube. The sensitivity control is mounted on the volume control shaft so that sensitivity is decreased at the same time volume is decreased. Without this dual control, the AVC action would make the receiver sensitivity increase to its maximum value when no station is tuned in. By reducing the sensitivity as well as the volume, this dual control keeps between-station-noise at a minimum.

There is a hum control on the rear of the chassis, under the 2A3 tubes. It should be adjusted to the point of minimum hum with the volume control off. In the event that the point for minimum hum appears to be beyond the limit of movement of the control, the 2A3 tubes should be interchanged. If a balance still can not be had, the 2A3 tubes must be replaced by a pair more nearly matched in their characteristics.

In the event that coil replacement makes it necessary to readjust the trimmer condensers, proceed as follows: Tune in a high frequency station (broadcast) of known frequency. Set the dial very accurately to the station's frequency and adjust the isolantite base oscillator trimmer condenser, mounted on the frequency selecting switch assembly, for maximum volume. Greater accuracy can be had if a weak station is selected, or use only a few feet of wire as the antenna with a .00025 mfd. condenser connected between the antenna and ground clips to take the place of the normal antenna capacity. Then tune in a short wave station at about 14,000 kc and adjust the trimmer of the translator section of the ganged tuning condenser (the middle section). Next, tune in the broadcast station used previously and adjust the antenna trimmer on the ganged tuning condenser and the small bakelite base trimmer mounted on the frequency selecting switch. Then tune in a broadcast station at the low frequency end of the dial and adjust the .0012 oscillator padding condenser for maximum volume. Follow this procedure exactly and, having made the adjustment, do not readjust when changing from the broadcast to the short wave station or vice versa.



POSITION OF LUGS AS VIEWED FROM REAR
FREQUENCY SELECTING SWITCH R 9505

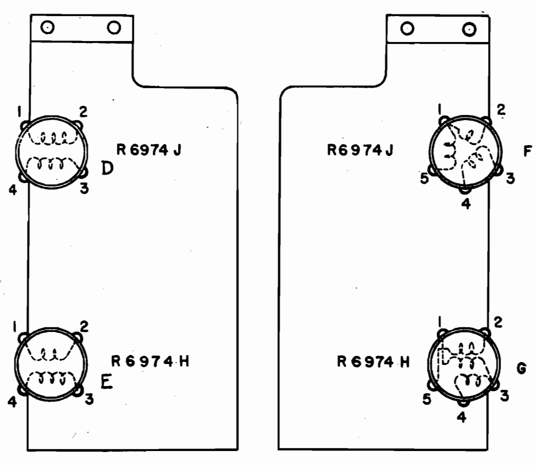


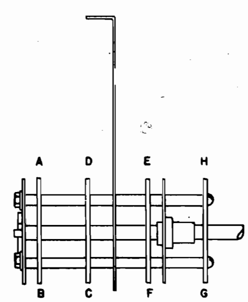
R 8780
ELECTROLYTIC COND.

| | |
|---|---|
| R-8446 | Coil - Antenna |
| R-8888 | Coil - Oscillator |
| R-8882 | Coil - Translator |
| R-6974H | Coil - Antenna - Oscillator, high range |
| R-6974J | Coil - Antenna - Oscillator, intermediate |
| R-2288 | Lamp - Pilot |
| R-8448 | Condenser - Variable tuning |
| R-8448B | Condenser - Variable tuning, complete with drive and dial assembly |
| R-9513 | Condenser - Trimmer, 12 mmf. |
| R-8817 | Condenser - Padding, 35 mmf. |
| R-7137 | Condenser - Padding, .012 mfd. |
| R-6565 | Condenser - IF tuning |
| R-7236 | Condenser - Electrolytic, 14 mfd. |
| R-8780 | Condenser - Electrolytic, dual |
| R-6138 | Condenser - .1 mfd. 300 volts |
| R-6444 | Condenser - .1 mfd. 200 volts |
| R-6761 | Condenser - .02 mfd. 600 volts |
| R-7070 | Condenser - .01 mfd. 600 volts |
| R-6954 | Condenser - .005 mfd. 600 volts |
| R-6461 | Condenser - .003 mfd. 800 volts |
| R-6933 | Condenser - .002 mfd. 600 volts |
| R-4592 | Condenser - .00025 mfd. mica |
| R-4303 | Condenser - .0001 mfd. mica |
| R-8711 | Condenser - .000025 mfd. mica |
| R-6570 | Control - Tone, 500 M ohms |
| R-9255 | Control - Volume and sensitivity |
| R-5823 | Resistor - 1 megohm - 1/2 watt carbon |
| R-6179 | Resistor - 500 M ohms - 1/2 watt carbon |
| R-5822 | Resistor - 400 M ohms - 1/2 watt carbon |
| R-5819 | Resistor - 100 M ohms - 1/2 watt carbon |
| R-7586 | Resistor - 100 M ohms - 1/3 watt carbon |
| R-6445 | Resistor - 50 M ohms - 1/2 watt carbon |
| R-6156 | Resistor - 30 M ohms - 1/2 watt carbon |
| R-6510 | Resistor - 5 M ohms - 1/2 watt carbon |
| R-6153 | Resistor - 3 M ohms - 1/2 watt carbon |
| R-6154 | Resistor - 1 M ohms - 1/2 watt carbon |
| R-8829 | Resistor - 1500 ohms - 1/2 watt carbon |
| R-6436 | Resistor - 400 ohms - 1/2 watt carbon |
| R-6155 | Resistor - 150 ohms - 1/2 watt carbon |
| R-9081 | Resistor - 50 ohms - 1 watt carbon |
| R-8886 | Resistor - Candohm |
| R-8901 | Resistor - Candohm |
| R-8801 | Transformer - IF input and interstage, coils and core only |
| R-8802 | Transformer - IF output, coils and core only |
| R-8801A | Transformer - IF input - complete less shield |
| R-8801J | Transformer - IF interstage - complete less shield |
| R-8802L | Transformer - IF output - complete less shield |
| R-9494A | Transformer - Audio interstage |
| R-9498A- | Transformer - 60 cycle power |
| R-8779A | Transformer - 25 cycle power |
| R-6235 | Tube-Cushion rubber, variable condenser mounting |

VOLTAGE AND CURRENT CHART - MODEL 1726X

| TUBE | PLATE VOLTAGE | SCREEN VOLTAGE | PLATE M. A. 6-Vol. on 1-Vol. off | SCREEN M. A. 1.5-Vol. on .5-Vol. off |
|---|---|---|---|---|
| 78 - RF | 225 | 85 | | |
| 78 - Transl | 220 | 85 | 2 | .2 |
| 56 - Osc | 70 | | 5 | |
| 78 - 1st IF | 200 | 75 | .4 | .2 |
| 78 - 2nd IF | 225 | 85 | 1.25 | 1 |
| 85 - Det - AF | 155 | | 5 | |
| 37 - AF | 155 | | 3 | |
| 2A3 - Output | 260 | | 60 | |
| 5Z3 - Rect | Max. D.C. voltage = 315V. Plate Current = 80 m.a. per plate | | | |

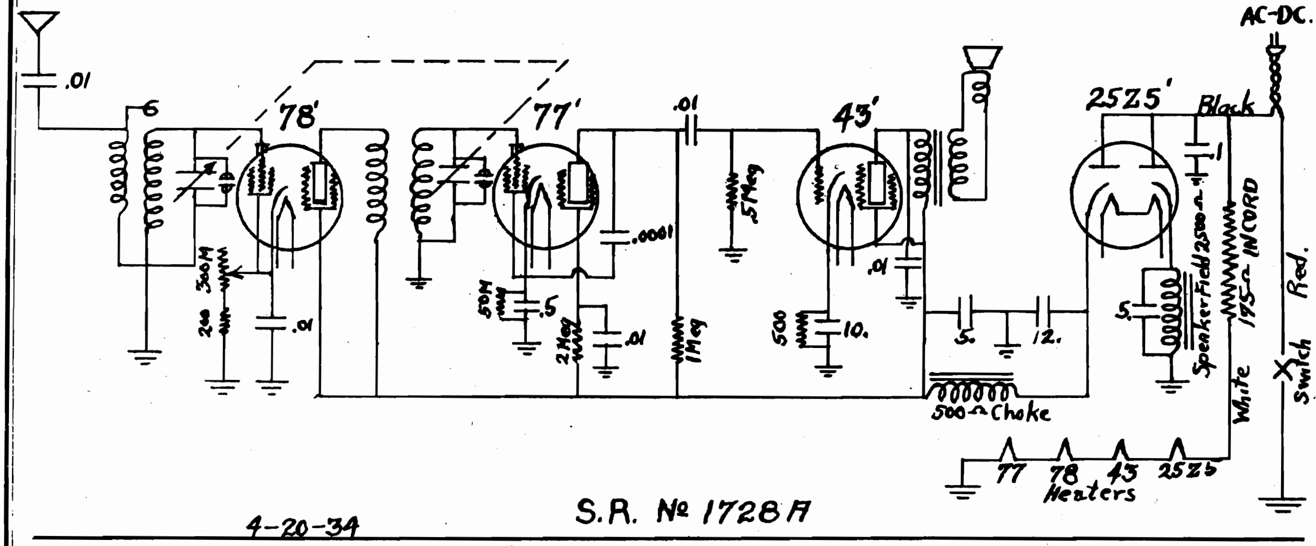



SHORT WAVE ANTENNA-OSCILLATOR COILS MOUNTED UNDER CHASSIS.
COIL NUMBERING & LETTERING CORRESPONDS TO SCHEMATIC.

SEARS-ROEBUCK & CO.

MODEL 1728-A
Schematic
Parts List




GENERAL INFORMATION

This set is of the conventional tuned radio frequency type so designed to operate on 105-120 volts of either AC or DC.

To operate unreel built-in-antenna and lay on floor or throw out window, turn volume all the way up, if on DC reverse plug if set does not start playing in one minute.

The cord of this set, at normal operation of receiver, becomes quite warm which is a natural condition, as there is a rapid heat dissipating resistance in same.

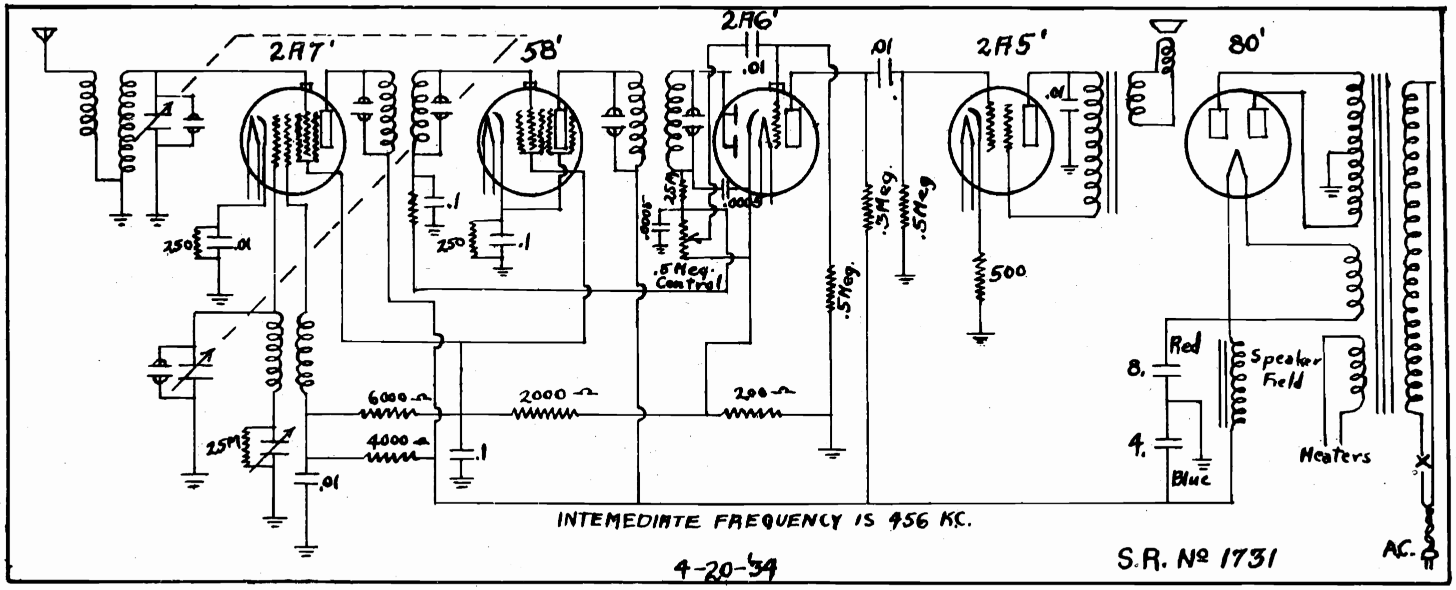
To balance set, first remove chassis from cabinet; second, tune condenser to about 1720 kc and align trimmer condenser on detector stage, then do same to antenna stage until loudest noise level is obtained.

PARTS LIST

| No. | |
|---|---|
| 60 | Volume control |
| 201 | Cabinet |
| 202 | Dynamic Speaker |
| 203 | Variable condenser |
| 204 | Set of coils - complete |
| 204a | Antenna coil - only |
| 204b | R F coil - only |
| 205 | Electrolytic condenser |
| 206 | AC DC choke |
| 207 | Cord ohm 175 ohm |
| 61 | Antenna cord |
| 208 | Escutcheon- Silvertone or Selector |
| 73 | Terminal strip- 3 lug |
| 71 | Knob |
| | Any tube socket (state no. of prongs) |
| | Any resistor (state ohms and watts) |
| | Any bypass condenser (state capacity) |

MODEL 1731
Schematic
Alignment Data
Parts List

SEARS-ROEBUCK & CO.




## GENERAL INFORMATION

This set is a superheterodyne designed to give maximum output of good quality which can be obtained from 5 tubes - and can be operated on 105-120 volt AC at 50-60 cycles only.

To operate, plug in AC and connect colored flexible wire out rear of chassis to approximately 50' of antenna, preferably outside; next, turn on switch and turn volume control nearly up and tune to desired station.

To balance set, first align the IF transformers at 456 kc with gang condenser closed, next turn condenser all way open and align at 1720 kc, then adjust padder condenser at 600 kc, then go back and check at 1720 kc.

## PARTS LIST

| NO. | |
|---|---|
| 250 | Cabinet |
| 251 | Dynamic Speaker |
| 253 | Variable condenser-2 gang |
| 254 | Set of coils- complete |
| 254a | Oscillator coil - only |
| 254b | Antenna coil - only |
| 254c | IF coil - top grid only |
| 254d | IF coil -bottom " " |
| 255 | Power transformer |
| 156 | 8&4 electrolytic condenser |
| 256 | Volume control |
| 257 | Dial unit complete |
| 258 | Candohms |
| 108 | Padder condenser 7 plate |
| 261 | A C switch |
| 158 | Power cord and plug |
| 73 | Terminal strip- 3 lug |

MODEL 1729
Schematic
Voltage Data

# SEARS-ROEBUCK & CO.

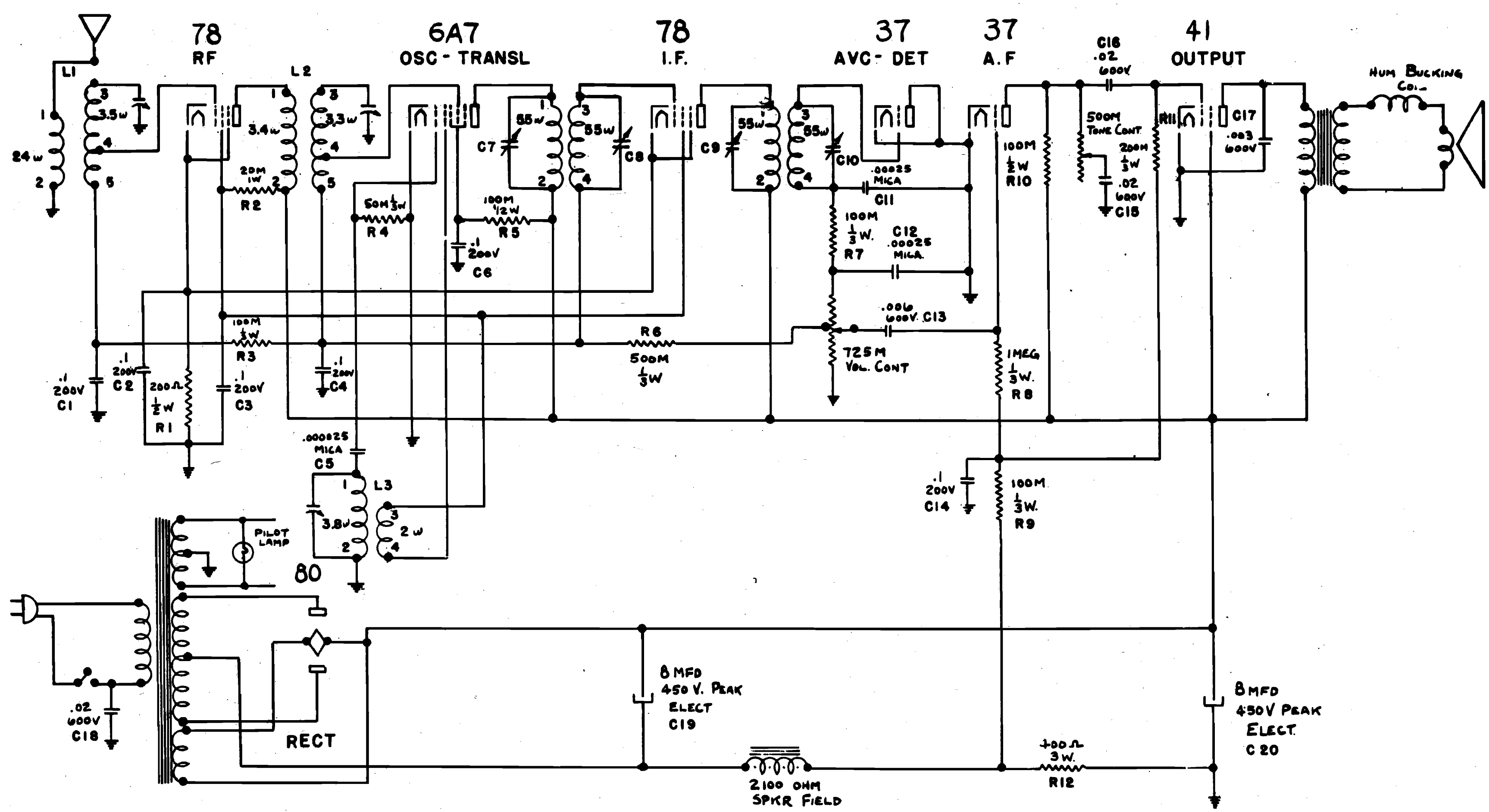


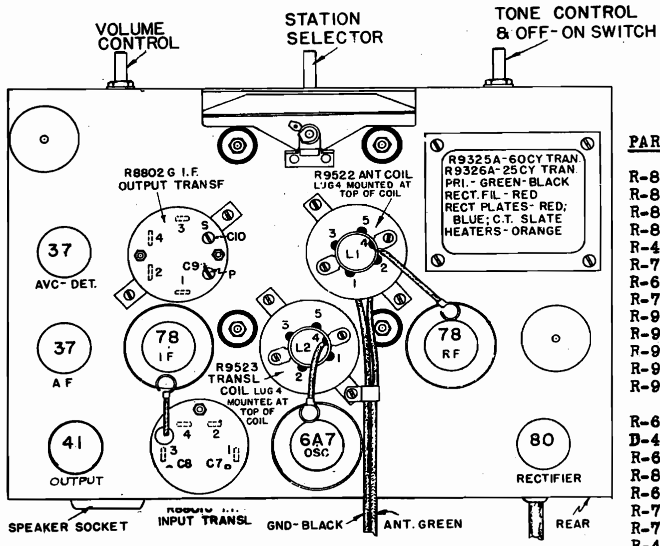

FIG. 2

| TUBE | | PLATE VOLTS | SCREEN VOLTS | PLATE M.A. | SCREEN M.A. |
|---|---|---|---|---|---|
| 78 | RF | 225 | 105 | 7 | 1.6 |
| 78 | IF | 225 | 105 | 7 | 1.6 |
| 37 | AF | 165 | | 3.5 | |
| 41 | Output | 220 | 230 | 21 | 3.5 |
| 6A7 | Osc-Transl. | Ep=225v | Eg2=105v | Eg3&5=70v | |
| | | Ip=2ma | Ig2=2ma | Ig3&5=2ma | |
| 80 | Rect. | Max.D-C = 370v. Plate current= 28 ma per plate | | | |

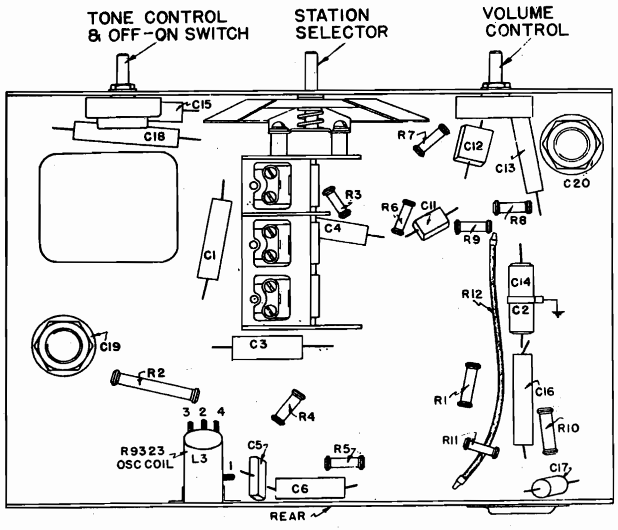
# MODEL 1729

Socket Layout
Chassis View
Parts List

## SEARS-ROEBUCK & CO.




TOP VIEW OF CHASSIS




UNDER VIEW OF CHASSIS

| PART NO. | DESCRIPTION |
|---|---|
| R-8297A | Board - Terminal, double |
| R-8308A | Board - Terminal, triple |
| R-8900B | Board - Terminal, five terminal |
| R-8725 | Card - Operating |
| R-4715 | Clamp - Ant. & Gnd. leads |
| R-7011A | Clip - Ant. lead |
| R-6381 | Clip - Grid |
| R-7031 | Clip - Pilot Light |
| R-9522 | Coil - Antenna |
| R-9323 | Coil - Oscillator |
| R-9523 | Coil - Translator |
| R-9546 | Condenser - Variable |
| R-9546A | Condenser - Variable, with dial and drive assembly |
| R-6565 | Condenser - IF |
| D-4758P | Condenser - 8 Mfd. Electrolytic |
| R-6444 | Condenser - .1 Mfd. 200 volt |
| R-8301 | Condenser - .1 Mfd. 200 volt, dual |
| R-6761 | Condenser - .02 Mfd. 600 volt |
| R-7244 | Condenser - .006 Mfd. 600 volt |
| R-7681 | Condenser - .003 Mfd. 600 volt |
| R-4592 | Condenser - .00025 Mfd. Mica |
| R-8711 | Condenser - .000025 Mfd. Mica |
| R-6571 | Control - Tone |
| R-9296 | Control - Volume |
| R-6989 | Cord - Power Supply |
| R-9333A | Dial and Indicator |
| R-6923 | Escutcheon |
| R-9528 | Instructions |
| R-8896 | Knob - Medium |
| R-8895 | Knob - Small |
| R-2288 | Lamp - Pilot |
| R-5346B | Lead - Antenna |
| R-5345D | Lead - Ground |
| R-5321 | Pin - Escutcheon |
| R-7585 | Resistor - 1 megohm, 1/3 watt |
| R-7228 | Resistor - 500 M ohms, 1/3 watt |
| R-6638 | Resistor - 200 M ohms, 1/3 watt |
| R-7586 | Resistor - 100 M ohms, 1/3 watt |
| R-5819 | Resistor - 100 M ohms, 1/2 watt |
| R-6637 | Resistor - 50 M ohms, 1/3 watt |
| R-5095 | Resistor - 20 M ohms, 1 watt |
| R-6276 | Resistor - 200 ohms, 1/2 watt |
| R-8562 | Resistor - 400 ohms, flexible |
| R-6006B | Shaft - Dial Drive |
| R-6018A | Shield - Coil |
| R-8803A | Shield - IF transf. |
| R-6450 | Shield - Electrolytic cond |
| R-8366 | Socket - 4 prong |
| R-8367 | Socket - 5 prong |
| R-8368 | Socket - 6 prong |
| R-8369 | Socket - 7 prong |

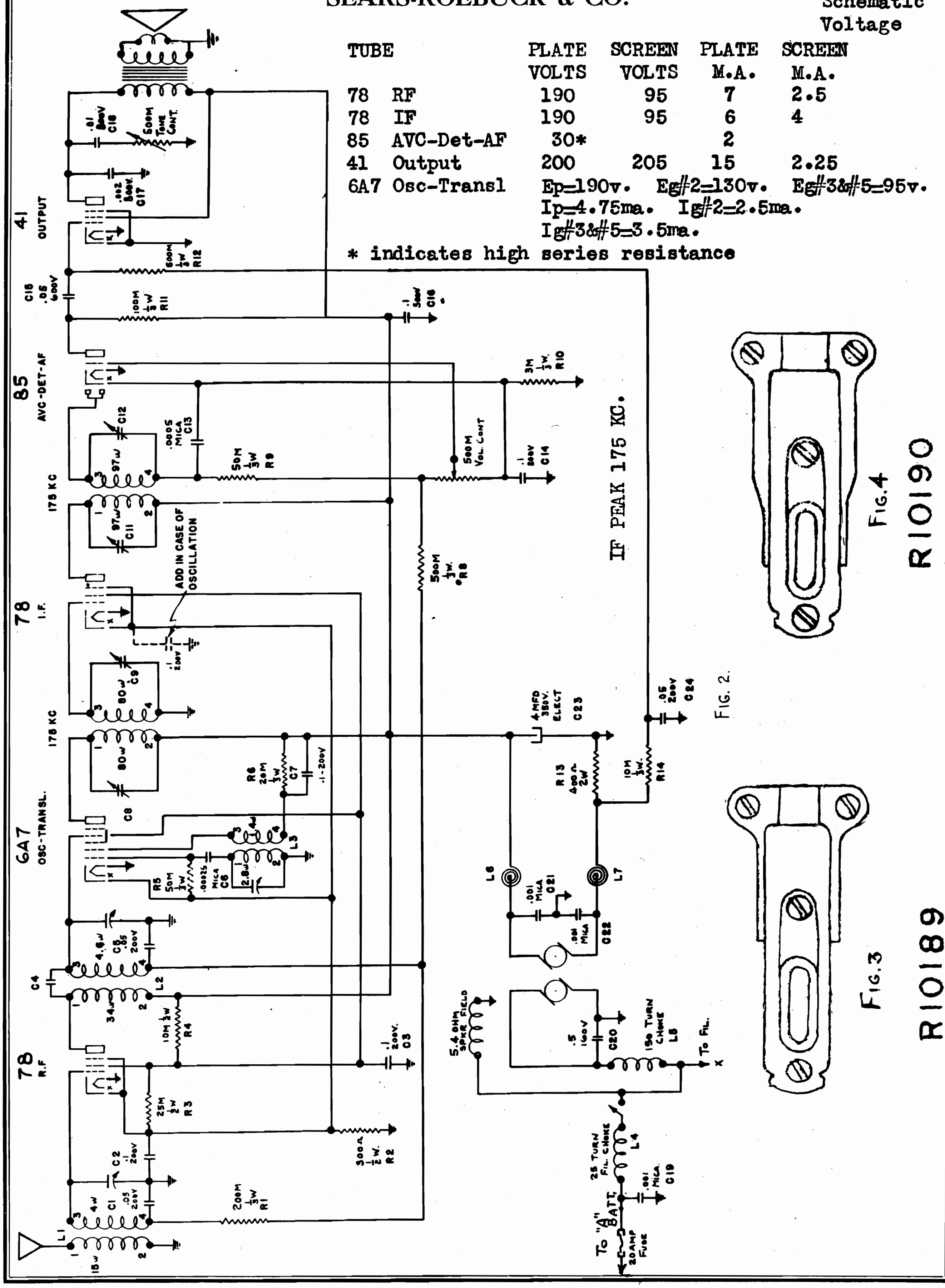
| PART NO. | DESCRIPTION |
|---|---|
| S-9549A | Speaker - 2250 ohm, 6" dynamic |
| R-9526 | Sticker - Tube layout & license - 60 cycle |
| R-9527 | Sticker - Tube layout & license - 25 cycle |
| R-9182 | Sticker - NRA |
| R-8801 | Transformer - IF input |
| R-8801G | Transformer - IF input complete, less shield |
| R-8802 | Transformer - IF output |
| R-8802G | Transformer - IF output complete, less shield |
| R-9325A | Transformer - 60 cycle power |
| R-9526A | Transformer - 25 cycle power |

MODEL 1730
Schematic
Voltage

# SEARS-ROEBUCK & CO.

| TUBE | PLATE VOLTS | SCREEN VOLTS | PLATE M.A. | SCREEN M.A. |
|---|---|---|---|---|
| 78 RF | 190 | 95 | 7 | 2.5 |
| 78 IF | 190 | 95 | 6 | 4 |
| 85 AVC-Det-AF | 30* | | 2 | |
| 41 Output | 200 | 205 | 15 | 2.25 |
| 6A7 Osc-Transl | Ep=190v. Eg#2=130v. Eg#3&#5=95v. Ip=4.75ma. Ig#2=2.5ma. Ig#3&#5=3.5ma. | | | |

* indicates high series resistance



# MODEL 1730
## Socket, Trimmers Adjustments Parts List

## SEARS-ROEBUCK & CO.

### SPECIAL NOTE

When peaking the IF transformers, use a low enough output from the test oscillator to render the AVC action inoperative.

### THE RF TUNING ADJUSTMENTS

There are three holes at the back of the chassis, giving access to the variable condenser trimmers. The hole nearest the drive end of the condenser is for the RF section trimmer. The next hole is for the translator, and the third one is for the oscillator.

### OSCILLATION

Any trouble from oscillation can be cured by connecting a .1 Mfd. 200 volt condenser, (Part #R-8286), from the IF cathode to ground.

### THE REMOTE CONTROL UNIT

A few of the first production remote control units used the type clamp shown in Fig. 3. Later production used the type illustrated in Fig. 4. Should trouble be experienced with controls having the type clamp shown in Fig. 3, due to the volume control cable's jumping out of the control head, the type of clamp shown in Fig. 4 should be substituted, (Part #R-10190).

The following procedure will improve the action of the on-off switch, where necessary.

Remove the volume control drum and turn the volume control counter clockwise to its off position. Then turn it clockwise just enough to take up all of the play, so that any further rotation would tend to turn the switch on. Remove the key from the remote control unit and turn the volume control knurled ring to its locked position. Then turn it, as though to switch it on, the slight amount necessary to take up the play. Then replace the volume control drum on the volume control shaft, maintaining a clockwise tension on the rotatable portion of the drum and tighten the set screws. Study of this operation will reveal that its purpose is to take advantage of all of the play in the mechanism in such a way that an increased length of movement is provided for turning the switch off.

It is of vital importance that no twists occur in the cable during the installation. Careful inspection for this point is necessary because in a cable of this type twists are not very obvious. Also, bends should be as gradual as practicable. Sharp bends greatly increase the stiffness of operation.

If, having followed the foregoing suggestions, trouble still is experienced with the remote control, the unit should be considered defective. Return the entire remote control unit, including the cables and the chassis pulleys, for replacement, to the Colonial Radio Corp., 254 Rano St., Buffalo, N.Y.

### ADJUSTING THE STATION SELECTOR DRIVE DRUM

1. Fully mesh the variable condenser plates.

2. Turn the Station Selector knurled ring to its low frequency limit.

3. Place the condenser drive drum on the variable condenser shaft and screw the binding strip to the condenser end plate. If necessary, bend the binding strip in such a way that the drive cable runs in as straight a line as possible from the drum to the point where it emerges from the chassis. However, care must be taken that the cable clamp does not touch any part of the chassis. Should it do so, it would render the rubber mounting of the variable condenser ineffective and microphonics would result. Then tighten the drum set screws.

4. After the set has been installed, and the remote control mounted, the calibration can be set more accurately in the following manner. Tune in a station of known frequency. Remove the dial glass retaining spring and set the dial pointer to the station's frequency. Then replace the retaining spring, making sure that the glass does not shift during the operation.

### THE GEN-E-MOTOR

The plate and screen voltages for the receiver, are supplied by a Gen-E-Motor. No attempt should be made to repair this unit. It should be returned to the Pioneer Gen-E-Motor Corp., 466 West Superior St., Chicago, Ill. Return only the unit itself. Do not return the complete housing assembly. To remove the Gen-E-Motor from its housing, proceed as follows.

1. Remove the two screws under the chassis, that mount the loud speaker.

2. Remove the three Parker-Kalon screws from the bottom of the Gen-E-Motor housing, and the two screws that hold the electrolytic condenser can to the housing. The Gen-E-Motor and its housing can then be tipped back from the chassis.

3. Unsolder the leads at the base of the housing, so that the Gen-E-Motor and housing can be completely removed from the chassis.

4. Removal of the two screws in each side of the housing, and unsoldering of the Gen-E-Motor leads under the housing, will permit the Gen-E-Motor to be taken from its housing.

### POLARITY CHANGING

The receivers are shipped with the polarity changing screws in the proper position for cars having the negative battery terminal grounded. If the car is one with a grounded positive terminal, the positions of the two screws must be changed, as indicated by the sticker on the case, and as shown in Fig. 5.

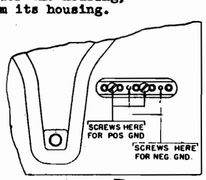
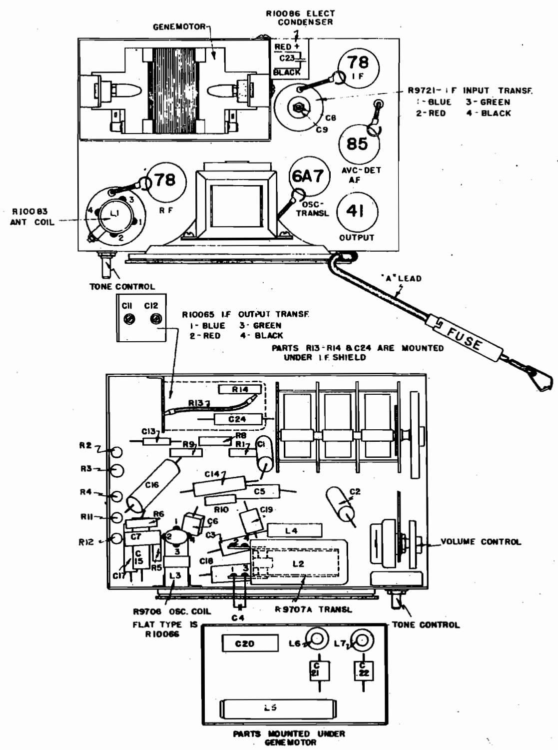



FIG. 5

| Part No. | Description |
|---|---|
| R-8297A | Board - Terminal, double |
| R-8308A | Board - Terminal, triple |
| R-8900A | Board - Terminal, 5 terminals |
| R-9753A | Board - Terminal, 6 terminals |
| R-6552E | Board - Resistor |
| R-9754A | Board - Polarity Changing |
| R-10089 | Book - Instruction |
| R-9588 | Bushing - Rubber, Genemotor Mounting |
| R-9044A | Choke - L4 |
| R-10116A | Choke - L5 |
| R-9757 | Choke - L6 & L7 |
| R-6381 | Clip - Grid |
| R-9741 | Clip - "A" Lead |
| R-10083 | Coil - Antenna |
| R-10066 | Coil - Oscillator |
| R-9707 | Coil - Translator |
| R-9990 | Condenser - Variable |
| R-10086 | Condenser - Electrolytic |
| R-8030 | Condenser - 1 Mfd. Generator |
| R-10025 | Condenser - .5 Mfd - Ammeter |
| R-9032 | Condenser - .5 Mfd 160 volt |
| R-10164 | Condenser - .1 Mfd 500 volt |
| R-8286 | Condenser - .1 Mfd 200 volt |
| R-9145 | Condenser - .05 Mfd 600 volt |
| R-8920 | Condenser - .05 Mfd 200 volt |
| R-7354 | Condenser - .05 Mfd 200 volt |
| R-9776 | Condenser - .01 Mfd 800 volt |
| R-10093 | Condenser - .002 Mfd 800 volt |
| R-6759 | Condenser - .001 Mfd Mica |
| R-6760 | Condenser - .0005 Mfd Mica |
| R-4592 | Condenser - .00025 Mfd Mica |
| R-10091 | Control - Remote, Complete with Pulleys Cables |
| R-9711 | Control - Tone (500 M ohms) |
| R-10172 | Control - Volume (500 M ohms) |
| R-9717 | Connector - "A" lead & fuse container |
| R-9751 | Fuse - 20 amp |
| R-9587 | Genemotor |
| R-9744 | Grommet - "A" lead |
| R-8870A | Lead - Antenna |
| R-9579B | Lead - "A" Ammeter end |
| R-9578A | Lead - "A" Chassis end |
| R-10153 | List - check |

| Part No. | Description |
|---|---|
| R-7085 | Resistor - 25 M ohms, 1/2 watt carbon |
| R-6640 | Resistor - 20 M ohms, 1/3 watt carbon |
| R-6152 | Resistor - 10 M ohms, 1/2 watt carbon |
| R-7587 | Resistor - 10 M ohms, 1/3 watt carbon |
| R-8972 | Resistor - 3 M ohms, 1/3 watt carbon |
| R-10078 | Resistor - 400 ohms, 1/3 watt carbon |
| R-6447 | Resistor - 300 ohms, 1/2 watt carbon |
| R-8419 | Resistor - 400 ohms, flexible |
| R-10056 | Screw - Polarity changer |
| R-10084A | Shield - Antenna Coil |
| R-9591 | Shield - Translator Coil |
| R-9360 | Shield - Tube |
| R-8092 | Socket - 6 Prong |
| R-8072 | Socket - 7 Prong |
| S-9967 | Speaker - Complete |
| S-9988A | Speaker - Cone & Voice Coil Assembly |
| S-9994 | Speaker - Clamping ring |
| S-10152 | Speaker - Field Coil |
| S-9968 | Speaker - eyelets |
| S-9959 | Speaker - Felt ring |
| S-10144A | Speaker - Transformer |
| R-9960 | Sticker - Polarity Changer |
| R1-10032 | Suppressor - Spark Plug |
| R2-10032 | Suppressor - Distributor |
| R-9729 | Stud - Set Mounting |
| R-9786 | Template - set mounting |
| R-10064A | Transformer - I F input |
| R-10065A | Transformer - I F output |
| R-9739 | Washer - Lock set mounting |
| R-9740 | Washer - Flat, set mounting |
| R-9719 | Nut - Set Mounting |
| R-8219 | Nut - Acorn |
| R-7228 | Resistor - 500 M ohms, 1/3 watt carbon |
| R-6638 | Resistor - 200 M ohms, 1/3 watt carbon |
| R-7586 | Resistor - 100 M ohms, 1/3 watt carbon |
| R-6637 | Resistor - 50 M ohms, 1/3 watt carbon |



MODEL 1733
Schematic

# SEARS-ROEBUCK & CO.

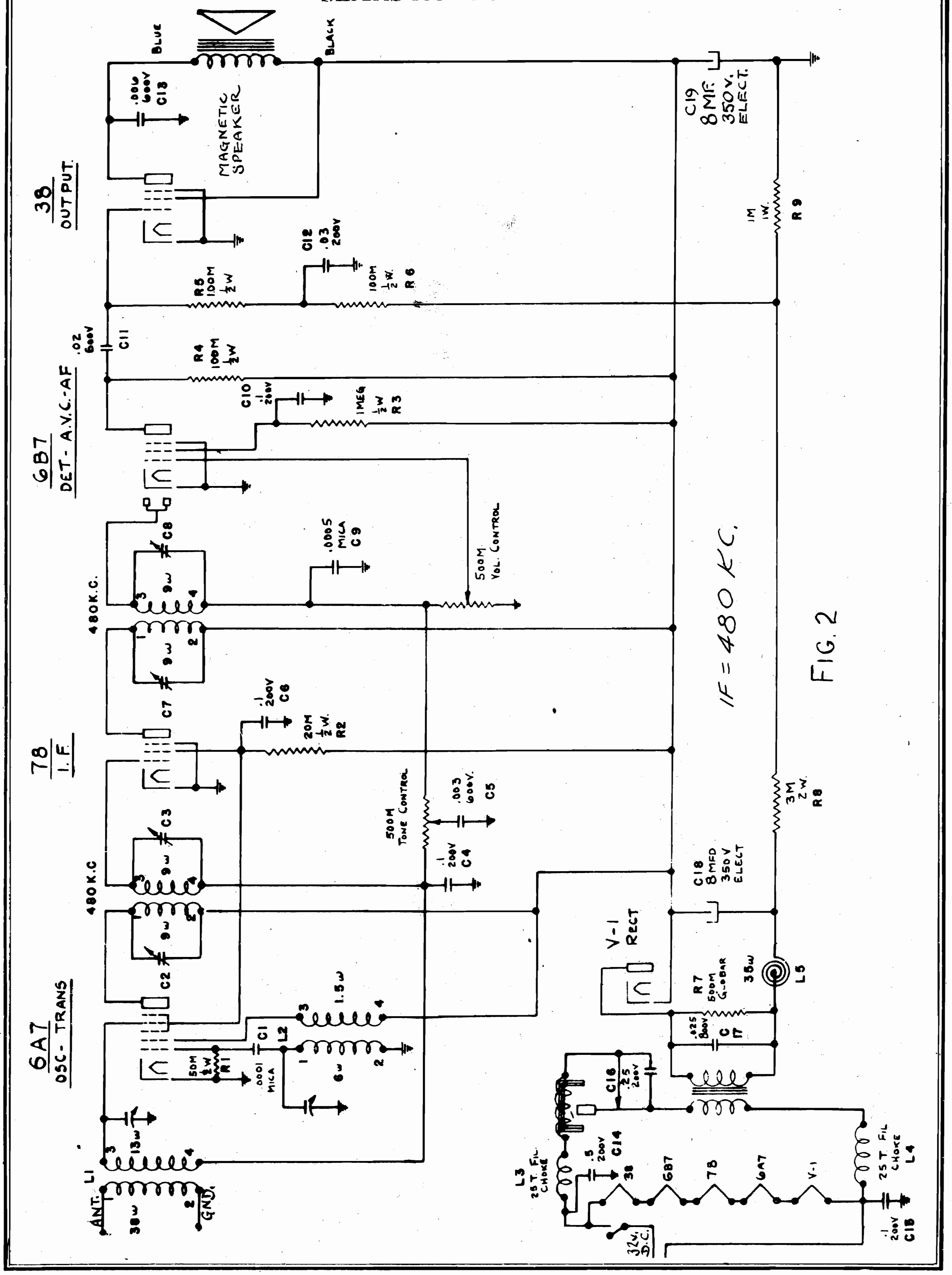
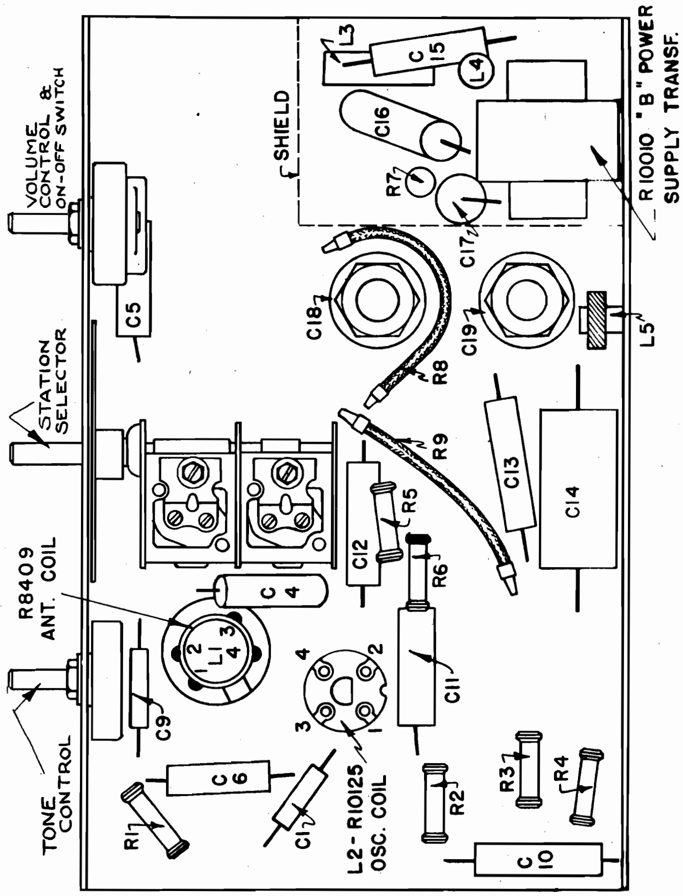


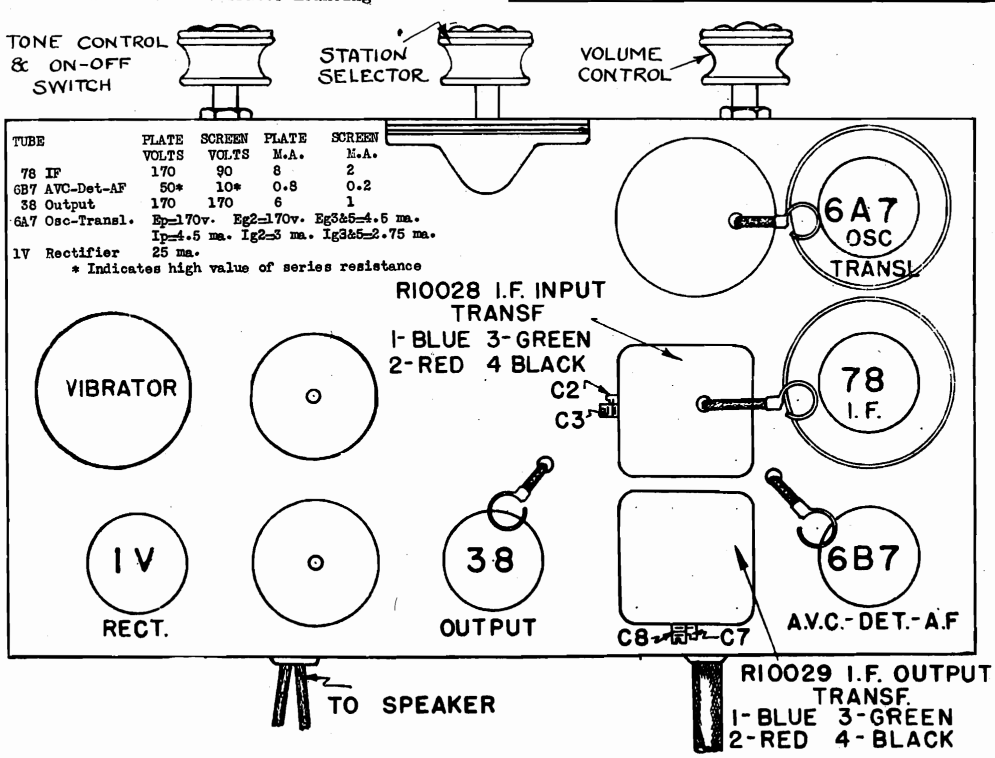

FIG. 2

**MODEL 1733**
Voltage, Socket
Chassis, Parts List

# SEARS-ROEBUCK & CO.

| PART NO. | DESCRIPTION |
|---|---|
| R-7901-A | Board - Fuse |
| R-5509-A | Board - Terminal |
| R-8297-A | Board - Terminal, double |
| R-8308-A | Board - Terminal, triple |
| R-8900-D | Board - Terminal, 5 terminals |
| R-9044-A | Choke (L3 & L4) |
| R-9757 | Choke (L5) |
| R-6381 | Clip - Grid |
| R-8409 | Coil - Antenna |
| R-10125 | Coil - Oscillator |
| R-8412 | Condenser - Variable |
| R-8488 | Condenser - 8 Mfd. electrolytic |
| R-6451 | Condenser - .5 Mfd. 200 volt |
| R-9817 | Condenser - .25 Mfd. 200 volt |
| R-6444 | Condenser - .1 Mfd. 200 volt |
| R-6630 | Condenser - .03 Mfd. 200 volt |
| R-10018 | Condenser - .025 Mfd. 800 volt |
| R-6761 | Condenser - .02 Mfd. 600 volt |
| R-7244 | Condenser - .006 Mfd. 600 volt |
| R-7681 | Condenser - .003 Mfd. 600 volt |
| R-6760 | Condenser - .0005 Mfd. Mica |
| R-4303 | Condenser - .0001 Mfd. Mica |
| R-6571 | Control - Tone |
| R-6570 | Control - Volume |
| R-6989 | Cord - Power |
| R-10012-A | Dial and Indicator |
| R-8406 | Escutcheon |
| R-7688 | Fuse - 10 Amp. |
| R-8895 | Knob - Small |
| R-8896 | Knob - Medium |
| R-10012 | Indicator |
| R-10020 | Instructions |
| R-5823 | Resistor - 1 Megohm, 1/2 watt carbon |
| R-5819 | Resistor - 100 M ohms, 1/2 watt carbon |
| R-6445 | Resistor - 50 M ohms, 1/2 watt carbon |
| R-5821 | Resistor - 20M ohms, 1/2 watt carbon |
| R-9745 | Resistor - Globar (R7) |
| R-9254 | Resistor - 1 M ohms, flexible |
| R-10016 | Resistor - 3 M ohms, flexible |
| R-6450 | Shield - Electrolytic cond. |
| R-7615-A | Shield - Coil |
| R-10011-A | Shield - Power Transf. |
| R-8366 | Socket - 4 Prong |
| R-8367 | Socket - 5 prong |
| R-8368 | Socket - 6 prong |
| R-8369 | Socket - 7 prong |
| R-10009 | Socket - Vibrator |
| S-9969 | Speaker - 6" Magnetic |
| R-10028-A | Transformer - IF input |
| R-10029 | Transformer - IF output |
| R-10010 | Transformer - Power |
| R-10008 | Tubes - Rubber, vibrator mounting |
| R-10014 | Vibrator |
| R-10007 | Washer - Rubber vibrator mounting |



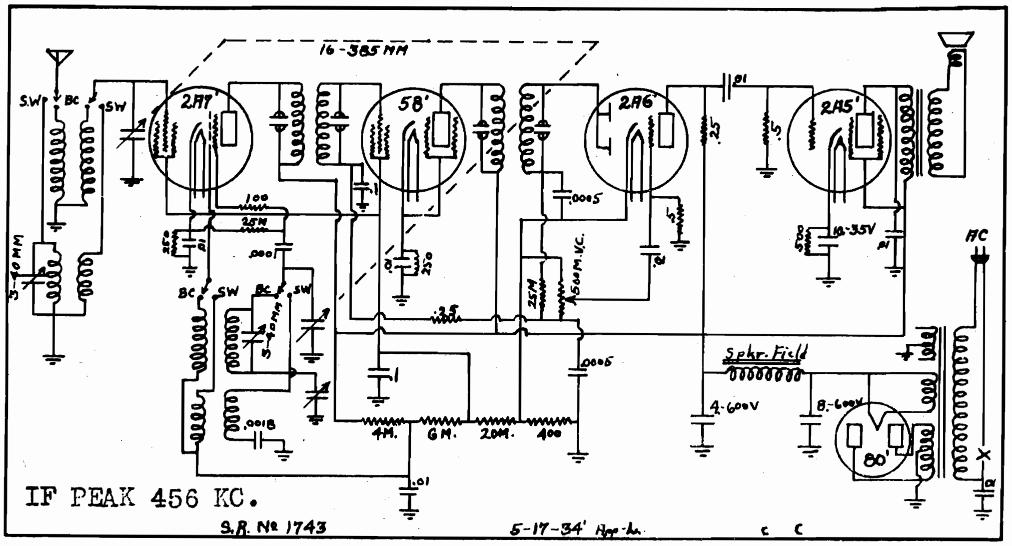




| TUBE | PLATE VOLTS | SCREEN VOLTS | PLATE M.A. | SCREEN M.A. |
|---|---|---|---|---|
| 78 IF | 170 | 90 | 8 | 2 |
| 6B7 AVC-Det-AF | 50* | 10* | 0.8 | 0.2 |
| 38 Output | 170 | 170 | 6 | 1 |
| 6A7 Osc-Transl. | Ep=170v. Eg2=170v. Eg3&5=4.5 ma. Ip=4.5 ma. Ig2=3 ma. Ig3&5=2.75 ma. | | | |
| 1V Rectifier | 25 ma. | | | |

* Indicates high value of series resistance

SEARS-ROEBUCK & CO.

MODEL 1743
Schematic
Alignment,Parts




GENERAL INFORMATION

Silvertone Model 1743A is a set so designed to get maximum efficiency from five tubes, and minimum trouble.

Model 1743A is a superheterodyne operating from 105-120 volts AC - 60 cycles only- Also furnished for 25 cycle.

This set covers from 1720 KC to 540 KC regular broadcast including 1712 KC police and 15 - 55 meters short wave which covers major foreign stations.

The circuit uses 1-2A7 1st detector and oscillator; 1-58 IF; 1-2A6 second detector and first audio; 1-2A5 power output and 1-80 rectifier

To align receiver proceed as follows:

1. Peak the two IF transformers, applying a 456 note at the 2A7 grid.

2. Turn variable condenser wide open, peaking oscillator stage at 1712 KC- then peak RF and antenna stage.

3. Adjust low frequency with gang tuned to 600 KC, to maximum peak.

4. Go back and check trimmers on gang condenser at 1400 KC.

PARTS LIST-MODEL 1743A

| No. | |
|---|---|
| 450 | Dynamic Speaker |
| 451 | Variable condenser |
| 452 | Volume control w/switch |
| 453 | Short wave switch |
| 454 | Airplane Dial complete |
| 455 | Power Transformer |
| 456 | Set of coils-complete |
| 456a | RFE Antenna coil-S.W. |
| 456b | RFE Oscillator " |
| 456c | RF Antenna BC |
| 457D | 456 KC IF units |
| 156 | 8&4 mfd condenser |
| 307 | 10 mfd 25v electrolytic |
| 308 | Terminal strip - 5 lug |
| 310 | .0018 Mica condenser |
| 309 | .01 mfd 800v cond. in can |
| 108 | Padder condenser 7 plate |
| 158 | Power cord & plug |
| | Any tube socket (state no.of prongs) |
| | Any resistor (state ohms & watts) |
| | Any by pass-not listed above(state capacity) |

**MODEL 1760 (Type 1)**
**Schematic**

## SEARS-ROEBUCK & CO.

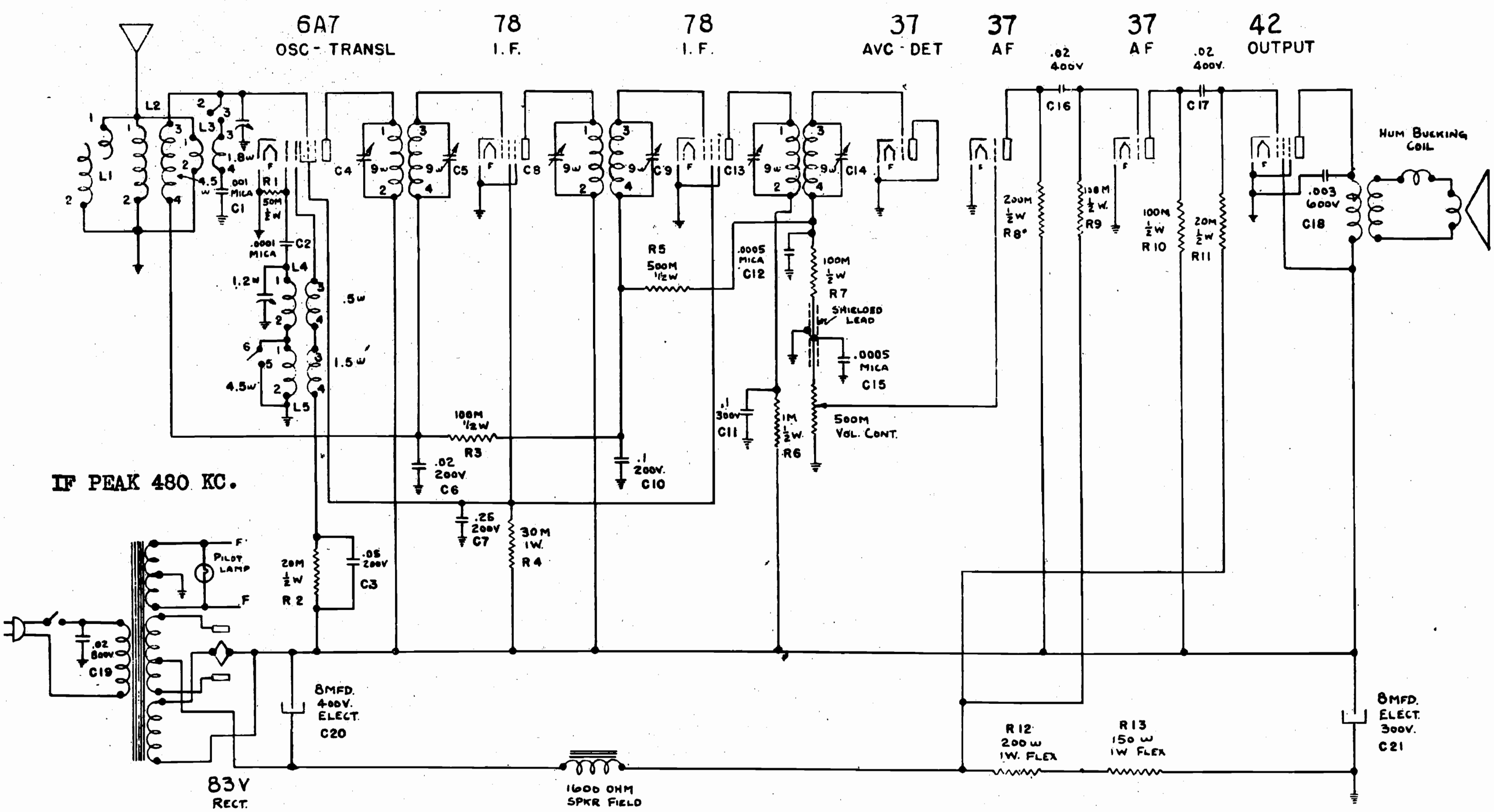


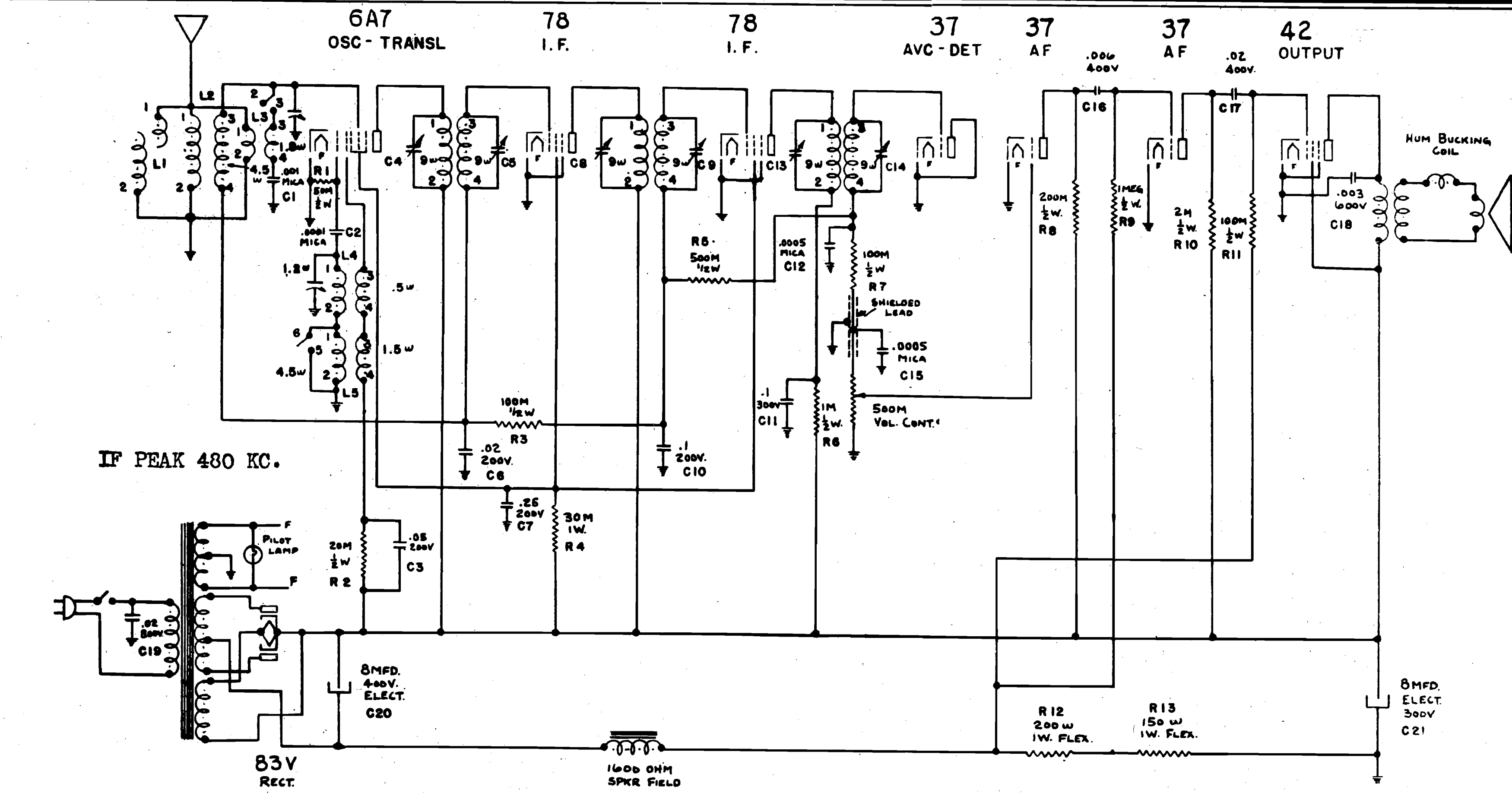

FIG. 2.

For Voltage Data for both types, see next page

Chassis using this circuit are rubber-stamped 206. If trouble from hum be encountered in this type chassis, it can be converted to the other circuit by changing C-16, R-9, R-10 and R-11.

SEARS-ROEBUCK & CO.

MODEL 1760 (Type 2)
Schematic
Voltage

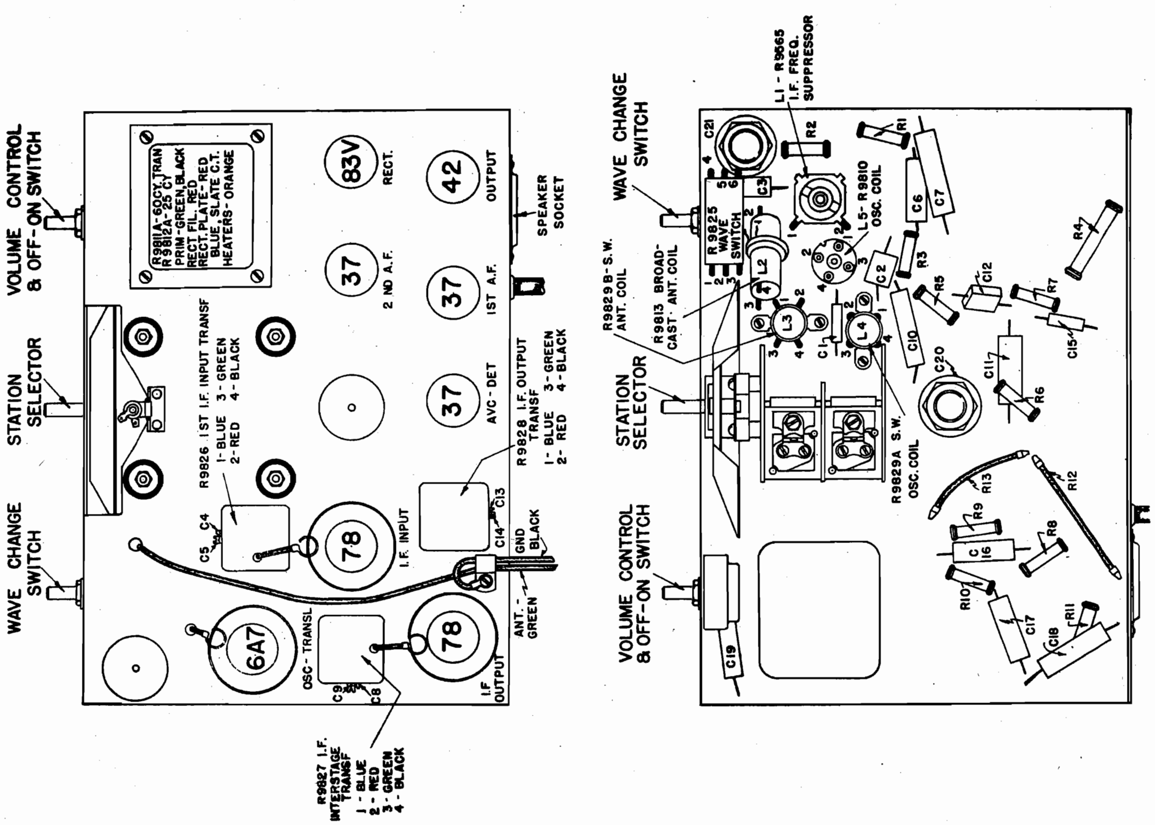



Chassis using this circuit are rubber-stamped 206A or 206B   FIG. 3

| TUBE | | PLATE VOLTS | SCREEN VOLTS | PLATE M.A. | SCREEN M.A. |
|---|---|---|---|---|---|
| 78 | 1st IF | 245 | 100 | 6.5 | 2 |
| 78 | 2nd IF | 240 | 100 | 6.5 | 2 |
| 37 | 1st AF | 20 | | 1.25 | |
| 37 | 2nd AF | 235 | | 3.5 | |
| 42 | Output | 235 | 245 | 23.0 | 5 |
| 6A7 | Osc-Transl. | Ep=245v Eg2=175v Eg3&5=80v. | | | |
| | | Ip=4.25ma Ig2=2.5ma. Ig3&5=1.75ma. | | | |
| 83V | Rectifier | Max.D-C=360v. Plate current=29ma per plate | | | |

MODEL 1760
Socket Layout
Chassis
Parts List

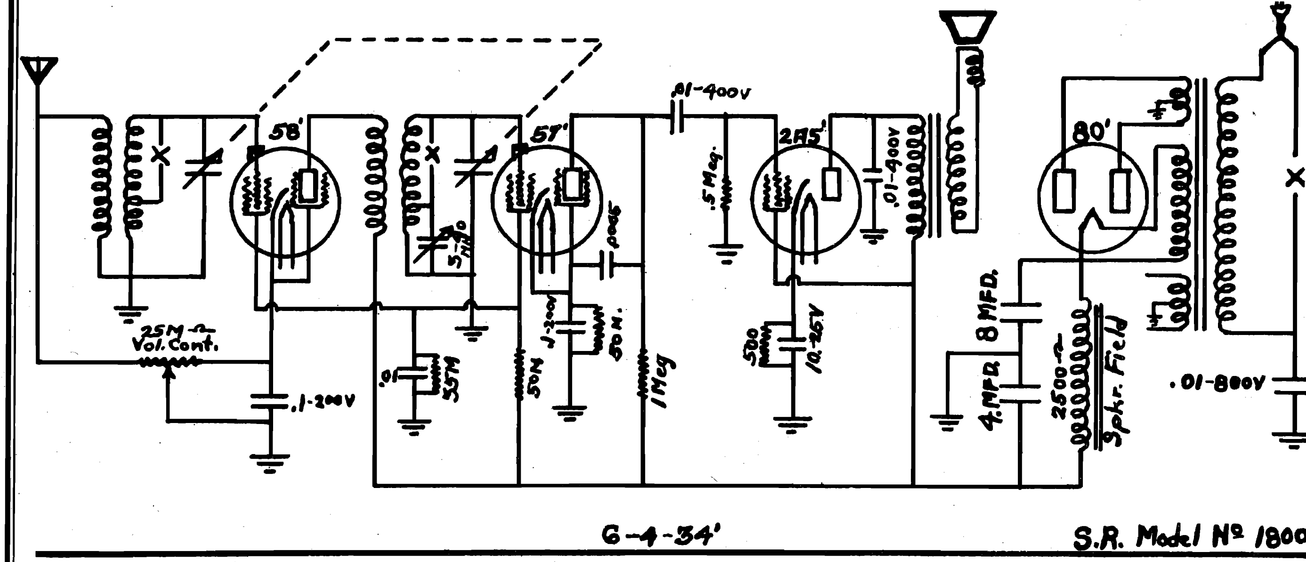
# SEARS-ROEBUCK & CO.




| PART NO. | DESCRIPTION |
|---|---|
| R-8297A | Board - Terminal, double |
| R-8308A | Board - Terminal, triple |
| R-9832 | Card - Operating |
| R-4715 | Clamp - Ant. & Gnd. leads |
| R-6381 | Clip - Grid |
| R-6381M | Clip - Grid with 7" lead |
| R-9810 | Coil - Oscillator |
| R-9829A | Coil - Oscillator, short wave |
| R-9813 | Coil - Antenna |
| R-9829B | Coil - Antenna, short wave |
| R-9565 | Coil - Ant. Wave trap |
| R-9816 | Condenser - Variable |
| R-9816A | Condenser - Variable with Drive and Dial Assembly |
| B-4758P | Condenser - 8 mfd. electrolytic |
| R-9817 | Condenser - .25 mfd. 200v. |
| R-6444 | Condenser - .1 mfd. 200v. |
| R-6138 | Condenser - .1 mfd. 300v. |
| R-7354 | Condenser - .05 mfd. 200v. |
| R-9899 | Condenser - .02 mfd. 800v. |
| R-9818 | Condenser - .02 mfd. 400v. |
| R-6629 | Condenser - .02 mfd. 200v. |
| R-7244 | Condenser - .006 mfd. 600v. |
| R-6571 | Control - Volume |
| R-6989 | Cord - Power Supply |
| R-9819A | Dial and Indicator |
| R-8889 | Escutcheon |
| R-9831 | Instructions |
| R-8893 | Knob - Large |
| R-8896 | Knob - Medium |
| R-2288 | Lamp - Pilot |
| R-5346B | Lead - Antenna |
| R-5345D | Lead - Ground |
| R-5823 | Resistor - 1 megohm, 1/2 watt carbon |
| R-6179 | Resistor - 500M ohms, 1/2 watt carbon |
| R-5830 | Resistor - 200M ohms, 1/2 watt carbon |
| R-5819 | Resistor - 100M ohms, 1/2 watt carbon |
| R-6445 | Resistor - 50M ohms, 1/2 watt carbon |
| S-9814 | Speaker - 8", 1600 ohm |
| S-7776B | Speaker - Cone & Voice Coil |
| S-9846 | Speaker - field coil |
| S-7893 | Speaker - hum bucking coil |
| S9840A | Speaker - Transformer |
| R-7414 | Speaker - plug, 4 prong |
| R-9825 | Switch - Wave |
| R-9826 | Transformer - IF input |
| R-9827 | Transformer - Interstage |
| R-9828 | Transformer - IF output |
| R-9811A | Transformer - 60 cycle power |
| R-9812A | Transformer - 25 cycle power |
| R-6689 | Resistor - 30M ohms, 1 watt |
| R-5821 | Resistor - 20M ohms, 1/2 watt |
| R-6073 | Resistor - 2M ohms, 1/2 watt |
| R-6154 | Resistor - 1M ohms, 1/2 watt |
| R-9822 | Resistor - 200 ohms, flexible |
| R-9823 | Resistor - 150 ohms, flexible |
| R-6652A | Shaft assembly |
| R-6450 | Shield - Electrolytic |
| R-6749 | Shield - Tube, top |
| R-8366 | Socket - 4 prong |
| R-8367 | Socket - 5 prong |
| R-8368 | Socket - 6 prong |
| R-8369 | Socket - 7 prong |

SEARS-ROEBUCK & CO.

MODEL 1800
Schematic
Notes,Parts List




GENERAL INFORMATION

This set is designed to operate on 105 to 120 volts AC - 50-60 cycles - also furnished in 25 cycles.

The circuit is of the conventional TRF type, covering the regular broadcast band including police, and short wave from 70 to 200 meters.

An antenna approximately 40' long outside is recommended, but very good results may be obtained with 20' to 25' inside.

Below are listed a few suggestions as to service -

A - to align set, proceed as follows-

1- Tune gang condenser way open and turn compensator adjustment screws to maximum noise level or loudest police signal - 1712 KC.

2- Check again with condenser tuned to 1400 KC.

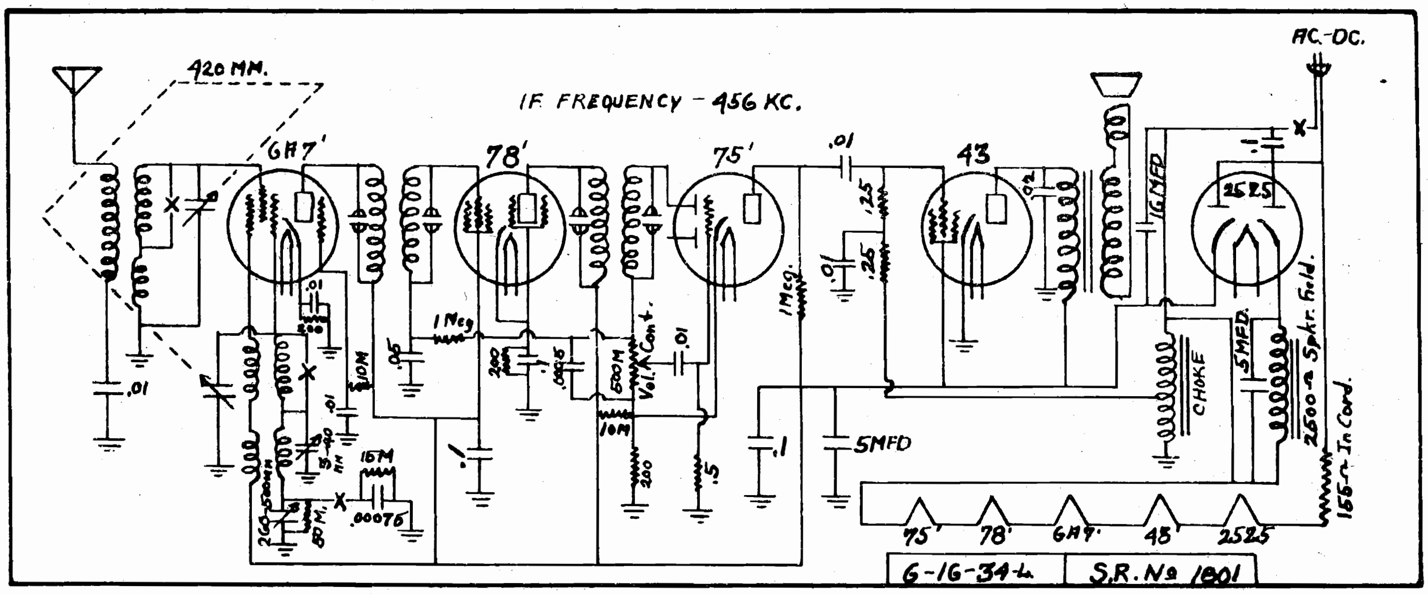
3- Short Wave - open variable condenser about half way and tune small padder condenser to maximum noise level-rocking variable condenser across midpoint while doing so.

PARTS LIST - S.R.#1800

| No. | |
|---|---|
| 73 | Terminal strip -3 lug |
| 105 | Volume control |
| 152 | Dynamic Speaker |
| 153 | Variable condenser-2 gang |
| 154 | Power transformer |
| 155 | Dial scale unit |
| 156 | 8&4 mfd electrolytic cond. |
| 158 | Power cord and plug |
| 159 | Knobs |
| 160 | Escutcheon plates |
| 165 | Set of coils complete |
| 165a | Antenna coil |
| 165b | Interstage coil |
| 307 | 10 mfd-25v electrolytic |
| 312 | 4 pole 2 position short wave switch |
| | Any tube socket (state no. of prongs) |
| | Any resistor (state ohms & watts) |
| | Any bypass condenser (state capacity) |

MODEL 1801
Schematic
Alignment
Parts List

SEARS-ROEBUCK & CO.




## GENERAL INFORMATION

This set is a superheterodyne designed to operate on AC - DC - 110 volts, 25 to 60 cycles.

To operate, unreel antenna and lay along floor or drop out of window. Turn volume control all the way up and tune in signals. If set does not start operating in two minutes, reverse the plug in wall receptacle.

To rebalance set, proceed as follows:

1 - Align IF transformers at 456 KC, applying 456 note at 6A7 control grid.

2 - Turn variable condenser all the way open - adjust compensators on variable condenser to 1712 KC.

3 - Tune to some weak signal about 1400 KC and readjust the <u>Detector Section</u> <u>only</u>.

4 - Tune set to some signal at 600 KC and while rocking condenser across 600 KC signal, adjust the BC low frequency padder.

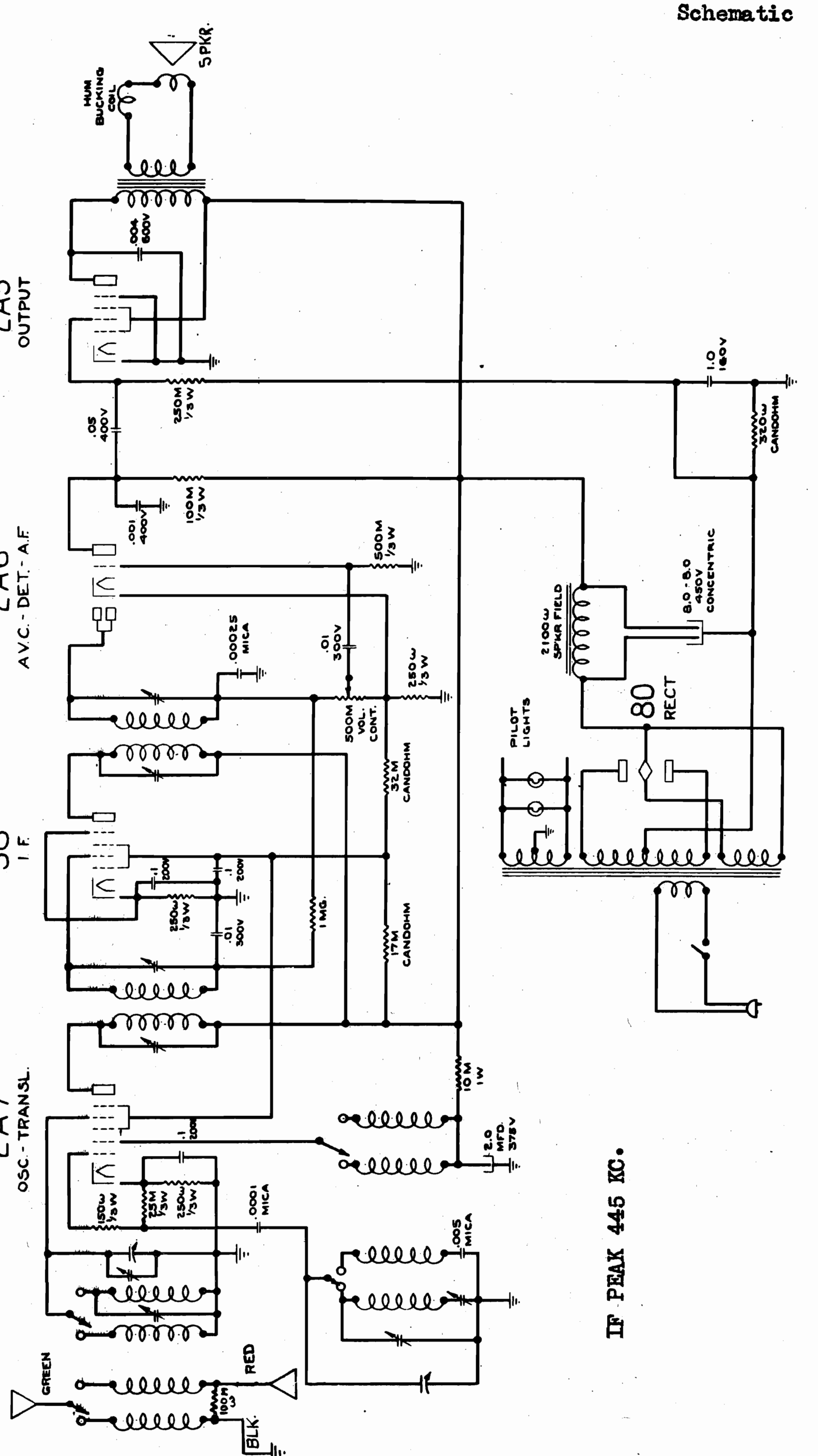
To rebalance Short Wave - tune to some signal about center of dial and while rocking variable condenser back and forth adjust 3-40 mm condenser to loudest peak.

### PARTS LIST - S.R.# 1801

| No. | |
|---|---|
| 52 | Variable condenser-2 gang |
| 61 | Antenna cord |
| 74 | Terminal strip- 7 lug |
| 101 | Dynamic speaker |
| 103 | Choke |
| 104 | 155 ohm Cordohm |
| 106 | Electrolytic condenser |
| 108 | Padder condenser |
| 256 | 500 ohm Volume control |
| 312 | 4 Pole 2 position short wave switch |
| 350 | Set of coils - complete |

# SEARS-ROEBUCK & CO.

**MODEL 1802-A, 1803-A, 1807**
**Schematic**



**MODEL 1802-A, 1803-A, 1807**
**Voltage, Alignment, Socket Layout**

# SEARS-ROEBUCK & CO.

## ALIGNMENT PROCEDURE

**The IF Stages:**

1. Connect the low voltage scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the control grid cap of the 58 IF tube. Leave the clip attached to the cap and the tube shield in place.

4. Set the test oscillator to 445 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the control grid cap of the 2A7 and tune the IF input transformer.

6. Repeat the adjustments in order to secure greater accuracy. Always use as low an output as possible from the test oscillator, in order to render the AVC action of the receiver inoperative.

**RF Alignment (Broadcast):**

1. Screw the padding condenser to about three quarters of its maximum capacity.

2. Set the test oscillator to 1750 kc and couple its output to the green antenna lead of the receiver.

3. Open the variable condenser plates all the way and adjust the broadcast oscillator coil trimmer for maximum output meter reading.

4. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the trimmer on the translator section of the variable condenser for maximum output. The translator section is the one nearer the dial, as shown in the Service Illustration.

5. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the broadcast oscillator padding condenser for maximum output.

6. Repeat the 1750 kc and 1400 kc adjustments. Always use a low enough output from the test oscillator to render the AVC ineffective.

**Short Wave Alignment:**

1. Leave the test oscillator loosely coupled to the green antenna lead as for broadcast alignment.

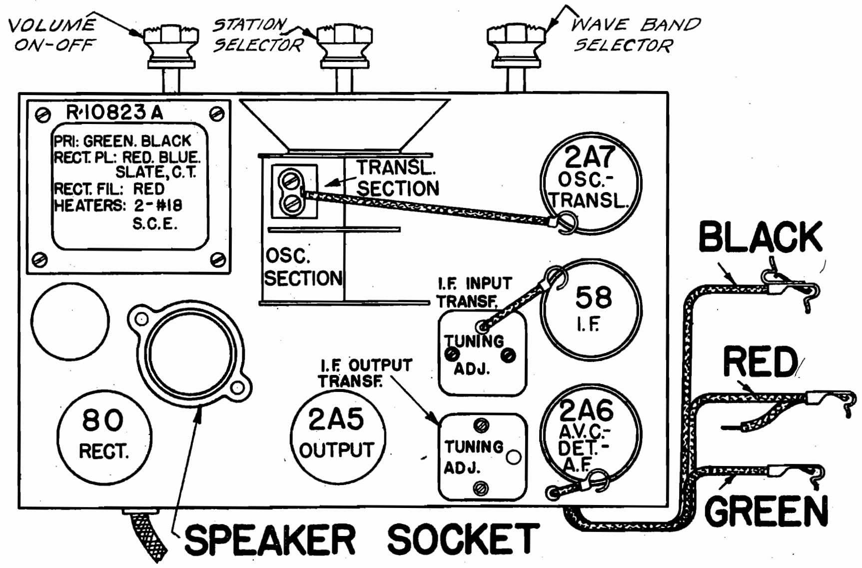
2. Set the test oscillator to 16000 kc. Its signal should be heard when the variable condenser plates are all the way out. If the test oscillator cannot be tuned in, the grid and plate wires to the short wave oscillator coil and to the oscillator socket should be moved as far away as possible from the metal of the chassis to reduce distributed capacity.

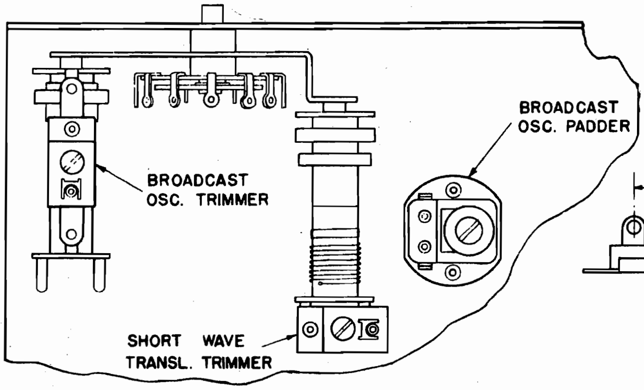
3. Set the test oscillator to 14000 kc and tune in its signal. Then adjust the short wave translator trimmer for maximum output.

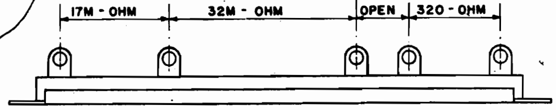
## TUBE VOLTAGE CHART

All readings should be taken between the chassis and the respective element of each tube.

| TUBE | PLATE | SCREEN | OSC.SECTION PLATE |
|---|---|---|---|
| 2A7 - Osc-Transl | 195 | 90 | 155 |
| 58 - IF | 195 | 90 | |
| 2A6 - AVC-Det-AF | 115 | | |
| 2A5 - Output | 185 | 195 | |




R 10861
CANDOHM RESISTOR

**MODEL 1804,1805, 1820,1826**
**Schematic Circuit Changes**

SEARS-ROEBUCK & CO.

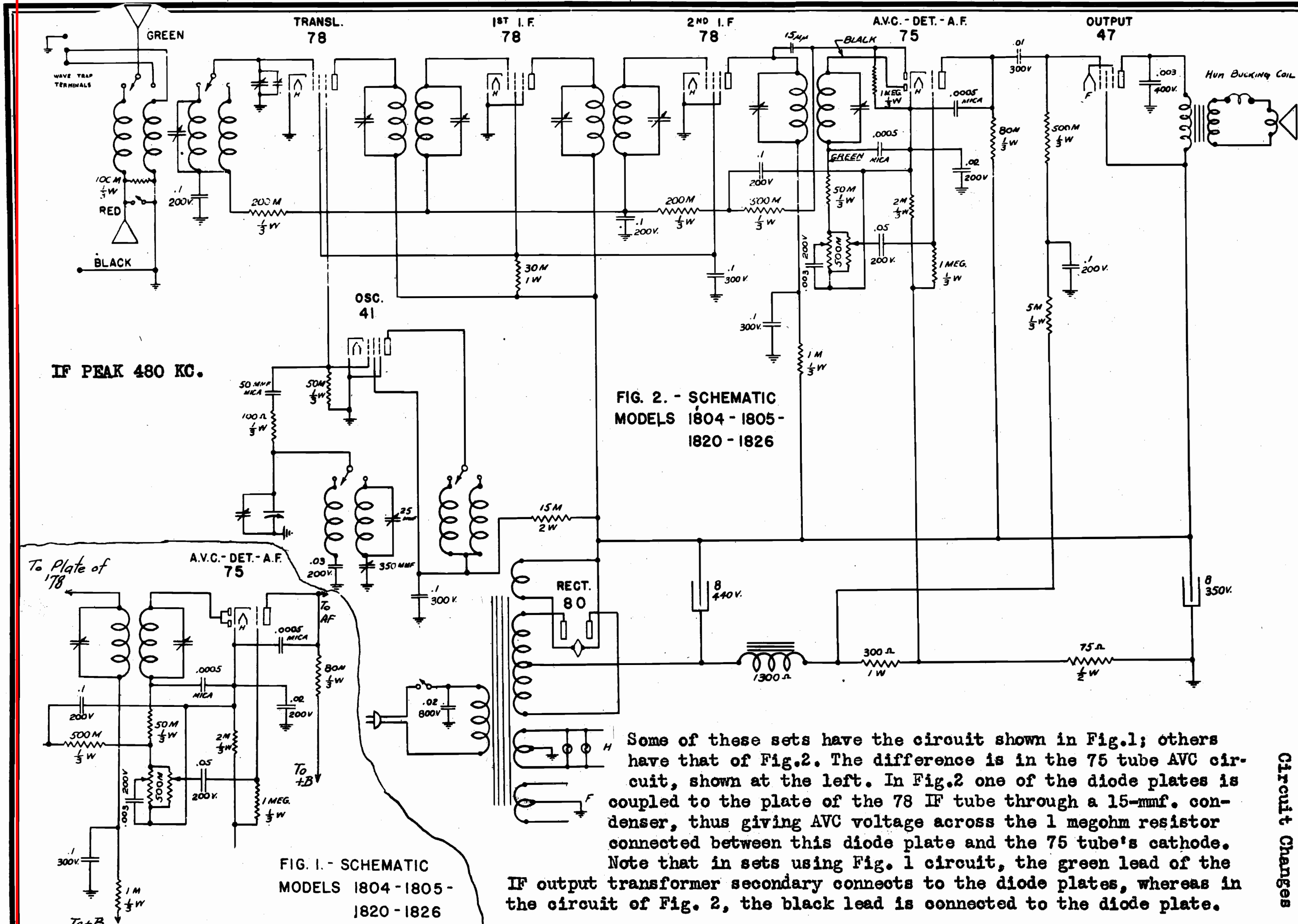



FIG. 2. - SCHEMATIC
MODELS 1804 - 1805 - 1820 - 1826

FIG. 1. - SCHEMATIC
MODELS 1804 - 1805 - 1820 - 1826

Some of these sets have the circuit shown in Fig.1; others have that of Fig.2. The difference is in the 75 tube AVC circuit, shown at the left. In Fig.2 one of the diode plates is coupled to the plate of the 78 IF tube through a 15-mmf. condenser, thus giving AVC voltage across the 1 megohm resistor connected between this diode plate and the 75 tube's cathode. Note that in sets using Fig. 1 circuit, the green lead of the IF output transformer secondary connects to the diode plates, whereas in the circuit of Fig. 2, the black lead is connected to the diode plate.

# MODEL 1804,1805,1820, 1826

## SEARS-ROEBUCK & CO.

## Wavetrap Data, Voltage Alignment, Socket Layout Parts List

### WAVE TRAP CONNECTIONS

In locations near the coast where code interference from ship stations may be experienced, a wave trap can be added. (Part #R11099.)

Some of the receivers have the terminal board shown in Fig. 3 mounted at the rear of the chassis. The wave trap, which may be mounted on the side of the cabinet, should be connected as shown in Fig. 3. In receivers not having this terminal board provided, the wave trap may be added as follows:

1. Unsolder both ends of the green wire which runs from the Wave Switch to one of the lugs on the broadcast antenna coil.

2. Solder the yellow wire of the wave trap to the switch lug in place of the original green wire.

3. Connect the blue wire of the wave trap to the lug of the broadcast antenna coil in place of the original green wire.

4. Connect the white wire of the wave trap to the chassis.

To adjust the wave trap, proceed as follows:

1. With the wave switch in the broadcast position, fully mesh the variable condenser plates.

2. If the interfering signal can be picked up, adjust the two tuning condensers of the wave trap until the interfering signal disappears.

3. If the frequency of the interfering signal is known, the adjustment can be made more quickly and accurately by means of a test oscillator. Set the oscillator to the interfering frequency and couple its output to the antenna lead. The oscillator should be adjusted to give high output. Then adjust the wave trap until the oscillator signal disappears. Usually the frequency of the interfering signal is very close to 500 kc and this frequency should be used if the interference is not heard at the time of the service call.

### ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator through a .1 mfd. condenser to the control grid of the 78 second IF tube. The grid clip should be left attached to the cap.

4. Set the test oscillator to 480 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustrations.

5. Change the test oscillator connection to the control grid cap of the 78 first IF tube and tune the IF interstage transformer.

6. Change the test oscillator connection to the control grid cap of the 78 translator tube and tune the IF input transformer.

7. In order to secure greater accuracy, repeat all of the operations, starting with the IF output transformer.

RF Alignment (Broadcast):

1. Set the test oscillator to 1785 kc.

2. Couple the output of the oscillator loosely to the antenna lead of the set, with the antenna connected.

3. Turn the variable condenser plates all the way out. Then adjust the oscillator trimmer for maximum output. This trimmer condenser is mounted on the terminal board of the broadcast oscillator coil, as shown in the Service Illustrations.

4. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and at the same time, adjust the broadcast oscillator padder for maximum output. The location of this padding condenser is shown in the Service Illustrations.

5. Repeat the adjustment of the oscillator trimmer at 1785 kilocycles.

6. Set the test oscillator to 1500 kc and tune in its signal. Then adjust the trimmer on the antenna section of the variable condenser for maximum output. In some of the receivers this trimmer has been removed from the variable condenser, in which case this step in the alignment procedure may be omitted.

Short Wave Alignment:

1. Set the test oscillator to 16 megacycles, leaving it coupled to the set's antenna lead as for broadcast alignment.

2. Turn the wave band switch to the short wave position and tune in the test oscillator signal. Then adjust the trimmer on the short wave antenna coil for maximum output.

3. Set the test oscillator to 6 megacycles and tune in its signal. If necessary, turns may be shifted on the short wave antenna coil to secure accurate alignment on this frequency. Should it become necessary to shift turns, the translator trimmer will have to be readjusted at 16 megacycles after the turns have been shifted.

### TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

| TUBE | | PLATE VOLTAGE | SCREEN VOLTAGE |
|---|---|---|---|
| 78 - Translator | - | 270 | 110 |
| 41 - Oscillator | - | 100 | 100 |
| 78 - First IF | - | 270 | 110 |
| 78 - Second IF | - | 260 | 110 |
| 75 - AVC-Det-AF | - | 185 | |
| 47 - Output | - | 260 | 270 |

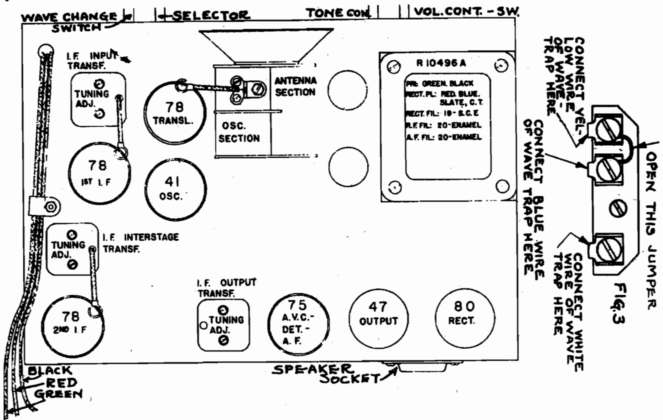
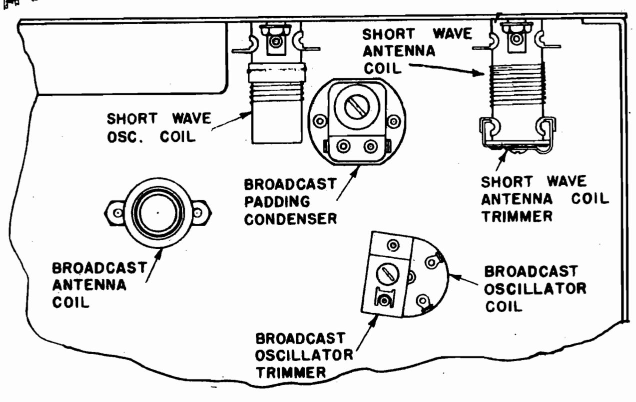



FIG. 3

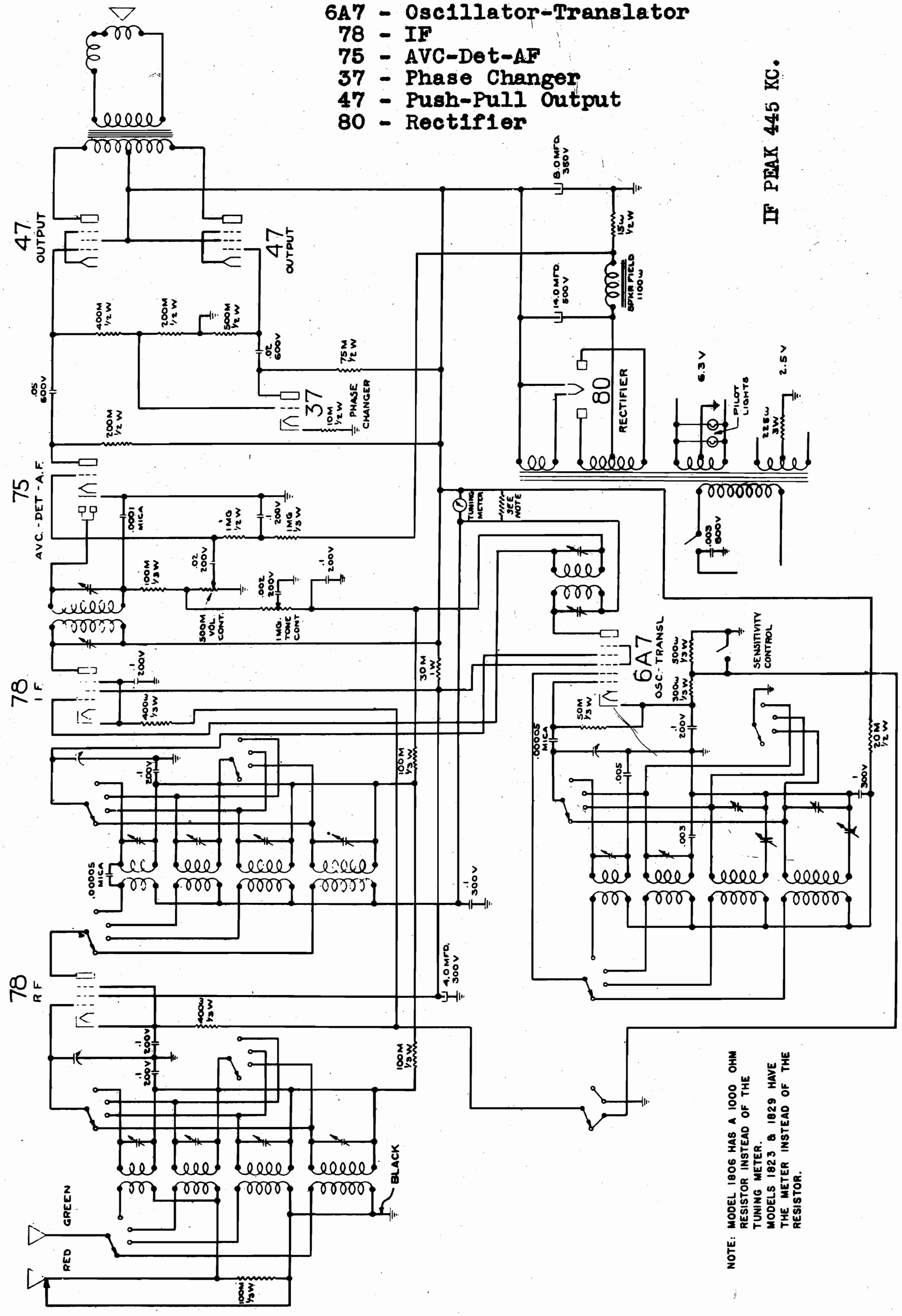



| | |
|---|---|
| R10446 | Coil - Antenna |
| R10399 | Coil - Oscillator |
| R9829F | Coil - Antenna, short wave |
| R9829E | Coil - Oscillator, short wave |
| R10453 | Condenser - Variable |
| R10453A | Condenser - Variable, complete with drive assembly and dial for models 1820 and 1826 |
| R10453B | Condenser - Variable, complete with drive assembly and dial for models 1804 and 1805 |
| D4758P | Condenser - Electrolytic, 8 mfd. |
| R8488 | Condenser - Electrolytic, 8 mfd. |
| R10197 | Condenser - Trimmer, 25 mmf. |
| R9975 | Condenser - Padding, 350 mmf. |
| R6138 | Condenser - .1 mfd. 300 volts |
| R6444 | Condenser - .1 mfd. 200 volts |
| R7354 | Condenser - .05 mfd. 200 volts |
| R6630 | Condenser - .03 mfd. 200 volts |
| R6629 | Condenser - .02 mfd. 200 volts |
| R10456 | Condenser - .02 mfd. 800 volts in metal case |
| R6462 | Condenser - .01 mfd. 300 volts |
| R10478 | Condenser - .003 mfd. 400 volts |
| R10495 | Condenser - .003 mfd. 200 volts |
| R6760 | Condenser - .0005 mfd. mica |
| R8621 | Condenser - .00005 mfd. mica |
| R10457 | Control - Tone, 500 M ohms |
| R10458 | Control - Volume, 500 M ohms |
| R7585 | Resistor - 1 megohm, 1/3 watt carbon |
| R7228 | Resistor - 500 M ohm, 1/3 watt carbon |
| R6638 | Resistor - 200 M ohm, 1/3 watt carbon |
| R7586 | Resistor - 100 M ohm, 1/3 watt carbon |
| R10920 | Resistor - 80 M ohm, 1/3 watt carbon |
| R6637 | Resistor - 50 M ohm, 1/3 watt carbon |
| R6689 | Resistor - 30 M ohm, 1 watt carbon |
| R7884 | Resistor - 15 M ohm, 2 watt carbon |
| R7226 | Resistor - 5 M ohm, 1/3 watt carbon |
| R6634 | Resistor - 2 M ohm, 1/3 watt carbon |
| R6636 | Resistor - 1 M ohm, 1/3 watt carbon |
| R9533 | Resistor - 300 ohms, 1 watt carbon |
| R8922 | Resistor - 100 ohms, 1/3 watt carbon |
| R10500 | Resistor - 75 ohms, 1/2 watt carbon |
| S10566 | Speaker - Model 1804 |
| S10509 | Speaker - Model 1805, 1820, 1826 |
| R10467 | Switch - Wave |
| R10501B | Transformer - IF input |
| R10469B | Transformer - IF interstage |
| R10470A | Transformer - IF output |
| R10496A | Transformer - Power, 60 cycle |
| R10497A | Transformer - Power, 25 cycle |

SEARS-ROEBUCK & CO.

**MODEL 1806,1823,1829**
**Schematic**

78 - RF
6A7 - Oscillator-Translator
78 - IF
75 - AVC-Det-AF
37 - Phase Changer
47 - Push-Pull Output
80 - Rectifier



MODEL 1806,1823,1829
Alignment, Voltage
Socket Layout

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

**The IF Stages:**

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, through a .1 mfd condenser, to the control grid of the 78 IF tube. The grid clip should be left attached to the cap and the tube shield must be in place.

4. Set the test oscillator to 445 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the control grid cap of the 6A7 tube and tune the IF input transformer.

6. In order to secure greater accuracy repeat the adjustments, starting with the IF output transformer.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

**RF Alignment; #1 Band (Broadcast):**

1. Couple the output of the test oscillator to the antenna lead of the set, with the antenna connected.

2. Set the test oscillator to 1520 kc.

3. Turn the variable condenser plates all the way out. Then adjust the #1 oscillator trimmer for maximum output. The locations of all of the trimmers are shown in the Service Illustrations.

4. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the #1 antenna trimmer and the #1 translator trimmer for maximum output.

5. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the #1 oscillator padder for maximum output.

6. Repeat the 1520 kc and 1400 kc adjustments for greater accuracy.

**#2 Band:**

1. Leave the test oscillator coupled to the antenna lead as for broadcast band alignment.

2. Set the test oscillator to 4250 kc.

3. Turn the variable condenser plates all the way out. Then adjust the #2 oscillator trimmer for maximum output.

4. Set the test oscillator to 4000 kc and tune in its signal. Then adjust the #2 antenna trimmer and the #2 translator trimmer for maximum output.

5. Set the test oscillator to 1700 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the #2 oscillator padder for maximum output.

6. Repeat the 4250 kc and 4000 kc adjustments for greater accuracy.

**#3 Band:**

1. Set the test oscillator to 10 megacycles.

2. Turn the variable condenser plates all the way out. Then adjust the #3 oscillator trimmer for maximum output. As shown in the Service Illustrations, this trimmer is mounted inside of its coil, under the chassis.

3. Set the test oscillator to 9 megacycles and tune in its signal. Then adjust the #3 antenna trimmer and the #3 translator trimmer for maximum output.

4. Set the test oscillator to 4.5 megacycles and tune in its signal. If necessary, shift turns on the antenna and translator coils to secure maximum sensitivity. Be sure to cement the turns in place.

5. If turns have been shifted, repeat the 10 megacycle and the 9 megacycle adjustments, since they will have been affected by shifting of the turns.

**#4 Band:**

1. Set the test oscillator to 19 megacycles.

2. Turn the variable condenser plates all the way out. Then adjust the #4 oscillator trimmer for maximum output.

3. Set the test oscillator to 18 megacycles and tune in its signal. Then adjust the #4 antenna trimmer and the #4 translator trimmer for maximum output.

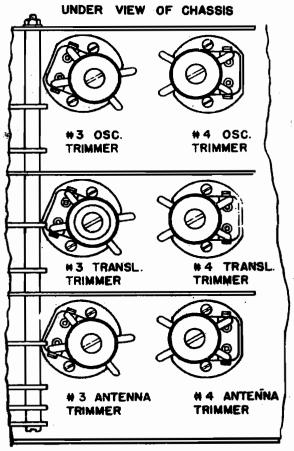
4. Set the test oscillator to 9 megacycles and tune in its signal. If necessary, shift turns on the antenna and translator coils to secure maximum sensitivity. Be sure to cement the turns in place.

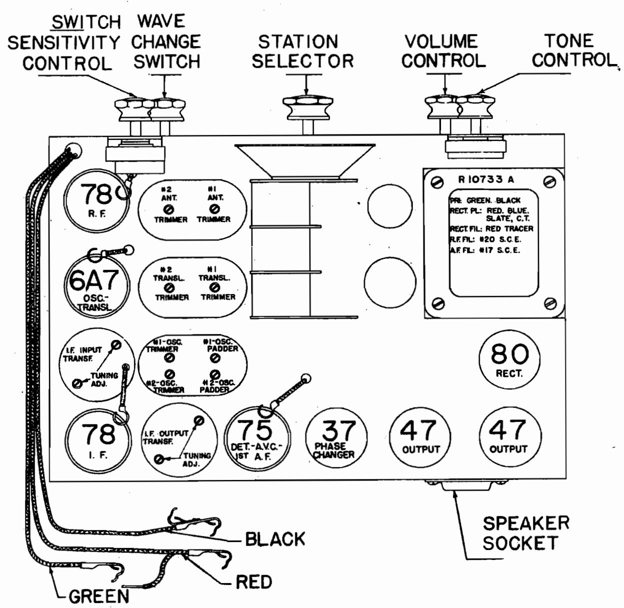
5. If turns have been shifted, repeat the 19 megacycle and 18 megacycle adjustments since they will have been affected by shifting of the turns.

TUBE VOLTAGE CHART

| TUBE | PLATE | SCREEN | OSC.SECTION PLATE | CATHODE |
|---|---|---|---|---|
| 78 - RF | 220 | 90 | | 3.1 |
| 6A7 - Osc-Transl | 220 | 90 | 160 | 2.6 |
| 78 - IF | 235 | 90 | | 3 |
| 75 - AVC-Det-AF | 75 | | | 0 |
| 37 - Phase Changer | 125 | | | 9 |
| 47 - Output | 230 | 235 | | 16 |

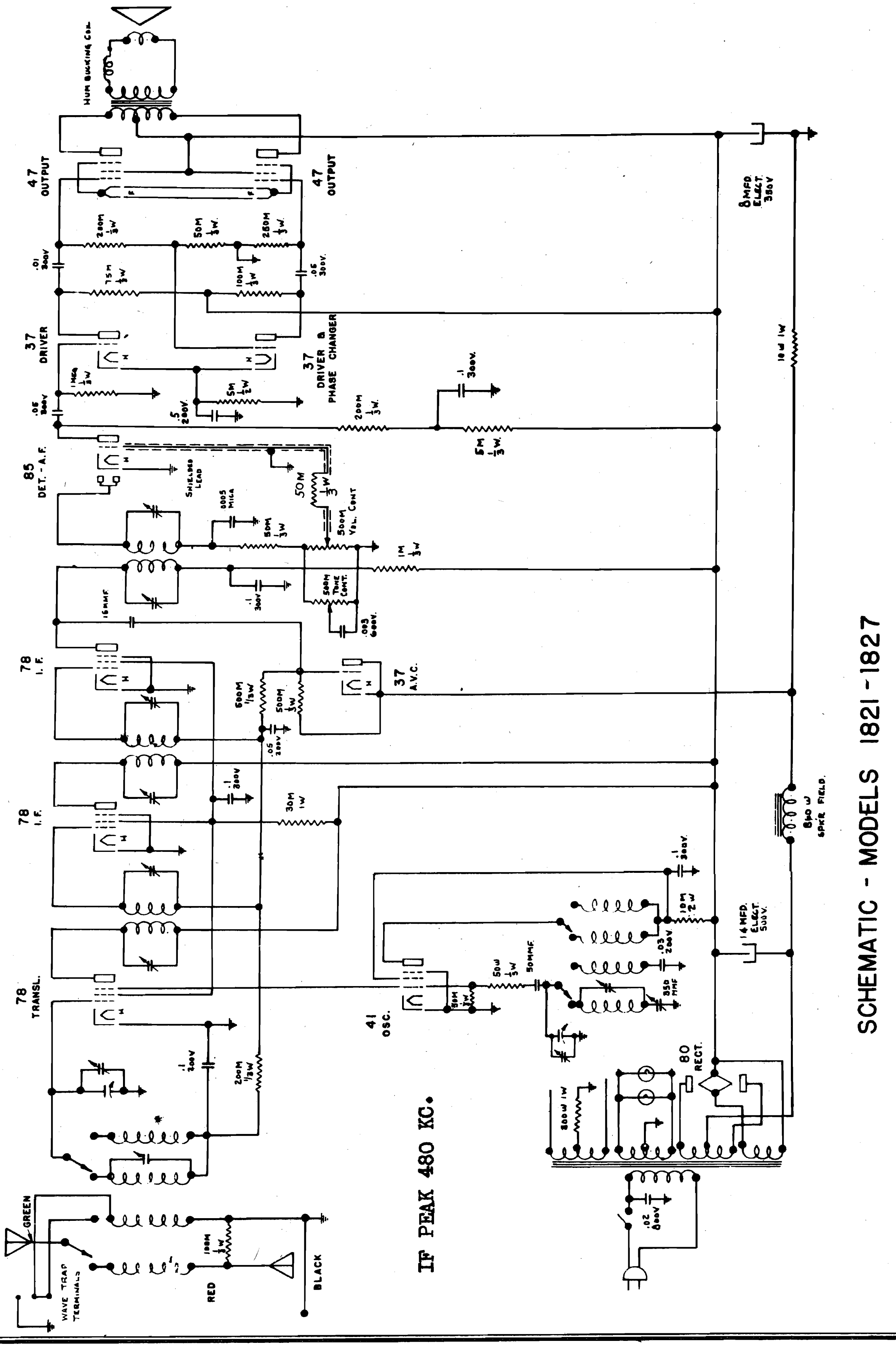
All readings are to be taken between the chassis and the respective element of each tube.



**MODEL 1821,1827**
**Schematic**

# SEARS-ROEBUCK & CO.




SCHEMATIC - MODELS 1821-1827

**MODEL 1821,1827**
**Alignment, Voltage Socket, Parts List**

# SEARS-ROEBUCK & CO.

## ALIGNMENT PROCEDURE

**The IF Stages:**

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator through a .1 mfd. condenser to the control grid of the 78 second IF tube. The grid clip should be left attached to the cap.

4. Set the test oscillator to 480 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustrations.

5. Change the test oscillator connection to the control grid cap of the 78 first IF tube and tune the IF interstage transformer.

6. Change the test oscillator connection to the control grid cap of the 78 translator tube and tune the IF input transformer.

7. In order to secure greater accuracy, repeat all of the operations, starting with the IF output transformer.

**RF Alignment (Broadcast):**

1. Set the test oscillator to 1785 kc.

2. Couple the output of the oscillator loosely to the antenna lead of the set, with the antenna connected.

3. Turn the variable condenser plates all the way out. Then adjust the oscillator trimmer for maximum output. This trimmer condenser is mounted on the terminal board of the broadcast oscillator coil, as shown in the Service Illustrations.

4. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and at the same time, adjust the broadcast oscillator padder for maximum output. The location of this padding condenser is shown in the Service Illustrations.

5. Repeat the adjustment of the oscillator trimmer at 1785 kilocycles.

6. Set the test oscillator to 1500 kc and tune in its signal. Then adjust the trimmer on the antenna section of the variable condenser for maximum output. In some of the receivers this trimmer has been removed from the variable condenser, in which case this step in the alignment procedure may be omitted.

**Short Wave Alignment:**

1. Set the test oscillator to 16 megacycles, leaving it coupled to the set's antenna lead as for broadcast alignment.

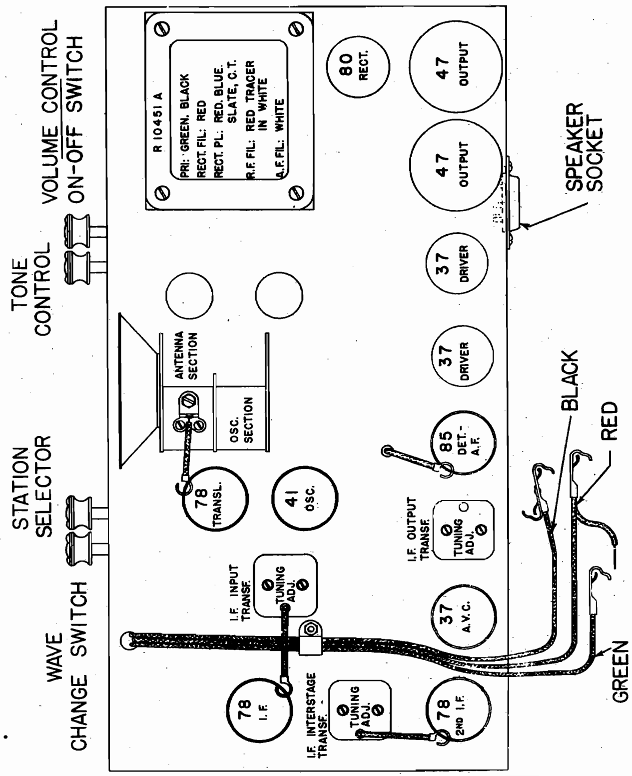
2. Turn the wave band switch to the short wave position and tune in the test oscillator signal. Then adjust the trimmer on the short wave antenna coil for maximum output.

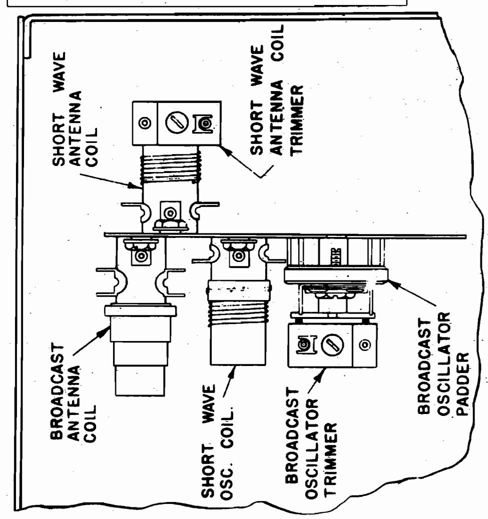
3. Set the test oscillator to 6 megacycles and tune in its signal. If necessary, turns may be shifted on the short wave antenna coil to secure accurate alignment on this frequency. Should it become necessary to shift turns, the translator trimmer will have to be readjusted at 16 megacycles after the turns have been shifted.

## TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

| TUBES | | PLATE VOLTAGE | SCREEN VOLTAGE |
|---|---|---|---|
| 78 - Translator | - | 245 | 85 |
| 41 - Oscillator | - | 115 | 115 |
| 78 - First IF | - | 245 | 85 |
| 78 - Second IF | - | 235 | 85 |
| 37 - AVC | - | Used as diode with no applied DC voltage | |
| 85 - Det-AF | - | 20 | |
| 37 - Driver | - | 140 | |
| 37 - Driver and Phase Changer | - | 110 | |
| 47 - Output | - | 240 | 245 |



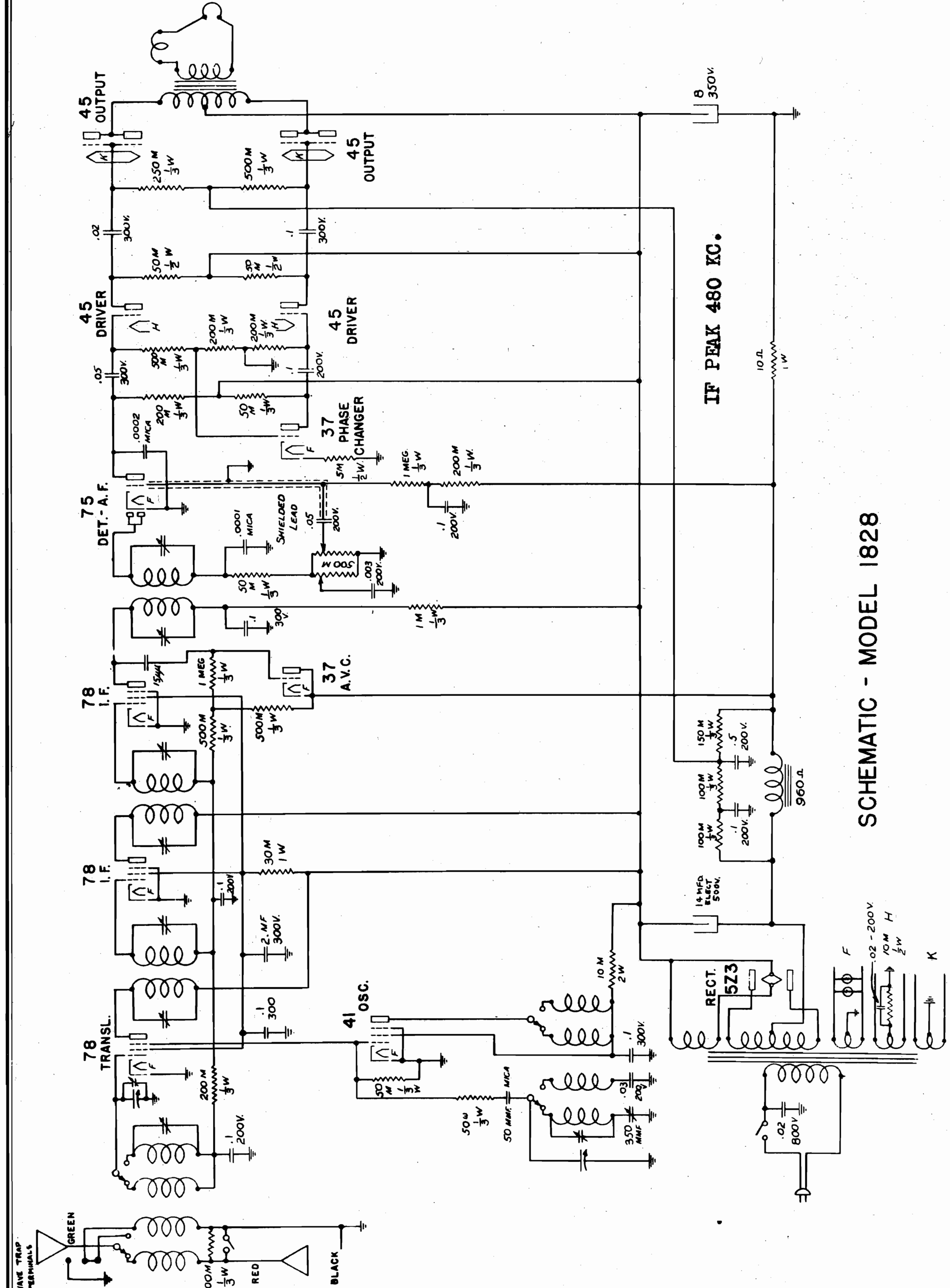




## SILVERTONE - - MODELS 1821, 1827

| Part No. | Description | Price per 100 |
|---|---|---|
| R8297A | Board - Terminal, double | 1.34 |
| R8308A | Board - Terminal, triple | 1.78 |
| R9446A | Board - Terminal, 4 terminals | 2.15 |
| R10468B | Transformer - IF input | 47.61 |
| R10469B | Transformer - IF interstage | 47.70 |
| R10470A | Transformer - IF output | 46.44 |
| R10451A | Transformer - Power, 60 cycles | 223.86 |
| R10452A | Transformer - Power, 25 cycles | 359.69 |
| R10446 | Coil - Antenna | 15.80 |
| R10399 | Coil - Oscillator | 9.29 |
| R9829F | Coil - Antenna, short wave | 25.29 |
| R9829G | Coil - Oscillator, short wave | 20.70 |
| R10453 | Condenser - Variable | 81.83 |
| R10453A | Condenser - Variable with dial and drive assembly | 170.49 |
| R7236 | Condenser - Electrolytic, 14 mfd. | 40.63 |
| R8488 | Condenser - Electrolytic, 8 mfd. | 28.00 |
| R10197 | Condenser - Trimmer, 25 mmf. | 3.59 |
| R9975 | Condenser - Padding, 350 mmf. | 10.55 |
| R6451 | Condenser - .5 mfd. 200 volts | 10.24 |
| R6138 | Condenser - .1 mfd. 300 volts | 10.95 |
| R6444 | Condenser - .1 mfd. 200 volts | 5.74 |
| R7857 | Condenser - .05 mfd. 300 volts | 4.74 |
| R7354 | Condenser - .05 mfd. 200 volts | 4.65 |
| R6630 | Condenser - .03 mfd. 200 volts | 4.49 |
| R10456 | Condenser - .02 mfd. 800 volts | 5.81 |
| R6462 | Condenser - .01 mfd. 300 volts | 4.52 |
| R10455 | Condenser - .003 mfd. 300 volts | 3.44 |
| R6760 | Condenser - .0005 mfd. mica | 4.56 |
| R8621 | Condenser - .00005 mfd. mica | 4.60 |
| R8042 | Condenser - .000015 mfd. mica | 4.56 |
| R10457 | Control - Tone, 500 M ohms | 20.69 |
| R10458 | Control - Volume, 500 M ohms | 28.01 |
| R7585 | Resistor - 1 megohm, 1/3 watt carbon | 5.91 |
| R7228 | Resistor - 500 M ohms, 1/3 watt carbon | 5.25 |
| R7584 | Resistor - 250 M ohms, 1/3 watt carbon | 5.25 |
| R6638 | Resistor - 200 M ohms, 1/3 watt carbon | 5.91 |
| R7586 | Resistor - 100 M ohms, 1/3 watt carbon | 5.91 |
| R10464 | Resistor - 75 M ohms, 1/3 watt carbon | 5.25 |
| R6637 | Resistor - 50 M ohms, 1/3 watt carbon | 5.25 |
| R6689 | Resistor - 30 M ohms, 1 watt carbon | 6.58 |
| R10465 | Resistor - 10 M ohms, 2 watt carbon | 7.23 |
| R7226 | Resistor - 5 M ohms, 1/3 watt carbon | 5.25 |
| R6510 | Resistor - 5 M ohms, 1/2 watt carbon | 6.58 |
| R6636 | Resistor - 1 M ohms, 1/3 watt carbon | 5.25 |
| R9533 | Resistor - 300 ohms, 1 watt carbon | 5.91 |
| R6632 | Resistor - 50 ohms, 1/3 watt carbon | 6.05 |
| R8739 | Resistor - 10 ohms, 1 watt, flexible | 5.25 |

MODEL 1828
Schematic

# SEARS-ROEBUCK & CO.



**MODEL 1828**
**Voltage, Alignment**
**Socket, Parts List**

# SEARS-ROEBUCK & CO.

To adjust the wave trap, proceed as follows:

1. With the wave switch in the broadcast position, fully mesh the variable condenser plates.

2. If the interfering signal can be picked up, adjust the two tuning condensers of the wave trap until the interfering signal disappears.

3. If the frequency of the interfering signal is known, the adjustment can be made more quickly and accurately by means of a test oscillator. Set the oscillator to the interfering frequency and couple its output to the antenna lead. The oscillator should be adjusted to give high output. Then adjust the wave trap until the oscillator signal disappears. Usually the frequency of the interfering signal is very close to 500 kc and this frequency should be used if the interference is not heard at the time of the service call.

## ALIGNMENT PROCEDURE

**The IF Stages:**

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator through a .1 mfd. condenser to the control grid of the 78 second IF tube. The grid clip should be left attached to the cap.

4. Set the test oscillator to 480 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustrations.

5. Change the test oscillator connection to the control grid cap of the 78 first IF tube and tune the IF interstage transformer.

6. Change the test oscillator connection to the control grid cap of the 78 translator tube and tune the IF input transformer.

7. In order to secure greater accuracy, repeat all of the operations, starting with the IF output transformer.

**RF Alignment (Broadcast):**

1. Set the test oscillator to 1785 kc.

2. Couple the output of the oscillator loosely to the antenna lead of the set, with the antenna connected.

3. Turn the variable condenser plates all the way out. Then adjust the oscillator trimmer for maximum output. This trimmer condenser is mounted on the terminal board of the broadcast oscillator coil, as shown in the Service Illustration.

4. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and at the same time, adjust the broadcast oscillator padder for maximum output. The location of this padding condenser is shown in the Service Illustration.

5. Repeat the adjustment of the oscillator trimmer at 1785 kilocycles.

6. Set the test oscillator to 1500 kc and tune in its signal. Then adjust the trimmer on the antenna section of the variable condenser for maximum output. In some of the receivers this trimmer has been removed from the variable condenser, in which case this step in the alignment procedure may be omitted.

**Short Wave Alignment:**

1. Set the test oscillator to 16 megacycles, leaving it coupled to the set's antenna lead as for broadcast alignment.

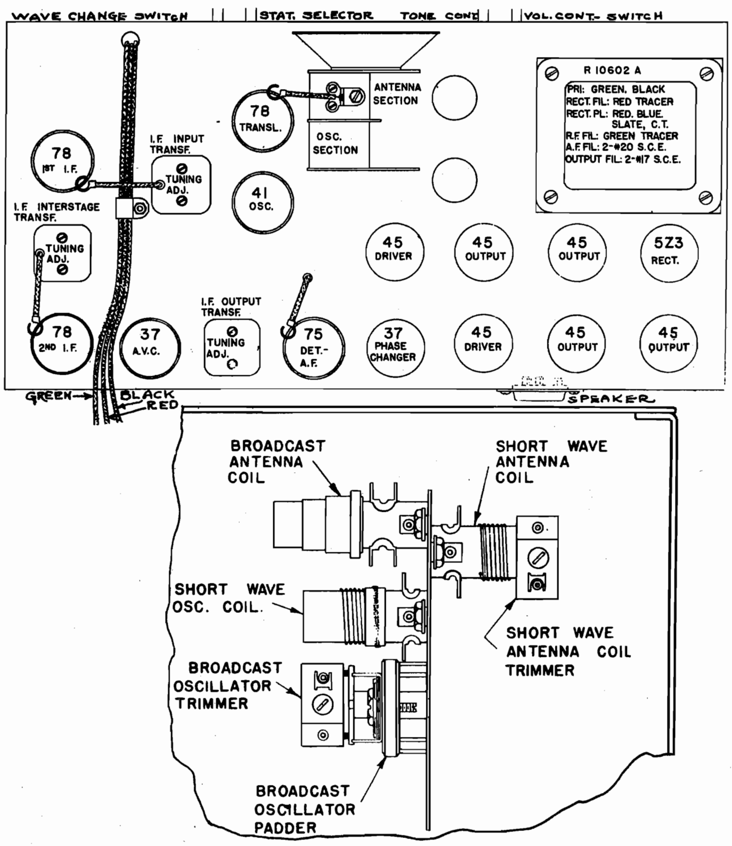
2. Turn the wave band switch to the short wave position and tune in the test oscillator signal. Then adjust the trimmer on the short wave antenna coil for maximum output.

3. Set the test oscillator to 6 megacycles and tune in its signal. If necessary, turns may be shifted on the short wave antenna coil to secure accurate alignment on this frequency. Should it become necessary to shift turns, the translator trimmer will have to be readjusted at 16 megacycles after the turns have been shifted.

## TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

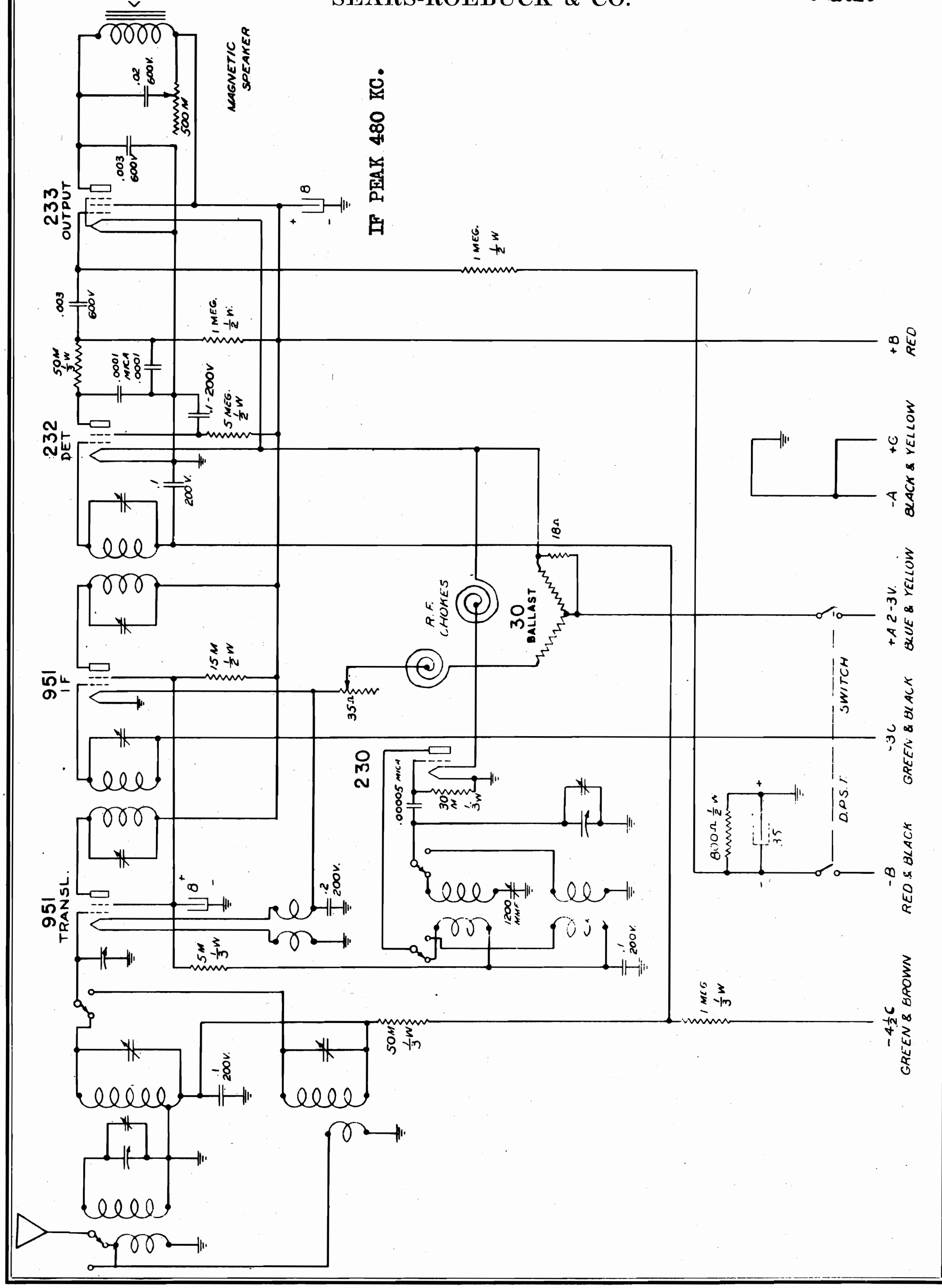
| TUBE | | PLATE VOLTAGE | SCREEN VOLTAGE |
|---|---|---|---|
| 78 - Translator | - | 255 | 80 |
| 41 - Oscillator | - | 120 | 120 |
| 78 - First IF | - | 255 | 80 |
| 78 - Second IF | - | 250 | 80 |
| 37 - AVC | - | Used as diode with no applied DC voltage. | |
| 75 - Det-AF | - | 105 | |
| 37 - Phase Changer | - | 130 | |
| 45 - Drivers | - | 150 | |
| 45 - Output | - | 250 | |




| | |
|---|---|
| R10446 | Coil - Antenna |
| R10399 | Coil - Oscillator |
| R9829F | Coil - Antenna, short wave |
| R9829G | Coil - Oscillator, short wave |
| R10453 | Condenser - Variable |
| R10453A | Condenser - Variable, with drive assembly |
| R7236 | Condenser - Electrolytic, 14 mfd. |
| R8488 | Condenser - Electrolytic, 8 mfd. |
| R10197 | Condenser - Trimmer, 25 mmf. |
| R9975 | Condenser - Padding, 350 mmf. |
| R8217 | Condenser - Electrolytic, 2 mfd. |
| R6451 | Condenser - .5 mfd. 200 volts |
| R6138 | Condenser - .1 mfd. 300 volts |
| R6444 | Condenser - .1 mfd. 200 volts |
| R7354 | Condenser - .05 mfd. 200 volts |
| R7857 | Condenser - .05 mfd. 300 volts |
| R6630 | Condenser - .03 mfd. 200 volts |
| R6629 | Condenser - .02 mfd. 200 volts |
| R7680 | Condenser - .02 mfd. 300 volts |
| R10456 | Condenser - .02 mfd. 800 volts, |
| R10495 | Condenser - .003 mfd. 200 volts |
| R7139 | Condenser - .0002 mfd. mica |
| R4303 | Condenser - .0001 mfd. mica |
| R8621 | Condenser - .00005 mfd. mica |
| R8042 | Condenser - .000015 mfd. mica |
| R10457 | Control - Tone, 500 M ohms |
| R10458 | Control - Volume, 500 M ohms |
| R6989 | Cord - AC line |
| R10429A | Dial diffusing disk |
| R10476 | Escutcheon |
| R10982 | Folder - Short wave |
| R7585 | Resistor - 1 megohm, 1/3 watt carbon |
| R7228 | Resistor - 500 M ohms, 1/3 watt carbon |
| R7584 | Resistor - 250 M ohms, 1/3 watt carbon |
| R6638 | Resistor - 200 M ohms, 1/3 watt carbon |
| R9778 | Resistor - 150 M ohms, 1/3 watt carbon |
| R7586 | Resistor - 100 M ohms, 1/3 watt carbon |
| R6637 | Resistor - 50 M ohms, 1/3 watt carbon |
| R6445 | Resistor - 50 M ohms, 1/2 watt carbon |
| R6689 | Resistor - 30 M ohms, 1 watt carbon |
| R6152 | Resistor - 10 M ohms, 1/2 watt carbon |
| R10465 | Resistor - 10 M ohms, 2 watt carbon |
| R6510 | Resistor - 5 M ohms, 1/2 watt carbon |
| R6636 | Resistor - 1 M ohms, 1/3 watt carbon |
| R6632 | Resistor - 50 ohms, 1/3 watt carbon |
| R8739 | Resistor - 10 ohms, 1 watt flexible |
| S10590S | Speaker |
| R10467 | Switch - Wave |
| R10468B | Transformer - IF input |
| R10469B | Transformer - IF interstage |
| R10470A | Transformer - IF output |
| R10602A | Transformer - Power, 60 cycle |
| R10603A | Transformer - Power, 25 cycle |
| R10441 | Shield - Tube, cap |
| R8315 | Socket - 4 prong |
| R8253 | Socket - 5 prong |
| R8367 | Socket - 5 prong, speaker |
| R8092 | Socket - 6 prong |
| R10549 | Socket - Pilot light |

**MODEL 1850,1851**
**Schematic**

# SEARS-ROEBUCK & CO.



**MODEL 1850,1851**
**Voltage,Alignment**
**Socket,Parts List**

# SEARS-ROEBUCK & CO.

## ALIGNMENT PROCEDURE

**The IF Stages:**

1. Connect the output meter across the loud speaker terminals. The high scale (about 100 volts) of the meter should be used.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the control grid of the IF tube, leaving the grid clip attached to the cap.

4. Set the test oscillator to 480 kc. and tune the IF output transformer. The locations of the tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the grid of the translator tube and tune the IF input transformer.

6. Repeat the adjustments to secure greater accuracy.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

**RF Alignment:** (Broadcast)

1. Set the test oscillator to exactly 1600 kc.

2. Couple the output of the oscillator to the antenna lead of the set, with the antenna connected.

3. Turn the dial pointer to exactly 1600 kc. and adjust the oscillator trimmer for maximum output. The oscillator trimmer is on the variable condenser section furthest from the dial.

4. Set the test oscillator to 1400 kc. and tune in its signal. Then adjust the translator and antenna trimmers for maximum output. The translator trimmer is accessible through the hole in the top of the translator coil shield as shown in the Service Illustration. The antenna trimmer is the one on the variable condenser section nearest the dial.

5. Set the test oscillator to 600 kc. and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the padder until maximum output is obtained.

6. Repeat the 1600 kc. and 1400 kc. adjustments.

**Short Wave Alignment:**

1. Set the test oscillator to 15 megacycles and tune in its signal.

2. Adjust the short wave translator trimmer for maximum output.

3. If necessary, shift the end turns (enamelled wire) of the short wave translator coil to secure accurate alignment and maximum output.

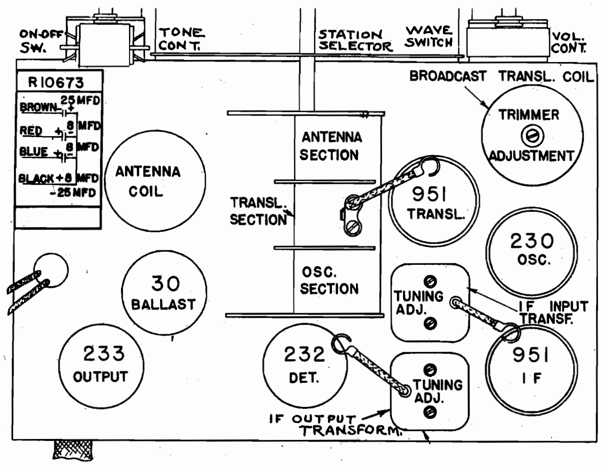
4. Re-adjust the translator trimmer at 15 megacycles.

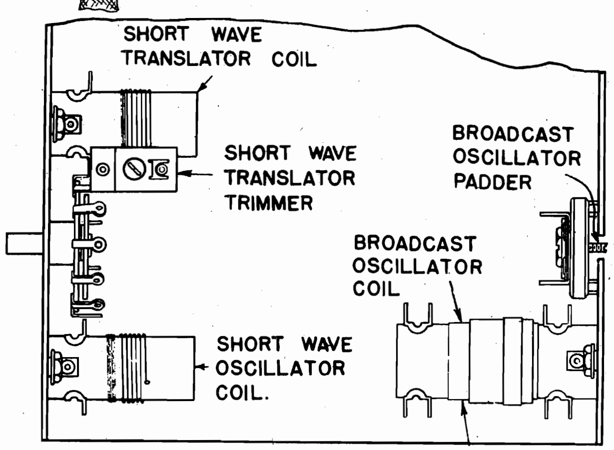
**TUBE VOLTAGE CHART**

| TUBE | PLATE VOLTAGE | SCREEN VOLTAGE | CONTROL GRID VOLTAGE |
|---|---|---|---|
| 951 - Translator | 122 | 70 | -.1 |
| 230 - Oscillator | 60 | | -.6 |
| 951 - IF | 122 | 70 | -.8 |
| 232 - Detector | 22.5* | 5* | -.1 |
| 233 - Output | 115 | 122 | -.1 |

NOTE: All control grid readings are lower than the actual applied voltage due to high series resistance in the circuit.

* - Indicates low reading due to high series resistance in circuit.



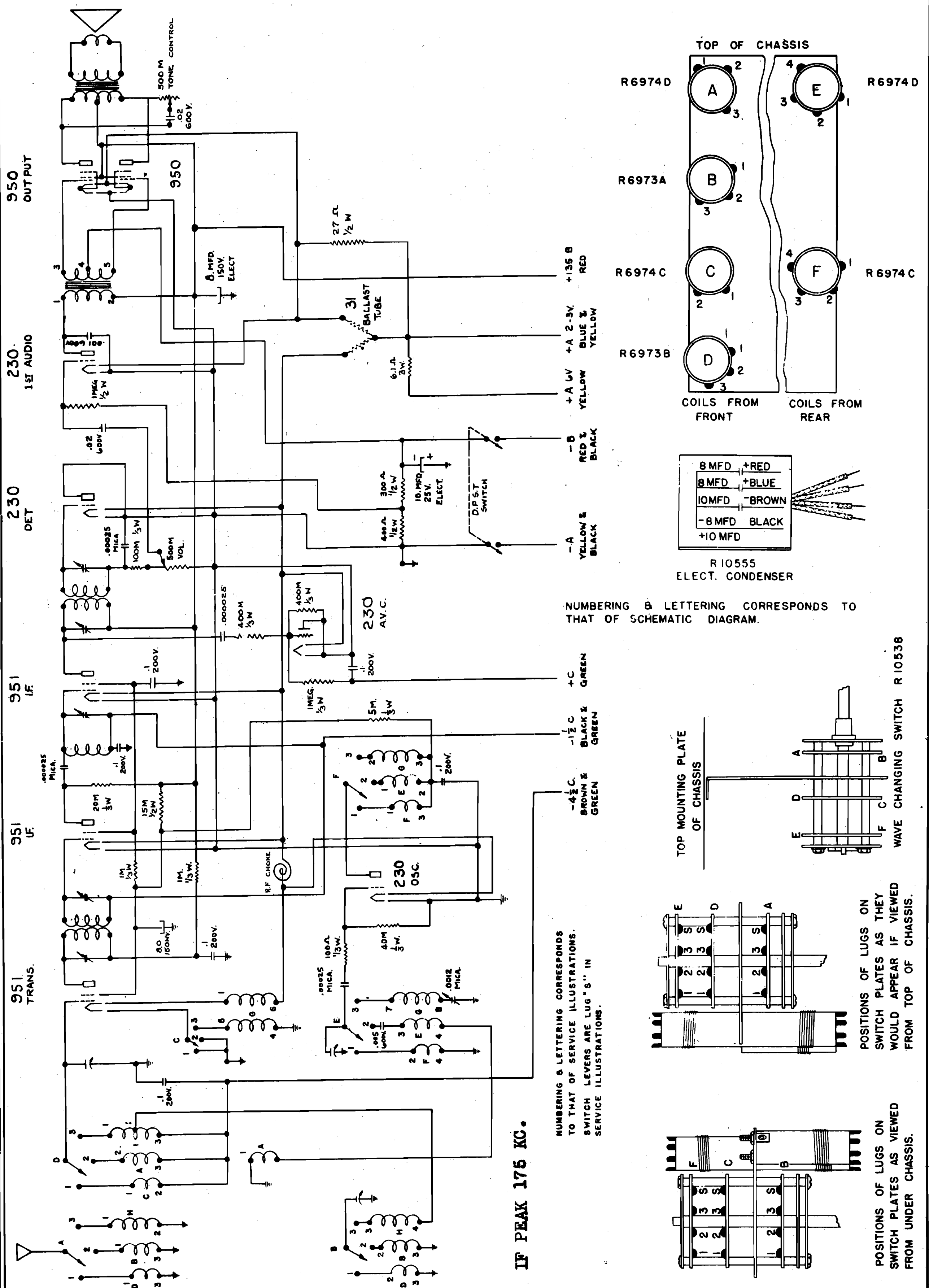

**SILVERTONE MODELS 1850 and 1851**

| Part No. | Description |
|---|---|
| R5509A | Board - Terminal, double |
| R8308A | Board - Terminal, triple |
| R9446A | Board - Terminal, 4 terminals |
| R10562 | Bushing - Rubber, chassis mounting |
| R10719 | Cable - Battery, model 1850 |
| R10720 | Cable - Battery, model 1851 |
| R10770 | Card - Operating |
| R8352 | Choke - RF |
| R5941 | Clamp - Battery cable |
| R4715 | Clamp - Antenna and ground leads |
| R7011A | Clip - Antenna and ground leads |
| R11043 | Clip - Grid |
| R10670 | Coil - Antenna, broadcast |
| R10674 | Coil - Oscillator, broadcast |
| R10671 | Coil - Translator, broadcast |
| R10931A | Coil - Antenna, short wave |
| R10931B | Coil - Oscillator, short wave |
| R10672 | Condenser - Variable |
| R10672A | Condenser - Variable, complete with dial and drive assembly |
| R10673 | Condenser - Electrolytic, block |
| R9426 | Condenser - Padding |
| R10197 | Condenser - Trimmer |
| R6380 | Condenser - .2 mfd. 200 volts |
| R6444 | Condenser - .1 mfd. 200 volts |
| R6761 | Condenser - .02 mfd. 600 volts |
| R7681 | Condenser - .003 mfd. 600 volts |

| Part No. | Description |
|---|---|
| R6110 | Resistor - 30 M ohms, 1/3 watt carbon |
| R7291 | Resistor - 15 M ohms, 1/2 watt carbon |
| R7226 | Resistor - 5 M ohms, 1/3 watt carbon |
| R7441 | Resistor - 800 ohms, 1/2 watt carbon |
| R10598 | Resistor - 18 ohms, 1/2 watt, flexible |
| R10505 | Ring - Glass clamping |
| R10445A | Shaft - Dial drive assembly |
| R8395 | Shield - Tube, base |
| R10440 | Shield - Tube, top |
| R10441 | Shield - Tube, cap |
| R10654 | Shield - Coil, base |
| R10653 | Shield - Coil, top |
| R8315 | Socket - 4 prong |
| R8253 | Socket - 5 prong |
| S10120 | Speaker - for model 1850 |
| S10573A | Speaker - for model 1851 |
| R10718 | Switch - Filament |
| R10467 | Switch - Wave |
| R10716A | Transformer - IF input |
| R10717 | Transformer - IF output |
| R4303 | Condenser - .0001 mfd. mica |
| R8621 | Condenser - .00005 mfd. mica |
| R10648 | Control - Tone |
| R10712 | Control - Volume |
| R10530A | Disk - Drive with bushing |
| R10503 | Escutcheon |
| R10982 | Folder - Short wave |
| R10504 | Glass - Escutcheon |
| R10635B | Indicator and mounting ring assembly |
| R10769 | Instruction leaflet |
| R10479 | Knob - Station Selector |
| R10705 | Knob |
| R11027 | Knob - With dot |
| R5346D | Lead - Antenna, green |
| R5345E | Lead - Ground, black |
| R10499B | Pointer |
| R8363 | Resistor - 5 megohm, 1/2 watt carbon |
| R5823 | Resistor - 1 megohm, 1/2 watt carbon |
| R7585 | Resistor - 1 megohm, 1/3 watt carbon |
| R6637 | Resistor - 50 M ohms, 1/3 watt carbon |

**MODEL 1854**
**Schematic**

# SEARS-ROEBUCK & CO.



**MODEL 1854**
**Alignment, Voltage**
**Socket Layout**

# SEARS-ROEBUCK & CO.

The type 31 Ballast tube maintains the filament voltage at its proper value (2 volts). This will be so whether a 2 volt air cell, a dry cell "A" block or a 6 volt storage battery is used. It is important that the receiver be turned off before removing any tubes. Otherwise the voltage across the remaining tubes will rise, with the possibility of damaging them.

Although the receiver will afford good reception after the "B" batteries have fallen to a lower value, for best results they should be replaced when the total voltage, under load, falls to 100 volts.

## THE 230 AVC CIRCUIT

A portion of the IF signal at the plate of the second IF tube is impressed through the .000025 mfd. condenser and the 400 M ohm resistor, upon the 230 AVC tube. This tube is used as a rectifier or diode, with plate connected to filament. During the positive half cycles of the signal voltage, diode current flows through the 400 M ohm resistor which is connected between grid and plate of the 230 AVC tube, creating a voltage drop across it. This voltage is effectively in series with the "C" battery, being connected to it through the 1 megohm resistor which is in the circuit between the 230 grid and the "C+" lead. Any increase in signal strength increases the current through the 230 AVC tube, increases the drop across the 400 M ohm resistor and therefore increases the total value of "C" bias. This increased "C" bias is impressed upon the control grids of the translator and IF tubes, decreasing their amplification. Since increases in signal strength are offset by decreases in tube amplification, the output of the second IF tube tends to remain at a constant value.

## ALIGNMENT PROCEDURE

**The IF Stages:**

1. Connect the output meter across the loud speaker terminals. The high scale (about 100 volts) of the meter should be used.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the grid of the second IF tube. Leave the grid clip attached to the cap.

4. Set the test oscillator to 175 kc and tune the IF output transformer. The locations of the tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the grid of the first IF tube and adjust the inter-stage tuning condenser. This condenser is the Isolantite base one mounted on the back plate of the chassis alongside of the Candohm resistor.

6. Change the test oscillator connection to the grid of the translator tube and tune the IF input transformer.

7. Repeat all of the adjustments to secure greater accuracy.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

**Broadcast (#1 Band) Alignment:**

1. Set the test oscillator to exactly 1600 kc.

2. Couple the output of the oscillator loosely to the antenna lead of the set, with the antenna connected.

3. Turn the dial pointer to exactly 1600 kc and adjust the oscillator trimmer for maximum output. The oscillator trimmer is the bakelite base condenser mounted on the back of the variable condenser end plate.

4. Set the test oscillator to 1500 kc and tune in its signal. Then adjust the translator and antenna trimmers for maximum output. The translator trimmer is the one on the middle section of the variable condenser. The antenna trimmer is the one on the variable condenser section nearest the dial.

5. Set the test oscillator to 600 kc. Tune in its signal and slowly rotate the variable condenser back and forth a degree or two, and at the same time adjust the padder until maximum output is obtained. The padder is the Isolantite base condenser mounted on the end plate of the variable condenser.

6. Since the adjustments are inter-acting to an extent, it is advisable to repeat the entire operation. Always use as low an output from the test oscillator as possible.

**Short Wave (#2 Band) Alignment:**

1. Set the test oscillator to 4000 kc and couple it loosely to the set's antenna lead, with the antenna connected.

2. Turn the wave band switch to the #2 position and tune in the oscillator signal.

3. If the calibration is out, shift turns (enamelled wire) on coil "E" until the proper calibration is obtained. The end plate may be removed from the chassis in order to gain access to the coils.

4. The turns of coils "A" and "B" may be shifted, if necessary, to obtain alignment and maximum output.

5. Check the calibration and alignment at 2000 kc. If they are not correct at this frequency, the 4000 kc adjustment should be repeated to obtain a compromise adjustment for the two frequencies.

6. Cement the coil turns in place.

**Short Wave (#3 Band) Alignment:**

1. Set the test oscillator to 15 megacycles.

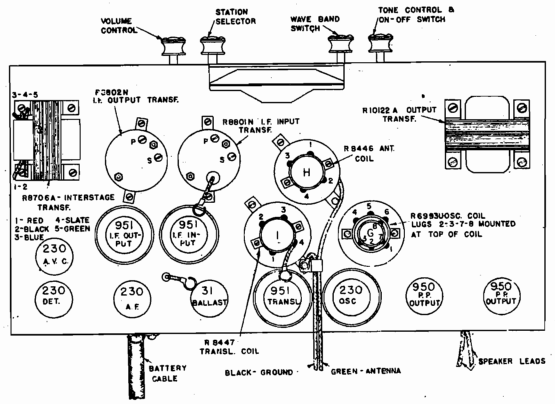
2. Couple its output loosely to the receiver's antenna lead, with the antenna connected. Turn the wave band switch to the #3 position and tune in the oscillator signal.

3. Obtain maximum output and proper calibration by shifting the leads of coils "C", "D" and "F".

4. Tune the test oscillator and the receiver to 6000 kc and shift turns on coils "C", "D" and "F" until maximum sensitivity and proper calibration are obtained.

5. Repeat operation #3 at 15 megacycles.

A loop of #14 wire with its ends soldered together to form a short circuited ring, fastened to a bakelite handle will prove useful for determining whether the end turns of the short wave coils need to be moved toward or away from the other turns. If sensitivity is increased when the loop of wire is slowly inserted inside of a short wave coil, it is an indication that the turns of the coil should be moved apart. If the sensitivity is decreased, it indicates either that the coil adjustment is correct, or that the turns should be moved closer together.




## TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

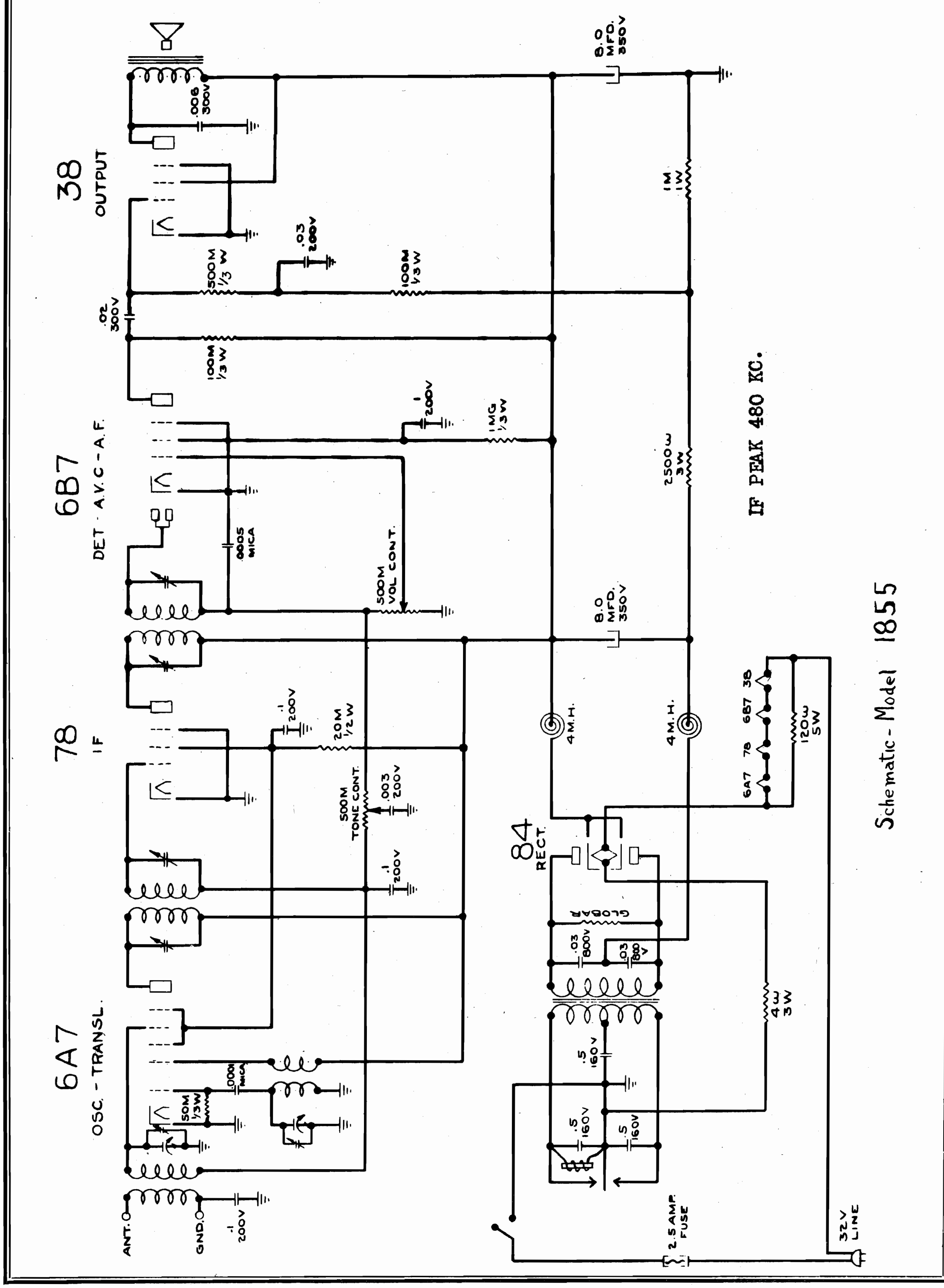
| TUBE | PLATE VOLTAGE | SCREEN VOLTAGE | CONTROL GRID VOLTAGE |
|---|---|---|---|
| 951 Translator - | 120 | 58.5 | -1.2 |
| 230 Oscillator - | 44 | | -2.35 |
| 951 1st IF - | 69 | 57 | - .3 |
| 951 2nd IF - | 120 | 57 | - .3 |
| 230 Detector - | Used as diode with no applied DC voltage. | | |
| 230 AVC - | Used as diode with no applied DC voltage. | | |
| 230 1st Audio - | 120 | | * |
| 950 Output - | 120 | 120 | -15 |

* - Extremely low readings due to high series resistance in circuit.

Actual Translator control grid voltage is -4.5 volts.
Actual IF control grid voltage is -1.5 volts.

**MODEL 1855**
**Schematic**

# SEARS-ROEBUCK & CO.



**MODEL 1855**
**Voltage, Alignment**
**Socket, Parts List**

# SEARS-ROEBUCK & CO.

## ALIGNMENT PROCEDURE

**The IF Stages:**

1. Connect the output meter across the loud speaker terminals. The high scale (about 100 volts) of the meter should be used.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the grid of the 78 IF tube. Leave the grid clip attached to the cap.

4. Set the test oscillator to 480 kc. and tune the IF output transformer. The locations of the tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the grid of the translator tube and tune the IF input transformer.

6. Repeat the adjustments to secure greater accuracy.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

**RF Alignment:**

1. Set the test oscillator to exactly 1750 kc. Couple the output of the oscillator to the antenna lead of the set, with the antenna connected.

2. Turn the dial to exactly 1750 kc. and adjust the oscillator trimmer for maximum output. The oscillator trimmer is the one on the variable condenser section, furthest from the dial.

3. Set the test oscillator to 1500 kc and tune in its signal. Adjust the antenna trimmer for maximum output.

## TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube. Supply voltage 32 volts.

| TUBES | PLATE | SCREEN | OSC. PLATE | OSC. GRID | CONTROL GRID |
|---|---|---|---|---|---|
| 6A7-Osc-Transl - | 165 | 85 | 165 | -3.6 | -.4 |
| 78-IF - | 165 | 85 | | | -.4 |
| 6B7-AVC-Det-AF - | 75 | 20 | | | -.2 |
| 38-Output - | 165 | 165 | | | -.6* |

* - Extremely low readings due to high series resistance in circuit.

The cover of the power supply unit is fitted with contact fingers to insure good contact with the rest of the power supply case. It is important that this cover makes tight electrical contact with the case to prevent noisy operation due to electrical disturbances from the vibrator.

The resistor marked "Globar", in the schematic, is a special resistor whose value varies with the voltage. When the receiver is first turned on, the output voltage tends to become very high until the tubes heat sufficiently to draw their normal load. Under these conditions, the Globar resistance drops to a comparatively low value, loading the transformer sufficiently to prevent damage. As the tubes become heated, tending further to lower the voltage, the Globar resistance increases greatly so that it no longer constitutes a load on the power supply.

Unlike the earlier Model 1733, the polarity of the power cord plug is not of importance.

The antenna coil is not grounded to the chassis, so that the receiver depends entirely upon the installation ground for its ground connection. Accordingly, the best ground possible should be installed.

The polarity of the speaker must be correct. The blue lead connects to the speaker terminal marked "P". The black lead connects to the "+" terminal.

## THE 6B7 - AVC-Detector-AF

The 480 kc signal from the IF stage is impressed between the cathode and the diode plates of the 6B7. in series with the 500 M ohms of the volume control. Diode current flows, creating a voltage drop across the control with the grounded end positive with respect to the other end. Since the control grid returns of the 6A7 and 78 tubes are connected to the ungrounded end of the volume control, the negative bias across it is impressed upon the control grids of these tubes. Any increase in signal strength increases the diode current and the drop across the volume control, increases the negative control grid bias and so reduces tube amplification. Since increases in signal strength tend to be offset by decreases in tube amplification, the input to the detector remains substantially at a constant value.

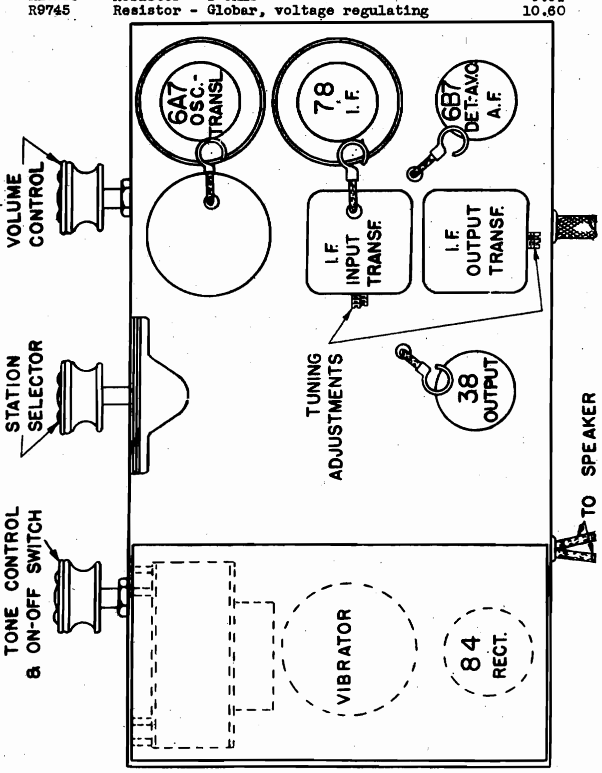
The audio component across the volume control is picked off by the movable arm and fed to the control grid of the pentode portion of the tube. It is there amplified and then coupled to the 38.

## REPLACEMENT PARTS AND PRICE LIST

FOR

SILVERTONE MODEL 1855

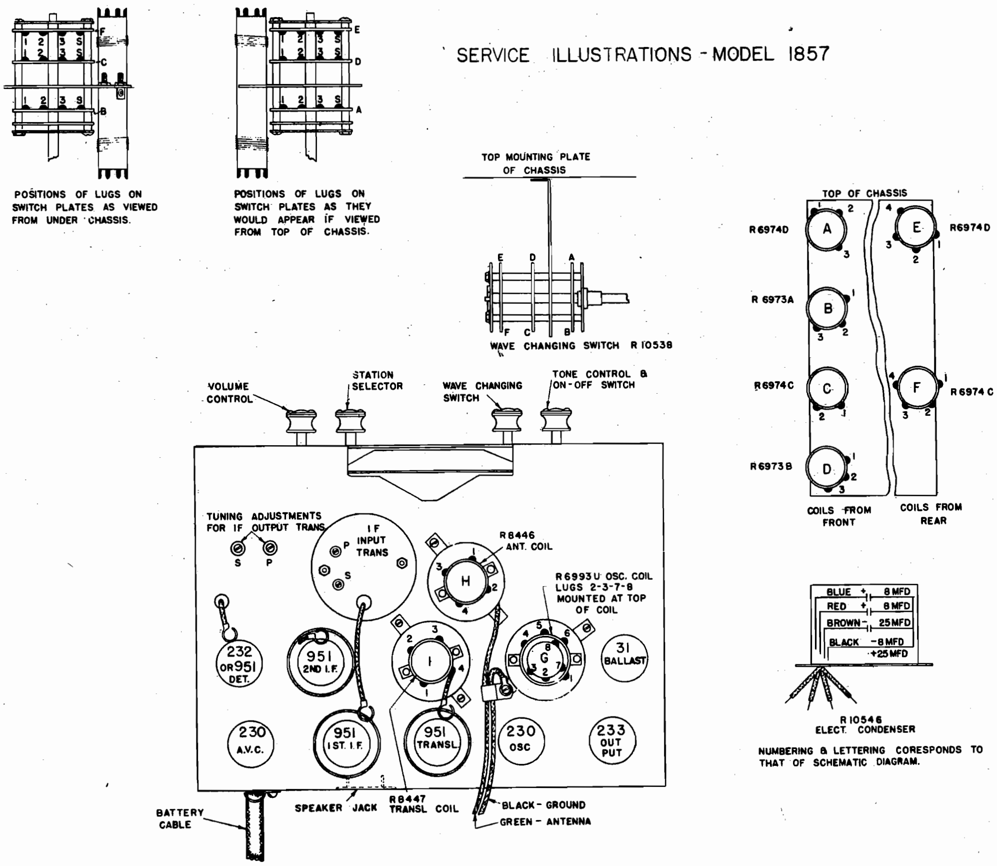
| Part No. | Description | Price per 100 |
|---|---|---|
| R8297A | Board - Terminal, double | 1.34 |
| R8308A | Board - Terminal, triple | 1.78 |
| R7901A | Board - Fuse | 5.85 |
| R10028A | Transformer - IF input | 40.44 |
| R10029 | Transformer - IF output | 39.80 |
| R10892A | Transformer - Power | 100.56 |
| R10125 | Coil - Oscillator | 9.33 |
| R9757 | Coil - Choke | 5.74 |
| R8412 | Condenser - Variable | 73.55 |
| R8488 | Condenser - Electrolytic, 8 mfd. 350 volts | 28.00 |
| R9032 | Condenser - .5 mfd. 160 volts | 8.04 |
| R6444 | Condenser - .1 mfd. 200 volts | 5.74 |
| R10887 | Condenser - .03 mfd. 800 volts | 5.58 |
| R6630 | Condenser - .03 mfd. 200 volts | 4.49 |
| R7680 | Condenser - .02 mfd. 300 volts | 4.46 |
| R10893 | Condenser - .006 mfd. 200 volts | 3.38 |
| R10495 | Condenser - .003 mfd. 200 volts | 3.25 |
| R6760 | Condenser - .0005 mfd. mica | 4.56 |
| R4303 | Condenser - .0001 mfd. mica | 7.97 |
| R6571 | Control - Tone | 34.81 |
| R6570 | Control - Volume, 500 M ohms | 23.60 |
| R6989 | Cord - Extension | 15.75 |
| R10012A | Dial and indicator | 12.87 |
| R8406 | Escutcheon | 7.69 |
| R10547 | Fuse - 2½ amp. | 3.04 |
| R10012 | Indicator | 4.40 |
| R10898 | Instruction leaflet | 1.55 |
| R10705 | Knob - Small | 4.65 |
| R10704 | Knob - Small with dot | 4.90 |
| R10479 | Knob - Medium | 4.75 |
| R5346D | Lead - Antenna | 3.57 |
| R5345A | Lead - Ground | 6.78 |
| R8700A | Lead - Speaker, black | 3.36 |
| R8809A | Lead - Speaker, blue | 3.36 |
| R7585 | Resistor - 1 megohm, 1/3 watt carbon | 5.91 |
| R7228 | Resistor - 500 M ohms, 1/3 watt carbon | 5.25 |
| R7586 | Resistor - 100 M ohms, 1/3 watt carbon | 5.91 |
| R6637 | Resistor - 50 M ohms, 1/3 watt carbon | 5.25 |
| R5821 | Resistor - 20 M ohms, 1/2 watt carbon | 8.54 |
| R10896 | Resistor - 2500 ohms, 3 watt | 8.65 |
| R9254 | Resistor - 1000 ohms, flexible | 5.25 |
| R10895 | Resistor - 120 ohms, 5 watt | 8.65 |
| R10295 | Resistor - 4 ohms | 9.04 |
| R9745 | Resistor - Globar, voltage regulating | 10.80 |

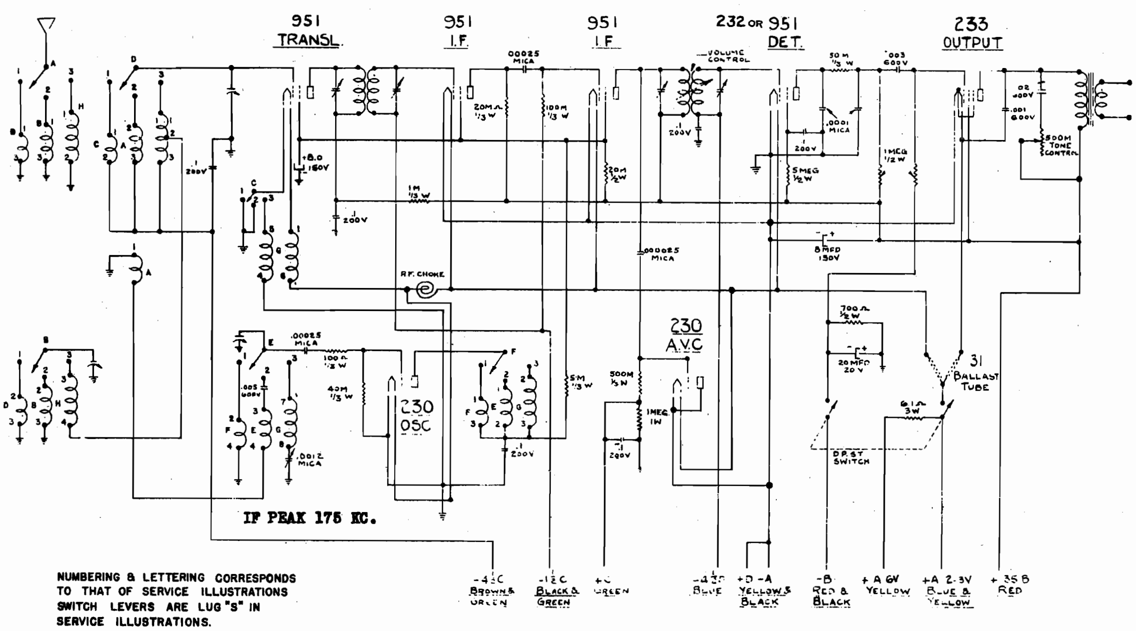


MODEL 1857
Schematic
Socket Layout

# SEARS-ROEBUCK & CO.

SERVICE ILLUSTRATIONS - MODEL 1857




SCHEMATIC - MODEL 1857

**MODEL 1857**
**Alignment, Voltage**
**Parts List**

# SEARS-ROEBUCK & CO.

## ALIGNMENT PROCEDURE

**The IF Stages:**

Connect the output meter across the loud speaker terminals. The high scale (about 100 volts) of the meter should be used.

1. Connect one lead of the test oscillator to the chassis.

2. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser to the grid of the 1st IF tube. Leave the grid clip attached to the cap.

3. Set the oscillator to 175 kc and tune the 2nd IF output transformer. The locations of the tuning adjustments are shown in the illustration.

4. Connect the oscillator, through the .1 mfd. condenser, to the grid of the translator tube and tune the IF input transformer.

5. Repeat the adjustments for the IF output transformer and then for the IF input transformer.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

**Broadcast (#1 Band) Alignment:**

1. Set the test oscillator to exactly 1600 kc.

2. Couple the output of the oscillator loosely to the antenna lead of the set, with the antenna connected.

3. Turn the dial pointer to exactly 1600 kc and adjust the oscillator trimmer for maximum output. The oscillator trimmer is the bakelite base condenser mounted on the back of the variable condenser end plate.

4. Set the test oscillator to 1500 kc and tune in its signal. Then adjust the translator and antenna trimmers for maximum output. The translator trimmer is the one on the middle section of the variable condenser. The antenna trimmer is the one on the variable condenser section nearest the dial.

5. Set the test oscillator to 600 kc. Tune in its signal and slowly rotate the variable condenser back and forth a degree or two, and at the same time adjust the padder until maximum output is obtained. The padder is the Isolantite base condenser mounted on the end plate of the variable condenser.

6. Since the adjustments are inter-acting to an extent, it is advisable to repeat the entire operation. Always use as low an output from the test oscillator as possible.

**Short Wave (#2 Band) Alignment:**

1. Set the test oscillator to 4000 kc and couple it loosely to the set's antenna lead, with the antenna connected.

2. Turn the wave band switch to the #2 position and tune in the oscillator signal.

3. If the calibration is out, shift turns (enamelled wire) on coil "E" until the proper calibration is obtained. The end plate may be removed from the chassis in order to gain access to the coils.

4. The turns of coils "A" and "B" may be shifted, if necessary, to obtain alignment and maximum output.

5. Repeat operations #3 and #4 at 2000 kc. If the alignment and calibration are not correct at this frequency, the 4000 kc adjustment should be repeated to obtain a compromise adjustment.

6. Cement the coil turns in place.

**Short Wave (#3 Band) Alignment:**

1. Set the test oscillator to 15 megacycles.

2. Couple its output loosely to the receiver's antenna lead, with the antenna connected. Turn the wave band switch to the #3 position and tune in the oscillator signal.

3. Obtain maximum output and proper calibration by shifting the leads of coils "C", "D" and "F".

4. Tune the test oscillator and the receiver to 6000 kc and shift turns on coils "C", "D" and "F" until maximum sensitivity and proper calibration are obtained.

5. Repeat operation #3 at 15 megacycles.

A loop of #14 wire with its ends soldered together to form a short circuited ring, fastened to a bakelite handle will prove useful for determining whether the end turns of the short wave coils need to be moved toward or away from the other turns. If sensitivity is increased when the loop of wire is slowly inserted inside of a short wave coil, it is an indication that the turns of the coil should be moved apart. If the sensitivity is decreased, it indicates either that the coil adjustment is correct, or that the turns should be moved closer together.

## TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

| TUBE | | PLATE VOLTAGE | SCREEN VOLTAGE | CONTROL GRID VOLTAGE |
|---|---|---|---|---|
| 951 Translator | - | 122 | 55 | -1.2 |
| 230 Oscillator | - | 45 | | -2.75 |
| 951 1st. IF | - | 115 | 55 | - .3 |
| 951 2nd. IF | - | 122 | 55 | - .2 |
| 951 Detector | - | * | * | -4.5 |
| 230 AVC | - | No applied DC voltage | | |
| 233 Output | - | 120 | 122 | * |

* - Extremely low readings due to high series resistance in circuit

Actual 233 control grid voltage is approximately 13 volts.
Actual IF control grid voltage is -1.5 volts.
Actual Translator control grid voltage is -4.5 volts.

## REPLACEMENT PARTS AND PRICE LIST

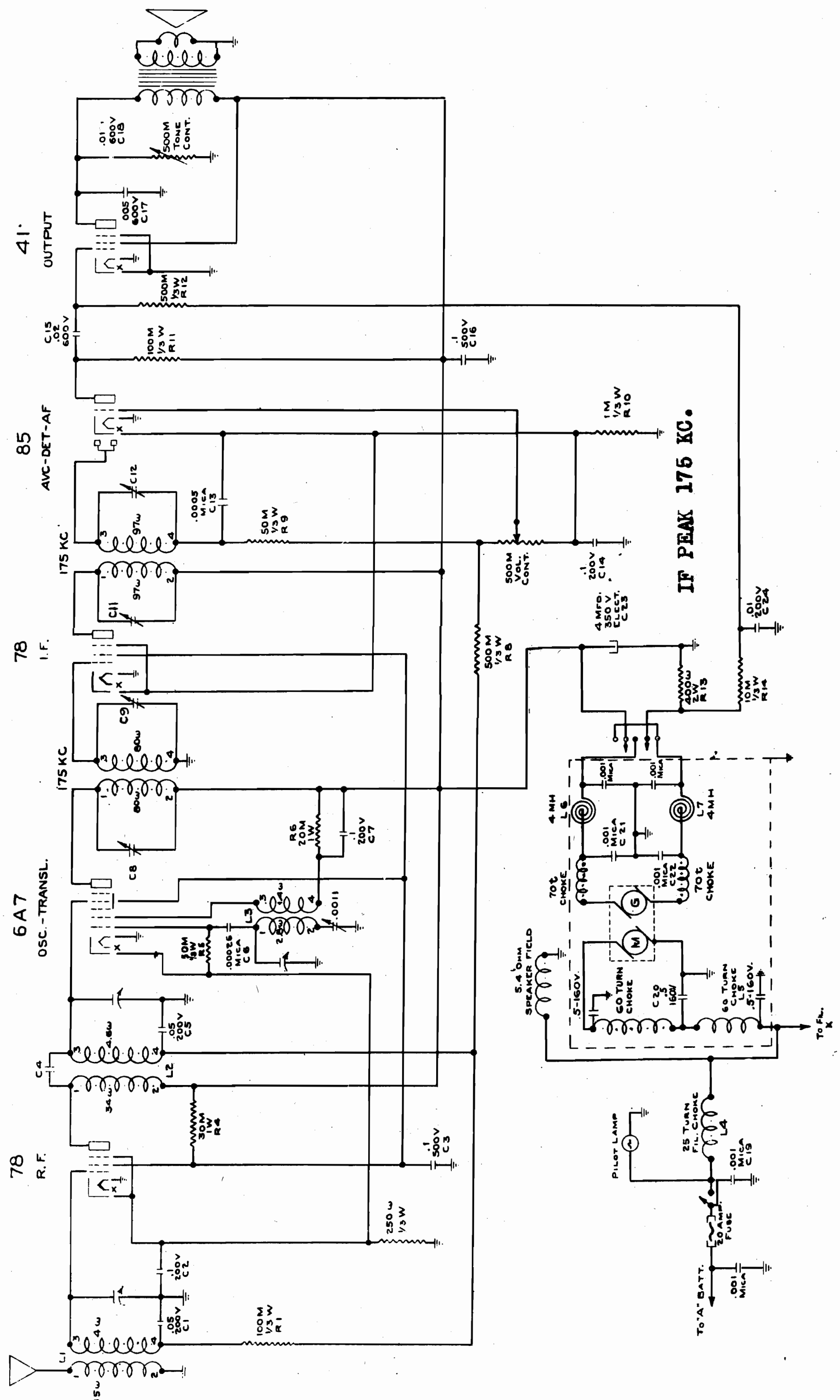
## FOR

## SILVERTONE MODEL 1857

| Part No. | Description | Price per 100 |
|---|---|---|
| R8297A | Board - Terminal, double | 1.34 |
| R8308A | Board - Terminal, triple | 1.78 |
| R9446A | Board - Terminal, 4 terminals | 2.15 |
| R7243 | Bushing - Fibre, wave switch and volume control | 1.44 |
| R10562 | Bushing - Rubber, chassis mounting | 1.71 |
| R7067 | Cable - Battery | 21.69 |
| R6415 | Transformer - IF input | 15.75 |
| R6415S | Transformer - IF input, complete less shield | 51.83 |
| R6401F | Transformer - IF output, (Volume control) | 56.34 |
| R10697A | Transformer - Speaker | 46.42 |
| R4794 | Washer - Insulating, tone control | .76 |
| R8088 | Washer - Insulating, tone control | .19 |
| R8446 | Coil - Antenna | 19.25 |
| R8447 | Coil - Translator | 15.44 |
| R6993U | Coil - Oscillator | 45.64 |
| R10528 | Coil - IF output transformer | 10.94 |
| R6973A | Coil - Antenna, intermediate range | 16.53 |
| R6973B | Coil - Antenna, high range | 16.23 |
| R6974D | Coil - Oscillator-translator, intermediate range | 29.98 |
| R6974C | Coil - Oscillator-translator, high range | 23.25 |
| R6667 | Collar - Stop, volume control | 2.13 |
| R11014 | Collar - Stop, gang switch | 1.71 |
| R10545 | Condenser - Variable | 140.25 |
| R10545A | Condenser - Variable, complete with dial and drive assembly | 233.67 |
| R7137 | Condenser - .0012 mfd. padding | 16.25 |
| R9513 | Condenser - Trimmer, bakelite base, mounted on variable condenser end plate | 6.56 |
| R10546 | Condenser - Dry electrolytic | 71.38 |
| R6565 | Condenser - IF input, tuning | 17.20 |
| R6139 | Condenser - IF output, tuning | 21.81 |
| R6444 | Condenser - .1 mfd. 200 volts | 5.74 |
| R6761 | Condenser - .02 mfd. 600 volts | 5.06 |
| R6954 | Condenser - .005 mfd. 600 volts | 5.38 |
| R7681 | Condenser - .003 mfd. 600 volts | 4.63 |
| R6952 | Condenser - .001 mfd. 600 volts | 4.38 |
| R4592 | Condenser - .00025 mica | 8.28 |
| R4303 | Condenser - .0001 mica | 7.97 |
| R8711 | Condenser - .000025 mica | 5.60 |
| R10529 | Control - Tone, 500 M ohms | 37.25 |
| R6401F | Control - Volume, (IF output transformer) | 56.34 |
| R7076 | Resistor - Candohm | 7.75 |
| R8363 | Resistor - 5 megohm, 1/2 watt carbon | 5.25 |
| R6690 | Resistor - 1 megohm, 1 watt carbon | 5.90 |
| R5823 | Resistor - 1 megohm, 1/2 watt carbon | 8.54 |
| R7228 | Resistor - 500 M ohms, 1/3 watt carbon | 5.25 |
| R7586 | Resistor - 100 M ohms, 1/3 watt carbon | 5.91 |
| R6637 | Resistor - 50 M ohms, 1/3 watt carbon | 5.25 |
| R6115 | Resistor - 40 M ohms, 1/3 watt carbon | 6.57 |
| R6640 | Resistor - 20 M ohms, 1/3 watt carbon | 5.25 |
| R5821 | Resistor - 20 M ohms, 1/2 watt carbon | 8.54 |
| R7226 | Resistor - 5 M ohms, 1/3 watt carbon | 5.25 |
| R6636 | Resistor - 1 M ohms, 1/3 watt carbon | 5.25 |
| R8364 | Resistor - 700 ohms, 1/2 watt carbon | 5.25 |
| R8922 | Resistor - 100 ohms, 1/3 watt carbon | 5.25 |
| R10505 | Ring - Glass clamping | .60 |
| R10623 | Ring - Felt | .94 |
| R5085 | Screw - Escutcheon | .54 |
| R10534A | Shaft - Volume control | 2.55 |
| R10535A | Shaft - Dial drive assembly | 6.80 |
| R6018A | Shield - Coil | 6.05 |
| R6573 | Shield - IF transformer | 4.24 |
| R10442 | Shield - Tube, base | .89 |
| R10440 | Shield - Tube, top | 2.65 |
| R10441 | Shield - Tube, cap | 1.50 |
| R11016 | Spacer - Wood | .50 |
| R8366 | Socket - 4 prong | 2.19 |
| R8367 | Socket - 5 prong | 2.25 |
| S6520B | Speaker | 354.89 |
| R10538 | Switch - Wave band selector | 52.50 |
| R10538B | Switch - Wave band selector, complete with coil assembly | 237.78 |

MODEL 1858
Schematic

SEARS-ROEBUCK & CO.




SCHEMATIC - MODEL 1858

**MODEL 1858**
**Alignment, Voltage**
**Socket, Parts List**

# SEARS-ROEBUCK & CO.

SILVERTONE - - MODEL 1858

* * *

The Silvertone Model 1858 is a five tube automobile radio receiver almost identical with the Model 1730 described in Service Manual Supplement #25. As an examination of the schematic will show, practically the only circuit difference is in the filtering of the Genemotor. The chief mechanical difference is that the pilot light lead of the Model 1858 is contained in the same covering as the drive cables. The mechanical and general information contained in the Model 1730 manual will apply equally as well to the Model 1858.

The tubes and their functions are:

78 - RF
6A7 - Oscillator-Translator
78 - IF
85 - AVC-Detector-AF
41 - Output

ALIGNMENT PROCEDURE

**The IF Stages:**

1. Connect the output meter (low voltage scale) across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the control grid cap of the 78 IF tube, leaving the grid clip attached to the cap.

4. Set the test oscillator to 175 kc and tune the IF output transformer. This transformer is mounted under the chassis. The location of its tuning adjustments is shown in the Service Illustration.

5. Change the test oscillator connection to the grid of the translator tube and tune the IF input transformer.

6. Repeat the adjustments to secure greater accuracy. Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

**RF Alignment:**

1. Connect the test oscillator to the antenna lead through a .00025 mfd. condenser.
2. Open the variable condenser plates to the point where the rotor plates just mesh with the stator plates.

3. Set the test oscillator to exactly 1500 kc and adjust the oscillator trimmer for maximum output.

4. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and at the same time adjust the padder until maximum output is obtained.

5. Repeat operations 1 to 4.

6. Set the test oscillator to 1400 kc and tune in its signal.

7. Adjust the antenna and translator trimmers for maximum output.

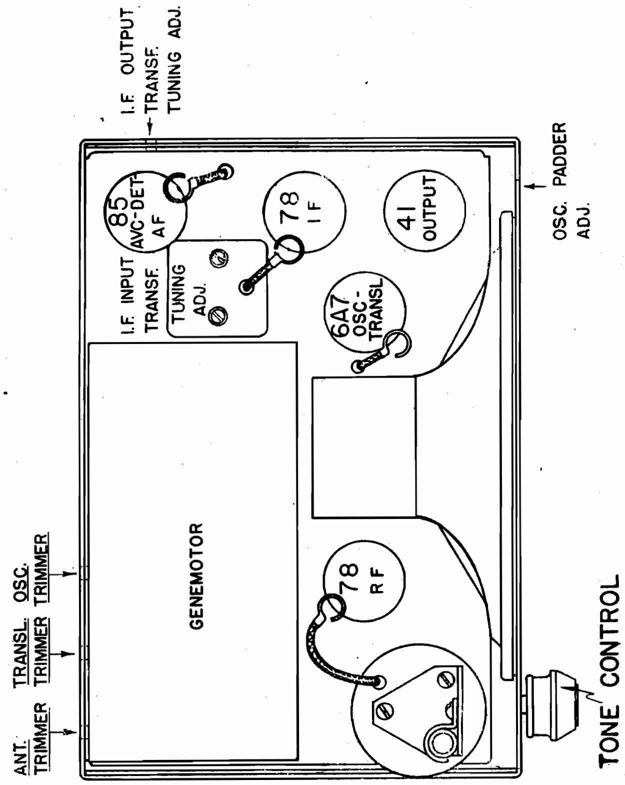
TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

| TUBE | PLATE | SCREEN | OSC. SECTION GRID | OSC. SECTION PLATE | CONTROL GRID | CATHODE |
|---|---|---|---|---|---|---|
| 78 - RF | - 210 | 77 | | | .1 | 3.7 |
| 6A7- Osc-Transl | - 210 | 77 | -.2 | 155 | .1 | 3.7 |
| 78 - IF | - 210 | 77 | | | 0 | 4.8 |
| 85 - AVC-Det-AF | - 38 | | | | .1 | 4.8 |
| 41 - Output | - 200 | 210 | | | -.5* | |

* - Extremely low reading due to high series resistance in circuit.

| Part No. | Description | Price per 100 |
|---|---|---|
| R7587 | Resistor - 10 M ohms, 1/3 watt carbon | 5.25 |
| R6636 | Resistor - 1 M ohms, 1/3 watt carbon | 5.25 |
| R10268 | Resistor - 250 ohms, 1/3 watt carbon | 5.25 |
| R8066 | Resistor - 400 ohms, 2 watt, flexible | 4.60 |
| R10056 | Screw - Polarity changer | .72 |
| R10084A | Shield - Antenna coil | 6.89 |
| R9591 | Shield - Translator coil | 7.70 |
| R9360 | Shield - Tube | 2.63 |
| R8092 | Socket - 6 prong | 2.46 |
| R8072 | Socket - 7 prong | 2.78 |
| S9967A | Speaker - Complete | 233.96 |
| S9988A | Speaker cone and voice coil assembly | 57.48 |
| S9994 | Speaker clamping ring | 1.36 |
| S10152 | Speaker field coil | 56.89 |
| S9968 | Speaker eyelets | .09 |
| S9959 | Speaker felt ring | .93 |
| S10144A | Speaker transformer | 43.17 |
| R9960 | Sticker - Polarity changer | .99 |
| R1-10032 | Suppressor - Spark plug | 9.85 |
| R2-10032 | Suppressor - Distributor | 9.85 |
| R9729 | Stud - Set mounting | 1.64 |
| R9786 | Template - Set mounting | .99 |
| R10435A | Transformer - IF input | 46.01 |
| R10065A | Transformer - IF output | 52.53 |




REPLACEMENT PARTS AND PRICE LIST

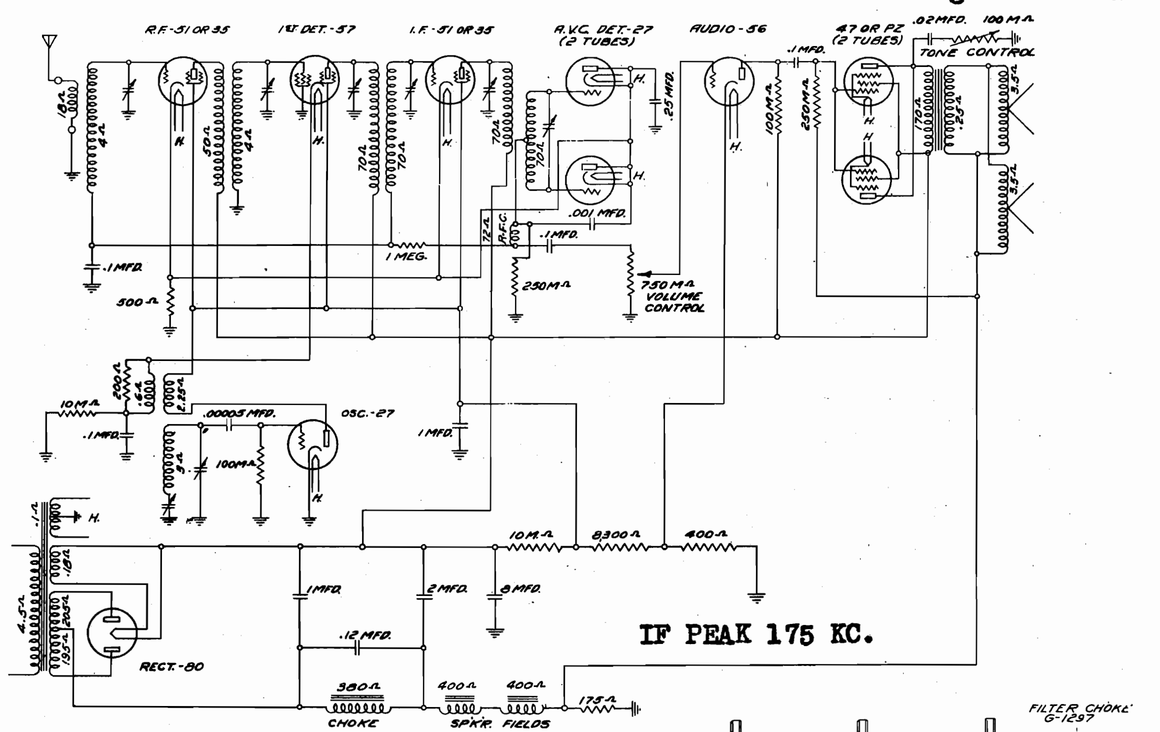
FOR

SILVERTONE - MODEL 1858

| Part No. | Description | Price per 100 |
|---|---|---|
| R8297A | Board - Terminal, double | 1.34 |
| R10134A | Board - Terminal, 4 terminals | 1.70 |
| R9753A | Board - Terminal, 6 terminals | 2.70 |
| R9754A | Board - Polarity changing | 4.73 |
| R11018 | Book - Instruction | 9.06 |
| R9588 | Bushing - Rubber, Genemotor mounting | 1.28 |
| R10862A | Choke - Primary of Genemotor | 8.73 |
| R9044A | Choke - Filament circuit | 8.93 |
| R9757 | Choke - Pancake type, Genemotor secondary | 5.74 |
| R2179A | Choke - RF, 70 turn, Genemotor secondary | 9.81 |
| R11043 | Clip - Grid | .19 |
| R9741 | Clip - "A" lead | 2.04 |
| R10314 | Coil - Antenna | 17.30 |
| R10348 | Coil - Oscillator | 9.33 |
| R10344 | Coil - Translator | 24.74 |
| R10211 | Condenser - Variable | 118.55 |
| R10086 | Condenser - Electrolytic | 32.55 |
| R9426 | Condenser - Padding | 13.75 |
| R8030 | Condenser - 1 mfd. generator | 19.90 |
| R10025 | Condenser - .5 mfd. ammeter | 16.74 |
| R9032 | Condenser - .5 mfd. 160 volts | 8.04 |
| R10164 | Condenser - .1 mfd. 500 volts | 5.05 |
| R8286 | Condenser - .1 mfd. 200 volts | 4.80 |
| R8920 | Condenser - .05 mfd. 200 volts | 4.50 |
| R6761 | Condenser - .02 mfd. 600 volts | 5.06 |
| R7070 | Condenser - .01 mfd. 600 volts | 4.50 |
| R8921 | Condenser - .01 mfd. 200 volts | 3.38 |
| R10322 | Condenser - .005 mfd. 600 volts | 3.48 |
| R6759 | Condenser - .001 mfd. mica | 5.68 |
| R6760 | Condenser - .0005 mfd. mica | 4.56 |
| R4592 | Condenser - .00025 mfd. mica | 8.28 |
| R10091 | Control - Remote, with 32" cables | 200.33 |
| R10680 | Control - Remote, with 22" cables | 195.05 |
| R9711 | Control - Tone, 500 M ohms | 19.69 |
| R10172 | Control - Volume, 500 M ohms | 26.93 |
| R9717 | Connector - "A" lead and fuse container | 1.74 |
| R10423A | Cover - Power supply case | 19.94 |
| R9587 | Genemotor | 476.76 |
| R9744 | Grommet - "A" lead | 1.15 |
| R7692 | Knob | 3.20 |
| R8870A | Lead - Antenna | 13.85 |
| R9578B | Lead - "A", ammeter end | 12.72 |
| R9578A | Lead - "A", chassis end | 25.07 |
| R9719 | Nut - Set mounting | .49 |
| R8219 | Nut - Acorn | 1.45 |
| R7228 | Resistor - 500 M ohms, 1/3 watt carbon | 5.25 |
| R7586 | Resistor - 100 M ohms, 1/3 watt carbon | 5.91 |
| R6637 | Resistor - 50 M ohms, 1/3 watt carbon | 5.25 |
| R6689 | Resistor - 30 M ohms, 1 watt carbon | 6.58 |
| R5095 | Resistor - 20 M ohms, 1 watt carbon | 6.58 |
| R9739 | Washer - Lock, set mounting | .16 |
| R9740 | Washer - Flat, set mounting | 1.52 |

# SEARS-ROEBUCK & CO.

**MODEL 7043, 7044**
**Schematic, Socket**
**Alignment Data**




**IF PEAK 175 KC.**

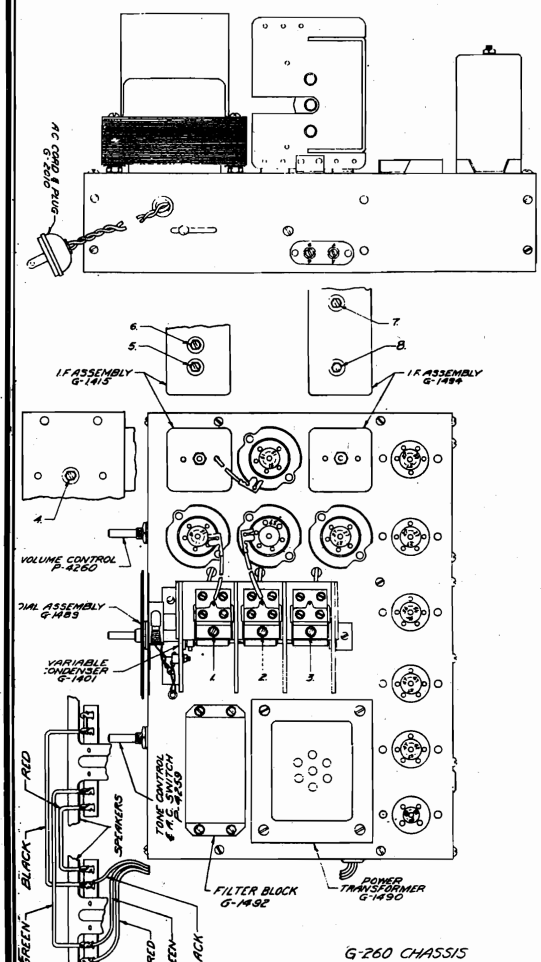



**Fig. 1. Bottom View**

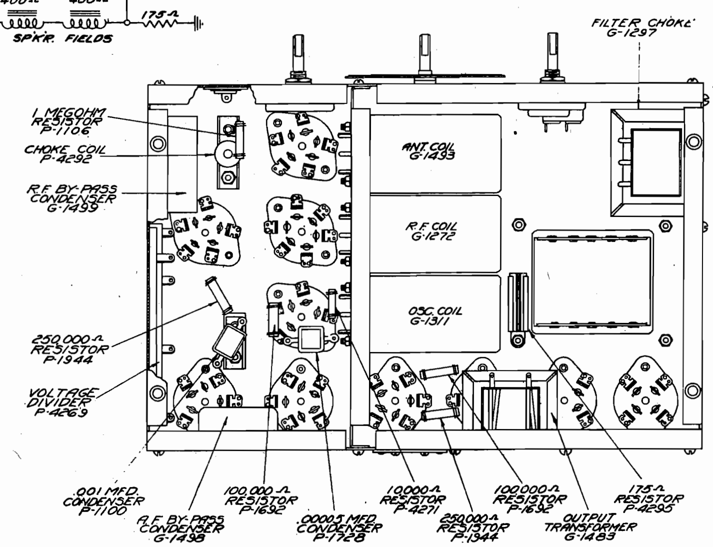



**Fig. 3. Top View**

First, let us explain the location of the various trimmers. Diagram of the top view, shows each trimmer numbered. You should be acquainted intimately with each adjustment. A Customer would not have to change their settings very much to ruin the sensitivity of the receiver. Further, if a readjustment is going to be necessary, it is imperative to know which circuit is being adjusted when a trimmer is being turned. No. 1 is the antenna trimmer, No. 2 first detector trimmer, No. 3 oscillator gang trimmer, No. 4 oscillator padding trimmer, No. 5 second detector grid trimmer, No. 6 second detector plate trimmer, No. 7 intermediate frequency grid trimmer, No. 8 intermediate frequency plate trimmer.

To readjust the trimmers on these superheterodyne receivers it will be necessary that a good design of 175 k.c. oscillator be employed and that a dependable broadcast test oscillator be on hand so that stages handling intermediate frequency and those handling radio frequency can be thoroughly checked. It is advisable to use a bakelite screw driver when making any of these adjustments. First, connect the 175 k.c. oscillator output leads from the con-

**MODEL 7043,7044**
**Voltage,Parts List**
**Resistance Test**

# SEARS-ROEBUCK & CO.

trol grid cap of the first detector tube, to ground. Do not remove any of the tubes from the sockets and it is not necessary to disconnect the grid cap clip from the first detector tube. Reset trimmers No. 5, No. 6, No. 7 and No. 8 for maximum output. While this test oscillator is working into the intermediate frequency stages, no adjustment of the tuning condenser on the receiver will have any effect inasmuch as the intermediate frequency stage is fixed tuned.

If your test oscillator is properly designed, it will supply exactly 175 k.c. and when trimmers No. 5, No. 6, No. 7 and No. 8 are set and tuned for maximum output, they will be correctly adjusted.

Next, disconnect the 175 k.c. test oscillator and connect to the antenna binding post of the receiver, the output lead from your broadcast test oscillator or tune in a broadcast signal around 1400 k.c., then reset trimmer No. 2 and No. 1, respectively, for maximum output. This adjustment will track the first detector and r.f. stages.

To check the calibration of the receiver, whether it be high or low, trimmer No. 3 (oscillator) should be reset until a station of known high frequency is brought in at the correct dial marking with peak volume. If your broadcast test oscillator is accurately calibrated, it might be used in place of the broadcasting station signal. In this adjustment, a broadcast station or test oscillator signal, at about 1400 k.c., should be chosen, the setting of the trimmer at 1400 k.c. is more critical than it would be at 600 k.c.

The next adjustment is important and not easily explained in writing so pay close attention to the following instructions. We will now balance the oscillator to the r.f. and first dector stages.

Tune the external broadcast test oscillator and the receiver both to 600 k.c. then slowly increase or decrease the capacity of No. 4 (oscillator padding trimmer) at the same time and continuously tuning back and forth across the signal with the receiver tuning condenser gang. The output meter needle will now be swinging up and down in step with the variation in tuning. Watch the peak of this swinging closely and readjust No. 4 trimmer until the swinging needle reaches its highest peak.

Retune the receiver and broadcast test oscillator to 1400 k.c. and re-check trimmer No. 3 to make sure that the adjustment of No. 4 has not thrown the receiver out of calibration. If it has, then readjust No. 3 until the calibration is correct, as previously explained, and check on trimmers No. 2 and No. 1, to make sure that the adjustment of No. 4 has not reduced the sensitivity.

## CIRCUIT RESISTANCE ANALYSIS

Model 260 Socket to ground

| Stage | Grid | Cath-ode | Heater | Plate | Screen G | Suppr. G | Space G |
|---|---|---|---|---|---|---|---|
| R. F. | Infinity | 500 | .1 | 18,400 | 8,700 | ... | ...... |
| 1st.Det. | 4.0 | 10,000 | .1 | 18,800 | 8,700 | .08 | ...... |
| Oscillator | 100,000 | .08 | .1 | 8,700 | ..... | ... | ...... |
| I. F. | Infinity | 510 | .1 | 18,600 | ..... | ... | ...... |
| A.V.C. Det. | 230,000 | 510 | .1 | 510 | ..... | ... | ...... |
| A.V.C. Det. | 230,000 | 510 | .1 | 510 | ..... | ... | ...... |
| Audio | 750,000 | 422 | .1 | 110,000 | ..... | ... | ...... |
| Output | 275,000 | ...... | .1 | 19,000 | ..... | ... | 18,800 |
| Output | 275,000 | ...... | .1 | 19,000 | ..... | ... | 18,800 |
| Rectifier | ....... | ...... | 18,800 | 1,580 | ..... | ... | ...... |

Note: Readings of one megohm and over are given as "infinity". The first three significant figures, only are interpreted from the ohm meter in each reading; the individual resistance in the circuit can be readily checked upon removal of chassis.

| | |
|---|---|
| P-1038 | Dial light . . . . . . . . . . . |
| P-1106 | 1,000,000 resistor . . . . . . . |
| P-1118 | Mounting washers . . . . . . . . |
| P-1253 | Fixed condenser (Green dot). . . |
| P-1459 | Tube shield base . . . . . . . . |
| P-1472 | Tube shield. . . . . . . . . . . |
| P-1581 | Mounting screws. . . . . . . . . |
| P-1595 | Tube sockets (type 80) . . . . . |
| P-1597 | Tube sockets (type 27) . . . . . |
| P-1682 | Tube sockets (type 51) . . . . . |
| P-1683 | Tube sockets (type 47) . . . . . |
| P-1692 | 100,000 ohm resistor . . . . . . |
| P-1728 | Fixed condenser (White dot). . . |
| P-1944 | 250,000 ohm resistor . . . . . . |
| P-4037 | Knobs (Large). . . . . . . . . . |
| P-4047 | Knobs (Small). . . . . . . . . . |
| P-4229 | Antenna ground post. . . . . . . |
| P-4246 | Spkr. diaphragm. . . . . . . . . |
| P-4256 | Escutcheon plate . . . . . . . . |
| P-4259 | Tone control and switch. . . . . |
| P-4260 | Volume control . . . . . . . . . |
| P-4262 | Tube sockets (type 56) . . . . . |
| P-4263 | Tube sockets (type 57) . . . . . |
| P-4269 | Voltage dividing resistor. . . . |
| P-4271 | 10,000 ohm resistor. . . . . . . |
| P-4292 | R. F. choke. . . . . . . . . . . |
| P-4295 | Pentode bias resistor. . . . . . |
| G-1269 | Ant. Osc. and R. F. coil shields |
| G-1272 | R. F. coil (less shield) . . . . |
| G-1311 | Osc. Coil (less shield). . . . . |
| G-1415 | 1st I. F. transformer. . . . . . |
| G-1429 | Filter choke . . . . . . . . . . |
| G-1483 | Output transformer . . . . . . . |
| G-1484 | Speaker voice coil . . . . . . . |
| G-1488 | Osc. trimmer condenser . . . . . |
| G-1489 | Dial and scale assembly. . . . . |
| G-1490 | Power trans.,110 V. 60 Cy. . . . |
| G-1490A | Power trans.,110 V. 25 Cy. . . . |
| G-1490B | Power trans.,220 V. 60 Cy. . . . |
| G-1492 | Filter pack,110 V. 60 Cy . . . . |
| G-1492A | Filter pack,110 V. 25 Cy . . . . |
| G-1493 | Ant. coil (less shield). . . . . |
| G-1494 | 2nd I. F. transformer. . . . . . |
| G-1498 | Bypass condenser (AF). . . . . . |
| G-1499 | Bypass condenser (RF). . . . . . |
| G-1501 | Speaker complete . . . . . . . . |

## VOLTAGE ANALYSIS

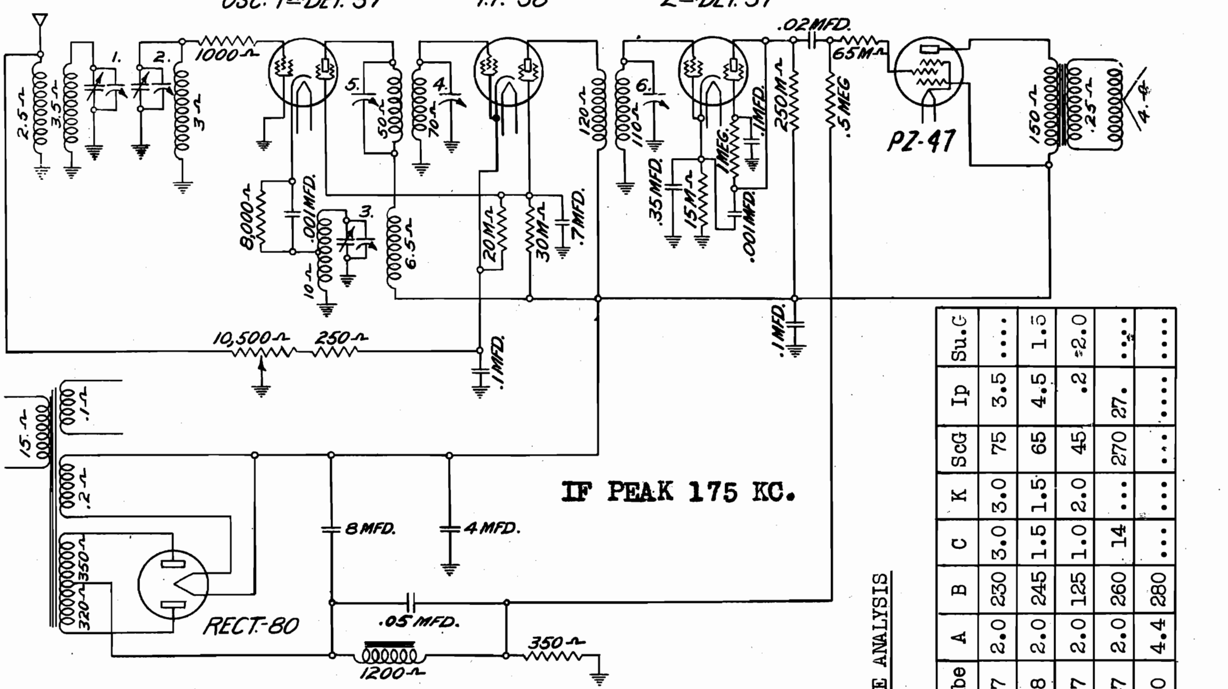
Model 260

| No. | Stage | Type Tube | "A" Volts | "B" Volts | Cont. Grid Volts | Cath. Volts | Screen Volts | Ip Norm. | Misc. |
|---|---|---|---|---|---|---|---|---|---|
| 1 | R. F. | 51 or.35 | 2.15 | 250 | .4 | 4. | 80 | 4. | ..... |
| 2 | 1st Det . | 57 | 2.25 | 137 | 4.5 | 5. | 83 | .5 | Suppressor Grid 4.5 |
| 3 | Osc . | 27 | 2.25 | 107 | 0 | 0 | 0 | 8. | ..... |
| 4 | I.F . | 51 or 35 | 2.25 | 244 | .4 | 4. | 76 | 1.7 | ..... |
| 5 | AVC Det . | 27 | 2.25 | 0 | 2.5 | 4.5 | 0 | 0 | ..... |
| 6 | AVC Det . | 27 | 2.25 | 0 | 2.5 | 4.5 | 0 | 0 | ..... |
| 7 | 1st Audio | 56 | 2.25 | 178 | 2. | 4. | 0 | 1.5 | ..... |
| 8 | Pentode. | 47 | 2.25 | 235 | 16. | 0 | 0 | 25. | Pentode Sp. C Grid 245 |
| 9 | Pentode | 47 | 2.25 | 235 | 16. | 0 | 0 | 25. | Pentode Sp. C Grid 245 |
| 10 | Rect. | 80 | 4.9 | 140 | 0 | 0 | 0 | 98. | ..... |

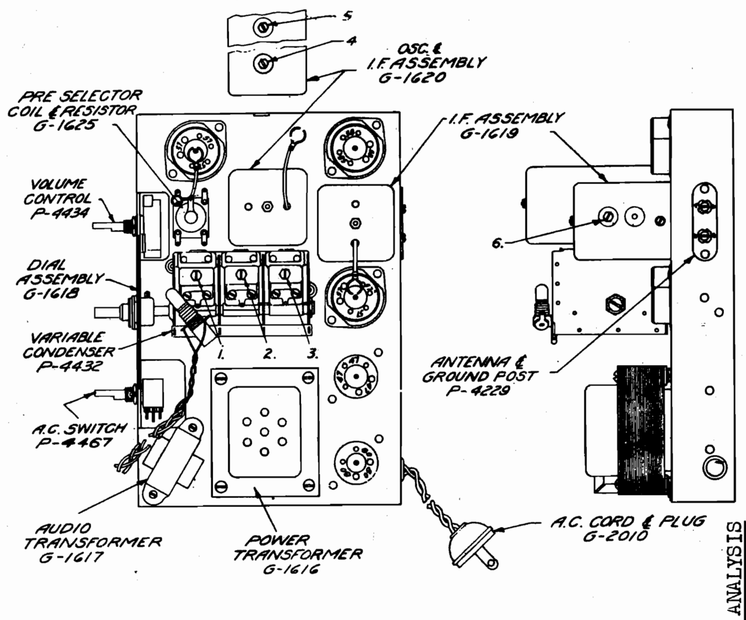
Vol. control "full on".
Tested with Weston model 565 analyzer.
Line: 115 Volts.

# SEARS-ROEBUCK & CO.

**MODEL 7048**
**Schematic, Voltage**
**Alignment, Resistance**




**IF PEAK 175 KC.**




First connect the 175 K. C. Oscillator to the first detector grid and adjust trimmers Nos. 4, 5 and 6 for maximum output as indicated by the loud speaker, or preferably by a regular output meter; next hook up the broadcast oscillator to the antenna and ground binding posts of the set and adjust number 3 (oscillator gang trimmer) at 1500 K. C., for calibration. This is accomplished by using a broadcast oscillator at 1500 K. C. if the calibration of the broadcast oscillator is known to be accurate or by tuning in a broadcasting station, using "crystal control" at a known frequency between 1400 and 1500 K. C., then adjust number 3 trimmer until the receiver's dial reading is exactly the same as the frequency of the broadcasting station; next readjust trimmers number 2 and 1 for maximum output at a point between 1400 and 1500 K. C., since adjusting at these high frequencies is more accurate and critical. No oscillator padding trimmer is employed on this receiver. The special shape of the oscillator tuning condenser rotor makes such a padding trimmer unnecessary.

## VOLTAGE ANALYSIS

| No. | Stage | Tube | A | B | C | K | ScG | Ip | Su.G |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Autodyne. . . . . . | 57 | 2.0 | 230 | 3.0 | 3.0 | 75 | 3.5 | .... |
| 2 | I.F . . . . . . . . . | 58 | 2.0 | 245 | 1.5 | 1.5 | 65 | 4.5 | 1.5 |
| 3 | 2nd. det. . . . . . | 57 | 2.0 | 125 | 1.0 | 2.0 | 45 | .2 | 2.0 |
| 4 | Output. . . . . . . | 47 | 2.0 | 260 | 14 | ... | 270 | 27. | .... |
| 5 | Rectifier . . . . . | 80 | 4.4 | 280 | ... | ... | ... | .... | .... |

Vol. control "full on".
Line: 115 volts.

## CIRCUIT RESISTANCE ANALYSIS

Socket to Ground

| Stage | Grid | Cath-ode | Heater | Plate | Screen G | Suppr. G | Space G |
|---|---|---|---|---|---|---|---|
| Auto-dyne. . | 1,000 | 8,000 | .1 | 50,000 | 20,000 | .1 | ...... |
| I.F . . | 70 | 270 | .1 | 50,000 | 20,000 | *270. | ...... |
| 2nd.Det | 110 | 15,000 | .1 | 300,000 | Infin-ity | 15,000 | ...... |
| Output. | 570,000 | ...... | .1 | 50,000 | ...... | ...... | 50,000 |
| Recti-fier . | ....... | ...... | 50,000 | 1,900 | ...... | ...... | ...... |

Readings of one megohm and over are given as "infinity". The first three significant figures, only are interpreted from the ohmmeter in each reading; the individual resistance in the circuit can be readily checked upon removal of chassis.

*NOTE: On first few thousand sets the i.f. Suppressor Grid Resistance read .1 ohm and was connected to ground.

Loud Speakers
Cone Replacement Data

# SEARS-ROEBUCK & CO.

CONE REPLACEMENT OF OUTSIDE TYPE SUSPENSION SPEAKERS (Fig.2).

1. Unsolder the voice coil leads from their terminals.

2. Remove the suspension mounting screws.

3. Drill out the cone mounting eyelets or cut off the small head ends with a cold chisel and hammer. If care is used, the cardboard mounting rings will not be damaged.

4. Remove the cone and blow out any dirt or metal chips from the air gap.

5. Re-assemble the cone, suspension, and cardboard mounting rings in their original order. Leave the suspension mounting screws loose enough so that the suspension can be shifted about.

6. Insert four strips about 3" long, 1/8" wide and .01" thick (cut from a calling card) between the inside of the voice coil and the pole stem. They should be evenly spaced around the pole stem. Spacers can be obtained from the factory. Part No. S-9177 for 5" and 6" speakers. Part No. S-7391 for all other speakers.

7. Replace the eyelets around the edge of the cone, leaving blank any holes that were originally left blank for speaker to baffle mounting screws. The eyeleting tool illustrated is recommended (Part No. R-8033).

8. Solder the voice coil leads to their terminals.

9. Tighten the suspension screws.

10. Remove the four spacer strips.

11. If it should happen that the cone is not properly centered after the replacement, loosen the suspension mounting screws and move the cone around until proper centering is secured. Sometimes several attempts are necessary before proper centering can be had.

REPLACING THE FIELD COIL IN SPEAKERS HAVING
THE POLE PLATE RIVETED TO THE YOKE (Fig.3).

1. It is always advisable to remove the cone first, as previously outlined, to avoid damaging it and to facilitate the work of field coil replacement.

2. Make a sketch of the coil connections, paying attention to the polarity, i.e.,note whether the start or finish of a winding connects to a particular terminal. This is important since incorrect polarity in speakers with hum bucking coils will increase the hum instead of eliminating it.

3. Drill out the pole-plate-to-yoke-rivets, or cut off the small head ends with a cold chisel and hammer. In some speakers the rivets are aluminum; in others steel. It probably will be easier to drill the steel ones than to cut them off.

4. Dis-assemble the yoke and pole plate and replace the defective coil. Be sure to replace any cardboard spacer rings in their original position.

5. Re-assemble the yoke and pole plate, using nuts and bolts instead of the rivets used originally.

6. Replace the cone and voice coil as outlined previously.

REPLACING THE FIELD COIL IN SPEAKERS HAVING
THE POLE PLATE BOLTED TO THE YOKE. (Fig. 4).

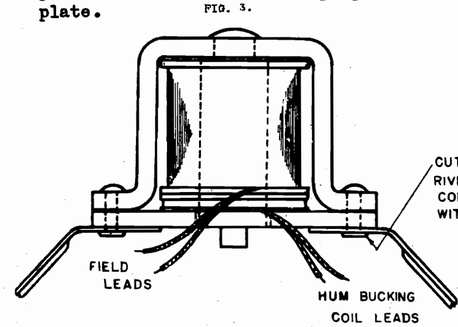
The procedure is the same for this type of speaker as for the type with riveted pole plate and yoke, except that the bolts are unscrewed instead of rivets removed. Be sure to keep the pole plate and yoke in the same relative positions as they were in originally, so that the pole stem will remain properly centered in the pole plate.

REPLACING THE FIELD COIL IN SPEAKERS HAVING
THE POLE PLATE WELDED TO THE YOKE.

1. Remove the cone and voice coil assembly as outlined previously.

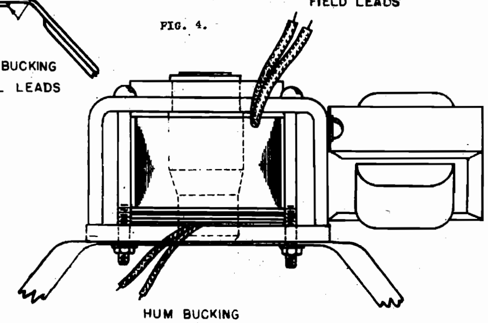
2. It will be necessary to break the welds with a cold chisel and hammer, but before doing so, drill four holes through the pole plate and yoke for the bolts and nuts which will replace the welds. Drilling the holes before breaking the welds and making the holes only large enough to pass the bolts will insure proper centering of the pole stem in the pole plate.

FIG. 3.



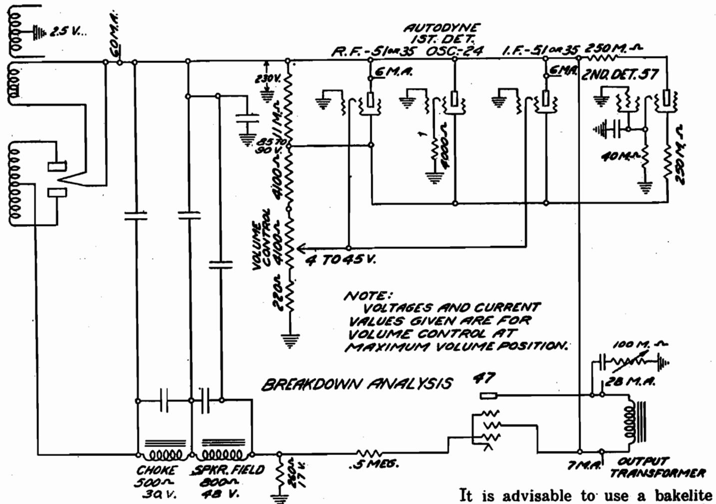

CUT OFF THIS END OF THE
RIVETS WITH A HAMMER AND
COLD CHISEL AND REPLACE
WITH BOLTS AND NUTS.

FIG. 4.



# SEARS-ROEBUCK & CO.

**MODEL 7049**
**Schematic, Socket Trimmer Data**




## READJUSTING TRIMMERS

The most important advice we can give you in regard to the adjustment of trimmers would be "don't make 'em." It has been proven conclusively to us that the Factory adjustment of these trimmers will not vary even when the set is severely jarred or dropped. However, if a customer were to tamper with their settings, a readjustment may have to be made. First, let us explain the location of the various trimmers. Diagram No. 3, top view of the series 220 chassis, shows each trimmer numbered. You should be acquainted intimately with each adjustment. A customer would not have to change the settings very much to ruin the sensitivity of the receiver. Further, if a re-adjustment appears to be necessary, it is imperative to know which circuit is being adjusted when a trimmer is being turned.

It is advisable to use a bakelite screwdriver when making any of these adjustments.

First, connect the 175 k. c. oscillator output leads from the control grid cap of the super-autodyne tube to ground. Do not remove any of the tubes from the sockets, and it is not necessary to disconnect the grid cap clip from the tube. Reset trimmers numbers 5, 6 and 7 for maximum output. While this test oscillator is working into the intermediate frequency stages, no adjustment of the tuning condenser on the receiver will have any effect, inasmuch as the intermediate frequency stage is fixed tuned.

If your test oscillator is properly designed, it will supply exactly 175 k. c., and when trimmers number 5, 6 and 7 are set for maximum output, they will be correctly adjusted and should be sealed.

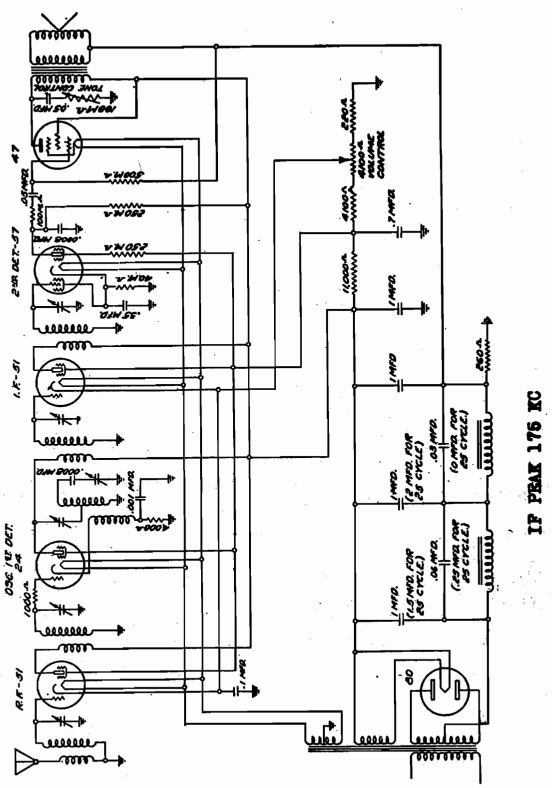
Next, disconnect the 175 k. c. test oscillator and connect to the antenna binding post of the receiver, the output lead from your broadcast test oscillator, or tune in a broadcast signal around 1400 k. c., then reset trimmers numbers 2 and 1 respectively for maximum output. This adjustment will track the super-autodyne grid circuit of the R. F. stage.

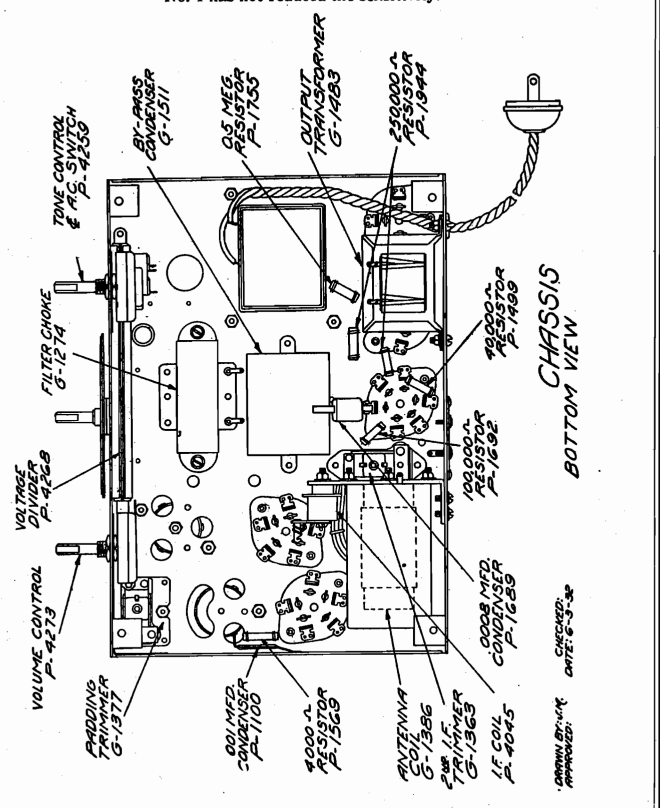
To check the calibration of the receiver, whether it be high or low, trimmer number 3 should be reset until a station of known high frequency is brought in on the correct dial marking with peak volume. If your broadcast test oscillator is accurately calibrated, it might be used in place of the broadcasting station signal. In this adjustment, a broadcast station or test oscillator signal at about 1400 k. c. should be chosen. The setting of the trimmer at 1400 k. c. is more critical than it would be at 600 k. c.; calibration, therefore more accurate.

The next adjustment is important and not easily explained in writing, so pay close attention to the following instruction. We will now balance the oscillator to the r. f. and first detector stages.

Tune the external broadcast test oscillator and the receiver both to 600 k.c., then slowly increase or decrease the capacity of No. 4 (oscillator padding trimmer), at the same time and continuously tuning back and forth across the signal with the receiver tuning condenser gang. The output meter needle will now be swinging up and down in step with the variation in tuning. Watch the peak of this swinging closely and readjust No. 4 trimmer until the swinging needle reaches its highest peak.

Retune the receiver and broadcast test oscillator to 1400 k.c. and re-check trimmer No. 3 to make sure that the adjustment of No. 4 has not thrown the receiver out of calibration. If it has, then readjust No. 3 until the calibration is correct, (as previously explained), and check on trimmers No. 2 and No. 1, to make sure that the adjustment of No. 4 has not reduced the sensitivity.



MODEL 7049
Resistance Test Data
Voltage Data, Socket

# SEARS-ROEBUCK & CO.

CIRCUIT RESISTANCE ANALYSIS

Socket to ground

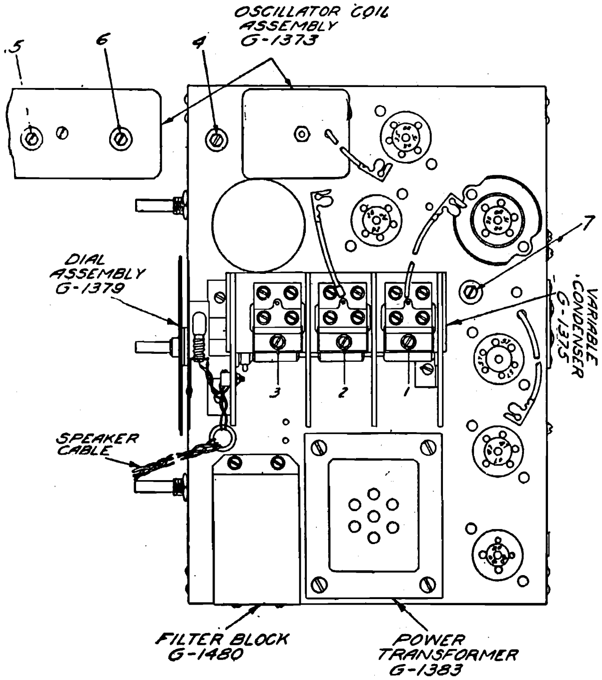
| Stage | Grid | Cath-ode | Heater | Plate | Screen G | Suppr. G | Space G |
|---|---|---|---|---|---|---|---|
| R.F. . | 4.5 | 220 | .1 | 19,500 | 8,400 | ...... | ...... |
| Auto-dyne. | 1,000 | 5,000 | .1 | 19,500 | 8,400 | ...... | ...... |
| I.F. . | 60 | 220 | .12 | 19,500 | 8,400 | ...... | ...... |
| 2nd. det . | 70 | 40,000 | .1 | 270,000 | 260,000 | 40,000 | ...... |
| Output | 500,000 | ...... | .1 | 19,600 | ....... | ...... | 19,400 |
| Recti-fier. | ....... | ...... | 19,500 | ..1,870 | ....... | ...... | ...... |

Note: Readings of one megohm and over are given as "infinity". The first three significant figures, only are interpreted from the ohm meter in each reading; the individual resistance in the circuit can be readily checked upon removal of chassis.

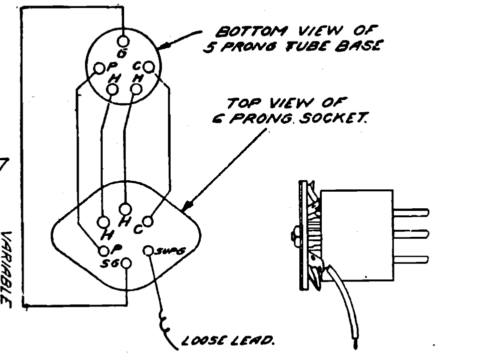
VOLTAGE ANALYSIS

| No. | Stage | Type Tube | "A" Volts | "B" Volts | Cont. Grid | Cath. Volts | Screen Volts | Ip. Norm. | Misc. |
|---|---|---|---|---|---|---|---|---|---|
| 1 | R.F . | 51 | 2.15 | 245 | 3.4 | 3.1 | 81 | 5. | |
| 2 | Auto-dyne 1st. Det. | 24 | 2.15 | 240 | 4.4 | 5.0 | 85 | 1.6 | |
| 3 | I.F . | 51 | 2.15 | 245 | 4.4 | 3.5 | 84 | 7. | |
| 4 | 2nd. Det. | 57 | 2.25 | 106 | 1.8 | 3. | 43 | .1 | Suppressor Grid 3 |
| 5 | Out-put. | 47 | 2.25 | 245 | 15. | 0. | 0 | 31. | Pent-space Charge-Grid 250 |
| 6 | Rect. | 80 | 4.8 | 300 | 0. | 0. | 0 | 68. | |

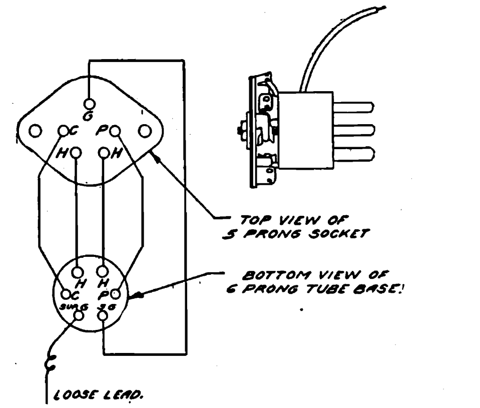
Vol. control "full on".
Tested with Weston model 565 analyzer.
Line: 115 Volts.



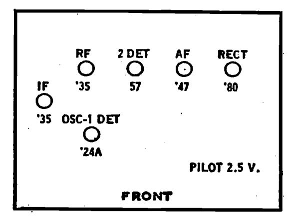

Number 1 is the antenna trimmer.
Number 2 is the gang condenser trimmer tuning the grid of the Super-autodyne.
Number 3 is the gang condenser trimmer tuning the plate (or oscillator of the super-autodyne).
Number 4 is the oscillator padding trimmer.
Number 5 is the Super-autodyne plate trimmer.
Number 6 is the I. F. grid trimmer.
Number 7 is the second detector grid trimmer.




SKETCH OF CONNECTIONS FOR ADAPTER TO PLUG INTO ANALYZER.

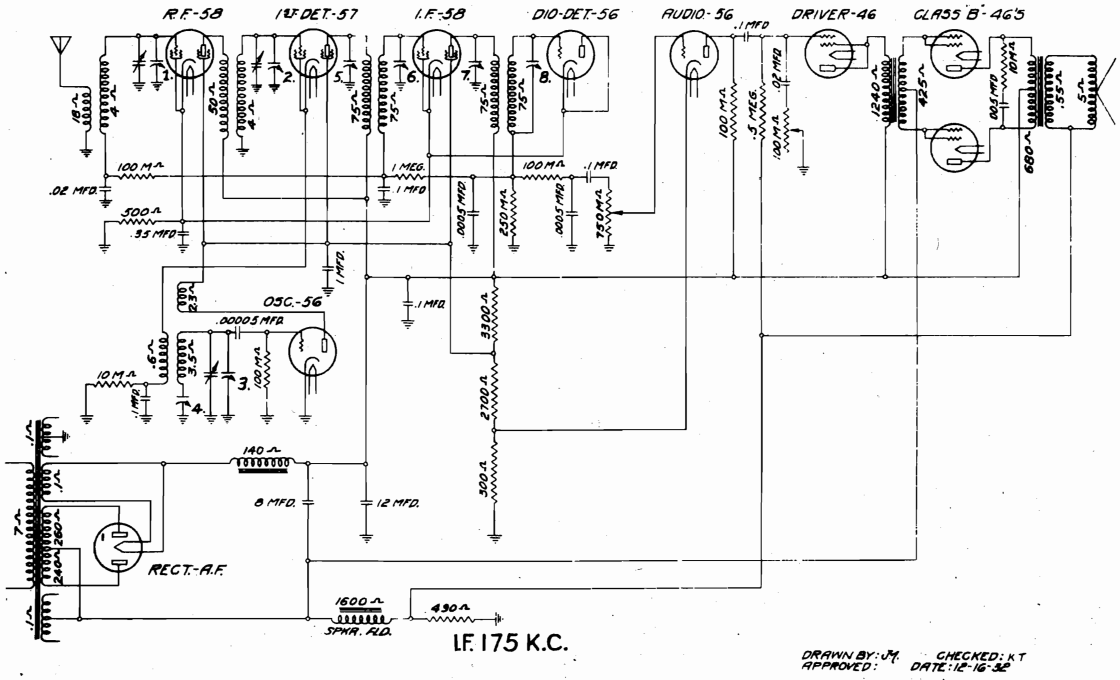



SKETCH OF CONNECTIONS FOR ADAPTER TO PLUG INTO SET



MODEL 7066
Schematic
Resistance Test

# SEARS-ROEBUCK & CO.

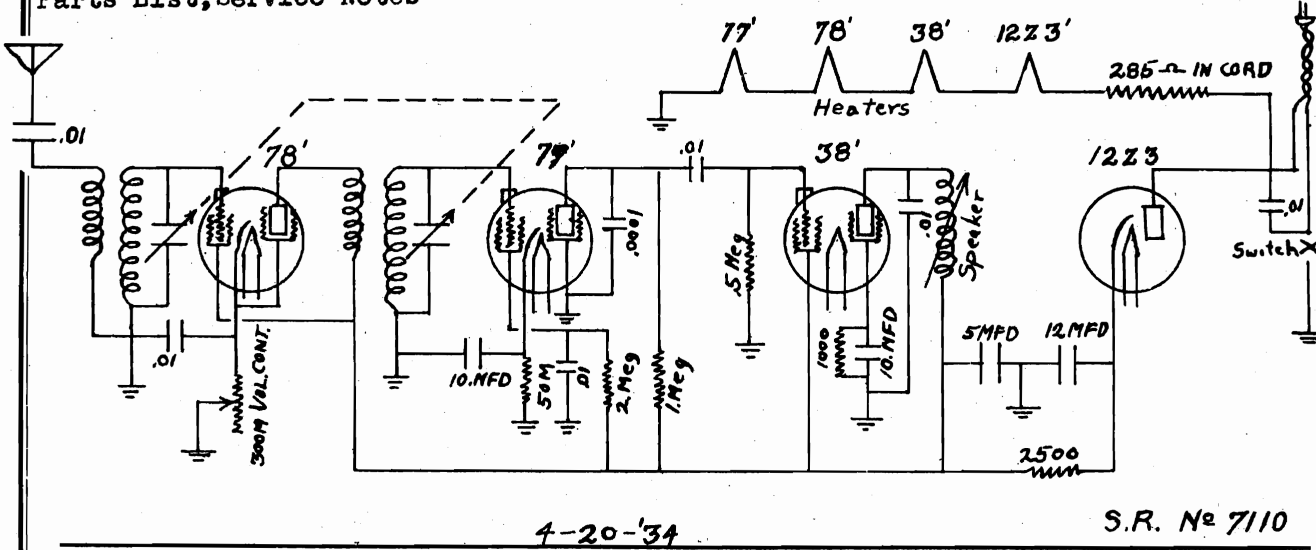



## RESISTANCE ANALYSIS

| TUBE | STAGE | GRID | CATHODE | HEATER | PLATE | SCREEN | SUPPRESSOR |
|---|---|---|---|---|---|---|---|
| 58 | RF | Infinity | 500 | .1 | 6300 | 3000 | 500 |
| 57 | 1 Det. | 4.C | 10,000 | .1 | 6300 | 3000 | 10,000 |
| 56 | Oscil. | 100,000 | 0 | .1 | 3000 | -- | -- |
| 58 | IF | Infinity | 500 | .1 | 6300 | 3000 | 500 |
| 56 | 2 Det.AVC | 250,000 | 500 | .1 | 500 | -- | - |
| 56 | AF | 750,000 | 300 | .1 | 100,000 | -- | - |
| 46 | Driver | 500,000 | - | .1 | 7600 | 7600 | - |
| 46 | Class "B" | 2400 | - | .1 | 6700 | 2400 | - |
| 46 | Class "B" | 2400 | - | .1 | 6700 | 2400 | - |
| 80 | Rectifier | --- | - | 6500 | 2400 | -- | - |

MODEL 7110
Schematic
Parts List, Service Notes

SEARS-ROEBUCK & CO.




GENERAL INFORMATION

This set is designed to operate on 105-120 volts AC or DC from 25 to 60 cycles. The cord of the set will become quite warm in operation. This is a normal condition, the voltage reducing resistor being an integral part of the line cord for rapid dissipation of heat.

The set is of the conventional tuned radio frequency type and is so developed as to give a minimum of trouble and a maximum of enjoyment.

It is recommended that the aerial be used that is supplied with the set. However, if a longer aerial is used, it is advisable to rebalance the antenna stage of the set to the aerial used. To accomplish this, remove the set from the cabinet and set the dial at about 20 on the scale. Turn the compensator screw on the rear section of the variable condenser back and forth until maximum signal strength is obtained.

This set is designed to oscillate across a major portion of the broadcast band. This regeneration is controllable by reducing the volume of the set. Oscillation in a set of this type increases the sensitivity from ten to twenty times.

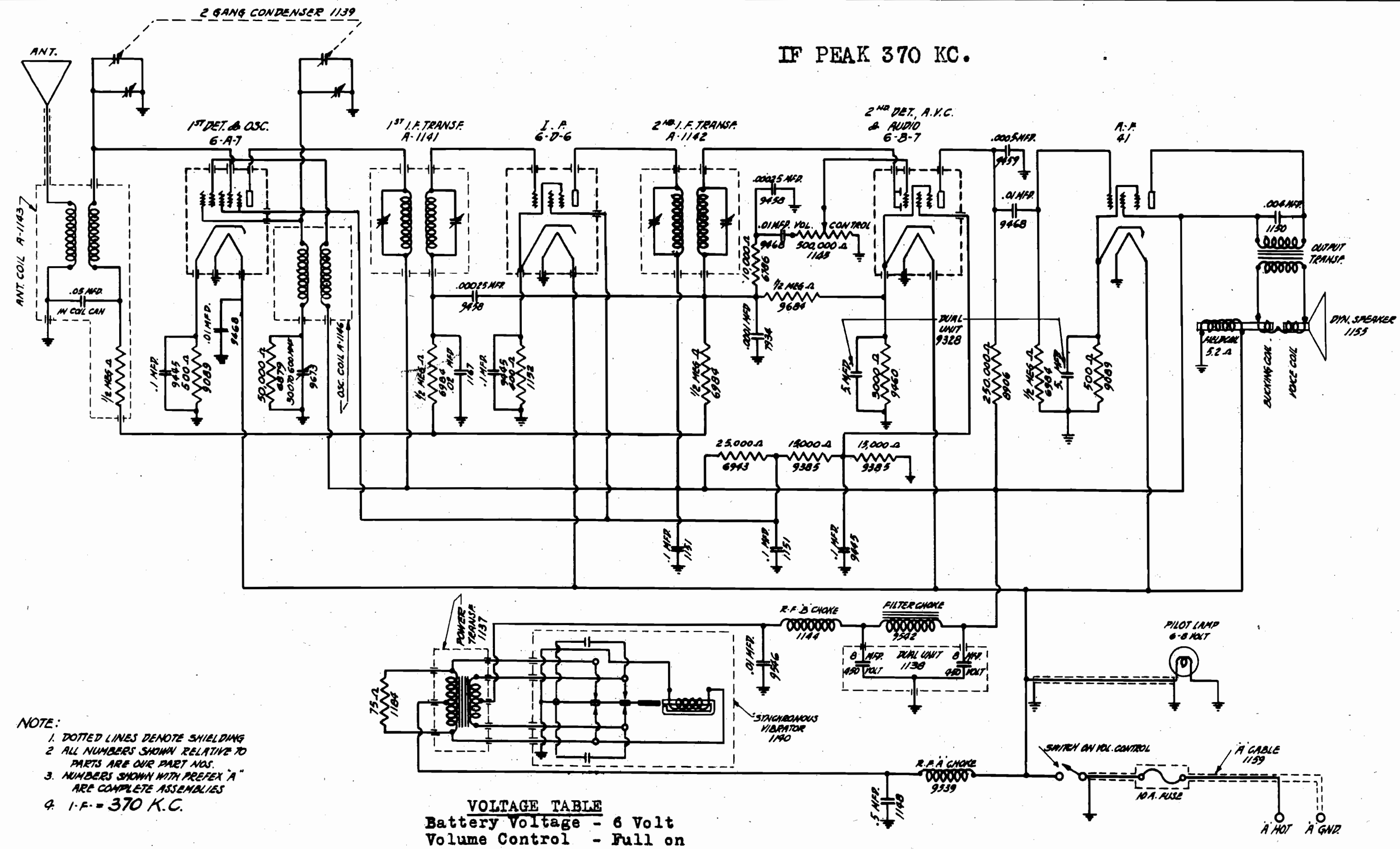
PARTS LIST

| No. | |
|---|---|
| 51 | Magnetic speaker |
| 52 | Variable condenser 2 gang |
| 53 | Set of coils - complete |
| 53a | Antenna coil - only |
| 53b | R F Coil - only |
| 54 | Cabinet |
| 55 | Cordohm 285 ohm |
| 60 | Volume control |
| 61 | Antenna cords |
| 70 | Electrolytic condenser |
| 71 | Knob |
| 73 | Terminal strip- 3 lug |
| 77 | Name Plate - Silvertone or Selector |
| | Any tube socket (state no. of prongs) |
| | Any resistor -(state ohms and watts) |
| | Any bypass condenser (state capacity) |

**MODEL 7117,1859-A**
Schematic
Voltage

# SEARS-ROEBUCK & CO.

IF PEAK 370 KC.




NOTE:
1. DOTTED LINES DENOTE SHIELDING
2. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NOS.
3. NUMBERS SHOWN WITH PREFEX "A" ARE COMPLETE ASSEMBLIES
4. I-F = 370 K.C.

VOLTAGE TABLE
Battery Voltage - 6 Volt
Volume Control - Full on

| TYPE OF TUBE | POSITION OF TUBE | FIL. VOLTS | PLATE VOLTS | CATHODE VOLTS | SCREEN VOLTS | GRID NO.1 | GRID NO.2 | GRID NO. 3 & 5 |
|---|---|---|---|---|---|---|---|---|
| 6A7 | Modulator & Oscillator | 6 | 250 | 2.5 | 100 | 10 | 250 | 100 |
| 6D6 | I. F. Amplifier | 6 | 250 | 1. | 100 | | | |
| 6B7 | Second Detector Diode AVC & 1st Audio Triode | 6 | 35## | 3 | 50 | | | |
| 41 | Output | 6 | 230 | 16 | 250 | | | |

##Triode Plate. Comparative Voltage only. The voltmeter is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

MODEL 7117,1859-A
Alignment Data
Parts List,Installation

# SEARS-ROEBUCK & CO.

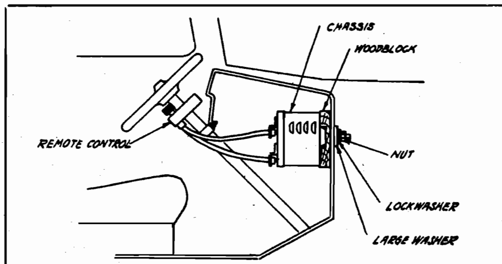
**ALIGNMENT PROCEDURE:** It should rarely be necessary to realign the intermediate transformers or the variable condenser. As a matter of fact, this should only be necessary when an intermediate transformer, oscillator or R. F. coil has become defective and require replacement. For properly aligning either the intermediate transformer or condenser it is necessary that an oscillator be used with some type of output measuring device.

**INTERMEDIATE ALIGNMENT:**

1. Connect the high side of the oscillator output to the control grid of the 6A7 tube leaving the control grid cap disconnected. The ground side of the oscillator should be connected to the chassis.
2. Set the oscillator at 370 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.
3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer which is accessible from the top of the I. F. transformer up and down until maximum reading is obtained on the meter, then adjust the trimmer screw located inside of the brass hex nut in the same manner.
4. The second I. F. transformer should next be adjusted in the same manner as the first I. F. transformer.

**TO ALIGN THE VARIABLE CONDENSER:** To align the variable condenser and padding condenser it is necessary that the receiver chassis be removed from the set housing. After the receiver chassis has been removed connect the remote control flexible drive shafts in their respective couplers, and set the dial needle on the dial face so that the dial calibration is correct.

1. Connect the high output side of theoscillator to the antenna and the ground to the receiver chassis.
2. Tune the receiver to exactly 1500 kilocycles on the dial and adjust the oscillator to this frequency. BRING IN THE 1500 KILOCYCLE SIGNAL (TO MAXIMUM OUTPUT) BY ADJUSTING THE OSCILLATOR VARIABLE CONDENSER TRIMMER MOUNTED ON TOP OF THE VARIABLE CONDENSER. THEN ADJUST THE OTHER VARIABLE CONDENSER TRIMMER FOR MAXIMUM OUTPUT. Looking at the front of the receiver the first section of the variable condenser is the oscillator section and the other section tunes the antenna coil.
3. Tune the receiver to approximately 600 kilocycles on the dial and set the oscillator to this frequency, then adjust the 600 padding condenser which is located on the right hand side and accessible through the hole in the chassis for maximum output. Always rock the condenser slightly to the right and left when making this adjustment, using the position where greatest output is obtained.




MOUNTING OF CHASSIS & REMOTE CONTROL FIG. #1

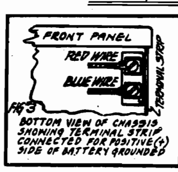



FIG 3 BOTTOM VIEW OF CHASSIS SHOWING TERMINAL STRIP CONNECTED FOR POSITIVE (+) SIDE OF BATTERY GROUNDED

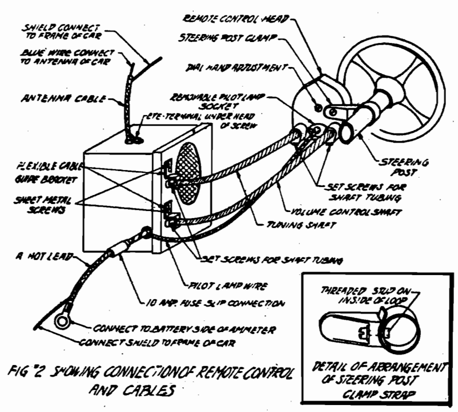



FIG 2 SHOWING CONNECTION OF REMOTE CONTROL AND CABLES

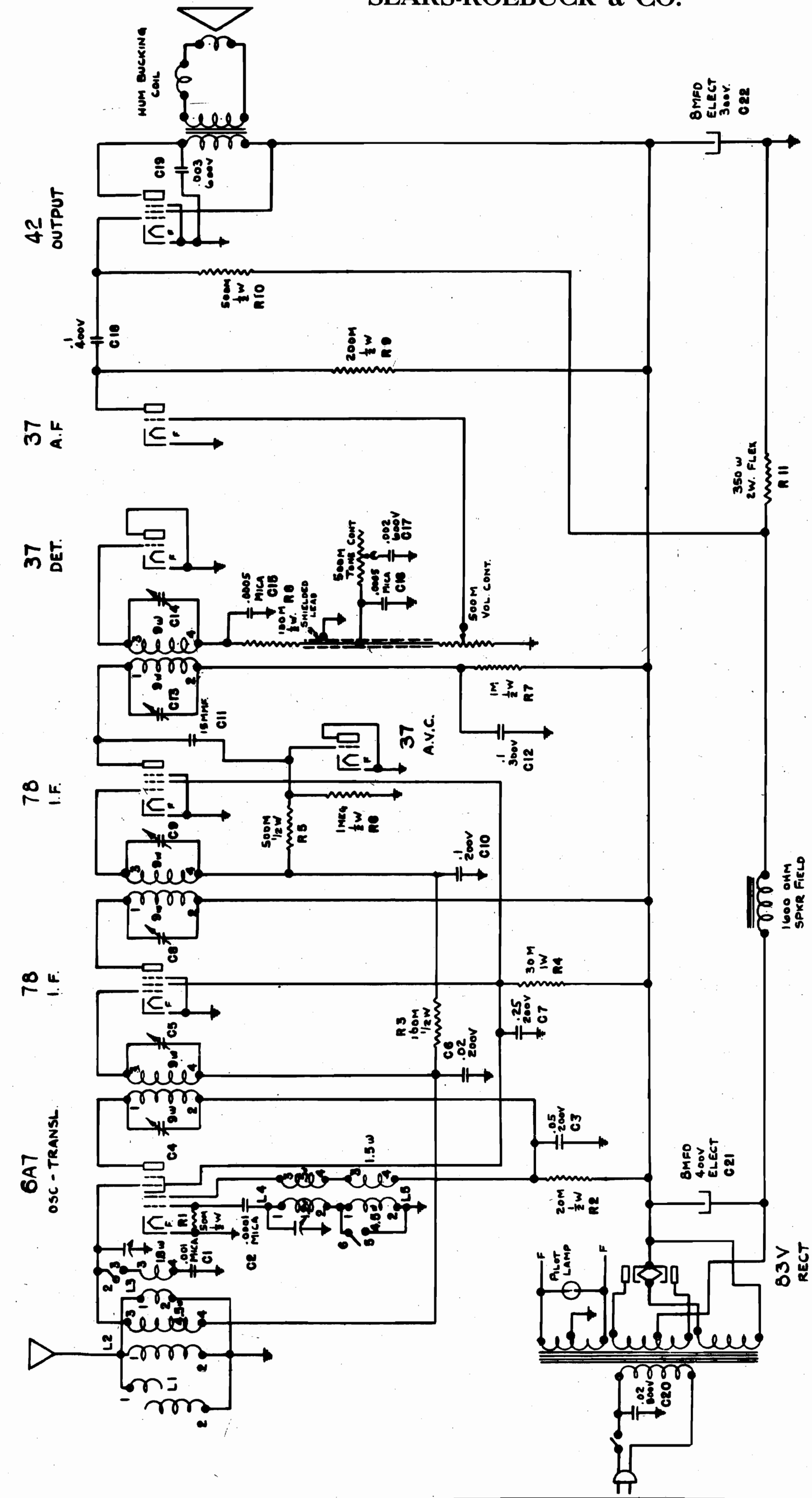
Always determine the polarity of the car battery post which is grounded to the automobile chassis before installing the receiver. When shipped from the factory the receiver is properly connected as illustrated (Fig. 3) for installation in automobiles which have the positive (+) battery post grounded to the car frame. If the negative (-) battery post is grounded, the position of the red and blue leads as shown on the terminal strip diagram must be reversed. As the terminal strip is located underneath and toward the right front corner of the receiver chassis it is necessary to remove the chassis from the set housing to make this change. This is accomplished by removing the sheet metal screw that grounds the antenna shield lead to the housing top, the twelve (12) machine screws around the edge of the housing front, the single machine screw on the bottom of the housing and then grasping the front panel of the housing and pulling outward. Using the receiver in an automobile with improper terminal strip polarity connections will result in damage to the vibrator unit, transformer or electrolytic condenser.

**PART NUMBER**

| | |
|---|---|
| 1143 | Antenna Coil |
| 1146 | Oscillator Coil |
| 1141 | First I. F. Transformer |
| 1142 | Second I. F. Transformer |
| 1155 | Dynamic Speaker |
| 9673 | Padding Condenser |
| 1139 | Two Gang Condenser |
| 1145 | Volume Control |
| 9328 | Electrolytic Condenser 2 x 5 Mfd. |
| 9458 | .00025 Mfd. Moulded Condenser |
| 9459 | .0005 Mfd. Moulded Condenser |
| 7934 | .0001 Mfd. Moulded Condenser |
| 9445 | .1 Mfd. 200 Volt Condenser |
| 1148 | .5 Mfd. 200 Volt Condenser |
| 9468 | .01 Mfd. 400 Volt Condenser |
| 9546 | .01 Mfd. 600 Volt Condenser |
| 1150 | .004 Mfd. 600 Volt Condenser |
| 1151 | .1 Mfd. 400 Volt Condenser |
| 1167 | .02 Mfd. 200 Volt Condenser |
| 1184 | 75 Ohm Wire Wound 1 Watt Resistor |
| 6943 | 25,000 Ohm 1 Watt Resistor |
| 6879 | 50,000 Ohm 1/3 Watt Resistor |
| 9385 | 15,000 Ohm 1/3 Watt Resistor |
| 9089 | 500 Ohm 1/3 Watt Resistor |
| 1152 | 400 Ohm 1/3 Watt Resistor |
| 6875 | 250 Ohm 1/3 Watt Resistor |
| 9460 | 3,000 Ohm 1/3 Watt Resistor |
| 6786 | 10,000 Ohm 1/3 Watt Resistor |
| 6984 | 500,000 Ohm 1/3 Watt Resistor |
| 8906 | 250,000 Ohm 1/3 Watt Resistor |
| 9581 | 10 Ampere Fuse |
| 1159 | "A" Battery Cable complete with fuse |
| 1140 | Vibrator |
| 1137 | Power Transformer |
| 1138 | 2 x 8 Mfd. Condenser Block |
| 9539 | R. F. "A" Choke |
| 1144 | R. F. "B" Choke |
| 9598 | .5 Mfd. Generator Condenser |

# SEARS-ROEBUCK & CO.

MODEL 7118,1708-A
Schematic
Voltage



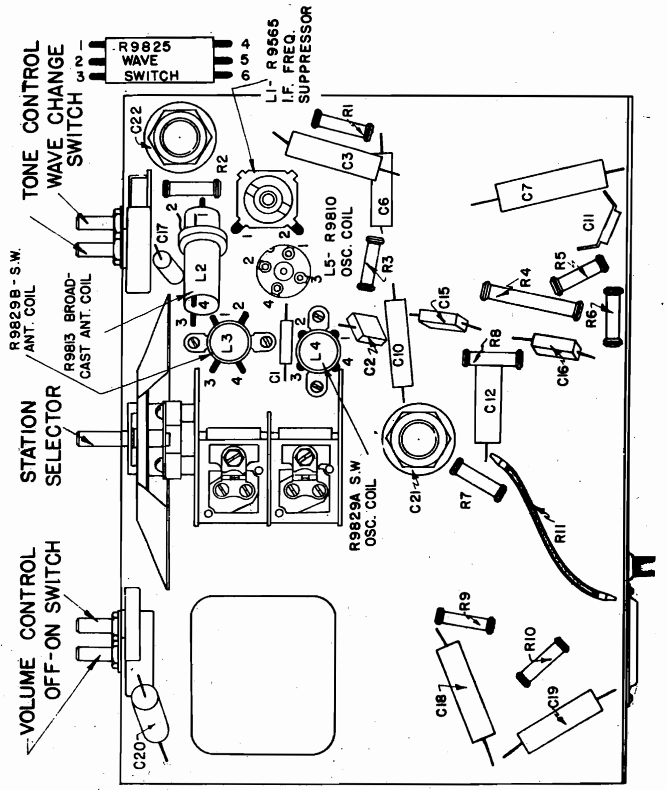

| TUBE | PLATE VOLTS | SCREEN VOLTS | PLATE M.A. | SCREEN M.A. |
|---|---|---|---|---|
| 78 1st IF | 245 | 100 | 6.5 | 2 |
| 78 2nd IF | 245 | 100 | 6.5 | 2 |
| 37 AF | 20 | | 1.25 | |
| 42 Output | 235 | 245 | 23 | 5 |

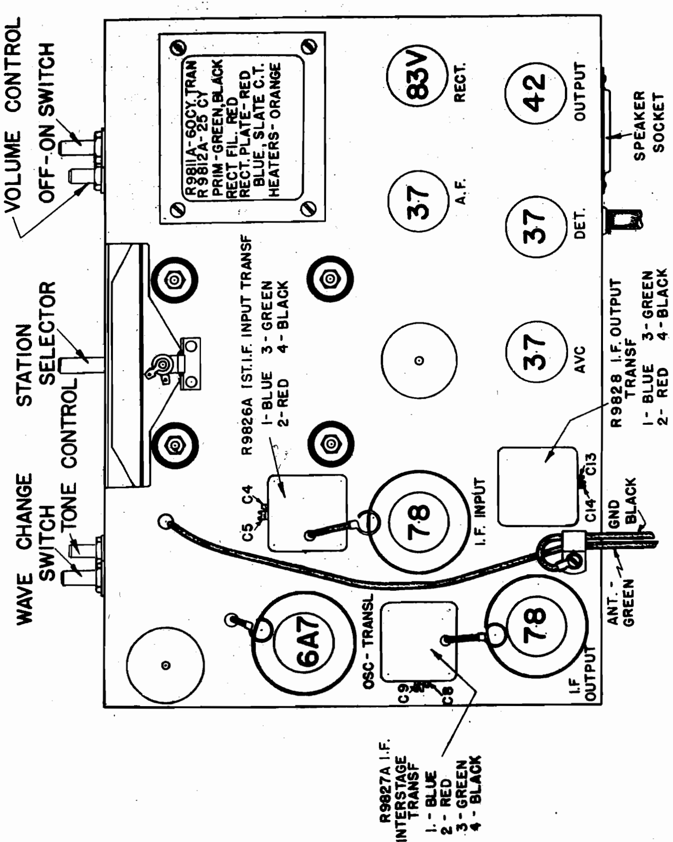
6A7 Osc-Transl. Ep=245v. Eg2=175v. Eg3&5=80v.
Ip=4.25ma. Ig2=2.5ma. Ig3&5=1.75ma.

83V Rectif. Max.D-C=360v Ip=29ma per plate

**MODEL 7118,1708-A**
**Socket Layout**
**Chassis,Parts List**

# SEARS-ROEBUCK & CO.

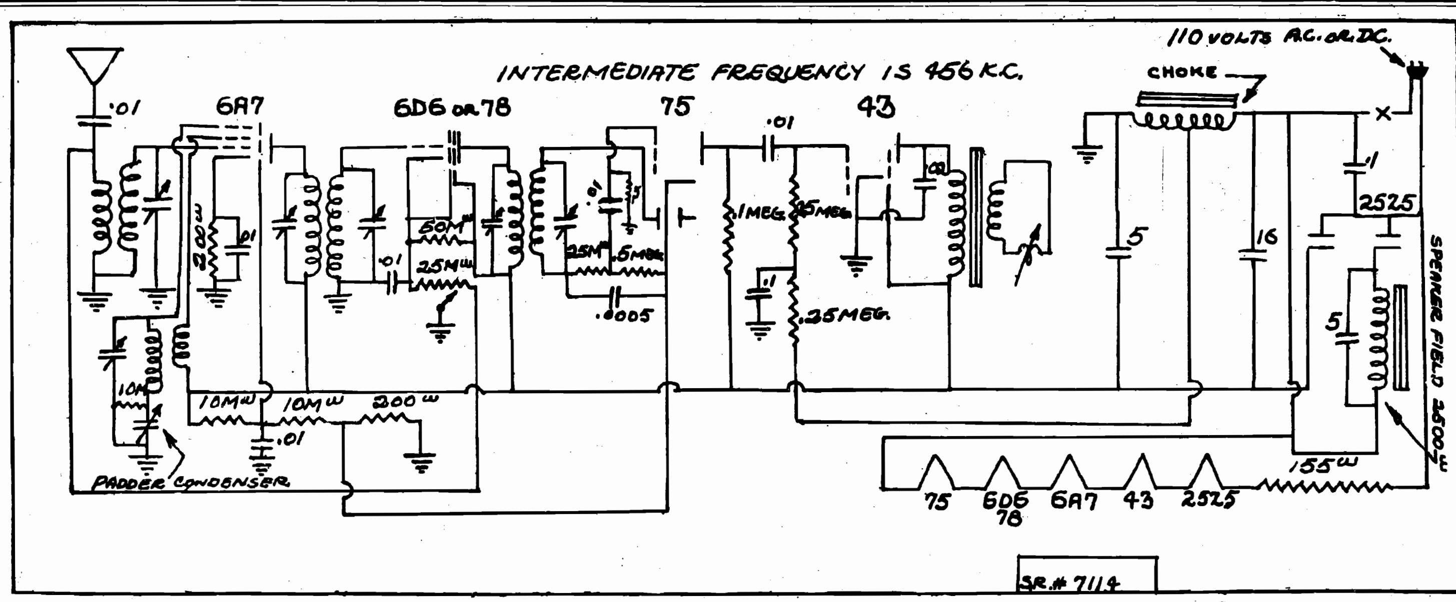



| Part No. | Description |
|---|---|
| R-8297-A | Board - Terminal, double |
| R-8308-A | Board - Terminal, triple |
| R-9949 | Card - Operating |
| R-4715 | Clamp - Ant. & gnd. leads |
| R-7011-A | Clip - Ant. lead |
| R-6381 | Clip - Grid |
| R-9813 | Coil - Antenna |
| R-9810 | Coil - Oscillator |
| R-9565 | Coil - Int. Freq. suppressor |
| R-9829-B | Coil - Ant. S.W. |
| R-9829-A | Coil - Osc. S.W. |
| R-9816 | Condenser - Variable |
| R-9816-A | Condenser - Variable complete with drive assembly and dial |
| D-4758-P | Condenser - 8 Mfd. electrolytic |
| R-8483 | Condenser - 8 Mfd. electrolytic |
| R-9817 | Condenser - .25 mfd. 200 volt |
| R-8931 | Condenser - .1 Mfd. 400 volt |
| R-6138 | Condenser - .1 Mfd. 300 volt |
| R-6444 | Condenser - .1 Mfd. 200 volt |
| R-7354 | Condenser - .05 Mfd. 200 volt |
| R-9899 | Condenser - .02 Mfd. 800 volt |
| R-6629 | Condenser - .02 Mfd. 200 volt |
| R-7681 | Condenser - .003 Mfd. 600 volt |
| R-6933 | Condenser - .002 Mfd. 600 volt |
| R-6759 | Condenser - .001 Mfd. Mica |
| R-6760 | Condenser - .0005 Mfd. Mica |
| R-4303 | Condenser - .0001 Mfd. Mica |
| R-8042 | Condenser - .000015 Mfd. |
| R-6570 | Control - Tone & Volume |
| R-6989 | Cord - Power |
| R-9819-A | Dial and Indicator |
| R-8889 | Escutcheon |
| R-9819 | Indicator |
| R-9948 | Instruction leaflet |
| R-8893 | Knob - Large |
| R-8896 | Knob - Medium |
| R-2288 | Lamp - Pilot |
| R-5346-B | Lead - Antenna |
| R-5345-D | Lead - Ground |
| R-5823 | Resistor - 1 meg. 1/2 watt carbon |
| R-6179 | Resistor - 500 M ohms 1/2 watt carbon |
| R-5830 | Resistor - 200 M ohms 1/2 watt carbon |
| R-6064 | Shield - Chassis bottom |
| R-6450 | Shield - Elec. Cond. |
| R-8366 | Socket - 4 prong |
| R-8367 | Socket - 5 prong |
| R-8368 | Socket - 6 prong |
| R-8369 | Socket - 7 prong |
| S-9814 | Speaker, complete |
| S-7776-B | Speaker Cone and Voice Coil |
| S-7893 | Speaker hum bucking coil |
| S-9846 | Speaker field coil |
| S-7769 | Speaker clamping ring |
| S-7770 | Speaker clamping ring |
| S-9840-AS | Speaker Transformer |
| S-7414 | Speaker plug |
| R-7609 | Switch - Filament |
| R-9825 | Switch - Wave |
| R-9826-A | Transformer - IF input |
| R-9827-A | Transformer - IF interstage |
| R-9828 | Transformer - IF output |
| R-9811-A | Transformer - 60 cycle power |
| R-9812-A | Transformer - 25 cycle power |
| R-5819 | Resistor - 100 M ohms 1/2 watt |
| R-6445 | Resistor - 50 M ohms 1/2 watt |
| R-6689 | Resistor - 30 M ohms 1 watt |
| R-5821 | Resistor - 20 M ohms 1/2 watt |
| R-6154 | Resistor - 1 M ohms 1/2 watt |
| R-9947 | Resistor - 350 ohms, 2 watt, |
| R-9882 | Screw - Dial pointer |
| R-7359 | Screw - Escutcheon |
| R-6652-A | Shaft - Dial drive |
| R-6748-A | Shield - Tube, bottom |
| R-6749 | Shield - Tube, top |

**MODEL 7114**
Schematic
Alignment Data
Parts List

SEARS-ROEBUCK & CO.




## GENERAL INFORMATION

This set is a superheterodyne designed to operate on alternating or direct current of any commercial frequency.

To operate, unreel the aerial to its full length and lay on the floor or drop out of a window. Turn the volume control all the way on. If after a few minutes the set does not function, reverse the plug in the wall socket.

The cord of this set becomes quite warm when the set is in operation. This is a natural condition as the voltage reducing resistor is woven in this cord.

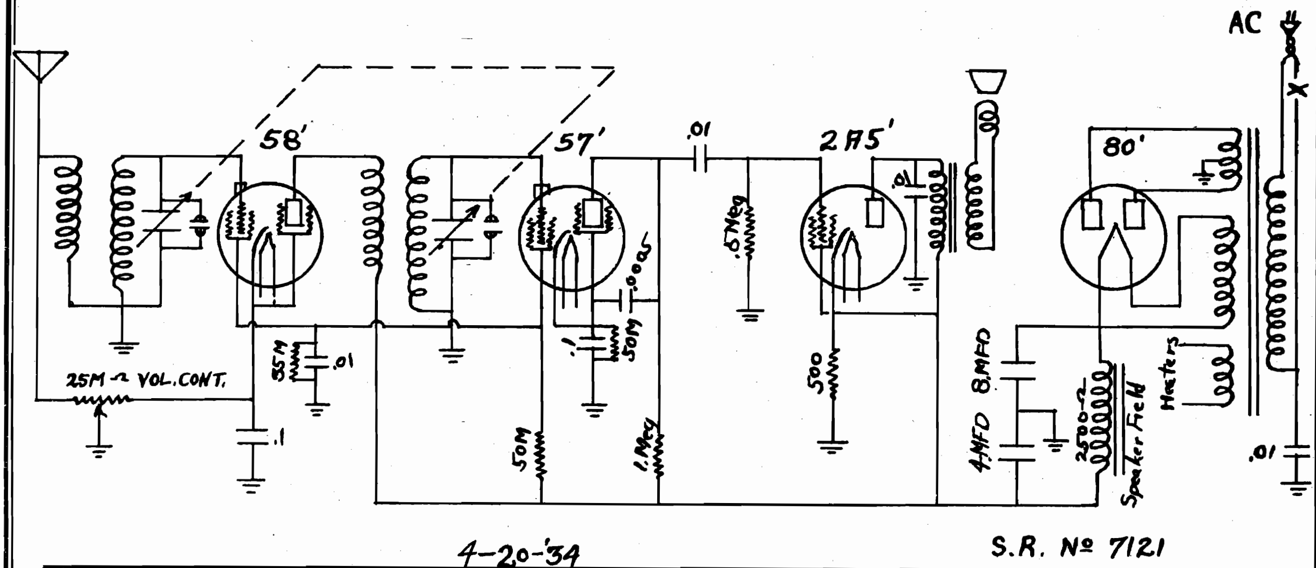
To rebalance the set, first align the I.F. transformers at 456 kc. Then with the variable condenser turned to zero, adjust the trimmers on the variable to 1712 kc. Now tune the set to some frequency around 1400 kc and readjust the detector section only to maximum output. The padder condenser (which is located beneath the chassis) is now readjusted at 600 kc. Tune the set to some signal around 600kc and with a No.4 Spintite adjust the padder condenser for maximum output, at the same time rocking the variable condenser back and forth to follow the signal.

## PARTS LIST

| No. | |
|---|---|
| 52 | Variable condenser 2 gang |
| 61 | Antenna Cord |
| 74 | Terminal Strip-7lug |
| 101 | Dynamic Speaker |
| 102 | Set of Coils |
| 102A | Osc. Coil |
| 102B | R.F. Coil |
| 102C | IF Transformer |
| 103 | Choke |
| 104 | Cordohm -155 ohm |
| 105 | Volume Control |
| 106 | Electrolytic condenser |
| 107 | Cabinet |

MODEL 7121
Schematic
Notes, Parts List

SEARS-ROEBUCK & CO.




## GENERAL INFORMATION

This set is designed to operate on 105-120 volts, 50-60 cycle, A.C. only.

The set is of conventional tuned radio frequency type, developed to give best results with a minimum of trouble.

An antenna approximately 40' outside is recommended, but it is possible to operate this set on 20-25' inside.

Below are listed a few suggestions as to service:

1. Hum-
   a. Defective filter condenser
   b. Bad tubes
   c. Defective bypass condenser
   d. Open resistor
2. Weak -
   a. Poor tubes
   b. Set out of balance
   c. Shorted bypass condenser
3. Poor tone -
   a. Speaker off center or dirt in voice coil
   b. Defective filter condenser
   c. Poor or defective tubes

This set is designed to oscillate about one-third to half way up the band starting from the police signals - this can be controlled with the volume control.

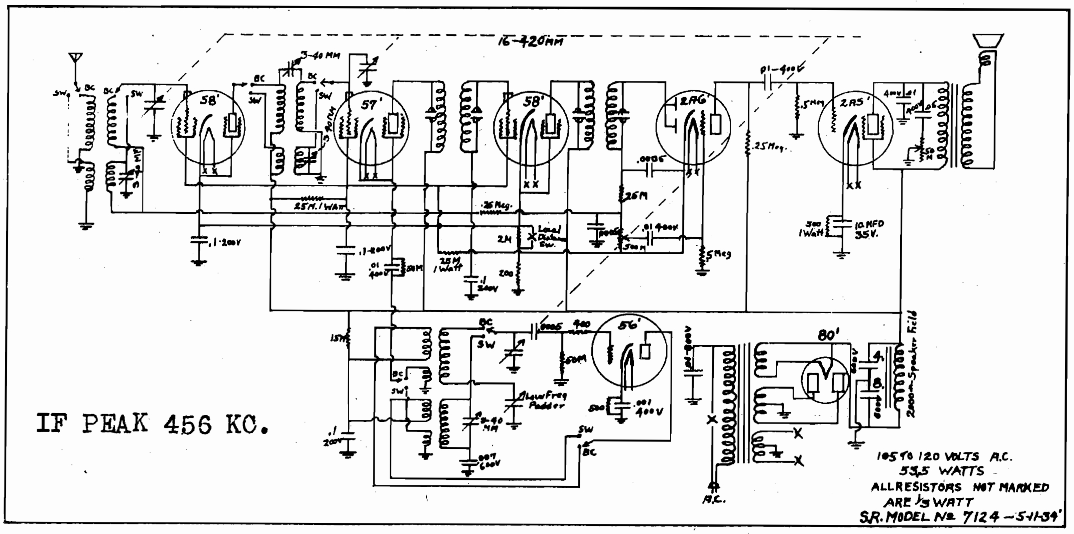
To rebalance set - turn variable condenser all the way open and tune trimming condensers until loudest noise level or if tuned to a police signal at 1720 kc can be heard. Then tune to some weak signal at 1400 k.c. and check trimmers again.

## PARTS LIST

| No. | |
|---|---|
| 73 | Terminal strip-3 lug |
| 150 | Cabinet |
| 152 | Dynamic Speaker |
| 153 | Variable condenser 2 gang |
| 154 | Power Transformer |
| 155 | Dial scale unit |
| 105 | Volume control |
| 156 | 8&4 electrolytic condenser |
| 157 | Set of coils - complete |
| 157a | Antenna coil - only |
| 157b | R.F. coil - only |
| 158 | Power cord and plug |
| 159 | Knobs |
| 160 | Escutcheon plate |
| | Any tube socket (state number of prongs) |
| | Any resistor (state ohms and watts) |
| | Any bypass condenser (state capacity) |

SEARS-ROEBUCK & CO.

MODEL 7124
Schematic
Alignment, Parts




## GENERAL INFORMATION

This set is designed to operate on 105-120 volts, A.C. The regular band covers from 1712 KC-550 KC and short wave from 15-55 meters.

To align set on broadcast, remove 56 oscillator tube, trim Intermediate Frequency Transformers at 456 KC from an oscillator, feeding same into 57, first detector grid. Secondly, open gang condenser wide open and adjust trimmer condensers on top to maximum noise level, then adjust low frequency padder at approximately 600 KC; after doing this go back and recheck at 1700 KC.

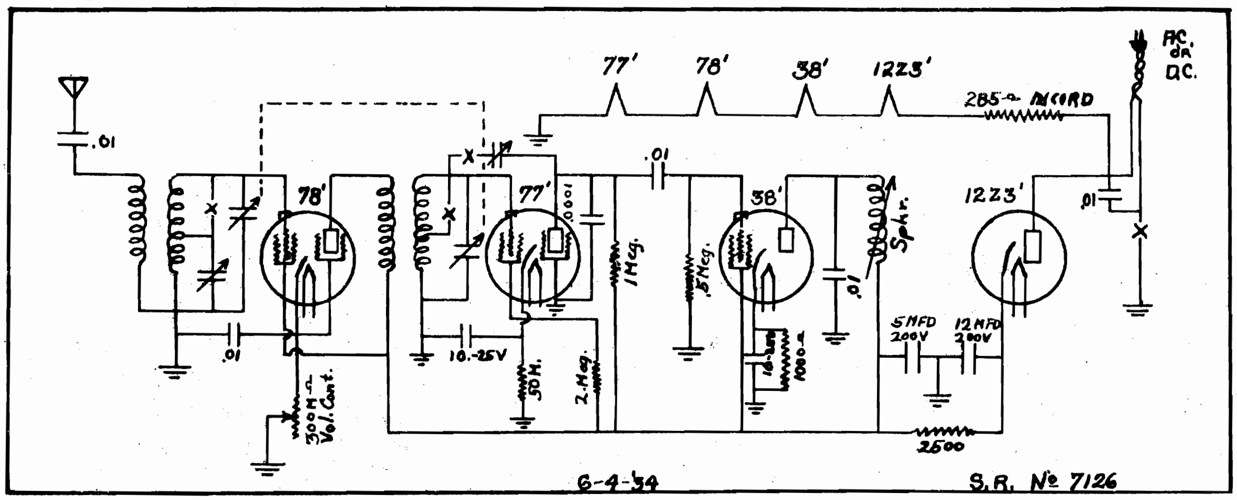
To adjust short wave, turn switch left and tune gang condenser to 31 meters on dial and trim small padders underneath to maximum noise level or some station, checking oscillator coil padder with gang condenser tuned at different points.

## PARTS LIST - MODEL SR 7124

| No. | |
|---|---|
| 301 | Dynamic Speaker 8" |
| 302 | Power Transformer |
| 156 | 8&4 Electrolytic cond. |
| 303 | Variable condenser 3 gang |
| 304 | Set of coils complete |
| 304a | RF antenna coil only |
| 304b | RF Int. " " |
| 304c | RF Osc. " " |
| 304d | 456 KC IF " " |
| 304e | SW & BC Int. " " |
| 304f | " " " Ant. " " |
| 304g | " " " Osc. " " |
| 305 | Airplane Dial complete |
| 256 | Vol. control-500M ohm |
| 306 | Tone control-50M "w/s |
| 261 | A.C. Switch |
| 158 | Power cord & plug |
| 307 | 10 mfd 25v Electrolytic |
| 108 | Padder condenser 7 plate |
| 308 | Short wave switch |
| 73 | Terminal strip-3 lug |
| 74 | " " 7 " |
| 309 | .01 mfd 600v condenser-in can |
| 310 | .0018 mica condenser |
| | Any tube socket (state No. of prongs) |
| | Any resistor (state ohms & watts) |
| | Any by pass condenser (state capacity) |

MODEL 7126
Schematic, Parts
Service Notes

## SEARS-ROEBUCK & CO.




### GENERAL INFORMATION

This set is designed to operate on 105-120 volts AC or DC from 25 to 60 cycles. The cord of the set will become quite warm in operation. This is a normal condition, the voltage reducing resistor being an integral part of the line cord for rapid dissipation of heat.

The set is of the conventional tuned radio frequency type and is so developed as to give a minimum of trouble and a maximum of enjoyment.

It is recommended that the aerial be used that is supplied with the set. However, if a longer aerial is used, it is advisable to rebalance the antenna stage of the set to the aerial used. To accomplish this, remove the set from the cabinet and set the dial to about 20 on the scale. Turn the compensator screw on the rear section of the variable condenser back and forth until maximum signal strength is obtained.

To align Short Wave, open variable condenser about half way and adjust the two short wave padders, one underneath and one on top of chassis, to maximum noise level.

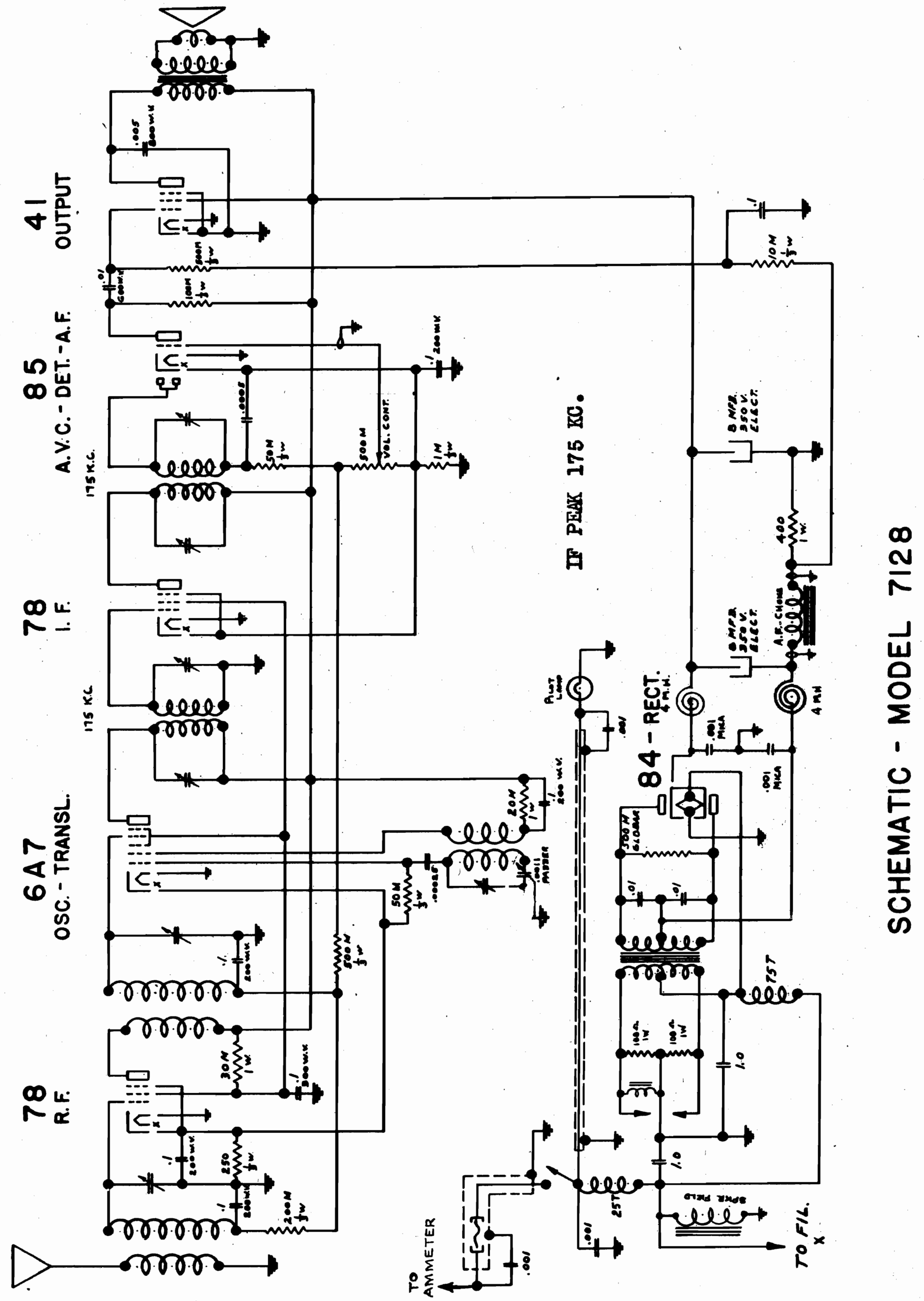
This set is designed to oscillate across a major portion of the broadcast band. This regeneration is controllable by reducing the volume of the set. Oscillation in a set of this type increases the sensitivity from ten to twenty times.

### PARTS LIST - S.R.# 7126.

| No. | |
|---|---|
| 51 | Magnetic speaker |
| 52 | Variable condenser |
| 55 | Cordohm 285 ohm |
| 56 | Complete set of coils |
| 56a | Antenna coil - only |
| 56b | Interstage coil - only |
| 60 | Volume control - 300 ohm |
| 61 | Antenna cord |
| 70 | Electrolytic condenser |
| 71 | Knobs |
| 72 | Short wave switch knob |
| 73 | Terminal strip - 3 lug |
| 77 | Name Plate - Silvertone or Selector |
| 312 | 4 Pole 2 position short wave switch |
| | Any tube socket (state no. of prongs) |
| | Any resistor (state ohms and watts) |
| | Any bypass condenser (state capacity) |

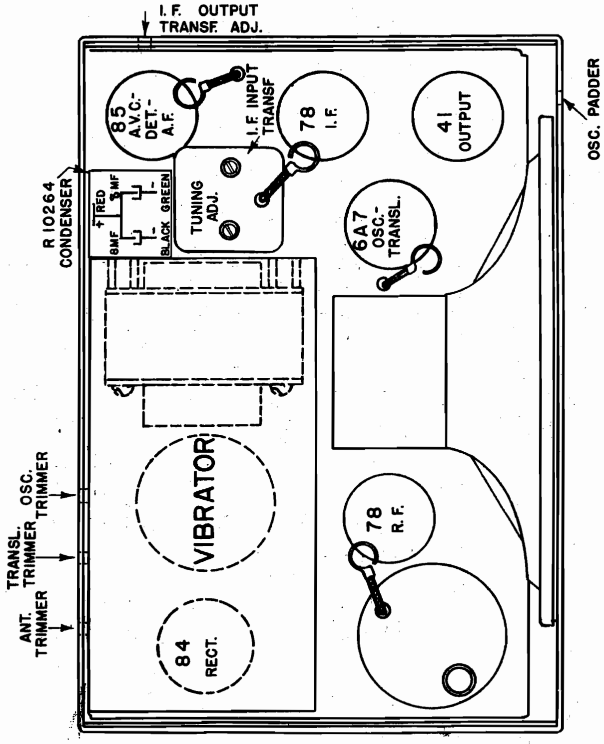
SEARS-ROEBUCK & CO.

**MODEL 7128**
**Schematic**



**MODEL 7128**
**Alignment,Voltage Socket,Parts List**

# SEARS-ROEBUCK & CO.




## SILVERTONE - MODEL 7128

The SILVERTONE Model 7128 is a six tube superheterodyne automobile radio receiver. It uses a full wave vibrator and tube rectifier to supply the "B" voltage.

The tubes and their functions are:

78 - RF
6A7 - Oscillator-Translator
78 - IF
85 - AVC-Det-AF
41 - Output
84 - Rectifier

The resistor marked "Globar" in the schematic, is a special voltage regulating resistor. Its value varies with the voltage applied to it. When the receiver is first turned on, the output voltage from the power supply tends to become very high until the tubes heat sufficiently to draw their normal load. Under these conditions, the Globar resistance drops to a comparatively low value, loading the transformer sufficiently to prevent damage. As the tubes become heated, tending further to lower the voltage, the Globar resistance increases greatly so that it no longer constitutes a load on the power supply.

The voltage drop across the volume control, due to the 85 diode current, is used for AVC voltage.

The general information given in Service Manual Supplement #25, for the Model 1730, will apply as well for the Model 7128.

## ALIGNMENT PROCEDURE

### The IF Stages:

1. Connect the output meter (low voltage scale) across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the control grid cap of the 78 IF tube, leaving the grid clip attached to the cap.

4. Set the test oscillator to 175 kc and tune the IF output transformer. This transformer is mounted under the chassis. The location of its tuning adjustments is shown in the Service Illustration.

5. Change the test oscillator connection to the grid of the translator tube and tune the IF input transformer.

6. Repeat the adjustments to secure greater accuracy. Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

### RF Alignment:

1. Connect the test oscillator to the antenna lead through a .00025 mfd. condenser.

2. Set the test oscillator to exactly 1500 kc.

3. Turn the variable condenser plates all the way out. Then slip a piece of card about the thickness of a postal card between the stator and the short end of the rotor plates in such a way that the plates cannot be meshed. Turn the rotor plates sufficiently to clamp the piece of paper between them and the stator. With the plates in this position, adjust the oscillator trimmer for maximum output.

4. Adjust the antenna and translator trimmers for maximum output.

5. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the oscillator padder until maximum output is obtained.

6. Repeat the trimmer adjustments at 1500 kc.

## TUBE VOLTAGE CHART

All readings are to be taken between chassis and the respective element of each tube.

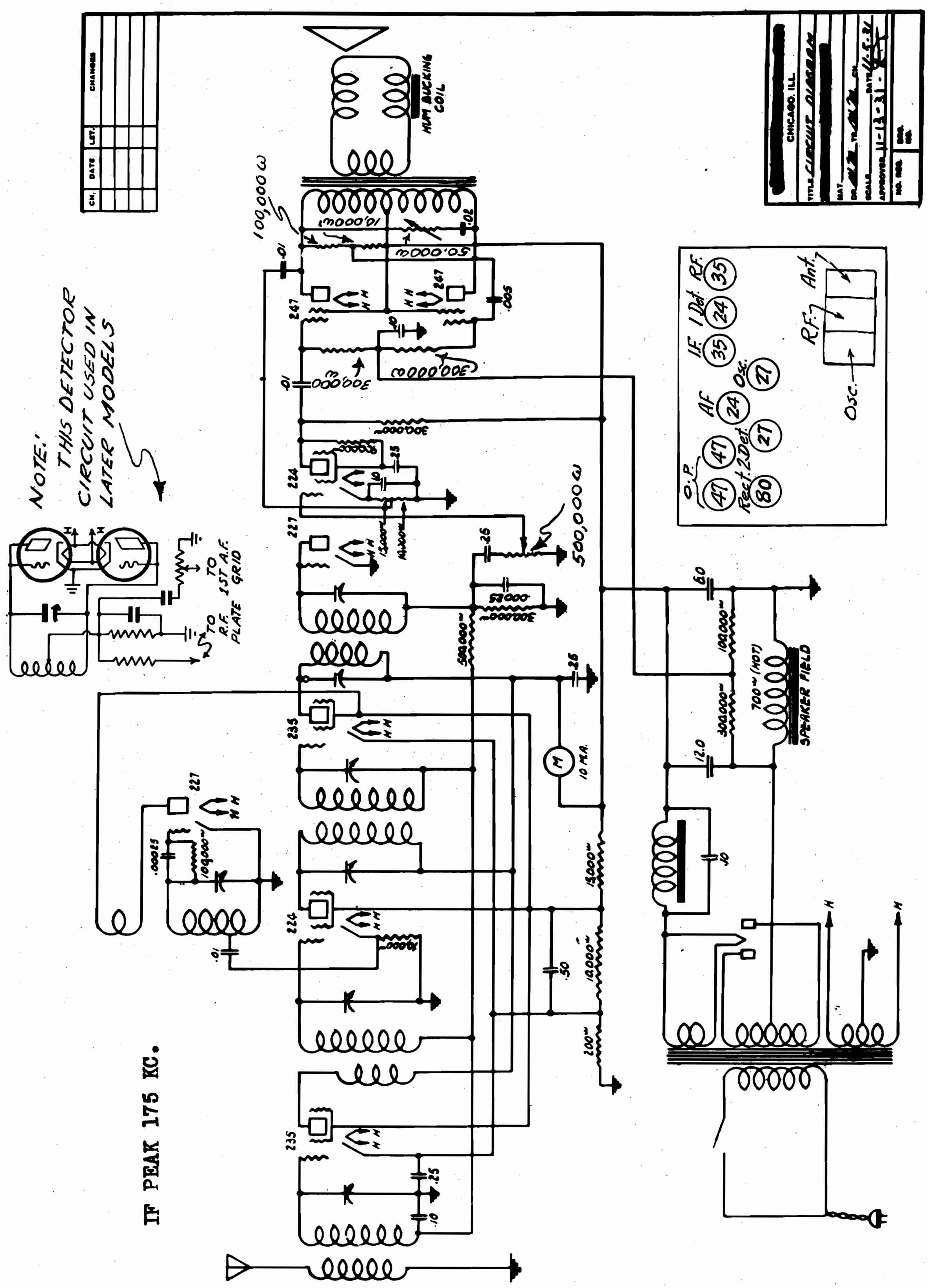
| TUBE | PLATE | SCREEN | OSC.SEC. PLATE | CATHODE |
|---|---|---|---|---|
| 78 - RF | 205 | 75 | | 3.7 |
| 6A7 - Osc-Transl | 205 | 75 | 140 | 3.7 |
| 78 - IF | 205 | 75 | | 4.5 |
| 85 - AVC-Det-AF | 35 | | | |
| 41 - Output | 195 | 205 | | |
| 84 - Rectifier | | | | 205 |

## REPLACEMENT PARTS AND PRICE LIST

| PART NO. | DESCRIPTION | PRICE PER 100 |
|---|---|---|
| R8297A | Board - Terminal, double | 1.34 |
| R8308B | Board - Terminal, double | 1.26 |
| R8308A | Board - Terminal, triple | 1.78 |
| R9753B | Board - Terminal, 6 terminals | 3.05 |
| R10273 | Booklet - Instruction | 2.40 |
| R9734A | Cable - Flexible, drive | 26.82 |
| R9734E | Cable and casing - Variable condenser drive | 71.43 |
| R10064A | Transformer - IF input | 44.27 |
| R10065A | Transformer - IF output | 52.53 |
| R10263A | Transformer - Power supply | 116.31 |
| R9044A | Choke - Single layer | 8.93 |
| R10095B | Choke - Triple layer | 10.41 |
| R11043 | Clip - Grid | .19 |
| R9741 | Clip - "A" lead | 2.04 |
| R10314 | Coil - Antenna | 17.30 |
| R10348 | Coil - Oscillator | 9.33 |
| R10344 | Coil - Translator | 24.74 |
| R9757 | Coil - Choke, pancake type | 5.74 |
| R10272A | Coil - Choke, audio | 24.90 |
| R10349A | Condenser - Variable, assembly | 153.57 |
| R10264 | Condenser - 8 mfd. dual, electrolytic | 68.25 |
| R10069 | Condenser - 1 mfd. 25 volts | 13.34 |
| R8030 | Condenser - 1 mfd. Generator | 19.90 |
| R10025 | Condenser - .5 mfd. Ammeter | 16.74 |
| R6444 | Condenser - .1 mfd. 200 volts | 5.74 |
| R8286 | Condenser - .1 mfd. 200 volts | 4.80 |
| R8581 | Condenser - .1 mfd. 300 volts | 4.40 |
| R7070 | Condenser - .01 mfd. 600 volts | 4.50 |
| R9776 | Condenser - .01 mfd. 800 volts | 4.46 |
| R10431 | Condenser - .005 mfd. 800 volts | 3.73 |
| R6759 | Condenser - .001 mfd. mica | 5.68 |
| R6760 | Condenser - .0005 mfd. mica | 4.56 |
| R4592 | Condenser - .00025 mfd. mica | 8.28 |
| R9426 | Condenser - Padding | 13.75 |
| R9710 | Control - Volume, 500 M ohms | 30.19 |
| R10274 | Control - Remote, head | 119.46 |
| R7228 | Resistor - 500 M ohms, 1/3 watt carbon | 5.25 |
| R6638 | Resistor - 200 M ohms, 1/3 watt carbon | 5.91 |
| R7586 | Resistor - 100 M ohms, 1/3 watt carbon | 5.91 |
| R6637 | Resistor - 50 M ohms, 1/3 watt carbon | 5.25 |
| R6689 | Resistor - 30 M ohms, 1 watt carbon | 6.58 |
| R5095 | Resistor - 20 M ohms, 1 watt carbon | 6.58 |
| R7587 | Resistor - 10 M ohms, 1/3 watt carbon | 5.25 |
| R6636 | Resistor - 1 M ohms, 1/3 watt carbon | 5.25 |
| R8522 | Resistor - 400 ohms, 1 watt carbon | 5.25 |
| R10268 | Resistor - 250 ohms, 1/3 watt carbon | 5.25 |
| R8436 | Resistor - 100 ohms, 1 watt, flexible | 5.25 |
| R9745 | Resistor - 500 M ohms, Globar, voltage regulating | 10.60 |

# SENTINEL RADIO CORP.

**MODEL 114**
Schematic
Circuit Change
Socket Layout



MODEL 114
Alignment Data
Voltage,Parts List

# SENTINEL RADIO CORP.

## VOLTAGE TABLE

Never check voltages until all tubes are fully warmed up to proper operating condition. The voltage table given below is taken at 115 volts line with a Model 547 Weston set checker. It must be remembered that the voltage readings taken vary directly as the line voltage and also with the accuracy of the meters used. A variation of 10% plus or minus is permissible.

### Tube Voltages

| Type of tube | Position of Tube | Filament Volts | B Volts | C Volts | Normal Plate M.A. | Screen Volts |
|---|---|---|---|---|---|---|
| 227 | Oscillator | 2.4 | 62.5 | | 4.75 | |
| 235 | Radio Frequency | 2.4 | 240 | 2.15 | 2.75 | 27 |
| 224 | 1st Detector | 2.4 | 230 | 4,35 | .5 | 65 |
| 235 | Intermediate | 2.4 | 237 | 2.15 | 2.75 | 72 |
| 227 | 2nd Detector | 2.4 | | | | |
| 247 | Pentode | 2.4 | 220 | 8.** | 32.5 | 250 |
| 247 | Pentode | 2.4 | 220 | 8.** | 32.5 | 250 |
| 280 | Rectifier | 4.9 | | | 47.5 ea.plate | |
| 224 | 1st Audio | 2.4 | 100 | 2.1* | .5 | 35* |

115 V. line Volume Control Full On

*These readings are only comparative and are not true voltages applied. The volt meter, when the readings are taken at these points, is in series with a very high resistance.

**To read the 247 bias, read between 247 grid and ground.

## ALIGNMENT OF RECEIVER:

Because of the construction and thorough impregnation of the intermediate coils, the intermediate stages should rarely need retracking. Only when an intermediate coil has become defective due to an open or burned out winding, should it be necessary to readjust the intermediate trimmers. Should this occur, it is necessary that an oscillator be used and the intermediate trimmers be adjusted at 175 kilocycles. To align the intermediate stages, connect the high side of the oscillator output to the grid circuit of the first detector, which is done by disconnecting the grid cap of the 224 first detector and connecting the high side of the test oscillator to the control grid of this tube. The ground side of the test oscillator should be connected to the ground post on the chassis. Set the oscillator at 175 kilocycles and adjust the output of the oscillator so that a convenient reading is obtained on the output meter. Be sure that the output from the oscillator is not so large that it will overload the second detector. If during the alignment the meter goes off scale, reduce the output of the test oscillator or adjust the receiver volume control.

The trimmers of the intermediate coils are accessible through the small holes in the bottom of the chassis. There are two trimmers to each intermediate coil. Align the grid trimmer of the first intermediate coil. After a maximum reading is obtained by adjusting the grid trimmer on the first intermediate, adjust the primary for maximum reading and then recheck the grid side to make certain the alignment of the secondary has not been changed by the adjustment of the primary. The same procedure is followed in aligning the second intermediate coils. After both intermediate coils are properly aligned the adjustment of the intermediate stage is complete and they should not be further disturbed.

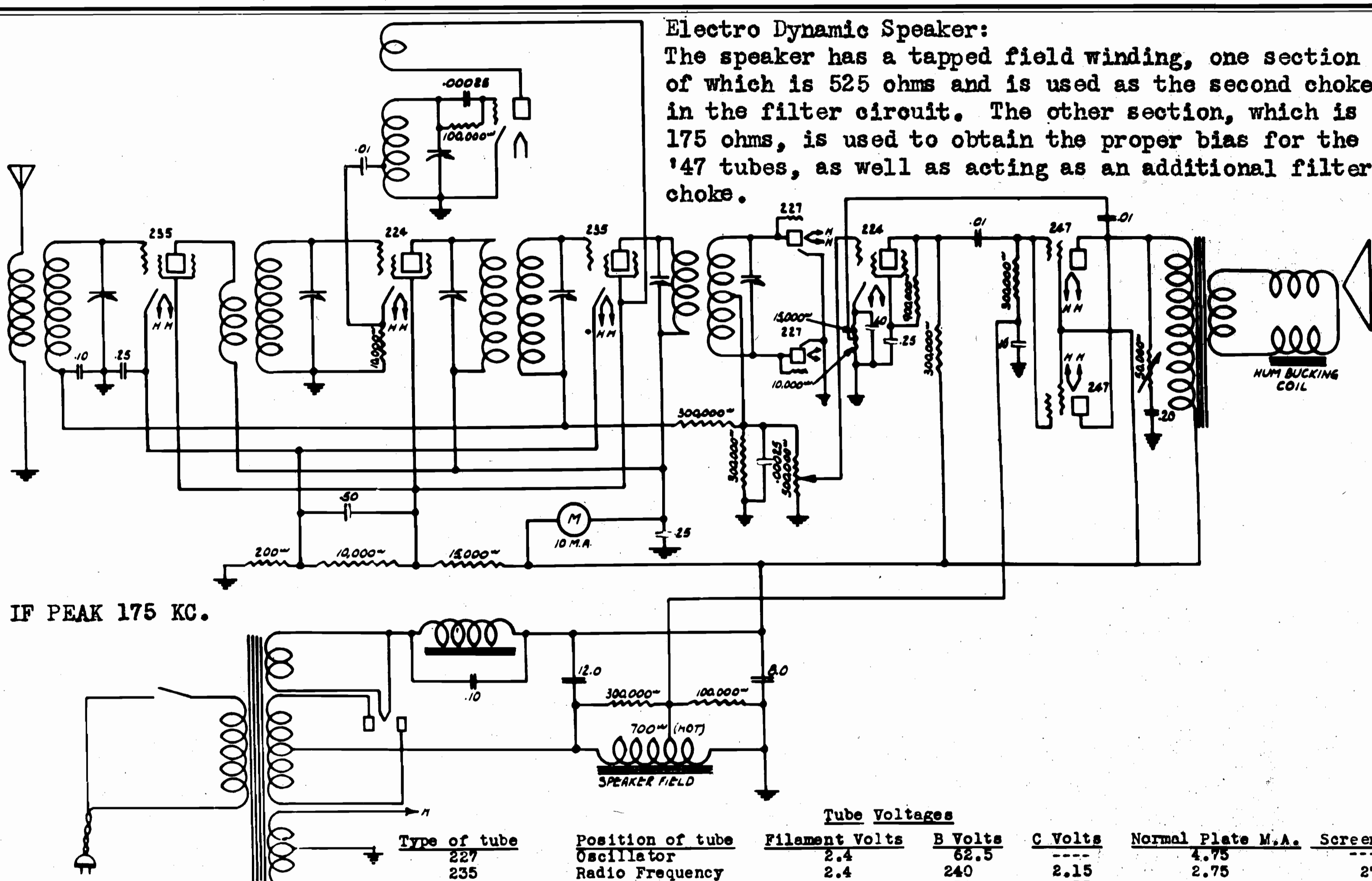
Replace the grid cap on the first detector and connect the oscillator output leads to the antenna and ground posts of the receiver and set the oscillator at 1435 kilocycles. Then tune the receiver to 1435 kilocycles on the dial. It is important that the receiver be tuned to this point. If the receiver is out of the cabinet it will be necessary to use some temporary indicator so that the position 1435 kilocyles on the the dial may be accurately located. (This indicator should be set so that when the variable condensers are at the maximum capacity stop the indicator points to the last line on the dial at the low frequency end.) Then track the variable condensers by adjusting the trimmer condensers in the following order: Oscillator, antenna and radio frequency - (reading from the front of the receiver toward the back, the variable condenser sections are: Oscillator, antenna and radio frequency). After the variable condensers have been properly tracked at 1435 kilocycles, adjust the oscillator to 1295 kilocycles. Tune the receiver to this frequency. Check alignment of the condensers at this point by bending the end plate of the rotors in and out, noting the change in reading on the output meter. If when the plates are bent in the reading is increased, it is an indication that that particular section requires more capacity and the end plate should be permanently bent in at this point; or, if when the end plate is bent away the reading is increased, the end plate should be bent away permanently, as it is an indication that that particular section requires less capacity at that particular point. The variable condensers should be checked in this manner at 1295, 880, 650 and 550 kilocycles. These points have been chosen so as to take advantage of the slots in the end plates of the variable condensers. This procedure of bending plates should rarely be necessary on the oscillator section, as the plates of the oscillator section are especially designed to properly track over the broadcast spectrum, providing the antenna and radio frequency stages are correctly aligned.

| | |
|---|---|
| 7269 | 200 ohm bias resistor |
| 7038 | 10,000 ohms 1st detector cathode, 247 plate and 1st audio cathode resistor |
| 7040 | 100,000 ohms osc. grid, 247 plate, and field shunt resistor |
| 7178 | 15,000 ohms series screen resistor |
| 7042 | 900,000 ohms 2nd detector screen resistor |
| 7187 | 500,000 ohms series bias resistor |
| 7310 | 300,000 ohms field shunt, 247 grid and 224 plate resistors |
| 7864 | Volume control and switch |
| 7037 | Tone control resistor |
| 7331 | Tone control condenser .05 mfd. |
| 7618 | .01 mfd. condenser |
| 7029 | .00025 mfd. osc. grid cond. & 2nd detector grid bias resistor bypass |
| 7457 | Dynamic speaker |
| 7534 | Power transformer for 110 V. 25 cycle |
| 7880 | Meter |
| 7501 | Power transformer |
| 7051 | 8 mfd. elec. condenser |
| 7078 | 12 mfd. elec. condenser |
| 7445 | Filter choke |
| 7620 | .1 mfd. condenser |
| 7255 | Bypass condenser block |
| 7422 | Variable condenser |

# SENTINEL RADIO CORP.

MODEL 118
Schematic
Voltage

Electro Dynamic Speaker:
The speaker has a tapped field winding, one section of which is 525 ohms and is used as the second choke in the filter circuit. The other section, which is 175 ohms, is used to obtain the proper bias for the '47 tubes, as well as acting as an additional filter choke.




IF PEAK 175 KC.

**Tube Voltages**

| Type of tube | Position of tube | Filament Volts | B Volts | C Volts | Normal Plate M.A. | Screen Volts |
|---|---|---|---|---|---|---|
| 227 | Oscillator | 2.4 | 62.5 | ---- | 4.75 | --- |
| 235 | Radio Frequency | 2.4 | 240 | 2.15 | 2.75 | 27 |
| 224 | 1st Detector | 2.4 | 230 | 4.35 | .5 | 65 |
| 235 | Intermediate | 2.4 | 237 | 2.15 | 2.75 | 72 |
| 227 | 2nd Detector | 2.4 | --- | ---- | ---- | -- |
| 227 | 2nd Detector | 2.4 | --- | ---- | ---- | -- |
| 247 | Pentode | 2.4 | 220 | 8.** | 32.5 | 250 |
| 247 | Pentode | 2.4 | 220 | 8.** | 32.5 | 250 |
| 280 | Rectifier | 4.9 | --- | ---- | 47.5 ea.plate | --- |
| 224 | 1st Audio | 2.4 | 100 | 2.1* | .5 | 35* |

115 V. line Volume Control Full On

*These readings are only comparative and are not true voltages applied. The volt meter, when the readings are taken at these points, is in series with a very high resistance.

**To read the 247 bias, read between 247 grid and ground.

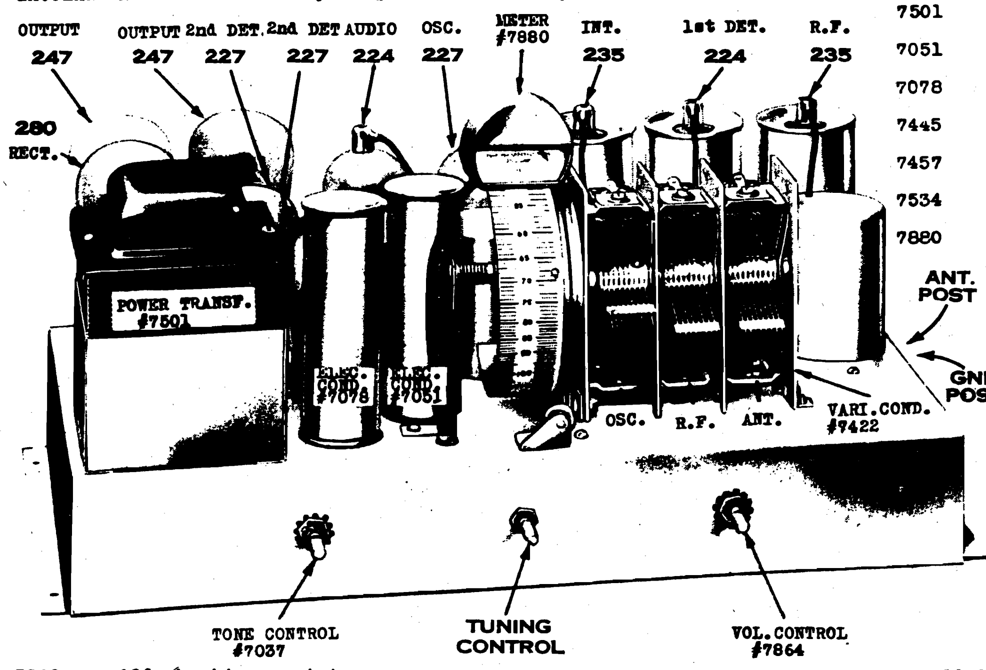
**MODEL 118**
**Alignment Data**
**Socket, Parts List**

# SENTINEL RADIO CORP.

ALIGNMENT OF RECEIVER:
Because of the construction and thorough impregnation of the intermediate coils, the intermediate stages should rarely need retracking. Only when an intermediate coil has become defective due to an open or burned out winding, should it be necessary to readjust the intermediate trimmers. Should this occur, it is necessary that an oscillator be used and the intermediate trimmers be adjusted at 175 kilocycles. To align the intermediate stages, connect the high side of the oscillator output to the grid circuit of the first detector, which is done by disconnecting the grid cap of the 224 first detector and connecting the high side of the test oscillator to the control grid of this tube. The ground side of the test oscillator should be connected to the ground post on the chassis. Set the oscillator at 175 kilocycles and adjust the output of the oscillator so that a convenient reading is obtained on the output meter. Be sure that the output from the oscillator is not so large that it will overload the second detector. If during the alignment the meter goes off scale, reduce the output of the test oscillator or adjust the receiver volume control.

The trimmers of the intermediate coils are accessible through the small holes in the bottom of the chassis. There are two trimmers to each intermediate coil. Align the grid trimmer of the first intermediate coil. After a maximum reading is obtained by adjusting the grid trimmer on the first intermediate, adjust the primary for maximum reading and then recheck the grid side to make certain the alignment of the secondary has not been changed by the adjustment of the primary. The same procedure is followed in aligning the second intermediate coils. After both intermediate coils are properly aligned the adjustment of the intermediate stage is complete and they should not be further disturbed.

Replace the grid cap on the first detector and connect the oscillator output leads to the antenna and ground posts of the receiver and set the oscillator at 1435 kilocycles. Then tune the receiver to 1435 kilocycles on the dial. It is important that the receiver be tuned to this point. If the receiver is out of the cabinet it will be necessary to use some temporary indicator so that the position 1435 kilocycles on the dial may be accurately located. (This indicator should be set so that when the variable condensers are at the maximum capacity stop the indicator points to the last line on the dial at the low frequency end.) Then track the variable condensers by adjusting the trimmer condensers in the following order: Oscillator, antenna and radio frequency - (reading from right to left the variable condenser sections are: Oscillator, radio frequency and antenna). After the variable condensers have been properly tracked at 1435 kilocycles, adjust the oscillator to 1295 kilocycles. Tune the receiver to this frequency. Check alignment of the condensers at this point by bending the end plate of the rotors in and out, noting the change in reading on the output meter. If when the plates are bent in the reading is increased, it is an indication that that particular section requires more capacity and the end plate should be permanently bent in at this point; or, if when the end plate is bent away the reading is increased, the end plate should be bent away permanently, as it is an indication that that particular section requires less capacity at that particular point.
The variable condensers should be checked in this manner at 1295, 880, 650 and 550 kilocycles. These points have been chosen so as to take advantage of the slots in the end plates of the variable condensers. This procedure of bending plates should rarely be necessary on the oscillator section, as the plates of the oscillator section are especially designed to properly track over the broadcast spectrum, providing the antenna and radio frequency stages are correctly aligned.



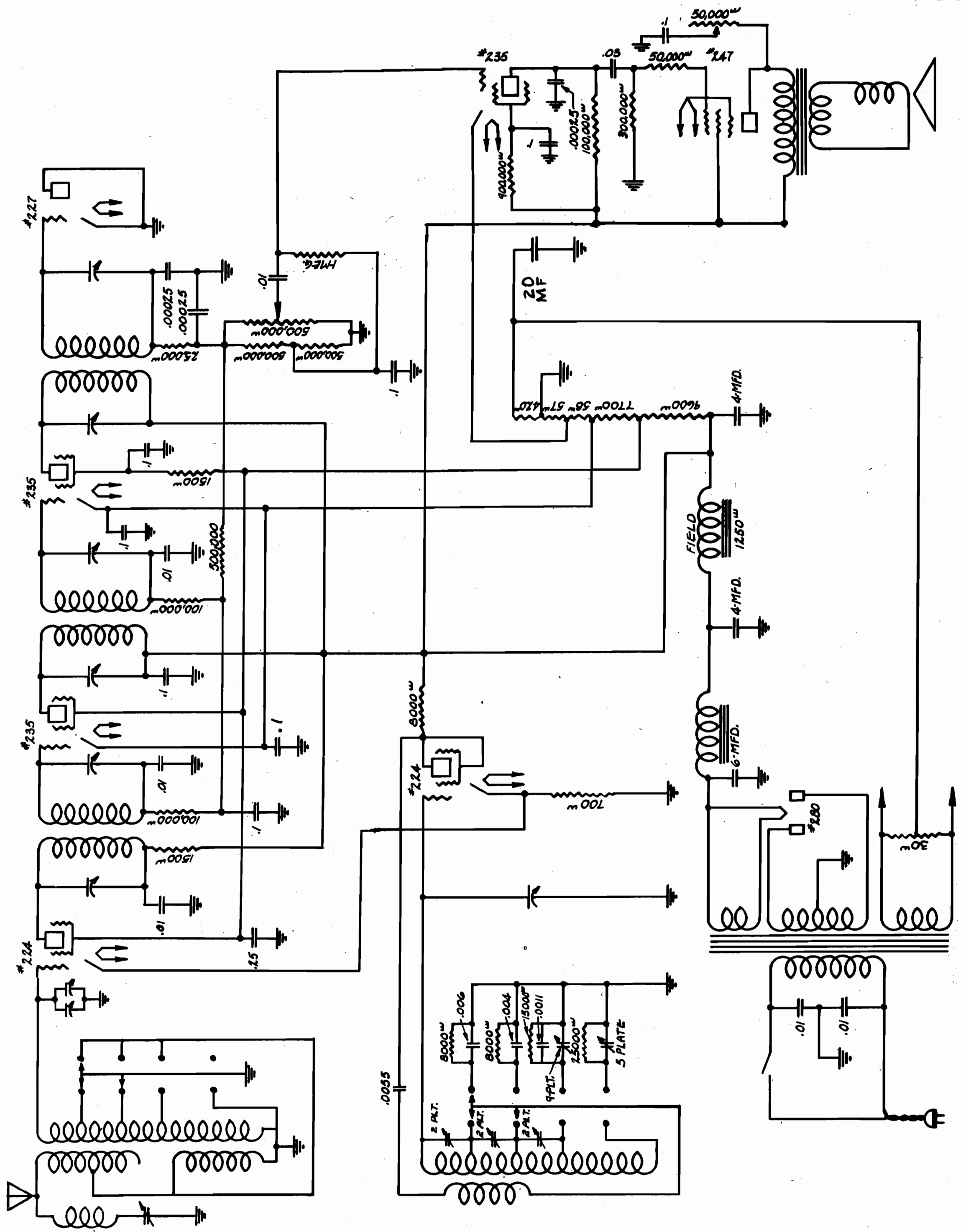

| | |
|---|---|
| 7501 | Power transformer |
| 7051 | 8 mfd. elec. condenser |
| 7078 | 12 mfd. elec. condenser |
| 7445 | Filter choke |
| 7457 | Dynamic speaker |
| 7534 | Power transformer for 110 V. 25 cycle |
| 7880 | Meter |

| | |
|---|---|
| 7269 | 200 ohm bias resistor |
| 7038 | 10,000 ohms 1st detector cathode, 247 plate and 1st audio cathode resistor |
| 7040 | 100,000 ohms osc. grid, 247 plate, and field shunt resistor |
| 7178 | 15,000 ohms series screen resistor |
| 7042 | 900,000 ohms 2nd detector screen resistor |
| 7187 | 500,000 ohms series bias resistor |
| 7255 | Bypass condenser block |
| 7422 | Variable condenser |

| | |
|---|---|
| 7310 | 300,000 ohms field shunt, |
| 7864 | Volume control and switch |
| 7037 | Tone control resistor |
| 7331 | Tone control condenser .05 mfd. |
| 7618 | .01 mfd. condenser |
| 7029 | .00025 mfd. osc. grid cond. |
| 7620 | .1 mfd. condenser |
| SE-269 | Pilot light |

# SENTINEL RADIO CORP.

**MODEL 125**
**Schematic**
**Voltage**




| Type of Tube | Position of Tube | Filament Volts | B Volts | C Volts | Screen Volts |
|---|---|---|---|---|---|
| 224 | Modulator | 2.35 | 250 | 10 | 100 |
| 224 | Oscillator | 2.35 | 160 | 12.5 | 160 |
| 235 | First I. F. | 2.35 | 250 | 7 | 100 |
| 235 | Second I. F. | 2.35 | 250 | 7 | 100 |
| 227 | Detector | 2.35 | --- | ---- | --- |
| 235 | First Audio | 2.35 | 125* | 5 | 25* |
| 247 | Audio | 2.35 | 230 | 16.5 | 250 |
| 280 | Rectifier | 4.85 | 34 MA each plate | | |

These readings are only comparative and are not true voltages applied. The voltmeter, when the readings are taken at these points, is in series with a very high resistance.

**MODEL 261,521**
**Battery Data**
**Parts List**

# SENTINEL RADIO CORP.

In the first models of the automobile radio the B- and hot "A" leads were connected as shown in diagram "A". In the present model these leads are as shown in diagram "B". All other connections are identical, as shown on the schematic drawing. Connecting the black lead in the cable, designated as B- in the instruction sheet, to the hot 6 volt post of the eliminator will supply the hot 6 volts and provide an "off and on" switch for the B eliminator as well as the receiver itself. In this way no other connection between the hot 6 volt lead of the eliminator and battery should be made and no switch for the hot lead to the eliminator is necessary; the set switch controlling both the B eliminator and receiver.

When using B batteries, the black lead should be connected to the B- of the batteries but under no circumstance should a separate lead from the B- terminal of the batteries be run to the chassis of the car or the shielded cable. In other words do not ground the B- terminal of the B batteries.

The only difference in the tube equipment between the early and present models is the output tube. The first model utizized a #41 output tube and the present model a #89 tube. Complete complement of tubes is:

One (1) Type 36 One (1) Type 85
Two (2) Type 39 One (1) Type 89

DIAGRAM "A"

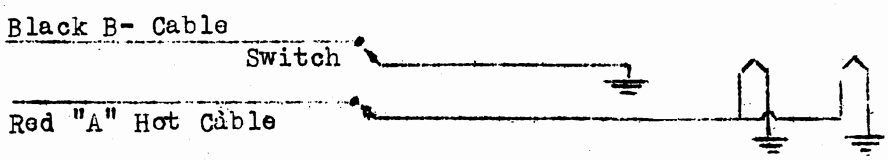
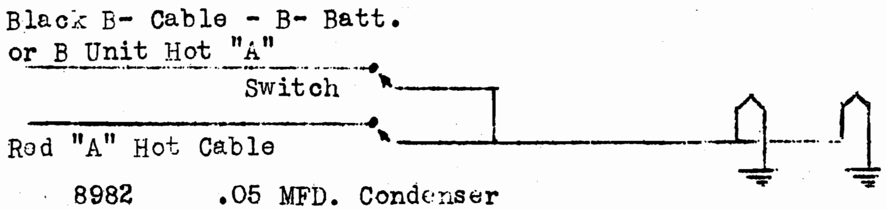


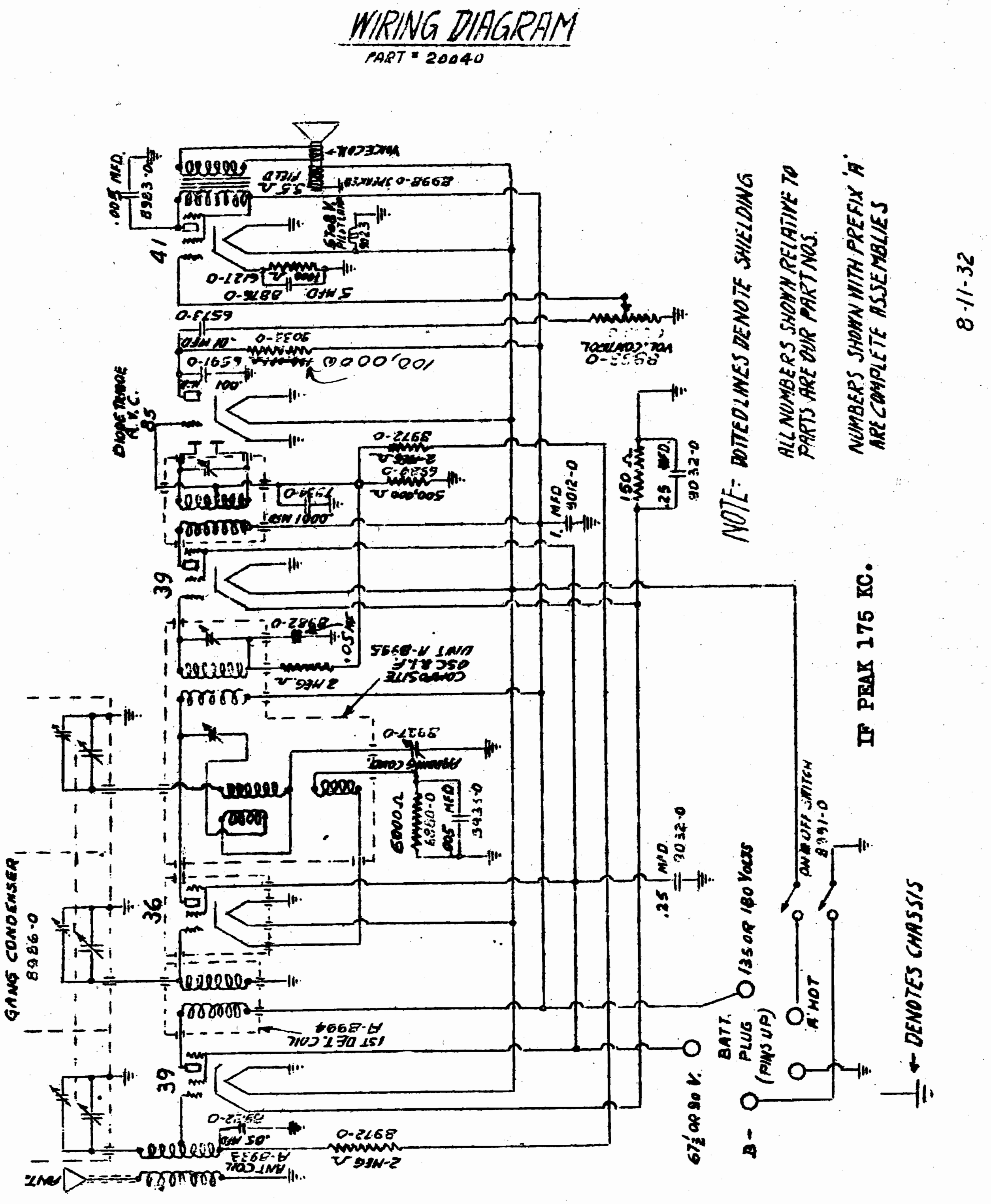

DIAGRAM "B"




| | |
|---|---|
| 8982 | .05 MFD. Condenser |
| 8933 | .005 MFD. 400 volt condenser |
| 8927 | Padding condenser |
| 8961 | .05 MFD. 400 volt condenser |
| 7934 | .0001 MFD. moulded condenser |
| 6591 | .0001 MFD. condenser 85 plate bypass |
| 7860 | .01 MFD. 400 volt coupling condenser |
| 8876 | 5 MFD. dry electrolytic cathode bypass |
| 9032 | .25 MFD. 200 volt cathode 7 screen bypass |
| 9012 | 1 MFD. condenser |
| 8983 | .003 MFD. plate bypass condenser |
| 8972 | 2 megohm resistor |
| 6880 | 6000 ohm resistor |
| 9033 | 100,000 ohm 85 tube plate resistor |
| 8065 | 1,000 ohm 41 tube cathode resistor |
| 6924 | 500,000 ohm resistor |
| 9018 | 150 ohm cathode resistor 1/3 watt |

**MODEL 261,521**
**Schematic**

# SENTINEL RADIO CORP.



**MODEL 261,521**
**Alignment Data**

# SENTINEL RADIO CORP.

The intermediate frequency transformers are tuned to 175 kilocyles. An oscillator which is accurately set to this frequency and which has an attenuator in its output to control the output can be used. It is of course best to start by retuning the intermediate stage before touching other adjustments. The outpnt of the intermediate frequency generator is connected one side to the grid of the 1st detector (236 tube) after removing the grid cap from this tube. The ground of the oscillator is connected to the chassis base. With the frequency set at 175 K.C. (accurately) the tuning adjustments of the 1st and 2nd I.F. transformers are adjusted to peak resonance. It is very important to use a long bakelite screw-driver for these adjustments. In adjusting, the successive tuning condensers are gone over several times readjusting the output of the oscillator or the receiver's volume control as required. With the I.F. transformers properly tuned and sealed, the R.F. and oscillator circuits may next be adjusted.

The grid cap of the 1st detector is replaced and a generator or oscillator having frequencies of 1400 and 600 kilocyles is set up and connected to the aerial and ground of the receiver.

Do not attempt to align condenser without a shield. It is extremely important that a shield corresponding to the can be placed around the antenna coil and gang condenser in making adjustments on the r.f. and oscillator circuits, otherwise due to the change in these circuits caused by this shielding a very inaccurate adjustment will be obtained. This shielding may consist of a piece of steel bent to the shape of the corner of the can fitting around the edge of the base from the speaker to the rear right hand corner and extending as high as the speaker with holes in it corresponding to the condenser trimmer locations or a regular can and cover with such holes provided. This shield or can and cover must be in secure and in proper location and not disturbed during these adjustments From this it is easily seen why if an attempt is made to check the alignment out of the can on this receiver a different or changed adjustment will be had as against the factory setting, which is made with the shielding in place.

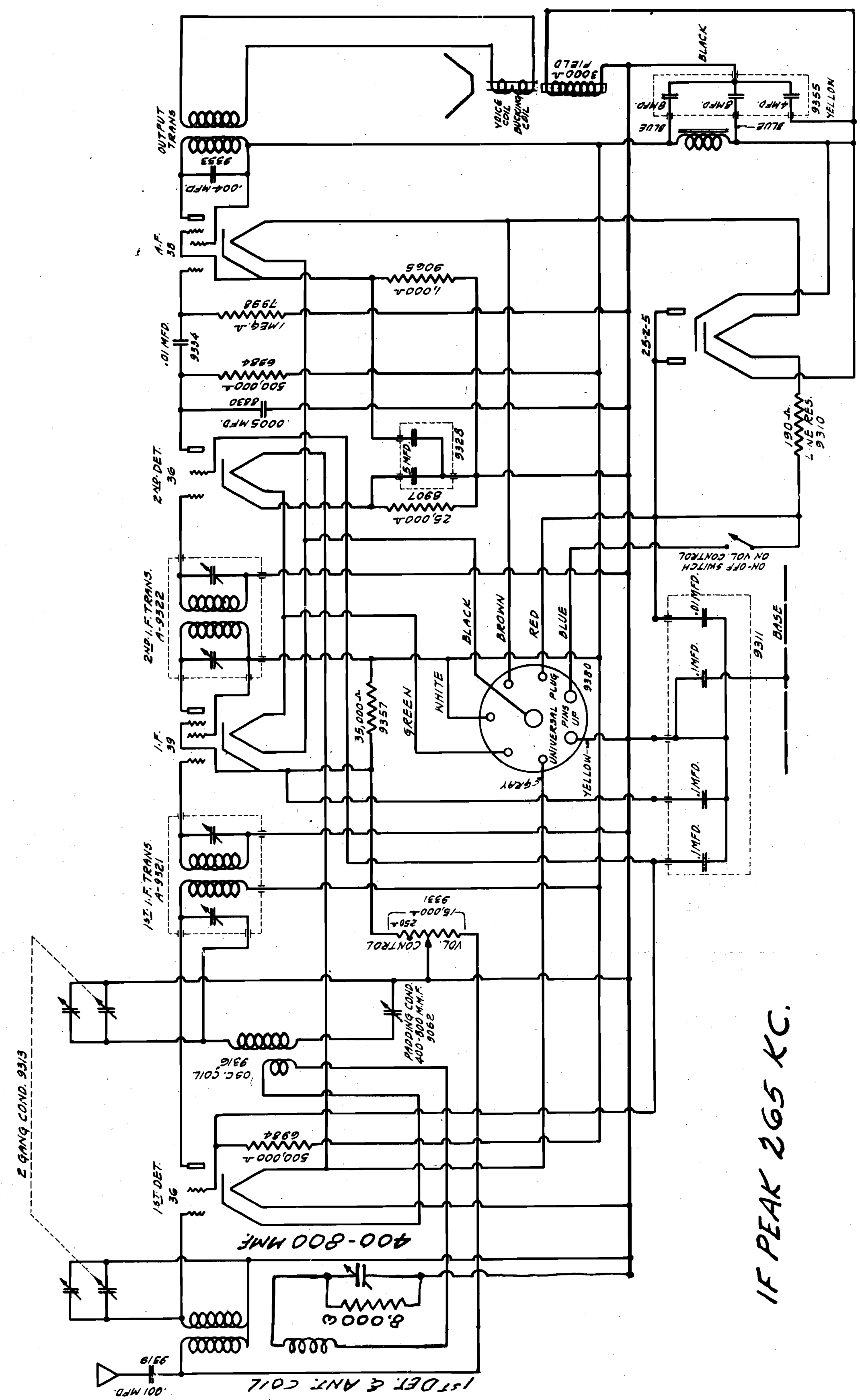
With the above shielding in place and tubes which are to be used in chassis, the procedure of circuit alignment is as follows:

Set the generator frequency at 1400 K.C. Set the tuning dial to 15 on the scale, open trimmers slightly on antenna (top) and 1st detector (middle) sections of gang condenser. Then without disturbing dial setting adjust oscillator (bottom) trimmer on gang to greatest signal. After this has been properly set adjust one at a time the antenna and 1st detector trimmers for maximum signals. If these operations are properly set as above, the receiver circuits are correct for the high frequency adjustment. Next change the generator frequency to 600 kilocycles and turn the tuning dial of the receiver to resonate with this signal.. This will come in around 82 on the dial. When the 600 kilocycle point is located on the dial next adjust the oscillator low frequency padding condenser, which is at the bottom rear edge of chassis base in right corner. The screw on this condenser is adjusted in and out as the receiver dial is slowly moved across the 600 K.C. resonant point until greatest signal strength is obtained. The combination of the best padding condenser setting with the dial setting giving the greatest signal output is the correct padding condenser adjustment. No change in the gang condenser trimmers adjustment should be made during the 600 K.C. adjustment.

DIAL LIGHT. If the dial light burns out be sure and replace with one of same type 6.3 volts 1000 hrs.

**MODEL 550**
**Schematic**

# SENTINEL RADIO CORP.




**ELECTRO DYNAMIC SPEAKER:** The speaker has a DC field resistance of 3000 ohms.

MODEL 550
Voltage
Alignment Data

# SENTINEL RADIO CORP.

FIVE TUBE AC-DC SUPERHETERODYNE
(110 V. AC-DC, 6 V. Storage Batteries & 32 V. DC)

VOLTAGE TABLE: Never check voltages until all tubes are fully warmed up to proper operating condition. The voltage table #1 is taken at 115 volts (AC) line with the volume control in the full on position. It must be remembered that the voltage readings vary directly as the line voltage and also with the accuracy of the meters used. A variation of 10% plus or minus is permissible. THE VOLTAGES WILL BE APPROXIMATELY AS GIVEN FOR EITHER DC OR AC OPERATION.

TUBE VOLTAGES — Table #1

| Type of Tube | Position of Tube | Filament Volts | Plate Volts | Screen Volts | C Volts |
|---|---|---|---|---|---|
| 36 | Composite Oscillator & Modulator | 5.5 | 108 | 21* | 2.5 |
| 39 | Intermediate Frequency | 5.6 | 108 | 108 | 2.5 |
| 36 | Detector | 5.7 | 27* | 21* | 2.5 |
| 38 | Output | 5.8 | 103 | 108 | 1.5* |
| 25z5 | Rectifier | 29.0 | 52.5 MA | | |

The voltage table #2 is for 6 volt battery operation with a B eliminator which is especially designed for the model #561 receiver. The voltages as given will be correct for 32 volt DC operation in conjunction with a B eliminator of the recommended factory type. It will be found that on certain types of eliminators which do not have sufficient output or a low 6 volt battery, the readings will be lower than that given in the voltage table.

TUBE VOLTAGES — Table #2

| Type of Tube | Position of Tube | Filament Volts | Plate Volts | Screen Volts | C Volts |
|---|---|---|---|---|---|
| 36 | Composite Oscillator & Modulator | 5.8 | 112 | 25* | 2.5 |
| 39 | Intermediate Frequency | 5.8 | 112 | 112 | 2.9 |
| 36 | Detector | 5.8 | 28* | 25* | 2.0 |
| 38 | Output | 5.8 | 108 | 112 | 1.5* |
| 25z5 | Rectifier | 52.5 MA | | | |

* These readings for both Table #1 and #2 are only comparative and are not true voltages applied. The voltmeter, when readings are taken at these points, is in series with a very high resistance.

IMAGE SUPPRESSION: Occasionally in some locations interference in the form of whistles or stations which are tuned in on dial settings other than the station's frequency may be encountered. This is a rare occurrence and is called image interference caused by two signals whose frequencies differ by twice the intermediate frequency. This should not be confused with heterodyne whistles which are caused by two stations being received whose frequencies are the same nor by local stations whose frequencies are close to some out-of-town stations frequency which might result in reception from both stations. To overcome this possibility of image interference an image suppression circuit is incorporated in the receiver. The image adjusting condenser is mounted on the back of the chassis below the first IF transformer shield and is accessible through the hole in the chassis. If a whistle or interfering station is received on a frequency other than its fundamental, tune the receiver to this interference and adjust the image suppression condenser until the interference disappears or until the interference is at the minimum point. UNLESS THERE IS AN ACTUAL IMAGE INTERFERENCE DO NOT ATTEMPT TO ADJUST THE IMAGE SUPPRESSION CIRCUIT.

INTERMEDIATE FREQUENCY ALIGNMENT: Only when an intermediate transformer has become defective, due to an open or burned out winding, should it be necessary to readjust the intermediate stages. Should this occur it is necessary that an oscillator be used with some type of output measuring device so as to correctly tune the transformers. To align the intermediate transformers connect the high side of the oscillator output to the control grid of the 36 oscillator modulator tube leaving the grid cap disconnected from the tube. The ground side of the test oscillator should be connected to the gang condenser frame and MUST NOT OTHERWISE BE GROUNDED. Set the oscillator at 265 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter. BE SURE THAT OUTPUT OF THE OSCILLATOR IS NOT SO HIGH AS TO OVERLOAD THE DETECTOR. IF DURING THE ALIGNMENT THE DETECTOR OVERLOADS REDUCE THE OUTPUT OF THE OSCILLATOR. Align the first intermediate transformer by turning the intermediate frequency trimmer screw up and down until maximum reading is obtained on the output motor. Both the primary and secondary trimmer screws should be adjusted in this manner. It is always best to recheck the grid side of the intermediate frequency transformer adjustment to make certain the alignment of the secondary has not been changed by the adjustment of the primary. The same procedure is followed in aligning the second intermediate transformer. After both intermediate transformers are adjusted the alignment of the intermediate stage is complete and the trimmer should not be further disturbed, and the grid cap should be connected to the grid of the 36 tube.

VARIABLE CONDENSER ALIGNMENT: If the intermediate frequency stage has been realigned or if an antenna or oscillator coil requires replacement it will be necessary to realign the variable condenser. The front section of the variable condenser (looking at the front of the receiver) is the oscillator section, the other section tunes the antenna stage. Tune the receiver to 1720 kilocycles on the dial and set the oscillator at this frequency. BE SURE THAT OUTPUT OF THE OSCILLATOR IS NOT SO HIGH AS TO OVERLOAD THE DETECTOR. IF DURING THE ALIGNMENT THE DETECTOR OVERLOADS REDUCE THE OUTPUT OF THE OSCILLATOR. Next ad-

SENTINEL RADIO CORP.

MODEL 550
Alignment Data
Parts List

just the trimmer screws of the oscillator and antenna sections which are mounted on top of the variable condensers so as to obtain maximum output reading. It will be found that the oscillator section trimmer condenser will in most cases have to be adjusted to minimum capacity and in some instances it may be necessary to remove the trimmer screw entirely. After the trimmers have been correctly adjusted, at this frequency, tune the receiver to 600 kilocycles and adjust the oscillator to 600 K.C. Next, adjust the oscillator padding condenser (which is located directly below the variable condenser and accessible through the hole in the front of the chassis) to obtain maximum reading on the output meter. If the above is correctly followed the receiver will now track correctly over the entire band from 1720 KC to 550 KC. It is always advisable to align the receiver, whenever possible, with the tubes that are to be used in the set.

32 VOLT FARM LIGHTING SYSTEMS! When the current supply is DC, the 32 volt mains plug must be inserted correctly into the 32 volt DC mains receptacle, otherwise the set will not operate because of reversed polarity. If, after inserting the mains plug into the receptacle, the receiver does not operate for approximately one minute or one and a half minutes, remove the mains plug and turn it half way around and insert it into the receptacle. When operating the receiver on DC it will be found that in most instances the noise interference is greater than when the receiver is used on AC current. DC appliances such as motors, fans, etc., as a general rule cause more interference than similar AC equipment. Unfortunately this interference can only be eliminated at the source of the interference. When operating the receiver on 32 volt DC and using a B eliminator, be sure to keep the set aerial wire as far away from the DC line as possible, to avoid noise pick up from the 32 volt DC line. By connecting the antenna wire to an outside aerial in the event the noise interference is excessive, the interference can generally be minimized, as the increased volume obtained with the longer aerial permits lower minimum volume control setting and a consequent apparent reduction in noise interference. It is not recommended that the 6 volt cable and 6 volt B eliminator be used on the 32 volt system by tapping in at 6 volt as the current consumption will be too large, nor is it recommended that B batteries be used as the life of the battery will be limited. To reduce the drain on the batteries if they are used, it is recommended that only 90 volts of battery be connected to the receiver.

PARTS PRICE LIST

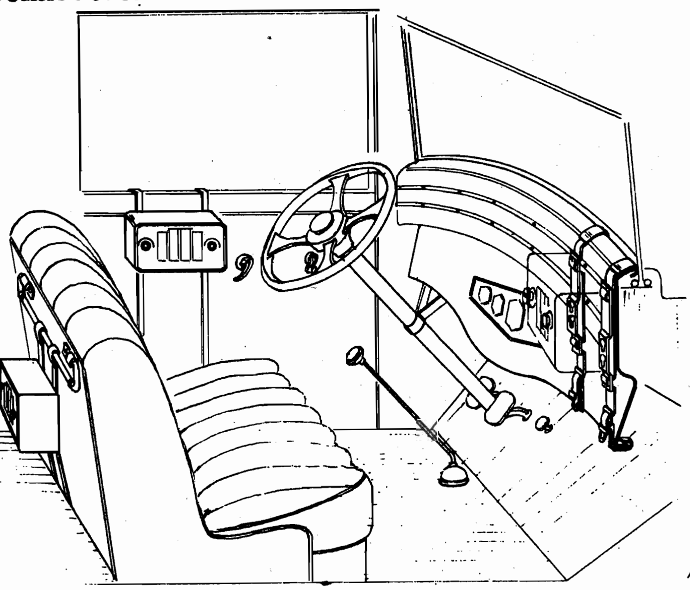
FOR THE

AC-DC FIVE TUBE SUPERHETERODYNE

| PART NUMBER | | PART NUMBER | |
|---|---|---|---|
| 8923 | 39 Tube Socket | 9357 | 35,000 " " |
| 8922 | 36 " " | 7998 | 1 Meg. Ohm Resistor |
| 9307 | 38 " " | 9337 | 8,000 Ohm Resistor |
| 9308 | Rectifier Tube Socket | 9405 | 110-V Cable |
| 9313 | Gang Condenser | 9342 | Knobs |
| 9062 | Padding Condenser | 9340 | Cabinet less back |
| 9316 | Oscillator Coil | 9423 | Wood Cabinet |
| 9317 | Antenna and 1st Detector Coil | 9369 | Cabinet Back |
| 9321 | 1st IF Transformer | 9411 | Antenna Wire and Spool |
| 9322 | 2nd IF Transformer | 7690 | Rubber Feet Pads |
| 9310 | Wire Wound Resistance Strip 190 ohms | 9399 | 6 Volt B Battery Eliminator |
| 9312 | Filter Choke | 9408 | 32 Volt B Battery Eliminator |
| 9315 | Dynamic Speaker | 9420 | 220 Volt Line Adapter |
| 9311 | By-pass Condenser Block (.1-.1-.1-01 M.F.D.) | 9153 | Car Antenna |
| 9355 | Elec. Condenser Block (8 x 8 & 4 M.F.D.) | 9131 | Spark Plug Suppressor |
| 9328 | " " " (5 x 5 M.F.D.) | 9132 | Generator Suppressor |
| 9333 | .004 M.F.D. Condenser | 9133 | Generator By-pass Condenser |
| 9334 | .01 M.F.D. Condenser | 9412 | 23 Ohm Resistor for 32-Volt Cable |
| 8830 | .0005 M.F.D. Mica Condenser | 9408 | 32 Volt Adapter Cable Complete |
| 9319 | .001 M.F.D. Mica Condenser | 9397 | 6-Volt Adapter Cable Complete |
| 9331 | Volume Control | 9380 | Set Cable Plug |
| 8907 | 25,000 Ohm Resistor | 9402 | Bkt. Assem. Complete |
| 9065 | 1,000 " " | 9393 | Web Strap Buckle |
| 6984 | 500,000 " " | 9390 | Long Web Strap Only |

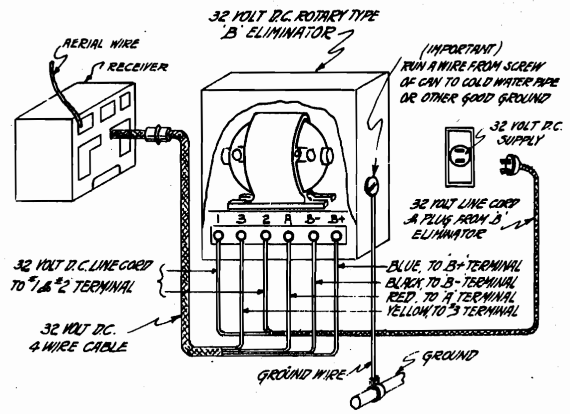
MODEL 550
**Installation and Connection Details**

# SENTINEL RADIO CORP.



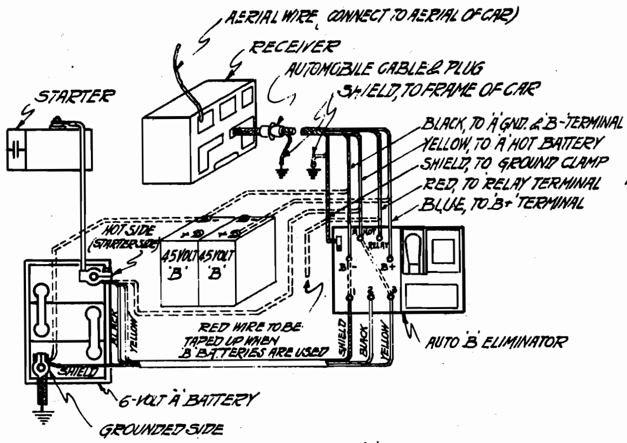
SKETCH SHOWING VARIOUS MOUNTING OF RECEIVER

FIG. 1



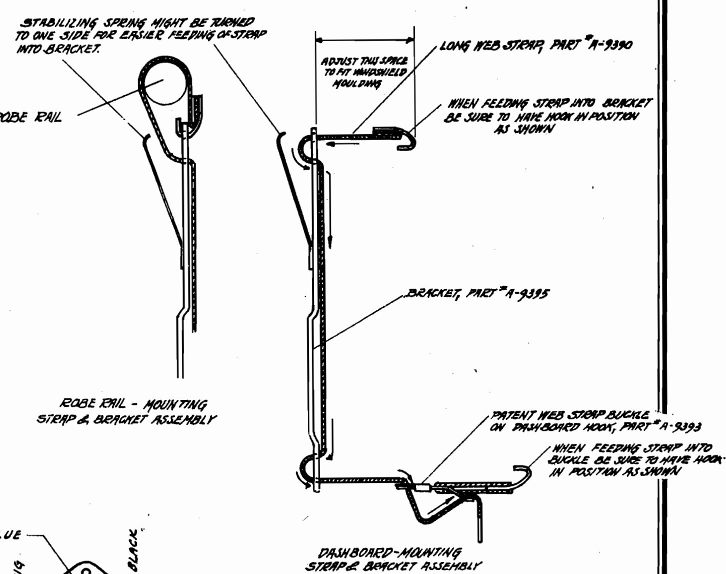

NOTE:- IF 'B' BATTERIES ARE USED INSTEAD OF 'B' ELIMINATOR, CONNECT THEM TO SET CABLE WIRES AS SHOWN IN DOTTED LINES IN FIG. #2. THE YELLOW AND BLACK CABLE WIRES ARE CONNECTED TO LINE CORD & PLUG FOR 32 VOLT SOCKET CONNECTION.

FIG #3 SKETCH SHOWING CABLE CONNECTIONS TO 'B' ELIMINATOR FOR 32 VOLT D.C. OPERATION



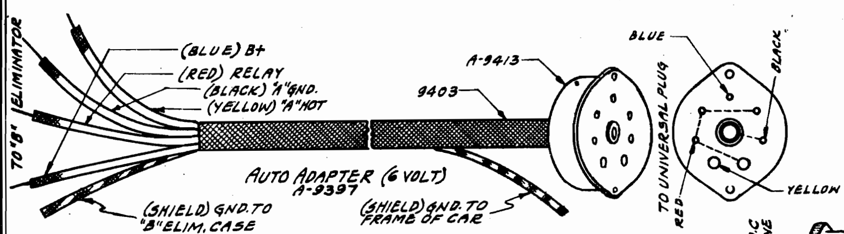

NOTE:- DOTTED LINES SHOW CONNECTIONS TO 'B' BATTERIES WHEN 'B' ELIMINATOR IS NOT USED

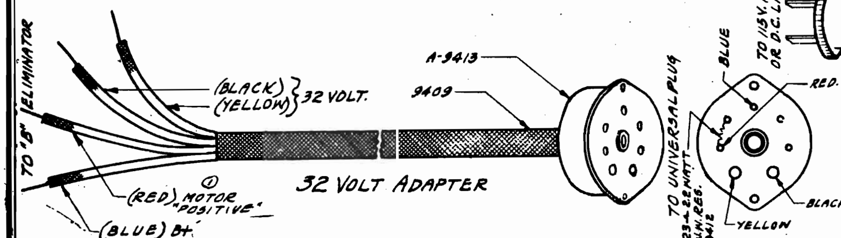
FIG. #2 SKETCH SHOWING CABLE CONNECTIONS TO 'B' ELIMINATOR OR 'B' BATTERIES FOR 6 VOLT 'A' AUTO OPERATION

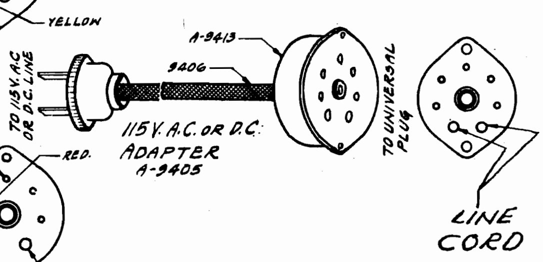



METHOD OF FEEDING STRAP INTO BRACKET & BUCKLE

FIG. #4

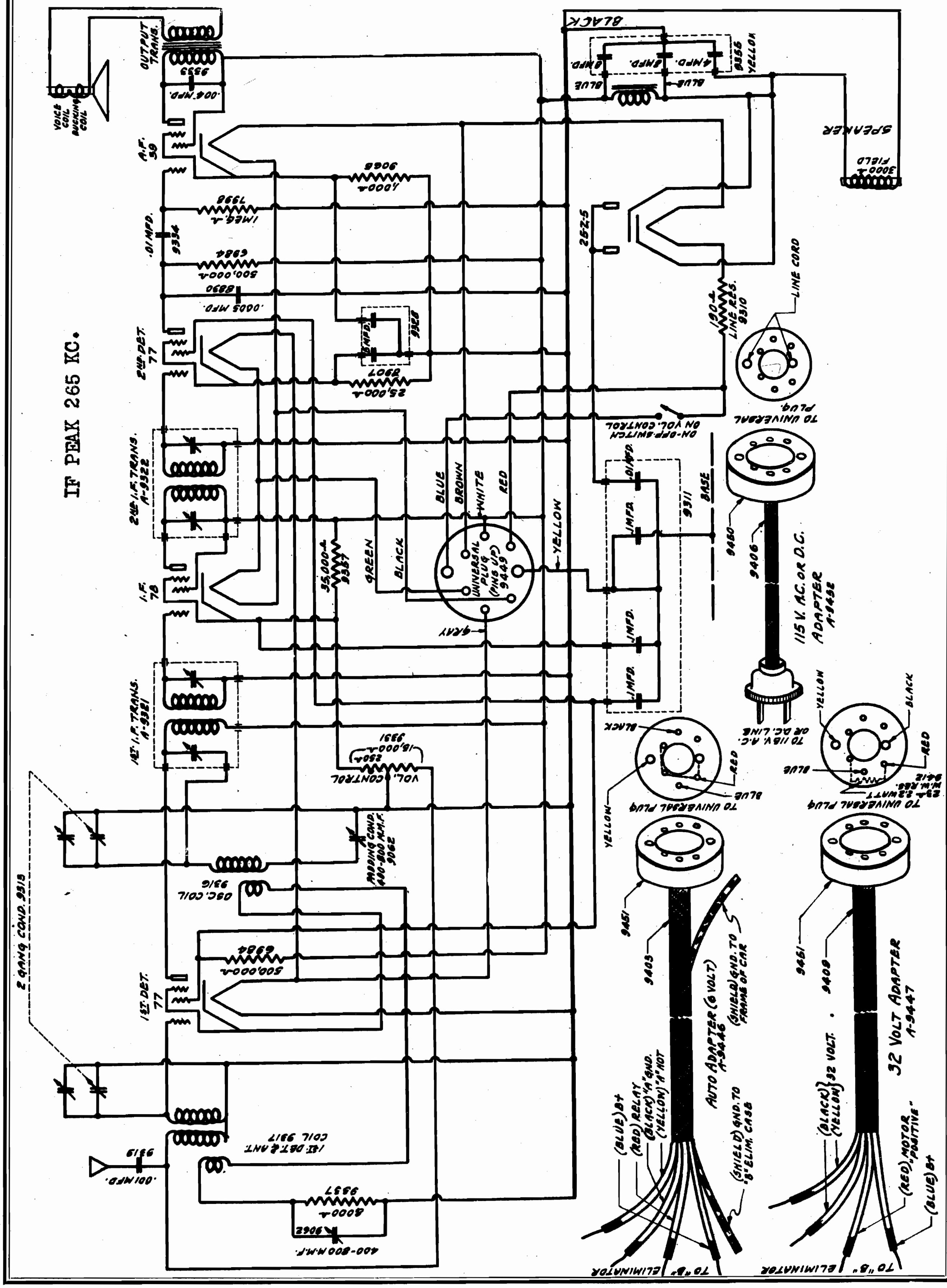


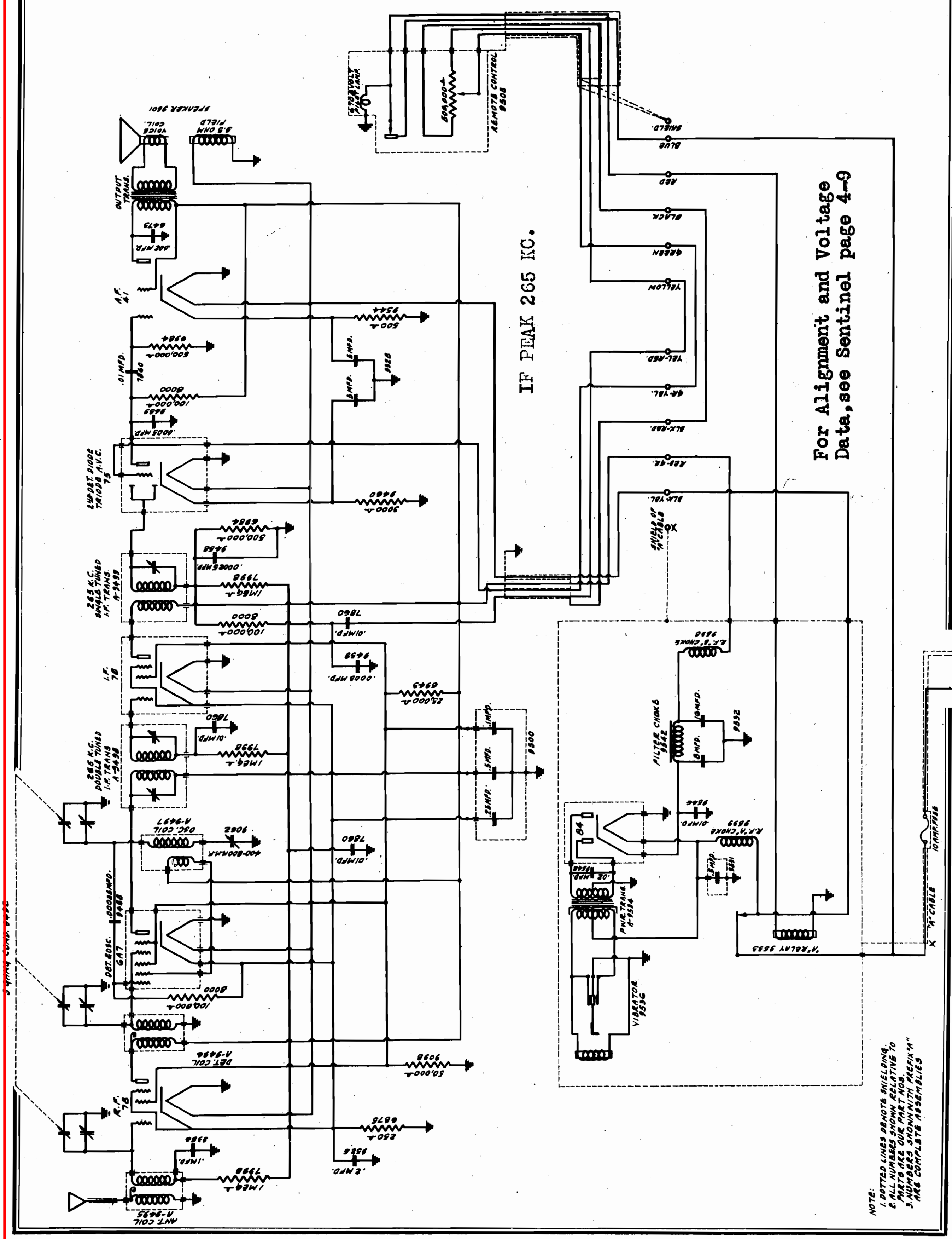
SENTINEL RADIO CORP.

MODEL 560 (2nd Type)
Schematic



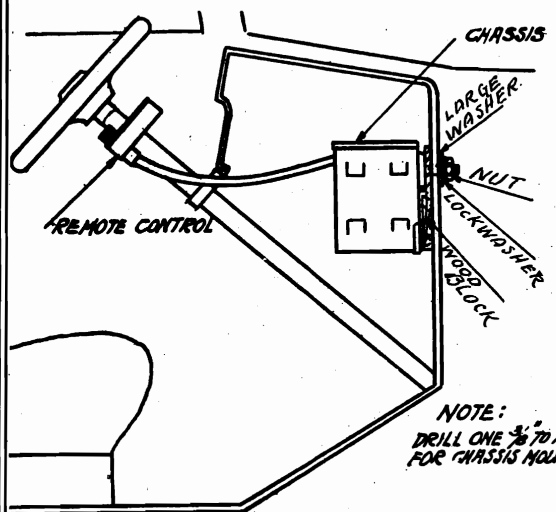
**MODEL 600 Auto**
**Schematic**

## SENTINEL RADIO CORP.



**MODEL 602**
**Installation Notes**

# SENTINEL RADIO CORP.



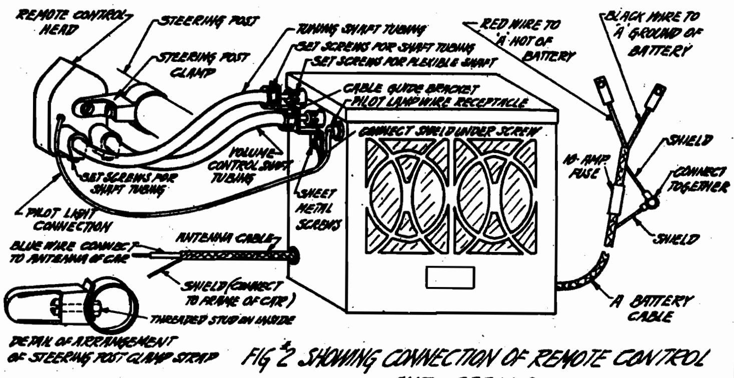




FIG #2 SHOWING CONNECTION OF REMOTE CONTROL AND CABLES

RECEIVER MOUNTING: The receiver, speaker and "B" eliminator are all contained in a single unit in one steel housing and requires the drilling of but one hole in the bulkhead for mounting. The receiver should be so mounted that the remote control shaft will reach the steering post in as straight a line as possible so as to eliminate any unnecessary bend in the cable. Care should be exercised in choosing the receiver location to avoid interference with the foot pedal, hand brake, clutch pedal and possible interference with the legs of the driver or passenger. A paper drilling template is provided to aid in finding the best location. When the location has been decided on, drill a 3/8" to 7/16" diameter hole in the motor bulkhead after which the wooden spacer block should be placed on the set mounting bolt and the bolt pushed through the hole in the bulkhead with the wooden spacer block on the driving compartment side. (Fig. No. 1). Place the steel washer, lockwasher and mounting bolt nut (in the order named) on the mounting bolt drawing up the nut loosely. Next, lift the receiver in position so that the square head of the mounting bolt will slip into the lower slotted end of the set mounting plate. Gently lowering the receiver will force the mounting bolt head to the top of the mounting plate slot. The receiver and the mounting bolt will be rigidly locked in position by drawing the mounting bolt up tight. On some installations because of insufficient room under the bulkhead it may be necessary to push the square head of the mounting bolt to the top of the mounting plate and then push the bolt through the hole drilled in the bulkhead.

REMOTE CONTROL: The remote control head, the steering post strap and clamp, the volume control and tuning control shaft tubing and the cable guide brackets are shipped unassembled. No difficulty will be had in properly assembling if the proper procedure is followed in the order given.

1. Mount the two cable guide brackets which are held in position with the two self tapping sheet metal screws, placing the pilot light shield lead under the head of one of these screws (see Fig. 2).

Push the flexible shaft of the volume control tubing through the volume control guide bracket into the volume control coupler mounted on the set until it touches the stop.

Then tighten the two flexible shaft set screws in the volume control coupler firmly.

Next, place the volume control shaft tubing so that it extends about 1/4" beyond the guide bracket. Do not permit tubing to touch the coupler. After correctly locating, screw the two guide bracket coupler set screws firmly, but do not force these set screws too tightly otherwise the drive shaft will bind. The tuning control flexible shaft should be mounted in the tuning coupler and the tuning control shaft tubing in the guide bracket in the same manner. Do not put the tuning control flexible shaft in the volume control coupler and vice-versa. Looking at the back of the remote control head the lefthand shaft tubing is the tuning control and the right hand one the volume control (Fig. 2). Looking at the side of the receiver the righthand coupler is the volume control and the lefthand coupler is the tuning control.

2. Loosen the two shaft tubing screws (Fig. 2) underneath the remote control head and insert the slotted end of each shaft tubing in their proper place in the remote control head, after which the set screw should be firmly tightened. If the shaft tubing is properly spaced from

**MODEL 602**
**Installation Notes** **SENTINEL RADIO CORP.**
**Part 2.**

the couplers,the volume control and tuning control will move freely. If improperly spaced the shaft tubing may rub on the couplers or may rub in the remote control head thereby making the volume control and tuning control work hard.

3. The steering post clamp strap and clamp bracket should now be mounted on the steering post. The steering post clamp strap has four holes, one of which is threaded. The other three holes are provided so that the clamp may be used on any of the various size steering posts.

The remote control head may be located on the left or righthand side of the steering post column or on the dashboard by using the proper one of the three threaded clamp screw holes on the back of the remote control head. To mount on the lefthand side of the steering post use the lefthand threaded hole, for righthand mounting use the righthand threaded hole and for dashboard mounting the top threaded hole.

Form the clamp with the threaded stud on the inside by placing it around the steering post. Place the slotted end of the clamp against the clamp strap so that the hole in the clamp lines up with the two holes in the strap (Fig. 2.) Push the clamp strap through the hole in the clamp and screw the clamp screw into the threaded strap stud sufficiently tight so that it will be locked firmly in position. The remote control head may now be mounted on the steering post clamp by pushing the machine screw through the hole at the end of the clamp and screwing this machine screw through the threaded hole in the back of the remote control head.

4. The remote control drive is now completely mounted. It is possible that the dial calibration will not be correct. To properly align the dial turn the tuning control knob in the counter clockwise direction until the stop on the variable condenser is reached. This will be indicated by increased tension on the knob. Do not force the dial otherwise the dial needle will jump and the dial calibration will be inaccurate.

PILOT LIGHT: A six to eight volt Mazda type miniature size pilot light is used in the remote control head. The pilot light lead from the remote control head must be inserted in the pilot light receptacle located on the side of the set housing adjacent to the volume control shaft tubing guide bracket. The shielded lead of the pilot light lead should be connected underneath the head of one of the guide bracket mounting screws. To replace the pilot light remove the two control knobs by pulling outward on the knobs. Next, the three small head machine screws on the front of the remote control which hold the front cover of the control box in place should be removed. The cover of the remote control head may now be lifted off the control box and the pilot light socket then becomes accessible.

ANTENNA: A good antenna is very important. An inefficient or insufficient aerial will result in unsatisfactory reception. Most late model cars are factory equipped with an antenna built in the roof of the car. This is generally the most satisfactory type of aerial. If the car is not equipped with a roof type aerial, one may be installed or use may be made of the various aerial kits now available such as plates that are mounted underneath the running board or the strap type aerial which can be fastened between the front and rear axles. THE CLOSER TO THE GROUND THE STRAP OR PLATE TYPE ANTENNA IS SUSPENDED THE GREATER ITS EFFICIENCY.

"B" ELIMINATOR: The "B" eliminator unit which contains the No. 84 rectifier tube is mounted below the receiver and is held in position in the set housing by three machine screws which are accessible from the bottom of the set housing. To replace the rectifier tube it is necessary that the "B" unit be removed from the set housing. To do this unscrew the three "B" unit machine screws in the bottom and the six screws that hold the small detachable plate on the lower back of the set housing. After this plate is removed, the set cable wires which are now accessible should be disconnected from the "B" eliminator terminal strip mounted on the eliminator unit, after which the eliminator may be pulled out of the set housing. Next, remove the cover of the eliminator by unscrewing the six machine screws which hold this in place. After the cover has been taken from the top of the "B" unit the complete mechanism of the "B" eliminator can be lifted out of the eliminator housing and the "B" eliminator tube replaced. Care should be taken when reinstalling the "B" unit in the set housing so that the set cable wires are properly connected to the "B" eliminator terminal strip. Excessive vibration of the "B" unit may be corrected by substituting a new vibrator rubber cover. When changing the rubber cover be sure to place the vibrator unit back in the "B" unit with the vibrator leads toward the "B" eliminator transformer. Continuous blowing of the fuse is indicative of a possible defective "B" unit transformer, a defective vibrator or a defective No. 84 tube. UNDER NO CIRCUMSTANCES ATTEMPT TO ADJUST THE VIBRATOR UNIT. IF THE UNIT BECOMES DEFECTIVE IT SHOULD BE REPLACED WITH A GOOD ONE ONLY. R.F. hash indicated by a constant static-like background noise, which is apparent over the entire tuning range (with the set aerial disconnected) may be due to a defective No. 84 tube or a loose "B" unit cover. If the set antenna lead is run in close proximity with the set "A" leads or the battery "A" hot lead, it is possible to pick up this form of interference. Rerouting the set antenna lead will correct this.

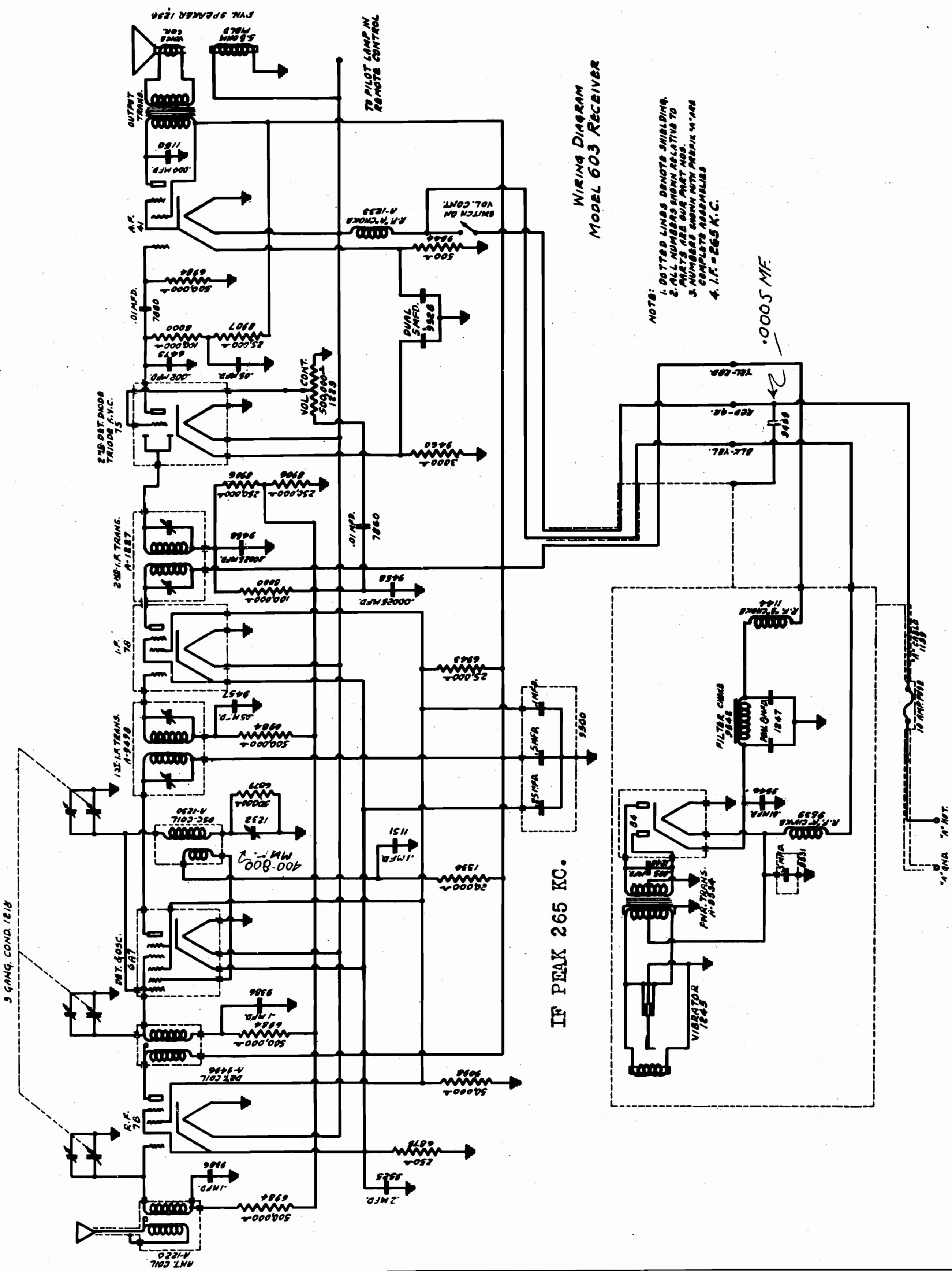
TUBES: The receiver utilizes the following tubes:

One (1) Type 78 - Amplifier Tube
One (1) Type 6A7 - Detector & Oscillator Tube
One (1) Type 78 - I. F. Tube
One (1) Type 75 - Second Detector Diode & AVC Tube
One (1) Type 41 - Output Tube
One (1) Type 84 - Rectifier Tube

The tube locations are shown in the diagram attached to the set housing cover. Always be sure that the tubes and their tube shields are firmly pressed down in their sockets. The tubes are readily accessible for removal or for checking by taking off the cover of the metal cabinet. To do this it is only necessary to unscrew the six machine screws which hold the cover to the cabinet and lift the cover off the cabinet. NOTE: In some installations, because of the location of the receiver it may be necessary to remove the set from the motor bulkhead to check the tubes. The tubes used are sturdily constructed and especially designed for use in automobile receivers and under normal conditions will give satisfactory service for a long period of time. Occasionally a tube may become faulty shortly after being placed in service and is generally indicated by low volume or distorted tone. Whenever this condition exists the tubes should be tested and the defective tubes or tube replaced. If the receiver becomes microphonic it can generally be traced to the 6A7, 75 or 41 tube.

**MODEL 603**
**Schematic**

# SENTINEL RADIO CORP.



**MODEL 603**

**Alignment, Voltage**

**Parts List**

## SENTINEL RADIO CORP.

1. Connect the high side of the oscillator output to the control grid of the 6A7 tube leaving the control grid cap disconnected. Connect the ground side of the oscillator to the receiver chassis.

2. Set the oscillator frequency at 265 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning one of the trimmer screws up and down until maximum reading is obtained on the output meter, and then adjust the other trimmer screw of the intermediate transformer for maximum sensitivity.

4. Adjust the second intermediate transformer in the same manner.

NOTE: Two types of intermediate transformer trimmers have been used in this model receiver. One type has two parallel holes in the top of the shield, one for each trimmer. The other type has a brass hex nut for adjusting one intermediate trimmer, the other intermediate trimmer being adjusted with the trimmer screw located inside of the brass hex nut. Regardless of which type trimmer is used the procedure is the same.

TO ALIGN THE VARIABLE CONDENSER: It is not necessary to remove the receiver chassis from the set housing to align the gang condenser. Regardless of whether or not the receiver is or is not mounted in the set housing the alignment procedure is the same. Three holes are provided in the left hand side of the set housing for the gang condenser trimmers and one in the front of the set housing for the 600 kilocycle padding condenser.

1. Properly connect the remote control head and shafts and adjust the dial needle on the dial face so that the dial calibration is correct.

2. Connect the high output side of the oscillator to the antenna and the ground to the receiver chassis.

3. Tune the receiver to exactly 1400 kilocycles on the dial and adjust the oscillator to this frequency. BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE OSCILLATOR GANG CONDENSER TRIMMER. Looking at the side of the receiver and reading from top to bottom the trimmer condensers are the antenna, R. F. and oscillator sections. Next, adjust the R. F. and antenna sections of the gang condenser for maximum sensitivity

4. Tune the receiver to approximately 600 kilocycles on the dial and set the oscillator to this frequency. Then adjust the 600 kilocycle padding condenser, which is located on and accessible through the hole in the front of the chassis for maximum output. Always rock the condenser slightly to the right and left when making this adjustment using the position of greatest output.

| TYPE OF TUBE | POSITION OF TUBE | FILAMENT VOLTS | TUBE VOLTAGES PLATE VOLTS | CATHODE VOLTS | SCREEN VOLTS | GRID NO. 1 | GRID NO. 2 | GRID NO. 3 | GRID NO. 5 |
|---|---|---|---|---|---|---|---|---|---|
| 78 | Radio Frequency | 6 | 210 | 4 | 80 | | | | |
| 6A7 | Oscillator & Modulator | 6 | 210 | 4 | | 35 | 140 | 80 | 80 |
| 78 | Intermediate Frequency | 6 | 210 | 4 | 80 | | | | |
| 75 | 2nd Detector Diode & AVC | 6 | 100 | 1.5 | | | | | |
| 41 | Output | 6 | 200 | 8 | 210 | | | | |
| 84 | Rectifier | 6 | 260## | 235 | | | | | |

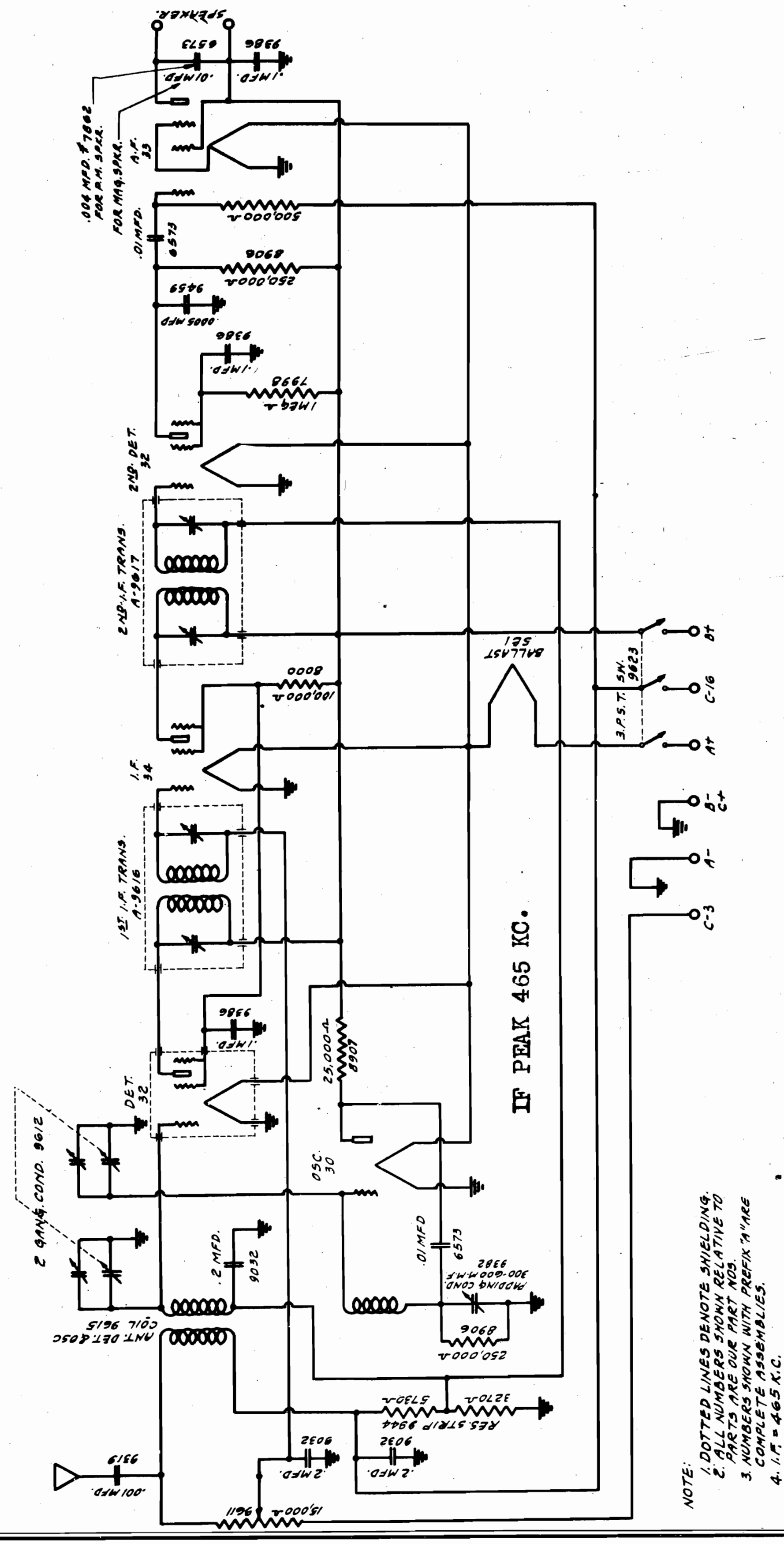
\## A. C. each plate
Total "A" current - 6.0 amperes
Read all voltages from socket to chassis

| PART NUMBER | | LIST PRICE |
|---|---|---|
| 1226 | Antenna Coil | $1.77 |
| 9496 | Detector Coil | .99 |
| 1230 | Oscillator | 1.01 |
| 9498 | 1st I. F. Transformer | 1.49 |
| 1227 | 2nd I. F. Transformer | 2.03 |
| 1236 | Dynamic Speaker | 7.00 |
| 1158 | Antenna Lead | .34 |
| 1244 | Set Cable | .60 |
| 9098 | 50,000 Ohm 1/2 Watt Resistor | .19 |
| 6943 | 25,000 Ohm 1 Watt Resistor | .21 |
| 6984 | 500,000 Ohm 1/3 Watt Resistor | .19 |
| 8000 | 100,000 Ohm 1/3 Watt Resistor | .19 |
| 9460 | 3,000 Ohm 1/3 Watt Resistor | .19 |
| 9544 | 500 Ohm 1 Watt Resistor | .21 |
| 6875 | 250 Ohm 1/3 Watt Resistor | .19 |
| 8906 | 250,000 Ohm 1/3 Watt Resistor | .19 |
| 8907 | 25,000 Ohm 1/3 Watt Resistor | .19 |
| 1336 | 20,000 Ohm 1/2 Watt Resistor | .19 |
| 1232 | Padding Condenser | .55 |
| 1218 | Three Gang Condenser | 4.10 |
| 9500 | Bypass Condenser (1-.1,1-.25, 1-.5 Mfd.) | 1.29 |
| 7860 | .01 Mfd. 400 Volt Condenser | .17 |
| 9386 | .1 Mfd. 200 Volt Condenser | .18 |
| 6473 | .002 Mfd. 400 Volt Condenser | .17 |
| 9525 | .2 Mfd. 200 Volt Condenser | .24 |
| 9203 | .1 Mfd. 400 Volt Condenser | .20 |
| 1150 | .004 Mfd. 400 Volt Condenser | .18 |
| 9328 | Dry Electrolytic Condenser (2-5 Mfd.) | 1.15 |
| 9133 | Generator .5 Mfd. Condenser | .55 |
| 9597 | Spark Plug Suppressor | .55 |
| 9598 | Distributor Suppressor | .55 |
| 9600 | Wood Mounting Block | .16 |
| 7717 | Housing Carriage Bolt 3/8" x 3" | .10 |
| 7718 | Hex Nut for 3/8" Carriage Bolt | .05 |

| PART NUMBER | | LIST PRICE |
|---|---|---|
| 9453 | 6A7 Tube Socket | $ .13 |
| 1255 | Set Housing Back | .25 |
| 1284 | Set Housing Cover | .55 |
| 1223 | Set Housing | 3.52 |
| 9581 | 10 Ampere Fuse | .06 |
| 1159 | "A" Battery complete with Fuse and Receptacle | .90 |
| 9063 | Tube Shield Retainer Base | .05 |
| 1361 | Tube Shield | .11 |
| 1253 | R. F. "A" Choke | .28 |
| 1229 | Volume Control with Switch | 1.22 |
| 109 | "B" Eliminator | 15.00 |
| 1246 | Vibrator Rubber Case | .40 |
| 1245 | Vibrator | 5.50 |
| 9534 | Power Transformer | 2.75 |
| 9542 | Filter Choke | .85 |
| 9539 | R. F. "A" Choke | .40 |
| 1144 | R. F. "B" Choke | .32 |
| 1247 | 2x 8 Mfd. Condenser Block | 2.75 |
| 9531 | .5 Mfd. Bypass Condenser | .58 |
| 9546 | .01 Mfd. 600 Volt Condenser | .18 |
| 1248 | .005 Mfd. 1000 Volt Condenser | .23 |
| 9559 | .0005 Mfd. Moulded Condenser | .21 |
| 9529 | No. 84 Tube Socket | .13 |
| 9513 | "B" Eliminator Housing Case | .55 |
| 9514 | "B" Eliminator Housing Case Cover | .35 |
| 1249 | "B" Terminal Strip with Screws | .60 |
| 1240 | Remote Control Complete | 3.00 |
| 1458 | Tuning Control Ring | .77 |
| 1459 | Volume Control Ring | .77 |
| 1460 | Dial Light Assembly | .44 |
| 1460A | Pilot Light Bulb | .44 |
| 1461 | Condenser Pulley Assembly | 1.20 |
| 1462 | Vol. Control Pulley Assembly | 1.00 |
| 1463 | Drive Cable Assembly | 2.30 |

**MODEL 660**
**Schematic**

# SENTINEL RADIO CORP.



IF PEAK 465 KC.

NOTE:
1. DOTTED LINES DENOTE SHIELDING.
2. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NOS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.
4. I.F. = 465 K.C.

MODEL 660
Alignment Data
Parts List

# SENTINEL RADIO CORP.

Whenever this condition is encountered be sure to try other 32 and 34 tubes. Oscillation may also be encountered when the speaker leads come too close to the first detector tube or the antenna, or if the shielding on the I.F. grid leads is loose or pushed back. Sometimes with some tubes oscillation may occur if the pad condenser across the speaker is removed or open. Low battery voltages will be indicated by low volume, signal fading and also motorboating may occur. Motorboating may be corrected by bypassing the "B" batteries from B plus to B minus with a .5 or 1 Mfd. condenser. Be sure to use a condenser that has a DC continuous working rating of not less than 200 volts. An insufficient aerial will reduce the volume and range of the receiver materially. If reception is weak and the tubes and batteries are good, try increasing the overall antenna length. Always keep the aerial as short as possible consistent with satisfactory reception.

INTERMEDIATE ALIGNMENT: Only when an intermediate transformer has become defective due to an open or burned out winding should it be necessary to readjust the intermediate transformer. For aligning either the intermediate transformer or the variable condenser it is necessary that an oscillator be used with some type of output measuring device. To align the intermediate transformer:

1. Connect the high side of the oscillator output to the control grid of the No. 30 Modulator tube. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning one of the intermediate transformer trimmer screws up and down until maximum reading is obtained on the output meter. Then adjust the other trimmer screw in the same manner.

4. The second I.F. transformer should next be adjusted in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

To align the variable condenser:

1. Connect the high output side of the oscillator to the set antenna lead and the ground side of the oscillator to the chassis.

2. Tune the receiver to 1400 kilocycles on the dial and set the oscillator to this frequency.

3. Adjust the variable condenser trimmer screws for maximum output reading.

4. Tune the set to approximately 600 kilocycles on the dial and adjust the oscillator frequency to 600 kilocycles. Adjust the padding condenser located on the rear of the chassis adjacent to the antenna and ground leads and accessible through the hole in the chassis for maximum output reading.

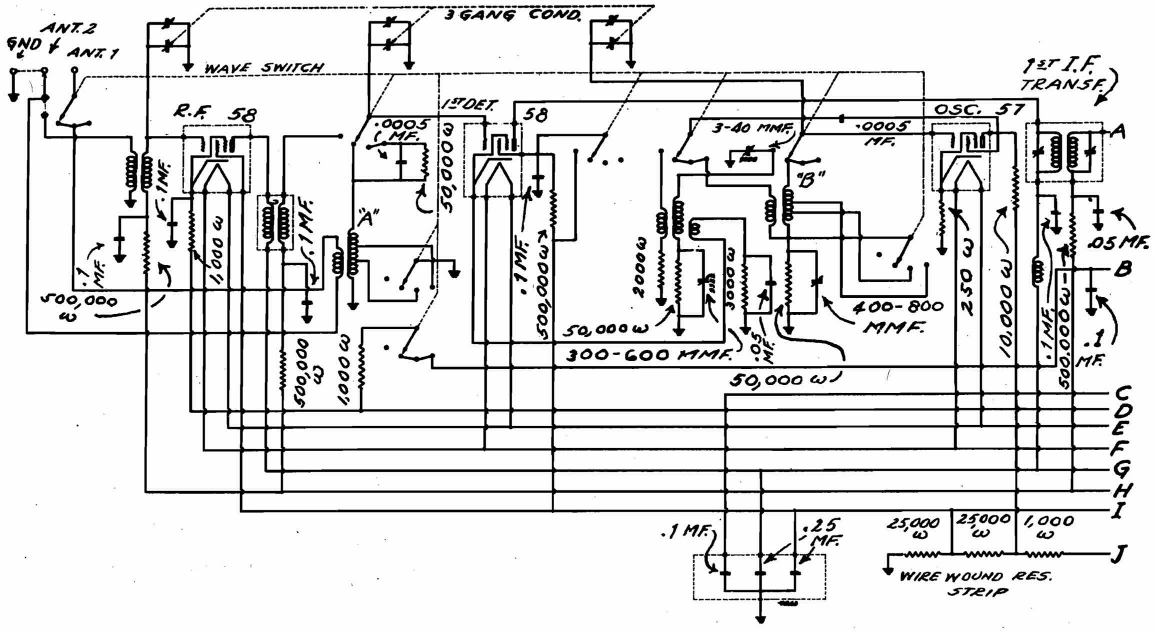
When making this adjustment be sure to rock the variable condenser slightly to the right and left using the position where the greatest output reading is obtained.

## PARTS AND PRICE LIST

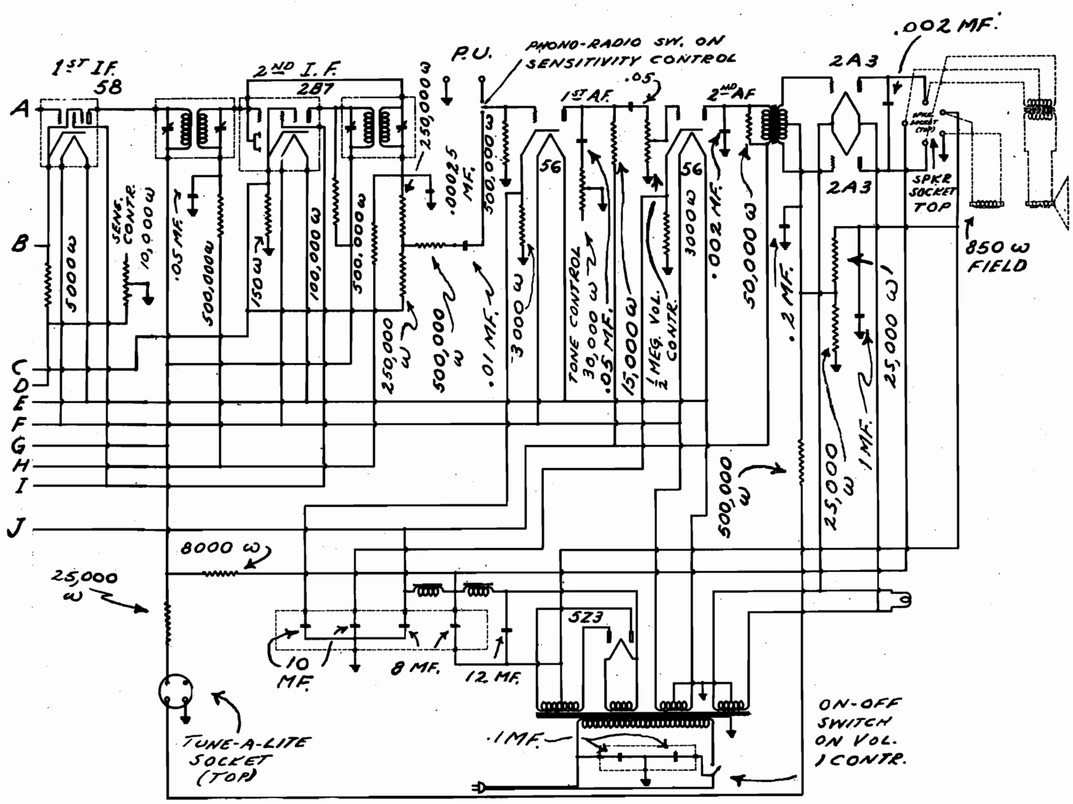
| PART NUMBER | | LIST PRICE |
|---|---|---|
| 9870 | No. 5E1 Tube Socket | $ .11 |
| 9619 | No. 30 Tube Socket | .11 |
| 9620 | No. 32 Tube Socket | .11 |
| 9621 | No. 34 Tube Socket | .11 |
| 9622 | No. 33 Tube Socket | .11 |
| 9221 | Tube Shield Base | .20 |
| 9222 | Tube Shield | .19 |
| 9612 | Two Gang Condenser | 2.54 |
| 9615 | Antenna, Detector & Oscillator Coil | 1.38 |
| 9616 | 1st I. F. Transformer | 1.90 |
| 9617 | 2nd I. F. Transformer | 1.90 |
| 9382 | Padding Condenser | .50 |
| 9614 | Tuning Dial | .55 |
| 9611 | Volume Control | .91 |
| 9623 | 3 P. S. T. Switch | 1.40 |
| 9613 | Battery Cable | 1.02 |
| 9625 | Wire Wound Resistor Strip | .36 |
| 8906 | 250,000 Ohm 1/3 Watt Resistor | .19 |
| 8907 | 25,000 Ohm 1/3 Watt Resistor | .19 |
| 8000 | 100,000 Ohm 1/3 Watt Resistor | .19 |
| 7998 | 1 Meg Ohm 1/3 Watt Resistor | .19 |
| 6984 | 500,000 Ohm 1/3 Watt Resistor | .19 |
| 9319 | .001 Mfd. Moulded Condenser | .22 |
| 9459 | .0005 Mfd. Moulded Condenser | .21 |
| 9386 | .1 Mfd. 200 Volt Condenser | .18 |
| 6573 | .01 Mfd. 200 Volt Condenser | .17 |
| 9032 | .2 Mfd. 200 Volt Condenser | .23 |
| 7862 | .004 Mfd. 400 Volt Condenser | .17 |
| 9718 | Knob | .14 |
| 9717 | Knob with arrow | .14 |

# SENTINEL RADIO CORP.

**MODEL 1040**
**Schematic**




NOTE:
1. DOTTED LINES DENOTE SHIELDING
2. COIL "A" COUPLED TO COIL "B"
3. IF PEAK = 465 KC.



MODEL 1040
Voltage
Alignment Data

SENTINEL RADIO CORP.

Line Voltage : 115
Volume Control : Full on
Sensitivity : Maximum Sensitivity
Band Selector Switch : 1500 KC-540 KC Band

| TUBE | | FIL. | PLATE | SCREEN | CATHODE |
|---|---|---|---|---|---|
| 58 | RF | 2.2 | 155* | 80 | 4 |
| 58 | 1st Detector | 2.2 | 155* | 80 | 6 |
| 58 | 1st IF | 2.2 | 155* | 80 | 7 |
| 2B7 | 2nd IF | 2.25 | 155* | 80 | 1 |
| 57 | Oscillator | 2.3 | 150 | 150 | |
| 56 | 1st AF | 2.3 | 185* | | 12 |
| 56 | 2nd AF | 2.4 | 235 | | 12 |
| 2A3 | Push-Pull Output | 2.4 | 245 | | 45** |
| 2A3 | Push-Pull Output | 2.4 | 245 | | 45** |
| 5Z3 | Rectifier | 5 | 5Z3 | | |

* Comparative voltage only. The voltmeter, when readings are taken at this point, is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis, unless otherwise specified.

** Read from grid to chassis.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 58 first detector leaving the grid clip disconnected. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut (accessible through the hole in top of IF transformer shield) of the first intermediate transformer trimmer screw up and down until maximum reading is obtained on the output meter. The adjust the trimmer screw located inside of the brass hex nut in the same manner.

NOTE: Some receivers utilize the brass hex trimmer nut and inside trimmer screw whereas other receivers of the same type have two parallel trimmer screws accessible through the two small holes in the top of the IF shields. In either case the procedure is the same. The second and third IF transformers are adjusted in the same manner as the first IF transformer.

TO ALIGN THE VARIABLE CONDENSER: It is important when aligning the variable condenser and padding condensers to follow the procedure given carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect. The variable condenser sections reading from front to rear are: Antenna, RF & Oscillator.

1. Connect the high output side of the oscillator to the antenna and the ground to the chassis.

2. Place the band selector switch for operation on the 1.5 to 4 megacycle band. Tune the receiver to 3.4 megacycles on the dial and adjust the oscillator to this frequency. Bring the 3.4 aligning signal in (maximum output) by adjusting the oscillator section variable condenser trimmer.

3. Tune the receiver to exactly 1.7 on the dial and set the oscillator at this frequency. THE 1.7 MEGACYCLE SIGNAL MUST BE BROUGHT IN (TO MAXIMUM OUTPUT) BY ADJUSTING THE 1.7 MEGACYCLE PADDING CONDENSER WHICH IS LOCATED ON THE FRONT OF THE CHASSIS BELOW THE DIAL. After making the 1.7 megacycle adjustment be sure to recheck the 3.4 megacycle adjustment. It is suggested that the 1.7 and 3.4 adjustments be rechecked several times.

NOTE: This completes the short wave adjustments. Should the dial calibration be too far off, the cause may be due to using the wrong oscillator frequency or dial setting.

4. Set the oscillator to 1400 kilocycles, tune the receiver to 1400 kilocycles on the dial and place the band selector switch for operation on the 1500-540 kilocycle band. Turn the receiver on its right side with the power transformer down and BRING IN (to maximum output) the 1400 kilocycle signal by adjusting the 1400 kilocycle trimmer which is mounted below the chassis on the short wave switch assembly. Next, adjust the antenna and RF variable condenser trimmers located on the top of the variable condenser for maximum output.

5. Leave the band selector switch for operation on the 1500 to 540 kilocycle band and set the oscillator frequency and tuning dial to approximately 600 kilocycles. Then while rocking the variable condenser slightly to the right and left adjust the 600 kilocycle padding condenser located towards the front on the left hand side of the chassis for maximum output. after which recheck the alignment at 1400 kilocycles and then the alignment at 600 kilocycles.

MODEL 1040
Parts List

# SENTINEL RADIO CORP.

BANDS: The frequency range of the four available bands are:

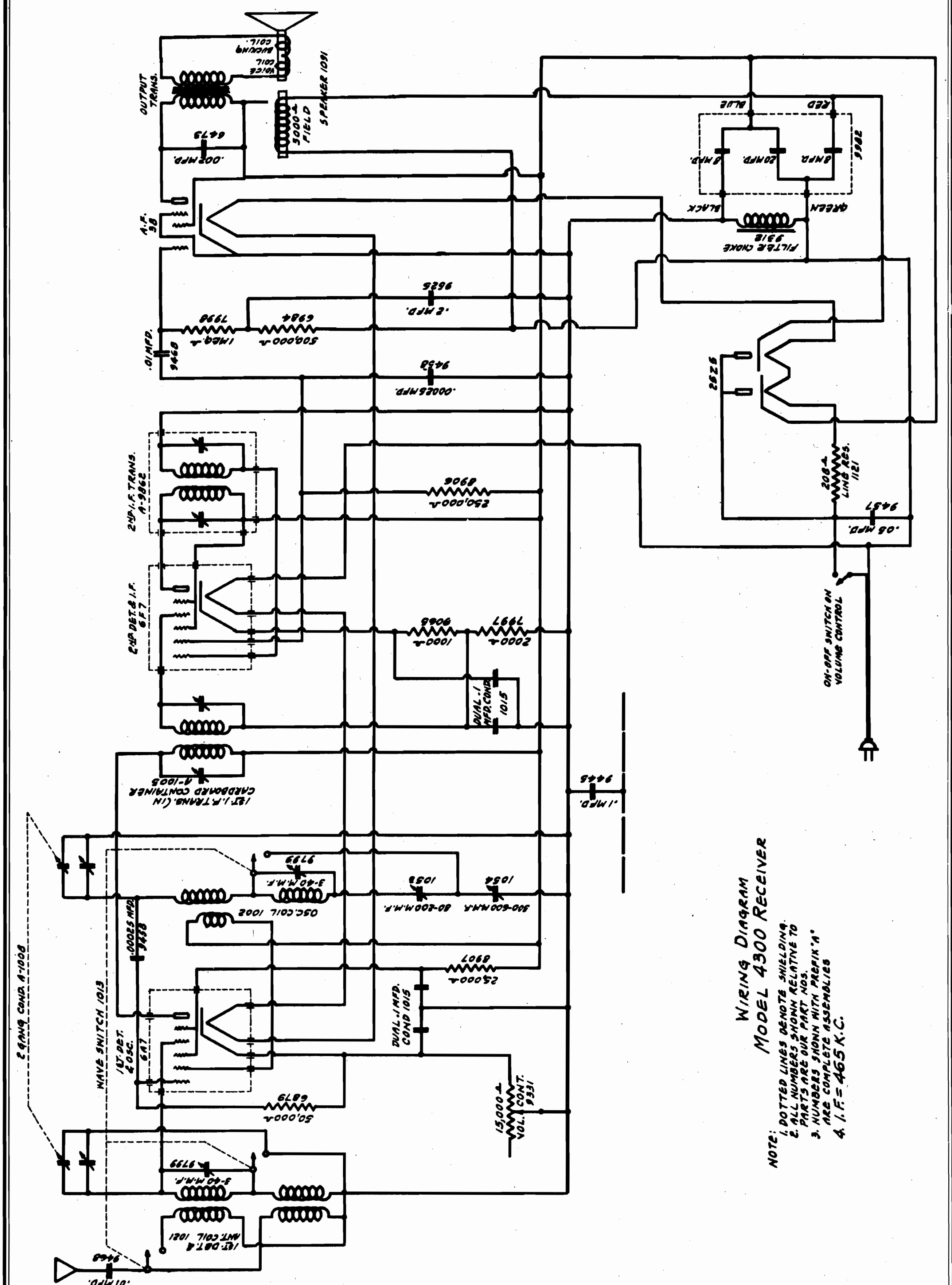
Band #1 - from 24 Megacycles to 9.8 Megacycles
Band #2 - from 9.8 Megacycles to 4 Megacycles
Band #3 - from 4 Megacycles to 1.5 Megacycles
Band #4 - from 1500 Kilocycles to 540 Kilocycles

## PARTS & PRICE LIST

| PART NUMBER | |
|---|---|
| 9839 | BC Antenna Coil |
| 9838 | BC R.F. Coil |
| 9840 | BC Oscillator Coil |
| 9842 | SW Oscillator Coil |
| 9843 | SW Antenna & 1st Detector Coil |
| 9835 | 1st & 2nd IF Transformer |
| 9662 | Third IF Transformer |
| 9800 | R.F. Choke |
| 9812 | Gang Condenser |
| 9275 | Tuning Dial & Drive Complete |
| 9986 | Tuning Dial Wave Band Screen Disc Assembly |
| 9806 | Tuning Dial Wave Band Clock Spring |
| 9688 | Tuning Dial Wave Band Bronze Cord |
| 9687 | Tuning Dial Wave Band Drive Pulley (on band selector, |
| 9710 | 110 Volt 50-60 Cycle Power Transformer |
| 9747 | Universal 115 to 230, 25-60 Cycle Power Transformer |
| 9709 | Choke |
| 9312 | Choke |
| 9748 | Audio Transformer |
| 9746 | Wire Wound Resistor Strip |
| 9195 | Bypass Condenser (2-.1 Mfd.) |
| 7843 | Bypass Condenser (2-.25-.1 Mfd.) |
| 9382 | Padding Condenser |
| 9062 | Padding Condenser |
| 9799 | Trimmer Condenser |
| 8979 | Tube Shield Base |
| 8980 | Tube Shield |
| 9080 | Tube Shield Caps |
| 9290 | SW Trimmer Wor, Drive Tuning Rod |
| 9287 | SW Trimmer Disc Assembly |
| 9279 | Wave Switch |
| 9296 | Volume Control |
| 9295 | Tone Control |
| 9834 | Sensitivity Control |
| 9845 | Tune-A-Lite |
| 9846 | Tune-A-Lite Socket |
| 6916 | Pilot Lamp Socket |
| 9738 | Electrolytic Condenser (2-8 & 2-10 Mfd. |
| 9739 | Wet Electrolytic Condenser (12 Mfd.) |
| 9970 | 8000 Ohm Wire Wound Resistor |
| 9459 | .0005 Moulded Condenser |
| 9458 | .00025 Moulded Condenser |
| 9698 | 1 Mfd. 100 Volt Condenser |
| 9032 | .2 Mfd. 200 Volt Condenser |
| 9386 | .1 Mfd. 200 Volt Condenser |
| 8961 | .05 Mfd. 400 Volt Condenser |
| 6590 | .002 Mfd. 200 Volt Condenser |
| 9203 | .1 Mfd. 400 Volt Condenser |
| 7860 | .01 Mfd. 400 Volt Condenser |
| 6979 | 10,000 Ohm 1 Watt Resistor |
| 9460 | 3,000 Ohm 1/3 Watt Resistor |
| 9346 | 25,000 Ohm 1/2 Watt Resistor |
| 8906 | 250,000 Ohm 1/3 Watt Resistor |
| 6879 | 50,000 Ohm 1/3 Watt Resistor |
| 6984 | 500,000 Ohm 1/3 Watt Resistor |
| 6769 | 15,000 Ohm 1/2 Watt Resistor |
| 9018 | 150 Ohm 1/3 Watt Resistor |
| 9065 | 1,000 Ohm 1/3 Watt Resistor |
| 9693 | 5,000 Ohm 1/3 Watt Resistor |
| 6875 | 250 Ohm 1/3 Watt Resistor |
| 8000 | 100,000 Ohm 1/3 Watt Resistor |
| 7997 | 2,000 Ohm 1/3 Watt Resistor |
| 9117 | Knobs |
| 9113 | Knobs |
| 9768 | Triple Binding Post Strip (A-1, A-2, Gnd.) |
| 6576 | Phono Tip Jacks |

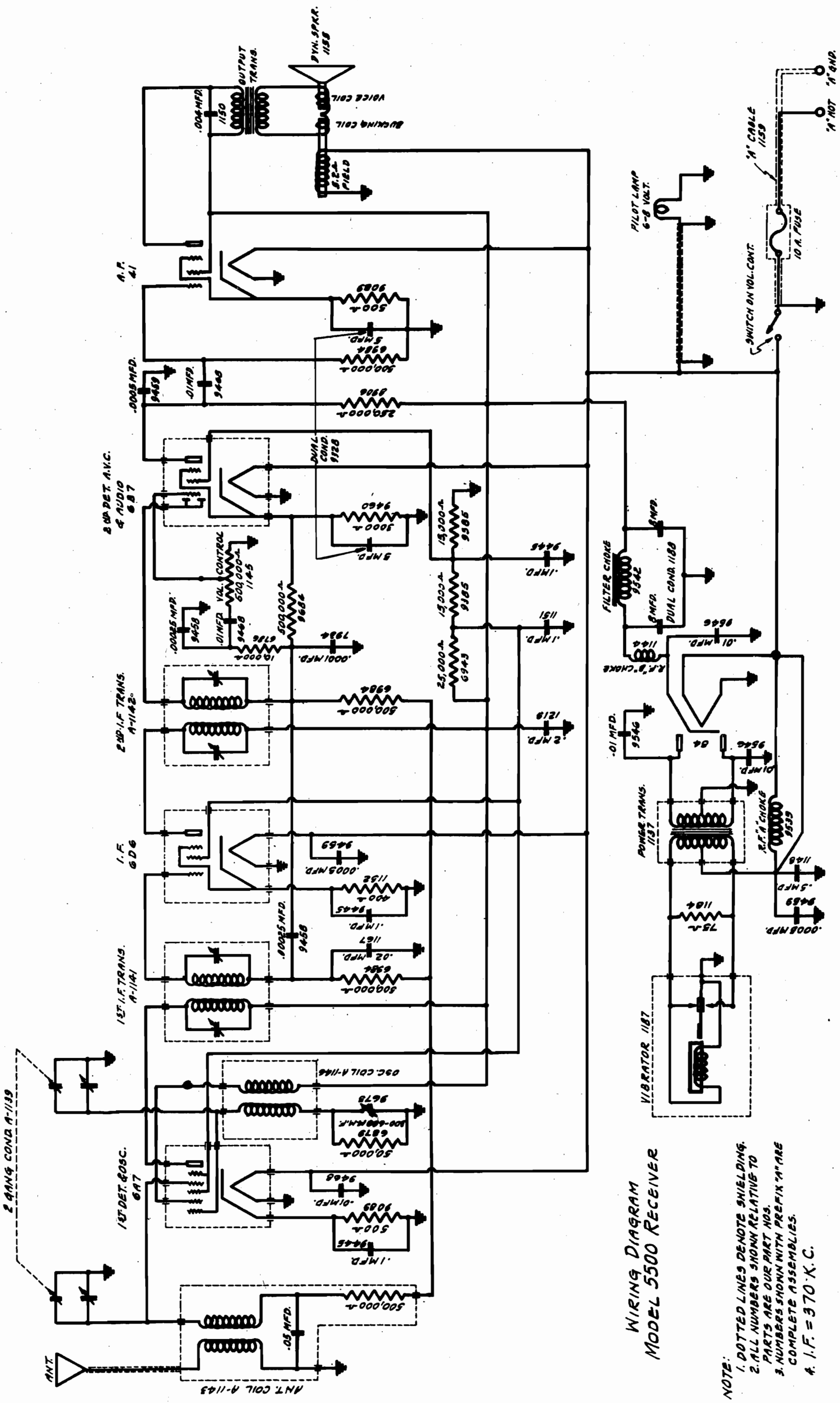
MODEL 4300
Schematic

# SENTINEL RADIO CORP.



**MODEL 5500**
**Schematic**

## SENTINEL RADIO CORP.



**MODEL 5500**
**Voltage**
**Alignment Data**
**Parts List**

# SENTINEL RADIO CORP.

**VOLTAGE TABLE**
Battery Voltage - 6 Volt
Volume Control - Full on

| TYPE OF TUBE | POSITION OF TUBE | FIL. VOLTS | PLATE VOLTS | CATHODE VOLTS | SCREEN VOLTS | GRID NO.1 | GRID NO. 2. | GRID NO. 3 & 5 |
|---|---|---|---|---|---|---|---|---|
| 6A7 | Modulator & Oscillator | 6 | 220 | 3 | 80 | 5 | 220 | 80 |
| 6D6 | I. F. Amplifier | 6 | 220 | 2.5 | 80 | | | |
| 6B7 | Second Detector Diode AVC & 1st Audio Tride | 6 | 35## | 3. | 40 | | | |
| 41 | Output | 6 | 215 | 13 | 220 | | | |
| 84 | Rectifier | 6 | 460-AC | 230 | | | | |

## Triode Plate. Comparative voltage only. The voltmeter is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

**ALIGNMENT PROCEDURE:** It should rarely be necessary to realign the intermediate transformers or the variable condenser. As a matter of fact, this should only be necessary when an intermediate transformer, oscillator or R. F. coil has become defective and require replacement. For propely aligning either the intermediate transformer or condenser it is necessary that an oscillator be used with some type of output measuring device.

**INTERMEDIATE ALIGNMENT:**

1. Connect the high side of the oscillator output to the control grid of the 6A7 tube leaving the control grid cap disconnected. The ground side of the oscillator should be connected to the chassis.
2. Set the oscillator at 370 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer which is accessible from the top of the I. F. transformer up and down until maximum reading is obtained on the meter, then adjust the trimmer screw located inside of the brass hex nut in the same manner.

4. The second I. F. transformer should next be adjusted in the same manner as the first I. F. transformer.

TO ALIGN THE VARIABLE CONDENSER: To align the variable condenser and padding condenser it is necessary that the receiver chassis be removed from the set housing. After the receiver chassis has been removed connect the remote control flexible drive shafts in their respective couplers, and set the dial needle on the dial face so that the dial calibration is correct.

1. Connect the high output side of the oscillator to the antenna and the ground to the receiver chassis.

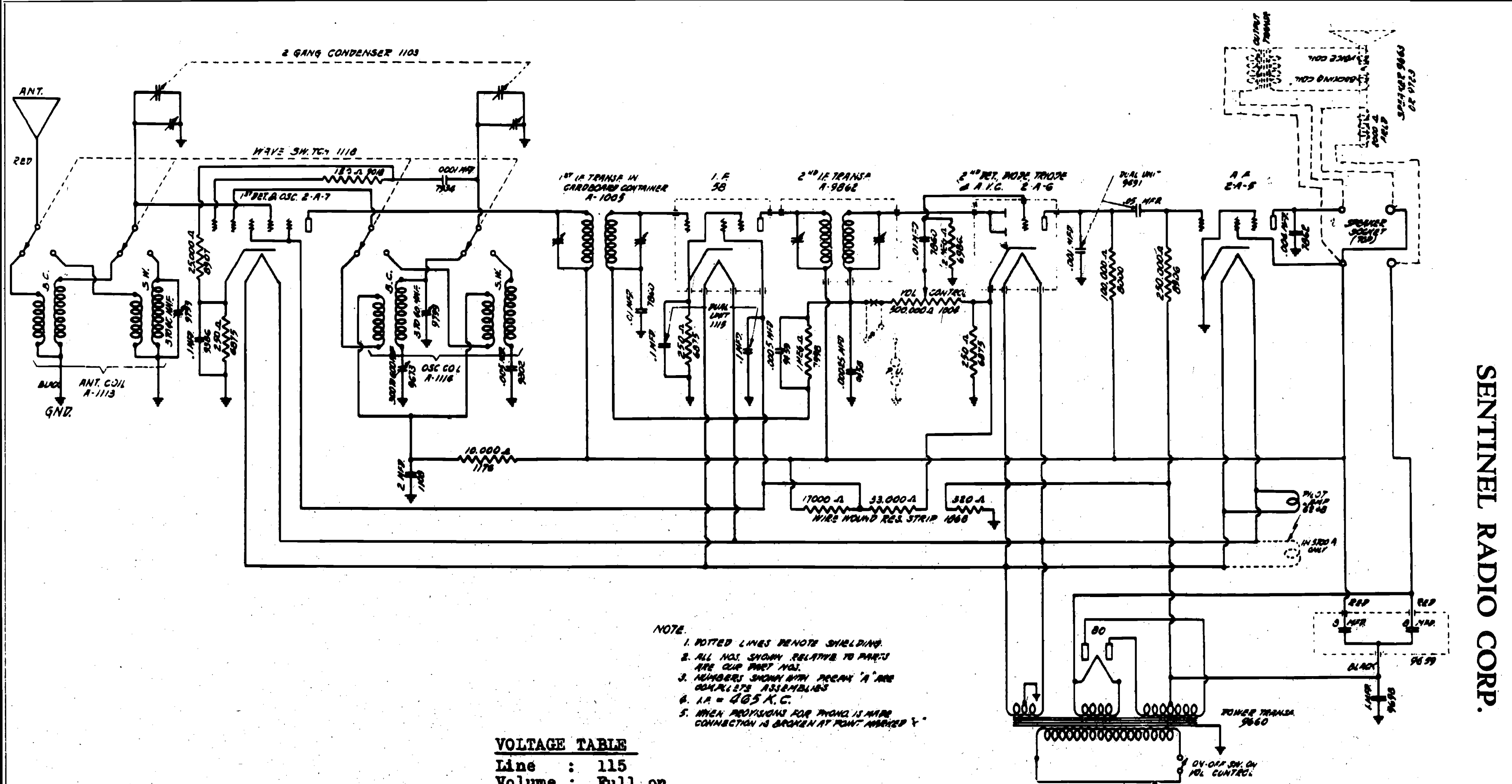
2. Tune the receiver to exactly 1500 kilocycles on the dial and adjust the oscillator to this frequency. BRING IN THE 1500 KILOCYCLE SIGNAL (TO MAXIMUM OUTPUT) BY ADJUSTING THE OSCILLATOR VARIABLE CONDENSER TRIMMER MOUNTED ON TOP OF THE VARIABLE CONDENSER. THEN ADJUST THE OTHER VARIABLE CONDENSER TRIMMER FOR MAXIMUM OUTPUT. Looking at the front of the receiver the first section of the variable condenser is the oscillator section and the other section tunes the antenna coil.

3. Tune the receiver to approximately 600 kilocycles on the dial and set the oscillator to this frequency, then adjust the 600 padding condenser which is located on the right hand side and accessible through the hole in the chassis for maximum output. Always rock the condenser slightly to the right and left when making this adjustment, using the position where greatest output is obtained.

1143 Antenna Coil
1146 Oscillator Coil
1141 First I. F. Transformer
1142 Second I. F. Transformer
1277 Dynamic Speaker
9673 Padding Condenser
1139 Two Gang Condenser
1145 Volume Control
1128 Set Housing
1127 Set Housing Front Cover
1156 Set Housing Front Cover Grille
1163 Wood Mounting Block
7717 Carriage Bolt 3/8"
7708 Carriage Bolt Steel Washer
7716 Carriage Bolt Lock Washer
1171 Cable Guide Bracket Assembly
1158 Antenna Lead
1166 Tube Shield
9581 10 Ampere Fuse
1159 "A" Battery Cable compete with fuse
1187 Vibrator
1137 Power Transformer
1188 2 x 8 Mfd. Condenser Block
1276 R. F. "A" Choke
9598 .5 Mfd. Generator Condenser
1212 Spark Plug Suppressor
1214 Distributor Suppressor
1213 Six Cylinder Suppression Kit
1278 Remote Control Head Complete Assembly
9959 Remote Control Tuning Knob with Key
9958 Remote Control Volume Knob
9954 Remote Control Head Clamp
9955 Remote Control Clamp Strap
1210 Remote Control Tuning Shaft Tubing 18"
1209 Remote Control Tubing Flexible Drive Shaft 18"
1210 Remote Control Volume Shaft Tubing 18"
1211 Remote Control Volume Flexible Drive Shaft 18"
9961 Remote Control Head Glass
9328 Electrolytic Condenser 2 x 5 Mfd.
9458 .00025 Mfd. Moulded Condenser
9459 .0005 Mfd. Moulded Condenser
7934 .0001 Mfd. Moulded Condenser
9445 .1 Mfd. 200 Volt Condenser
1148 .5 Mfd. 200 Volt Condenser
9468 .01 Mfd. 400 Volt Condenser
1150 .004 Mfd. 600 Volt Condenser
1151 .1 Mfd. 400 Volt Condenser
1167 .02 Mfd. 400 Volt Condenser
1219 .2 Mfd. 400 Volt Condenser
1248 .005 Mfd. 1000 Volt Condenser
1184 75 Ohm Wire Wound 1 Watt Resistor
6943 25,000 Ohm 1 Watt Resistor
8000 100,000 Ohm 1/3 Watt Resistor
1280 35,000 Ohm 1/3 Watt Resistor
9089 500 Ohm 1/3 Watt Resistor
1152 400 Ohm 1/3 Watt Resistor
8907 25,000 Ohm 1/3 Watt Resistor
9460 3,000 Ohm 1/3 Watt Resistor
6786 10,000 Ohm 1/3 Watt Resistor
6984 500,000 Ohm 1/3 Watt Resistor
6943 25,000 Ohm 1 Watt Resistor

# SENTINEL RADIO CORP.

**MODEL 5700,5721**
**Schematic**
**Voltage**




**VOLTAGE TABLE**
Line : 115
Volume : Full on

| TUBE | | FIL. | PLATE | SCREEN | CATHODE | GRID NO.1 | GRID NO.2 | GRID NO. 3 & 5 |
|---|---|---|---|---|---|---|---|---|
| 58 | I. F. Amplifier | 2.45 | 205 | 80 | 2 | | | |
| 2A7 | Oscillator & 1st Detector | 2.45 | 205 | | 2.5 | 1.5 | 160 | 80 |
| 2A6 | Second Detector Diode AVC and Triode | 2.45 | 100## | | 1 | | | |
| 2A5 | Output | 2.45 | 190 | 205 | .8### | | | |
| 80 | Rectifier | 4.85 | | | | | | |

## Triode Plate. Comparative voltage only. The voltmeter is in series with a high resistance and is therefore not the true voltage applied.

Read all voltages from socket to chassis unless otherwise specified.

### Read from grid to chassis.

MODEL 5700,5721
Alignment Data
Parts List

# SENTINEL RADIO CORP.

ALIGNMENT PROCEDURE: Only when an IF transformer, antenna or oscillator coil is replaced should it ever be necessary to realign the receiver. For aligning either the intermediate transformer or the variable condenser it is absolutely necessary that a good accurate calibrated oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 2A7 tube leaving the grid cap disconnected. The ground side of the oscillator should be connected to the receiver chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the intermediate transformer brass hext adjusting nut located on top of the intermediate transformer can up and down until maximum reading is obtained on the output meter. Then adjust the trimmer screw located inside the brass hex nut for maximum output.

4. Adjust the second I. F. transformer in the same manner as the first I. F. transformer.

VARIABLE CONDENSER ALIGNMENT: It is essential that the following instructions be carefully adhered to in the order given otherwise the receiver will be insensitive and the dial calibration will be inaccurate.

1. Connect the high side of the oscillator output to the set antenna lead and the oscillator ground to the receiver chassis.

2. Place the band selector switch for operation on the 16 to 5.2 megacycle band.

3. Set the oscillator frequency to exactly 15 megacycles and adjust the receiver dial to exactly 15 megacycles. Then BRING IN THE 15 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE trimmer condenser of the oscillator gang condenser section. The oscillator trimmer condenser is mounted on top of the rear section of the variable condenser. The front section of the variable condenser tunes the antenna stage.

4. Place the band selector switch for operation on the 1715 to 535 kilocycle band, set the oscillator to exactly 1400 kilocycles and tune the receiver dial to 1400 kilocycles. BRING IN THIS 1400 KILOCYCLE SIGNAL BY ADJUSTING THE SMALL TRIMMER CONDENSER which is located underneath near the center and towards the front of the chassis.

5. Next adjust the antenna variable gang condenser section trimmer condenser for maximum output (front section).

6. Leave the receiver operating on the same band and set the oscillator frequency to approximately 600 kilocycles and adjust the dial to approximately 600 kilocycles. Then while rocking the variable condenser slightly to the right and left, adjust the 600 kilocycle padding condenser which is located below the speaker and accessible through the front of the chassis for maximum output.

7. Recheck the 1400 kilocycle adjustment.

8. Place the band selector switch for operation on the 16 to 5.2 megacycle band and tune the dial to exactly 15 megacycles and set the oscillator frequency to 15 megacycles. Then adjust the trimmer condenser which is located underneath and toward the center of the right hand side of the chassis for maximum output.

This completes the alignment procedure and it is suggested that all the adjustments be rechecked.

BAND SELECTOR SWITCH: Two different frequency bands are available, the frequency range being:

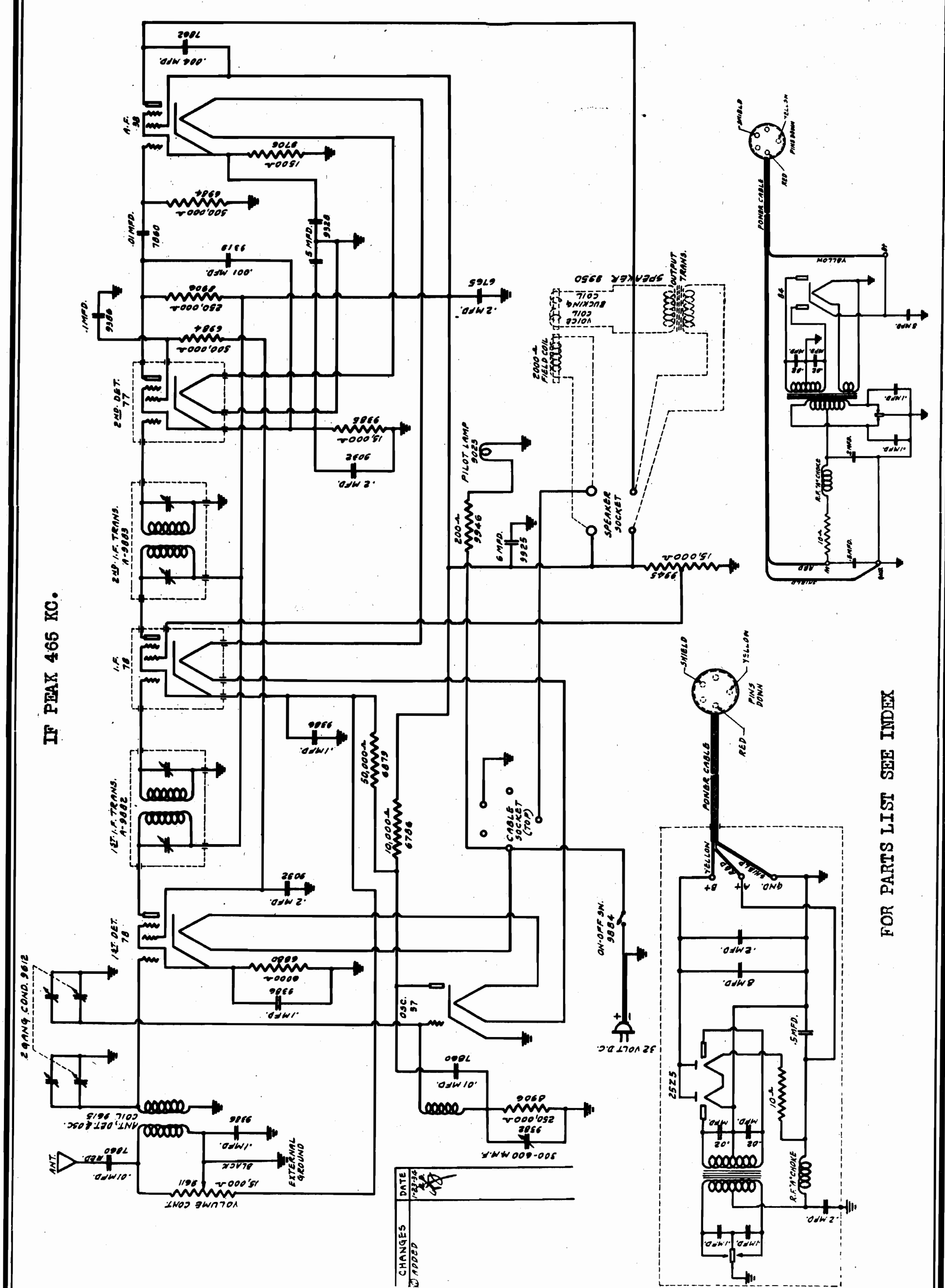
1715 to 535 Kilocycles- 175 to 560.75 Meters
16 to 5.2 Megacycles- 18.7 to 57.7 Meters

## PARTS & PRICE LIST

| PART NUMBER | | | |
|---|---|---|---|
| 1113 | Antenna Coil | 6875 | 250 Ohm 1/3 Watt Resistor |
| 1114 | Oscillator Coil | 9018 | 150 Ohm 1/3 Watt Resistor |
| 1005 | First I. F. Transformer | 8907 | 25,000 Ohm 1/3 Watt Resistor |
| 9862 | Second I. F. Transformer | 1176 | 10,000 Ohm 1/3 Watt Resistor |
| 1118 | Wave Switch | 9698 | 1 Mfd. 100 Volt Condenser |
| 1103 | Gang Condenser | 9386 | .1 Mfd. 200 Volt Condenser |
| 1104 | Volume Control | 7862 | .004 Mfd. 400 Volt Condenser |
| 9660 | Power Transformer | 7860 | .01 Mfd. 400 Volt Condenser |
| 9659 | 2-8 Mfd. Electrolytic Condenser | 1115 | 2x.1 Mfd. 200 Volt Condenser |
| 9673 | Padding Condenser | 9691 | .05 Mfd. & .001 Mfd, 400 Volt Condenser |
| 9799 | Trimmer Condenser | 1108 | 2 Mfd. Dry Electrolytic Condenser |
| 9671 | Pilot Light Socket | 9307 | .005 Mfd. Moulded Condenser |
| 6248 | 2.5 Volt Pilot Light Socket | 9458 | .00025 Mfd. Moulded Condenser |
| 1104 | Tuning Dial | 7934 | .0001 Mfd. Moulded Condenser |
| 1068 | Wire Wound Resistor Strip | 9459 | .0005 Mfd. Moulded Condenser |
| 6984 | 500,000 Ohm 1/3 Watt Resistor | 8980 | Tube Shield |
| 7997 | 1 Meg Ohm 1/3 Watt Resistor | 1179 | Large Knob |
| 8000 | 100,000 Ohm 1/3 Watt Resistor | 1180 | Knob with dot |
| 8906 | 250,000 Ohm 1/3 Watt Resistor | 9759 | Small Knob |

# SENTINEL RADIO CORP.

MODEL 6101, 6102
Schematic



**MODEL 6101, 6102**
**Service Notes**
**Voltage**
**Alignment Data**

# SENTINEL RADIO CORP.

This receiver is designed to operate on 32 volt battery plants only and must not be used on 36 volt battery plants without a voltage regulator. Generally, it is not advisable to operate the receiver while the generator is charging the battery due to the fact that considerable radio interference (static noise) may be encountered. This is not a reflection on the receiver, but is due to interference caused by the power plant generator, itself. Some generators have built-in traps to eliminate this interference and when so constructed this particular type of plant generator will not cause interference. If excessive static noise is encountered be sure that it is not caused by the 32 volt plant generator.

THIRTY-TWO VOLT POWER UNIT: Two power units have been furnished with the six tube 32 volt receiver, one unit utilizes a 25Z5 tube and the other an 84 tube. Diagrams for both of these units are shown on the receiver circuit diagram. It will be noted from the parts and price list that all parts with the exception of the power transformer and tube sockets are interchangeable. When ordering these parts be sure to order by part number.

NOTE: The dynamotor type unit supplied with the five tube 32 volt receiver cannot be used with the six tube receiver nor can the power units (utilizing the 84 or 25Z5 tube) furnished with the six tube receiver be used with the five tube 32 volt set.

The 32 volt power unit is shipped unmounted and must be placed in the sound-proof celotex compartment. In the console models this is located below the receiver mounting board and in the table models it is located above the chassis. To install the power unit in the sound-proof box remove the wood screws which hold the celotex back to the box, then place the power unit on the rubber mounting blocks provided inside of this box so that the unit is floating free on these rubber insulators. It is very important that the unit does not touch the side of the box. If excessive vibration is noticed be sure to check the power unit installation, as excessive vibration will result if it is not properly mounted on all of the rubber supports or if it is permitted to touch the side of the celotex housing.

PILOT LIGHT: A type T-3¼ #40 6.3 volt pilot light is used. The pilot light is readily accessible for removal from the rear of the cabinet.

ANTENNA AND GROUND: Under ordinary conditions an aerial from twenty-five to seventy-five feet in length including lead-in will prove ample. In some locations which are located a considerable distance from broadcast stations it may be necessary to use a longer aerial than this to obtain satisfactory daylight reception. Never place the aerial lead-in in close proximity to the 32 volt lighting lines, as considerable static noise may be picked up if the antenna lead-in is run parallel to the 32 volt power lines for any distance.

INTERMEDIATE ALIGNMENT: Only when an intermediate transformer has become defective due to an open or burned out winding should it be necessary to readjust the intermediate transformer. For aligning either the intermediate transformer or the variable condenser it is necessary that an oscillator be used with some type of output measuring device. To align the intermediate transformer:

1. Connect the high side of the oscillator output to the control grid of the #36 modulator tube. The ground side of the oscillator should be connected to the ground lead.
2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.
3. Align the first intermediate transformer by turning one of the intermediate transformer trimmer screws up and down until maximum reading is obtained on the output meter. Then adjust the other trimmer screw in the same manner.
4. The second I. F. transformer should next be adjusted in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

To align the variable condenser:

1. Connect the high output side of the oscillator to the set antenna lead and the ground side of the oscillator to the ground lead.
2. Tune the receiver to 1400 kilocycles on the dial and set the oscillator to this frequency.
3. Adjust the variable condenser trimmer screws for maximum output reading.
4. Tune the set to approximately 600 kilocycles on the dial and adjust the oscillator frequency to 600 kilocycles. Adjust the padding condenser located on the rear of the chassis adjacent to the antenna and ground leads and accessible through the hole in the chassis for maximum output reading.

When making this adjustment be sure to rock the variable condenser to the right and left using the position where the greatest reading is obtained.

VOLTAGE TABLE

Line Voltage : 32 Volts
Volume Control: Full On

| TUBE | | FIL. | PLATE | SCREEN | CATHODE |
|---|---|---|---|---|---|
| 78 | 1st Detector | 6.5 | 160 | 70 | 5 |
| 37 | Oscillator | 6.5 | 100 | | 20 |
| 78 | I.F. | 6.5 | 160 | 70 | 25 |
| 77 | 2nd Detector | 6.5 | 65* | 25* | 25 |
| 38 | Output | 6.5 | 150 | 160 | 15 |
| 25Z5 | Rectifier or 84 Rectifier | | | | |

* Comparative voltage only.
Read voltage from socket to receiver chassis.

**MODEL 6101,6102**
**MODEL 6315,6317,6321**
**Parts Lists**

# SENTINEL RADIO CORP.

## PARTS LIST FOR MODEL 6101

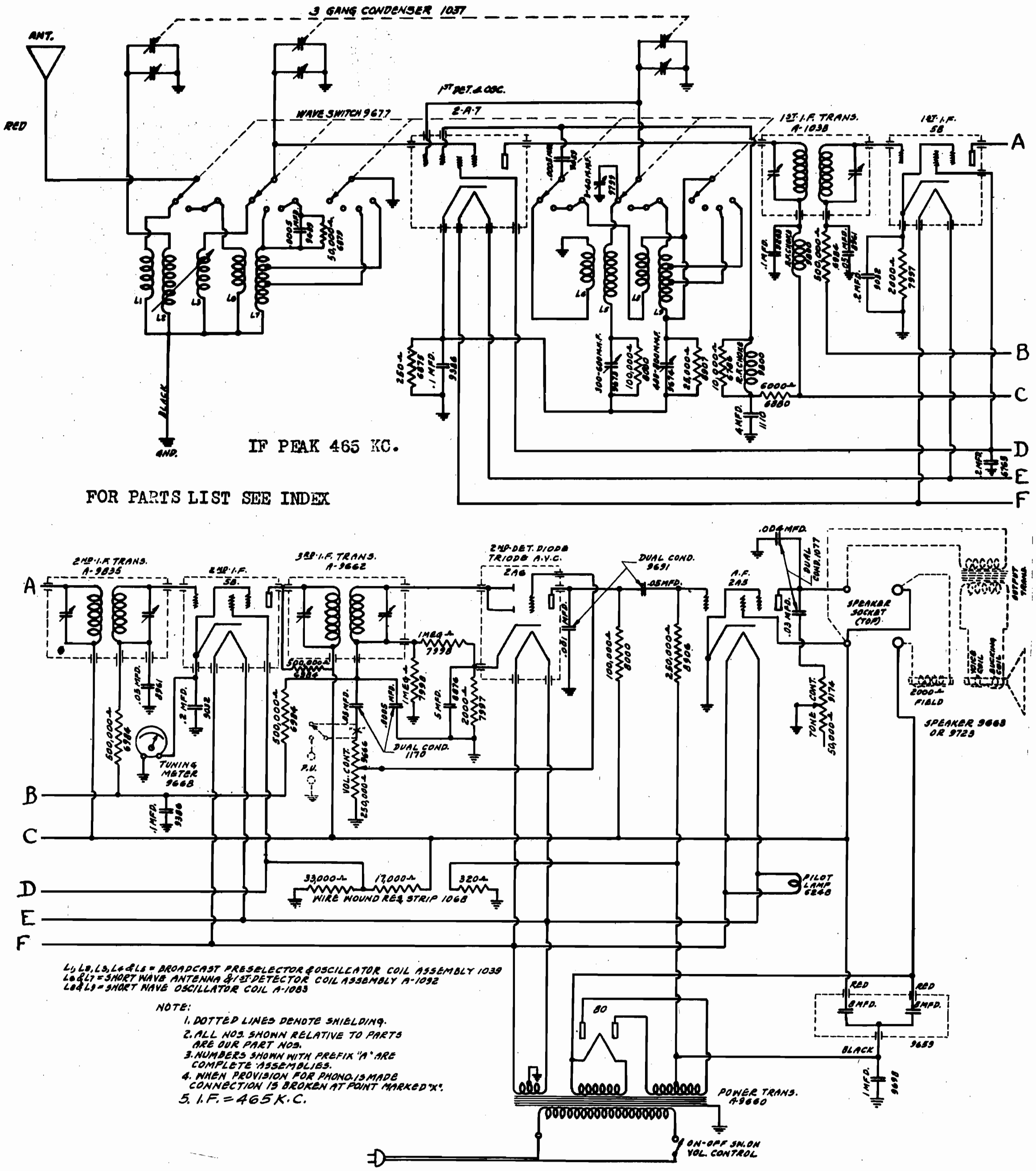
| PART NUMBER | | LIST PRICE |
|---|---|---|
| 9422 | 78 Tube Socket | $ .13 |
| 9421 | 77 Tube Socket | .13 |
| 9519 | 37 Tube Socket | .13 |
| 9307 | 38 Tube Socket | .13 |
| 9872 | Cable Socket | .13 |
| 9557 | Speaker Socket | .13 |
| 9612 | Two Gang Condenser | 2.75 |
| 9880 | Tuning Dial | .55 |
| 9881 | Pilot Light Socket | .11 |
| 9023 | Pilot Light | .39 |
| 9946 | Wire Wound Resistor Strip 15,000 Ohms | .39 |
| 9945 | Wire Wound Resistor Strip 200 Ohms | .55 |
| 9884 | Off and On Switch | .61 |
| 9611 | Volume Control | .91 |
| 9382 | Padding Condenser | .50 |
| 8980 | Tube Shield | .11 |
| 9082 | Tube Shield Cap | .04 |
| 9925 | 6 Mfd. Electrolytic Condenser | 1.43 |
| 9328 | Dual 5 Mfd. Electrolytic Condenser | .72 |
| 9882 | First I. F. Transformer | 1.98 |
| 9883 | Second I. F. Transformer | 1.98 |
| 9615 | Antenna, Detector & Oscillator Coil | 1.43 |
| 6765 | .2 Mfd. 400 Volt Condenser | .30 |
| 9052 | .2 Mfd. 200 Volt Condenser | .23 |
| 9386 | .1 Mfd. 200 Volt Condenser | .18 |
| 7860 | .01 Mfd. 400 Volt Condenser | .17 |
| 7862 | .004 Mfd. 400 Volt Condenser | .17 |
| 9319 | .001 Mfd. Moulded Condenser | .21 |
| 8906 | 250,000 Ohm 1/3 Watt Resistor | .19 |
| 6984 | 500,000 Ohm 1/3 Watt Resistor | .19 |
| 6786 | 10,000 Ohm 1/3 Watt Resistor | .19 |
| 9706 | 1,500 Ohm 1/3 Watt Resistor | .19 |
| 6880 | 6,000 Ohm 1/3 Watt Resistor | .19 |
| 9385 | 15,000 Ohm 1/3 Watt Resistor | .19 |
| 107 | 32 Volt Power Unit complete with 25Z5 Tube | 22.50 |
| 107A | 32 Volt Power Unit complete with 84 Tube | 22.50 |
| 9907 | Three Conductor Power Cable with Plug | 1.10 |
| 9918 | Bottom Rubber Cushion | .08 |
| 9919 | Side Rubber Cushion | .17 |
| 9895 | Celotex Housing | 2.20 |
| 8701 | Vibrator | 8.25 |
| 8702 | .5 Mfd. Condenser | .98 |
| 8703 | .02-.02 Mfd. Condenser | .83 |
| 8704 | .1-.1 Mfd. Condenser | 1.38 |
| 8705 | 8 Mfd. Condenser | 2.25 |
| 8706 | 1 Mfd. Condenser | .55 |
| 8707 | Cord & Plug | 2.35 |
| 8708 | RF A Choke | .66 |
| 8709 | Transformer used with 25Z5 Tube | 6.00 |
| 8710 | Transformer used with 84 Tube | 7.00 |
| 8711 | 5 Ohm Resistor | .83 |

## PARTS LIST FOR MODEL 6317

| PART NUMBER | | LIST PRICE |
|---|---|---|
| 1039 | Broadcast, Antenna, Preselector & Oscillator Coil | $ 2.75 |
| 1083 | Short Wave Oscillator Coil | .73 |
| 1092 | Short Wave Antenna & First Detector Coil | .75 |
| 1038 | First I. F. Transformer | 2.20 |
| 9835 | Second I. F. Transformer | 2.20 |
| 9662 | Third I. F. Transformer | 2.05 |
| 9800 | R. F. Choke | .83 |
| 1037 | Three Gang Condenser | 4.25 |
| 1079 | Dial | .61 |
| 9677 | Wave Band Switch | 3.58 |
| 9651 | Wave Band Indicator Assembly | 1.10 |
| 9287 | Short Wave Trimmer Disc. Assembly | .39 |
| 9682 | Short Wave Trimmer Worm Tuning Rod | .88 |
| 9673 | Padding Condenser | .50 |
| 9674 | Padding Condenser | .50 |
| 9799 | Trimmer Condenser | .15 |
| 9659 | Electrolytic Condenser Dual 8 Mfd. | 2.80 |
| 8876 | Electrolytic Condenser 5 Mfd. | .72 |
| 1110 | Electrolytic Condenser 4 Mfd. | 1.14 |
| 9660 | Power Transformer | 4.02 |
| 9663 | Dynamic Speaker 6" | 9.79 |
| 9723 | Dynamic Speaker 8" | 12.00 |
| 9666 | Volume Control | 1.27 |
| 9174 | Tone Control | .94 |
| 9668 | Tuning Meter | 2.75 |
| 1068 | Wire Wound Resistor Strip | .96 |
| 9671 | Pilot Lamp Socket | .09 |
| 6248 | 2.5 Volt Pilot Lamp Bulb | .17 |
| 8980 | Tube Shield | .11 |
| 9082 | Tube Shield Cap | .04 |
| 9459 | .0005 Mfd. Moulded Condenser | .21 |
| 9698 | 1 Mfd. 100 Volt Condenser | .56 |
| 9203 | .1 Mfd. 400 Volt Condenser | .21 |
| 9386 | .1 Mfd. 200 Volt Condenser | .19 |
| 8961 | .05 Mfd. 400 Volt Condenser | .18 |
| 1077 | .03 Mfd. & .004 Mfd. 400 Volt Condenser | .62 |
| 1170 | .0005 Mfd. & .05 Mfd. 400 Volt Condenser | .34 |
| 9691 | .001 Mfd. & .05 Mfd. 400 Volt Condenser | .39 |
| 6765 | .2 Mfd. 400 Volt Condenser | .26 |
| 9032 | .2 Mfd. 200 Volt Condenser | .25 |
| 6984 | 500,000 Ohm 1/3 Watt Resistor | .19 |
| 8000 | 100,000 Ohm 1/3 Watt Resistor | .19 |
| 6879 | 50,000 Ohm 1/3 Watt Resistor | .19 |
| 8907 | 25,000 Ohm 1/3 Watt Resistor | .19 |
| 6875 | 250 Ohm 1/3 Watt Resistor | .19 |
| 7997 | 2,000 Ohm 1/3 Watt Resistor | .19 |
| 6786 | 10,000 Ohm 1/3 Watt Resistor | .19 |
| 7998 | 1 Meg Ohm 1/3 Watt Resistor | .19 |
| 8906 | 250,000 Ohm 1/3 Watt Resistor | .19 |
| 6880 | 6,000 Ohm 1/3 Watt Resistor | .19 |
| 6576 | Phono Jacks | .14 |
| 6123 | S.P.D.T. Phono-Radio Switch | .55 |
| 9889 | Tuning Control Knob | .22 |
| 9889 | Tone Control Knob | .22 |
| 9887 | Short Wave Switch Control Knob | .22 |
| 9886 | Volume Control Knob | .22 |
| 9888 | Short Wave Trimmer Knob | .22 |

MODEL 6315, 6317, 6321
Schematic

# SENTINEL RADIO CORP.



# SENTINEL RADIO CORP.

**MODEL 6315,6317,6321**
**Voltage**
**Alignment Data**

BAND SELECTOR SWITCH: The receiver is designed for operation onfour different frequency bands. The frequency range of these bands are:

Band No. 1 - from 10 Megacycles to 24 Megacycles
Band No. 2 - from 4 Megacycles to 10 Megacycles
Band No. 3 - from 1.5 Megacycles to 4 Megacycles
Band No. 4 - from 1500 Kilocycles to 540 Kilocycles

VOLTAGE TABLE

Line Voltage : 115
Volume Control: Full on
Wave Band : Broadcast

| TUBE | Fil. | Plate | Screen | Cathode Volts | Grid No.1 | Grid No.2 | Grid No. 3 & 5 |
|---|---|---|---|---|---|---|---|
| 2A7 Oscillator 1st Detector | 2.45 | 220 | | 2.2 | 3.5 | 200 | 90 |
| 58 First I. F. Amplifier | 2.45 | 220 | 90 | 6 | | | |
| 58 Second I. F. Amplifier | 2.45 | 220 | 90 | 3.5 | | | |
| 2A6 Second Detector | 2.45 | 120## | | 1 | | | |
| 2A5 Output | 2.45 | 210 | 220 | | | | |
| 80 Rectifier | 4.89 | | | | | | |

## Triode Plate. Comparative voltage only. The voltmeter is in series with a high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

ALIGNMENT PROCEDURE: Only when an antenna, oscillator or I. F. transformer has become defective due to an open or shorted winding should it be necessary to realign the receiver. For aligning either the intermediate transformer or variable condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 2A7 First Detector tube, leaving the grid clip disconnected. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer up and down until maximum reading is obtained on the output meter, then adjust the trimmer screw located inside of the brass hex nut in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

4. The second and third I. F. transformers should next be adjusted in the same manner as the first I.F. transformer.

TO ALIGN THE VARIABLE CONDENSER: It is important when aligning the variable condenser and padding condensers to follow the procedure given carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect.

1. Connect the high output side of the oscillator to the antenna and the ground to the chassis.

2. Place the band selector switch for operation on the 1.5 to 4 megacycle band. Tune the receiver to exactly 1.7 megacycles onthe dial, set the short wave trimmer about half the distance between maximum clockwise and counter-clockwise rotation and adjust the oscillator frequency to exactly 1.7 megacycles.

Next, bring this 1.7 megacycle signal in to maximum output by adjusting the padding condenser accessible through the hole in the right hand side and closest to the rear of the chassis.

3. Leave the band selector switch for operation on the 1.5 to 4 megacycle band and tune the receiver to exactly 3.4 megacycles on the dial.

Next, set the test oscillator to exactly 3.4 megacycles and tune the signal in by adjusting the oscillator variable condenser trimmer mounted on top of the variable condenser. The middle section of the variable condenser is the oscillator section. Recheck the 1.7 megacycle adjustment after making the adjustment at 4 megacycles. For best results it is always advisable to check each adjustmet several times. NOTE: This completes the short wave adjustment.

4. Adjust the band selector switch for operation on the broadcast band (1500 to 540 kilocycles) and tune the receiver to exactly 1400 kilocycles on the dial and set the oscillator to this frequency. Turn the receiver on end and bring this 1400 kilocycle signal in to maximum output by adjusting the trimmer screw on the small trimmer,which is located adjacent to the short wave switch underneath the chassis.

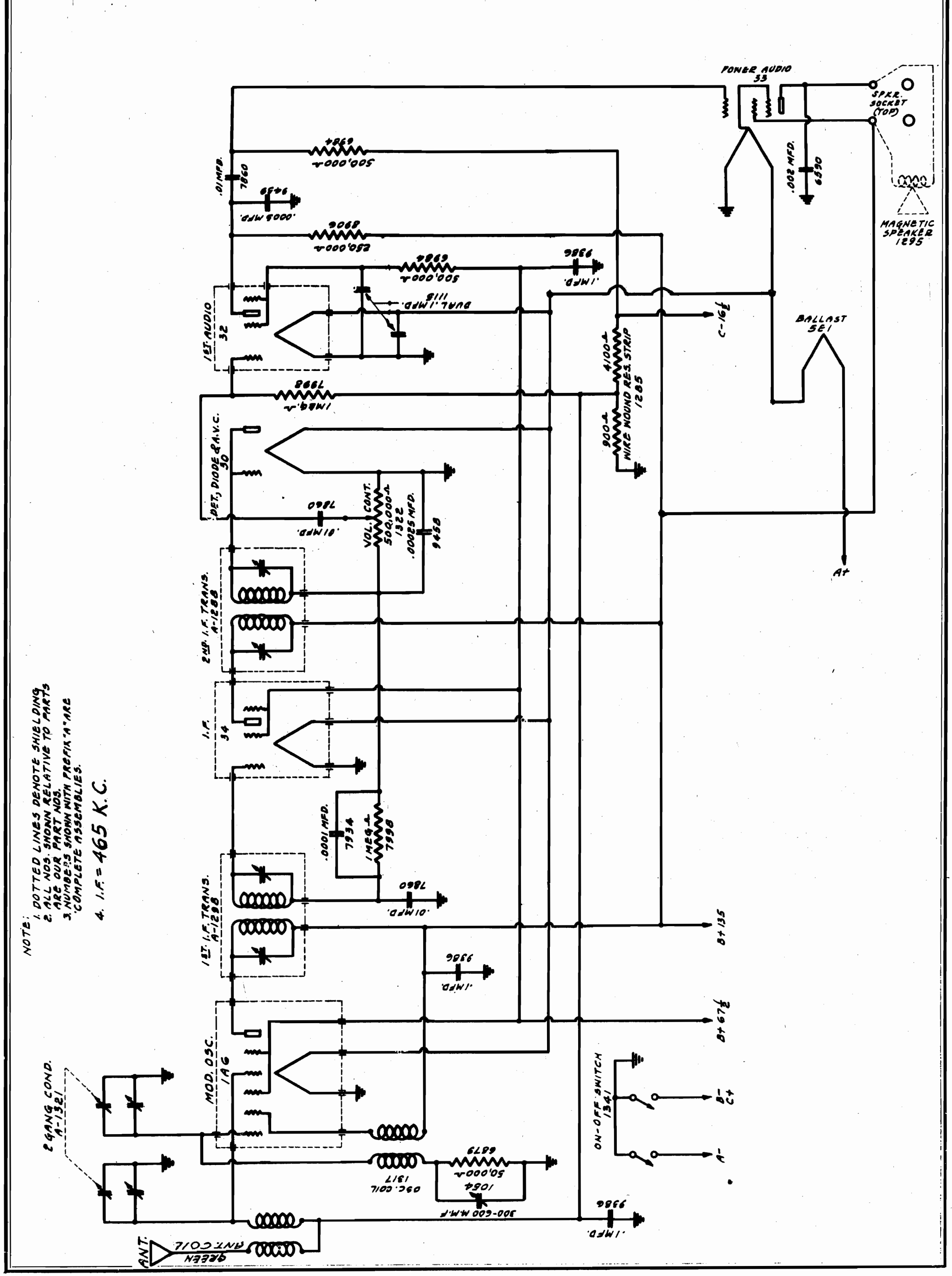
Next, adjust the antenna and preselector variable condenser section trimmers mounted on top of the variable condenser for maximum signal output. (These are the front and rear gang sections).

5. Leave the band selector switch for operation on the broadcast band (1500 to 540 kilocycles) and tune the receiver and oscillator to approximately 600 kilocycles. Then adjust the 600 kilocycle padding condenser which is located on the right hand side and towards the front of the chassis for maximum output reading. This adjustment is quite critical and it is necessary to rock the condenser slightly to the right and left to obtain maximum sensitivity.

Always recheck the 1400 kilocycle alignment after making the adjustment at 600 kilocycles.

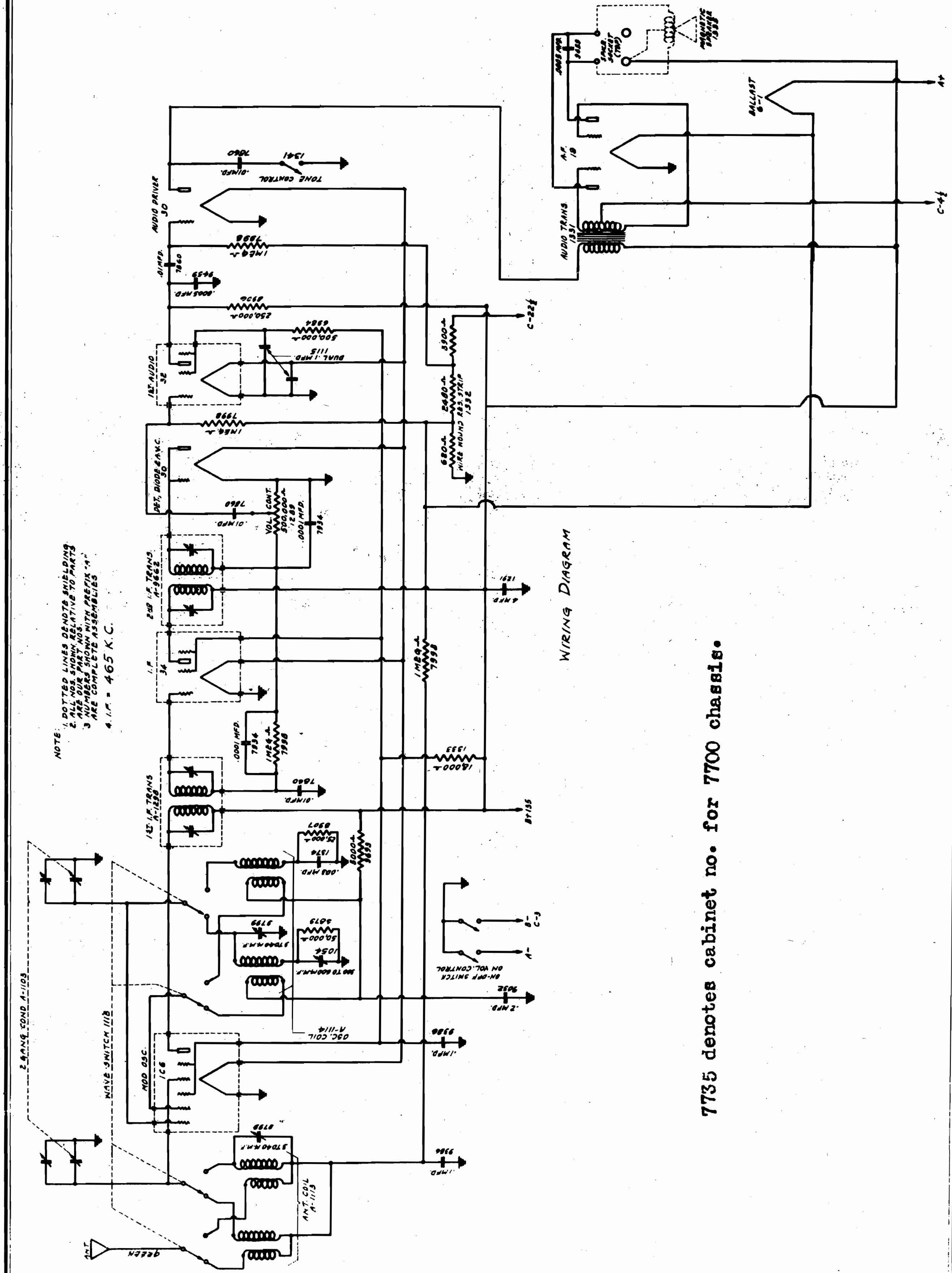
**MODEL 6200, 6234, 6241**
**Schematic**

## SENTINEL RADIO CORP.



# SENTINEL RADIO CORP.

**MODEL 7700,7732,7741**
**Schematic**




**7735 denotes cabinet no. for 7700 chassis.**

MODEL 7700,7732,7741
Voltage, Parts List
Alignment Data

# SENTINEL RADIO CORP.

1. Connect the high side of the oscillator output to the control grid of the 1C6 tube leaving the grid cap disconnected. Connect the ground side of the oscillator to the receiver chassis.

2. Set the test oscillator frequency to 465 kilocycles (this must be accurate).

3. Align the first intermediate ansformer by turning one of the trimmer screws up and down until maximum reading is obtained on the output meter, and then adjust the other trimmer screw of the same transformer for maximum sensitivity.

4. Adjust the second intermediate transformer in the same manner.

NOTE: Two type intermediate transformer trimmers have been used in this receiver. One type has two parallel holes in the top of the shield, one for each trimmer. The other type has a brass hex nut for adjusting one trimmer, the other intermediate trimmer being adjusted with the trimmer screw located inside of the brass hex nut. Regardless of which type trimmer is used the procedure is the same.

TO ALIGN THE VARIABLE CONDENSER: It is important when aligning to follow the procedure carefully, otherwise the receiver will lack sensitivity and the dial calibration will be incorrect.

1. Connect the high output side of the oscillator to the receiver antenna lead and the ground to the chassis.

2. Place the band selector switch for operation on the short wave band, tune the receiver to exactly 15 megacycles on the dial and set the test oscillator frequency to exactly 15 megacycles. THEN TUNE IN THE 15 MEGACYCLE SIGNAL BY ADJUSTING THE TRIMMER MOUNTED ON TOP OF THE OSCILLATOR SECTION OF THE GANG CONDENSER TO MAXIMUM OUTPUT.

Looking at the front of the receiver the oscillator section is the rear section of the gang condenser.

3. Set the band selector switch for operation on the broadcast band, adjust the test oscillator frequency to 1400 kilocycles and set the receiver dial to exactly 1400 kilocycles. NEXT, BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE TRIMMER LOCATED UNDERNEATH AND NEAR THE CENTER FRONT OF THE CHASSIS.

4. After making this adjustment tune the dial to 1720 kilocycles and set theoscillator frequency to 1720 kilocycles. If the 1720 kilocycle signal cannot be received reduce the 1400 kilocycle trimmer capacity until the 1720 kilocycle signal is brought in.

5. Next, set the receiver dial and test oscillator to exactly 1400 kilocycles, and adjust the trimmer located on the front section of the gang condenser for maximum sensitivity.

6. Leave the band selector switch for operation on the broadcast band, tune the receiver and set the oscillator to approximately 600 kilocycles. Then adjust the 600 kilocycle padding condenser,which is located on and accessible through the small hole in the front of the chassis, for maximum sensitivity. As this adjustment is quite critical it is necessary to rock the condenser slightly to the right and left to find the point of greatest sensitivity.

7. Place the band selector switch for operation on the short wave band, adjust the test oscillator frequency to exactly 15 megacycles and set the receiver dial to 15 megacycles. Turn the receiver on its back with the dial up and adjust the trimmer, which is mounted on the top of the coil underneath and near the right hand side of the chassis, for maximum output. Be sure to rock the condenser slightly to the right and left when making this adjustment.

This completes the alignment procedure. It is recommended that all of the adjustments be gone over again Generally it will be found that improved results can be obtained if this is done.

VOLTAGE TABLE
"A" Battery - 3 Volt Dry Cell
"B" Battery - 3 45 Volt "B" Batteries
"C" Battery - 1 22½ Volt Battery

| TUBE | | FIL. | PLATE | SCREEN | GRID NO.2 | GRID NO 3 & 5 |
|---|---|---|---|---|---|---|
| 1C6 | Oscillator & 1st Detector | 2.1 | 135 | | 115 | 67½ |
| 30 | Second Detector | 2.1 | | | | |
| 34 | I. F. | 2.1 | 135 | 67½ | | |
| 32 | 1st Audio | 2.1 | 37.5## | 20## | | |
| 30 | Driver | 2.1 | 135 | | | |
| 19 | Output | 2.1 | 135 each plate | | | |

## Comparative voltage only
Read all voltages from socket to chassis

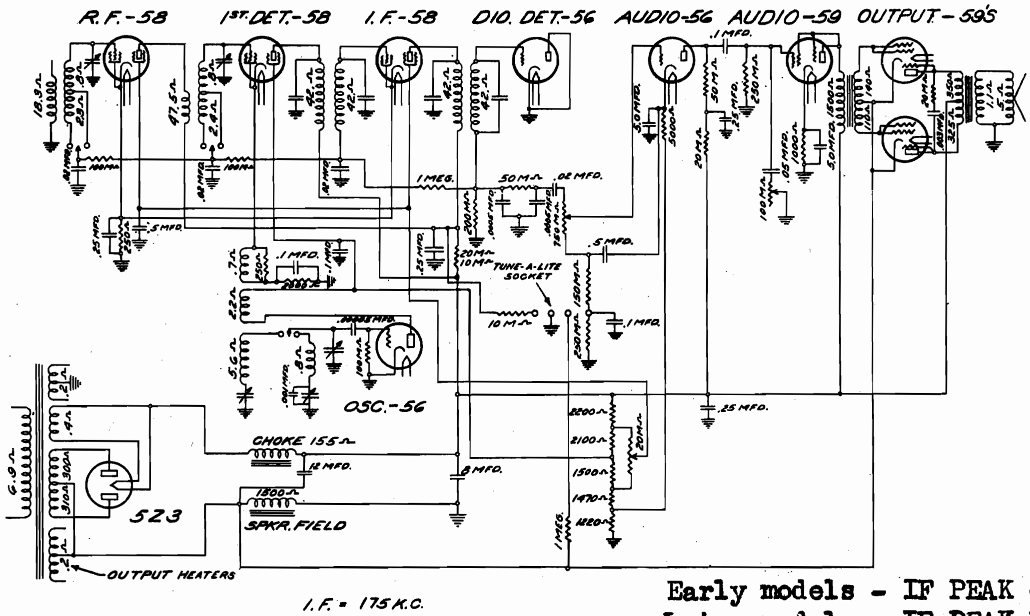
Total "B" Drain - .023 Amperes
Total "A" Drain - .620 Amperes

When making tube voltage checks use batteries that deliver full voltage with the receiver turned on.

| PART NUMBER | | LIST PRICE | PART NUMBER | | LIST PRICE |
|---|---|---|---|---|---|
| 1113 | Antenna Coil | $1.63 | 1333 | 18,000 Ohm 1/2 Watt Resistor | $ .19 |
| 1114 | Oscillator Coil | 1.63 | 9693 | 5,000 Ohm 1/3 Watt Resistor | .19 |
| 1298 | 1st I. F Transformer | 2.05 | 8907 | 25,000 Ohm 1/3 Watt Resistor | .19 |
| 9662 | 2nd I. F. Transformer | 2.05 | 1292 | 6 Conductor Battery Cable | .68 |
| 1331 | Audio Transformer | 1.40 | 1289 | Volume Control with D.P.S.T. Switch | 1.24 |
| 1291 | 4 Mfd. Wet Electrolytic Condenser | .85 | 1341 | Tone Control Switch | .40 |
| 1115 | Dual .1 Mfd. 200 Volt Condenser | .35 | 1370 | One Color Tuning Dial | .30 |
| 7860 | .01 Mfd. 400 Volt Condenser | .17 | 1338 | Two Color Tuning Dial | .35 |
| 9032 | .2 Mfd. 200 Volt Condenser | .23 | 1103 | Two Gang Condenser | 3.93 |
| 9459 | .0005 Mfd. Mica Mould Condenser | .21 | 1361 | Tube Shield | .15 |
| 7934 | .0001 Mfd. Mica Mould Condenser | .21 | 9988 | Tube Shield | .11 |
| 1374 | .003 Mfd. Mica Mould Condenser | .21 | 1053 | Padding Condenser | .50 |
| 1332 | Wire Wound Resistor Strip | .35 | 1054 | Padding Condenser | .55 |
| 7998 | 1 Meg Ohm 1/3 Watt Resistor | .19 | 9799 | Trimmer Condenser | .15 |
| 6984 | 500,000 Ohm 1/3 Watt Resistor | .19 | 6-1 | Voltage Regulator Tube | 3.00 |
| 8906 | 250,000 Ohm 1/3 Watt Resistor | .19 | 1179 | Knob, Large | .15 |
| 6879 | 50,000 Ohm 1/3 Watt Resistor | .19 | 1180 | Knob, Small with Dot | .17 |

**MODEL 4801,4802**
**Schematic,Voltage**
**Parts List**

# SILVER - MARSHALL MFG. CO.




**Early models - IF PEAK 465 KC.**
**Later models - IF PEAK 175 KC.**

| | | Ef | Ep | Eg | Ek | Esg | Esug | Ip |
|---|---|---|---|---|---|---|---|---|
| 58 | RF | 1.9 | 180 | .2 | 2 | 72 | 0 | 3.7 |
| 58 | 1st Det | 1.9 | 230 | 1.2 | 6.5 | 100 | 0 | 2.6 |
| 56 | Osc. | 1.9 | 105 | .1 | 0 | | | 5.5 |
| 58 | IF | 1.9 | 180 | .2 | 2 | 72 | 0 | 3.5 |
| 56 | Diode Det. | 1.9 | 0 | .3 | 0 | | | 0 |
| 56 | 1st AF | 1.9 | 103 | .1 | 42 | | | 1.3 |
| 59 | 2nd AF | 2.1 | 190 | 3.5 | 19 | 190 | 190 | 16.5 |
| 59 | Class B1 | 2.1 | 350 | 0 | 108 | 350 | 0 | 7 |
| 59 | Class B2 | 2.1 | 350 | 0 | 108 | 350 | 0 | 7 |
| 5Z3 | Rect. | 4.5 | 390* | | | | | 43* |

* - per plae
* - Per Plate
Vol.Cont. - Full On
Line - 110 volts

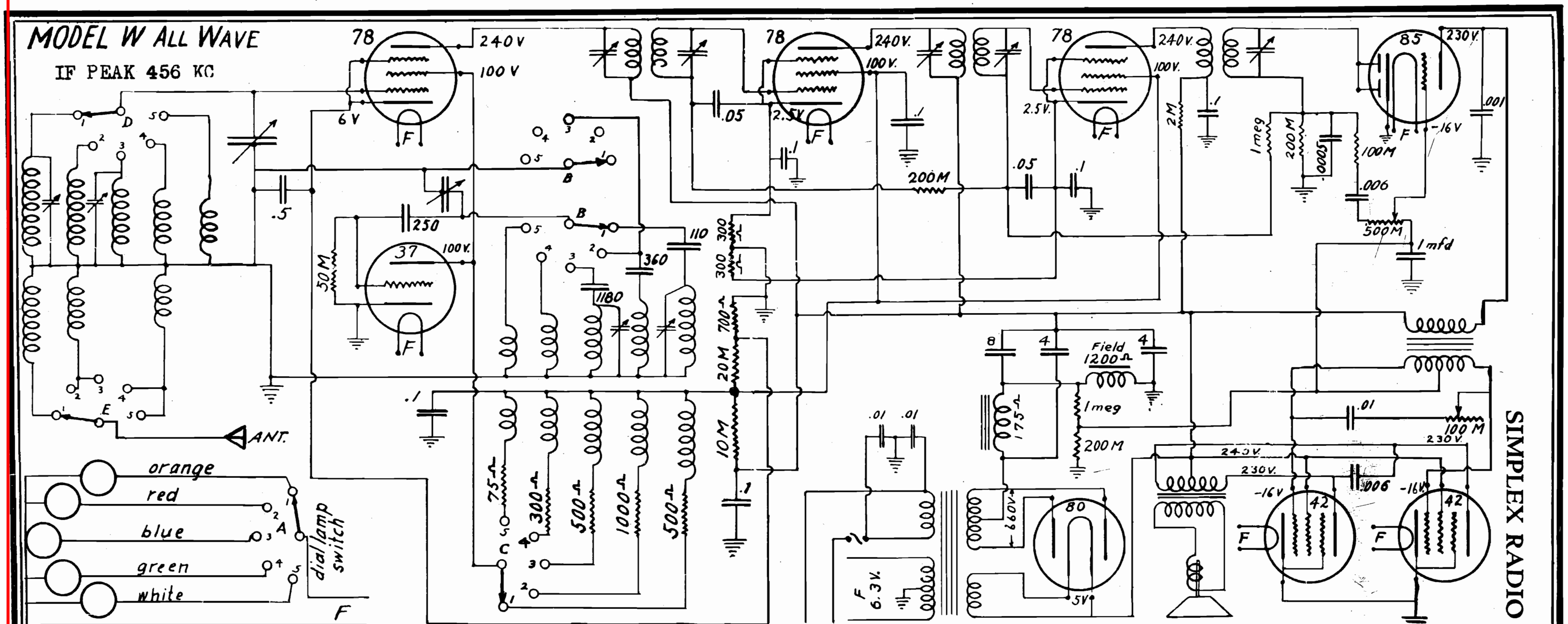
| PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|
| P-1038 | Pilot Light | $ .45 |
| P-1100-A | .001 Mfd. Condenser | .25 |
| P-1108 | 10,000 Resistor, 1 Watt | .25 |
| P-1381 | .0005 Mfd. Condenser | .50 |
| P-1685 | 2,000 Ohm Resistor | .25 |
| P-1728 | .00005 Mfd. Condenser | .40 |
| P-1999 | 10,000 Ohm Resistor | .25 |
| P-4168 | Blinder | .10 |
| P-4182 | Felt Washer | .05 |
| P-4200 | 5,000 Ohm Resistor | .30 |
| P-4259 | Tone Control and Switch | 1.75 |
| P-4260 | Volume Control | 1.25 |
| P-4262 | 56 Sockets | .25 |
| P-4264 | 58 Sockets | .25 |
| P-4391 | Field Coil | 2.50 |
| P-4485 | Tube Shield | .15 |
| P-4486 | Tube Shield Caps | .10 |
| P-4487 | Tube Shield Case | .10 |
| P-4514 | 12 Mfd. - 8 Mfd. Dual Electrolytic | 2.85 |
| P-4585 | Dual 5 Mfd. Condenser | 1.50 |
| P-4595 | 1 Meg. Resistor | .25 |
| P-4597 | 250 Ohm Resistor | .25 |
| P-4640 | .25 Mfd. Condenser | .20 |
| P-4644 | .05 Mfd. Condenser | .20 |
| P-4646 | .02 Mfd. Condenser | .25 |
| P-4659 | 50,000 Ohm Resistor | .25 |
| P-4662 | 100,000 Ohm Resistor | .25 |
| P-4664 | 200,000 Ohm Resistor | .25 |
| P-4701 | .10 Mfd. Condenser | .30 |
| P-4761 | .5 Mfd. Condenser | .40 |
| P-4890 | Small Knobs | .25 |
| P-4891 | Large Knobs | .25 |
| P-4894 | Escutcheon Plate | .80 |
| P-4905 | 59 Sockets | .15 |
| P-4909 | 20,000 Ohm Resistors | .25 |
| P-4911 | .25 Mfd. Condensers | .35 |
| P-4914 | 5Z3 Socket | .15 |
| P-4915 | Tune-A-Lite | 3.00 |
| P-4917 | Tune-A-Lite Socket | .25 |
| P-4919 | Switch - Wave Change | 1.00 |
| P-4923 | Noise Control | 1.00 |
| P-4924 | Tune-A-Lite Bracket | .15 |
| P-4925 | Canopy Mtg. Studs | .10 |
| P-4929 | Tune-A-Lite Blinder | .15 |
| P-4930 | 20,000 Ohm Resistor | .25 |
| P-4931 | 250,000 Ohm Resistor | .25 |
| P-4932 | 150,000 Ohm Resistor | .25 |
| P-4933 | 1,000 Ohm Resistor | .25 |
| P-4934 | .003 Mfd. Condenser | .25 |
| P-4937 | Wing Bolts | .10 |
| P-4952 | Wing Nuts | .05 |
| P-4957 | Diaphragm | .50 |
| G-1281 | Primary Coil Assembly (R.F. Coil) | .75 |
| G-1282 | Primary Coil Assembly (Ant. Coil) | .40 |
| G-1378 | Single Insulated Trimmer | .75 |
| G-1401 | Gang Condenser | 5.00 |
| G-1403 | Trimmer Assembly | .75 |
| G-1488 | Padding Condenser | .75 |
| G-1600 | Voice Coil and Spider | .65 |
| G-1669 | Filter Choke Assembly | 1.75 |
| G-1708 | 10" Speaker | 6.00 |
| G-1776 | Power Transformer Assembly | 4.50 |
| G-1776-A | Power Transformer 25 Cycle | 6.25 |
| G-1776-B | Power Transformer 220 Volt | 5.00 |
| G-1777 | Output Transformer Assembly | 2.00 |
| G-1778 | Input Transformer | 2.50 |
| G-1779 | R.F. Units | 4.00 |
| G-1792 | 1st. I.F. Transformer | 2.50 |
| G-1793 | I.F. Coil and Dowel Assembly (G-1792) | 1.25 |
| G-1794 | 2nd. I.F. Transformer | 2.00 |
| G-1795 | Dial Assembly | .90 |
| G-1797 | Canopy | 1.00 |
| G-1803 | R.F. Coil Assembly | .80 |
| G-1804 | Oscillator Coil Assembly | .90 |

**MODEL W All Wave**
**Schematic, Voltage**
**Alignment Data**
**MODEL X**
**Schematic**
**Voltage**

# SIMPLEX RADIO CO.

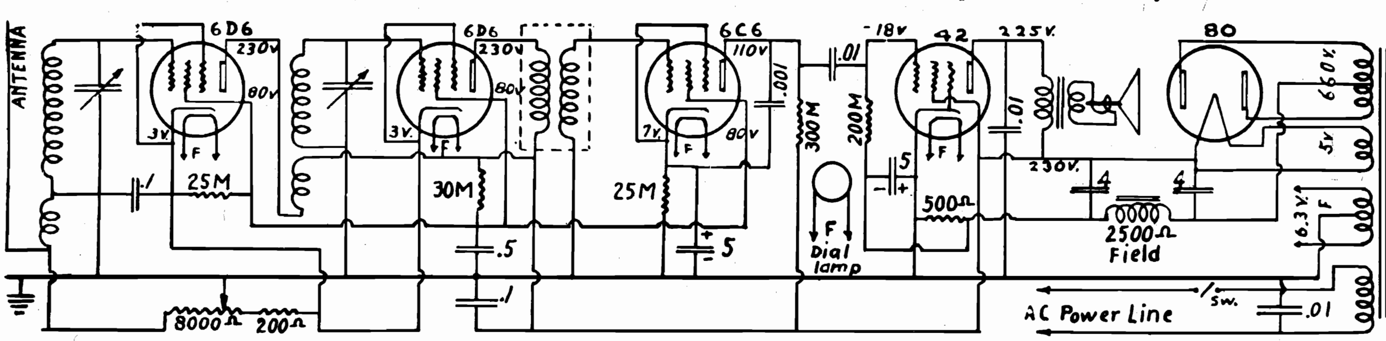
## MODEL W ALL WAVE

IF PEAK 456 KC




The intermediate stages are carefully phased to 456 kilocycles at the factory. Should rephasing be necessary, feed a 456 kilocycle signal from a test oscillator to the grid cap of the tube marked "78," located at the rear end of the tuning condenser, then adjust the double trimmers in the top of the coil cans nearest this tube, also the single trimmer in the top of the coil can near the "85" tube, to loudest volume, being sure to keep the oscillator signal at a low volume level. In trimming the frequency bands, first set the dial to the third group of figures from the right-hand end. Trim the "red" band first by adjusting the trimmers on the top of the tuning condenser until a signal of the proper frequency applied to the built-in aerial is heard at its loudest. Next, trim the "orange" band by adjusting the three-plate trimmers, located on the underside of the chassis, to loudest volume with proper signal frequency applied to the antenna. Next, trim the "blue" band by adjusting the two-plate trimmers located adjacent to the three-plate trimmers, to loudest volume with the proper signal frequency applied to the antenna. In trimming the various bands be sure that the band switch is set to the proper band as indicated by the color of the dial lamp. Also, keep the oscillator signal to as low volume level as possible for accuracy.

Model X



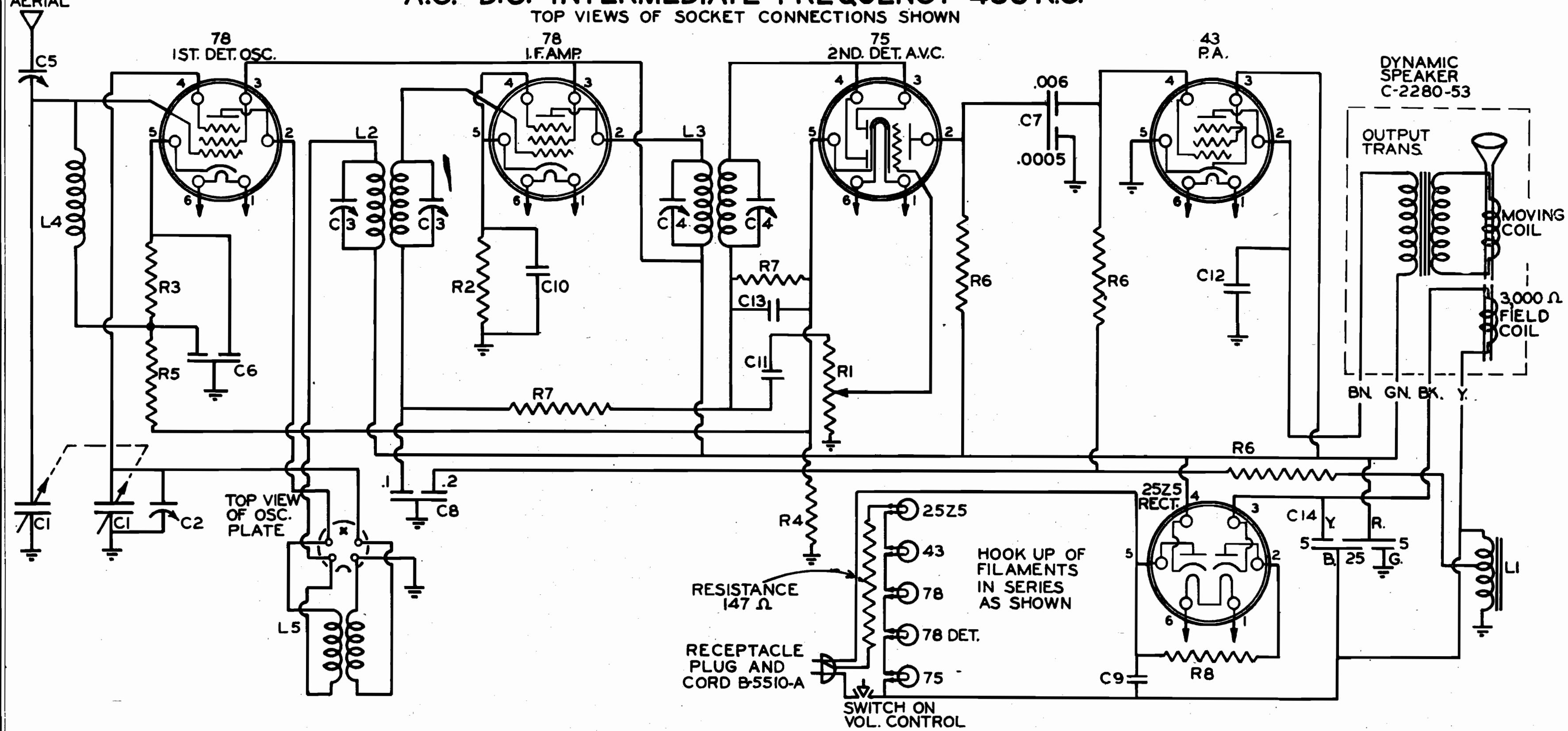

**PHONOGRAPH:** Mount single pole toggle switch at any convenient point on rear flange of chassis, disconnect 5 mfd. condenser from "cathode" of 6C6 socket and connect it to one side of switch, connect other side of switch to "cathode" of socket and connect phonograph across switch.

**MODEL 53 AC-DC**
**Schematic**

SPARKS-WITHINGTON CO.

# SCHEMATIC DIAGRAM
## SPARTON MODEL 53 SUPERHETERODYNE
## A.C.-D.C. INTERMEDIATE FREQUENCY 456 K.C.

TOP VIEWS OF SOCKET CONNECTIONS SHOWN




| | | | | | |
|---|---|---|---|---|---|
| C1 | VARIABLE CONDENSER | B-5509 | C8 | .1-.2 MFD. 100 V. | A-11092-6 |
| C2 | ADJUSTABLE CONDENSER | | C9 | .025 MFD. 400 V. | A-11086-4 |
| C3 | NO.1 I.F. TRIMMER | A-11474 | C10 | .1 MFD. 100 V. | A-11130-1 |
| C4 | NO.2 I.F. TRIMMER | A-9553 | C11 | .006 MFD. 400 V. | A-11130-4 |
| C5 | ANTENNA TRIMMER | A-11484 | C12 | .01 MFD. 200 V. | A-11130-7 |
| C6 | .05-.05 MFD. 100 V. | A-11092-1 | C13 | .0005 MFD. MOLDED | A-9578-14 |
| C7 | .006-.0005 MFD. 400 V. | A-11092-2 | C14 | 5-25-5 MFD. ELECTROLYTIC | A-11093-1 |

| | | |
|---|---|---|
| R1 | 500,000 Ω VOL. CONTROL | A-11480 |
| R2 | 400 Ω WIREWOUND | B-5243-30 |
| R3 | 290 Ω WIREWOUND | B-5243-36 |
| R4 | 100 Ω WIREWOUND | B-5243-37 |
| R5 | 2,200 Ω WIREWOUND | B-5243-13 |
| R6 | 300,000 Ω .25 W. | B-5737-3 |
| R7 | 500,000 Ω .25 W. | B-5737-5 |
| R8 | 50 Ω WIREWOUND | B-6061-1 |

NOTE: Part No. of Condenser C13 in late Model 53 Chassis is changed from A-9578-14 to A-9578.

| | | |
|---|---|---|
| L1 | TAPPED CHOKE | A-9566 |
| L2 | NO.1 I.F. TRANSFORMER | A-11476 |
| L3 | NO.2 I.F. TRANSFORMER | A-11477 |
| L4 | PRE-SELECTOR COIL | A-11486 |
| L5 | OSCILLATOR COIL | A-11475 |

MODEL 53 AC-DC
Voltage
Chassis View

SPARKS-WITHINGTON CO.

(ORIGINAL) EFFECTIVE AUGUST 28, 1934

# Sparton Model 53 A. C.-D. C. Superheterodyne Schematic Diagram and Voltage Resistance Chart

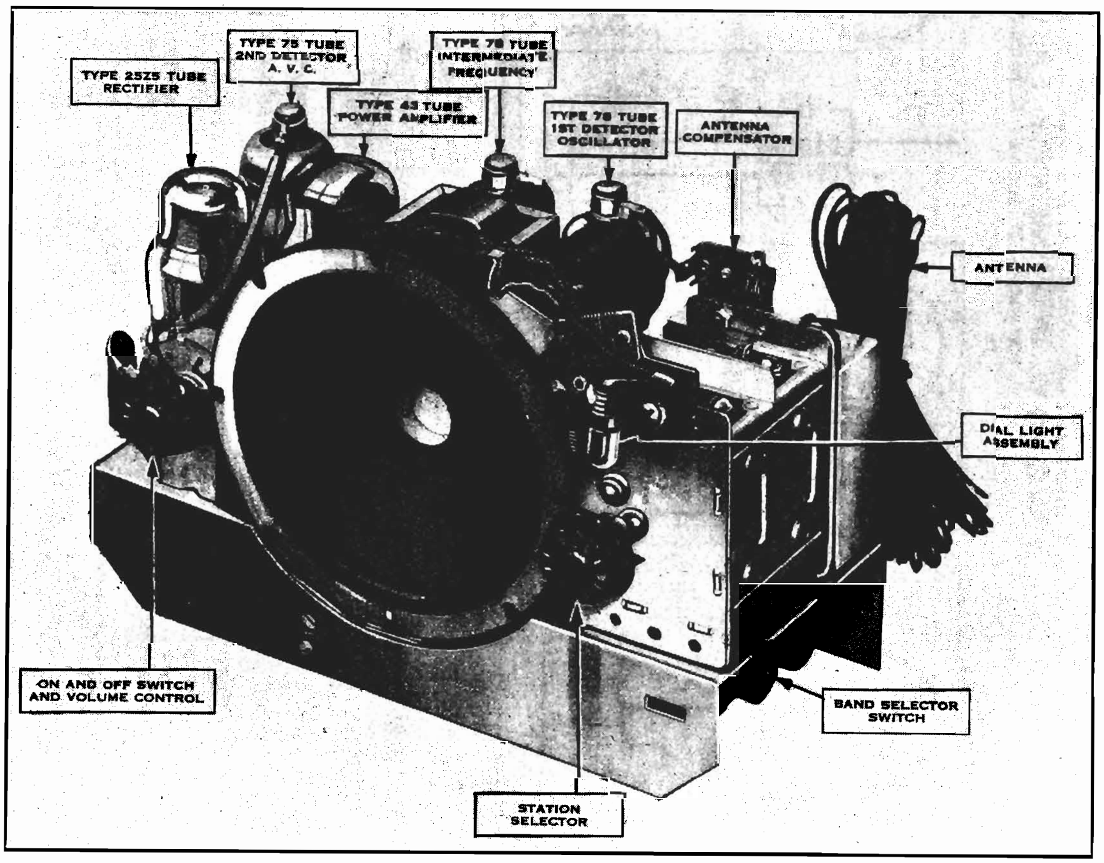
## VOLTAGE-RESISTANCE CHART

Line Supply — A. C.
Line Voltage — 119

Position of Volume Control — Full with Antenna Disconnected

| Tube | Function | Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Measurement | Prong No. 1 | Prong No. 2 | Prong No. 3 | Prong No. 4 | Prong No. 5 | Prong No. 6 | Grid Cap |
| 78 | 1st Detector-Oscillator | Volts | 28 | 105 | 105 | ** | 18 | 28 | 15 |
| | | Ohms | 700 | 30,000 | 30,000 | ** | 2500 | 700 | 2100 |
| 78 | I-F Amplifier | Volts | 28 | 105 | 105 | 3.7 | 3.7 | 28 | ** |
| | | Ohms | 700 | 30,000 | 30,000 | 350 | 350 | 700 | 1,000,000 |
| 75 | 2d Detector-A.V.C. | Volts | 28 | ** | ** | ** | ** | 28 | ** |
| | | Ohms | 700 | 450,000 | 500,000 | 500,000 | 100 | 700 | 500,000 |
| 43 | Power Amplifier | Volts | 28 | 98 | 105 | ** | ** | 28 | — |
| | | Ohms | 700 | 25,000 | 25,000 | 500.000 | 0 | 700 | — |
| 25Z5 | Rectifier | Volts | 28 | 118 | 105 | 70 | 118 | 28 | — |
| | | Ohms | 700 | 800 | 25,000 | 3500 | 750 | 700 | — |

NOTES: Voltage and resistance readings are for schematic diagram shown. See note under schematic diagram. Allow 15% + or — on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.
**Cannot be measured with Weston No. 665, Type 1.




MODELS 53 AND 57 CHASSIS

Note: Model 53 Chassis is not equipped with dial light assembly or band selector switch.

**MODEL 53 AC–DC**
**MODEL 57 AC–DC**
**Alignment Data**

SPARKS-WITHINGTON CO.

(Original) Effective September 28, 1934

# Detailed Alignment Instructions for SPARTON Models 53 and 57

**Foreword:** Before attempting to realign the circuits of the above SPARTON models, the service man should read carefully the information contained in the preceding pages of Bulletin No. 3-E, especially the paragraphs pertaining to the use of a test oscillator, output meter, method of adjusting the various trimming and padding condensers, and the bending of split condenser plate sections.

The use of quality test equipment is highly recommended, and a good test oscillator becomes a virtual necessity when aligning the all-wave or short-wave type of receiver. Due to the fact that the ear cannot distinguish small changes in sound intensity, an output meter is essential to the proper adjustment of the various condensers.

Unless otherwise specified, the adjusting of any condenser consists of turning the adjusting screw or nut to the right or left until the output meter registers the greatest deflection.

**1. EQUIPMENT NEEDED.**

A. Modulated test oscillator (crystal controlled or accurately calibrated) capable of generating frequencies from 172.5 to 1710 kilocycles.
B. Output meter.
C. Part A-9631 adjusting wrench.

**2. STEP BY STEP PROCEDURE FOR COMPLETE ALIGNMENT OF MODELS.**

**Note:** For proper alignment of these chassis, the procedure should be followed in the same order as given.

A. **Alignment of Model 53.**

(1) Turn on receiver and test oscillator, and allow both to operate several minutes before attempting to adjust any condensers.

(2) Connect "antenna" of test oscillator to grid cap of Type 78 First Detector-Oscillator Tube, and "ground" of test oscillator to chassis frame of receiver. Connect output meter (condenser in series) from plate of Type 43 Tube to ground. (See Fig. 1, Page 1, Bulletin No. 3-E.)

**Note:** It is advisable to read carefully the operating instructions included with test oscillator. A blocking condenser must be in series with the test oscillator antenna lead to prevent damage to the oscillator. If the oscillator construction or equipment does not include this, use a .1 MFD or .2 MFD fixed condenser.

(3) Tune test oscillator to obtain a signal of 456 kilocycles.

(4) Turn the Station Selector of the receiver so that the condenser plates are all of the way out.

(5) Retard the volume control of the receiver as much as possible and still obtain a ½ to ¾ full scale deflection of the output meter. The gain control of the test oscillator should be advanced to obtain sufficiently strong signals.

(6) Adjust condensers $C_1$ (reached from the bottom of the chassis) and $C_2$ (reached from the back of the chassis). These are the first and second intermediate frequency adjustable condensers, respectively.

(7) Set the Station Selector Knob pointer at 540 kilocycles with the variable condenser rotor plates flush with the stator plates.

(8) Disconnect "antenna" lead of test oscillator from grid cap of first detector oscillator tube and connect to the antenna terminal of the chassis.

(9) Tune test oscillator to obtain a signal of 1500 kilocycles.

(10) Tune the station selector of the receiver to 1500 kilocycles.

(11) Without disturbing the 1500 kilocycles setting of either the test oscillator or the receiver, adjust condenser $C_3$ and the antenna compensator $C_4$ for a maximum deflection of the output meter.

(12) Tune the test oscillator and receiver to 900 kilocycles for calibration check.

(13) Tune test oscillator and receiver to 600 kilocycles, and again check the calibration.

(14) Operation of the receiver should also be checked at 1710 kilocycles and 550 kilocycles.

**Note:** If the test oscillator is crystal-controlled for a frequency of 172.5 kilocycles, harmonics of this frequency may be used to check the dial calibrations at the following readings: 690, 862.5, 1035, 1207.5, 1380, and 1552.5 kilocycles. The end plates of the oscillator section of the two-gang condenser may be bent if necessary to correct dial readings.

(15) The condenser $C_4$ (antenna compensator) may require readjustment to permit best performance of the receiver **after** it has been connected to the antenna with which it will be used.

B. **Alignment of Model 57.**

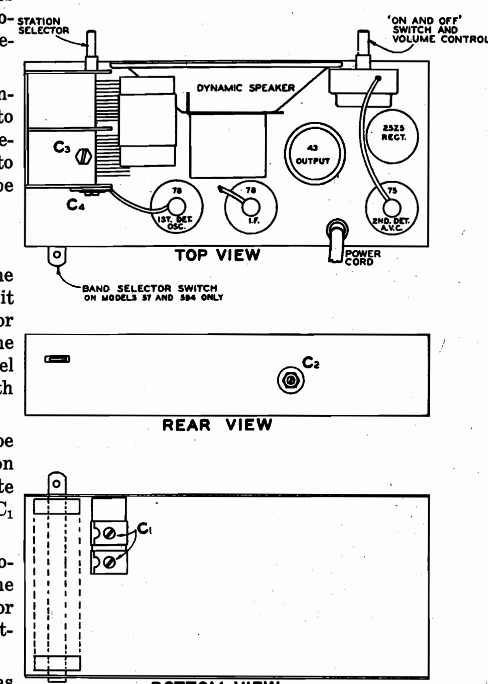
**Note:** The Model 57 is similar to the Model 53 with the exception that it is equipped with the band selector switch and dial light assembly. The alignment procedure for this model is the same as that for the 53 with the following exceptions:

(1) The band selector switch should be moved to the broadcast position (pushed in) when the intermediate frequency adjustable condenser $C_1$ and $C_2$ are adjusted.

(2) When the rotor plates of the two-gang condenser are flush with the stator plates, the station selector knob pointer should be on the right-hand edge of the symbol "S".

(3) After the alignment procedure has been completed, the band selector switch should be moved to the short-wave position (pulled out). With the band selector switch in this position, a test oscillator frequency of 1500 kilocycles should be heard through the receiver when the station selector dial knob is turned to the low-frequency end of the dial between 540 and 600 kilocycles (between 54 and 60).

**Note:** All adjustments should be rechecked to assure accuracy and stability of adjustment and calibration. The condenser $C_4$ of the Model 57 will also have to be readjusted **after** the receiver is connected to the regular antenna.




C1 — FIRST INTERMEDIATE FREQUENCY ADJUSTABLE CONDENSER.
C2 — SECOND INTERMEDIATE FREQUENCY ADJUSTABLE CONDENSER.
C3 — OSCILLATOR TRIMMING CONDENSER.
C4 — ANTENNA COMPENSATING CONDENSER.

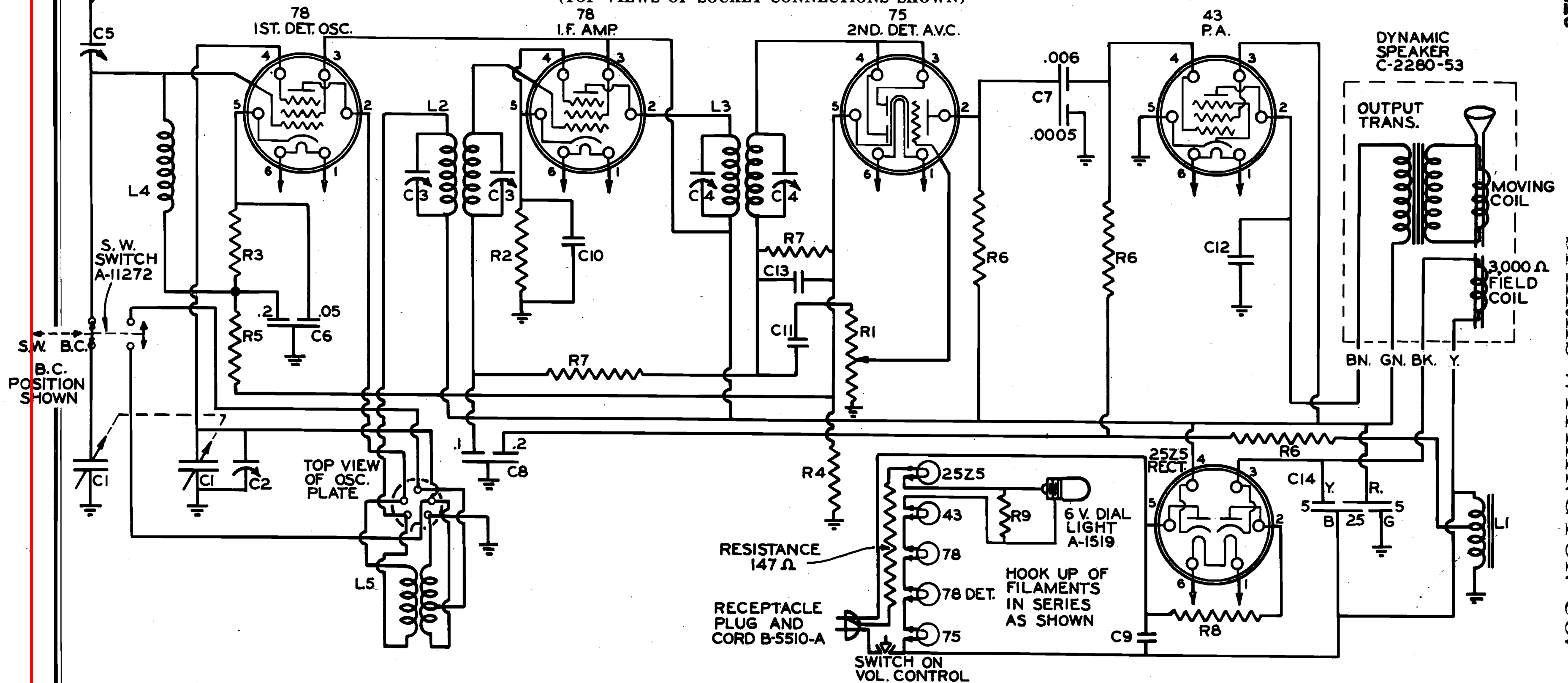
FIG. 5. CHASSIS DIAGRAM FOR SPARTON MODELS 53 AND 57.

**MODEL 57 AC-DC**
**Schematic**

SPARKS-WITHINGTON CO.

# SPARTON MODEL 57 SUPERHETERODYNE
## SCHEMATIC DIAGRAM
## A. C.-D. C. INTERMEDIATE FREQUENCY 456 KILOCYCLES

(TOP VIEWS OF SOCKET CONNECTIONS SHOWN)




| | | | | | |
|---|---|---|---|---|---|
| C1 VARIABLE CONDENSER | B-5509 | C8 .1-.2 MFD. 100 V. | A-11092-6 | R1 500,000 Ω VOL. CONTROL | A-11480 |
| C2 ADJUSTABLE CONDENSER | | C9 .025 MFD. 400 V. | A-11086-4 | R2 400 Ω WIREWOUND | B-5243-30 |
| C3 NO. 1 I.F. TRIMMER | A-11474 | C10 .1 MFD. 100 V. | A-11130-1 | R3 290 Ω WIREWOUND | B-5243-36 |
| C4 NO. 2 I.F. TRIMMER | A-9553 | C11 .006 MFD. 400 V. | A-11130-4 | R4 100 Ω WIREWOUND | B-5243-37 |
| C5 ANTENNA TRIMMER | A-11499 | C12 .01 MFD. 200 V. | A-11130-7 | R5 2,200 Ω WIREWOUND | B-5243-13 |
| C6 .05-.2 MFD. 100 V. | A-11092-7 | C13 .0005 MFD. MOLDED | A-9578-14 | R6 300,000 Ω .25 W. | B-5737-3 |
| C7 .006-.0005 MFD. 400 V. | A-11092-2 | C14 5-25-5 MFD. ELECTROLYTIC | A-11093-1 | R7 500,000 Ω .25 W. | B-5737-5 |
| | | | | R8 50 Ω WIREWOUND | B-6061-1 |
| | | | | R9 2.5 Ω WIREWOUND | A-9647 |

NOTE: Part No. of Condenser C-13 in late Models 57 chassis is changed from A-9578-14 to A-9578.

| | |
|---|---|
| L1 TAPPED CHOKE | A-9566 |
| L2 NO. 1 I.F. TRANSFORMER | A-11476 |
| L3 NO. 2 I.F. TRANSFORMER | A-11477 |
| L4 PRE SELECTOR COIL | A-9601 |
| L5 OSCILLATOR COIL | A-11504 |

SPARKS-WITHINGTON CO.

MODEL 57 AC-DC
Voltage
Chassis View

(ORIGINAL) EFFECTIVE AUGUST 30, 1934

# Sparton Model 57 A. C.-D. C. Superheterodyne Schematic Drawing and Voltage-Resistance Chart

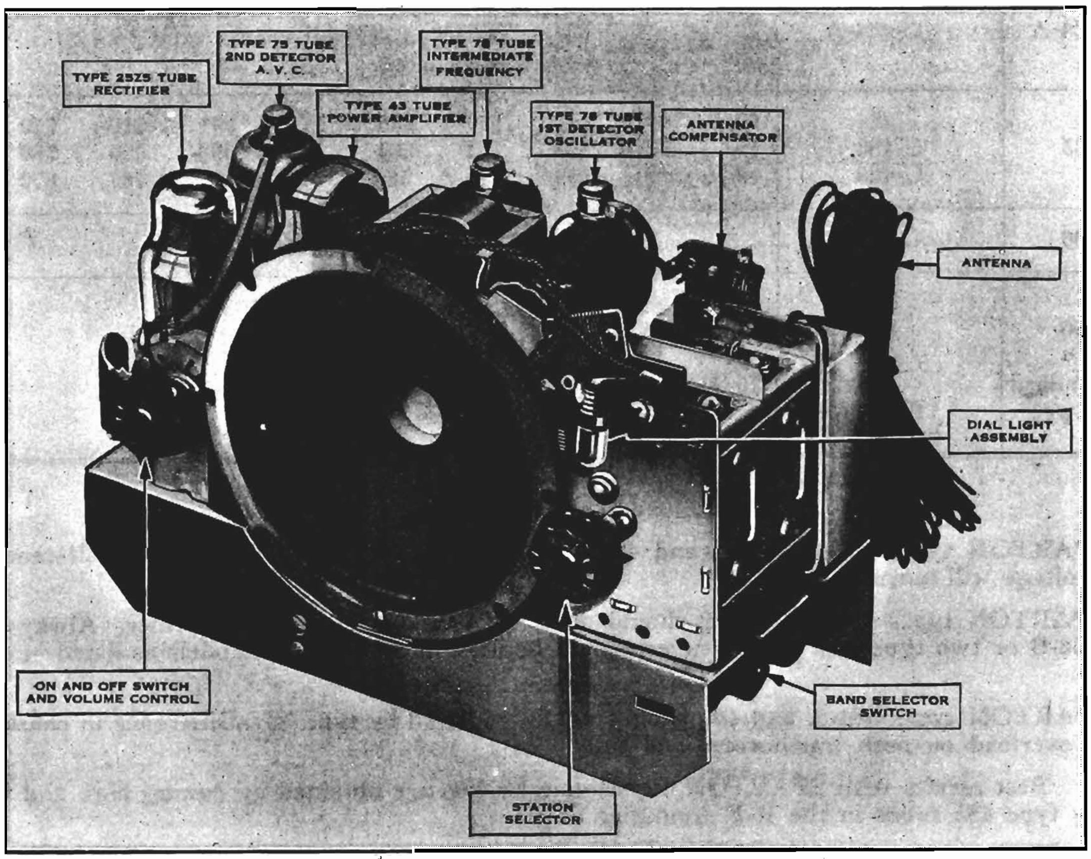
## VOLTAGE-RESISTANCE CHART

Line Supply — A. C.
Line Voltage — 119

Position of Volume Control — Full with Antenna Disconnected
Position of Band Selector Switch — Short-Wave

| Tube | Function | Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Measurement | Prong No. 1 | Prong No. 2 | Prong No. 3 | Prong No. 4 | Prong No. 5 | Prong No. 6 | Grid Cap |
| 78 | 1st Detector-Oscillator | Volts | 31 | 115 | 115 | ** | 22 | 31 | 15 |
| | | Ohms | 700 | 70.000 | 70.000 | ** | 2500 | 700 | 2100 |
| 78 | I-F Amplifier | Volts | 31 | 115 | 115 | 4 | 4 | 31 | ** |
| | | Ohms | 700 | 50.000 | 50,000 | 300 | 300 | 700 | 1,000,000 |
| 75 | 2d Detector-A.V.C. | Volts | 31 | ** | ** | ** | ** | 31 | ** |
| | | Ohms | 700 | 500,000 | 500,000 | 500.000 | 100 | 700 | 500.000 |
| 43 | Power Amplifier | Volts | 31 | 107 | 115 | ** | ** | 31 | —— |
| | | Ohms | 700 | 50.000 | 50,000 | 500.000 | 0 | 700 | —— |
| 25Z5 | Rectifier | Volts | 31 | 118 | 115 | 95 | 116 | 31 | —— |
| | | Ohms | 700 | 850 | 45,000 | 3500 | 900 | 700 | —— |

NOTES: Voltage and resistance readings are for schematic diagram shown. See note under schematic diagram. Allow 15% + or — on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.
**Cannot be measured with Weston No. 665, Type 1.




MODEL 57 CHASSIS

SPARKS-WITHINGTON CO.

**(First Revision) Effective August 24, 1934**

# Chart of Special SPARTON Radio Tubes

| Present Type Number | Replaces Discontinued Types or Type Numbers | USED IN SPARTON MODELS |
|---|---|---|
| 181 | C-171<br>C-181 | AC-7 AC-62 AC-63 |
| 401 | C-373<br>C-401<br>Kellogg-401 | AC-5 AC-7 AC-62 AC-63 |
| 482-A | C-182-A | AC-7 AC-63 600-DC 620-DC 750-DC<br>AC-62 301-DC 610-DC 740-DC 931-DC |
| 482-B | 182-B<br>C-182 | 591 593 930 931 |
| 483 | C-183 | 235 420 591 600 620 930<br>410 589 593 610 737 931 |
| 484-A | C-484-A | 301-DC 610-DC 740-DC 931-DC<br>600-DC 620-DC 750-DC |
| 485 | 484<br>C-484<br>C-485 | 69 89 101 110 235 570 591 610 740 930<br>79 89-A 103 111 301 574 593 620 750 931<br>79-A 99 109 111-A 564 589 600 737 870 |
| 486 | C-686 | 39 49 |
| 50<br>(Standard Type) | 250<br>450<br>585<br>586<br>C-585<br>C-586 | 35 89 103 111-A 574<br>69 89-A 109 301 740<br>79 99 110 564 750<br>79-A 101 111 570 870 |

## IMPORTANT

SPARTON types 482-A, 482-B and 483 should not be replaced by type '45. Difference in filament voltage will burn out type '45.

SPARTON types 482-B and 483 should never be mixed in a power amplifier. Always use two type 482-B or two type 483. These tubes should be used in SPARTON Models as listed in the above chart.

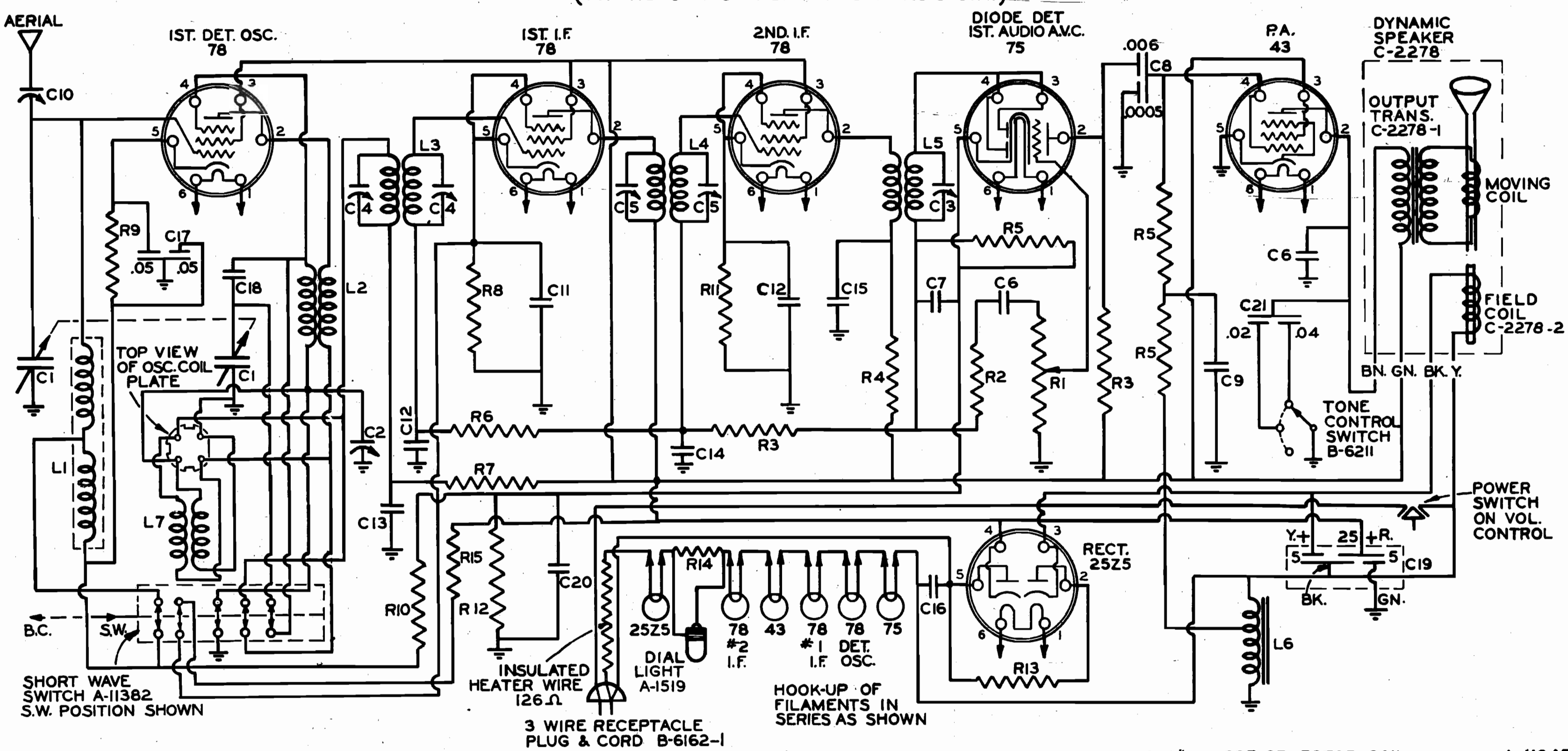
SPARTON types 484-A and 485 should not be replaced by type '27. Difference in characteristics causes overload on both transformer and tube.

NOTE: Best results with SPARTON Equasonne Models are obtained by mixing high and low reading type 485 tubes in the R-F Amplifier unit.

MODEL 65, 66 Schematic
MODEL 65T, 66T Note

SPARKS-WITHINGTON CO.

# SCHEMATIC DIAGRAM
## SPARTON MODELS 65 AND 66 SUPERHETERODYNE
## A.C.-D.C. INTERMEDIATE FREQUENCY 456 K.C.
(TOP VIEWS OF SOCKET CONNECTIONS SHOWN)




| | | |
|---|---|---|
| C1 | VARIABLE CONDENSER | B-6153 |
| C2 | B.C. OSCILLATOR TRIMMER | A-10972 |
| C3 | ADJUSTABLE CONDENSER | A-10973 |
| C4 | ADJUSTABLE CONDENSER | A-10977 |
| C5 | ADJUSTABLE CONDENSER | A-11034 |
| C6 | .006 MFD. 400 V. | A-11130-4 |
| C7 | .0005 MFD. MOLDED | A-11095-1 |
| C8 | .006-.0005 MFD. 400 V. | A-11092-2 |
| C9 | .5 MFD. 100 V. | A-11130-2 |
| C10 | ANTENNA TRIMMER | A-11071 |
| C11 | .1 MFD. 100 V. | A-11086-1 |
| C12 | .05 MFD. 100 V. | A-11086-2 |
| C13 | .05 MFD. 200 V. | A-11087-1 |
| C14 | .1 MFD. 100 V. | A-11089-1 |
| C15 | .05 MFD. 200 V. | A-11086-3 |
| C16 | .025 MFD. 400 V. | A-11086-4 |
| C17 | .05-.05 MFD. 100 V. | A-11092-1 |
| C18 | .0005 MFD. MOLDED | A-9578-14 |
| C19 | 5-25-5 MFD. ELECTROLYTIC | A-11093 |
| C20 | .1 MFD. 100 V. | A-11130-1 |
| C21 | .04-.02 MFD 200 V. | A-9612-1 |

| | | | |
|---|---|---|---|
| R1 | 250,000 Ω | VOL. CONTROL | A-11069 |
| R2 | 50,000 Ω | .25 W. | B-5458-27 |
| R3 | 500,000 Ω | .25 W. | B-5458-28 |
| R4 | 3,000 Ω | .25 W. | B-5458-19 |
| R5 | 300,000 Ω | .25 W. | B-5458-29 |
| R6 | 100,000 Ω | .25 W. | B-5458-30 |
| R7 | 15,000 Ω | .5 W. | B-4114-23 |
| R8 | 1,700 Ω | .25 W. | B-5458-15 |
| R9 | 290 Ω | WIREWOUND | B-5243-36 |
| R10 | 2,200 Ω | WIREWOUND | B-5243-13 |
| R11 | 230 Ω | WIREWOUND | B-5243-34 |
| R12 | 100 Ω | WIREWOUND | B-5243-37 |
| R13 | 50 Ω | 2 W. | B-6061-2 |
| R14 | 25 Ω | WIREWOUND | A-9647 |
| R15 | 60,000 Ω | .25 W. | B-5458-33 |

| | | |
|---|---|---|
| L1 | PRE-SELECTOR COIL | A-11045 |
| L2 | FOREIGN BAND OSC. COIL | A-11047 |
| L3 | #1 I.F. TRANSFORMER | A-11039 |
| L4 | #2 I.F. TRANSFORMER | A-11040 |
| L5 | #3 I.F. TRANSFORMER | A-11041 |
| L6 | CHOKE COIL | A-11038 |
| L7 | BROADCAST OSC. COIL | A-11068 |

**Models 65T and 66T are equipped with a power transformer and must be used ONLY on A.C.**

NOTE: Late Model 65 and 66 chassis have an adjustable condenser C3 connected across the primary of No. 3 I. F. Transformer L5. Part No. of C3 Adjustable Condenser is changed from A-10973 to A-11474. Also Resistor R11 is changed to .25 watt 2200 ohms (B-5458-1) and Resistor R15 is changed to .25 watt 50,000 ohms (B-5458-31). Also Part No. of No. 3 I. F. Transformer L5 is changed from A-11041 to A-11535.

MODEL 65,66
Voltage
Chassis View

SPARKS-WITHINGTON CO.

# Sparton Models 65 and 66 A. C.-D. C. Superheterodyne Schematic Diagram and Voltage-Resistance Chart

## VOLTAGE-RESISTANCE CHART

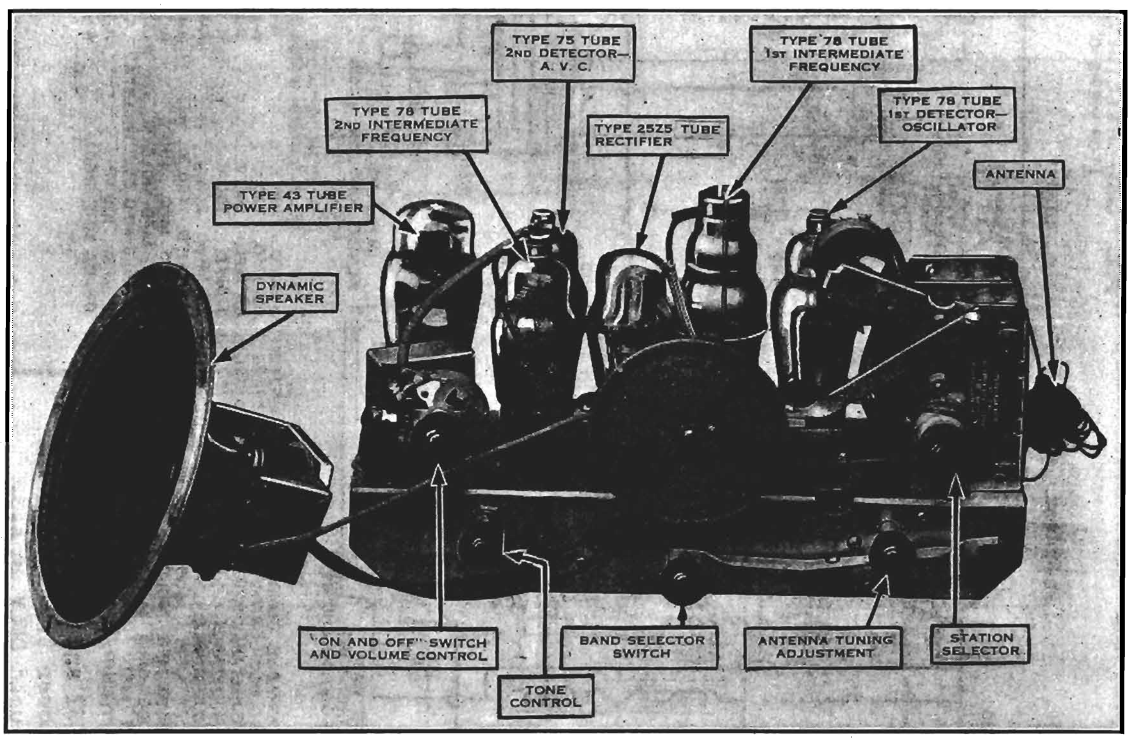
Line Supply — A. C.
Line Voltage — 119

Position of Volume Control — Full with Antenna Disconnected
Position of Band Selector Switch — Short-Wave

| Tube | Function | Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Measurement | Prong No. 1 | Prong No. 2 | Prong No. 3 | Prong No. 4 | Prong No. 5 | Prong No. 6 | Grid Cap |
| 78 | 1st Detector-Oscillator | Volts | 29 | 80 | 105 | 0 | 17.5 | 29 | 17.5 |
| | | Ohms | 700 | * | * | 0 | 2500 | 700 | 2400 |
| 78 | 1st I-F Amplifier | Volts | 29 | 105 | 105 | 7.5 | 7.5 | 29 | 0 |
| | | Ohms | 700 | * | * | 1700 | 1700 | 700 | 800,000 |
| 78 | 2nd I-F Amplifier | Volts | 29 | 75 | 105 | 2.7 | 2.7 | 29 | 0 |
| | | Ohms | 700 | * | 350,000 | 250 | 250 | 700 | 800,000 |
| 75 | 2nd Det.-A.V.C. | Volts | 29 | ** | ** | ** | .64 | 29 | 0 |
| | | Ohms | 700 | 500,000 | 500,000 | 500,000 | 100 | 700 | 250,000 |
| 43 | Power Amplifier | Volts | 29 | 95 | 105 | ** | ** | 29 | — |
| | | Ohms | 700 | * | * | 750,000 | 0 | 700 | — |
| 25Z5 | Rectifier | Volts | 29 | 28 | 105 | 74 | 30 | 29 | — |
| | | Ohms | 700 | 800 | * | 3000 | 800 | 700 | — |

NOTES: Voltage and resistance readings are for schematic diagram shown. See note under schematic diagram. Allow 15% + or — on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.

*Zero, provided correct meter polarity is used. **Cannot be measured with Weston No. 665, Type 1.




MODELS 65 AND 66 CHASSIS

(ORIGINAL) EFFECTIVE AUGUST 1, 1934

MODEL 65,66,65T,66T
Alignment Data

SPARKS-WITHINGTON CO.

(Original) Effective August 14, 1934

# Detailed Alignment Instructions for SPARTON Models 65, 65-T, 66 and 66-T

**Note:** Models 65 and 66 are A. C.-D. C. receivers; Models 65-T and 66-T are equipped with a power transformer and must be used on A. C. only.

**Foreword:** Before attempting to realign the circuits of the above SPARTON models, the service man should read carefully the information contained in the preceding pages of this bulletin, especially the paragraph pertaining to the use of a test oscillator, an output meter, method of adjusting the various trimming and padding condensers, and the bending of split condenser plate sections.

The use of quality test equipment is highly recommended, and a good test oscillator becomes a virtual necessity when aligning the all-wave type of receiver. Due to the fact that the ear cannot distinguish small changes in sound intensity, an output meter is essential to the proper adjustment of the various condensers.

Unless otherwise specified, the adjusting of any condenser consists of turning the adjusting screw or nut to the right or left until the output meter registers the greatest deflection.

**1. EQUIPMENT REQUIRED.**

A. Modulated test oscillator (crystal controlled or accurately calibrated) capable of generating frequencies from 172.5 to 15,000 kilocycles.

B. Output meter.

C. Sparton Part A-9631 Adjusting Wrench.

**2. STEP BY STEP PROCEDURE FOR COMPLETE ALIGNMENT OF MODELS.**

**Note:** For proper alignment of these chassis, the procedure should be followed in the same order as given.

**A. Alignment of Broadcast Band.**

(1) The dial pointer should be exactly parallel with the horizontal lines on the scale when the selector rotor plates are completely in mesh with the stator plates. The pointer may be reset, if necessary, by first loosening the nut on the planetary drive and drum, then resetting the pointer, and then tightening the nut.

(2) Turn on receiver and test oscillator, and allow both to operate several minutes before attempting to align any condensers.

(3) **Warning:** Before connecting test oscillator to receiver, be sure to read carefully the operating instructions included with the test oscillator.

Connect "antenna" of test oscillator to grid cap of type 78 first detector oscillator tube, and "ground" of test oscillator to chassis frame of receiver.

(4) Tune test oscillator to obtain signal of 456 kilocycles.

(5) Turn volume control of receiver on full, and place Band Selector Switch in Broadcast Position. Make sure condenser plates are turned all the way out.

(6) Adjust I-F condensers ($C_1$, $C_2$, and $C_3$). See Fig. 6.

(7) Disconnect "antenna" leads of test oscillator tube and connect to the antenna terminal of the chassis.

(8) Tune test oscillator to obtain a signal of 1500 kilocycles.

(9) Tune station selector of receiver to 1500 kilocycles. Also adjust antenna tuning condenser ($C_A$).

**Note:** Do not disturb the 1500 kilocycle setting of either the test oscillator or the receiver.

(10) Adjust oscillator trimmer condenser ($C_O$).

(11) Check calibration of receiver by setting the test oscillator to obtain a signal of 172.5 kilocycles. Harmonics of this frequency should be picked up at the following readings on the dial: 690, 862.5, 1035, 1207.5, 1380 and 1552.5 kilocycles.

The end plates of the oscillator section of the two gang condenser may be bent if necessary to correct dial readings.

**Note:** An allowance of 20 kilocycles at 900 kilocycles and 15 kilocycles at 600 kilocycles is permitted.

**B. Alignment of Short-Wave Band.**

(1) Adjust Band Selector Switch to Short Wave Position.

(2) Adjust test oscillator to obtain a wave length of 20 meters (15 megacycles) and tune receiver to this wave length. Adjust for resonance with antenna tuning condenser ($C_A$). Calibration should check within 1½ meters. Push or pull the wires that are near the oscillator coil to correct any greater variation in calibration.

(3) Adjust test oscillator to obtain a wave length of 50 meters (6 megacycles) and tune receiver to this wave length. Adjust for resonance with antenna tuning condenser ($C_A$). Calibration should check within 1½ meters. If the error in calbration exceeds this amount, recheck the preceding adjustments.

**Note:** All adjustments should be re-checked to assure accuracy and stability of adjustment and calibration.

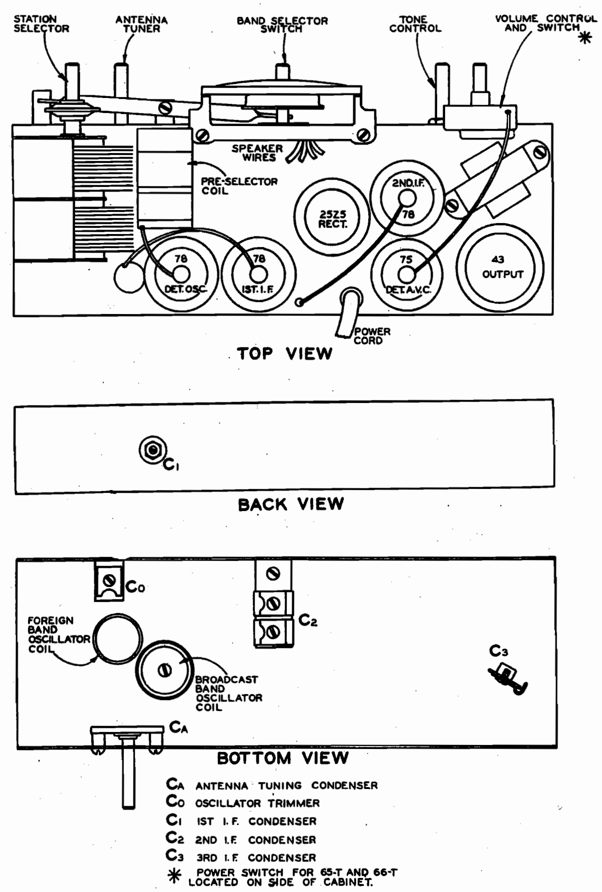



Fig. 6. CHASSIS DIAGRAM FOR SPARTON MODELS 65, 65-T, 66 AND 66-T

**MODEL 67,68,691**
**Alignment Data**

SPARKS-WITHINGTON CO.

(Original) Effective August 29, 1934

# Detailed Alignment Instructions for SPARTON Models 67, 68 and 691

**Foreword:** Before attempting to realign the circuits of the above SPARTON models, the service man should read carefully the information contained in the preceding pages of this bulletin, especially the paragraphs pertaining to the use of a test oscillator, an output meter, method of adjusting the various trimming and padding condensers, and the bending of split condenser plate sections.

The use of quality test equipment is highly recommended, and a good test oscillator becomes a virtual necessity when aligning the all-wave or short-wave type of receiver. Due to the fact that the ear cannot distinguish small changes in sound intensity, an output meter is essential to the proper adjustment of the various condensers.

Unless otherwise specified, the adjusting of any condenser consists of turning the adjusting screw or nut to the right or left until the output meter registers the greatest deflection.

**1. EQUIPMENT REQUIRED.**

A. Modulated test oscillator (crystal controlled or accurately calibrated) capable of generating frequencies from 172.5 to 15,000 kilocycles.

B. Output meter.

C. Sparton Part A-5732 or A-8737 adjusting wrench.

**2. STEP BY STEP PROCEDURE FOR COMPLETE ALIGNMENT OF MODELS.**

**Note:** For proper alignment of these chassis, the procedure should be followed in the same order as given.

**A. Alignment of Intermediate-Frequency Stages.**

(1) Turn on receiver and test oscillator, and allow both to operate several minutes before attempting to align any condensers.

(2) Connect "antenna" of test oscillator to grid cap of type 6A7 first detector-oscillator tube, and "ground" of test oscillator to chassis frame of receiver. Connect output meter as in Fig. 1, page 1, Bulletin No. 3-E.

**Note:** It is advisable to read carefully the operating instructions included with test oscillator.

(3) Tune test oscillator to obtain a signal of 345 kilocycles.

(4) Turn the volume control of receiver on full, and place Band Selector Switch in Broadcast Position.

(5) Adjust I. F. condensers $C_7$ and $C_8$. (See Fig. 7.)

(6) The dial pointer should point to the lowest calibrated frequency mark on the broadcast section of the kilocycle scale (dial division between 55 and horizontal line). **If the dial pointer reads incorrectly, it may be reset by first loosening the nut on the planetary drive and drum (back of the Station Selector knob), then resetting the pointer while holding the rotor plates completely in mesh with the stator plates, and then tightening the nut.**

**B. Alignment of Broadcast Band.**

(1) Disconnect "antenna" lead of test oscillator from grid cap of first detector-oscillator tube and connect to the antenna terminal of the chassis.

(2) Tune test oscillator and receiver to frequency of 1500 kilocycles.

(3) Adjust Condenser $C_6$.

(4) Adjust Condensers $C_2$ and $C_4$.

(5) Tune test oscillator and receiver to 600 kilocycles.

(6) Adjust condenser $C_9$ for maximum output.

**Note:** Slight readjustments of the station selector and condenser $C_9$ may be required to obtain the greatest deflection on the output meter. A variation of 5 kilocycles from the value of 600 kilocycles is permitted in this procedure.

(7) Check calibration of receiver by tuning the test oscillator to obtain a signal of 172.5 kilocycles. Harmonics of this frequency should be picked up at the following readings of the dial: 690, 862.5, 1035, 1207.5, 1380, and 1552.5 kilocycles.

The end plates of the oscillator section of the two gang condenser may be bent if necessary to correct dial readings.

**C. Alignment of Short-Wave Band.**

(1) Turn the Band Selector Switch to the Short-Wave Position.

(2) Tune the station selector to 1500 kilocycles in the broadcast band.

(3) Tune test oscillator to obtain a signal of 20 meters wave length (15 megacycles).

(4) Without changing the station selector setting of 1500 kilocycles, adjust condenser $C_5$. The station selector should show the same reading of 1500 kilocycles when the receiver is tuned to signals of 1500 kilocycles or 20 meters (15000 kilocycles.)

(5) With the test oscillator tuned to 20 meters, adjust condensers $C_1$ and $C_3$.

(6) Tune the test oscillator to obtain a wave length of 50 meters (6 megacycles) and tune receiver to this wave length for calibration check.

(7) Tune test oscillator to obtain a wave length of 33.3 meters (9 megacycles) and tune receiver to this wave length for calibration check.

(3) Tune test oscillator to obtain a wave length of 20 meters (15 megacycles) and tune receiver to this wave length for calibration check.

**Note:** All adjustments should be re-checked to assure accuracy and stability of adjustment and calibration.

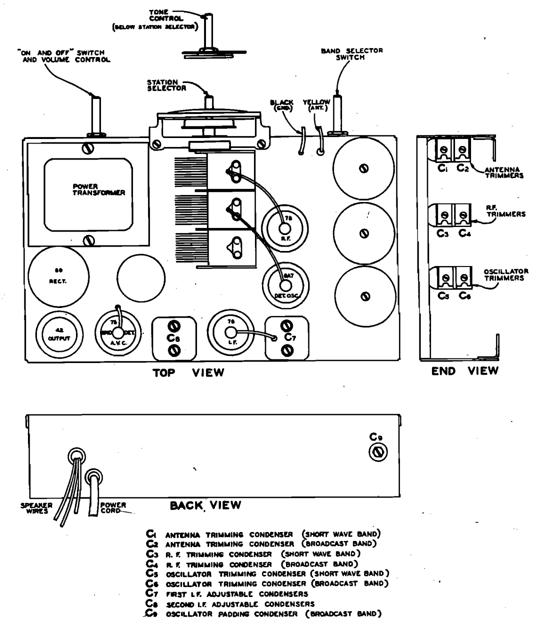
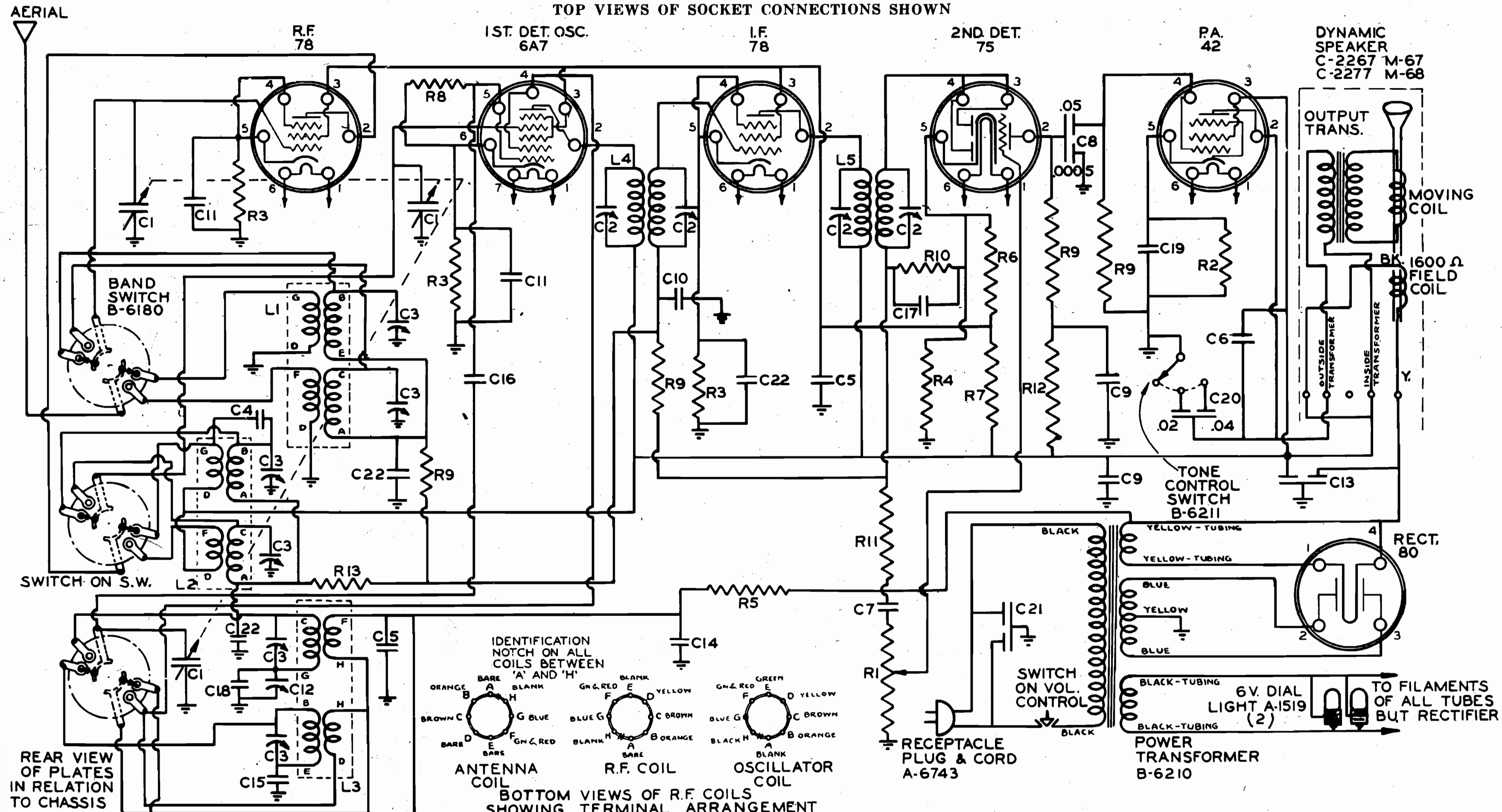



FIG. 7. CHASSIS DIAGRAM FOR SPARTON MODELS 67, 68, AND 691

MODEL 67,68,691
Schematic

SPARKS-WITHINGTON CO.

# SPARTON MODELS 67, 68 AND 691 SUPERHETERODYNE
## INTERMEDIATE FREQUENCY 345 K. C.
TOP VIEWS OF SOCKET CONNECTIONS SHOWN




| | | |
|---|---|---|
| C1 | VARIABLE CONDENSER | B-6212 |
| C2 | I.F. TRIMMERS (WITH COILS) | |
| C3 | R.F. TRIMMERS (DOUBLE) | A-11455 |
| C4 | 8-9 MMF. | A-11261 |
| C5 | .01 MFD. 400 V. | A-11130-5 |
| C6 | .006 MFD. 400 V. | A-9916 |
| C7 | .025 MFD. 400 V. | A-11409 |
| C8 | .05-.0005 400 V. | A-11408 |
| C9 | .2 MFD. 600 V. | A-11473-4 |
| C10 | .2 MFD. 200 V. | A-11473-2 |
| C11 | .1 MFD. 200 V. | A-11473-1 |
| C12 | 100-300 MMF. PADDER | A-7809-5 |
| C13 | 8-8 MFD. ELECTROLYTIC | A-11223-1 |
| C14 | 4 MFD. ELECTROLYTIC | A-11224-1 |
| C15 | .0032 MFD. MOLDED | A-7038-8 |
| C16 | .00005 MFD. MOLDED | A-5175-1 |
| C17 | .0005 MFD. MOLDED | A-5175-2 |
| C18 | .00025 MFD. MOLDED | A-9578-5 |
| C19 | 10 MFD. 25 V. | A-10377 |
| C20 | .04-.02 MFD. 400 V. | A-11407 |
| C21 | .006-.006 MFD. | A-7878 |
| C22 | .05 MFD. 200 V. | A-11410 |
| C23 | R.F. TRIMMER | A-11289 |

| | | | |
|---|---|---|---|
| R1 | 250,000 Ω | VOL. CONTROL & SWITCH | A-11245 |
| R2 | 500 Ω | WIREWOUND | B-5243-38 |
| R3 | 600 Ω | WIREWOUND | B-5243-19 |
| R4 | 230 Ω | WIREWOUND | B-5243-21 |
| R5 | 30,000 Ω | 1 W. | B-4540-12 |
| R6 | 20,000 Ω | 1 W. | B-4540-5 |
| R7 | 10,000 Ω | 3 W. | B-4539-3 |
| R8 | 50,000 Ω | .25 W. (CARBON) | B-5458-31 |
| R9 | 250,000 Ω | .25 W. | B-5737-1 |
| R10 | 500,000 Ω | .25 W. | B-5737-5 |
| R11 | 50,000 Ω | .25 W. | B-5737-4 |
| R12 | 100,000 Ω | .25 W. | B-5737-2 |
| R13 | 4,000 Ω | .25 W. | B-5737-7 |

| | | |
|---|---|---|
| L1 | NO. 1 R.F. COIL | A-11231 |
| L2 | NO. 2 R.F. COIL | A-11232 |
| L3 | OSCILLATOR COIL | A-11233 |
| L4 | NO. 1 I.F. TRANSFORMER | A-6314-1 |
| L5 | NO. 2 I.F. TRANSFORMER | A-6314-2 |

MODEL 67,68,691
Voltage
Chassis View

SPARKS-WITHINGTON CO.

(ORIGINAL) EFFECTIVE AUGUST 1, 1934

# Sparton Models 67, 68, and 691 A. C. Superheterodyne Schematic Diagram and Voltage-Resistance Chart

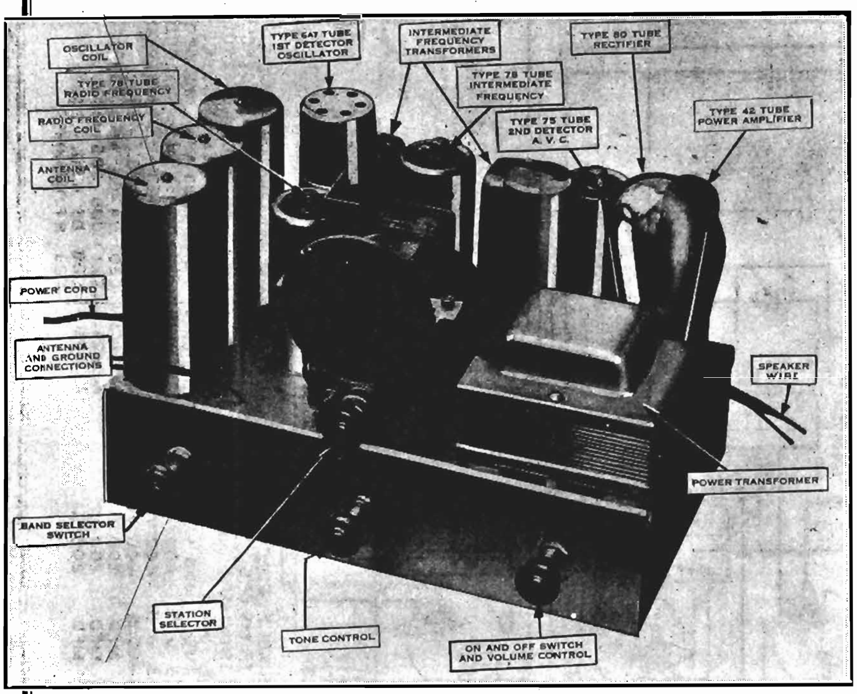
## VOLTAGE-RESISTANCE CHART

Line Voltage — 119
Position of Tone Control — Full

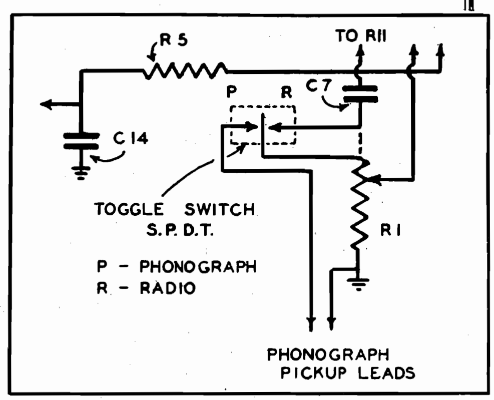
Position of Volume Control — Full with Antenna Disconnected
Position of Band Selector Switch — Short-Wave

| Tube | Function | Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Measure-ment | Prong No. 1 | Prong No. 2 | Prong No. 3 | Prong No. 4 | Prong No. 5 | Prong No. 6 | Prong No. 7 | Grid Cap |
| 78 | R-F Amplifier | Volts | 6.1 | 275 | 135 | 6.3 | 6.3 | 0 | — | ** |
| | | Ohms | 0 | 29,000 | 20,000 | 650 | 650 | 0 | — | 1,000,000 |
| 6A7 | 1st Detector-Oscillator | Volts | 6.1 | 275 | 135 | 135 | ** | 6.4 | 0 | ** |
| | | Ohms | 0 | 28.000 | 20,000 | 60.000 | 55,000 | 650 | 0 | 1,000,000 |
| 78 | I-F Amplifier | Volts | 6.1 | 275 | 135 | 6.3 | 6.3 | 0 | — | ** |
| | | Ohms | 0 | 29,000 | 20,000 | 650 | 650 | 0 | — | 1,000,000 |
| 75 | 2d Detector-A.V.C. | Volts | 6.1 | 120 | 0 | 0 | 1.6 | 0 | — | ** |
| | | Ohms | 0 | 500.000 | 600,000 | 600,000 | 270 | 0 | — | 250,000 |
| 42 | Power Amplifier | Volts | 6.1 | 260 | 280 | 0 | 19.5 | 0 | — | — |
| | | Ohms | 0 | 27,000 | 27,000 | 250,000 | 500 | 0 | — | — |
| 80 | Rectifier | Volts | 440 | 405 | 410 | 440 | — | — | — | — |
| | | Ohms | 28,000 | 1,250 | 1,350 | 28,000 | — | — | — | — |

NOTES: Voltage and resistance readings are for schematic diagram shown. See note under schematic diagram. Allow 15% + or — on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.
**Cannot be measured with Weston No. 665, Type 1.




MODELS 67, 68, AND 691 CHASSIS



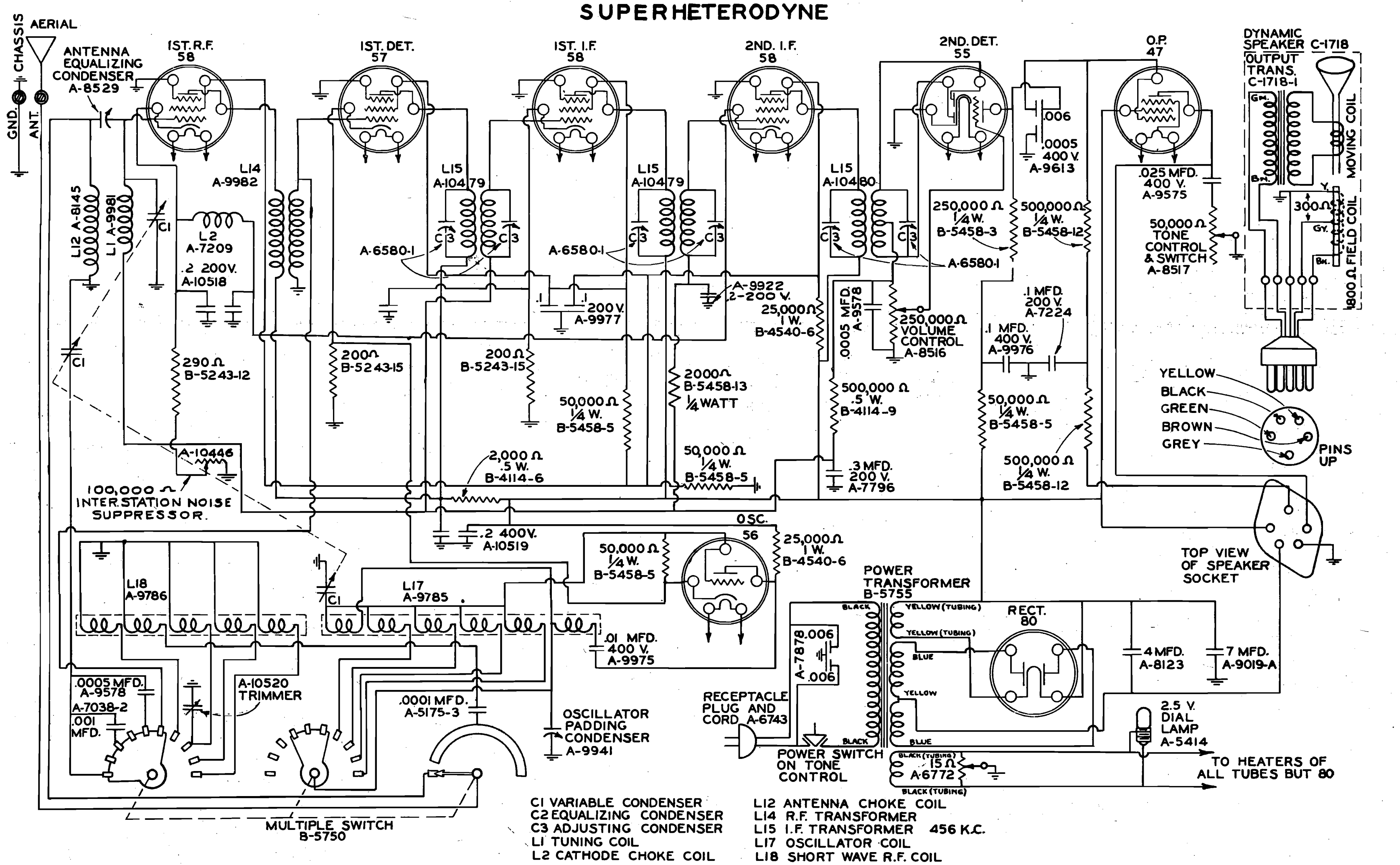

### CIRCUIT FOR PHONOGRAPH PICK-UP

Break connection between Condenser C7 and Volume Control R1 (see Schematic Diagram) and install toggle switch (SPARTON Part A-11561 may be used). Toggle switch may be mounted by drilling a ½" hole in the back of the chassis, 4 inches from the right hand side and 1 inch up from the bottom.

MODEL 75A,475A,478A
Schematic

SPARKS-WITHINGTON CO.

# SCHEMATIC DIAGRAM
## SPARTON MODELS 75A-475A-478A
## SUPERHETERODYNE




IF PEAK 456 KC.

### CHANGES IN MODELS 75-A, 475-A and 478-A SCHEMATIC DIAGRAM

Effective March 27, 1934

Resistor 8,000 ohms, B-5458-23 and condenser .006 mfd., A-9916, added to cathode circuit of Type 57 1st Detector tube. See diagram under Voltage Analysis and Continuity Chart.

MODEL 75A,475A,478A
Voltage
Notes

SPARKS-WITHINGTON CO.

(ORIGINAL) EFFECTIVE FEBRUARY 15, 1934

# Sparton Models 75-A, 475-A and 478-A Superheterodyne Schematic Diagram, Voltage Analysis and Continuity Chart

## VOLTAGE ANALYSIS AND CONTINUITY CHART

Line Voltage 120

Position of Volume Control—Full with Antenna Disconnected

Position of Inter-Station Noise Suppressor—Full

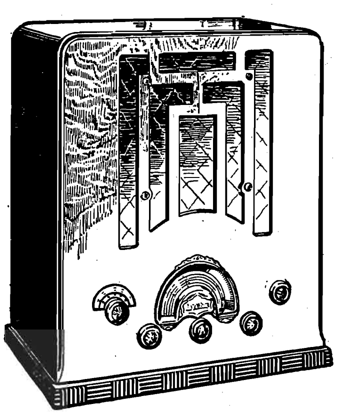
Position of Band Selector Switch—Broadcast

Position of Tone Control—Full

| Tube | Location | PLATE | | Screen Grid Volts | Control Grid Volts | RESISTANCE TO GROUND (OHMS) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Volts | Ma. | | | Plate | Screen | C. Grid | Cathode |
| 58 | R-F Stage | 245. | 6.5 | 120. | —4.9 | 77,000 | 50,000 | 750,000 | 290 |
| 57 | 1st Detector | 245. | — | 52. | —1.9 | 77,000 | 100,000 | 12 | 200 |
| 56 | Oscillator | 105. | — | — | —1.9 | 100,000 | — | 50,000 | 200 |
| 58 | 1st I-F Stage | 255. | 5.0 | 52. | —1.0 | 75,000 | 100,000 | 750,000 | 200 |
| 58 | 2nd I-F Stage | 255. | 6.0 | 120. | —4.5 | 75,000 | 50,000 | 750,000 | 290 |
| 55 | Diode Det.-A.V. C. | — | — | — | — | 250,000 | — | — | 0 |
| | Triode Audio | 15. | 0.75 | — | — | 375,000 | — | 250,000 | |
| 47 | Power Stage | 245. | 21.0 | 255. | —20.0 | 75,000 | 75,000 | 1,000,000 | 7.5 |
| 80 | Rectifier | 355† | — | — | — | — | — | — | — |

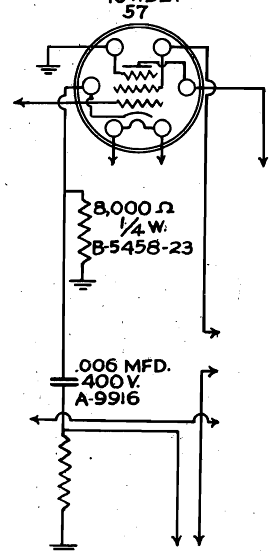
NOTES: Allow 15% + or — on all measurements.
All heater voltages: 2.5, except 80 Rectifier filament: 5.0 volts.

†As read on 800 volt scale of A-C meter in Jewell 444 Set Analyzer.



SPARTON MODEL 75-A

NOTE: SPARTON MODEL 475-A has Model 75-A chassis and Model 74 cabinet.
SPARTON MODEL 478-A has Model 75-A chassis and Model 478 cabinet.



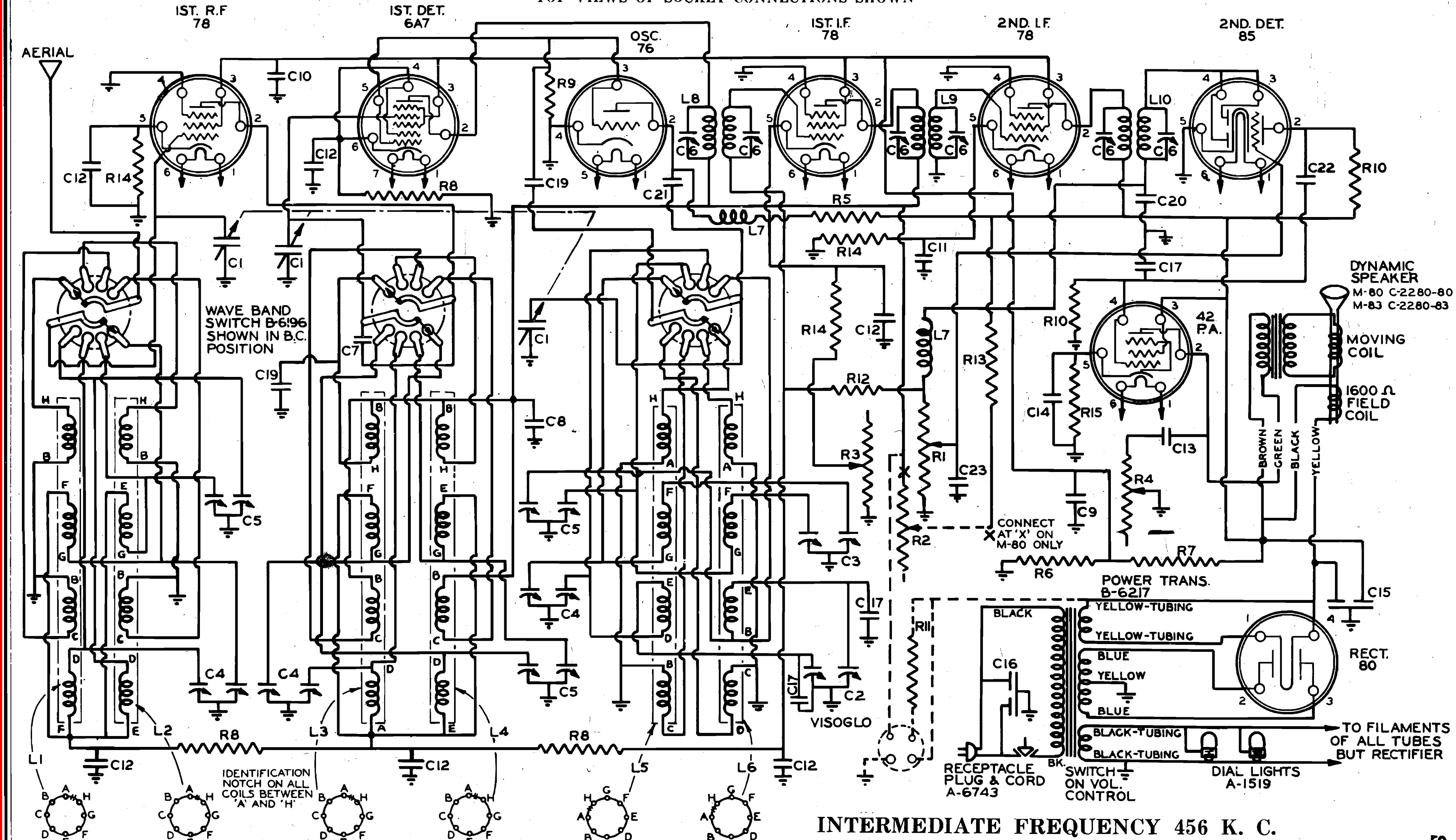

NOTE: The 8,000 ohm Resistor (B-5458-23) and .006 mfd. condenser (A-9916) are included in the Type 57 1st Detector circuit as above in all chassis having light brown color tuning scales.
These receivers will have —3.0 volts on Type 57 Control Grid instead of —1.9 and 8,000 ohms cathode resistance to ground instead of 200 ohms as shown in the above table.

# MODEL 80,83,84, 85X,86X

## Schematic

SPARKS-WITHINGTON CO.

TOP VIEWS OF SOCKET CONNECTIONS SHOWN




INTERMEDIATE FREQUENCY 456 K. C.

BOTTOM VIEW OF COILS SHOWING TERMINAL ARRANGEMENTS

| | | |
|---|---|---|
| C1 | VARIABLE CONDENSER | B-6218 |
| C2 | OSC. PADDER 10 PLATE | A-10846-1 |
| C3 | OSC. PADDER 7 PLATE | A-10846-2 |
| C4 | R.H. TRIMMER | A-11454 |
| C5 | L.H. TRIMMER | A-11455 |
| C6 | I.F. TRIMMER IN COILS | |
| C7 | 8 TO 9 MFD. | A-11261 |
| C8 | .2 MFD. 400 V | A-11473-3 |
| C9 | .2 MFD. 200 V. | A-11130-6 |
| C10 | .1 MFD. 200 V. | A-11089-2 |
| C11 | .1 MFD. 100 V. | A-11089-1 |
| C12 | .1 MFD. 100 V | A 11130-1 |
| C13 | .025 MFD. 600 V | A-11130-8 |
| C14 | 10 MFD. 25 V. | A-10377 |
| C15 | 8-8 MFD. | A-11223-1 |
| C16 | .006-.006 MFD. | A-7878 |
| C17 | .001 MFD. MOLDED | A-9578-10 |
| C19 | .0001 MFD. MOLDED | A-11095-3 |
| C20 | .0005 MFD. MOLDED | A-9578 |
| C21 | .00005 MFD. MOLDED | A-11095-2 |
| C22 | .01 MFD. 400 V. | A-11130-5 |
| C23 | .00025 MFD. MOLDED | A-11095-4 |

| | | | | |
|---|---|---|---|---|
| R1 | 250,000 Ω | VOL. CONTROL | | A-11297 |
| R2 | 5,000 Ω | VOLT. REGULA. | | A-11381 |
| R3 | 100,000 Ω | I.N. SUPPRESS. | | A-10446 |
| R4 | 100,000 Ω | TONE CONTROL | | A-11334 |
| R5 | 20,000 Ω | | 1 W | B-4540-14 |
| R6 | 25,000 Ω | | 10 W. | B-5029-1 |
| R7 | 15,000 Ω | | 10 W. | B-5029-2 |
| R8 | 1,000 Ω | | .25 W. | B-5458-11 |
| R9 | 50,000 Ω | | .25 W. | B-5458-5 |
| R10 | 500 000 Ω | | .25 W. | B-5737-5 |
| R11 | 1,000,000 Ω | | .25 W. | B-5737-6 |
| R12 | 250,000 Ω | | .25 W. | B-5737-1 |
| R13 | 5,000 Ω | WIREWOUND | | B-6061-5 |
| R14 | 400 Ω | WIREWOUND | | B-5243-41 |
| R15 | 500 Ω | WIREWOUND | | B-5243-42 |

| | | |
|---|---|---|
| L1 | NO. 1 ANTENNA COIL | A-11211 |
| L2 | NO. 2 ANTENNA COIL | A-11212 |
| L3 | NO. 1 R.F. COIL | A-11213 |
| L4 | NO. 2 R.F COIL | A-11214 |
| L5 | NO. 1 OSCILLATOR COIL | A-11215 |
| L6 | NO. 2 OSCILLATOR COIL | A-11216 |
| L7 | 16 M.H. CHOKE | A-3506 |
| L8 | NO. 1 I.F. TRANSFORMER | A-6313-3 |
| L9 | NO. 2 I.F. TRANSFORMER | A-6313-4 |
| L10 | NO. 3 I.F. TRANSFORMER | A-6313-5 |

NOTE: Export Model 86-X has Power Transformer (Part B-6271), equipped with primary voltage taps for operation at 125, 150 and 250 volts A. C. line. See schematic diagram and notes (Fig. 1) for Model 85-X.

SPARKS-WITHINGTON CO.
(ORIGINAL) EFFECTIVE AUGUST 10, 1934

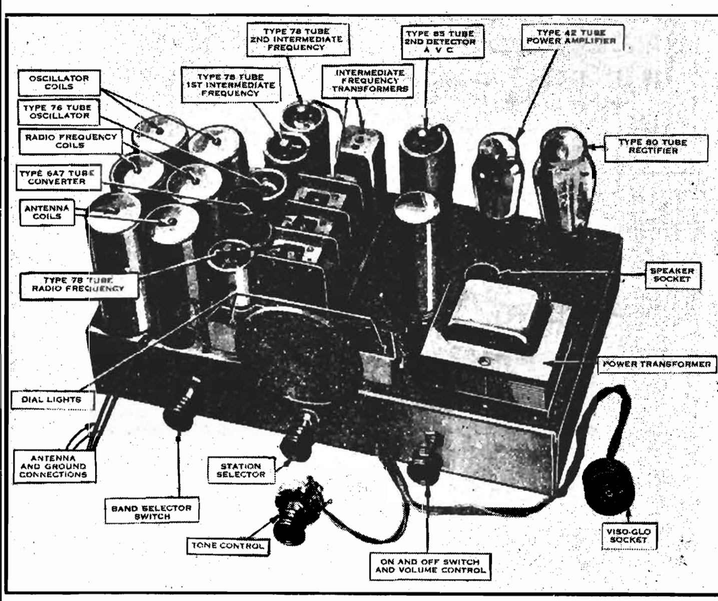
# Sparton Models 80, 83, 84, 85-X and 86-X Superheterodyne Schematic Diagram and Voltage-Resistance Chart

## VOLTAGE-RESISTANCE CHART

Line Voltage — 120
Position of Tone Control — Full
Position of Viso-Glo Regulator — Full
Position of Volume Control — Full with Antenna Disconnected
Position of Band Selector Switch — Broadcast
Position of Inter-Station Noise Suppressor — Full

| Tube | Function | Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Measure-ment | Prong No. 1 | Prong No. 2 | Prong No. 3 | Prong No. 4 | Prong No. 5 | Prong No. 6 | Prong No. 7 | Grid Cap |
| 78 | R-F Amplifier | Volts | * | 220 | 110 | 0 | 2.5 | * | — | 0 |
| | | Ohms | 0 | 40,000 | 25,000 | 0 | 400 | 0 | — | 500,000 |
| 6A7 | Converter | Volts | * | 220 | 110 | 3.8 | ** | 3.8 | * | 0 |
| | | Ohms | 0 | 40,000 | 25,000 | 45,000 | 45,000 | 900 | 0 | 500.000 |
| 76 | Oscillator | Volts | * | 175 | ** | 0 | 6 | * | — | — |
| | | Ohms | 0 | 55,000 | 45,000 | 0 | 0 | 0 | — | — |
| 78 | 1st I-F Amplifier | Volts | * | 220 | 110 | 0 | 3.8 | * | — | 0 |
| | | Ohms | 0 | 40.000 | 25,000 | 0 | 400 | 0 | — | 500,000 |
| 78 | 2d I-F Amplifier | Volts | * | 280 | 110 | 0 | 3.3 | * | — | 0 |
| | | Ohms | 0 | 40,000 | 25,000 | 0 | 400 | 0 | — | 0 |
| 85 | 2d Detector-A.V.C. | Volts | * | ** | ** | ** | 0 | * | — | 0 |
| | | Ohms | 0 | 500.000 | 250,000 | 250,000 | 0 | 0 | — | 0 |
| 42 | Power Amplifier | Volts | * | 270 | 285 | 0 | 20 | * | — | — |
| | | Ohms | 0 | 40,000 | 40,000 | 500,000 | 450 | 0 | — | — |
| 80 | Rectifier | Volts | 450 | 400 | 400 | 450 | — | — | — | — |
| | | Ohms | 40,000 | 100 | 100 | 40,000 | — | — | — | — |

NOTES: Voltage and resistance readings are for schematic diagram shown. Allow 15% + or — on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.
*Zero or 6.0 volts A. C., depending on twist of filament hook-up wire. When Prong No. 1 reads zero, Prong No. 6 (Prong No. 7 of Type 6A7 Tube) should read 6.0, and vice versa.
**Cannot be measured with Weston No. 665, Type 1.




MODELS 80, 83, 84, 85-X, AND 86-X CHASSIS

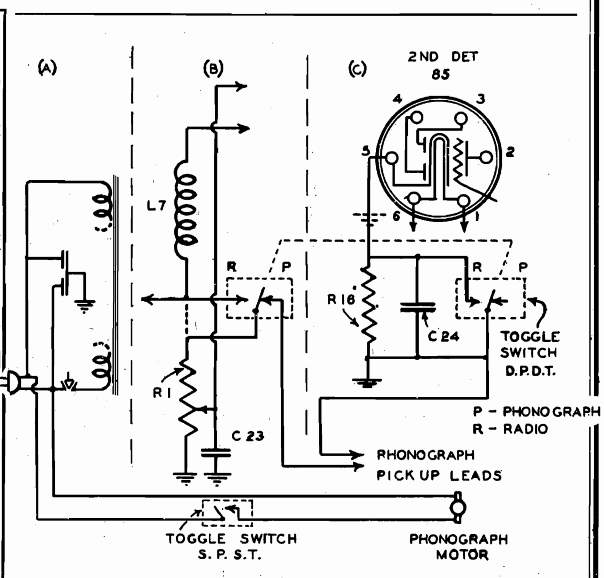



FIG. 1

**THE MODEL 85-X PHONOGRAPH COMBINATION** has the circuit changes shown in Fig. 1 in addition to the regular schematic diagram. The dotted lines in Sections (B) and (C) are shown solid in the regular schematic diagram and toggle switch (D. P. D. T.), condenser C24 and resistor R16 are added. Section (A) shows connections of toggle switch, Part A-5905, and phonograph motor on Model 85-X.

**A PHONOGRAPH PICK-UP** may be used with the Models 80, 83, 84 and 85-X by incorporating the toggle switch (D.P.D.T.), Part A-11561, condenser C24 (10 MFD., Part A-10377), resistor R-16 (5,000 ohms, ¼ watt, Part B-5458-16), and the circuit changes shown in Fig. 1, Sections (B) and (C) only. The toggle switch may be mounted by drilling a ½-inch hole in the back of the chassis, 4 inches from the left hand side and 1 inch up from the bottom.

(Original) Effective September 28, 1934

# Detailed Alignment Instructions for SPARTON All-Wave Models 80, 83, 84, 85-X, 86-X, and 104

**Note:** The Models 80, 83, 84, 85-X and 86-X employ an eight-tube chassis. The Model 104 employs a ten-tube chassis.

The Model 85-X is a radio-phonograph combination and the Model 86-X is an export receiver equipped with a special power transformer permitting operation on line voltages of 125, 150, and 250 volts A. C.

The alignment procedure is the same for all of the above models.

**Foreword:** Before attempting to realign the circuits of the above SPARTON models, the service man should read carefully the information contained in the preceding pages of Bulletin No. 3-E, especially the paragraphs pertaining to the use of a test oscillator, output meter, method of adjusting the various trimming and padding condensers, and the bending of split condenser plate sections.

The use of quality test equipment is highly recommended and a good test oscillator becomes a virtual necessity when aligning the all-wave type of receiver. Due to the fact that the ear cannot distinguish small changes in sound intensity, an output meter is essential to the proper adjustment of the various condensers. Unless otherwise specified, the adjusting of any condenser consists of turning the adjusting screw or nut to the right or left until the output meter registers the greatest deflection.

## 1. EQUIPMENT REQUIRED

A. Modulated test oscillator (crystal controlled or accurately calibrated) capable of generating frequencies from 172.5 to 20,000 kilocycles.

B. Output meter.

C. Part A-7613 adjusting wrench.

## 2. STEP BY STEP PROCEDURE FOR COMPLETE ALIGNMENT OF MODELS

**Note:** For proper alignment of these chassis, the procedure should be followed in the same order as given.

In the following procedure, the broadcast band will be termed Band No. 1; the first short-wave band (green section of the dial), Band No. 2; the second short-wave band (red section of the dial), Band No. 3; the third short-wave band (blue section of the dial), Band No. 4. The dial pointer should be exactly parallel with the horizontal lines of the kilocycle scale when the condenser plates are fully meshed. If the pointer does not read correctly, loosen the two set screws which hold the dial drum to the condenser shaft, hold the rotor plates fully meshed with the stator plates and set the pointer so that it is parallel with the horizontal lines on the kilocycle scale. Then tighten set screws.

### A. Alignment of Intermediate-Frequency Stages.

(1) Turn on receiver and test oscillator and allow both to operate several minutes before attempting to adjust any condensers.

(2) Connect "antenna" of test oscillator to grid cap of Type 6A7 First Detector (Converter) Tube, and "ground" of test oscillator to chassis frame of receiver. Connect output meter "low tap" across voice coil of speaker. (See Fig. 1, Page 1, Bulletin No. 3-E).

**Note:** It is advisable to read carefully the operating instructions included with the test oscillator.

(3) Tune test oscillator to obtain a signal of 456 kilocycles.

(4) Turn the volume control of receiver on full, retard inter-station noise suppressor so that the receiver will be least sensitive, and place band selector switch in broadcast position (Band No. 1).

(5) Adjust I. F. Condensers $C_3$, $C_2$, and $C_1$, in the order given (see Fig. 8).

### B. Alignment of Broadcast Band.

(1) Disconnect "antenna" leads of test oscillator from grid cap of first detector (converter) tube and connect to the antenna terminal of the chassis.

(2) Tune test oscillator to obtain a signal of 1350 kilocycles.

(3) Tune the station selector of the receiver to 1350 kilocycles, and without disturbing the setting of the test oscillator or the station selector, adjust condensers $C_{12}$, $C_8$, and $C_4$, in the order given.

(4) Tune test oscillator and receiver to 600 kilocycles and adjust condenser $C_{16}$.

(5) Retune test oscillator and receiver to 1350 kilocycles and check the adjustments of condensers $C_{12}$, $C_8$, and $C_4$.

(6) Calibration of the broadcast band should also be checked at 900 kilocycles and 600 kilocycles.

### C. Alignment of Band No. 2 (1.2 to 3.6 Megacycles).

(1) Turn the band selector switch to the first short-wave band (green section of the dial).

(2) Tune test oscillator and receiver to 3,000 kilocycles and adjust Condensers $C_{13}$, $C_9$, and $C_5$, in the order give.

(3) Tune test oscillator and receiver to 1650 kilocycles and adjust condenser $C_{17}$.

(4) Retune the test oscillator and receiver to 3,000 kilocycles and check the adjustments of Condensers $C_{13}$, $C_9$, and $C_5$.

### D. Alignment of Band No. 3 (3.1 to 8.0 Megacycles).

**Caution:** On the third and fourth bands (second and third short-wave bands) care must be taken to adjust the various condensers to the **fundamental** of the signal and not to the **image.** The image frequency is equal to the fundamental minus twice the intermediate frequency of the receiver. A set that is adjusted to the image frequency instead of to the fundamental may be detected by tuning over the band with the Inter-station Noise Suppressor turned full on, allowing maximum sensitivity of the receiver. If a "dead spot" appears near the center of the band, the adjustable condensers for that band have probably been adjusted to the image instead of the fundamental.

On Band No. 4 this type of misalignment may be more easily detect by turning the set to full sensitivity and with the test oscillator generating a frequency of 15,000 kilocycles, tune the dial to approximately 15,900 kilocycles. If a strong signal is found at approximately this frequency, it indicates that the band has been adjusted to the image frequency. The normal image frequency for 1500 kilocycles would be 1500 kilocycles minus twice 456 kilocycles or approximately 14,100 kilocycles. Therefore a signal on this frequency may be found with the test oscillator generating a 15,000 kilocycle signal.

(1) Turn band selector switch to the second short-wave position (red section of the dial).

(2) Tune test oscillator and receiver to 7,200 kilocycles and adjust condensers $C_{14}$, $C_{10}$, and $C_6$, in the order given.

(3) Tune test oscillator and receiver to 3,600 kilocycles and adjust condenser $C_{18}$.

(4) Retune test oscillator and receiver to 7,200 kilocycles and check the adjustments of condensers $C_{14}$, $C_{10}$, and $C_6$.

### D. Alignment of Band No. 4 (7.5 to 20 Megacycles).

(1) Turn the band selector switch to the third short-wave position (blue section of the dial).

(2) Tune the test oscillator and receiver to 15,000 kilocycles and adjust condensers $C_{15}$, $C_{11}$, and $C_7$ in the order given.

(3) Tune test oscillator and receiver to 9,000 kilocycles and adjust condenser $C_{19}$.

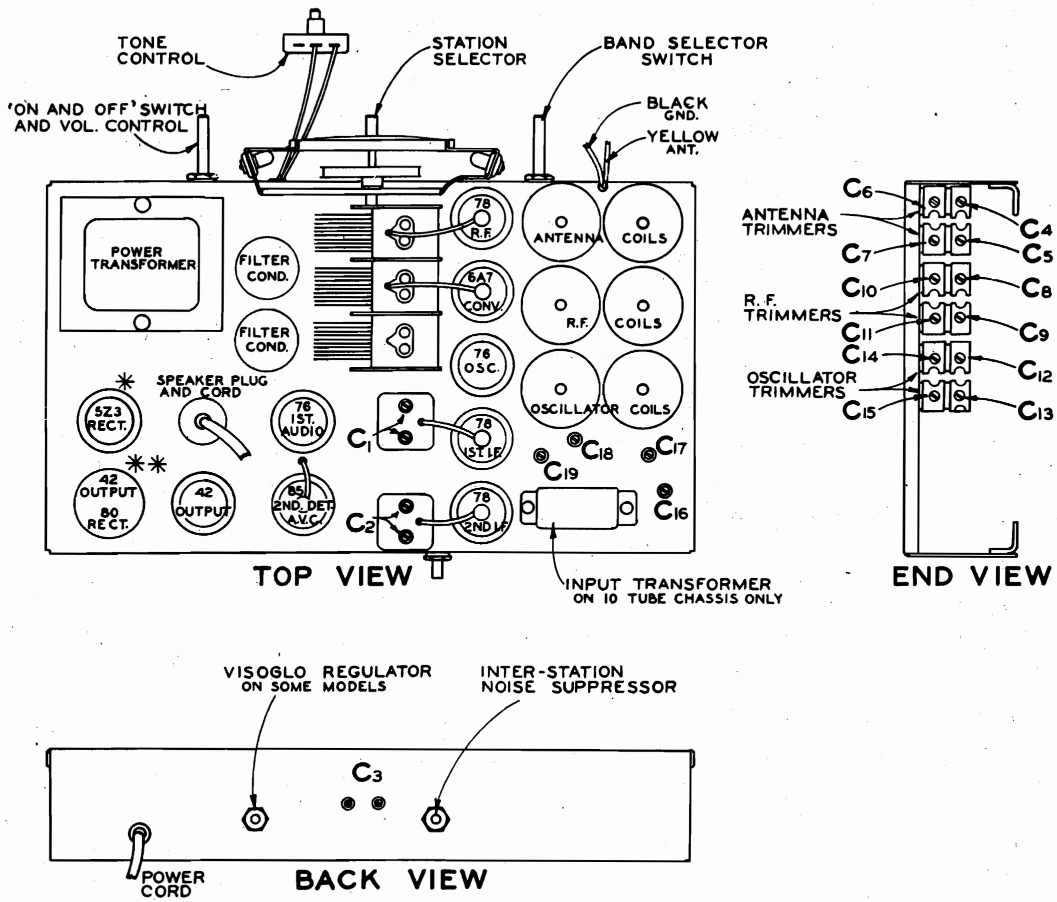
(4) Retune test oscillator and receiver to 15,000 kilocycles and check the adjustments of condensers $C_{15}$, $C_{11}$, and $C_7$.

(5) The calibration of the receiver should also be checked at a frequency of 12,000 kilocycles.

**Note:** All adjustments should be rechecked to assure accuracy and stability of adjustment and calibration.

**MODELS 80,83,84,85X, 86X,104**
**Trimmer Locations**
**Frequency Tables**

# SPARKS-WITHINGTON CO.




*Type 76 First Audio and Type 523 Rectifier are used on the ten-tube chassis (Model 104) only.

**Type 42 output tube is used in this position on the Model 104 only, and the type 80 rectifier is used on the eight-tube chassis Models 80, 83, 84, 85-X and 86-X only.

**INTERMEDIATE-FREQUENCY ADJUSTABLE CONDENSERS**

| | | |
|---|---|---|
| $C_1$ | — FIRST I. F. | (ADJUST AT 456 K. C.) |
| $C_2$ | — SECOND I. F. | (ADJUST AT 456 K. C.) |
| $C_3$ | — THIRD I. F. | (ADJUST AT 456 K. C.) |

**RADIO-FREQUENCY INPUT TRIMMERS (ANTENNA TRIMMERS)**

| | | |
|---|---|---|
| $C_4$ | — BAND NO. 1. | (ADJUST AT 1350 K. C.) |
| $C_5$ | — BAND NO. 2. | (ADJUST AT 3000 K. C.) |
| $C_6$ | — BAND NO. 3. | (ADJUST AT 7200 K. C.) |
| $C_7$ | — BAND NO. 4. | (ADJUST AT 15000 K. C.) |

**RADIO-FREQUENCY OUTPUT TRIMMERS (R. F. TRIMMERS)**

| | | |
|---|---|---|
| $C_8$ | — BAND NO. 1. | (ADJUST AT 1350 K. C.) |
| $C_9$ | — BAND NO. 2. | (ADJUST AT 3000 K. C.) |
| $C_{10}$ | — BAND NO. 3. | (ADJUST AT 7200 K. C.) |
| $C_{11}$ | — BAND NO. 4. | (ADJUST AT 15000 K. C.) |

**OSCILLATOR TRIMMING CONDENSERS**

| | | |
|---|---|---|
| $C_{12}$ | — BAND NO. 1. | (ADJUST AT 1350 K. C.) |
| $C_{13}$ | — BAND NO. 2. | (ADJUST AT 3000 K. C.) |
| $C_{14}$ | — BAND NO. 3. | (ADJUST AT 7200 K. C.) |
| $C_{15}$ | — BAND NO. 4. | (ADJUST AT 15000 K. C.) |

**OSCILLATOR PADDING CONDENSERS**

| | | |
|---|---|---|
| $C_{16}$ | — BAND NO. 1. | (ADJUST AT 600 K. C.) |
| $C_{17}$ | — BAND NO. 2. | (ADJUST AT 1650 K. C.) |
| $C_{18}$ | — BAND NO. 3. | (ADJUST AT 3600 K. C.) |
| $C_{19}$ | — BAND NO. 4. | (ADJUST AT 9000 K. C.) |

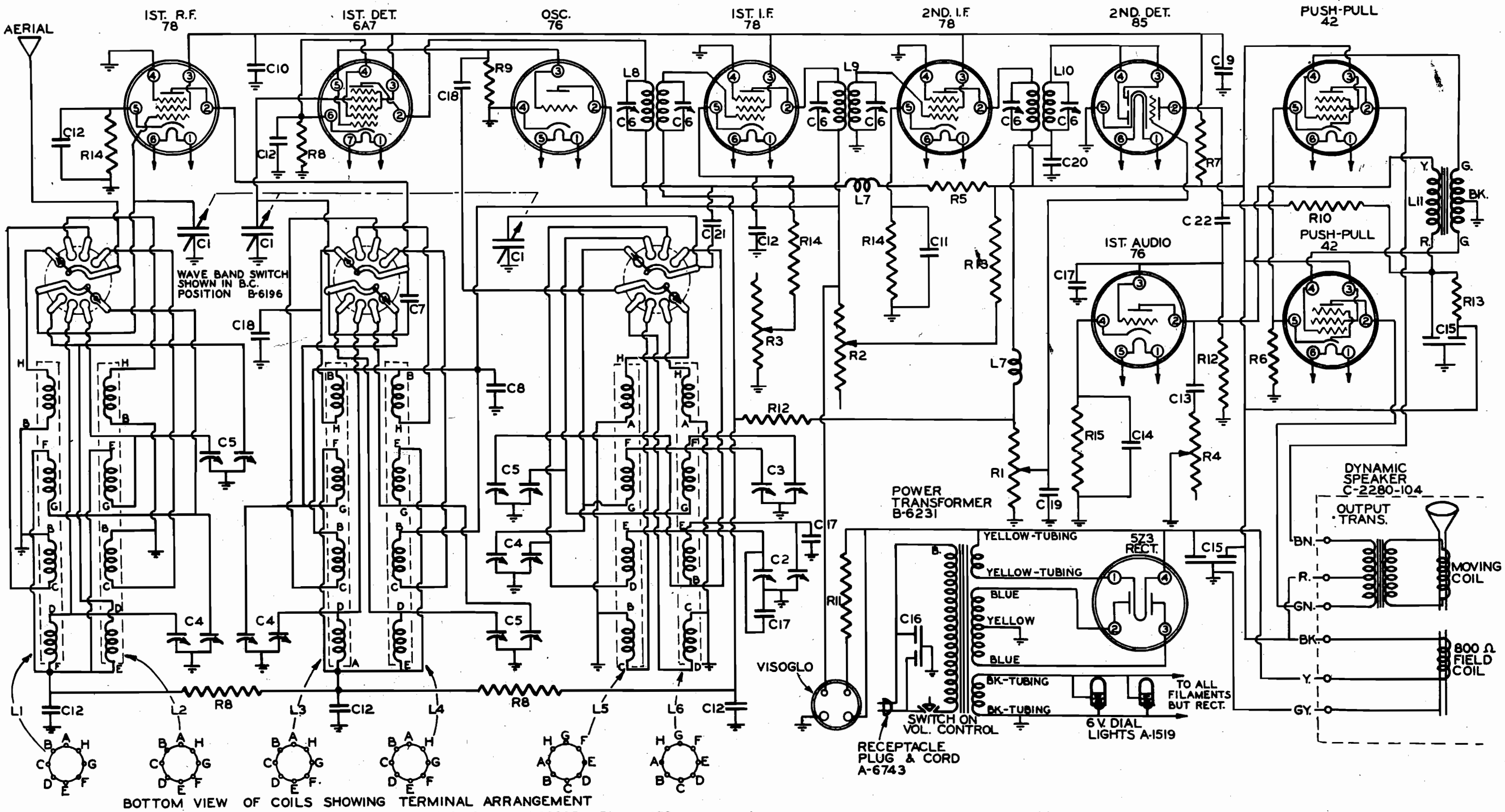
FIG. 8 CHASSIS DIAGRAM FOR SPARTON MODELS 80, 83, 84, 85-X, 86-X AND 104

MODEL 104
Schematic

SPARKS-WITHINGTON CO.

# SPARTON MODEL 104 SUPERHETERODYNE
## SCHEMATIC DIAGRAM
## INTERMEDIATE FREQUENCY 456 KILOCYCLES

(TOP VIEWS OF SOCKET CONNECTIONS SHOWN)




| | | |
|---|---|---|
| C1 VARIABLE CONDENSER | | B-6218 |
| C2 OSC. PADDER 10 PLATE | | A-10846-1 |
| C3 OSC. PADDER 7 PLATE | | A-10846-2 |
| C4 R.H. TRIMMER | | A-11454 |
| C5 L.H. TRIMMER | | A-11455 |
| C6 I.F. TRIMMER IN COILS | | |
| C7 8 TO 9 MFD. | | A-11261 |
| C8 .2 MFD. | 400 V. | A-11473-3 |
| C9 .2 MFD. | 200 V. | A-11130-6 |
| C10 .1 MFD. | 200 V. | A-11089-2 |

| | | |
|---|---|---|
| C11 .1 MFD. | 100 V. | A-11089-1 |
| C12 .1 MFD. | 100 V. | A-11130-1 |
| C13 .025 MFD. | 600 V. | A-11130-8 |
| C14 10 MFD. | 25 V. | A-10377 |
| C15 8-8 MFD. | | A-11223-1 |
| C16 .006-.006 MFD. | | A-7878 |
| C17 .001 MFD. MOLDED | | A-9578-10 |
| C18 .0001 MFD. MOLDED | | A-11095-3 |
| C19 .00025 MFD. MOLDED | | A-11095-4 |
| C20 .0005 MFD. MOLDED | | A-9578 |

| | | |
|---|---|---|
| C21 .00005 MFD. MOLDED | | A-11095-2 |
| C22 .01 MFD. | 400 V. | A-11130-5 |

| | | | |
|---|---|---|---|
| R1 250,000 Ω | VOL. CONTROL | | A-11297 |
| R2 5,000 Ω | VOLT. REGULA. | | A-11381 |
| R3 100,000 Ω | NOISE SUPP. | | A-10446 |
| R4 100,000 Ω | TONE CONT. | | A-11334 |
| R5 10,000 Ω | | 1 W. | B-4540-9 |
| R6 250 Ω | WIREWOUND | | B-6061-4 |
| R7 15,000 Ω | | 10 W. | B-5029-2 |
| R8 1,000 Ω | | .25 W. | B-5458-11 |
| R9 50,000 Ω | | .25 W. | B-5458-5 |
| R10 500,000 Ω | | .25 W. | B-5737-5 |

| | | | |
|---|---|---|---|
| R11 1,000,000 Ω | | .25 W. | B-5737-6 |
| R12 250,000 Ω | | .25 W. | B-5737-1 |
| R13 3,000 Ω | WIREWOUND | | B-6061-3 |
| R14 400 Ω | WIREWOUND | | B-5243-41 |
| R15 2,000 Ω | | .25 W. | B-5458-32 |

| | |
|---|---|
| L1 NO. 1 ANTENNA COIL | A-11211 |
| L2 NO. 2 ANTENNA COIL | A-11212 |
| L3 NO. 1 R.F. COIL | A-11213 |
| L4 NO. 2 R.F. COIL | A-11214 |
| L5 NO. 1 OSC. COIL | A-11215 |
| L6 NO. 2 OSC. COIL | A-11216 |
| L7 16 M.H. CHOKE | A-3506 |
| L8 NO. 1 I.F. TRANSFORMER | A-6313-3 |
| L9 NO. 2 I.F. TRANSFORMER | A-6313-4 |
| L10 NO. 3 I.F. TRANSFORMER | A-6313-5 |
| L11 AUDIO TRANSFORMER | A-11434-1 |

**MODEL 104**
**Voltage**
**Chassis View, Notes**

SPARKS-WITHINGTON CO.

(ORIGINAL) EFFECTIVE SEPTEMBER 11, 1934

# Sparton Model 104 A. C. Superheterodyne Schematic Diagram and Voltage-Resistance Chart

## VOLTAGE-RESISTANCE CHART

Line Voltage — 120
Position of Viso-Glo Regulator — Full
Position of Tone Control — Full

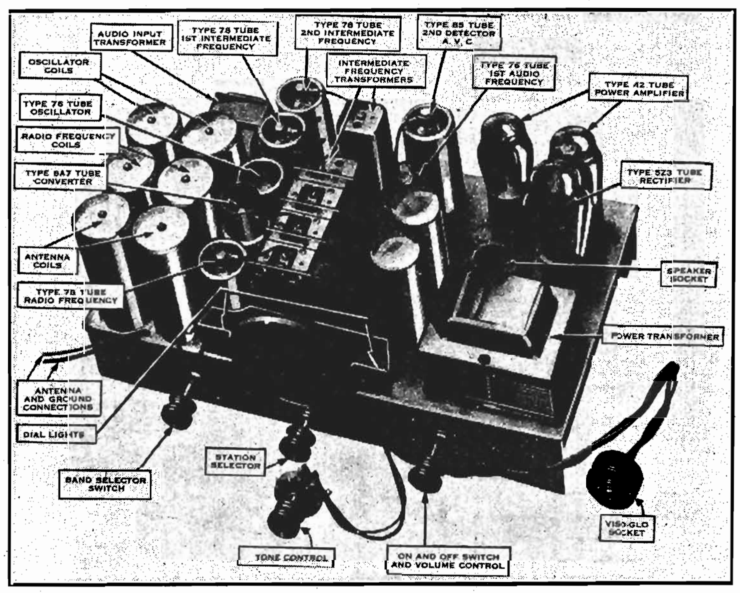
Position of Volume Control — Full with Antenna Disconnected
Position of Band Selector Switch — Broadcast
Position of Inter-Station Noise Suppressor — Full

| Tube | Function | Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Measurement | Prong No. 1 | Prong No. 2 | Prong No. 3 | Prong No. 4 | Prong No. 5 | Prong No. 6 | Prong No. 7 | Grid Cap |
| 78 | R. F. Amplifier | Volts | * | 195 | 95 | 0 | 3.2 | * | —— | 0 |
| | | Ohms | 0 | 45,000 | 25,000 | 0 | 400 | 0 | —— | 500,000 |
| 6A7 | Converter | Volts | * | 195 | 95 | 3.8 | ** | 3.8 | * | 0 |
| | | Ohms | 0 | 45,000 | 25,000 | 900 | 45,000 | 900 | 0 | 500,000 |
| 76 | Oscillator | Volts | * | 150 | ** | 0 | * | —— | —— | —— |
| | | Ohms | 0 | 50,000 | 45,000 | 0 | 0 | —— | —— | —— |
| 78 | 1st I. F. Amplifier | Volts | * | 195 | 95 | 0 | 3.2 | * | —— | 0 |
| | | Ohms | 0 | 45,000 | 25,000 | 0 | 400 | 0 | —— | 500,000 |
| 78 | 2nd I. F. Amplifier | Volts | * | 250 | 95 | 0 | 3.2 | * | —— | 0 |
| | | Ohms | 0 | 35,000 | 25,000 | 0 | 0 | 0 | —— | 0 |
| 85 | 2nd Detector-A. V. C. | Volts | * | ** | ** | ** | 0 | * | —— | 0 |
| | | Ohms | 0 | 500,000 | 250,000 | 250,000 | 0 | 0 | —— | 250,000 |
| 76 | 1st A. F. Amplifier | Volts | * | ** | 8.8 | 0 | * | —— | —— | —— |
| | | Ohms | 0 | 40,000 | 250,000 | 1,750 | 0 | —— | —— | —— |
| 42 | Power Amplifier | Volts | * | 245 | 250 | 0 | 18 | * | —— | —— |
| | | Ohms | 0 | 35,000 | 38,000 | 1200 | 250 | 0 | —— | —— |
| 42 | Power Amplifier | Volts | * | 245 | 250 | 0 | 18 | * | —— | —— |
| | | Ohms | 0 | 35,000 | 38,000 | 1200 | 250 | 0 | —— | —— |
| 5Z3 | Rectifier | Volts | 365 | 330 | 330 | 365 | —— | —— | —— | —— |
| | | Ohms | 3800 | 50 | 50 | 3800 | —— | —— | —— | —— |

NOTES: Voltage and resistance readings are for schematic diagram shown on back of sheet. Allow 15% + or — on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.

*Zero or 5.8 volts, depending on twist of filament hook-up wire. If Prong No. 1 reads zero, Prong No. 6 (Prong No. 7 of Type 6A7 or Prong No. 5 of Type 76) should read 5.8 volts, and vice versa.

**Cannot be measured with Weston No. 665, Type 1.




MODEL 104 CHASSIS

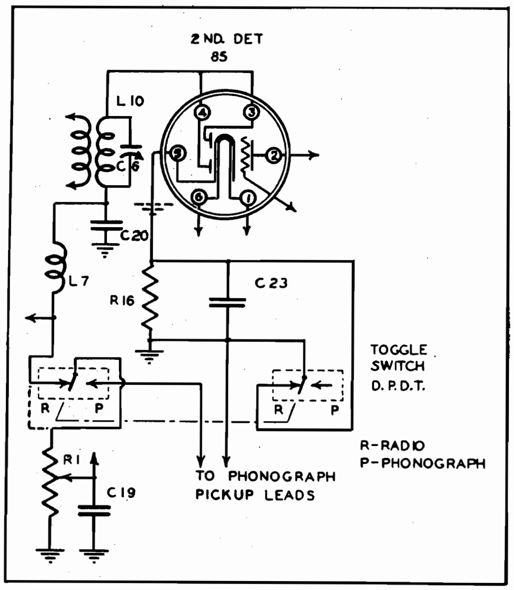


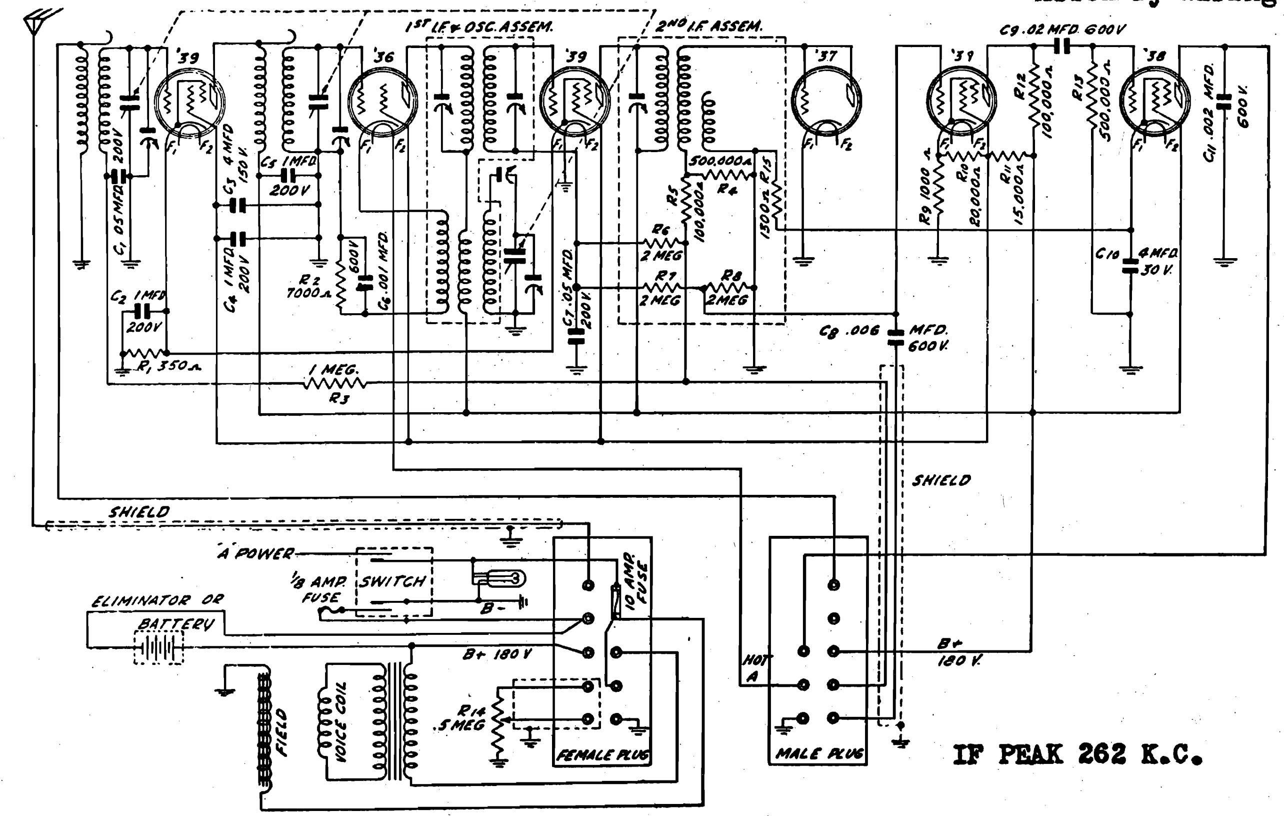

DIAGRAM OF CONNECTIONS FOR PHONOGRAPH PICKUP

Parts required: 1 Toggle Switch (D. P. D. T.), Part A-11561; 1 Condenser (C23), Part A-10377, 10 MFD., 25 V.; 1 Resistor (R-16), Part B-5458-16, 5000 ohms, ¼ watt.

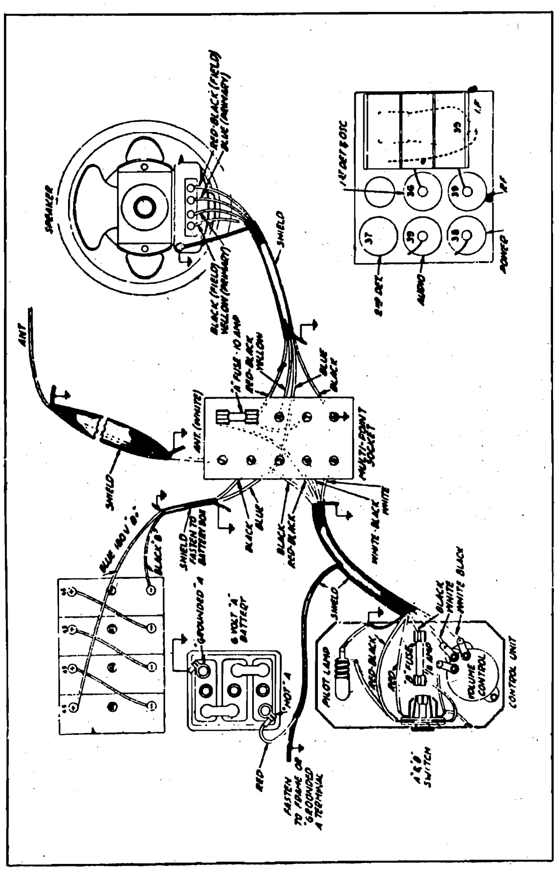
Dotted line between R1 and L7 and dotted ground at Prong No. 5 of Type 85 tube indicate original connections. See schematic diagram on back of sheet. Toggle switch may be mounted by drilling ½" hole in back of chassis 4 inches from left hand side and 1 inch up from bottom.

# STAR

**MODEL 062**
**Schematic**
**Voltage**
**Assembly Wiring**




**IF PEAK 262 K.C.**




## VOLTAGE DATA

| Tube | Plate | Screen | Grid | Plate MA. |
|---|---|---|---|---|
| R-F. | 177 | 80 | 3 | 3.6 |
| 1st Det. | 173 | 76 | 7* | .9* |
| I-F. | 177 | 80 | 3 | 3.6 |
| 2nd Det. | 0 | 0 | 0 | 0 |
| 1st A-F. | 54 | 77 | 6 | 1.2 |
| Output | 159 | 165 | 15.5 | 10.0 |

* Will vary with dial setting.

**MODEL 6-U**
**Schematic**

# STAR

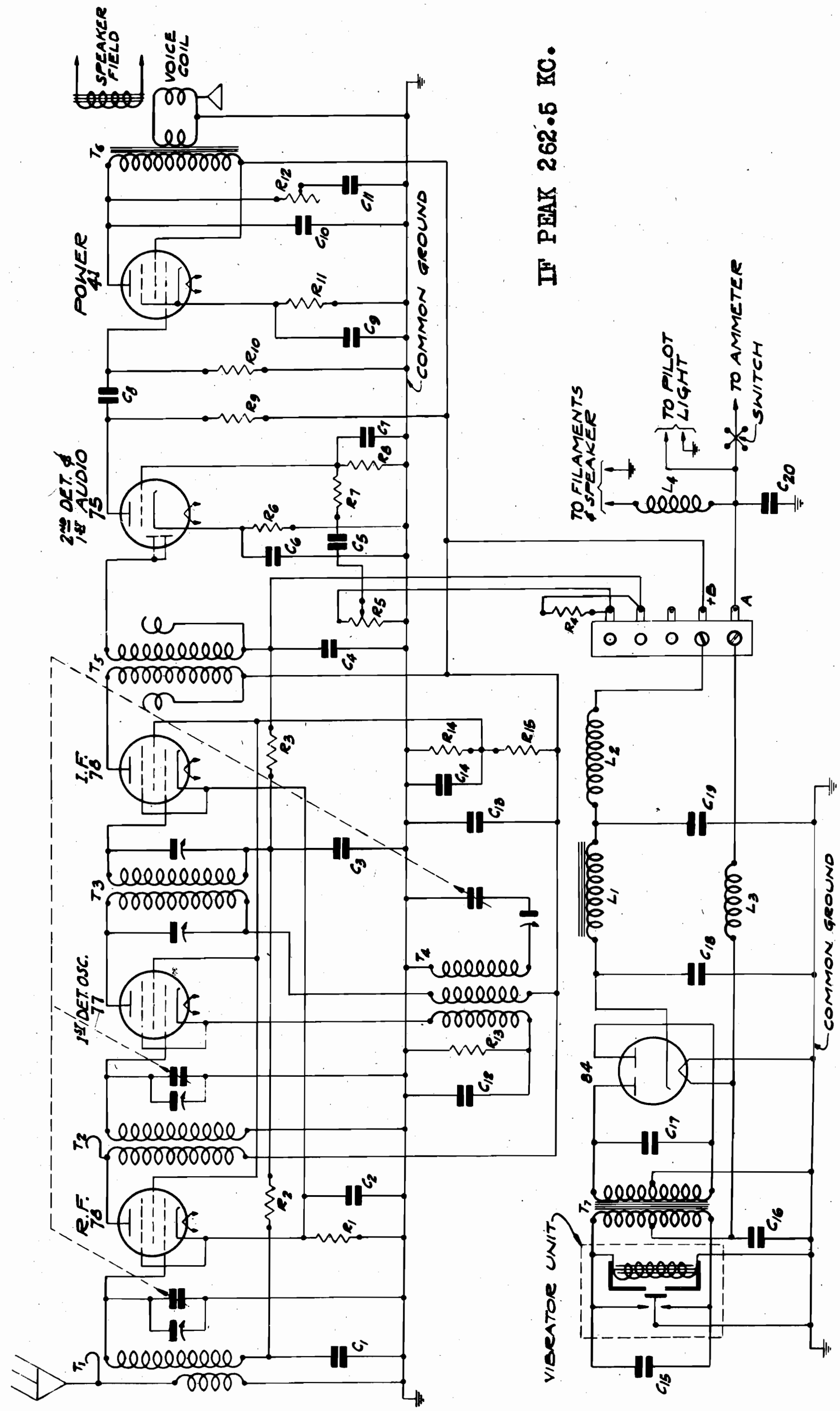
T1 ANTENNA COIL (P-5099)
T2 R.F. INTERSTAGE COIL (P-5065)
T3 } 1ST I.F. & OSCILLATOR
T4 } COIL (P 5063)
T5 2ND I.F. COIL (P-5022)
T6 OUTPUT TRANS. (P-50632)
T7 POWER TRANS. (P-50633)

L1 FILTER CHOKE (P-50637)
L2 R.F. "B" CHOKE (P-5174)
L3 ELIMINATOR "A" CHOKE (P-5175)
L4 R.F. "A" CHOKE (P-5167)

R1 260 OHMS
R2 1.0 MEGOHM
R3 2.0 "
R4 200,000 OHM
R5 250,000 OHM VOL. CONTROL
R6 6,000 OHM
R7 100,000 OHM
R8 1.0 MEGOHM
R9 250,000 OHM
R10 250,000 OHM
R11 800 OHM
R12 150,000 OHM TONE CONTROL
R13 4,000 OHM
R14 20,000 OHM
R15 15,000 OHM

C1 0.050 M.F. 200V. TUBULAR
C2 0.500 M.F. (BLOCK RED-WH.)
C3 0.050 M.F. (BLOCK GR.-WH.)
C4 0.00025 M.F. MICA
C5 0.050 M.F. 200V. TUBULAR
C6 12.000 M.F. ELECTROLYTIC IN BLOCK WITH C9
C7 0.00025 M.F. MICA
C8 0.050 M.F. (BLOCK GR.)
C9 12.000 M.F. ELECTROLYTIC IN BLOCK WITH C6
C10 0.003 M.F. (BLOCK YELLOW)
C11 0.020 M.F. 600V. TUBULAR
C12 0.001 M.F. MICA
C13 0.500 M.F. (BLOCK BLUE)
C14 0.100 M.F. (BLOCK BROWN)
C15 0.500 M.F. 120V. TUBULAR
C16 1.000 M.F. 120V. TUBULAR
C17 0.010 M.F. 1600V. TUBULAR
C18 10.000 M.F. BLOCK WITH C19
C19 10.000 M.F. BLOCK WITH C18
C20 0.500 M.F. 120V. TUBULAR

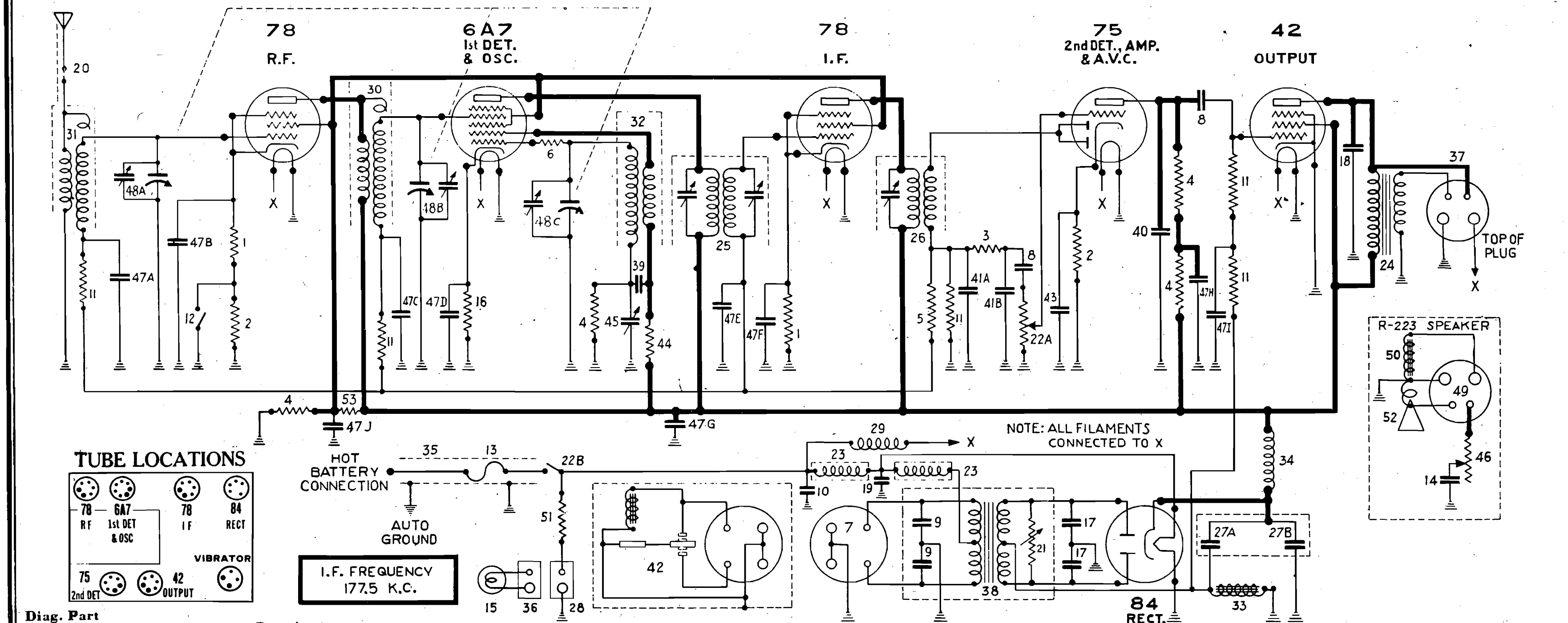
COLOR CODE DESIGNATES CONDENSERS IN BY PASS BLOCK



**MODEL 1171,1172**
**Chassis R-117**
**Schematic,Socket**
**Parts List**

# STEWART-WARNER CORP.

# STEWART-WARNER 1171 & 1172 AUTO RADIO (R-117 CHASSIS)




| Diag. No. | Part No. | Description |
|---|---|---|
| 1 | 67257 | 500 ohm ¼ watt carbon resistor |
| 2 | 67580 | 6000 ohm ¼ watt carbon resistor |
| 3 | 81152 | 10,000 ohm ¼ watt carbon resistor |
| 4 | 81645 | 50,000 ohm ¼ watt carbon resistor |
| 5 | 81682 | 1.1 megohm ¼ watt carbon resistor |
| 6 | 81727 | 1000 ohm ¼ watt carbon resistor |
| 7 | 81837 | Vibrator socket (Standard 4 prong) |
| 8 | 83007 | .02 Mfd. 600 volt paper condenser |
| 9 | 83058 | .25 Mfd. 100 volt paper condenser |
| 10 | 83063 | .5 Mfd. 100 volt paper condenser |
| 11 | 83082 | 260,000 ohm ¼ watt carbon resistor |
| 12 | 83179 | Local-distance switch (SPST) |
| 13 | 83207 | 15 ampere fuse |
| 14 | 83217 | .04 Mfd. 600 volt paper condenser |
| 15 | 83278 | 6 volt pilot light bulb (1171 only) (See No. 84058 for Model 1172) |
| 16 | 83293 | 300 ohm ¼ watt carbon resistor |
| 17 | 83352 | .015 Mfd. 600 volt paper condenser |
| 18 | 83706 | .006 Mfd. 600 volt paper condenser |
| 19 | 83714 | 1.5 Mfd. 100 V. shielded paper condenser |
| 20 | 83723 | Antenna lead and plug |
| 21 | 83725 | 0-500,000 ohm special Globar resistor |
| 22-A | 83728 | 500,000 ohm volume control } In one unit. |
| 22-B | 83728 | On-Off Switch } In one unit. |
| 23 | 83730 | Vibrator R.F. Choke |
| 24 | 83731 | Output Transformer |
| 25 | 83732 | First I.F. Transformer |
| 26 | 83733 | Second I.F. Transformer |
| 27-A | 83734 | Dual 8 Mfd. 350 Volt Dry Electrolytic Condenser |
| 27-B | 83734 | Dual 8 Mfd. 350 Volt Dry Electrolytic Condenser |
| 28 | 83739 | 2 prong Pilot Light Socket |
| 29 | 83742 | Filament R.F. Choke |
| 30 | 83746 | R.F. (B) Coil and shield |
| 31 | 83747 | Antenna (A) coil and shield |
| 32 | 83748 | Oscillator (O) coil and shield |
| 33 | 83760 | Filter Choke |
| 34 | 83770 | B supply R.F. Choke |
| 35 | 83777 | Battery Lead and Fuse Housing |
| 36 | 83778 | Pilot Light Cable and Plug |
| 37 | 83779 | Speaker Cable and Plug |
| 38 | 83780 | Power Transformer |
| 39 | 83783 | .00011 mfd. Molded Mica Condenser |
| 40 | 83784 | .0011 mfd. Molded Mica Condenser |
| 41A | 83785 | Dual .0005 mfd. Molded Mica Condenser |
| 41B | 83785 | Dual .0005 mfd. Molded Mica Condenser |
| 42 | 83800 | Plug-in Vibrator |
| 43 | 83803 | 12 mfd. 25 V. Dry Electrolytic Condenser |
| 44 | 83804 | 40,000 ohm, ¼ watt Carbon Resistor |
| 45 | 83805 | Oscillator Padding Trimmer |
| 46 | 83812 | 35,000 ohm Tone Control Variable Resistor |
| 47A | 83831 | .05 mfd. 100 volt Paper Condenser } In one Unit. Common terminal grounded to can. |
| 47B | 83831 | .05 mfd. 100 volt Paper Condenser |
| 47C | 83831 | .05 mfd. 100 volt Paper Condenser |
| 47D | 83831 | .05 mfd. 100 volt Paper Condenser |
| 47E | 83831 | .05 mfd. 100 volt Paper Condenser |
| 47F | 83831 | .05 mfd. 100 volt Paper Condenser |
| 47G | 83831 | .1 mfd. 400 volt Paper Condenser |
| 47H | 83831 | .1 mfd. 400 volt Paper Condenser |
| 47I | 83831 | .25 mfd. 100 volt Paper Condenser |
| 47J | 83831 | .25 mfd. 300 volt Paper Condenser |
| 48A | 83834 | Three gang Variable Condenser with mtg. Plate and Shaft Coupling |
| 48B | 83834 | Three gang Variable Condenser with mtg. Plate and Shaft Coupling |
| 48C | 83834 | Three gang Variable Condenser with mtg. Plate and Shaft Coupling |
| 49 | 83845 | Male Speaker Plug and Bracket |
| 50 | 83850 | Speaker Field Coil and Housing (5.5 ohms) |
| 51 | 84175 | 35 ohm Flexible Resistor. Note: Early Model 1171 sets used 15 ohm Resistor. No Resistor used in Model 1171 |
| 52 | 84021 | Diaphragm & Shell Assem. (R-223 Spkr.) |
| | 84058 | 6 to 8 volt Dial Light Bulb (1172 only) |
| 53 | 84095 | 15,000 ohm, 2 watt Carbon Resistor |

(See other side for other parts)

## MISCELLANEOUS PARTS NOT SHOWN ON DIAGRAM

| Part No. | Description |
|---|---|
| 83144 | Spark Plug Suppressor |
| 83145 | Distributor Suppressor |
| 83242 | Back Cover and Casing Bracket Screws |
| 83727 | Back Cover |
| 83836 | Front Cover and Speaker Grill Cloth |
| 83838 | Case Assembly, less Covers |
| 83861 | Tuning Knob (1171 only) |
| 83862 | Volume Control Key (1171 only) |
| 83904 | Generator and Ammeter Condenser |
| 84106 | Volume Control Knob (1172 only) |

**MODEL 1171,1172**
**Voltage Data**
**Alignment Data**

# STEWART - WARNER CORP.

The Stewart-Warner 6 Tube Superheterodyne Model No. R-117 Chassis is used in the Model 1171 and 1172 Auto Radio receivers. These two sets are identical with the exception of the remote control head and the flexible shafts.

The Model 1171 remote control uses a key to operate the volume control and a knob for tuning while the 1172 control uses a different type of head with knobs for both the volume control and tuning. Sets with serial numbers below 15000 are Models 1171's, while those above 15000 are 1172's.

The only difference in the chassis used is the omission of the dial light dimming resistor (diagram No. 51) in the 1172 sets.

## DIAL CALIBRATION

In the Model 1171, the dial can be calibrated by tuning in a station of known frequency and then setting the pointer to give the correct reading by turning the adjusting screw which is located on the middle of the back of the remote control head. In the Model 1172, the dial is calibrated by tuning the tuning knob after the pointer has stopped at the last dial division. Turning the knob in a clockwise direction, after the pointer reaches 15.4, will lower the dial reading, while turning it counter clockwise after the pointer is at 5.3, will increase the dial reading.

## CIRCUIT DESCRIPTION

In the R-117 Chassis, the incoming signal is tuned and amplified by the 78 R. F. amplifier tube and then it is further amplified and its frequency is converted to 177.5 K. C. in the 6A7 combination first detector and oscillator tube.

The 177.5 K. C. signal is amplified by the I. F. stage, using a 78 type tube and is then rectified by the diodes of the 75 second detector tube. The rectified current produces a modulated D. C. voltage drop across the diode load resistor No. 11. The audio frequency modulation is impressed across the 500,000 ohm volume control from where is goes to the triode section of the 75 which acts as an audio amplifier.

The modulated drop across resistor No. 11 is filtered and applied to the grids of the 78 and 6-A-7 tubes to provide A.V.C. action.

## LOCAL-DISTANCE SWITCH

A local-distance switch is provided in the R. F. stage to reduce the sensitivity in locations where there is excessive noise in tuning between stations. When this switch is in the open or "local" position, a high bias is placed on the 78 R. F. tube by means of the 6000 ohm resistor No. 2. This resistor is shorted out when the switch is thrown to the distance position (with white dot showing) thus reducing the bias to its normal value.

## POWER SUPPLY PROTECTIVE RESISTOR

The filter system and the rectifier tube are protected against breakdown during the warming-up period by the Globar resistor connected across the high voltage secondary of the power transformer (No. 21 in the circuit diagram). This resistor drops rapidly in resistance as the voltage across it rises, so that it acts as a load on the power transformer and keeps the voltage below the danger point until the tubes warm up and take their normal current. Because of its unique voltage characteristics, the Globar resistor cannot be tested with an ordinary ohmmeter, since it will show a resistance of several megohms.

## ALIGNMENT

A good modulated oscillator and a sensitive output meter are necessary for proper alignment of the R. F. and I. F. stages of this receiver. The output of the oscillator must be adjustable to give a very weak signal which will not actuate the A. V. C. of the receiver. The output meter must be sensitive enough to give sufficient reading with such a weak signal.

The output meter should be connected from the 42 plate to ground through a .25 mfd. condenser or across the voice coil, depending upon its sensitivity. A convenient point to connect to the 42 plate is the terminal of the tone control which is wired to the speaker plug.

During all alignment adjustments, keep the volume control full on and the local-distance switch in the "distance" position.

## I. F. ALIGNMENT

The I. F. trimmers are located on the top of the I. F. transformers which may be reached by removing the front cover. The modulated oscillator should be set to exactly 177.5 K. C. and connected from the 6-A-7 control grid to ground. Adjust the oscillator output to give about half-scale reading of the output meter. Adjust all three I. F. trimmers to give maximum output reading.

The first I. F. transformer has a double trimmer consisting of a slotted screw for one trimmer and a hex nut around it for the other. In adjusting the second I. F. transformer single trimmer, it is desirable to use a bakelite screwdriver or one having only a small metal tip. After the I. F. trimmers have been aligned once, go back and repeat the procedure, since any adjustment of one will affect the others to some extent.

## R. F. ALIGNMENT

The gang condenser trimmers can be reached by removing the back cover. Connect a .00025 mfd. mica condenser in series with the output of the test oscillator and the aerial lead of the receiver. This condenser is absolutely necessary to secure proper alignment of the antenna stage. Adjust the receiver to approximately 1400 K. C. and carefully tune the service oscillator to give maximum receiver output. Adjust the output of the oscillator to the minimum value which will give sufficient output meter deflection. Adjust the two trimmers nearest to the shaft end of the gang condenser to give maximum output meter reading. The trimmer on the other condenser section (oscillator section) should not be touched unless the set does not calibrate properly.

## ALIGNING THE PADDING CIRCUIT

The low-frequency oscillator padding trimmer located on the side of the chassis does not require adjustment in most cases. However, if the set does not align properly at the low frequency end proceed as follows: Remove the chassis from the case. To do this it is necessary to unsolder the braided shield from the outside of the case at the antenna plug opening and then remove the screws holding the chassis to the case. Set the test oscillator to exactly 600 K. C. and tune the set **to the signal.** Adjust the padding trimmer which is mounted on the side of the chassis **while turning the gang condenser back and forth** over a small range. The correct setting is the one which gives maximum output. If the pointer is not exactly at 6.0 (600 K. C.) for maximum output, re-adjust the pointer calibration to get the proper reading. After adjusting the padding trimmer check up the alignment and calibration at 1400 K. C.

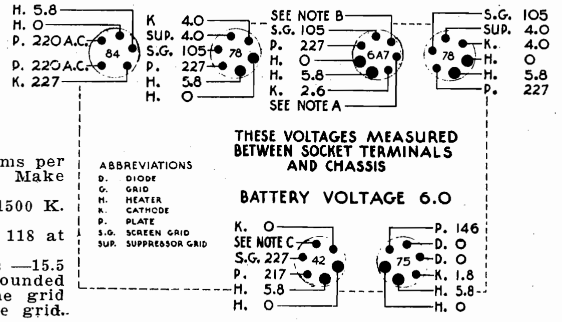
## ADJUSTMENT OF OSCILLATOR TRIMMER

If the receiver is badly out of calibration, particularly at the high frequency end, the following procedure should be followed.

Set the test oscillator to **exactly 1400 K. C.** Turn the tuning knob until the dial pointer indicates 14.0 (1400 K. C.) and then adjust the oscillator trimmer (third one from shaft end of the variable condenser) until the signal is received with maximum output. Then adjust the other two gang condenser trimmers as directed under R. F. alignment.

## SOCKET VOLTAGES

**LOCAL-DISTANCE SWITCH IN DISTANCE POSITION**
**BOTTOM VIEW OF CHASSIS**




7-18-34

**IMPORTANT:** Use high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon range of meter. Make allowances for battery voltage variations.

**NOTE A:** The oscillator grid voltage varies from 0 at 1500 K. C. to —5.0 at 530 K. C.

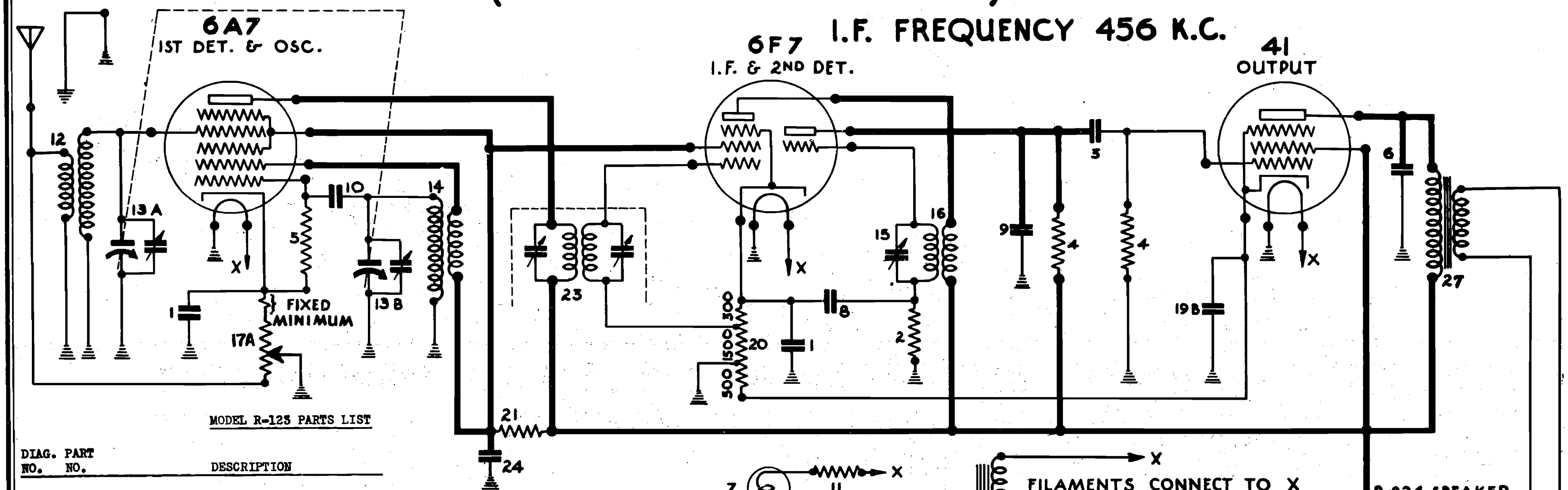
**NOTE B:** The oscillator anode voltage may vary from 118 at 1500 K. C. to 128 at 530 K. C.

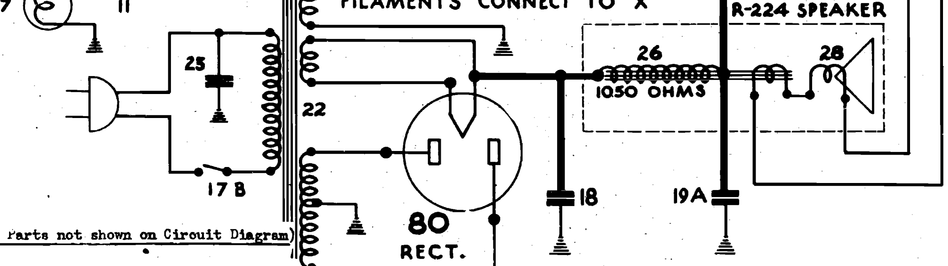
**NOTE C:** The actual bias on the grid of the 42 tube is —15.5 volts which must be measured from chassis to the ungrounded filter choke terminal. Due to the high resistance of the grid leak, the voltmeter will show only about —1 volt at the grid.

**MODELS 1231 to 1239**
**Chassis R-123**
**Schematic, Socket**
**Parts List**

STEWART - WARNER CORP.

# STEWART-WARNER MODEL R-123 CHASSIS (RECEIVER MODELS 1231 to 1239)
## (TEMPORARY CIRCUIT DIAGRAM)



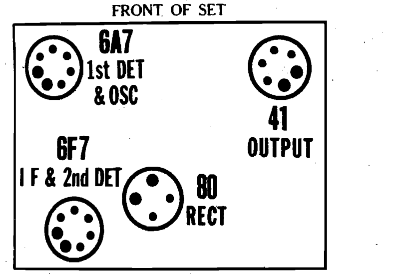
MODEL R-123 PARTS LIST

| DIAG. NO. | PART NO. | DESCRIPTION |
|---|---|---|
| 1 | 81630 | .1 mfd. 100 volt tubular paper condenser |
| 2 | 81682 | 1.1 megohm, 1/4 watt carbon resistor |
| 3 | 83007 | .02 mfd. 600 volt tubular paper condenser |
| 4 | 83072 | 510,000 ohm, 1/4 watt carbon resistor |
| 5 | 83080 | 51,000 ohm 1/4 watt carbon resistor |
| 6 | 83219 | .01 mfd. 600 volt tubular paper condenser |
| 7 | 83278 | 6.3 volt dial light bulb |
| 8 | 83353 | .05 mfd. 100 volt tubular paper condenser |
| 9 | 83436 | .002 mfd. 1000 volt tubular paper condenser |
| 10 | 83539 | .00026 mfd. molded mica condenser |
| 11 | 83566 | 10 ohm, flexible wire wound resistor |
| 12 | 83948 | Antenna (A) coil |
| 13A, 13B | 83949 | Two section gang condenser |
| 14 | 83950 | Oscillator (O) Coil |
| 15 | 83952 | 2nd I.F. trimmer condenser |
| 16 | 83953 | 2nd I.F. transformer coil |
| 17A, 17B | 83959 | 7500 ohm volume control with 350 ohm fixed minimum, line switch — In one unit |
| 18 | 83960 | 6 mfd. 400 volt wet electrolytic condenser |
| 19A, 19B | 83962 | 5 mfd. 350 V. dry electro.cond., 10 mfd. 25 V. dry electro.cond. — In one unit (Model R-123-A only. Also see No. 84399) |
| 20 | 83963 | 300, 1500 and 500 ohm tapped bias resistor |
| 21 | 83964 | 25,000 ohm, 2 watt carbon resistor |
| 22 | 83966 | Power transformer, 115 volts, 60 cycles (Model R-123-A) (See No. 84400 & 84402 for other voltages and frequencies) |
| 23 | 83973 | 1st I.F. transformer |
| 24 | 83974 | .1 mfd. 200 volt tubular paper condenser |
| 25 | 83976 | .02 mfd. 1000 volt shielded paper condenser |
| 26 | 83987 | Field coil and housing (1050 ohms) |
| 27 | 84009 | Output transformer |
| 28 | 84010 | Diaphragm & Shell assembly |
| | 84400 | Power transformer, 115 volts, 25 to 133 cycles (Model R-123-B) |
| | 84402 | Power trans. 100 to 240 volts, 40 to 133 cycles (Model R-123-W) |
| | 84399 | 5 mfd. 350 V. Dry Electro.Cond., 10 mfd. 25 V. Dry Electro.Cond. — In one shielded unit. For R-123-B & W only. |

(Miscellaneous Parts not shown on Circuit Diagram)

| PART NO. | DESCRIPTION |
|---|---|
| 17615 | Volume Control Mtg. Lock Washer (3/8") |
| 316.2 | Tuning Dial set screw |
| 67034 | Volume Control Mtg. Nut (3/8"-32) |
| 67263 | #6 x 1/4" Self Tapping Screw |
| 81834 | Six prong tube socket |
| 81837 | Four prong tube socket |
| 81949 | Seven prong tube socket |
| 83552 | Chassis Mtg. Screw (#10 x 7/8" Self Tapping) |
| 83574 | Dial Light Socket and Bracket |
| 83578 | Escutcheon Mtg. Wood Screw (#1 x 1/4" R.H.) |
| 83587 | Front Plate Mtg. Screw (#8 x 1-1/4" Ornamental Head) |
| 83624 | #8 x 1/4 Self Tapping Screw |
| 83941 | Tuning Dial and Bushing |
| 83945 | Volume Control Dial & Bracket |
| 83970 | Escutcheon Plate |
| 84015 | Knob Washer (paper 5/8" O.D.) |
| 84016 | Rubber Washer (3/4" O.D.) |
| 84017 | Knob (Model 1231) |
| 84130 | Metal Front Grill (Model 1235 only) |
| 84343 | Knob (Model 1235 & 1236) |
| 84541 | Wave trap (to eliminate code interference) |

## TUBE LOCATIONS
FRONT OF SET

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**Wave Trap**
**Installation Data**

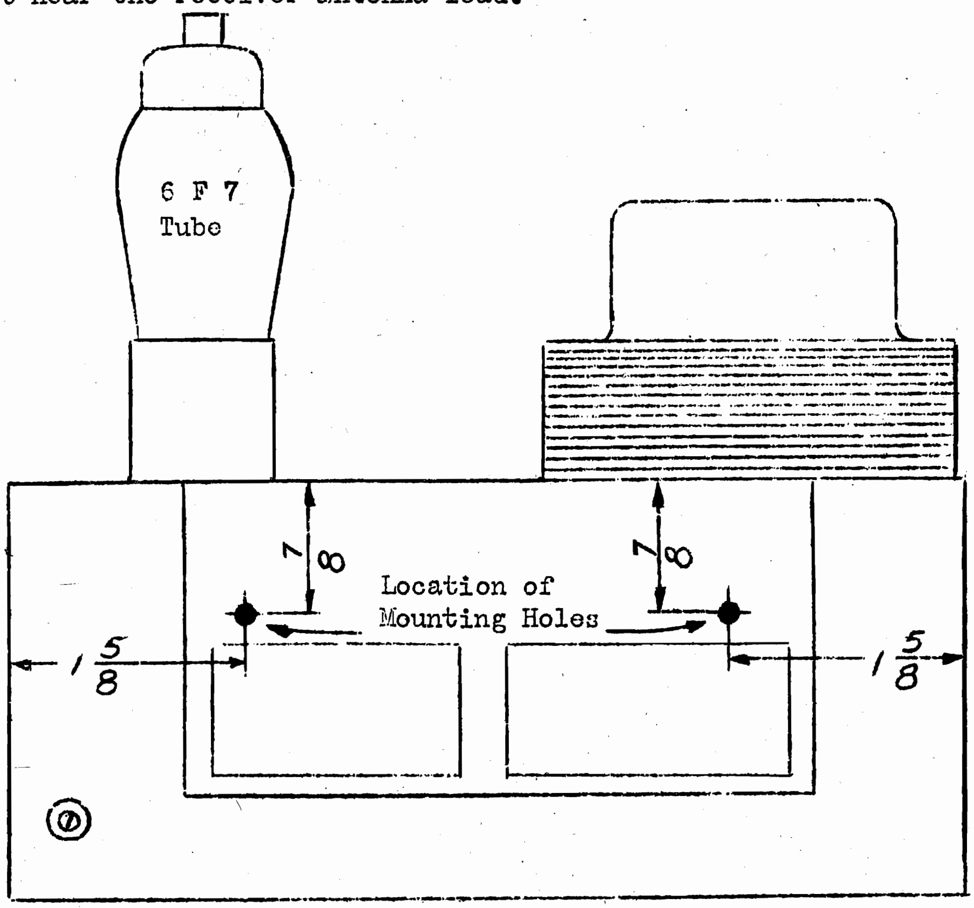
## STEWART WARNER CORP.

INSTRUCTIONS FOR INSTALLATION OF WAVE TRAP

This wave trap is designed to be used with any Stewart-Warner chassis using an intermediate frequency of 456 kilocycles. The trap will reduce or prevent code interference caused by powerful code stations which operate at or near this frequency.

It is made for easy installation by any service man. In the Model R-123, two holes for mounting it are provided on the rear of the chassis so that the wave trap may be attached by means of the two self-tapping screws which are included in the kit. These holes are normally covered by the paper name plate, but they can easily be found by punching through the paper sticker with a point at the positions shown on the diagram.

On all other models, the trap should be screwed to the inside of the cabinet near the receiver antenna lead.



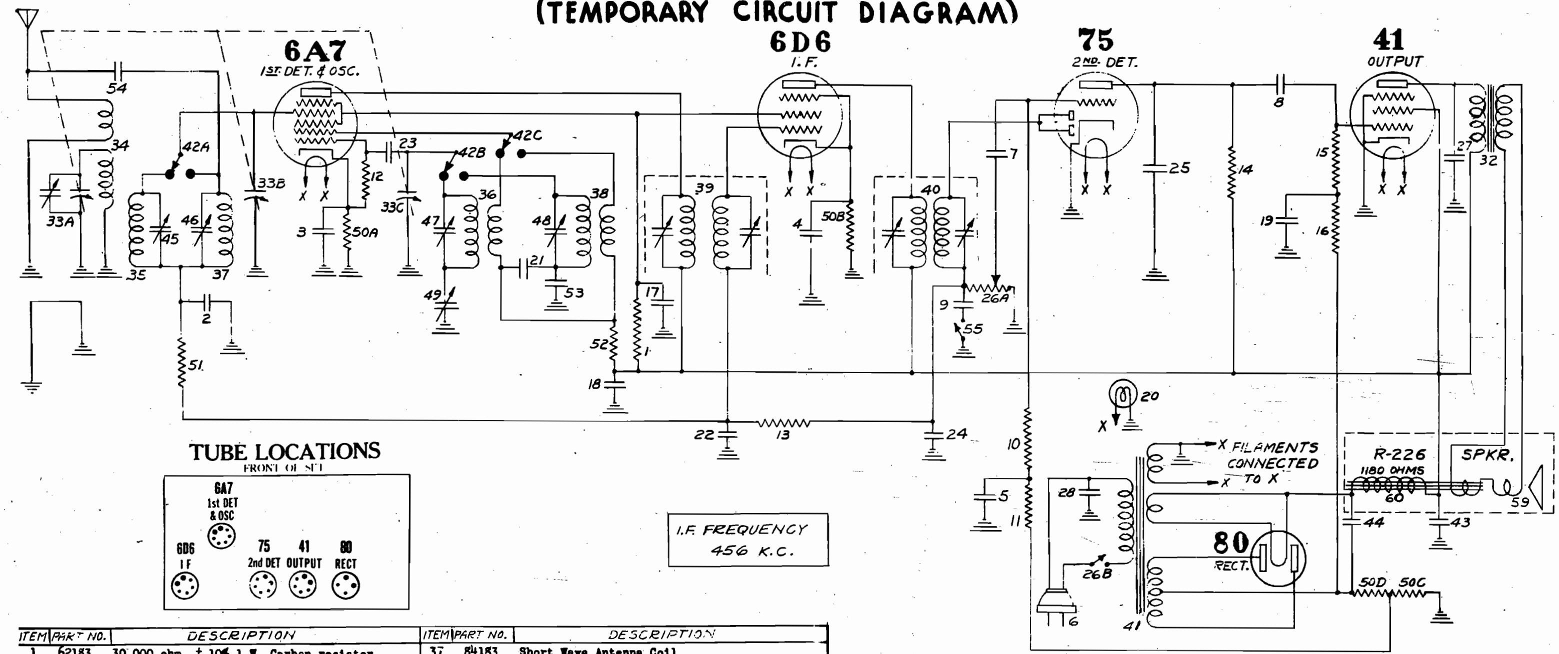

After mounting the trap, connect the blue antenna wire from the set to one of the wave trap leads and connect the antenna lead-in to the other wave trap lead.

Usually the wave trap will not require adjustment, but if some particular code station continues to cause excessive interference after installing the trap, it can be adjusted to diminish the unwanted signal. To make this adjustment, turn the slotted screw extending from the back of the wave trap with a screwdriver. Turn it slowly, first in one direction and then in the other, until the interfering signal disappears or has minimum volume.

**MODELS 1251 to 1259**
**Chassis R-125 Series**
**Chassis R-125A & 125X**
**Schematic, Parts List**
**Circuit Changes**

STEWART WARNER CORP.

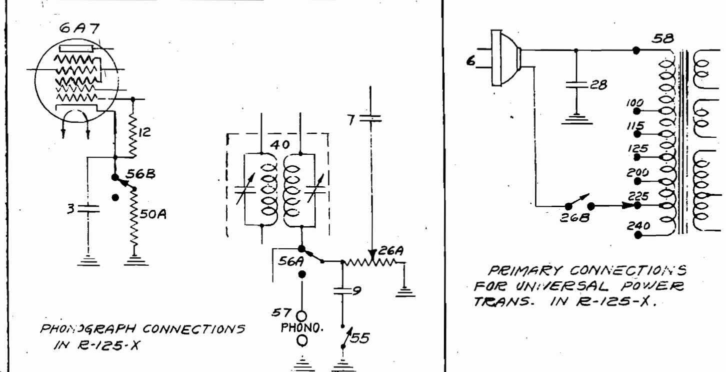
# STEWART-WARNER MODEL R-125 CHASSIS (RECEIVER MODELS 1251 to 1259)
## (TEMPORARY CIRCUIT DIAGRAM)




| ITEM | PART NO. | DESCRIPTION |
|---|---|---|
| 1 | 62183 | 30,000 ohm, ± 10% 1 W. Carbon resistor |
| 2 | 81630 | .1 mfd. 100 volt paper condenser |
| 3 | 81630 | .1 mfd. 100 volt paper condenser |
| 4 | 81630 | .1 mfd. 100 volt paper condenser |
| 5 | 81630 | .1 mfd. 100 volt paper condenser |
| 6 | 81974 | Line Cord and plug |
| 7 | 83007 | .02 mfd. 600 volt paper condenser |
| 8 | 83007 | .02 mfd. 600 volt paper condenser |
| 9 | 83011 | .004 mfd. 600 volt paper condenser |
| 10 | 83072 | 510,000 ohm, ± 20% ¼ watt carbon resistor |
| 11 | 83072 | 510,000 ohm, ± 20% ¼ watt carbon resistor |
| 12 | 83080 | 51,000 ohm, ± 20% ¼ watt carbon resistor |
| 13 | 83082 | 260,000 ohm, ± 20% ¼ watt carbon resistor |
| 14 | 83082 | 260,000 ohm, ± 20% ¼ watt carbon resistor |
| 15 | 83082 | 260,000 ohm, ± 20% ¼ watt carbon resistor |
| 16 | 83082 | 260,000 ohm, ± 20% ¼ watt carbon resistor |
| 17 | 83214 | .25 mfd. 250 volt paper condenser |
| 18 | 83214 | .25 mfd. 250 volt paper condenser |
| 19 | 83219 | .01 mfd. 600 volt paper condenser |
| 20 | 83278 | 6.3 volt dial light bulb |
| 21 | 83352 | .015 mfd. ± 10% 600 volt paper condenser |
| 22 | 83353 | .05 mfd. 100 volt paper condenser |
| 23 | 83539 | .00026 mfd. ± 25% molded mica condenser |
| 24 | 83539 | .00026 mfd. ± 25% molded mica condenser |
| 25 | 83539 | .00026 mfd. ± 25% molded mica condenser |
| 26A) 26B) | 83551 | 500,000 ohm volume control) Line switch ) in one unit |
| 27 | 83706 | .006 mfd. 600 volt paper condenser |
| 28 | 83976 | .02 mfd. 1000 volt paper condenser |
| 32 | 84153 | Output transformer (Part of R-226 Speaker) |
| 33A) 33B) 33C) | 84174 | Three gang variable condenser |
| 34 | 84175 | Broadcast Antenna coil (also see No. 84229) |
| 35 | 84178 | Broadcast detector coil (also see No. 84229) |
| 36 | 84180 | Broadcase oscillator coil |
| 37 | 84183 | Short Wave Antenna Coil |
| 38 | 84185 | Short wave oscillator coil |
| 39 | 84187 | 1st I.F. Transformer |
| 40 | 84188 | 2nd I.F. Transformer |
| 41 | 84189 | Power Transformer (115 volts 60 cycles) (R-125-A only) (also see item 58) |
| 42A) 42B) 42C) | 84191 | Range Switch |
| 43 | 84192 | 16 mfd. 350 volt wet Electrolytic condenser |
| 44 | 84193 | 16 mfd. 350 volt wet Electrolytic condenser |
| 45 | 84194 | R.F. trimmer condenser (3 to 23 mmfd.) |
| 46 | 84194 | R.F. trimmer condenser (3 to 23 mmfd.) |
| 47 | 84194 | R.F. trimmer condenser (3 to 23 mmfd.) |
| 48 | 84194 | R.F. trimmer condenser (3 to 23 mmfd) |
| 49 | 84195 | Oscillator Padding trimmer (300-600 mmfd.) |
| 50A) 50B) 50C) 50D) | 84196 | (300 ohm ± 10% resistor) (300 ohm ± 10% resistor) (25 ohm ± 10% resistor) (275 ohm ± 10% resistor) in one unit |
| 51 | 84198 | 110,000 ohm, ± 20% ¼ watt carbon resistor |
| 52 | 84199 | 16.000 ohm, ± 20% ¼ watt carbon resistor |
| 53 | 84200 | .004 mfd. ± 5% molded mica condenser |
| 54 | 84220 | Antenna Coupling condenser (20 mmfd.) |
| | 84229 | Broadcast Pre-Selector Coil Assembly (consists of No. 84175 and 84178 coils) |
| 55 | 84420 | Tone Control Switch |
| 56A) 56B) | 84404 | Phonograph Switch (D.P.D.T.) (R-125-X only) |
| 57 | 84407 | Phonograph terminal strip (R-125-X only) |
| 58 | 84408 | Power Transformer (100 to 240 volts) 25 to 133 cycles) (R-125-X only) |

Form 6233 7-16-34 Printed in U. S. A.

STEWART-WARNER CORPORATION CHICAGO U S A




| ITEM | PART NO. | DESCRIPTION |
|---|---|---|
| 59 | 84504 | Diaphragm & Shell Assem.-for R-226 Speaker) for service |
| 60 | 84505 | Field Coil & Housing Assem-for R-226 Speaker) only |

CIRCUIT DIAGRAM (R-125-A & X)

DATE ISSUED 6-19-34

Stewart-Warner

R-125

MODELS 1251 to 1259
Chassis R-125 Series
Alignment Data

STEWART WARNER CORP.

RADIO SERVICE NOTES - MODEL R-125 CHASSIS (RECEIVER MODELS 1251 TO 1259)

NO. 3 - ALIGNMENT OF MODEL R-125 CHASSIS

Experience has definitely shown that a selective radio chassis such as the Stewart-Warner Model R-125 cannot be properly aligned by ear or "on the air." An output meter and a high grade modulated service oscillator are absolutely essential. The oscillator should be capable of generating the frequencies of 456 K.C., 600 K.C., 1400 K.C. and a short wave range extending to 4000 K.C. or more. This oscillator must provide a wide range of signal output -- very weak for proper alignment of the various bands so that the A.V.C. circuit will not be actuated and very strong for use when the receiver is badly out of adjustment or for shortwave alignment where harmonics are used.

When using your oscillator do not rely on calibration curves for frequency determination but check the frequencies by comparison with broadcast station signals.

PRELIMINARY STEPS.

To align the R-125 chassis, proceed as follows:

1. Remove the chassis from the cabinet.

2. Connect the output metal across the primary of the output transformer on the dynamic speaker. (Center and blue terminals)

3. Turn the volume control to maximum volume position.

4. For all adjustments use an all-bakelite aligning tool which has only a small meter screwdriver tip.

5. At all times during alignment use the lowest output meter scale which will provide a steady reading and adjust the oscillator output so that the output meter reads near the center of the scale.

6. Refer to the diagram for the location of trimmer condensers.

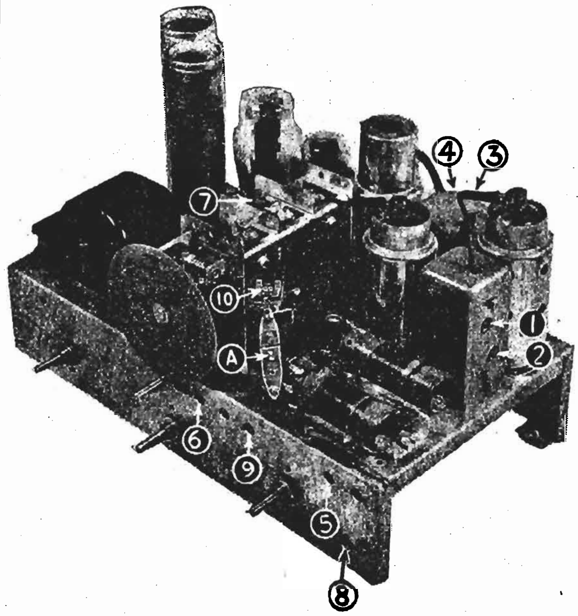
VERY IMPORTANT: In aligning all but the I.F. stages it is absolutely necessary to have a 400 to 500 ohm resistor in series with the antenna lead to the oscillator. Do not omit this resistor or the alignment will be incorrect!

I.F. ALIGNMENT

1. Set the test oscillator to exactly 456 K.C. Connect the output leads of oscillator from the 6A7 control grid to ground and set the range switch (right hand knob) to the broadcast position (clockwise). Carefully adjust the I.F. transformer trimmers No. 1,2,3, and 4 for maximum output meter deflection. Repeat the four adjustments since the adjustment of each trimmer has some effect on the others.

STEWART WARNER CORP.

**MODELS 1251 to 1259**
**Chassis R-125 Series**
**Trimmer Locations**
**Alignment Data, Part 2**




## LOCATION OF MODEL R-125 ALIGNING TRIMMERS

1) 2) 1st I.F. transformer trimmers

3) 4) 2nd I.F. transformer trimmers

5 Broadcast oscillator shunt trimmer
6 Broadcast detector shunt trimmer
7 Broadcast Pre-selector shunt trimmer
8 Broadcast oscillator padding trimmer
9 Short Wave oscillator shunt trimmer
10 Short Wave detector shunt trimmer

## BROADCAST BAND ALIGNMENT

1. Check the position of the dial on the condenser shaft by pushing the rotor plates of the gang condenser to full mesh. The dial should then read 530 K.C. Please note that the plates should be pushed with the fingers and not turned by means of the dial for this check.

2. Turn the range switch (right hand knob) to the maximum clockwise position, which is the broadcast setting.

3. Whenever possible, use a broadcast station signal between 1300 and 1420 K.C. to calibrate the receiver dial. If no such station can be heard, you can use a 1400 K.C. signal from your oscillator provided that it is properly calibrated. To calibrate the set turn its dial to the exact frequency setting of the signal (either a station or the oscillator) then carefully adjust trimmer No. 5 (broadcast oscillator shunt trimmer) until the signal is tuned in with maximum volume at its correct frequency setting.

4. Connect a 400 or 500 ohm, 1 watt carbon resistor in series with the test oscillator output and the receiver antenna lead. This resistor must remain connected for all broadcast and short wave adjustments in order to secure proper alignment of the antenna stage. Ground the receiver chassis and connect the oscillator ground lead to the chassis.

5. Set the test oscillator to approximately 1400 K.C. and carefully tune the receiver to the signal. Adjust trimmer No. 6 (broadcast detector shunt trimmer) and trimmer No. 7 (broadcast pre-selector shunt trimmer) for maximum output meter reading. Retune the receiver and check the adjustments. Do not touch trimmer No. 5 since this will change the calibration.

6. Set the test oscillator to approximately 600 K.C. and tune the receiver to the signal. Adjust trimmer No. 8 (broadcast oscillator padding

MODELS 1251 to 1259
Chassis R-125 Series
Alignment Data,Part 3

STEWART WARNER CORP.

trimmer) to get maximum output meter deflection. Retune the receiver dial to a peak and readjust the trimmer. Continue this procedure of adjusting the trimmer and retuning the set until the output meter reading cannot be increased. This procedure must be followed or the receiver will not be properly aligned.

7. With a 1400 K.C. test oscillator signal, check alignment of trimmers No. 6 and 7.

## SHORT WAVE BAND ALIGNMENT.

1. Turn the receiver range switch to the short wave band position (counter-clockwise).

2. Set the test oscillator to give a 16,000 K.C. signal. If your oscillator cannot reach this frequency, use the 2nd harmonic of 8,000 K.C., the third harmonic of 5333 K.C., or the fourth harmonic of 4000 K.C., all of which will give a 16,000 K.C. signal.

3. To calibrate this point turn the receiver dial to 16 M.C. on the inner dial scale and adjust Trimmer No. 9 (shortwave oscillator shunt trimmer) to give maximum output. Generally two peaks will be found. Align on the peak secured with the trimmer screw farthest out. Then adjust trimmer No. 10 (short-wave detector shunt trimmer) to a peak. After this is done, try detuning No. 10 in either direction and retune the receiver dial. If this gives a higher output, continue detuning No. 10 and retuning the dial until the maximum output meter reading is reached. If this procedure results in a lower output, detune the trimmer in the opposite direction and retune the dial, etc.

IMPORTANT: The antenna coupling condenser marked "A" in the diagram is adjusted to a definite capacity at the factory and should not require any further adjustment. Therefore do not adjust trimmer "A" unless it is found that trimmer No. 10 will not peak or if maximum output is obtained with No. 10 either all the way out or all the way in. If it is necessary to adjust trimmer "A" turn its adjusting screw all the way in and then turn it out just far enough to give a satisfactory peak on No. 10 when trimmer No. 10's adjusting screw is almost all the way out.

Always readjust No. 10 after adjusting trimmer "A".

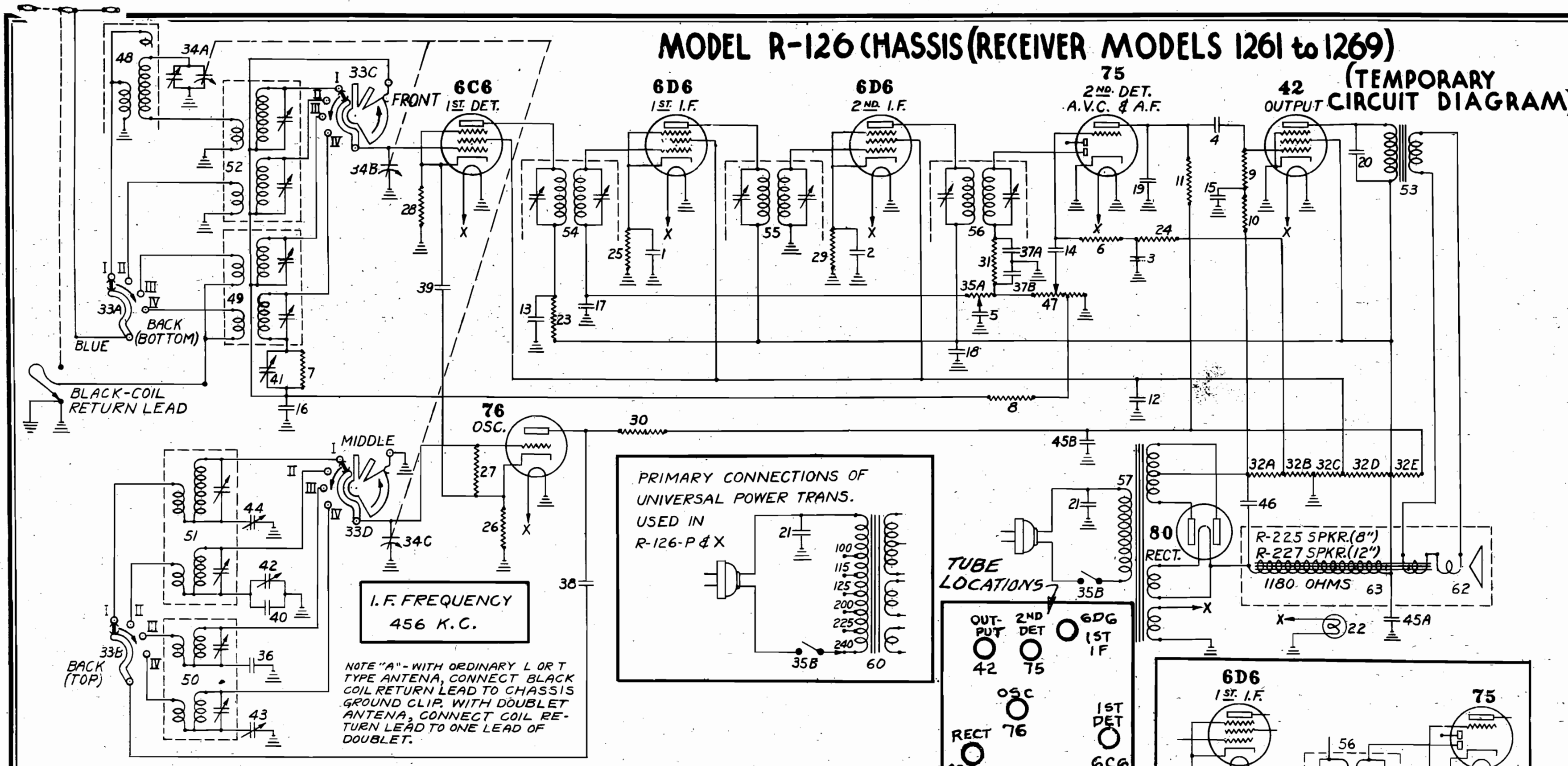
4. Tune the receiver to about 15.1 M.C. and check for the image signal which should be weaker than the 16.0 M.C. signal. If the image is as strong as the signal it shows that trimmer No. 10 is not properly adjusted. No signal at 15.1 M.C. but one at 16.9 M.C. shows that trimmer No. 9 is aligned on the image frequency and thus both No. 9 and 10 must be readjusted at the proper frequency.

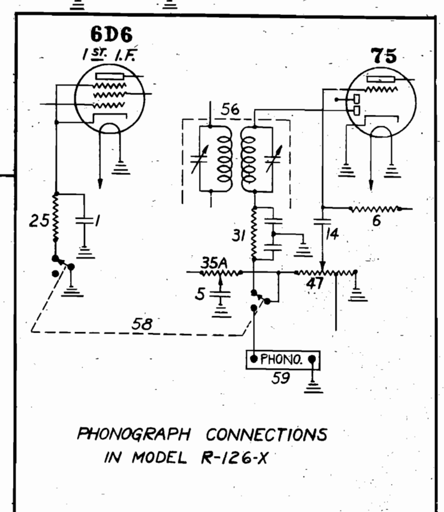
Note: After completing the alignment, all of the trimmers except the padding and I.F. trimmers should be locked in place with Ambroid or some similar type cement in order that they will not be jarred out of adjustment.

Schematic, Socket Changes, Parts List

# STEWART WARNER CORP.

MODELS 1261 to 1269
Chassis R-126 Series
Chassis R-126-A, -P & -X




| ITEM NO. | PART NO. | DESCRIPTION |
|---|---|---|
| 1 | 81630 | .1 mfd. 100 volt paper condenser |
| 2 | 81630 | .1 mfd. 100 volt paper condenser |
| 3 | 81630 | .1 mfd. 100 volt paper condenser |
| 4 | 83007 | .02 mfd. 600 volt paper condenser |
| 5 | 83011 | .004 mfd. 600 volt paper condenser |
| 6 | 83072 | 510,000 ohm ±20%, ¼ watt carbon resistor |
| 7 | 83082 | 260,000 ohm ±20%, ¼ watt carbon resistor |
| 8 | 83082 | 260,000 ohm ±20%, ¼ watt carbon resistor |
| 9 | 83082 | 260,000 ohm ±20%, ¼ watt carbon resistor |
| 10 | 83082 | 260,000 ohm ±20%, ¼ watt carbon resistor |
| 11 | 83082 | 260,000 ohm ±20%, ¼ watt carbon resistor |
| 12 | 83214 | .25 mfd. 250 volt paper condenser |
| 13 | 83219 | .01 mfd. 600 volt paper condenser |
| 14 | 83219 | .01 mfd. 600 volt paper condenser |
| 15 | 83352 | .015 mfd. 600 volt paper condenser |
| 16 | 83353 | .05 mfd. 100 volt paper condenser |
| 17 | 83353 | .05 mfd. 100 volt paper condenser |
| 18 | 83440 | .1 mfd. 400 volt paper condenser |
| 19 | 83539 | .00026 mfd. molded mica condenser |
| 20 | 83706 | .006 mfd. 600 volt paper condenser |
| 21 | 83976 | .02 mfd. 1000 volt shielded paper cond. |
| 22 | 84058 | Dial Light bulb (6 to 8 volt) |
| 23 | 84199 | 16,000 ohm ± 20%, ¼ watt carbon resistor |
| 24 | 84235 | 1.1 megohm ±20%, 1/4 watt carbon resistor |
| 25 | 84236 | 2,500 ohm, ±10%, 1/4 watt carbon resistor |
| 26 | 84237 | 510 ohm ± 20%, 1/4 watt carbon resistor |
| 27 | 84238 | 11,000 ohm ±20%, 1/4 watt carbon resistor |
| 28 | 84239 | 6,100 ohm ±20%, 1/4 watt carbon resistor |
| 29 | 84240 | 4,000 ohm ±10% 1/4 watt carbon resistor |
| 30 | 84241 | 31,000 ohm ±20%, 1/2 watt carbon resistor |
| 31 | 84242 | 31,000 ohm ±20%, 1/4 watt carbon resistor |
| 32A, 32B, 32C, 32D, 32E | 84273 | Tapped Voltage Divider: 225 ohm ±10%, resistor; 20 ohm ±10%, resistor; 10,000 ohm ±10%, resistor; 13,500 ohm ±10%, resistor; 8000 ohm ± 10%, resistor |
| 33A, 33B, 33C, 33D | 84274 | Range Switch |
| 34A, 34B, 34C | 84275 | 3 gang variable condenser |
| 35A, 35B | 84279 | 300,000 ohm variable tone control; Line switch — In one unit. |
| 36 | 84280 | .006 mfd. ± 10% molded Mica condenser |
| 37A, 37B | 84281 | Dual .00026 mfd. molded mica condenser |
| 38 | 84282 | .001 mfd. ±10% molded mica condenser |
| 39 | 84282 | .001 mfd. ±10% molded mica condenser |
| 40 | 84282 | .001 mfd. ±10% molded mica condenser |
| 41 | 84283 | Short wave padding trimmer condenser |
| 42 | 84283 | Short wave padding trimmer condenser |
| 43 | 84283 | Short wave padding trimmer condenser |
| 44 | 84284 | Broadcast padding trimmer condenser |
| 45A, 45B | 84286 | 8 mfd. 450 volt dry electrolytic cond.; 2 mfd. 400 volt dry electrolytic cond. — In one unit |
| 46 | 84288 | 14 mfd. 475 volt wet electrolytic condenser |
| 47 | 84289 | 500,000 ohm volume control (Tap at 125,000 ohms from ground) |
| 48 | 84290 | Broadcast Antenna Coil |
|  | 84295 | Dual coil trimmer condenser (part of coil assembly) |
| 49 | 84298 | Band #3 Antenna Coil and trimmer cond.; Band #4 Antenna Coil and trimmer cond. — In one unit See #84295 |
| 50 | 84302 | Band #3 Oscillator Coil and trimmer; Band #4 Oscillator Coil and trimmer — In one unit See #84295 |
| 51 | 84305 | Broadcast Oscillator Coil and trimmer; Band #2 Oscillator Coil and trimmer — In one unit See #84295 |
| 52 | 84308 | Broadcast detector coil and trimmer; Band #2 Antenna Coil and trimmer — In one unit See #84295 |
| 53 | 84312 | Output transformer (on R-225 & R-227 Speakers) |
| 54 | 84320 | 1st I.F. Transformer |
| 55 | 84321 | 2nd I.F. Transformer |
| 56 | 84322 | 3rd I.F. Transformer |
| 57 | 84324 | Power transformer (115 volts 60 cycle) (R-126-A only) See 84410 for 100-240 volts Used in R-126 P & X |
| 58 | 84404 | Phonograph toggle switch (R-126-X only) |
| 59 | 84407 | Phonograph terminal strip (R-126X only) |
| 60 | 84410 | Power transformer (100 to 240 volts, 25 to 133 cycles Used on R-126P & X only |
| 61 | 84412 | Phonograph terminal strip (R-126P only) |
| 62 | 84504 | Diaphragm shell assembly — For R-225 8 inch speaker — For service only |
| 63 | 84505 | Field coil and housing — For R-225 8 inch speaker — For service only |
| 62 | 84506 | Diaphragm shell assembly — For R-227 12 inch speaker — For service only |
| 63 | 84507 | Field coil and housing — For R-227 12 inch speaker — For service only |

CIRCUIT DIAGRAM (R-126-A, P & X)

DATE ISSUED 6-30-34

Stewart-Warner NUMBER

MODELS 1261 to 1269
Chassis 126 Series
Alignment Data

STEWART WARNER CORP.

RADIO SERVICE NOTES - MODEL R-126 CHASSIS (RECEIVER MODELS 1261 TO 1269)

NO. 3 - ALIGNMENT OF MODEL R-126 CHASSIS

Experience has definitely shown that a selective radio chassis such as the Stewart-Warner Model R-126 cannot be properly aligned by ear or "on the air". An output meter and a high grade modulated service oscillator are absolutely essential. The oscillator should be capable of generating the frequencies of 456 K.C., 600 K.C., 1400 K.C. and a short wave range extending to 4000 K.C. or more. This oscillator must provide a wide range of signal output -- very weak for proper alignment of the various bands so that the A.V.C. circuit will not be actuated and very strong for use when the receiver is badly out of adjustment or for short wave alignment where harmonics are used.

When using your oscillator do not rely on calibration curves for frequency determination but check the frequencies by comparison with broadcast station signals.

PRELIMINARY STEPS

To align the R-126 chassis, proceed as follows:

1. Remove the chassis from the cabinet.

2. Connect the output meter across the primary of the output transformer on the dynamic speaker. (Center and blue terminals)

3. Turn the volume control to maximum volume position.

4. For all adjustments use an all-bakelite aligning tool which has only a small metal screw driver tip.

5. At all times during alignment use the lowest output meter scale which will provide a steady reading and adjust the oscillator output so that output meter reads near the center of the scale.

6. Refer to the diagram for location of trimmer condensers.

VERY IMPORTANT: In aligning all but the I.F. stages it is absolutely necessary to have a 400 to 500 ohm resistor in series with the antenna lead to the oscillator. Do not omit this resistor or the alignment will be incorrect!

I.F. ALIGNMENT

1. Set the test oscillator to exactly 456 K.C. Connect the output leads of oscillator from the 6C6 control grid to ground and set the range switch (lower center knob) to the broadcast position (dial pointer on black dial scale). Carefully adjust the I.F. transformer trimmers No. 1,2,3,4,5 and 6 for maximum output meter deflection. Repeat the six adjustments since the adjustment of each trimmer has some effect on the others.

BROADCAST BAND ALIGNMENT

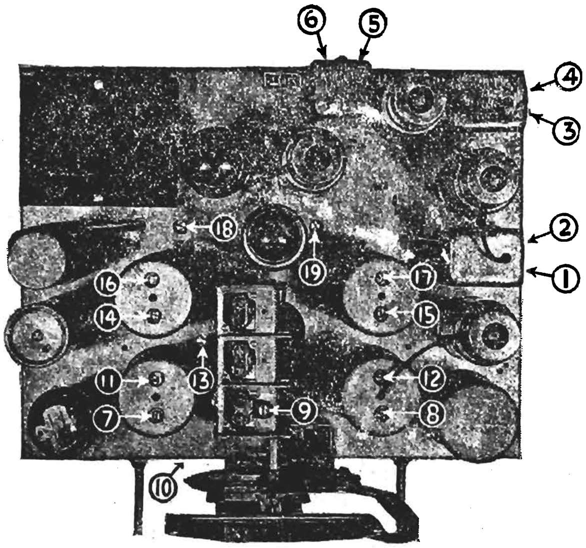
1. Check the position of the dial on the condenser shaft by pushing the rotor plates of the gang condenser to full mesh. The dial should then read 530 K.C. Please note that the plates should be pushed with the fingers and not turned by means of the dial for this check.

STEWART WARNER CORP.

MODELS 1261 to 1269
Chassis R-126 Series
Alignment Data, Part 2

LOCATIONS OF MODEL R-126

ALIGNING TRIMMERS




1)
2) 1st. I.F. transformer trimmers

3)
4) 2nd. I.F. transformer trimmers

5)
6) 3rd. I.F. transformer trimmers

7 Broadcast oscillator shunt trimmer
8 Broadcast detector shunt trimmer
9 Broadcast pre-selector shunt trimmer
10 Broadcast oscillator padding trimmer
11 1st. Shortwave Band oscillator shunt trimmer
12 1st. Shortwave Band detector shunt trimmer
13 1st. Shortwave Band oscillator padding trimmer
14 2nd. Shortwave Band oscillator shunt trimmer
15 2nd. Shortwave Band detector shunt trimmer
16 3rd. Shortwave Band oscillator shunt trimmer
17 3rd. Shortwave Band detector shunt trimmer
18 3rd. Shortwave Band oscillator padding trimmer
19 3rd. Shortwave Band detector padding trimmer

2. Turn the range switch (lower center knob) to the maximum counter-clockwise position, which is the broadcast setting.

3. Whenever possible, use a broadcast station signal between 1300 and 1420 K.C. to calibrate the receiver dial. If no such station can be heard, you can use a 1400 K.C. signal from your oscillator provided that it is properly calibrated. To calibrate the set, turn its dial pointer to the exact frequency setting of the signal (either a station or the oscillator). Carefully adjust trimmer No. 7 (broadcast oscillator shunt trimmer) until the signal is tuned in with maximum volume at its correct frequency setting.

4. Connect a 400 or 500 ohm, 1 watt carbon resistor in series with the test oscillator output and the receiver antenna lead. <u>This resistor must remain connected for all broadcast and short wave adjustments in order to secure proper alignment of the antenna stage.</u> Ground the receiver chassis and connect the oscillator ground lead to the chassis.

5. With the test oscillator adjusted to approximately 1400 K.C. carefully tune the receiver to the signal. Adjust trimmer No. 8 (broadcast detector shunt trimmer) and No. 9 (broadcast pre-selector shunt trimmer) for maximum output meter reading. Retune the receiver and check the adjustments. Do not touch trimmer No. 7 since this will change the calibration.

6. Set the test oscillator to approximately 600 K.C. and tune the receiver to the signal. Adjust the broadcast oscillator padding trimmer No. 10 to get maximum output meter deflection. Then retune the receiver dial to a peak and readjust the trimmer. Continue this procedure of adjusting the trimmer and retuning the set until the output meter reading cannot be increased. <u>This procedure must be followed or the receiver will not be properly aligned.</u>

7. With a 1400 K.C. test oscillator signal, check alignment of trimmers No. 8 and 9.

MODELS 1261 to 1269
Chassis R-126 Series
Alignment Data, Part 3

STEWART WARNER CORP.

## FIRST SHORT WAVE BAND ALIGNMENT

1. Turn receiver range switch to the first short wave band position (dial pointer on red dial scale).

2. Adjust the oscillator to exactly 4000 K.C.

3. To calibrate this point set the receiver dial pointer to 4000 K.C. on the red dial scale and adjust trimmer No. 11 (first shortwave band oscillator shunt trimmer) to a peak. If there are two peaks, the proper one is the one with the trimmer screw farthest out. Then tune trimmer No. 12 (first short wave band detector shunt trimmer) to a peak. Try detuning No. 12 in either direction and retune the receiver dial. If this gives a higher output meter reading, continue detuning No. 12 and retuning the dial until the maximum output meter reading is reached. If this procedure results in a lower output detune the trimmer in the opposite direction, retune the receiver, etc.

4. To check the above adjustment, leave the test oscillator set at 4.0 M.C. and increase its output. Then tune in the image signal at about 3.1 M.C. on the receiver dial. This image signal should be weak compared to the correct signal at 4.0 M.C. If it is almost as strong as the 4.0 M.C. signal, it is a sign that trimmer No. 12 is not properly adjusted and it will be necessary to repeat the procedure for aligning this trimmer. If no signal can be heard at 3.1 M.C. even with greatly increased oscillator output, tune the set at 4.9 M.C. A signal heard at this point shows that trimmer No. 11 is aligned on the image frequency and so both No. 11 and 12 must be readjusted at the proper signal frequency.

5. Set the test oscillator to about 1750 K.C. and tune the receiver to the signal. Adjust trimmer No. 13 (first shortwave band oscillator padding trimmer) for maximum output. Then retune the receiver dial to a peak and again adjust the trimmer. Continue this procedure of adjusting the trimmer and retuning the set until the output meter reading cannot be increased.

6. Check the alignment of trimmer 12 with a 4000 K.C. signal.

## SECOND SHORT WAVE BAND ALIGNMENT

1. Turn the receiver range switch to the second short wave band position (dial pointer on green dial scale).

2. Adjust the test oscillator to exactly 12,000 K.C. If you cannot obtain this frequency on your oscillator, you may use the second harmonic of 6000 K.C., the third harmonic of 4000 K.C., or the fourth harmonic of 3000 K.C., all of which will give a 12,000 K.C. signal.

3. To calibrate, set the receiver dial pointer to 12 M.C. on the green dial scale and then adjust trimmer No. 14 (second shortwave band oscillator shunt trimmer) for maximum output. Generally two peaks will be found. Align on the one with the trimmer screw farthest out. Adjust trimmer No. 15 (second shortwave band detector trimmer) to a peak. After this is done, try to increase the output meter reading by detuning trimmer No. 15 and retuning the dial.

4. Tune the receiver to about 11.1 M.C. and check for reception of the image which should be weaker than the 12.0 M.C. signal. If the image is almost as strong as the correct signal, it shows that trimmer No. 15 has not been properly adjusted. If the signal cannot be heard at 11.1 M.C., but can be received at 12.9 M.C., then trimmer No. 14 is aligned on the image frequency and No. 14 and 15 must be realigned at the proper signal frequency.

## THIRD SHORT WAVE BAND ALIGNMENT

1. Turn the receiver range switch to the third short wave band (pointer on purple dial scale).

2. Set the test oscillator to give a 20,000 K.C. signal. If your oscillator cannot reach this frequency, use the 2nd harmonic of 10,000 K.C., the third harmonic of 6666 K.C., the fourth harmonic of 5000 K.C., or the fifth harmonic of 4000 K.C., all of which will give a 20,000 K.C. signal.

3. To calibrate this point, turn the receiver dial pointer to 20 M.C. on the purple dial scale and adjust trimmer No. 16 (third shortwave band oscillaton shunt trimmer) to give maximum output. If there are two peaks, align on the one with the trimmer screw farthest out. Then adjust trimmer No. 17 (third shortwave band detector shunt trimmer) to a peak. After this is done, try to increase the output meter reading by detuning No. 17 and retuning the receiver dial.

4. Tune the receiver to about 19.1 M.C. and check for the image signal which should be weaker than the 20.0 M.C. signal. If the image is almost as strong as the signal, it indicates that trimmer No. 17 has not been properly adjusted. No signal at 19.1 M.C. but one at 20.9 M.C. shows that trimmer No. 16 is aligned on the image frequency and thus both No. 16 and 17 must be readjusted.

5. Adjust test oscillator to 12,000 K.C., or use the second harmonic of 6000 K.C., the third harmonic of 4000 K.C., or the fourth harmonic of 3000 K.C., all of which will give a 12000 K.C. signal.

Calibrate this point by setting the dial pointer to 12.0 M.C. on the purple scale and adjusting trimmer No. 18 (third shortwave band oscillator padding trimmer) to give maximum output. Retune the dial and then adjust trimmer No. 19 (third shortwave band detector padding trimmer) to a peak. Retune the dial and readjust No. 19. Repeat this procedure of adjusting No. 19 and retuning the dial until it does not increase the output meter reading.

6. Check the reception of the image signal at 11.1 M.C. If the image is almost as strong as the 12 M.C. signal but was found to be satisfactory at 19.1 M.C. with a 20,000 K.C. signal, No. 18 or 19 are aligned on the wrong peak and should be readjusted.

7. Check adjustment of No. 17 with a 20,000 K.C. signal.

NOTE: To prevent the trimmers from being jarred out of adjustment, use Ambroid or some similar cement to fasten the trimmer screws in position after completing the alignment. This should be done to all adjusting screws except the padding and I.F. trimmers.

MODELS 1271 to 1279
Chassis 127 Series
Alignment Data, Part 1

STEWART WARNER CORP.

RADIO SERVICE NOTES - MODEL R-127 CHASSIS (RECEIVER MODELS 1271 TO 1279)

## NO. 3 - ALIGNMENT OF MODEL R-127 CHASSIS

Experience has definitely shown that a selective radio chassis such as the Stewart-Warner Model R-127 cannot be properly aligned by ear or "on the air". An output meter and a high grade modulated service oscillator are absolutely essential. The oscillator should be capable of generating the frequencies of 456 K.C., 600 K.C., 1400 K.C., and a short wave range extending to 4000 K.C. or more. This oscillator must provide a wide range of signal output -- very weak for proper alignment of the various bands so that the A.V.C. circuit will not be actuated and very strong for use when the receiver is badly out of adjustment or for shortwave alignment where harmonics are used.

When using your oscillator do not rely on calibration curves for frequency determination but check the frequencies by comparison with broadcast station signals.

### PRELIMINARY STEPS

To align the R-127 chassis proceed as follows:

1. Remove the chassis from the cabinet.

2. Connect the output meter across the primary of the output transformer on the dynamic speaker. (Center and blue terminals)

3. Turn the volume control to maximum volume position.

4. For all adjustments use an all-bakelite aligning tool which has only a small metal screw driver tip.

5. At all times during alignment use the lowest output meter scale which will provide a steady reading and adjust the oscillator output so that output meter reads near the center of the scale.

6. Refer to the diagram for the location of the trimmer condensers.

VERY IMPORTANT: In aligning all but the I.F. stages it is absolutely necessary to have a 400 to 500 ohm resistor in series with the antenna lead to the oscillator. Do not omit this resistor or the alignment will be incorrect!

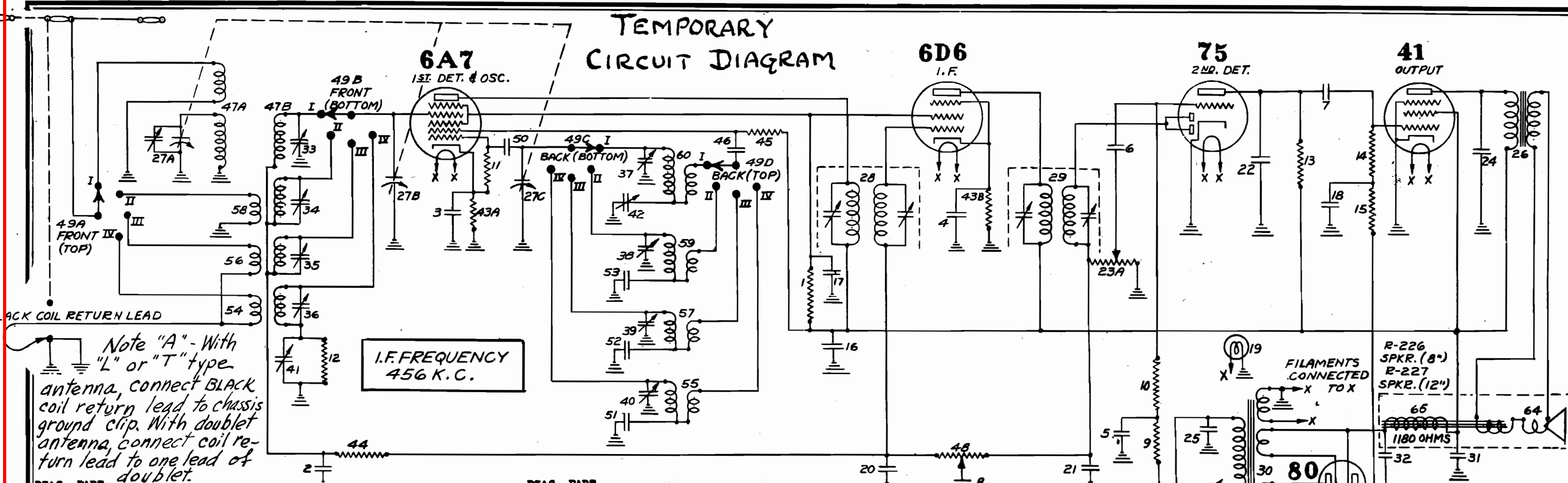
### I.F. ALIGNMENT

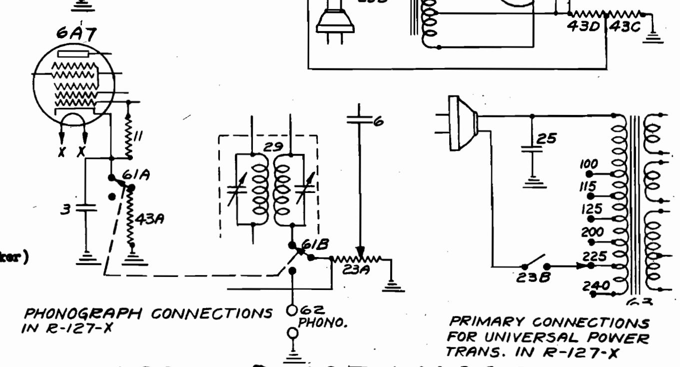
1. Set the test oscillator to exactly 456 K.C. Connect the output leads of oscillator from the 6A7 control grid to ground and set the range switch (right hand knob) to the broadcast position (fully clockwise). Carefully adjust the I.F. transformer trimmers No. 1,2,3, and 4 for maximum output meter deflection. Repeat the four adjustments since the adjustment of each trimmer has some effect on the others.

# STEWART WARNER CORP.

**MODELS 1271 to 1279**
**Chassis R-127 Series**
**Chassis R-127-X**
**Schematic, Socket**
**Circuit Changes**
**Parts List**

## TEMPORARY CIRCUIT DIAGRAM



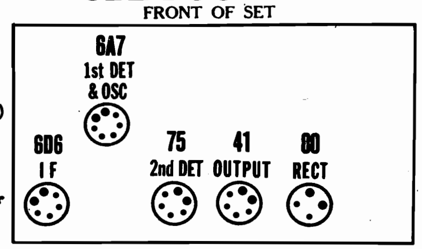

| DIAG. NO. | PART NO. | DESCRIPTION |
|---|---|---|
| 1 | 62183 | 30,000 ohm, 1 watt carbon resistor |
| 2 | 81630 | .1 mfd. 100 volt paper condenser |
| 3 | 81630 | .1 mfd. 100 volt paper condenser |
| 4 | 81630 | .1 mfd. 100 volt paper condenser |
| 5 | 81630 | .1 mfd. 100 volt paper condenser |
| 6 | 83007 | .02 mfd. 600 volt paper condenser |
| 7 | 83007 | .02 mfd. 600 volt paper condenser |
| 8 | 83011 | .004 mfd. 600 volt paper condenser |
| 9 | 83072 | 510,000 ohm. 1/4 watt carbon resistor |
| 10 | 83072 | 510,000 ohm. 1/4 watt carbon resistor |
| 11 | 83080 | 51,000 ohm. 1/4 watt carbon resistor |
| 12 | 83082 | 260,000 ohm 1/4 watt carbon resistor |
| 13 | 83082 | 260,000 ohm 1/4 watt carbon resistor |
| 14 | 83082 | 260,000 ohm 1/4 watt carbon resistor |
| 15 | 83082 | 260,000 ohm 1/4 watt carbon resistor |
| 16 | 83214 | .25 mfd. 250 volt paper condenser |
| 17 | 83214 | .25 mfd. 250 volt paper condenser |
| 18 | 83219 | .01 mfd. 600 volt paper condenser |
| 19 | 83278 | 6.3 volt dial light bulb |
| 20 | 83353 | .05 mfd. 100 volt paper condenser |
| 21 | 83559 | .00026 mfd. molded mica condenser |
| 22 | 83559 | .00026 mfd. molded mica condenser |
| 23A, 23B | 83551 | 500,000 ohm volume control, Line Switch } In one Unit |
| 24 | 83706 | .006 mfd. 600 volt paper condenser |
| 25 | 83976 | .02 mfd. 1000 volt shielded paper condenser |
| 26 | 84153 | Output transformer ( for R-226, 8 inch speaker) (see No.84312 for 12" speaker) |
| 27A, 27B, 27C | 84174 | 3-gang variable condenser |
| 28 | 84187 | 1st I.F transformer |
| 29 | 84188 | 2nd I.F transformer |
| 30 | 84189 | Power transformer (110 volts 60 cycle) (R-127-A only) (see No. 84408 for Universal transformer) |
| 31 | 84192 | 16 mfd. 350 volt wet electrolytic condenser |
| 32 | 84193 | 16 mfd. 350 volt wet electrolytic condenser |
| 33 | 84194 | R.F. trimmer condenser ( 3 to 23 mmfd.) |
| 34 | 84194 | R.F. trimmer condenser ( 3 to 23 mmfd.) |
| 35 | 84194 | R.F. trimmer condenser ( 3 to 23 mmfd.) |
| 36 | 84194 | R.F. trimmer condenser ( 3 to 23 mmfd.) |
| 37 | 84194 | R.F. trimmer condenser ( 3 to 23 mmfd.) |

| DIAG. NO. | PART NO. | DESCRIPTION |
|---|---|---|
| 38 | 84194 | R.F. Trimmer condenser (3 to 23 mmfd.) |
| 39 | 84194 | R.F. trimmer condenser (3 to 23 mmfd.) |
| 40 | 84194 | R.F. trimmer condenser (3 to 23 mmfd.) |
| 41 | 84195 | Trimmer Condenser (300-600 mmfd.) |
| 42 | 84195 | Trimmer Condenser (300-600 mmfd.) |
| 43A | 84196 | 300 ohm resistor } In One Unit |
| 43B | 84196 | 300 ohm resistor } In One Unit |
| 43C | 84196 | 25 ohm resistor } In One Unit |
| 43D | 84196 | 275 ohm resistor } In One Unit |
| 44 | 84198 | 110,000 ohm ½ watt carbon resistor |
| 45 | 84199 | 16,000 ohm ½ watt carbon resistor |
| 46 | 84200 | .004 mfd. molded mica condenser |
| 47A, 47B | 84229 | Broadcast Pre-Selector Coil Assembly |
| | 84312 | Output transformer (for R-227 12" speaker) |
| 48 | 84368 | 300,000 ohm variable tone control |
| 49A, 49B, 49C, 49D | 84369 | Range Switch |
| 50 | 84370 | .0001 mfd. molded mica condenser |
| 51 | 84371 | .0004 mfd. molded mica condenser |
| 52 | 84372 | .006 mfd. molded mica condenser |
| 53 | 84373 | .0015 mfd. molded mica condenser |
| 54 | 84377 | #4 band antenna coil |
| 55 | 84380 | #4 band oscillator coil |
| 56 | 84381 | #3 band antenna coil |
| 57 | 84383 | #3 band oscillator coil |
| 58 | 84385 | #2 band antenna coil |
| 59 | 84387 | #2 band oscillator coil |
| 60 | 84389 | Broadcast oscillator coil |
| 61A, 61B | 84404 | Phonograph Switch ( D.P. D.T.) (R-127-X only) |
| 62 | 84407 | Phonograph Terminal Strip (R-127-X only) |
| 63 | 84408 | Power Transformer (100 to 240 Volts, 25 to 133 Cycles) (R-127-X only) |
| 64 | 84504 | Diaphragm & Shell assembly } For R-226 - 8" speaker |
| 65 | 84505 | Field Coil & Housing } For R-226 - 8" speaker |
| 64 | 84506 | Diaphragm & Shell Assembly } For R-227 - 12" speaker |
| 65 | 84507 | Field Coil and housing } For R-227 - 12" speaker |

# MODEL R-127 CHASSIS (RECEIVER MODELS 1271 to 1279)

## TUBE LOCATIONS

FRONT OF SET



MODELS 1271 to 1279
Chassis R-127 Series
Alignment Data, Part 2

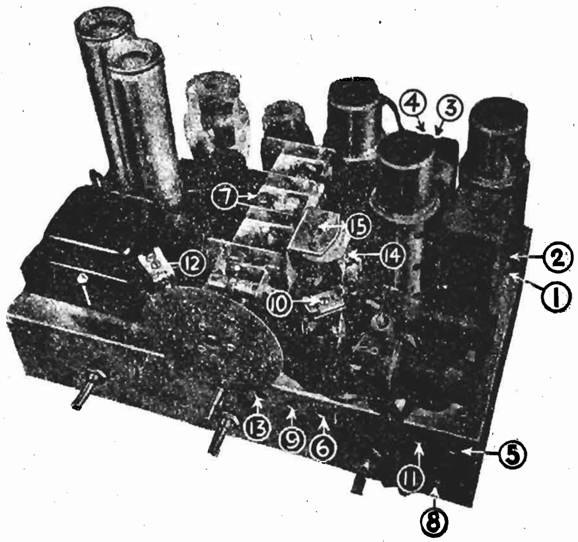
STEWART WARNER CORP.

LOCATION OF MODEL R-127
ALIGNING TRIMMERS

1) 2) 1st I.F. transformer trimmers

3) 4) 2nd I.F. transformer trimmers

5 Broadcast oscillator shunt trimmer
6 Broadcast detector shunt trimmer
7 Broadcast Pre-selector shunt trimmer
8 Broadcast oscillator padding trimmer
9 1st Short wave band oscillator shunt trimmer
10 1st Short wave band detector shunt trimmer
11 2nd Short wave band oscillator shunt trimmer
12 2nd Short wave band detector shunt trimmer
13 3rd Short wave band oscillator shunt trimmer
14 3rd Short wave band detector shunt trimmer
15 3rd Short wave band detector padding trimmer




BROADCAST BAND ALIGNMENT

1. Check the position of the dial on the condenser shaft by pushing the rotor plates of the gang condenser to full mesh. The dial should then read 5.3 (530 K.C.). Please note that the plates should be pushed with the fingers and not turned by means of the dial for this check.

2. Turn the range switch (right hand knob) to the maximum clockwise position, which is the broadcast setting.

3. Whenever possible, use a broadcast station signal between 1300 and 1420 K.C. to calibrate the receiver dial. If no such station can be heard, you can use a 1400 K.C. signal from your oscillator provided it is accurately calibrated. To calibrate the set, turn its dial to the exact frequency setting of the signal (either a station or the oscillator). Then carefully adjust trimmer No. 5 (broadcast oscillator shunt trimmer) until the signal is tuned in with maximum volume at its correct frequency setting.

4. Connect a 400 or 500 ohm, 1 watt carbon resistor in series with the test oscillator output and the receiver antenna lead. This resistor must remain connected for all broadcast and short wave adjustments in order to secure proper alignment of the antenna stage. Ground the receiver chassis and connect the oscillator ground lead to the chassis.

5. With the test oscillator adjusted to approximately 1400 K.C., carefully tune the receiver to the signal. Adjust trimmer No. 6 (broadcast detector shunt trimmer) and No. 7 (broadcast pre-selector shunt trimmer) for maximum output meter reading. Retune the receiver and check the adjustments. Do not touch trimmer No. 5 since this will change the calibration.

6. Set the test oscillator to approximately 600 K.C. and tune the receiver to the signal. Adjust trimmer No. 8 (broadcast oscillator padding trimmer) to get maximum output meter deflection. Then retune the receiver dial to a peak and readjust the trimmer. Continue this procedure of adjusting the trimmer and retuning the set until the output meter reading cannot be increased. <u>This procedure must be followed or the receiver will not be properly aligned.</u>

7. With a 1400 K.C. test oscillator signal, check alignment of trimmers No. 6 and 7.

## FIRST SHORT WAVE BAND ALIGNMENT

1. Turn receiver range switch to the first short wave band position, which is the third position of the right hand knob when turning it in a clockwise direction.

2. Adjust the oscillator to <u>exactly</u> 4000 K.C.

3. To calibrate this point set the receiver dial to 4.0 megacycles on the red dial scale and adjust trimmer No. 9 (first shortwave band oscillator shunt trimmer) to a peak. If there are two peaks, the proper one is the one with the trimmer screw farthest out. Then tune No. 10 (first shortwave band detector shunt trimmer) to a peak. Try <u>detuning</u> No. 10 in either direction and <u>retune</u> the receiver dial. If this gives a higher output meter reading, continue detuning No. 10 and retuning the dial until the maximum output meter reading is reached. If this procedure results in a lower output detune the trimmer in the opposite direction and retune the receiver to secure the maximum output.

4. To check the above adjustment, leave the test oscillator set at 4.0 M.C. and increase its output. Then tune in the image signal at about 3.1 M.C. on the receiver dial. This image signal should be weak compared to the correct signal at 4.0 M.C. If it is almost as strong as the 4.0 M.C. signal, it is a sign that trimmer No. 10 is not properly adjusted and it will be necessary to repeat the procedure for aligning this trimmer. If no signal can be heard at 3.1 M.C. even with greatly increased oscillator output, tune the set to 4.9 M.C. A signal heard at this point, shows that trimmer No. 9 is aligned on the image frequency and so both No. 9 and 10 must be readjusted at the proper signal frequency.

## SECOND SHORT WAVE BAND ALIGNMENT

1. Turn the receiver range switch to the second short wave band position, which is the second position in a clockwise direction.

2. Adjust the test oscillator to exactly 12,000 K.C. If you cannot obtain this frequency on your oscillator, you may use the second harmonic of 6000 K.C., the third harmonic of 4000 K.C., or the fourth harmonic of 3000 K.C., all of which will give a 12,000 K.C. signal.

3. To calibrate this point turn the receiver dial to 12 M.C. on the green dial scale and then adjust trimmer No. 11 (second short wave band oscillator shunt trimmer). Generally, there will be two peaks, so align on the one with the trimmer screw farthest out. Adjust trimmer No. 12 (second shortwave detector shunt trimmer) to a peak. After this is done, try to increase the output meter deflection by detuning trimmer No. 12 and retuning the receiver dial. Continue detuning No. 12 and retuning the dial until the maximum output meter reading is reached.

MODELS 1271 to 1279
Chassis R-127 Series
Alignment Data, Part 4

STEWART WARNER CORP.

4. Tune the receiver to about 11.1 M.C. and check for reception of the image signal which should be weaker than the 12.0 M.C. signal. If the image is almost as strong as the 12 M.C. signal, it shows that No. 12 is not adjusted properly. If the signal cannot be heard at 11.1 M.C., but can be received at 12.9 M.C., then trimmer No. 11 is aligned on the image frequency and No. 11 and 12 must be realigned at the proper signal frequency.

## THIRD SHORT WAVE BAND ALIGNMENT

1. Turn the receiver range switch to the third shortwave band position, which is the furthest counter-clockwise position.

2. Set the test oscillator to give a 20,000 K.C. signal. If your oscillator cannot reach this frequency, use the 2nd harmonic of 10,000 K.C., the third harmonic of 6666 K.C., the fourth harmonic of 5000 K.C., or the fifth harmonic of 4000 K.C., all of which will give a 20,000 K.C. signal.

3. To calibrate this point turn the receiver dial to 20 M.C. on the purple dial scale and adjust Trimmer No. 13 (third shortwave band oscillator shunt trimmer) to give maximum output. Generally there will be two peaks, so align on the one with the trimmer screw farthest out. Then adjust trimmer No. 14 (third short wave band detector shunt trimmer) to a peak. After this is done, try to increase the output meter deflection by detuning No. 14 and retuning the receiver dial. Continue detuning No. 14 and retuning the dial until the maximum output meter reading is reached.

4. Tune the receiver to about 19.1 M.C. and check for the image signal which should be weaker than the 20.0 M.C. Signal. If the image is almost as strong as the 20 M.C. signal, it shows that No. 14 is not adjusted correctly. No signal at 19.1 M.C. but one at 20.9 M.C. shows that trimmer No. 13 is aligned on the image frequency and thus both No. 13 and 14 must be readjusted.

5. Adjust test oscillator to 12,000 K.C., or use the second harmonic of 6000 K.C., the third harmonic of 4000 K.C., or the fourth harmonic of 3000 K.C., all of which will give a 12,000 K.C. signal. Carefully tune the dial to the signal at about 12 M.C. on the purple dial scale. Adjust trimmer No. 15 (third shortwave band detector padding trimmer) for maximum output meter reading and then retune the dial. Repeat this procedure of adjusting the trimmer and retuning the dial until it does not increase the output meter reading.

6. Check reception of the image signal at 11.1 M.C. If the image is almost as strong as the 12 M.C. signal, but was found to be satisfactory at 19.1 M.C. with a 20,000 K.C. signal, No. 15 should be readjusted.

7. Check the adjustment of No. 14 with a 20,000 K.C. signal.

NOTE: To prevent the trimmers from being jarred out of adjustment use Ambroid or some similar cement to fasten the trimmer screws in position after completing the alignment. This should be done to all trimmers except the padding and I.F. trimmers.

STROMBERG-CARLSON TEL. MFG. CO.

MODEL 60
Specifications
Schematic

# Stromberg-Carlson No. 60 Type Radio Receivers

## ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| Type of Circuit | Superheterodyne |
| Tuning Ranges | 540—1570 k. c. and 5.5 to 15.5 mc. |
| Type and Number of Tubes | 1 No. 6D6, 1 No. 6A7, 1 No. 6B7, 1 No. 37, 2 No. 41, 1 No. 80 |
| Voltage Rating | 105-125 volts |
| Frequency Rating | 50-60 Cycles |
| Power Consumption Rating | 80 Watts |

## CIRCUIT DESCRIPTION

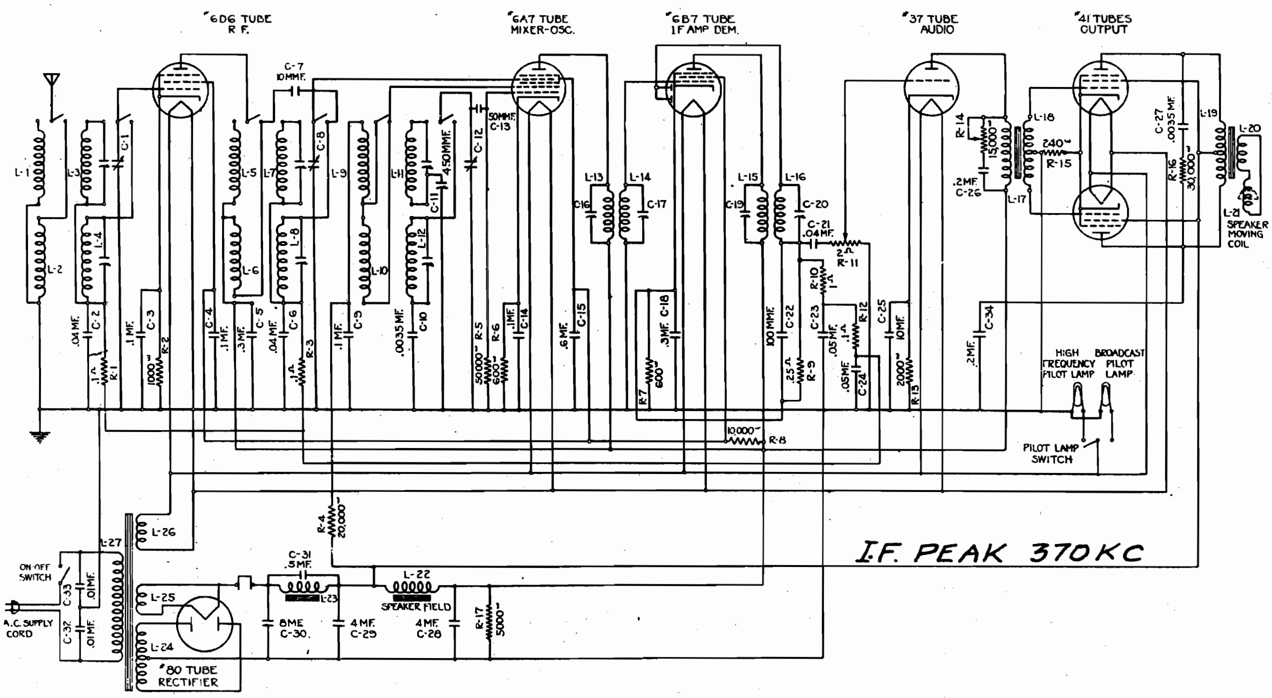
These receivers are seven tube A. C. operated Superheterodynes with two tuning ranges; standard broadcast and short-wave broadcast. See P-24418 Instructions for Installation and Operation to details of controls, installation and operating procedure.

The No. 6D6 tube is used as the R. F. amplifier. The No. 6A7 tube is used for the oscillator-mixer. The No. 6B7 tube serves as the I. F. amplifier, A. V. C., and demodulator. The No. 37 tube is the first audio amplifier and the two No. 41 tubes function as the power output stage. The No. 80 is the rectifier in the power supply circuit.

## NORMAL VOLTAGE READINGS

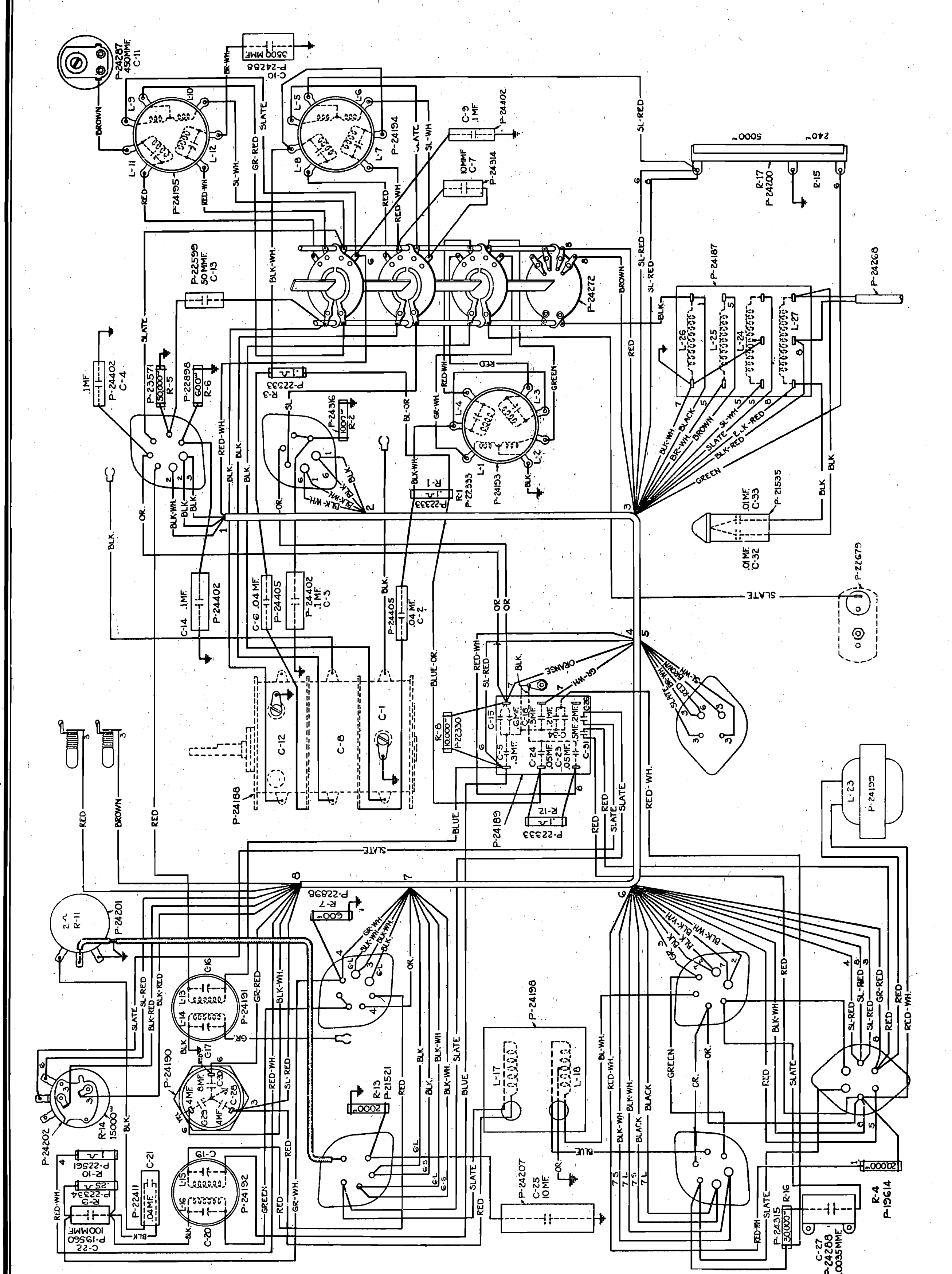
These voltage readings are obtained by measuring between the various tube socket contacts and the bases with the tubes and speaker plug in place. The set is therefore in operation when the measurements are made. Fig. 2 shows the terminal layout of the sockets with the proper terminal numbers. The terminals of each socket are numbered, starting with one heater or filament pin and proceeding around the pin circle clockwise to the other heater or filament pin. This is done looking at the bottom of the socket. Tune Receiver to 1500 k. c.

Voltages are given for a line voltage of 120 volts and allowance should be made for differences when the line voltage is higher or lower. A meter with a resistance of 1,000 ohms per volt should be used for measuring the D. C. voltages. The Volume Control should be set all "On" (clockwise) before measuring voltages. See page 2.



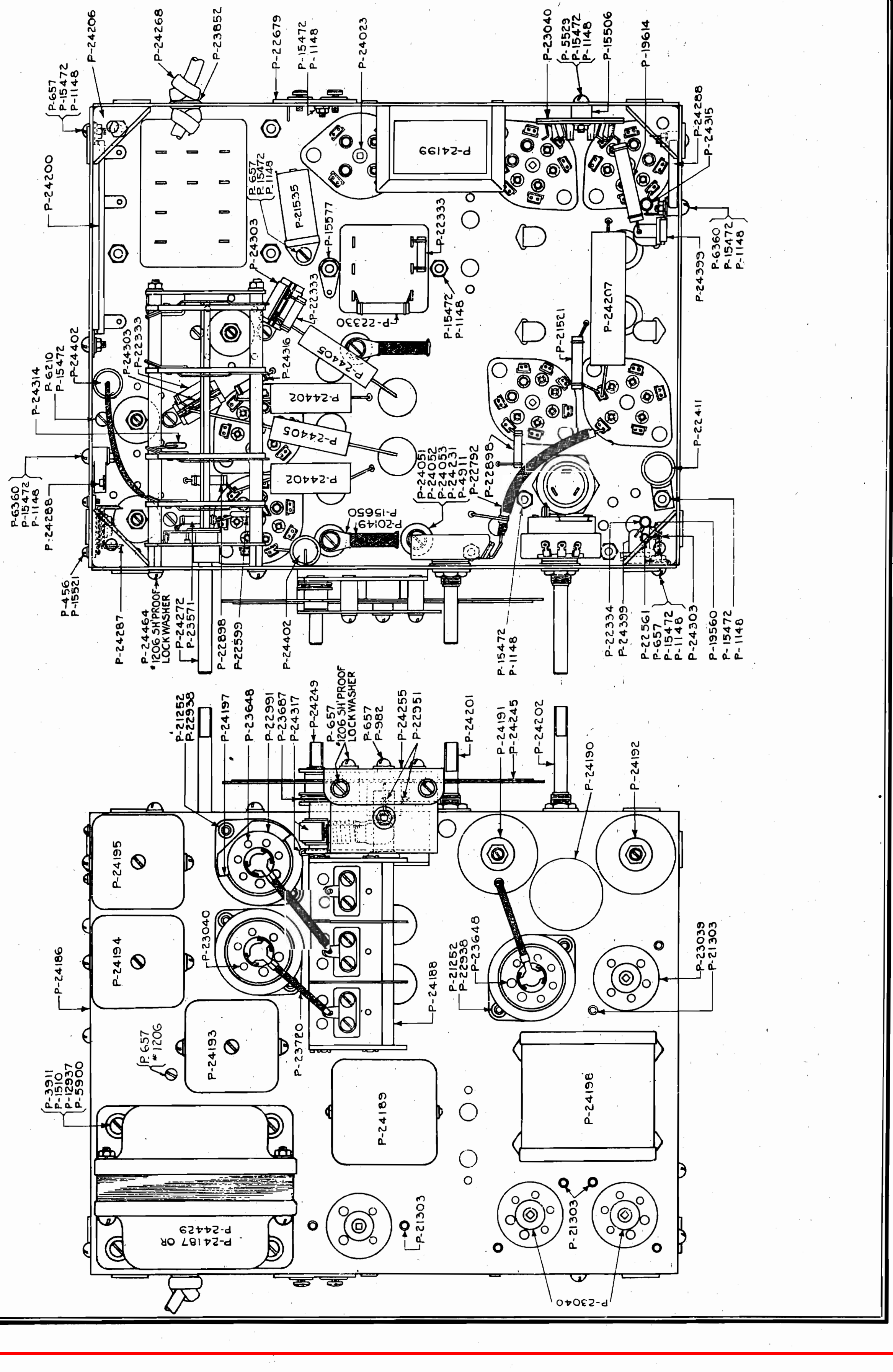
**MODEL 60**
**Chassis Wiring**

# STROMBERG-CARLSON TEL. MFG. CO.



STROMBERG-CARLSON TEL. MFG. CO.

MODEL 60
Chassis Views



**MODEL 60**
**Socket Layout**
**Voltage**
**Parts List**

## STROMBERG-CARLSON TEL. MFG. CO.

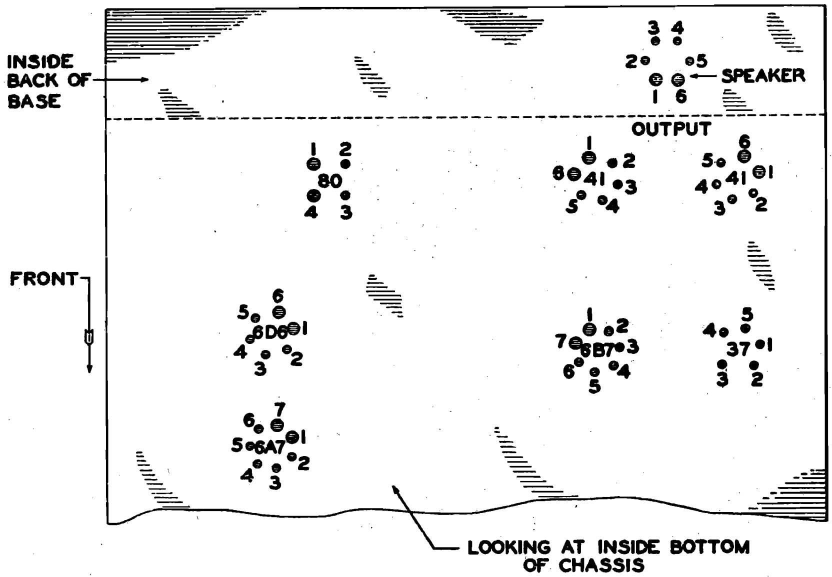



**Fig. 2. Terminal Layout for Voltage Measurement Chart.**

| *Tube* | *Circuit* | *Cap.* | *Terminals of Sockets* 1 | 2 | 3 | 4 | 5 | 6 | 7 | *Heater Voltages Between Terminal Nos.* |
|---|---|---|---|---|---|---|---|---|---|---|
| 6D6 | R. F. Amp. | G 0 | H 0 | P 145 | S 85 | Sup. 5.5 | K 5.5 | H 0 | — | 1–6—*6.5* volts |
| 6A7 | Mixer-Osc. | Mix. G 0 | H 0 | Mix. P 145 | S 85 | Osc. P. 175 | Osc. G —20 | K 5.5 | H 0 | 1–7—*6.5* volts |
| 6B7 | I. F., Dem. | G 0 | H 0 | P 145 | S 85 | D 0 | D 0 | K 3 | H 0 | 1–7—*6.5* volts |
| 37 | 1st Audio | — | H 0 | P 140 | G 0 | K 8 | H 0 | — | — | 1–5—*6.5* volts |
| 41's | Output | — | H 0 | P 250 | S 250 | G 0 | K 16 | H 0 | — | 1–6—*6.5* volts |
| 80 | Rectifier | — | F 270 | P *298* | P *298* | F 270 | — | — | — | 1–4—*4.9* volts |
| Speaker Socket | | | 245 | 145 | 270 | 270 | 250 | 245 | | |

A. C. voltages are indicated by italics

## REPLACEMENT PARTS

| Piece Number | | List Prices |
|---|---|---|
| P-24187 | Power Transformer, 105-125 volts, 50-60 cycles | $ 6.35 |
| P-24429 | Power Transformer, 210-250 volts, 50-60 cycles | 10.00 |
| P-24245 | Dial Assembly | 1.00 |
| P-24249 | Drive Assembly | .15 |
| P-23687 | Washer | .01 |
| P-24255 | Escutcheon Assembly | 1.20 |
| P-24189 | By-Pass Capacitor Assembly | 3.55 |
| P-24191 | Transformer Assembly, 1st I. F. | 2.15 |
| P-24192 | Transformer Assembly, 2nd I. F. | 2.15 |
| P-22679 | Ant. and Ground Binding Post Assembly | .15 |
| P-24268 | Power Cord | .75 |
| P-22991 | Tube Shield Base | .05 |
| P-24197 | Tube Shield | .17 |
| P-24023 | Tube Socket, 4 Pin | .17 |
| P-23039 | Tube Socket, 5 Pin | .17 |
| P-23040 | Tube Socket, 6 pin | .17 |
| P-23648 | Tube Socket, 7 pin | .17 |
| P-24198 | Audio Transformer Assembly | 3.70 |
| P-24199 | Choke Coil Assembly | 1.80 |
| P-24200 | Voltage Divider Resistor | .60 |

| Piece Number | | List Prices |
|---|---|---|
| P-24201 | Volume Control Potentiometer | .85 |
| P-24202 | Treble Control and On-Off Switch | 1.15 |
| P-24317 | Pilot Lamp Socket | .15 |
| P-24272 | Range Switch Assembly | 4.15 |
| P-21535 | Capacitor Assembly, 2—.01 Mfd. | .80 |
| P-22411 | Capacitor Assembly, .04 Mfd. | .80 |
| P-24402 | Capacitor, .1 Mfd. | .45 |
| P-24405 | Capacitor, .04 Mfd. | .45 |
| P-24190 | Electrolytic Capacitor, 8 Mfd., 4 Mfd., 4 Mfd. | 3.40 |
| P-24207 | Electrolytic Capacitor, 10 Mfd. | .80 |
| P-22898 | Resistor, 600 Ohms, Type D | .37 |
| P-24316 | Resistor, 1,000 Ohms, Type D | .37 |
| P-23571 | Resistor, 50,000 Ohms, Type D | .37 |
| P-22333 | Resistor, .1 Megohm, Type D | .37 |
| P-22334 | Resistor, .25 Megohm, Type D | .37 |
| P-22561 | Resistor, 1 Megohm, Type D | .37 |
| P-21521 | Resistor, 2,000 Ohms, Type C | .37 |
| P-22330 | Resistor, 10,000 Ohms, Type C | .37 |
| P-24315 | Resistor, 30,000 Ohms, Type C | 4.75 |
| P-19614 | Resistor, 20,000 Ohms, Type B | .55 |
| P-24288 | Moulded Capacitor, 3,500 MMFD | 4.75 |
| P-24416 | Knob (Large) | .30 |
| P-24417 | Knob (Small) | .20 |

STROMBERG-CARLSON TEL. MFG. CO.

MODEL 68
Specifications
List of Parts

# Engineering Data
# Stromberg-Carlson No. 68 All-Wave Radio Receiver

**STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY**
**Rochester, New York**

## ELECTRICAL SPECIFICATIONS

Type of Circuit — Superheterodyne
Tuning Ranges — A—520 to 1500 kc.; B—1400 to 4200 kc.; C—3.7 to 10.5 mc.; D—8.9 to 25 mc.
Type and Number of Tubes — 2 No. 6D6, 1 No. 6A7, 1 No. 6B7, 1 No. 5Z3, 3 No. 42, 1 No. 76, 1 No. 85
Voltage Rating — 105-125 Volts
Frequency Rating — 50-60 Cycles
Power Consumption Rating (Maximum line voltage) — 160 Watts
Intermediate Frequency — 370 kc.

## CIRCUIT DESCRIPTION

This receiver is a ten tube A. C. operated all-wave superheterodyne having four tuning ranges. See P-24689, Installation and Operating Instructions, for installation and operating procedure.

One No. 6D6 tube is used as an R. F. amplifier, the No. 6A7 tube is used as a modulator, and the No. 76 acts as the oscillator in the Tuner Unit. In the Amplifier Chassis the other No. 6D6 acts as the I. F. amplifier. The No. 6B7 is in the A. V. C. circuit, while the No. 85 acts as demodulator and first audio amplifier. One No. 42 operates as a second or driver audio stage and the other two constitute the power output stage. The No. 5Z3 is the rectifier in the power supply.

## NORMAL VOLTAGE READINGS

These voltage readings are obtained by measuring between the various tube socket contacts and the bases with the tubes in place. The Receiver is therefore in operation when the measurements are made. Fig. 1 shows the terminal layout of the sockets with the proper terminal numbers. The terminals of each socket are numbered, starting with one heater or filament pin and proceeding around the pin circle clockwise to the other heater or filament pin. This is done looking at the bottom of the socket.

Voltages are given for a line voltage of 119 volts and allowance should be made for differences when the line voltage is higher or lower. A meter with a resistance of 1,000 ohms per volt should be used for measuring the D. C. voltages. See page 2.

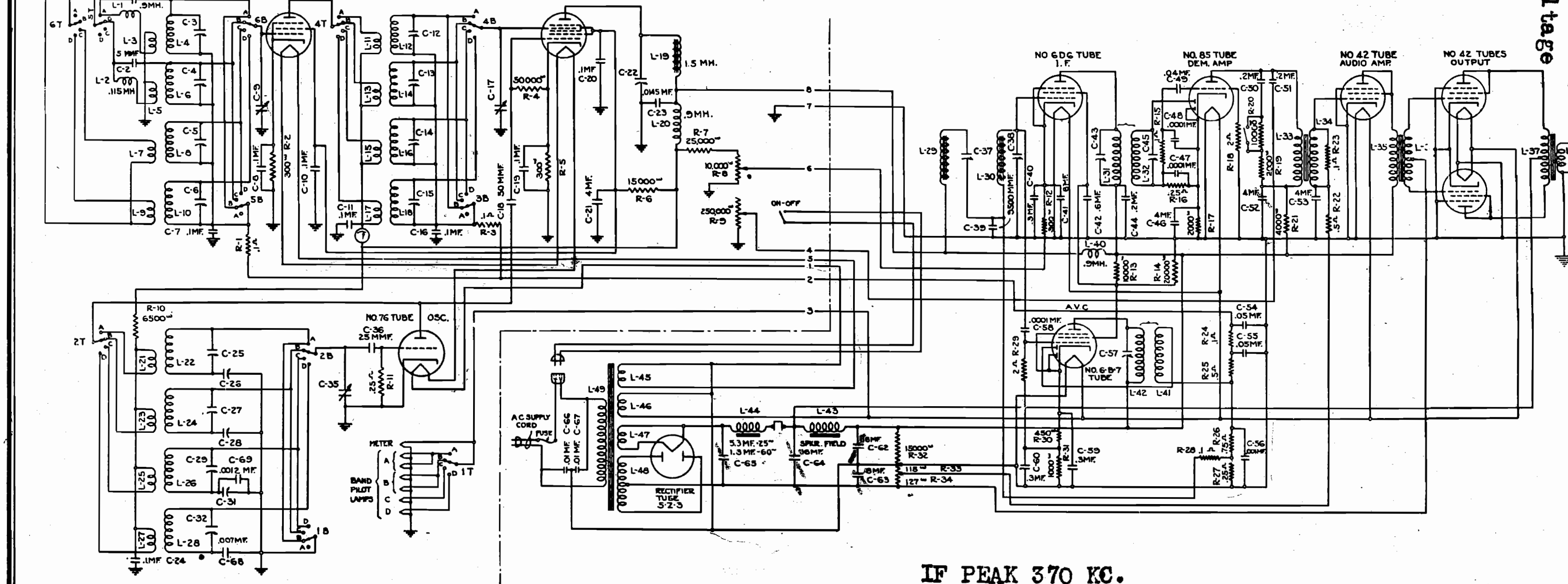
## REPLACEMENT PARTS

| Piece Number | Description of Part | Required Per Receiver | List Price Each |
|---|---|---|---|
| 24685 | Capacitor Assembly (25 to 60 cycle) | 1 | $15.00 |
| 24558 | Capacitor Assembly (50 to 60 cycle) | 1 | 10.00 |
| 24676 | Capacitor Assembly (By-Pass) | 1 | 5.00 |
| 23970 | Capacitor Assembly | 1 | 1.60 |
| 23965 | Transformer Assembly (Audio) | 1 | 4.55 |
| 24687 | Power Transformer (25 to 60 cycle) | 1 | 15.00 |
| 24422 | Power Transformer (50 to 60 cycle) | 1 | 10.00 |
| 24424 | Transformer Assembly (IF) | 1 | 4.00 |
| 24425 | Transformer Assembly (IF) | 1 | 4.00 |
| 24426 | Transformer Assembly (IF) | 1 | 4.00 |
| 24677 | Transformer Assembly (IF) | 1 | 4.00 |
| 23959 | Choke Assembly | 1 | 2.50 |
| 24025 | Transformer Assembly (Audio) | 1 | 2.40 |
| 23967 | Transformer Assembly (Audio Output) | 1 | 2.20 |
| 23649 | Tube Socket (8 Prong) | 2 | .17 |
| 23648 | Tube Socket (7 Prong) | 2 | .17 |
| 23040 | Tube Socket (6 Prong) | 7 | .17 |
| 23039 | Tube Socket (5 Prong) | 1 | .17 |
| 23038 | Tube Socket (4 Prong) | 1 | .17 |
| 21984 | Fuse Block | 1 | .20 |
| 23150 | Fuse 2- Ampere | 1 | .12 |
| 24574 | Condenser (Illini) .0095 M. F. | 1 | 1.00 |
| 21334 | Condenser (Illini) .001 M. F. | 1 | .60 |
| 22411 | Capacitor Assembly .04 M. F. | 1 | .80 |
| 21535 | Capacitor Assembly .01 M. F. | 1 | .80 |
| 23819 | Coil Assembly .9 M. H. | 3 | .60 |
| 17350 | Switch (Base Control) | 1 | .75 |
| 24268 | Cord (Power) | 1 | .75 |
| 19259 | Cord (Power receptacle to tuner) | 1 | 1.30 |
| 24674 | Cable (Output) | 1 | 1.75 |
| 22329 | Resistor 6,500 Ohm | 1 | .37 |
| 18704 | Resistor 15,000 Ohm | 1 | .37 |
| 22334 | Resistor .25 Meg. | 1 | .37 |
| 23571 | Resistor 50,000 Ohm | 1 | .37 |
| 24073 | Resistor 25,000 Ohm | 1 | .37 |
| 22333 | Resistor—Type D, .1 Meg. | 5 | .37 |
| 22335 | Resistor—Type D, .5 Meg. | 1 | .37 |
| 24316 | Resistor—Type D, .1000 Ohm | 1 | .37 |
| 22871 | Resistor—Type D, 2 Meg. | 1 | $ .37 |
| 18696 | Resistor—Type B, 1,000 Ohm | 1 | .55 |
| 19614 | Resistor—Type B, 2,000 Ohm | 1 | .55 |
| 22328 | Resistor—Type C, 4,000 Ohm | 1 | .37 |
| 21521 | Resistor—Type C, 2,000 Ohm | 2 | .37 |
| 22330 | Resistor—Type C, 10,000 Ohm | 1 | .37 |
| 23568 | Resistor—Type D, 450 Ohm | 1 | .37 |
| 23844 | Resistor—Type D, 300 Ohm | 3 | .37 |
| 23966 | Resistor—Voltage Divider | 1 | 1.85 |
| 24340 | Switch (Range) | 1 | 7.00 |
| 24561 | Capacitor 5 MMF | 2 | .20 |
| 24402 | Capacitor .1 M. F. | 4 | .45 |
| 24668 | Coil Assembly .115 M. H. | 1 | .60 |
| 24460 | Capacitor .0025 M. F. | 1 | 3.75 |
| 24579 | Cable (Output) | 1 | 4.00 |
| 24465 | Binding Post (Antenna and Ground) | 1 | .40 |
| 24423 | Coil Assembly 1.5 M. H. | 1 | 1.15 |
| 24575 | Capacitor .015 M. F. | 1 | 1.25 |
| 24402 | Capacitor .1 M. F. | 4 | .45 |
| 24166 | Capacitor 25 MMF | 1 | .25 |
| 24560 | Capacitor 50 MMF | 1 | .25 |
| 24352 | Capacitor (IF Tuning Condenser) | 1 | .40 |
| 24580 | Capacitor (Electrolytic) | 1 | 1.40 |
| 24346 | Potentiometer (Volume Control) | 1 | 1.40 |
| 22593 | Potentiometer (Tone Control) | 1 | 1.85 |
| 24358 | Bracket Assembly | 1 | .20 |
| 24362 | Dial Disc. Assembly | 1 | .40 |
| 24366 | Dial Plate | 1 | .45 |
| 24290 | Bearing | 1 | .03 |
| 24372 | Shaft Assembly | 1 | .25 |
| 24371 | Dial | 1 | .75 |
| 24375 | Dial Thrust Bearing | 1 | .04 |
| 24376 | Tuning Meter | 1 | 2.75 |
| 24317 | Pilot Lamp Sockets | 7 | .15 |
| 24505 | Front Dial Lens (Glass) | 1 | .25 |
| 24380 | Dial Lens Clips | 4 | .02 |
| 24388 | Dial Pointer | 1 | .05 |
| 24773 | Loud Speaker | 1 | 13.50 |

**MODEL 68**
Schematic
Voltage

# STROMBERG-CARLSON TEL. MFG. CO.

Fig. 2. Schematic Circuit of Selector and Amplifier Chassis



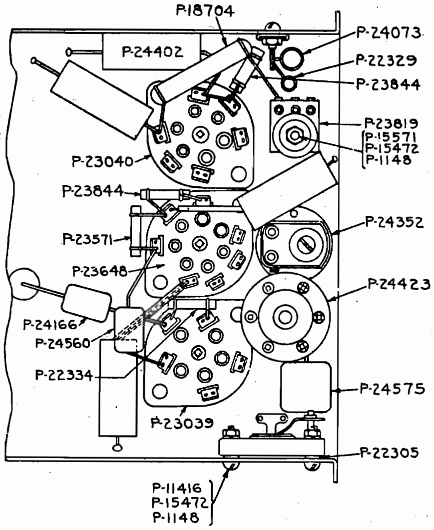

IF PEAK 370 KC.

| | | Terminals of Sockets | | | | | | | Heater Voltages Between Terminal Nos. at 119 volts |
|---|---|---|---|---|---|---|---|---|---|
| | | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| 6D6 | RF | +175 | +89 | +2.38 | +2.38 | | --- | --- | 1-6 6.4* |
| 6A7 | Mod. | +180 | +89 | +89 | -8.6 | +2.0 | --- | --- | 1-7 6.4* |
| 76 | Osc. | +152 | -25 | 0 | | --- | --- | --- | 1-5 6.4* |
| 6D6 | IF | +181 | +100 | +2.6 | +2.6 | | --- | --- | 1-6 6.3* |
| 6B7 | AVC | +181 | +100 | 0 | +8.65 | +8.65 | --- | --- | 1-7 6.3* |
| 85 | 1 AF | +150 | +0.1 | +10 | +10 | | --- | --- | 1-6 6.35* |
| 42 | 2 AF | +170 | +170 | -.22 | 0 | | --- | --- | 1-6 6.3* |
| 42 | Output | +378 | +378 | -37 | 0 | | --- | --- | 1-6 6.3* |
| 5Z3 | Rect. | 484 | 484 | | --- | --- | --- | --- | 1-4 4.8* |
| Speaker Socket | | +181 | +382 | +382 | +382 | --- | --- | --- | *=A-C voltages |
| Connector Socket | | 0 | 6.3* | 0 | 19.2* | 0 | 0 | +180 | |

Set tuned to 1000 kc., "A" band. Volume Control on full

# STROMBERG-CARLSON TEL. MFG. CO.

MODEL 68
Socket Layout
Chassis Views



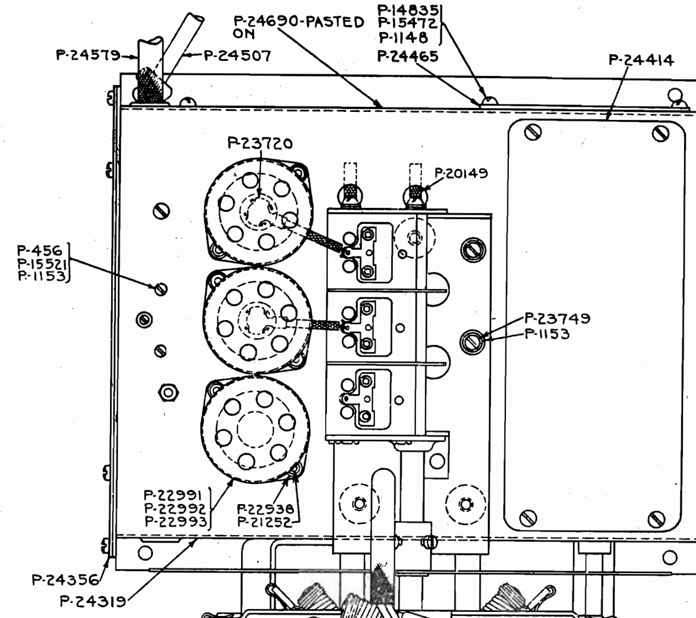
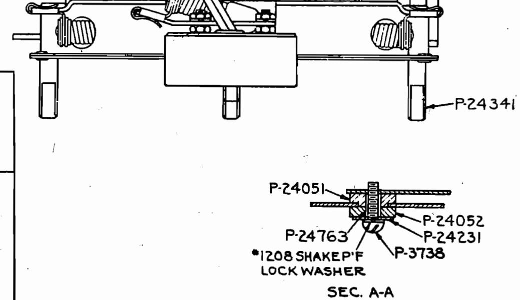




Fig. 5. Chassis Assembly of Selector



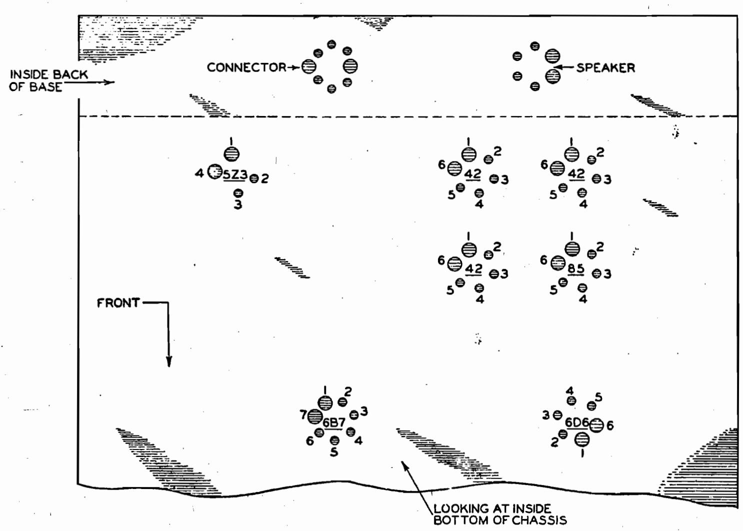
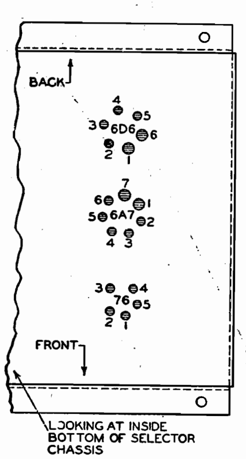
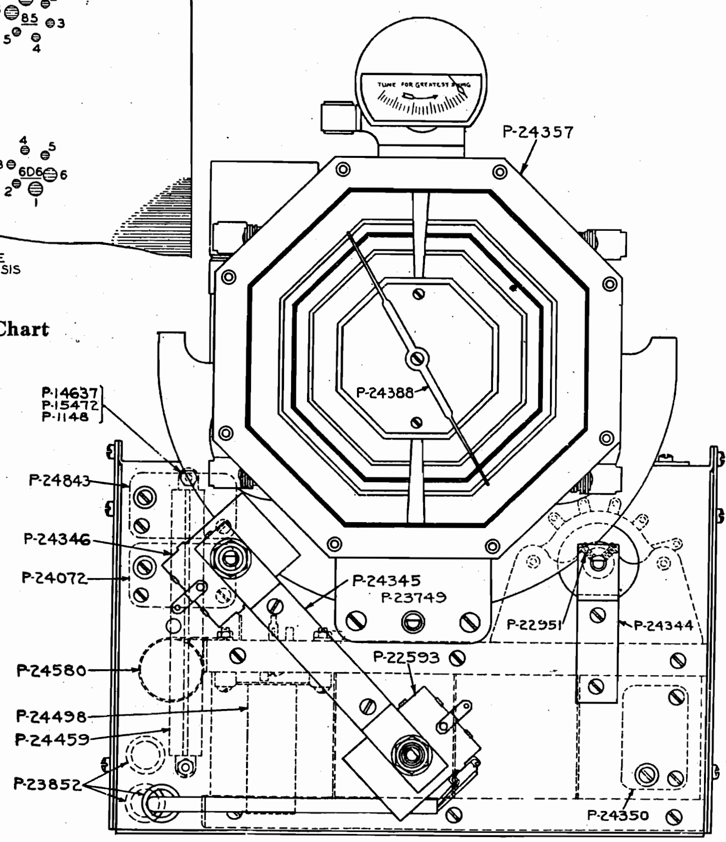




Fig. 1. Terminal Layout for Voltage Measurement Chart



**MODEL 68**
**Chassis Wiring of Selector**

STROMBERG-CARLSON TEL. MFG. CO.

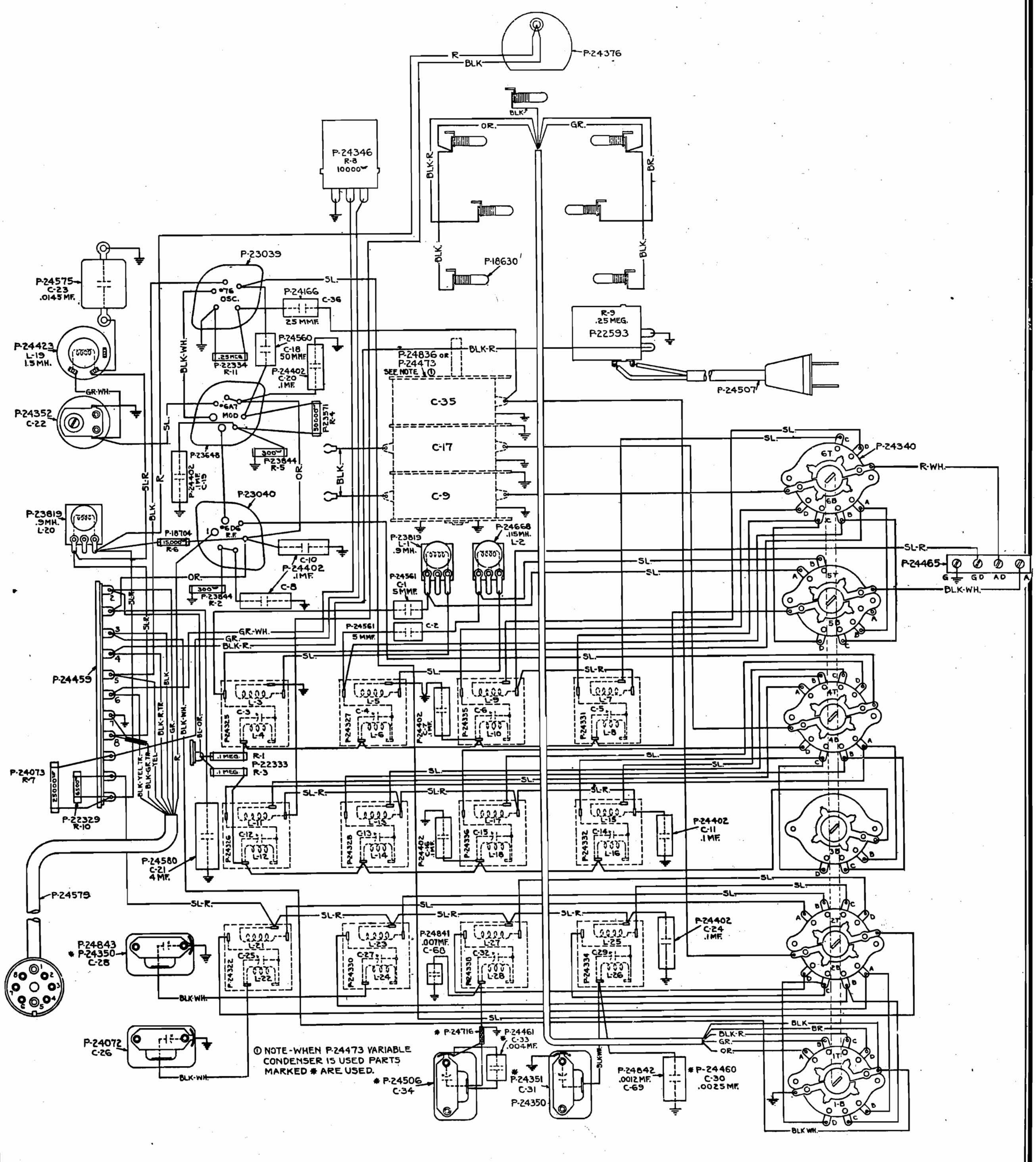


Fig. 3. Wiring Diagram of Selector

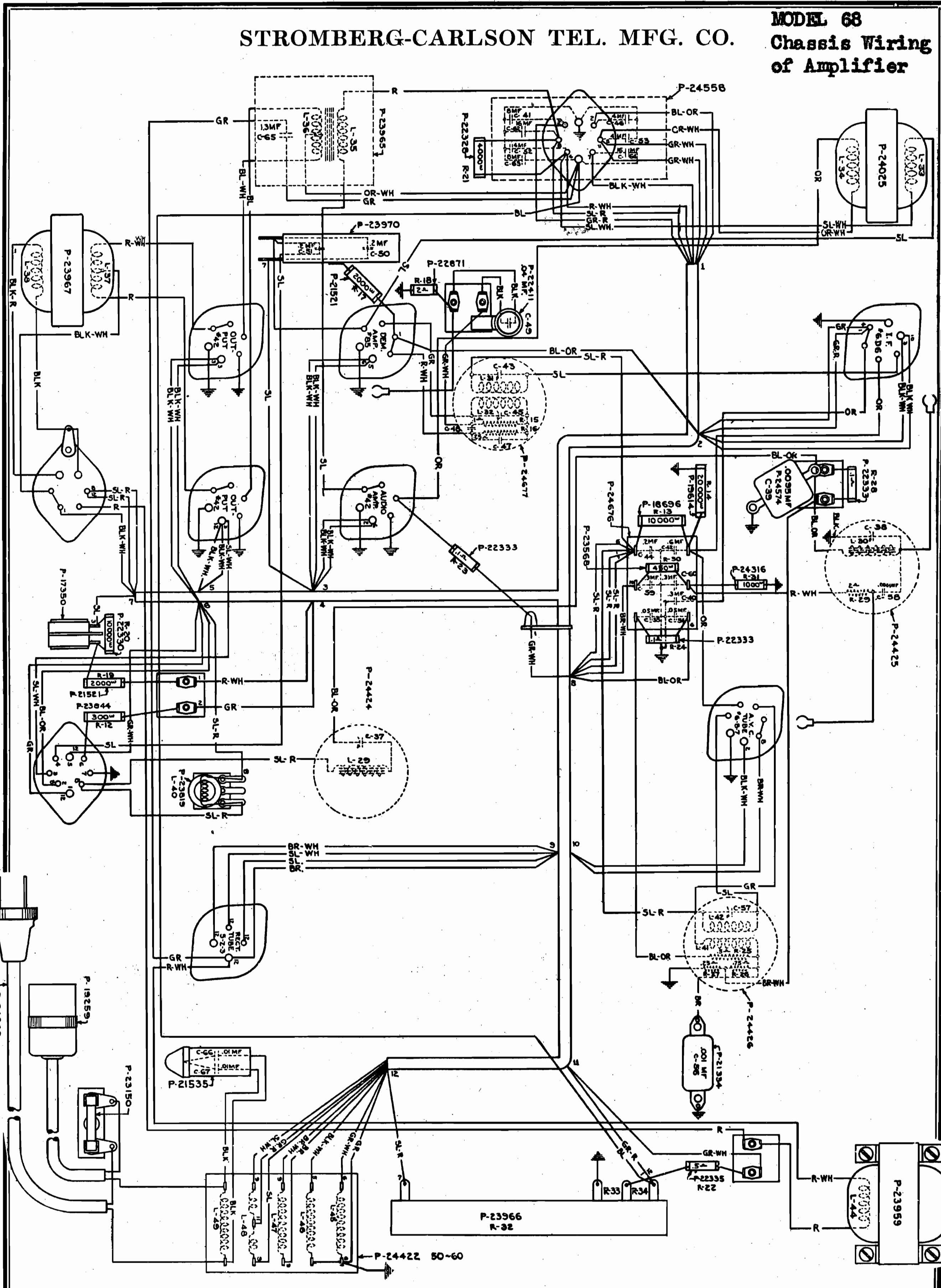



Fig. 4. Wiring Diagram of Amplifier Chassis

**MODEL 68**
**Amplifier**
**Chassis Views**

## STROMBERG-CARLSON TEL. MFG. CO.

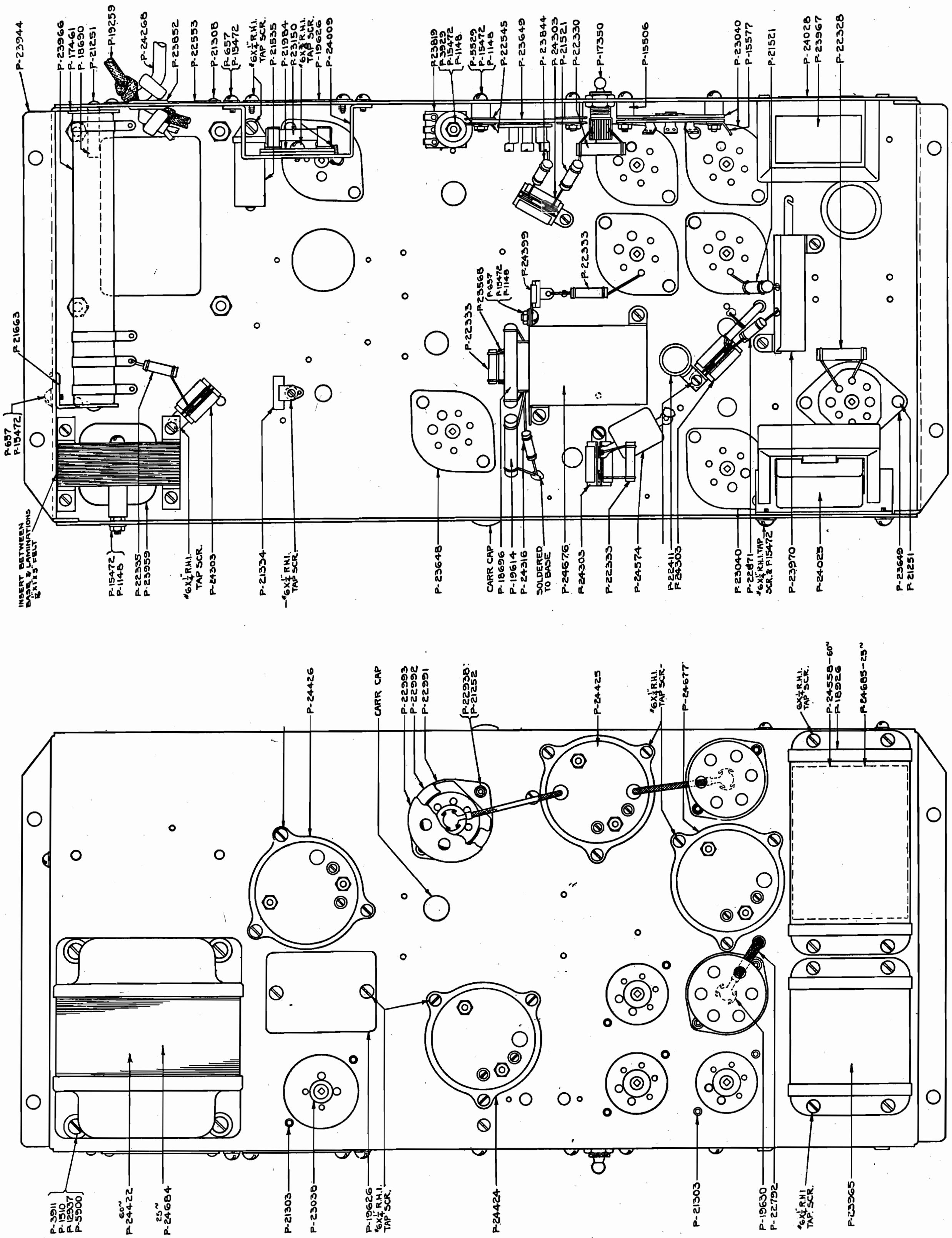



**Fig. 6. Chassis Assembly of Amplifier**

STROMBERG-CARLSON TEL. MFG. CO.

# Stromberg-Carlson No. 69 All-Wave Selector

## ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| Type of Circuit | Superheterodyne Frequency Changer |
| Tuning Ranges (in Selector) | B—1430 to 4200 kc.; C—3.7 to 10.5 mc.; D—9 to 25 mc. |
| Type and Number of Tubes | 1 No. 6D6 1 No. 6A7, 1 No. 76, 1 No. 84 |
| Voltage Rating | 105-125 Volts |
| Frequency Rating | 50-60 Cycles |
| Power Consumption Rating | 28 Watts |
| Frequency of Signal Output to Receiver | 545 Kc. |

## CIRCUIT DESCRIPTION

The No. 69 All-Wave Selector contains the frequency changer circuits of a superheterodyne system which connected to the input (Ant. and Gnd. connections) of a good standard broadcast receiver gives an extension of the tuning range from 1500 kilocycles to 25 megacycles. Thus all frequencies between 550 kilocycles and 25 megacycles can be readily tuned. See P-24692 Installation and Operating Instructions for details of controls, installation and operating procedures.

The No. 6D6 tube is used as the R. F. Amplifier. The No. 6A7 tube is used as the Modulator. The No. 76 tube is used as the Oscillator. The No. 84 tube is the Rectifier in the self-contained power supply.

## NORMAL VOLTAGE READINGS

These voltage readings are obtained by measuring between the various tube socket contacts and the bases with the tubes in place. The Selector is therefore in operation when the measurements are made. Fig. 2 shows the terminal layout of the sockets with the proper terminal numbers. The terminals of each socket are numbered, starting with one heater or filament pin and proceeding around the pin circle clockwise to the other heater or filament pin. This is done looking at the bottom of the socket.

Voltages are given for a line voltage of 120 volts and allowance should be made for differences when the line voltage is higher or lower. A meter with a resistance of 1,000 ohms per volt should be used for measuring the D. C. voltages. See page 2.

**IF PEAK 545 KC.**

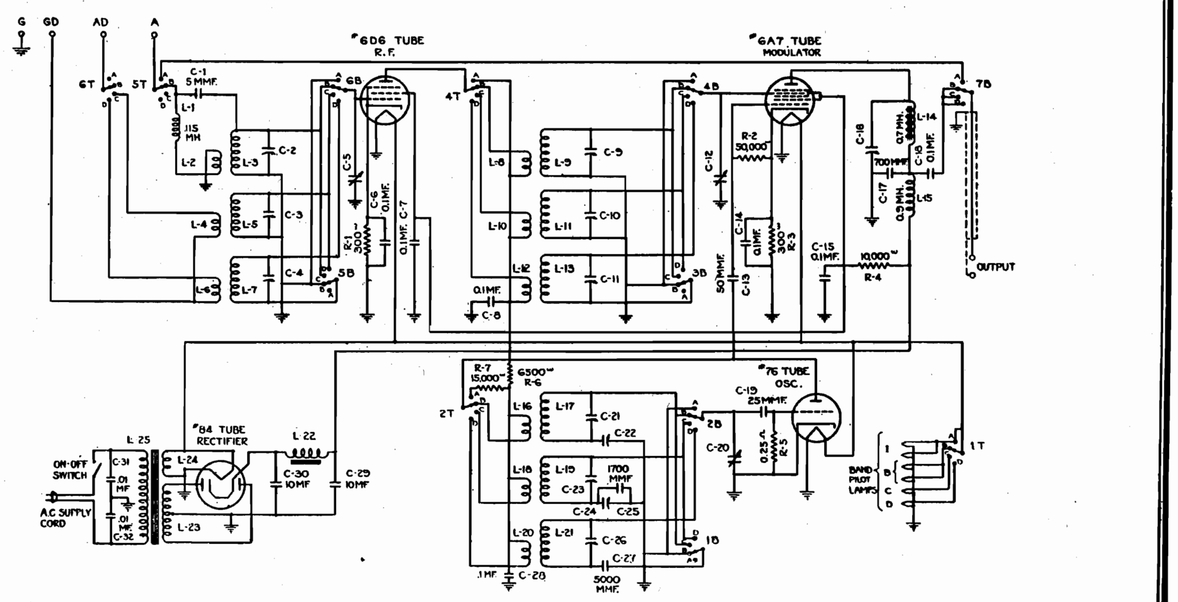



Fig. 1. Schematic Circuit

MODEL 69
Chassis Wiring

STROMBERG-CARLSON TEL. MFG. CO.

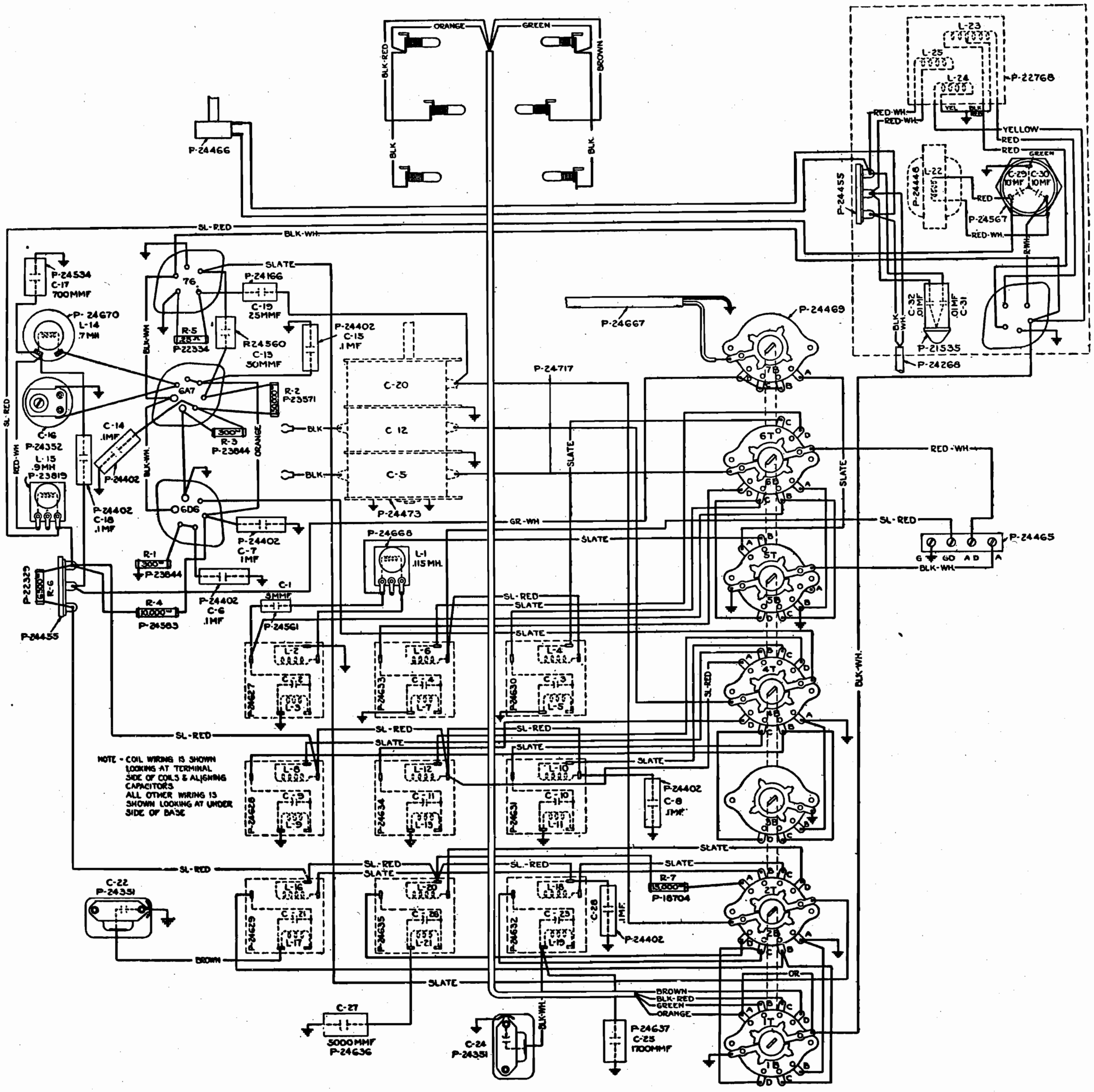



Fig. 3. Wiring Diagram.

# STROMBERG-CARLSON TEL. MFG. CO.

MODEL 69
Socket Layout
Voltage
Parts List

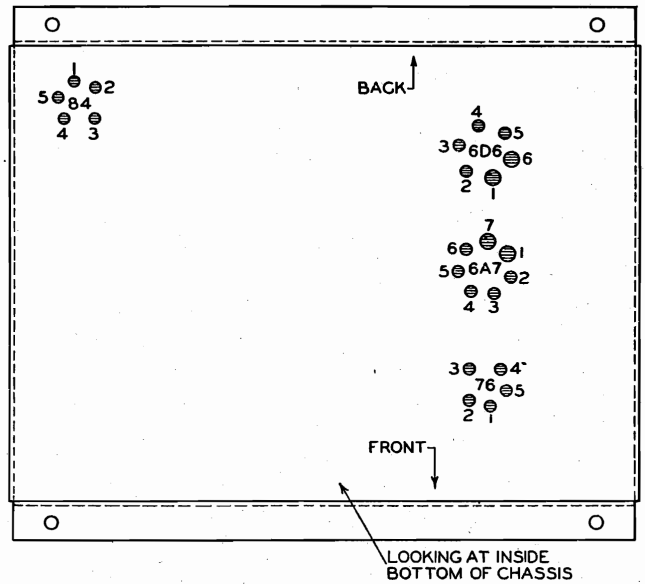



**Fig. 2. Terminal Layout for Voltage Measurement Chart.**

| *Tube* | *Circuit* | *Cap.* | *Terminals of Socket* 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|
| 6D6 | R. F. Amp. | G 0 | H 0 | P 191 | S 103 | Sup. 2.9 | K 2.9 | H A. C. 6.3 | — |
| 6A7 | Modulator | Mod. G 0 | H A. C. 6.3 | Mod. P 191 | S 103 | G2 103 | G1 Approx. —1 | K 3.1 | H 0 |
| 76 | Oscillator | — | H 0 | P 160 | G —14 | K 0 | H A. C. 6.3 | — | — |
| 84 | Rectifier | — | H 0 | P A. C. 178 | P A. C. 178 | K 207 | H A. C. 6.3 | — | — |

Measured on Range B at 2400 Kc.—Line voltage 120 volts A. C.

## REPLACEMENT PARTS

| Piece Number | Part | Required Per Receiver | List Price Each |
|---|---|---|---|
| 24469 | Switch Range | 1 | $ 7.75 |
| 24627 | Coil Assembly (Antenna Range B) | 1 | 2.00 |
| 24628 | Coil Assembly (R. F. Range B) | 1 | 2.00 |
| 24629 | Coil Assembly (Oscillator Range B) | 1 | 2.00 |
| 24630 | Coil Assembly (Antenna Range C) | 1 | 2.00 |
| 24631 | Coil Assembly (R. F. Range C) | 1 | 2.00 |
| 24632 | Coil Assembly (Oscillator Range C) | 1 | 2.00 |
| 24633 | Coil Assembly (Antenna Range D) | 1 | 2.00 |
| 24634 | Coil Assembly (R. F. Range D) | 1 | 2.00 |
| 24635 | Coil Assembly (Oscillator Range D) | 1 | 2.00 |
| 24637 | Capacitor .0017 MF | 1 | .35 |
| 24561 | Capacitor 5 MMF | 1 | .20 |
| 24636 | Capacitor .005 MF | 1 | .60 |
| 24402 | Capacitor .1 MF | 2 | .45 |
| 24668 | Coil Assembly .115 MH | 1 | .60 |
| 18704 | Resistor 15,000 Ohms | 1 | .52 |
| 24361 | Variable Condenser (Only) | 1 | 4.00 |
| 24362 | Dial Disc Assembly | 1 | .40 |
| 24366 | Dial Plate | 1 | .45 |
| 24367 | Dial Reflector Assembly | 1 | 2.00 |
| 24669 | Dial | 1 | .75 |
| 24290 | Bearing | 1 | .03 |
| 24474 | Shaft Assembly | 1 | .25 |
| 24317 | Pilot Lamp Sockets | 6 | .15 |
| 15602 | Dial Eyelets | 8 | .01 |
| 24388 | Dial Pointer | 1 | .05 |
| 24505 | Lenses (Glass) | 1 | .25 |

| Piece Number | Part | Required per Receiver | List Price Each |
|---|---|---|---|
| 24380 | Clips (Lens) | 4 | $ .02 |
| 3x¼″ | Screws (R. H. Br. Wood) (Clips) | 4 | .01 |
| 22768 | Transformer (Power) 60-cycle | 1 | 4.25 |
| 24567 | Capacitor Electrolytic | 1 | 3.00 |
| 24448 | Choke Assembly | 1 | 2.00 |
| 21535 | Capacitor Assembly | 1 | .80 |
| 22973 | Tube Sockets (5 prong) Rectifier Tube | 1 | .15 |
| 23039 | Tube Socket (5 prong) Oscillator Tube | 1 | .17 |
| 23040 | Tube Socket (6 prong) Amplifier Tube | 1 | .17 |
| 23648 | Tube Socket (7 prong) Modulator Tube | 1 | .17 |
| 24466 | Switch (On-Off) | 1 | .60 |
| 24465 | Binding Post (Antenna and Ground) | 1 | .40 |
| 24670 | Coil Assembly .7 MH | 1 | 1.25 |
| 23819 | Coil Assembly .9 MH | 1 | .60 |
| 24667 | Cord Output | 1 | 2.50 |
| 22329 | Resistor 6,500 Ohm | 1 | .37 |
| 22334 | Resistor .25 Megohm | 1 | .37 |
| 23571 | Resistor 50,000 Ohm | 1 | .35 |
| 23844 | Resistor 300 Ohm | 2 | .37 |
| 24583 | Resistor 10,000 Ohm | 1 | .35 |
| 24402 | Capacitor .1 MF | 5 | .45 |
| 24560 | Capacitor 50 MMF | 1 | .25 |
| 24166 | Capacitor 25 MMF | 1 | .25 |
| 24351 | Capacitor Aligner | 2 | 1.00 |
| 24352 | Capacitor Aligner | 1 | .40 |
| 24534 | Capacitor 700 MMF | 1 | .35 |

MODEL 69
Chassis Views

STROMBERG-CARLSON TEL. MFG. CO.

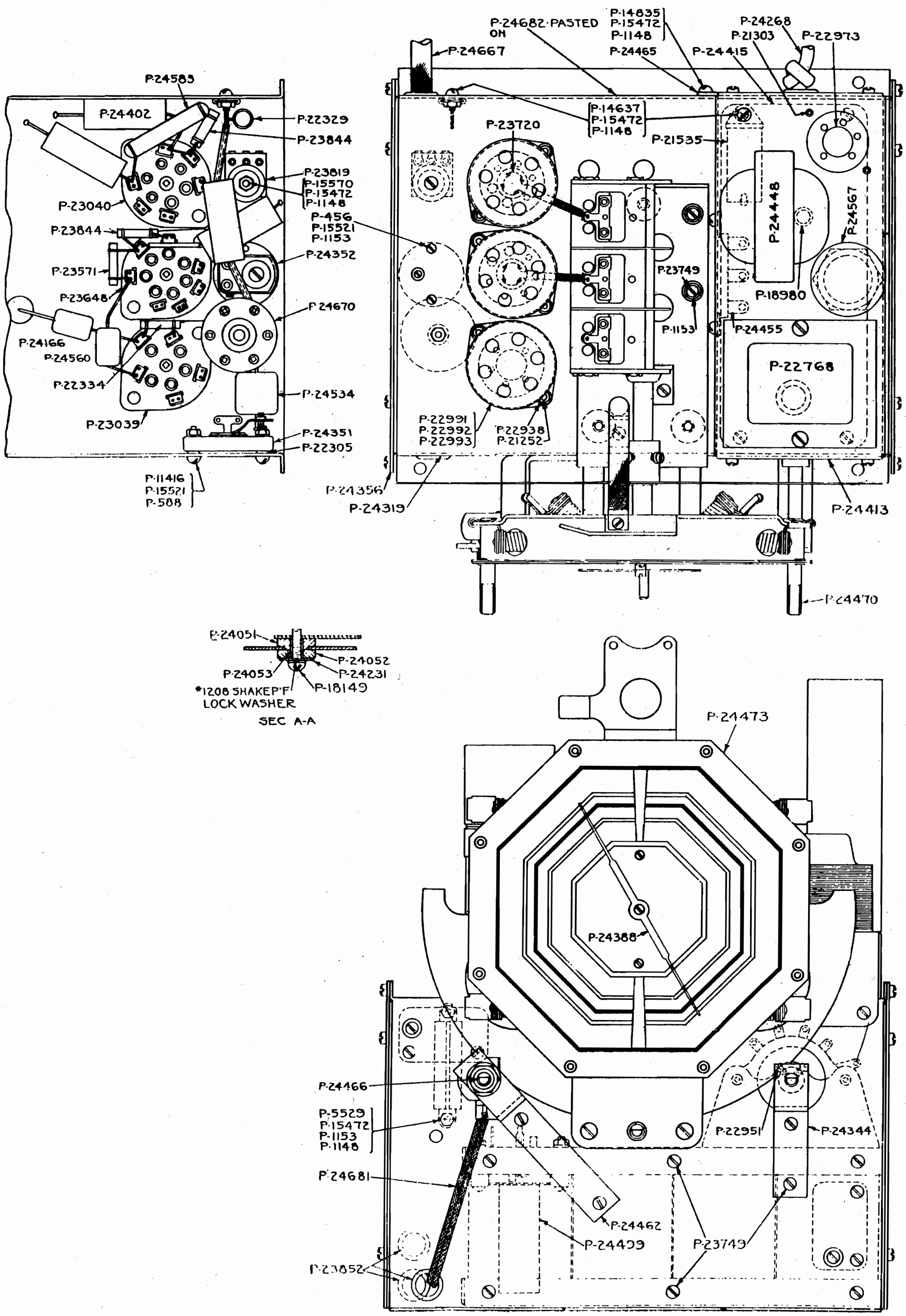
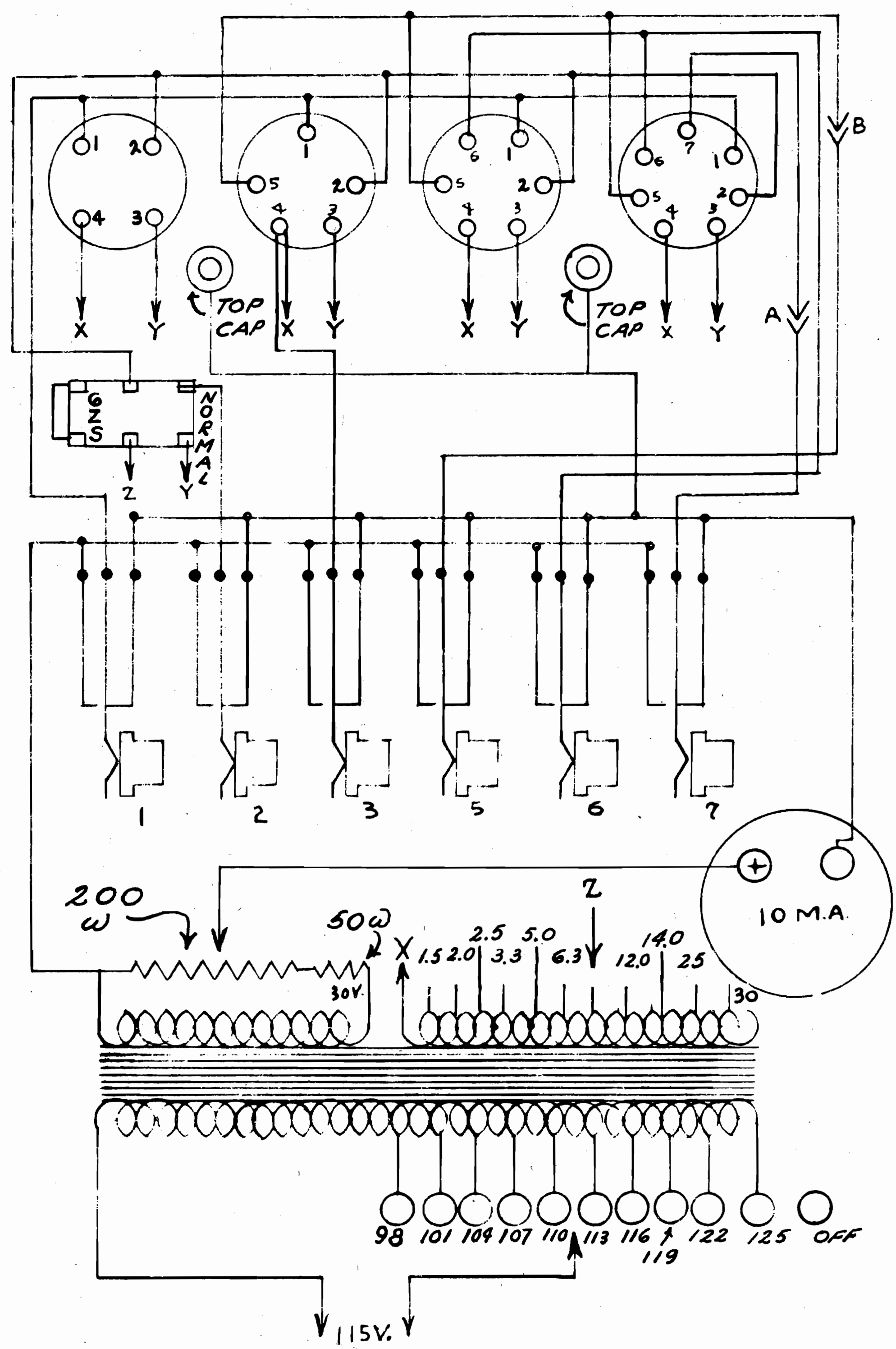



Fig. 4. Chassis Assembly.

MODEL 35
Schematic

SUPREME INSTRUMENTS CORP.

Switch A Normally closed, open for 12 Z5 Tube
Switch B Normally closed, open for 12 A5 Tube




SUPREME INSTRUMENTS CORP.
GREENWOOD, MISS

May 21st, 1934

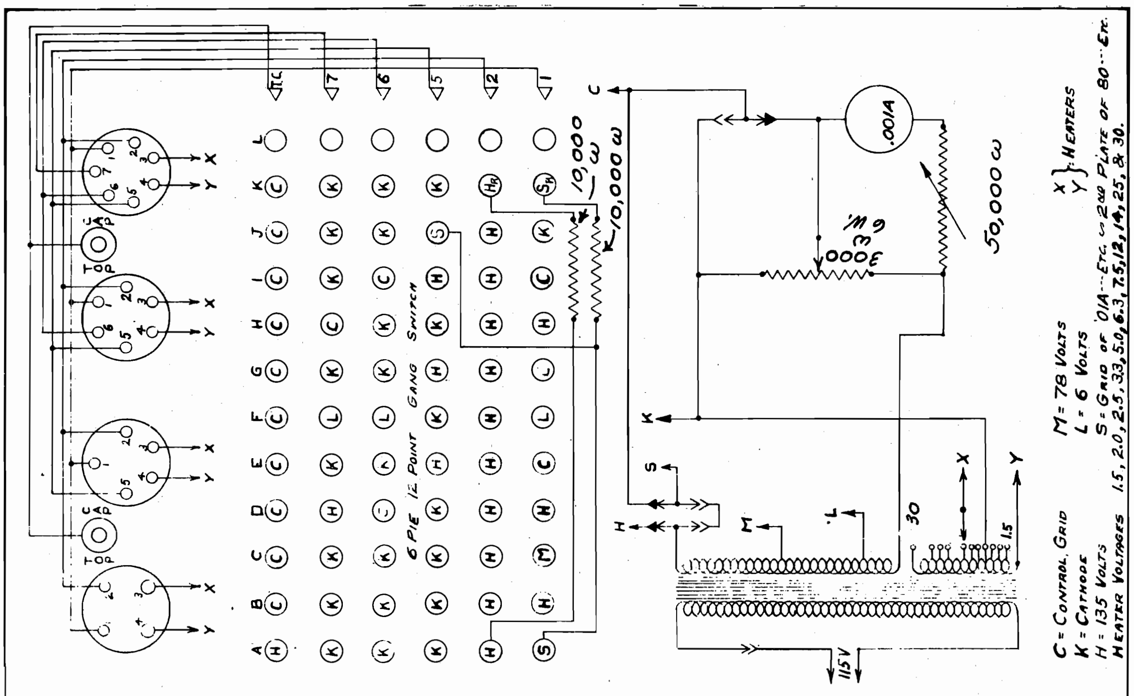
782A

Schematic Diagram
Model 35

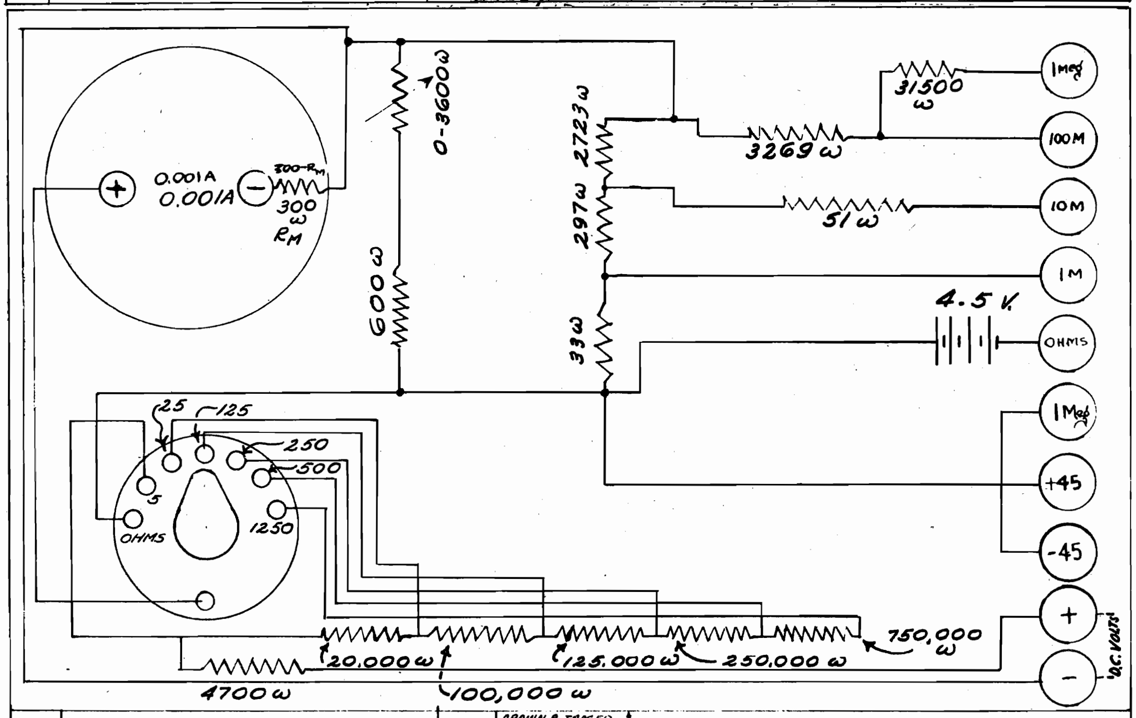
| DRAWN & TRACED | CHECKED | APPROVED |
| --- | --- | --- |
| [illegible] | W.B. [illegible] | [illegible] |

MODEL 55
MODEL 111
Schematics

# SUPREME INSTRUMENTS CORP.



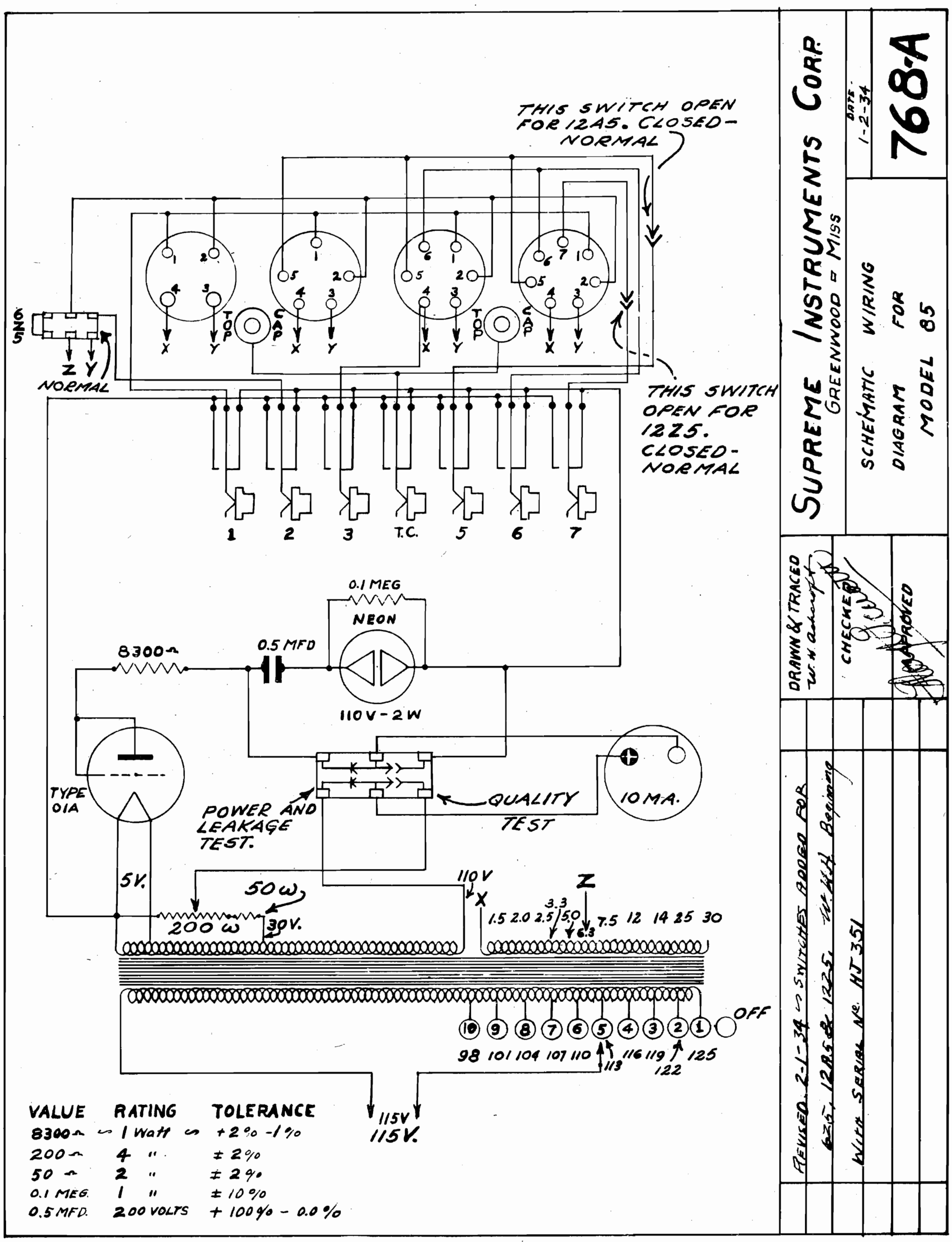

| | | | DRAWN & TRACED W. n Ashcroft | SUPREME INSTRUMENTS CORP. GREENWOOD, MISS | |
|---|---|---|---|---|---|
| | | | CHECKED | SCHEMATIC WIRING DIAGRAM FOR MODEL 55 | DATE 1-16-34 |
| | | | APPROVED | | 772-A |




| | | | DRAWN & TRACED T. Bizzello | SUPREME INSTRUMENTS CORP. GREENWOOD, MISS | |
|---|---|---|---|---|---|
| | | | CHECKED by | Schematic Wiring Diagram Model 111 | Oct 25, 1933 |
| | | | Approved | | 733A |

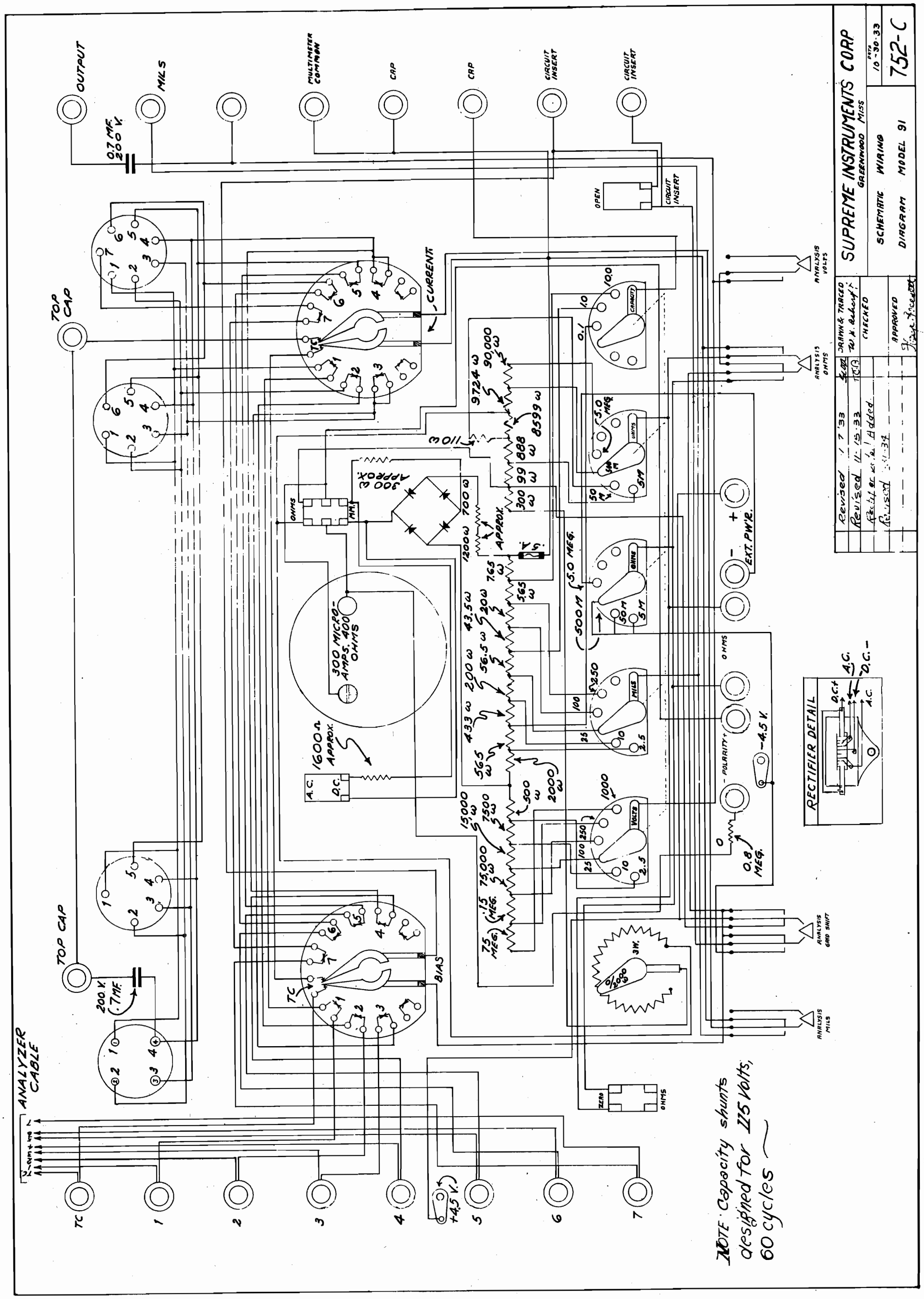
**MODEL 85**
**Schematic**

# SUPREME INSTRUMENTS CORP.



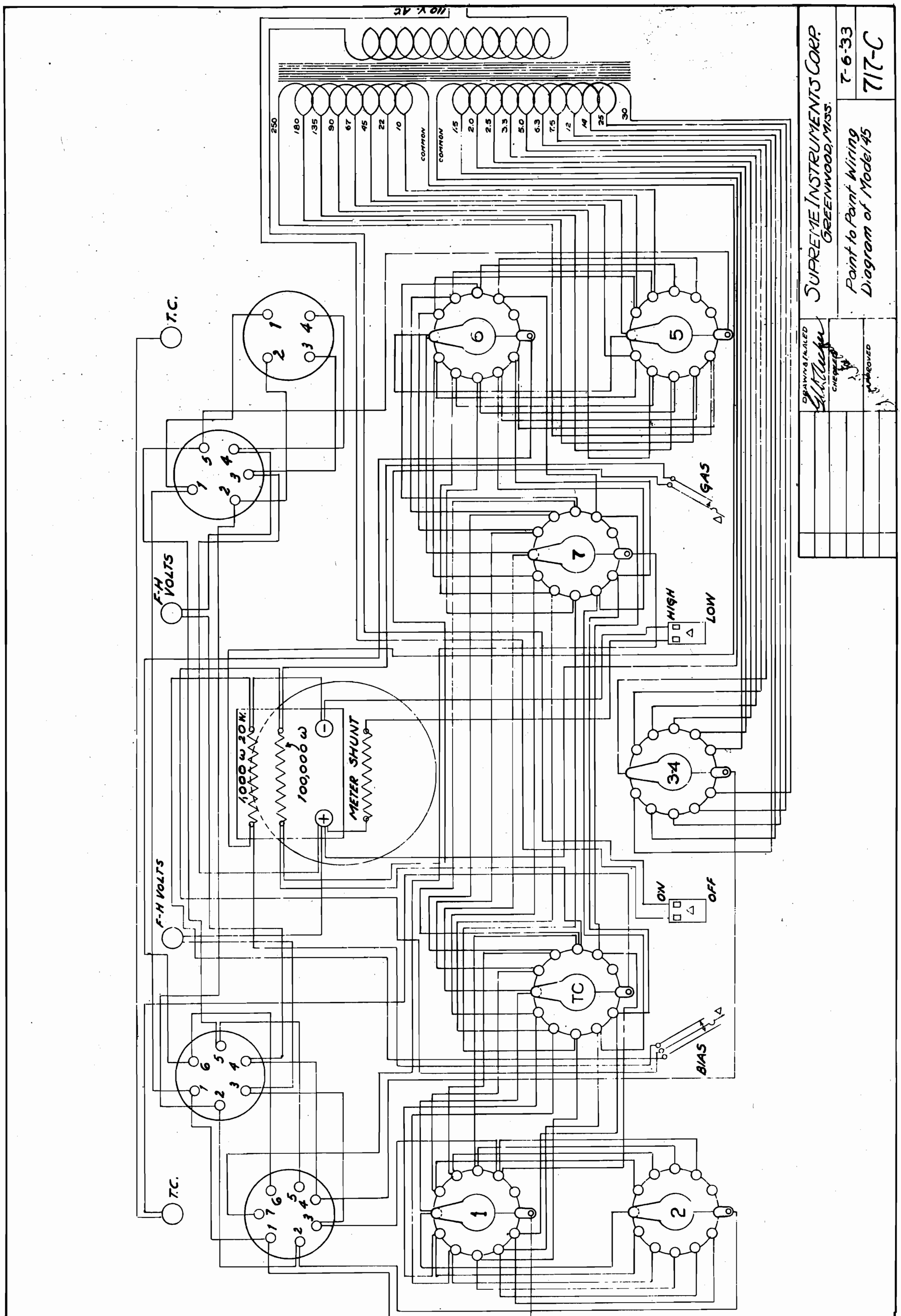
**MODEL 91**
**Schematic**

# SUPREME INSTRUMENTS CORP.



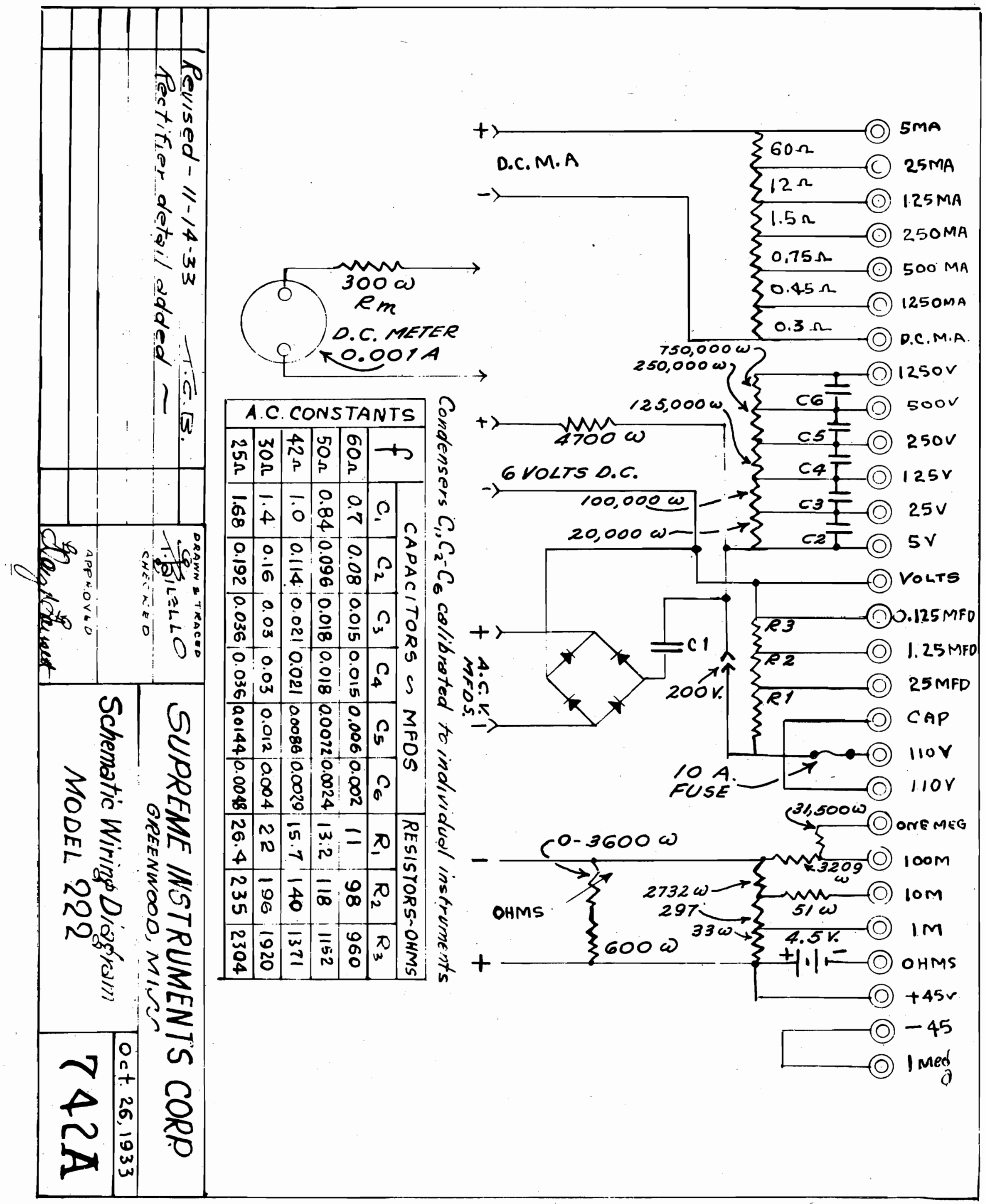
MODEL 145
Schematic

SUPREME INSTRUMENTS CORP.



**MODEL 222**
**Schematic**

# SUPREME INSTRUMENTS CORP.

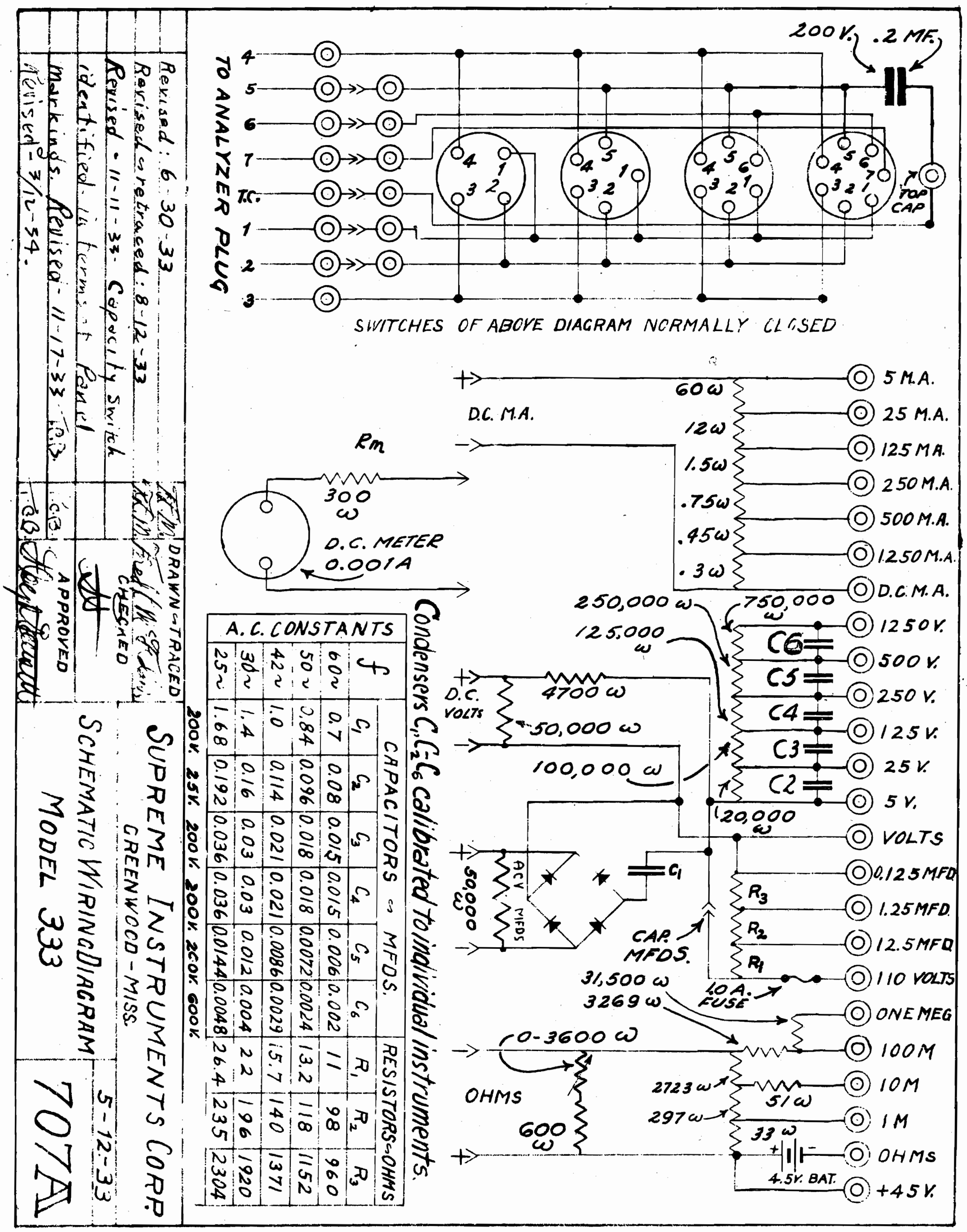



A.C. CONSTANTS

| f | $C_1$ | $C_2$ | $C_3$ | $C_4$ | $C_5$ | $C_6$ | $R_1$ | $R_2$ | $R_3$ |
|---|---|---|---|---|---|---|---|---|---|
| | CAPACITORS in MFDS | | | | | | RESISTORS-OHMS | | |
| 60Ω | 0.7 | 0.08 | 0.015 | 0.015 | 0.006 | 0.002 | 11 | 98 | 960 |
| 50Ω | 0.84 | 0.096 | 0.018 | 0.018 | 0.0072 | 0.0024 | 13.2 | 118 | 1152 |
| 42Ω | 1.0 | 0.114 | 0.021 | 0.021 | 0.0086 | 0.0029 | 15.7 | 140 | 1371 |
| 30Ω | 1.4 | 0.16 | 0.03 | 0.03 | 0.012 | 0.004 | 22 | 196 | 1920 |
| 25Ω | 1.68 | 0.192 | 0.036 | 0.036 | 0.0144 | 0.0048 | 26.4 | 235 | 2304 |

**MODEL 333 Revised Schematic**

# SUPREME INSTRUMENTS CORP.

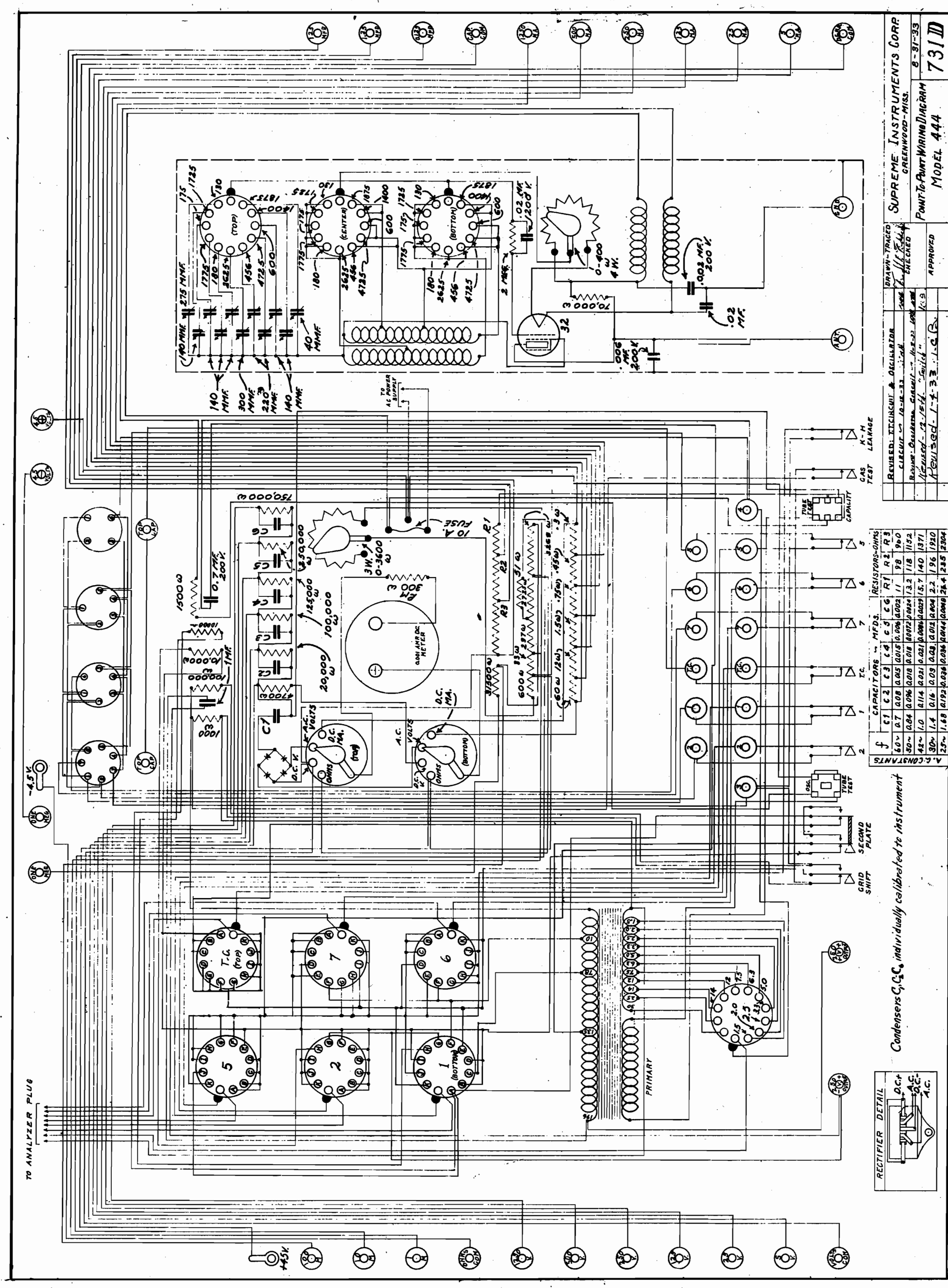



A. C. CONSTANTS

| f | $C_1$ | $C_2$ | $C_3$ | $C_4$ | $C_5$ | $C_6$ | $R_1$ | $R_2$ | $R_3$ |
|---|---|---|---|---|---|---|---|---|---|
| | CAPACITORS in MFDS. | | | | | | RESISTORS in OHMS | | |
| 60~ | 0.7 | 0.08 | 0.015 | 0.015 | 0.006 | 0.002 | 11 | 98 | 960 |
| 50~ | 0.84 | 0.096 | 0.018 | 0.018 | 0.0072 | 0.0024 | 13.2 | 118 | 1152 |
| 42~ | 1.0 | 0.114 | 0.021 | 0.021 | 0.0086 | 0.0029 | 15.7 | 140 | 1371 |
| 30~ | 1.4 | 0.16 | 0.03 | 0.03 | 0.012 | 0.004 | 22 | 196 | 1920 |
| 25~ | 1.68 | 0.192 | 0.036 | 0.036 | 0.0144 | 0.0048 | 26.4 | 235 | 2304 |
| | 200V. | 25V. | 200V. | 200V. | 200V. | 600V. | | | |

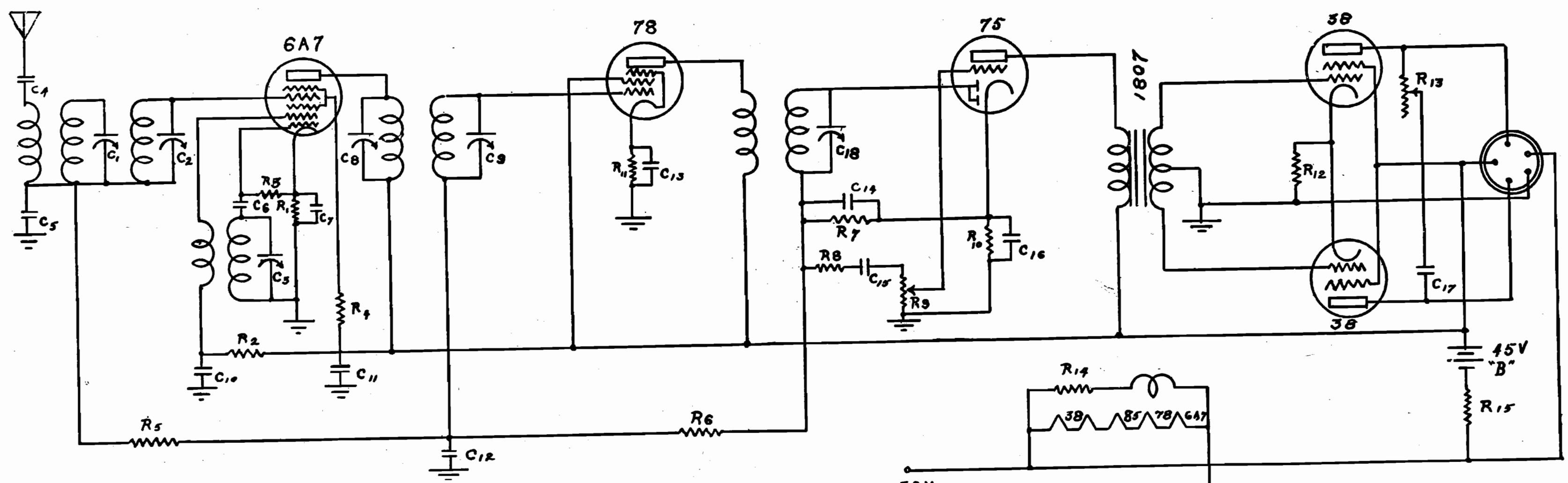
**MODEL 444**
**Schematic**

# SUPREME INSTRUMENTS CORP.



MODEL AK-54,AM-54
(Mayor & Senator)
Schematic

L. TATRO PRODUCTS CORP.




In some cases an '85 tube replaces the '75. In such cases R2 becomes 800 ohms instead of 400 ohms.

IF PEAK 175 KC.

# Circuit Diagram "L'Tatro" Radio

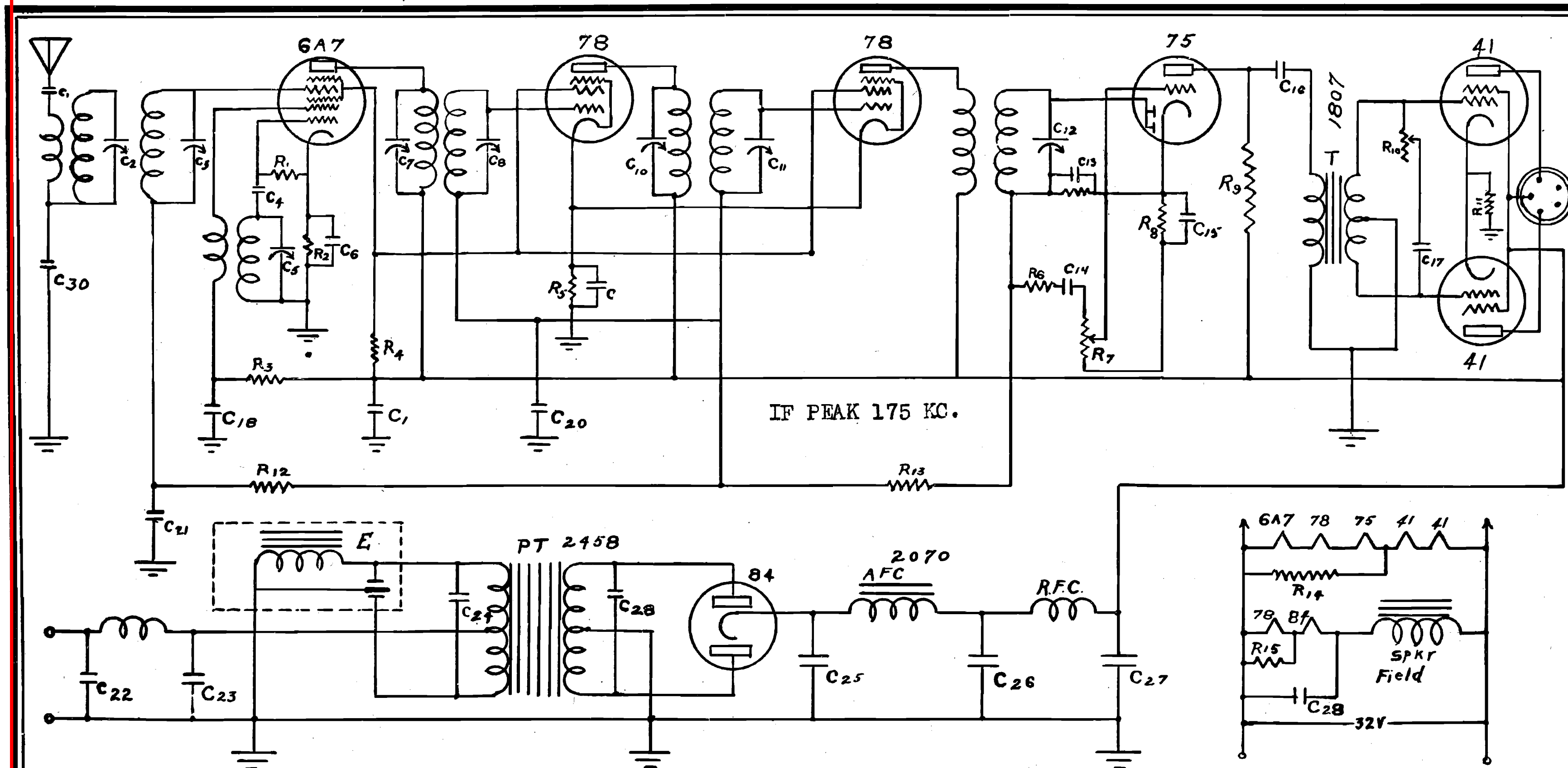
## Models AK54 - - AM54 [Mayor and Senator]

C1, C2 and C3 tuning condensers; C8, C9 and C18 I. F. trimmers; C4 .0025 Mfd; C5, C12 .05 Mfd; C6 100 MMfd; C7, C10, C11, C13 .1 Mfd.; C14 .0005 Mfd; C15 .025 Mfd; C16 10 Mfd 6 volt electrolytic; C17 .005 Mfd.

R1 250 ohms; R2 20,000 ohms; R3 50,000 ohms; R4 38,000 ohms; R5 and R6 1 meg; R7 250,000 ohms; R8 30,000 ohms; R9 ½ meg volume control; R10 5000 ohms; R11 400 ohms; R12 800 ohms; R13 ½ meg tone control; R14 200 ohms (10 watt); R15 25 ohms (10 watt).

MODEL L-74,N-74
(Lieut.Governor &
Governor)
Schematic,Voltage

L. TATRO PRODUCTS CORP.




| Tube | Plate | Screen | Cathode | Anode Grid |
|---|---|---|---|---|
| 6A7 | 198 | 80 | 2.4 | 140 |
| 78* | 198 | 80 | 7.0 | ... |
| 75 | 194 | .. | 1.5 | ... |
| 41* | 193 | 198 | 16.5 | ... |

# Circuit Diagram "L'Tatro Radio

## Models L74 - - N74 [Lieut. Governor and Governor]

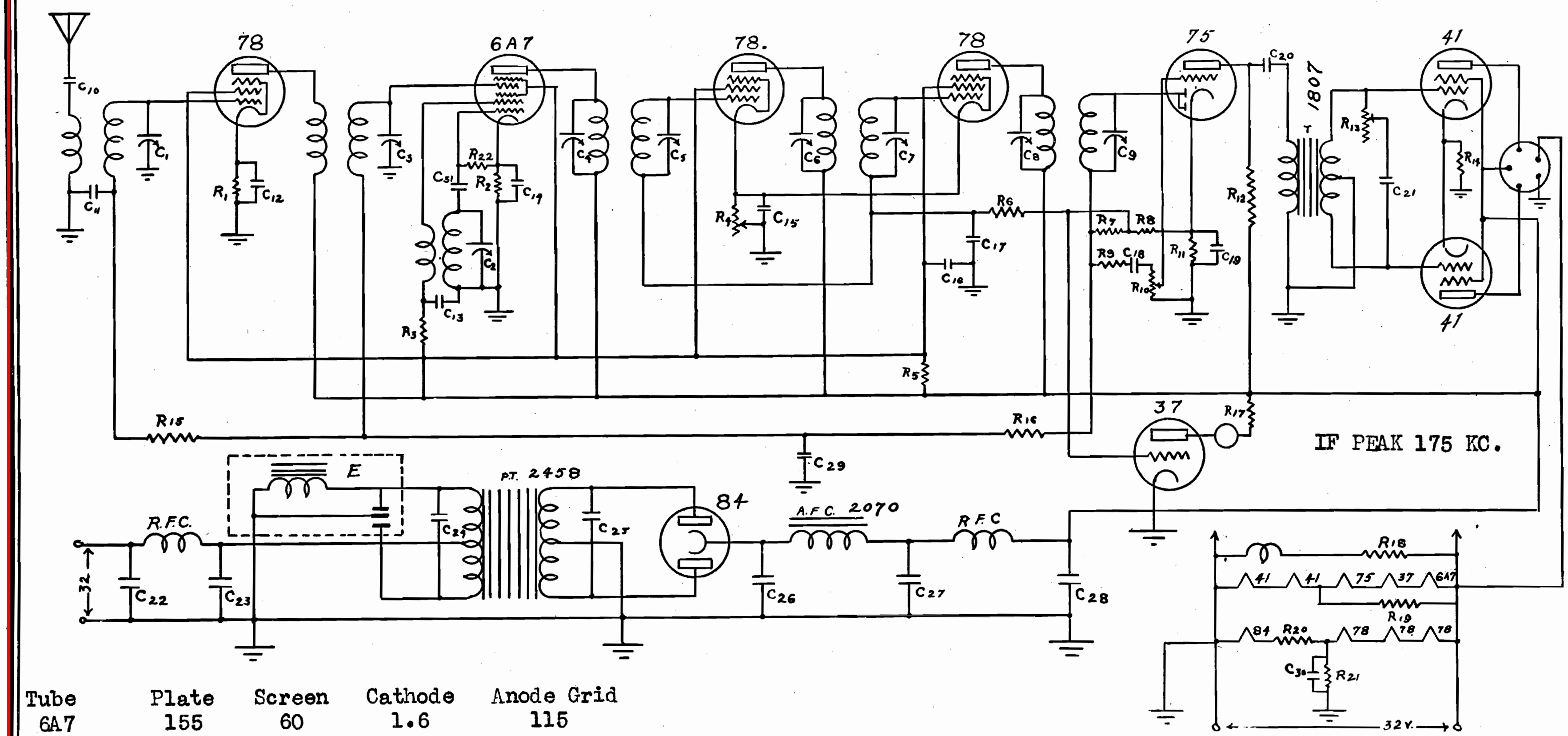
*Two tubes used; same reading on both.

C2, C3 and C5 tuning condensers; C7, C8, C10, C11 and C12 I. F. trimmers; C1, C17 .0025 Mfd; C4 100 Mmfd; C13 .0005 Mfd; C14 .015; C15 10 Mfd: C16, C18, C19 .1 Mfd; C20, C21 .05 Mfd; C22 20 Mfd. 40 volt non-polarized; C23 1 Mfd. special high frequency; C24, C28 special high frequency condensers; C25 8 Mfd; C26 16 Mfd; C27 .1 special; C28 10 Mfd. 14 volt non-polarized; C30 .1 omitted on late models. Note: C19 in above diagram is located between C18 and C20 and should be connected above R4.

R1 50,000 ohms; R2 250 ohms; R3 20,000 ohms; R4 38,000 ohms; R5 2500 ohms; R6 100,000 ohms; R7 ½ meg volume control; R8 5000 ohms; R9 100,000 ohms; R10 ½ meg tone control; R11 450 ohms; R12 250,000 ohms; R13 1 meg; R14 200 ohms 10 watt; R15 30 ohms 10 watt. R9 and C10 are omitted on late models, with primary of transformer to high potential. Resistor parallel to C13 is ¼ meg.

MODEL 094
(President)
Schematic, Voltage

L. TATRO PRODUCTS CORP.




| Tube | Plate | Screen | Cathode | Anode Grid |
|---|---|---|---|---|
| 6A7 | 155 | 60 | 1.6 | 115 |
| 78 IF * | 155 | 60 | 3.1 | ... |
| 78 RF ° | 155 | 60 | 3.0 | ... |
| 75 | 198 | .. | 1.6 | ... |
| 37 | 65 | .. | 0 | ... |
| 41* | 198 | 204 | 20.0 | ... |

* Two tubes used; 78's in IF ° 78 in RF

# Diagram "L'Tatro" Radio

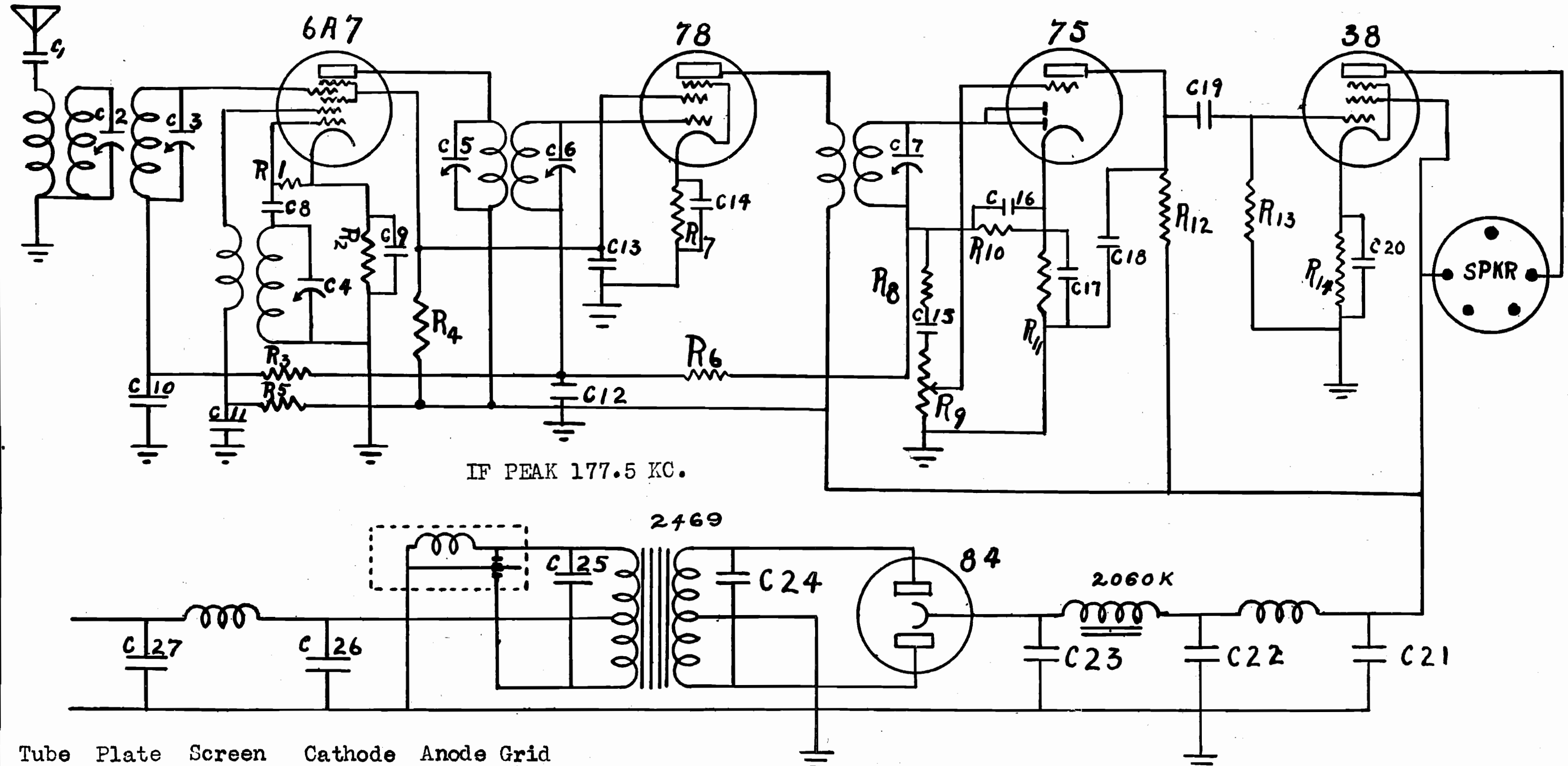
## Model 094 [President]

C1, C2 and C3 tuning condensers; C4, C5, C6, C7, C8 and C9 I. F. trimmers; C10 and C21 .0025 Mfd; C11, C13, C17 .05 Mfd. condensers; C12, C14, C15, C16, C20 .1 Mfd; C18 .015 Mfd; C19 10 Mfd. 6 volt; C22 20 Mfd. 40 volt non-polarized; C23 special high frequency 1 Mfd; C24, C25 special high frequency condensers; C26 8 Mfd; C27 16 Mfd; C28 special .1 Mfd; C30 high frequency .1 Mfd; C31 100 Mfd.

R1 1500 ohms; R2 250 ohms; R3 20,000 ohms; R4 20,000 ohms with 800 ohms limiting section; R5 38,000 ohms; R6, R7, R8, R15, R16 250,000 ohms; R9, R12 100,000 ohms; R10 ½ meg volume control; R11 5000 ohms; R13 ½ meg tone control; R14 450 ohms; R18, R19 200 ohms; R20 25 ohms; R21 125 ohms. R 21 should parallel the three 78 tubes in above diagram.

MODEL P-54
(Recorder)
Schematic, Voltage

L. TATRO PRODUCTS CORP.




| Tube | Plate | Screen | Cathode | Anode Grid |
|---|---|---|---|---|
| 75 | 108 | ... | 1.05 | ... |
| 38 | 158 | 165 | 15.5 | ... |
| 78 | 163 | 100 | 3.0 | ... |
| 6A7 | 163 | 100 | 2.9 | 120 |

Readings taken between chassis and points indicated with 1000-ohm-per-volt meter. Filament, 6.3-6.4 volts.

# Circuit Diagram "L'Tatro" Radio

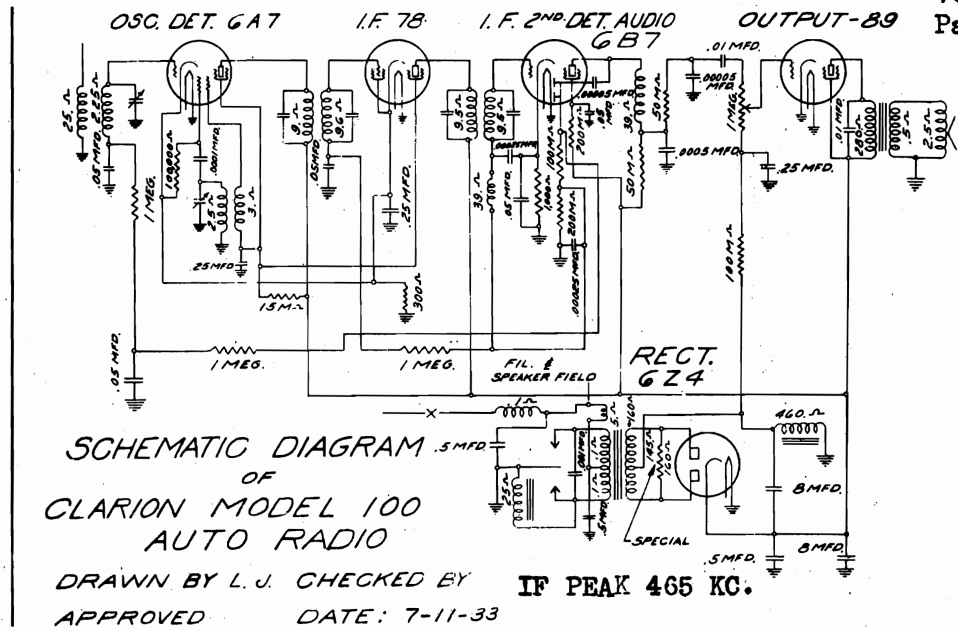
## Model P54 [Recorder]

C2, C3 and C4 are tuning condensers; C5, C6 and C7 I. F. trimmers; C1 .0025 Mfd; C8 100 MMfd; C9, C11, C12, C13, C14 and C21 .1 Mfd; C10 and C19 .05 Mfd; C15 .015 Mfd; C16 and C18 .0005 Mfd; C17 and C20 10 Mfd. electrolytic; C22 and C23 8 Mfd. electrolytic; C24 and C25 special buffer condensers; C26 1 Mfd. high frequency; C27 10 Mfd. non-polarized electrolytic.

R1 50,000 ohms; R2 250 ohms; R3 1 meg; R4 38,000 ohms; R5 20,000 ohms; R6 ¼ meg; R7 450 ohms; R8 100,000 ohms; R9 ½ meg volume control; R10 ¼ meg; R11 5000 ohms; R12 500.000 ohms; R13 1 meg; R14 1250 ohms.

**MODEL 100-AR**
**Schematic**
**Voltage**
**Parts List**

# TRANSFORMER CORP. OF AMERICA




**IF PEAK 465 KC.**

| No. | Stage | Tube | Ef | Ep | Eg | Ek | Esg | Esug | Ip | Ep-O | Eg-O | Ip-O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Osc.- Det . . | 6A7 | 6 | 185 | .1 | 3 | 83 | | 4.6 | 81 | .05 | 1.7 |
| 2 | I. F. . . . . . | 78 | 6 | 185 | .1 | 3 | 102 | 0 | 7.5 | | | |
| 3 | I. F. 2nd Det. Audio . | 6B7 | 6 | 58 | .05 | 2.3 | 45 | | 2.2 | d .1 | | |
| 4 | Output. . . . | 89 | 6 | 190 | .05 | 0 | 194 | 0 | 18 | | | |
| 5 | Rectifier . . | 6Z4 | 6 | p208 | | 185 | | | p18 | | | |

O - Oscillator.
Volume Control - Full On.
Battery Voltage - 6 Volts.

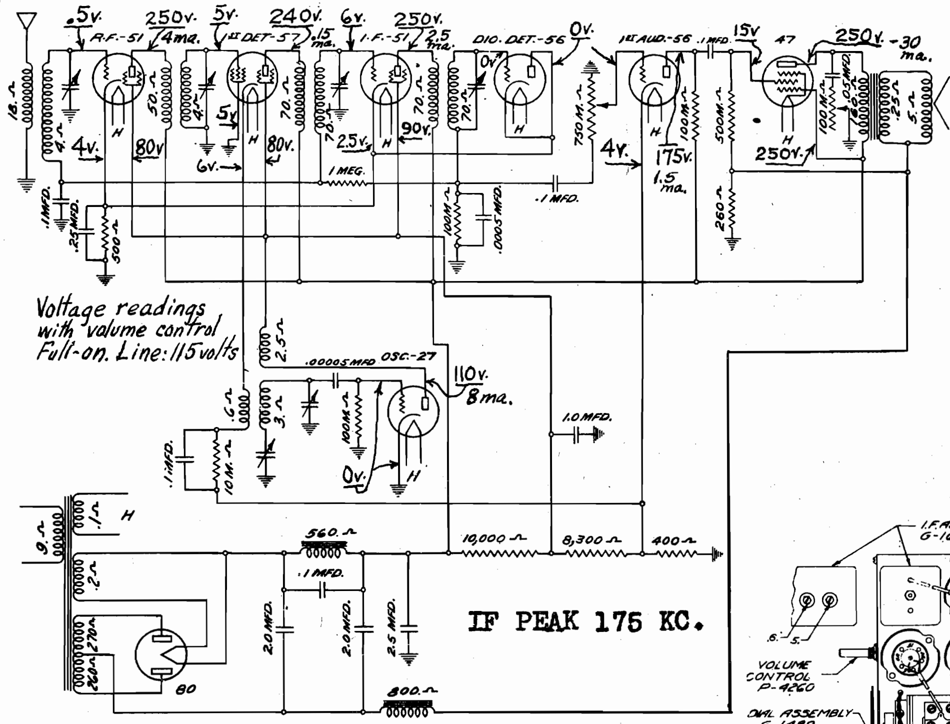
p - Per Plate.
d - Diode Plate.

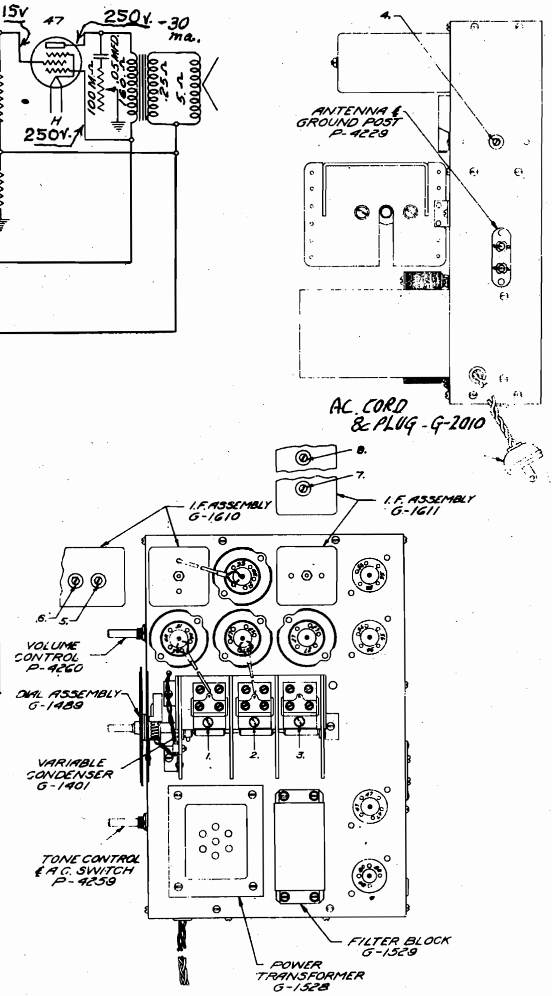
G-1705 Speaker Complete
G-1727 "B" Choke
G-1746 Vibrator Complete
G-1748 Output Transformer
G-1751 Voice Coil and Cone
G-1753 Dial Drive and Head
G-1754 Male Cable Tuning
G-1755 Female Cable Tuning
G-1756 Perforated Mtg. Strap for Control Head
G-1756-C Threaded Mtg. Strap for Control Head
G-1763 I. F. Transformer (1st and 2nd)
G-1788 Key Knob and Shaft
P-1083 Lock Washer, Small
P-1381 .0005 Condenser
P-1728 .00005 Mfd. Condenser
P-1756 Threaded Mounting Strap
P-4372 .00025 Condenser
P-4446 .001 Mfg. Condenser
P-4504 1,000 Ohm Resistor
P-4590 .0001 Condenser
P-4595 1 Megohm Resistor
P-4602 Grommet, Small
P-4640 .25 Mfd. Condenser
P-4644 .05 Mfd. Condenser
P-4645 .01 Mfd. Condenser
P-4659 50,000 Ohm Resistor
P-4662 100,000 Ohm Resistor
P-4664 200,000 Ohm Resistor
P-4713 15,000 Ohm Resistor
P-4732 Socket 6A7
P-4733 Socket 78
P-4744 Tuning Condenser
P-4761 .5 Mfd. Condenser
P-4763 Vibrator - Unit only
P-4764 Rubber Vibrator Box and Cover
P-4765 Vibrator, Special Resistor
P-4767 Electrolytic Condenser
P-4769 Volume Control
P-4771 Socket 6B7
P-4772 Socket 89
P-4773 Socket 6Z4
P-4774 Generator Condenser
P-4775 Spark Plug Suppressor
P-4776 Distributor Suppressor
P-4777 Mounting Studs
P-4778 Mounting Nuts
P-4787 Bushing and Drive Set Screws
P-4788 Shaft Bushings
P-4791 Wing Nuts
P-4792 Chassis Mounting Screw
P-4793 Grommet, Large
P-4795 Fuse Assembly
P-4796 Fuse - 10 Ampere
P-4797 Mounting Washers
P-4799 "A" Choke
P-4804 Untuned Choke
P-4807 Terminal Strip
P-4811 Vibrator Transformer
P-4812 Choke (Unshielded)
P-4822 Dial Bezel
P-4823 Dial Pointer
P-4826 Dial Light Bracket
P-4829 Dial Scale
P-4832 Knob Tuning
P-4833 Knob Springs
P-4835 Dial Glass
P-4843 Antenna Oscillator Coil
P-4849 Mounting Strap Nuts
P-4855 150 Ohm Resistor

**MODEL 241**
**Schematic, Socket**

# TRANSFORMER CORP. OF AMERICA

**Alignment Data**
**Point-to-Point**




To adjust the trimmers, connect your 175 K. C. oscillator to the first detector type 57 grid cap, and in the following order: Readjust trimmers numbers, five, six, seven and eight for maximum output, next, disconnect the 175 K.C. oscillator and connect to the antenna binding post of the receiver, the output lead from your broadcast test oscillator or tune in a broadcast signal from a known frequency crystal controlled station at 1400 K. C., then reset trimmers, two and one respectively for maximum output. This adjustment will track the first detector and r. f. stage.

To check the calibration of the receiver, whether it be high or low, trimmer, number three (oscillator) should be reset until a station of known high frequency is brought in at the correct dial marking with peak volume. If your broadcast test oscillator is accurately calibrated, it might be used in place of the broadcast station signal. In this adjustment a signal at about 1400 K. C. should be chosen The setting of the trimmers at 1400 K. C. is more critical than it would be at 600 K. C., therefore more accurate.

The next adjustment is important and not easily explained in writing, so pay close attention to the following instructions: We now balance the oscillator to the r. f. and first detector stages. Tune the external broadcast test oscillator and the receiver both to 600 K. C., then slowly increase or decrease the capacity of No. 4 (oscillator padding trimmer) at the same time and continuously tuning back and forth across the signal with the receiver tuning condenser gang. The output meter needle will now be swinging up and down in step with the variation in tuning. Watch the peak of this swinging closely and readjust No. 4 trimmer until the swinging needle reaches its highest peak.

Retune the receiver and broadcast test oscillator to 1400 K. C. and recheck trimmer No. 3 to make sure that the adjustment of No. 4 has not thrown the receiver out of calibration. If it has, then readjust No. 3 until the calibration is correct, as previously explained, and check on trimmers No. 2 and No. 1 to make sure that the adjustment of No. 4 has not reduced the sensitivity.

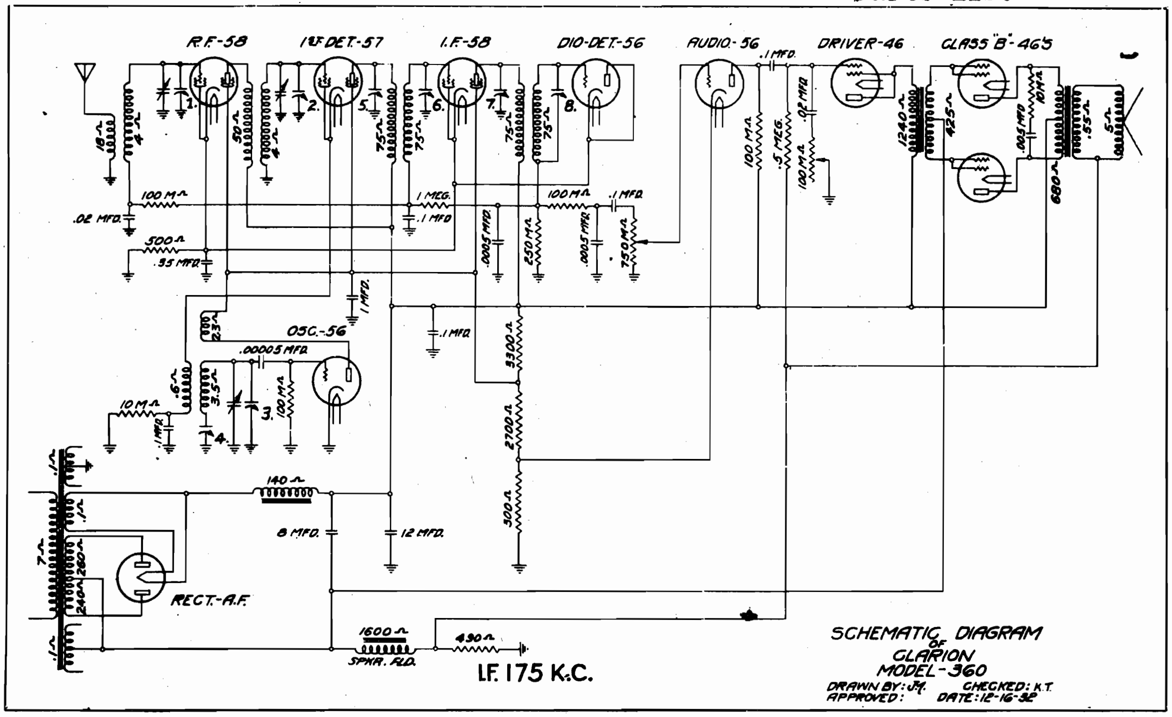
CIRCUIT RESISTANCE ANALYSIS
Model 241 Socket to ground

| Stage | Grid | Cathode | Heater | Plate | Screen G | Suppr. G | Space G |
|---|---|---|---|---|---|---|---|
| 51 R.F. . . | Infinity | 500 | .08 | 18,700 | 8,700 | .... | ...... |
| 57 1st.det. | 4.2 | 10,000 | .08 | 18,700 | 8,700 | .06 | ...... |
| 51 I.F. . . | Infinity | 500 | .07 | 18,700 | 8,700 | ... | ...... |
| 27 Oscillator . | 100,000 | .06 | .07 | 8,750 | ...... | ... | ...... |
| 56 Dio det. | 100,000 | 500 | .07 | 500 | ...... | ... | ...... |
| 56 A.F. . . | 750,000 | 400 | .07 | 118,000 | ...... | ... | ...... |
| 47 Pentode. | 750,000 | ...... | .07 | 18,800 | ...... | ... | 18,700 |
| 80 Rectifier. . | ....... | ...... | 18,800 | 1,320 | ...... | ... | ...... |

Note: Readings of one megohm and over are given as "Infinity". The first three significant figures, only are interpreted from the ohmmeter in each reading; the individual resistance in the circuit can be readily checked upon removal of chassis.

# TRANSFORMER CORP. OF AMERICA

**MODEL 360**
**Schematic, Point-to-Point**
**Parts List**




| | | |
|---|---|---|
| P-1038 | Pilot Light. . . . . . . . . . | |
| P-1106 | 1 Megohm Resistor. . . . . . | |
| P-1381 | .0005 MFD. Cond. . . . . . . | |
| P-1459 | Tube Shield Base . . . . . . | |
| P-1472 | Tube Shield. . . . . . . . . | |
| P-1692 | 100,000 Ohm Resistor . . . . | |
| P-1728 | .00005 MFD. Cond . . . . . . | |
| P-1755 | .5 Megohm Resistor . . . . . | |
| P-1944 | 250,000 Ohm Resistor . . . . | |
| P-4168 | Blinder. . . . . . . . . . . | |
| P-4229 | Ant. Grnd. Post. . . . . . . | |
| P-4256 | Escutcheon . . . . . . . . . | |
| P-4259 | Tone Control and Switch. . . | |
| P-4260 | Volume Control . . . . . . . | |
| P-4262 | #56 Socket . . . . . . . . . | |
| P-4263 | #57 Socket . . . . . . . . . | |
| P-4264 | #58 Socket . . . . . . . . . | |
| P-4271 | 10,000 Ohm Resistor. . . . . | |
| P-4297 | #46 Socket . . . . . . . . . | |
| P-4368 | 10,000 Ohm Resistor (1 Watt) | |
| P-4370 | .005 MFD. Cond . . . . . . . | |
| P-4373 | Speaker Diaphragm. . . . . . | |
| P-4393 | Large Knob . . . . . . . . . | |
| P-4394 | Small Knob . . . . . . . . . | |
| P-4398 | .1 MFD. Cond . . . . . . . . | |
| P-4447 | .02 MFD. Cond. . . . . . . . | |
| P-4485 | Tube Shield. . . . . . . . . | |
| P-4486 | Tube Shield Cap. . . . . . . | |
| P-4487 | Tube Shield Base . . . . . . | |
| P-4514 | Electrolytic Cond. . . . . . | |
| P-4519 | A.F. Socket. . . . . . . . . | |
| P-4526 | 490 Ohm Resistor . . . . . . | |
| P-4533 | Voltage Divider. . . . . . . | |
| P-4534 | Voltage Divider. . . . . . . | |
| G-1272 | R.F. Coil. . . . . . . . . . | |
| G-1401 | Variable Cond. . . . . . . . | |
| G-1415 | I.F. Transformer (1st) . . . | |
| G-1488 | Trimmer Condenser. . . . . . | |
| G-1489 | Dial and Scale Assembly. . . | |
| G-1493 | Antenna Coil . . . . . . . . | |
| G-1508 | Speaker. . . . . . . . . . . | |
| G-1562 | Oscillator Coil. . . . . . . | |
| G-1600 | Voice Coil . . . . . . . . . | |
| G-1660 | Output Transformer . . . . . | |
| G-1661 | I.F. Transformer (2nd) . . . | |
| G-1662 | Power Transformer. . . . . . | |
| G-1662A | Power Transformer (25 cycle) | |
| G-1662B | Power Transformer (220 volt) | |
| G-1664 | Input Transformer. . . . . . | |
| G-1669 | Filter Choke . . . . . . . . | |
| G-1671 | Bypass Pack. . . . . . . . . | |

## CIRCUIT RESISTANCE ANALYSIS

Model 360 Socket to ground.

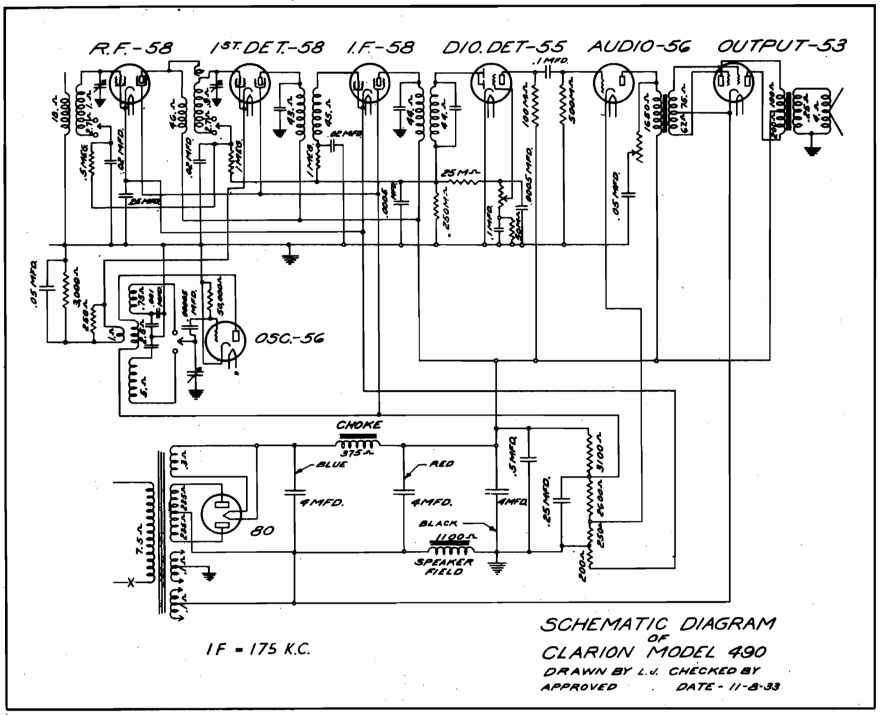
| STAGE | GRID | CATHODE | HEATER | PLATE | SCREEN G | SUPPR. G |
|---|---|---|---|---|---|---|
| R.F. . . . . | Infinity | 500 | .1 | 6,300 | 3,000 | 500 |
| 1st Det. . . | 4.0 | 10,000 | .1 | 6,300 | 3,000 | 10,000 |
| Oscillator . | 100,000 | 0 | .1 | 3,000 | ..... | ...... |
| I.F. . . . . | Infinity | 500 | .1 | 6,300 | 3,000 | 500 |
| A.V.C. Det . | 250,000 | 500 | .1 | 500 | ..... | ...... |
| Audio. . . . | *750,000 | 300 | .1 | 100,000 | ..... | ...... |
| Driver . . . | 500,000 | ...... | .1 | 7,600 | 7,600 | ...... |
| Class "B". . | 2,400 | ...... | .1 | 6,700 | 2,400 | ...... |
| Class "B". . | 2,400 | ...... | .1 | 6,700 | 2,400 | ...... |
| Rectifier. . | ........ | ...... | 6,500 | 2,400 | ..... | ...... |

* VOLUME CONTROL FULL ON.

NOTE: Readings of one megohm and over are given as "infinity". The first three significant figures only, are interpreted from the ohmmeter in each reading; the individual resistance in the circuit can be readily checked upon removal of chassis.

MODEL 490
Schematic
Voltage, Parts List

# TRANSFORMER CORP. OF AMERICA




## VOLTAGE ANALYSIS OF MODEL 490 USING A 1000 OHM PER VOLTMETER

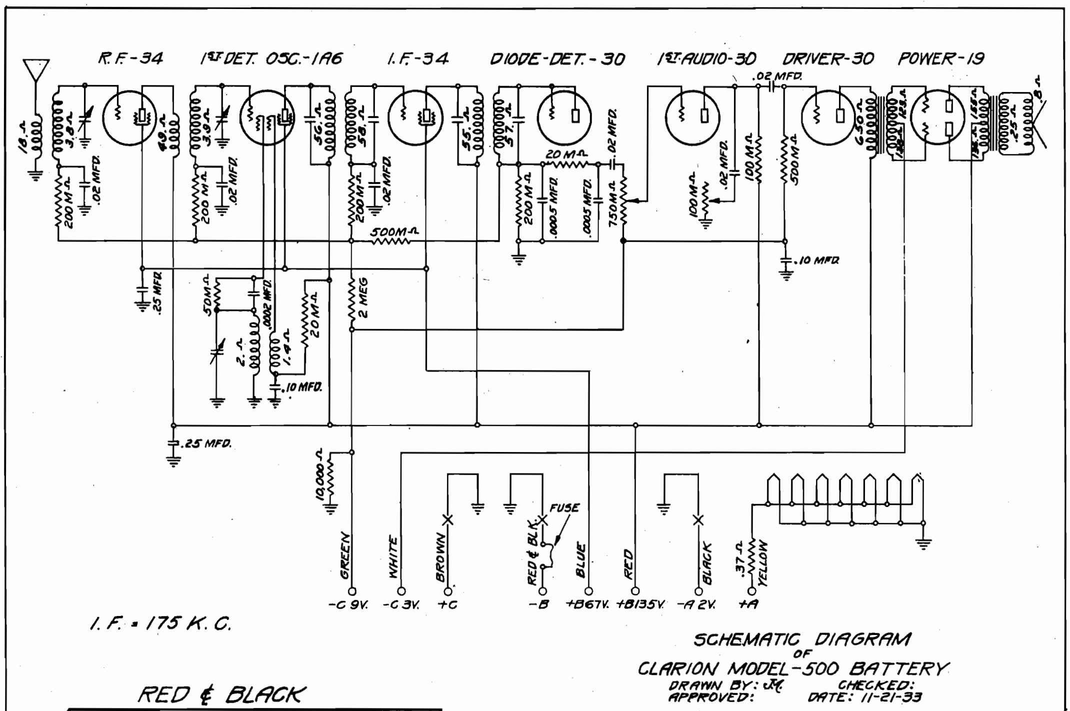
| TUBE | STAGE | Ef | Ep | Eg | Ek | Esg | Esug | Ip | |
|---|---|---|---|---|---|---|---|---|---|
| 58 | R.F. | 2.3 | 190 | .3 | 2.9 | 83 | 0 | 6. | |
| 58 | 1st DET. | 2.3 | 190 | .3 | 7. | 78 | 0 | 2. | |
| 56 | OSCILL. | 2.3 | 83 | .3 | 0 | | | 4.5 | |
| 58 | I.F. | 2.3 | 190 | .3 | 2.9 | 83 | 0 | 5.5 | *Per Plate |
| 55 | DIODE | 2.3 | 36 | .2 | 0 | .2** | | 2. | ** Diode |
| 56 | A.F. | 2.3 | 198 | .2 | 10 | | | 5. | Voltage |
| 53 | OUTPUT | 2.5 | 292* | 0 | 0 | | | 12.* | |
| 80 | RECT. | 4.5 | 292* | | | | | 37.* | |

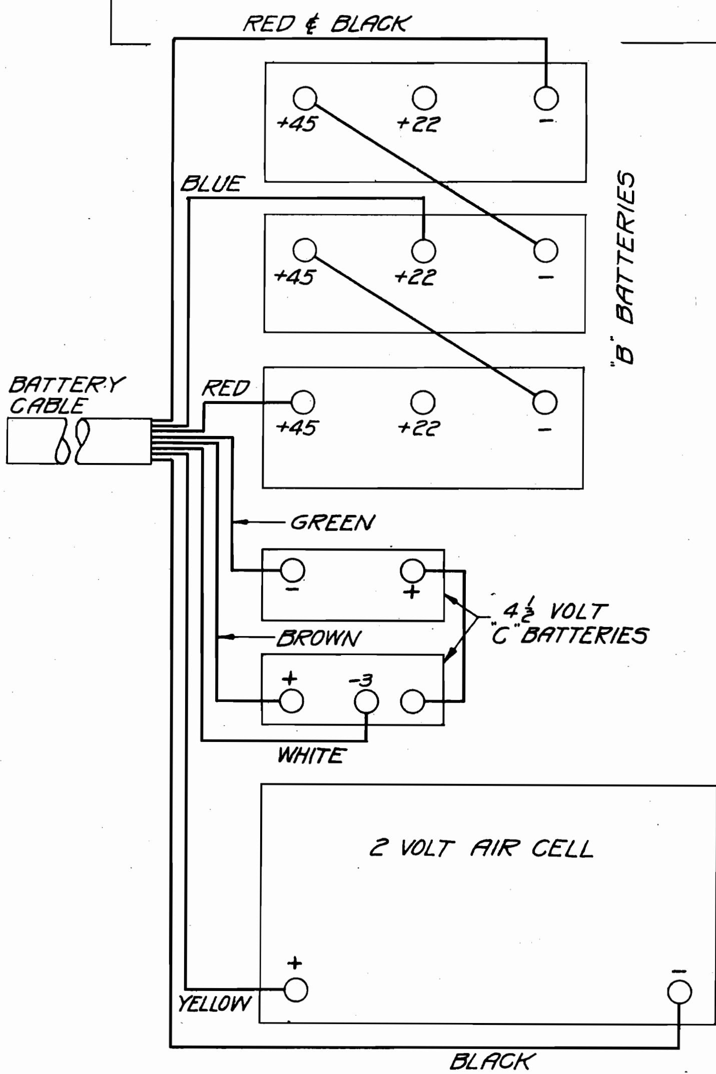
LINE VOLTAGE 107 VOLUME CONTROL - FULL ON

| | |
|---|---|
| P-1015 | Contact spring. . . . . . . . . |
| P-1038 | Pilot light . . . . . . . . . . |
| P-1100A | .001 mfd. . . . . . . . . . . |
| P-1381 | .0005 mfd. condenser. . . . . |
| P-1595 | Socket #80. . . . . . . . . . |
| P-1728 | .00005 mfd. condenser . . . . . |
| P-1860 | Pilot light bracket . . . . . |
| P-14229 | Antenna and ground post . . . . |
| P-4262 | #56 socket. . . . . . . . . . |
| P-4264 | #58 socket. . . . . . . . . . |
| P-4400 | Grid clips. . . . . . . . . . |
| P-4485 | Tube shield . . . . . . . . . |
| P-4486 | Tube shield cap . . . . . . . |
| P-4488 | Escutcheon plate. . . . . . . |
| P-4595 | 1 meg.resistor. . . . . . . . |
| P-4597 | 250 ohm resistor. . . . . . . |
| P-4640 | .25 mfd. condenser. . . . . . |
| P-4644 | .05 mfd. condenser. . . . . . |
| P-4646 | .02 mfd. condenser. . . . . . |
| P-4659 | 50,000 ohm resistor . . . . . |
| P-4662 | 100,000 ohm resistor. . . . . |
| P-4663 | 500,000 ohm resistor. . . . . |
| P-4701 | .1 mfd. condenser . . . . . . |
| P-4869 | 25,000 ohm resistor . . . . . |
| P-4910 | 3,000 ohm resistor. . . . . . |
| P-4935 | Field coil. . . . . . . . . . |
| P-4961 | 8-4 mfd. electrolytic . . . . . |
| P-4965 | Voltage divider . . . . . . . . |
| P-4969 | .5 mfd. condenser . . . . . . . |
| P-4970 | 100 Ohm resistor. . . . . . . . |
| P-4971 | Diaphragm . . . . . . . . . . . |
| P-4972 | Knobs . . . . . . . . . . . . . |
| P-4975 | Short wave switch . . . . . . . |
| P-4976 | 55 socket . . . . . . . . . . . |
| P-4977 | 53 socket . . . . . . . . . . . |
| P-4978 | Tone control. . . . . . . . . . |
| P-4979 | Volume control. . . . . . . . . |
| G-1274 | Choke assembly. . . . . . . . . |
| G-1281 | Coil and dowel (used in G-1803) |
| G-1282 | Coil and dowel (used in G-1826) |
| G-1488 | Padding condenser . . . . . . . |
| G-1600 | Voice coil and spider . . . . . |
| G-1709 | 10" speaker . . . . . . . . . . |
| G-1793 | I. F. coils (used in G-1843). . |
| G-1794 | Large I. F. transformer . . . . |
| G-1803 | R. F. coil. . . . . . . . . . . |
| G-1805 | Variable condenser. . . . . . . |
| G-1806 | Dial assembly . . . . . . . . . |
| G-1807 | Power transformer . . . . . . . |
| G-1812 | Input audio transformer . . . . |
| G-1813 | Output audio transformer. . . . |
| G-1843 | Small I. F. transformer . . . . |
| G-1844 | Oscillator coil . . . . . . . . |
| G-1846 | Antenna coil. . . . . . . . . . |
| G-1847 | I. F. coils (used in G-1794). . |

TRANSFORMER CORP. OF AMERICA

**MODEL 500**
**Schematic, Batt. Data**
**Parts List**

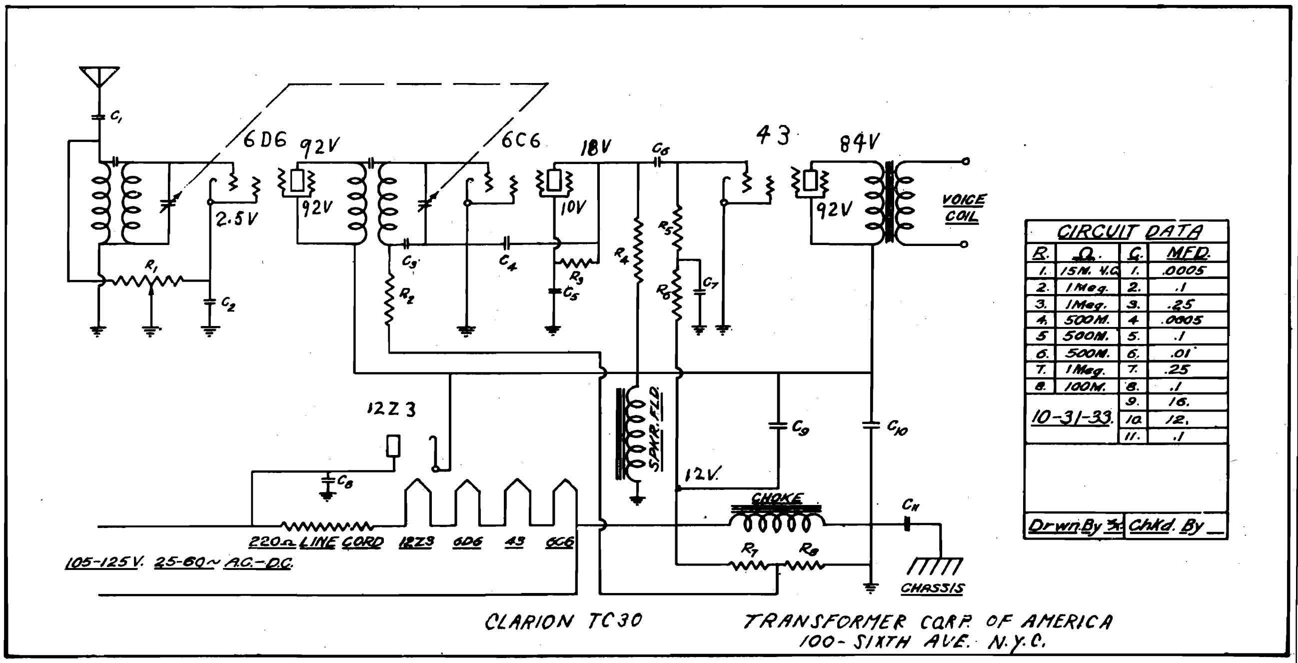



| | | |
|---|---|---|
| 1 | P-1381 | .0005 Condenser |
| 1 | P-1802 | Ornamental Head Screw |
| 1 | P-1886 | Hex. Head Cap Screws |
| 1 | P-4486 | Tube Shield Cap |
| 1 | P-4640 | .25 Mfd. Condenser |
| 1 | P-4646 | .02 Mfd. Condenser |
| 1 | P-4659 | 50,000 Ohm Resistor |
| 1 | P-4661 | 10,000 Ohm Resistor |
| 1 | P-4662 | 100,000 Ohm Resistor |
| 1 | P-4663 | 500,000 Ohm Resistor |
| 1 | P-4664 | 200,000 Ohm Resistor |
| 1 | P-4701 | .10 Mfd. Condenser |
| 1 | P-4728 | Tube Shield |
| 1 | P-4729 | Tube Shield Base |
| 1 | P-4730 | I.F. Unit |
| 1 | P-4731 | I.F. Unit |
| 1 | P-4853 | Escutcheon Plate |
| 1 | P-4890 | Small Knob |
| 1 | P-4891 | Large Knob |
| 1 | P-4909 | 20,000 Ohm Resistor |
| 1 | P-4998 | Gang Condenser |
| 1 | P-4999 | Volume Control |
| 1 | P-5000 | Tone Control |
| 1 | P-5001 | 3 Point Switch |
| 1 | P-5004 | Speaker |
| 1 | P-5014 | Fuse Base |
| 1 | P-5015 | Battery Cable |
| 1 | P-5016 | #34 Socket |
| 1 | P-5017 | #1A6 Socket |
| 1 | P-5018 | #30 Socket |
| 1 | P-5019 | #19 Socket |
| 1 | P-5020 | 2 Meg. Resistor |
| 1 | P-5021 | .0002 Condenser |
| 1 | P-5022 | Dial |
| 1 | P-5037 | 1/4 Amp. Fuse |
| 1 | G-1835 | Oscillator Coil |
| 1 | G-1836 | Antenna Coil |
| 1 | G-1837 | R.F. Coil |
| 1 | G-1838 | Driver Transformer |
| 1 | G-1839 | Output Audio |

MODEL TC-30
Schematic
Parts List

# TRANSFORMER CORP. OF AMER. (New Co.)




## CLARION TC 30

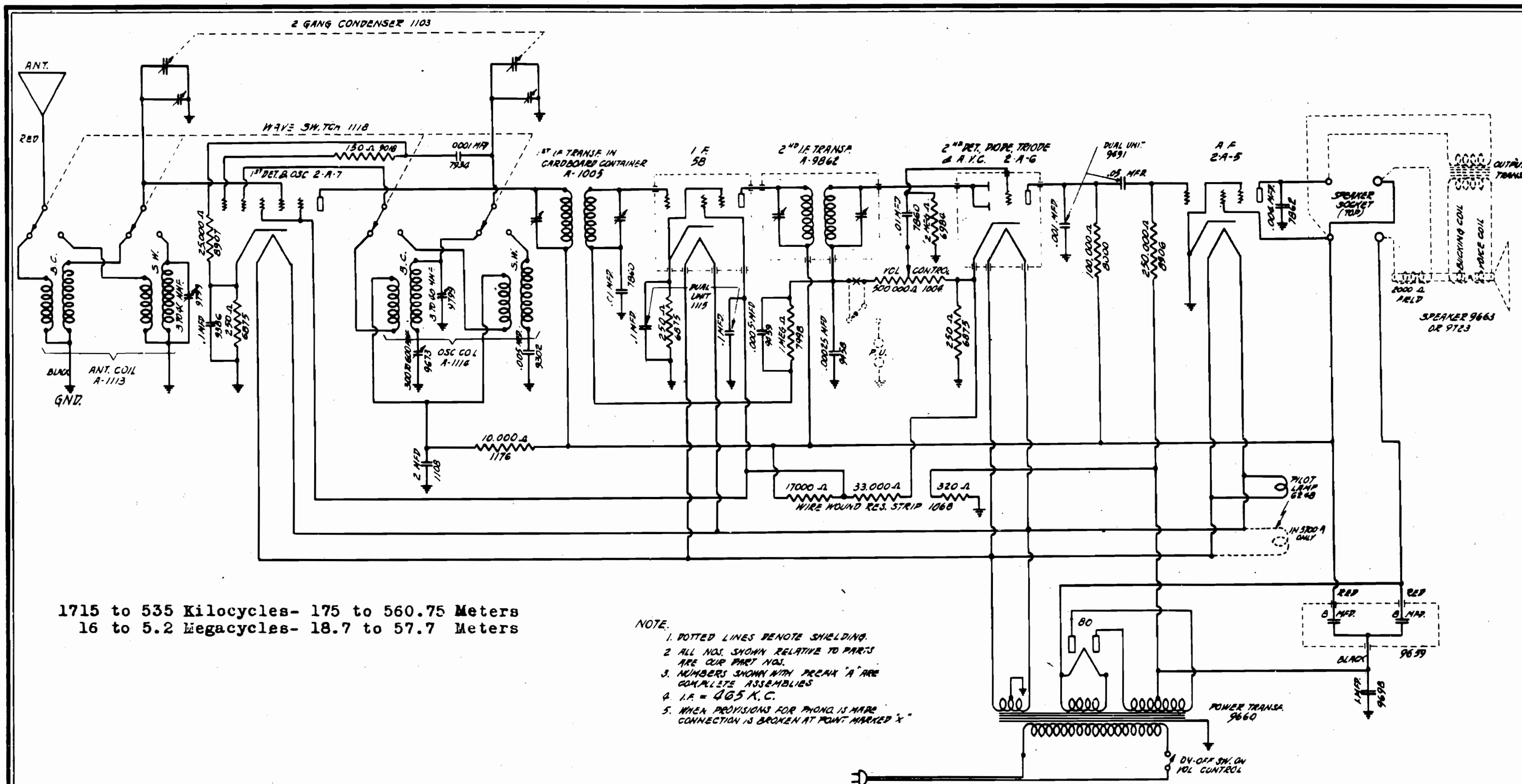
## REPLACEMENT PARTS

| Stock No. | Part No. | Description of part | List price |
|---|---|---|---|
| TWR500I0 | R2-3-7 | I megohm resistor | .I2 |
| TWR50020 | R4-5-6 | 500,000 resistor.................. | .I2 |
| TWR50030 | R8 | I00,000 resistor.................. | .I2 |
| Twr50050 | CI-4 | .0005 Fixed condenser ............. | .I6 |
| TWR50060 | C2-5-8-II | .I - 200 volt condensor ........... | .I2 |
| TWR50070 | C3-7 | .25 - 200 volt condensor .......... | .I6 |
| TWR50080 | C6 | .0I - 400 volt condensor .......... | .I2 |
| TWR50090 | C9-I0 | I2 x I6 filter condenser .......... | I.20 |
| Twr50I00 | | 220 ohm line cord ................. | .68 |
| TWR50II0 | | Two gang condenser ................ | 2.00 |
| TWR50I30 | | Antenna coil ...................... | .40 |
| TWR50I20 | | R.F. coil ......................... | .40 |
| TWR50I40 | | Speaker . ......................... | 4.20 |
| TWR50I50 | | Knobs ............................. | .20 |
| TWR50I60 | RI | Volume control .................... | .96 |

ALIGNMENT- Connect a test oscillator to the antenna wire of the receiver and set the oscillator and receiver to I400 K.C. Adjust either trimmer on the tuning condenser for maximum output.

MODEL TC-20,TC-21

TRANSFORMER CORP. OF AMER. (New Co.Schematic,Voltage




1715 to 535 Kilocycles- 175 to 560.75 Meters
16 to 5.2 Megacycles- 18.7 to 57.7 Meters

NOTE.
1. DOTTED LINES DENOTE SHIELDING.
2. ALL NOS. SHOWN RELATIVE TO PARTS ARE OUR PART NOS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES
4. I.F. = 465 K.C.
5. WHEN PROVISIONS FOR PHONO. IS MADE CONNECTION IS BROKEN AT POINT MARKED "X"

VOLTAGE TABLE
Line : 115
Volume : Full on

| TUBE | | FIL. | PLATE | SCREEN | CATHODE | GRID NO.1 | GRID NO.2 | GRID NO. 3 & 5 |
|---|---|---|---|---|---|---|---|---|
| 58 | I. F. Amplifier | 2.45 | 205 | 80 | 2 | | | |
| 2A7 | Oscillator & 1st Detector | 2.45 | 205 | | 2.5 | 1.5 | 160 | 80 |
| 2A6 | Second Detector Diode AVC and Triode | 2.45 | 100## | | 1 | | | |
| 2A5 | Output | 2.45 | 190 | 205 | .87### | | | |
| 80 | Rectifier | 4.85 | | | | | | |

## Triode Plate. Comparative voltage only. The voltmeter is in series with a high resistance and is therefore not the true voltage applied.

Read all voltages from socket to chassis unless otherwise specified.

### Read from grid to chassis.

TRANSFORMER CORPORATION OF AMERICA
100 SIXTH AVE N.Y.C.

MODEL TC-20,TC-21
Alignment Data
Parts List

# TRANSFORMER CORP. OF AMER. (New Co.)

ALIGNMENT PROCEDURE: Only when an IF transformer, antenna or oscillator coil is replaced should it ever be necessary to realign the receiver. For aligning either the intermediate transformer or the variable condenser it is absolutely necessary that a good accurate calibrated oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 2A7 tube leaving the grid cap disconnected. The ground side of the oscillator should be connected to the receiver chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the intermediate transformer brass hext adjusting nut located on top of the intermediate transformer can up and down until maximum reading is obtained on the output meter. Then adjust the trimmer screw located inside the brass hex nut for maximum output.

4. Adjust the second I. F. transformer in the same manner as the first I. F. transformer.

VARIABLE CONDENSER ALIGNMENT: It is essential that the following instructions be carefully adhered to in the order given otherwise the receiver will be insensitive and the dial calibration will be inaccurate.

1. Connect the high side of the oscillator output to the set antenna lead and the oscillator ground to the receiver chassis.

2. Place the band selector switch for operation on the 16 to 5.2 megacycle band.

3. Set the oscillator frequency to exactly 15 megacycles and adjust the receiver dial to exactly 15 megacycles. Then BRING IN THE 15 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE trimmer condenser of the oscillator gang condenser section. The oscillator trimmer condenser is mounted on top of the rear section of the variable condenser. The front section of the variable condenser tunes the antenna stage.

4. Place the band selector switch for operation on the 1715 to 535 kilocycle band, set the oscillator to exactly 1400 kilocycles and tune the receiver dial to 1400 kilocycles. BRING IN THIS 1400 KILOCYCLE SIGNAL BY ADJUSTING THE SMALL TRIMMER CONDENSER which is located underneath near the center and towards the front of the chassis.

5. Next adjust the antenna variable gang condenser section trimmer condenser for maximum output (front section).

6. Leave the receiver operating on the same band and set the oscillator frequency to approximately 600 kilocycles and adjust the dial to approximately 600 kilocycles. Then while rocking the variable condenser slightly to the right and left, adjust the 600 kilocycle padding condenser which is located below the speaker and accessible through the front of the chassis for maximum output.

7. Recheck the 1400 kilocycle adjustment.

8. Place the band selector switch for operation on the 16 to 5.2 megacycle band and tune the dial to exactly 15 megacycles and set the oscillator frequency to 15 megacycles. Then adjust the trimmer condenser which is located underneath and toward the center of the right hand side of the chassis for maximum output.

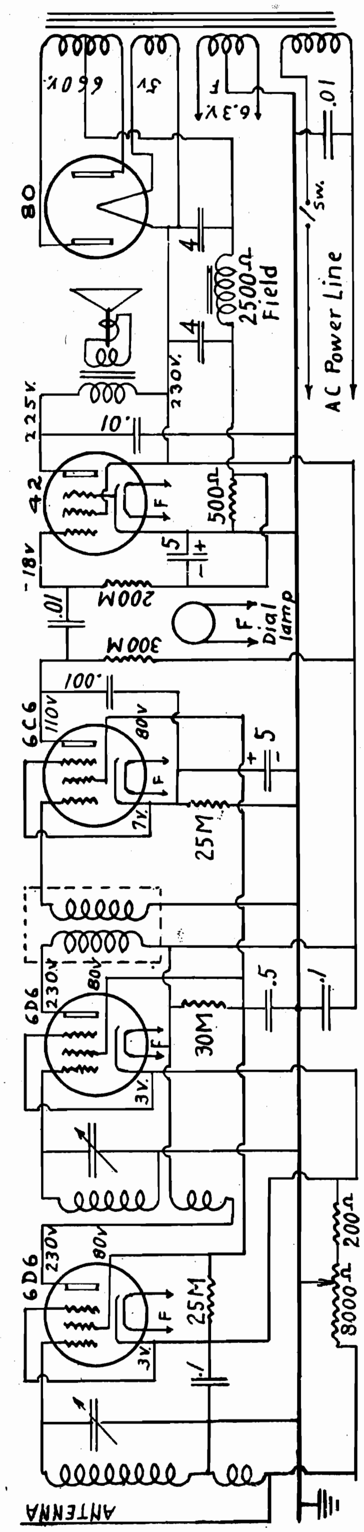
This completes the alignment procedure and it is suggested that all the adjustments be rechecked.

## PARTS & PRICE LIST

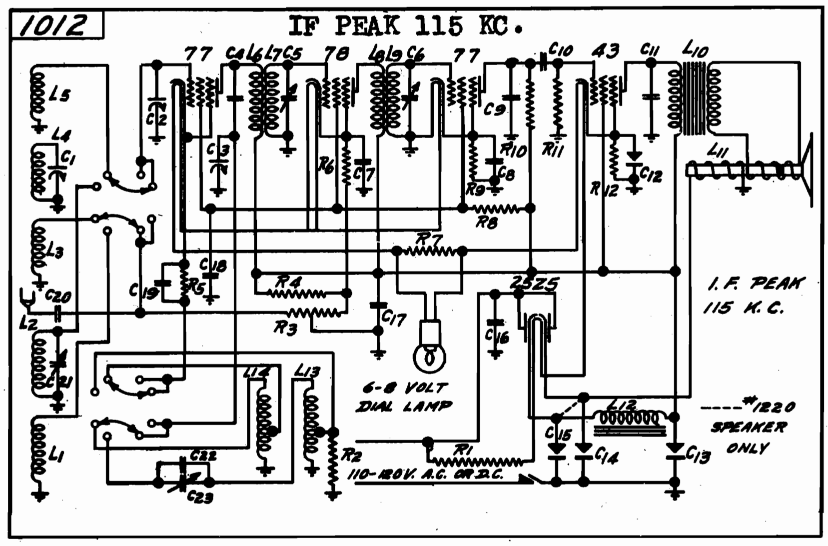
| PART NUMBER | | LIST PRICE |
|---|---|---|
| 1113 | Antenna Coil | $ 1.63 |
| 1114 | Oscillator Coil | 1.63 |
| 1005 | First I. F. Transformer | 2.10 |
| 9862 | Second I. F. Transformer | 2.10 |
| 1118 | Wave Switch | .75 |
| 1103 | Gang Condenser | 3.02 |
| 1104 | Volume Control | 1.24 |
| 9660 | Power Transformer | 4.02 |
| 9659 | 2-8 Mfd. Electrolytic Condenser | 2.80 |
| 9673 | Padding Condenser | .50 |
| 9799 | Trimmer Condenser | .15 |
| 9671 | Pilot Light Socket | .09 |
| 6248 | 2.5 Volt Pilot Light Socket | .17 |
| 1104 | Tuning Dial | .28 |
| 1068 | Wire Wound Resistor Strip | .96 |
| 6984 | 500,000 Ohm 1/3 Watt Resistor | .19 |
| 7997 | 1 Meg Ohm 1/3 Watt Resistor | .19 |
| 8000 | 100,000 Ohm 1/3 Watt Resistor | .19 |
| 8906 | 250,000 Ohm 1/3 Watt Resistor | .19 |
| 6875 | 250 Ohm 1/3 Watt Resistor | .19 |
| 9018 | 150 Ohm 1/3 Watt Resistor | .19 |
| 8907 | 25,000 Ohm 1/3 Watt Resistor | .19 |
| 1176 | 10,000 Ohm 1/3 Watt Resistor | .19 |
| 9698 | 1 Mfd. 100 Volt Condenser | .56 |
| 9386 | .1 Mfd. 200 Volt Condenser | .19 |
| 7862 | .004 Mfd. 400 Volt Condenser | .17 |
| 7860 | .01 Mfd. 400 Volt Condenser | .17 |
| 1115 | 2x.1 Mfd. 200 Volt Condenser | .35 |
| 9691 | .05 Mfd. & .001 Mfd. 400 Volt Condenser | .39 |
| 1108 | 2 Mfd. Dry Electrolytic Condenser | .99 |
| 9307 | .005 Mfd. Moulded Condenser | .55 |
| 9458 | .00025 Mfd. Moulded Condenser | .21 |
| 7934 | .0001 Mfd. Moulded Condenser | .21 |
| 9459 | .0005 Mfd. Moulded Condenser | .21 |
| 8980 | Tube Shield | .11 |
| 1179 | Large Knob | .15 |
| 1180 | Knob with dot | .17 |
| 9759 | Small Knob | .14 |

MODEL TC-40 Schematic
MODEL TC-52 Schematic
Parts List

# TRANSFORMER CORP. OF AMER. (New Co.)




Model TC-40

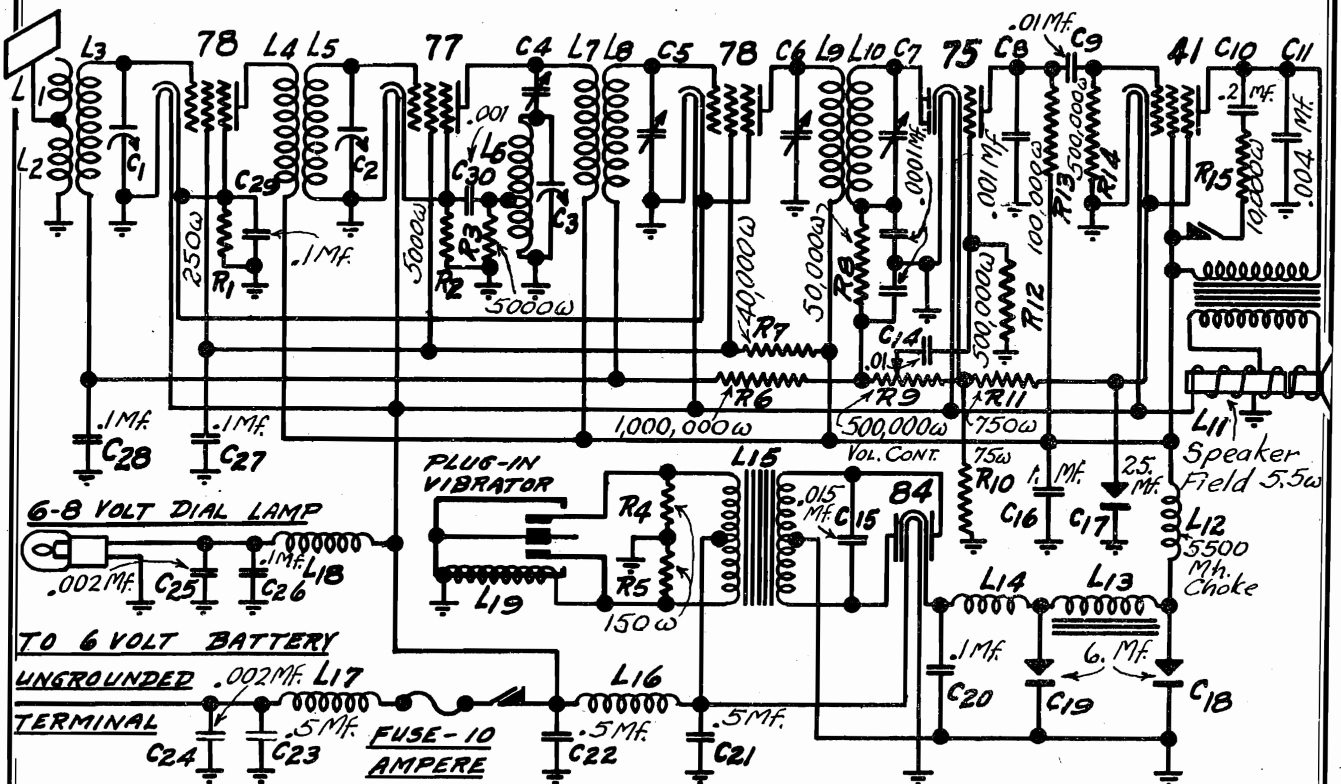



| CODE | PART NO. | RESISTORS |
|---|---|---|
| R1 | 1125 | 130 Ohm Resistor in Power Cord A.P. |
| R2 | 1063 | 500 Ohm Long Wave Oscillator Resistor |
| R3 | 1296 | 10,000 Ohm Volume Control & Switch |
| R4 | 922 | 75,000 Ohm I.F. Cathode Resistor |
| R5 | 919 | 5,000 Ohm Oscillator Feed Resistor |
| R6 | 1063 | 500 Ohm I.F. Cathode Bias Resistor |
| R7 | 1308 | 20 Ohm Pilot Light Shunt Resistor |
| R8 | 921 | 40,000 Ohm R.F. & I.F. Screen Feed Resistor |
| R9 | 941 | 20,000 Ohm Second Detector Cathode Bias Resistor |
| R10 | 924 | 250,000 Ohm Second Detector Plate Load Resistor |
| R11 | 925 | 500,000 Ohm 43 Grid Bias Resistor |
| R12 | 1063 | 500 Ohm 43 Cathode Bias Resistor |
| | | **CONDENSERS** |
| C1 | 833 | 371 MMFD. First Preselector Section of 3 Gang |
| C2 | 833 | 371 MMFD. Second Preselector Section of 3 Gang |
| C3 | 833 | 336 MMFD. Oscillator Section of 3 Gang |
| C4 | 264 | .00005 MFD. Oscillator Plate Feed Condenser |
| C5 | 1521 | 75-150 MMFD. First I.F. Trimmer |
| C6 | 1523 | 75-150 MMFD. Second I.F. Trimmer |
| C7 | 272A | .1 MFD. 200 Volt I.F. Cathode By-Pass |
| C8 | 183A | .2 MFD. 200 Volt Second Detector Cathode By-Pass |
| C9 | 662 | .002 MFD. Mica Second Detector Plate Filter |
| C10 | 269A | .01 MFD. 400 Audio Feed Condenser |
| C11 | 269A | .01 MFD. 400 Volt Output Plate Filter |
| C12 | 928 | 25 MFD. 25 Volt 43 Cathode By-Pass |
| C13 | 1295 | 4 MFD. 150 W.V. Dry Electrolytic |
| C14 | 1295 | 4 MFD. 150 W.V. Dry Electrolytic |
| C15 | 1295 | 10 MFD. 150 W.V. Dry Electrolytic |
| C16 | 272A | .1 MFD. 200 Volt Line By-Pass Condenser |
| C17 | 267A | .5 MFD. 200 Volt B. Supply By-Pass Condenser |
| C18 | 272A | .1 MFD. 200 Volt R.F. & I.F. Screen By-Pass |
| C19 | 265 | .001 MFD. Mica Oscillator Coupling Condenser |
| C20 | 265 | .001 MFD. Mica Antenna Series Condenser |
| C21 | 972 | 2 Plate L.W. Preselector Trimmer |
| C22 | 339 | 2-.0001 MFD. Mica L.W. Oscillator Series Condenser |
| C23 | 1522 | 75-100 MMFD. L.W. Oscillator Series Trimmer |
| | | **INDUCTANCES** |
| L1 | 1475 | L.W. Preselector Primary 800 Turns #36 S.S.E. |
| L2 | 1475 | Long-Wave Preselector Secondary 490 Turns #36 S.S.E. |
| L3 | 847 | Broadcast Preselector Primary 178 Turns #36 S.S.E. |
| L4 | 847 | Broadcast First Secondary 133 Turns #36 S.S.E. |
| L5 | 847 | Broadcast Second Secondary 128 Turns #36 S.S.E. |
| L6 | 1470 | Microhenry First I.F. Primary |
| L7 | 1470 | 25,000 Microhenry First I.F. Secondary |
| L8 | 1473 | 25,000 Microhenry Second I.F. Primary |
| L9 | 1473 | 25,000 Microhenry Second I.F. Secondary |
| L10 | | #43 Output Transformer 917 Rola 1220 Quam |
| L11 | | 3000 Ohm Speaker Field 917 Rola 1220 Quam |
| L12 | 940 | 20 Henry Choke |
| L13 | 1476 | L.W. Oscillator 390 Turns #36 S.S.E. Tapped 20 Turns |
| L14 | 1470 | Broadcast Oscillator 106 Turns #36 S.S.E. Tapped 30 Turns |

Model TC-52

MODEL TC-50
Schematic
Voltage
Alignment Data

TRANSFORMER CORP. OF AMER. (New Co.)




IF PEAK 175 KC.

R-F. ADJUSTMENT: Remove chassis from case, couple the output of a modulated oscillator from antenna to ground, set the dial at 1400 and the oscillator at 1400 KC.

Place the oscillator and receiver in operation and adjust the oscillator output so that a weak signal is heard in the loudspeaker when the volume control is at its maximum position.

Adjust trimming condensers, starting with C3, C2 and then C1, until maximum output is obtained. Readjust a second time as there is a slight interlocking of adjustments. Greater accuracy can be obtained with an output meter.

I-F. ADJUSTMENT: The four I-F. trimming condensers are adjusted at 175 KC.

Connect a modulated oscillator set at 175 KC. between the first detector grid and ground. Connect output meter.

Adjust the tuning condenser so that no signal except the I-F. oscillator is heard at maximum volume, With the volume control set at maximum, reduce the output of the oscillator until a small deflection is obtained. Unless this is done, the AVC action will make correct adjustments impossible.

Trim in order C4, C5, C6 and C7. Repeat adjustments and then follow with the R-F. adjustments.

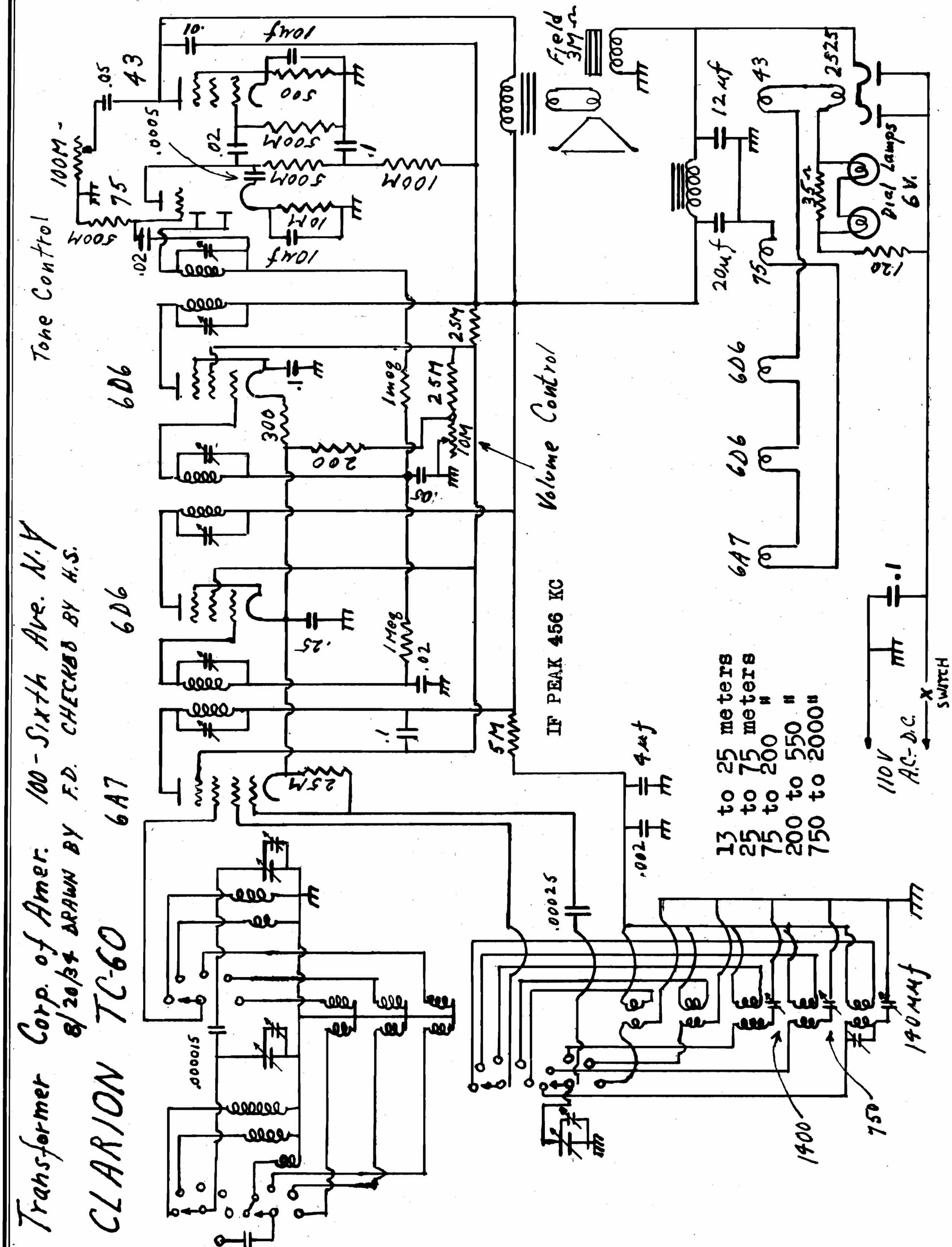
SOCKET VOLTAGES

| | TUBE | CATHODE-PLATE | CATHODE-SCREEN | CATHODE-GRND. | PLATE CUR. |
|---|---|---|---|---|---|
| R-F. | 78 | 180 | 85 | 2 | 4 MA. |
| Det-Osc. | 77 | 180 | 85 | 4 | 6.3 " |
| I-F. | 78 | 180 | 85 | 2 | 4 |
| 2Det.AVC. | 75 | 125 | -- | 2 | 1 |
| Output | 41 | 175 | 180 | 15 | 17 |

Heater Voltage 5.5 volts.

MODEL TC-60
Schematic

TRANSFORMER CORP. OF AMER. (New Co.)



MODEL TC-60
Alignment Data
Parts List

# TRANSFORMER CORP. OF AMER. (New Co.)

The action of the A.V.C. will defeat the purpose of an output meter if used in the normal manner. To obviate this, the oscillator output should be turned to as low a setting as will cause a reading on the output meter with the volume control on the set turned to maximum. This will allow the out meter to function correctly. Adjust the test oscillator to 456 K.C. and connect to the grid cap of the 6A7 tube and adjust the trimmers on the three I.F. stages. (There are two adjustments in each coil; a screw and a nut.)

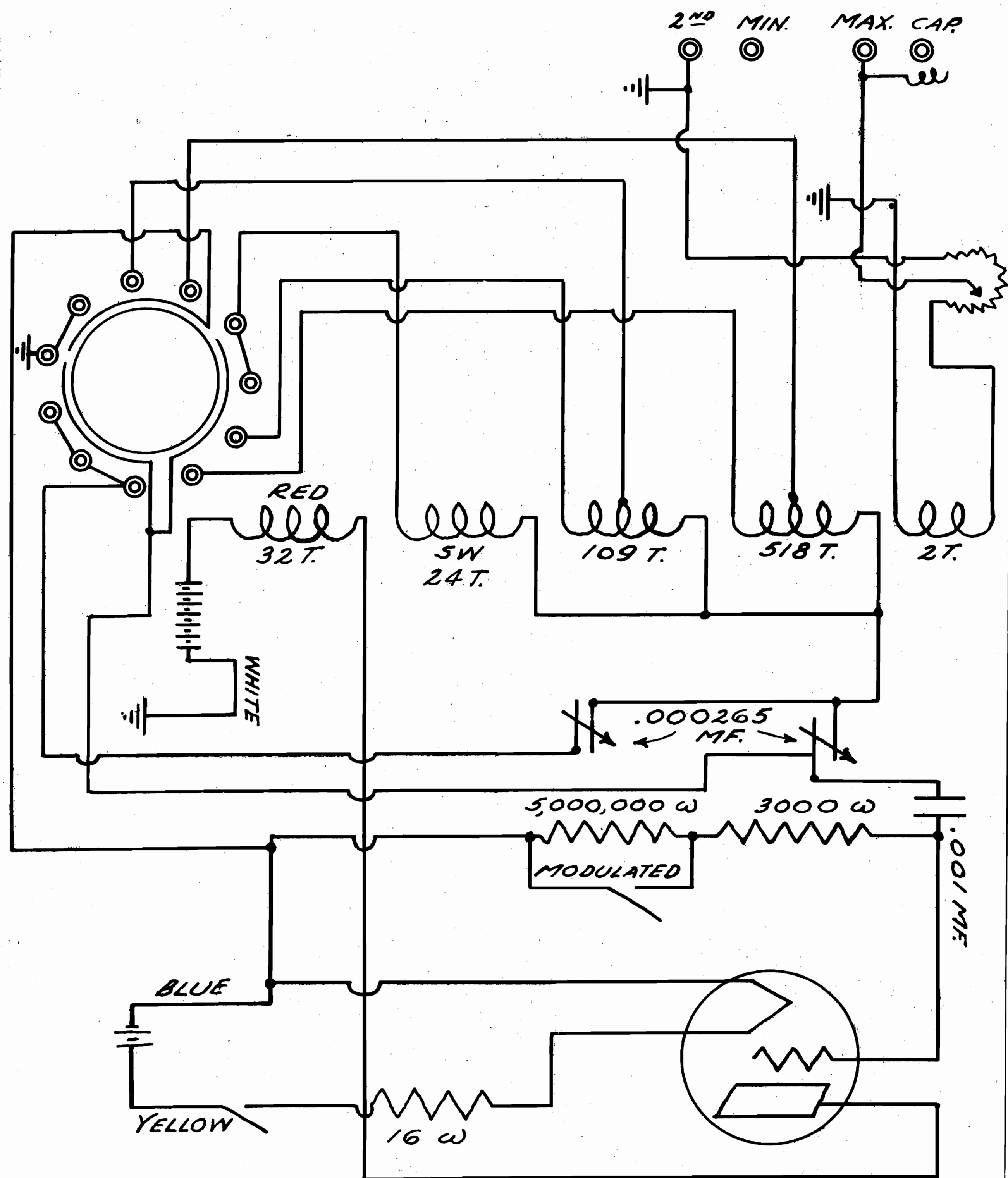
R.F. ALIGNMENT-Connect oscillator to antenna wire on set and adjust oscillator to 1400 K.C. Set receiver dial to 1400 K.C. and wave band switch to the broadcast position. Adjust output of oscillator as outlined under I.F. alignment. Adjust trimmers on sections 1 and 2 for maximum output. Then adjust section 3 of the variable condenser for maximum output. The oscillator padder condenser is the center one of three located on the back of the chassis. In the event that the oscillator section does not track through the broadcast band; this trimmer should be adjusted.

No adjustments are necessary on the other wave bands. All the coils are correctly matched so that they will be in alignment if the above adjustments are correctly made.

| PART NO. | LIST PRICE PARTS LIST | PRICE |
|---|---|---|
| TCG-1001 | 3000 ohm 5" speaker single 43 trans | $ 5.20 |
| TCG-1002 | BROADCAST Oscillator and I st I.F. coil | 2.95 |
| TCG-1003 | Second I.F. Transformer | 1.95 |
| TCG-1004 | Third I.F. Transformer | 1.95 |
| TCG-1005 | LONG wave oscillator loading coil | .70 |
| TCG-1006 | Broadcast and long wave preselector | 2.50 |
| TCG-1007 | S.W. antenna Coil 13-25 Meter band | .55 |
| TCG-1008 | S.W. " " 25-75 " " | .55 |
| TCG-1009 | S.W. " " 75-200 " " | .55 |
| TCG-1010 | S.W. Oscilator " 13-25 " " | .55 |
| TCG-1011 | S.W. " " 25-75 " " | .55 |
| TCG-1012 | S.W. " " 75-200 " " | .55 |
| TCG-1013 | 200 Filter choke | 1.20 |
| TCG-1014 | 3 gang variable condenser | 3.60 |
| TCG-1015 | 3000 ohm vol. cont. with switch | 1.10 |
| TCG-1016 | 100,000 tone control | .75 |
| TCG-1017 | 3 gang 6 circuit 5 position wave change switch | 2.10 |
| TCG-1018 | 20-12 mfd. 100 w.v. filter cond. | 1.95 |
| TCG-1019 | 4 mfd. 100 wv Filter cond. | .80 |
| TCG-1020 | Dual 10 mfd. By-pass cond. | 1.20 |
| TCG-1021 | .25 mfd. 200V Tubular cond. | .24 |
| TCG-1022 | .1 mfd. 200V Tubular Cond. | .16 |
| TCG-1023 | .05 " " " " | .14 |
| TCG-1024 | .02 " " " " | .13 |
| TCG-1025 | .01 " " " " | .13 |
| TCG-1026 | .006 " 400V " " | .13 |
| TCG-1027 | Moulded Mica cond. 000015,002, and .0005 mfd. | ..20 |
| TCG-1028 | Trimmer cond. 3-30 mmf. | .20 |
| TCG-1029 | Triple Padding cond. strip, 140-600-1500 mmf. | 1.60 |
| TCG-1030 | Line resistor 155 ohms tapped at 20 ohms | 1.20 |
| TCG-1031 | 500 ohm 1/2 watt Carbon Resistor | .25 |
| TCG-1032 | 1/3 Watt carbon resistor any value | .19 |

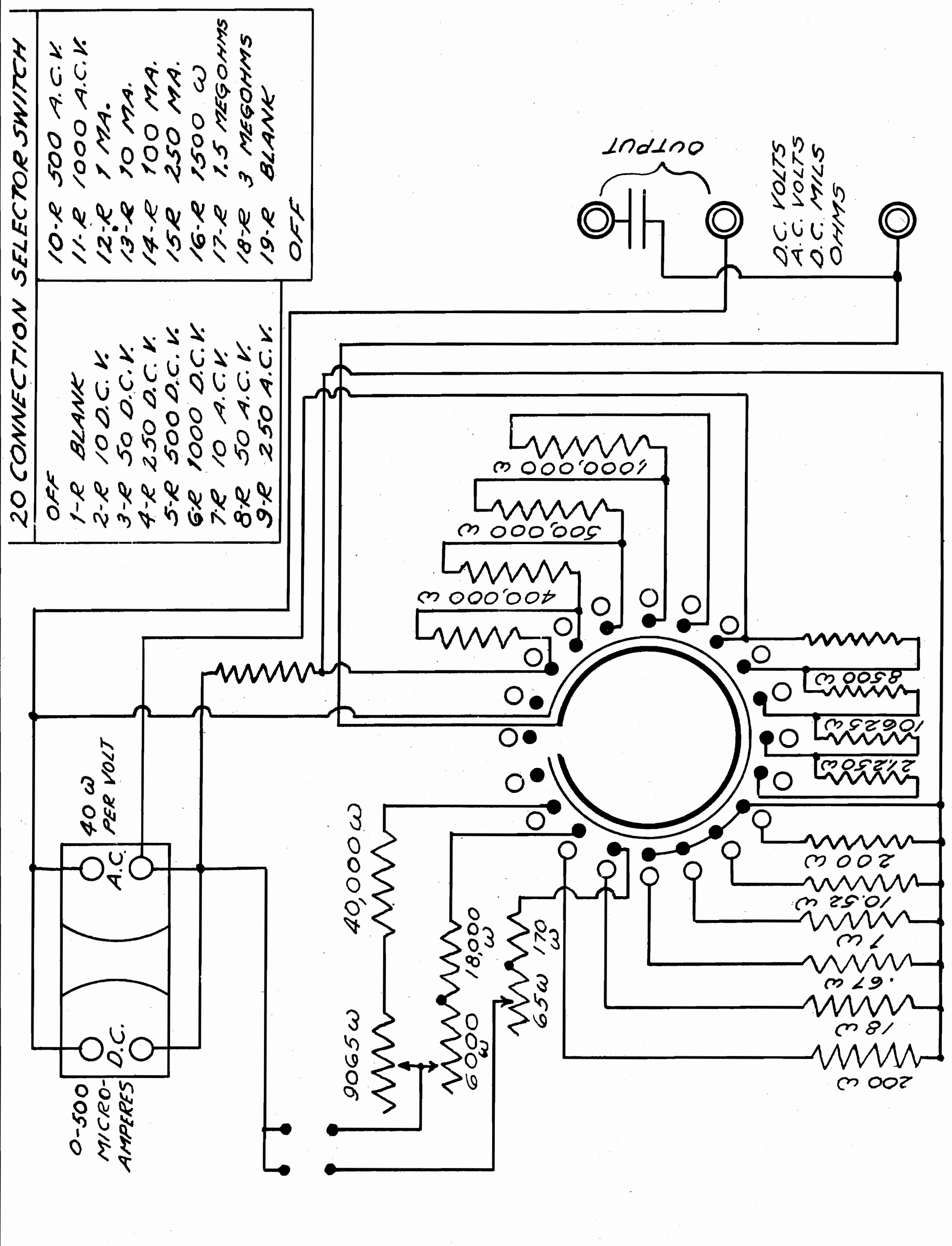
TRIPLETT ELECTRICAL INSTRUMENT CO.

MODEL 1151
Oscillator
Schematic



MODEL 1200
Tester
Schematic

# TRIPLETT ELECTRICAL INSTRUMENT CO.

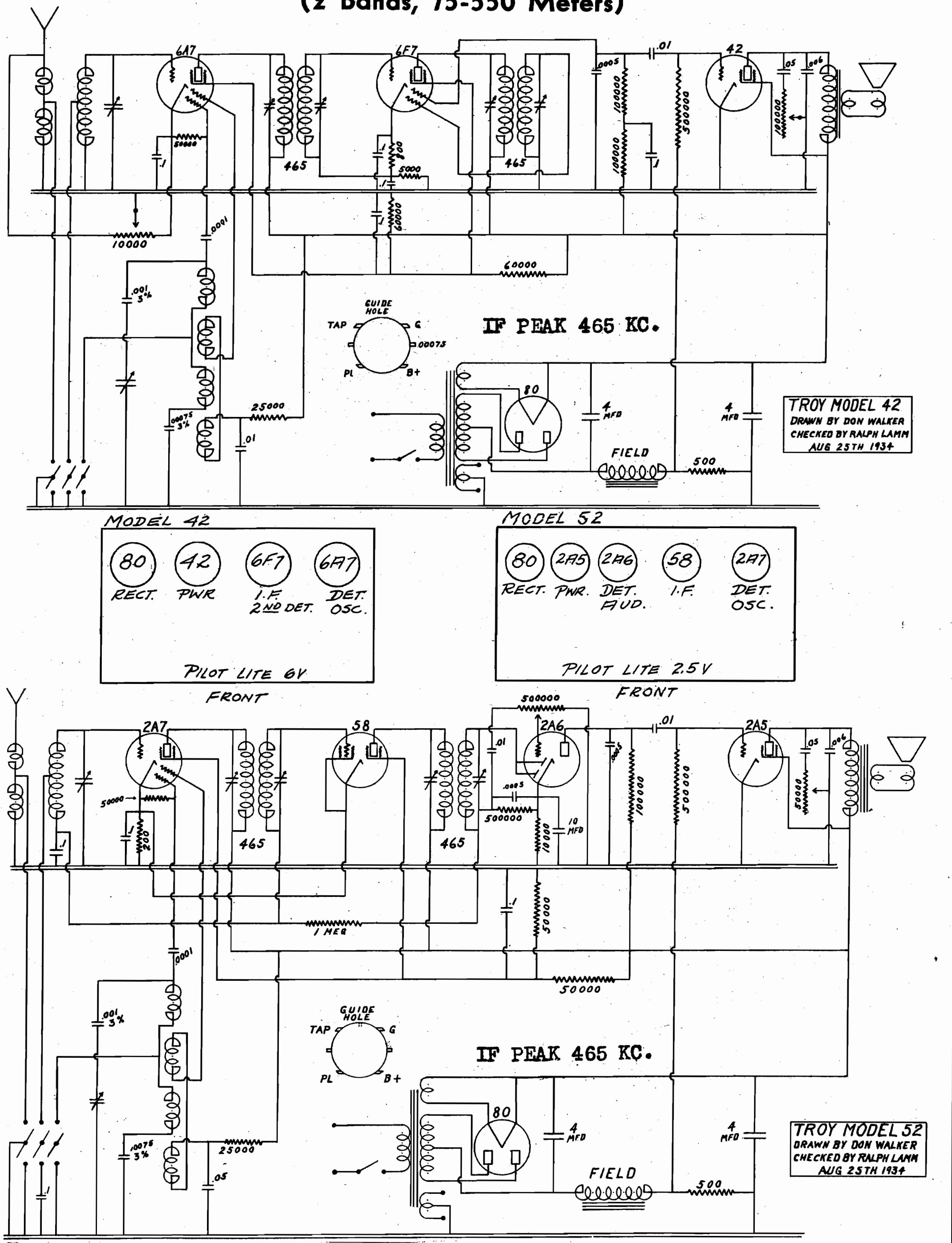


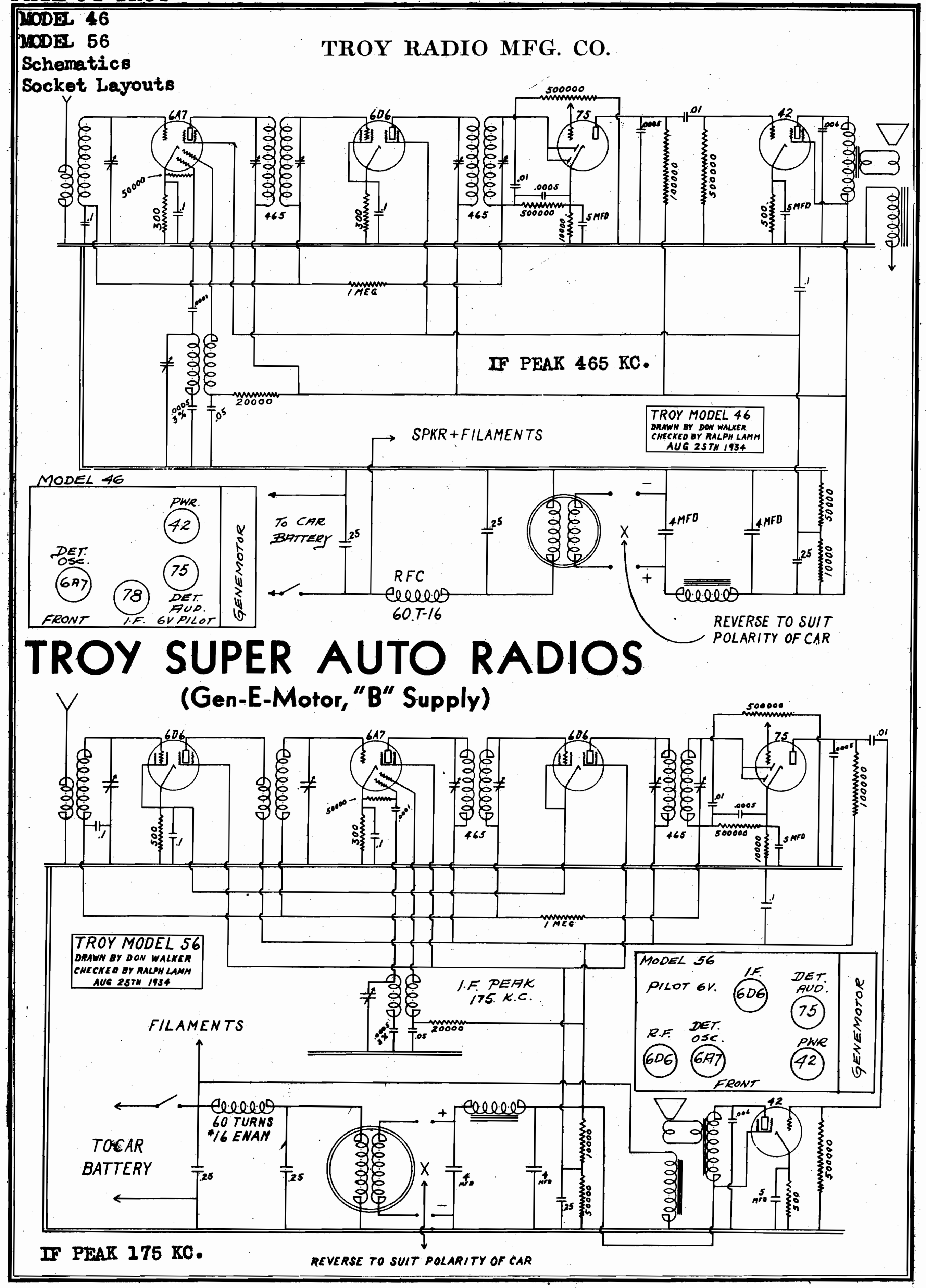
MODEL 42
MODEL 52
Schematics
Socket Layouts

TROY RADIO MFG. CO.

# TROY 4 and 5 TUBE SUPERS

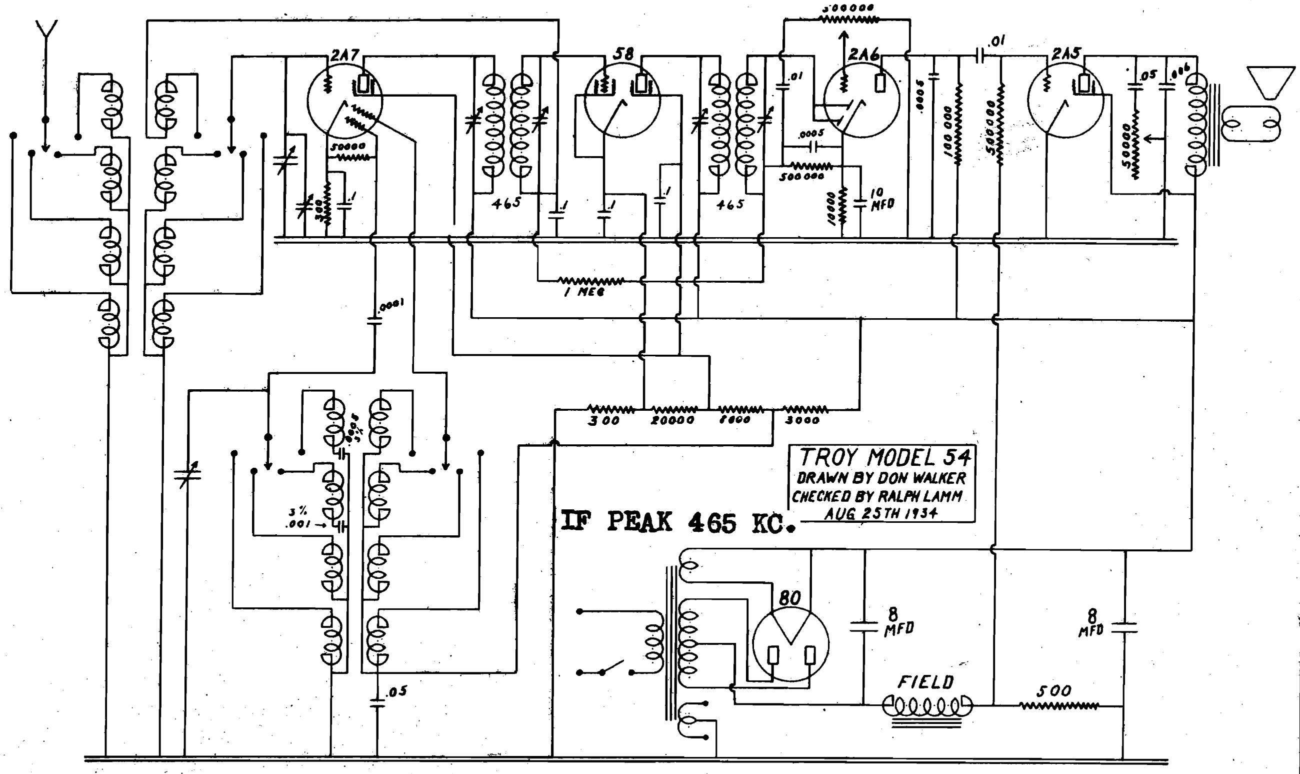
## (2 Bands, 75-550 Meters)




MODEL 46
MODEL 56
Schematics
Socket Layouts
TROY RADIO MFG. CO.
6A7
6D6
75
42
500000
.01
.0005
.006
50000
300
.1
465
100000
10000
5 MFD
500
1 MEG
.0001
20000
.05
IF PEAK 465 KC.
TROY MODEL 46
DRAWN BY DON WALKER
CHECKED BY RALPH LAMM
AUG 25TH 1934
SPKR + FILAMENTS
MODEL 46
PWR.
DET. OSC.
DET. AUD.
78
FRONT
I.F.
6V PILOT
GENEMOTOR
To CAR BATTERY
.25
RFC
60 T-16
4 MFD
REVERSE TO SUIT POLARITY OF CAR
TROY SUPER AUTO RADIOS
(Gen-E-Motor, "B" Supply)
TROY MODEL 56
DRAWN BY DON WALKER
CHECKED BY RALPH LAMM
AUG 25TH 1934
I.F. PEAK 175 K.C.
FILAMENTS
MODEL 56
PILOT 6V.
R.F.
60 TURNS #16 ENAM
TO CAR BATTERY
IF PEAK 175 KC.
REVERSE TO SUIT POLARITY OF CAR

MODEL 54
MODEL 84
Schematic

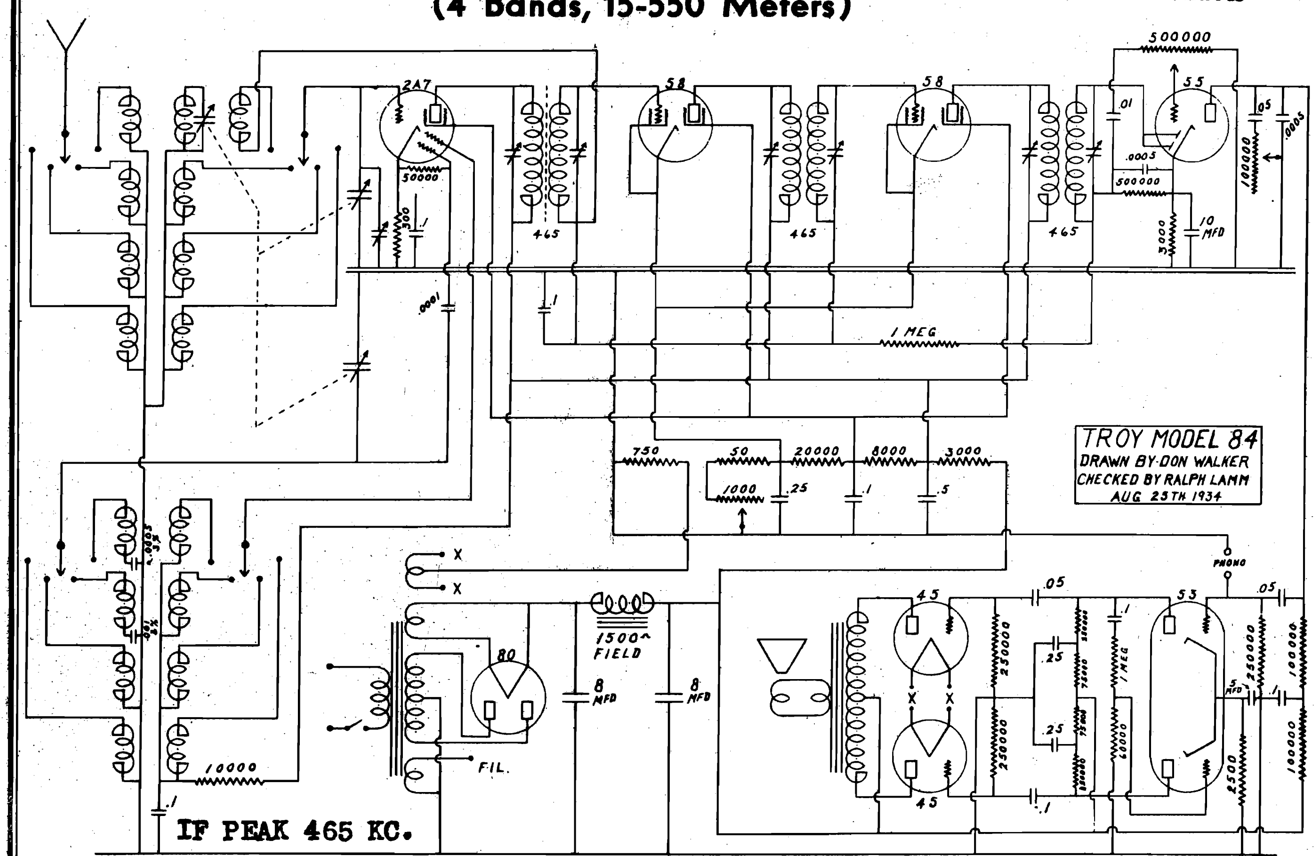
TROY RADIO MFG. CO.




# TROY ALL WAVE SUPERS

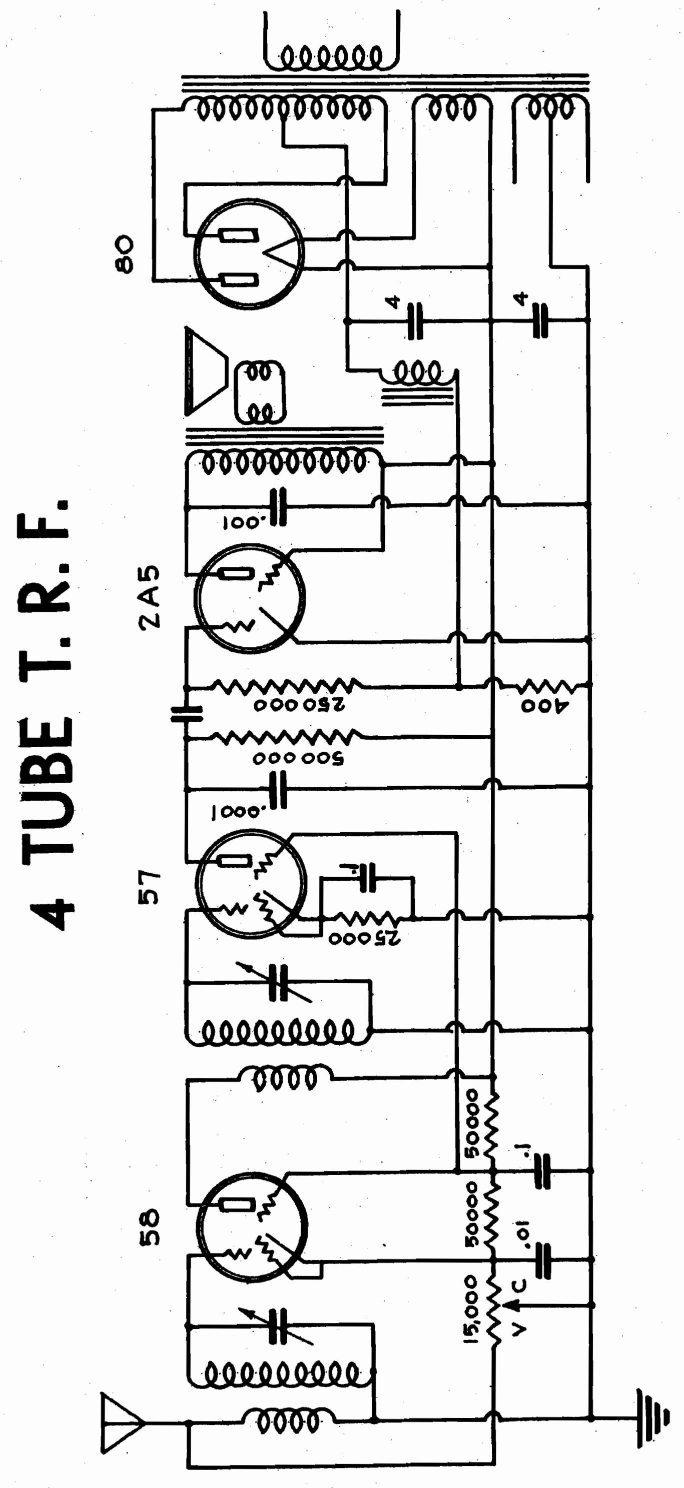
## (4 Bands, 15-550 Meters)

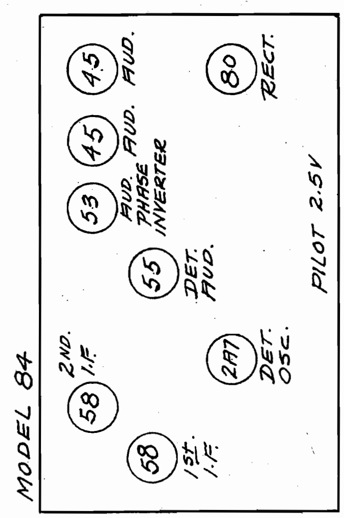
For Socket Layout, see Index

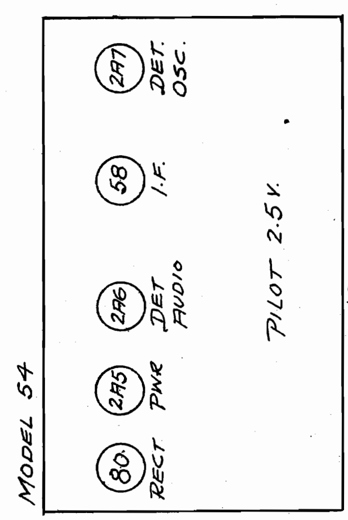


MODEL 4-Tube TRF
Schematic
MODELS 54,84
Socket Layouts

TROY RADIO MFG. CO.

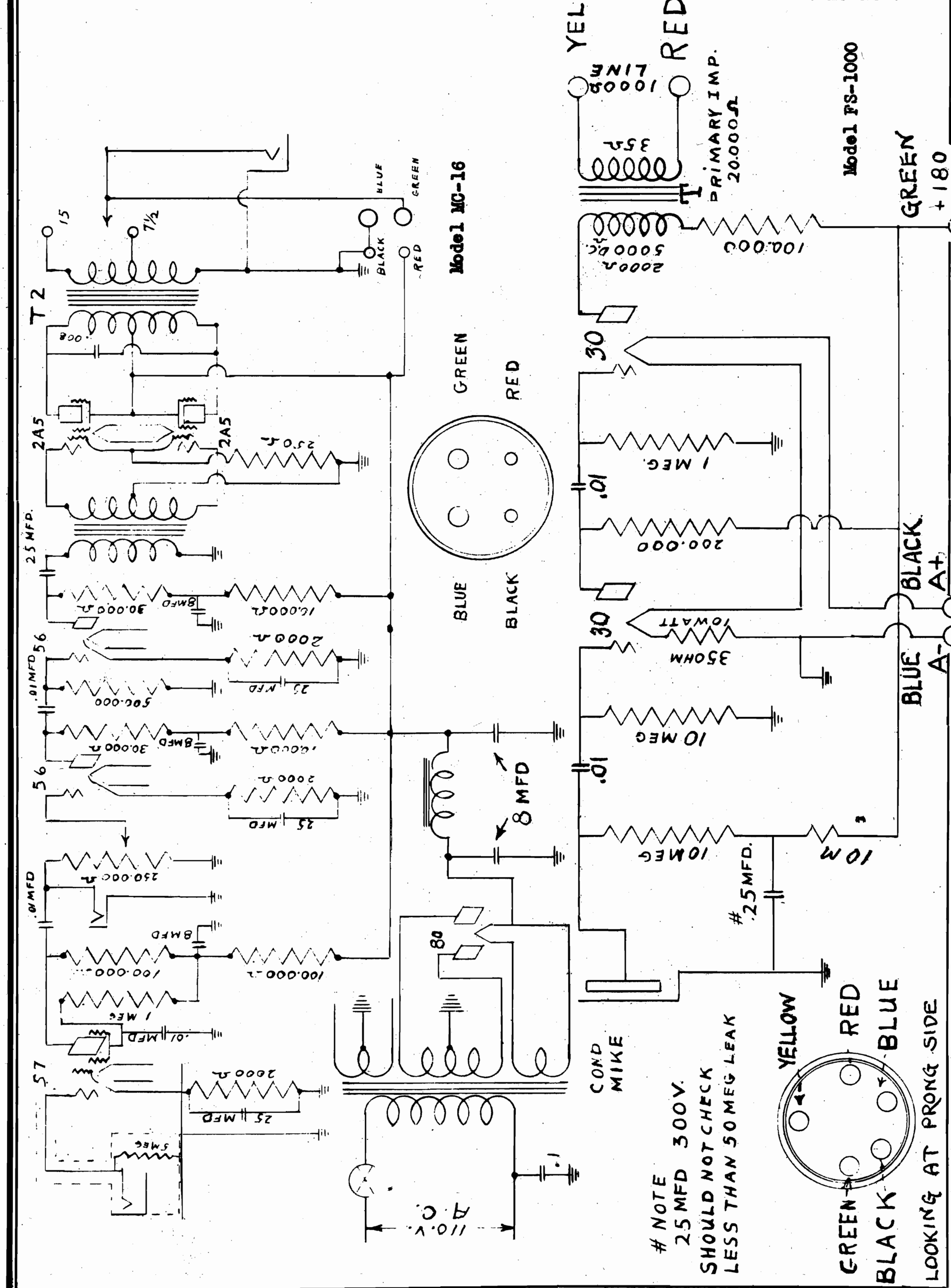


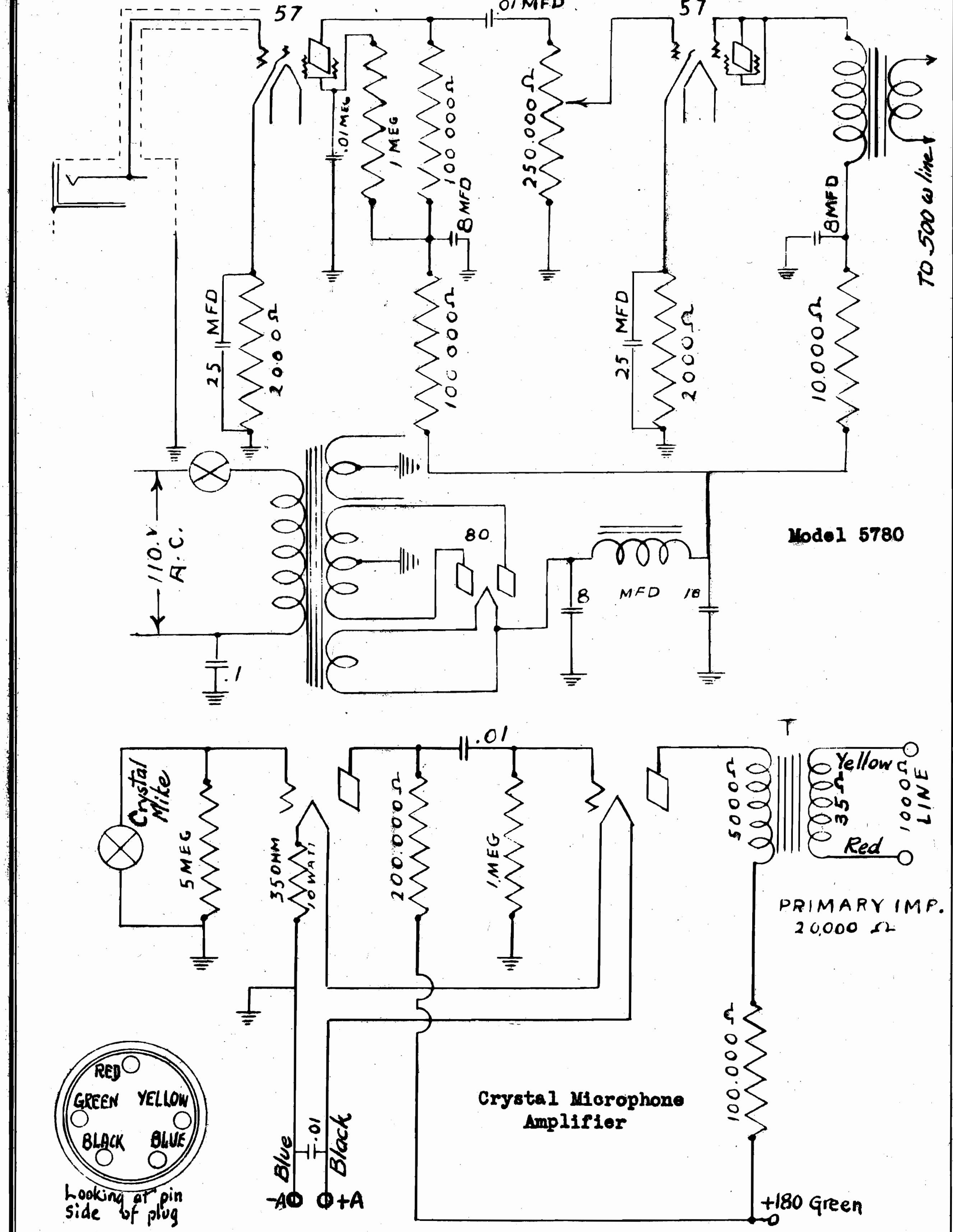
TURNER CO.

MODEL MC-16
MODEL FS-1000
Schematic



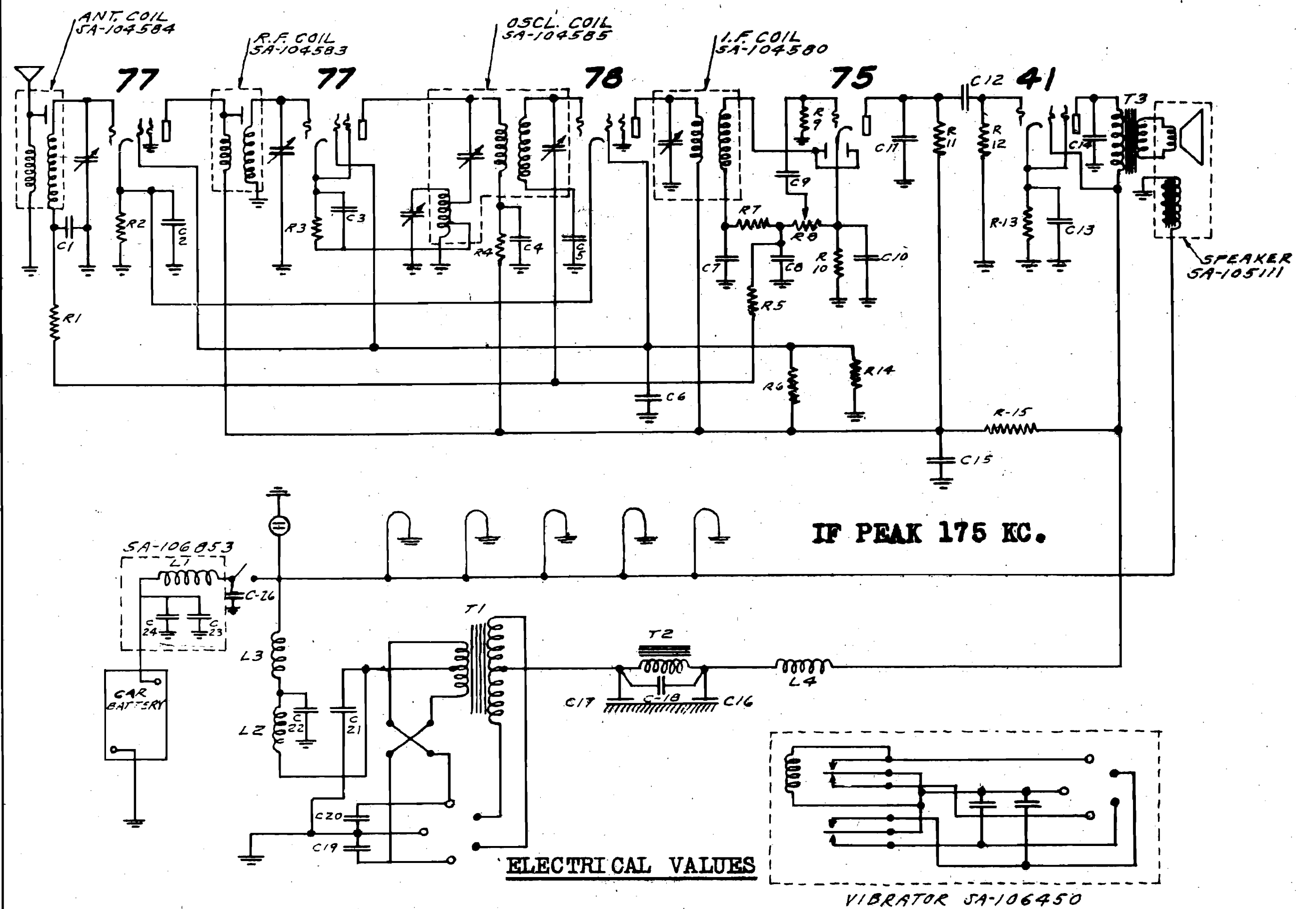
**MODEL 5780**
**MODEL Crystal-Microphone Amplifier Schematic**

# TURNER CO



**MODEL 45-A, 45-C**
**Schematic**
**Color Code**

# UNITED AMERICAN BOSCH CORP.




## ELECTRICAL VALUES

| | | | | | |
|---|---|---|---|---|---|
| R-1 | 100,000 ohms 1/4 watt | R-19 | --- | C-16 | 8 mfd. electrolytic |
| R-2 | 750 ohms 1/4 watt | R-20 | --- | C-17 | 8 mfd. electrolytic |
| R-3 | 7500 ohms 1/4 watt | C-1 | .05 - 2 ply | C-18 | .1 mfd. - 2 ply |
| R-4 | 2000 ohms 1/4 watt | C-2 | .25 - 2 ply | C-19 | .05 mfd. - 2 ply |
| R-5 | 1/2 meg. 1/4 watt | C-3 | .002 - 4 ply | C-20 | .05 mfd. - 2 ply |
| R-6 | 40,000 ohms 1/4 watt | C-4 | .05 - 3 ply | C-21 | .5 mfd. 200 V. in can |
| R-7 | 50,000 ohms 1/4 watt | C-5 | .05 - 2 ply | C-22 | .5 mfd. 200 V. in can |
| R-8 | 1/2 meg. Volume Control | C-6 | .05 - 3 ply | C-23 | .5 mfd. mica |
| R-9 | 1 meg. 1/4 watt | C-7 | .0001 mfd. mica | C-24 | .001 mfd. mica |
| R-10 | 5,000 ohms 1/4 watt | C-8 | .0001 mfd. mica | C-25 | --- |
| R-11 | 1/4 meg. 1/4 watt | C-9 | .005 - 3 ply | C-26 | .0001 mica |
| R-12 | 1/2 meg. 1/4 watt | C-10 | .25 - 2 ply | L-1 | R.F. Choke coil |
| R-13 | 600 ohms 1/2 watt | C-11 | .003 - 4 ply | L-2 | Choke coil |
| R-14 | 75,000 ohms 1/4 watt | C-12 | .005 - 3 ply | L-3 | R.F. Choke coil |
| R-15 | 4,000 ohms 1 watt | C-13 | 10 mfd. electrolytic | L-4 | R.F. Choke coil |
| R-16 | --- | C-14 | .005 - 3 ply | T-1 | Power Transformer |
| R-17 | --- | C-15 | .05 - 3 ply | T-2 | Choke coil |
| R-18 | --- | | | T-3 | Output Transformer |

## STANDARD WIRE COLOR CODE

Plate .............Blue
"B" plus ......... Red
Grid ............. Green
Screen ........... Green and White
Cathode .......... Black
A.V.C. ........... Red & Yellow or White
"B" minus ........ Black and White
Ground ........... Black and Red
Overhead grid .... Green rubber

## STANDARD VOLUME CONTROL WIRING

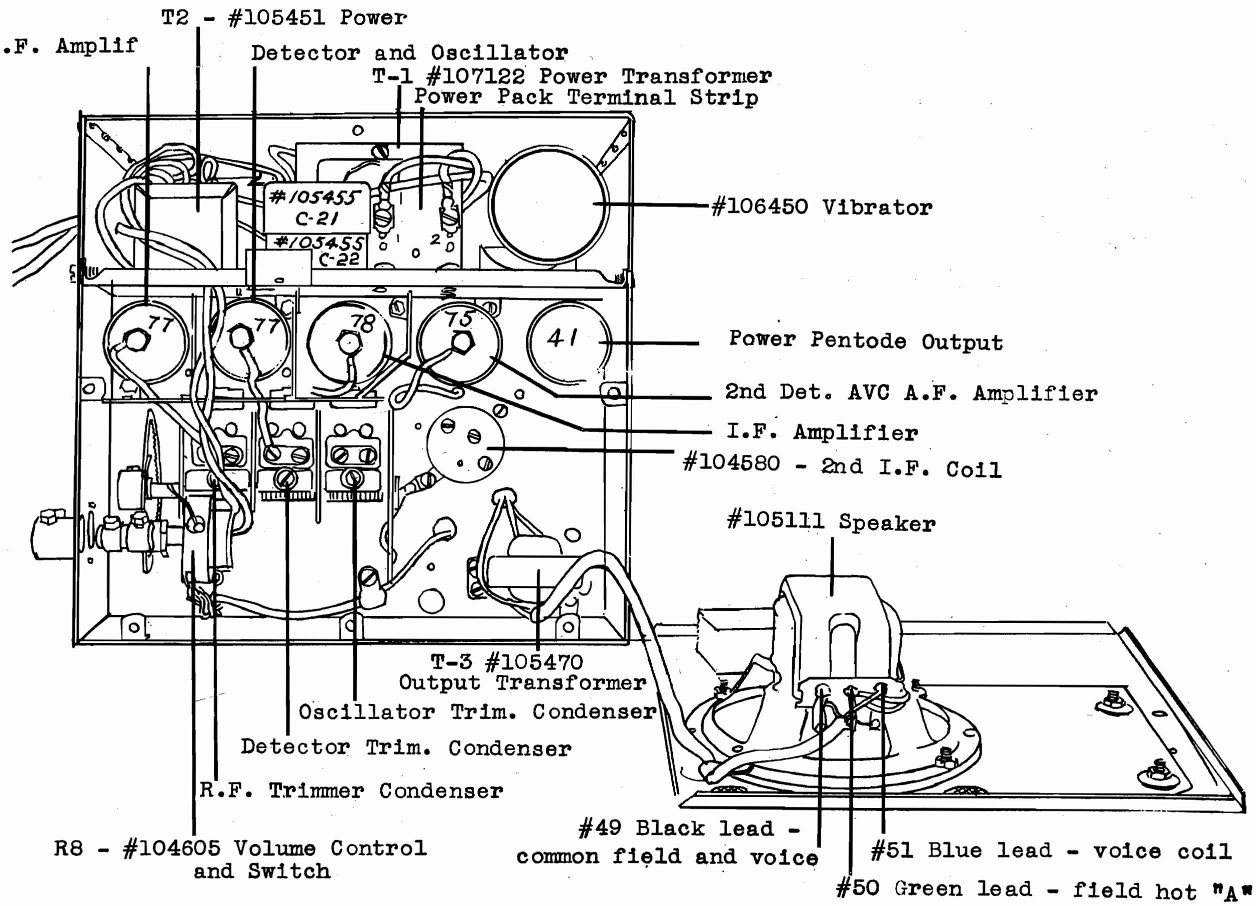
Arm ............ Green
Low Side ....... Black
High ........... Red and White

## R.M.A. RESISTOR COLOR CODE

| BODY | TIP | DOT |
|---|---|---|
| 0 - BLACK | 0 - BLACK | .0 - BLACK |
| 1 - BROWN | 1 - BROWN | 0 - BROWN |
| 2 - RED | 2 - RED | 00 - RED |
| 3 - ORANGE | 3 - ORANGE | 000 - ORANGE |
| 4 - YELLOW | 4 - YELLOW | 0000 - YELLOW |
| 5 - GREEN | 5 - GREEN | 00000 - GREEN |
| 6 - BLUE | 6 - BLUE | 000000 - BLUE |
| 7 - PURPLE | 7 - PURPLE | |
| 8 - GREY | 8 - GREY | |
| 9 - WHITE | 9 - WHITE | |

MODEL 45-A, 45-C
Alignment Data

# UNITED AMERICAN BOSCH CORP.




## ADJUSTING AND ALIGNING INSTRUCTIONS

All of the adjustable condensers, commonly called trimmer condensers, are very accurately adjusted at the factory and will not need any further adjustments unless a coil or I.F. transformer is changed, or the adjustments tampered with in the field. Therefore, DO NOT attempt to change the setting of any of the trimmer condensers unless it is definitely known that adjustment is necessary, and a test oscillator is available, then proceed as follows:

1. Connect output meter across voice coil of speaker terminals #49 and #51 (Fig. #1).
2. Set test oscillator at 175 kilocycles (using .1 mfd. antenna condenser).
3. Connect test oscillator lead to grid of the first I. F. tube.
4. Adjust condenser on primary of second I. F. transformer on top of set to peak on output meter.
5. Connect test oscillator lead to grid of first detector tube.
6. Adjust condenser on primary of first I. F. transformer (under set) to peak.
7. Adjust condenser on secondary of first I.F. transformer to peak. (There are two small holes on side of housing for adjustment #6 and #7.)

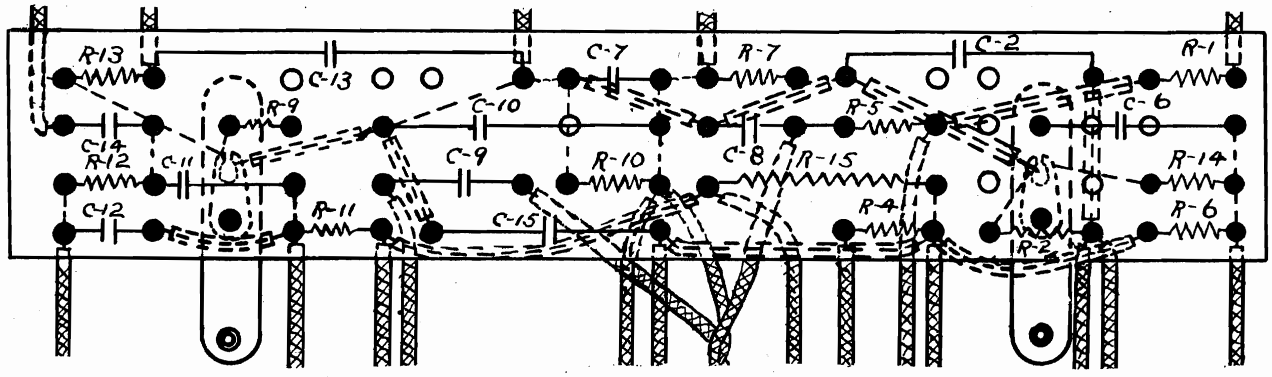
The above procedure lines up the I. F. stages properly and our attention can now be turned to the oscillator and R. F. adjustments, which are made as follows:

1. Set test-oscillator at 1500 kilocycles (using .1 mfd. antenna condenser).
2. Connect test-oscillator lead to grid of first detector.
3. Set gang condenser at 1500 kilocycles as follows:
   (a) Open gang to fullest extent.
   (b) Close slowly to thickness of approximately .015".
4. Peak oscillator trimmer on end of condenser gang.
5. Set test-oscillator at 1400 kilocycles.
6. Connect test-oscillator to antenna lead (using .0002 mfd. antenna condenser).
7. Peak other two condensers on gang.
8. Do not touch oscillator trimmer at 1400 kilocycles setting of gang.

This set should now be fully aligned and normal sensitivity prevail.

**MODEL 45-A,45-C**
**Testing Data**
**Parts List**

# UNITED AMERICAN BOSCH CORP.




## TESTING

(d) SPEAKER: Check field supply with voltohmmeter at speaker, reading between points #49 and #50 (Fig. #1) on speaker terminals (5.8 volts or over). Unsolder blue lead from speaker (#51) and test across terminals #49 and #51 for continuity of voice coil. (Reading full scale ohmmeter.)

(e) SECONDARY OUTPUT TRANSFORMER: After unsoldering blue lead from terminal (#51 Fig. #1), test with ohmmeter between blue lead and terminal #49 (full scale reading - ohmmeter).

(f) CHASSIS: After checking the components listed above, test the voltages as they appear on voltage chart and Fig. #4. The resistance measurements as found in "Resistance Chart" and Fig. #5. If any particular reading obtained is very different from the chart reading, the trouble is located in the portion of the circuit associated with the points at which this discrepancy occurs. Referring to circuit diagram and location drawings (Figs. #1, #2, #3), each part making up the circuit may be individually tested until the faulty part is specifically located.

### RESISTORS

| | Ohms | Body | Tip | Dot |
|---|---|---|---|---|
| 106879 | Resistor strip assembly | | | |
| 105247 | 7,500 | Purple | Green | Red |
| 105265 | 750 | Purple | Green | Brown |
| 101211 | 600 | Blue | Black | Brown |
| 105249 | 5,000 | Green | Black | Red |
| 105278 | 100,000 | Brown | Black | Yellow |
| 105245 | 2,000 | Red | Black | Red |
| 105246 | 1/2 meg. | Green | Black | Yellow |
| 105251 | 40,000 | Yellow | Black | Orange |
| 105276 | 50,000 | Green | Black | Orange |
| 105281 | 1 meg. | Brown | Black | Green |
| 105279 | 1/4 meg. | Red | Green | Orange |
| 105277 | 75,000 | Purple | Green | Orange |
| 106531 | 4,000 | Yellow | Black | Red |
| 104605 | Volume control with switch | | | |

### CONDENSERS

| | |
|---|---|
| 105300 | Suppressor condenser for generator |
| 102495 | Condenser .1 mfd - 2 ply |
| 106386 | Condenser .05 mfd - 2 ply, short |
| 106844 | Variable condenser, complete |
| 103852 | Condenser .002 - 4 ply |
| 102493 | Condenser .05 - 2 ply |
| 102492 | Condenser .05 - 3 ply |
| 106917 | Condenser assembly |
| 106878 | Electrolytic condenser |
| 106853 | Condenser and choke coil assembly |
| 105455 | Condenser for assembly 106853 |
| 103775 | Condenser .001 mica |
| 105568 | Condenser .5 - 2 ply |
| 105000 | Variable condenser |
| 102497 | Condenser .25 - 2 ply |
| 102492 | Condenser .05 - 3 ply |
| 106417 | Condenser .001 mica |
| 103659 | Condenser .005 - 3 ply |
| 105743 | Condenser .003 - 4 ply |
| 105741 | Electrolytic condenser 10 mfd. |

### MAIN ASSEMBLIES

| | |
|---|---|
| 106836 | Chassis and power pack assembly |
| 106891 | Control unit for Model 45A |

### CONTROL UNIT PARTS (45A)

| | |
|---|---|
| 104986 | Dial plate |
| 105090 | Knob (volume control) |
| 104977 | Knob (tuning) |
| 105088 | Frame assembly |
| 106893 | Flexible shaft (volume control) |
| 106892 | Flexible shaft (tuning) |
| 104892 | Thumb screw - dial light assembly |
| 104997 | Dial scale |
| 105114 | Set screw - flexible cable |
| 105151 | Spring |
| 78692 | Felt washer |
| 105179 | Stud - dial scale and bracket |
| 108 | Lock washer for thumb screw |
| 104337 | Screw - mounting |
| 81809 | Nut - mounting |
| 104392 | Washer - mounting |
| 62872 | Lock washer - mounting |
| 105958 | Dial light cable assembly |
| 106809 | Lamp |

### COILS

| | |
|---|---|
| 105452 | R.F. Choke coil (power pack) |
| 105854 | R.F. Choke coil (power pack) |
| 104580 | I.F. Coil complete (chassis) |
| 104583 | R.F. Coil complete (chassis) |
| 104584 | Antenna coil |
| 104585 | Detector and oscillator coil complete |
| 105451 | Choke coil assembly |
| 106853 | Condenser and choke coil assembly |
| 105824 | Choke coil for condenser and choke assembly |

### CABLES AND CABLE ASSEMBLIES

| | |
|---|---|
| 106544 | Dial light cable assembly |
| 105432 | Antenna cable |
| 106543 | Battery cable assembly |
| 105160 | Speaker cable |

### TRANSFORMERS

| | |
|---|---|
| 105470 | Output transformer |
| 107122 | Power transformer |

**MODEL 45-A,45-C**
**Chassis View**
**Data**

# UNITED AMERICAN BOSCH CORP.

The tubes employed in this circuit are as follows:

1 type 77 radio frequency amplifier.
1 type 77 detector oscillator.
1 type 78 intermediate frequency amplifier.
1 type 75 second detector, A.V.C. and audio amplifier.
1 type 41 output tube.

The antenna is coupled to the first stage by means of a transformer. The R.F. stage is coupled to the oscillator by means of a transformer. Resistance coupling is employed between the audio portion of the type 75 tube and the output tube. The first I.F. transformer is doubly tuned and the second I.F. transformer has a tuned primary.

Automatic volume control is provided by utilizing the potential drop in the collector circuit of the type 75 tube. The A.V.C. is made a part of the D.C. grid circuits of the R.F. amplifier and the I.F. amplifier. The intermediate frequency employed is 175 kilocycles.

An electro-dynamic speaker is used with this set. This speaker has a field resistance of 4 ohms and a voice coil resistance of 3.9 ohms.

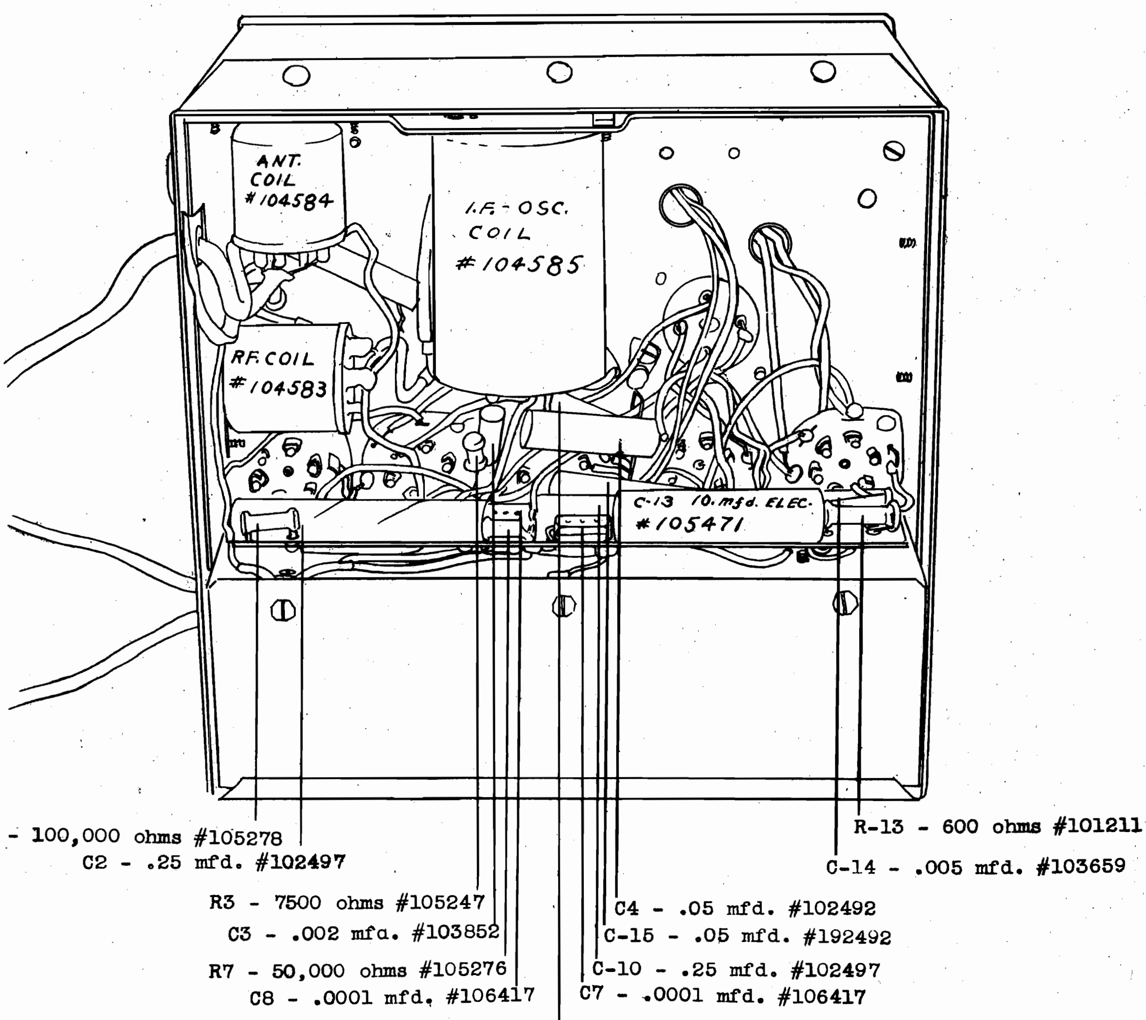



Figure #2

**MODEL 45-A,45-C**
**Voltage**
**Resistance Chart**

# UNITED AMERICAN BOSCH CORP.

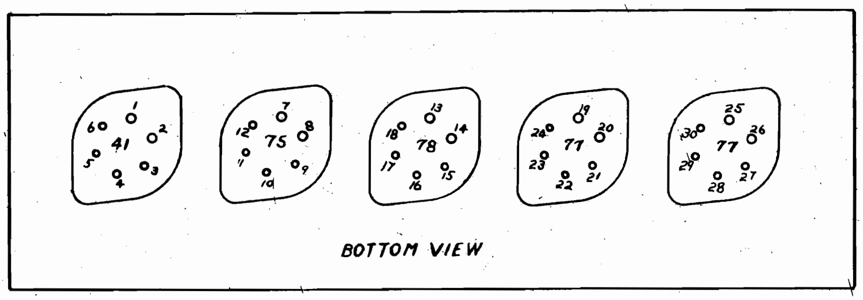



Figure #4

| 41 Power | 75 2nd Det. Audio Amplifier & AVC. | 78 IF Amplifier | 77 Det. Osc. | 77 RF Amplifier |
|---|---|---|---|---|
| 1 - Fil. | 7 - Fil. | 13 - Fil. | 19 - Fil. | 25 - Fil. |
| 2 - Fil. | 8 - Fil. | 14 - Fil. | 20 - Fil. | 26 - Fil. |
| 3 - Plate | 9 - Plate | 15 - Plate | 21 - Plate | 27 - Plate |
| 4 - Screen | 10 - Di Plate | 16 - Screen | 22 - Screen | 28 - Screen |
| 5 - Grid | 11 - Di Plate | 17 - Suppressor | 23 - Suppressor | 29 - Suppressor |
| 6 - Cathode | 12 - Cathode | 18 - Cathode | 24 - Cathode | 30 - Cathode |

## VOLTAGE CHART

Voltages read from ground to following points with Weston Model 564 Voltohmmeter (six volt storage battery used).

| | | | | |
|---|---|---|---|---|
| 2 - 5.5 V. | 8 - 5.5 V. | 14 - 5.5 V. | 20 - 5.5 V. | 26 - 5.5 V. |
| 3 - 178 V. | 9 - 112 V. | 15 - 155 V. | 21 - 155 V. | 27 - 155 V. |
| 4 - 187 V. | 12 - 1.1 V. | 16 - 62 V. | 22 - 62 V. | 28 - 62 V. |
| 6 - 1.3 V. | | 18 - 3.5 V. | 24 - 42 V. | 30 - 3.5 V. |

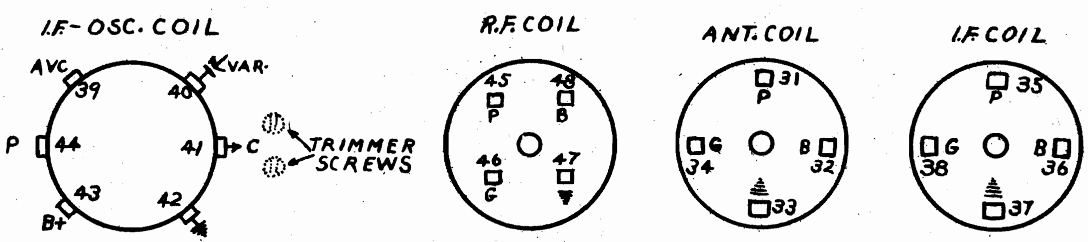



Figure #5

## RESISTANCE CHART

**Antenna Coil**

#31 - 32 Primary - 22 ohms
#33 - 34 Secondary- 3 ohms

**Output Transformer**

Primary - 400 ohms

**I. F. Coil**

#35 - 36 Primary - 95 ohms
#37 - 38 Secondary- 85 ohms

**R. F. Coil**

#45 - 48 Primary - 70 ohms
#46 - 47 Secondary- Full scale

**Socket Readings to Ground**

6 - 600 ohms
12 - 5400 ohms
24 - 8000 ohms
30 - 750 ohms

**"B" Plus Terminal**

#4 to ground about 100,000 ohms (shows kick of cond. discharge on contact).

**Det. Osc. Coil**

(#39 to grid cap 78) I.F. Primary - 75 ohms
(#43 - #44) I.F. Secondary - 70 ohms
(40-42) Oscillator

"B" voltage 185 under set load (with 6 V. storage battery).
Total drain on car battery 4.5 amps.
Output 2.5 watts.
Intermediate frequency 175 K.C.

**MODEL 79-C**
**Chassis View**

# UNITED AMERICAN BOSCH CORP.

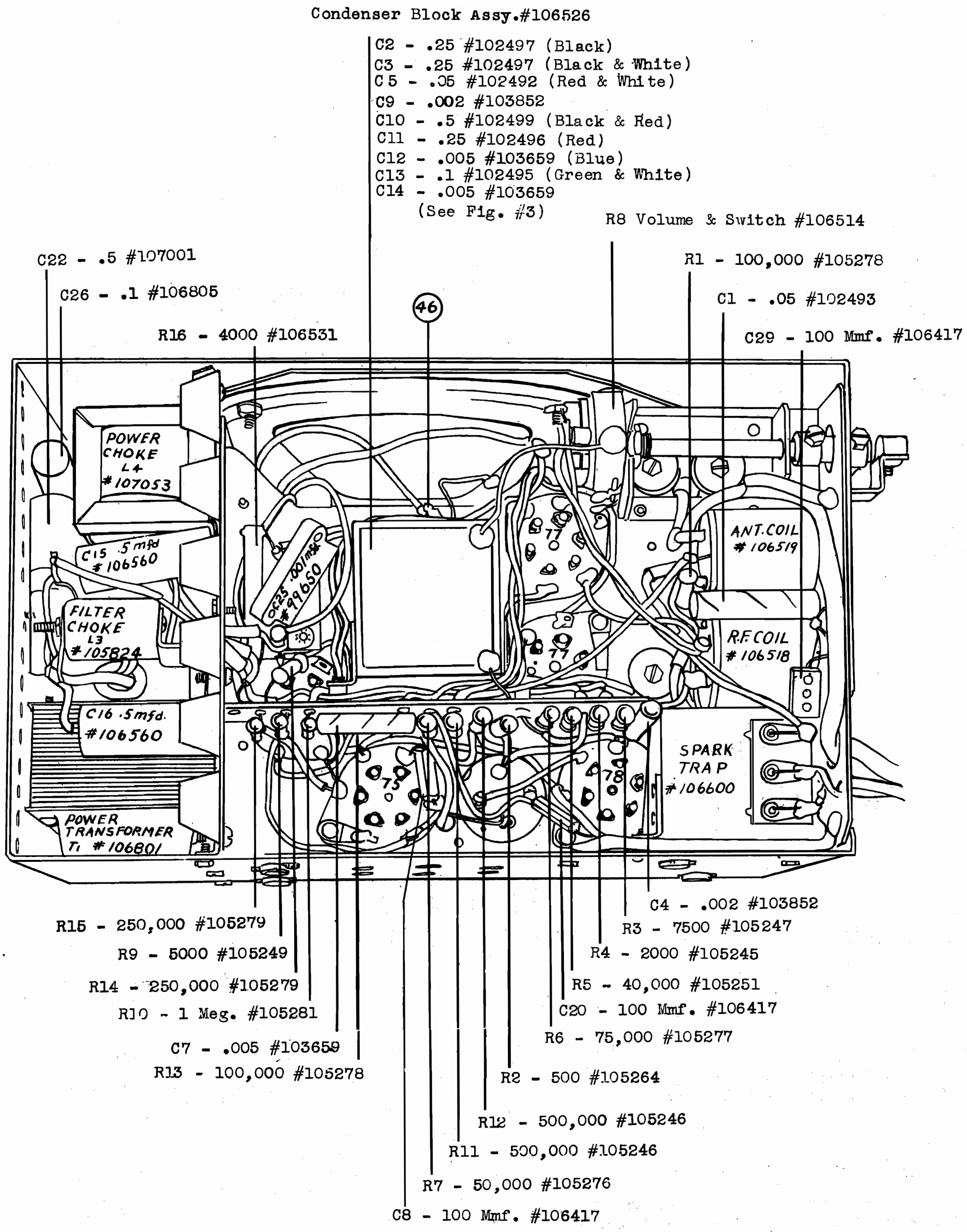
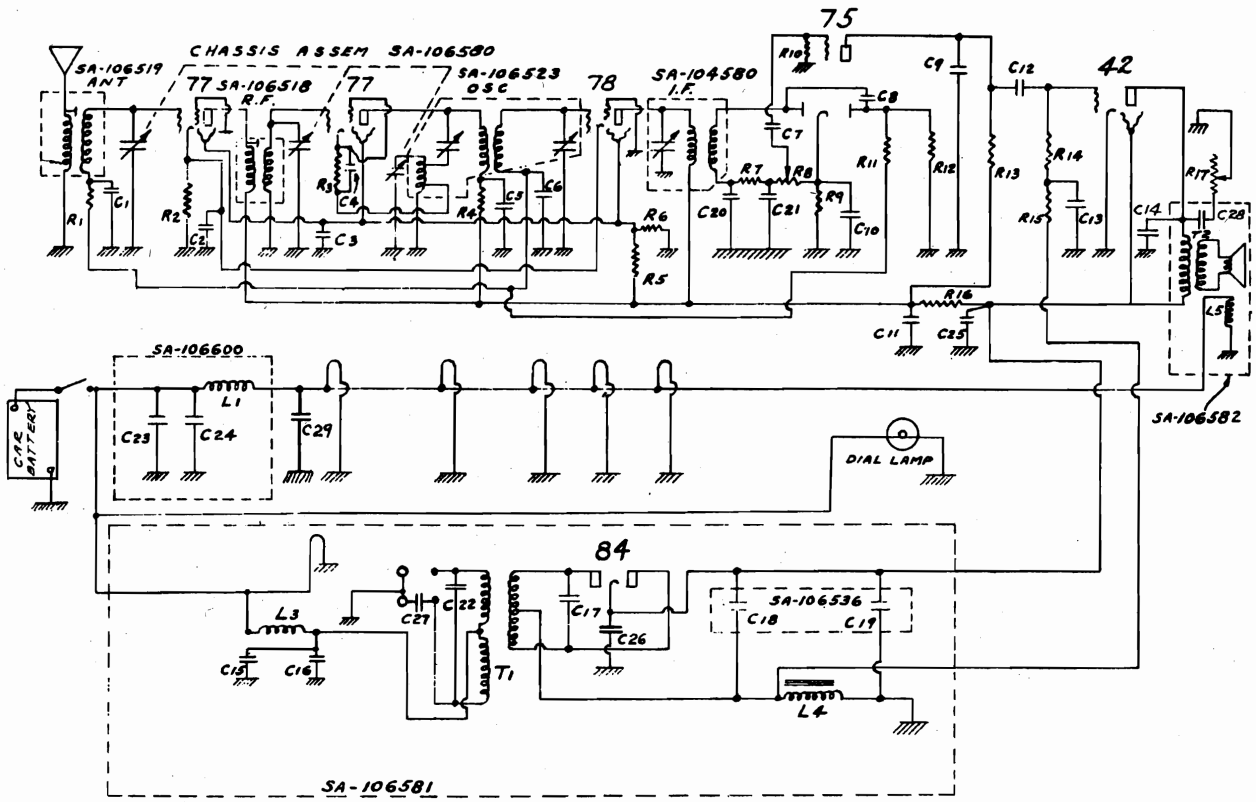


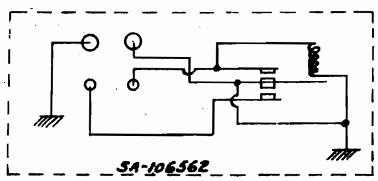

Fig. #2

**MODEL 79-C**
**Schematic**
**Notes**

# UNITED AMERICAN BOSCH CORP.




**IF PEAK 175 KC.**




ELECTRICAL VALUES

| | | |
|---|---|---|
| R-1 100,000 ohms 1/4 watt | C-1 .05 - 2 ply | C-19 10 mf. (450) |
| R-2 500 ohms 1/4 watt | C-2 .25 - 2 ply | C-20 100 mmf. mica |
| R-3 7500 ohms 1/4 watt | C-3 .25 - 2 ply | C-21 100 mmf. mica |
| R-4 2000 ohms 1/4 watt | C-4 .002 - 4 ply | C-22 .5 - 2 ply |
| R-5 40,000 ohms 1/4 watt | C-5 .05 - 3 ply | C-23 .001 mica |
| R-6 75,000 ohms 1/4 watt | C-6 .05 - 2 ply | C-24 .5 - 2 ply |
| R-7 50,000 ohms 1/4 watt | C-7 .005 - 3 ply | C-25 .001 mica |
| R-8 .5 M. volume control | C-8 100 mmf. mica | C-26 .1 - 3 ply |
| R-9 5000 ohms 1/4 watt | C-9 .002 - 4 ply | C-27 .001 mica |
| R-10 1 meg. 1/4 watt | C-10 .5 - 2 ply | C-28 .05 - 3 ply |
| R-11 .5 meg. 1/4 watt | C-11 .25 - 3 ply | C-29 100 mmf. mica |
| R-12 .5 meg. 1/4 watt | C-12 .005 - 3 ply | T-1 Power Transformer |
| R-13 100,000 ohms 1/4 watt | C-13 .1 - 2 ply | T-2 Output Transformer |
| R-14 1/4 meg. 1/4 watt | C-14 .005 - 3 ply | L-1 Filter Choke |
| R-15 1/4 meg. 1/4 watt | C-15 .5 - 2 ply | L-3 Filter Choke |
| R-16 4000 ohms 1 watt | C-16 .5 - 2 ply | L-4 Power Choke |
| R-17 500,000 ohms Tone Control | C-17 .008 - 1600 V. | L-5 Field Coil |
| | C-18 6 mf. (450) | |

Automatic volume control is provided by utilizing the potential drop in the collector circuit of the type 75 tube. The A.V.C. is made a part of the D.C. grid circuits of the R.F. and I.F. amplifiers.

An electro-dynamic speaker is used with this set. This speaker has a field resistance of 5.6 ohms and a voice coil resistance of approximately 3 ohms.

A tone control is provided in the plate circuit of the output tube. This consists of a condenser and variable resistor in series.

**MODEL 79-C**
**Voltage**
**Resistance Chart**

# UNITED AMERICAN BOSCH CORP.

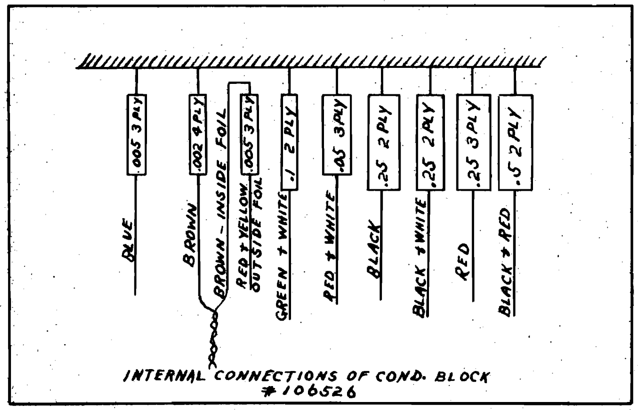



Fig. #3

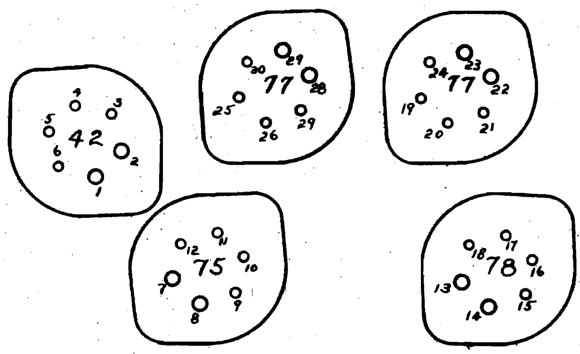



Fig. #4

| 42 Power | 75 2nd Det. AVC | 78 I. F. | 77 Det. Osc. | 77 R. F. |
|---|---|---|---|---|
| #1 - Fil. | #7 - Fil. | #13 - Fil. | #19 - Suppressor | #25 - Suppressor |
| #2 - Fil. | #8 - Fil. | #14 - Fil. | #20 - Screen | #26 - Screen |
| #3 - Cathode | #9 - Cathode | #15 - Cathode | #21 - Plate | #27 - Plate |
| #4 - Grid | #10 - Di Plate | #16 - Suppressor | #22 - Fil. | #28) - Fil. |
| #5 - Screen | #11 - Di Plate | #17 - Screen | #23 - Fil. | #29) - Fil. |
| #6 - Plate | #12 - Plate | #18 - Plate | #24 - Cathode | #30 - Cathode |

## VOLTAGE CHART

Voltage readings from ground to following points with Weston Model 564 Voltohmmeter (.6 volt storage battery used).

| 42 A.F. | 75 2nd Det. | 78 I. F. | 77 Det. Osc. | 77 R.F. |
|---|---|---|---|---|
| #1 - 5.5 V. | #7 - 5.5 | #13 - 5.5 | #20 - 81 | #26 - 81 |
| #5 - 225 | #9 - 1.3 | #15 - 3.0 | #21 - 183 | #27 - 185 |
| #6 - 205 | #12 - 116 | #17 - 81. | #23 - 5.5 | #29 - 5.5 |
| "B" - 12.5 | | #18 - 187 | #24 - 4 to 6 | #30 - 3.1 |

## RESISTANCE CHART

(All measurements made with ohmmeter)

| Antenna Coil | I. F. Coil | R. F. Coil |
|---|---|---|
| 42-44 Primary - 21 ohms | 31-34 Primary - 100 ohms | 49-50 Primary - 80 ohms |
| 43-45 Secondary- 2.5 ohms | 32-33 Secondary- 85 ohms | 51-52 Secondary- Full scale |

**"B" Plug Terminal to Ground**

About 130,000 ohms (shows kick of condenser discharge on contact).

**Output Transformer**

Primary -- 500 ohms

**Detector Osc. Coil**

(37-39) - Osc. grid coil - 5 ohms
(40 to grid cap of 78) - Primary I.F. - 70 ohms
(35 to 36) - Secondary I. F. - 70 ohms

**Sockets (All readings to ground)**

9 - 5500 ohms
24 - 7500 ohms
30 - 550 ohms

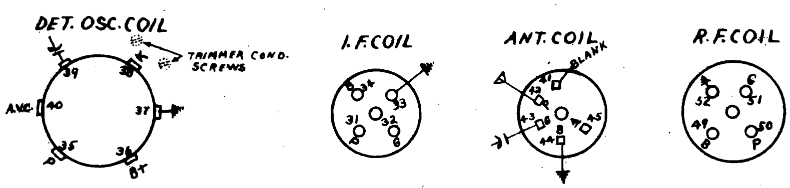



Fig. #5

**MODEL 79-C**
**Alignment Data**
**Socket Layout**

# UNITED AMERICAN BOSCH CORP.

## ALIGNMENT INSTRUCTIONS

All the adjustable condensers, commonly called trimmer condensers, are very accurately adjusted at the factory and will not need any further adjustment unless a coil or I.F. transformer is changed, or the adjustments tampered with in the field. Therefore, DO NOT attempt to change the setting of any of the trimmer condensers unless it is definitely known that adjustment is necessary, and a test oscillator is available, then proceed as follows and refer to Fig. #1.

### (A) I.F. ADJUSTMENT

(Use .1 mfd. antenna condenser)

1. Connect test oscillator to grid of 1st I.F. (78) tube.
2. Adjust small I.F. coil (between 78 and 75 tube) to maximum output.
3. Connect test oscillator to grid of 1st detector (77) tube.
4. Adjust condensers on coil in left hand corner of receiver for maximum output.
5. Repeat the above operations for accuracy.

### (B) OSCILLATOR ADJUSTMENT

(Use .1 mfd. condenser on grid - .002 mfd. on antenna)

1. Connect test oscillator to grid of 1st detector (77) tube. Set at 1500 K.C.
2. Set gang to 1500 K.C. as follows:
   (a) Open gang to fullest extent.
   (b) Close slowly to thickness of approximately .015 of an inch.
3. Peak oscillator condenser on end of gang.
4. Connect test oscillator to antenna lead.
5. Peak other two condensers on gang.
6. Check sensitivity at several points on dial scale.

The set is now fully aligned and normal sensitivity prevails.

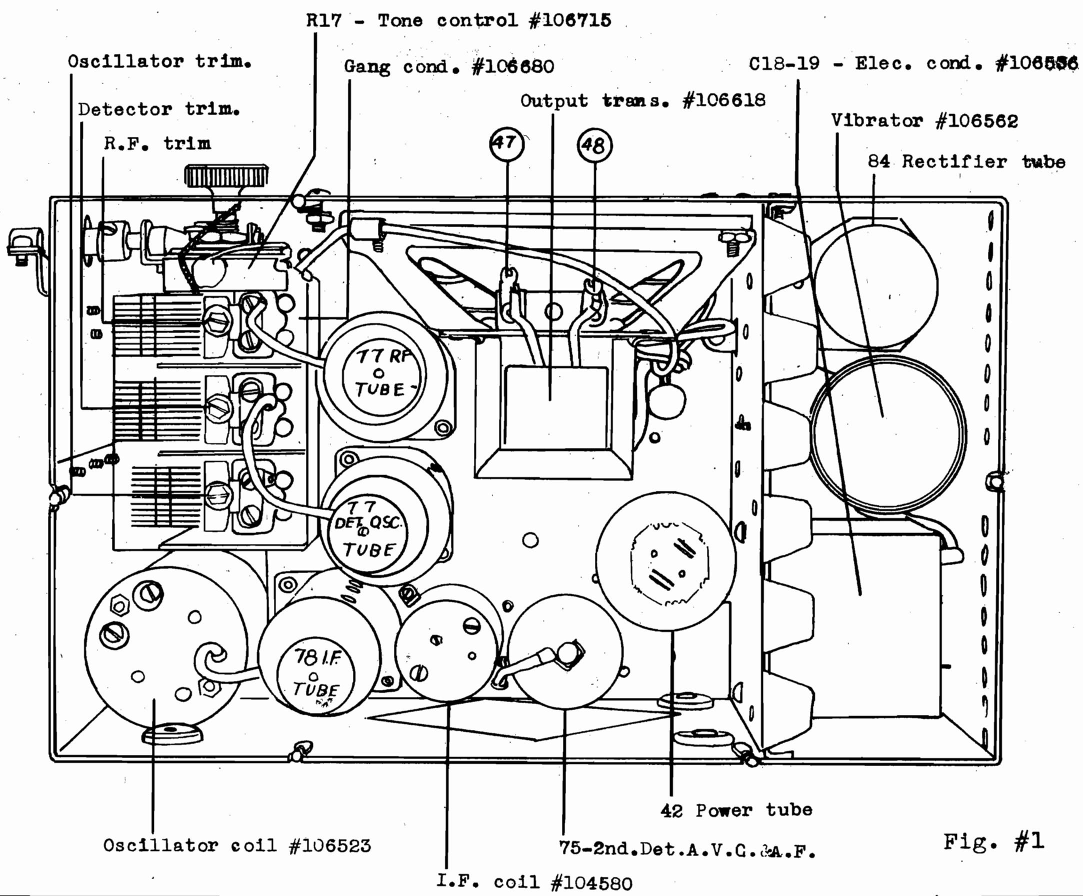



Fig. #1

**MODEL 79-C**
**Parts List**

# UNITED AMERICAN BOSCH CORP.

| Part No. | Description |
|---|---|
| | CONTROL UNIT PARTS |
| 106541 | Flexible volume control shaft |
| 106542 | Flexible tuning shaft |
| 107433 | Knob for tuning |
| 107268 | Control unit knob with key (volume control) |
| 106797 | Control unit dial scale |
| 105627 | Control unit dial glass |
| 107470 | Control unit dial indicator |
| 107333 | Control unit dial frame |
| 105597 | Control unit mounting bracket |
| 106809 | Dial lamp |
| 107424 | Dial light cable assembly (barrel type) |
| 107550 | Dial light cable assembly (spring type) |
| 105608 | Spare key |
| 105607 | Control unit mounting strap assembly |
| | CABLE ASSEMBLIES |
| 107317 | Battery cable assembly |
| 106544 | Dial light cable assembly |
| 105432 | Antenna cable assembly |
| 107320 | Battery cable |
| 107318 | Battery cable (chassis end) |

RESISTORS

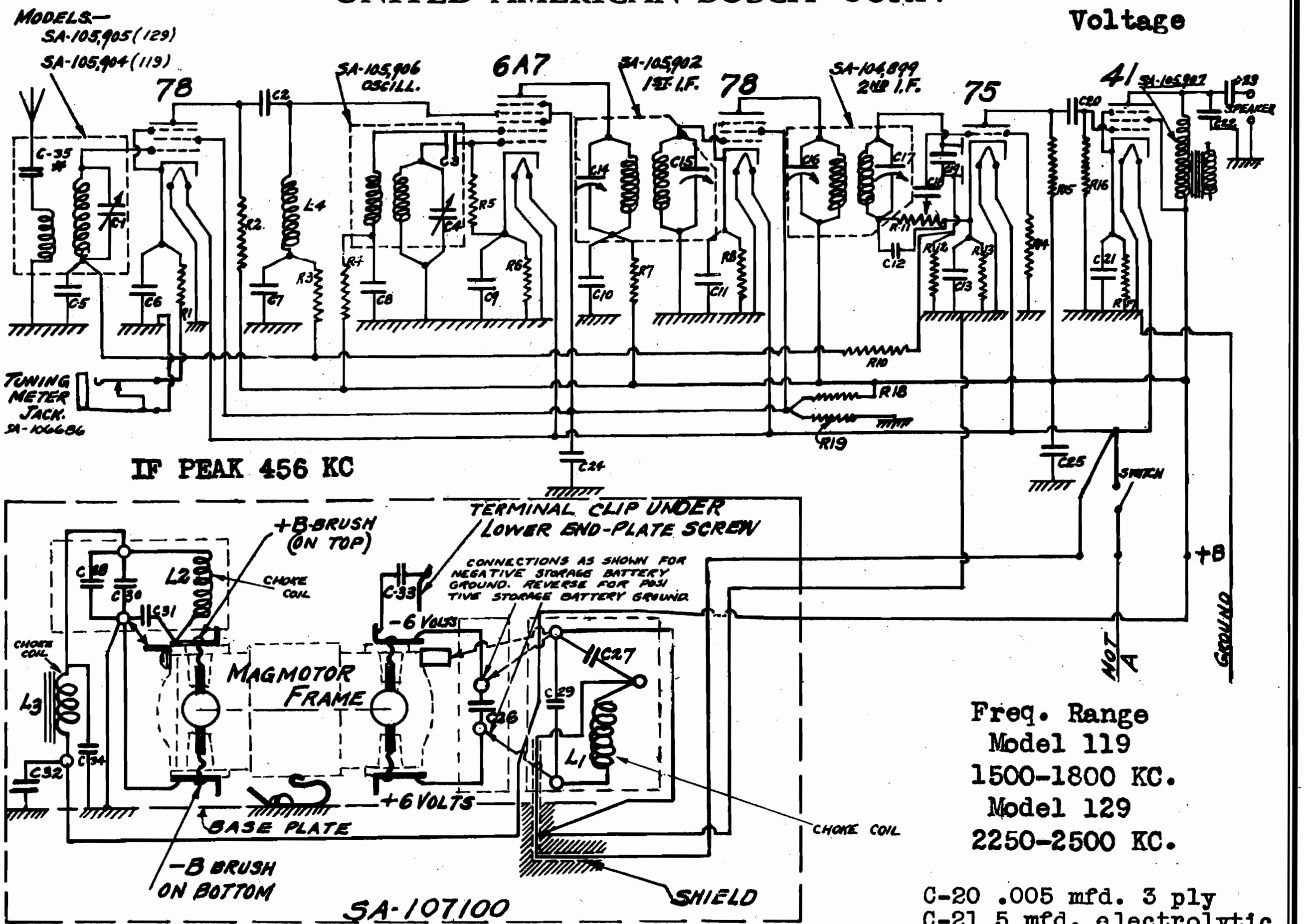
| Part No. | Ohms | Body | Tip | Dot |
|---|---|---|---|---|
| 106531 | 4,000 | Yellow | Black | Red |
| 105278 | 100,000 | Brown | Black | Yellow |
| 105264 | 500 | Green | Black | Brown |
| 105246 | .5 meg. | Green | Black | Yellow |
| 105276 | 50,000 | Green | Black | Orange |
| 105281 | 1 meg. | Brown | Black | Green |
| 105249 | 5,000 | Green | Black | Red |
| 105279 | 1/4 meg. | Red | Green | Orange |
| 105247 | 7,500 | Purple | Green | Red |
| 105245 | 2,000 | Red | Black | Brown |
| 105251 | 40,000 | Yellow | Black | Orange |
| 105277 | 75,000 | Purple | Green | Orange |

| Part No. | Description |
|---|---|
| | **SUPPRESSORS** |
| 106755 | **Spark plug suppressor** |
| 106754 | **Coil suppressor** |
| 105300 | **Suppressor condenser for generator** |
| | **TRANSFORMERS** |
| 106801 | **Power transformer** |
| 106618 | **Speaker transformer** |
| | TUBE SOCKETS & TUBE SHIELDS |
| 103424 | **Tube shield** |
| 104615 | Tube socket |
| 104616 | Tube socket - 5 prong |
| 103513 | Tube socket - 6 prong |
| | TUBES |
| ER 75 | **2nd Det., A.V.C. and A.F. amplifier** |
| ER 77 | **Detector and oscillator** |
| ER 42 | Power output tube |
| ER 78 | **I.F. amplifier** |
| ER 84 | **Rectifier** |
| | BRACKETS, CLIPS AND CLAMPS |
| 100644 | Cable clamp |
| 106564 | Drive shaft bracket |
| 106565 | Drive shaft casing clamp |
| 79381 | Clamp for power transformer leads |
| 99623 | Terminal clip |
| 100263 | Grid clip |
| 100478 | Terminal clip |

| Part No. | Description |
|---|---|
| | COILS |
| 105824 | Choke coil |
| 106523 | Oscillator coil assembly |
| 104580 | I.F. coil assembly |
| 107053 | Choke coil on base assembly |
| 106519 | Antenna coil assembly |
| 106518 | R.F. coil assembly |
| 106713 | Speaker field coil |
| | CONDENSERS |
| 105300 | Suppressor condenser for generator |
| 106804 | Condenser (.008 plus or minus 10%) |
| 106805 | Condenser - .1 - 3 ply |
| 103775 | Condenser - mica .001 |
| 102493 | Condenser .05 - 2 ply |
| 106417 | Condenser .0001 mica |
| 106600 | Condenser and choke assembly |
| 99650 | Condenser .001 mica |
| 106536 | Electrolytic condenser |
| 107001 | Condenser and clip assembly |
| 102499 | Condenser for above .5 - 2 ply |
| 106526 | Condenser assembly (block) |
| 102497 | Condenser .25 - 2 ply |
| 102492 | Condenser .05 - 3 ply |
| 103852 | Condenser .002 - 4 ply |
| 102499 | Condenser .5 - 2 ply |
| 102496 | Condenser .25 - 3 ply |
| 103659 | Condenser .005 - 3 ply |
| 102495 | Condenser .1 - 2 ply |
| 102402 | Condenser on speaker .05 - 3 ply |
| 106417 | Condenser .001 mfd. mica |
| | **MISCELLANEOUS** |
| 105363 | **Spark plug nipple** |
| 106807 | **Paper template (drilling)** |
| 107271 | **Housing assembly (front half)** |
| 106671 | **Bottom cover assembly** |
| 106546 | **Top cover and nameplate assembly** |
| 107205 | **Screen and baffle assembly** |
| 106517 | **Pin for variable condenser insulation bushing** |
| 106715 | Tone control |
| 106716 | Tone control knob |
| 106510 | Dust shield |
| 107060 | Housing assembly (rear half) |
| 106573 | Base assembly (power pack) |
| 106562 | Vibrator unit |
| 101856 | Insulation plate assembly |
| 106545 | Base assembly (chassis) |
| 106680 | Variable condenser assembly |
| 106514 | Volume control |
| 106524 | Tube shield cap assembly |
| 106728 | Insulation between oscillator coil and base |
| 93965 | Cover assembly (chassis end) insulation strip |
| 107181 | Speaker screen |
| 106513 | Speaker baffle |
| 103423 | Tube shield base |
| 106617 | Diaphragm assembly, complete |
| 106498 | Speaker housing |
| 101856 | Speaker insulation plate assembly |
| 106492 | Speaker core and frame assembly |
| 106508 | Variable condenser gear |
| 106509 | Variable condenser bracket assembly for drive |
| 106983 | Fuse (25 amperes) in battery cable |
| 100730 | Antenna plate |
| 105429 | Battery cable fuse body |
| 105425 | Battery cable fuse body cap |
| 105430 | Fuse body insulator - battery cable |
| 105427 | Battery cable fuse body spring |
| 106506 | Volume control bracket |
| 106495 | Speaker transformer bracket |
| 106684 | Tone control bracket |

**Police Motorcycle Radio** | **MODEL 119,129** **Schematic** **Voltage**

# UNITED AMERICAN BOSCH CORP.




**Freq. Range**
**Model 119**
**1500-1800 KC.**
**Model 129**
**2250-2500 KC.**

| | |
|---|---|
| R-1 | 300 ohms 1/4 watt |
| R-2 | 20,000 ohms 1/2 watt |
| R-3 | 100,000 ohms 1/4 watt |
| R-4 | 20,000 ohms 1/4 watt |
| R-5 | 100,000 ohms 1/4 watt |
| R-6 | 300 ohms 1/4 watt |
| R-7 | 2000 ohms 1/4 watt |
| R-8 | 300 ohms 1/4 watt |
| R-9 | ----- |
| R-10 | .5 meg. 1/4 watt |
| R-11 | .5 meg. volume control |
| R-12 | 2 meg. 1/4 watt |
| R-13 | 5000 ohms 1/4 watt |
| R-14 | 1 meg. 1/4 watt |
| R-15 | .25 meg. 1/4 watt |
| R-16 | .5 meg. 1/4 watt |
| R-17 | 750 ohms 1/4 watt |
| R-18 | 10,000 ohms 1/2 watt |
| R-19 | 100,000 ohms 1/2 watt |

| | |
|---|---|
| C-1 | 70-140 mmf air |
| C-2 | .0001 mfd. mica |
| C-3 | .0001 mfd. mica |
| C-4 | 70-140 mmf air |
| C-5 | .05 - 2 ply |
| C-6 | .05 - 2 ply |
| C-7 | .05 - 2 ply |
| C-8 | .05 - 2 ply |
| C-9 | .05 - 2 ply |
| C-10 | .05 - 2 ply |
| C-11 | .05 - 2 ply |
| C-12 | .0001 mfd mica |
| C-13 | 5 mfd electrolytic |
| C-14 | 7-80 mmf mica |
| C-15 | 7-80 mmf mica |
| C-16 | 7-80 mmf mica |
| C-17 | 7-80 mmf mica |
| C-18 | .005 mfd. 3 ply |
| C-19 | .0001 mfd. mica |

| | |
|---|---|
| C-20 | .005 mfd. 3 ply |
| C-21 | 5 mfd. electrolytic |
| C-22 | .005 - 3 ply |
| C-23 | .25 mfd. 3 ply |
| C-24 | .25 mfd. 2 ply |
| C-25 | .25 mfd. 3 ply |
| C-26 | .0001 mfd. |
| C-27 | .001 mfd. |
| C-28 | .05 mfd. 3 ply |
| C-29 | .1 mfd. 2 ply |
| C-30 | .001 mfd. |
| C-31 | .001 mfd. |
| C-32 | 4.0 mfd. |
| C-33 | .001 mfd. |
| C-34 | 4.0 mfd. |
| C-35 | .0004 mfd. mica |
| L-1 | ----- |
| L-2 | .15 milli-henry |
| L-3 | 200 ohms D.C. |
| L-4 | Choke coil |

## OPERATING VOLTAGES AND TUBE COMPLEMENT

| Tube Type | Tube Function | Plate Voltage | Screen Voltage | Voltage Cathode to Ground | Heater Voltage |
|---|---|---|---|---|---|
| 78 | R.F. Amp. | 45 | 95 | 2.3 | 6.0 |
| 6A7 | Det., Osc. | 170 | 95 | 2.3 | 6.0 |
| 78 | I.F. Amp. | 175 | 95 | 2.3 | 6.0 |
| 75 | Det.,A.V.C., A.F. Amp. | 73 | | 0.6 | 6.0 |
| 41 | A.F. Amp. | 165 | 175 | 13 | 6.0 |

NOTE: The above readings were taken from the various socket points to ground using a Weston Model 663 volt-ohmmeter which has a resistance as a voltmeter of 1000 ohms per volt full scale. For meters of other ratings, these voltages may not be as indicated.

**MODEL 119,129**
**Installation Data**

UNITED AMERICAN BOSCH CORP.

## INSTALLATION

In order to mount this receiver on a motorcycle, certain fittings are required. The fittings recommended are contained in a kit supplied by the Indian Motorcycle Company and known as the "Indian Radio Support and Antenna Kit Assembly" (#92344).

Contained in this kit are complete instructions covering the mounting of this receiver on a motorcycle, using the parts in the kit.

When installing the receiver, the shielded cable must be passed in front of the handle-bars, (this is very important), then downward past the front head lug and along the frame front tube under the tank to the battery. The cable should be attached to the tubes of the frame by clips.

## CONNECTIONS

The power supply unit contained in the receiver is arranged for operation on a motor-cycle where the negative side of the battery is grounded. In cases where the receiver is to be used on a motorcycle where the positive side of the battery is grounded, it will be necessary to reverse the red and black wires inside of the power supply unit. With the negative side of the storage battery grounded, the red wire should be connect-ed to the "+" terminal and the black wire should be connected to the "-" terminal. With the positive side of the storage battery grounded, the red wire should be connect-ed to the "-" terminal and the black wire should be connected to the "+" terminal.

The terminal of the battery cable marked "hot" should be connected to the ungrounded side of the storage battery. The other terminal should be connected to the grounded side of the storage battery. A fuse is contained in a spring-bayonet cartridge lo-cated in the battery cable near the receiver. The fuse is the standard type used for automotive purposes and is rated at 10 amperes. To replace the fuse, force the rubber tube covering the fuse container along the cable toward the receiver until the end of the fuse cartridge can be grasped and removed. The rubber tube should be held firmly to keep the cartridge from receding into the tube while the fuse is being replaced so that the two halves of the cartridge can be conveniently refitted.

All screws, nuts, and washers must be firmly set and all electrical connections are to be tight and clean even to the possible necesitty of removing a slight amount of paint to accomplish this.

## "B" POWER SUPPLY UNIT

The "B" power for operation of the receiver is supplied by the American-Bosch magmotor. This magmotor unit is turned on and off simultaneously with the receiver and receives its energy from the storage battery of the motorcycle.
The magmotor is essentially a dynamotor, the armature having two windings, one to supply the driving force for rotating the armature and the other for generating the de-sired "B" power. The armature is fitted with a commutator at each end. The brushes which contact the commutators look alike, but the material of those operating at the 6-volt end is quite different from that of those operating at the high voltage end. If, for any reason, the brush holders are removed from the frame, they must be returned to their original positions when re-assembled. Failure to do this will cause shortened commutator life and improper operation of the magmotor unit.
The magmotor is provided with a permanent magnet, rather than field coils, for excita-tion. This makes possible the extreme compactness of the unit and also conserves the battery energy. Should it be necessary to remove the magnet during service operations, some marking should be made on adjacent sides of the frame and magnet so that the mag-net can be returned to its original position and not inverted. If it is assembled in an inverted position, the polarity of the output will be reversed and the radio re-ceiver will not function. A large soft iron "keeper" should be placed across the poles of the magnet when it is removed in order to conserve the magnetism. It is well to re-magnetize the magnet after re-assembling the magmotor in order that it may give com-pletely satisfactory service. If the magnet is not remagnetized, the output of the magmotor will be reduced.
The armature shaft rotates in ball bearings which are carried in the endplates. An oil cup is provided in the top edge of each of the endplates. Six (6) drops of Bosch Oil US-506, or a light mineral oil should be put in each cup at the expiration of each 1000 hours use. The term "light mineral oil" applies to the so-called household oils sold in small spout cans by the large refiners of petroleum products. This light mineral oil should not be confused with the light household oils of the "sperm" variety so widely advertised. These "sperm" oils must not be used on the light ball bearings of the magmotor - to do so will gum the bearings and cause unsatisfactory operation.

UNITED AMERICAN BOSCH CORP.

## TUNING

The receiver as delivered will be tuned to the station frequency requested. Due to unavoidable differences between the frequency adjustment made at the factory and that of the station, it will be necessary to re-align the tuning condensers slightly. One of the following methods of procedure should be followed depending on whether or not a tuning meter is available. The method of tuning using a tuning meter is preferable since more accurate adjustment is possible.

A. With Tuning Meter: With the receiver installed on the motorcycle and turned on, plug the tuning meter into the jack provided for the purpose. If the station desired is not heard, drive the motorcycle (with the radio set in operation), toward the broadcasting station. When the station is heard stop the motorcycle and proceed as follows:

(1) Remove both small circular cover plates from the top of the receiver housing, thus exposing the tuning adjustment screws.

(2) Loosen the brass lock nuts (which can be seen through the two holes), using a 7/16" socket wrench. This operation must be observed or damage will be done to the tuning condensers when alignment is attempted with a screw driver.

(3) Insert a screw driver into the slot in the shaft of the left hand condenser (when the receiver is in such a position that the volume control is toward the operator), and adjust this condenser until maximum deflection of the tuning meter in the direction indicated by the arrow on the dial is obtained for the station being heard.

(4) Repeat operation "3" with the right hand condenser.

(5) Lock the condensers with the 7/16" socket wrench and replace the circular cover plates.

B. Without Tuning Meter: With the receiver installed on the motorcycle and turned on, drive the machine toward the broadcasting station. When the station is heard faintly, stop the motorcycle and proceed as follows:

(1) Remove both small circular cover plates from the top of the receiver housing, thus exposing the tuning adjustment screws.

(2) Loosen the brass lock nuts (which can be seen through the two holes), using a 7/16" socket wrench. This operation must be observed or damage will be done to the tuning condensers when alignment is attempted with a screw driver.

(3) Insert a screw driver into the slot in the shaft of the left hand condenser (when the receiver is in such a position that the volume control knob is toward the operator), and adjust this condenser until the station is heard loudest.

(4) Reduce the volume with the volume control.

(5) Repeat operations "3" and "4" with the right hand condenser.

(6) Lock the condensers with the 7/16" socket wrench and replace the circular cover plates.

Alignment by the above operations will be approximate only. To obtain the exact alignment required for successful operation, proceed as follows:

> Drive the motorcycle with the receiver operating at maximum volume to a "dead" spot, or to a place sufficiently remote from the transmitter to produce a weak signal. In such a location repeat operations "1", "2", "3", "5" and "6" under "B". Under no circumstances should the volume of the signal be reduced by adjusting the volume control knob. Keep the volume control in its maximum position. Do not neglect to lock the condensers with the socket wrench after alignment and before replacing the cover plates.

When these tuning operations have been properly executed, the receiver installation on the motorcycle is then ready for suppression of ignition interference and subsequently ready for service.

## IGNITION NOISE SUPPRESSION

Shielded ignition cable, spark plug suppressors, spark plug shields, and bypass condensers are furnished as auxiliary equipment with the Models 119 and 129 receivers. These items are necessary for the suppression of ignition interference.

In attempting to suppress ignition interference, the following must be observed:

(1) Damp the oscillations at the spark plugs and across distributor caps by putting resistors (suppressors) in the cables at these points.

(2) Prevent the cables, spark plugs, etc., from radiating to the antenna by enclosing them in grounded metal shields.

(3) Minimize the effect of auxiliary or secondary radiating systems by a judicious choice of grounding points and by making ground connections in the proper way. A ground connection for high frequency currents cannot be made by running wires between the cable shield to be grounded and the engine block or the frame of the machine. The cable shield to be grounded must be brought down against the surfaces of the frame and clamped or soldered in place as required by the circumstances. The choice of ground points is commonly accomplished by trial and error-experience with the phenomena governing such circuits being extremely helpful.

Before proceeding with the work of suppressing ignition noise, the ignition system of the motorcycle should be checked thoroughly to make certain that all high-tension leads make good connections at their terminals, that the spacing of the spark plug electrodes is the minimum amount consistent with good motor performance, that the gap between the distributor electrode and the rotor electrode is a minimum, that all leaky high-tension cables are replaced, etc.

The specific procedure for suppressing ignition noise with either two or four cylinder motorcycles and with either battery or magneto ignition is as stated below:

A. Two-Cylinder Motorcycle - Battery Ignition:

(1) Install suppressor in series with each spark plug lead as close as possible to the spark plug.

(2) Replace each spark plug lead with a shielded cable.

(3) Connect .5 mfd. bypass condenser from the generator to ground.

(4) Disconnect the lead between coil and breaker and replace with a shielded lead running directly from the coil to the breaker (length approximately 10").

(5) Ground the housing of the ignition coil to the frame.

(6) Install a spark plug shield on each spark plug whenever possible.

B. Two-Cylinder Motorcycle - Magneto Ignition:

(1) Install suppressor in series with each spark plug lead as close as possible to the spark plug.

(2) Replace each spark plug lead with a shielded cable.

(3) Connect .5 mfd. bypass condenser from the generator to ground.

(4) Install a spark plug shield on each spark plug whenever possible.

C. Four-Cylinder Motorcycle - Battery Ignition:

(1) Install suppressor in series with each spark plug lead as close as possible to the spark plug.

(2) Install suppressor in series with the lead to the center contact of the distributor as close as possible to the distributor.

(3) Replace each spark plug lead with a shielded cable.

(4) Ground the spark plug cables in the tube which carries them over the motor.

(5) Connect .5 mfd. bypass condenser from the generator to ground.

(6) Install a spark plug shield on each spark plug.

(7) Connect .5 mfd. bypass condenser from the "hot" side of the ignition coil to ground.

D. Four-Cylinder Motorcycle - Magneto Ignition:

(1) Install suppressor in series with each spark plug lead as close as possible to the spark plug.

(2) Replace each spark plug lead with a shielded cable.

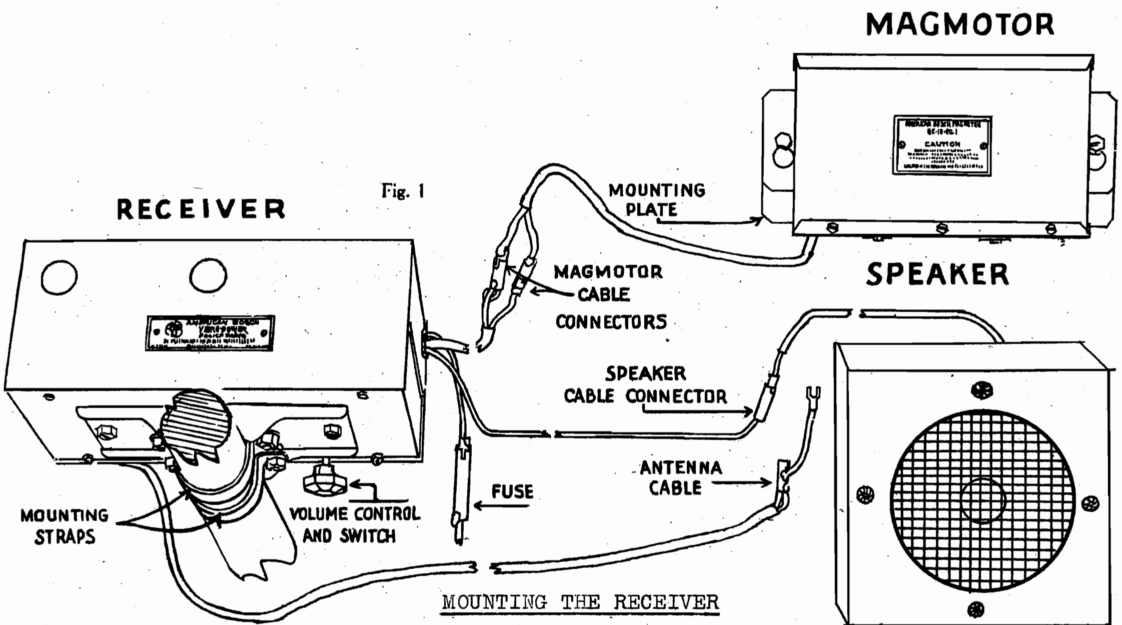
(3) Ground the spark plug cables in the tube which carries them over the motor.

(4) Connect .5 mfd. bypass condenser from the generator to ground.

(5) Install a spark plug shield on each spark plug.

MODEL 139,149
Installation Data

# UNITED AMERICAN BOSCH CORP.




## MOUNTING THE RECEIVER

A mounting plate is provided for the receiver which fastens to the steering column with two large straps. This plate should be placed on the upper side of the steering column below the instrument panel with the large ends of the keyhole slots at the top. The nuts on the small carriage bolts fastening the straps to the mounting plate should be securely tightened so that the mounting plate will not slip on the steering column. The two screws in the bushings in the receiver housing should then be loosened and the receiver placed on top of the mounting plate with the heads of the screws entering the keyhole slots in the mounting plate. The screws should be allowed to engage the narrow portions of the keyhole slots and the screws should then be tightened securely so that the receiver is held rigidly in place. (See Figure #1).

For cases where mounting on the steering column is not feasible, a bulkhead mounting plate has been provided which is fastened to the bulkhead with three carriage bolts. The adapter plate which is provided for use in conjunction with the mounting plate should be attached with screws to the opposite side of the receiver housing from that through which the volume control shaft projects. It should be placed so that the small ends of the keyhole slots are at the top. The receiver should then be placed on the mounting plate so that the screws in the bushings on the mounting plate enter the keyhole slots in the adapter plate. When the screws engage the small portions of the keyhole slots they should be tightened so that the receiver unit will be held securely

## MOUNTING THE MAGMOTOR

The magmotor or the "B" power supply unit is provided with a mounting plate which is fastened to the operator's side of the bulkhead with three carriage bolts. The two screws in the bushings in the mounting plate should be loosened and the power supply unit placed so that these screws enter the keyhole slots in the bracket fastened to the back of the housing. When the screws engage the small portions of the keyhole slots, they should be tightened so that the unit will be held securely in place.

## MOUNTING THE SPEAKER

Two studs are provided on the speaker unit which fasten it to the bulkhead in a position where it will not interfere with the operation of the vehicle but where it will permit a good signal to be heard.

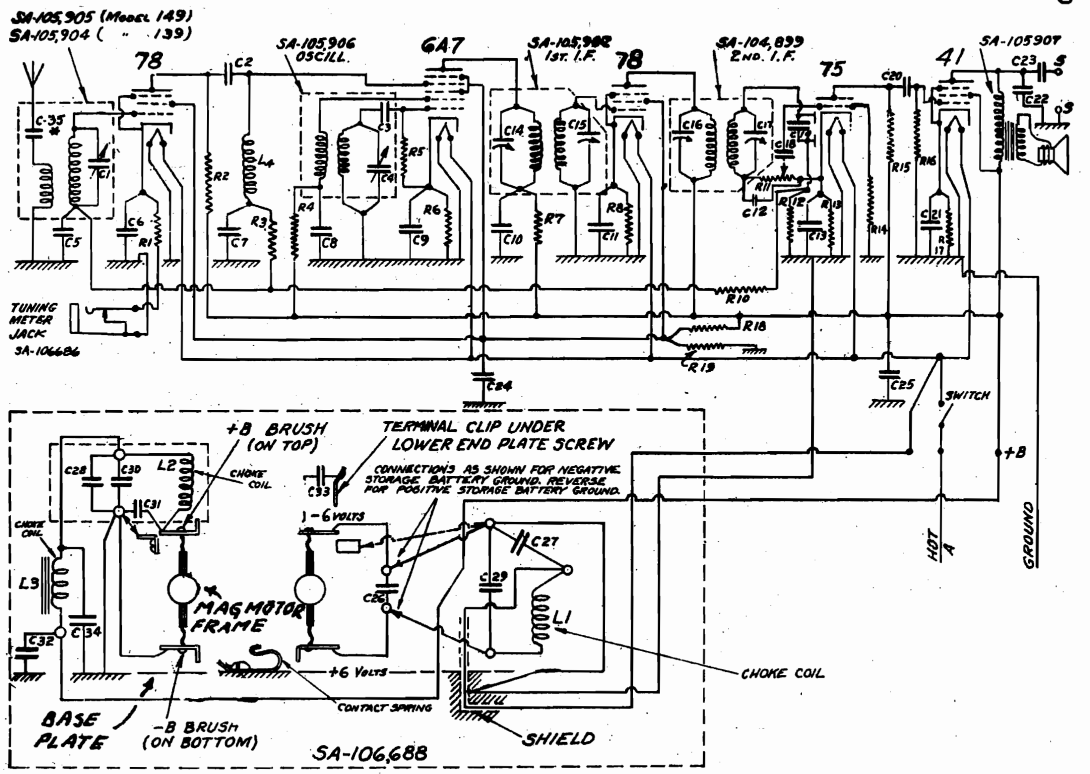
## CONNECTIONS

The power supply unit, as provided, is arranged for operation in a motor car where the negative side of the battery is grounded. In cases where this unit is to be used in a motor car where the positive side of the battery is grounded, it will be necessary to reverse the red and black wires inside of the unit. With the negative side of the storage battery grounded, the red wire should be connected to the "+" terminal and the black wire should be connected to the "-" terminal. With the positive side of the storage battery grounded, the red wire should be connected to the "-" terminal and the black wire should be connected to the "+" terminal.

A duplex cable is provided between the receiver and the power supply unit. The two sections of this cable should be connected together. A battery cable containing a fuse is provided. The terminal marked "hot" should be connected to the ungrounded side of the storage battery. The other terminal should be connected to the grounded side of the storage battery. The other shielded cable which enters the receiver housing at the same point as the battery cable and the power supply cable should be connected to the loud speaker. At the other end of the receiver housing a black cotton covered cable is provided which should be connected to the antenna lead-in. Refer to Figure #1 for these cable connections. The antenna lead-in should be shielded and the shield soldered to the bayonet connection beyond the junction.

# UNITED AMERICAN BOSCH CORP.

**MODEL 139,149**
**Schematic**
**Voltage**




Frequency range:

**IF PEAK 456 KC**

Model 139 - 1500 to 1800 kilocycles
Model 149 - 2250 to 2500 kilocycles

ELECTRICAL VALUES

C-1 70-140 mmf. air
C-2 .0001 mfd. mica
C-3 .0001 mfd. mica
C-4 70-140 mmf. air
C-5 .05 mfd. 2 ply
C-6 .05 mfd. 2 ply
C-7 .05 mfd. 2 ply
C-8 .05 mfd. 2 ply
C-9 .05 mfd. 2 ply
C-10 .05 mfd. 2 ply
C-11 .05 mfd. 2 ply
C-12 .0001 mfd. mica
C-13 5 mfd. electrolytic
C-14 7-80 mmf. mica
C-15 7-80 mmf. mica
C-16 7-80 mmf. mica
C-17 7-80 mmf. mica
C-18 .005 mfd. 3 ply
C-19 .0001 mfd. mica
C-20 .005 mfd. 3 ply

C-21 5 mfd. electrolytic
C-22 .005 mfd. 3 ply
C-23 .25 mfd. 3 ply
C-24 .25 mfd. 2 ply
C-25 .25 mfd. 3 ply
C-26 .0001 mfd.
C-27 .001 mfd.
C-28 .05 mfd. 3 ply
C-29 .1 mfd. 2 ply
C-31 .001 mfd.
C-32 4 mfd.
C-33 .001 mfd.
C-34 4 mfd.
C-35 .0004 mfd. mica
C-38 .001 mfd.

L-1 Magmotor choke coil
L-2 .15 milli-henry
L-3 200 ohms D.C.
L-4 Choke coil

R-1 300 ohms 1/4 watt
R-2 20,000 ohms 1/2 watt
R-3 100,000 ohms 1/4 watt
R-4 20,000 ohms 1/4 watt
R-5 100,000 ohms 1/4 watt
R-6 300 ohms 1/4 watt
R-7 2,000 ohms 1/4 watt
R-8 300 ohms 1/4 watt
R-9 ----
R-10 .5 meg. 1/4 watt
R-11 .5 meg. volume control
R-12 2 meg. 1/4 watt
R-13 5,000 ohms 1/4 watt
R-14 1 meg. 1/4 watt
R-15 .25 meg. 1/4 watt
R-16 .5 meg. 1/4 watt
R-17 750 ohms 1/4 watt
R-18 10,000 ohms 1/2 watt
R-19 100,000 ohms 1/2 watt

SOCKET VOLTAGES

| Tube Type | Tube Function | Plate Voltage | Screen Voltage | Voltage Cathode to Ground | Heater Voltage |
|---|---|---|---|---|---|
| 78 | R.F. Amp. | 45 | 95 | 2.3 | 6.0 |
| 6A7 | Det., Osc. | 170 | 95 | 2.3 | 6.0 |
| 78 | I.F. Amp. | 175 | 95 | 2.3 | 6.0 |
| 75 | Det., A.V.C., A.F. Amp. | 73 | | 0.6 | 6.0 |
| 41 | A.F. Amp. | 165 | 175 | 13 | 6.0 |

NOTE:- These readings were taken from the various socket points to ground using a Weston Model 663 volt-ohmmeter which has a resistance as a voltmeter of 1000 ohms per volt full scale. For meters of other ratings, these voltages may not be as indicated.

MODEL 139,149
Testing Data

# UNITED AMERICAN BOSCH CORP.

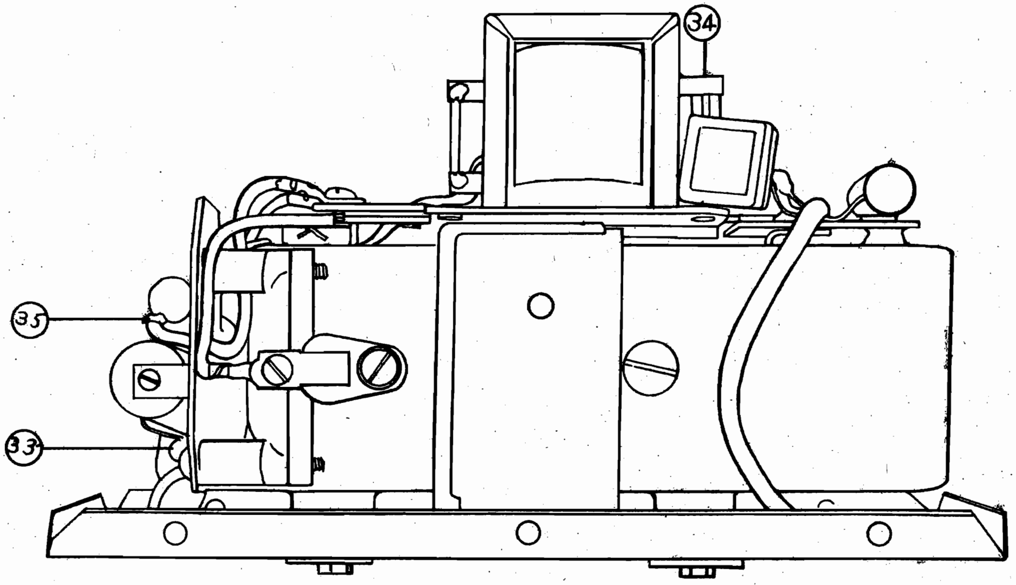


Fig. 4

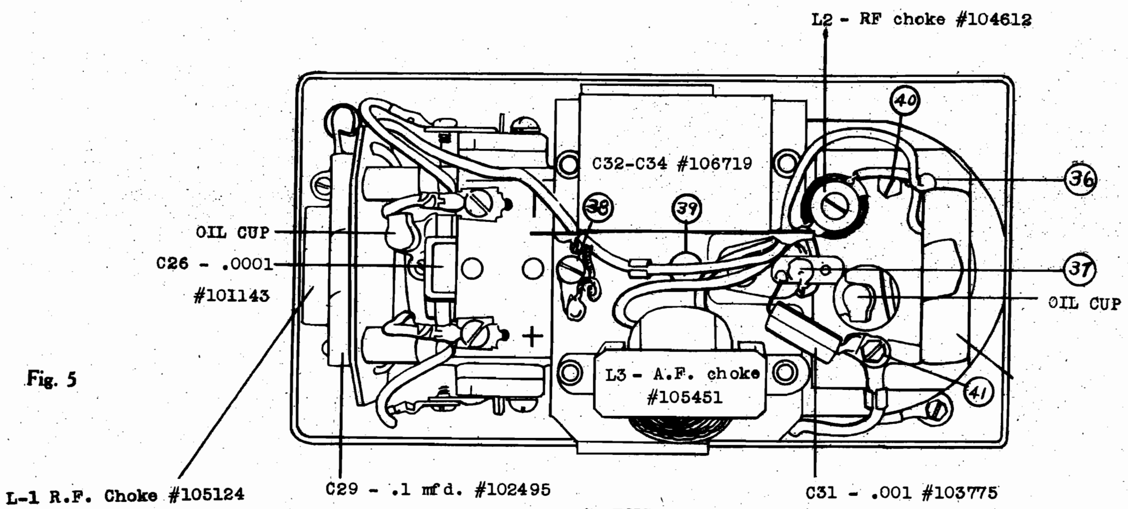



Fig. 5

## TESTING

(a) ANTENNA: Substitute a piece of insulated wire 6 to 8 feet long and lay on ground; if reception is normal, the regular antenna is at fault and should be checked for grounds, opens, etc. (Somewhat better reception should be expected with wire antenna than with car antenna.)

(b) TUBES: Remove and test, or substitute known good tubes, one at a time.

(c) SPEAKER: Disconnect speaker cable from chassis by means of bayonet connector. Test across terminals of speaker with volt-ohmmeter for continuity of voice coil. Reading of 4.5 ohms should be obtained on ohmmeter.

(d) SECONDARY OF OUTPUT TRANSFORMER: With speaker cable disconnected, test with ohmmeter between terminal #1 and ground. Reading of 0.5 ohms should be obtained on ohmmeter.

(e) CHASSIS: After checking the components listed above, test the voltages as they appear on voltage chart and the resistance measurements as found in "Chassis Resistance Chart". If any particular reading obtained is very different from the chart reading, the trouble is located in the portion of the circuit associated with the points at which this discrepancy occurs. Referring to the circuit diagram and location drawings, each part making up the circuit may be individually tested until the faulty part is specifically located.

f) MAGMOTOR: See section giving complete magmotor service information.

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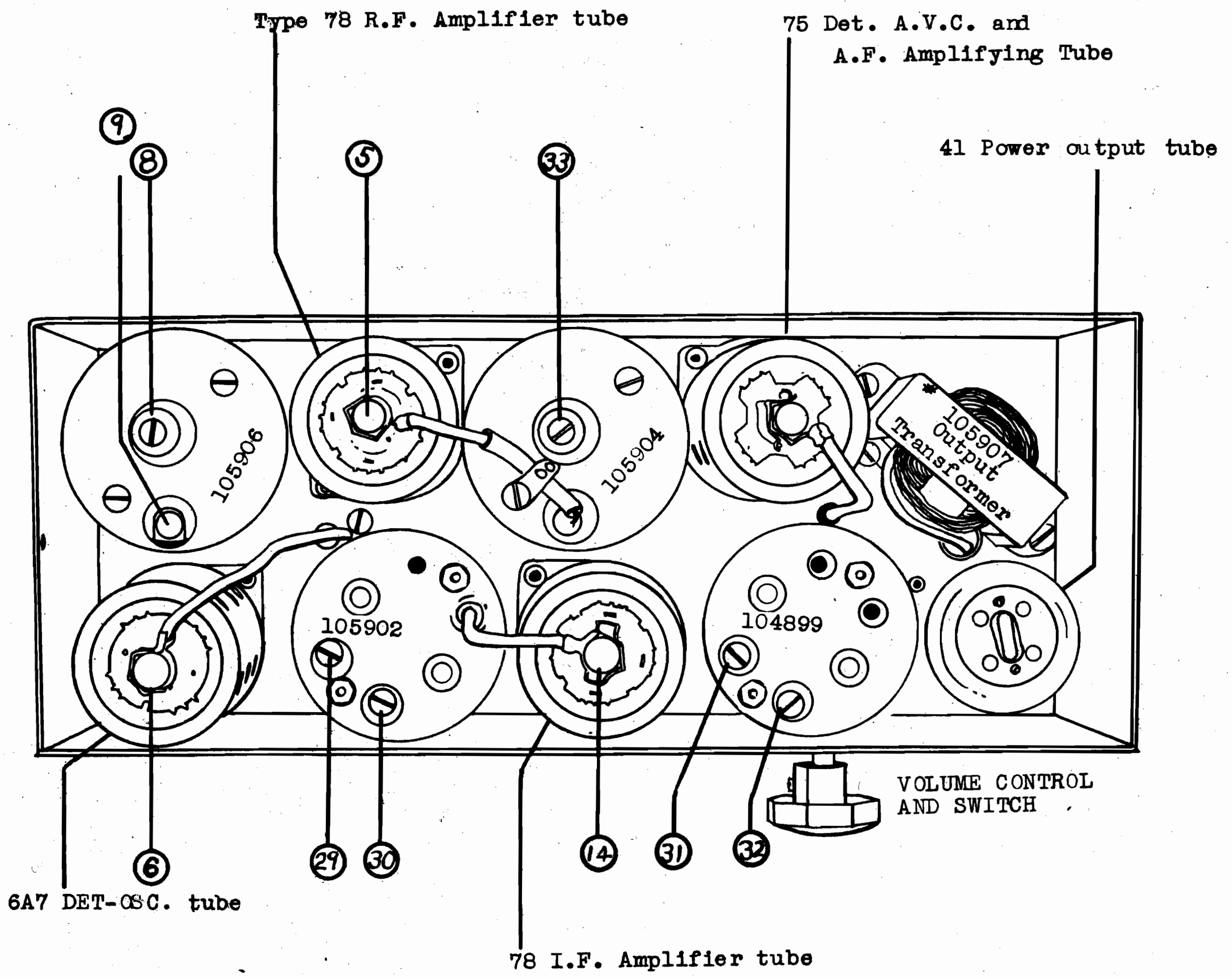



Fig. 2

ALIGNMENT INSTRUCTIONS

All of the adjustable condensers, commonly called trimmer condensers, are very accurately adjusted at the factory and will not need any further adjustments unless an I.F. transformer is changed, or the adjustments tampered with in the field. Therefore, DO NOT attempt to change the setting of any of the trimmer condensers unless it is definitely known that adjustment is necessary, and a test oscillator is available, then proceed as follows: See Fig. #2.

1. Connect output meter across terminals of speaker voice coil.
2. Set test oscillator at 456 kilocycles.
3. Connect test oscillator lead to grid of I.F. amplifier tube, type 78. (Point #14).
4. Adjust condenser on primary of second I.F. transformer, (Point #31) to peak on output meter.
5. Adjust condenser on secondary of second I.F. transformer, (Point #32) to peak on output meter.
6. Connect test oscillator lead to grid of detector-oscillator tube, type 6A7 (Point #6)
7. Adjust condenser on primary of first I. F. transformer (Point #29) to peak on output meter.
8. Adjust condenser on secondary of first I. F. transformer, (Point #30) to peak on output meter.

The above procedure lines up the I. F. stages properly, so that all that remains is to tune the oscillator and preselector circuits to the frequency of the station it is desired to receive. This has been covered in the section headed - TUNING

MODEL 139,149
Tuning Data

# UNITED AMERICAN BOSCH CORP.

## TUNING

The radio receiver as delivered will be tuned to the station frequency requested. Due to unavoidable differences between the frequency adjustment made at the factory and that of the station, it will be necessary to realign the tuning condensers slightly. One of the following methods of procedure should be followed depending upon whether or not a tuning meter is available. The method of tuning using a tuning meter is preferable since more accurate adjustment is possible.

A. With Tuning Meter.

With the receiver in the motor car, and connected to the car antenna and battery, turn the receiver fully on and allow it to get into operation which will be indicated by a slight hum heard in the speaker. Plug the tuning meter into the jack in the receiver housing. If the station desired is not heard, drive the machine (with the radio set in operation), toward the broadcasting station. When the station is heard, stop the motor car and proceed as follows:

(a) Loosen the brass condenser lock nuts (which can be seen through the two holes in the top cover of the housing) using a 7/16" socket wrench. This operation must be observed or damage will be done to the tuning condensers when alignment is attempted with a screw driver.

(b) With a screw driver inserted into the slot in the shaft of the left hand condenser (when the receiver is in such a position that the volume control is toward the operator), adjust this condenser until maximum deflection of the tuning meter in the direction indicated by the arrow on the dial is obtained on the station being heard.

(c) Repeat operation "b" with the right hand condenser.

(d) Lock the condensers with the 7/16" socket wrench.

B. Without Tuning Meter.

With the receiver in the motor car, and connected to the car antenna and battery, turn the receiver fully on and allow it to get into operation which will be indicated by a slight hum heard in the speaker.

If the station desired is not heard, drive the machine (with radio set in operation) toward the broadcasting station. When the station is heard faintly, stop the motor car and proceed as follows:

(a) Loosen the brass condenser lock nuts (which can be seen through the two holes in the top cover of the housing) using a 7/16" socket wrench. This operation must be observed or damage will be done to the tuning condensers when alignment is attempted with a screw driver.

(b) With a screw driver inserted into the slot in the shaft of the left hand condenser, when the receiver is in a position such that the volume control knob is toward the operator, adjust this condenser until the station is heard loudest.

(c) Reduce the volume by rotating the volume control knob on the face of the receiver housing counter-clockwise.

(d) Repeat operations (b) and (c) with the right hand condenser.

(e) Lock the condensers with the 7/16" socket wrench.

Alignment by the above operations will be only approximate. To attain the exact alignment required for successful operation proceed as follows:

(a) Drive the motor car (with radio operating with volume control on full) to a "dead" spot or to a place sufficiently remote from the transmitter to produce a weak signal. In such a location repeat operations "a", "b", "d" and "e". In this case under no circumstances should the volume of the signal be reduced by adjusting the volume control knob. Keep the volume control in its maximum position. Do not neglect to lock the condensers with the socket wrench after alignment and before replacing cover plates.

MODEL 139,149
Resistance Test

# UNITED AMERICAN BOSCH CORP.

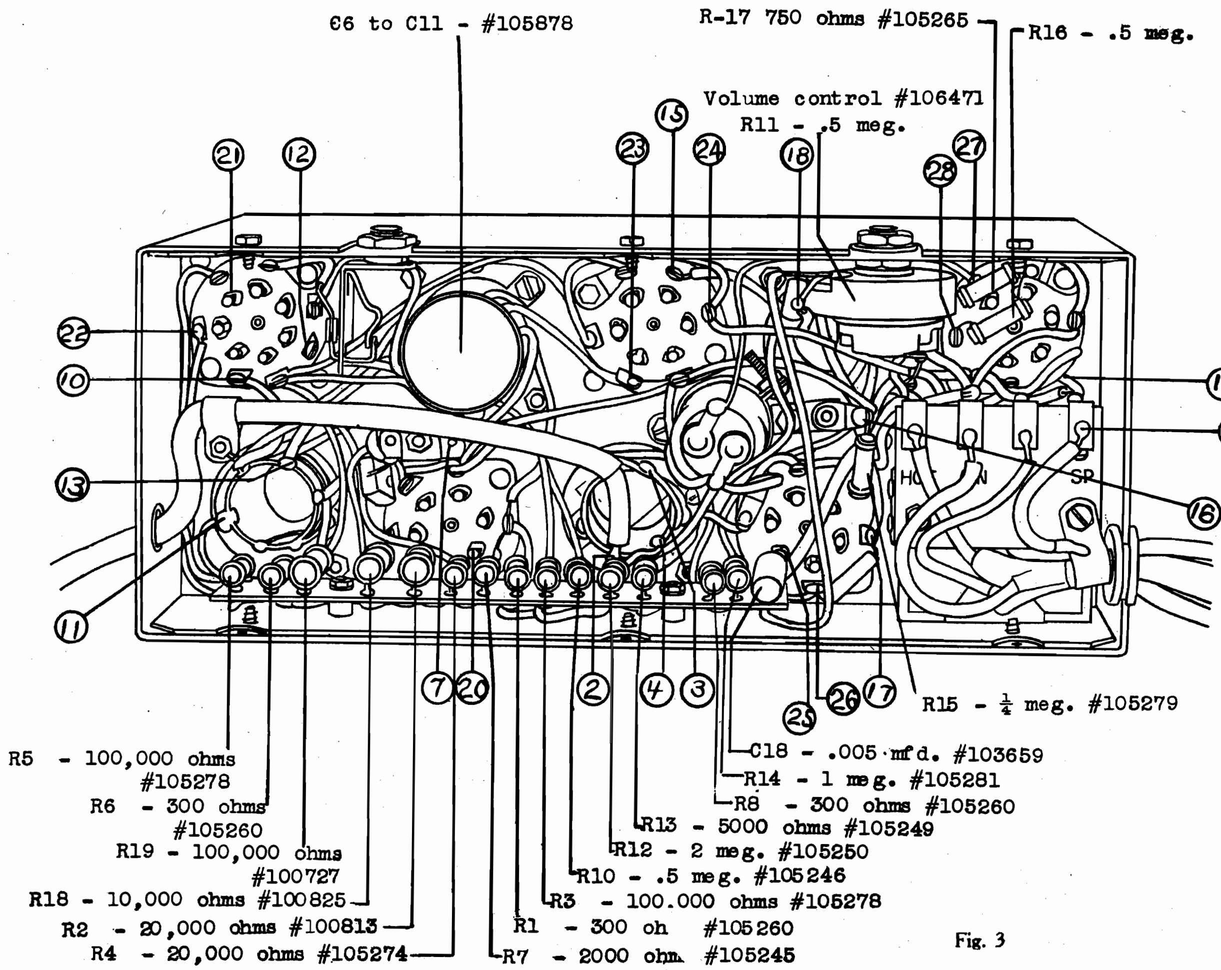



Fig. 3

## CHASSIS RESISTANCE CHART

All measurements made with Weston Model 663 volt-ohmmeter.

(Refer to Figs. 2 and 3)

| SECTION OF CIRCUIT | MEASURE BETWEEN POINTS | OHMMETER READING |
|---|---|---|
| Antenna Coil - Primary | #2 & #3 | 0.5 ohms |
| Antenna Coil - Secondary | #4 & #5 | 2 ohms |
| R.F. Choke Coil | #6 & #7 | 3 ohms |
| Oscillator Coil - Primary (Grid) | #9 & GND | 1 ohms |
| Oscillator Coil - Secondary (Plate) | #10 & #11 | 2 ohms |
| First I.F. Transformer - Primary | #12 & #13 | 23 ohms |
| First I.F. Transformer - Secondary | #14 & GND | 23 ohms |
| Second I.F. Transformer - Primary | #15 & #16 | 23 ohms |
| Second I.F. Transformer - Secondary | #17 & #18 | 23 ohms |
| Output Transformer - Primary | #19 & #16 | 580 ohms |
| *R.F. Amplifier - Type 78 - Cathode to Ground | #20 & GND | 300 ohms |
| Det.-Oscillator - Type 6A7 - Cathode to Ground | #21 & GND | 300 ohms |
| Det.-Oscillator - Type 6A7 - Osc. Grid to Ground | #22 & GND | 100,000 ohms |
| I.F. Amplifier - Type 78 - Cathode to Ground | #23 & GND | 300 ohms |
| I.F. Amplifier - Type 78 - Screen Grid to Ground | #24 & GND | 100,000 ohms |
| Second Det. & Amp. - Type 75 - Cathode to Ground | #25 & GND | 5,000 ohms |
| Second Det., & Amp.-Type 75-A.V.C. Collector to Ground | #26 & GND | 2,000,000 ohms |
| Second Det., & Amp.- Type 75 - Collector to Ground | #17 & GND | 500,000 ohms |
| Power Amplifier - Type 41 - Cathode to Ground | #27 & GND | 750 ohms |
| Power Amplifier - Type 41 - Grid to Ground | #28 & GND | 500,000 ohms |
| B+ Terminal to Ground | #16 & GND | 110,000 ohms |

* This measurement should not be made with the tuning meter connected in the circuit.

# UNITED AMERICAN BOSCH CORP.

## MAGMOTOR SERVICE INFORMATION

### LUBRICATION

The armature shaft rotates in ball bearings which are carried in the end plates. An oil cup is provided in the top edge of each of the end plates. Six drops of Bosch oil US-506, or a light mineral oil should be put in each cup at the expiration of each 1000 hours of use. See Fig. 5 for the location of the oil cups. The term "light mineral oil" applies to the so-called household oils sold in small spout cans by the large refiners of petroleum products. This light mineral oil should not be confused with the light household oils of the "sperm" variety so widely advertised. These "sperm" oils must not be used on the light ball bearings of the magmotor - to do so will gum the bearings and cause unsatisfactory operation.

### BALL BEARINGS

The ball bearings are held in place by means of set screws located in the top of each end plate. There are two set screws in each end plate, the top one locking the lower one in place. Extreme care must be observed when these set screws are tightened since screwing them down too tightly will distort the ball bearings sufficiently to increase the friction in the bearings with a resultant increase in current drain from the storage battery. The set screws should be carefully tightened while the magmotor is connected to the receiver and while the armature is rotating. An ammeter should be inserted in the battery circuit so that the current drain may be observed. When the set screws have been properly tightened with the magmotor connected to the receiver, the current drain should be approximately 3.0 amperes. Both of the set screws must be removed when dismantling the unit.

### BRUSHES

The magmotor has four brushes, two in the input or motor end and two in the output or generator end. The brushes in the input or motor end are made of copper graphite and can be distinguished by their copper color from the brushes in the output or generator end which are made of pure carbon. Under no circumstances must these brushes be interchanged. The brushes should be replaced after 3000 hours of operation. To use the brushes more than 3000 hours will result in their wearing down so that they make intermittent contact with the commutators, producing excessive sparking and resulting in damage to the commutators. To remove the brushes, first remove the brush holder by removing the screws which fasten the holders to the magmotor frame. Then melt the solder on the brush holder terminal clip so that the flexible wire connection to the brush is loosened and while the solder is molten pull the brush out of the holder. It is very important that the proper grade of brushes are used and no brushes should be used except those furnished by the United American Bosch Corporation.

### DISMANTLING AND ASSEMBLING THE MAGMOTOR

In order to inspect and service the armature it is necessary to remove the armature from the magmotor frame. To do this the following procedure should be observed:

(a) Disconnect the red and black wires connected to the polarity terminal plate and also the two green wires connected to the brushes on the sides of the magmotor.

(b) Remove the filter assembly mounted on the brass plate fastened to the top of the magmotor by removing the two screws #38 and #39 in Fig. #5.

(c) Remove the other filter assembly fastened to the top of the magmotor by removing the two self-tapping screws #40 and #41 shown in Fig. #5.

(d) Remove the filter assembly on the end of the magmotor by removing the four end plate fastening screws.

(e) Remove the two upper ball bearing set screws and loosen the two lower set screws in the end plates.

(f) Remove the end plate to which the filter assembly is attached.

(g) Withdraw the armature.

All parts of the power unit are now available for inspection.

To assemble the unit, reverse the sequence of operations given above. Make certain that the wires to the low voltage side are connected as they were originally and use extreme care in tightening the ball bearing set screws (see the special instructions for adjusting the ball bearing set screws).

### MAGNETIZING

The magnet should retain its original magnetic strength for an indefinite period but there are factors that may cause dissipation of the magnetism as, for example, the removal of the armature. A reduction in the magnetism will cause the magmotor to operate at a higher speed to deliver the same voltage which will result in a greatly reduced life. For this reason it is well to remagnetize the magnet after any work has been done on the power unit especially if the armature has been removed.

The unit should be completely assembled when the magnetizing is done in order to obtain the proper field excitation. This can be done on a standard Bosch or American-Bosch magnetizing stand.

Should it be necessary to remove the magnet during the service operations, some marking should be made on adjacent sides of the frame and magnet so that the magnet can be returned to its original position and not inverted. If it is assembled in an inverted position, the polarity of the output will be reversed and the receiver will not function.

### CONDENSERS AND CHOKE COILS

The position in which the condensers and choke coils are placed has a direct bearing on the efficiency of the magmotor and if it is necessary to replace any of these parts, it is of the utmost importance that they be placed in exactly the same positions as the parts removed. The leads must also be of the same length and gauge, or larger and must be placed in the same position as the ones removed.

### COMMUTATORS

When the armature has been removed for inspection, and the commutators are found to be dirty, they may be cleaned by using a clean cloth saturated with gasoline or if necessary, by using very fine sandpaper. If the commutators are badly worn and pitted, it will be necessary to turn them down in a lathe. Extreme care should be observed in performing this operation, removing only enough material to provide a good surface.

### TESTING

(Refer to Figs. 4 and 5)

With voltage of 6.0 volts measured between point #33 and ground, the "B" voltage, measured between Point #34 and ground with the receiver connected, should be approximately 175 volts.

If the magmotor armature fails to rotate when the cable connections have been made properly and the switch in the chassis has been turned on, the continuity of the circuit through the motor portion of the magmotor should be checked with an ohmmeter in accordance with the following resistance chart:

If the magmotor armature rotates but no "B" voltage is obtained between #34 and ground, the continuity of the circuit through the generator portion of the magmotor and the associated filters, should be checked with an ohmmeter in accordance with the following resistance chart:

MAGMOTOR RESISTANCE CHART

All measurements made with Weston Model 663 Volt-ohmmeter. (Refer to Figs. 4 & 5)

| SECTION OF CIRCUIT | MEASURE BETWEEN POINTS | OHMMETER READING |
|---|---|---|
| Complete Motor Circuit | #33 and GND | 1 ohm |
| "A" circuit R.F. choke | #33 and #35 | Full scale |
| Complete Generator Circuit | #34 and GND | 800 ohms |
| "B" Circuit A.F. Choke | #34 and #36 | 220 ohms |
| "B" Circuit R.F. Choke | #36 and #37 | Full scale |

Whenever possible, a direct comparison should be made with a magmotor which is definitely known to be in good operating condition in order to avoid the misinterpretation of variations of readings due to variations in storage battery voltages, load conditions, meter accuracies. etc.

MODEL 260
Alignment Data

UNITED AMERICAN BOSCH CORP.

## ADJUSTMENT INSTRUCTIONS OF MODEL 260

I. F. Adjustment - The intermediate frequency amplifier is tuned to 517.5 K. C. With this frequency supplied from an approved standard signal generator, place the output terminals of the generator on the input to the 3rd I. F. amplifier tube, i. e. high side on the grid cap and low side on metal frame of receiver. Tune the adjustment screw of the diode transformer for maximum deflection of the output meter (connected across the voice coil terminals of the loud speakers). A sensitivity of approximately 50,000 microvolts should be indicated. Next, connect the signal generator terminals to the 2nd I. F. tube. Tune the adjustment screws of the 3rd I. F. transformer for maximum deflection of the output meter. A sensitivity of 3,000 microvolts should be indicated. Next, connect the signal generator to the 1st I. F. tube and tune the adjustments of the 2nd I. F. transformer for maximum. A sensitivity of 100 microvolts should be indicated. Next, connect the signal generator to the 1st detector tube and tune the first I. F. transformer. A sensitivity of 10 microvolts should be indicated. Leaving signal generator on 1st detector, recheck all the I. F. stages.

R. F. Adjustment - (a) Broadcast Band

Check position of pointer to make sure it is at the marking line just beyond the 540 K. C. calibration mark when variable condenser plates are fully engaged. Then adjust set to the 1400 K. C. marking on scale. Adjust signal generator to 1400 K. C. and connect its output terminals through a dummy antenna to antenna and ground connections. With about 1,000 microvolts from signal generator (to make for ease of finding signal) adjust the broadcast oscillator trim condenser (B. C. Osc. Coil - Trimmer) as indicated in Figure #1. Reduce signal generator input as signal is tuned in so as to keep within a useful deflection of the output meter. When signal is tuned in, adjust the screws marked R. F. TRIMMER and ANT-TRIMMER in Figure #1. These last two need not be touched throughout further adjustments of the radio set. Next, place the set at the 600 K. C. marking with signal generator likewise and adjust the screw of the B. C. OSC. COIL LAGGING condenser until the signal is tuned in. Return the pointer to 1400 K. C., the signal generator likewise, and make the slight readjustment of the B. C. OSC. TRIM condenser for good accuracy of calibration.

When all the adjustments as described are correctly made, the following sensitivity should be maintained for a standard output of 100 milliwatts on a carrier input modulated 30% at 400 cycles.

| | | | | |
|---|---|---|---|---|
| Frequency | (KC) | 1400 | 1000 | 600 |
| Sensitivity | (MV) | 3 | 5 | 7 |

(b) Green Band (1600 - 3500 K. C.)

By means of wavechange switch, place pointer on this band. Place pointer on 3.5 mark, set the signal generator to 3500 K. C. and with sufficient input to receiver from standard signal generator, tune the screw adjustment labelled GREEN BAND TRIMMER until the signal is a maximum. Then place pointer to the 1.6MC mark, adjust signal generator to 1600 K. C. and tune the screw marked GREEN BAND LAGGING CONDENSER until the signal output is a maximum.

Return set and signal generator to 3.5MC and readjust GREEN BAND TRIMMER the slight amount necessary. Check the sensitivity. The following readings should obtain for 100 milliwatts output.

| | | | | |
|---|---|---|---|---|
| Frequency | (KC) | 3500 | 2400 | 1600 |
| Sensitivity | (MV) | 5 | 5 | 5 |

NOTE: Each oscillator coil is provided with means of adjusting its inductance. This comprises a copper vane placed in the field of the coil and made movable by means of a screw adjustment. On the green, red and blue bands, the adjustment may be made through holes in the side plate adjacent to the oscillator trimmer condensers. While primarily a factory adjustment, these vanes may be used for adjustment in the field where it has been found necessary to make repairs to an oscillator coil. The method is as follows: Having gone through the adjustment of the GREEN BAND as described above, it is found that the sensitivity, particularly in mid-scale (2.4 megacycles) is not up to standard; say, for example, it indicates a sensitivity of 20 microvolts.

MODEL 260
Alignment Data
Socket and
Trimmer Layout

# UNITED AMERICAN BOSCH CORP.

Give the vane adjustment screw two turns in a clockwise direction and repeat the adjustments given above at 3.5MC, 1.6MC, and back to 3.5MC. Then tune set and signal generator to 2400 K.C. and observe sensitivity. If this has improved, the adjustment is in the correct direction and a few more trials should be made exactly as described until the correct sensitivity is obtained. If on the other hand a poorer sensitivity is obtained at 2400 K. C., return setting two turns to its original position and repeat procedure making vane adjust in counterclockwise direction, until correct sensitivity is obtained.

It should be mentioned again that this tedious procedure is never necessary unless an oscillator coil has in some way become damaged. In the factory, special test equipment is provided which makes for quick adjustment of inductances to the correct value before the coil is mounted in the radio set.

(c) Red Band (4000 - 9000 K. C.)

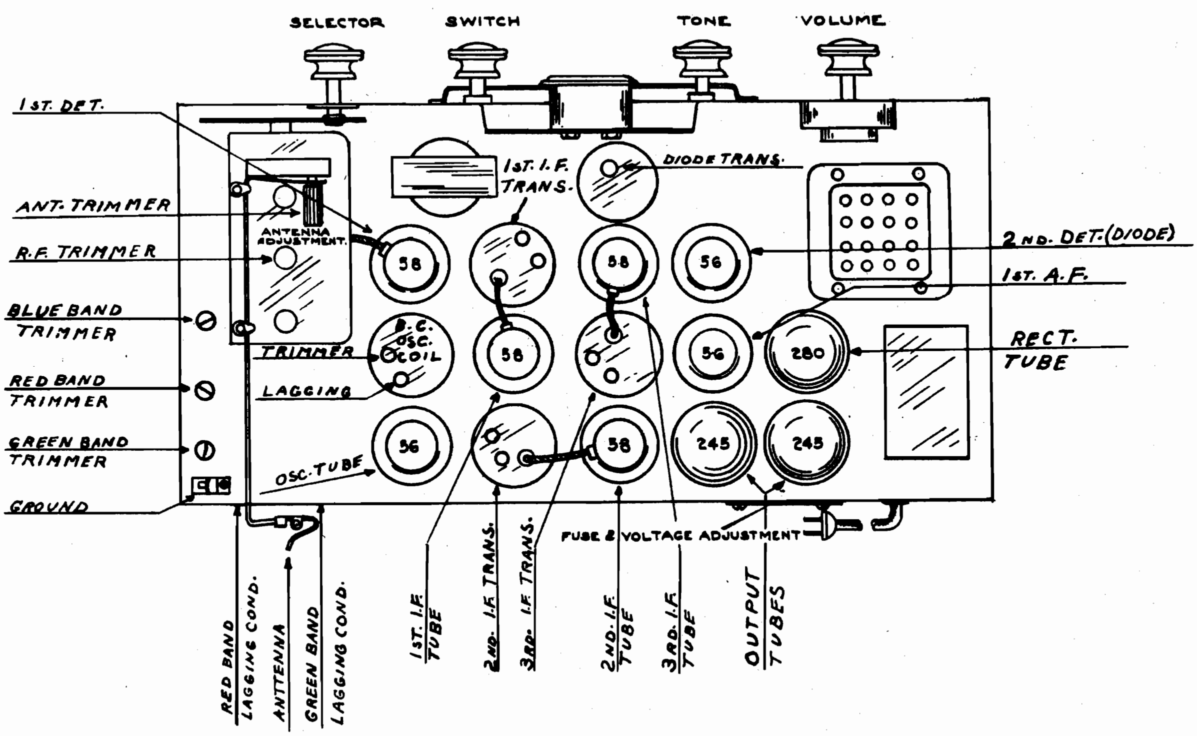
Adjustments in this band are made exactly as described for the green band except that the appropriate trimmer and lagging condensers are used. In Figure #1, reference is made to RED BAND TRIMMER and RED BAND LAGGING CONDENSER. Sensitivity should be in the neighborhood of 5 microvolts across the scale..

(d) Blue Band (10,000 - 20,000 K. C.)

Adjustments in this band should be made starting at the highest frequency end, say 18 MC if obtainable on signal generator. A frequency not lower than 15 MC is desirable. At this highest frequency, set pointer on radio set to calibration and tune BLUE BAND TRIMMER until signal is correctly received. Then place the signal generator at 10 MC and tune radio set until signal is received. If this tuning point deviates from the correct calibration point, the vane regulating the oscillator coil inductance may be reset and the tuning process repeated until scale is adjusted to calibration and the correct sensitivity is obtained. Care should be taken to see that the adjustment is made for the signal itself and not the image. That is, a 15 MC signal should be tuned in at 15 on dial and its image, with more input from standard signal generator, at 14 MC. Five microvolts across scale corresponds to the correct sensitivity.

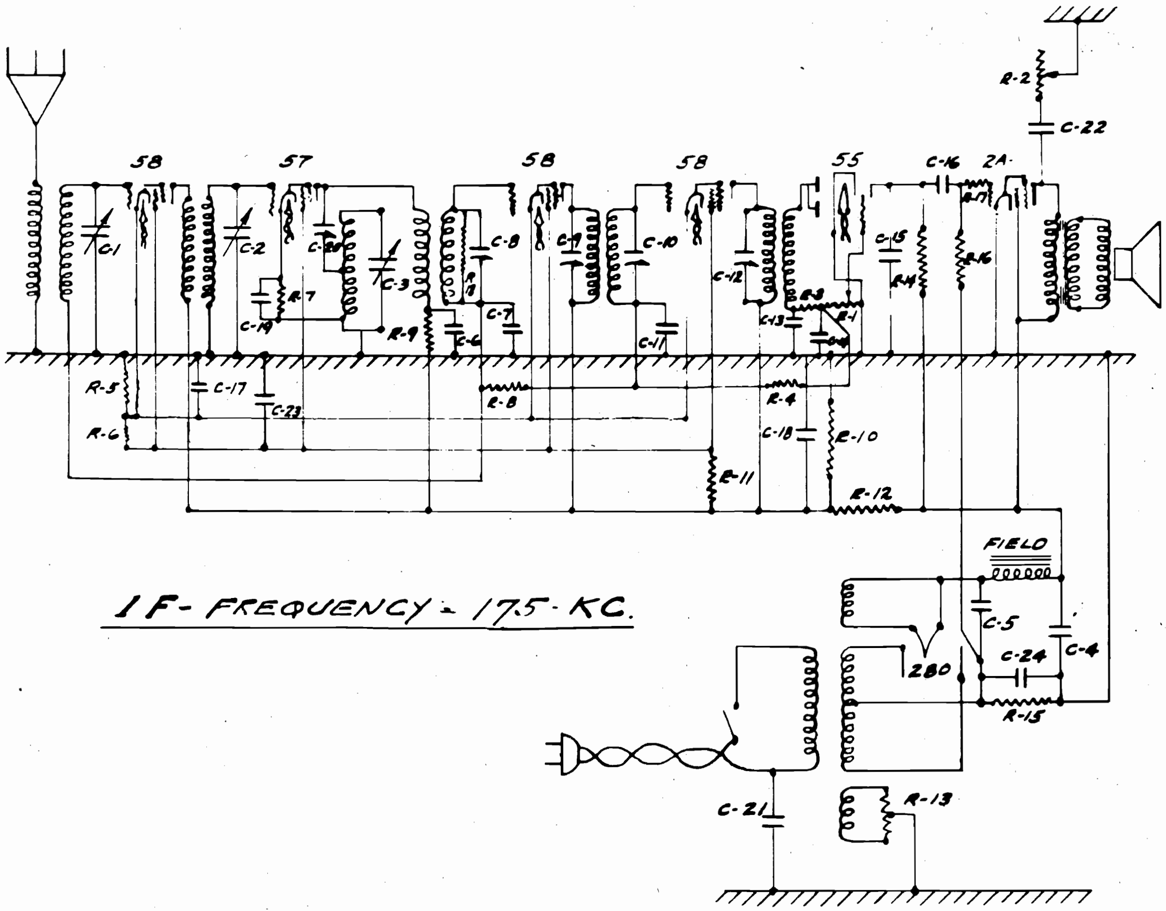
MODEL 260 FIG. 1

I.F. 517.5 KC



# UNITED AMERICAN BOSCH CORP.

**IMPORTANT** UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND MUST BE ACCURATE WITHIN ± .010" · WORK TO DIMENSIONS · DO NOT SCALE DRAWING · FINISH WHERE INDICATED · NO BURRS




| | | |
|---|---|---|
| R-1 | 500,000 VARIABLE | SA-104,437 |
| R-2 | 550,000 " | SA-104,443 |
| R-3 | 50,000 OHMS | SA-100,512 |
| R-4 | 500,000 " | SA-100,194 |
| R-5 | 500 " | SA-99583 |
| R-6 | 30,000 " | SA-101,722 |
| R-7 | 7500 | SA 104,824 |
| R-8 | 1 MEG. | SA-100,815 |
| R-9 | 2000 OHMS. | SA-100,826 |
| R-10 | 40,000 " | SA-99,957 |
| R-11 | 15,000 " | SA-101,404 |
| R-12 | 3500 " | SA-105,161 |
| R-13 | 5 " MID TAP | SA 99412 |
| R-14 | 100,000 OHMS | SA 100,727 |
| R-15 | 350 " | SA-102,564 |
| R-16 | 500,000 " | SA-100,194 |
| R-17 | 100,000 " | SA-100,727 |
| R-18 | 20,000 " | SA-105274 |
| C-1 | | |
| C-2 | VAR. COND | SA-105,134 |
| C-3 | | |
| C-4 | 4 MFD. | SA-105,165 |
| C-5 | 8 MFD. | |
| C-6 | .01-3 PLY | SA-104,459 |
| C-7 | .05-2 PLY | SA-104,459 |
| C-8 | 140-220 MMF | SA-105,108 |
| C-9 | 140-220 MMF | SA-105,109 |
| C-10 | 140-220 MMF | SA-105,109 |
| C-11 | .05-2 PLY | SA-104,459 |
| C-12 | 7-80 MMF. | SA-105,126 |
| C-13 | .0001 MICA. | SA-101,143 |
| C-14 | .0001 MICA. | SA-101,143 |
| C-15 | .00025 MICA. | SA-99781 |
| C-16 | .005-3 PLY | SA-104,459 |
| C-17 | .25-2 PLY | SA-104,459 |
| C-18 | .25-3 PLY | SA-102,490 |
| C-19 | .002-MICA | SA-100,198 |
| C-20 | 140-220 MMF | SA-105,108 |
| C-21 | .01-4 PLY | SA-103,695 |
| C-22 | .05-3 PLY | SA-102,492 |
| C-23 | .25-2 PLY | SA-104,459 |
| C-24 | 20 MFD | SA-105,165 |

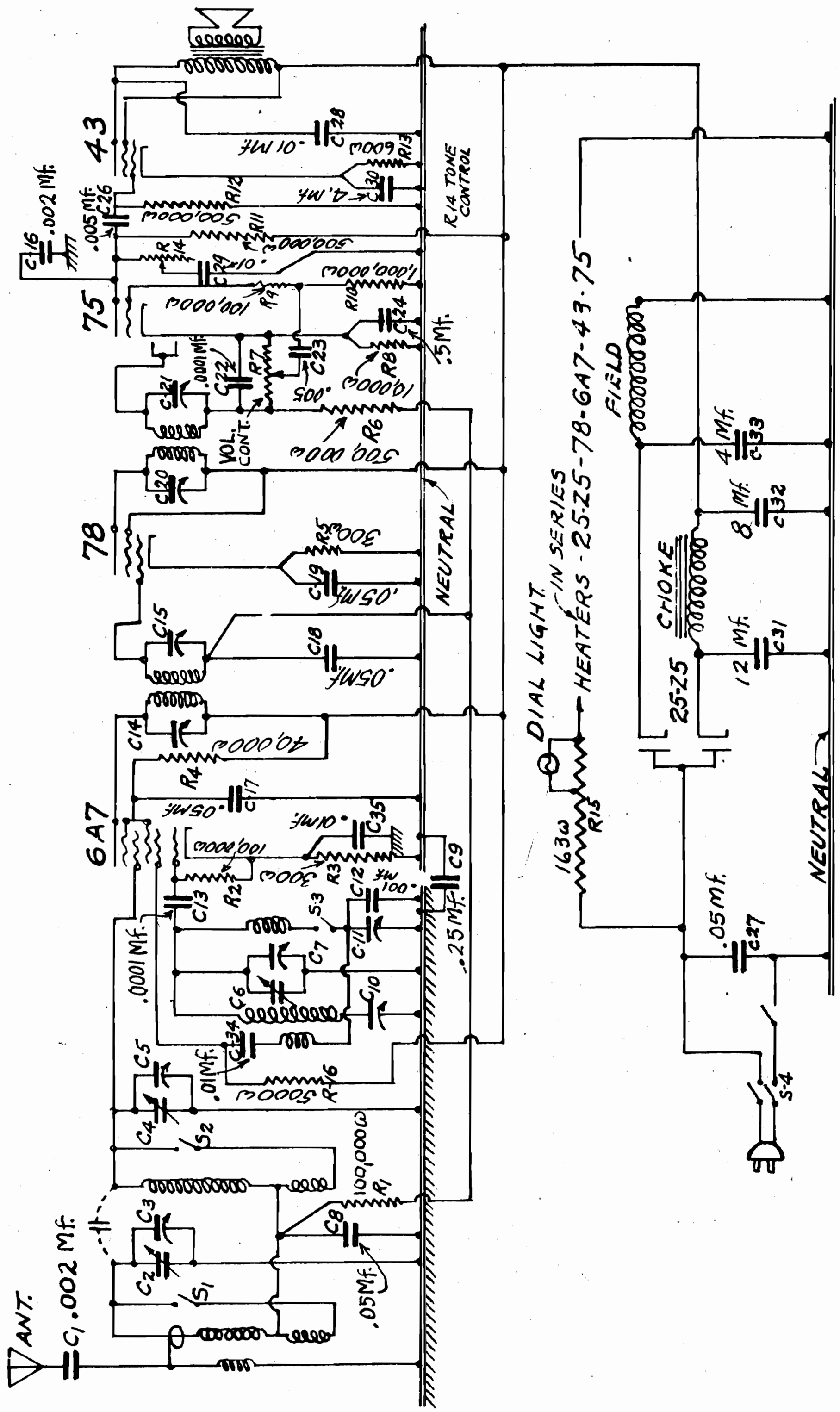
| MATERIAL AND SPECIFICATION | LENGTH PER 1000 PCS. | WEIGHT PER 1000 PCS. | FIRST MADE FOR |
|---|---|---|---|
| | | | MOD. 307<br>SA-105,110 |

## WIRING DIAGRAM

| UNITED AMERICAN BOSCH CORPORATION<br>FACTORY: SPRINGFIELD, MASS. | SCALE | THE SERVICE STAGE FOR THIS PART IS SERVICE No. | 01-105,164 |
|---|---|---|---|
| DATE 5-3-33 · DR. BY E.E.S. · CH. BY [illegible] · APPROVED BY ES. AHF | | NOT A WORKING DRAWING UNTIL APPROVED BY ES. | ED. 1 |

MODEL 357
Schematic

UNITED AMERICAN BOSCH CORP




IF = 175 KC

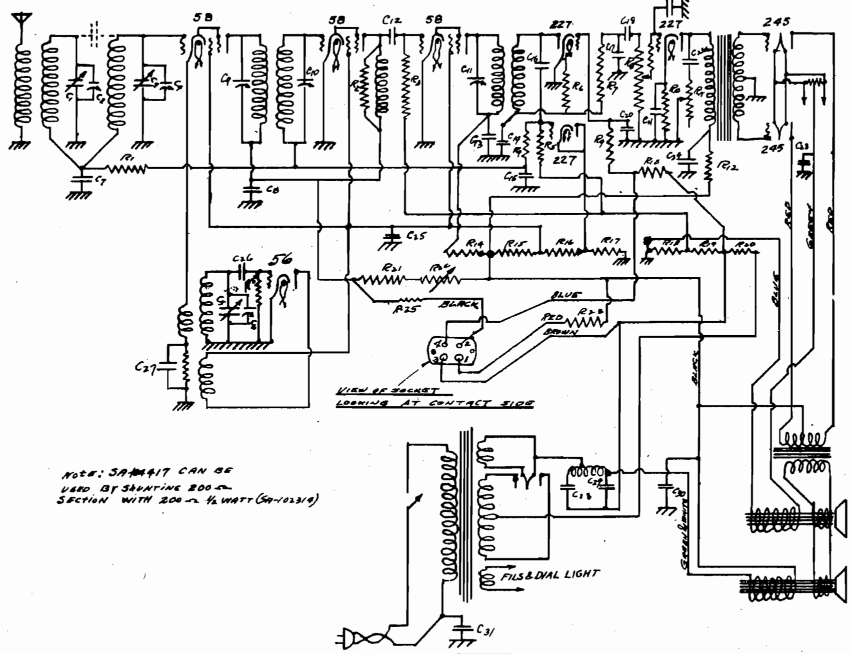
SCHEMATIC DIAGRAM OF MODEL 357

MODEL 310-A
Schematic

# UNITED AMERICAN BOSCH CORP.

## SERVICE INSTRUCTIONS FOR MODEL

## 310A




SCHEMATIC WIRING DIAGRAM - MODEL 310-A

### ELECTRICAL VALUES

R1 - 100,000 ohms
R2 - 20,000 ohms
R3 - 100,000 ohms
R4 - 1/2 megohm
R5 - 1 megohm
R6 - 1/2 megohm
R7 - 20,000 ohms
R8 - 1/2 meg.
Volume control
R9 - 1/4 megohm
R10 - 3,000 ohms
R11 - 1/2 meg.
Tone control
R12 - 10,000 ohms
R13 - 1/4 megohm
R14 - 1,000 ohms
R15 - 12,000 ohms
R16 - 8,000 ohms
R17 - 6,000 ohms
R18 - 30 ohms
R19 - 70 ohms

R20 - 300 ohms
R21 - 10,000 ohms
R22 - 10,000 ohms (vari.)
R23 - 2 megohms
R24 - 100,000 ohms
R25 - 20,000 ohms
C1 )
C2 ) Variable
C3 ) gang
C4 ) with
C5 ) trimmers
C6 )
C7 - .04 - 3 ply
C8 - .05 - 3 ply
C9 - 7 - 70 mmf
C10- 7 - 70 mmf
C11- 7 - 70 mmf
C12- 500 mmf
C13- .05 - 3ply

C14 - 100 mmf
C15 - .05 - 2 ply
C16 - 100 mmf
C17 - 100 mmf
C18 - .05 - 2 ply
C19 - 100 mmf
C20 - .25 2 ply
C21 - 8 mf - 200 V
C22 - .05 - 3 ply
C23 - .05 - 3 ply
C24 - 1 mf - 450 V
C25 - .5 - 3 ply
C26 - 100 mmf
C27 - .05 - 2 ply
C28 - 8 mfd)
C29 - 8 mfd)
C30 - 4 mfd)
C31 - .01 - 4 ply

### RESISTOR COLOR CODE

| | | | |
|---|---|---|---|
| 1,000 ohms | Brown | Black | Red |
| 20,000 ohms | Red | Black | Orange |
| 100,000 ohms | Brown | Black | Yellow |
| 3,000 ohms | Orange | Black | Red |
| 300 ohms | Orange | Black | Brown |
| 8,000 ohms | Gray | Black | Brown |
| 10,000 ohms | Brown | Black | Orange |
| 12,000 ohms | Brown | Red | Orange |
| 6,000 ohms | Blue | Black | Red |

MODEL 310-A
Socket, Voltage
Parts List

# UNITED AMERICAN BOSCH CORP.

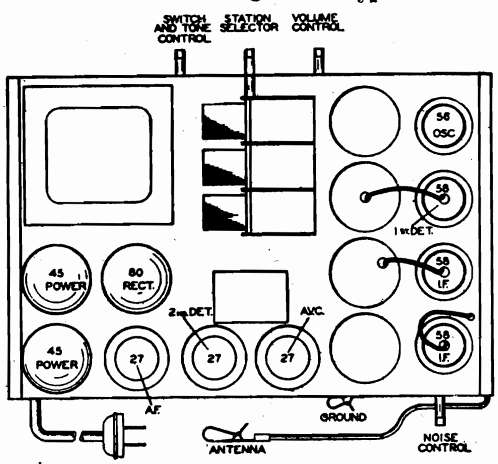
## SOCKET VOLTAGES

| | Osc. 56 | 1st Det. 58 | 1st IF 58 | 2nd IF 58 | AVC 27 | 2nd Det. 27 | AF 27 | AF 2-45 | Rect. 80 |
|---|---|---|---|---|---|---|---|---|---|
| Filament | 2.48 | 2.49 | 2.50 | 2.50 | 2.50 | 2.50 | 2.52 | 2.52 | 5.1 |
| Plate | 100 | #110-180 | #110-180 | 280 | 44 | - | 210 | 290 | - |
| Screen | - | 100 | 100 | 100 | - | - | - | - | - |
| Cathode | - | 4.2 | - | - | - | - | 18 | 49 | - |
| # Bias | - | 3 | 3 | 3 | - | * 0-12 | - | - | - |

* Depending upon setting of noise control.

# Due to high resistance in grid circuit, this voltage cannot be measured at the socket therefore, readings shown here were taken at "C Stick."

NOTE: These values are readings of a high resistance volt meter from each socket terminal to ground. The filament voltages are, of course, an exception. Cathode readings are given for those tubes having the grid at ground. The valves are only approximate and will vary with the line voltage and type of meter employed.




RESISTORS

100196 2 meg. ohms
100815 1 meg. ohms
100194 500,000 ohms
100195 250,000 ohms
100813 20,000 ohms
100727 100,000 ohms
100825 10,000 ohms
102821 3000 ohms
100823 2000 ohms
99412 Mid Tap
104437 Volume control
104443 Tone control with switch
105054 Var. resistance (noise adjustment)
104418 Tapped resistor
104417 Tapped resistor

MAIN ASSEMBLIES

105043 Chassis complete with tubes and shields
105072 Twin speakers with baffle board
105071 Speaker with output transformer
103731 Speaker only
105075 Cabinet

MISC. PARTS

104421 Power transformer
105055 Cable (speaker to chassis)
104402 Knob
105074 Tuning lamp
104948 Dial plate
105985 Tuning light plate

COILS

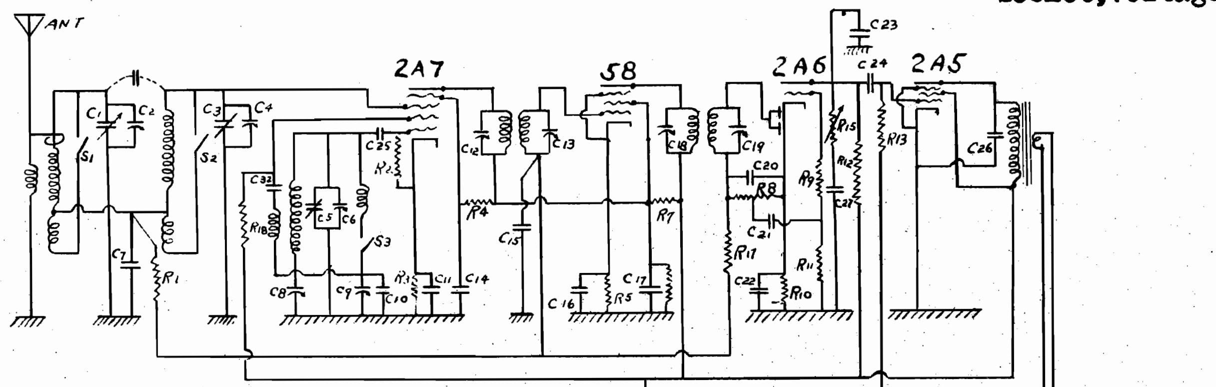
104439 2nd. I. F. coil
104438 1st I. F. coil
104440 Oscillator coil
104429 Ant. coil
104441 Pre. Selector coil
103584 Choke coil (small)
105053 Choke coil (large)
105061 Input transformer
104442 Output transformer

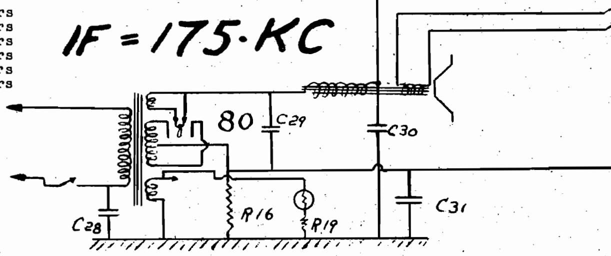
CONDENSERS

104422 Filter condenser
105046 1 mfd. 450 V
103037 8 mfd. 200 V
102498 .5 mfd. 3-ply
102949 .04 mfd. 3-ply
102493 .05 mfd. 2-ply
102492 .05 mfd. 3-ply
103695 .01 mfd. 4-ply
100880 .0005 Mica
101143 .0001 Mica
102497 .25 2-ply

**MODEL 352**
**Schematic**
**Socket, Voltage**

# UNITED AMERICAN BOSCH CORP.

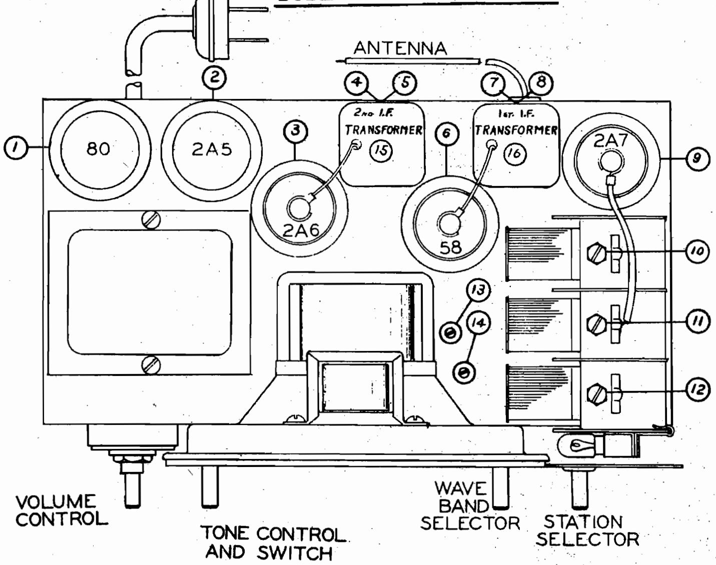



C1 Variable condenser gang w/ trimmers
C2 Variable condenser gang w/ trimmers
C3 Variable condenser gang w/ trimmers
C4 Variable condenser gang w/ trimmers
C5 Variable condenser gang w/ trimmers
C6 Variable condenser gang w/ trimmers
C7 .05 - 2 ply condenser
C8 Trimmer condenser
C9 Trimmer condenser
C10 .001 Mica condenser
C11 .05 - 2 ply condenser
C14 .05 - 2 ply condenser
C15 .05 - 2 ply condenser
C16 .05 - 2 ply condenser
C20 .0001 Mica condenser
C21 103659
C21 .005 - 3 ply condenser
C22 .5 - 2 ply condenser
C23 .002 - 4 ply condenser
C24 .005 - 3 ply condenser
C25 .0001 Mica condenser
C26 .01 - 3 ply condenser
C27 .01 - 3 ply condenser
C28 .01 - 4 ply condenser
C29 Filter condenser assembly 8,6 & 20 mfd.
C30 Filter condenser assembly 8,6 & 20 mfd.
C31 Filter condenser assembly 8,6 & 20 mfd.
C32 .01 - 3 ply condenser

R1 100,000 ohms 1/4 watt resistor
R2 50,000 ohms 1/4 watt resistor
R3 750 ohms 1/4 watt resistor
R4 50,000 ohms 1/4 watt resistor
R5 750 ohms 1/4 watt resistor
R6 40,000 ohms 1/2 watt resistor
R7 20,000 ohms 1 watt resistor
R8 Volume control
R9 100,000 ohms 1/4 watt resistor
R10 5,000 ohms 1/4 watt resistor
R11 1 meg. 1/4 watt resistor
R12 250,000 ohms 1/4 watt resistor
R13 250,000 ohms 1/4 watt resistor
R15 Tone control
R16 400 ohms 1 watt resistor
R17 1/2 meg. 1/4 watt resistor
R18 20,000 ohms 1/4 watt resistor

## TUBE LAYOUT DIAGRAM




## NOMENCLATURE

#1 Rectifier tube
#2 Power pentode tube
#3 2nd det. AVC & AF tube
#4 I.F. trimmer condenser
#5 I.F. trimmer condenser
#6 I.F. tube
#7 I.F. trimmer condenser
#8 I.F. trimmer condenser
#9 Det. osc. tube
#10 Osc. trimmer condenser
#11 Preselector trim con.
#12 Antenna trim condenser
#13 S. W. osc. lag cond.
#14 B. C. osc. lag cond.
#15 2nd I. F. transformer
#16 1st I. F. transformer

## SOCKET VOLTAGES

| Tube | Stage | Fil. | Plate | Screen | Cathode | Grid | |
|---|---|---|---|---|---|---|---|
| 2A7 | 1st Det. | 2.4 | 75 | 30 | 0.8 | | Line voltage 115 |
| | Osc. | | 60 | | | | Power in watts 50 |
| 58 | I. F. | 2.4 | 250 | 75 | 2.0 | | Bias 2A5 (across resistor) 15 volts |
| 2A6 | 2nd Det. | 2.4 | 95 | | 1.5 | | |
| 2A5 | Pentode | 2.5 | 235 | 250 | 0 | 7.5 | |
| 80 | Rectifier | 4.7 | | | | | |

**MODEL 352**
**Alignment**
**Parts List**

# UNITED AMERICAN BOSCH CORP.

## GENERAL DESCRIPTION

The American-Bosch Model 352 is a five-tube superheterodyne dual wave receiver. This model is for 110 volt, 60 cycle operation.

The tuning of this receiver is divided between two illuminated scales. The BLACK scale covers the standard broadcast band (550 to 1600 kilocycles) and the RED scale covers the short wave band including the frequencies between 1600 kilocycles and 4200 kilocycles.

## ALIGNING

To align the 352 chassis, it is essential to use a high grade modulated oscillator and sensitive output meter. The R.F. signal fed into the receiver must be very weak or it will cause the A.V.C. to function, making correct alignment impossible. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low signal.

Before attempting to align a receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. A top view of the chassis is shown on page R100b and should be carefully studied before the actual work is started.

## ALIGNING THE I. F. (175 KC)

1. Set volume control on full.
2. Tone control should be on bass position.
3. Short circuit antenna and ground leads to prevent local stations from interferring with subsequent alignment operations.
4. Connect output meter across voice coil of loud speaker (speaker impedence is 3.5 ohms).
5. Set test oscillator to 175 KC and adjust its output to produce measurable reading on output meter when test oscillator is connected between frame of the chassis and the grid of 58 I. F. tube #6.
6. Adjust #4 and #5 to maximum output, reducing signal oscillator output as stage is brought into resonance.
7. Connect test oscillator to grid of 2A7 (#9) and adjust #7 and #8 to maximum output.

## ALIGNING B.C. OSC. AND R.F.

1. Set wave change switch to broadcast or BLACK scale position.
2. Connect test oscillator to grid of first detector tube 2A7 (#9) and adjust test oscillator to 1400 KC.
3. Set dial scale to maximum mark beyond 550 KC calibration point when gang is entirely closed.
4. Set scale at 1400 KC and adjust #10 to maximum output. NOTE: Two peaks will be heard as trimmer condenser is tuned. The second peak from maximum capacity should be used.
5. Connect test oscillator to antenna through 100. mmf. condenser and with scale still set at 1400 KC adjust condensers #10, 11 and 12 to maximum output.
6. Set scale and test oscillator to 600 KC and adjust #14 simultaneously changing this adjustment and the tuning control of chassis for maximum output. This type of adjustment is known as "max-max" and is obtained in the following manner:

   Tune receiver with left hand by means of tuning knob and adjust #14 in either direction and then without changing it, tune the receiver through a maximum, noting the value of output meter reading. Change #14 further in same direction, retune receiver and note reading. If output drops with second adjustment, reverse direction of the adjustment of #14, continue this type of trial and error adjustment until no further improvement can be made when either tuning control or #14 are changed. While this procedure may appear difficult, facility can be easily acquired by practice and the operation requires only a few moments.
7. With test oscillator and scale set at 1400 KC readjust #10, 11 and 12, since previous operation may have altered oscillator trimmer setting.
8. Check sensitivity across band.

## ALIGNING S. W. OSC.

1. Set wave change switch to short wave or RED band position.
2. Set test oscillator to 1800 KC and adjust #13 and tuning control to a "max-max" as per instructions given under Broadcast Band Alignment.
3. Check sensitivity across band.

## PARTS LIST RS 352

| Part No. | Description of Parts |
|---|---|
| | RESISTORS |
| 105278 | 100,000 ohms 1/4 watt |
| 105276 | 50,000 ohms 1/4 watt |
| 105265 | 750 ohms 1/4 watt |
| 103410 | 40,000 ohms 1/2 watt |
| 102345 | 20,000 ohms 1 watt |
| 105249 | 5,000 ohms 1/4 watt |
| 105281 | 1 meg. 1/4 watt |
| 105279 | 250,000 ohms 1/4 watt |
| 103062 | 400 ohms 1 watt |
| 105246 | 1/2 meg. 1/4 watt |
| 105274 | 20,000 ohms 1/4 watt |
| | MAIN AND SMALL ASSEMBLIES |
| 105711 | Speaker complete |
| 106452 | Chassis complete with tubes and tube shields |
| 105676 | Dial scale assembly |
| 106384 | Resistor strip assembly |
| 105708 | 1st I. F. coil assembly |
| 105709 | 2nd I. F. assembly |
| 105791 | Antenna coil assembly |
| 105755 | Preselector coil assembly |
| 105753 | Oscillator coil assembly |
| 106170 | Speaker field coil assembly |
| | MISCELLANEOUS PARTS |
| 98713 | Dial lamp |
| 105702 | Speaker bracket |
| 103257 | Shield |
| 97906 | Plug for line cable |
| 105648 | Knobs |
| 101869 | Felt foot |
| 105317 | Name plate |
| 105316 | Dial plate |
| 106303 | Cabinet |
| 105162 | Grid lead assembly |
| 106242 | Switch (dual wave) |
| 105144 | Rubber bushing for condenser gang mounting |
| 105947 | Spring ring |
| 105936 | Tube shield for 58 tube |
| 100377 | Spacer for insulation plate assembly |
| 104249 | Insulation plate assembly on transformer |
| 106349 | Dial lamp bracket assembly |
| 106392 | Spacer for resistor strip |
| 106134 | Plug button for I. F. coils |
| 105563 | Volume control |
| 105560 | Tone control |
| | TRANSFORMERS |
| 105659 | Power transformer |
| 106171 | Speaker output transformer |

| Part No. | Description of Parts |
|---|---|
| | CONDENSERS |
| 105771 | Variable condenser gang with trimmers |
| 106386 | .05 - 2 ply condenser |
| 105704 | Trimmer condenser |
| 101775 | .001 Mica condenser |
| 102493 | .05 - 2 ply condenser |
| 101143 | .0001 Mica condenser |
| 103659 | .005 - 3 ply condenser |
| 102499 | .5 - 2 ply condenser |
| 103852 | .002 - 4 ply condenser |
| 106279 | .01 - 3 ply condenser |
| 105931 | .01 - 4 ply condenser |
| 106340 | Filter condenser assembly 8, 6 and 20 mfd. |
| 106277 | .01 - 3 ply condenser |
| | WASHERS |
| 99545 | Insulation washer for antenna cable |
| 108 | Lock washer for power transformer |
| 80589 | Volume control lock washer |
| 105145 | Condenser mounting rubber washer |
| 95702 | Condenser mounting plain washer |
| 53544 | #6 Shakeproof lock washer |
| | SCREWS |
| 97704 | Trimmer condenser fastening screw |
| 104387 | Fastening screw for speaker coil and condenser assemblies |
| 95988 | Screw for oscillator coil |
| 101951 | Name plate fastening screw |
| 101700 | Speaker bracket fastening screw |
| 101865 | Condenser mounting fastening screw |
| 102441 | Set screw for dial scale assembly |
| 95996 | Resistor strip fastening screw |
| | NUTS |
| 103039 | Nut for volume control and dual wave switch |
| 105795 | Nut for power transformer |
| 68226 | Hex nut for screw 104387 |

## PARTS LIST RS 354

5 tube dual wave - 220 volts, 25 cycles

| Part No. | Description of Parts |
|---|---|
| 106489 | Chassis assembly complete |
| 106061 | Power transformer |

All other parts are the same as RS 352.

MODEL 360
Alignment Data

UNITED AMERICAN BOSCH CORP.

The adjustment of the receiver may be divided into five divisions: (1) adjustment of the I. F. amplifier (2) adjustment of the broadcast band (black) (3) adjustment of the 1500-4000 K. C. band (green) (4) adjustment of the 3500-9000 K. C. band (red) and (5) adjustment of the 8000-20,000 band (blue).

The procedure is as follows:

(A) I. F. Adjustment

(1) Set signal generator to ~~476~~ K. C. with attenuator well ahead (20,000mv).

(2) Introduce signal to grid of second I. F. amplifier (see diagram).

(3) Adjust small screws in front side of third I. F. transformer for loudest signal, reducing attentuator as required. Final sensitivity about 5000 microvolts.

(4) Decrease signal generator attenuator to about 1000mv and introduce signal to grid of first I. F. amplifier.

(5) Adjust alignment screws of second I. F. transformer for loudest signal, reducing attenuator as stage is brought into resonance. Final sensitivity about 300 microvolts.

(6) Decrease signal generator attenuator to about 50 microvolt setting, and introduce signal to grid of first detector.

(7) Repeat alignment procedure on 1st I. F. transformer (see diagram) until best adjustment is obtained. Sensitivity about 20 microvolts.

(B) R. F. Adjustment

(1) Set signal generator to 1500 K. C. with input from signal generator to grid of first detector. Place pointer of radio set to 1.5 mark on dial. Adjust screw of trim condenser in top of right rear shield container until signal is tuned in. This screw is usually designated by a red color code. Having obtained tune at this point set signal generator to 600 K. C. and set pointer to .6 mark on station indicator and adjust other screw in the shield container until the signal is tuned in. Now return to the 1500 K. C. point with set and signal generator and make the slight resetting of the first named screw to obtain accurate adjustment to scale reading.

(2) Connect signal generator to antenna lead, making sure the antenna equivalent (200 mmf) is in the circuit.

(3) Continue setting of 1500 K. C. Adjust alignment condensers on variable condenser gang (1st and 2nd sections from front of set) for loudest signal. Check sensitivity, and calibration at several points on dial. Set should come correctly to kilocycles settings of important broadcasting stations, and its sensitivity on the signal generator should be within the limits specified here.

| | | | |
|---|---|---|---|
| K. C. - - - | 1500 | 1000 | 600 |
| M. V. - - - | 5 | 5 | 10 |

**MODEL 360**
**Alignment Data**

# UNITED AMERICAN BOSCH CORP.

Having placed the broadcast band in correct setting, we are now ready to adjust the short wave bands. In order to attempt this a reliable signal generator is required Examples are the Ferris Instrument Co. type 10B, General Radio 603-A, R. C. A. type TMV-18. Do not try to make adjustments on the short wave bands by means of harmonic obtained from a set tester designed for use only on 500 to 1500 K. C. band. Such a procedure will usually end in getting so far off correct adjustment as to require factory service.

## (C) Adjustment of the Green Band

Place signal generator on 3600 K. C. and pointer of radio set at the 3.6 mark on the dial.

Adjust trim condenser in right hand front shield container until signal is tuned in. This trim condenser is usually red color coded. Place signal generator on 1600 K.C. and adjust dial scale pointer of set to 1.6 mark. Adjust opposite condenser in shield container to best signal. Return to 3600 K. C. and repeat adjustment. In adjusting to the 3600 K. C. point it is possible to obtain two settings for different positions of the trim condenser in the shield container. This denotes merely the plus and minus frequency between oscillator and signal generator which will give the correct I. F. frequency. The correct setting of the trim condenser is the one wherein the screw is turned furthest out. In any event, an incorrect setting will always be denoted by lack of sensitivity when the set and signal generator are tuned to 2500 K. C. (mid-band). This check is usually quite valuable. The sensitivities should be as follows:

| | | | |
|---|---|---|---|
| K. C. - - - | 3600 | 2400 | 1600 |
| M. V. - - - | 10 | 10 | 5 |

## (D) Adjustment of the Red Band

Place signal generator on 8000 K. C. marking and tune receiver in region of 8.0 on scale. Note where signal is received. Next place signal generator on its 4000 K. C. setting and tune set to 4.0 on scale. Adjust oscillator lag condenser (rear unit on right hand side plate) until signal is received. Return set and signal generator to 8000 K. C. and observe pointer setting and sensitivity. Slight deviations from calibration can be compensated by manipulating the stiff wires connecting the oscillator coil to the switch.

## (E) Adjustment of the Blue Band

Place signal generator at 20,000 K. C. or if this is not available, then adjust to highest possible frequency, which preferably should be at least 15,000 K. C. Tune set to this frequency and note where signal generator is received on the dial scale. Then place signal generator on 10,000 K. C. and adjust oscillator lag condenser (front unit on side plate) until signal generator is tuned in at 10 on dial scale. Now return both signal generator and radio set to the high frequency setting. Located on the under side of the base and adjacent to the switch and high frequency selector coils are two trim condensers which are used for correct adjustment at this high frequency. Increase setting of attenuator until signal generator can be tuned in at two points on dial (say 20 and 19). Then with set pointer at 20 adjust these trim condensers for best signal decreasing signal generator attenuator as signal becomes better tuned. At correct adjustment a very loud signal will be obtained at 20 while a feeble signal or none at all is observed at 19. This is a practical illustration of the effectiveness of pre-selection as outlined in the first part of this description.

The adjustment instructions just given apply to a Model 360 receiver which is in reasonable operating condition, but in some manner has been thrown out of adjustment. Obviously, before the radio technician can go thru with the adjustments given here, he must assure himself that defective tubes, injured parts, such as punctured condensers, shorted variable condensers, open resistors, scratched high frequency coils, etc. are not such as to cause the set to be inoperative on one or more bands of frequencies.

# UNITED AMERICAN BOSCH CORP.

## SERVICE INSTRUCTIONS FOR ADJUSTMENT OF MODEL 370

The Model 370 is a dual band receiver with the following frequency coverages: On the broadcast band, printed in black, 540 to 1712 kc.; this includes not only the American broadcast band but also certain of the police transmitters. On the short-wave police band, ship to shore transmitters, and the short-wave broadcast at 6000 kc.

The Model 370 is a 7-tube superheterodyne receiver comprising a combination first detector oscillator, two stages of intermediate frequency amplification, diode rectification and automatic volume control, an audio amplifier tube on control by the signal, an audio frequency driver stage, and a push pull power output stage. Selectivity is provided by a double tuned antenna selector and three double tuned intermediate frequency transformers, comprising a total of eight selective circuits.

The tube complement of the Model 370 follows:

1 Type 2A7, oscillator and first detector
1 Type 58, first intermediate frequency amplifier
1 Type 2B7, second intermediate frequency amplifier, detector and a.v.c.
1 Type 58, controlled audio amplifier
1 Type 53, driver stage
1 Type 53, push pull output stage
1 Type 83V, rectifier

The adjustment of the receiver will be described under three headings - (A) intermediate frequency amplifier, (B) broadcast band (black), (C) short wave band (red).

Alignment procedure should always be in the order given below:

### (A) INTERMEDIATE FREQUENCY AMPLIFIER ADJUSTMENT

(1) Set signal generator or alignment oscillator to 265 kc. and adjust its output to produce a measurable signal on the output meter when the generator is connected to the control grid cap of the second i.f. (2B7).

(2) Set volume control at maximum volume position, tone control at bass and wave change switch so that the black scale or broadcast band is in operation.

(3) With signal generator connected between frame of the receiver and grid cap of the second i.f. amplifier, adjust small screws in front side of their i.f. transformer for loudest signal, adjusting attenuator of signal generator as required. Note: If calibrated output meter and accurate signal generator are being used, the sensitivity should be approximately 8000 microvolts for an output voltage of .6 volts measured across the moving coil of the speaker. This corresponds to 100 milliwatt standard output.

Note: Signal generators may vary as much as 50% in accuracy of attenuation and for this reason, the sensitivity data should be regarded as an approximate guide to correct performance.

(4) Decrease signal generator output to about 500 microvolts and connect signal generator to control grid cap of first i.f. amplifier tube (58).

(5) Adjust alignment screws of second i.f. transformer for loudest signal, reducing output of signal generator as stage is brought into resonance. This adjustment is made by using a small screw driver inserted thru the hole provided in the dial scale. Final sensitivity should be about 300 microvolts.

(6) Decrease signal generator output to about 50 microvolts and connect signal generator to control grid cap of first detector tube (2A7).

(7) Adjust alignment screws of first i.f. transformer until loudest signal is obtained, reducing attenuator as stage is brought into resonance. Readjust second and third i.f. transformer alignment screws to assure perfect alignment of the entire amplifier. This should be done without removing signal generator lead from first detector. Over-all sensitivity of the i.f. amplifier should be approximately 51 microvolts.

### (B) BROADCAST BAND ADJUSTMENT

(1) Rotate tuning control until gang condenser is fully closed. The pointer should now be in line with the fine black mark approximately 1/8" beyond the 550 kc. calibration mark (5.5 on dial). The travel of the pointer from this mark to the position which it occupies when the condenser is fully open, should be 3-1/16 inches. When the indicator mechanism is so adjusted that this travel is obtained alignment of preselector and oscillator circuits will then assure the best calibration.

(2) Set signal generator to 1400 kc. with input connected to grid cathode of first detector tube (2A7).

(3) Adjust tuning control until point is at 1400 kc. calibration mark. Adjust screw of the oscillator section of the gang condenser (see diagram), until maximum output is obtained. Sensitivity should be about 50 microvolts.

(4) Connect signal generator to antenna ground terminal using an antenna equivalent of 200 mmf. condenser in series with antenna lead to signal generator.

(5) Adjust all trimmer screws of the gang condenser to a maximum. Sensitivity should be approximately 10 microvolts.

(6) Set signal generator to 600 kc. with connections made to antenna and ground terminals.

(7) Tune in signal by means of tuning control and then adjust both tuning control and broadcast band oscillator lagging adjustment simultaneously for a maximum. Note: This type of adjustment is known as "max-max" and is obtained in the following manner:

MODEL 370
Alignment Data

# UNITED AMERICAN BOSCH CORP.

Tune receiver with left hand by means of tuning knob and adjust oscillator lag condenser with right hand. Make slight change in oscillator lag condenser in either direction and then, without changing it, tune the receiver thru a maximum noting the value of output meter reading obtained. Change oscillator lag condenser further in the same direction, retune receiver and note reading. If output drops with second adjustment, reverse direction of the adjustment of the oscillator lag condenser. Continue this type of trial and error adjustment until no improvement can be made when either tuning control or oscillator lag condenser are changed. While this procedure may appear difficult, facility can be easily acquired by practice and the operation required only a few moments.

(8) Recheck 1400 kc. adjustment since oscillator lagging procedure may have slightly detuned oscillator. Check sensitivity at various settings along broadcast band. Sensitivity should be approximately 10 microvolts or less.

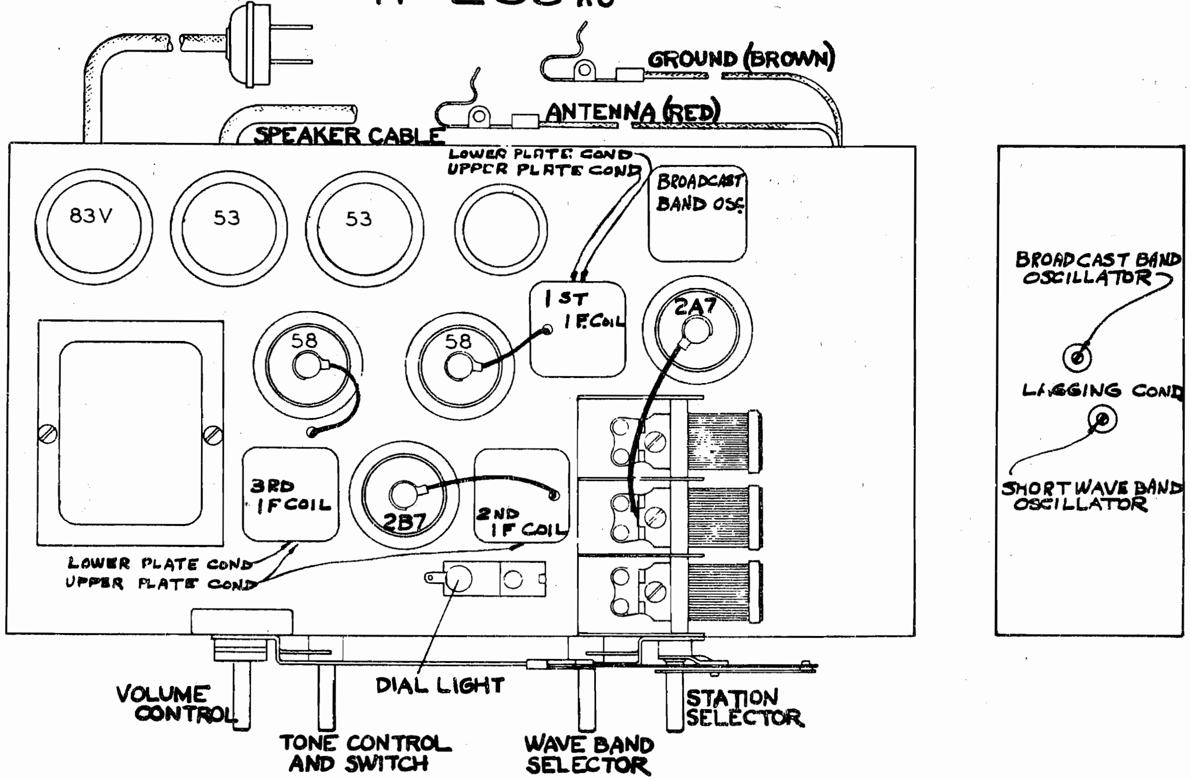
## (C) SHORT WAVE ADJUSTMENT

(1) Set signal generator at 2400 kc. with output connected to antenna and ground terminals.

(2) Change wave band switch to red band, tune in signal at 2400 kc. and "max-max" oscillator as described above, using short-wave oscillator lagging condensers as shown on diagram.

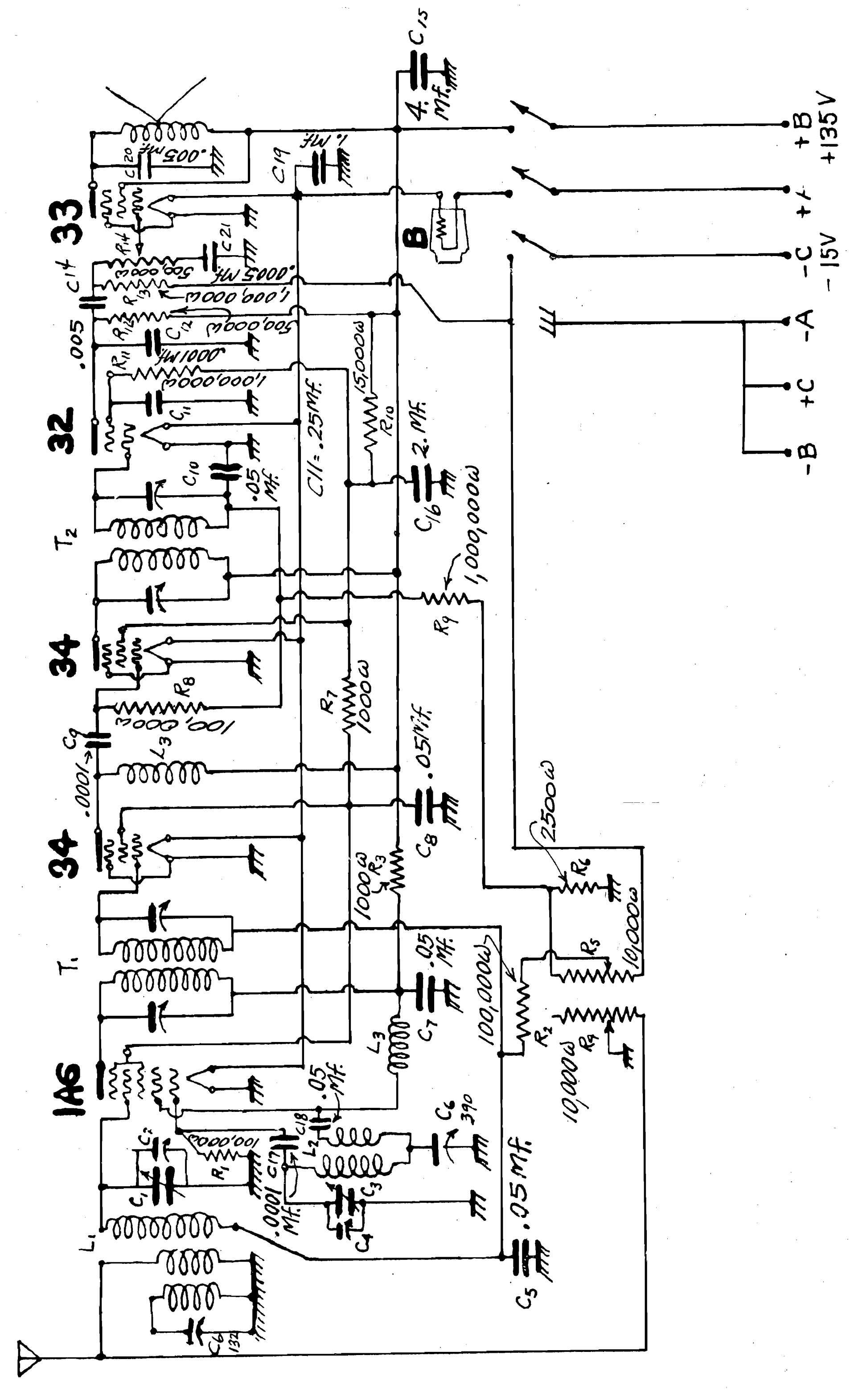
(3) Check sensitivity of entire short-wave band which should be 50 microvolts or less.

IF-265 KC



MODEL 376
Schematic

UNITED AMERICAN BOSCH CORP

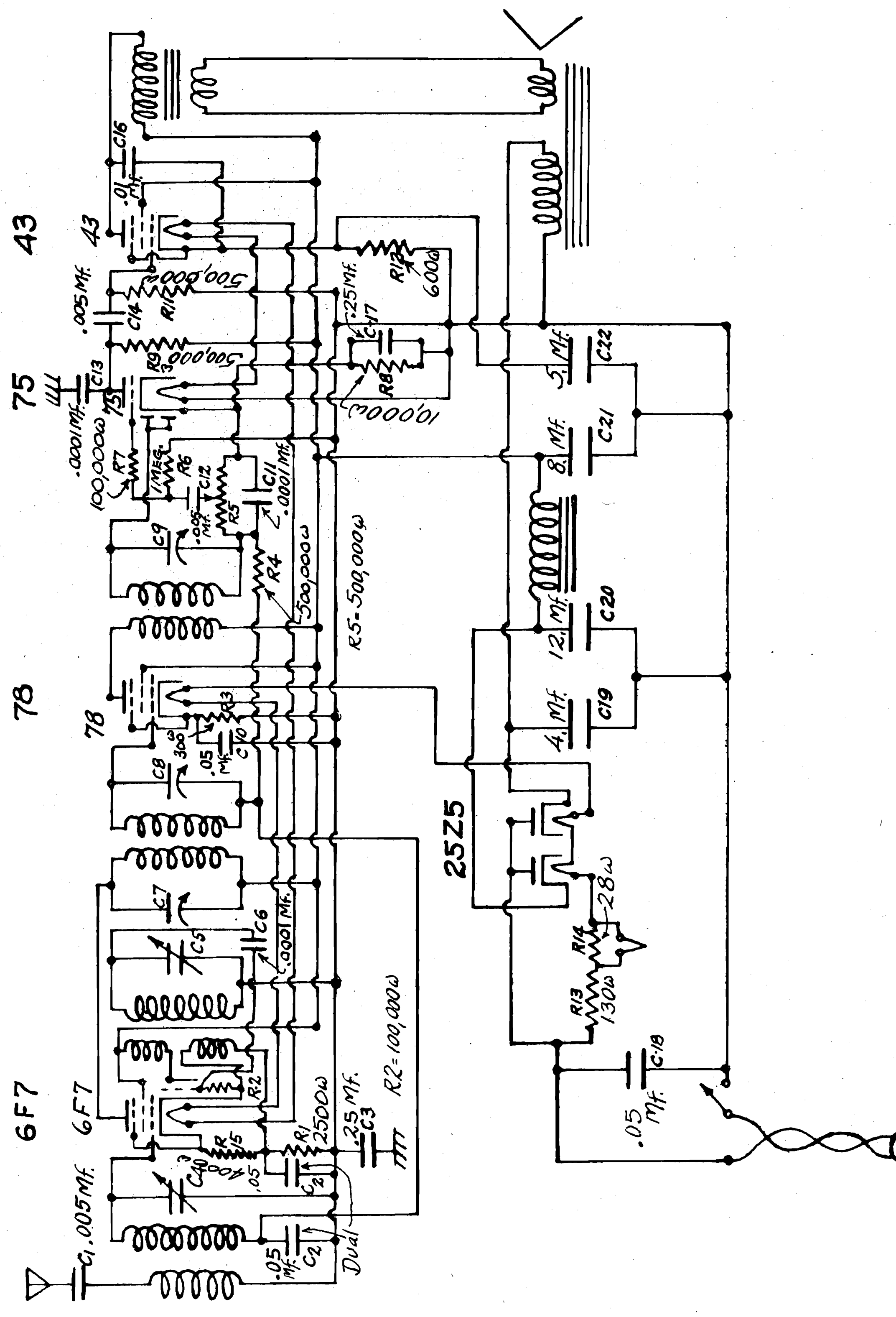



456 KC IF

SCHEMATIC DIAGRAM OF MODEL 376

MODEL 402
Schematic

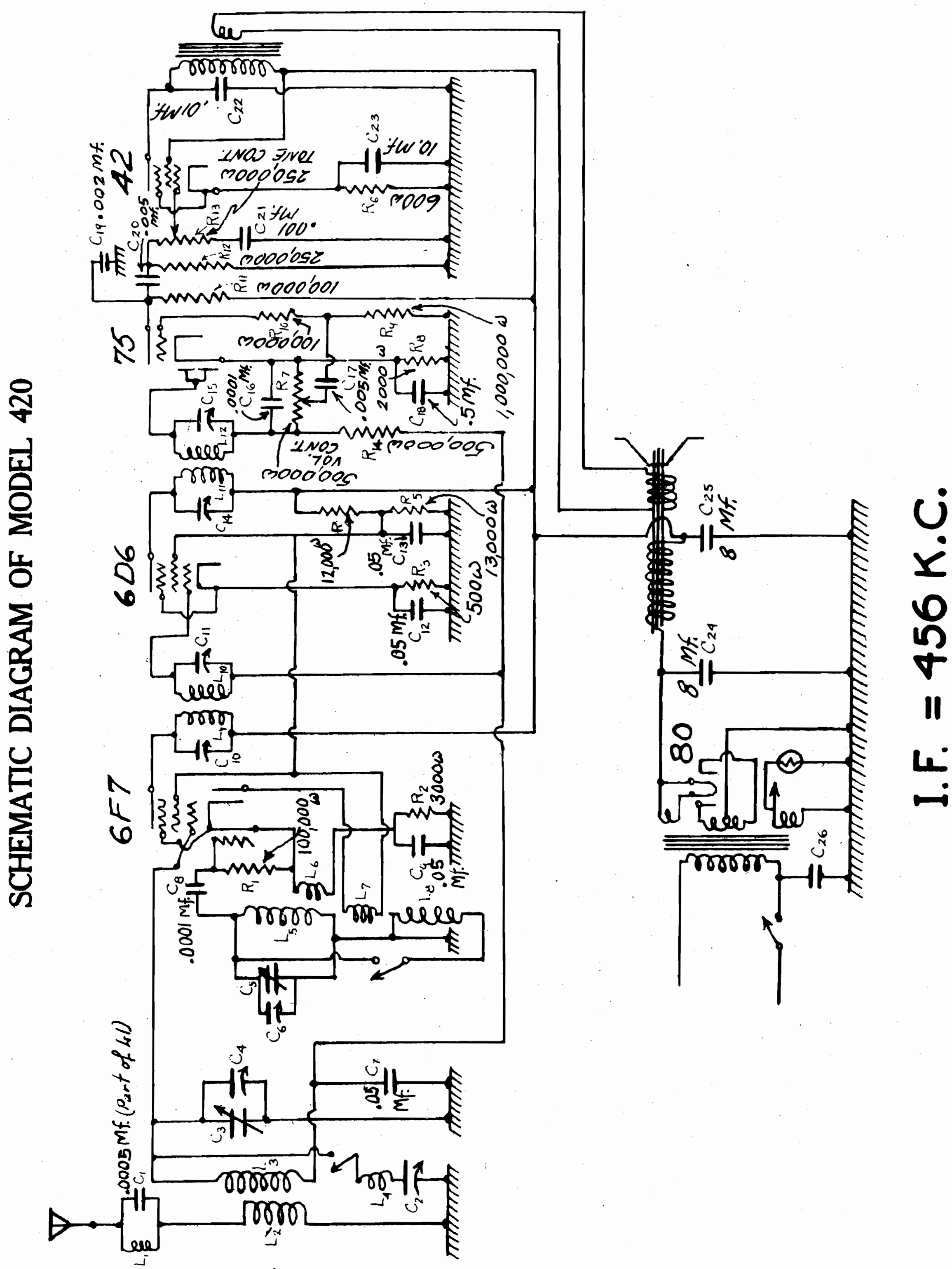
# UNITED AMERICAN BOSCH CORP




INTERMEDIATE FREQUENCY - 456 K.C.

SCHEMATIC DIAGRAM OF MODEL 402

# UNITED AMERICAN BOSCH CORP



**MODEL 460**
**Schematic**

# UNITED AMERICAN BOSCH CORP

**RECORD OF CHANGES**

ADDED PORTION OF DIAGRAM COVERING MOD. 464. CORRECTED CAPACITIES OF C12, C13, C14 & C13 ED. 2

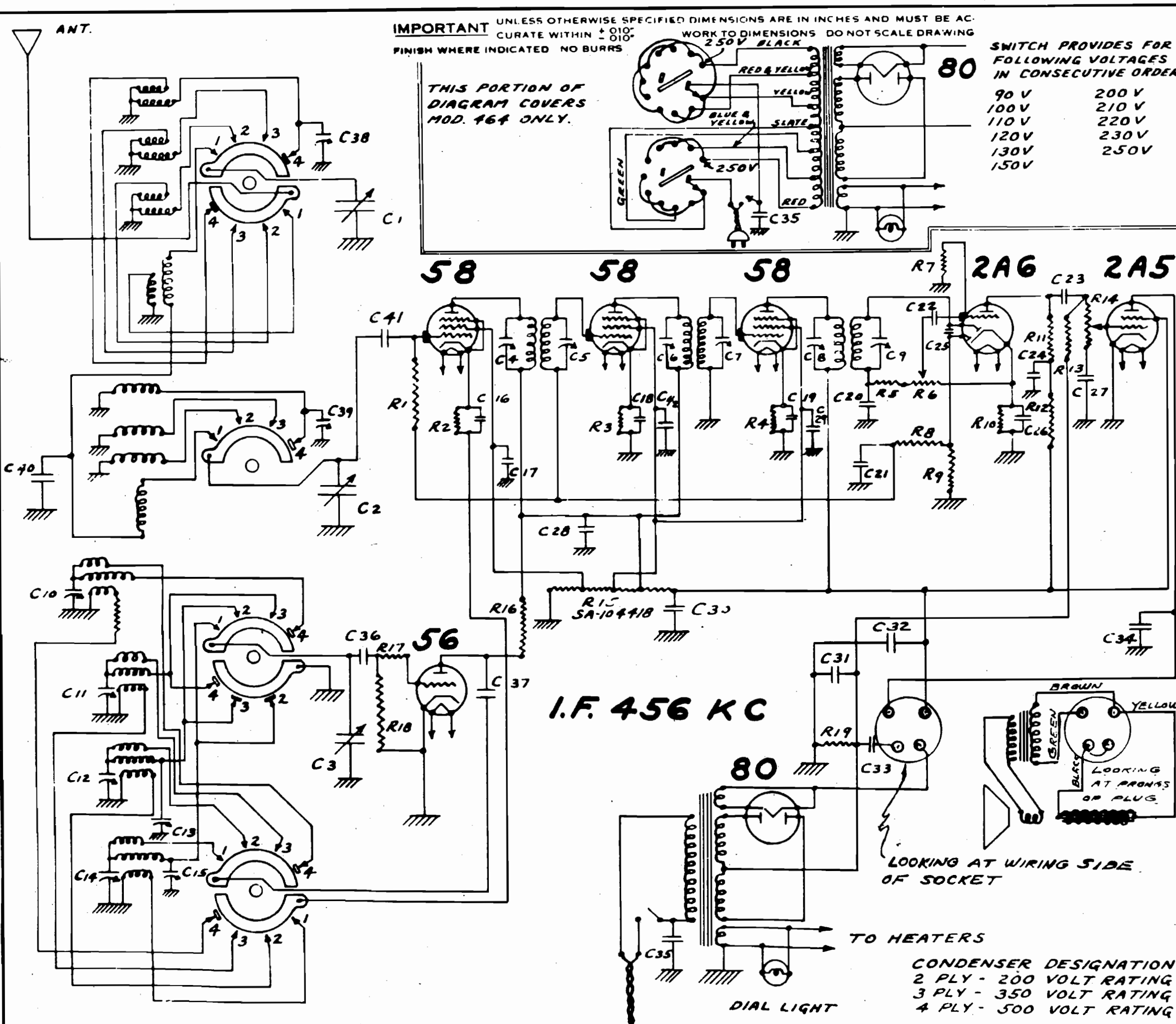
10-4-34

**IMPORTANT** UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND MUST BE ACCURATE WITHIN $\pm .010$ WORK TO DIMENSIONS DO NOT SCALE DRAWING FINISH WHERE INDICATED NO BURRS

THIS PORTION OF DIAGRAM COVERS MOD. 464 ONLY.

SWITCH PROVIDES FOR FOLLOWING VOLTAGES IN CONSECUTIVE ORDER

| | |
|---|---|
| 90 V | 200 V |
| 100 V | 210 V |
| 110 V | 220 V |
| 120 V | 230 V |
| 130 V | 250 V |
| 150 V | |




NOTE:- SWITCH POSITION IS SHOWN IN HIGHEST FREQUENCY SCALE POSITION. (PURPLE)

1 - BLACK OR BROADCAST
2 - GREEN - 1.5 - 4.0 MC.
3 - RED - 4.0 - 10 MC.
4 - PURPLE 10 - 20 MC

CONDENSER DESIGNATION
2 PLY - 200 VOLT RATING
3 PLY - 350 VOLT RATING
4 PLY - 500 VOLT RATING

| | | |
|---|---|---|
| C1 | | SA-106352 |
| C2 | VAR. COND. | |
| C3 | | |
| C4 | PART | SA-105695 |
| C5 | OF | |
| C6 | PART | SA-105693 |
| C7 | OF | |
| C8 | PART | SA-105696 |
| C9 | OF | |
| C10 | 2000 MMF. VAR | SA-103800 |
| C11 | 2000 MMF. VAR | SA-103800 |
| C12 | 1200 MMF. VAR | SA-105683 |
| C13 | 7-70 MMF. | |
| C14 | 300 MMF. VAR | SA-105684 |
| C15 | 7-70 MMF. | |
| C16 | .05 MF. 2 PLY | SA-102493 |
| C17 | .05 MF. 2 PLY | SA-102493 |
| C18 | .05 MF. 2 PLY | SA-106386 |
| C19 | .05 MF. 2 PLY | SA-102493 |
| C20 | 100 MMF. MICA | SA-106417 |
| C21 | .05 MF. 2 PLY | SA-102493 |
| C22 | .005 MF. 3 PLY | SA-103659 |
| C23 | .02 MF 3 PLY | SA-102504 |
| C24 | .1 MF 3 PLY | SA-102494 |
| C25 | 100 MMF. MICA | SA-101143 |
| C26 | .5 MF 2 PLY | SA-102499 |
| C27 | .001 MF 4 PLY | SA-106403 |
| C28 | .05 MF 3 PLY | SA-102492 |
| C29 | .05 MF 2 PLY | SA-102493 |
| C30 | .05 MF 3 PLY | SA-102492 |
| C31 | 20 MF. ELECTRO | |
| C32 | 4 MF. ELECTRO | SA-106665 |
| C33 | 8 MF. ELECTRO | |
| C34 | .01 MF. 3 PLY | SA-106277 |
| C35 | .01 MF 4 PLY | SA-105931 |
| C36 | 100 MMF. MICA | SA-101143 |
| C37 | .05 MF. 2 PLY | SA-106386 |
| C38 | TRIM. COND. | SA-105705 |
| C39 | TRIM. COND | SA-105705 |
| C40 | .05 MF. 2 PLY | SA-102493 |
| C41 | 100 MMF. MICA. | SA-101143 |
| R1 | ½ MEG ¼ W | SA-105246 |
| R2 | 2000 Ω ¼ W | SA-105245 |
| R3 | 1000 Ω ¼ W | SA-105267 |
| R4 | 1000 Ω ¼ W | SA-105267 |
| R5 | 50,000 Ω ¼ W | SA-105276 |
| R6 | 500,000 Ω VOL. | SA-105562 |
| R7 | 1 MEG ¼ W | SA-105281 |
| R8 | ½ MEG ¼ W | SA-105246 |
| R9 | 1 MEG ¼ W | SA-105281 |
| R10 | 2000 Ω ¼ W | SA-105245 |
| R11 | 70,000 Ω ¼ W | SA-107363 |
| R12 | 70,000 Ω ¼ W | SA-107363 |
| R13 | ¼ MEG ¼ W | SA-105279 |
| R14 | VARIABLE | SA-105561 |
| R15 | MULTIPLE | SA-104418 |
| R16 | 25,000 Ω ½ W | SA-100197 |
| R17 | 50 Ω ½ W | SA-100844 |
| R18 | 20,000 Ω ¼ W | SA-105274 |
| R19 | 400 Ω 1 W | SA-103062 |
| | | |
| C42 | .05 2 PLY | SA-106386 |

| POS. | NAME | QTY. | DRAWING NO. AND PART NO. |
|---|---|---|---|
| 4 | | | |
| 3 | | | |
| 2 | | | |
| 1 | | | |

**WIRING DIAGRAM**

FIRST MADE FOR MOD. 460

UNITED AMERICAN BOSCH CORPORATION
FACTORY: SPRINGFIELD, MASS.

| DATE | DR. BY | CH. BY | APPROVED BY EG. | SCALE |
|---|---|---|---|---|
| 7/16/34 | GWS | | | |

THE SERVICE STAGE FOR THIS PART IS SERVICE No.

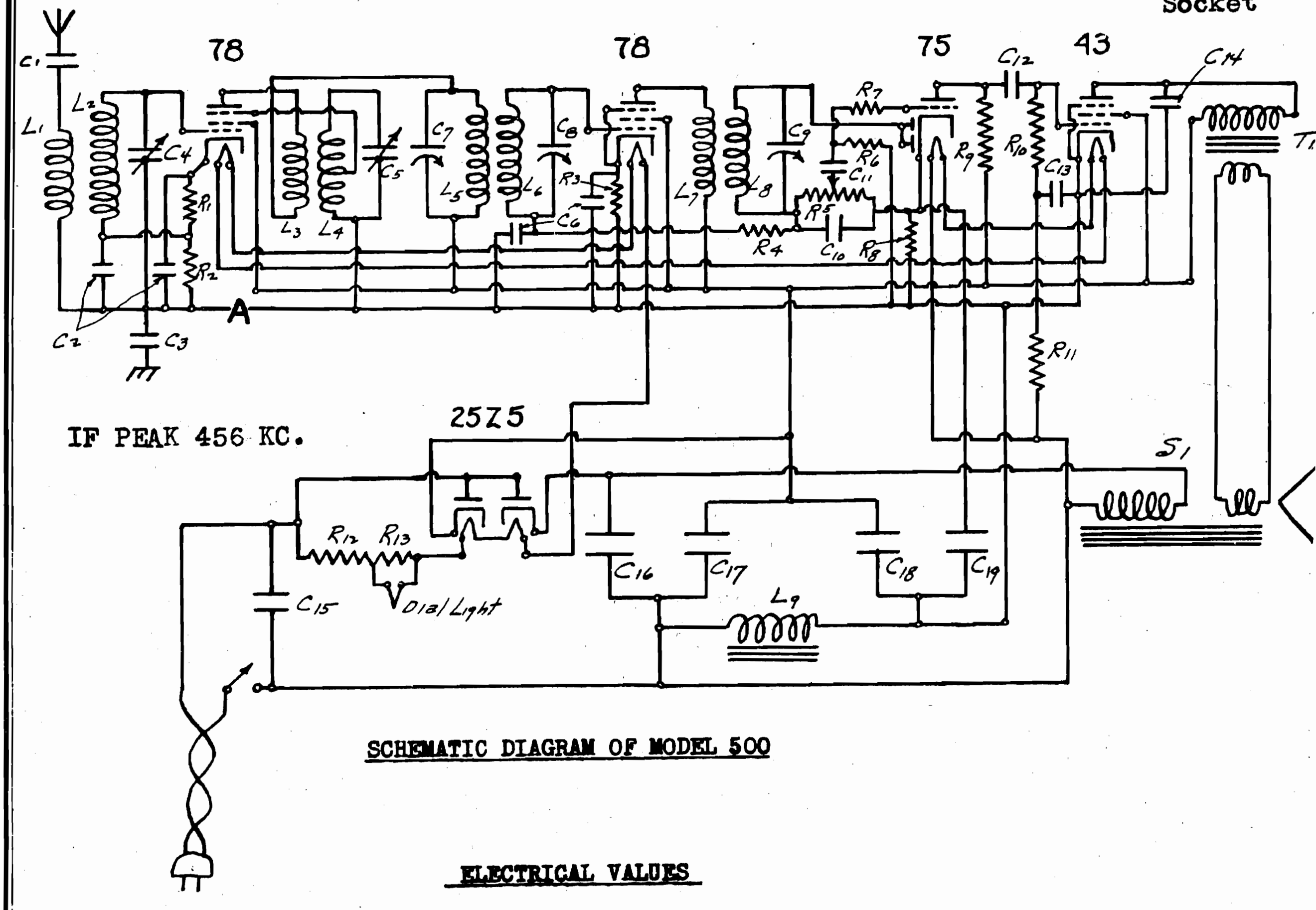
NOT A WORKING DRAWING UNTIL APPROVED BY EG.

**DI-107316**

ED. 2

# UNITED AMERICAN BOSCH CORP.

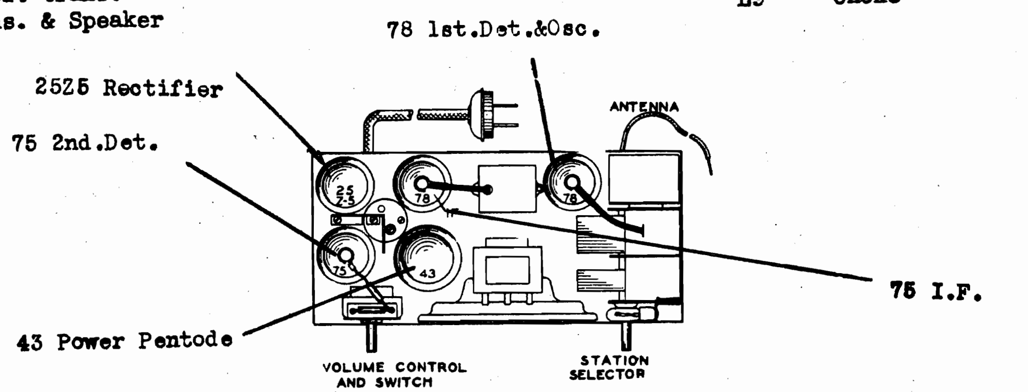
**MODEL 500**
Schematic
Socket




SCHEMATIC DIAGRAM OF MODEL 500

## ELECTRICAL VALUES

| | | | | | |
|---|---|---|---|---|---|
| R1 | - 500 | C1 | - .005 - 3 ply | C14 | - .01 - 4 ply |
| R2 | - 2500 | C2 | - .05 Dual | C15 | - .01 - 4 ply |
| R3 | - 100 | C3 | - .25 - 2 ply | C16 | - 4 mf. 150V |
| R4 | - 500,000 | C4 | - (2-gang cond. | C17 | - 16 mf. 150V |
| R5 | - 500,000 var. | C5 | - (with trimmers | C18 | - 4 mf. 150V |
| R6 | - 1 meg. | C6 | - .05 Dual | C19 | - 5 mf. 150V |
| R7 | - 100,000 | C7 | - (Mica I.F. | L1 ) L2 ) | Ant. Coil |
| R8 | - 5000 | C8 | - (Trimmers | L3 ) | |
| R9 | - 250,000 | C9 | - Mica Trimmers | L4 ) | v Det. Osc. Assy. |
| R10 | - 500,000 | C10 | - .0001 Mica | L5 ) L6 ) | |
| R11 | - 250,000 | C11 | - .005 - 3 ply | L7 ) | 2nd I.F. Assy. |
| R12 | - 130 | C12 | - .005 - 3 ply | L8 ) | |
| R13 | - 35 | C13 | - .25 - 2 ply | L9 | Choke |
| T1 | - Output trans. | | | | |
| S1 | - Trans. & Speaker | | | | |



MODEL 500
Voltage
Alignment Data

# UNITED AMERICAN BOSCH CORP.

## VOLTAGE READINGS

Note: Since no circuits are directly connected to the metal chassis as in the usual A. C. radio sets, it is necessary to measure voltages to the negative side of the circuit designated as "A" on the wiring diagram. A high resistance voltmeter must be used or readings will be inaccurate.

The following voltage readings were taken with the receiver supplied by 115 volts 60 cycle alternating current. Voltage readings will be slightly lower when D. C. is used and will vary with the type of meter used.

| | | |
|---|---|---|
| 1. (Rectifier 25Z5) | Voltage across C16 | 120 V |
| | " " C12 | 120 V |
| | " " Heater | 25 V |
| 2. (Power tube 43) | " Screw to point A | 105 V |
| | " Plate " " " | 96 V |
| | " Bias across L9 | 15 V |
| | " Heater | 25 V |
| 3. (Second Detector 75) | " Plate to point A | 37 V |
| | " Bias cathode to A | .5 V |
| | " Heater | 6 V |
| 4. (Intermediate 78) | " Screen to point A | 105V |
| | " Plate to point A | 105V |
| | " Bias Cathode point A | 1.3V |
| | " Heater | 6V |
| 5. (Osc. Det. 78) | " Screen to point A | 105 V |
| | " Plate " " A | 105 V |
| | " Grid bias Cathode to coil lug across R. | 2.8 V |
| | " Suppressor bias cathode to pointA | 16.5 V |
| | Heater | 6 V |

The heater voltages may vary considerably because the series connection maintains constant current rather than constant voltage.

## Alignment Instructions - Model 500

### I. F. Adjustment 456 K. C.

Note: The signal generator or alignment oscillator should have no external ground connection of the low potential side of its output either to ground or to the power line and the low potential output terminal may be connected to the frame of the receiver. An external ground of the receiver frame will result in a loud hum making alignment impossible.

1. Connect volume indicator across moving coil of speaker (speaker impedance is 4.5 ohms)

2. Set volume control at maximum

3. Connect signal generator to grid of I. F. tube (78) and adjust the trim condenser in the top of the small I. F. housing which is located above the chassis between the tubes, to maximum output.

4. Connect signal generator to grid of 1st detector and adjust both condensers to a maximum output. These adjustments are made by means of slotted screws at the rear of the housing.at center of set.

### Oscillator and R. F. Adjustment

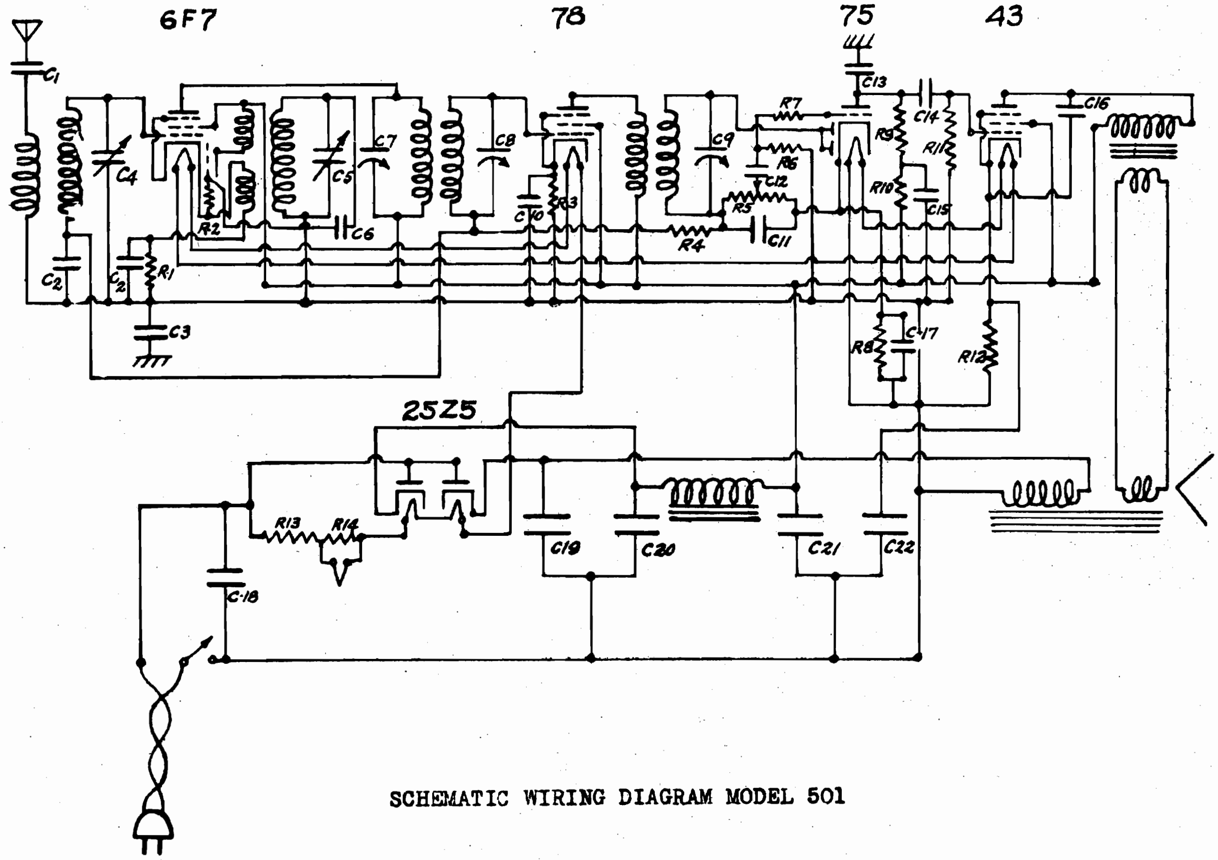
1. Connect R. F. signal generator to antenna wire thru 100 mf mica condenser. Antenna should be hanked.

2. Set dial scale to maximum mark beyond the 550 kilocycle calibration point when gang is entirely closed.

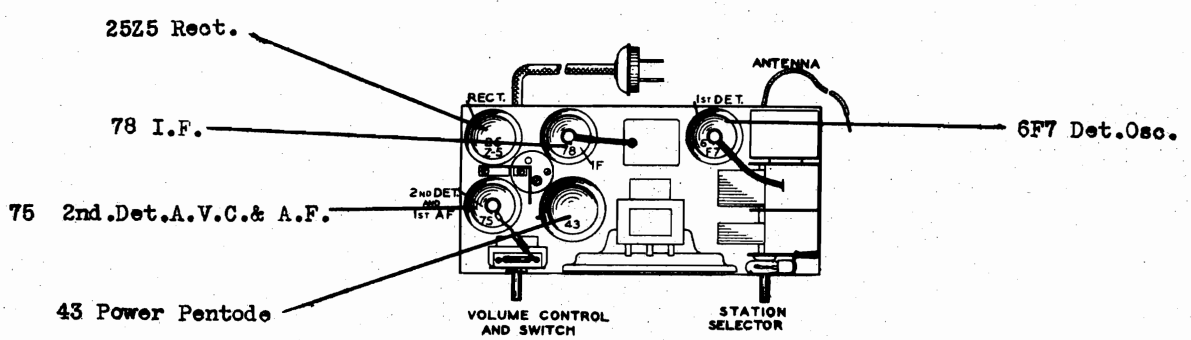
3. Trim both condenser sections to a maximum with the signal generator and scale set at 1500 kilocycles.

MODEL 501 AC-DC
Schematic
Socket

# UNITED AMERICAN BOSCH CORP.




SCHEMATIC WIRING DIAGRAM MODEL 501




## ELECTRICAL VALUES

| | | |
|---|---|---|
| R1 - 1500 ¼ W | R13 - 130 | C11 - .0001 Mica. |
| R2 - 100000 " | R14 - 28 | C12 - .005 - 3 Ply |
| R3 - 300 " | C1 - .005 - 3 Ply | C13 - .0001 Mica. |
| R4 - 500000 " | C2 - .05 Dual | C14 - .005 - 3 Ply |
| R5 - 500000 Var. | C3 - .25 - 2 Ply | C15 - .25 - 2 Ply |
| R6 - 1 Meg. ¼ W | C4) - 2 gang cond. | C16 - .01 - 4 Ply |
| R7 - 100000 " | C5) - With trim. | C17 - .25 - 2 Ply |
| R8 - 10000 " | C6 - .0001 Mica. | C18 - .01 - 4 Ply |
| R9 - 500000 " | C7 - Mica. I. F. | C19 - 4 Mfd. 150 V |
| R10 - 50000 " | C8 - Trimmers | C20 - 12 " " |
| R11 - 500000 " | C9 - " | C21 - 8 " " |
| R12 - 600 ½ W | C10 - .05 - 2 Ply | C22 - 5 " 25 V |

MODEL 501 AC-DC
Voltage
Parts List

# UNITED AMERICAN BOSCH CORP.

## MODEL 501

### I - A.C.MEASUREMENT

| Stage | Tube | Fil | Plate | Screen | Cathode |
|---|---|---|---|---|---|
| 1 Det. | 6.F7 | 6.0 | 115 | 115 | 12 |
| Osc. | | | 115 | | |
| I.F. | 78 | 6.0 | 115 | 115 | 2.8 |
| 2 Det. | 75 | 5.9 | 30 | - | 0.7 |
| Amp. | | | | | |
| Power | 43 | 22 | 115 | 115 | 17 |
| Rect. | 25Z5 | 25 | 125 | - | - |

| | | | |
|---|---|---|---|
| Line Voltage | 115 | Dynamic Field | 108 Volts |
| Power in Watts | 47 | Filter Choke Drop | 8.8 Volts |
| Dial Lamp Volts | 6.0 | | |
| Res. Strip Volts | 47 | | |

### II - D.C.MEASUREMENT

| Stage | Tube | Fil | Plate | Screen | Cathode |
|---|---|---|---|---|---|
| 1 Det. | 6.F7 | 6.2 | 102 | 102 | 8.7 |
| Osc. | | | 102 | | |
| I.F. | 78 | 5.9 | 102 | 102 | 2.5 |
| 2 Det. | 75 | 5.8 | 27 | - | 0.6 |
| Amp. | | | | | |
| Power | 43 | 24 | 102 | 102 | 13 |
| Rect. | 25Z5 | 27 | 110 | - | - |

| | | | |
|---|---|---|---|
| Line Volts | 115 | Resistance Strip Volts | 47 |
| Dial Lamp Volts | 6 | Dynamic Field Volts | 115 |

## ESSENTIAL PARTS LIST

RESISTORS

| | |
|---|---|
| 105260 | 300 Ohm. 1/4 Watt |
| 101211 | 600 " 1/4 " |
| 105268 | 1500 " 1/4 " |
| 105272 | 10,000 " 1/4 " |
| 105278 | 100,000 " 1/4 " |
| 105246 | 500,000 " 1/4 " |
| 105281 | 1 Meg " 1/4 " |
| 105308 | Volume Control |
| 105319 | Power Resistor Strip |

CONDENSERS

| | |
|---|---|
| 101143 | .0001 Mica |
| 103659 | .005 MF 3 Ply |
| 103695 | .01 MF 4 Ply |
| 102493 | .05 MF 2 Ply |
| 105327 | .05 MF Dual |
| 102497 | .25 MF 2 Ply |
| 105728 | Variable Condenser |
| 105722 | Filter Condenser |

COILS

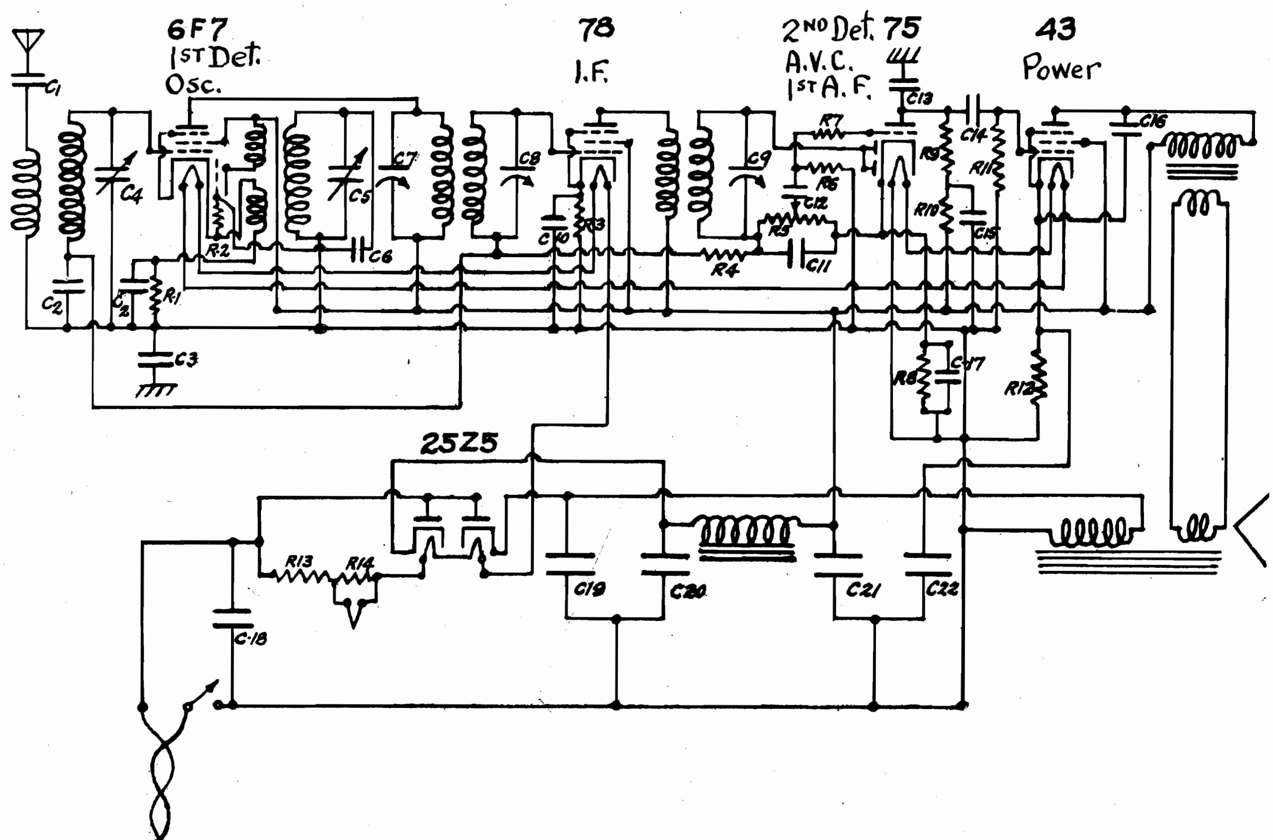
| | |
|---|---|
| 105725 | Antenna Coil |
| (105721 | Oscillator Coil |
| (105721 | First I.F. Coil |
| 105318 | Second I.F. Coil |
| 105724 | Choke Coil |

MISC. PARTS

| | |
|---|---|
| 105726 | Speaker Assembly |
| 105343 | Line Cable |
| 105732 | Dial Scale Assembly |
| 105336 | Dial Lamp Socket |
| 95572 | Dial Lamp |
| 105344 | Antenna Cable |

MODEL 502
Schematic
Socket

# UNITED AMERICAN BOSCH CORP.

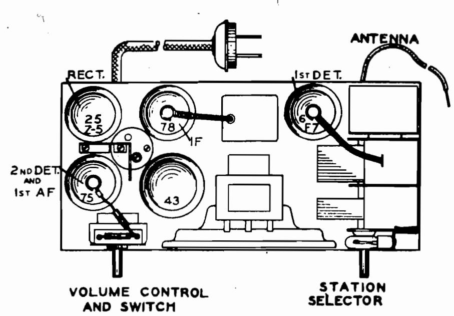



*INTERMEDIATE FREQUENCY - 456 K.C.*

## ELECTRICAL VALUES

R1 1500 ohms ¼ watt
R2 100000 " " "
R3 300 " " "
R4 500000 " " "
R5 500000 variable
R6 1 meg ohms ¼ watt
R7 100000 " " "
R8 10000 " " "
R9 500000 " " "
R10 50000 " " "
R11 500000 " " "
R12 600 " ½ "
R13 130
R14 28
C1 .005 3 Ply
C2 .05 Dual
C3 .25 2 Ply
C4) Two gang cond.
C5) with trimmers

C6 .0001 mica
C7)
C8) Mica I.F.
C9) Trimmers
C10 .05 2 Ply
C11 .0001 Mica
C12 .005 3 Ply
C13 .0001 Mica
C14 .005 3 Ply
C15 .25 2 Ply
C16 .01 4 Ply
C17 .25 2 Ply
C18 .01 4 Ply
C19 4 M.F. 150 V.
C20 12 M.F. 150 V.
C21 8 M.F. 150 V.
C22 5 M.F. 25 V.



MODEL 502
Voltage
Parts List

# UNITED AMERICAN BOSCH CORP.

## I - A.C. MEASUREMENT

| Stage | Tube | Fil | Plate | Screen | Cathode |
|---|---|---|---|---|---|
| 1 Det. | 6.F7 | 6.0 | 115 | 115 | 12 |
| Osc. | | | 115 | | |
| I.F. | 78 | 6.0 | 115 | 115 | 2.8 |
| 2 Det. | 75 | 5.9 | 30 | - | 0.7 |
| Amp. | | | | | |
| Power | 43 | 22 | 115 | 115 | 17 |
| Rect. | 25Z5 | 25 | 125 | - | - |

| | | | |
|---|---|---|---|
| Line Voltage | 115 | Dynamic Field | 108 Volts |
| Power in Watts | 47 | Filter Choke Drop | 8.8 Volts |
| Dial Lamp Volts | 6.0 | | |
| Res. Strip Volts | 47 | | |

## II - D.C. MEASUREMENT

| Stage | Tube | Fil | Plate | Screen | Cathode |
|---|---|---|---|---|---|
| 1 Det. | 6.F7 | 6.2 | 102 | 102 | 8.7 |
| Osc. | | | 102 | | |
| I.F. | 78 | 5.9 | 102 | 102 | 2.5 |
| 2 Det. | 75 | 5.8 | 27 | - | 0.6 |
| Amp. | | | | | |
| Power | 43 | 24 | 102 | 102 | 13 |
| Rect. | 25Z5 | 27 | 110 | - | - |

| | | | |
|---|---|---|---|
| Line Volts | 115 | Resistance Strip Volts | 47 |
| Dial Lamp Volts | 6 | Dynamic Field Volts | 115 |

To replace tubes it is necessary to remove the chassis from the cabinet. Remove the screws which fasten the back. Remove the knobs and the screws holding the bottom of the chassis in place. The chassis may then be moved back from the front of the cabinet until the tubes are accessible.

CAUTION: Disconnect the receiver from the power supply before touching the chassis, tubes, or any metal parts inside the cabinet.

**Resistors**

105260 300 ohms ¼ Watt
101211 600 ohms ¼ Watt
105272 10,000 ohms ¼ Watt
105276 50,000 ohms ¼ Watt
105278 100,000 ohms
105268 1,500 ohms ¼ Watt
105246 ½ meg. ohms
105281 1 meg. ohms
105308 Vol. Control & Switch

**Condensers**

102493 .05 - 2 Ply
105327 .05 Dual
101143 .0001 Mica
103659 .005
103695 .01 - 4 Ply
102497 .25 - 2 Ply
105722 (Electrolytic)

**Coils**

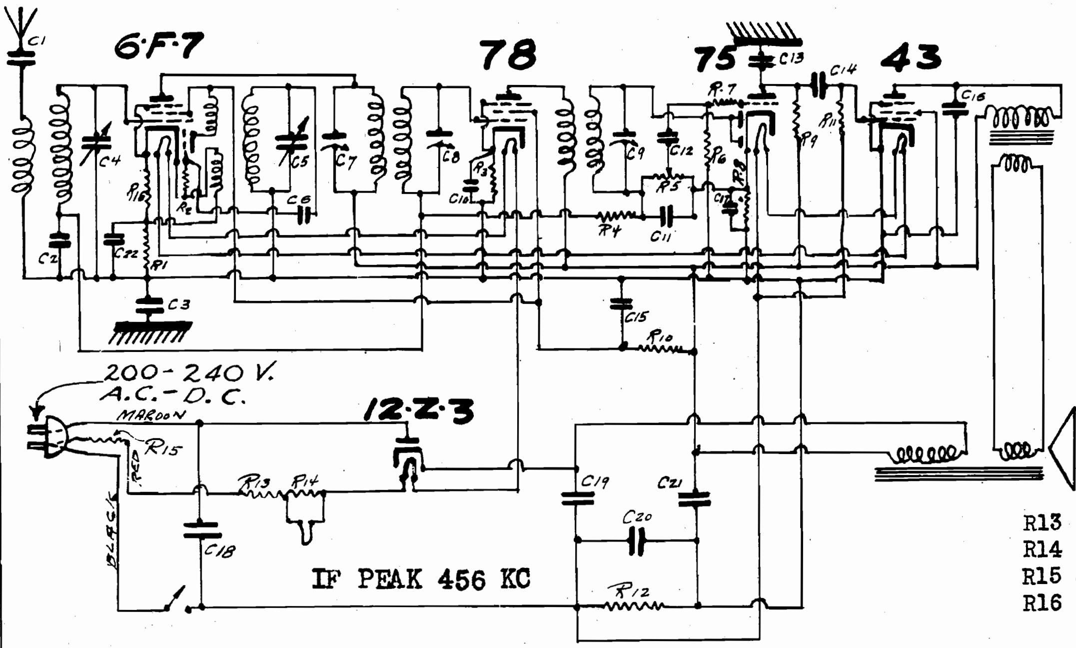
105725 Antenna Coil
105721 I.F., Det., & Osc. Coil
105318 2nd I.F. Coil
105724 Choke Coil Assy.

**Misc. Parts**

105335 Knob
105321 Speaker Baffle
101869 Felt Feet
105334 Name Plate
106318 Dial Plate
105729 Chassis Assy.
106307 Cabinet
105726 Speaker
105732 Dial Scale Assy.
95572 Dial Lamp
105336 Dial Lamp Socket Assy.
105723 Condenser Gang

MODEL 503
Schematic
Socket

# UNITED AMERICAN BOSCH CORP.




ELECTRICAL VALUES

| | | | | |
|---|---|---|---|---|
| R1 | 2500 ohms 1/4 watt | | C10 | .05 mfd. 2-ply |
| R2 | 100000 " " " | | C11 | .0001 mfd. mica |
| R3 | 500 " " " | | C12 | .005 mfd. 3-ply |
| R4 | 500000 " " " | | C13 | .0001 mfd. mica |
| R5 | 500000 " variable | | C14 | .005 mfd. 3-ply |
| R6 | 1 megohm 1/4 watt | | C15 | .05 " 2-ply |
| R7 | 100000 ohms 1/4 watt | | C16 | .005 " 3-ply |
| R8 | 10000 " " " | | C17 | .25 " 2-ply |
| R9 | 500000 " " " | | C18 | .01 " 4-ply |
| R10 | 3000 " 1/2 " | | C19 | 8 mfd. 300 volts |
| R11 | 250000 " 1/4 " | | C20 | 20 " 25 volts |
| R12 | 400 " 2 " | | C21 | 8 mfd. 300 volts |
| | | | C22 | .05 mfd. 2-ply |
| | | | C1 | .005 mfd. 3-ply |
| | | | C2 | .05 " 2-ply |

| | | |
|---|---|---|
| R13 | 130 | ) metal clad resis. |
| R14 | 28 | ) |
| R15 | 390 | " line cord |
| R16 | 4000 ohms 1/4 watt | |

| | |
|---|---|
| C3 | .25 mfd. 2-ply |
| C4) | Two gang cond. |
| C5) | with trimmers. |
| C6 | .0001 mfd. mica |
| C7) | Mica |
| C8) | I. F. |
| C9) | Trimmers |

**Resistors**

| Part No. | |
|---|---|
| 102177 | 400 ohms 2 watts |
| 105264 | 500 " 1/4 " |
| 105283 | 4000 " 1/4 " |
| 105270 | 2500 " 1/4 " |
| 102821 | 3000 " 1/2 " |
| 105277 | 10000 " 1/4 " |
| 105278 | 100000" 1/4 " |
| 105279 | 250000" 1/4 " |
| 105246 | 500000" 1/4 " |
| 105281 | 1 megohm 1/4 " |
| 105308 | Vol. Control and switch |

**Condensers**

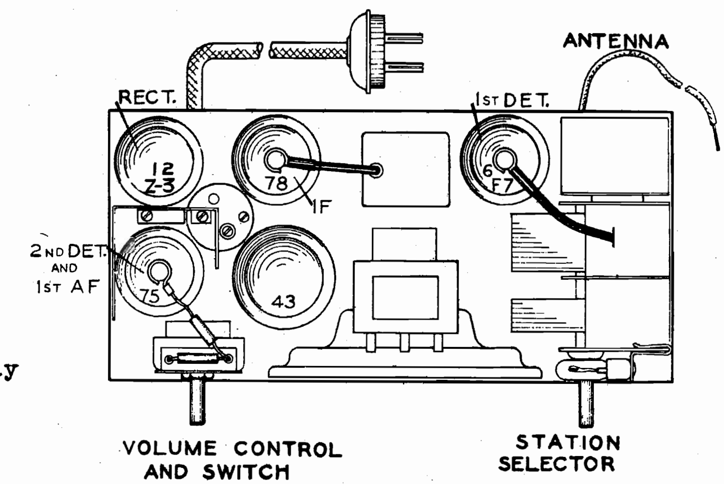
| | |
|---|---|
| 103695 | .01 mfd. 4-ply paper |
| 106386 | .05 " 2-ply " |
| 102497 | .25 " 2-ply " |
| 103659 | .005 " 3-ply " |
| 101143 | .0001 " mica |
| 106487 | electrolytic filter |
| 106621 | variable condenser assembly |

**Coils**

| Part No. | |
|---|---|
| 105725 | Antenna coil assembly |
| 106484 | I.F., Det., and osc. coil |
| 105318 | 2nd I. F. coil |

**Misc. Parts**

| | |
|---|---|
| 105335 | Knob |
| 105321 | Speaker Baffle |
| 101869 | Felt Foot |
| 105334 | Nameplate |
| 106318 | Dial-plate |
| 106623 | Chassis Assembly |
| 106307 | Cabinet |
| 106485 | Speaker |
| 106381 | Dial scale assembly |
| 104916 | Dial Lamp |
| 105336 | Dial Lamp Socket Assembly |



MODEL 503
Voltage
Notes

# UNITED AMERICAN BOSCH CORP.

## SERVICE INSTRUCTIONS FOR AMERICAN-BOSCH VIBRO-POWER RECEIVER

## MODEL 503

### INTRODUCTION

The Model 503 is an extremely compact five-tube, automatic volume control superheterodyne which may be operated from any (200 to 240 Volt) A.C. or D.C. supply service.

An important feature of this receiver is its extended tuning range (540 to 1,650 kilocycles). This range includes not only the complete broadcast band, but also many of the important state and city police assignments.

### INSTALLATION

The Model 503 is supplied with an attached antena of the proper length which when fully extended, will provide adequate pick-up unless the receiver is operated in a shielded building.

No ground connection is provided and an external ground from the chassis must not be used, as this may result in damage to the receiver.

If insufficient signal is received with the aerial indoors it may be connected to a conventional single-wire outdoor antenna of from 40 to 100 feet in length. The latter should be as high as possible, and not too close to other aerials or to electric light or power wires.

A lightning arrester is usually required by the electrical code on an outdoor antenna. This arrester may be connected between any point on the "lead-in" and any grounded object, such as a water pipe or a length of pipe driven into moist earth. The connection is best made with a standard copper ground clamp.

When used with alternating current, to complete the installation it is only necessary to insert the attachment plug in any convenient electric light socket or outlet.

When used with direct current the attachment plug must be inserted in the outlet in a definite manner. If after the receiver has been connected to a direct current source, it fails to function and its loud speaker has absolutely no background of sound, reverse the attachment plug in the outlet.

Information regarding your power supply may be obtained from your local electric light company.

### OPERATION

VOLUME CONTROL AND SWITCH: Two operating controls appear on the front panel. The left-hand knob is the combination switch and volume control. In the extreme counter-clockwise position of the knob (turned to the left) the receiver is "off". When the control is turned in a clockwise direction (to the right) the receiver is switched "on" and the scale is illuminated.

Further movement of the knob increases the volume to any desired point. When locating weak or distant stations it is advisable to advance the control to the "fully on" position.

Automatic Volume Control is provided within the receiver and prevents any noticeable change in volume from fading signals. All stations are tuned in with practically the same room volume. "Blasting" from powerful locals is eliminated when tuning, and the operation of the receiver is greatly simplified.

STATION SELECTOR: The right-hand knob is the tuning control. It operates the illuminated tuning dial which is calibrated in channel markings and corresponds to the kilocycle markings given for stations in newspapers and log books, except that for convenience in tuning and conservation of space on the dial, the last cypher has been dropped. For example, a station on 700 kilocycles is received at 70 on the scale.

### I. VOLTAGE MEASUREMENTS WHEN USING 220 VOLT A. C. LINE

| Stage | Tube | Fil. | Plate | Screen | Cathode |
|---|---|---|---|---|---|
| 1st Det. | 6F7 | 6.0 | 130 | 112 | 12.5 |
| Osc. | | | 112 | | |
| I. F. | 78 | 6.0 | 130 | 112 | 3.6 |
| 2nd Det. Amp. | 75 | 6.0 | 50* | - | .5 |
| Power | 43 | 25 | 112 | 130 | x21 (bias across 400 ohms) |
| Rectifier | 12Z3 | 12 | Voltage across plate to cathode 248 volts | | |

| | | | |
|---|---|---|---|
| Line Voltage | 220 | Resistor Strip Volts | 40 |
| Power in Watts | 80 | Resistor Cord Volts | 117 |
| Dial Lamp Volts | 6.0 | Dynamic Field | 95 |

All above voltage measurements taken with reference to "neutral" line marked "AA" on diagram. *Voltmeter of 1000 ohms per volt must be used especially for type 75 tube plate. This bias measured from junction R12, C22 and junction R11, R12. Since filaments in series run constant current, filament voltages may vary considerably from those given above without affecting receiver operation.

### II. VOLTAGE MEASUREMENTS WHEN USING 220 VOLT D. C. LINE

| Stage | Tube | Fil. | Plate | Screen | Cathode |
|---|---|---|---|---|---|
| 1st Det. | 6F7 | 6.0 | 108 | 95 | 9.9 |
| Osc. | | | 95 | | |
| I. F. | 78 | 6.0 | 108 | 95 | 2.8 |
| 2nd Det. Amp. | 75 | 6.0 | *45 | | |
| Power | 43 | 25 | 96 | 108 | 17.5 |
| Rectifier | 12Z3 | 12 | Voltage across plate to cathode 221 volts | | |

| | | | |
|---|---|---|---|
| Line Voltage | 220 | Resistor Strip Volts | 43 |
| Power in Watts | 80 | Resistor Cord Volts | 120 |
| Dial Lamp Volts | 6.0 | Dynamic Field | 81 |

### TUBES

The receiver employs five tubes of the following types:

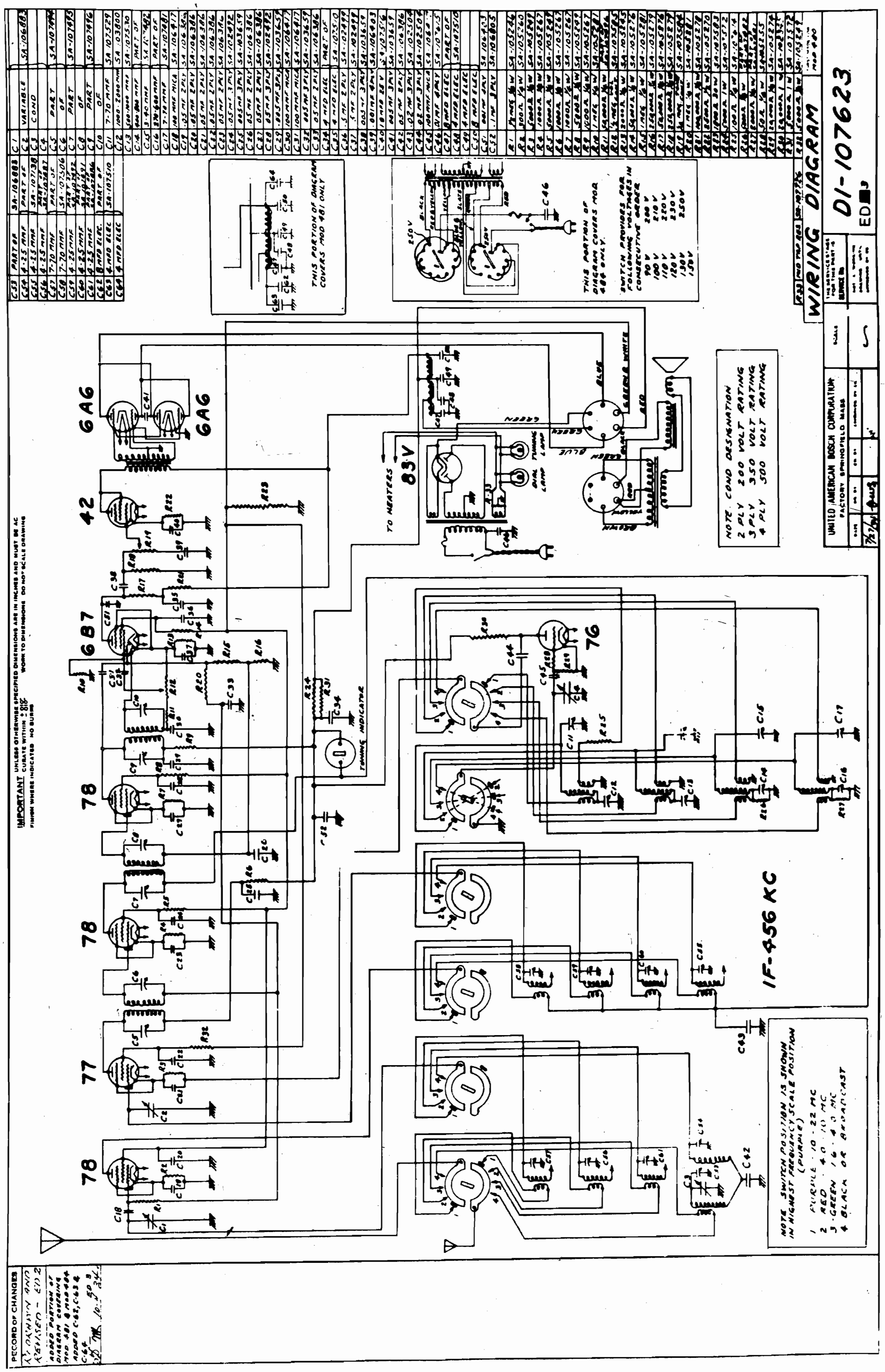
- 1 type 6F7 detector oscillator
- 1 type 78 intermediate frequency amplifier
- 1 type 75 second detector, A. V. C., and audio amplifier
- 1 type 43 power pentode
- 1 type 12Z3 rectifier

To replace tubes it is necessary to remove the chassis from the cabinet. Remove the screws which fasten the back. Remove the knobs and the screws holding the bottom of the chassis in place. The chassis may then be moved back from the front of the cabinet until the tubes are accessible.

CAUTION: Disconnect the receiver from the power supply before touching the chassis, tubes, or any metal parts inside the cabinet.

MODEL 480
Schematic

# UNITED AMERICAN BOSCH CORP



**MODEL 4054**
**Schematic**
**Socket**

# UNITED MOTORS SERVICE

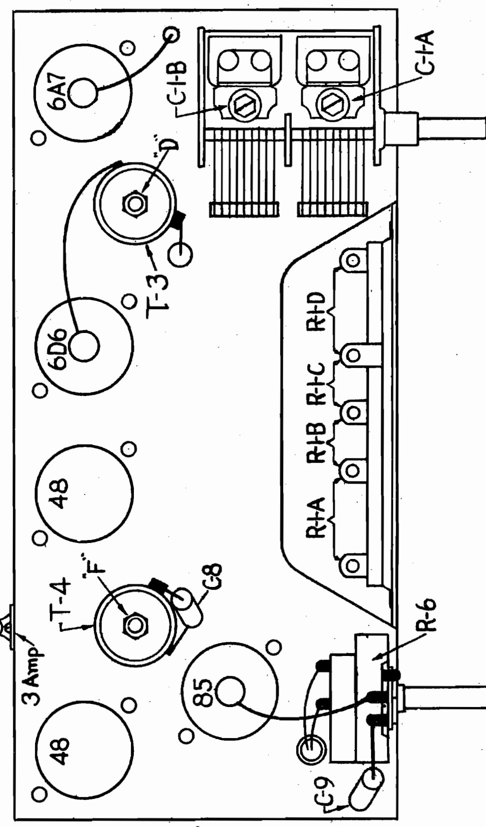



Fig. 2 Parts Locating Diagram (Top)

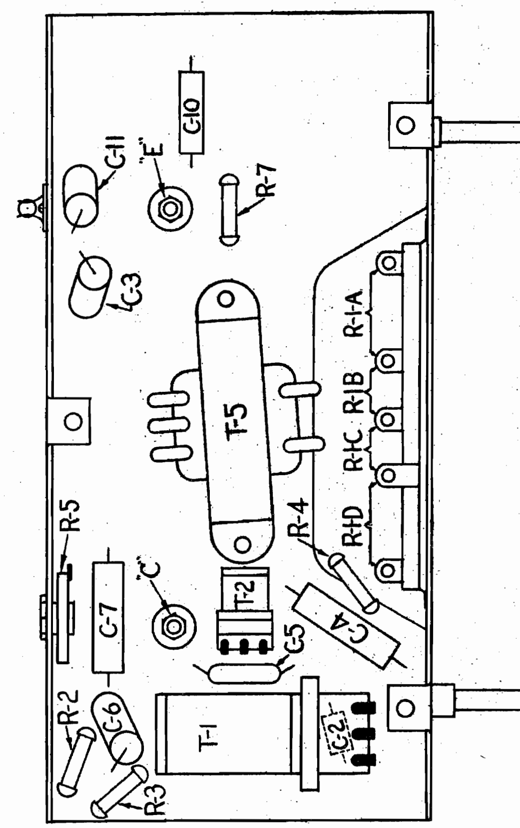



Fig. 3 Parts Locating Diagram (Bottom)

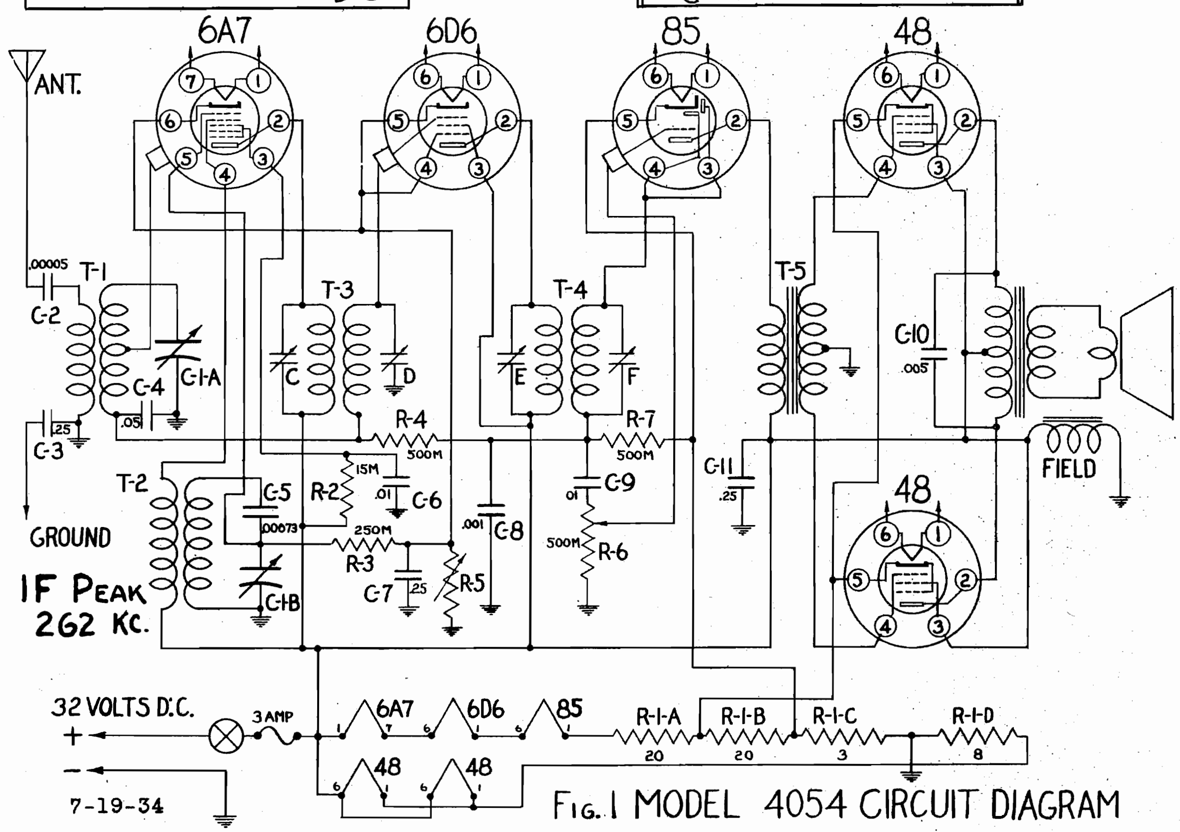



Fig. 1 MODEL 4054 CIRCUIT DIAGRAM

**MODEL 4054**
**Alignment**
**Voltage**

# UNITED MOTORS SERVICE

## R-5 RESISTOR ADJUSTMENT

The R-5 resistor shown on figure 3 is a cathode bias resistor variable from 50 to 200 ohms. This resistor controls the residual bias on the 6A7 and 6D6 tubes and must be carefully adjusted. This may be accomplished by tuning the set to an extremely weak station and adjusting R-5 for maximum volume in the speaker.

## CIRCUIT GROUND

If an external ground is used it must be connected to the green wire on chassis to guard against short circuits when used on 32 Volt systems with positive grounds.

## PEAKING

All of the adjustable condensers, commonly called "trimmer" condensers are very accurately adjusted at the factory and will not need any further adjustment unless they are tampered with in the field or a defective coil has been replaced. DO NOT attempt to change the setting of any trimmer condensers unless it is definitely known that the adjustment is necessary. If re-alignment is found necessary, the only way the circuits can be properly adjusted is with the use of an oscillator and output meter. Connect the output meter to the plate prong of one of the type 48 output tubes and to the chassis frame. Make sure that the output meter is protected with a series condenser to prevent the D.C. from flowing through the meter circuit. If the meter is not protected, connect a 1/10 mfd. condenser in series with the lead to the chassis frame.

### PEAKING I.F. STAGES AT 262 K.C.

(a) Connect the output of the oscillator to the grid cap of the 6A7 tube (leave 6A7 grid lead clip in place) and to the chassis frame.

(b) Turn the condenser gang until the plates are entirely out of mesh

(c) Set the oscillator on 262 K.C. and feed this signal through the I.F. stages of the set.

(d) Peak the I.F. trimmer located on the top of the 1st I.F. Coil, designated as "D" on figure 3. Then peak the trimmer located on the bottom of the same coil designated as "C" on figure 2. Due to the detuning effect the primary winding exerts over the secondary, it will then be necessary to reset trimmer "D" for maximum output.

(e) Peak the I.F. trimmer located on the top of the 2nd I.F. coil, designated as "F" on figure 3. Then peak the trimmer located on the bottom of the same coil designated as "E" on figure 2. Then reset trimmer "F" on top of the coil making all adjustments for maximum output.

NOTE: In the event that the I.F. stages are badly out of alignment at 262 K.C. the operation outlined in paragraphs (d) and (e) should be repeated.

### Peaking Gang Condenser at 1400 K.C.

(a) In order that the 1400 K.C. position of the condenser plates can be accurately determined the chassis must be placed back in the cabinet. The dial pointer should be placed on the sleeve of the condenser gang and the condenser plates turned until they are entirely out of mesh. The pointer should then be moved to the 1750 K.C. position approximately 1/8" below bottom of the numerals "170" (which is slightly off the end of the dial) care being taken to see that the condenser plates are not moved. The tuning knob should be turned until the dial pointer sets on 1400 K.C. This will set the condenser plates in the proper position for aligning at 1400 K.C.

(b) Coil up the antenna lead to within a foot of the chassis and set the oscillator at 1400 K.C. Feed the oscillator output into the antenna wire. This may be done by connecting the shielding on the oscillator output lead to the chassis frame and by simply wrapping a few turns of the portion of the antenna wire nearest the chassis around the oscillator output lead. This will ordinarily provide sufficient coupling between the test oscillator and the antenna circuit of the set. A direct connection with the antenna wire can be made by inserting a pin into the wire close to the chassis.

(c) Peak the oscillator trimmer condenser shown as C-1-B on figure 2 until the oscillator output can be heard in the speaker. Then the trimmer C-1-A located on the adjacent section of the gang condenser, making all adjustments for maximum deflection on the output meter scale.

NOTE: To avoid A.V.C. action and to insure sharp peaking of all trimmers, reduce the oscillator output to the lowest level that will give a reasonable deflection on the output meter scale.

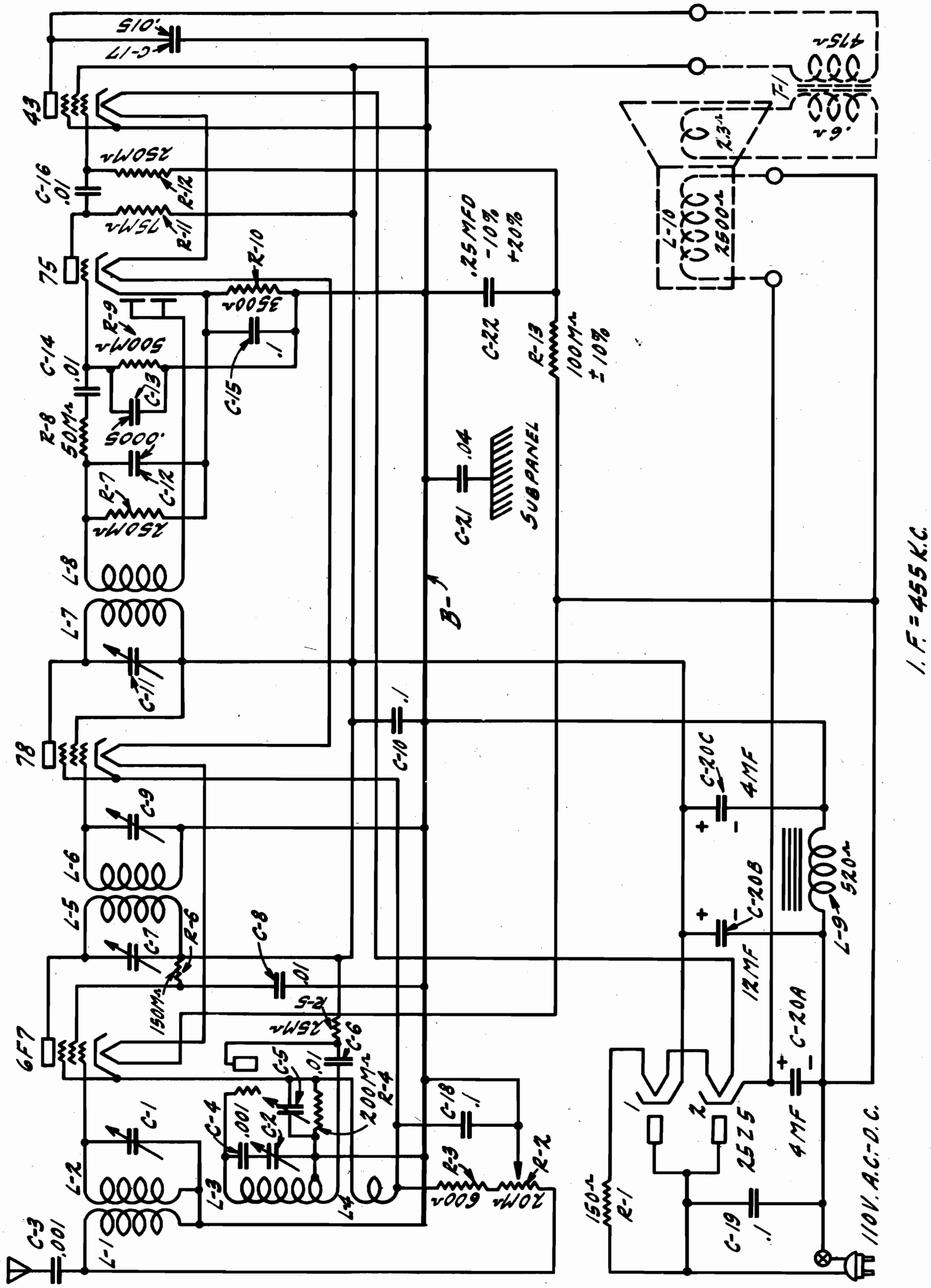
## VOLTAGE CHART

All readings are taken from each of the tube socket connections to the chassis frame. The socket contact numbers are in accordance with those found on the circuit diagram.

| TUBE | #1 | #2 | #3 | #4 | #5 | #6 | #7 | Cap |
|---|---|---|---|---|---|---|---|---|
| 6A7 | 32 | 32 | 18.5 | 32 | 0 | .5 | 26 | 0 |
| 6D6 | 19.5 | 32 | 32 | .5 | .5 | 26 | -- | 0 |
| 85 | 13.5 | 29 | 0 | 0 | .9 | 19.7 | -- | 0 |
| 48 | 6 | 31.5 | 32 | 0 | 6.5 | 32 | -- | -- |
| 48 | 6 | 31.5 | 32 | 0 | 6.5 | 32 | -- | -- |

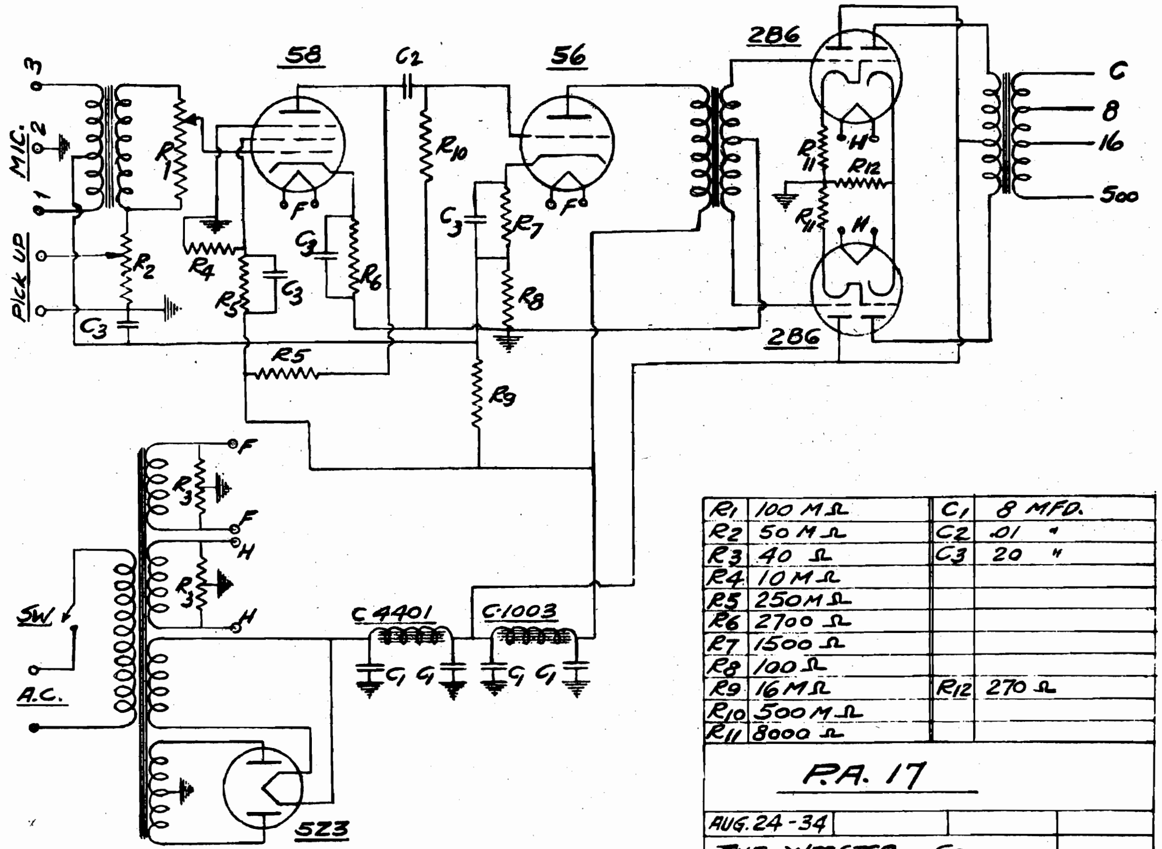
MODEL 3092
Chassis 513
Schematic

# U. S. RADIO & TELEVISION CORP.



# WEBSTER CO

MODEL PA-17
MODEL PA-42
Schematic

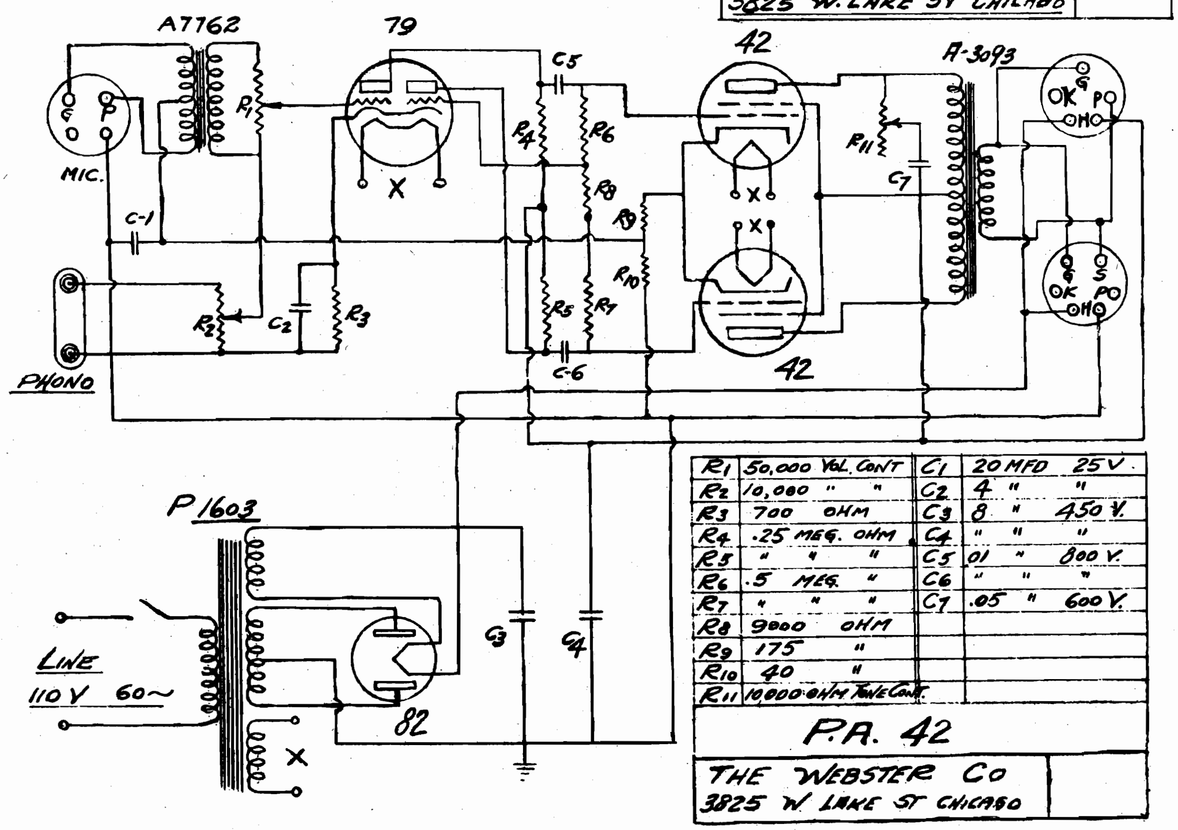



| | | | |
|---|---|---|---|
| R1 | 100 MΩ | C1 | 8 MFD. |
| R2 | 50 MΩ | C2 | .01 " |
| R3 | 40 Ω | C3 | 20 " |
| R4 | 10 MΩ | | |
| R5 | 250 MΩ | | |
| R6 | 2700 Ω | | |
| R7 | 1500 Ω | | |
| R8 | 100 Ω | | |
| R9 | 16 MΩ | R12 | 270 Ω |
| R10 | 500 MΩ | | |
| R11 | 8000 Ω | | |

P.A. 17

AUG. 24-34

THE WEBSTER CO
3825 W. LAKE ST CHICAGO



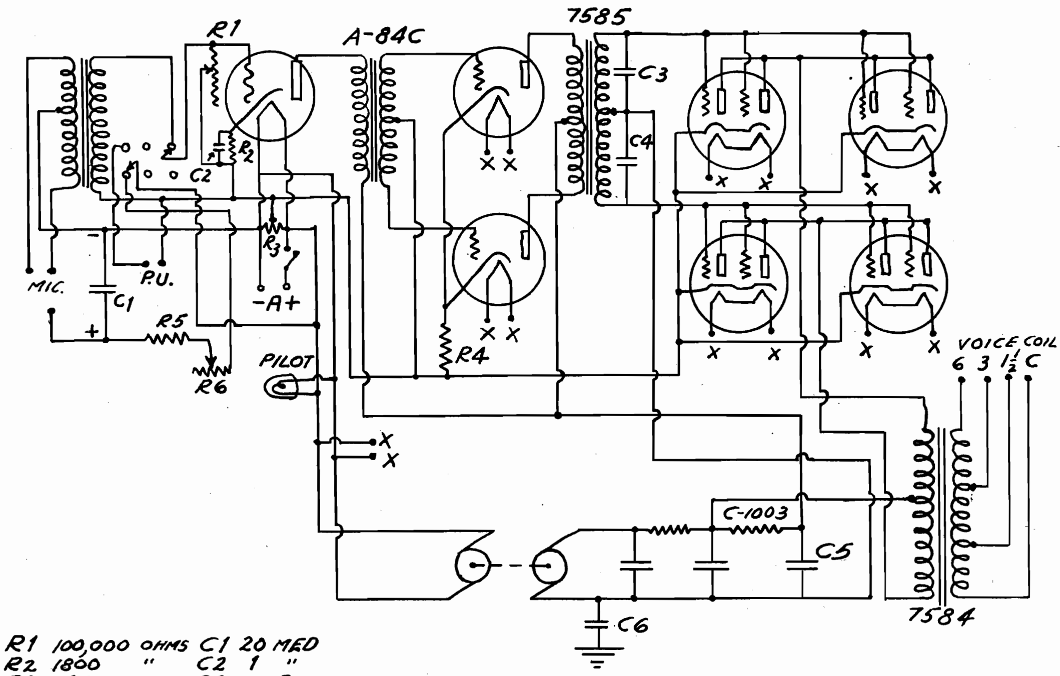

| | | | |
|---|---|---|---|
| R1 | 50,000 Vol. Cont | C1 | 20 MFD 25 V. |
| R2 | 10,000 " " | C2 | 4 " " |
| R3 | 700 OHM | C3 | 8 " 450 V. |
| R4 | .25 MEG. OHM | C4 | " " " |
| R5 | " " " | C5 | .01 " 800 V. |
| R6 | .5 MEG. " | C6 | " " " |
| R7 | " " " | C7 | .05 " 600 V. |
| R8 | 9000 OHM | | |
| R9 | 175 " | | |
| R10 | 40 " | | |
| R11 | 10,000 OHM Tone Cont. | | |

P.A. 42

THE WEBSTER CO
3825 W. LAKE ST CHICAGO

MODEL B-79
MODEL WR-85
Schematic

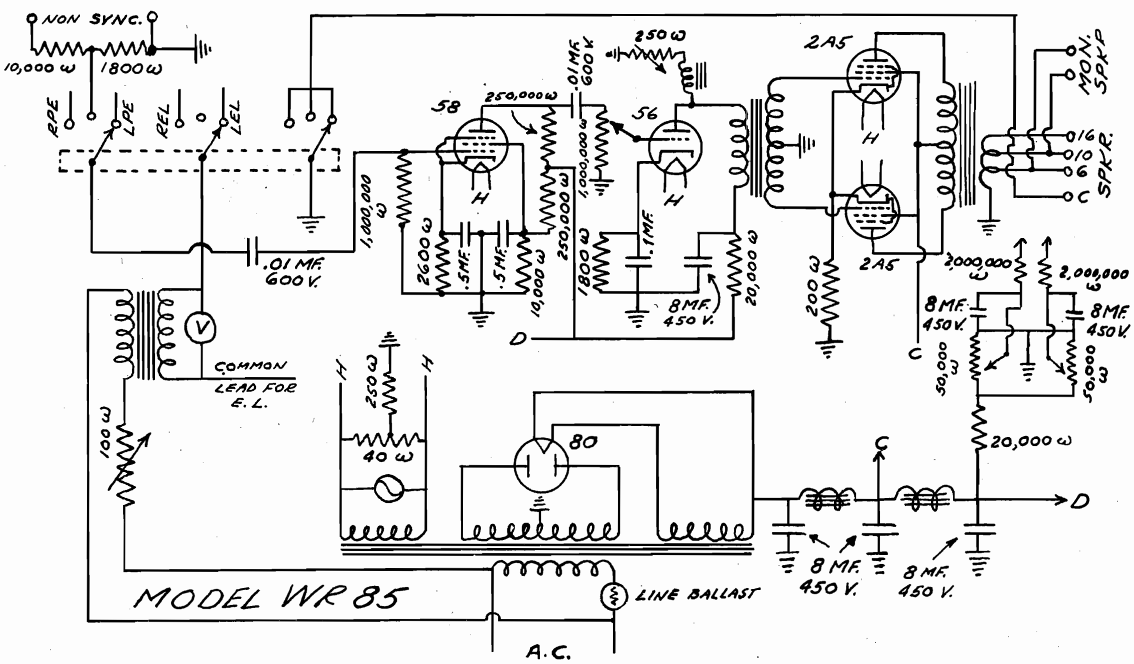
# WEBSTER CO.




| | | | |
|---|---|---|---|
| R1 | 100,000 OHMS | C1 | 20 MFD |
| R2 | 1800 " | C2 | 1 " |
| R3 | 40 " | C3 | .0015 " |
| R4 | 1350 " | C4 | .0015 " |
| R5 | 150 " | C5 | 8 " |
| R6 | 200 " | C6 | 1 " |

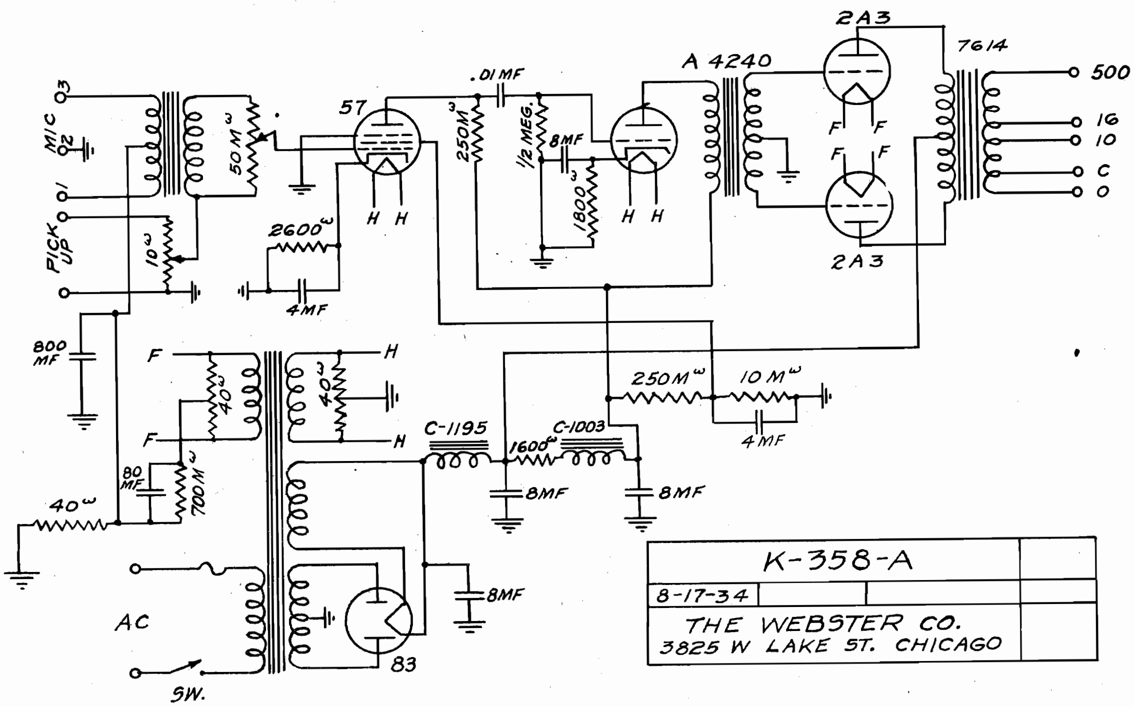
B-79 MOBILE SYSTEM

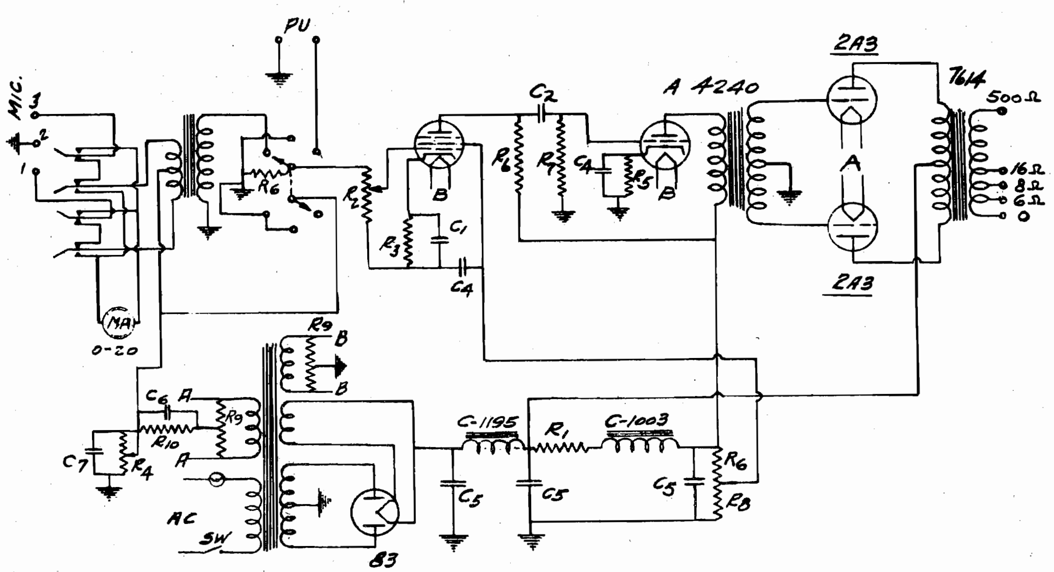
THE WEBSTER Co.
3825 W LAKE ST. CHICAGO



**MODEL K-358-A**
**MODEL K-359-A**
**Schematic**

# WEBSTER CO.




| | | | |
|---|---|---|---|
| $R_1$ | 16000 Ω | $R_{10}$ | 700 Ω |
| $R_2$ | 50 M Ω | | |
| $R_3$ | 2700 Ω | $C_1$ | 4 MFD |
| $R_4$ | 100 Ω | $C_2$ | .01 " |
| $R_5$ | 1800 Ω | $C_3$ | |
| $R_6$ | 250 M Ω | $C_4$ | 4 MFD |
| $R_7$ | 1/2 MEG | $C_5$ | 8 " |
| $R_8$ | 10 M Ω | $C_6$ | 80 MFD |
| $R_9$ | 40 Ω | $C_7$ | 800 " |

K-359 A
8-18-34
THE WEBSTER Co
3825 W LAKE ST CHICAGO

# WELLS-GARDNER & CO., INC.

**MODEL O-C Series Schematic Parts List**

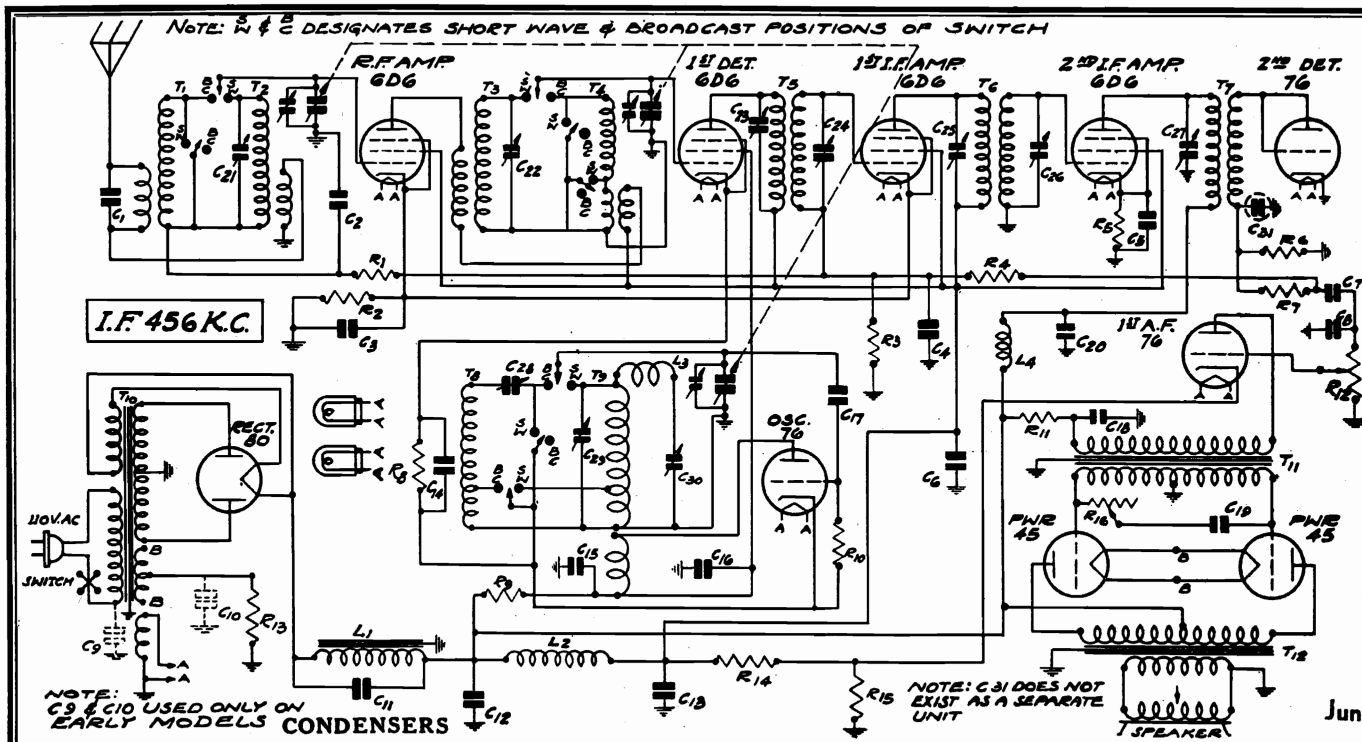



Fig. 1—Schematic Circuit Diagram

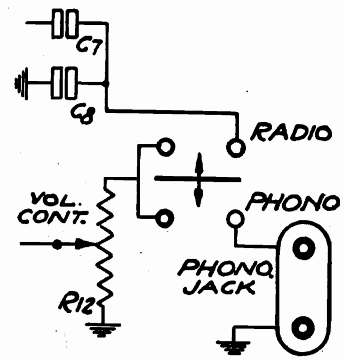



Fig. 5—Phonograph Connections

June, 1934

## CONDENSERS

| Part No. | Code | Capacity | Volts | Type |
|---|---|---|---|---|
| P-80919 | C1 | 250 mmfd. | | Moulded |
| P-80862 | C2 | .05 mfd. | 200V. | Tubular |
| P-80888 | C3 | .25 mfd. | 200V. | Tubular |
| P-80862 | C4 | .05 mfd. | 200V. | Tubular |
| P-80862 | C5 | .05 mfd. | 200V. | Tubular |
| P-80888 | C6 | .25 mfd. | 200V. | Tubular |
| P-80862 | C7 | .05 mfd. | 200V. | Tubular |
| P-81005 | C8 | 35 mmfd. | 600V. | Moulded |
| *P-80997 | C9 | .01 mfd. | 600V. | Condenser in metal can |
| *P-80888 | C10 | .25 mfd. | 200V. | Tubular |
| P-80985 | C11 | .15 mfd. | 200V. | Tubular |
| P-81039 | C12 | 16.0 mfd. | 400V. | Wet Electrolytic |
| P-81018 | C13 | 6.0 mfd. | 150V. | Dry Electrolytic |
| | C16 | 2.0 mfd. | 300V. | |
| | C18 | 2.0 mfd. | 300V. | |
| P-80862 | C14 | .05 mfd. | 200V. | Tubular |
| P-80864 | C15 | .10 mfd. | 200V. | Tubular |
| P-81005 | C17 | 35 mmfd. | 600V. | Moulded |
| P-80863 | C19 | .004 mfd. | 600V. | Tubular |
| P-81041 | C20 | .10 mfd. | 400V. | Tubular |
| P-2102 | C21 | 3-40 mmfd. | | Ant. S.W. Trimmer |
| P-2102 | C22 | 3-40 mmfd. | | 1st Det. S.W. Trimmer |
| P-2103 | C23 | 200± 50 mmfd. | | Dual Trimmer |
| | C24 | 200± 50 mmfd. | | Part of I.F. Assem. |
| P-2103 | C25 | 200± 50 mmfd. | | Dual Trimmer |
| | C26 | 200± 50 mmfd. | | Part of I.F. Assem. |
| P-1685 | C27 | 70± 30 mmfd. | | 3rd I.F. Coil Trimmer |
| P-2112 | C28 | 300-500 mmfd. | | 600 K.C. Trimmer |
| P-2102 | C29 | 3-40 mmfd. | | Osc. S.W. Trimmer |
| P-1685 | C30 | 70± 30 mmfd. | | 6000 K.C. Trimmer |
| P-81027 | | Three Gang Condenser | | |

## RESISTORS

| Part No. | Code | Resistance | Watts | Type |
|---|---|---|---|---|
| P-A95204 | R1 | 200,000 ohm | .2 | Carbon |
| P-98023 | R2 | 150 ohm | .5 | Flex. Wire Wound |
| P-A95105 | R3 | 1 megohm | .2 | Carbon |
| P-A95205 | R4 | 2 megohm | .2 | Carbon |
| P-98024 | R5 | 400 ohm | .5 | Flex. Wire Wound |
| P-A94304 | R6 | 300,000 ohm | .2 | Carbon |
| P-A95104 | R7 | 100,000 ohm | .2 | Carbon |
| P-A94252 | R8 | 2,500 ohm | .2 | Carbon |
| P-98022 | R9 | 30,000 ohm | 2.0 | Carbon |
| P-A95104 | R10 | 100,000 ohm | .2 | Carbon |
| P-C94303 | R11 | 30,000 ohm | 1.0 | Carbon |
| P-96005 | R12 | 2 megohm | | Volume Control and Switch |
| P-98006 | R13 | 780 ohm | 3.0 | Armored Wire Wound |
| | R14 | 6000 ohm | 1.4 | |
| | R15 | 460 ohm | .2 | |
| P-97003 | R16 | 3 megohm | | Tone Control |

*Used in Early Models only.

| Part No. | Item |
|---|---|
| P-50638 | Power Transformer 115V. 60 cycles T 10 |
| P-50639 | Power Transformer 115V. 25 cycles T 10 |
| P-50640 | Power Transformer 115-230V. 40-60 cycles T 10 |
| P-50641 | Power Choke L 1 |
| P-50642 | Audio Output Transformer T 12 |
| P-50643 | Audio Input Transformer T 11 |
| P-5176 | Antenna R.F. Trans. T 1 and T 2 less can |
| P-5177 | Interstage R.F. Trans. T3 and T4 less can |
| P-5178 | Oscillator Coil Assembly T8 and T9 less can |
| P-5186 | 3rd I. F. Coil T7 less can |
| P-40433 | Cans for the above coils |
| P-5184 | 1st I.F. Coil & Can Assembly T5 |
| P-5185 | 2nd I.F. Coil & Can Assembly T6 |
| P-5190 | H. F. Oscillator Tracking Coil L3 |
| P-5151 | I.F. Plate Isolating Reactor L4 |
| P-70702 | A.C. Cord & Plug |
| P-1421 | Single Insulated Terminal Strip |
| P-1441 | Double Insulated Terminal Strip |
| P-2060 | Small Knob |
| P-2062 | Large Knob |
| P-30342A | Grid Cap only |
| P-30456 | Small Pointer |
| P-20912 | Large Double End Pointer |
| P-2012 | Pilot Light Bulb |
| P-10272 | Rubber Mounting Feet |
| P-10320 | Glass Crystal |
| P-20875 | Crystal Retaining Ring |
| P-2152 | 8" Dynamic Speaker Mantel L2 |
| P-1968 | 10" Dynamic Speaker Console L2 |
| P-2101 | Three Position Band Change Switch |
| P-20905 | Condenser Shield |
| | 8" Black Drive Cord (V.C. or T.C. Ind.) |
| | 29" Black Drive Cord (Cond. Drive) |
| P-2126 | Pilot Lamp Socket & Clip Assembly |
| P-20911 | Bottom Shield |
| P-1011A | Phono-Radio Switch |
| P-1193 | Phono Jack |
| P-2025 | No. 80 Socket |
| P-1643 | No. 45 Socket |
| P-2022 | No. 76 Socket |
| P-1885 | No. 6D6 Socket |
| P-1637 | Speaker Socket |
| P-40434 | Tube Shield—Aluminum (for earlier models) |
| P-40424 | Tube Shield Base—Aluminum (for earlier models) |

MODEL O-C Series
Socket, Voltage
Alignment Data

# WELLS-GARDNER & CO., INC.

## Replacing Drive Cord

Remove chassis from cabinet.

Take off the pilot light assembly by lifting off the two sockets and spring clips.

Detach the large pointer by removing the screw at the center of the dial.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis.

Then lay the complete dial assembly face downward in front of the chassis. It is not necessary to remove the volume control and tone control collars which hold the indicator cords of these two controls in position.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 4.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 4. Insert one end of the drive cord from the outside through the hole in the eyelet in the drive drum.

Tie the end of the cord which has been inserted in the hole to one end of the tension spring.

Wrap the cord in a clockwise direction (facing front of chassis) around the drive drum approximately one-half turn.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one-half times around the drive shaft as shown in Fig. 4.

Then bring this cord up from the drive shaft and wrap it around the drive drum approximately one and one fifth turns in a clockwise direction until it is up to the hole in this drum as illustrated.

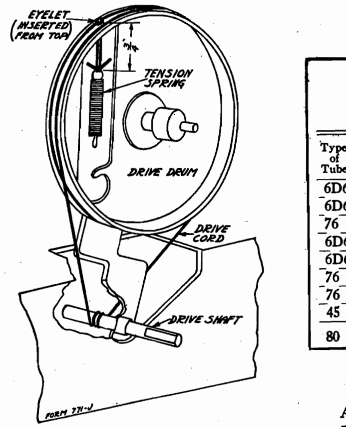



Fig. 4—Drive Cord Replacement

Insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring, when hanging free, should be approximately ¾" from the flange of the drum as shown in Fig. 4. Cut off the surplus length of cord after it is knotted.

Then secure the other end of the tension spring over the spur on the drive drum.

Replace the dial assembly and pointer.

Replace the pilot light assembly after which the chassis may be reinstalled in the cabinet.

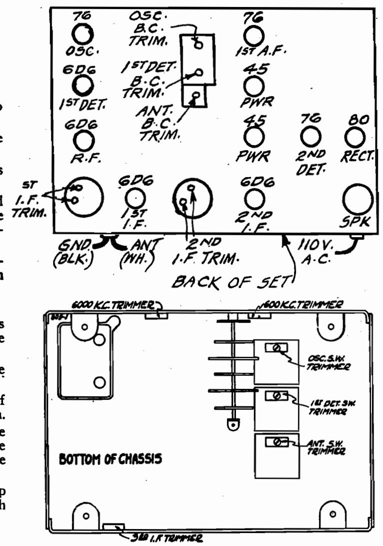



Fig. 2—Tube Arrangement & Location of Trimmers

### Voltages at Sockets
LINE VOLTAGE — 115
ANTENNA SHORTED TO GROUND

| Type of Tube | Function | Across Fila. or Heater | Plate to Cath. | Screen to Cath. | Cath. to Ground | Normal Plate M. A. |
|---|---|---|---|---|---|---|
| 6D6 | R. F. | 6.3 | 95 | 95 | 2.8 | 7.0 |
| 6D6 | 1st Det. | 6.3 | 88 | 95 | 9.2 | 2.9 |
| 76 | Osc. | 6.3 | 110 | — | — | 5.0 |
| 6D6 | 1st I. F. | 6.3 | 95 | 95 | 2.8 | 7.0 |
| 6D6 | 2nd I. F. | 6.3 | 300 | 95 | 3.3 | 6.0 |
| 76 | 2nd Det. | 6.3 | — | — | — | — |
| 76 | 1st Audio | 6.3 | 160 | — | 9.0 | 4.0 |
| 45 | Output | 2.5 | 245 | — | 48.0 | 30.0 |
| 80 | Rectifier | 5.0 | 890 V. A. C. pl. to pl. | | | 58.0 per plate |

## Phono Connections

Phonograph connections can be made as shown in Fig. 5. A single pole double throw switch and double pin jack are required. These should be mounted on the back panel of the chassis close to the 2nd detector. The connections are made by opening the diode circuit at the point shown in the illustration and completing the connections to the switch and pin jacks as indicated. A high impedance pick-up should be used. If a low impedance pick-up is used a step-up transformer will be required for sufficient volume. The volume control of the set will regulate the phono volume.

## Change in Early Models

In the early models of this receiver the side of the trimmer condenser C27 which is shown in Fig. 1 as connected to ground was connected to the B+ side of the 3rd I. F. coil primary.

## Condenser Alignment

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and re-alignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 456 K. C. and accurately calibrated signals over the broadcast and short wave bands, 530-1740 K. C. and 5.8-18.3 M. C., is required. An output indicating meter is also necessary. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screw driver for the adjustments. The complete procedure is as follows:

### Intermediate Frequency Adjustment

Set the signal generator for 456 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. The volume control should be at the maximum position. Reduce the signal so that A. V. C. action is not obtained.

Then adjust the five I. F. trimmer condensers until maximum output is obtained. The adjusting screws for the 1st and 2nd trimmer condensers are reached from the top of the chassis and are in the round I. F. cans - See Fig. 2. The openings to these trimmer condensers are covered over by small cover plates which are held in position by screws. Loosen these screws until the cover plates can be swung around. **CAUTION - Use an insulated screwdriver for adjusting trimmers to prevent short circuiting to ground.** In the 3rd I. F. coil, only the primary has a variable trimmer condenser. This condenser is mounted on the back panel of the chassis as shown in Fig. 2 and the adjustment screw is reached through a hole in the back panel.

### Broadcast Band Adjustment

The broadcast short wave switch should be in the broadcast position. Set the signal generator for 1740 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Reduce the signal so that A. V. C. action is not obtained. Adjust the oscillator broadcast trimmer until maximum output is obtained. This trimmer is on the tuning condenser and its location is shown in Fig. 2.

Then set the signal generator for 1500 K. C. Turn the rotor until maximum output is obtained. Loosen the set screw in the pointer hub and set the pointer at the 1500 K. C. mark on the broadcast band scale. Retighten the hub set screw. Then adjust the antenna and 1st detector broadcast trimmers until maximum output is obtained.

Next set the signal generator for 600 K. C. and adjust the 600 K. C. trimmer. The adjusting screw is reached through a hole in the front panel of the chassis as shown in Fig. 2. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting at the same time adjusting the 600 K. C. trimmer screw until the highest output is obtained.

### Short Wave Band Adjustment

CAUTION—After the broadcast band alignment as described above has been made, do not change the adjustment of any of the broadcast band trimmers.

In aligning the short wave band of the receiver, it will be noted that the signal will be heard with the signal generator set at two points 912 K. C. apart. That is, if the receiver is tuned to 15,000 K. C. a signal will be heard when the signal generator is set at 15,000 K. C. and again at approximately 15,912 K. C. This is due to image reception or the fact that a 456 K. C. beat is obtained when the signal is 456 K. C. lower than the receiver oscillator and also when the signal is 456 K. C. higher than the receiver oscillator. Care should be taken to see that the receiver is tracked with the signal generator adjusted to the lower of the two frequencies at which a signal is heard, in order that the oscillator in the receiver will be 456 K.C. higher in frequency than the signal.

Turn the broadcast short wave switch to the short wave position. Turn the rotor to the full open position. As explained above, the volume control should be at the maximum position and the signal should be reduced to prevent A. V. C. action. Set the signal generator for 18,300 K. C. Then adjust the oscillator short wave trimmer for maximum output. This trimmer is reached from under the chassis and its position is shown in Fig. 2. If a maximum output peak cannot be reached, it may be due to the fact that the antenna and 1st detector short wave trimmers are screwed down too far. Back off these two trimmer screws two or three turns and then adjust the oscillator short wave trimmer for maximum output.

Next set the signal generator for 15,000 K. C. Turn the rotor until maximum output is obtained. Then adjust the antenna and 1st detector short wave trimmers for maximum output.

Next set the signal generator for 6000 K. C. and adjust the 6000 K. C. trimmer. This condenser is mounted on the front panel of the chassis as shown in Fig. 2 and is reached through a hole in the front panel. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 6000 K. C. trimmer screw until the highest output is obtained.

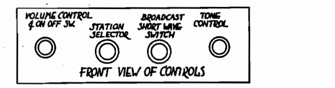



Fig. 3—Arrangement of Controls

## D. C. Resistance of Windings

**Following are the D.C. resistances of the various windings in the chassis.**

| Part No. | Item | Code | D.C. Resistance in Ohms |
|---|---|---|---|
| P-5176 | S.W. and B.C. Antenna R.F. Transformer Primaries (in series) | T1 T2 | 27.9 |
| | B.C. Antenna R.F. Transformer Secondary | T1 | 5.0 |
| | S.W. Antenna R.F. Transformer Secondary | T2 | Small |
| P-5177 | S.W. and B.C. Interstage R.F. Transformer Primaries (in series) | T3 T4 | 2.7 |
| | B.C. Interstage R.F. Transformer Secondary | T4 | 4.4 |
| | S.W. Interstage R.F. Transformer Secondary | T3 | Small |
| P-5178 | S.W. Oscillator Grid Coil | T9 | Small |
| | S.W. Oscillator Plate Coil | T9 | .25 |
| | B.C. Oscillator Grid Coil | T8 | 3.5 |
| P-5190 | S.W. Oscillator Tracking Coil | L3 | 1.27 |
| P-5184 | 1st I.F. Coil Primary | T5 | 5.0 |
| | 1st I.F. Coil Secondary | T5 | 5.0 |
| P-5185 | 2nd I.F. Coil Primary | T6 | 5.0 |
| | 2nd I.F. Coil Secondary | T6 | 5.0 |
| P-5186 | 3rd I.F. Coil Primary | T7 | 9.3 |
| | 3rd I.F. Coil Secondary | T7 | 26.3 |
| P-50643 | Audio Input Transformer Primary | T11 | 2300. |
| | Audio Input Transformer Secondary Center Tap to Outside | T11 | 2600. |
| | Audio Input Transformer Secondary Center Tap to Inside | T11 | 2000. |
| P-50642 | Audio Output Transformer Primary Center Tap to Outside | T12 | 360. |
| | Audio Output Transformer Primary Center Tap to Inside | T12 | 320. |
| | Audio Output Transformer Secondary | T12 | .44 |
| P-1968 | Speaker Voice Coil | | 3.0 |
| | Speaker Field Coil | L2 | 5000. |
| P-50641 | Filter Choke | L1 | 150. |
| P-50638 | Power Transformer 115V. 60 Cycles Pri. | T10 | 5.3 |
| | Power Transformer 115V. 60 Cycles H.T. Sec. Center Tap to Outside | T10 | 120. |
| | Power Transformer 115V. 60 Cycles H.T. Sec. Center Tap to Inside | T10 | 110. |
| | Power Transformer 115V. 60 Cycles Sec. (80 Fil.) | T10 | Small |
| | Power Transformer 115V. 60 Cycles Sec. (AA Fil.) | T10 | Small |
| | Power Transformer 115V. 60 Cycles Sec. (BB Fil.) | T10 | Small |

# WELLS-GARDNER & CO., INC.

**MODEL 5-E Series Schematic, Socket Parts List**

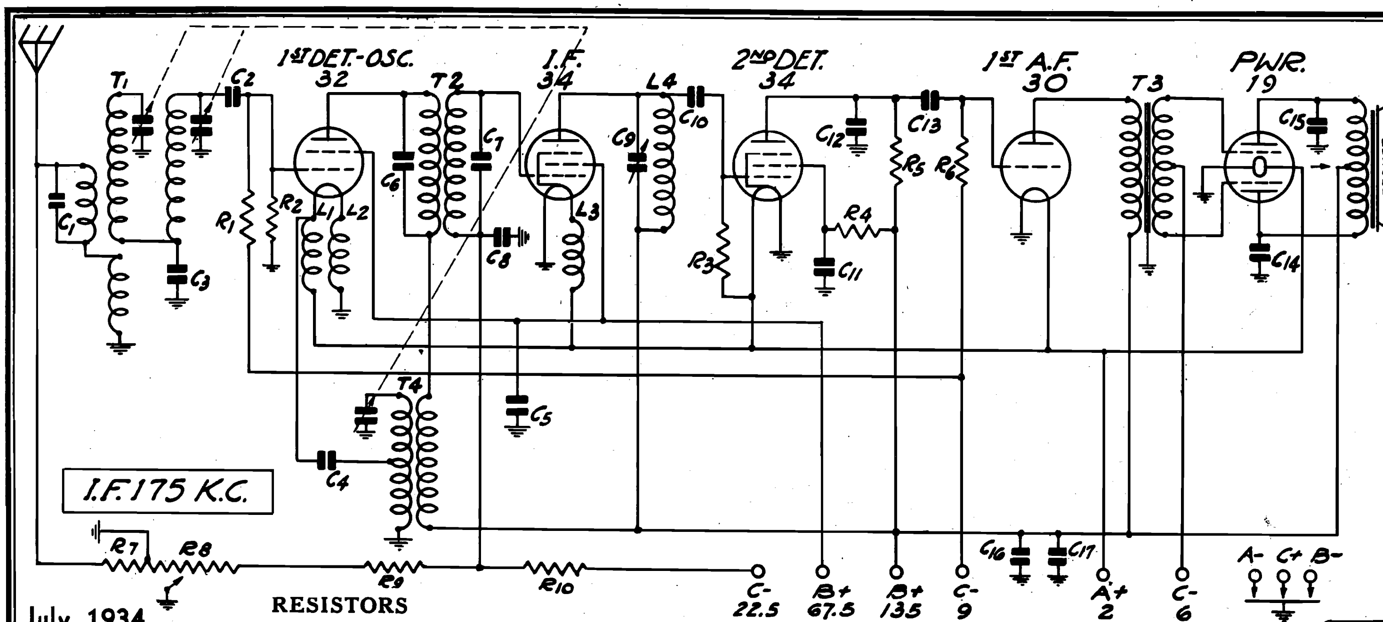



Fig. 1—Schematic Circuit Diagram.

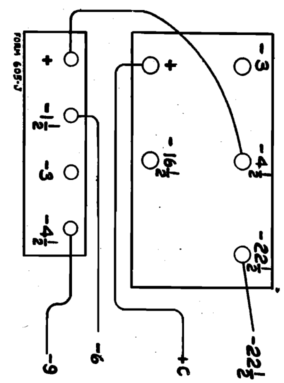



Fig. 3—Optional "C" Battery Connections

July, 1934

## RESISTORS

| Part No. | Code | Resistance | Wattage | Type |
|---|---|---|---|---|
| P-A94505 | R1 | 5 Megohm | 0.2 | Carbon |
| P-A94105 | R2 | 1 Megohm | 0.2 | Carbon |
| P-A94205 | R3 | 2 Megohm | 0.2 | Carbon |
| P-B94104 | R4 | 100,000 Ohm | 0.5 | Carbon |
| P-B94403 | R5 | 40,000 Ohm | 0.5 | Carbon |
| P-A95105 | R6 | 1 Megohm | 0.2 | Carbon |
| P-96001 | R7 | 3,000 Ohm | | Volume Control |
| | R8 | 60,000 Ohm | | |
| P-A94901ww | R9 | 900 Ohm | 0.2 | Wire Wound |
| P-A94652 | R10 | 6,500 Ohm | 0.2 | Carbon |
| *P-A94106 | R1 | 10 Megohm | 0.2 | Carbon |
| *P-A94205 | R2 | 2 Megohm | 0.2 | Carbon |

*These resistors were used on first models.

## CONDENSERS

| Part No. | Code | Capacity | Voltage | Type |
|---|---|---|---|---|
| P-81812 | C1 | 200 mmf | | Wire—Part of Ant. Assem |
| P-81801 | C2 | 35 mmf | | Wire—Part of Ant. Assem. |
| P-80862 | C3 | 0.05 mf | 200V | Tubular |
| P-80862 | C4 | 0.05 mf | 200V | Tubular |
| P-80862 | C5 | 0.05 mf | 200V | Tubular |
| P-81806 | C6 | 70 mmf | | Wire |
| P-81804 | C7 | 45 mmf | | Wire |
| P-80862 | C8 | 0.05 mf | 200V | Tubular |
| P-1685 | C9 | 70 ± 30 mmf | | I. F. Trimmer |
| P-81800 | C10 | 50 mmf | | Wire |
| P-81045 | C11 | 0.25 mf | 200V | Tubular |
| P-80863 | C12 | 0.004 mf | 600V | Tubular |
| P-80898 | C13 | 0.006 mf | 600V | Tubular |
| P-80969 | C14 | 0.01 mf | 400V | Dual Tubular |
| | C15 | 0.01 mf | 400V | |
| P-80864 | C16 | 0.1 mf | 200V | Tubular |
| P-80968 | C17 | 4.0 mf | 150V | Electrolytic |
| P-81036 | 3 Gang Condenser | | | |

## MISCELLANEOUS

| Part No. | ITEM |
|---|---|
| P-2131 | No. 32 Socket |
| P-1645 | No. 34 Socket |
| P-1644 | No. 30 Socket |
| P-1833 | No. 19 Socket |
| P-1640 | Speaker Socket |
| P-20406-A | Tube Shield for 34 and 32 Tubes |
| P-20786 | Tube Shield Base |
| P-50586-D | Audio Input Transformer T3 |
| P-5168 | Double Tuned Ant. Trans. Assem. Comp. with resistors and condensers T1 less can |
| P-40432 | Can for above Assem. |
| P-5199 | 1st I.F. Coil and Can Assem. T2 |
| P-5187 | Oscillator Coil and Can Assem. T4 |
| P-5188 | 2nd I.F. Coil and Can Assem. L4 |
| P-5172 | Double Filament Reactor L1, L2 |
| P-5189 | Single Filament Reactor L3 |
| P-30342-A | Grid Cap Only |
| P-2060 | Knob, plain |
| P-2122 | Knob, Arrow Indicator |
| P-1441-A | Double Insulated Terminal Strip |
| P-1786 | Five Lug Terminal Strip |
| P-1831 | On-Off Switch |
| P-20711 | Gang Condenser Shield |
| P-10272 | Rubber Chassis Cushions |
| P-70703 | Antenna and Ground Wire |
| P-70749 | "B" Battery Wire Assem. |
| P-70771 | "A" Battery Wire Assem. |
| P-70772 | "C" Battery Wire Assem. |
| P-2124 | Speaker 6" |
| P-2125 | Speaker 8" |

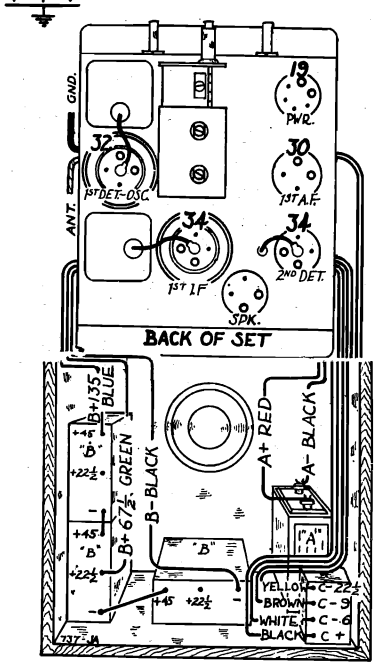



Fig. 2—Tube Arrangement and Battery Connections.

**MODEL 5-E Series**
**Voltage**
**Alignment Data**

# WELLS-GARDNER & CO., INC.

## Circuit

This receiver is designed to operate from a battery power supply the values of which are shown in Fig. 1. All of the tubes used are of the 2 volt type. The receiver is designed to operate at a very low current drain from the batteries and still have a very satisfactory quality of output.

The circuit has a preselector stage incorporating 2 tuned circuits for image rejection. This couples into the type 32 first detector-oscillator tube through a combination of inductive coupling in T1 and capacitive coupling through C3. In Fig. 1 the two coils to the right of the 32 1st detector tube are the primary and secondary of the 1st I. F. transformer while below this tube are the oscillator coils. The oscillating circuit is tuned by the oscillator section of the gang condenser and is always resonant at a frequency of 175 K. C. above the frequency to which the R. F. circuit is tuned.

One stage of I. F. amplification is employed using a 34 tube. Fixed condensers tune the primary and secondary of the first I. F. transformer. A second I. F. unit of the impedance coupled type is provided in which the inductance L4 is tuned by a trimmer condenser C9. The volume control is of the variable antenna input and I. F. bias type. Referring to Fig 1 it will be noted that one end of the volume control strip is connected to the antenna and the other end is connected to resistor R9. Also note that the volume control strip is tapped. Bias voltage for the 34 I. F. tube is obtained from a potentiometer consisting of resistors R9, R10 and the 60,000 ohm section of the volume control R8 which resistors are connected across the 22½ volt "C" battery.

As the slider of the volume control is moved away from the antenna end, the signal input to the antenna stage is increased. The bias voltage of the I. F. tube is not affected until the tap is reached. As the slider moves from this point to the end of the strip the I. F. bias is decreased, thus increasing the sensitivity. When this happens the plate current goes up and more battery current is used.

A 34 tube is used as the 2nd detector or demodulator. Demodulation takes place in the grid circuit of this tube.

Resistance coupling is used between the 2nd detector and the 1st audio stage which uses a 30 tube. The 1st audio stage is transformer coupled to the output stage. Class "B" amplification is employed in the output stage which uses a type 19 tube. This consists of two output tubes in one envelope. A magnetic reproducer is used.

A 3 pole switch controls all three sources of battery supply.

## Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and at the intermediate frequency, and an output meter are required for indicating the effect of adjustments.

First set the signal generator to a frequency of 175 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector thru a .05 mfd. condenser. The ground lead from the signal generator goes to the ground lead of the receiver. Adjust trimmer condenser C9 on the back panel of the chassis until maximum output is obtained. **A non-metallic screw driver should be used in making this adjustment as the I. F. trimmer is at B+ potential.**

Next set the signal generator for 1730 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Adjust the trimmer of the oscillator section of the 3 gang condenser until maximum output is obtained. The oscillator section is the one with the cut plate rotor.

Then set the signal generator for 1400 K. C. and turn the rotor until maximum output is obtained. Adjust the other two trimmers on the gang condenser for maximum output.

To obtain dial scale calibration tune in an 800 K. C. signal and set the dial pointer at that mark on the dial scale. When calibrated in this manner, the setting will be approximately correct at both ends of the scale.

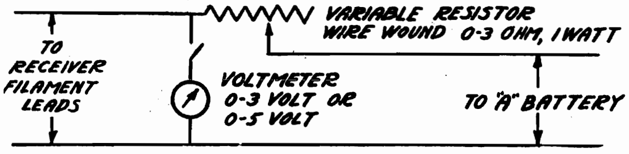



**Fig. 4—Using Voltage Regulator with 3 Volt "A" Battery**

The use of the cut plate type of condenser eliminates the necessity of a 600 K. C. padder and no adjustment at this frequency, therefore, is required.

## D. C. Resistance of Windings

**Following are the D.C. resistances of the various windings in the chassis.**

| Part No. | Item | Code | D. C. Resistance in Ohms |
|---|---|---|---|
| P-5168 | Double Tuned Ant. Coil Pri. | T1 | 19.2 |
| | Double Tuned Ant. Coil Sec. (Preselector) | T1 | 3.2 |
| | Double Tuned Ant. Coil Sec. (1st Det.) | T1 | 3.2 |
| P-5199 | 1st I.F. Coil Pri. | T2 | 90.0 |
| | 1st I.F. Coil Sec. | T2 | 116.0 |
| P-50586-D | Audio Input Trans. Pri. | T3 | 1010. |
| | Audio Input Trans. Sec. Cent. Tap to outside end | T3 | 648. |
| | Audio Input Trans. Sec. Cent. Tap to inside end | T3 | 588. |
| P-5187 | Oscillator Coil, Grid Winding | T4 | 4.1 |
| | Oscillator Coil, Plate Winding | T4 | 10.4 |
| P-5172 | Double Filament Reactor Assem. | L1 | .61 |
| | Double Filament Reactor Assem. | L2 | .61 |
| P-5189 | Single Filament Reactor Assem. | L3 | .61 |
| P-5188 | 2nd I.F. Reactor Coil | L4 | 52.1 |
| P-2124 | 6" Magnetic Speaker, Center Tap to outside end | | 272. |
| | 6" Magnetic Speaker, Center Tap to inside end | | 225. |
| P-2125 | 8" Magnetic Speaker (same as P-2124) | | |

### VOLTAGES AT SOCKETS

**Volume Control at Maximum—Antenna Shorted to Ground**
**B+135 Volts**
**Voltages to Chassis**

| Type of Tube | Function | Across Filament | Plate to Cath. | Screen to Cath. | Grid to Cath. | Normal Plate M. A. |
|---|---|---|---|---|---|---|
| 32 | 1st Det. & Osc. | 2.0 | 135 | 67.5 | 7.5 (1) (2) | 2.5 |
| 34 | I. F. | 2.0 | 135 | 67.5 | 2.5 (3) | 2.8 |
| 34 | 2nd Det. | 2.0 | 50 | 40 (1) | 0 | 1.8 |
| 30 | 1st Audio | 2.0 | 135 | | 9 (4) | 3.0 |
| 19 | Output | 2.0 | 135 | | 6 | 1.8 Total |

(1) With 250,000 ohm meter.
(2) Subject to variation due to oscillatory current.
(3) With 25,000 ohm meter.
(4) As read at "C" battery.

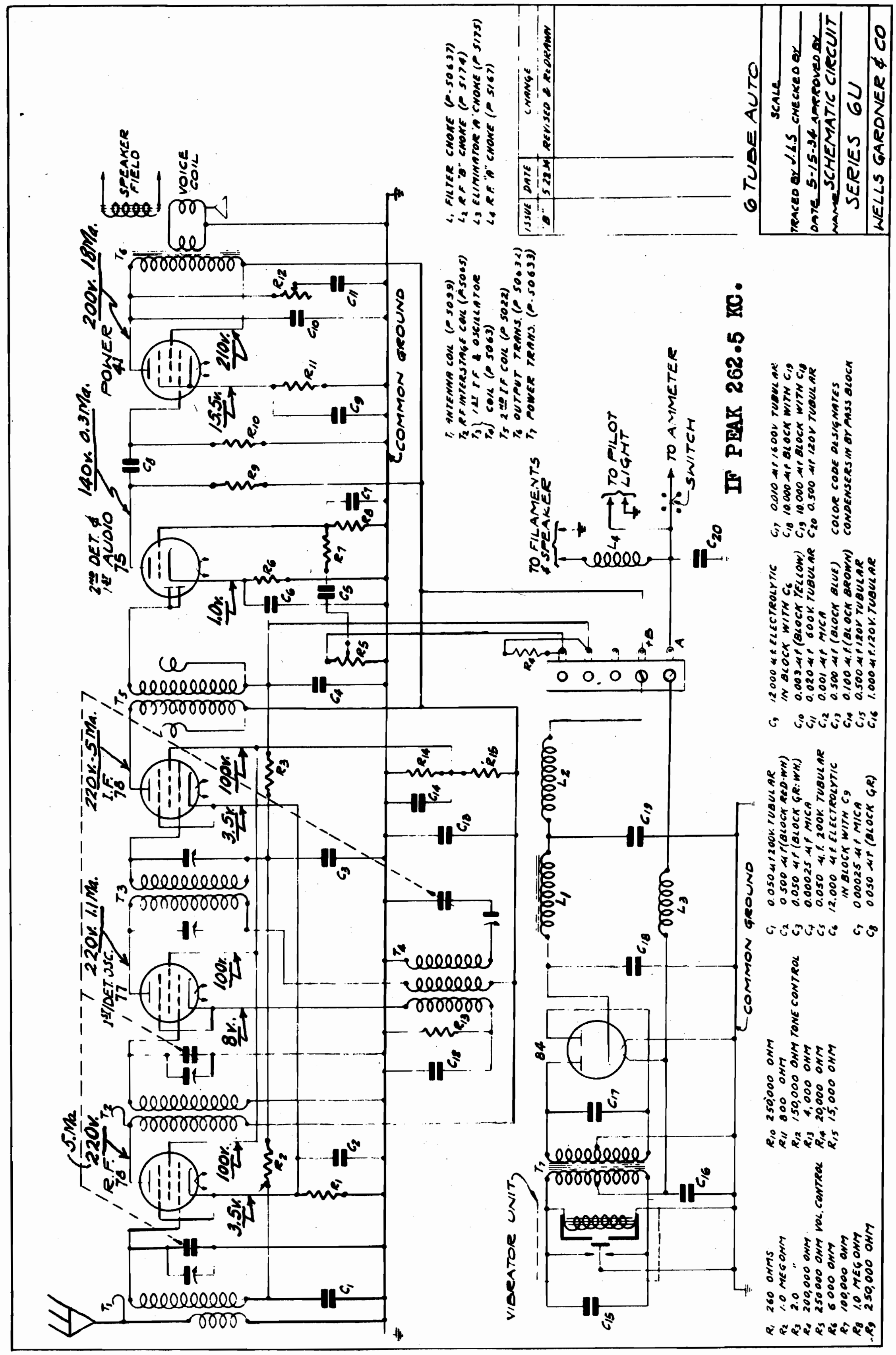
## Voltages

Check the voltages at the sockets to see if correct values are being delivered to the tubes. The antenna and ground should be disconnected and the antenna and ground leads from the set connected together. The volume control should be turned to the right or maximum position.

The voltage chart gives the voltages with all tubes in, the speaker connected and the set in operating condition. These voltages are typical of the sets but will vary slightly with variations in individual receivers, tubes, test equipment used and battery voltages.

**MODEL 6-U Series Schematic**

# WELLS-GARDNER & CO., INC.



**MODEL 6-U Series**
**Alignment Data**
**Wiring Instructions**

WELLS-GARDNER & CO., INC.

## Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and accurately calibrated signals at and around 262.5 K. C., the intermediate frequency and an output indicating meter are desirable.

**Do not take the chassis out of the box.** First set the signal generator at approximately 262.5 K. C. Connect the antenna lead from the generator to the control grid of the I. F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A. V. C. action. Note from Fig. 1 that the second I. F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262.5 K. C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Do not change the signal generator setting. Then adjust the 1st I. F. trimmer condenser screws for maximum output. There are 2 holes at one end of the chassis box. The 2 trimmer screws can be reached through these holes. CAUTION—use an insulated screwdriver to prevent short circuiting to ground.

Now disconnect the signal generator and adjust it to exactly 1400 K. C. The antenna lead from the generator is then connected to the antenna lead of the receiver. Connect the tuning condenser flexible drive shaft to the chassis if it has been disconnected. Turn the station selector knob until the rotor plates are completely in mesh. Then with a screwdriver turn the calibration screw on the back of the control unit, until the pointer is at the lowest frequency mark. This is the large point, 5 points below the 55 mark.

Then turn the station selector knob until the pointer on the dial scale is at 1400 K. C.

Then adjust the oscillator R. F. and antenna trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator section first. See Fig. 2.

Next, set the signal generator for a signal of 600 K. C. and adjust the oscillator 600 K. C. trimmer. This condenser is mounted on the end of the gang condenser. See Fig. 2.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K. C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K. C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

If the control unit or flexible shaft is moved after the set has been aligned, the setting of the dial pointer may change. This can be adjusted by turning the control unit calibration screw until the pointer is at the correct setting.

## Completing the Wiring Connections

### Battery Cable

The battery connection is made at the ammeter. In the case of vibrator equipped sets no attention need be paid to polarity. The connection at the end of this cable is secured to one of the posts at the back of the ammeter in the instrument panel. This cable should preferably be connected to the post which will not show the discharge caused by the receiver.

The battery cable is made up in two pieces which are joined together by the fuse receptacle. The latter houses the fuse and fuse shield. The two parts of the cable are connected together by a bayonet pin connection.

### Dynamotor "B" Unit Sets

In sets equipped with Dynamotor "B" Units there is a connection which may have to be changed depending on which side of the car battery is grounded. This unit is shipped from the factory correctly wired up for cars that have the positive side of the battery grounded, as shown in Fig. 9. If the negative side of the car battery is grounded, the connections to the terminal strip on the Dynamotor unit must be reversed, as shown in the same illustration.

### Sensitivity Control Jumper

Referring to Figs. 8 and 9 it will be noted that there is a terminal strip in the chassis with terminals marked Nos. 1, 2 and 3 as shown. The receiver is shipped from the factory with a wire jumper in terminals Nos. 2 and 3. When connected in this manner, the sensitivity of the receiver is correct for ordinary conditions of reception as met with in a city or at reasonable proximity to the broadcasting stations. If the receiver is used in the country or at a great distance from the broadcasting stations, this jumper should be inserted in terminals Nos. 1 and 2. This connection increases the sensitivity of the receiver, providing for better reception of distant stations. However, at the same time the receiver will appear to be somewhat noisier owing to the fact that the pickup of noise signals will also be increased.

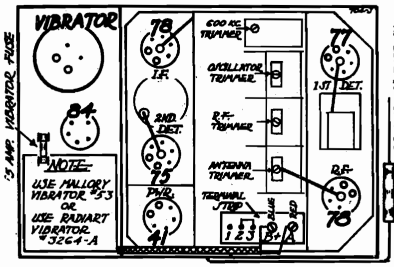



*Fig. 8—Location of Tubes—Vibrator Sets*

After the wiring has all been completed and the chassis and cables are permanently installed try out the set and adjust the antenna trimmer. The location and types of the tubes are shown in Figs. 8 and 9. The types of vibrators in vibrator equipped sets are also shown.

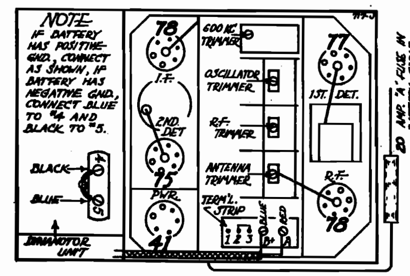



*Fig. 9—Location of Tubes—Dynamotor Sets*

### Adjusting Antenna Trimmer

To adjust the antenna trimmer, tune in a weak signal between 1200 and 1400 K.C. with the volume control about three-fourths on. Remove the cover of the chassis box. The antenna trimmer is the trimmer condenser closest to the terminal strip—see Figs. 8 and 9. Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION—Do not turn any of the other trimmer adjusting screws as these have all been properly set at the factory with precision instruments.

### Calibrating the Receiver

To calibrate the receiver, tune in a station of known frequency. At the back of the control unit is the calibration screw—see Fig. 5. Insert a screw driver and turn this screw until the pointer on the dial scale is at the frequency of the station being received.

WELLS-GARDNER & CO., INC.

## Mounting the Chassis

The chassis is mounted in back of the dash as shown in Figs. 1 and 2. The first step is to inspect the dash to determine at which point there is space available. Lift the chassis box up and temporarily hold it in the proposed position. In Figs. 1 and 2 is shown the position at which the chassis is generally mounted. However, there are many other possible locations, depending on the considerations as mentioned below and the space available.

In general, the chassis will be mounted in the vertical position, that is, with the long dimension vertical, as illustrated and as mentioned above, since this method of mounting is the most convenient. It may, however, be mounted horizontally. If mounted in this manner, the speaker must face downward. *Never install a chassis with the speaker facing upward due to the fact that dirt and water may get in and ruin the speaker.*

Other points to consider in choosing the chassis location are as follows: Mount the chassis box in such a way that the cover may be readily removed for inspection of tubes. Mount the chassis box as high as possible to avoid interference with the feet of the people in the front compartment. If mounted at the extreme left or right of the dash, the speaker should face inward for acoustical reasons. Mount the chassis box in such a way as to avoid interference with the car controls, including pedals, gear shift lever, cowl ventilator, etc. If there is a great deal of room available on the dash, consideration should also be given to the length and position of the flexible shafts.

Next secure the dash mounting plate to the chassis box by means of the four screws provided. Note that there are six tapped holes on the chassis box for this purpose. For vertical mounting use the four tapped holes which permit the slot at the bottom of the mounting plate to extend below the chassis box—see Figs. 3 and 4. For horizontal mounting the mounting plate may be secured to the right hand set of four tapped mounting holes or the left hand set of four, whichever is the most convenient. As indicated in Fig. 3, for vertical mounting, holes "A" in dash mounting plate shall be used, and for horizontal mounting, holes "B" shall be used.

Now place the chassis box, with plate attached, in position on the dash and with a center punch locate the lower mounting hole at approximately the position in the slot as shown in Fig. 3. Then remove the box and by means of the template provided, or by using the dimensions shown in Fig. 3, locate the two upper mounting holes. Next drill the three ¼" holes required.

Three 4" square head mounting bolts are supplied. Take two of these, which will be used for the upper part of the mounting plate and screw on nut "A" (see Fig. 4). The nut should be just

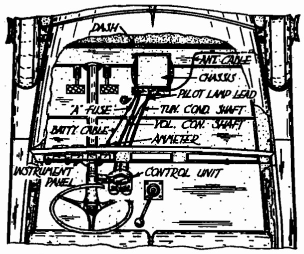



*Fig. 1—General Installation—Top View*

far enough away from the head of the bolt to permit the bracket of the mounting plate to slip down as shown in the illustration. Then put on nut "B" and the washer, after which the two bolts can be put through the dash, with the shanks extending into the engine compartment, as shown in Fig. 4. A washer, lockwasher, and nut are then put on these bolts from the front of the dash to hold them in place.

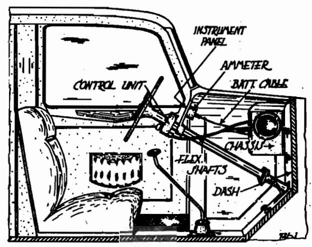



*Fig. 2—General Installation—Side View*

*The distance "X" between nuts "A" and "B" determines how far out the chassis is mounted from the dash. When there is a lot of apparatus in back of the dash, such as wires, tubing, etc., the chassis will have to set out far enough to clear it. However, in most cars, there is no interfering apparatus and therefore the distance "X" will be zero.*

Then put a washer on the third mounting bolt and put this bolt through the lower mounting hole *with the head on the engine side of the dash,* as shown in the illustration. Put on a washer, lockwasher, and nut "D" and tighten it up. Then put on nut "E" with a washer as shown. Nut "E" should be screwed down until it is up against nut "D," when distance "X," as explained above, is zero.

*All tubes and the vibrator (vibrator equipped sets) should be in the sockets and the flexible drive shaft brackets should be attached to the chassis box before the chassis is mounted—see article on Attachment of Flexible Shafts.*

The dash mounting plate with chassis attached is slipped over the three mounting bolts. The two upper brackets on the plate slip down in back of nut "A" as shown in Fig. 4 and the slot at the bottom of the plate slips over the shank of the lower mounting bolt in back of nut "E." The plate will then hang with the bottom farther away from the dash than the top. A washer, lockwasher, and nut "F" are then put on the lower mounting bolt. Nut "F" is screwed on until the mounting plate is tight up against the washer in back of nut "E." In this position, the bracket at the top of the mounting plate should butt up against nut "A" and be tight. Also the mounting plate will be approximately parallel with the dash.

## Mounting the Control Unit

The control unit is mounted on the steering column under the steering wheel as shown in Figs. 1 and 2. It is generally mounted in the right hand position as shown in Figs. 1 and 2. It may also be mounted in the left hand or top position at the preference of the customer, see Fig. 5 (A).

For right hand mounting the supporting arm is screwed to the back of the control unit as shown in Fig. 5 (C). For left hand and top mountings use the correct tapped hole as indicated in the same illustration.

To attach the control unit, first remove the supporting arm by taking out the supporting arm screw—see Fig. 5 (C). Now note that there are several holes in the strap. These are for different sizes of steering columns. Wrap the strap around the column and put the strap screw through the strap nut as shown in Fig. 5 (C). Do not tighten up the screw until the flexible shafts are attached.

Next attach the two flexible shafts to the control unit as explained in the next article. Then reattach the supporting arm to the control unit proper.

## Attaching the Flexible Drive Shafts

After the chassis is mounted and the control unit is temporarily mounted, the flexible drive shafts may be attached. Two 30" shafts are supplied unless otherwise specified. These shafts may also be had in 14" and 20" lengths. *These shafts are provided with special ends and cannot be cut to length.*

The flexible drive shafts should always be installed with a minimum amount of bending. Always keep the radius of the bend as large as possible. The larger the radius of the bend, the easier the shaft will turn.

If the shafts are not already secured to the control unit proceed as follows: First loosen the set screw in the volume control shaft housing at the back of the control unit. The volume control shaft may be identified by a brass fitting at both ends. The longer of these two fittings has a key slot and is inserted into the control unit as shown in Fig. 5 (B). Insert the shaft far enough so that the key knob engages and may be inserted all the way. The set screw tightened down and the set screw in the housing tightened down on the shaft casing.

To secure the flexible shafts to the chassis, first attach the two brackets to the chassis box by means

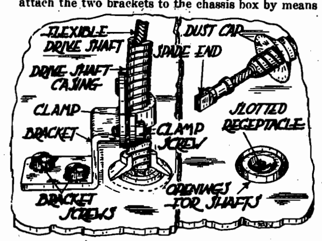



*Fig. 6—Details of Flexible Shaft Attachment*

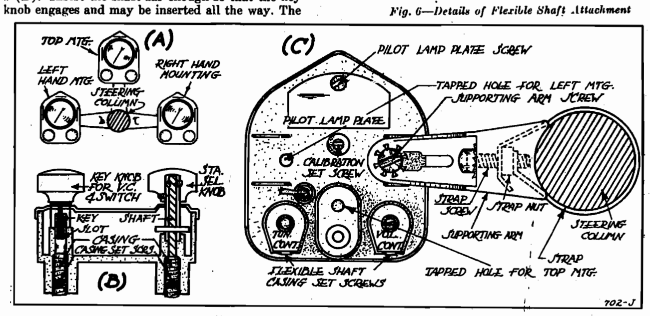



*Fig. 5—Details of Control Unit Mounting*

set screw in the housing at the back of the control unit is then tightened down on the shaft casing.

To insert the tuning condenser shaft in the control unit, first remove the station selector knob. Then loosen the two set screws on the shank extending from the front of the control unit. Also loosen the set screw in the tuning shaft housing at the back of the control unit. Then insert the end of the flexible shaft with no fitting into the tuning condenser shaft housing until the end of this shaft is flush with the end of the shank and tighten the two set screws. The knob may then be replaced, the of the screws furnished and as shown in Fig. 6. Before tightening up the bracket screws, center the opening through the clamp with the opening for the spade end of the shaft in the chassis. Then tighten the screws.

Both shafts are provided with spade ends which are readily inserted into the slotted receptacles provided in the chassis—see Fig. 6. Before inserting the flexible shafts, slip the rubber dust caps with $\frac{5}{16}$" holes over the shaft casings. After the shafts are inserted the clamps are tightened down on the shaft casings by means of the clamp screws as shown in the illustration.

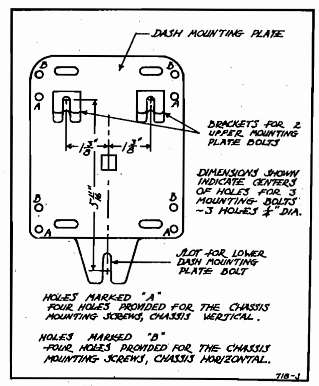



*Fig. 3—Dash Mounting Plate*

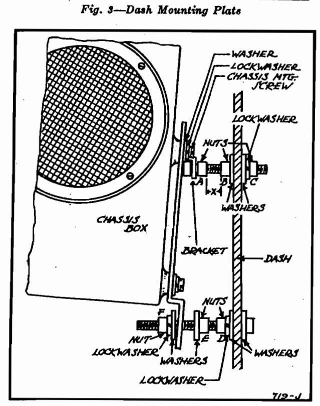
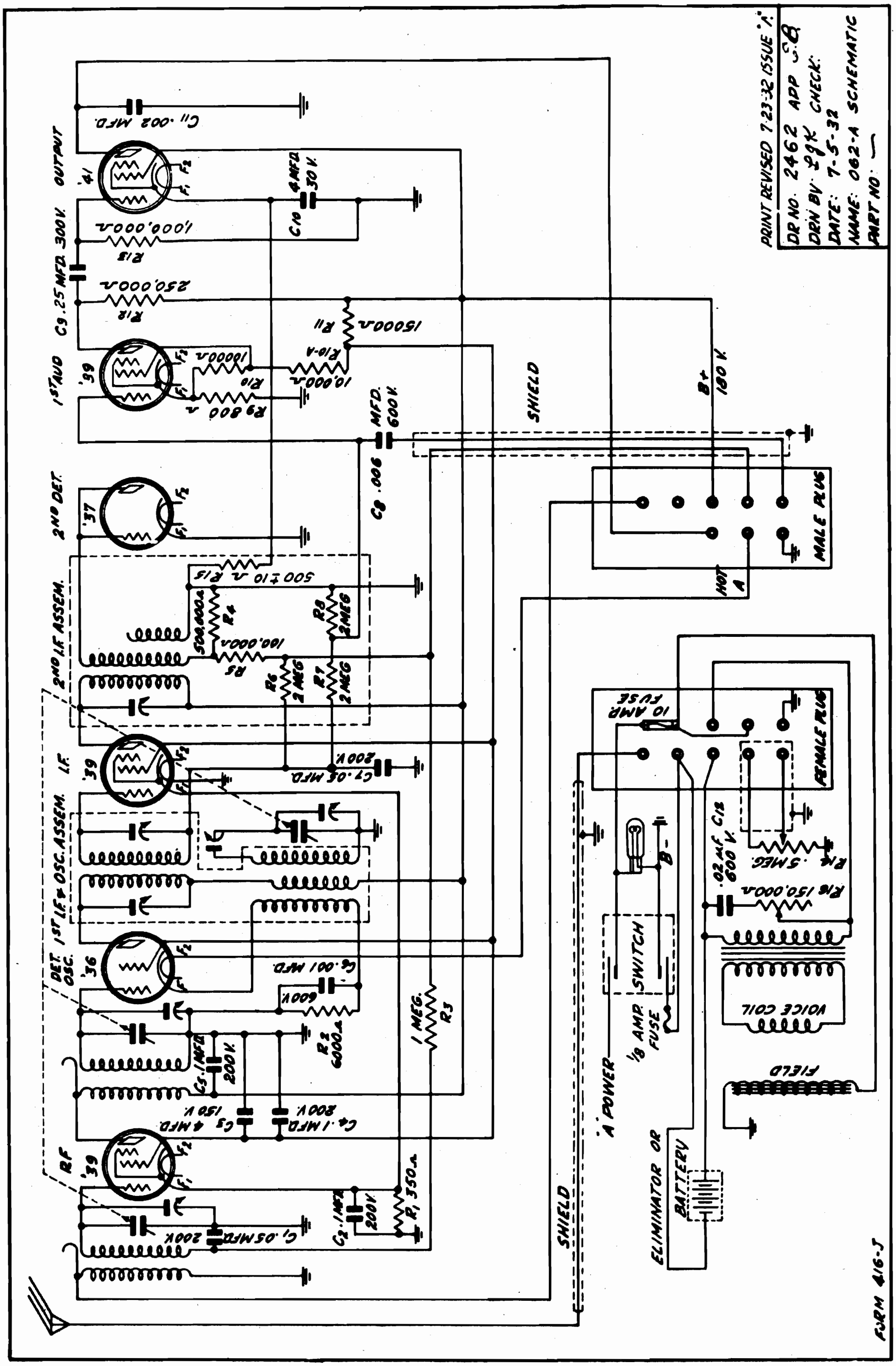



*Fig. 4—Details of Chassis Mounting on Dash*

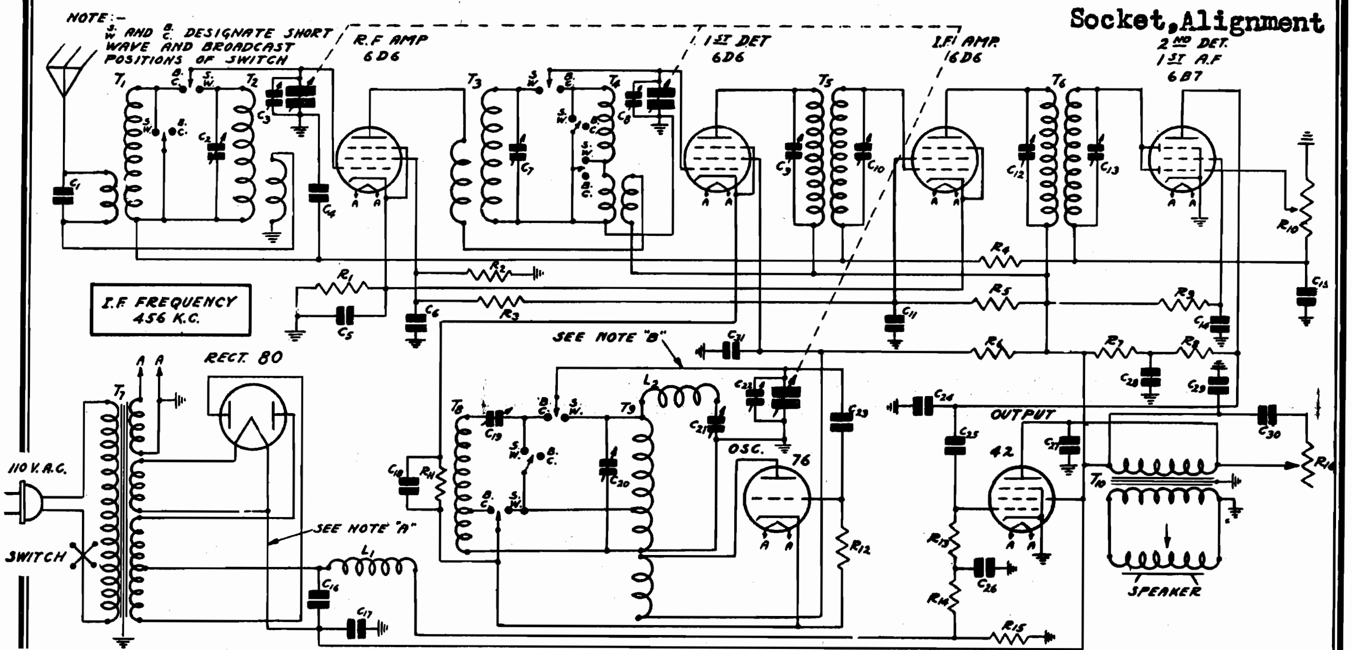
MODEL 062-A
Schematic

WELLS-GARDNER & CO., INC.



**MODEL 7-D Series**
**Schematic**
**Socket, Alignment**

# WELLS-GARDNER & CO., INC.




NOTE "A":-FILTER CHOKE USED IN SERIES AT THIS POINT IN 1ST MODELS. NOTE "B":-SERIES PADDER USED IN SERIES AT THIS POINT IN 1ST MODELS. $L_2$ & $C_{21}$ WERE NOT USED.

**Fig. 1—Schematic Circuit Diagram**

## Condenser Alignment

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and re-alignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 456 K. C. and accurately calibrated signals over the broadcast and short wave bands, 530-1740 K. C. and 5.8-18.3 M. C., is required. An output indicating meter is also necessary. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screw driver for the adjustments. The complete procedure is as follows:

### Intermediate Frequency Adjustment

Set the signal generator for 456 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. The volume control should be at the maximum position. Attenuate the signal so that A. V. C. action is not obtained.

Then adjust the four I. F. trimmer condensers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and are in the round I. F. cans—See Fig. 2. The openings to the trimmer condensers are covered by a small cover plate which is held in position by a screw. Loosen these screws until the cover plates can be swung around.

### Broadcast Band Adjustment

The broadcast short wave switch should be in the broadcast position. Set the signal generator for 1740 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Attenuate the signal so that A. V. C. action is not obtained. Adjust the oscillator broadcast trimmer until maximum output is obtained. This trimmer is on the tuning condenser and its location is shown in Fig. 2.

Then set the signal generator for 1500 K. C. Turn the rotor until maximum output is obtained. Loosen the pointer

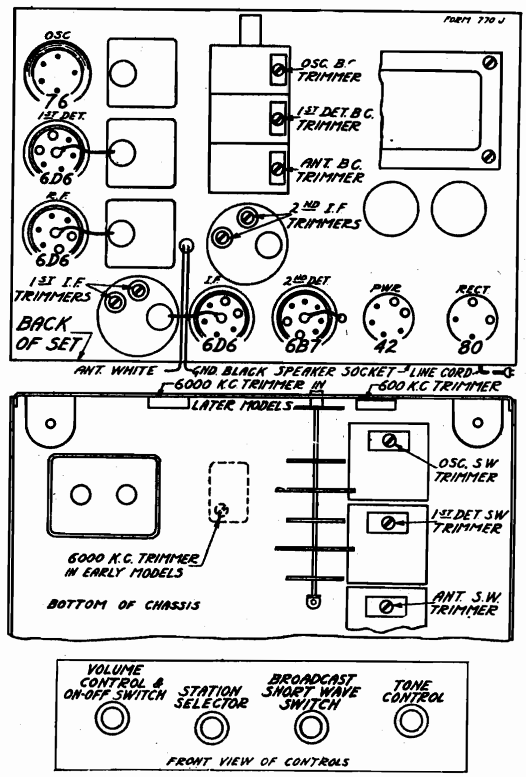



**Fig. 2—Tube Arrangement and Location of Trimmers**

screw and set the pointer at the 1500 K. C. mark on broadcast band scale. Retighten pointer screw. Then adjust the antenna and 1st detector broadcast trimmers until maximum output is obtained.

Next set the signal generator for 600 K. C. and adjust the 600 K. C. trimmer. The adjusting screw is reached through a hole in the front panel of the chassis as shown in Fig. 2. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over

**MODEL 7-D Series**
**Voltage, Parts List**
**Circuit Changes**

# WELLS-GARDNER & CO., INC.

this setting at the same time adjusting the 600 K. C. trimmer screw until the highest output is obtained.

## Short Wave Band Adjustment

CAUTION—After the broadcast band alignment as described above has been made, do not change the adjustment of any of the broadcast band trimmers.

Turn the broadcast short wave switch to the short wave position. Turn the rotor to the full open position. As explained above, the volume control should be at the maximum position and the signal should be attenuated to prevent A. V. C. action. Set the signal generator for 18,300 K. C. Then adjust the oscillator short wave trimmer for maximum output. This trimmer is reached from under the chassis and its position is shown in Fig. 2.

Next set the signal generator for 15,000 K. C. Turn the rotor until the dial pointer is at the 15,000 K. C. mark on the short wave portion of the dial scale. Then adjust the antenna and 1st detector short wave trimmers until maximum output is obtained.

In aligning the short wave band of the receiver, it will be noted that the signal will be heard with the signal generator set at two points 912 K. C. apart. That is, if the receiver is tuned to 15,000 K. C. a signal will be heard when the signal generator is set at 15,000 K. C. and again at approximately 15,912 K. C. This is due to image reception or the fact that a 456 K. C. beat is obtained when the signal is 456 K. C. lower than the receiver oscillator and also when the signal is 456 K. C. higher than the receiver oscillator. Care should be taken to see that the receiver is tracked with the signal generator adjusted to the lower of the two frequencies at which a signal is heard, in order that the oscillator in the receiver will be 456 K.C. higher in frequency than the signal.

Next set the signal generator for 6000 K. C. and adjust the 6000 K. C. trimmer. In the first models of this receiver, this condenser was located at the point shown in Fig. 2 in dashed lines. In the later models it is reached through a hole in the front panel of the chassis as shown in the same illustration. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 6000 K. C. trimmer screw until the highest output is obtained. In the early models this adjustment is broad while in the later models it is more critical.

## Caution

The can of electrolytic condenser C16 is not at ground potential. Therefore in any work on the chassis, care should be taken not to touch this can and any other grounded point such as the other electrolytic condenser can.

## Replacing Drive Cord

Remove chassis from cabinet.

Take off the pilot light assembly by lifting off the two sockets and spring clips.

Detach the large pointer by removing the screw at the center of the dial.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis.

Then lay the complete dial assembly face downward in front of the chassis. It is not necessary to remove the volume control and tone control collars which hold the indicator cords of these two controls in position.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 3.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 3. Insert one end of the drive cord from the outside through the hole in the eyelet in the drive drum.

### Voltages at Sockets

LINE VOLTAGE — 115
ANTENNA SHORTED TO GROUND

| Type of Tube | Function | Across Fila. or Heater | Plate to Cath. | Screen to Cath. | Control Grid to Cath. | Normal Plate M. A. |
|---|---|---|---|---|---|---|
| 6D6 | R. F. | 6.3 | 246 | 100 | 3.6(1) | 5.3 |
| 6D6 | 1st Det. | 6.3 | 237 | 97 | 8.0(2) | 3.4 |
| 76 | Osc. | 6.3 | 115 | | 0 | 4.8 |
| 6D6 | I. F. | 6.3 | 246 | 130 | 3.6(1) | 8.3 |
| 6B7 | 2nd Det. | 6.3 | 50(3) | 40(3) | 0 | 2.7 |
| 42 | Power | 6.3 | 230 | 245 | 17.0(4) | 33.0 |
| 80 | Rectifier | 5.0 | | | | 37.0 per plate |

(1) Cathode to ground
(2) Subject to variation
(3) Read with 1,000,000 ohm meter
(4) As read across R15

Tie the end of the cord which has been inserted in the hole to one end of the tension spring.

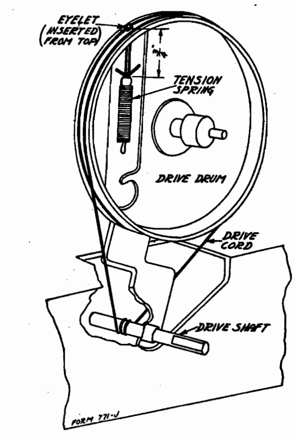



Fig. 3—Drive Cord Replacement

Wrap the cord in a clockwise direction (facing front of chassis) around the drive drum approximately one-half turn.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one-half times around the drive shaft as shown in Fig. 3.

Then bring this cord up from the drive shaft and wrap it around the drive drum approximately one and one fifth turns in a clockwise direction until it is up to the hole in this drum as illustrated.

Insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring, when hanging free, should be approximately ¾" from the flange of the drum as shown in Fig. 3. Cut off the surplus length of cord after it is knotted.

Then secure the other end of the tension spring over the spur on the drive drum.

Replace the dial assembly and pointer.

Replace the pilot light assembly after which the chassis may be reinstalled in the cabinet.

## Changes in Early Models

There are two points at which the early models of this receiver differ from the present models. These points are indicated in Fig. 1 and described below.

### Power Unit

In the early models a separate filter choke was used in series at the point indicated in note A in Fig. 1. The values of the two filter condensers C16 and C17 were less than as used at present. The values of the old and new condensers are shown in the parts list. A different power transformer was also used with the early filter system and this is likewise shown in the parts list.

**The two power transformers are not interchangeable and care must be taken in ordering for replacement purposes to order the correct one.** The original chassis can be identified by the separate filter choke.

### Short Wave Oscillator

Referring to Fig. 1 it will be noted that there is a tracking coil L2 and a trimmer condenser C21 connected in series between the short wave oscillator coil and ground. In the first models of this receiver these two units, which are required for tracking the short wave oscillator, are not used. Instead a series padding condenser was used at the point in the circuit indicated by note B in Fig. 1.

**At the time this change was made a change was also made in the oscillator assembly and care must be taken in ordering for replacement purposes to order the correct one.** Early models with the original oscillator assembly have no spot of paint or a green spot of paint on the 80 socket rivet. Later models with the new oscillator assembly and new tracking system have a red spot of paint on the 80 socket rivet.

## Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty-cycle, receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle chassis can be operated satisfactorily from a sixty-cycle power supply. However, the reverse is not true, the sixty-cycle receiver cannot be operated from a twenty-five cycle power supply.

A 110-220 Volt, 40-60 cycle Power Transformer is also available for this model.

## REPAIR PARTS LIST FOR 7 TUBE BROADCAST AND SHORT WAVE RECEIVER

When ordering parts be sure and give the part number. Also give the series number which will be found in the License Notice label. If there is a spot of paint on the chassis, give this color.

| Part No. | Item | List Price |
|---|---|---|
| P-1441 | Double Mounting Strip | .10 |
| P-1421 | Single Mounting Strip | .10 |
| P-2060 | Knob Small | .20 |
| P-2062 | Knob Large | .20 |
| P-10337 | Small Tone & Volume Control Disc | .10 |
| P-20912 | Pointer, Large | .20 |
| P-2012 | Pilot Light Bulb 6-8 volt | .15 |
| P-10272 | Rubber Mounting Feet | .10 |
| P-10820 | Glass Crystal | .15 |
| P-20875 | Crystal Retainer Ring | .10 |
| P-2090 | 6" Speaker Mantel Sets L1 - 1250 ohm | 6.00 |
| P-2091 | 8" Speaker Console Sets L1 - 1250 ohm | 6.75 |
| | 8" Black Drive Cord (V. C. or T. C. Ind.) | .05 |
| | 29" Black Drive Cord (Cond. Drive) | .10 |
| P-2126 | Pilot Lamp Socket & Clip Assembly | .10 |
| P-2101 | Broadcast-Short Wave Switch | 1.88 |

| Part No. | Item | List Price |
|---|---|---|
| P 1885 | No. 6D6 Socket | $ .15 |
| P-2022 | No. 76 Socket | .15 |
| P 1944 | No. 6B7 Socket | .15 |
| P-1884 | No. 42 Socket | .15 |
| P-2025 | No. 80 Socket | .15 |
| P-1637 | Speaker Socket | .10 |
| P 40445 | Tube Shield for 6D6 & 6B7 Tubes | .15 |
| P-40444 | Tube Shield for 76 Tube | .15 |
| P-40443 | Tube Shield Bases | .10 |
| *P-50634 | Power Transformer 115 Volts, 60 Cycles | 3.00 |
| *P-50635 | Power Transformer 115 Volts 25 Cycles | 4.50 |
| *P-50636 | Power Transformer 115-230 Volts, 40-60 Cycles | 3.25 |
| †P-50646 | Power Transformer 115 Volts, 60 Cycles | 3.25 |
| †P-50647 | Power Transformer 115 Volts, 25 Cycles | 4.50 |
| †P-50648 | Power Transformer 115-230 Volts, 40-60 Cycles | 3.75 |
| *P-50637 | Filter Reactor | .85 |
| P-50599 A | Output Transformer T 10 | 1.15 |
| P-5176 | Antenna R.F. Trans. less can T1 & T2 | 1.80 |
| P-5177 | Inter-Stage R. F. Trans. less can T3 & T4 | 1.75 |
| *P-5178 | Oscillator Coil Assembly Less can T8 & T9 | 1.70 |
| †P-5183 | Oscillator Coil Assembly Less can T9 & T9 | 1.70 |
| P-40433 | Cans for the above Assemblies | .15 |
| †P-5190 | High Frequency Oscillator Tracking Coil L2 | .35 |
| P-5179 | 1st I. F. Assembly Complete with Can T5 | 2.15 |
| P-5180 | 2nd I. F. Assembly Complete with Can T6 | 1.75 |
| P-30342-A | Grid Cap Only | .10 |
| P-70702 | AC Cord & Plug | .70 |
| P-1504 | 8 Terminal Mounting Strip | .10 |

| Part No. | Code | Resistance | Watts | Type | List Price |
|---|---|---|---|---|---|
| P-98016 | R1 | 200 ohm | .2 | Flex. Wire Wound | $ .15 |
| P-B93303 | R2 | 30,000 ohm | .5 | Carbon | .20 |
| P-B94602 | R3 | 6,000 ohm | .5 | Carbon | .15 |
| P-A95205 | R4 | 2.0 megohm | .2 | Carbon | .15 |
| P-98020 | R5 / R6 | 16,000 ohm / 25,000 ohm | 1.5 / 1.0 | Armored wire wound | .65 |
| P-A94203 | R7 | 20,000 ohm | .2 | Carbon | .15 |
| P-B94603 | R8 | 60,000 ohm | .5 | Carbon | .15 |
| P-B94254 | R9 | 250,000 ohm | .5 | Carbon | .15 |
| P-96014 | R10 | 500,000 ohm | | Vol. Control & Switch | 1.05 |
| P-A94252 | R11 | 2,500 ohm | .2 | Carbon | .15 |
| P-A94104 | R12 | 100,000 ohm | .2 | Carbon | .15 |
| P-A95504 | R13 | 500,000 ohm | .2 | Carbon | .20 |
| P-A94104 | R14 | 100,000 ohm | .2 | Carbon | .15 |
| P-98015 | R15 | 235 ohm | 2.0 | Flex. Wire Wound | .15 |
| P-97011 | R16 | 150,000 ohm | | Tone Control | .75 |

| Part No. | Code | Capacity | Volts | Type | List Price |
|---|---|---|---|---|---|
| P-80919 | C1 | .00025 mfd. | | Moulded | $ .20 |
| P-2102 | C2 | 3-40 mmfd. | | Ant. S.W. Trimmer | .15 |
| | C3 | (See 3 Gang Cond.) | | Gang Trimmer | |
| P-80862 | C4 | .05 mfd. | 200V. | Tubular | .15 |
| P-80888 | C5 | .25 mfd. | 200V. | Tubular | .25 |
| P-80890 | C6 | .05 mfd. | 400V. | Tubular | .20 |
| P-2102 | C7 | 3-40 mmfd. | | 1st Det.S.W. Trim. | .15 |
| | C8 | (See 3 Gang Cond.) | | Gang Trimmer | |
| P-1386-B | C9 / C10 | 90±30 mmfd. / 90±30 mmfd. | | Dual Trimmer Part of I. F. Assem. | |
| P-81034 | C11 | .25 mfd. | 300V. | Tubular | .30 |
| P-1386-B | C12 / C13 | 90±30 mmfd. / 90±30 mmfd. | | Dual Trimmer Part of I. F. Assem. | |
| P-81040 | C14 | .25 mfd. | 400V. | Tubular | .35 |
| P-80977 | C15 | .0001 mfd. | | Moulded | .20 |
| †P-81043 | C16 | 18.0 mfd. | 300V. | Electrolytic Wet | 1.30 |
| *P-80916 | C16 | 8.0 mfd. | 450V. | Electrolytic Wet | 1.25 |
| *P-81032 | C17 | 8.0 mfd. | 500V. | Electrolytic Wet | 1.30 |
| †P-81042 | C17 | 14.0 mfd. | 400V. | Electrolytic Wet | 1.45 |
| P-80862 | C18 | .05 mfd. | 200V. | Tubular | .15 |
| P-2112 | C19 | 300-500 mmfd. | | 600 K.C. Trimmer | .45 |
| P-2102 | C20 | 3-40 mmfd. | | Osc. S.W. Trimmer | .15 |
| †P-1685 | C21 | 70±30 mmfd. | | 6000 K.C. Trimmer | .35 |
| | C22 | (See 3 Gang Cond.) | | Gang Trimmer | |
| P-81005 | C23 | .000035 mfd. | | Moulded | .15 |
| P-80914 | C24 | .002 mfd. | 600V. | Tubular | .20 |
| P-80981 | C25 | .01 mfd. | 400V. | Tubular | .20 |
| P-81044 | C26 | .03 mfd. | 400V. | Tubular | .15 |
| P-80914 | C27 | .002 mfd. | 600V. | Tubular | .20 |
| P-81033 | C28 | .25 mfd. | 400V. | Tubular | .35 |
| P-80887 | C29 | .1 mfd. | 400V. | Tubular | .20 |
| P-80890 | C30 | .05 mfd. | 400V. | Tubular | .20 |
| P-80887 | C31 | .1 mfd. | 400V. | Tubular | .20 |
| P-81027-B | | 3 Gang Condenser | | | 3.35 |
| *P-2113 | | 600-1200 mmfd. | | 6000 K.C. Trimmer | .61 |

*** Used in early Models. See Article on changes in this Manual**
**† Used in Later Models. See Article on changes in this Manual**

**MODEL 9-B Series**
**Schematic, Socket**

# WELLS-GARDNER & CO., INC.

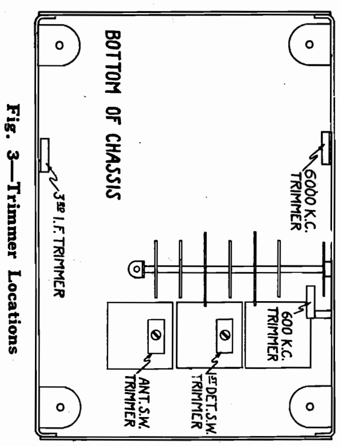
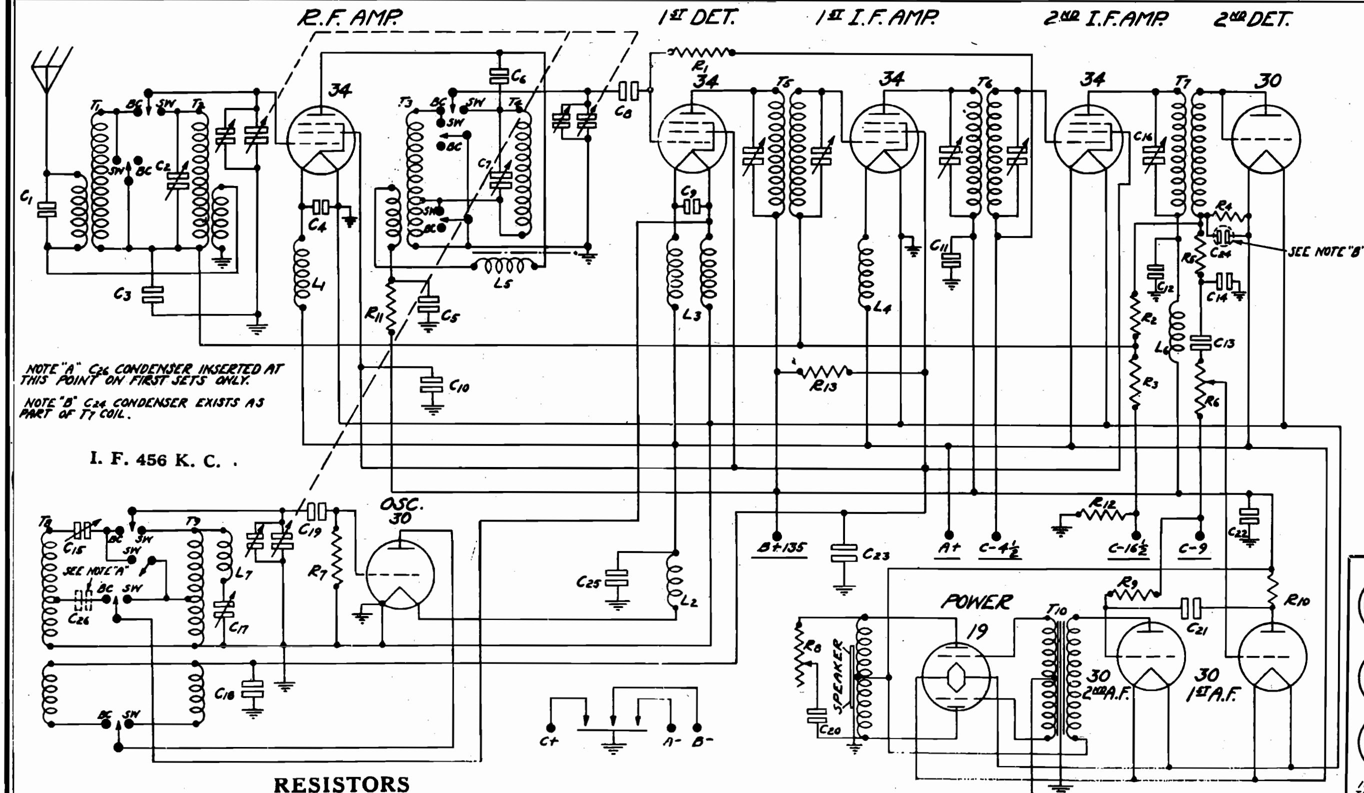
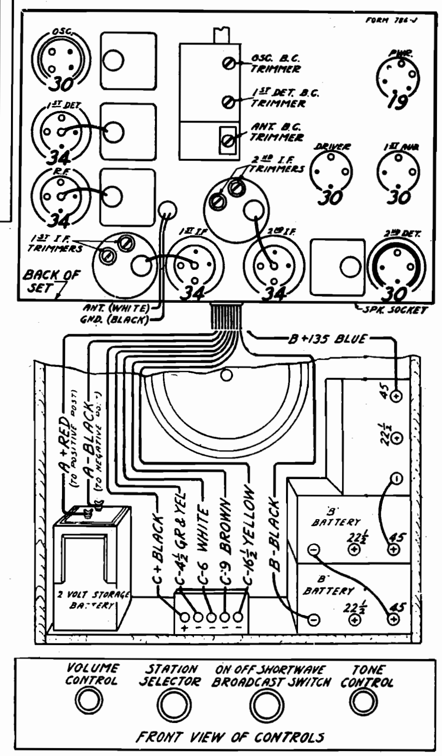



Fig. 3—Trimmer Locations




## RESISTORS

| Part No. | Code | Resistance | Wattage | Type |
|---|---|---|---|---|
| P-A95305 | R1 | 3 Megohm | .2 | Carbon |
| P-A95305 | R2 | 3 Megohm | .2 | Carbon |
| P-A94805 | R3 | 8 Megohm | .2 | Carbon |
| P-A94304 | R4 | 300,000 Ohm | .2 | Carbon |
| P-A95104 | R5 | 100,000 Ohm | .2 | Carbon |
| P- 96016 | R6 | 2 Megohm | | Volume Control |
| P-A94104 | R7 | 100,000 Ohm | .2 | Carbon |
| P- 97013 | R8 | 45,000 Ohm | | Tone Control |
| P-A94105 | R9 | 1 Megohm | .2 | Carbon |
| P-A94104 | R10 | 100,000 Ohm | .2 | Carbon |
| P-A95102 | R11 | 1,000 Ohm | .2 | Carbon |
| P-A95153 | R12 | 15,000 Ohm | .2 | Carbon |
| P-B94652 | R13 | 6,500 Ohm | .2 | Carbon |
| *P- 97011 | | 150,000 Ohm | | Tone Control |
| *P-A95603 | | 60,000 Ohm | .2 | Carbon |

* These parts were used on first models only—see article on "Changes in Early Models."

## CONDENSERS

| Part No. | Code | Capacity | Voltage | Type |
|---|---|---|---|---|
| P-80919 | C1 | 250 mmf. | | Moulded |
| P- 2102 | C2 | 3–40 mmf. | | Trimmer |
| P-81076 | C3 | .05 mf. | 200V | Tubular |
| P-81076 | C4 | .05 mf. | 200V | Tubular |
| P-81076 | C5 | .05 mf. | 200V | Tubular |
| P-81094 | C6 | .006 mf. | 600V | Tubular |
| P- 2102 | C7 | 3–40 mmf. | | Trimmer |
| P-81800 | C8 | 50 mmf. | | Wire Capacitor |
| P-81076 | C9 | .05 mf. | 200V | Tubular |
| P-81102 | C10 | .25 mf. | 140V | Tubular |
| P-81110 | C11 | .25 mf. | 200V | Tubular |
| P-81076 | C12 | .05 mf. | 200V | Tubular |
| P-81076 | C13 | .05 mf. | 200V | Tubular |
| P-80977 | C14 | 100 mmf. | | Wire Capacitor |
| P- 2112 | C15 | 300–500 mmf. | | Trimmer |
| P- 1685 | C16 | 40—100 mmf. | | Trimmer |
| P- 1685 | C17 | 40—100 mmf. | | Trimmer |
| P-81076 | C18 | .05 mf. | 200V | Tubular |
| P-81005 | C19 | 35 mmf. | | Moulded |
| P-81071 | C20 | .05 mf. | 400V | Tubular |
| P-81094 | C21 | .006 mf. | 600V | Tubular |
| P-82001 | C22 | 4.0 mf. | 150V | Electrolytic |
| | C23 | 8.0 mf. | 150V | Electrolytic |
| | C24 | Part of 3rd I. F. Coil Assembly T7 | | |
| P-81102 | C25 | .25 mf. | 140V | Tubular |
| *P-81076 | C26 | .05 mf. | 200V | Tubular |
| P-81027 | | 3 Gang Condenser | | |

MODEL 9-B Series
Service Notes, Parts

WELLS-GARDNER & CO., INC.

## Replacing Drive Cord

Lift off the pilot light assembly.

Detach the large pointer by removing the center screw.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis.

Then lay the complete dial assembly face downward in front of the chassis. It is not necessary to remove the volume control and tone control collars which hold the indicator cords of these two controls in position.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 6.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 6. Insert one end of the drive cord from the outside through the hole in the eyelet in the drive drum.

Tie the end of the cord which has been inserted in the hole to one end of the tension spring.

Wrap the cord in a clockwise direction (facing front of chassis) around the drive drum approximately one-half turn.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one-half times around the drive shaft as shown in Fig. 6.

Then bring this cord up from the drive shaft and wrap it around the drive drum approximately one and one fifth turns in a clockwise direction until it is up to the hole in this drum as illustrated.

Insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring, when hanging free, should be approximately ¾" from the flange of the drum as shown in Fig. 6. Cut off the surplus length of cord after it is knotted.

Then secure the other end of the tension spring over the spur on the drive drum.

Replace the dial assembly and pointer.

Replace the pilot light assembly.

## Changes in Early Models

The condenser, C26 was used only on the early models of this receiver. Another change was in the tone control circuit. In the early models R8 was a 150,000 ohm resistor paralleled by a 60,000 ohm resistor. However, in the later models this arrangement was replaced by a single 45,000 ohm resistor to provide greater sensitivity in tone control.

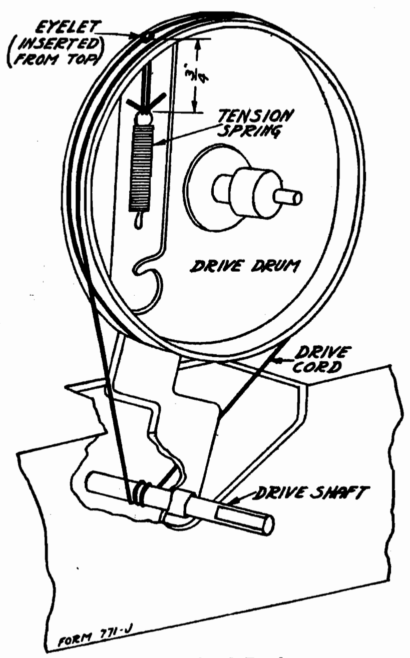



**Fig. 6—Drive Cord Replacement**

## Circuit

This model is a broadcast and short wave receiver with a coverage of 530 to 1730 K. C. on the broadcast band and 5.8 to 16.0 M. C. on the short wave band. Dual band coverage is accomplished by means of dual sets of R. F. and oscillator coils and a 4 section three position selector switch. The various circuits made and broken, as this switch is thrown, are indicated in the schematic circuit diagram Fig. 1.

Referring to the antenna transformer in Fig. 1, T1 is the broadcast transformer and T2 the short wave transformer. The two primaries are connected in series. With the switch in the short wave position, the short wave secondary is connected to the grid circuit of the 34 R. F. amplifier tube and the broadcast secondary is short circuited. When the switch is in the broadcast position, the short wave secondary circuit is opened up and the broadcast secondary is connected to the grid circuit of the tube. The secondary being used is tuned by the R. F. section of the three gang condenser. A separate variable trimmer condenser C2 is used for the short wave secondary.

Bias voltage for the 34 R. F. and 1st I. F. tubes is obtained from a high resistance potentiometer composed of resistors R2, R3 and R4, which are connected across the 16½ volt "C" battery and the 2 volt "A" source. See Fig. 1. The grid circuit of this tube is connected between resistors R2 and R3.

The output of the R. F. 34 tube is fed through another R. F. transformer with tuned secondary into a second 34 tube which functions as the first detector. The first detector section of the three gang condenser is used for tuning this circuit. This interstage R. F. transformer consists of two portions shown as T3 and T4 on the diagram. T4 is the short wave coupling coil and T3 is the broadcast transformer.

The short wave coupling coil is connected to the plate circuit of the 34 R. F. amplifier thru an interstage plate reactor, L5, in conjunction with a by-pass condenser, C6. The standard wave transformer, T3, functions as a simple R. F. coupling the same as that of T1. A separate trimmer condenser C7 is used for the short wave coil.

A type 30 tube is employed in a separate oscillator circuit. Referring to the diagram, T8 is the broadcast oscillator coil and T9 is the short wave oscillator coil. The coil being used is tuned by the oscillator section of the three gang condenser and these circuits are always resonant at 456 K. C. above the frequency to which the R. F. amplifier is tuned. When the switch is in the broadcast position, the connections are completed to the broadcast oscillator coil and the short wave oscillator coil is opened up. When the switch is in the short wave position, the connections are completed to the short wave coil and the broadcast coil is connected between ground and the short tap in order to render it ineffective. A 600 K. C. padding condenser C15 is used in conjunction with the broadcast oscillator and a 6,000 K. C. padder C17 is used for the short wave oscillator circuit.

## REPAIR PARTS LIST FOR 9 TUBE BATTERY OPERATED BROADCAST AND SHORT WAVE SUPERHETERODYNE RECEIVER

When ordering parts be sure and give the part number. Also give the series number which will be found in the License Notice label. If there is a spot of paint on the chassis, give this color.

### MISCELLANEOUS

| Part No. | ITEM |
|---|---|
| P-5176 | Antenna R. F. Trans. T1, T2 less can |
| P-5236 | Interstage R. F. Trans. T3, T4 less can |
| P-5224 | Oscillator Coil T8, T9 less can |
| P-5186 | 3rd I. F. Assembly T7 |
| P-40433 | Cans for the above assemblies |
| P-5179A | 1st I. F. Coil and Can Assembly T5 |
| P-5185 | 2nd I. F. Coil and Can Assembly T6 |
| P-5189 | Filament Reactor L1 |
| P-5189 | Filament Reactor L2 |
| P-5235 | Double Filament Reactor L3 |
| P-5189 | Filament Reactor L4 |
| P-5228 | S. W. R. F. Interstage Plate Reactor L5 |

WELLS-GARDNER & CO., INC.

**MODEL 9-B Series Voltage Alignment Data**

## Condenser Alignment

Use a non-metallic screw driver for the adjustments. The complete procedure is as follows:

### Intermediate Frequency Adjustment

Set the signal generator for 456 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. The volume control should be at the maximum position. Reduce the signal so that A. V. C. action is not obtained.

Then adjust the five I. F. trimmer condensers until maximum output is obtained. The adjusting screws for the 1st and 2nd trimmer condensers are reached from the top of the chassis and are in the round I. F. cans—See Fig. 2. The openings of these trimmer condensers are covered over by small cover plates which are held in position by screws. Loosen these screws until the cover plates can be swung around. **CAUTION—Use an insulated screwdriver for adjusting trimmers to prevent short circuiting to ground.** In the 3rd I. F. coil, only the primary has a variable trimmer condenser. This condenser is mounted on the back panel of the chassis as shown in Fig. 3 and the adjustment screw is reached through a hole in the back panel.

### Broadcast Band Adjustment

The broadcast short wave switch should be in the broadcast position. Set the signal generator for 1730 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Reduce the signal so that A. V. C. action is not obtained. Adjust the oscillator broadcast trimmer until maximum output is obtained. This trimmer is on the tuning condenser and its location is shown in Fig. 2.

Then set the signal generator for 1500 K. C. Turn the rotor until maximum output is obtained. Loosen the set screw in the pointer hub and set the pointer at the 1500 K. C. mark on the broadcast band scale. Retighten the hub set screw. Then adjust the antenna and 1st detector broadcast trimmers until maximum output is obtained.

Next set the signal generator for 600 K. C. and adjust the 600 K. C. trimmer. The adjusting screw is reached through a hole in the front panel of the chassis as shown in Fig. 3. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting at the same time adjusting the 600 K. C. trimmer screw until the highest output is obtained.

### Short Wave Band Adjustment

CAUTION—After the broadcast band alignment as described above has been made, do not change the adjustment of any of the broadcast band trimmers.

In aligning the short wave band of the receiver, it will be noted that the signal will be heard with the signal generator set at two points 912 K. C. apart. That is, if the receiver is tuned to 15,000 K. C. a signal will be heard when the signal generator is set at 15,000 K. C. and again at approximately 15,912 K. C. This is due to image reception or the fact that a 456 K. C. beat is obtained when the signal is 456 K. C. lower than the receiver oscillator and also when the signal is 456 K. C. higher than the receiver oscillator. Care should be taken to see that the receiver is tracked with the signal generator adjusted to the lower of the two frequencies at which a signal is heard, in order that the oscillator in the receiver will be 456 K. C. higher in frequency than the signal.

Turn the broadcast short wave switch to the short wave position. As explained above, the volume control should be at the maximum position and the signal should be reduced to prevent A. V. C. action.

Next set the signal generator for 15,000 K. C. Turn the rotor until maximum output is obtained. Then adjust the antenna and 1st detector short wave trimmers for maximum output.

Next set the signal generator for 6000 K. C. and adjust the 6000 K. C. trimmer. This condenser is mounted on the front panel of the chassis as shown in Fig. 3 and is reached through a hole in the front panel. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 6000 K. C. trimmer screw until the highest output is obtained.

## Voltages at Sockets

**Antenna Shorted to Ground**
**Batteries Up to Rated Voltages. See Fig. 1**
**Voltages Read from Negative Filament Terminal**

| Type of Tube | Function | Across Filament | Plate to Gnd. | Control Grid to Ground | Screen to Gnd. | Normal Plate M. A. |
|---|---|---|---|---|---|---|
| 34 | R. F. | 2.0 | 135 | 4.5 (1) | 80 | 2.8 |
| 34 | 1st Det. | 2.0 | 135 | 4.5 (1) | 80 | 3.0 |
| 30 | Osc. | 2.0 | 80 | | | 2.8 |
| 34 | 1st I. F. | 2.0 | 135 | 4.5 (1) | 80 | 2.8 |
| 34 | 2nd I. F. | 2.0 | 135 | 4.5 | 80 | 2.8 |
| 30 | 2nd Det. | 2.0 | | | | |
| 30 | 1st Audio | 2 0 | 95 | 9.0 (2) | | 0.35 |
| 30 | 2nd Audio | 2.0 | 135 | 9.0 (3) | | 3.0 |
| 19 | Output | 2.0 | 135 | 6.0 | | 1.3 |

(1) Computed figure—cannot be read because of high resistance cir.
(2) Volume Control at minimum.
(3) As read at battery.

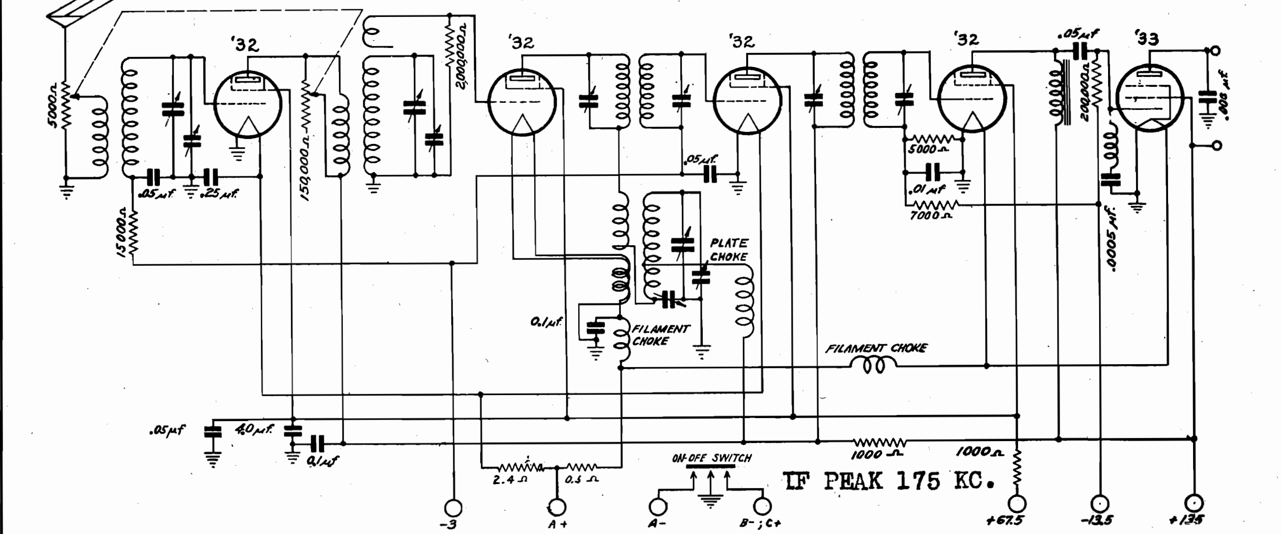
## D. C. Resistance of Windings

**Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.**

| Part No. | Item | Code | D. C. Resistance in Ohms |
|---|---|---|---|
| P-5176 | B. C. Antenna R. F. Transformer, Primary | T1 | 28.0 |
| | B. C. Antenna R. F. Transformer, Secondary | T1 | 5.0 |
| | S. W. Antenna R. F. Transformer, Primary | T2 | 0.25 |
| | S. W. Antenna R. F. Transformer, Secondary | T2 | Small |
| P-5236 | B. C. Interstage R. F. Transformer, Primary | T3 | 5.25 |
| | B. C. Interstage R. F. Transformer, Secondary | T3 | 5.0 |
| | S. W. Interstage R. F. Transformer, Secondary | T4 | Small |
| P-5224 | B. C. Oscillator Grid Coil | T8 | 2.4 |
| | B. C. Oscillator Plate Coil | T8 | 3.5 |
| | S. W. Oscillator Grid Coil | T9 | 1.0 |
| | S. W. Oscillator Plate Coil | T9 | Small |
| P-5179-A | 1st I. F. Coil Primary | T5 | 12.0 |
| | 1st I. F. Coil Secondary | T5 | 13.0 |
| P-5185 | 2nd I. F. Coil Primary | T6 | 5.5 |
| | 2nd I. F. Coil Secondary | T6 | 5.5 |
| P-5186 | 3rd I. F. Coil Primary | T7 | 12.0 |
| | 3rd I. F. Coil Secondary | T7 | 30.0 |
| P-50586-B | Audio Transformer Primary | T10 | 910.0 |
| | Audio Transformer Secondary, Center tap to outside | T10 | 590.0 |
| | Audio Transformer Secondary, Center tap to inside | T10 | 530.0 |
| P-5189 | Filament Reactor | L1 | 0.65 |
| P-5189 | Filament Reactor | L2 | 0.65 |
| P-5235 | Double Filament Reactor (each) | L3 | 0.3 |
| P-5189 | Filament Reactor | L4 | 0.65 |
| P-5228 | S. W. R. F. Interstage Plate Reactor | L5 | 28.0 |
| P-5227 | I. F. Isolating Reactor | L6 | 1.6 |
| P-2179 | Speaker Voice Coil, Center tap to outside | | 300.0 |
| | Speaker Voice Coil, Center top to inside | | 250.0 |

MODEL 92,93
Schematic
Socket,Voltage

# WELLS - GARDNER & CO.




TURN THE VOLUME CONTROL ALL THE WAY ON, CONNECT THE ANTENNA AND GROUND LEADS TOGETHER AND TURN THE GANG CONDENSER PLATES ALL THE WAY OUT. CHECK BATTERY VOLTAGES.

| TUBE | CIRCUIT | VOLTAGE |
|---|---|---|
| R.F. '32 | Filament | 2. |
| | Screen Grid | 65. |
| | Plate | 127. |
| | Control Grid | 1.4 |
| 1st Det. & Oscillator '32 | Filament | 2. |
| | Screen Grid | 65. |
| | Plate | 85. |
| | Control Grid | No Reading |
| I.F. '32 | Filament | 2. |
| | Screen Grid | 65. |
| | Plate | 125. |
| | Control Grid | 5. * |
| 2nd Det '32 | Filament | 2. |
| | Screen Grid | 67. |
| | Plate | 127.5 |
| | Control Grid | 3.2 |
| Audio '33 | Filament | 2. |
| | Screen Grid | 132.5 |
| | Plate | 117.5 |
| | Control Grid | 7.5 ** |

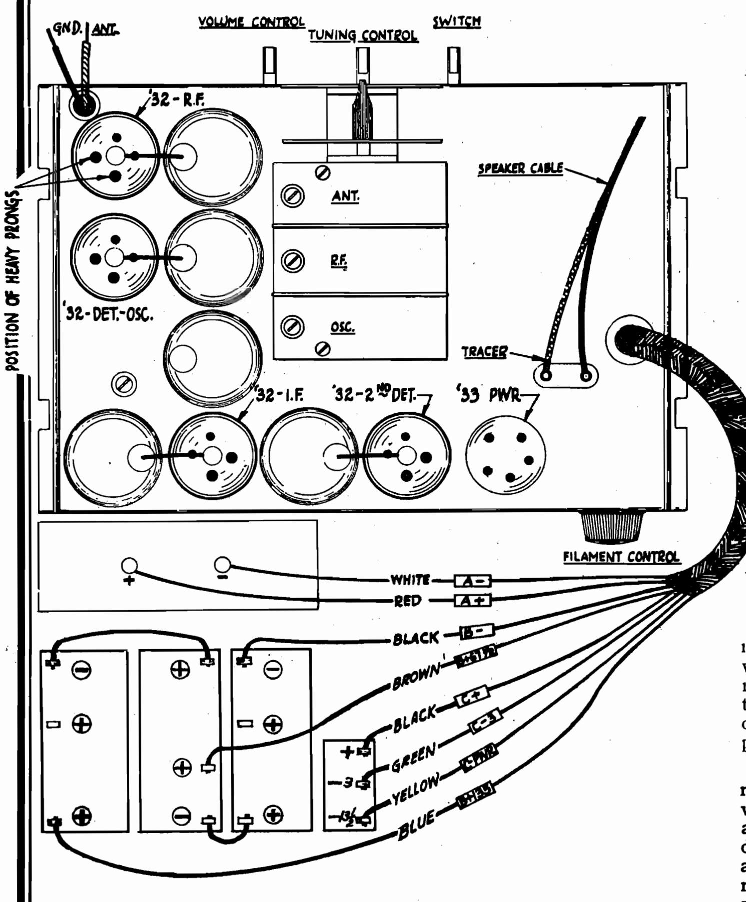
*This includes filament voltage.
**250 v. Scale.

The measurement of grid bias voltages is not recommended as this causes an abnormal rise in plate current which is injurious to the tube. When the receiver does not function properly and the trouble is apparently due to incorrect grid bias on any tube or tubes, the cause of the incorrect bias may be determined by applying the proper continuity test.

**CAUTION: Do not attempt to take voltage measurements or test the '33 pentode tube with a set analyzer which is not designed to test that type of tube. A special adaptor is necessary. The latest type analyzers only are designed to test pentode tubes. The UY socket in an analyzer which is used to test '24, '35, and '27 tubes cannot be used to test '33 pentode tubes.** A break-in adaptor and the external binding posts of the set analyzer may be used to take voltage measurements when an adaptor is not available.

Comparison of the voltage measurements taken and those shown in the chart below will show any irregularities. The cause of any variation may be determined by applying the proper continuity test. REMEMBER:—Voltage measurements will vary slightly with different sets of tubes, and also with different chassis. Unless the voltages are radically different than normal, they may be considered satisfactory.

The voltages shown in the chart were taken with a 1000 ohm per volt voltmeter; voltage measurements taken with a voltmeter having a different resistance will, of course, differ from those shown.



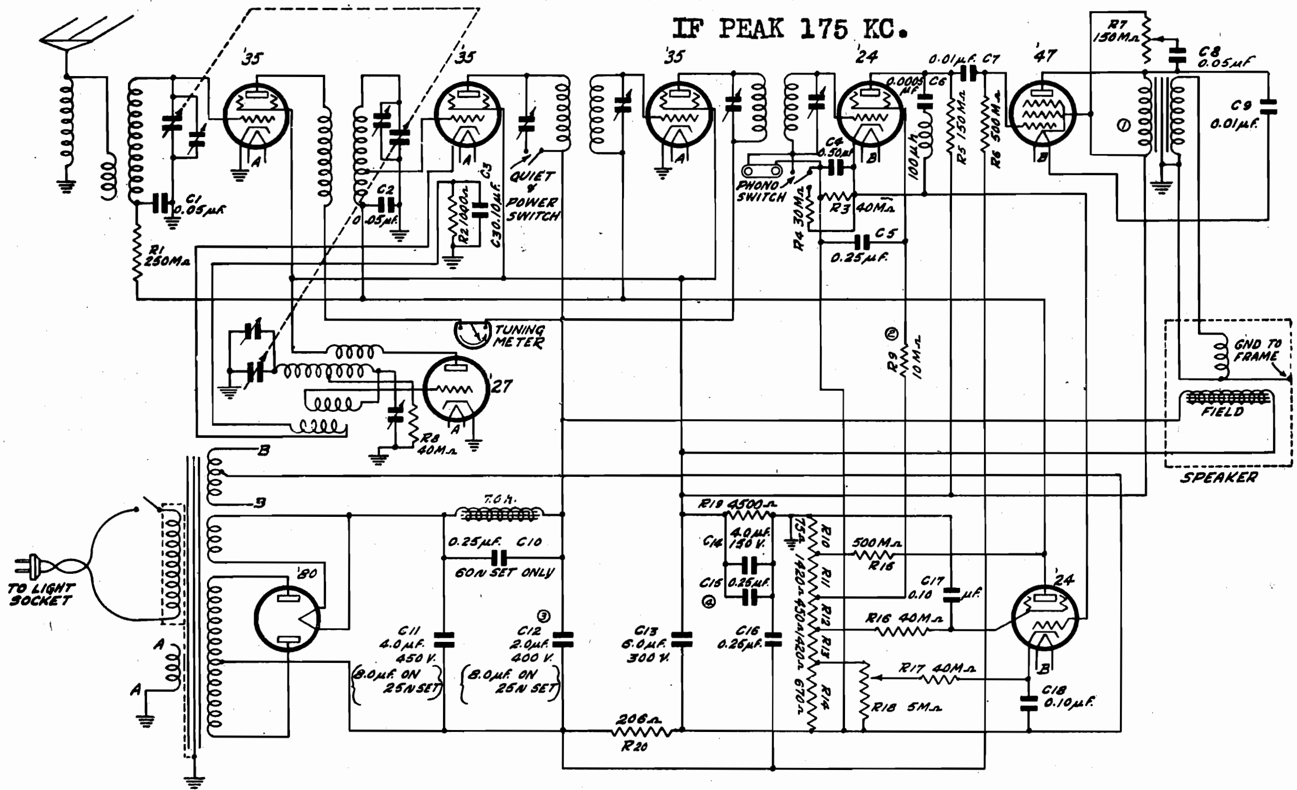

The .006 mfd. condenser connected from the plate of the pentode tube to ground is there for two reasons,—one, to prevent any I.F. or harmonic of the intermediate frequency from getting into the speaker and possibly coupling back into the antenna to cause a squeal; two, to put the proper amount of capacity across the speaker winding to produce a pleasing tone quality. This condenser may be varied to any value from .002 mfd. to .006 mfd. without losing its effectiveness in preventing the I.F. from getting into the speaker.

MODEL 40,40-A
Schematics

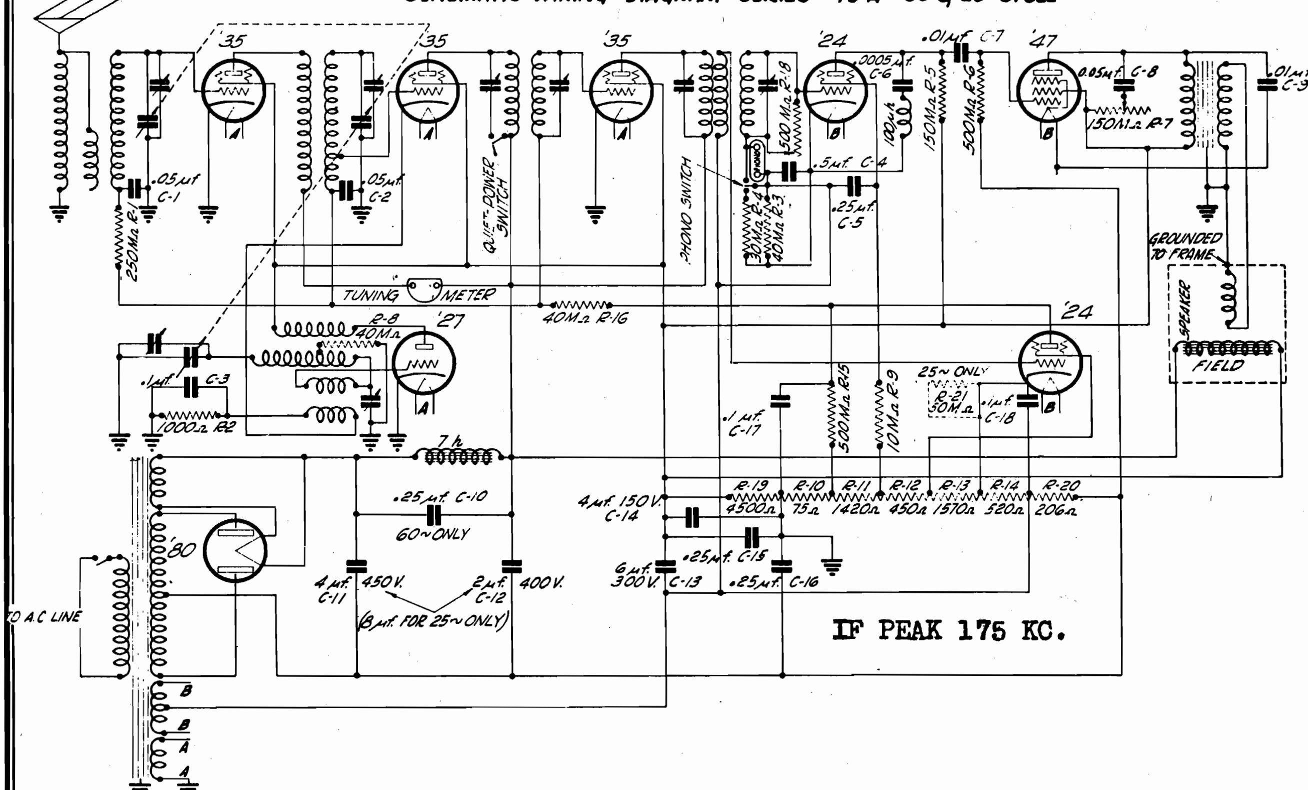
# WELLS - GARDNER & CO.

SCHEMATIC WIRING DIAGRAM SERIES 40 – 60~ & 25~

IF PEAK 175 KC.



SCHEMATIC WIRING DIAGRAM SERIES 40-A 60 & 25 CYCLE



IF PEAK 175 KC.

**MODEL 40,40-A**
**Alignment Data**
**Socket,Voltage**

# WELLS - GARDNER & CO.

A modulated test oscillator and an output meter MUST be used when aligning this receiver to insure accurate alignment. It is important that the oscillator deliver a signal at exactly 175 K.C. in addition to frequencies in the broadcast band.

The adjustable condensers which tune the primaries and secondaries of the I.F. transformers are adjusted by inserting a screw driver through the holes in the chassis base directly below the I.F. transformer assemblies.

A trimmer condenser is mounted over each section in the gang and is adjusted by turning the screw located under the hole in the top of the gang shield.

The oscillator 600 K.C. tracking condenser is on the back of the chassis near the "QUIET-POWER" switch.

Make each adjustment in the order given below or the receiver may be thrown further out of alignment and it will then be a difficult task to align it properly.

The receiver and test oscillator must be well grounded and the output kept within the range of the output meter at all times.

All shields must be in place when making the adjustments.

**INTERMEDIATE CIRCUITS.**—Tune the test oscillator to exactly 175 K.C., and connect its output to the grid of the first detector tube after removing the clip on the tip of the tube. Connect the output meter across the secondary of the speaker coupling transformer and then adjust all four condensers which tune the intermediate transformers, for the greatest deflection on the output meter. Check the settings of all four condensers to make certain the maximum output has been obtained.

When the above instructions have been followed remove the test oscillator coupling and replace the grid clip on the tip of the first detector tube.

**GANG CONDENSERS.**—Turn the gang condenser plates all the way in and see that the dial pointer is on the first dial division point below 550 K.C.

Tune the test oscillator to 1,400 K.C., turn the dial to read 1,400 K.C., and then adjust each gang condenser trimmer for maximum output.

**OSCILLATOR.**—Tune the test oscillator to 600 K.C., and tune the receiver to the signal. Disconnect the output meter and then rotate the adjusting screw on the oscillator 600 K.C. tracking condenser. Rock the gang condenser back and forth across the signal at the same time, and listen closely until the maximum volume is obtained. The tracking condenser is then properly adjusted and remains fixed thereafter.

The gang condenser trimmers only must then be adjusted again at 1,400 K.C. for maximum output.

The receiver should be accurately aligned if the above instructions have been followed and no further adjustments need be made.

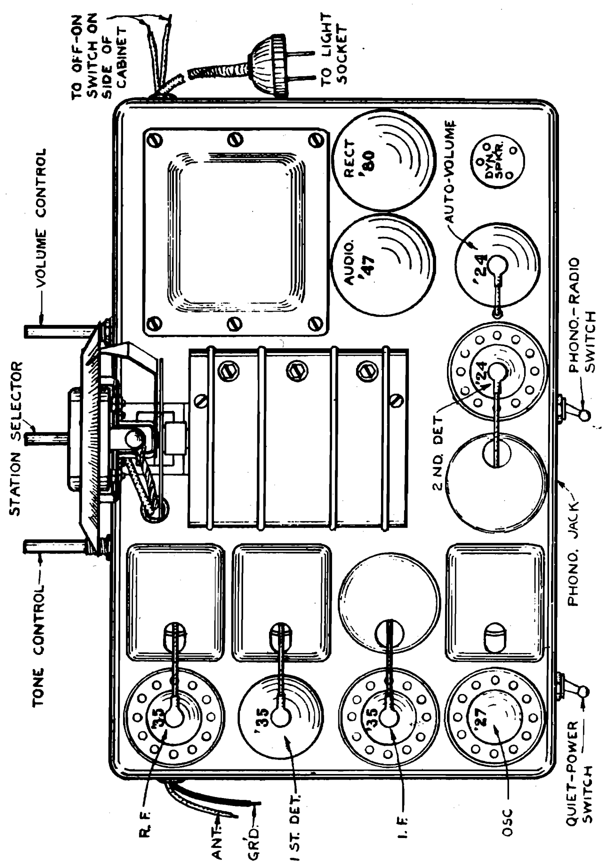
The blue lead on the filter block is common for condensers C4, C5, and C18, and the black lead is common for condensers C3, C15, C16, and C17. The second detector plate filter choke is also contained in the block and is connected by two yellow leads, C8, (white-red leads) and C10 (red leads) are connected as shown in Fig. 1 schematic wiring diagram.

## Voltages at Sockets

The voltages shown in the chart were taken with a 1,000 ohm per volt voltmeter; voltage measurements taken with a voltmeter having a different resistance will, of course, differ from those shown.

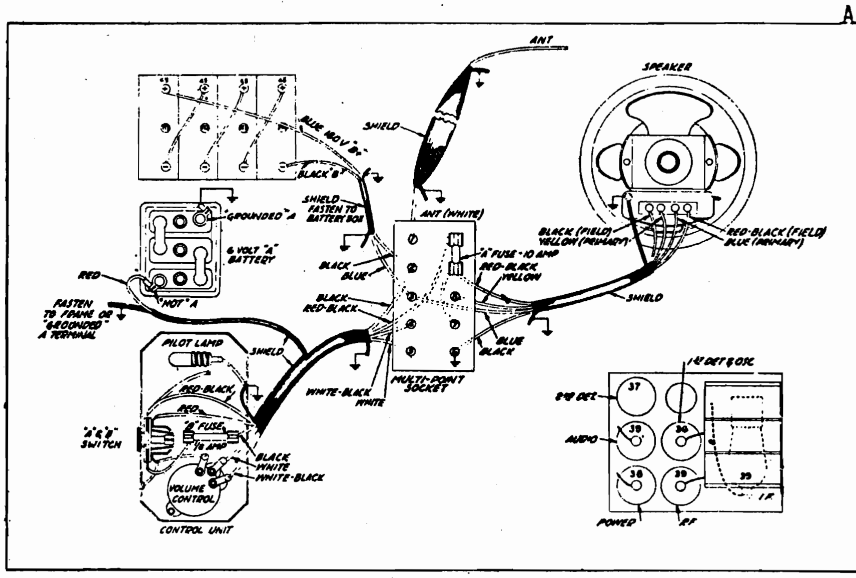
**Turn the volume control all the way on, connect the antenna and ground leads together and turn the gang condenser plates all the way out. Check the line voltage.**

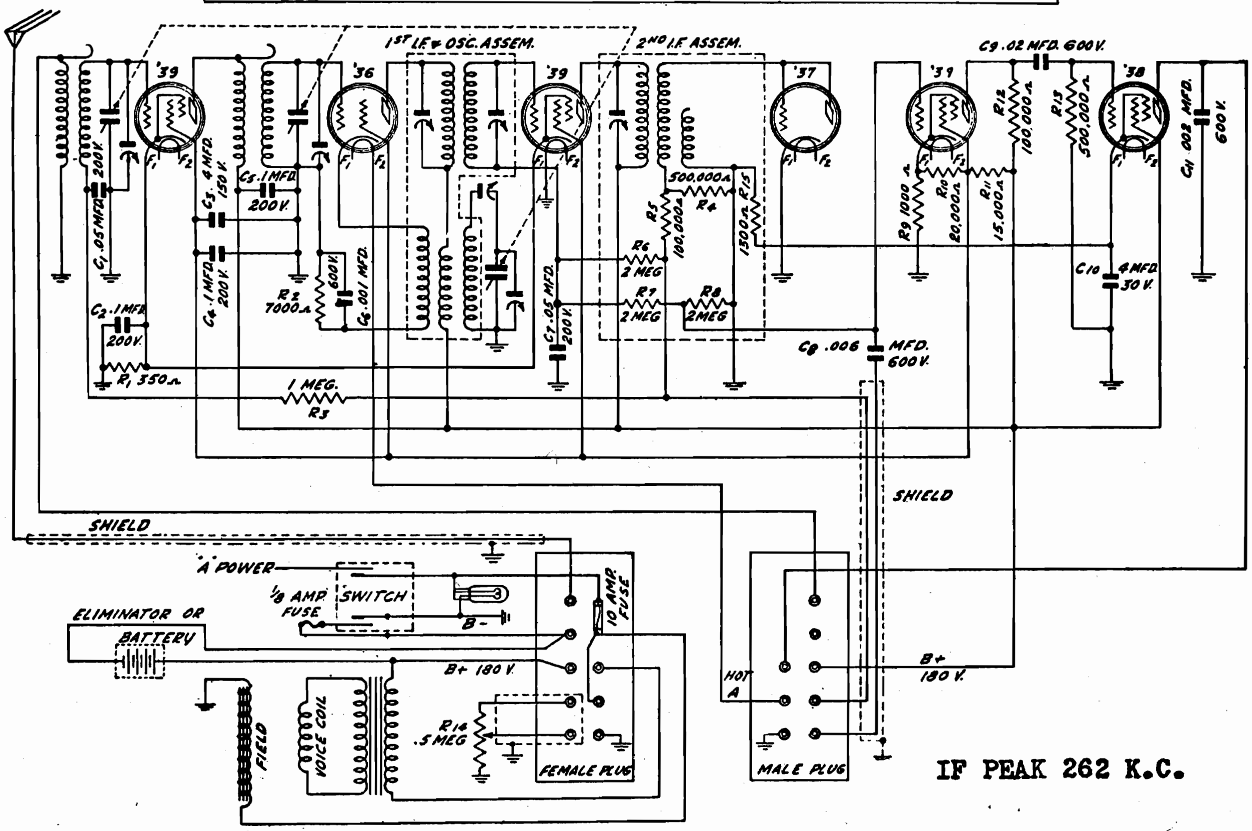
| Tube | Circuit | LINE VOLTAGE | | | | |
|---|---|---|---|---|---|---|
| | | 90 V. | 100 V. | 110 V. | 120 V. | 130 V. |
| R. F. '35 | Screen-Grid<br>Plate | 70<br>143 | 78<br>159 | 85<br>175 | 92<br>191 | 100<br>207 |
| 1st Det. '35 | Screen-Grid<br>Plate | 70<br>143 | 78<br>159 | 85<br>175 | 92<br>191 | 100<br>207 |
| I. F. '35 | Screen-Grid<br>Plate | 70<br>143 | 78<br>159 | 85<br>175 | 92<br>191 | 100<br>207 |
| Oscillator '27 | Plate | 70 | 78 | 85 | 92 | 100 |
| 2nd Det. '24 | Screen-Grid<br>Plate | 66<br>127 | 73<br>134 | 80<br>141 | 87<br>148 | 94<br>155 |
| A. V. C. '24 | Grid<br>Screen-Grid | 14<br>24 | 15.5<br>26 | 17<br>28 | 18.5<br>30 | 20<br>32 |
| Audio '47 | Accelerating-Grid<br>Plate | 199<br>171 | 221<br>190 | 244<br>210 | 267<br>230 | 289<br>250 |
| Rectifier '80 | Current (both plates)<br>Plate to Plate Volt. | 67 MA<br>512 | 75 MA<br>569 | 82 MA<br>625 | 89 MA<br>682 | 96 MA<br>739 |



# WESTERN AUTO SUPPLY CO.

MODEL 062
Schematic
Voltage
Assembly Wiring




IF PEAK 262 K.C.

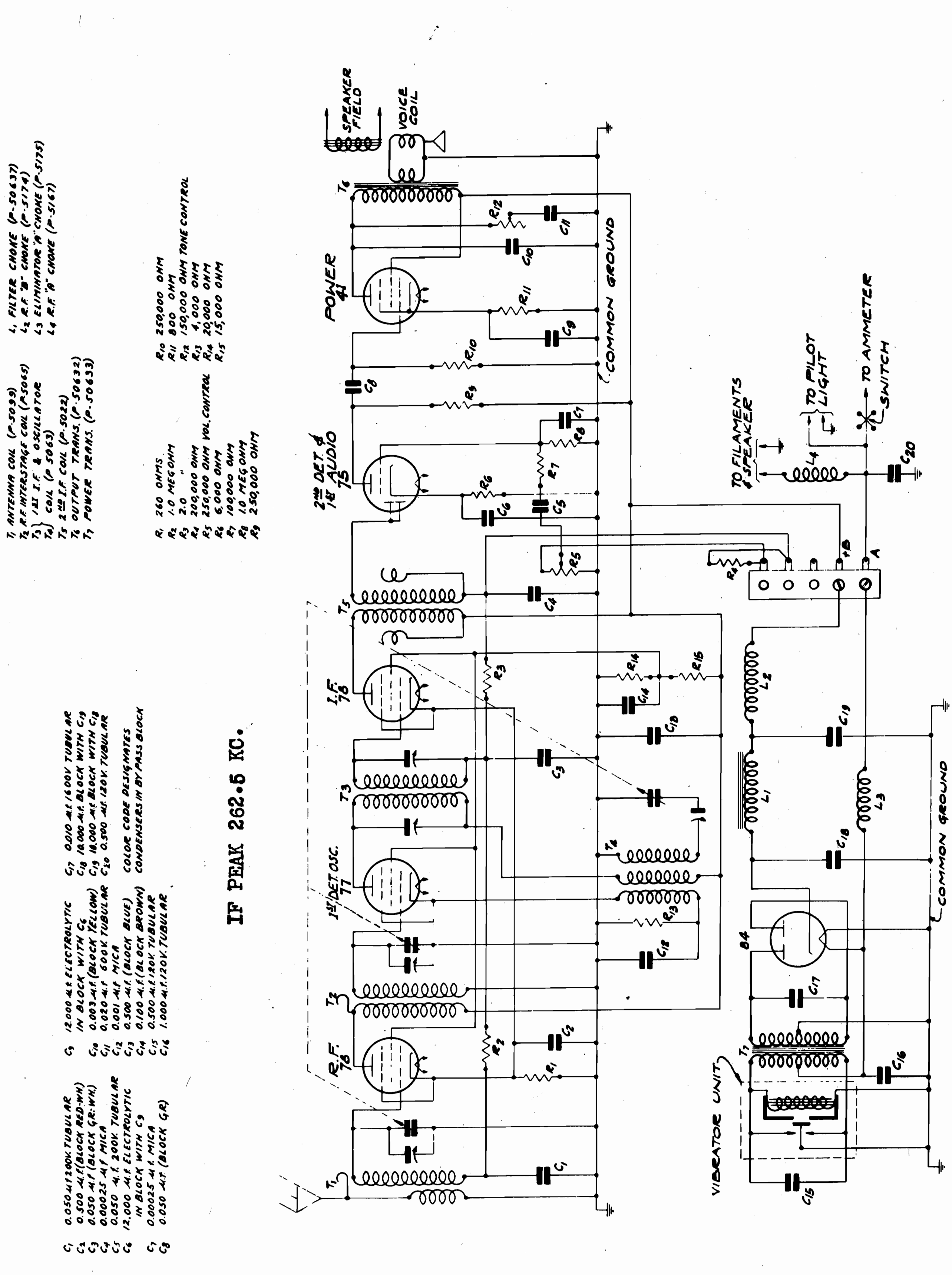
## VOLTAGE DATA

| *Tube* | *Plate* | *Screen* | *Grid* | *Plate MA.* |
|---|---|---|---|---|
| R-F. | 177 | 80 | 3 | 3.6 |
| 1st Det. | 173 | 76 | 7* | .9* |
| I-F. | 177 | 80 | 3 | 3.6 |
| 2nd Det. | 0 | 0 | 0 | 0 |
| 1st A-F. | 54 | 77 | 6 | 1.2 |
| Output | 159 | 165 | 15.5 | 10.0 |

* Will vary with dial setting.

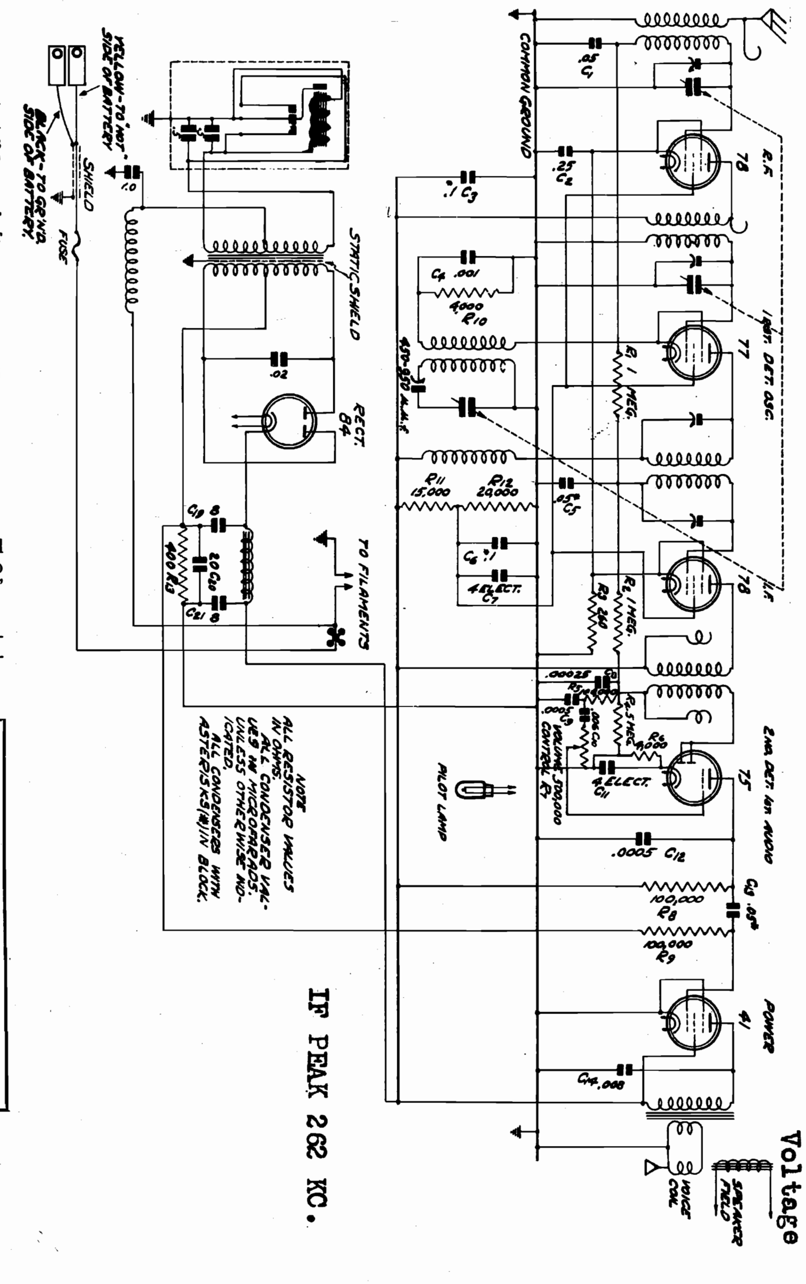
**MODEL 6-U**
**Schematic**

# WESTERN AUTO SUPPLY CO.



MODEL Z6Z1
Schematic
Voltage

WESTERN AUTO SUPPLY CO.




IF PEAK 262 KC.

## Circuit

The circuit consists of an antenna stage, a 78 R.F. stage, a 77 1st detector-oscillator stage, a 78 I.F. stage, a 75 dual diode-triode tube, which functions as a diode 2nd-detector and triode 1st audio stage, and a single 41 output stage. An 84 full wave rectifier is used in the power unit. The intermediate frequency is 262 K.C. The diode current establishes a drop across a resistor which is used as additional bias voltage for the R.F. and I.F. tubes giving automatic volume control action. Noise suppression between stations is obtained by the resistor in the cathode circuit of the 75 tube, the drop across which must be overcome before rectification in this tube begins. The manual volume control varies the audio voltage applied to the grid of the 75 tube.

A vibrator interrupts the current through the primary of the power transformer in the power unit. This, together with the turns ratio in this transformer, results in the high voltage AC being present in the secondary of the transformer. The full wave rectifier tube, filter choke, and filter condensers convert this high voltage AC into high voltage DC for the plate and screen circuits.

Current for the receiver is obtained from the car storage battery. In Fig. 11 is shown the condenser block internal wiring.

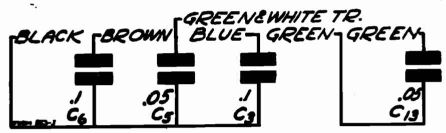



*Fig. 11—Condenser Block—Internal Wiring*

## Voltages at Sockets

In the following chart are given the voltages at the sockets with all the tubes in, all units connected, and the set in operating condition, but with no signal being received. The antenna should be grounded.

A thousand ohm-per-volt meter of 0-250 volt range is required for the plate and screen voltages.

Lower ranges will be necessary for the grid and heater voltages. It is not absolutely necessary to have a high resistance meter for the heater or "A" battery reading.

These voltages will vary with variations in receivers, tubes, test equipment used, and "B" eliminator output voltage.

| Type of Tube | Function | Across Heater | Plate to Cathode | Screen to Cathode | Grid to Cathode | Normal Plate MA |
|---|---|---|---|---|---|---|
| 78 | R. F. | 6.1 | 182 | 80 | 3.(1) | 7.0 |
| 77 | 1st Det. and Osc. | 6.1 | 178 | 77 | 5.(2) | 1.3(2) |
| 78 | I. F. | 6.1 | 182 | 80 | 3.(1) | 7.0 |
| 75 | 2nd Det. 1st Audio | 6.1 | 70(3) | | 1.4(1) | .35 |
| 41 | Output | 6.1 | 172.5 | 176.5 | 12.5(4) | 16.0 |
| 84 | Rect. | 6.1 | 205 | | | 17.5 per plate |

(1) Cathode to Ground
(2) Subject to Variation
(3) Triode Plate to Cathode
(4) Read Across 400-Ohm Resistor, R13

MODEL Z621
Alignment
Parts List

# WESTERN AUTO SUPPLY CO.

## Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and accurately calibrated signals at and around 262 K.C., the intermediate frequency and an output indicating meter are desirable.

First set the signal generator at approximately 262 K.C. Connect the antenna lead from the generator to the control grid of the I.F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A.V.C. action. Note from Fig. 10 that the second I.F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262 K.C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Then adjust the two intermediate frequency condensers for maximum output. One of the I.F. condenser screws is reached through the hole on the top of the 1st I.F. assembly can. The other I.F. condenser screw is reached from the bottom of the sub-panel through a hole at the bottom of this assembly.

Now set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the generator is, in this instance, connected to the antenna lead of the receiver. Connect the flexible drive shaft to the chassis if it has been disconnected. As explained previously, the dial scale should be at the low frequency end stop when the rotor is completely in mesh. Then turn the station selector knob until the dial scale is at 1400 K.C.

Then adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator section first.

Next, set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw for this condenser is reached through a hole in the back wall of the sub-panel.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

## Rattle

If rattle is experienced when a signal is being received, it is, in practically all cases, due to mechanical vibration at some point in the chassis. Inspect the chassis and look for a loose tube shield or a loose part at some point which can rattle against another part. When the vibrating part is found, secure it in place in some manner. This can generally be done with a wedge made of a piece of paper, cardboard or wood. Rattle may, in some instances, be due to a loose cover. If this is the case, remove the cover and bend the edge of the chassis box outward between the screw holes so that the cover will fit tightly when it is put on.

## If the Receiver Fails to Operate

**"A" Fuse**—Check the "A" line fuse in the cable.

**"A" Line Open**—See if power is being supplied to the speaker, tube heaters, and "B" eliminator.

**"B" Eliminator Not Working**—See if the "B" eliminator is in proper working order by checking the high voltage points at the tube plate terminals (see Fig. 10).

**Antenna and Lead**—See if antenna is properly connected to lead-in wire and antenna lead from set. Be sure antenna system is not grounded at any point.

**All Tubes Not Inserted**—See if all tubes are inserted as per Fig. 8.

**Defective Tubes**—Try out a new set of tested tubes.

**Grid Caps Not Connected**—See if all grid caps are properly connected to top of top grid connection tubes.

**Variable Condenser Plates Shorted**—Check condenser sections in chassis carefully for foreign particles or rotor stator rubbing.

## CHASSIS PARTS

| Part No. | Description | List Price |
|---|---|---|
| P-1780 | No. 75 Tube Socket | $0.10 |
| P-1761 | No. 77 Tube Socket | .10 |
| P-1762 | No. 78 Tube Socket | .10 |
| P-1665 | No. 41 Tube Socket | .10 |
| P-1803 | No. 84 Tube Socket | .10 |
| P-1805 | Single Pin Jack | .10 |
| P-1799 | Tube Shield Assembly | .25 |
| P-20656 | Chassis Box | 4.00 |
| P-20657 | Chassis Box Cover | 1.10 |
| P-70740 | Shielded Antenna Lead | .40 |
| P-70744 | Shielded "A" Battery Lead | 1.15 |
| P-1926 | Interrupter with Condensers in Rubber Boot and Metal Case | 6.35 |
| P-10260 | Cardboard Baffle | .20 |
| P-1924 | 15 Amp. Fuse | .10 |
| P-1774 | Electrodynamic Speaker | 3.75 |
| P-20585 | Cond. Drive Gear | .25 |
| P-1801 | Volume Control and Drive Bracket | .30 |
| P-20635 | Cond. Drive Pinion | .15 |
| P-20677 | Pinion Adjustment Plate | .10 |
| P-20614 | Lock Lever | .10 |
| P-20658 | Tension Spring | .10 |
| P-30419 | Entry Plate Assembly | .10 |
| P-1830 | Dial Gear and Strip Assembly | .40 |
| P-1816 | Celluloid Dial Strip only | .15 |
| P-1810 | Pilot Lamp Socket and Spring Clip | .10 |
| P-1563 | 6-8 Volt Pilot Lamp | .25 |
| P-10263 | Rubber Tube Bumper—Square | .10 |
| P-10210 | Rubber Tube Bumper—Round | .10 |
| P-10213 | Rubber Band for Tube | .10 |
| P-50569 | Filter Choke Assembly | 1.60 |
| P-50595 | Power Trans. Assembly | 2.90 |
| P-5099 | Antenna R. F. Transformer—Less Can | 1.20 |
| P-5065 | Interstage R. F. Transformer—Less Can | 1.00 |
| P-5105 | Second I. F. Transformer and Can Assembly | .95 |
| P-5096 | First I. F. and Oscillator Transformer and Can Assembly | 2.70 |
| P-5097 | Single Solenoid "A" Choke | .25 |
| P-40431 | Antenna R. F. Can | .15 |
| P-1826 | Interstage R. F. Can | 10 |

## Resistors

| Part No. | Code No. | Resistance | Type | List Price |
|---|---|---|---|---|
| P-A95105 | R-1 | 1 Megohm | Carbon | $0.25 |
| P-A95105 | R-2 | 1 Megohm | Carbon | .25 |
| P-B94261 | R-3 | 260 ohm | Carbon | .35 |
| P-A95504 | R-4 | .5 Megohm | Carbon | .25 |
| P-A95104 | R-5 | 100,000 ohm | Carbon | .25 |
| P-A94402 | R-6 | 4,000 ohm | Carbon | .20 |

| Part No. | Code No. | Resistance | Type | List Price |
|---|---|---|---|---|
| P-91066 | R-7 | 0-500,00 ohm | Volume Control and Switch | $1.15 |
| P-A95104 | R-8 | 100,000 ohm | Carbon | .25 |
| P-A95104 | R-9 | 100,000 ohm | Carbon | .25 |
| P-A94402 | R-10 | 4,000 ohm | Carbon | .20 |
| P-B94153 | R-11 | 15,000 ohm | Carbon | .25 |
| P-B94203 | R-12 | 20,000 ohm | Carbon | .25 |
| P-C94401 | R-13 | 400 ohm | Carbon | .20 |

## Condensers

| Part No. | Code No. | Capacity | Voltage | Type | List Price |
|---|---|---|---|---|---|
| P 80862 | C-1 | .05 mfd. | 200 V. | Tubular | $0.30 |
| P 80888 | C 2 | .25 mfd. | 200 V. | Tubular | .35 |
| P-80821-B | C-4 | .001 mfd. | 600 V. | Molded | .25 |
| P-80937 | C-7<br>C-11 | 4.0 mfd.<br>4.0 mfd. | | Electrolytic Block in can | 1.25 |
| P-80919 | C-8 | .00025 mfd. | 600 V. | Molded | .20 |
| P-80945 | C-9 | .0005 mfd. | 600 V. | Molded | .15 |
| P-80898 | C-10 | .006 mfd. | 600 V. | Tubular | 15 |
| P-80945 | C-12 | .0005 mfd. | 600 V. | Molded | .15 |
| P-80966 | C-14 | .008 mfd. | 600 V. | Tubular | 20 |
| P-80962A | .02 mfd. | 800 V. | Tubular Condenser | | .25 |
| P-80978A | 1. mfd. | 120 V. | Tubular Condenser | | .45 |
| P-80976A | Dual | .5 mfd. | 120 V. | Tubular Condenser In Paper Box | .80 |
| P-80956 | C-19<br>C-20<br>C-21 | 8.0 mfd.<br>20.0 mfd.<br>8.0 mfd. | 225 V.<br>25 V.<br>225 V. | Electrolytic Block in Can | 2.25 |
| P-80955 | C-3<br>C-5<br>C-6<br>C-13 | .1 mfd.<br>.05 mfd.<br>.1 mfd.<br>.05 mfd. | 300 V.<br>200 V.<br>200 V.<br>300 V. | Bypass Block in Can | 1.35 |
| P-1539 | 600 K. C. Trimmer Condenser | | | | .45 |
| P-80957 | Three-Gang Variable Condenser | | | | 3.00 |

## CONTROL UNIT PARTS

(When Separate Control Unit Is Used)

| Part No. | Description | List Price |
|---|---|---|
| P-1816 | Celluloid Dial Strip | $0.15 |
| P-1825 | Dial Gear and Strip Assembly | .40 |
| P-20509B | Control Unit Swivel | .15 |
| P-20510A | Steering Post Apron | .30 |
| P 20511 | Steering Post Clamp | .15 |
| P-20693 | Control Box Cover | .35 |
| P-20635 | Cond. Drive Pinion | .15 |
| P-70746 | Pilot Lamp Cable only | .40 |
| P-1415A | Pilot Lamp Socket and Clip | .15 |
| P-1563A | 6-8 Volt Pilot Lamp | .25 |
| P-30426 | Ornamental Plug | .10 |
| P-30414 | Key | .15 |

# WESTINGHOUSE ELEC. SUPPLY CO.

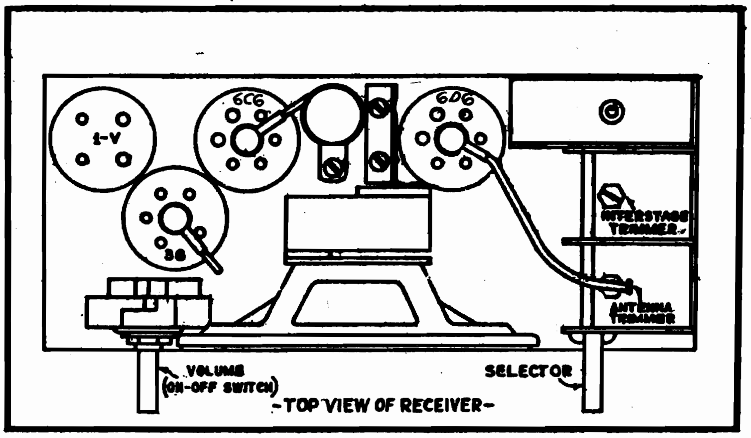
**MODEL WR-20**
**Schematic**
**Socket**
**Voltage**

## Universal Compact

Operates on either AC or DC

110-120 Volts, 25-60 Cycles

Adaptable for 220-Volt Current with use of 220-Volt Resistor



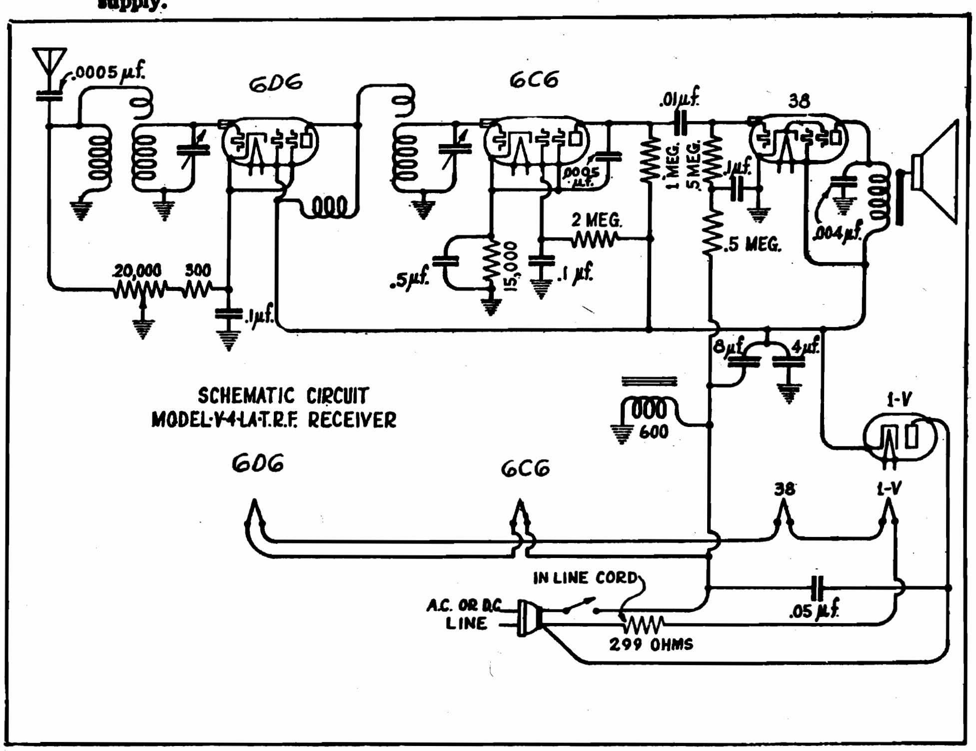

## Voltage Readings:

Readings should be taken with Volume Control fully on, Tuning Control set for 550 KC., and antenna outside of set. Use a D. C. voltmeter having a resistance of 1000 ohms per volt.

| *Chassis* | *To— Plate* | *Screen* | *Cathode* |
|---|---|---|---|
| 77—Detector | 10- 15 | 9- 12 | 1- 2 |
| 78—R.F. Amplifier | 105-115 | 105-115 | 2- 3 |
| 38—Output Pentode | 105-115 | 105-115 | —— |

Voltage across filter choke is "C" bias for 38 Tube=10v.

Readings will not change materially regardless of type of power supply.




*Circuit Wiring Diagram*

MODEL WR-21
Schematic
Socket,Voltage

# WESTINGHOUSE ELEC. SUPPLY CO.

## Voltage Readings:

Readings should be taken with Volume Control fully on. Tuning control set for 550 K.C., and antenna outside the set. Use a D.C. Voltmeter having a resistance of 1000 ohms per volt.

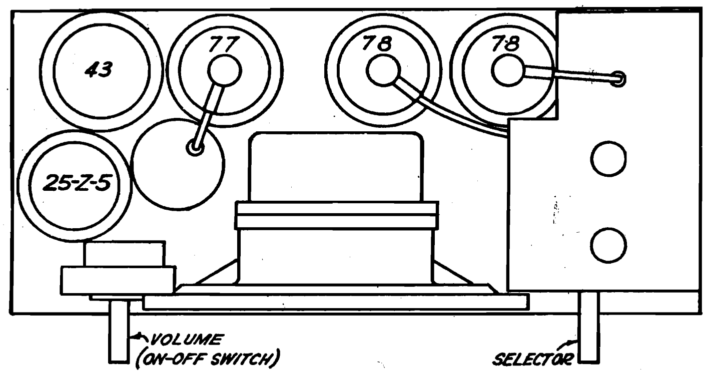
| Using | 300-volt scale Plate to Ground | 300-volt scale Screen to Ground | 30-volt scale Cathode to Ground |
|---|---|---|---|
| 78—Detector Oscillator .. | 98 | 98 | 1.6 |
| 78—I. F. Amplifier........ | 98 | 98 | 2.8 |
| 77—2nd Detector ... ..... | 35 | 25 | 1.5 |
| 43—Power Amplifier ..... | 92 | 98 | .. |
| 25Z5—Rectifier ............. | .. | .. | 98 |

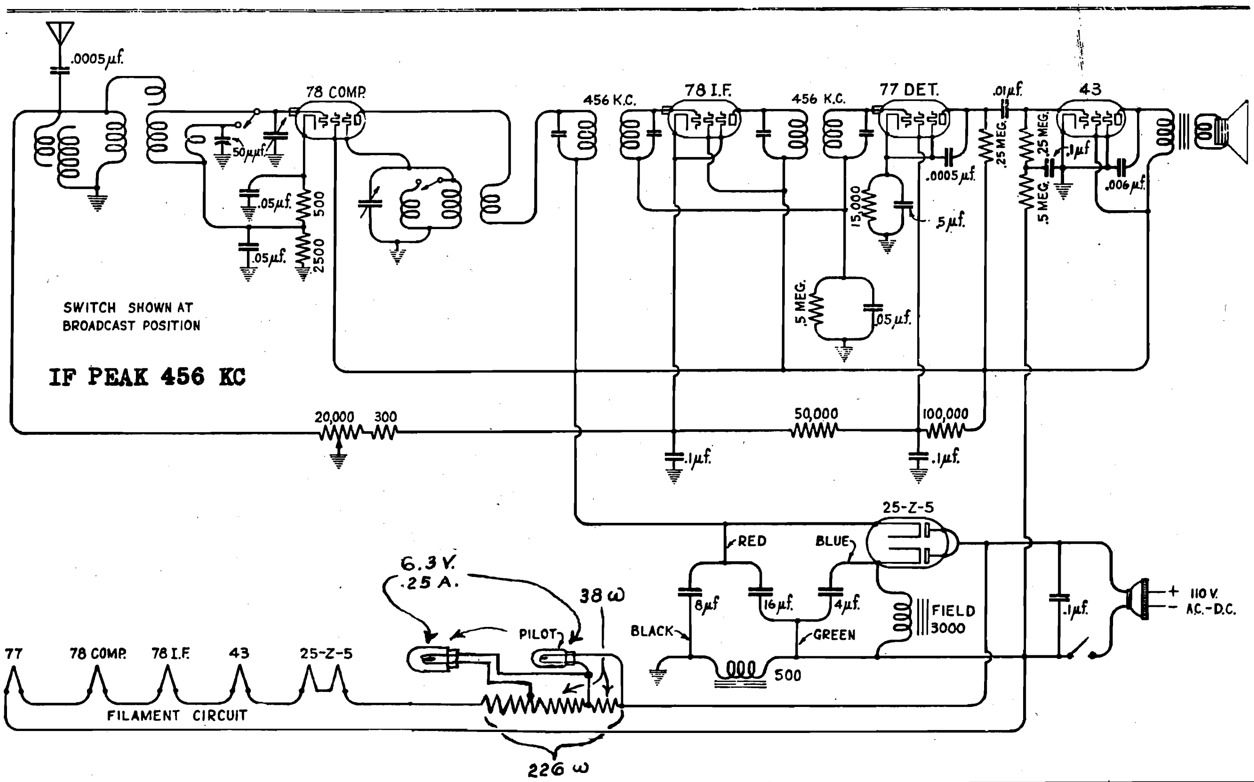
A.C.-D.C. . . 100-135 Volts . . 25-70 Cycles
Also Available for 220 Volts.

| Broadcast | Short Wave |
|---|---|
| 540—1500 Kilocycles | 1500—3000 Kilocycles |
| 550— 200 Meters | 200— 100 Meters |

Voltage across speaker field 100 volt.

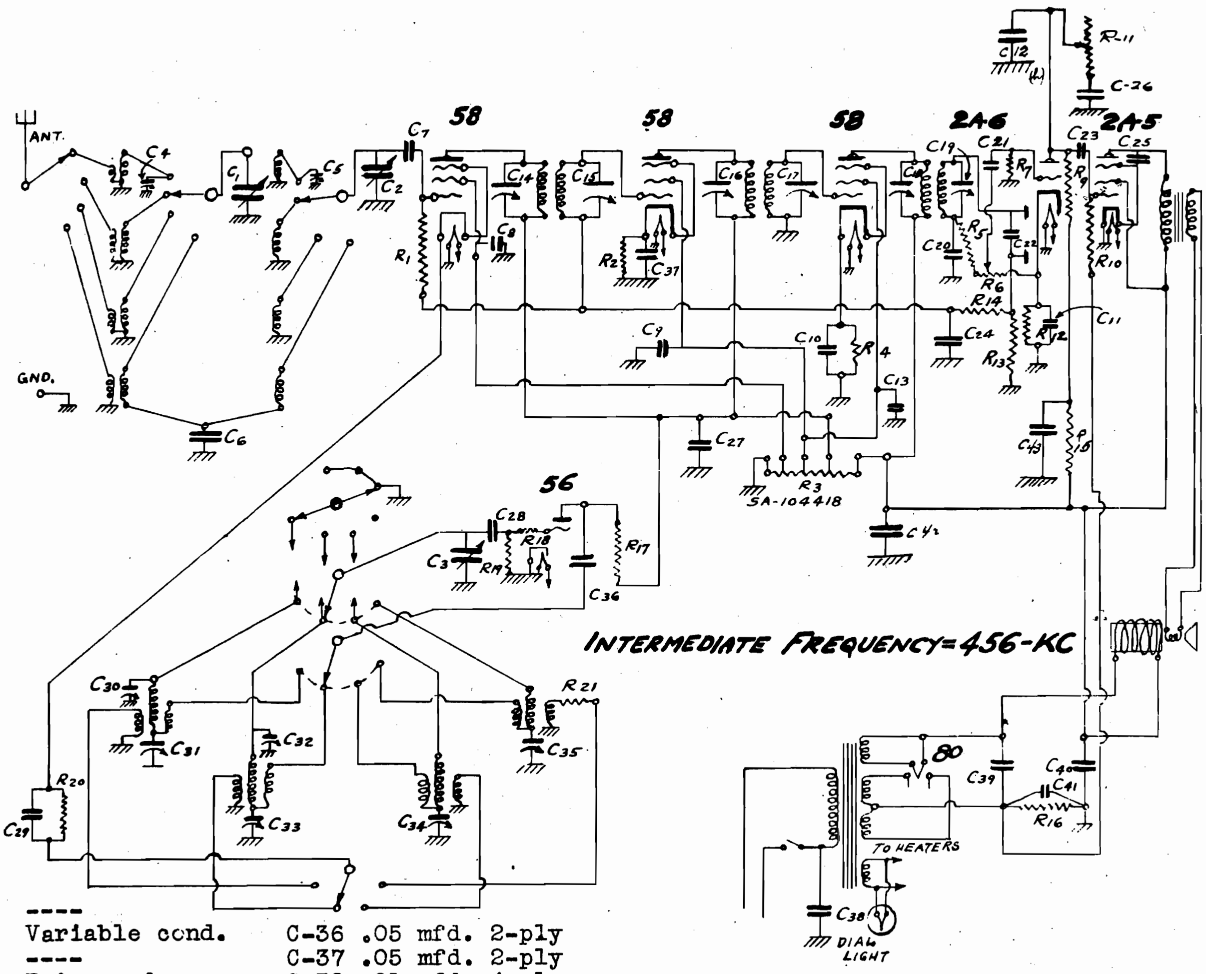
Bias for 43 tube is measured across filter choke and should be 15 to 18 volts.



MODEL WR-23, WR-24
Schematic

## WESTINGHOUSE ELEC. SUPPLY CO.




C-1 ----
C-2 Variable cond.
C-3 ----
C-4 Trim condenser
C-5 Trim condenser
C-6 .05 mfd. 2-ply
C-7 100 mmf mica
C-8 .05 mfd. 2-ply
C-9 .05 mfd. 2-ply
C-10 .05 mfd. 2-ply
C-11 .5 mfd. 2-ply
C-12 .001 mica
C-13 .05 mfd. 2-ply
C-14 30 - 100 mmf mica
C-15 30 - 100 mmf mica
C-16 30 - 100 mmf mica
C-17 30 - 100 mmf mica
C-18 30 - 100 mmf mica
C-19 30 - 100 mmf mica
C-20 100 mmf mica
C-21 .005 mfd. 3-ply
C-22 100 mmf mica
C-23 .005 mfd. 3-ply
C-24 .05 mfd. 2-ply
C-25 .005 mfd. 3-ply
C-26 .01 3-ply
C-27 .05 mfd. 3-ply
C-28 100 mmf mica
C-29 .05 mfd. 2-ply
C-30 7 - 70 mmf
C-31 300 mmf variable
C-32 7 - 70 mmf
C-33 1200 mmf variable
C-34 2000 mmf variable
C-35 2000 mmf variable
C-36 .05 mfd. 2-ply
C-37 .05 mfd. 2-ply
C-38 .01 mfd. 4-ply
C-39 8 mfd. electro
C-40 4 mfd. electro
C-41 20 mfd. electro
C-42 .05 mfd. 3-ply
C-43 .1 mfd. 3-ply

R-1 1/2 meg. 1/4 watt
R-2 1000 ohms 1/4 watt
R-3 Multiple
R-4 1000 ohms 1/4 watt
R-5 50,000 ohms 1/4 watt
R-6 500,000 ohms vol.
R-7 1 meg. 1/4 watt
R-9 250,000 ohms 1/4 watt
R-10 250,000 ohms 1/4 watt
R-11 Variable
R-12 5000 ohms 1/4 watt
R-13 1 meg. 1/4 watt
R-14 1/2 meg. 1/4 watt
R-15 50,000 ohms 1/4 watt
R-16 400 ohms 1 watt
R-17 25,000 ohms 1/2 watt
R-18 50 ohms 1/2 watt
R-19 20,000 ohms 1/4 watt
R-20 2000 ohms 1/4 watt
R-21 200 ohms 1/4 watt

STANDARD RESISTOR COLOR CODE

| BODY | TIP | DOT |
|---|---|---|
| 0-BLACK | 0-BLACK | .0-BLACK |
| 1-BROWN | 1-BROWN | 0-BROWN |
| 2-RED | 2-RED | 00-RED |
| 3-ORANGE | 3-ORANGE | 000-ORANGE |
| 4-YELLOW | 4-YELLOW | 0000-YELLOW |
| 5-GREEN | 5-GREEN | 00000-GREEN |
| 6-BLUE | 6-BLUE | 000000-BLUE |
| 7-PURPLE | 7-PURPLE | |
| 8-GREY | 8-GREY | |
| 9-WHITE | 9-WHITE | |

# MODEL WR-23, WR-24
## Voltage, Socket Alignment, Parts List

WESTINGHOUSE ELEC. SUPPLY CO.

SERVICE TECHNICAL DATA

SOCKET VOLTAGES

| Stage | Tube | Fil. | Plate | Screen | Cathode | Grid |
|---|---|---|---|---|---|---|
| 1st Det. | 58 | 2.65 | 220 | 40 | 2.8 | -- |
| 1st IF | 58 | 2.65 | 220 | 95 | 2.0 | -- |
| 2nd IF | 58 | 2.65 | 240 | 95 | 2.7 | -- |
| Osc. | 56 | 2.65 | 75 | -- | 0 | 25 |
| 2nd Det. | 2A6 | 2.65 | 90 | -- | 1.4 | -- |
| Output | 2A5 | 2.65 | 235 | 240 | 0 | -- |
| Rectifier | 80 | 4.8 | --- | --- | - | -- |

Bias on 2A5 (across 400 ohms) - 22 volts
Output of rectifier 360 volts

Line volts = 115
Power 60 watts

Note: These values are readings of a high resistance voltmeter from each socket terminal to ground, with the exception of the filament voltages. The values are only approximate and will vary with the line voltage and the type of meter employed.

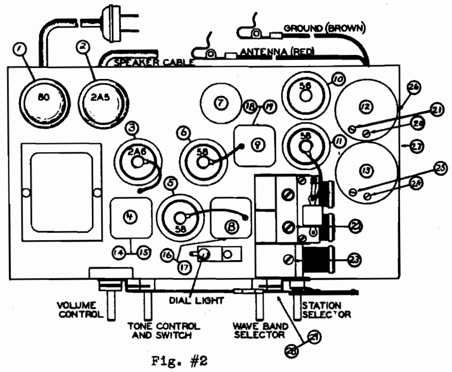



Fig. #2

#1 type 80 rectifier
#2 type 2A5 output pentode
#3 type 2A6 2nd det. A.V.C. and 1st A. F.
#4 3rd I. F. coil
#5 type 58 I. F. tube
#6 type 58 I. F. tube
#7 Filter condenser
#8 2nd I. F. coil
#9 1st I. F. coil
#10 type 56 osc. tube
#11 type 58 1st det. tube
#12 broadcast osc. coil
#13 2nd band osc. coil
#14 3rd I. F. trim cond.
#15 3rd I. F. trim cond.
#16 2nd I. F. trim cond.
#17 2nd I. F. trim cond.
#18 #19 1st I. F. trim cond.
#20 Broadcast osc. trim cond.
#21 Broadcast osc. lag. cond.
#22 #23 Presector trim cond.
#24 2nd band trim. cond.
#25 2nd band lag. cond.
#26 3rd band lag. cond.
#27 4th band lag. cond.
#28) 4th band selector trim cond.
#29) underneath chassis

ALIGNING THE CHASSIS

To properly align the Model WR-23 and 24 chassis, it is essential to use a high grade modulated oscillator and a sensitive output meter. The R. F. signal fed into the receiver must be very weak or it will cause the A.V.C. to function making correct alignment impossible. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low signal.

Before attempting to align a receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and the various alignment condensers. A top view of the chassis is shown in Fig. 2 and should be carefully studied before the actual work is started.

(A) ALIGNING THE I. F. (456 K. C.)

1. Set test oscillator to 456 K. C.
2. Connect test oscillator to grid of second I. F. tube #5 and adjust #14 and #15 to maximum output, reducing test oscillator as required.
3. Connect test oscillator to grid of first I. F. amplifier #9 and adjust #16 and #17 to maximum output.
4. Connect test oscillator to grid of first detector #11 and adjust #18 and #19 to maximum output.
5. Recheck the above four operations for accuracy.

(B) ALIGNING THE R. F.

1. Set test oscillator to 1500 KC and connect to grid of first detector #11. Place pointer of radio to 1.5 mark on dial. Adjust #20 until signal is tuned in. This adjusting screw is usually designated by a red color dot. Having obtained tune at this point set test oscillator to 600 KC and tune station selector to .6 mark on dial. Adjust #21 until the signal is tuned in. Now return to 1500 KC point with set and test oscillator and make the resetting of #20 to obtain accurate adjustment to scale reading.
2. Connect test oscillator to antenna lead, making sure the equivalent (200 mmf) is in the circuit.
3. Continue setting of 1500 KC. Adjust #22 and #23 for maximum output. Check sensitivity and calibration at several points on dial. Set should come correctly to kilocycle settings of important broadcasting stations.

(C) ALIGNING THE 2ND BAND

1. Set test oscillator to 3600 KC and indicator of radio at 3.6 mark on dial.
2. Adjust #24 until signal is tuned in. This trim condenser is usually marked with a red color dot. Set test oscillator at 1600 KC and tune set to 1.6 mark. Adjust #25 to maximum output. Return to 3600 KC and repeat adjustment. In adjusting the 3600 KC point it is possible to obtain two settings for different position of the trim condenser. This denotes merely the plus and minus frequency between oscillator and test oscillator which will give the correct I. F. frequency. The correct setting of the trim condenser is the one wherein the screw is turned furthest out. In any event, an incorrect setting will always be denoted by lack of sensitivity when the set and test oscillator are tuned to 2500 KC (mid-band).

(D) ALIGNING THE 3RD BAND

1. Set test oscillator to 8000 KC marking and tune receiver in region of 8.0 on dial scale. Note when signal is received. Next set test oscillator to 4000 KC setting and tune set to 4.0 on dial scale. Adjust #26 on right side of chassis until signal is heard.
2. Retune set and test oscillator to 8000 KC and observe pointer setting and sensitivity. Slight deviations from calibration can be compensated by manipulating the stiff wires connecting the oscillator coil to switch.

(E) ALIGNING THE 4TH BAND

1. Set test oscillator to 20,000 KC or if this is not available, then adjust to highest possible frequency, which preferably should be at least 15,000 KC. Tune set to this frequency and note where set oscillator is received on dial scale. Then place test oscillator on 10,000 KC and adjust #27 on right of chassis until test oscillator is tuned at 10. on dial scale. Now return both test oscillator and radio set to high frequency. Located underneath the base and adjacent to the switch and high frequency selector coils are two trim condensers #28 and #29 which are used for correct adjustment at this high frequency.

Increase setting of test oscillator until signal generator can be tuned in at two points on dial (say 20 and 19). Then with pointer of set at 20 adjust #28 and #29 for maximum output decreasing test signal as signal becomes better tuned. At correct adjustment a very loud signal will be obtained at 20 on dial while a feeble signal or none at all is observed at 19. This is a practical illustration of the effectiveness of preselection as outlined in the first part of this description.

SERVICE PARTS LIST

| PART NUMBER | DESCRIPTION |
|---|---|
| | MAIN ASSEMBLIES |
| WR-07200 | Chassis assembly |
| WR-07361 | Cabinet assy. (Mod. WR-23) |
| WR-07364 | Cabinet assy. (Mod. WR-24) |
| WR-05750 | Speaker assembly (large) |
| WR-05575 | Speaker assembly (small) |
| WR-05781 | Power transformer |
| | COILS |
| WR-05695 | 1st and 2nd IF coil |
| WR-05696 | 3rd IF coil |
| WR-05684 | Oscillator coil (black) |
| WR-05683 | Oscillator coil (green) |
| WR-05689 | Oscillator coil (red) |
| WR-05687 | Oscillator coil (blue) |
| WR-05690 | Preselector coil (black-antenna) |
| WR-05691 | Preselector coil (black-input) |
| WR-05685 | Preselector coil (green) |
| WR-05686 | Preselector coil (red) |
| WR-05688 | Preselector coil (blue) |
| WR-01858 | Field coil |
| WR-02551 | Output transformer |
| | CONDENSERS |
| WR-05705 | Trimmer condenser |
| WR-02493 | .05 mfd. 2-ply |
| WR-01143 | 100 mmf. mica |
| WR-02499 | .5 mfd. 2-ply |
| WR-06403 | .001 mfd. mica |
| WR-03659 | .005 mfd. 3-ply |
| WR-06277 | .01 mfd. 3-ply |
| WR-02492 | .05 mfd. 3-ply |
| WR-05931 | .01 mfd. 4-ply |
| WR-02494 | .1 mfd. 3-ply |
| WR-06665 | Filter condenser |

MISCELLANEOUS PARTS

| | |
|---|---|
| WR-02282 | Diaphragm assembly (small) |
| WR-02283 | Diaphragm assembly (large) |
| WR-98713 | Dial lamp |
| WR-07195 | Dial scale |
| WR-07136 | Dial plate |
| WR-07228 | Knobs |
| WR-05561 | Tone control |
| WR-05562 | Volume control |
| WR-05707 | Wave change switch |
| WR-05118 | Dial gear assembly |
| WR-07072 | Variable cond. gang assembly |
| WR-03424 | Long tube shield |
| WR-06355 | Condenser drive disc assembly |
| WR-07062 | Condenser drive arm assembly |
| WR-06364 | Condenser drive spring |
| WR-06943 | Condenser drive bracket assy. |
| WR-06946 | Cond. drive gear and shaft assy. |
| WR-07066 | Dial indicator link |
| WR-07063 | Indicator |
| WR-07062 | Lever assembly |
| WR-03199 | Dial light bracket assembly |
| WR-01711 | Line cable and plug |

RESISTORS

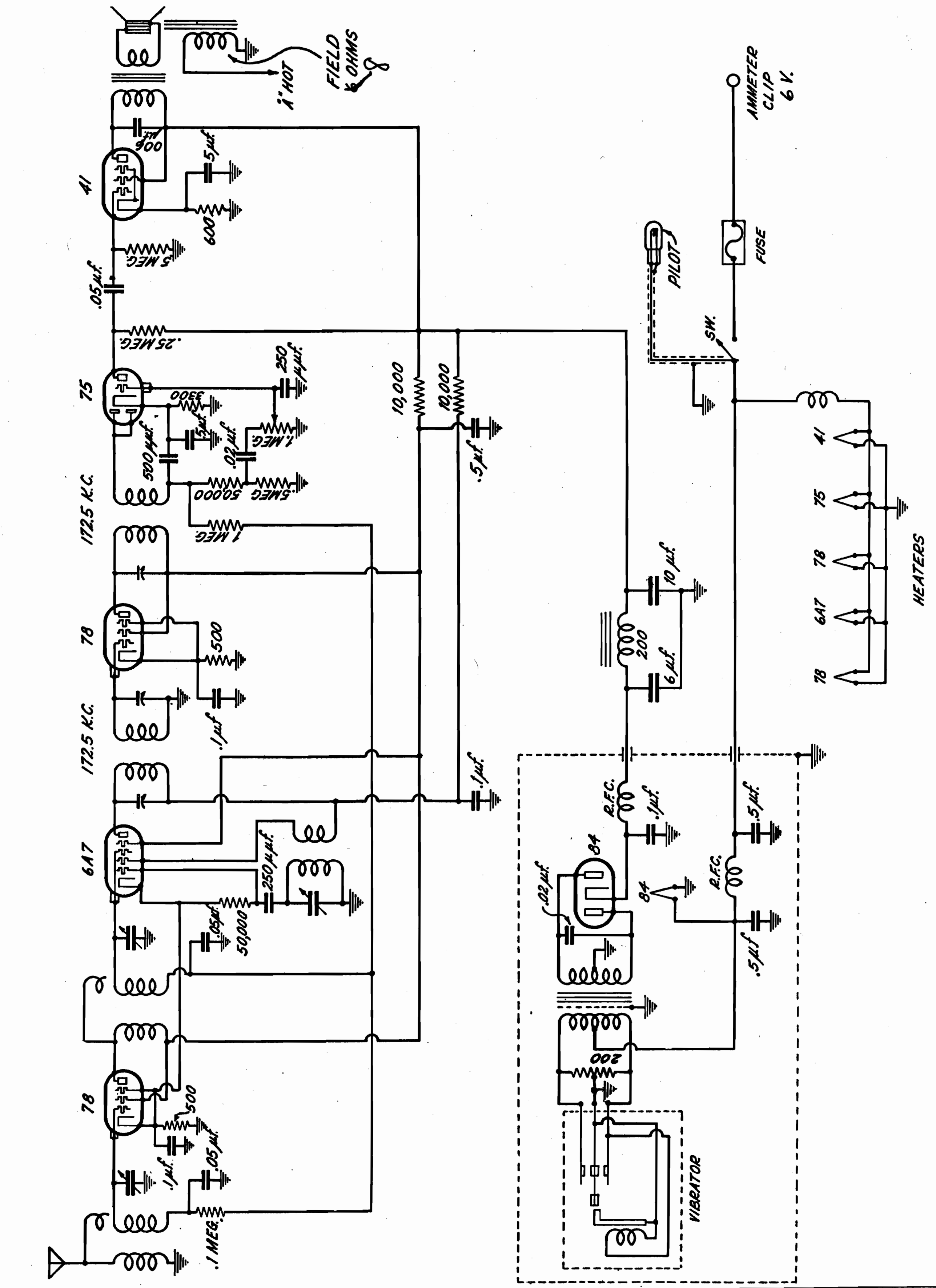
| | |
|---|---|
| WR-05246 | .5 meg. 1/4 W |
| WR-05267 | 10,000 1/4 W |
| WR-04418 | Multiple |
| WR-05267 | 1000 1/4 W |
| WR-05276 | 50000 1/4 W |
| WR-05281 | 1 meg. 1/4 W |
| WR-05279 | 1/4 meg. 1/4 W |
| WR-05249 | 5000 1/4 W |
| WR-03062 | 400 1 W |
| WR-00197 | 25000 1/2 W |
| WR-00814 | 50 1/2 W |
| WR-05274 | 20000 1/4 W |
| WR-05245 | 2000 1/4 W |
| WR-05258 | 200 1/4 W |

SOCKETS

| | |
|---|---|
| WR-03513 | 6-prong socket |
| WR-03686 | 4-prong socket |
| WR-03514 | 5-prong socket |

**MODEL WR-25**
**Schematic**

# WESTINGHOUSE ELEC. SUPPLY CO.



MODEL WR-25
Alignment
Voltage, Parts List

WESTINGHOUSE ELEC. SUPPLY CO.

## ADJUSTMENTS

The receiver was carefully adjusted and tested by experts at the factory, and should reach the customer in perfect condition. Under no circumstances should these adjustments be disturbed unless it is absolutely necessary as in the repairing of a damaged set. This should be done by an experienced Auto Radio Service man only.

### Intermediate Transformers

To align the intermediate frequency transformers, use a good modulated oscillator set for 172½ k.c. Set the volume control for maximum volume and turn the dial to a point where little or no signal is received; then ground the antenna.

Connect the oscillator output between the grid of the 6A7 tube and ground. Connect an output meter across the primary of the speaker transformer or across the voice coil. Using the smallest output from the test oscillator that will give a small reading on the meter, adjust the two I.F. transformers for the largest reading obtainable. Use a non-metallic screw driver if possible.

### Radio Frequency and Oscillator

To align the R.F. and oscillator sections, couple the oscillator through a standard dummy antenna to the antenna lead and ground of the receiver. Set the test oscillator to some frequency between 1350-1450 k.c. Set the dial to the frequency selected. Adjust trimmers on the variable condenser beginning with the oscillator trimmer. Reduce the output of the test oscillator and repeat. In the absence of an oscillator, the R.F. sections may be aligned on broadcast.

Tune in a weak station between 1350 and 1450 k.c. and align as before. If an output meter is not available, adjust for maximum volume, then reduce the input and repeat.

*Voltage Analysis:*

Note: All "B" and "C" voltages should be measured on a high resistance voltmeter of 1000 ohms per volt or over.

The voltages are measured to ground from the points named. Ground the antenna to its shield when taking readings.

Battery volts—6. Volts across heaters—6 scant. Volts across speaker field—6 scant.

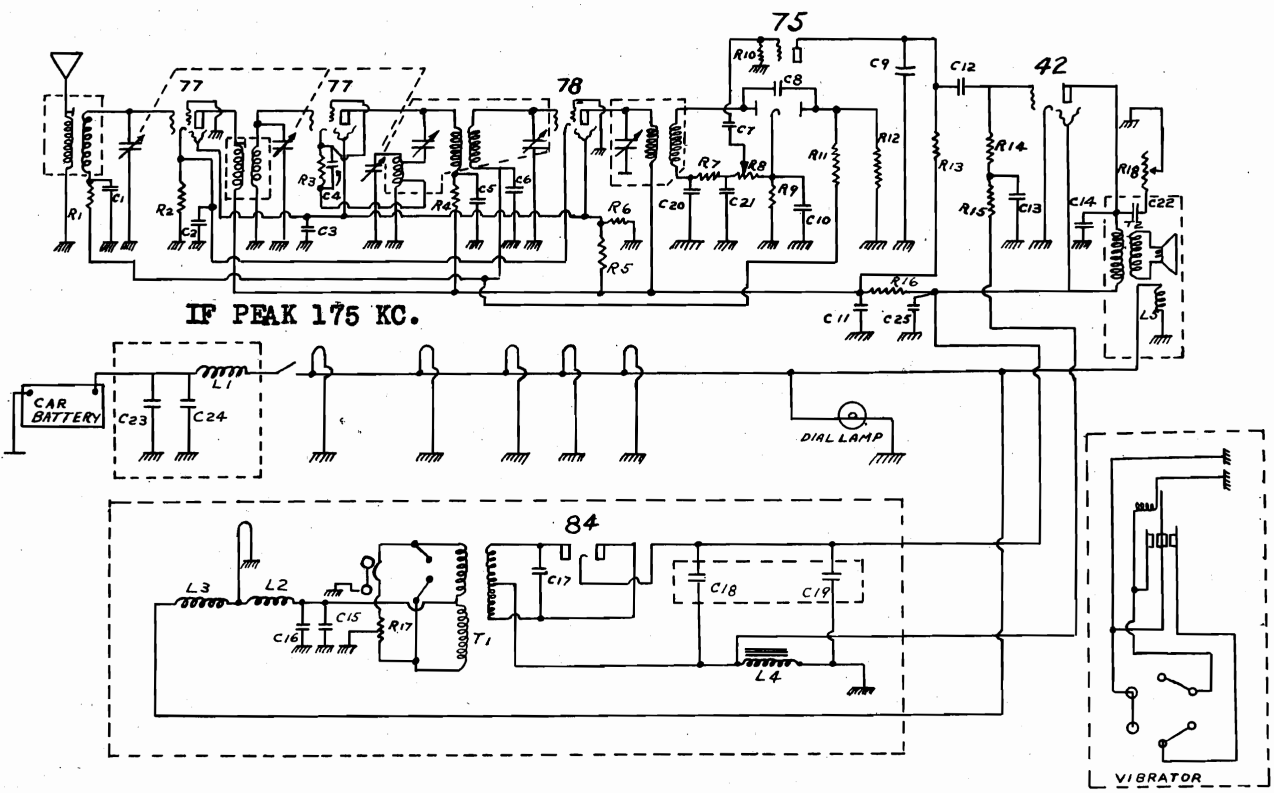
| *Tube* | *Plate* | *Screen* | *Cathode* | *Suppressor* | *Osc. plate* |
|---|---|---|---|---|---|
| 78 | 110 | 110 | 6 | 6 | — |
| 6A7 | 170 | 110 | 6 | — | 170 |
| 75 | 110 | — | 1.3 | — | — |
| 78 | 110 | 110 | 3.5 | 3.5 | — |
| 41 | 210 | 220 | 15 | — | — |

| *Part No.* | *Description* |
|---|---|
| ZT-92 | Antenna Coil |
| ZT-93 | Interstage Coil |
| ZT-94 | Composite I.F. and Oscillator Coil |
| ZT-95 | Output I.F. Coil |
| ZT-99 | Power Transformer |
| ZT-96 | "B" Filter Choke |
| NT-53 | "B" R.F. Choke |
| ZT-98-A | "A" R.F. Choke, multiple layer |
| ZC-123 | Filter Condenser, 10 x 6 mfd. |
| IC-43 | 5 Mfd. Electrolytic Condenser |
| EC-19 | .5 Mfd. Tubular Condenser |
| ZR-104 | 10,000 Ohm 2 Watt Wire Wound Resistor |
| | Any Carbon Resistor |
| | Any Mica Condenser |
| | Any Socket |
| KL-6 | Pilot Light Bulb |
| WR-92 | Volume control, complete with switch |
| ZV-3 | Vibrator |
| ZS-66 | Speaker |
| NZ-54 | Spark Plug Suppressor |
| NZ-54-A | Distributor Suppressor |
| NZ-55 | Generator Condenser |

WESTINGHOUSE ELEC. SUPPLY CO.

MODEL WR-26
Schematic
Voltage

# SERVICE INSTRUCTIONS
# WESTINGHOUSE MOTOR CAR RADIO
## MODEL WR-26




ELECTRICAL VALUES

C1 .05 mfd. 2 ply
C2 .25 mfd. 2 ply
C3 .25 mfd 2 ply
C4 .002 mfd. 4 ply
C5 .05 mfd. 3 ply
C6 .05 mfd. 2 ply
C7 .005 mfd. 3 ply
C8 100 mmfd. mica
C9 .002 mfd. 4 ply
C10 .5 mfd. 2 ply
C12 .005 mfd. 3 ply
C13 .1 mfd. 2 ply
C14 .005 mfd. 3 ply
C15 .5 mfd. 2 ply
C16 .5 mfd. 2 ply
C17 .02 mfd. 4 ply
C18 6. mfd.
C19 10. mfd.
C20 10 mmfd. mica
C21 100mmfd. mica
C22 .05 mfd. 3 ply
C23 .001 mica
C24 .5 mfd. 2 ply
C25 .001 mica
R1 100,000 ohms 1/4 W.
R2 500 ohms 1/4 W.
R3 7500 ohms 1/4 W.
R4 2000 ohms 1/4 W.
R5 40,000 ohms 1/4 W.
R6 75,000 ohms 1/4 W.
R7 50,000 ohms 1/4 W.
R8 1/2 meg. Vol. Control
R9 5000 ohms 1/4 W.
R10 1 meg. 1/4 W.
R12 1/2 meg. 1/4 W.
R13 100,000 ohms 1/4 W.
R14 250,000 ohms 1/4 W.
R15 250,000 ohms 1/4 W.
R16 4,000 ohms 1 W.
R17 200 Center tapped
R18 1/2 meg. Tone Control
T1 Power Trans.
T2 Output Trans.
L1 Filter Choke
L2 Filter Choke
L3 Filter Choke
L4 Power Choke
L5 Field Coil

MODEL WR-26 SOCKET VOLTAGES
(Car Battery 6 Volts Under Load)

| Tube | Use | Fil. | Plate | Screen | Cathode | Bias |
|---|---|---|---|---|---|---|
| 77 | RF | 5.3 | 179 | 79 | 2.9 | |
| 77 | Det. Osc. | 5.3 | 178 | 79 | 4.3 to 8.4 | |
| 78 | IF | 5.3 | 179 | 79 | 2.9 | |
| 75 | 2nd Det. AVC | 5.3 | 113 | | | |
| 42 | AF | 5.3 | 201 | 217 | 1.2 | 13.0 |

The above readings were taken from ground or metal of chassis to socket terminals and will vary slightly with different types of voltmeters used.

**MODEL WR-26**
**Socket,Parts List**

# WESTINGHOUSE ELEC. SUPPLY CO.

**Alignment Data**

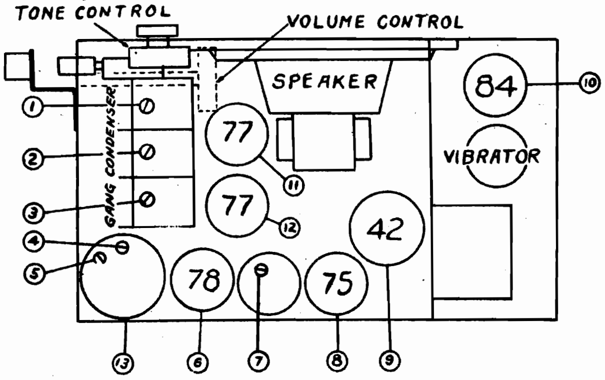



Fig. #2

#1 RF Trimmer Condenser
#2 1st Det. Trimmer Cond.
#3 Osc. Trimmer Condenser
#4) #5) 1st IF Trimmer Cond.
#6 IF Amplifier
#7 2nd IF Trimmer Cond.
#8 2nd Det. AVC & AF Amplifier
#9 Power Output
#10 Rectifier
#11 RF Amplifier
#12 Det. and Osc.
#13 1st IF & Osc.Coil

All of the adjustable condensers commonly called trimmer condensers, are very accurately adjusted at the factory and will not need any further adjustments unless a coil or I. F. transformer is changed or the adjustments have been tampered with in the field. Therefore, DO NOT attempt to change the setting of any of the trimmer condensers unless it is definitely known that adjustment is necessary, and a high-grade test oscillator and output meter is available, then proceed as follows:

1. Connect output meter across voice coil of speaker.
2. Set volume control on full.
3. Set tone control to bass position.
4. Connect dial light.

(A) I. F. Adjustment

1. Connect a .1 mfd. condenser in series with antenna lead of test oscillator.
2. Set test oscillator to 175 K. C.
3. Connect test oscillator to grid of 1st I. F. tube #6 (see Fig. #2) and adjust #7 to maximum output.
4. Connect test oscillator to grid of 1st Det. #12 and adjust condensers #4 and 5 to maximum output.
5. Repeat the above adjustments for accuracy.

(B) Oscillator Adjustment

1. Set test oscillator to 1500 K. C.
2. Connect test oscillator leads to grid of 1st Det. #12.
3. Set gang condenser to 1500 K. C. as follows:
   (a) Open gang to fullest extent.
   (b) Close slowly to the thickness of a thin cardboard strip or approximately .015".
4. Peak oscillator condenser #3 on end of gang.

(C) R. F. Adjustment

1. Set test oscillator to 1400 K. C.
2. Change antenna condenser in oscillator lead from .1 mfd. to .0002 mfd., and connect test oscillator to antenna lead of set.
3. Set condenser gang at 1400 K. C.
4. Peak condensers #1 and 2 on gang.
5. Do not touch oscillator trimmer #3 at 1400 K. C. setting of gang.

SERVICE PARTS LIST WR-26 MOTOR CAR RADIO

RESISTORS

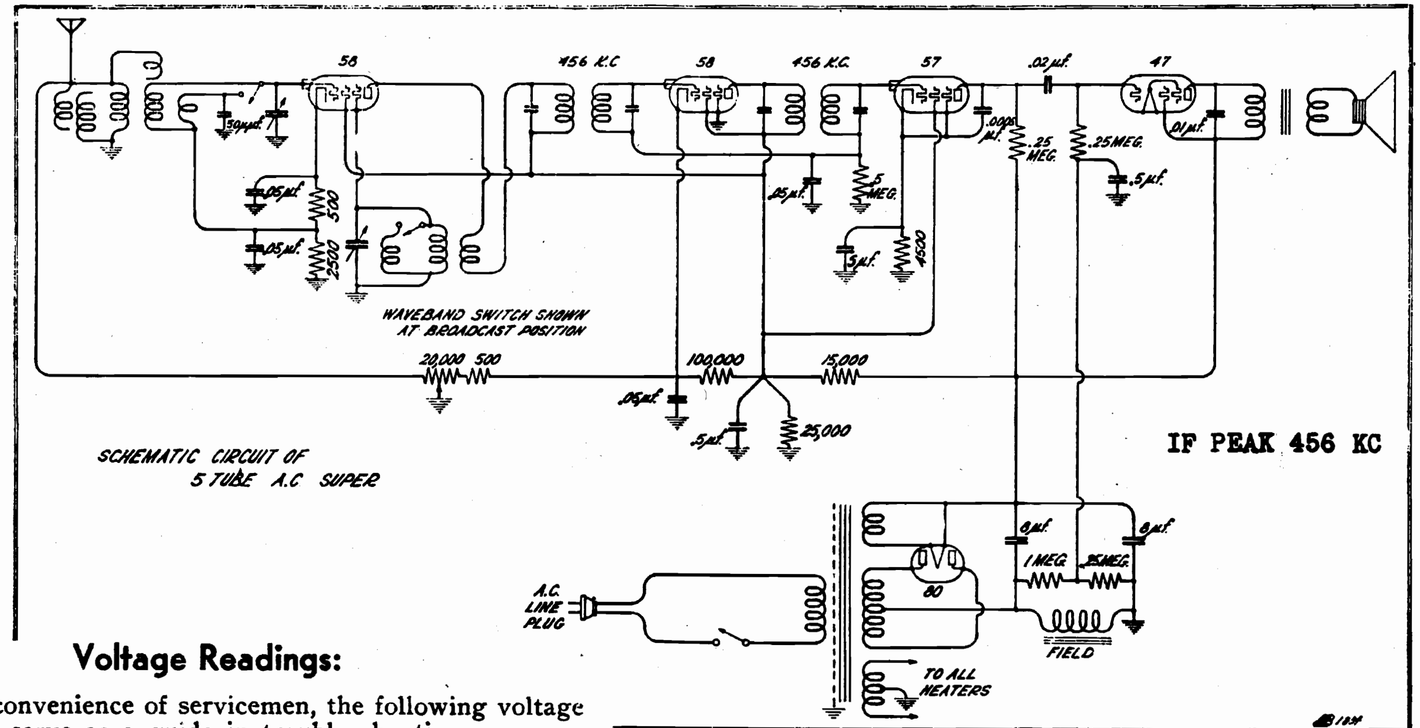
| | Ohms | Body | Tip | Dot |
|---|---|---|---|---|
| WR-05277 | 75,000 | Purple | Green | Orange |
| WR-05251 | 40,000 | Yellow | Black | Orange |
| WR-05245 | 2,000 | Red | Black | Red |
| WR-05247 | 7,500 | Purple | Green | Red |
| WR-05279 | 250,000 | Red | Green | Yellow |
| WR-05249 | 5,000 | Green | Black | Green |
| WR-05281 | 1 meg. | Brown | Black | Green |
| WR-05278 | 100,000 | Brown | Black | Yellow |
| WR-05276 | 50,000 | Green | Black | Orange |
| WR-05246 | 500,000 | Green | Black | Yellow |
| WR-05264 | 500 | Green | Black | Brown |
| WR-06531 | 4,000 | Yellow | Black | Red |
| WR-06527 | Resistor strip assembly ....... | | | |
| WR-06537 | Mid tap resistor .............. | | | |

CONDENSERS

| | |
|---|---|
| WR-06558 | Electrolytic cond.-power pack. |
| WR-06680 | Variable condenser assembly... |
| WR-06536 | Condenser- power pack base ... |
| WR-06526 | Condenser assembly block ..... |
| WR-06560 | Condenser in can ............. |
| WR-06600 | Condenser & choke assembly ... |
| WR-02493 | Condenser .05 - 2 ply ........ |
| WR-06417 | Condenser .0001 mfd. mica .... |
| WR-99650 | Condenser .001 mfd. mica ..... |
| WR-03659 | Condenser .005 - 3 ply ....... |

| Part No. | Description of Parts |
|---|---|
| WR-03852 | Condenser .002 4 ply ......... |
| WR-02497 | Condenser .25 2 ply .......... |
| WR-02499 | Condenser .5 2 ply .......... |
| WR-02496 | Condenser .25 3 ply .......... |
| WR-02495 | Condenser .1 2 ply .......... |
| WR-03775 | Condenser .001 mica .......... |
| WR-02492 | Condenser .05 3 ply- speaker . |
| WR-06560 | Condenser- power pack base ... |
| WR-03864 | Condenser .002 4 ply ......... |
| WR-03660 | Condenser .005 3 ply ......... |
| WR-02303 | Condenser .05 3 ply ......... |
| WR-02508 | Condenser .1 3 ply ......... |
| WR-01883 | Condenser .25 2 ply ......... |
| WR-02322 | Condenser .5 2 ply ......... |
| WR-02386 | Condenser .25 3 ply ......... |
| | **COILS** |
| WR-05824 | Choke coil- power pack ....... |
| WR-05452 | R.F. choke coil - power pack.. |
| WR-06523 | Oscillator coil assembly ..... |
| WR-04580 | I. F. coil assembly-chassis .. |
| WR-06519 | Antenna coil assembly ....... |
| WR-06518 | R.F. coil assembly ........... |
| WR-06713 | Speaker field coil ........... |
| | **TRANSFORMERS** |
| WR-06535 | Transformer- power pack ...... |
| WR-06618 | Output transformer ........... |
| WR-07053 | Iron core filter choke ....... |

WESTINGHOUSE ELEC. SUPPLY CO.




## Voltage Readings:

For the convenience of servicemen, the following voltage readings will serve as a guide in trouble shooting.

Readings are to be taken with all the tubes in their places, volume control turned on full and antenna wire grounded to chassis.

The D.C. Voltmeter used should be 1000 ohms per volt, or over. Line volts 117 A.C.

| | Fil. | Ground to Plate | Ground to Screen | Ground to Cathode | Ground to Suppressor |
|---|---|---|---|---|---|
| 58 Osc. 1st Det. | 2.4 A.C. | 80 D.C. | 80 D.C. | 2. D.C. | ........ |
| 58 Osc. I. F. Amplifier | 2.4 A.C. | 80 D.C. | 80 D.C. | 11. D.C. | ........ |
| 57 2nd Det. | 2.4 A.C. | 75 D.C. | 80 D.C. | 4.5 D.C. | 4.5 D.C. |
| 47 Output | 2.4 A.C. | 245 D.C. | 255 D.C. | ........ | ........ |
| 80 Rectifier | 5 0 | | | | |

Voltage across speaker field, 90.

Above voltages were taken with a high resistance voltmeter of 1000 ohms per volt and may vary somewhat with different sets and with the resistance of the voltmeter.

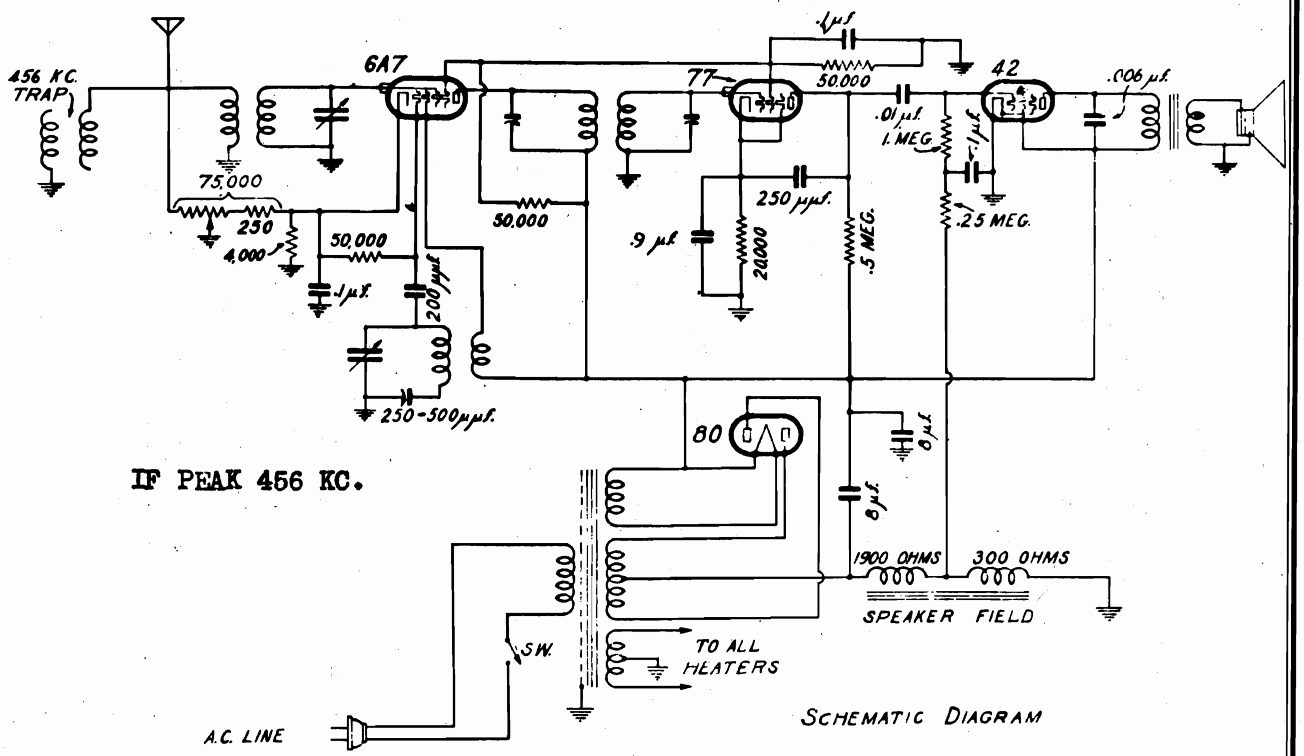
## FIVE-TUBE BROADCAST AND SHORT-WAVE SUPERHETERODYNE

110-120 Volts . . A.C. . . 60 Cycles

| Broadcast | Short Wave |
|---|---|
| 540—1500 Kilocycles | 1500—3000 Kilocycles |
| 550— 200 Meters | 200— 100 Meters |

MODEL WR-27
Schematic
Voltage

WESTINGHOUSE ELEC. SUPPLY CO.




IF PEAK 456 KC.

VOLTAGE READINGS

Readings of voltages should be taken with the Volume Control turned on fully (all the way to the right). D-C, measurements must be read with a high resistance voltmeter (1000 ohms per volt) and an A-C. voltmeter must be used on the a-c. circuit readings.

The d-c. voltages are measured from the points indicated to ground.

| TUBE | PLATE | ANODE GRID | CONTROL GRID | SCREEN GRID | SUPPR. GRID | CATHODE |
|---|---|---|---|---|---|---|
| 6A7 | 214 | 214 | - | 62 | - | 2 |
| 77 | 70 | - | - | 62 | 4 | 4 |
| 42 | 194 | - | -13* | 215 | - | - |
| 80 | - | - | - | - | - | - |

* Measured from ground to tap on speaker field winding

Voltage across field, 100 volts d-c.
Voltage across '80 filament, 5 volts a-c.
Voltage across all other heaters or filaments, 6.2 volts a-c.
The above voltages, with minor variations, should be obtained with an a-c. line input of 117.5 volts.

# WESTINGHOUSE ELEC. SUPPLY CO.

**MODEL WR-28, WR-29
Voltage, Socket
Alignment Data**

## SERVICE TECHNICAL DATA

### SOCKET VOLTAGES

| Stage | Tube | Filament | Plate | Screen | Cathode |
|---|---|---|---|---|---|
| Rectifier | 80 | 4.85 | 382 | | |
| Power Output | 42 | 6.1 | 234 | 245 | 18 |
| 2nd Detector | 75 | 6.1 | 126 | | 0.87 |
| 1st I.F. | 6D6 | 6.1 | 245 | 99 | 5.6 |
| 2nd I.F. | 6D6 | 6.1 | 245 | 96 | 5.6 |
| Oscillator | 6A7 | 6.1 | 236-136 | 87 | 4.7 |

Note: These values are readings of a high resistance voltmeter from each socket terminal to ground, with the exception of the filament voltages. The values are only approximate and will vary with the line voltage and the type of meter employed. Line voltage - 112.

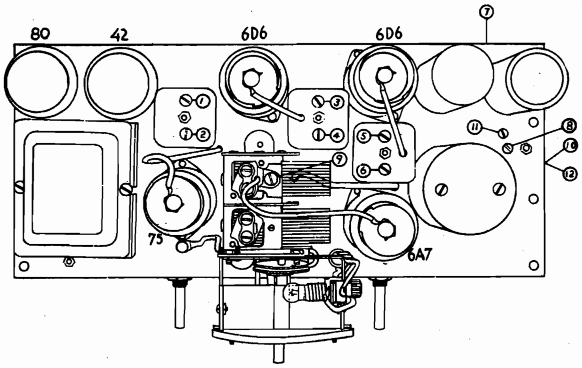



Figure #1

#1 I. F. trimmer condenser
#2 I. F. trimmer condenser
#3 I. F. trimmer condenser
#4 I. F. trimmer condenser
#5 I. F. trimmer condenser
#6 I. F. trimmer condenser
#7 Wave trap tuning condenser
#8 B. B. oscillator trim condenser
#9 Selector trim condenser
#10 B. B. oscillator lag. condenser -top screw
#11 S. W. B. oscillator trim condenser
#12 S. W. B. oscillator lag. condenser (bottom screw)

## CIRCUIT DESCRIPTION

The Models WR-28-29 are six tube, dual wave-band receivers, designed to operate over the frequency ranges from 1570 to 540 kilocycles and 15,500 to 5,700 kilocycles. The circuits comprise an R. F. selector circuit, a combination first detector oscillator, two stages of intermediate frequency amplification (456 KC) with double tuned circuits coupling each stage, a combination second detector, A.V.C. and first audio stage, a power output stage and a rectifier tube.

The wave change switch serves to change the electrical circuits to the wave band desired and in addition operates to illuminate the particular dial scale in use.

## ALIGNING THE CHASSIS

To properly align the Models WR-28-29 chassis, it is essential to use a high grade modulated oscillator and a sensitive output meter. The R. F. signal fed into the receiver must be very weak or it will cause the A. V. C. to function making correct alignment impossible. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low signal.

Before attempting to align the chassis, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and the various alignment condensers. A top view of the chassis is shown in Fig. #1 and should be carefully studied before the actual work is started.

### A- I. F. ADJUSTMENT

1. Set test oscillator to 456 K. C.

2. Connect A. C. voltmeter (output meter) across voice coil of speaker.

3. Connect test oscillator to grid of 2nd I.F. tube (6D6 in rear of condenser gang) and frame of chassis.

4. Adjust #1 and #2 to maximum output on output meter.

5. Connect test oscillator to grid of 1st I.F. tube (6D6 - rear right hand tube).

6. Adjust #3 and #4 to maximum output.

7. Connect test oscillator to grid of 1st detector (6A7).

8. Adjust #5 and #6 to maximum output.

This completes the I. F. adjustment.

### B - R. F. ADJUSTMENT
(Broadcast Band)

1. Connect test oscillator to antenna and ground leads. Set wave change switch to broadcast band position as indicated by the dial light. Set station selector to 540 K. C.

2. With test oscillator still adjusted to 456 K. C., increase signal strength of test oscillator until signal is heard in loud speaker.

3. Adjust #7 (through small hole in right hand rear panel of chassis) until signal disappears or goes through a null. If signal disappears, increase signal output from test oscillator and readjust #7 until a definite minimum is obtained. The purpose of this adjustment is to correctly adjust a wave trap installed to block direct transmission of 456 K. C. (usually ship telegraph signals) from antenna to first detector.

4. Set test oscillator and station selector to 1400 K. C.

MODEL WR-28,WR-29
Schematic
Alignment,Part 2

# WESTINGHOUSE ELEC. SUPPLY CO.

5. Adjust #8 to maximum output.

6. Adjust #9 to maximum output.

7. Set test oscillator and station selector to 600 K. C.

8. Adjust #10 to maximum output (top screw)

9. Set test oscillator and station selector to 1400 K. C. and readjust #8 and #9 for correct calibration.

C - R. F. ADJUSTMENT
(Short Wave Band)

1. Set wave change switch to short wave band position.

2. Set test oscillator and station selector to 15,000 K. C.

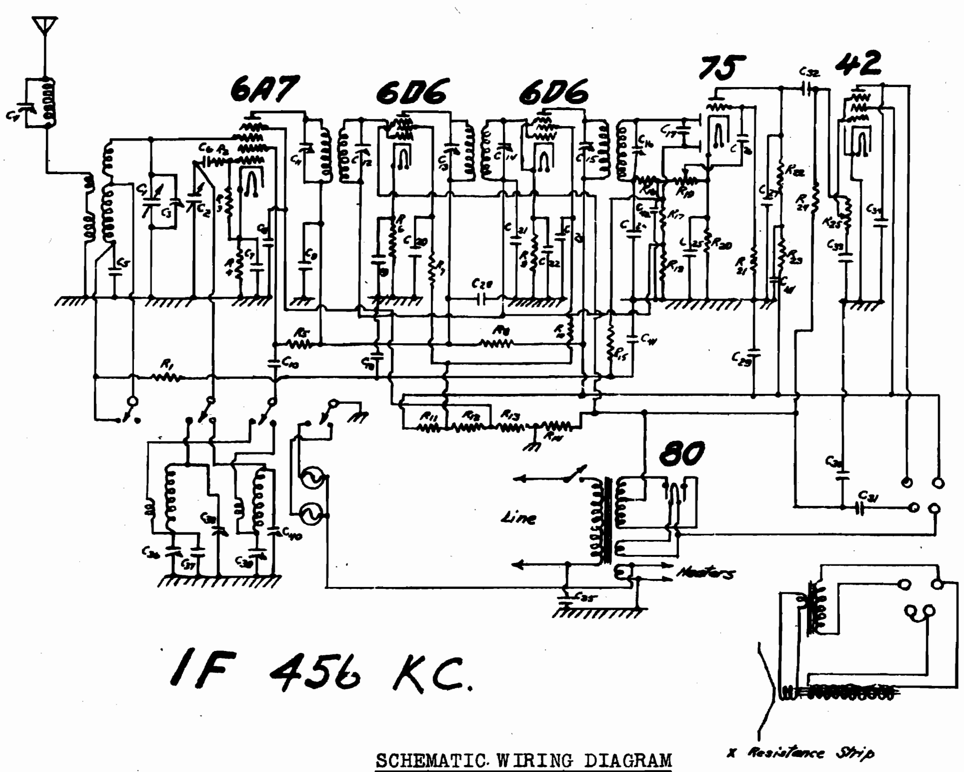
3. Adjust #11 until signal is tuned in.

4. Adjust R. F. trimmer condenser (mounted underneath chassis on R. F. coil) to maximum output.

5. Set test oscillator and station selector to 6000 K. C.

6. Adjust #12 to maximum output (bottom screw)

7. Set test oscillator and station selector to 15,000 K. C. and readjust #11 and R. F. trimmer underneath chassis for correct calibration. This completes the lining up process.




SCHEMATIC WIRING DIAGRAM

ELECTRICAL VALUES

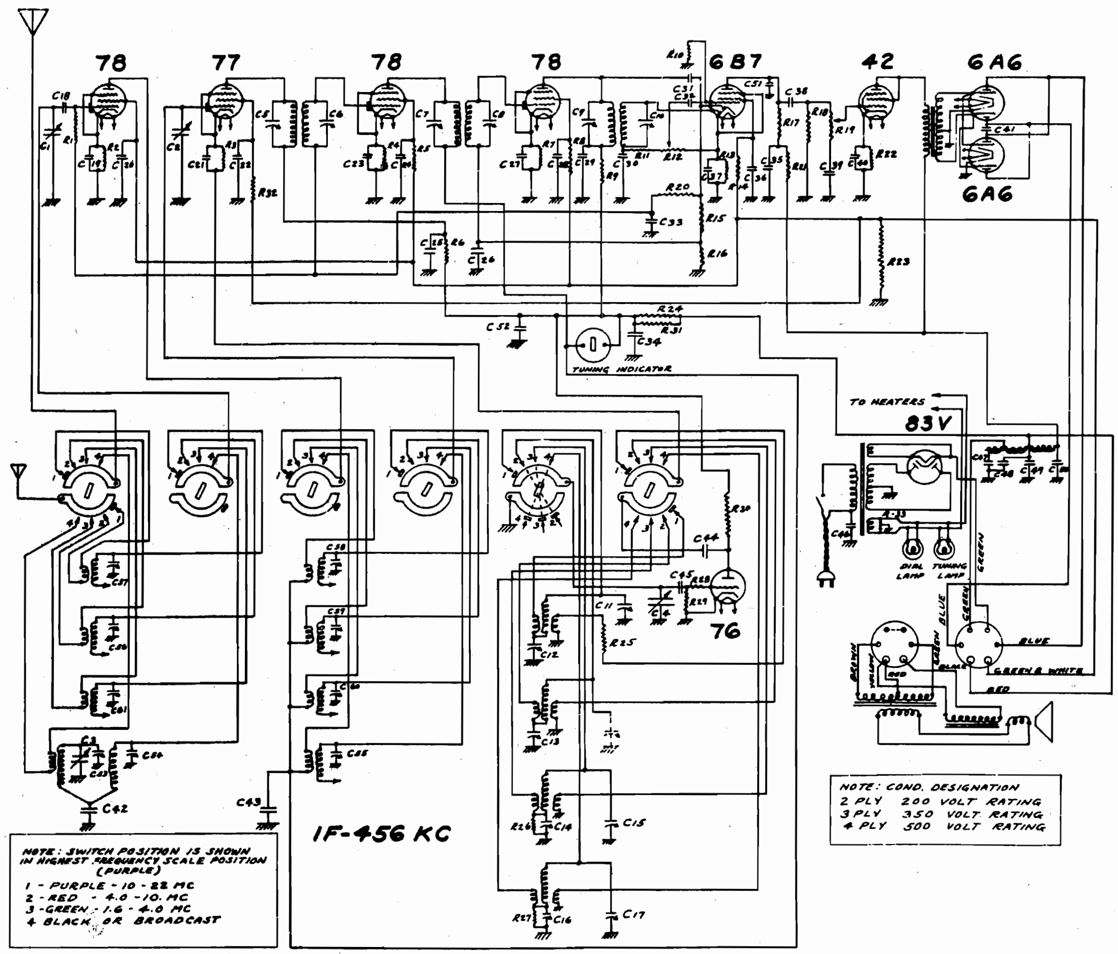
C-1 Var. gang with trimmer
C-2 Var. gang with trimmer
C-3 Var. gang with trimmer
C-4 600 mmf. variable
C-5 .05 mf - 2 ply
C-6 .0001 mica
C-7 .05 - 2 ply
C-8 .05 - 2 ply
C-9 .05 - 3 ply
C-10 .02 - 3 ply
C-11 I.F. coil
C-12 I.F. coil
C-13 I.F. coil
C-14 I.F. coil
C-15 I.F. coil
C-16 I.F. coil
C-17 .0001 mica
C-18 .05 - 2 ply
C-19 .05 - 2 ply
C-20 .05 - 2 ply
C-22 .05 - 2 ply
C-23 .05 - 2 ply

C-24 .0001 mica
C-25 .5 - 2 ply
C-26 .005 - 3 ply
C-27 .001 - 4 ply
C-28 8 - electrolytic
C-29 4 - electrolytic
C-30 20- electrolytic
C-31 8 - electrolytic
C-32 .005 - 3 ply
C-33 .001 - 4 ply
C-34 .01 - 4 ply
C-35 .01 - 4 ply
C-36 425 mmf. variable
C-37 1500 mmf. mica
C-38 Trimmer condenser
C-39 425 mmf. variable
C-40 Trimmer condenser
C-41 .05 - 3 ply
C-42 .0001 - mica
C-43 .05 - 3 ply
C-44 4-40 mmf. variable
R-1 .1 meg. 1/4 watt
R-2 50 ohms 1/4 watt

R-3 50,000 ohms 1/4 watt
R-4 500 ohms 1/4 watt
R-5 20,000 ohms 1/2 watt
R-6 1,000 ohms 1/4 watt
R-7 5,000 ohms 1/4 watt
R-8 1,000 ohms 1/4 watt
R-9 1,000 ohms 1/4 watt
R-10 5,000 ohms 1/4 watt
R-11 11,200 ohms
R-12 1,800 ohms
R-13 12,000 ohms
R-14 300 ohms
R-15 1 meg - 1/4 watt
R-16 50,000 ohms - 1/4 watt
R-17 1 meg - 1/4 watt
R-19 .5 meg. variable
R-20 2,000 ohms 1/4 watt
R-21 1 meg. 1/4 watt
R-22 75,000 ohms - 1/4 watt
R-23 50,000 ohms - 1/4 watt
R-24 .25 meg. 1/4 watt
R-25 .25 meg. variable

# WESTINGHOUSE ELEC. SUPPLY CO.

**MODEL WR-30**
**Schematic**




SCHEMATIC WIRING DIAGRAM

ELECTRICAL VALUES

C-1 Variable condenser
C-2 Variable condenser
C-3 Variable condenser
C-4 Variable condenser
C-5 I.F. coil
C-6 I.F. coil
C-7 I.F. coil
C-8 I.F. coil
C-9 I.F. coil
C-10 I.F. coil
C-11 7-70 mmf.
C-12 1000-2000 mmf.
C-13 500-1000 mmf.
C-14 400-800 mmf.
C-15 3-40 mmf.
C-16 270-600 mmf.
C-17 7-70 mmf.
C-18 100 mmf. mica
C-19 .05 - 2 ply
C-20 .05 - 2 ply
C-21 .05 - 2 ply
C-22 .05 - 2 ply
C-23 .05 - 2 ply
C-24 .05 - 3 ply
C-25 .005 - 3 ply
C-26 .05 - 2 ply
C-27 .05 - 2 ply
C-28 .05 - 3 ply
C-29 .005 - 3 ply
C-30 100 mmf. mica
C-31 100 mmf. mica
C-32 .005 - 3 ply
C-33 .05 - 2 ply
C-34 4 mfd. electrolytic
C-35 4 mfd. electrolytic
C-36 .5 - 2 ply
C-37 .5 - 2 ply
C-38 .005 - 3 ply
C-39 .001 - 4 ply
C-40 20 mfd. 25 V.
C-41 .005 - 3 ply
C-42 .05 - 2 ply
C-43 .02 - 3 ply
C-44 .02 - 3 ply
C-45 100 mmf. mica
C-46 .01 - 4 ply
C-47 8 mfd. electrolytic
C-48 4 mfd. electrolytic
C-49 4 mfd. electrolytic
C-50 8 mfd. electrolytic
C-51 .001 - 4 ply
C-52 .1 - 3 ply
C-53 Variable condenser gang
C-54 4-25 mmf.
C-55 4-25 mmf.
C-56 4-25 mmf.
C-57 7-70 mmf.
C-58 7-70 mmf.
C-59 4-25 mmf.
C-60 4-25 mmf.
C-61 4-25 mmf.
R-1 1/2 meg. 1/4 watt
R-2 300 ohms 1/4 watt
R-3 5,000 ohms 1/4 watt
R-4 1,000 ohms 1/4 watt
R-5 5,000 ohms 1/4 watt
R-6 1,000 ohms 1/4 watt
R-7 1,000 ohms 1/4 watt
R-8 5,000 ohms 1/4 watt
R-9 1,000 ohms 1/4 watt
R-10 1 meg. 1/4 watt
R-11 50,000 ohms 1/4 watt
R-12 1/2 meg. volume control
R-13 2,000 ohms 1/4 watt
R-14 50,000 ohms 1/4 watt
R-15 1 meg. 1/4 watt
R-16 250,000 ohms 1/4 watt
R-17 50,000 ohms 1/4 watt
R-18 250,000 ohms 1/4 watt
R-19 1/4 meg. tone control
R-20 1 meg. 1/4 watt
R-21 100,000 ohms 1/4 watt
R-22 2,500 ohms 1/2 watt
R-23 1,800 ohms 30 watt
R-24 5,000 ohms 1 watt
R-25 100 ohms 1/4 watt
R-26 5,000 ohms 1/4 watt
R-27 2,000 ohms 1/4 watt
R-28 50 ohms 1/4 watt
R-29 20,000 ohms 1/4 watt
R-30 20,000 ohms 1 watt
R-31 5,000 ohms 1 watt
R-32 5,000 ohms 1/4 watt
R-33 Mid tap resistor

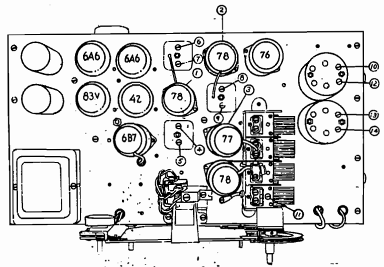
**MODEL WR-30**
**Voltage, Socket**
**Alignment Data**
**Parts List**

# WESTINGHOUSE ELEC. SUPPLY CO.

## SERVICE TECHNICAL DATA

| Stage | Tube | Filament | Plate | Screen | Cathode |
|---|---|---|---|---|---|
| Rectifier | 83V | 5.0 | | | 340 |
| Audio power output | 6A6 | 6.0 | 305 | | |
| Audio power output | 6A6 | 6.0 | 305 | | |
| Audio driver | 42 | 6.0 | 260 | 280 | 30 |
| 2nd Det., AVC, 1st audio | 6B7 | 6.0 | 12 | 55 | 3.8 |
| I.F. amplifier | 78 | 6.0 | 240 | 100 | 4.5 |
| I.F. amplifier | 78 | 6.0 | 230 | 100 | 4.5 |
| R.F. amplifier | 78 | 6.0 | 240 | 100 | 2.5 |
| 1st Detector | 77 | 6.0 | 240 | 100 | 4.5 |
| Oscillator | 76 | 6.0 | 95 | | |

Note: These values are readings of a high resistance voltmeter from each socket terminal to ground, with the exception of the filament voltages. The values are only approximate and will vary with the line voltage and the type of meter employed. Line voltage - 115.




#1 2nd I.F. tube
#2 1st I.F. tube
#3 1st detector tube
#4 I.F. trimmer condenser
#5 I.F. trimmer condenser
#6 I.F. trimmer condenser
#7 I.F. trimmer condenser
#8 I.F. trimmer condenser
#9 I.F. trimmer condenser
#10 B.B. oscillator trim. condenser (Red code)
#11 B.B. preselector trim. condenser
#12 B.B. oscillator lag. condenser
#13 2nd band oscillator trim. condenser (Green code)
#14 2nd band oscillator lag. condenser

## SERVICE PARTS LIST - WR-30

| Part No. | Description |
|---|---|
| | MAIN ASSEMBLIES |
| WR-07685 | Chassis assembly |
| WR-07594 | Speaker |
| WR-07698 | Cabinet |
| | COILS |
| WR-07494 | I.F. coil assembly #1 |
| WR-07495 | I.F. coil assembly #2 |
| WR-07496 | I.F. coil assembly #3 |
| WR-07504 | Choke coil assembly |
| WR-03554 | Choke coil assembly |
| WR-07481 | Oscillator coil assembly (Broadcast) |
| WR-07482 | Oscillator coil assembly (Green band) |
| WR-07483 | Oscillator coil assembly (Red band) |
| WR-07484 | Oscillator coil assembly (Blue band) |
| | CONDENSERS |
| WR-07682 | Variable condenser assembly |
| WR-07510 | Condenser assembly - electrolytic |
| WR-07516 | Condenser assembly - electrolytic |
| WR-07530 | Trimmer condenser assembly |
| WR-03800 | Trimmer condenser assembly |
| WR-07529 | Trimmer condenser assembly |
| WR-07615 | Condenser assembly - buffer |
| WR-06386 | Condenser .05 - 2 ply |
| WR-02499 | Condenser .05 - 2 ply |
| WR-06417 | Condenser .0001 mica |
| WR-06403 | Condenser .01 - 3 ply |
| WR-03659 | Condenser .005 - 2 ply |
| WR-02504 | Condenser .02 - 3 ply |
| WR-02494 | Condenser .1 - 3 ply |

RESISTOR

| Part No. | Ohms | Body | Tip | Dot |
|---|---|---|---|---|
| WR-07508 | Resistor strip assembly | | | |
| WR-07509 | Resistor strip assembly | | | |
| WR-05276 | 10,000 | Brown | Black | Orange |
| WR-05276 | 50,000 | Green | Black | Orange |
| WR-05267 | 1,000 | Black | Black | Red |
| WR-05249 | 5,000 | Green | Black | Red |
| WR-05281 | 1 meg. | Brown | Black | Green |
| WR-05245 | 2,000 | Red | Black | Red |
| WR-07572 | 5,000 | Green | Black | Red |
| WR-05260 | 300 | Orange | Black | Brown |
| WR-07614 | 100 | Brown | Black | Brown |
| WR-05274 | 20,000 | Red | Black | Orange |
| WR-02345 | 20,000 | Red | Black | Orange |
| WR-07726 | 50 | Green | Black | Black |
| WR-01423 | 2,500 | Red | Green | Red |
| WR-05279 | 250,000 | Red | Green | Yellow |

| Part No. | Description |
|---|---|
| | TUBE SOCKETS & TUBE SHIELD |
| WR-03514 | Tube socket - 5 prong |
| WR-03513 | Tube socket - 6 prong |
| WR-05694 | Tube socket - 7 prong |
| WR-03686 | Tube socket - 4 prong |
| WR-03424 | Tube shield - long |
| WR-03257 | Tube shield - short |
| WR-05624 | Tube socket - 7 prong |
| | MISCELLANEOUS PARTS |
| WR-07105 | Power transformer |
| WR-07584 | Tone control |
| WR-07565 | Volume control |
| WR-07506 | Switch assembly (wave change) |
| WR-07708 | Dial lamp bracket assembly |
| WR-06809 | Dial lamp |
| WR-07640 | Knob - tone control switch |
| WR-07643 | Knob - large for variable condenser |
| WR-07641 | Knob - small for variable condenser |
| WR-07642 | Knob - volume control |
| WR-05952 | Antenna cable assembly |
| WR-01711 | Cable assembly - line |
| WR-07564 | Input transformer |
| WR-07583 | Resistance |
| WR-07636 | Dial scale assembly |
| WR-07630 | Indicator dial scale |
| WR-07627 | Guide - dial scale |
| WR-07136 | Dial plate |
| WR-07647 | Indicator plate |
| WR-07683 | Tuning indicator |

### A - ALIGNING THE I.F. (456 KC)

1. Set test oscillator to 456 KC.

2. Connect output meter across voice coil of speaker.

3. Connect test oscillator to grid of 2nd I.F. tube (#1).

4. Adjust #4 and #5 to maximum output as indicated on output meter.

5. Connect test oscillator to grid of 1st I. F. tube (#2).

6. Adjust #6 and #7 to maximum output.

7. Connect test oscillator to grid of 1st detector tube (#3).

8. Adjust #8 and #9 to maximum output.

### B - ADJUSTMENT OF BROADCAST OR 1st BAND

Note: Because of set sensitivity it is difficult to make an accurate R.F. adjustment unless the set sensitivity is reduced. This is easily accomplished by cutting out the amplification of an I. F. stage. To do this, remove grid clip on tube #1, and connect to this tube the grid clip previously connected to tube #2. Remove tube #2 from its socket.

1. Set test oscillator and station selector to 1400 KC.

2. Connect test oscillator to grid of 1st detector tube (#3).

3. Adjust #10 (Red color coded) until signal is tuned in.

4. Connect test oscillator to antenna and ground leads of chassis.

5. Adjust #11 and the two alignment condensers underneath the chassis located directly in front of the small shield containers housing the broadcast selector coils, until signal is correctly tuned in.

6. Set test oscillator and station selector to 600 KC.

7. Adjust #12 to maximum output.

8. Return to 1400 KC setting and readjust #10 for correct calibration.

### C - ADJUSTMENT OF 2nd BAND

1. Adjust wave change switch to 2nd band position and set station selector to 3600 KC.

2. Set test oscillator to 3600 KC.

3. Adjust #13 (Green color coded) until signal is tuned in.

4. Adjust trim condensers, located underneath chassis and mounted on the small coils at the extreme right end, to maximum output.

5. Set test oscillator and station selector to 1800 KC.

6. Rotate #14 until signal is at maximum.

7. Return test oscillator and station selector to 3600 KC setting and readjust #13 for correct calibration.

### D - ADJUSTMENT OF 3rd BAND

1. Set wave change switch to 3rd band position and set test oscillator and station selector to 9000 KC. On bottom of chassis fastened to the back plate is the 3rd band oscillator coil in its shield container. This coil is directly in back of the wave change switch. A Green wire twisted around a Green and White wire will be noticed. This twist serves to make the slight adjustment necessary to bring this band to correct calibration. If set is not on calibration, an increase or decrease of the twist will serve to readjust the calibration. This adjustment will serve for about one-half a scale division either way. If set is initially off more than this, it indicates a serious fault in the oscillator circuit such as poor or incorrect connections, open resistor, defective oscillator tube or other major fault.

Assuming that the correction can be made, the set is now placed on its proper marking and adjustment is made of the preselector trim condensers for this wave band. These condensers are two in number and are mounted integral with the preselector coils. The coils are part of the main switch assembly and are located between the 2nd band (furthest left on under side) and the highest frequency selector coils which are located under the isolantite trim condensers.

2. Adjust test oscillator and station selector to 5000 KC setting.

3. Adjust 3rd band lagging condenser to maximum output. This condenser is located on the back plate to the right of the 3rd band oscillator coil mentioned above.

4. Return to 9000 KC setting and check the previous setting.

### E - ADJUSTMENT OF 4th BAND

1. Set wave change switch to the 4th band position and adjust test oscillator and station selector to 20,000 KC.

2. Adjust oscillator trim condenser (lower left hand unit on back of chassis) for maximum output.

3. Then adjust trim condensers for further maximum output. These condensers are two isolantite base units mounted integral with the switch assembly.

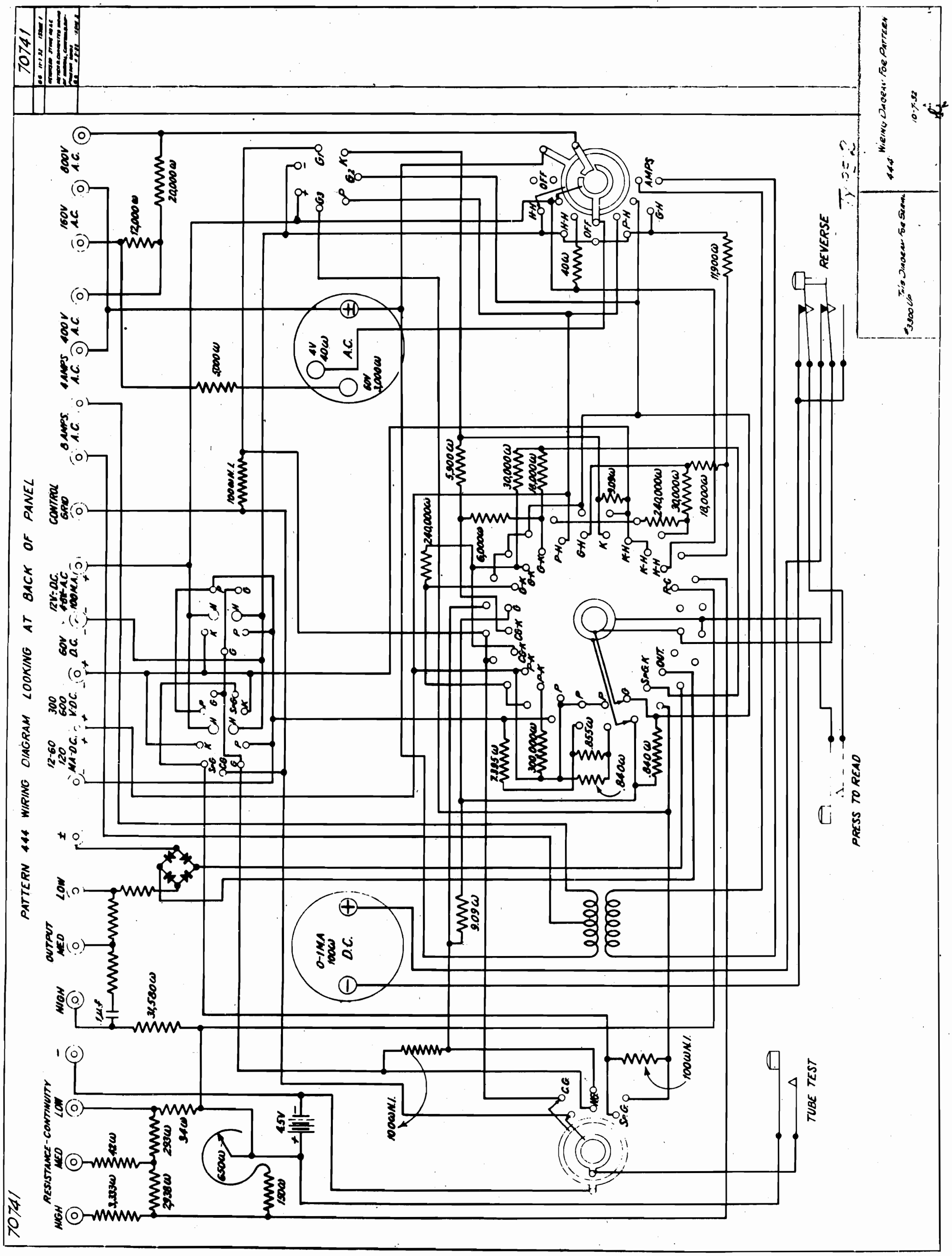
4. Set test oscillator and station selector to 12,000 KC.

5. Adjust oscillator lag condenser (upper left hand corner of rear plate) until signal is tuned in.

6. Return test oscillator and station selector to 20,000 KC and check setting.

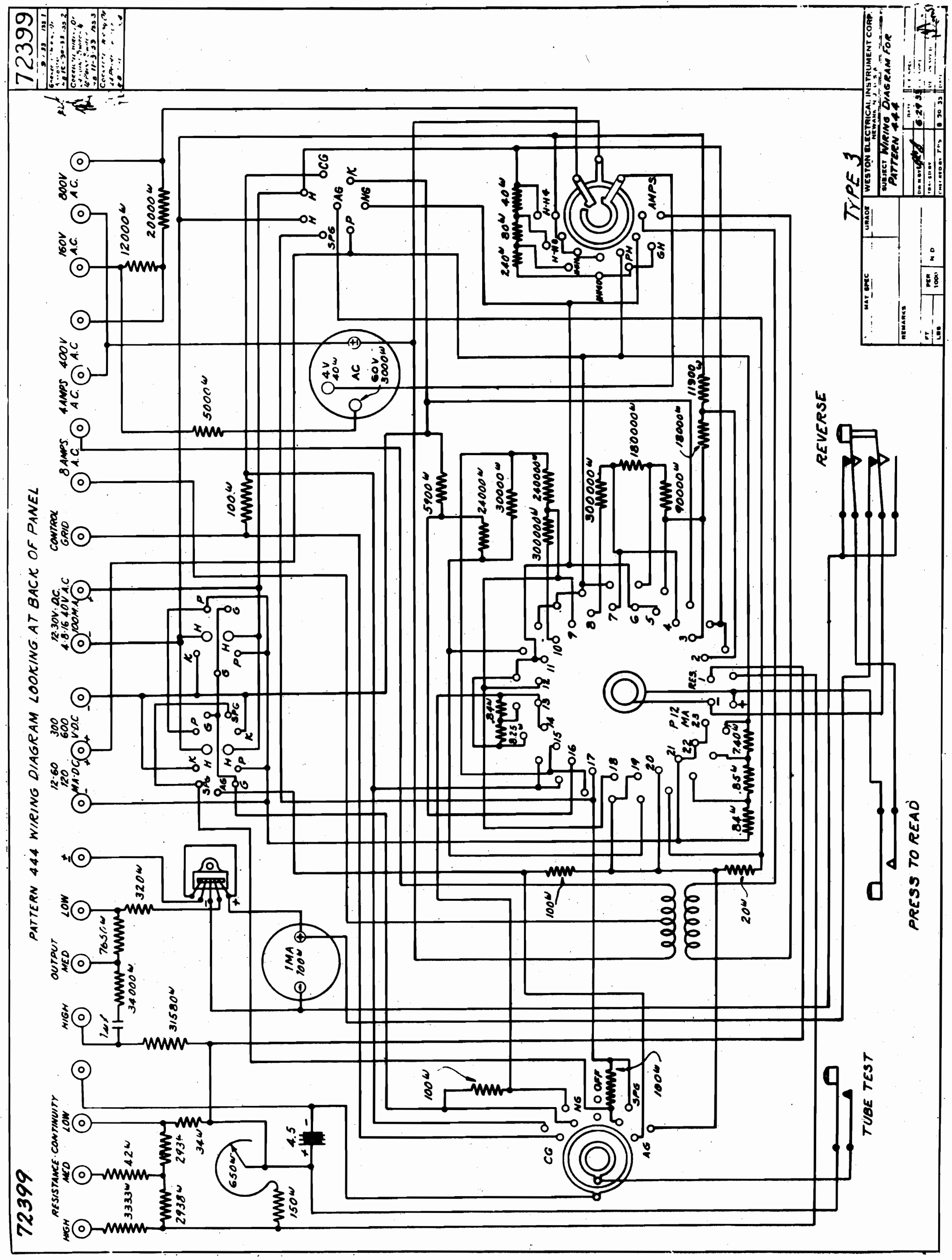
**MODEL 444**
**Type 2**
**Schematic**

# WESTON ELECTRICAL INSTRUM'T CORP.



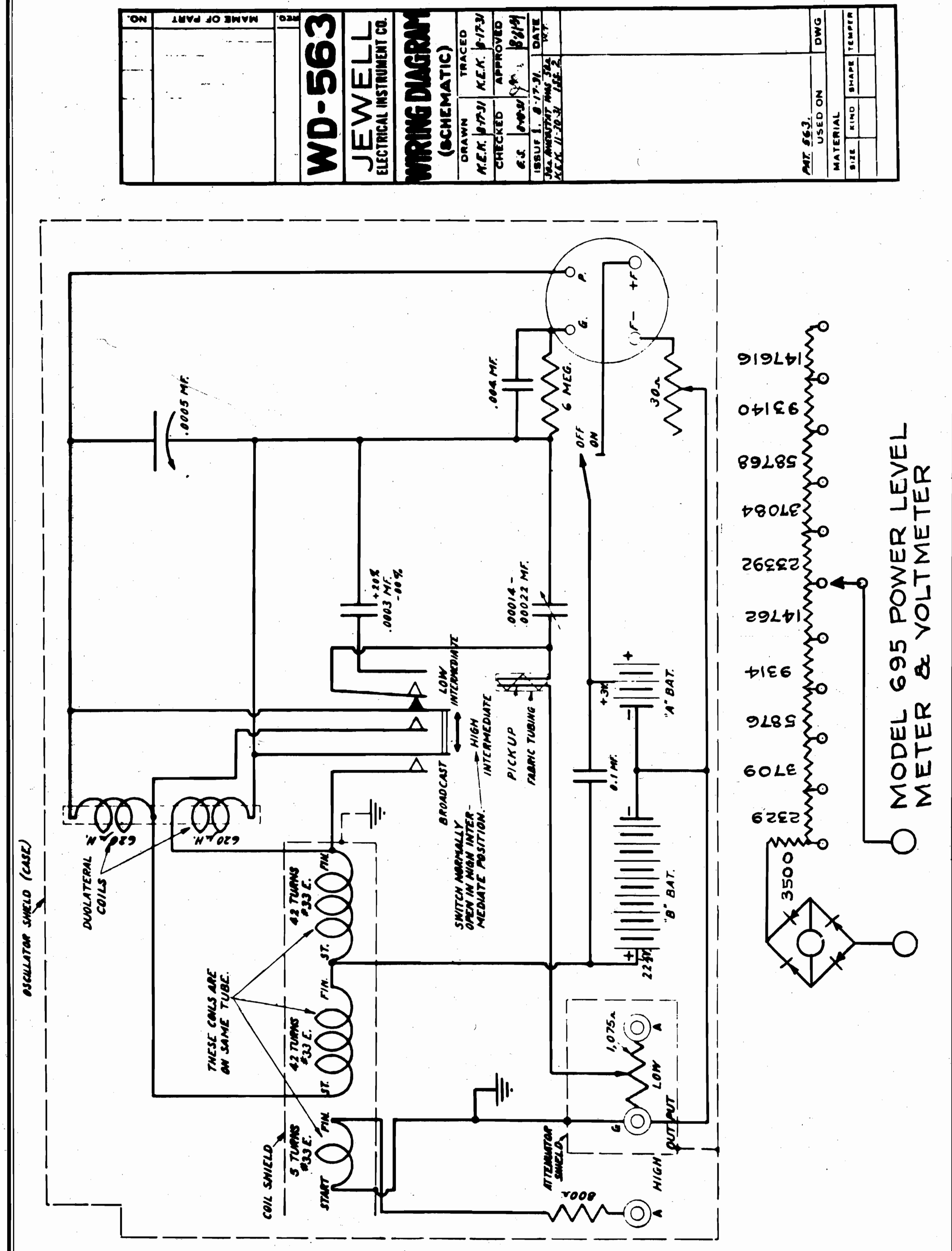
**MODEL 444**
**Type 3**
**Schematic**

# WESTON ELECTRICAL INSTRUM'T CORP.



WESTON ELECTRICAL INSTRUM'T CORP.

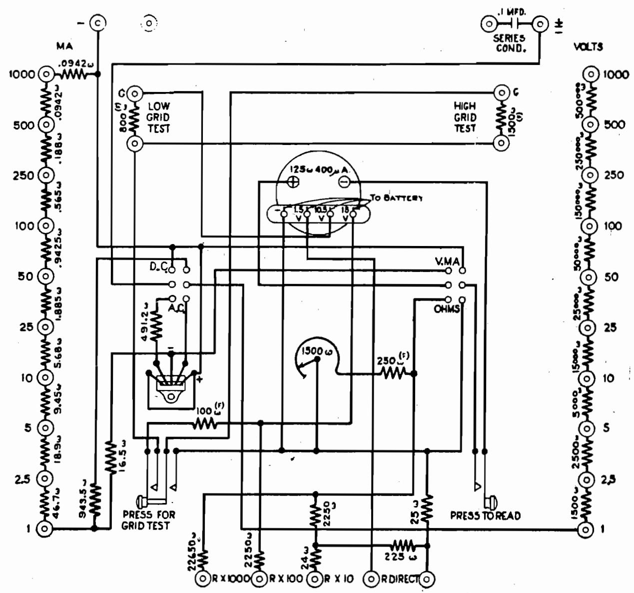
MODEL 563 (Type 2)
MODEL 695
Schematics

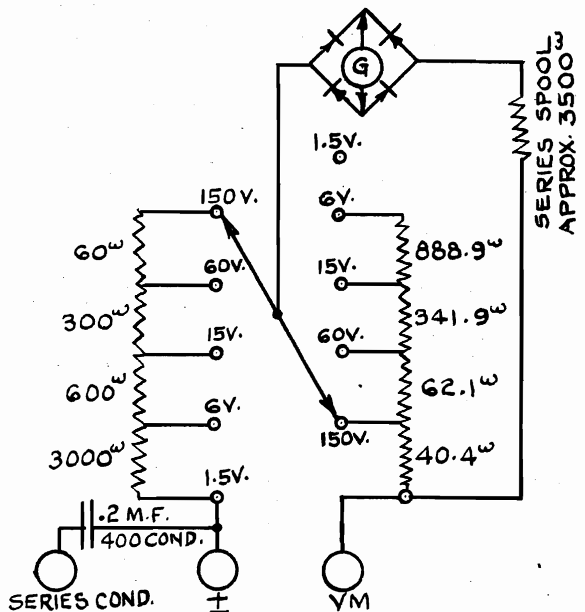


MODEL 571
MODEL 665
Schematics

WESTON ELECTRICAL INSTRUMENT CORP.

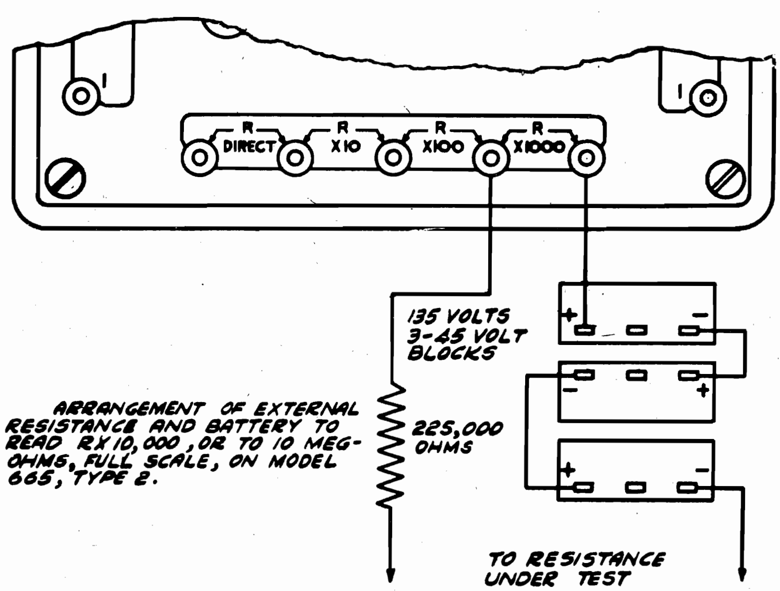
## INTERNAL CONNECTION DIAGRAM
## OF
## MODEL 665 TYPE 2 SELECTIVE ANALYZER



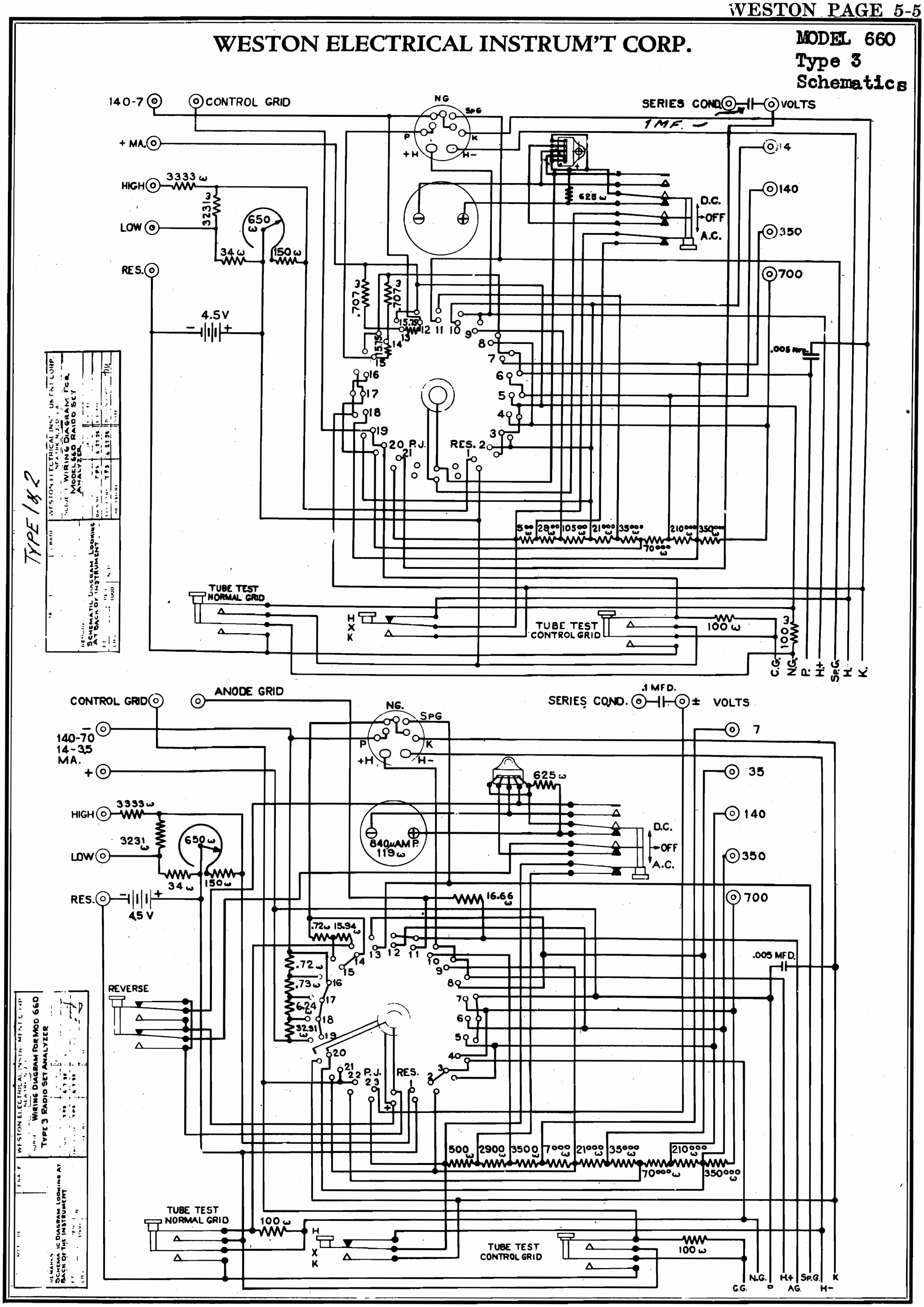




MODEL 571 OUTPUT METER

## PROCEDURE FOR INCREASING RESISTANCE RANGE TO 10 MEGOHMS

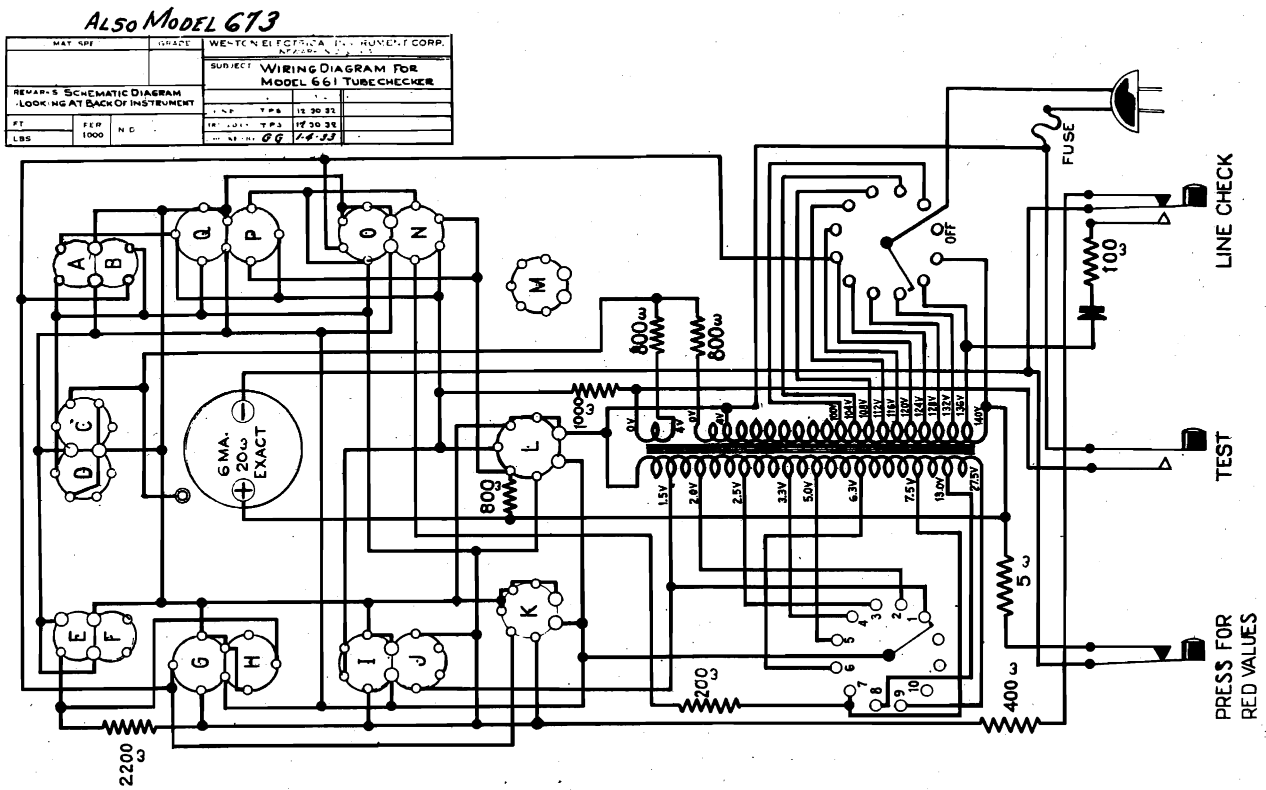


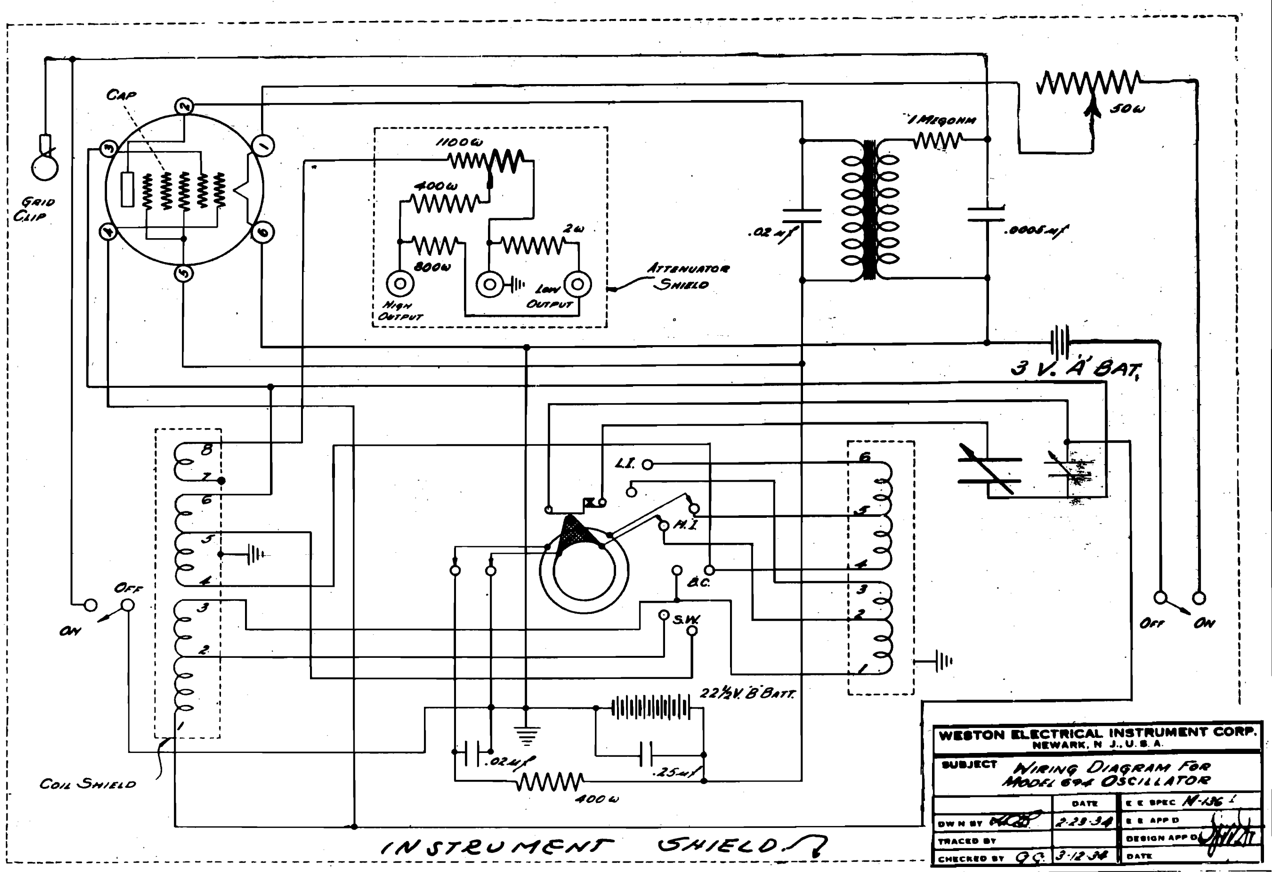

ARRANGEMENT OF EXTERNAL RESISTANCE AND BATTERY TO READ RX10,000, OR TO 10 MEG-OHMS, FULL SCALE, ON MODEL 665, TYPE 2.


WESTON ELECTRICAL INSTRUM'T CORP.
MODEL 660
Type 3
Schematics
140-7
CONTROL GRID
+ MA.
HIGH
3333 ω
3231 ω
LOW
650 ω
34 ω
150 ω
RES.
4.5V
SERIES COND.
VOLTS
1 MF.
14
140
350
700
625 ω
D.C.
OFF
A.C.
.005 MFD.
P.J.
RES.
TUBE TEST
NORMAL GRID
TUBE TEST
CONTROL GRID
H
X
K
100 ω
C.G.
N.G.
P.
H+
Sp.G.
H-
K.
TYPE 1 & 2
CONTROL GRID
ANODE GRID
140-70
14-3.5
MA.
.1 MFD.
7
35
840 μAMP.
119 ω
16.66
REVERSE
70000 ω
350000 ω
TYPE 3 RADIO SET ANALYZER

**MODEL 661, 673**
**MODEL 694**
**Schematics**

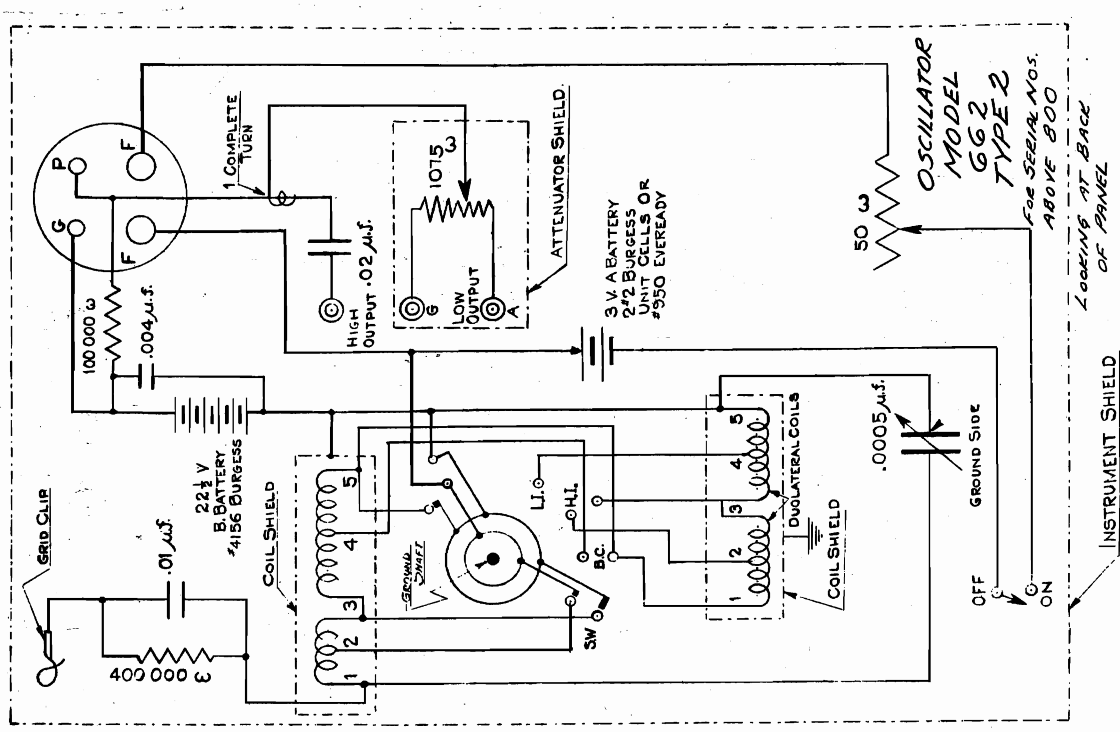
# WESTON ELECTRICAL INSTRUM'T CORP.

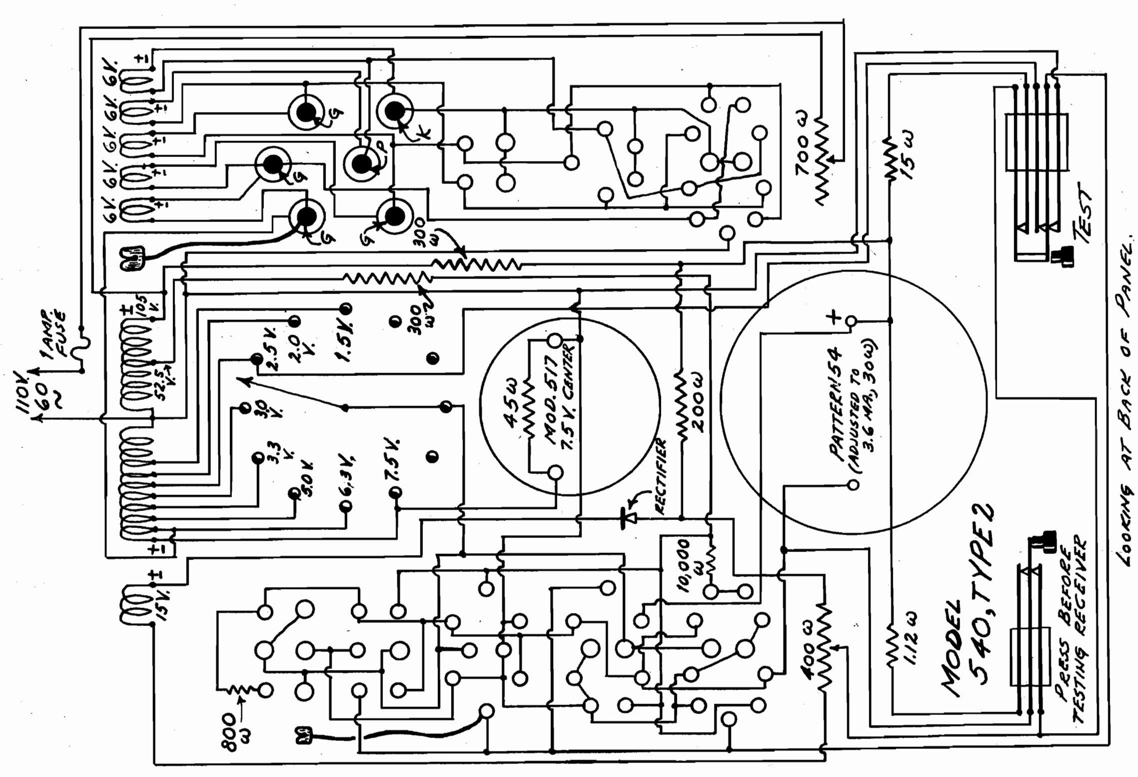


# WESTON ELECTRICAL INSTRUM'T CORP.

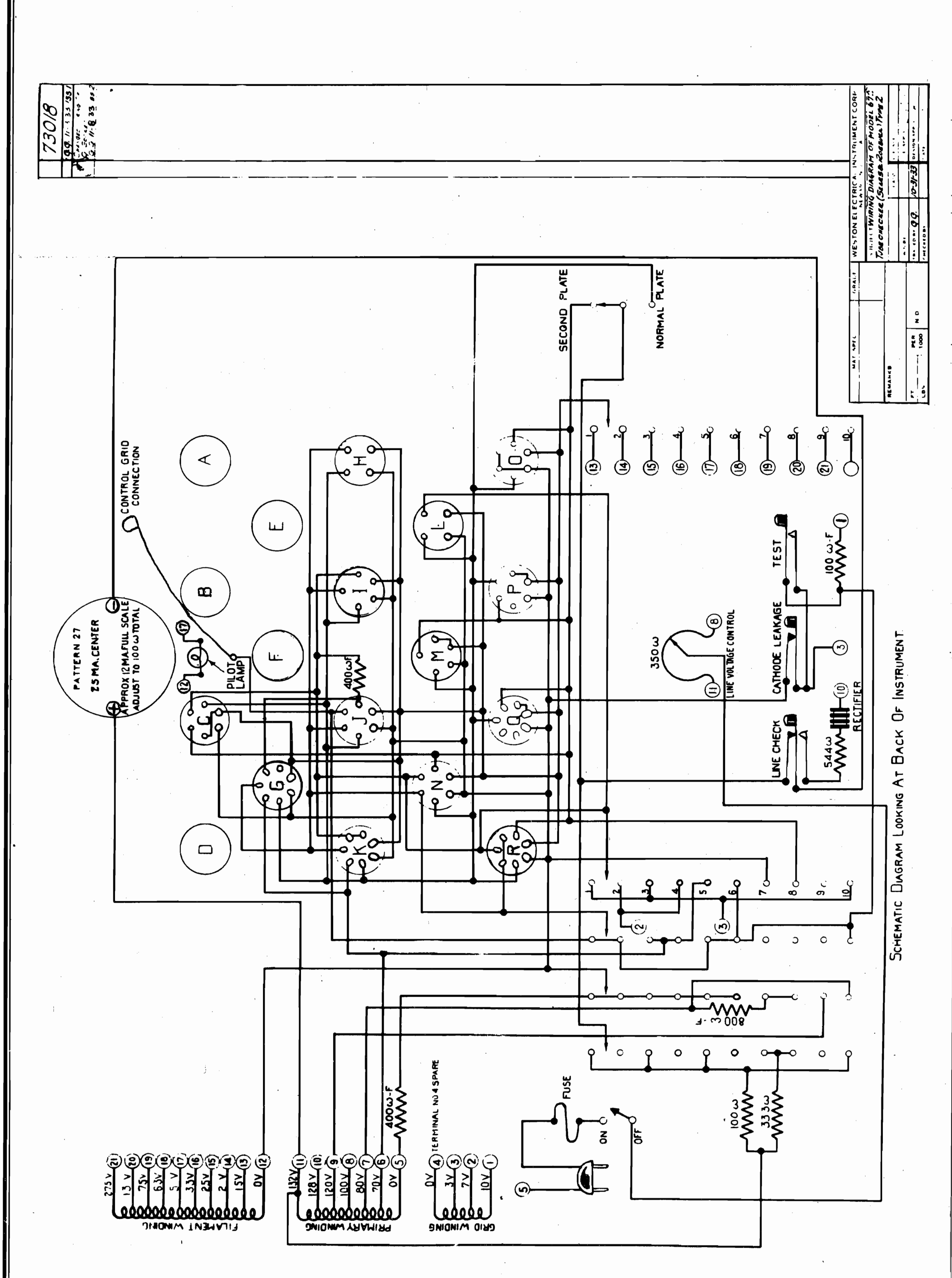
**MODEL 540, Type 2**
**MODEL 662, Type 2**
**Schematics**



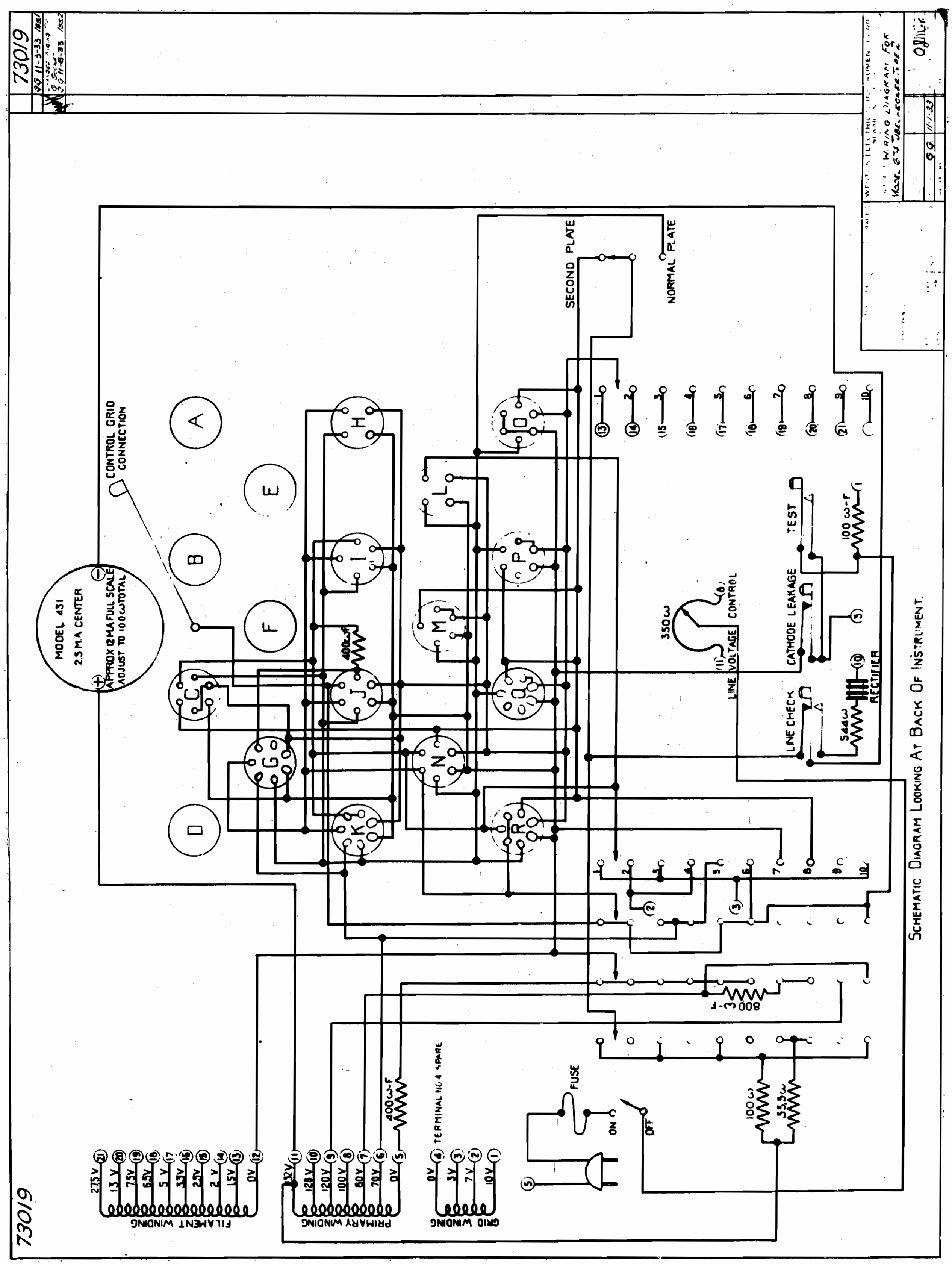
**MODEL 672, Type 2**
**Schematic**

# WESTON ELECTRICAL INSTRUM'T CORP.



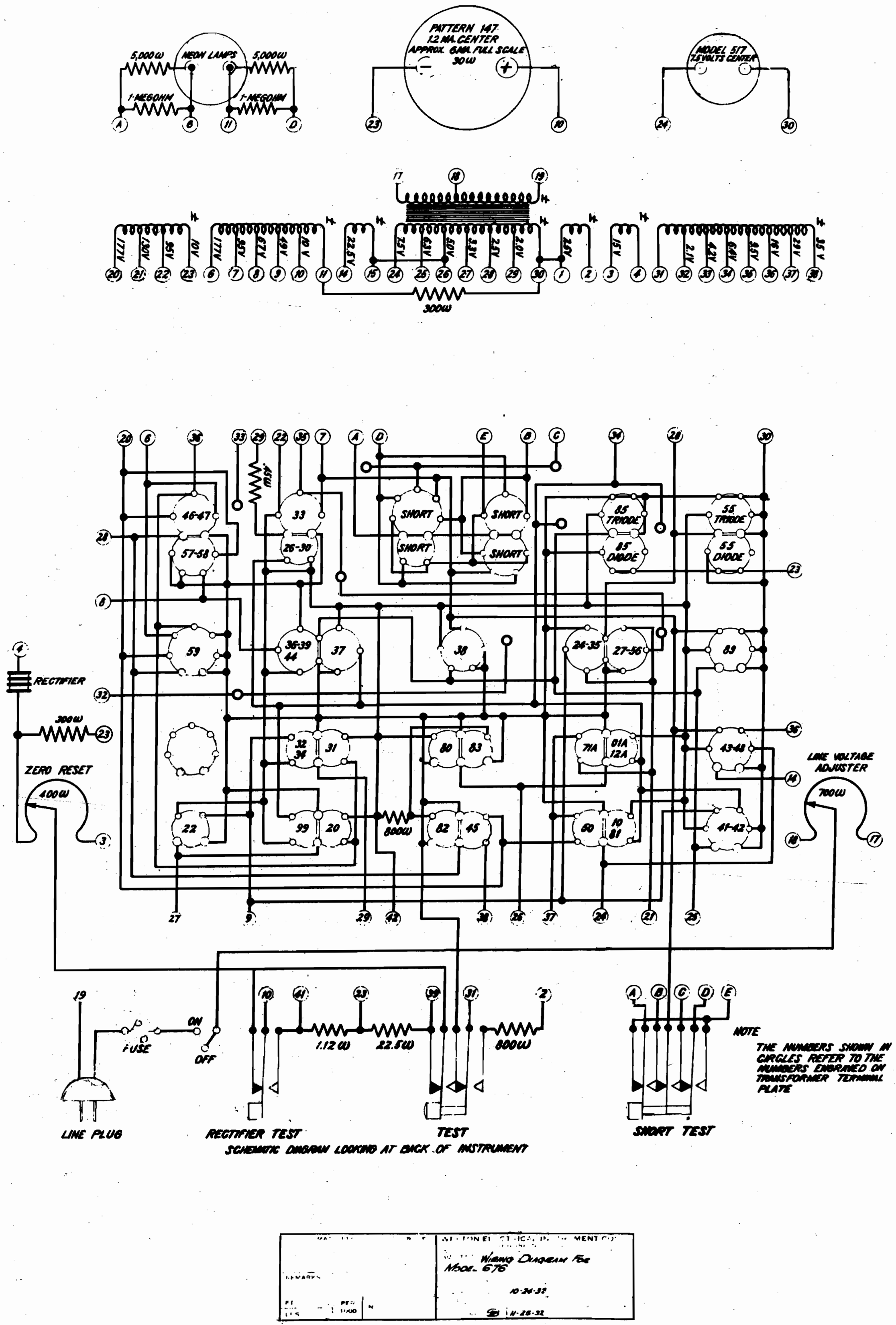
MODEL 674, Type 2
Schematic

# WESTON ELECTRICAL INSTRUMENT CORP.



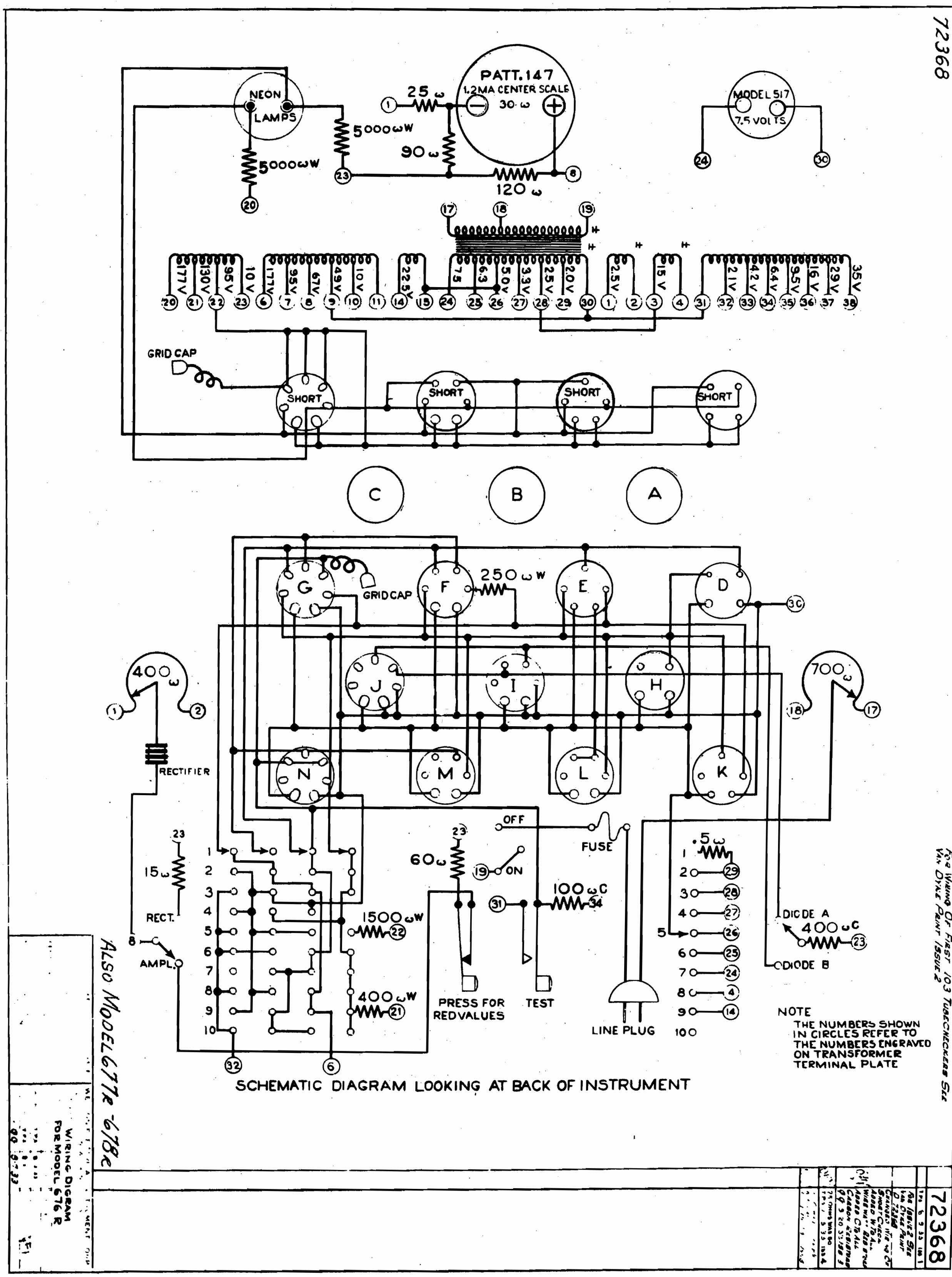
MODEL 676
Schematic

# WESTON ELECTRICAL INSTRUM'T CORP.



WESTON ELECTRICAL INSTRUM'T CORP.

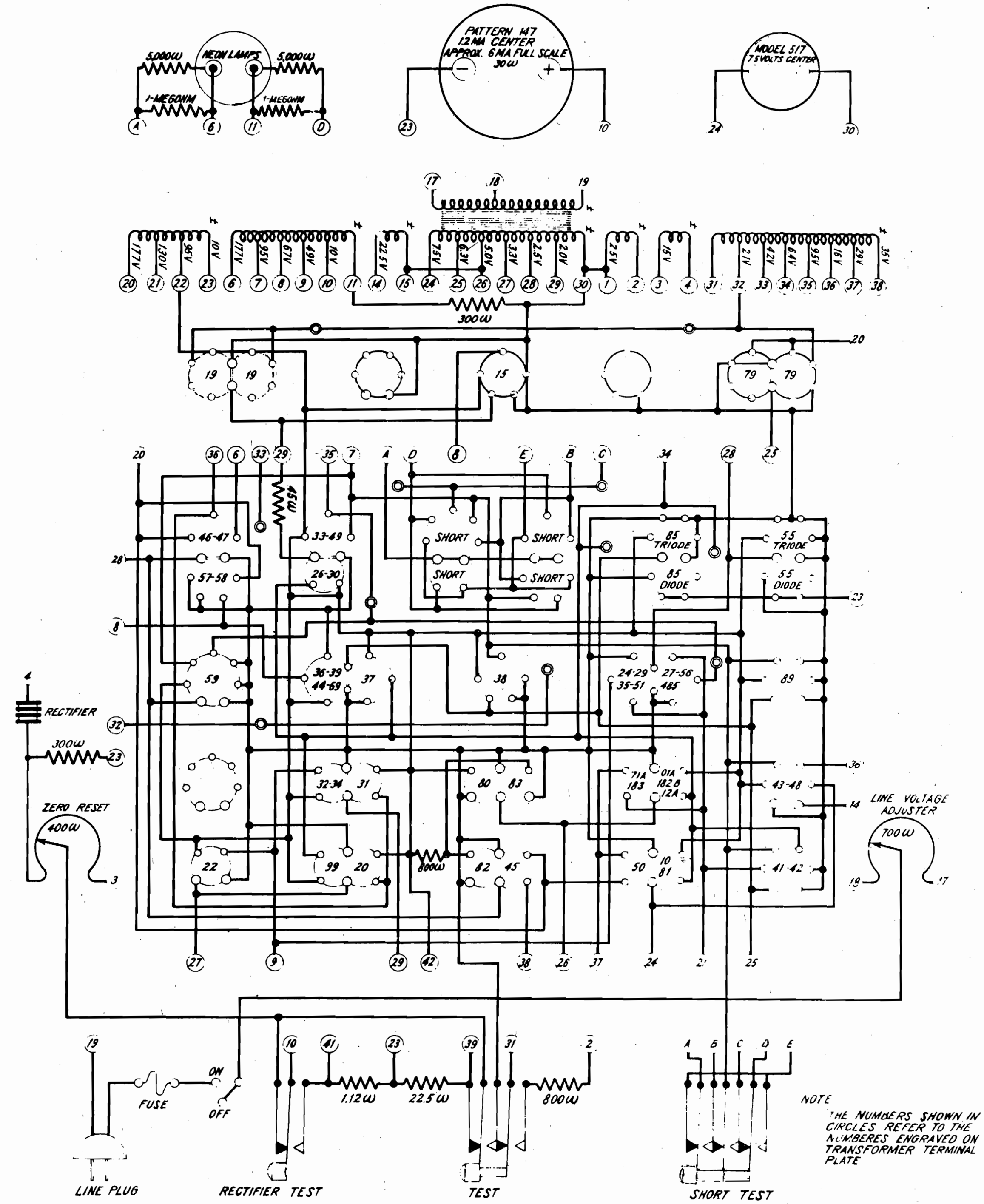
MODEL 676-R, 677-R, 678-R
Schematic




SCHEMATIC DIAGRAM LOOKING AT BACK OF INSTRUMENT

MODEL 677,678
Schematic

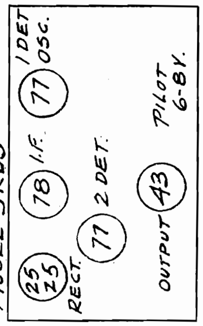
# WESTON ELECTRICAL INSTRUM'T CORP.




SCHEMATIC DIAGRAM LOOKING AT BACK OF INSTRUMENT

MODEL 3KD5
Schematic
Voltage
Socket

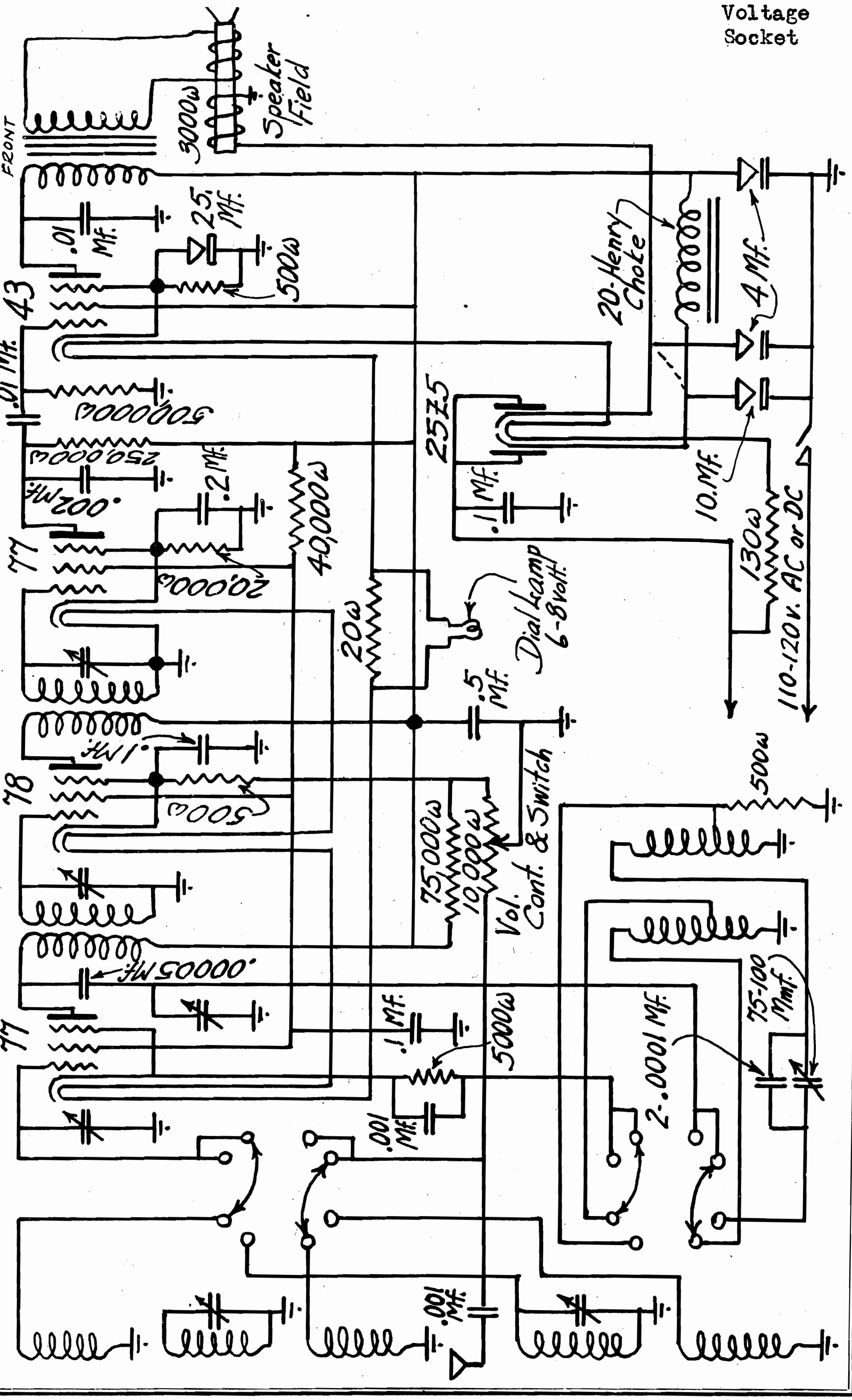
# WILCOX-GAY CORP.




Speaker Field Voltage 135 v.

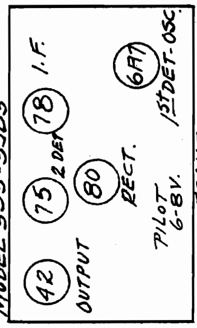
IF PEAK 115 KC.

| TUBE | CIRCUIT | PLATE | SCREEN GRID | CATHODE |
|---|---|---|---|---|
| 77 | Det-Osc. | 113 | 65 | 3.5 |
| 78 | IF | 118 | 65 | 2.2 |
| 77 | 2nd Det. | 52 | 65 | 3.2 |
| 43 | Output | 111 | 118 | 17 |



MODEL 3SB5
Schematic
Voltage
Socket

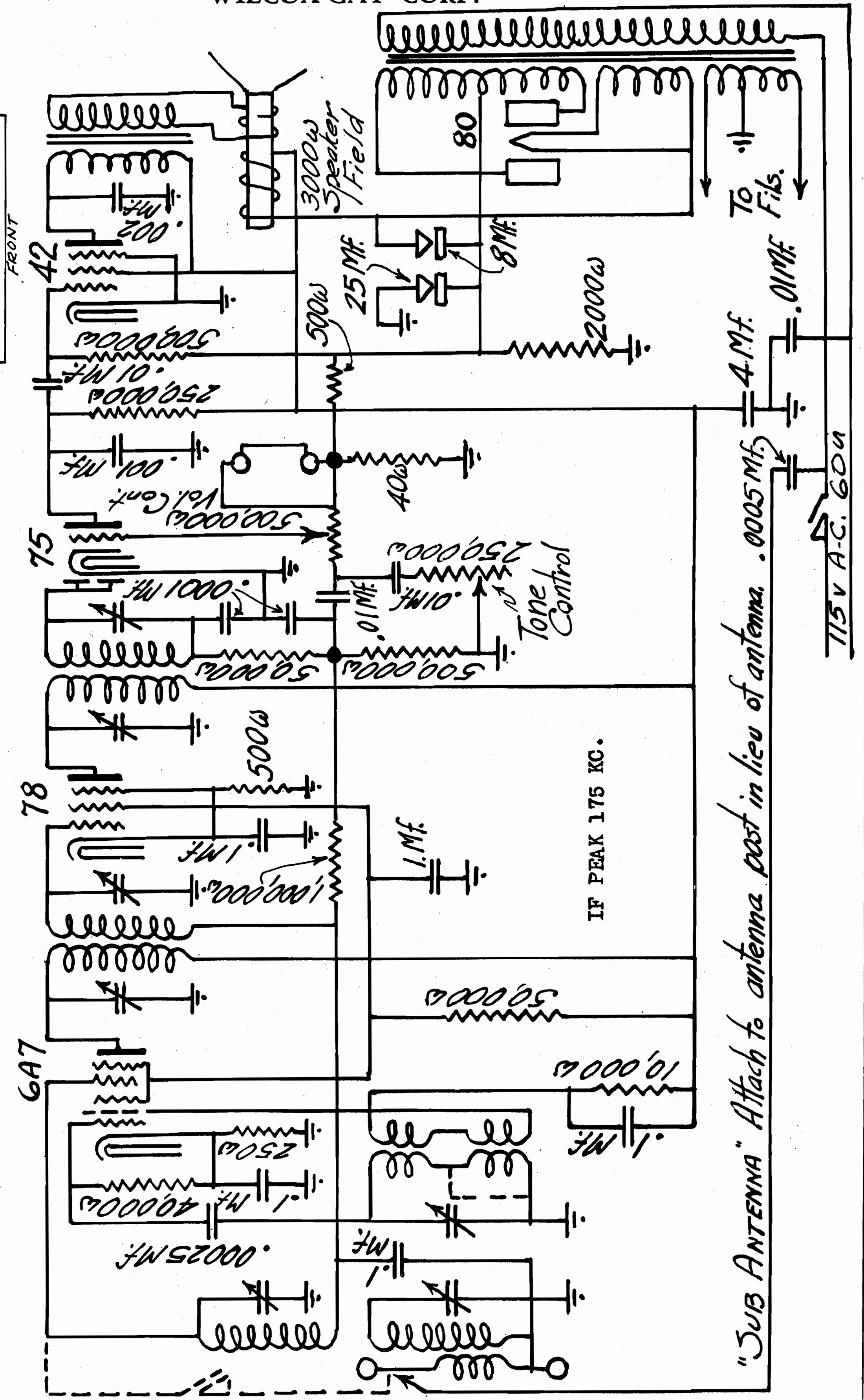
WILCOX-GAY CORP.




| TUBE | CIRCUIT | PLATE | SCREEN | GRID | CATHODE |
|---|---|---|---|---|---|
| 6A7 | Det-Osc. | 240 | 84 | | 4 |
| 78 | IF | 240 | 82 | | 4 |
| 75 | 2nd Det. | 104 | | | 0 |
| 42 | Output | 232 | 240 | | 0 |

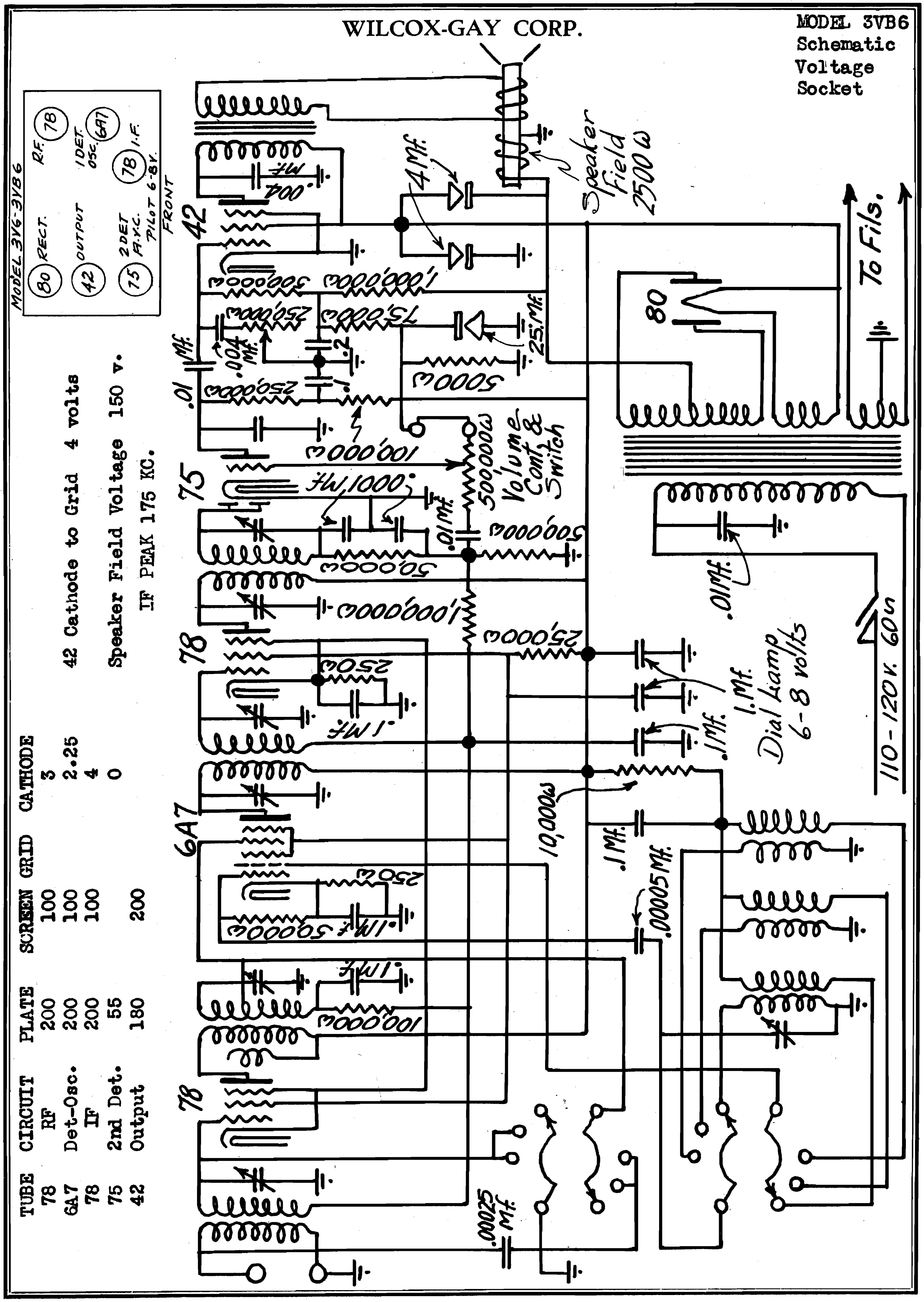
42 Grid to Cathode 10 volts
Speaker Field 125 volts

IF PEAK 175 KC.



WILCOX-GAY CORP.

MODEL 3VB6
Schematic
Voltage
Socket




| TUBE | CIRCUIT | PLATE | SCREEN GRID | CATHODE |
|---|---|---|---|---|
| 78 | RF | 200 | 100 | 3 |
| 6A7 | Det-Osc. | 200 | 100 | 2.25 |
| 78 | IF | 200 | 100 | 4 |
| 75 | 2nd Det. | 55 | | 0 |
| 42 | Output | 180 | 200 | |

42 Cathode to Grid 4 volts

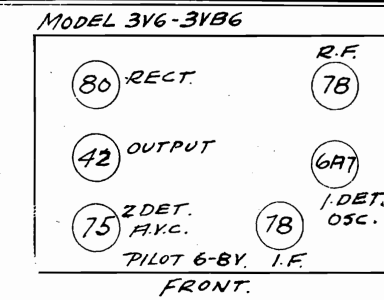
Speaker Field Voltage 150 v.

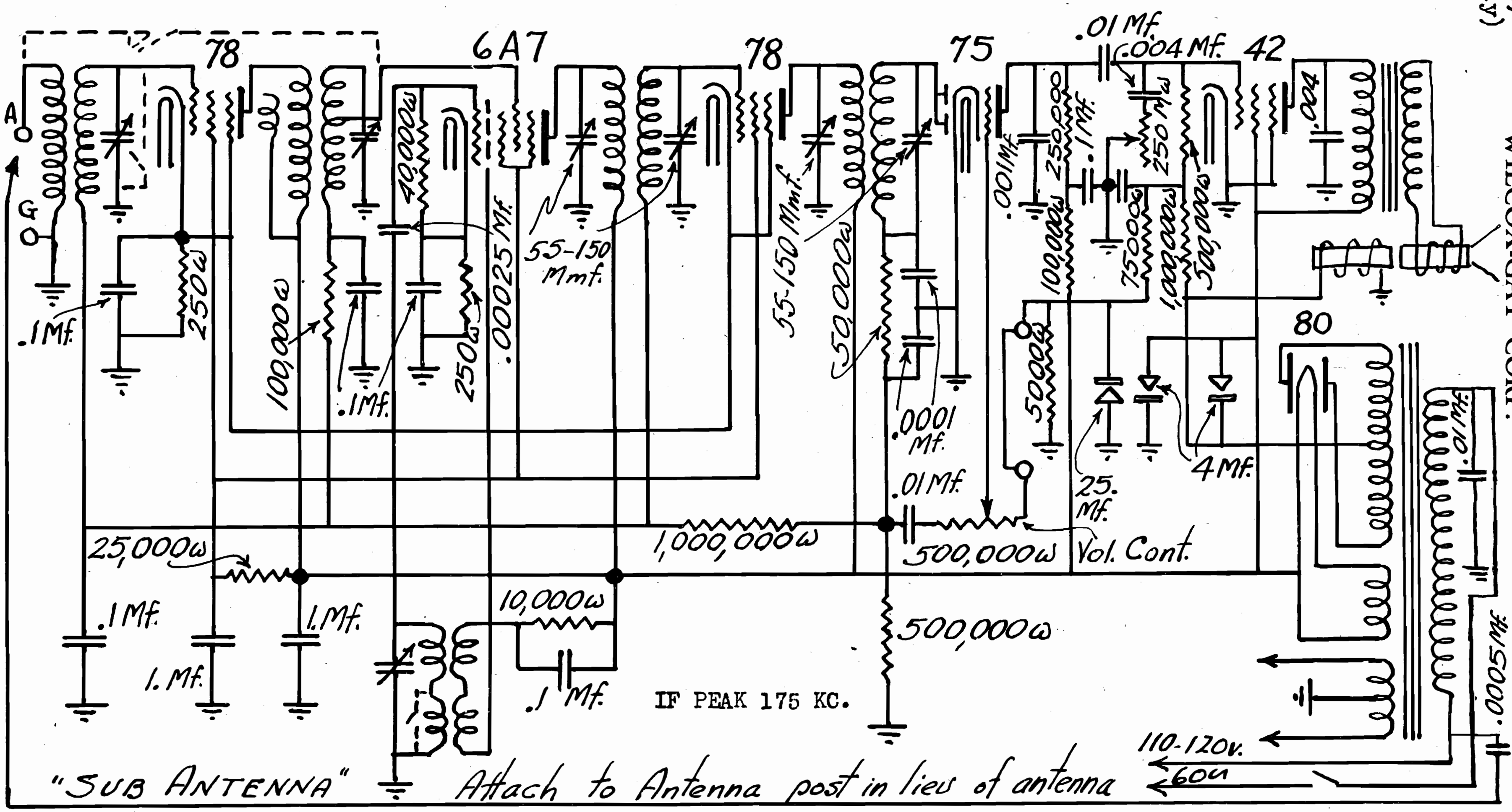
IF PEAK 175 KC.

MODEL 3V6 (BC & SW)
MODEL 3VA6 (BC Only)
Schematic, Socket Voltage

| TUBE | CIRCUIT | PLATE | SCREEN GRID | CATHODE |
|---|---|---|---|---|
| 78 | RF | 200 | 100 | 3 |
| 6A7 | Det-Osc. | 200 | 100 | 2.25 |
| 78 | IF | 200 | 100 | 4 |
| 75 | 2nd Det. | 55 | - | 0 |
| 42 | Output | 180 | 200 | |

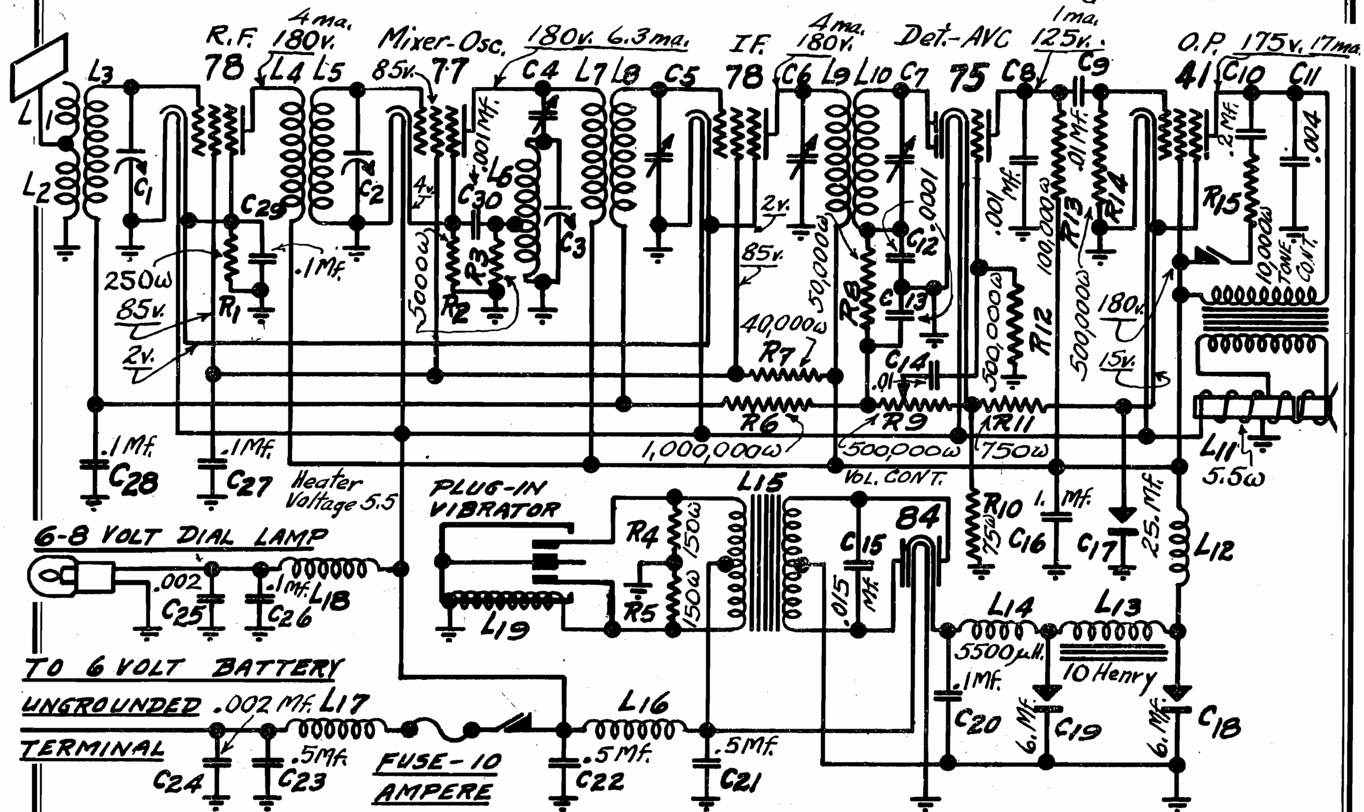
42 Cathode to Ground 4 v.
Speaker Field Voltage
150 volts



WILCOX-GAY CORP.

MODEL 4B6, Road Mate
Schematic, Voltage
Alignment




The three R. F. trimming condensers are adjusted at 1400 K. C.. Proceed as follows: Procure a modulated oscillator giving a signal at 1400 K.C..

Remove the chassis from case, couple the output of the oscillator from antenna to ground, set the dial at 1400 and the oscillator at 1400 K.C..

Place the oscillator and receiver in operation and adjust the oscillator output so that a weak signal is heard in the loudspeaker when the volume control is at its maximum position.

Then adjust the trimming condensers starting with C 3, C 2 and then C 1 until maximum output is obtained. Readjust a second time as there is a slight interlocking of adjustments.

A more accurate adjustment can be made with an output meter.

I. F. Adjustment:

The four I. F. trimming condensers are adjusted at 175 K.C.. Proceed as follows: Procure a modulated oscillator giving a signal at 175 K.C., a non-metallic screw driver and an output meter.

Connect the oscillator output between the first detector grid and ground. Connect output meter.

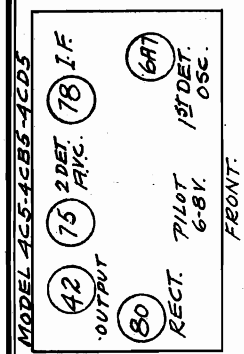
IF PEAK 175 KC.

Adjust the tuning condenser so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the oscillator output until a small deflection is obtained. Unless this is done the action of the AVC will make it impossible to obtain correct adjustments.

Trim in order C 4, C 5, C 6 and C 7, repeat adjustments and then follow with the R. F. adjustments.

MODEL 4C5,4CB5 (BC & SW)
MODEL 4CA5 (BC Only)
Schematic,Voltage,Socket

WILCOX-GAY CORP.

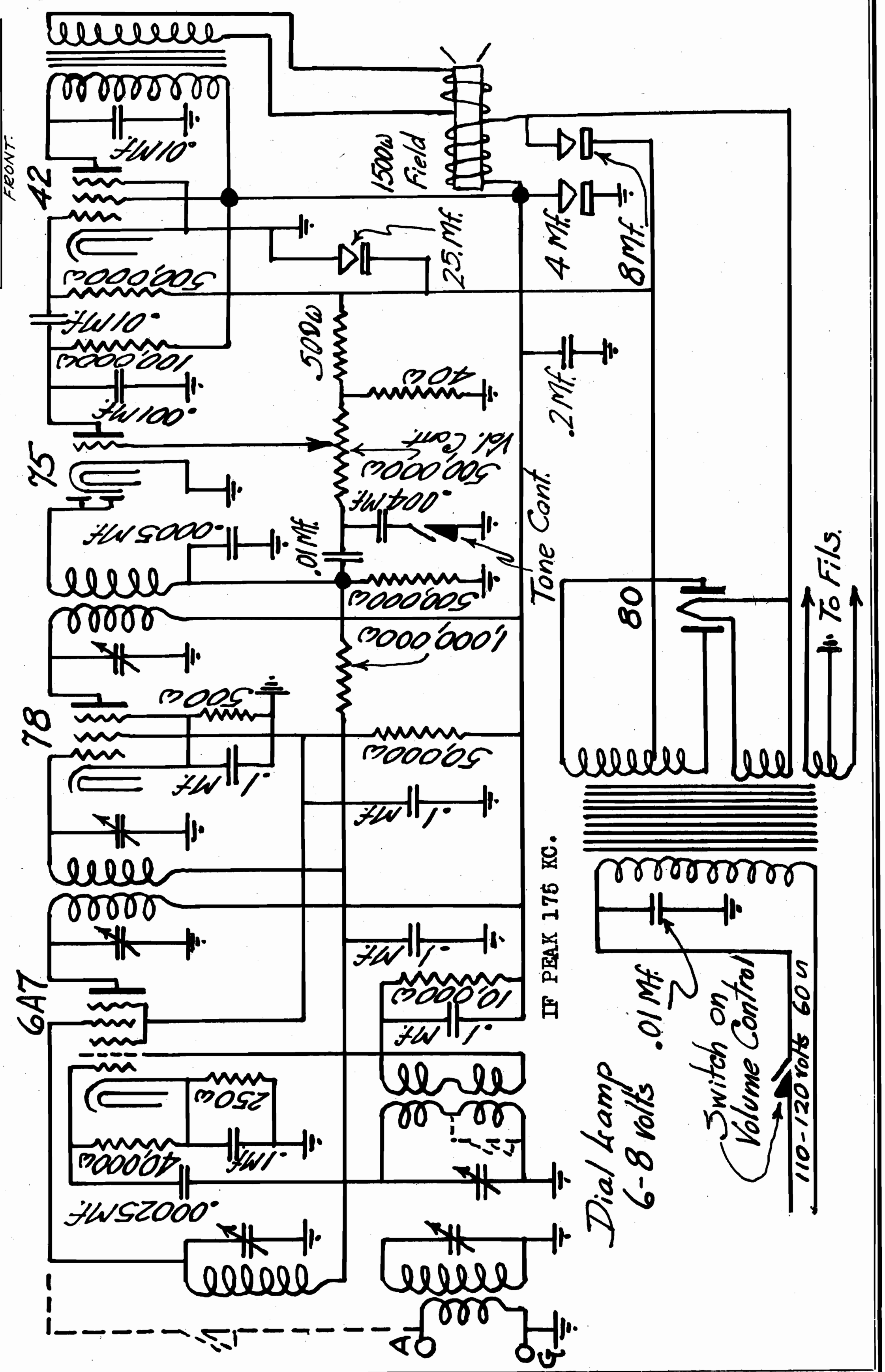


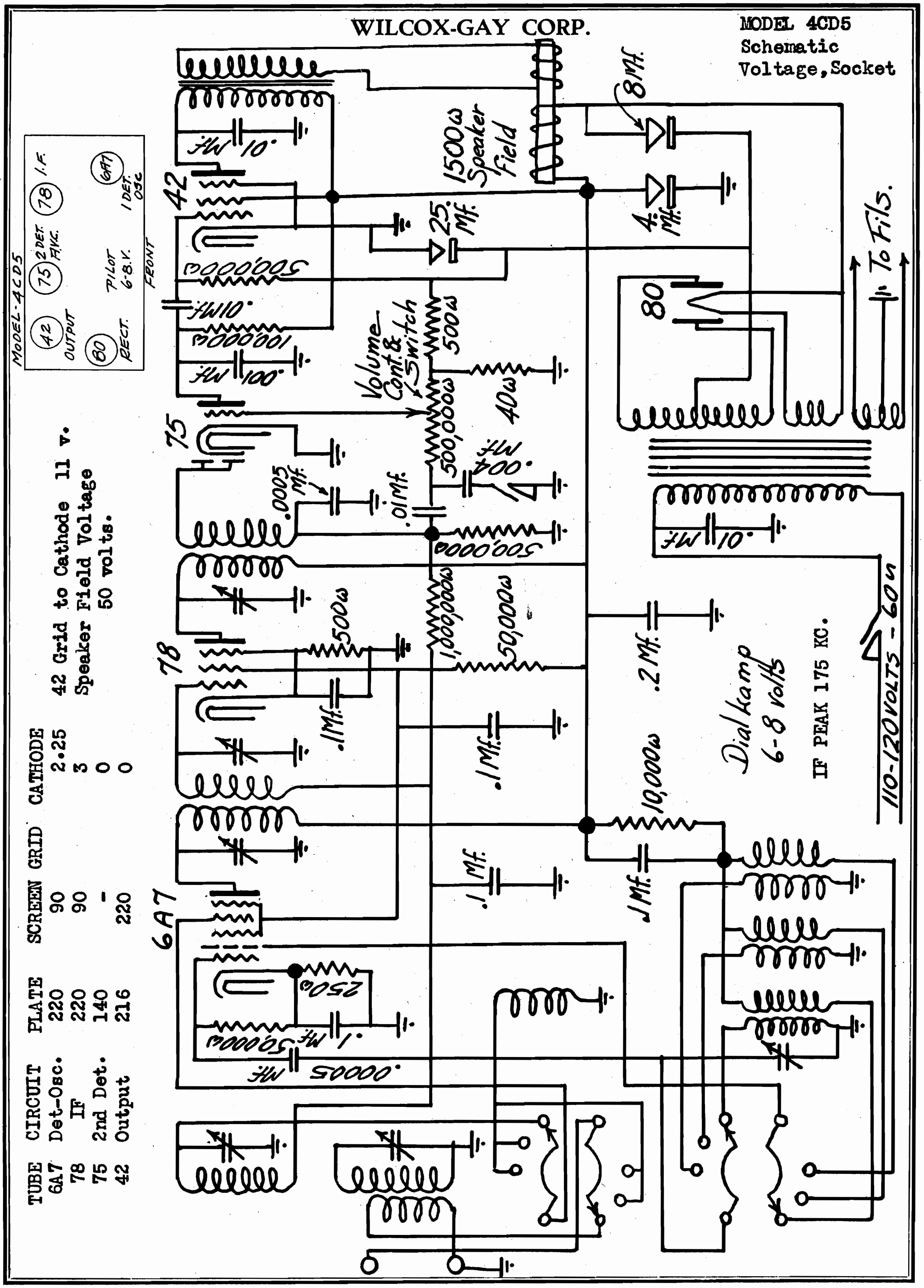

| TUBE | CIRCUIT | PLATE | SCREEN GRID | CATHODE |
|---|---|---|---|---|
| 6A7 | Det-Osc. | 220 | 90 | 2.25 |
| 78 | IF | 220 | 90 | 3 |
| 75 | 2nd Det. | 140 | — | 0 |
| 42 | Output | 216 | 220 | 0 |

42 Grid to Cathode 11 v.

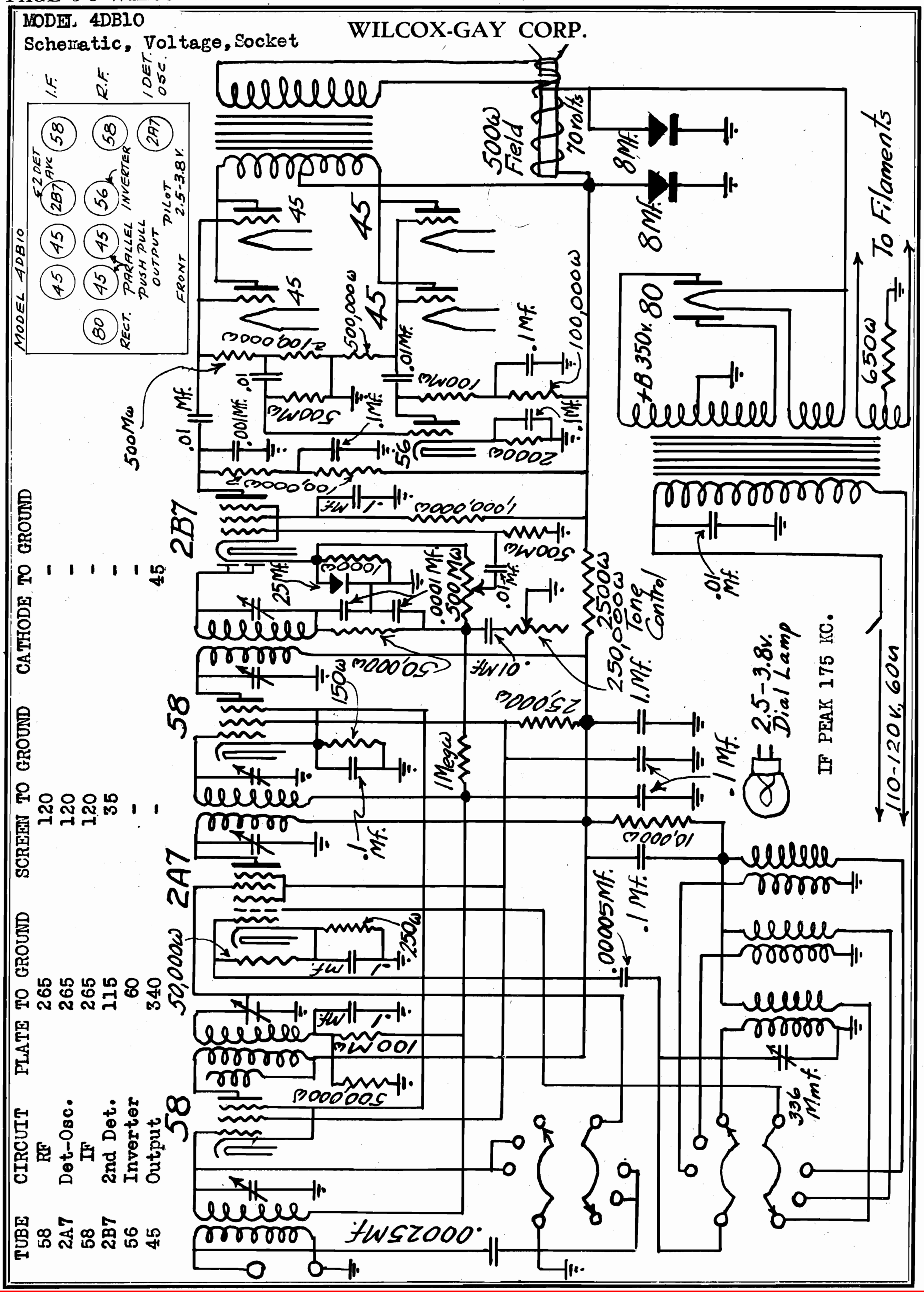
Speaker Field Voltage 50 volts

IF PEAK 175 KC.




WILCOX-GAY CORP.
MODEL 4CD5
Schematic
Voltage, Socket
TUBE CIRCUIT PLATE SCREEN GRID CATHODE
6A7 Det-Osc. 220 90 2.25
78 IF 220 90 3
75 2nd Det. 140 - 0
42 Output 216 220 0
42 Grid to Cathode 11 v.
Speaker Field Voltage 50 volts.
IF PEAK 175 KC.
MODEL-4CD5
42 OUTPUT
75 2 DET. AVC.
78 I.F.
80 RECT.
PILOT 6-8.V.
6A7 1 DET. OSC.
FRONT
1500ω Speaker Field
8Mf.
4.Mf.
25.Mf.
Volume Cont. & Switch
500ω
40ω
500,000ω
.004 Mf
.01Mf.
.0005 Mf.
500,000ω
1,000,000ω
50,000ω
500ω
.1Mf.
.2Mf.
10,000ω
Dial Lamp 6-8 volts
To Fils.
110-120 VOLTS - 60~
250ω
50,000ω
.1 Mf.
.00005 Mf.
100,000ω
10.
100.
42
75
78
6A7
80

MODEL 4DB10
Schematic, Voltage, Socket

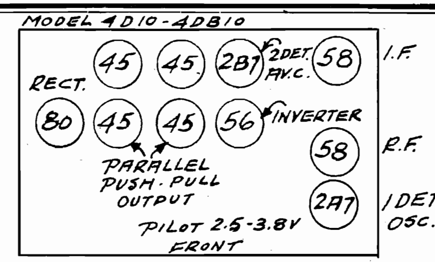


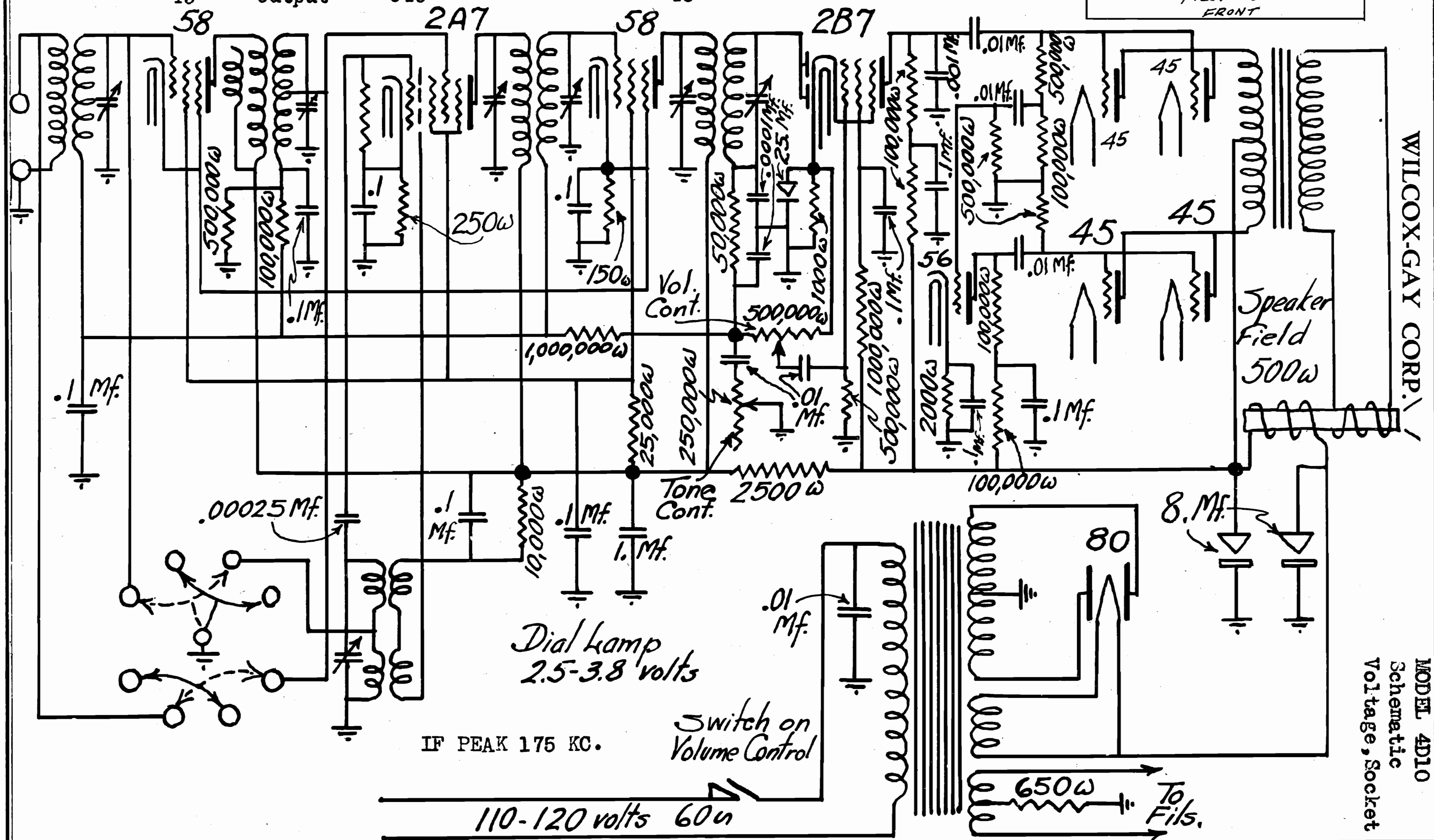

| TUBE | CIRCUIT | PLATE TO GROUND | SCREEN TO GROUND | CATHODE TO GROUND |
|---|---|---|---|---|
| 58 | RF | 265 | 120 | - |
| 2A7 | Det-Osc. | 265 | 120 | - |
| 58 | IF | 265 | 120 | - |
| 2B7 | 2nd Det. | 115 | 35 | - |
| 56 | Inverter | 60 | - | - |
| 45 | Output | 340 | - | 45 |

MODEL 4D10
Schematic
Voltage, Socket

| TUBE | CIRCUIT | PLATE | SCREEN GRID | CATHODE |
|---|---|---|---|---|
| 58 | RF | 265 | 120 | - |
| 2A7 | Det-Osc. | 265 | 120 | - |
| 58 | IF | 265 | 120 | - |
| 2B7 | 2nd Det. | 115 | 35 | - |
| 56 | Inverter | 60 | - | |
| 45 | Output | 340 | - | 45 |

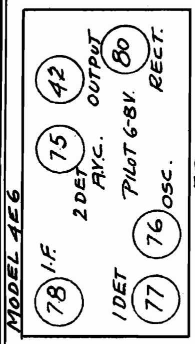
+B 350 volts
Speaker Field 70 volts

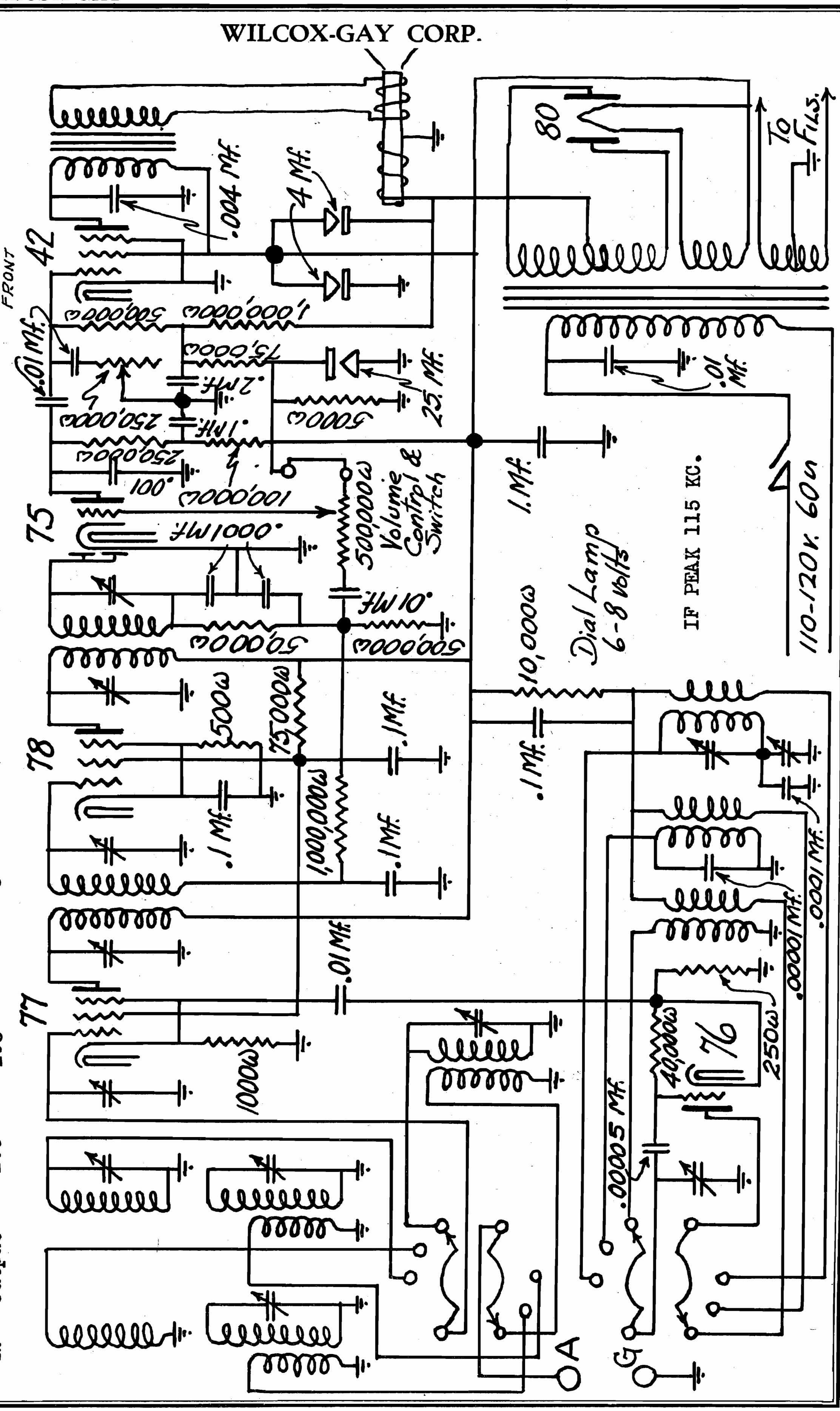


**MODEL 4E6**
**Schematic**
**Voltage**
**Socket**

WILCOX-GAY CORP.




76 Grid to Ground -10 v.
Speaker Field Voltage
147 volts

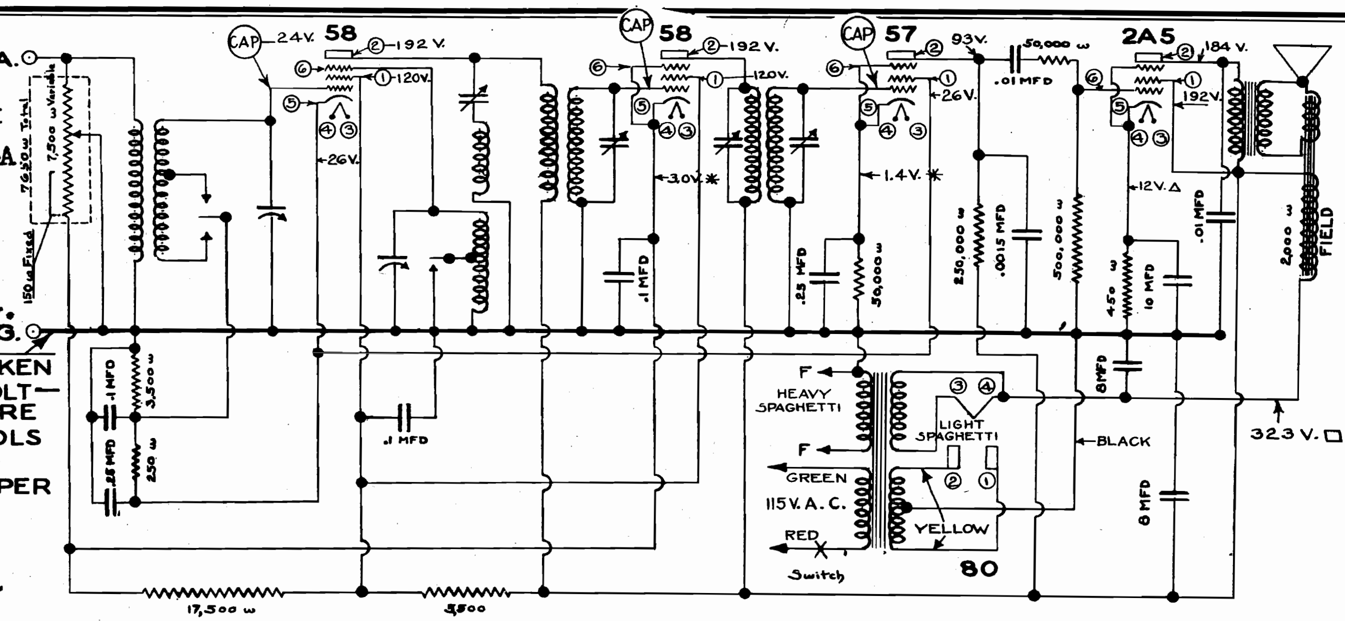
| TUBE | CIRCUIT | PLATE | SCREEN | GRID | CATHODE |
|---|---|---|---|---|---|
| 77 | 1st Det. | 195 | 80 | | 2 |
| 76 | Oscill. | 127 | | | 2 |
| 78 | IF | 195 | 80 | | 2 |
| 75 | 2nd Det. | 55 | 0 | | 0 |
| 42 | Output | 170 | 195 | | -5 |

**MODEL 450**
**Schematic**
**Socket, Voltage**

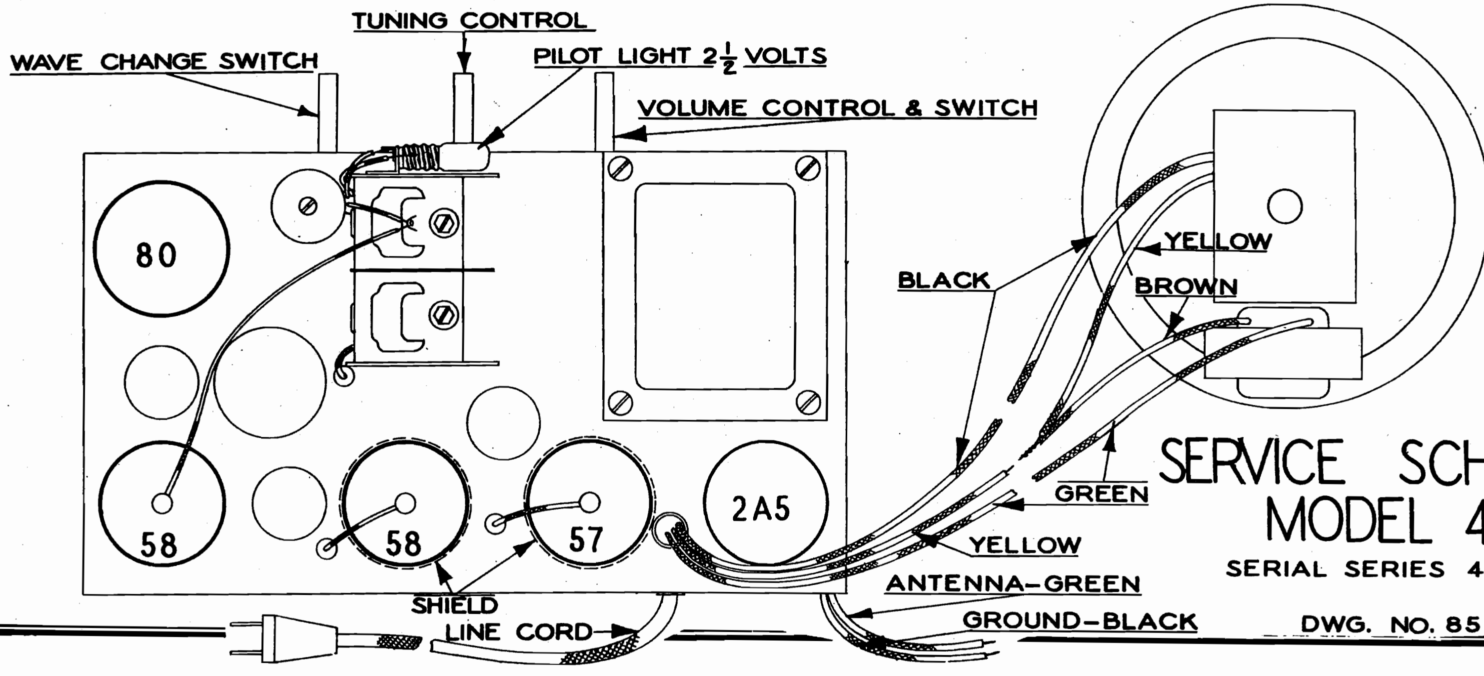
# THE RUDOLPH WURLITZER CO.

NUMBERS IN CIRCLES INDICATE TUBE ELEMENTS IN ACCORDANCE WITH R.C.A. RADIOTRON PINBASE LAYOUT.

Above Serial #4,402,001-A changes are as follows:
58 Tubes changed to 6D6
57 Tube changed to 6C6
2A5 Tube changed to 41
Pilot lamp changed to 6v.




NOTE—ALL VOLTAGES TAKEN FROM THIS POINT. ALL VOLTAGE READINGS LISTED ARE TAKEN WITH ALL CONTROLS TURNED ON FULL AND NO SIGNAL. USE 1000 OHMS PER VOLT VOLTMETER.
300 V. SCALE UNLESS OTHERWISE SPECIFIED.
□ INDICATES 600 V. SCALE.
Δ INDICATES 120 V. SCALE.
✳ INDICATES 10 V. SCALE.
LINE = 115 V. 60 CYCLE. INTERMEDIATE FREQUENCY = 456 K.C.




# SERVICE SCHEMATIC
## MODEL 450
SERIAL SERIES 4,400,001 AND UP

DWG. NO. 85

MODEL 450
Alignment Data
Parts List

THE RUDOLPH WURLITZER CO.

The Model 450 is a five tube dual band superheterodyne covering the broadcast band and an additional short-wave band of from 1440 to 3500 kc. The circuit used embodies a 58 oscillator-modulator, a 58 I. F. amplifier operating at 456 kc., a 57 plate circuit second detector, and a 2A5 output audio stage. The volume control functions to increase the bias on the I. F. 58 and decrease the signal from the antenna to effect a decrease in volume. In all ganging operations this control must be advanced to its maximum position (clockwise), and THE WEAKEST SIGNAL THAT WILL GIVE A SATISFACTORY INDICATION ON THE OUTPUT METER must be used.

The I.F. trimmer adjustments are carefully made at the factory and should not be tampered with unless a thorough investigation definitely proves the I.F. amplifier to be at fault. In that event:-

(a) Attach the output meter from screen to plate of the 2A5 tube.

(b) Attach the local oscillator tuned to 456 kc. to the antenna lead of the receiver and,

(c) Adjust the I.F. trimmers (screw adjustments, accessible when the name plate is removed) for maximum indication on the output meter.

There are no adjustments to be made on the short-wave band.

## TO CALIBRATE THE 450

With the band switch in the broadcast position (clockwise), set the dial to the position where a station (or oscillator) of known frequency, about 1400 kc., should come in.

(a) Adjust oscillator trimmer (screw adjustment, top-rear of gang condenser) until desired signal is received.

The calibration will fall within reasonable limits over the balance of the tuning range with no further adjustments.

## TO ALIGN THE 450

With the band switch in the broadcast position (clockwise), set the dial to approximately 1400 kc.

(a) Attach the output meter from screen to plate of the 2A5 tube.

(b) Attach the local oscillator tuned to the set to the green antenna lead and,

(c) Adjust the R. F. trimmer (screw adjustment, top, front of gang condenser) for maximum indication on output meter.

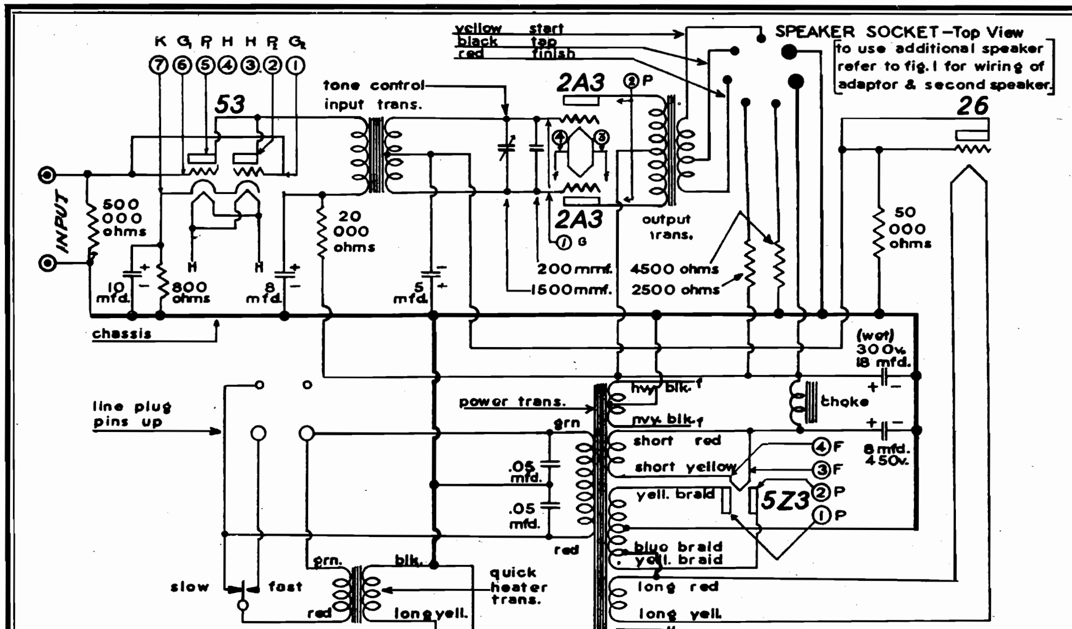
The alignment will fall within reasonable limits over the balance of the tuning range with no further adjustments.

44-4176 Coil, Antenna Assembly (1)
44-4177 Coil, Oscillator Assembly (1)
44-4164 Coil, I. F. Assembly (2)
44-3715 Condenser, 8 & 8 & 10 Mfd. (1)
44-3344 Condenser .1 & .25 Mfd. 200 Volt (2)
44-3820 Condenser .1 Mfd. 200 Volt (1)
44-3838 Condenser .01 Mfd. 600 Volt (1)
44-4233 Condenser .01 Mfd. 600 Volt (1)
44-4234 Condenser .0015 Mfd. 600 Volt (1)
44-4179 Condenser I. F. Tuning Assembly (1)
44-4162 Condenser 4 Gang & Dial Assembly (1)
    44-4237 Dial Scale & Hub Assembly (1)
44-4167 Control, Volume & Line Switch (1)
44-4186 Lamp Bracket & Socket Assembly (1)
    44-767 Dial Lamp (1)
44-2238 Line Cord (1)
44-4190 Resistor (1) Voltage Divider
44-4187 Resistor 450 Ohm 1 Watt (1)

44-4182 Resistor ½ Meg Ohm ¼ Watt (1)
44-4183 Resistor ¼ Meg Ohm ¼ Watt (1)
44-4184 Resistor 50,000 Ohm ¼ Watt (1)
44-3751 Socket 4 Prong (1)
44-3866 Socket 6 Prong (4)
44-4166 Switch, Short Wave (1)
44-2663 Speaker Assembly, Jensen (1)
    44-3835 Field Coil (1)
    44-3834 Output Transformer (1)
    44-3836 Cone & Voice Coil Assembly (1)
        Above Speaker for Table Model
44-4285 Speaker Assembly, Magnavox (1)
    44-4157 Field Coil (1)
    44-4155 Output Transformer (1)
    44-4158 Cone & Voice Coil Assembly (1)
        Above Speaker for Console Model
44-4168 Transformer, Power 60 Cy. 110 Volt (1)
44-4280 Transformer, Power 25 Cy. 110 Volt (1)
44-4170 Transformer, Power 60 Cy. 230 Volt (1)

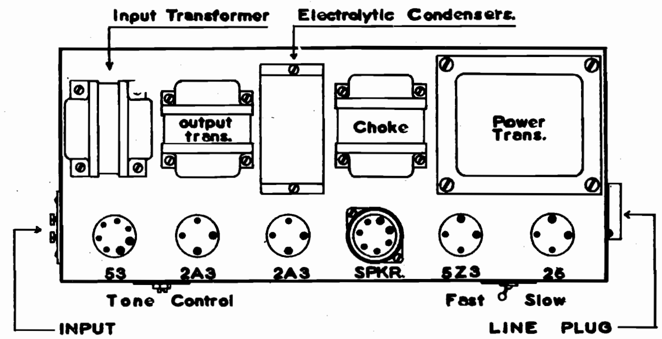
**MODEL 453 Amplifier**
**Schematic, Socket Circuit Details**

# THE RUDOLPH WURLITZER CO.

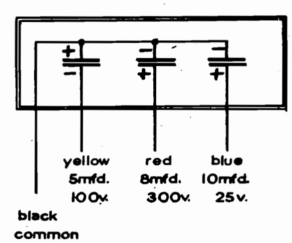



SCHEMATIC DIAGRAM
MODEL 453
POWER AMPLIFIER

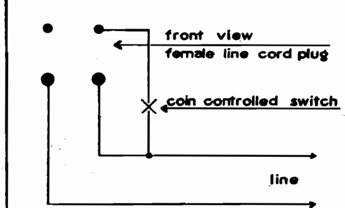
SERIAL NUMBERS
5,100,250
and up



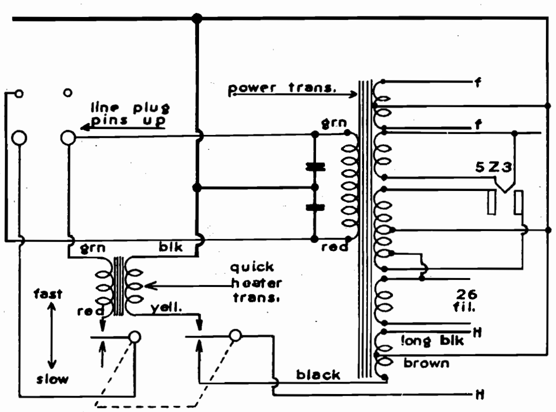

TOP VIEW — MODEL 453




Detail of 4681 Electrolytic Cond.




Detail of Line Cord Plug Connections.




QUICK HEATER TRANSFORMER CIRCUIT
SERIAL NUMBERS 5,100,001
to 5,100,249

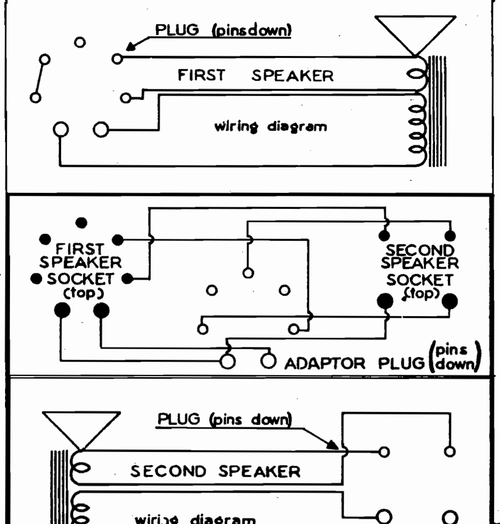



FIG. I

## NOTES

*Measure all D.C. voltages from chassis with a 1000 ohm per volt meter, with the line at 120volts 60cycle.*

*Numbers in circles indicate tube elements in accordance with RCA-Cunningham Pinbase Layouts.*

| Average A.C. Voltages. | | Average D.C. Voltages | |
|---|---|---|---|
| 5Z3 filament | 5.0 | 2A3 plates | 300 |
| 2A3 filament | 2.7 | 2A3 grids | -57 |
| 26 filament | 1.4 | 53 plates | 200 |
| 53 heater | 2.5 | 53 cathode | 4.2 |

*Amplifier Power Consumption* 130 watts.

# SERVICE SCHEMATIC

## SIMPLEX POWER AMPLIFIER

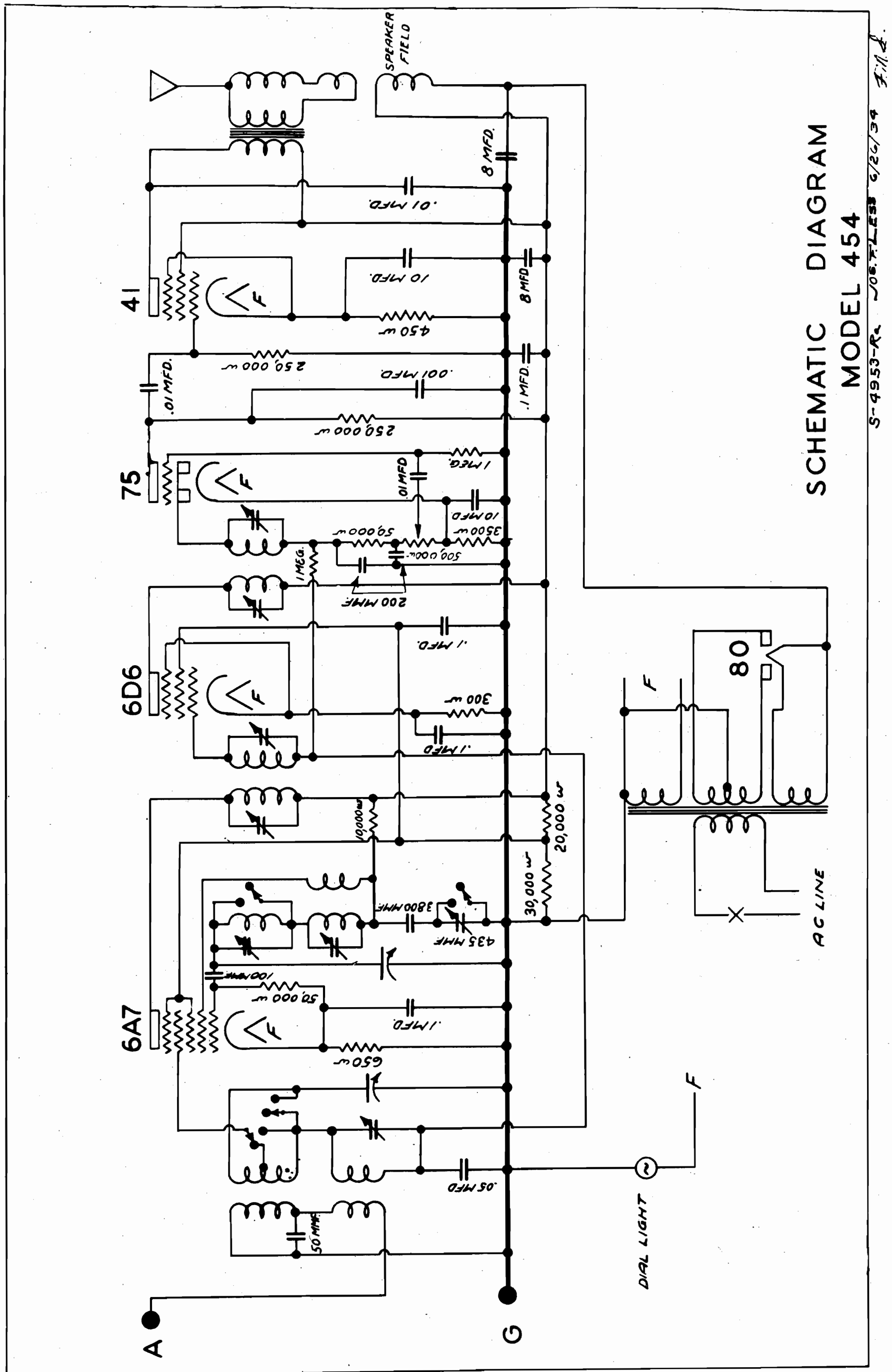
# MODEL 453

7-16-34

W. A. HAYES

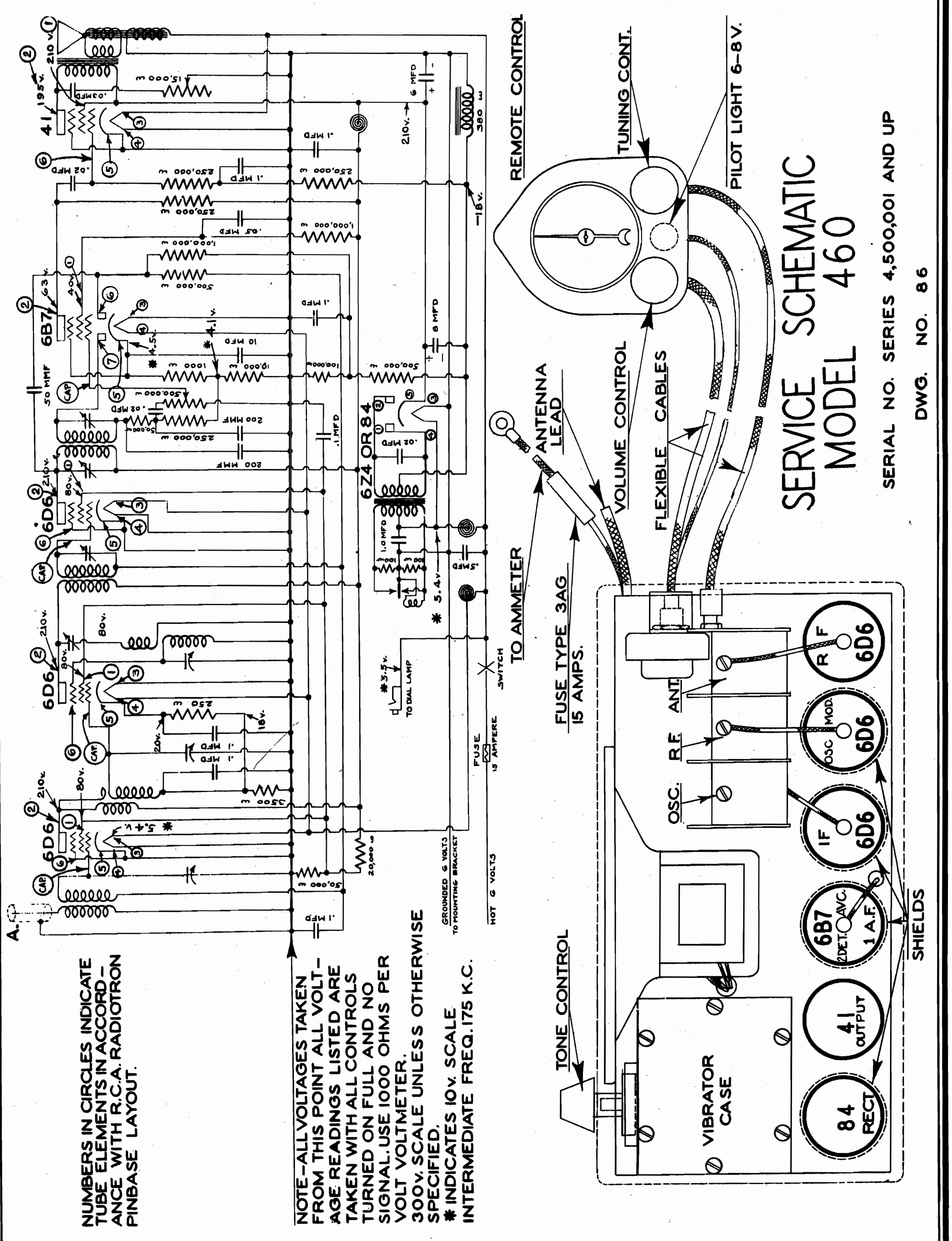
**MODEL 454**
**Schematic**

# THE RUDOLPH WURLITZER CO.



MODEL 460
Schematic
Socket
Voltage

# THE RUDOLPH WURLITZER CO.



MODEL 460
Alignment Data

# THE RUDOLPH WURLITZER CO.

The Model 460 is a 6 tube superheterodyne, completely self-contained, for operation from a 6 volt d.c. source. A cable drive remote control head is used, one cable operating the volume control and switch and the other cable operating the tuning condenser.

The circuit comprises a stage of R.F. amplification, an oscillator-modulator, and a stage of I.F. amplification at 175 kc., each using a 6D6 tube. A 6B7 is used as a diode second detector-A.V.C. and first audio stage and a 41 is used in the audio output stage. The power supply, an integral part of the chassis, uses an 85 or a 6Z4 as a full wave rectifier for the B supply. The filter choke is in the negative side of the B supply, and the voltage drop across it, after being filtered, furnished the C supply for the set.

The pentode section of the 6B7 is used as the first audio stage, resistance coupled into the 41. One of the diode plates of the 6B7 is used for the diode second detector and the other diode plate is used in the diode A.V.C. circuit. An inspection of Drawing #86 will indicate that under no-signal conditions, the cathode of the 6B7 is considerably more positive than the A.V.C. diode plate. As a result no current will flow through the A.V.C. diode until the signal applied to this diode plate is greater than the bias on the 6B7 cathode. The advantage of the circuit is two--fold, greater volume on weak signals and more uniform volume on all signals than straight diode A.V.C. provides.

IN ALL GANGING OPERATIONS USE THE WEAKEST SIGNAL THAT WILL GIVE A SATISFACTORY INDICATION ON THE OUTPUT METER and turn both the volume and tone controls to their maximum positions (clock-wise).

TO ALIGN (or gang) THE I.F. CIRCUITS

(1) Attach the output meter from screen to plate of the 41 tube.

(2) Feed the signal from the local oscillator tuned to exactly 175 kc. into the receiver at the control grid of the oscillator-modulator 6D6.

(3) Adjust the I.F. trimmers for maximum indication on the output meter, ALWAYS KEEPING THE SIGNAL INPUT LOW.

(a) The first I.F. trimmers are mounted in the end of the first I.F. transformer located between the gang condenser and the chassis pan. The nut adjusts the primary trimmer.

(b) The second I.F. trimmers are mounted in the end of the second I.F. transformer, located under the chassis pan directly below the speaker field. The nut adjusts the primary trimmer.

TO CALIBRATE THE OSCILLATOR

(1) Set the dial pointer to 53 with the plates entirely enmeshed.

(2) Set the dial pointer to the position where a station or (oscillator) of known frequency, about 1500 kc., should be received and adjust oscillator trimmer (screw adjustment, top of gang condenser, inside end) until the desired signal is heard.

(3) Set the dial pointer to the position where a station (or oscillator) of known frequency, about 1100 kc., should be received and correct calibration (if necessary) by bending the rotor plates of the inside gang condenser section.

(4) Repeat operation 3 at, or near, 850 kc.

(5) Repeat operation 3 at, or near, 700 kc.

(6) Repeat operation 3 at, or near, 580 kc.

TO ALIGN (or gang) THE R.F. CIRCUITS

(1) Attach the output meter from screen to plate of the 41 tube.

(2) Attach the local oscillator to the antenna lead and KEEP THE SIGNAL INPUT L W.

(3) With the receiver and oscillator tuned to resonance at, or near, 1500 kc. adjust the antenna and R.F trimmers (screw adjustments, top of gang condenser, outside and middle sections) until maximum output is obtained.

(4) With the receiver and oscillator tuned to resonance at, or near, 1100 kc. bend the rotor plates of the outside and middle gang condenser sections to obtain maximum output.

(5) Repeat operation 4 at, or near, 850 kc.

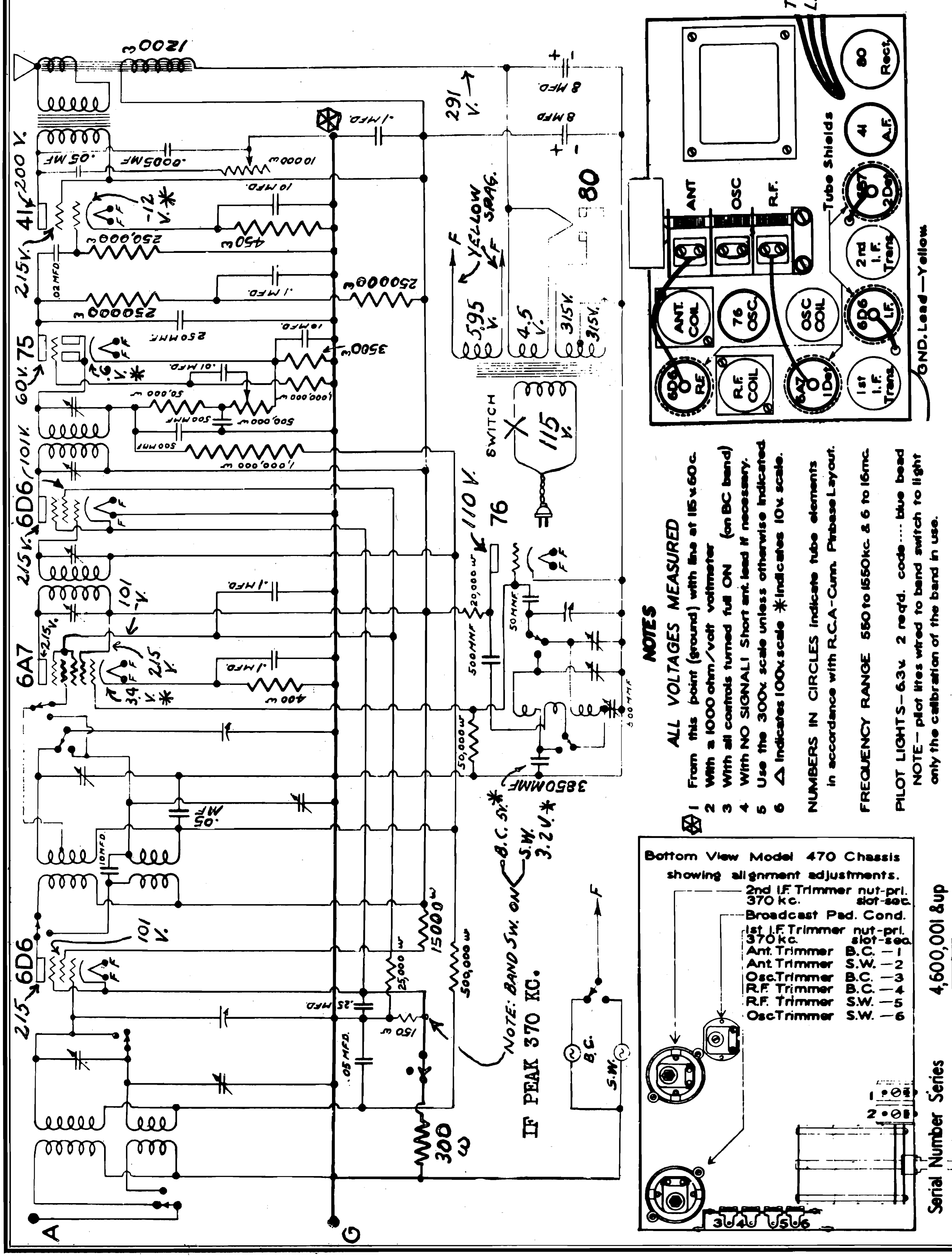
(6) Repeat operation 4 at, or near, 700 kc.

(7) Repeat operation 4 at, or near, 580 kc.

NOTE--RE OPERATION 2, CALIBRATION PROCEDURE: If more than one position of the oscillator trimmer enables the desired signal to be received REDUCE THE INPUT TO THE RECEIVER until one, and only one position of the oscillator trimmer will enable the desired signal to be received.

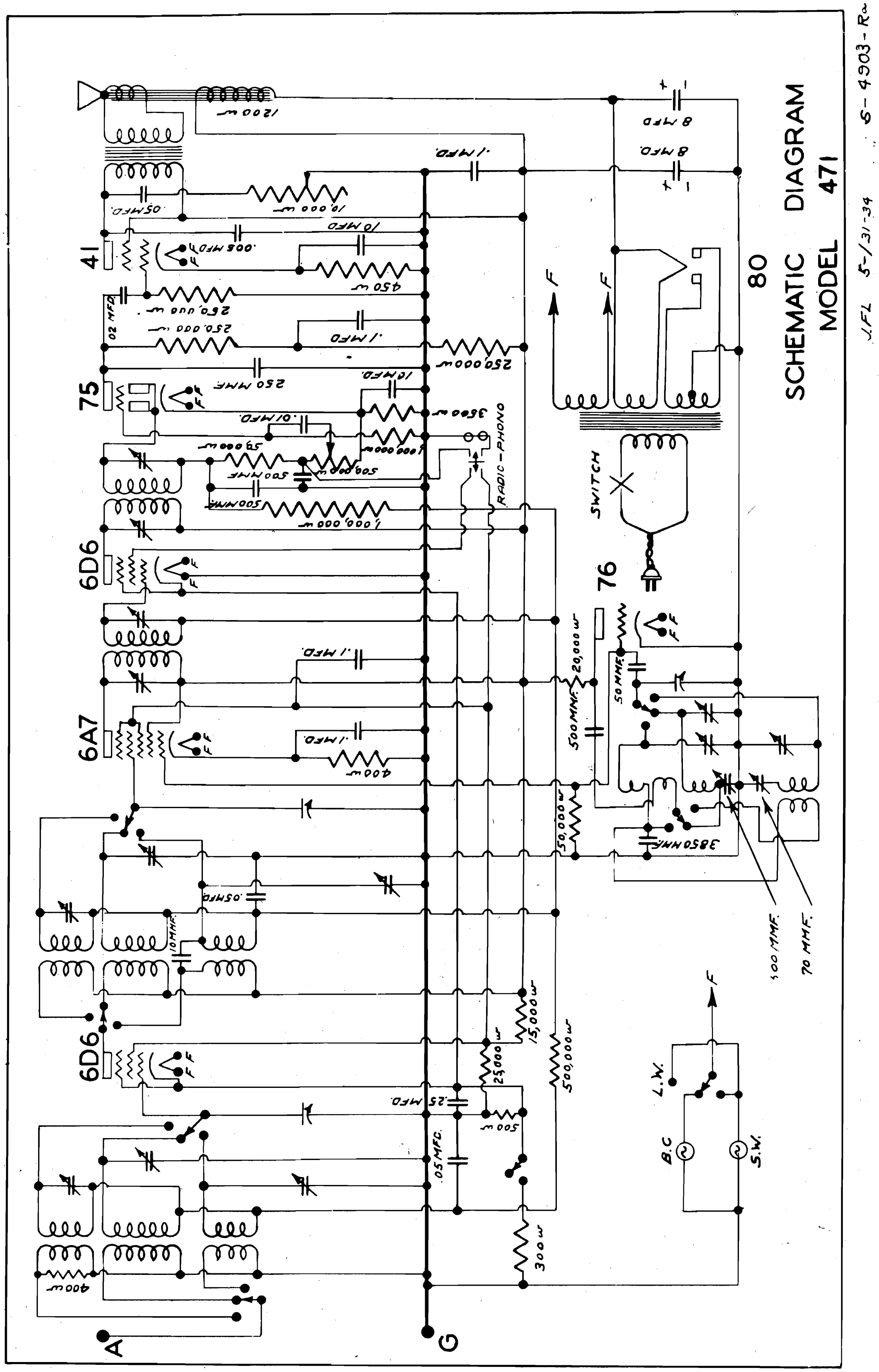
# THE RUDOLPH WURLITZER CO.

**MODEL 470**
Schematic
Socket
Voltage



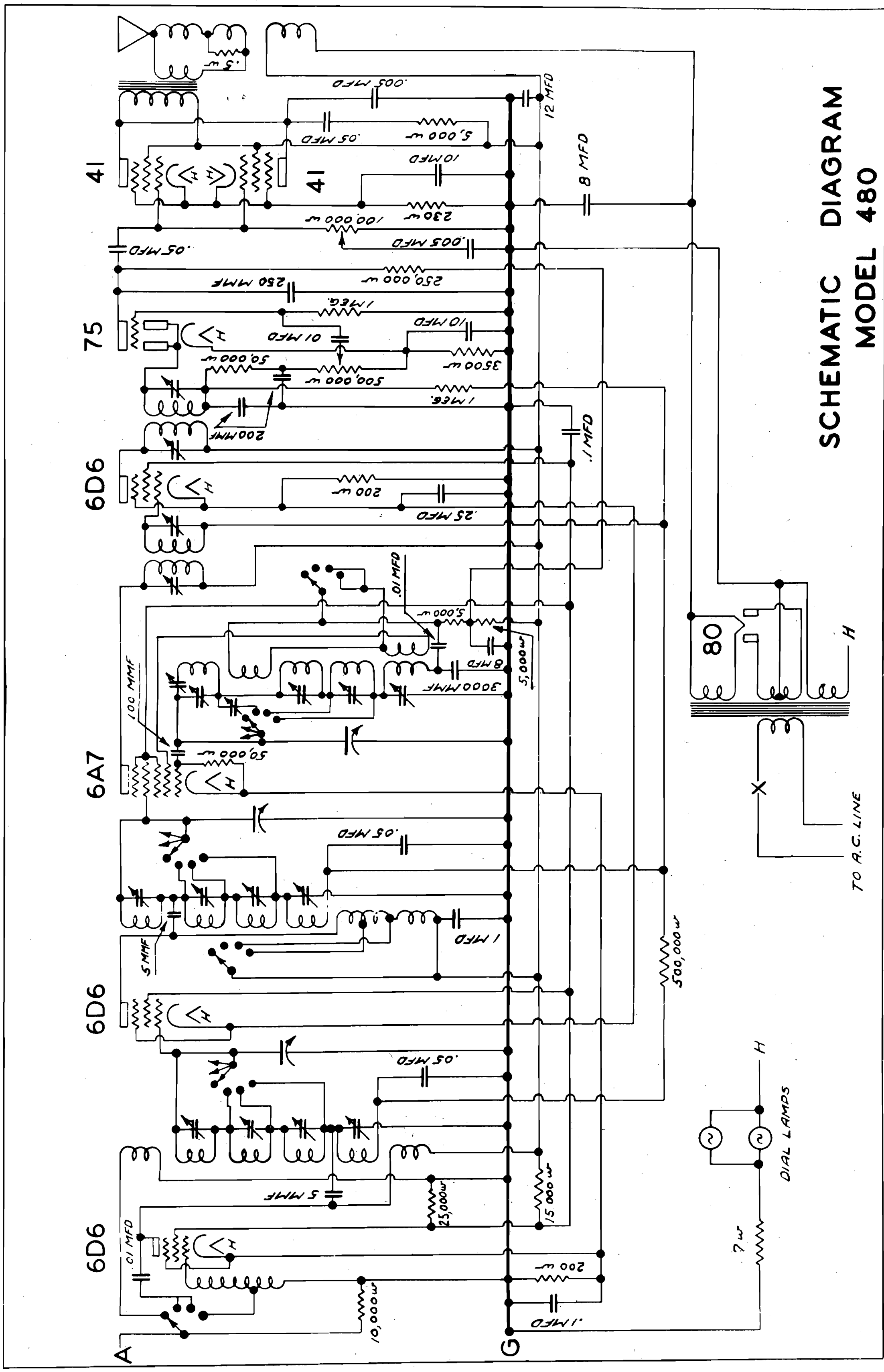
**MODEL 471**
**Schematic**

# THE RUDOLPH WURLITZER CO.



MODEL 480
Schematic

# THE RUDOLPH WURLITZER CO.



MODEL Lyric C-4, M-4
Notes, Alignment Data

THE RUDOLPH WURLITZER CO.

The only difference between the Lyric Models C-4 and M-4 is the placement of the volume control and gang condenser. On the Model C-4 the volume control is mounted on a bracket at the left, and the gang condenser on the right. On the Model M-4 the volume control is mounted below the gang condenser on the right. Hereinafter these models are referred to indiscriminately as Model C/M-4. The early Model C/M-4 is a single (broadcast) band receiver. The later models have an additional short wave band, approximately 1500 to 4000 kc., which is selected by a toggle switch at the right rear of the chassis pan. There are no calibration or alignment adjustments to make on this band. For short wave reception the switch must be thrown toward the end of the chassis pan. For Broadcast reception, toward the center of the chassis pan.

Connect the output meter (when used) from screen to plate of 43 tube.

Advance the volume control to its maximum position (clockwise).

In all ganging operations USE THE WEAKEST SIGNAL THAT WILL GIVE A SATISFACTORY INDICATION ON THE OUTPUT METER. Do this by reducing the input, NOT BY RETARDING THE VOLUME CONTROL.

The C/M-4 uses the 6B7 as a reflexed I.F.--A.F. amplifier, and the I.F. trimmer adjustments are very critical. For this reason, and because these adjustments are carefully made at the factory, the alignment of the I.F. trimmers is not recommended. If, however, the I.F. amplifier is definitely at fault--the following procedure should be followed:-

(1) Attach the output meter from screen to plate of 43 tube.

(2) Attach antenna lead to local oscillator tuned to 456 kc.

(3) KEEPING THE INPUT FROM THE LOCAL OSCILLATOR AS LOW AS POSSIBLE, adjust the I.F. trimmers for maximum reading on the output meter.

(A) The first I.F. trimmer is located under the chassis pan, adjustable through a hole in the chassis pan, near right center, directly in front of the first I.F. transformer. The slot adjustment is the primary trimmer. The nut ($\frac{1}{4}$" hex) adjustment is the secondary trimmer.

(B) The second I.F. trimmer is located under the chassis pan, adjustable through a hole in the chassis pan, left center, near volume control.

TO CALIBRATE THE C/M-4

(1) Throw the toggle switch (if any) to the broadcast position.

(2) Set the gang condenser to the position where a station (or oscillator) of known frequency, about 1500 kc., should be received.

(3) Adjust the oscillator trimmer (screw adjustment, top of gang condenser, front end) until desired signal is heard. The calibration of the rest of the dial will fall within reasonable limits without further adjustment.

TO ALIGN (or gang) THE C/M-4

(1) Throw the toggle switch (if any) to the broadcast position.

(2) Connect the output meter from screen to plate of the 43 tube.

(3) Turn condenser to approximately 1400 kc., connect antenna lead to local oscillator tuned to set, and check setting of volume control.

(4) Adjust R. F. trimmer (screw adjustment, rear end, top of gang condenser) until output meter indicates maximum output. KEEP SIGNAL INPUT LOW. The alignment of the balance of the tuning range will fall within reasonable limits with no further adjustments.

ALIGNMENT PROCEDURE FOR LYRIC C-4 & M-4

THE RUDOLPH WURLITZER CO.

## ALIGNMENT PROCEDURE FOR MODEL P-5

The Lyric Model P-5 is a five tube superheterodyne of the universal type with the heaters of the tubes connected in series. A 456 kc. I. F. amplifier is used and a series (acceptor) wave trap is shunted across the primary of the antenna coil to minimize the pick-up of stations operating at, or very near, the I. F.

The circuit used includes, a 6A7 electron coupled oscillator-first detector, and a 75 duplex diode hi-mu triode in the second detector-first A. F. circuit. Diode type A. V. C. is employed.

The first I. F. transformer is fitted with an adjustable tickler to control the sensitivity of the receiver. This tickler is mounted on a small wooden dowel protruding from the center, bottom, of the transformer and is connected between the cathode and suppressor of the 78 I. F. tube. To increase the sensitivity of this receiver, pull out on the dowel. To decrease the sensitivity of, (or to stabalize), this receiver, push the dowel in.

A socket is provided at which the autodaptor may be connected, thus enabling the P-5 to be operated from a 6 volt D. C. source.

IN ALL GANGING OPERATIONS USE THE WEAKEST SIGNAL THAT WILL GIVE A SATISFACTORY INDICATION ON THE OUTPUT METER. DO THIS BY REDUCING THE INPUT, NOT BY RETARDING THE VOLUME CONTROL.

The I. F. trimmer adjustments are carefully made at the factory and should not be tampered with unless a thorough investigation definitely proves the I. F. amplifier to be at fault. In that event:-

(1) Attach the output meter from screen to plate of the 43 tube.

(2) Attach the local oscillator, tuned to 456 kc., to the antenna lead.

(3) Adjust the I. F. trimmers for maximum indication on the output meter.

(A) The first I. F. trimmer is a dual unit, located on the rear of the chassis pan. The nut adjustment is the secondary trimmer.

(B) The second I. F. trimmer is a dual unit located on the top of the chassis pan near the volume control. The nut adjustment is the primary trimmer.

(4) Adjust the wave trap trimmer for MINIMUM indication (dip) on the output meter.

(A) This trimmer is a single unit at the extreme left end, on the rear of the chassis pan.

TO CALIBRATE THE P-5

(1) Set the condenser to the point where a station (or oscillator) of known frequency, about 1400 kc., should be received.

(2) Adjust the oscillator trimmer (screw adjustment top, front of gang condenser) until desired signal is heard. The calibration will then fall within reasonable limits with no further adjustment.

TO ALIGN (or gang) THE R. F. CIRCUIT

(1) Attach output meter from screen to plate of the 43 tube.

(2) Turn condenser to 1400 kc.

(3) Attach antenna lead to local oscillator tuned to resonance with receiver,.

(4) Adjust R. F. trimmer (screw adjustment top, rear of gang condenser) for maximum indication on the output meter. The alignment of the R. F. stage will fall within reasonable limits with no further adjustments.

MODEL SA-5
Alignment Data

# THE RUDOLPH WURLITZER CO.

The Model SA-5 is a 5 tube superheterodyne covering the broadcast band and utilizing a band pass filter between the antenna and the first detector, a 2A7 electron coupled oscillator-first detector circuit, a 175 kc., I. F. amplifier, and a 2A6 duplex diode hi-mu triode second detector-first A. F. circuit. Diode type A.V.C. is employed.

IN ALL GANGING OPERATIONS USE THE WEAKEST SIGNAL THAT WILL GIVE A SATISFACTORY INDICATION ON THE OUTPUT METER. DO THIS BY REDUCING THE INPUT, NOT BY RETARDING THE VOLUME CONTROL.

The I. F. trimmers are carefully adjusted at the factory and should not be tampered with unless a thorough investigation definitely proves the I. F. amplifier to be at fault. In that event:-

(1) Attach the output meter from screen to plate of the 2A5 tube.

(2) Attach local oscillator tuned to exactly 175 kc. to the control grid of the 2A7, providing a D. C. from this point to ground.

(3) Adjust the I. F. trimmers for maximum indication on the output meter. These I. F. trimmers are mounted on a strip extending from near the 2A7 socket toward the center of the chassis pan. A recheck of each trimmer adjustment, to insure perfect alignment of the I. F. stages, is recommended.

## TO CALIBRATE THE SA-5

(1) Set the dial to the point where a station (or oscillator) of known frequency, about 1400 kc, should be received. Adjust the oscillator trimmer (screw adjustment, top center of gang condenser) until desired signal is heard.

(2) Set the dial to the point where a station (or oscillator) of known frequency, about 1000 kc., should be received and bend the rotor plates, when necessary, to correct the calibration.

(3) Repeat operation 2 at, or near, 800 kc.

(4) Repeat operation 2 at, or near, 600 kc.

## TO ALIGN (or gang) THE R. F. CIRCUITS

(1) Set the dial to 1400 kc.

(A) Attach the output meter from screen to plate of the 2A5 tube.

(B) Attach local oscillator and tune to resonance with receiver.

(C) Adjust antenna trimmer (screw adjustment top, rear of gang condenser) for maximum indication on output meter.

(D) Adjust R. F. trimmer (screw adjustment top, front of gang condenser) for maximum indication on output meter.

(2) Set dial to 1000 kc.

(A) Adjust local oscillator to resonance with receiver.

(B) Bend rotor plates (front and rear gang condenser sections) for maximum indication on output meter.

(3) Repeat operation 2 at 800 kc.

(4) Repeat operation 2 at 600 kc.

MODEL SA-6
Alignment Data

THE RUDOLPH WURLITZER CO.

In all ganging operations USE THE WEAKEST SIGNAL THAT WILL GIVE A SATISFACTORY INDICATION ON THE OUTPUT METER. Do this by reducing the input, NOT BY RETARDING THE VOLUME CONTROL.

The I. F. trimmer adjustments are carefully made at the factory and should not be tampered with unless a thorough investigation definitely proves the I. F. amplifier to be at fault. In that event:-

1. Feed the signal from the local oscillator tuned to exactly 175 kc. into the set at the control grid 2A7, using some type of coupling device that will provide D. C. path from control grid to ground.

2. Attach the output meter from screen to plate of the 2A5 tube.

3. KEEPING THE SIGNAL AS LOW AS POSSIBLE, adjust the I. F. trimmers to give a maximum indication on the output meter. These I. F. trimmers will be found under the chassis pan, mounted on a strip extending from near the 2A7 socket to the center of the chassis pan. After having carefully adjusted these trimmers for maximum output, a final check should be made by going over each adjustment a second time to insure perfect alignment.

TO CALIBRATE THE SA-6

1. Set the dial to the point where a station (or oscillator) of known frequency, about 1400 kc., should come in. Adjust oscillator trimmer (screw adjustment top rear of gang condenser) until the desired signal is heard.

2. Set the dial to the point where a station (or oscillator) of known frequency, about 1000 kc. should come in. Then bend the rotor segments (about half engaged with the stator plates at this dial setting) to correct the calibration. If the dial reading is higher than the actual frequency, bend the segments away from the stator, and vica-versa,

3. Repeat operation two at, or near, 800 kc.

4. Repeat operation two at, or near, 600 kc.

This completes the calibration procedure.

TO ALIGN (or gang) THE R. F. CIRCUIT

1. Set dial to 1400 kc.

(A) Attach the output meter from screen to plate of the 2A5 tube.

(B) Attach the lead from local oscillator to the antenna post of the receiver, and adjust the oscillator to resonance with the receiver.

(C) KEEPING THE SIGNAL AS LOW AS POSSIBLE, adjust the antenna trimmer (screw adjustment, top of gang condenser, front end) for maximum indication on the output meter. Then-adjust the R. F. trimmer (screw adjustment, top center of gang condenser) for maximum indication on output meter.

2. Set dial to 1000 kc.

(A) Adjust the local oscillator for resonance with the receiver.

(B) Bend the segments of the rotor plates on the front and center sections of the gang condenser to give maximum indication on the output meter.

3. Repeat operation two at 800 kc.

4. Repeat operation two at 600 kc.

This completes the alignment procedure.

MODEL SA-91-A
Alignment Data

# THE RUDOLPH WURLITZER CO.

## BALANCING

Caution: When balancing radio frequency or IF circuits, be sure that the volume control is turned to the full "On" position and the output of the test oscillator adjusted to give a very weak signal. This is necessary to minimize the automatic volume control action and to permit the most accurate adjustment.

## INTERMEDIATE FREQUENCY CIRCUITS

The intermediate frequency amplifier of this receiver operates at 175 kc. and an accurately calibrated test oscillator generating this frequency is necessary for ganging.

Current from the test oscillator should be fed into the set by removing the control grid cap on the type 57 detector modulator tube, and connecting the oscillator output terminals between the chassis pan and the control grid cap of this tube.

The IF transformers are tuned by adjusting the screws under the removable name plate on the rear of the chassis.

To align the RF circuits the test oscillator should first be set to some known frequency between 1400 and 1500 kc. and the set tuned so that the dial pointer indicates this frequency. The trimmer condenser of the oscillator section of the variable condenser (front section) should then be tuned until the test signal is received with greatest output.

There are two possible adjustments on the trimmer condensers at which this signal may be received; the proper adjustment is that at which the trimmer is set to minimum capacity; that is, the adjustment at which the trimmer plate is farthest out. When this has been done the trimmer condensers of the second and third variable condensers are to be set to give maximum output.

The set should next be balanced at approximately 1250, 950, 700 and 550 kc. in the order mentioned as follows:

The test oscillator is set to some known frequency, approximately that recommended above, and the set adjusted for maximum output by bending the adjustable sections of the rotor end plates of the variable condensers. In doing this, the plates or the oscillator section should be bent first and those of the remaining sections bent after the oscillator is adjusted.

## AUTOMATIC VOLUME CONTROL

The detector and automatic gain control functions are performed by the diode section of the type 55 tube which rectifies the energy sent to it by the intermediate frequency amplifier. The DC component of this energy passes through a net work of high resistances and by-pass condensers to the control grids of the RF and IF tubes to control the amount of amplification in these stages.

An increase in signal strength results in an opposite action decreasing the amount of RF and IF amplification. The audio component of the signal rectified by the diode, is passed through the manual volume control which also serves as a part of the diode resistance net work. The adjustment of this control sets the amount of energy passed on to the audio amplifier for further amplification.

# THE RUDOLPH WURLITZER CO.

The Model SU-5 is a dual wave superheterodyne receiver covering the broadcast band (550 to 1500 kc.), and a short wave band of from 1580 to 3700 kc.

Connect the line cord lead marked with a red dot to the grounded side of the line. Connect the output meter from screen to plate of the 43 tube.

Advance the tone and volume controls to their maximum positions (clockwise).

In all ganging operations USE THE WEAKEST SIGNAL THAT WILL GIVE A SATISFACTORY INDICATION ON THE OUTPUT METER, do this by reducing the input, NOT BY RETARDING THE VOLUME CONTROL.

The I. F. trimmer adjustments are carefully made at the factory and should not be tampered with unless a thorough investigation definitely proves the I. F. amplifier is at fault, in that event:-

(1) Attach the output meter to the 43 tube.

(2) Attach antenna lead to a local oscillator tuned to 456 KC.

(3) KEEPING THE SIGNAL INPUT AS LOW AS POSSIBLE, adjust the two I. F. trimmers to give maximum indication on output meter.

(A) The first I. F. trimmer is on the rear of the chassis directly under the first I. F. transformer, between the 6A7 and 78 tubes. The slot adjustment is the primary trimmer. The hex nut adjustment is the secondary trimmer.

(B) The second I. F. trimmer is located on the top of the chassis pan, left end, near the volume control. The adjustments are the same as on the first I. F. trimmer.

UNDER NO CIRCUMSTANCES SHALL THE SINGLE TRIMMER AT THE EXTREME RIGHT REAR OF THE CHASSIS (usually marked with red) BE ADJUSTED.

TO CALIBRATE BROADCAST BAND:-

(1) Turn the band switch to the broadcast position (clockwise).

(2) Set the dial pointer to the position where a station (or oscillator) of known frequency, about 1400 kc., should come in.

(3) Adjust oscillator trimmer (screw adjustment, top of gang condenser, front-dial-end) until desired signal is heard.

The calibration of the rest of the dial will fall within reasonable limits with no further adjustment.

TO ALIGN (or gang) THE BROADCAST BAND:-

(1) Connect the output meter to the 43 tube.

(2) Set dial to approximately 1400 kc., connect antenna lead to local oscillator tuned to set, and check settings of volume and tone controls.

(3) Adjust R. F. trimmer (screw adjustment, top of gang condenser, rear end) until output meter indicates maximum output. KEEP SIGNAL INPUT LOW! The alignment over the balance of the tuning range will fall within reasonable limits without further adjustment.

TO CALIBRATE THE SHORT WAVE BAND:-

(1) Turn the band switch to the short wave position (counter-clockwise).

(2) Set the dial pointer to the position where a station (or oscillator) of known frequency about 3700 kc., should come in.

(3) Adjust the short wave oscillator trimmer (screw adjustment, under chassis pan-adjustable through hole in chassis pan top front, right corner near gang condenser) until desired signal is heard. The calibration of the rest of the dial will fall within reasonable limits without further adjustment.

TO ALIGN (or gang) THE SHORT WAVE BAND:-

(1) Connect the output meter to 43 tube.

(2) Set dial to approximately 3600 kc. (3.6 MC.), connect antenna lead to local oscillator tuned to set and check settings of tone and volume controls.

(3) Adjust short wave R. F. trimmer (screw adjustment, rear of antenna coil mounting bracket, between 6A7 and 78 tubes) until the output meter indicates maximum output. KEEP THE SIGNAL INPUT LOW! The alignment over the balance of the tuning range will fall within reasonable limits without further adjustment.

ALIGNMENT PROCEDURE FOR LYRIC SU-5

MODEL SW-88
Alignment Data

# THE RUDOLPH WURLITZER CO.

The Model SW-88 is an eight tube superheterodyne designed to receive modulated signals whose carrier frequency is between 550 and 22,000 kc. This tuning range is divided into four bands.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1st. | Scale | 550 | 1500 | kc. | 546 | 200 m. | | Broadcast. |
| 2nd. | Scale | 1450 | 3700 | kc. | 207 | 81.1 m. | | Police Calls. |
| 3rd. | Scale | 3500 | 9000 | kc. | 85.7 | 33.3 m. | | Domestic S.W. |
| 4th. | Scale | 8500 | 22000 | kc. | 35.3 | 13.6 m. | | Foreign S.W. |

The desired band is selected by a four position wave change switch mounted directly below the tuning control. This switch knob also controls the sliding mask behind the dial scale, allowing only the calibration of the band in use to be illuminated.

The Model SW-88 uses a 57 first detector, a 56 oscillator whose output is inductively coupled into the cathode circuit of the first detector, two stages of I.F. amplification(at 485 kc.) using 58 tubes, a 56 diode second detector and A.V.C. tube, a 57 first audio, and a 2A5 in the audio output stage.

IN ALL GANGING OPERATIONS USE THE WEAKEST SIGNAL THAT WILL GIVE A SATISFACTORY INDICATION ON THE OUTPUT METER, AND TURN THE VOLUME & TONE CONTROLS TO THEIR MAXIMUM POSITIONS (clockwise).

The I.F. trimmer adjustments are carefully made at the factory and should not be tampered with unless a thorough investigation definitely proves the I.F. amplifier to be at fault,in that event:-

(1) Attach the output meter from plate to screen of 2A5 tube.
(2) Feed the signal from the local oscillator tuned to exactly 485 kc. into the receiver at the control grid of the first detector, providing a D.C. path from the point to ground.
(3) Adjust the I.F. trimmers to give maximum indication on the output meter. There are three I.F. transformers, each with two screw adjustments. On the early models these adjustments are on the bottom of the transformers, accessible from the under side of the chassis. On the later models these adjustments are on the top of the transformers.
(4) NEXT-feed the 485 kc. signal in at the antenna post,replace the first detector grid cap, and adjust the wave trap condenser for MINIMUM indication on the output meter. This adjustment is a $\frac{1}{4}$" hex nut on a two plate trimmer under the chassis,below the gang condenser, near the band switch.

## TO CALIBRATE THE SW-88

(1) Set the dial to the point where a station (or oscillator) of known frequency, about 1400 kc.,should come in.
(A) Set Band switch to band 1 (top scale).
(B) Adjust oscillator trimmer (screw adjustment, top-rear of gang condenser) until desired signal is heard. There will be two peaks in adjusting this trimmer. The peak obtained with the loosest trimmer setting is correct.
(2) Repeat operation 1 at,or near,550 kc., using band 1.
(A) Adjust oscillator pad (fourth adjustment from right, on rear of chassis pan) until desired signal is heard.
(3) Repeat operation 1 at, or near,1450 kc.,using band 2.
(A) Adjust oscillator pad (third adjustment from right on rear of chassis pan) until the desired signal is heard.
(4) Repeat operation 1 at, or near, 3500 kc.,using band 3.
(A) Adjust oscillator pad (second adjustment from right on rear of chassis pan) until the desired signal is heard.
(5) Repeat operation 1 at, or near, 8500 kc.,using band 4.
(A) Adjust oscillator pad (extreme right adjustment on rear of chassis pan) until the desired signal is heard.

## TO ALIGN (or gang) THE R.F. CIRCUITS

(1) Set the dial to 1400 kc., using band 1.
(A) Attach oscillator, tuned to set, to antenna post.
(B) Attach output meter from screen to plate of 2A5 tube.
(C) Adjust R. F. trimmer (screw adjustment, top-front-of gang condenser) for maximum output. KEEP SIGNAL INPUT LOW!
(2) Set the dial to 3700 kc., using band 2.
(A) Tune the oscillator to the receiver and adjust R.F. trimmer (extreme left adjustment on rear of chassis pan) for maximum output. KEEP SIGNAL INPUT LOW!
(3) Set the dial to 9000 kc., using band 3.
(A) Tune the oscillator to the receiver and adjust R.F. trimmer (second adjustment from left on rear of chassis pan)

Note 1-In case the local oscillator will not reach the higher alignment frequencies, harmonics of lower frequencies may be used.

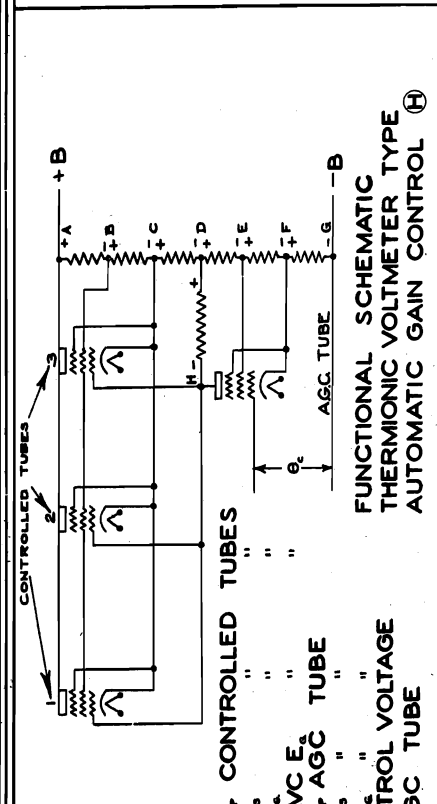
CORRECTION--The 9000 kc. R.F. trimmer is erroneously shown connected to switch point 4 in the Model SW-88 Service Schematic, Drawing No. 83. This trimmer should be wired to point 3, and point 4 should be left open.

ALIGNMENT PROCEDURE FOR MODEL SW-88

MODEL SA-133
Schematics' Details

# THE RUDOLPH WURLITZER CO.

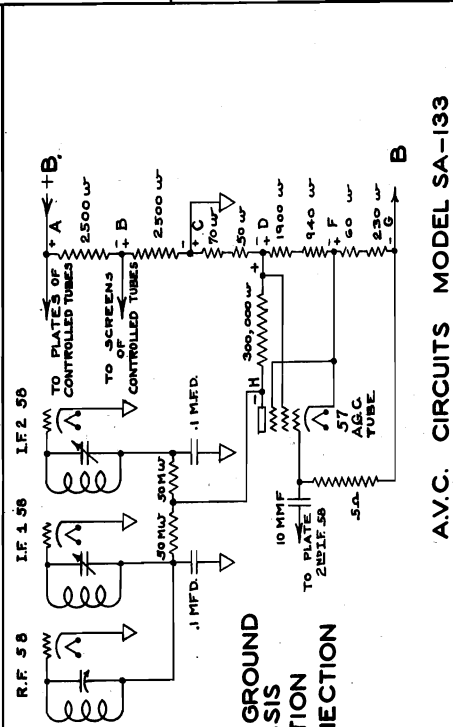
FIG. 1



C–A $E_p$ CONTROLLED TUBES
C–B $E_s$ " "
C–D $E_c$ " "
D–H AVC $E_a$
F–D $E_p$ AGC TUBE
F–E $E_s$ " "
F–G $E_c$ " "
$e_c$ CONTROL VOLTAGE FOR AGC TUBE

FUNCTIONAL SCHEMATIC THERMIONIC VOLTMETER TYPE AUTOMATIC GAIN CONTROL

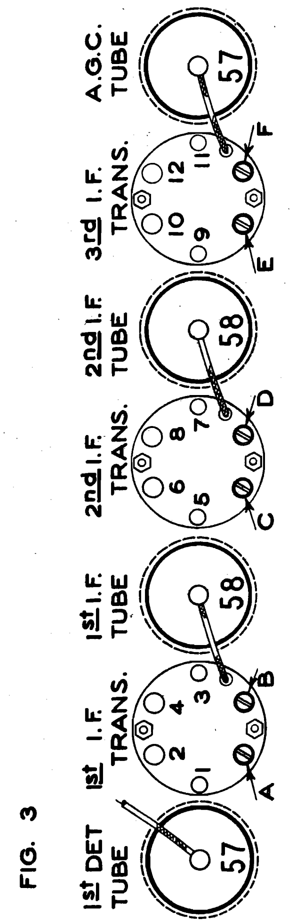
FIG. 2



LEGEND
INDICATES GROUND TO CHASSIS
CONNECTION
NO CONNECTION
Ω MEGOHM
MΩ KILOHM
ω OHM

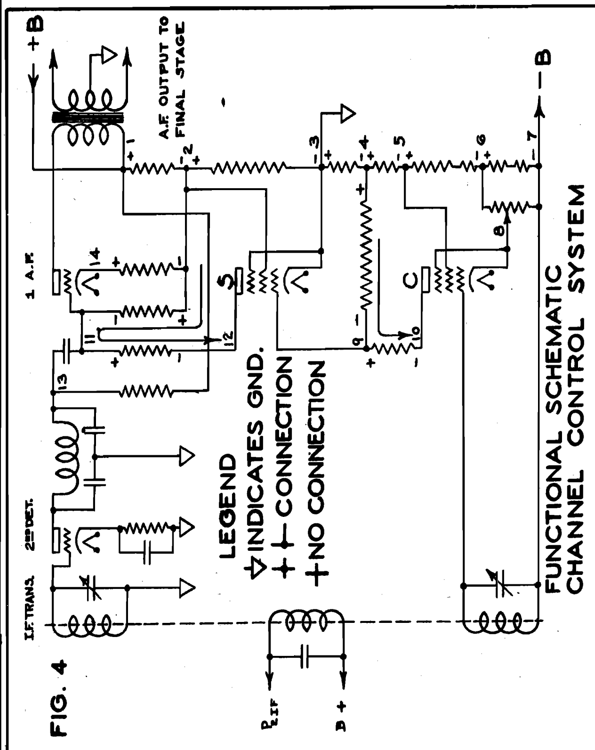
A.V.C. CIRCUITS MODEL SA-133

FIG. 3



I.F. AMPLIFIER SECTION MODEL SA—133

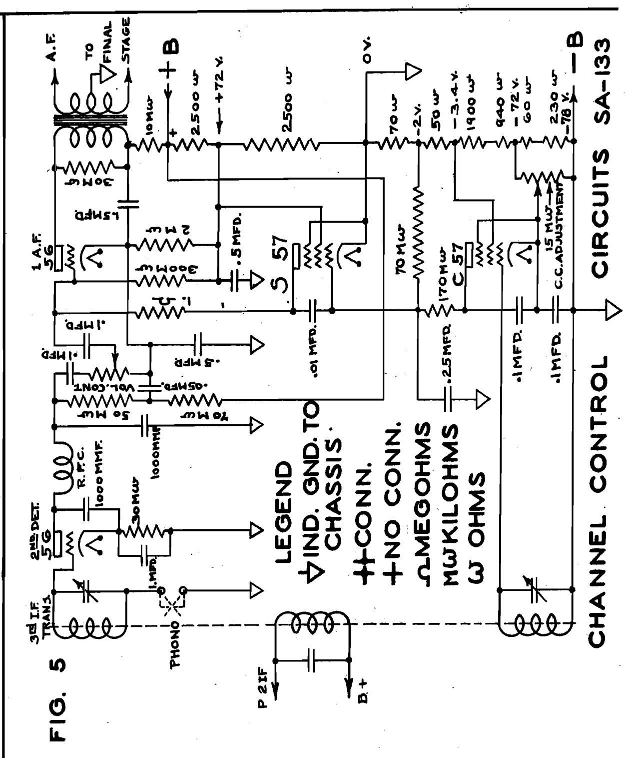
FIG. 4



LEGEND
INDICATES GND.
CONNECTION
NO CONNECTION

FUNCTIONAL SCHEMATIC CHANNEL CONTROL SYSTEM

FIG. 5



LEGEND
IND. GND. TO CHASSIS
CONN.
NO CONN.
Ω MEGOHMS
MΩ KILOHMS
ω OHMS

CHANNEL CONTROL CIRCUITS SA-133

MODEL SA-133
Alignment Data

THE RUDOLPH WURLITZER CO.

The difficulty in correctly aligning the I.F. stages is a result of the design of the I. F. transformers. In order to obtain a high degree of selectivity without sacrificing tone quality these transformers have been designed to provide a very narrow resonance curve with an essentially flat top. This is accomplished by over-coupling these transformers enough to get "double-bumps" the correct distance apart. With these transformers over-coupled it is impossible to correctly align them, therefore, it is necessary to decouple each I. F. transformer while it is being aligned. This is accomplished by shunting one winding with a 20,000 ohm resistor and aligning the other winding.

In the event that the I.F. stages require realignment the following procedure should be followed.

(1) Attach the output meter from plate to plate of the 2A5 tubes.
(2) Remove the silencing tube of the channel control circuit
(3) Attach the local oscillator tuned to exactly 175 kc. to the control grid of the first detector, using some type of coupling device that provides a d.c. path to ground. IN ALL GANGING OPERATIONS USE THE WEAKEST SIGNAL THAT WILL GIVE A SATISFACTORY INDICATION ON THE OUTPUT METER.
(4) Attach a resistor across the secondary of the first I.F. transformer (by inserting the leads in holes 3 & 4--See Figure 3, Drawing #82-B) and adjust screw A for MAXIMUM indication on the output meter.
(5) Remove the resistor from the secondary of the first I.F. transformer and place it across the primary (holes 1 & 2) and adjust screw (B) for MAXIMUM indication on the output meter. LEAVE THIS RESISTOR WHERE IT IS FOR THE BALANCE OF THE ALIGNMENT PROCEDURE.
(6) With a second resistor repeat operation 4, (holes 7 & 8, screw (C).
(7) With this second resistor repeat operation 5, (holes 5 & 6, screw (D).
(8) With a third resistor repeat operation 4,(holes 11 & 12, screw (E).
(9) With this third resistor repeat operation 5, (holes 9 & 10, screw (F).
(10) Adjust the channel control pad (screw adjusting trimmer under chassis pan near third I.F. transformer, (adjustable through hole in chassis pan bottom cover) for MINIMUM (dip) indication on the output meter. This dip is not very pronounced, and unless extreme care is exercised it may be passed over without being noticed. Note--Be sure the resistor leads make good contact when inserted in holes in transformers.

TO CALIBRATE THE SA-133

(1) Adjust the dial mechanism (if necessary) so that with the plates entirely enmeshed the dial will indicate 525 kc.
(2) Set the dial to the point where a station(or oscillator) of known frequency, about 600 kc., should be received and adjust the oscillator pad (screw adjustment under hole in chassis pan between oscillator section on gang condenser shields) until desired signal is heard.
(3) Set the dial to the point where a station(or oscillator) of known frequency, about 1400 kc., should be received and adjust the oscillator trimmer (screw adjustment, top of gang condenser, third from front) until desired signal is heard.
(4) Re-check operations 2 & 3.
(5) Check the calibration at, or near, 1200 kc. and correct (if necessary) by bending outer oscillator section rotor plates.
(6) Repeat operation 5 at, or near, 950 kc.
(7) Repeat operation 5 at, or near, 650 kc.
(8) A thorough re-check of the foregoing 7 operations to insure perfect calibration is recommended. If the alignment procedure to this point has been performed correctly the calibration will be accurate to within 2kc. at all points on the dial.

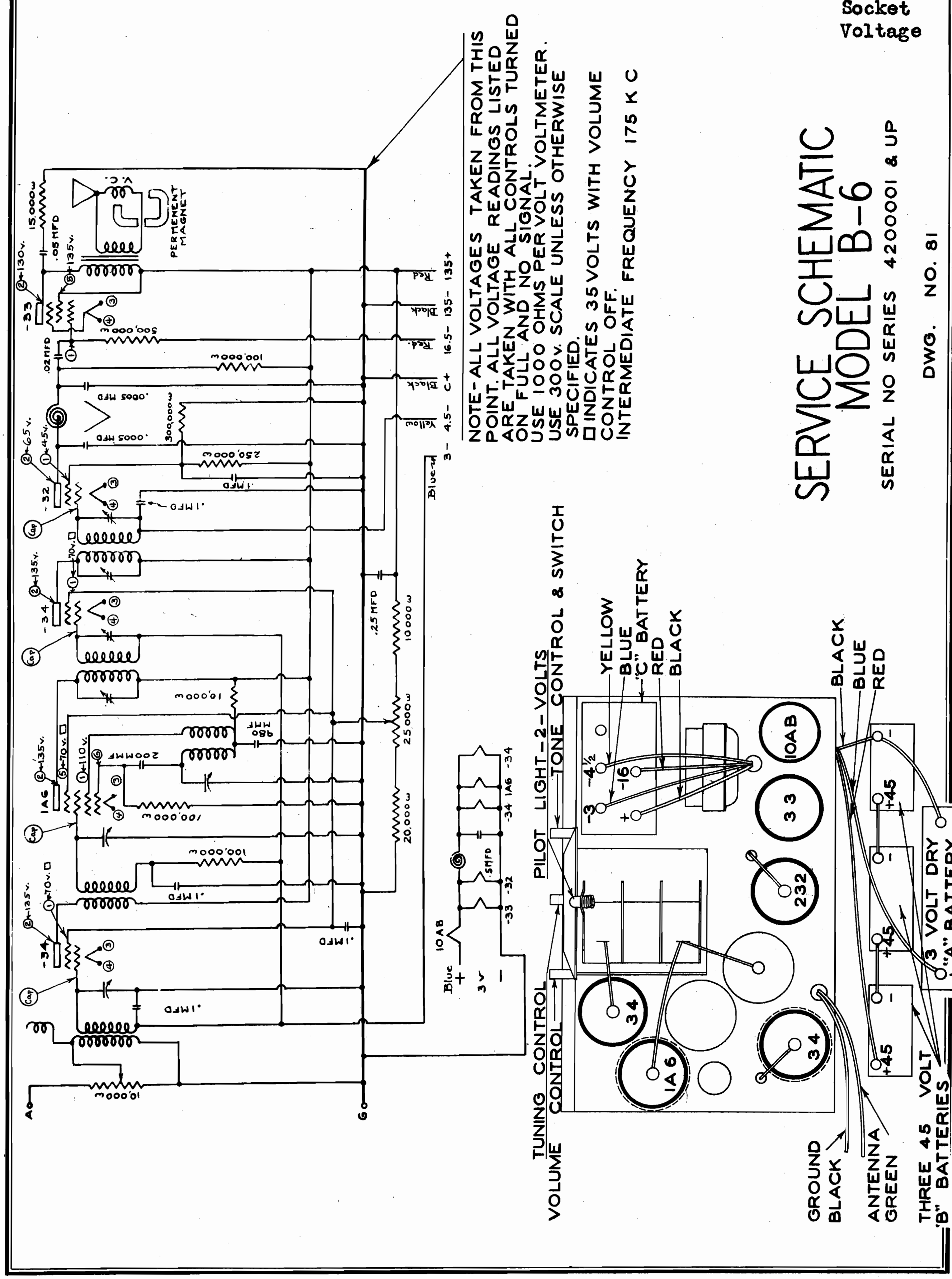
TO ALIGN THE R. F. CIRCUITS OF THE SA-133

(1) Attach the output meter from plate to plate of the 2A5 tubes.
(2) Attach the local oscillator to the antenna and tune to to set at each test frequency.
(3) At 1400 kc., adjust the antenna, link, and R.F trimmers (screw adjustments, top of gang condenser--see Drawing #82) for maximum indication on the output meter USING THE WEAKEST SIGNAL THAT WILL GIVE A SATISFACTORY INDICATION.
(4) At 1200 kc. bend the plates of the antenna, link and R.F rotors to give maximum indication on the output meter.
(5) Repeat operation 4 at 950 kc.
(6) Repeat operation 4 at 650 kc.
(7) Repeat operation 4 at 570 kc.
(8) Re-check operations 3-8 inclusive to insure perfect alignment.
(9) REMOVE RESISTORS FROM THE I.F. TRANSFORMERS.
(10) Remove the output meter and local oscillator, attach antenna, set dial to a point where no signal is being received and turn channel control counter-clockwise just far enough to silence the static and other inter-station noises.

The Model SA-133 is now ready for operation.

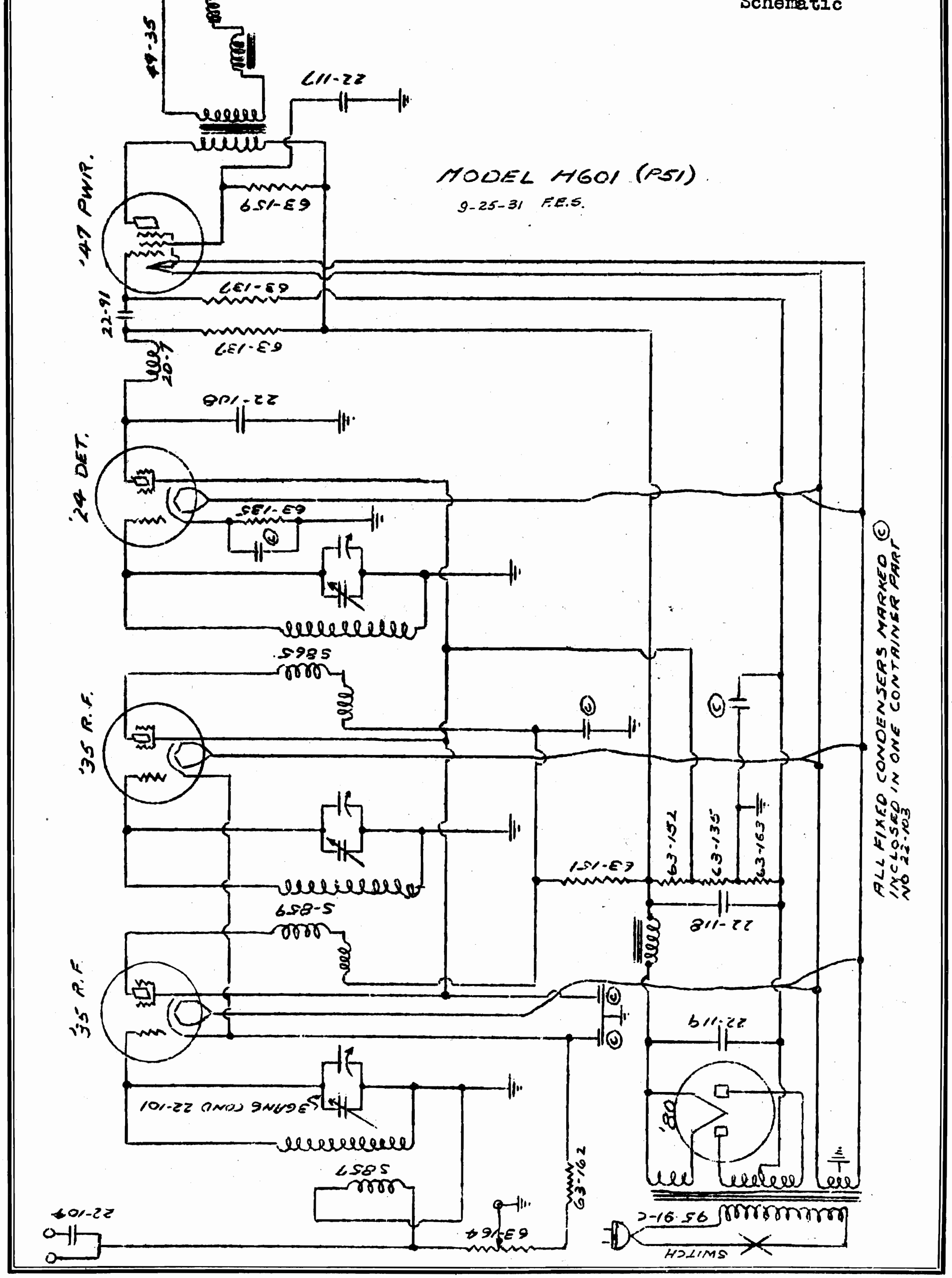
**MODEL B-6**
Schematic
Socket
Voltage

# THE RUDOLPH WURLITZER CO.



ZENITH RADIO CORP.

MODEL M-601 (P51)
(Export Only)
Schematic



MODEL M-601 (P51)
Parts List

ZENITH RADIO CORP.

## Variable Condenser Assembly

| | | |
|---|---|---|
| 22-101 | Three gang condenser | |
| S-861 | Dial drum assembly | |
| S-769 | Pilot lamp bracket and socket | |
| 100-18 | $2\frac{1}{2}$ volt lamp | |
| 11-2 | Pulley string | |
| 80-69 | Dial string tension spring | |

## Fixed Condensers

| | | |
|---|---|---|
| 22-91 | .03 mfd. condenser | (audio coupling) |
| S-392 | Antenna series condenser | |
| 22-103 | Five section bypass condenser | |
| 22-108 | .002 mfd. condenser | (bypass) |
| 22-117 | .5 " " | " |
| 22-118 | 6. " " | (electrolytic low voltage) |
| 22-119 | 6. " " | ( " high " ) |

## Resistors

| | | |
|---|---|---|
| 63-135 | 25M ohm resistor | (Red, Green end, Or ange Dot) |
| 63-137 | 250M " " | ( " " " Yellow " ) |
| 63-151 | 15M " " | (Brown " " Orange " ) |
| 63-152 | 43M " " | (Yellow Orange " " ) |
| 63-159 | 4M " " | ( " Black end Red " ) |
| 63-162 | 100 " " | (Flat wire wound black " ) |
| 63-163 | 320 " " | " " " Red " ) |
| 63-164 | Volume control | |

## Coils

| | | |
|---|---|---|
| S-857 | 1st R.F.coil (antenna) | (Coil Only) |
| S-859 | 2nd " " " (intermediate) | ( " " ) |
| S-865 | 3rd " " " (detector) | ( " " ) |
| 20-8 | R.F.choke | |

## Shields

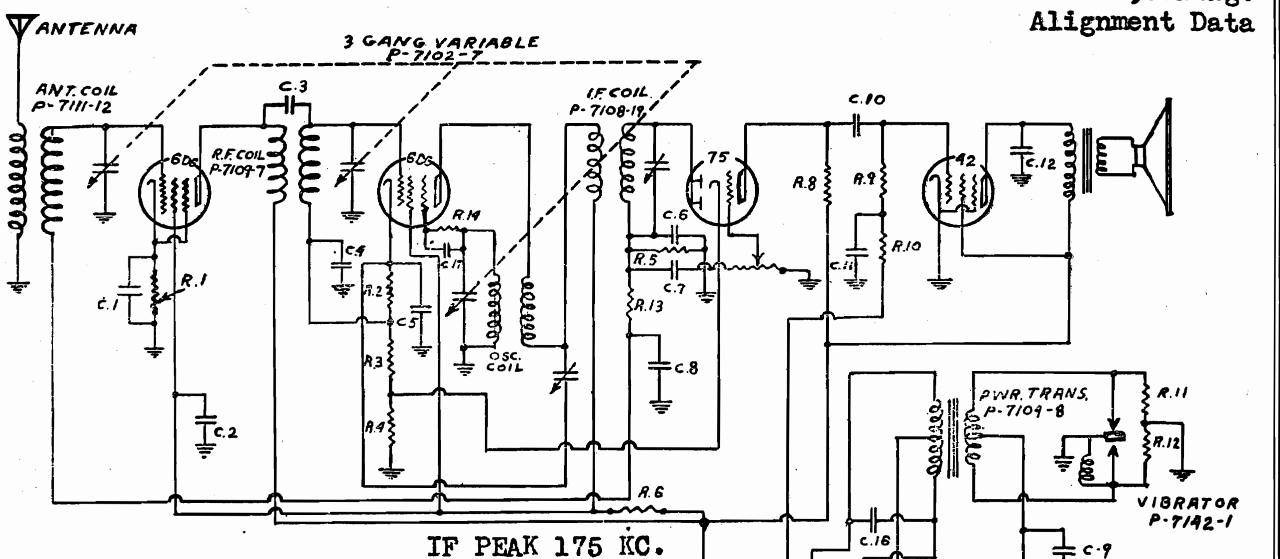
| | |
|---|---|
| 126-59 | R.F. coil shield can |
| 126-68 | Condenser shield |
| MS-163 | Tube shield |
| S-771 | Coil mounting base |

## Miscellaneous

| | | |
|---|---|---|
| 26-20 | Calibrated dial strip | |
| 46-50 | Knobs for switch & volume control | |
| 46-51 | Knob for dial | |
| 49-34 | Dynamic speaker | |
| 57-269 | Escutcheon plate | |
| 78-34 | Four prong socket | |
| 78-35 | Five " " | |
| 78-39 | " " Pentode socket | |
| 83-226 | Speaker terminal strip | |
| 85-29 | Off & On switch | |
| 95-91 | Power transformer | (60 cycle) |
| 95-92 | " " | (25 " ) |

# ZENITH RADIO CORP.

MODEL 7
Schematic
Socket, Voltage
Alignment Data




**CONDENSERS**

C.1 .05 X 200 V.
C.2 .1 X 200 V.
C.3 11 μμf. GIMMICK
C.4 .05 X 200 V.
C.5 .01 X 200 V.
C.6 .001 MICA
C.7 .01 400 V.
C.8 .05 200 V.
C.9 1 MFD. X 120 V.
C.10 .01 X 400 V.
C.11 .1 X 200 V.
C.12 .005 X 600 V.
C.13 8 MFD. X 350 V.
C.14 8 MFD. X 350 V.
C.15 .002 MICA
C.16 .015 X 1400 V.
C.17 .00025 MICA

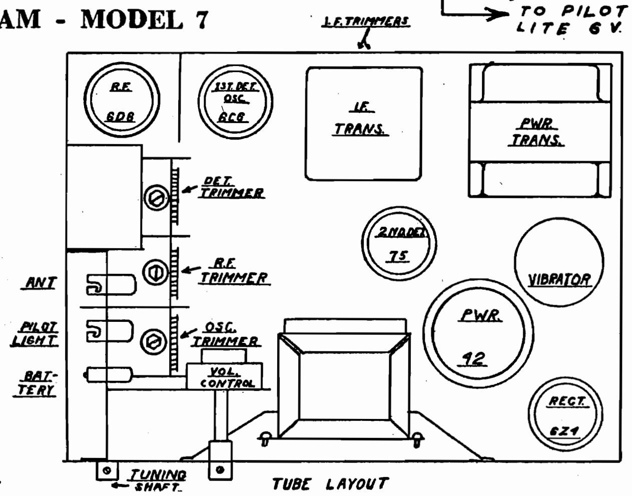
**RESISTORS**

R.1 150 Ω
R.2 450
R.3 5000
R.4 200
R.5 1 MEG. 1/3 W
R.6 25 M. 1 W.
R.7 500 M. VOL. CONTROL
R.8 250 M. 1/3 W.
R.9 500 M. 1/3 W.
R.10 301 M 1/3 W. WHITE DOT
R.11 100
R.12 100
R.13 500 M. 1/3 W
R.14 1 MEG.

**CIRCUIT DIAGRAM - MODEL 7**

NOTE:
C.1, C.2, C.4, C.5 IN ONE UNIT. PART 7145-4
C.13, C.14 IN ONE UNIT PART 7119-4
R.1, R.2, R.3, R.4 IN ONE UNIT. PART 7106-14
R.11, R.12 IN ONE UNIT. PART 7106-6

| TUBE | POSITION | Ef | Ek | $Eg^1$ | $Eg^2$ | $Eg^3$ | Ep |
|---|---|---|---|---|---|---|---|
| 6D6 | R.F. | 5.9 | 1.5 | 0. | 98 | 1.5 | 240 |
| 6C6 | DET.-OSC. | 5.9 | 17. | 15. | 98 | —.5 | 98 |
| 75 | 1st AUD. | 5.9 | .5 | 0 | — | — | 80 |
| 42 | PWR. | 5.9 | 0 | —5 | 240 | 0 | 220 |
| 84 | RECT. | 5.9 | 240 | — | — | — | — |




TUBE LAYOUT

**I. F. ALIGNMENT:**

1. With variable condenser at its maximum capacity position and with volume control full on, connect in series with a .1 mfd. condenser, an oscillator set at 175 kilocycles to the grid cap of the 6C6 tube.
2. Adjust trimming condensers I. F. transformer, part number 7108-19 (see top view of chassis) to resonance with oscillator, as indicated on an output meter connected across the primary terminals of the speaker input transformer. Maximum deflection on the meter indicates resonance.

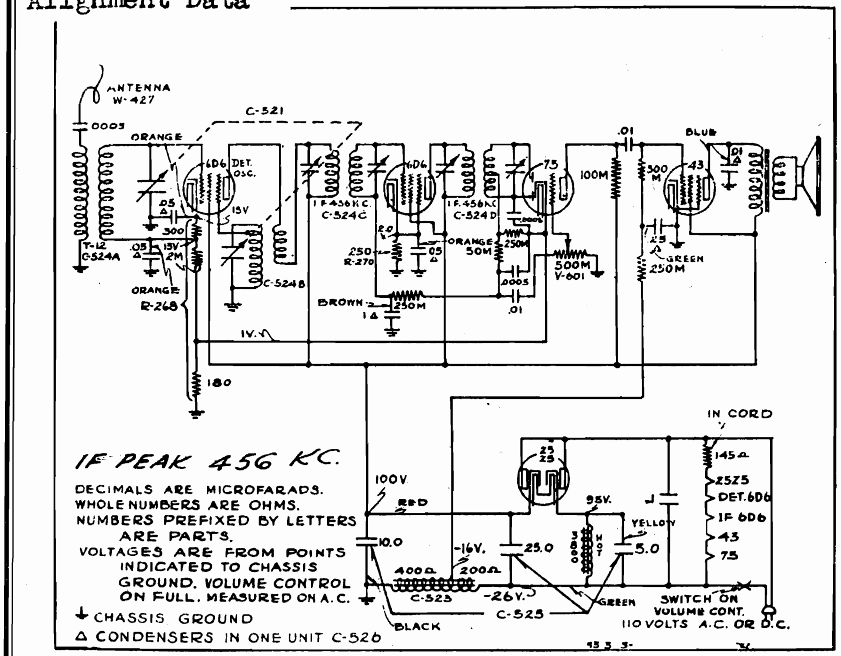
Note: The I. F. transformer has two trimmers, both of which are adjustable through the rear of the case.

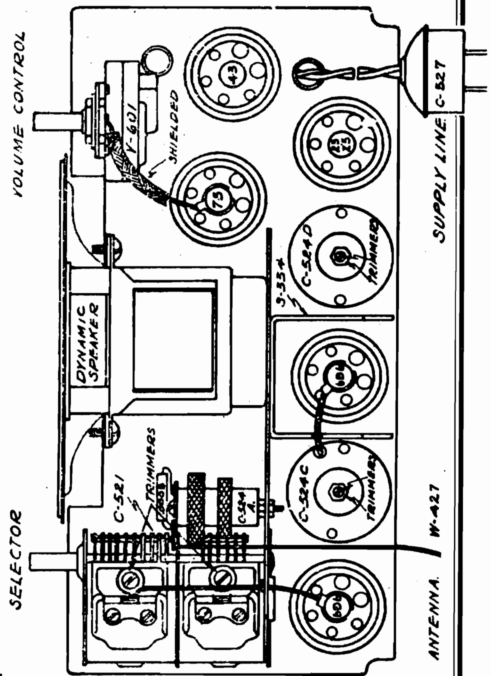
**FREQUENCY ALIGNMENT:**

1. Attach oscillator connected in series with a 200 mmfd. condenser to the antenna lead and with the variable condenser at its minimum capacity position (extreme right of its rotation) and with an oscillator set at 1550 kilocycles, adjust con-condenser trimmer of oscillator section (shaft end) to resonance.
2. Re-set oscillator to 1400 kilocycles, rotate variable condenser to pick up signal, adjust antenna and R. F. trimmers to resonance.
3. Check alignment at 1200-1000-800-600-530 kilocycles by setting oscillator to these frequencies and picking up signal by rotating condenser.
4. Bend slotted plates of antenna and R. F. sections only if necessary. UNDER NO CIRCUMSTANCES BEND PLATES OF OSCILLATOR SECTION.

MODEL 701
MODEL 702
Schematic, Socket
Alignment Data

# ZENITH RADIO CORP.



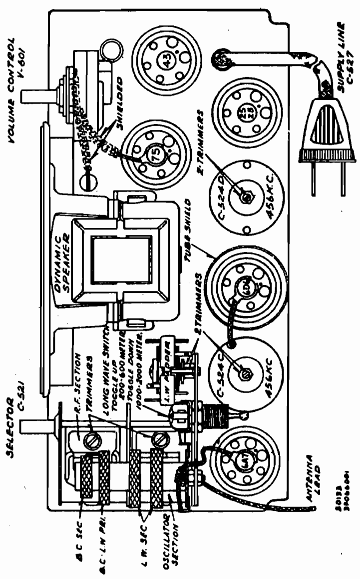




Schematic circuit diagram Model 701 AC-DC Superheterodyne, with automatic volume control

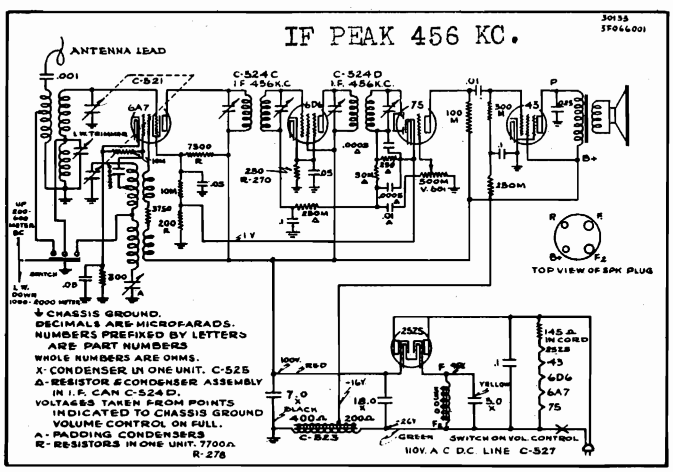
**Should it be necessary, at any time, to rebalance this set the procedure is as follows: Attach a 456 kilocycle oscillator to the grid of the 6D6 tube in back of the variable condenser and adjust the trimming condensers of the I. F. transformers to maximum deflection on an output meter connected across the primary of the speaker input transformer. While adjusting these trimmers, the variable condenser should be at the maximum capacity position—at the extreme right of its rotation.**

**Next disconnect the antenna wire and connect an oscillator in series with a 75 mmf. condenser to the antenna coil. Rotate the condenser plates to the minimum capacity position—extreme left turn, and adjust the trimmer condenser of the rear section of the variable condenser to resonance with an oscillator set at 1725 kilocycles, then adjust the condenser of the front section of the variable condenser to resonance. Align at 1400—1200—1000—800—600—530 kilocycles, bend slotted plates of variable condenser if necessary.**

# MODEL 701




# MODEL 702



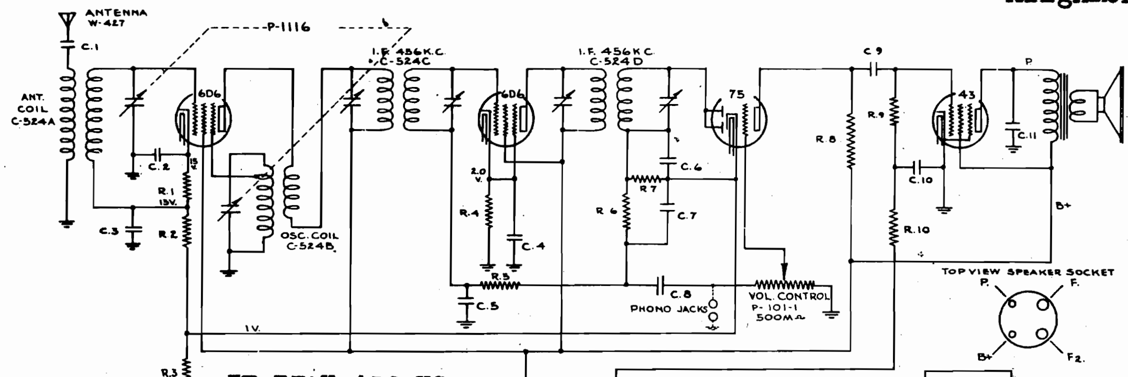

Schematic Circuit Diagram and Aligning Instructions Model 702 AC-DC Superheterodyne
200-600 Meters: 1000-2000 Meters

**Should it be necessary, at any time, to rebalance this set the procedure is as follows: Attach a 456 kilocycle oscillator to the grid of the 6A7 tube in back of the variable condenser and adjust the trimming condensers of the I. F. transformers to maximum deflection on an output meter connected across the primary of the speaker input transformer. While adjusting these trimmers, the variable condenser should be at the maximum capacity position—at the extreme right of its rotation.**

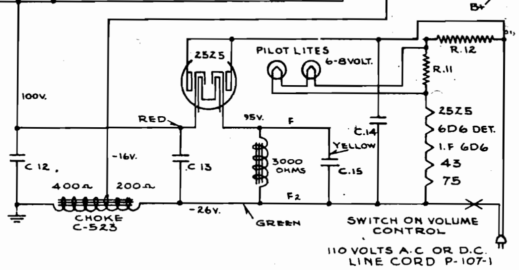
**With switch lever up in 200-600 meter position, disconnect the antenna wire and connect an oscillator in series with a 250 mfd. condenser to the antenna coil, rotate the condenser plates to the minimum capacity position, extreme left turn, and adjust trimmer condenser of the oscillator and rear section of the variable to resonance with the oscillator set at 200 meters, adjust the front section to resonance at 215 meters, align at 250—300—400—500 meters and bend slotted plates of variable condenser if necessary. To adjust long wave, 1000-2000 meters, with switch lever down, set variable at maximum capacity, extreme right turn, and tune generator to maximum output, then peak long wave padder (hexagon nut of L. W. Padder), at the same time tuning oscillator until maximum output is attained. Attach oscillator leads to grid of 6A7 ground, set variable condenser at minimum capacity, extreme left turn, and adjust oscillator to resonance with set. Remove oscillator lead from grid of 6A7 and attach to antenna lead, then adjust long wave R.F. trimmer to maximum output (set screw adjustment of L. W. Padder). Do not disturb either oscillator or variable condenser while making this adjustment.**

# ZENITH RADIO CORP.

**MODEL 801**
**Schematic, Socket**
**Alignment Data**




## IF PEAK 456 KC.




### LEGEND

**RESISTORS**

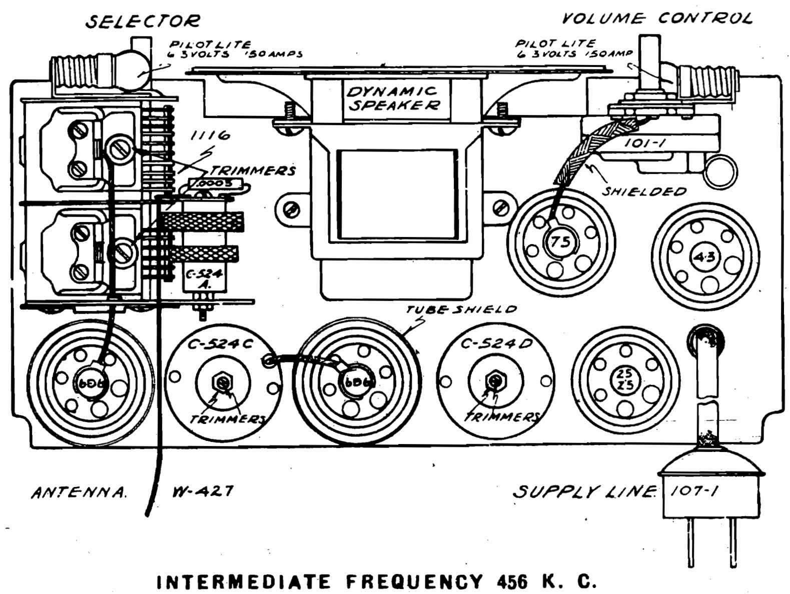
| Nº | VALUE | |
|---|---|---|
| R. 1:- | 300 | * |
| R. 2:- | 2M | * |
| R. 3:- | 180 | * |
| R. 4:- | 250 R-270 | |
| R. 5:- | 250M | |
| R. 6:- | 50M | |
| R 7:- | 250M | |
| R 8:- | 100M | |
| R 9:- | 300M | |
| R 10:- | 250M | |
| R 11:- | 40Ω 300M.A. 0.36W. P-106-1 | |
| R 12:- | 126 IN CORD P107-1 | |

**CONDENSERS**

| Nº | VALUE | |
|---|---|---|
| C. 1:- | .0005 | MICA |
| C. 2:- | .05 | 200V |
| C 3:- | .05 | 200V |
| C 4:- | .05 | 200V. |
| C. 5:- | .1 | 200V. |
| C 6:- | .0005 | MICA |
| C. 7:- | .0005 | MICA |
| C 8:- | .01 | 400V |
| C 9 - | .01 | 400V |
| C. 10:- | .1 | 200V. |
| C 11:- | .025 | 300 |
| C 12:- | 5.0 MFD. | C-525D |
| C. 13:- | 25.0 MFD. | * |
| C 14:- | .1 | 400V. |
| C 15:- | 5.0 MFD | * |

:NOTE:-
* R 1, R. 2 & R. 3 IN ONE UNIT PART NUMBER R-268.
* C. 13 AND C 15 IN ONE UNIT PART NUMBER C-525-C
NUMBERS PREFIXED BY LETTERS ARE PARTS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL MEASURED ON A C CURRENT.

# MODEL 801




**INTERMEDIATE FREQUENCY 456 K. C.**

**I.F. ALIGNMENT**

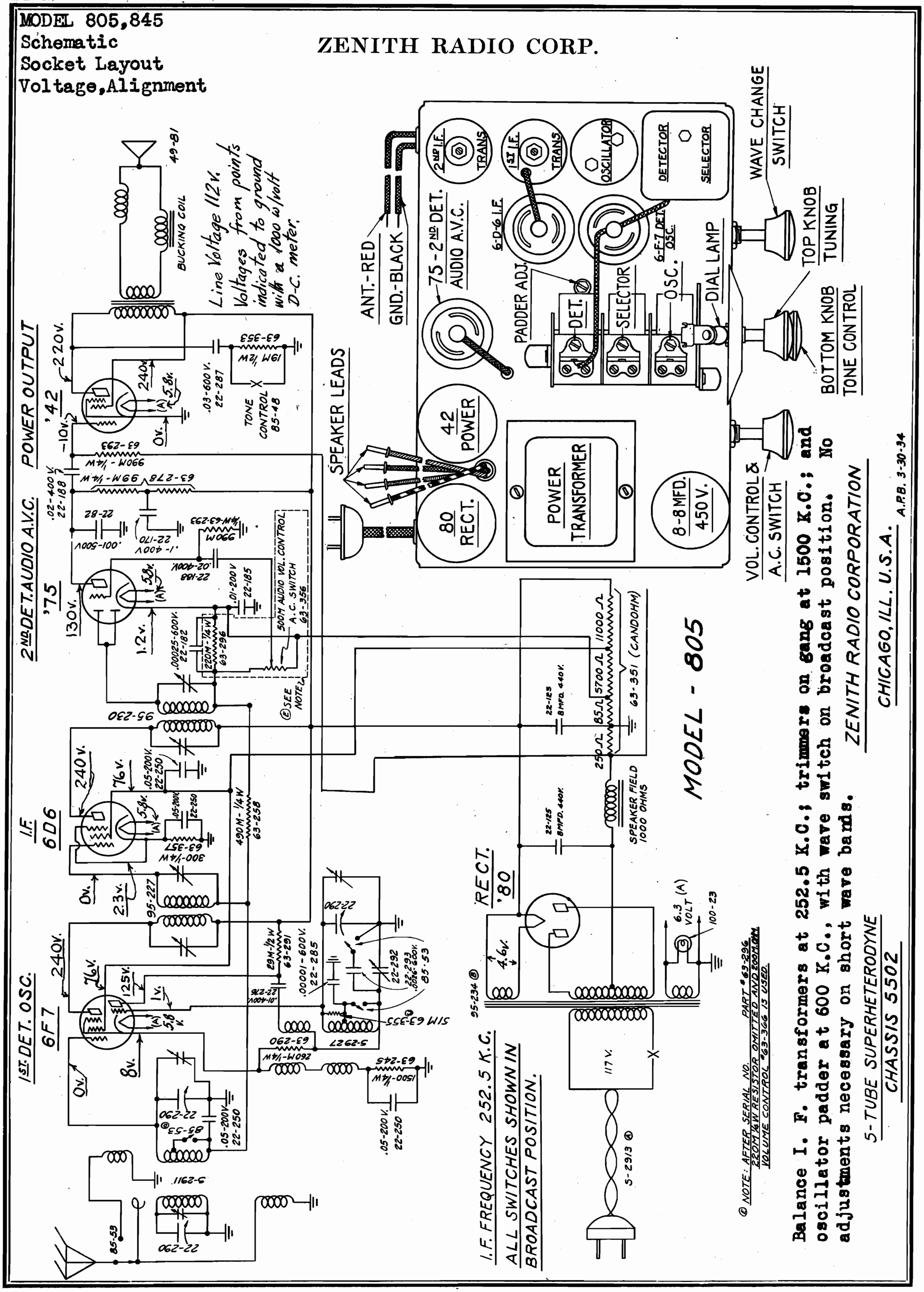
1. To peak I.F. transformers, connect oscillator set at 456 kilocycles to the grid of the 6D6 tube directly in back of the variable condenser and adjust the trimming condensers of the I.F. transformers to resonance (Maximum deflection on an output meter connected across the primary of the speaker input transformer).

Each I.F. trimmer has two adjustments, one nut and one screw, both of which are adjustable from the top.

**BROADCAST BAND ALIGNMENT**

1. Disconnect antenna wire and connect oscillator in series with a 75 mmfd. condenser to the antenna coil. With the variable condenser set at its minimum capacity position, at the extreme right of its rotation, and with an oscillator output adjusted to 1720 kilocycles, adjust trimmer of oscillator section of variable condenser (rear section) to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer). Next adjust the trimmer condenser of the front section of the variable condenser to resonance.
2. Check alignment at 1400-1200-1000-800-600-530 kilocycles, bending the slotted plates of the front section of the variable condenser only if absolutely necessary.

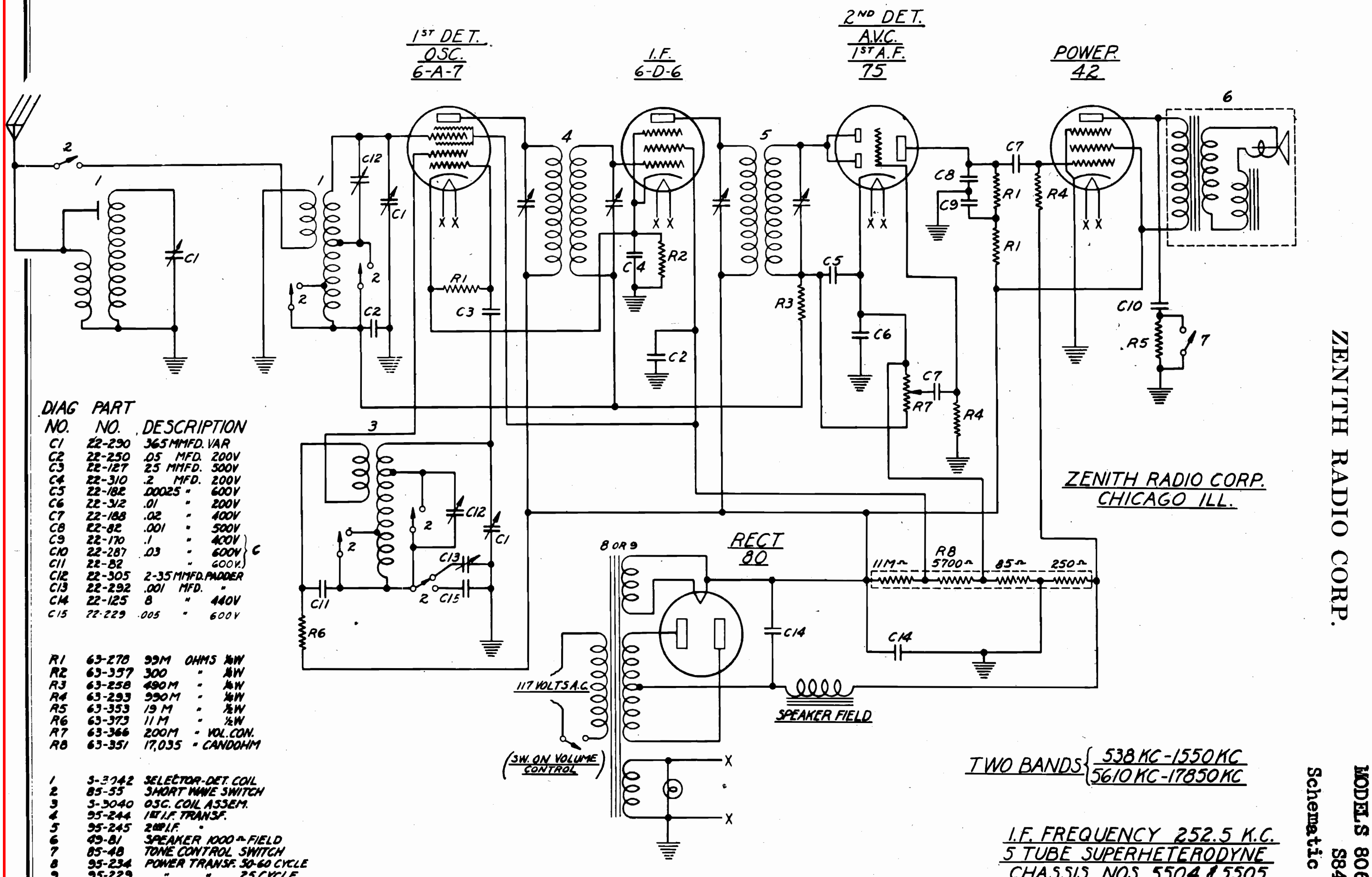
MODEL 805,845
Schematic
Socket Layout
Voltage,Alignment



**MODELS 806,807, S847,850**

**Schematic**

# ZENITH RADIO CORP.




| DIAG NO. | PART NO. | DESCRIPTION |
|---|---|---|
| C1 | 22-290 | 365 MMFD. VAR |
| C2 | 22-250 | .05 MFD. 200V |
| C3 | 22-127 | 25 MMFD. 500V |
| C4 | 22-310 | .2 MFD. 200V |
| C5 | 22-182 | .00025 " 600V |
| C6 | 22-312 | .01 " 200V |
| C7 | 22-188 | .02 " 400V |
| C8 | 22-82 | .001 " 500V |
| C9 | 22-170 | .1 " 400V } C |
| C10 | 22-287 | .03 " 600V } C |
| C11 | 22-82 | " 600V. } C |
| C12 | 22-305 | 2-35 MMFD. PADDER |
| C13 | 22-292 | .001 MFD. " |
| C14 | 22-125 | 8 " 440V |
| C15 | 22-229 | .005 " 600V |
| R1 | 63-278 | 99M OHMS ¼W |
| R2 | 63-357 | 300 " ¼W |
| R3 | 63-258 | 490M " ¼W |
| R4 | 63-293 | 990M " ¼W |
| R5 | 63-353 | 19 M " ½W |
| R6 | 63-373 | 11 M " ½W |
| R7 | 63-366 | 200M " VOL. CON. |
| R8 | 63-351 | 17,035 " CANDOHM |
| 1 | S-3042 | SELECTOR-DET. COIL |
| 2 | 85-55 | SHORT WAVE SWITCH |
| 3 | S-3040 | OSC. COIL ASSEM. |
| 4 | 95-244 | 1ST I.F. TRANSF. |
| 5 | 95-245 | 2ND I.F. " |
| 6 | 49-81 | SPEAKER 1000 Ω FIELD |
| 7 | 85-48 | TONE CONTROL SWITCH |
| 8 | 95-234 | POWER TRANSF. 50-60 CYCLE |
| 9 | 95-229 | " " 25 CYCLE |

TWO BANDS { 538 KC-1550 KC / 5610 KC-17850 KC }

I.F. FREQUENCY 252.5 K.C.
5 TUBE SUPERHETERODYNE
CHASSIS NOS. 5504 & 5505

## MODELS 806-807-S847-850

MODELS 806,807,
S847,850
Voltage, Socket
Alignment Data

ZENITH RADIO CORP.

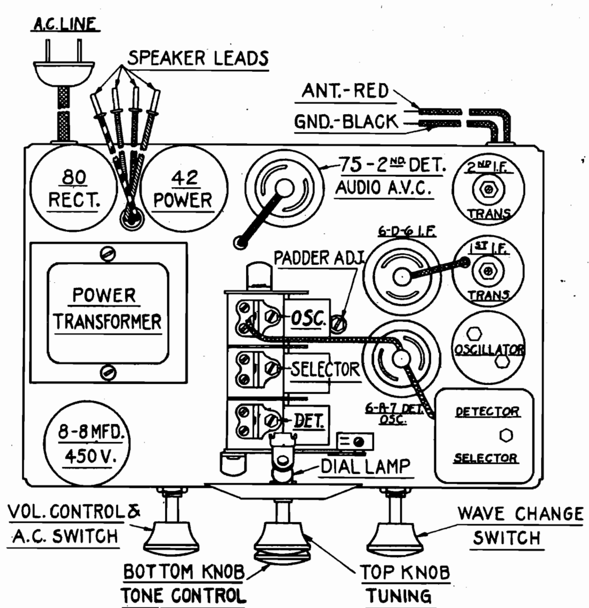
| TUBE | POSITION | Ef | Ek | Eg1 | Eg2 | Eg3 | Ep |
|---|---|---|---|---|---|---|---|
| 6A7 | 1st Det. | 5.8 | 5.2 | 0 | 80 | - | 260 |
| | Osc. | | | .6 | - | - | 210 |
| 6D6 | I.F. | 5.8 | 5.2 | 0 | 80 | 5.2 | 260 |
| 75 | 2nd Det. | 5.8 | 1.5 | 0 | - | - | 135 |
| 42 | PWR. | 5.8 | 0 | -.7 | 260 | - | 245 |
| 80 | RECT. | 4.8 | - | - | - | - | - |

Line Voltage 112 — Antenna and Ground Disconnected

All measurements taken from point indicated to ground, using a 1000 ohm per volt D.C. meter ( except filaments).
F - Filament; K - Cathode; g1 - Control Grid; g2 - Screen Grid; g3 - Suppressor Grid; p - Plate.

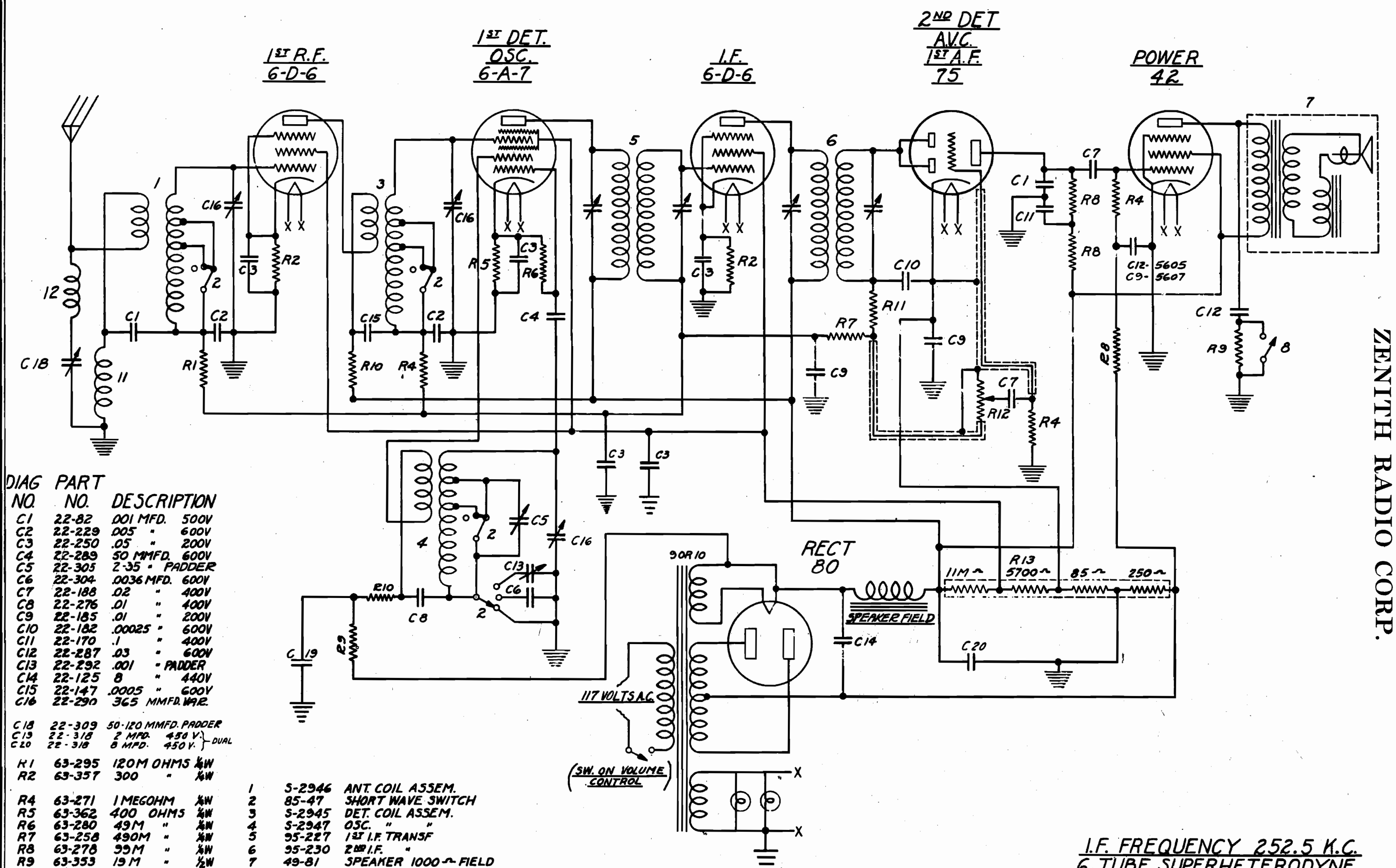
Alignment

1. Balance I.F. transformers at 252.5 K.C. with test oscillator connected to control grid of 6A7 and ground.
2. Connect test oscillator to antenna and ground leads.
3. Adjust broadcast padder (located nest to gang on top of chassis) for correct dial reading at 600 K.C.
4. Adjust trimmer on oscillator section of gang for correct dial reading at 15 M.C. Adjust detector trimmers (located between gang and coil shield on top of chassis) for maximum signal.
5. Adjust oscillator trimmer (located on right side underneath chassis) for correct dial reading at 1400 K.C. - also adjust preselector and detector trimmers on gang for maximum signal.
6. Readjust broadcast padder for correct dial setting.



**MODELS 808, 809, 860, 861**

# ZENITH RADIO CORP.




| DIAG NO. | PART NO. | DESCRIPTION |
|---|---|---|
| C1 | 22-82 | .001 MFD. 500V |
| C2 | 22-229 | .005 " 600V |
| C3 | 22-250 | .05 " 200V |
| C4 | 22-289 | 50 MMFD. 600V |
| C5 | 22-305 | 2-35 " PADDER |
| C6 | 22-304 | .0036 MFD. 600V |
| C7 | 22-188 | .02 " 400V |
| C8 | 22-276 | .01 " 400V |
| C9 | 22-185 | .01 " 200V |
| C10 | 22-182 | .00025 " 600V |
| C11 | 22-170 | .1 " 400V |
| C12 | 22-287 | .03 " 600V |
| C13 | 22-292 | .001 " PADDER |
| C14 | 22-125 | 8 " 440V |
| C15 | 22-147 | .0005 " 600V |
| C16 | 22-290 | 365 MMFD. VAR. |
| C18 | 22-309 | 50-120 MMFD. PADDER |
| C19 | 22-318 | 2 MFD. 450 V. } DUAL |
| C20 | 22-318 | 8 MFD. 450 V. } DUAL |
| R1 | 63-295 | 120M OHMS ¼W |
| R2 | 63-357 | 300 " ¼W |
| R4 | 63-271 | 1 MEGOHM ¼W |
| R5 | 63-362 | 400 OHMS ¼W |
| R6 | 63-280 | 49M " ¼W |
| R7 | 63-258 | 490M " ¼W |
| R8 | 63-278 | 99M " ¼W |
| R9 | 63-353 | 19M " ½W |
| R10 | 63-373 | 11M " ½W |
| R11 | 63-355 | 51M " ¼W |
| R12 | 63-366 | 200M " VOL. CON. |
| R13 | 63-351 | 17,035 " CANDOHM |

| | | |
|---|---|---|
| 1 | S-2946 | ANT. COIL ASSEM. |
| 2 | 85-47 | SHORT WAVE SWITCH |
| 3 | S-2945 | DET. COIL ASSEM. |
| 4 | S-2947 | OSC. " " |
| 5 | 95-227 | 1ST I.F. TRANSF |
| 6 | 95-230 | 2ND I.F. " |
| 7 | 49-81 | SPEAKER 1000 Ω FIELD |
| 8 | 85-48 | TONE CONTROL SWITCH |
| 9 | 95-234 | POWER TRANSF. 50-60 CYCLE |
| 10 | 95-229 | " " 25 CYCLE |
| 11 | 20-71 | ANT. CHOKE |
| 12 | 20-75 | WAVE TRAP CHOKE |

MODELS - 808-809-860-861

I.F. FREQUENCY 252.5 K.C.
6 TUBE SUPERHETERODYNE
CHASSIS NOS. 5605 AND 5607

ZENITH RADIO CORP.
CHICAGO ILL.

MODELS 808,809,
860,861
Voltage, Socket
Alignment Data

# ZENITH RADIO CORP.

5605

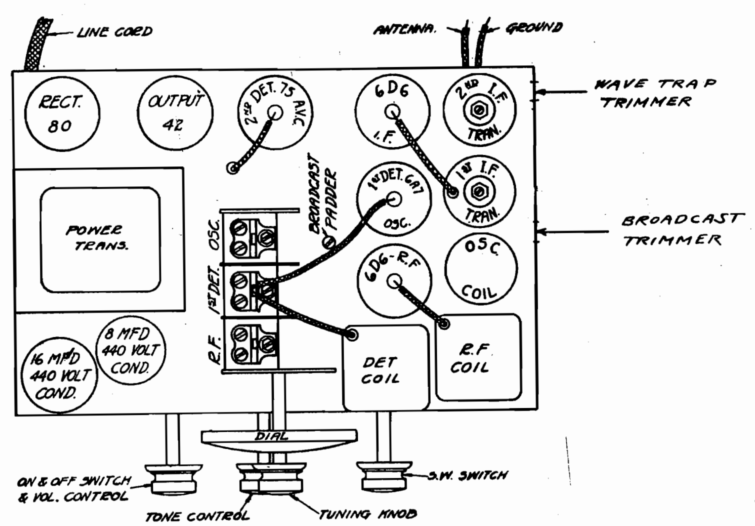
| TUBE | POSITION | Ef | Ek | Eg1 | Eg2 | Eg3 | Ep |
|---|---|---|---|---|---|---|---|
| 6D6 | R.F. | 5.6 | 2.4 | 0 | 70 | 2.4 | 200 |
| 6A7 | 1St. Det. | 5.6 | 3 | 0 | 70 | - | 250 |
| | Osc. | | | 3.6 | - | - | 230 |
| 6D6 | I.F. | 5.6 | 2.6 | 0 | 70 | 2.6 | 250 |
| 75 | 2nd. Det. 1st Audio | 5.6 | 1.4 | 0 | - | - | 148 |
| 42 | PWR. | 5.6 | 0 | -.6 | 250 | - | 250 |
| 80 | RECT. | 4.6 | - | - | - | - | 300 |

Line Voltage 112 Antenna and Ground Disconnected

All measurements taken from point indicated to ground, using a 1000 ohm per volt D.C. meter (except heaters).
F - Filament; K - Cathode; gl - Control Grid; g2 - Screen Grid; g3 - Suppressor Grid; p - Plate.

## Alignment

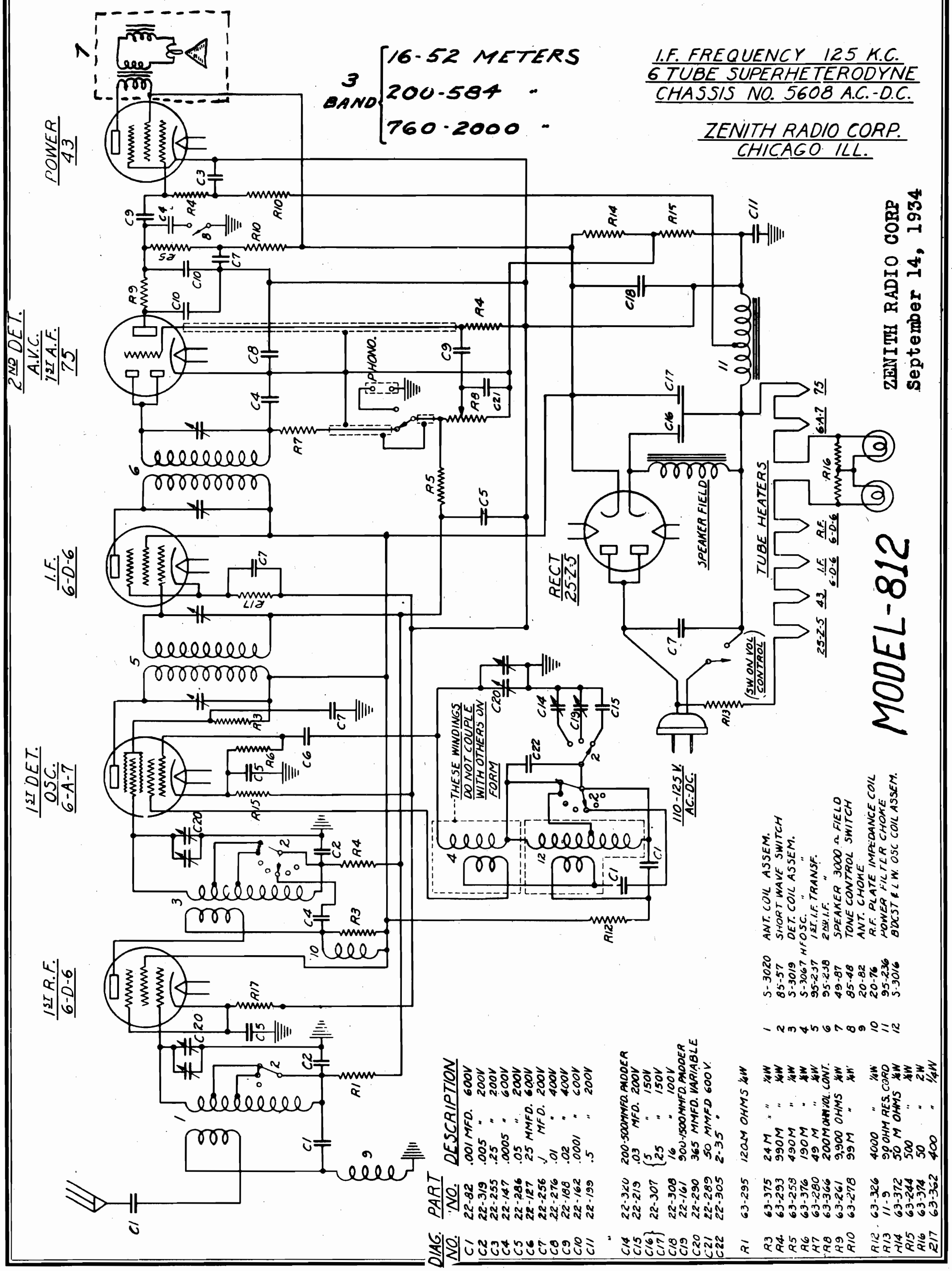
1. Balance intermediate transformers at 252.5 K.C. with oscillator connected to grid of first detector and ground.
2. Adjust wave trap padder (located underneath chassis at rear right side) for <u>weakest</u> signal with 252.5 K.C. oscillator connected to aerial and ground.
3. Turn wave band switch clockwise to the highest frequency band. Connect 15,000 K.C. oscillator to aerial and ground. Balance oscillator trimmer on three-gang condenser for correct dial reading at this frequency.
4. Turn wave band switch counter-clockwise to standard broadcast position. Adjust broadcast oscillator trimmer (located underneath chassis at right center) for correct dial reading at 1400 K.C. and balance R. F. and 1st detector trimmers on three-gang condenser for loudest signal.
5. Adjust oscillator standard broadcast padder through hole in top center of chassis for correct dial reading at 600 K.C.




TUBE-POSITION

**MODEL 812**
**Schematic**

# ZENITH RADIO CORP.



MODEL 812
Voltage, Socket
Alignment Data

ZENITH RADIO CORP.

| TUBE | POSITION | Ef | Ek | Eg1 | Eg2 | Eg3 | Ep |
|---|---|---|---|---|---|---|---|
| 6D6 | R.F. | 5.7 | 4.2 | 5 | 96 | 5 | 98 |
| 6A7 | 1st Det. | 5.7 | 2.3 | 2 | 50 | - | 96 |
| | Osc. | | | 0 | - | - | 96 |
| 6D6 | I. F. | 5.7 | 4.1 | 5 | 96 | 5 | 96 |
| 75 | 2nd Det. | 5.7 | 1.1 | 5 | - | - | 25 |
| 43 | PWR. | 24 | 0 | -5 | 96 | - | 90 |
| 25Z5 | RECT. | 24 | Spkr. Fld. 80 | - | - | - | - |

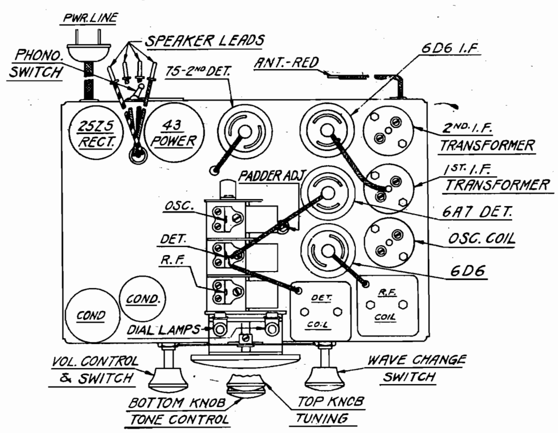
Line Voltage 112 — Antenna and Ground Disconnected

All voltages measured from B-(negative side of C18) using a 1000 ohm per volt D.C. meter (except heaters).
F - Filament; K - Cathode; gl - Control Grid; g2 - Screen Grid; g3 - Suppressor Grid; p - Plate.

## Alignment

1. Balance intermediate transformers at 125 K.C. with service oscillator connected to grid of first detector and chassis.
2. Rotate wave-band switch clockwise to the short-wave position. Connect service oscillator to antenna and ground leads and set for 18750 K.C. Balance oscillator trimmer on gang for correct dial reading at 16 meters.
3. Turn wave-band switch to center or standard broadcast position. Adjust padder condenser (located on top center of chassis next to gang) for correct dial reading at 500 meters (600 K.C.).
4. Balance oscillator trimmer (located underneath chassis at right center) for correct dial reading at 210 meters (1440 K.C.). Balance R.F. and 1st detector trimmers on gang to resonance
5. Turn switch counter-clockwise to long-wave position. Adjust oscillator padder (located underneath chassis at rear right side) for correct dial reading at 2000 meters (150 K.C.).

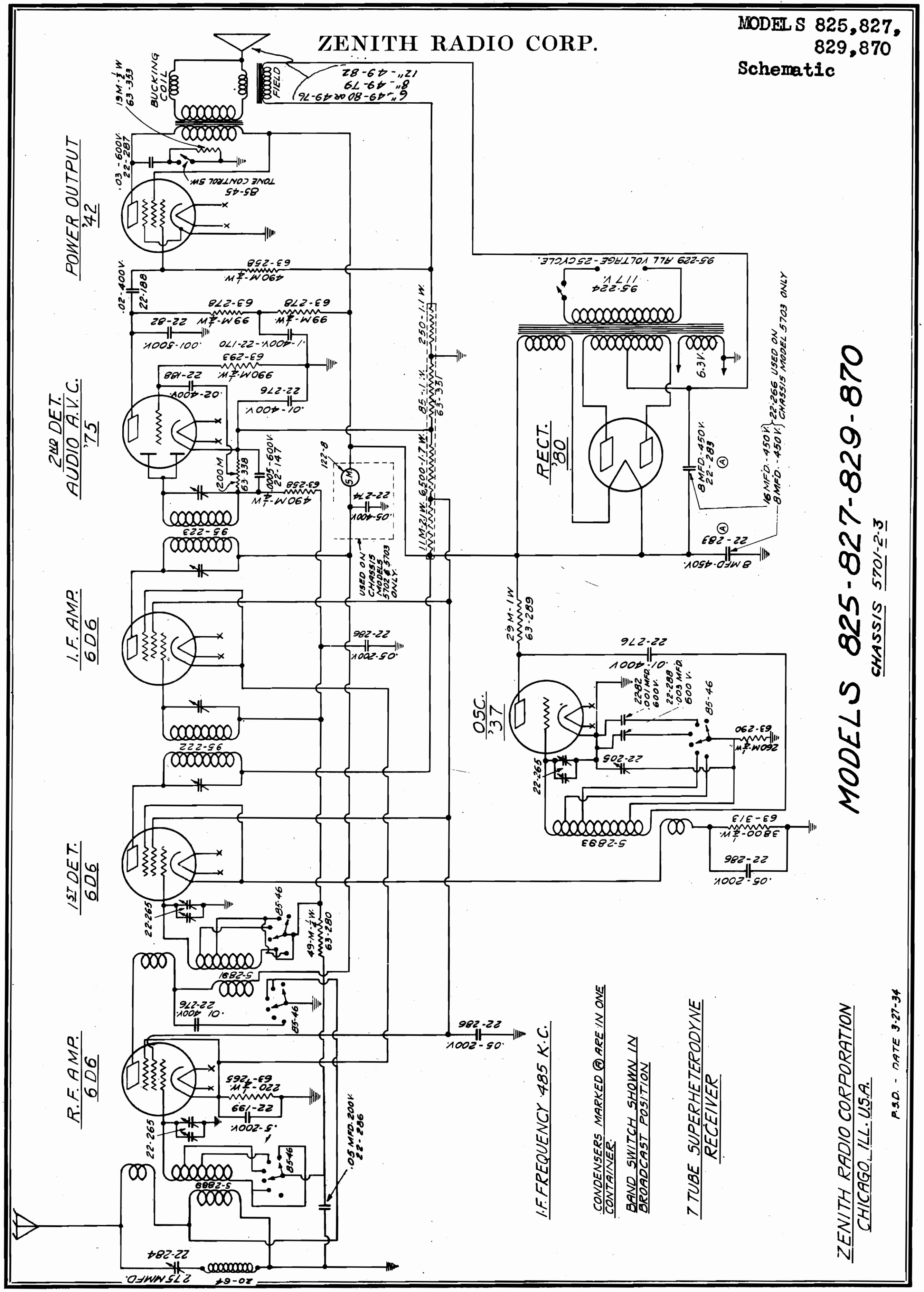
NOTE: If howls are encountered on short-wave band the oscillator trimmer on gang is too tight.




MODEL 812
Chassis 5608

Tube Position

MODELS 825,827, 829,870
Schematic



MODELS 825,827,
829,870
Voltage, Socket
Alignment Data

## ZENITH RADIO CORP.

SOCKET VOLTAGES — 5701 - 2 - 3 CHASSIS

| TYPE | POSITION | Ef | Ek | Eg1 | Eg2 | Eg3 | Ep |
|---|---|---|---|---|---|---|---|
| 6D6 | R.F. | 5.4 | 2.8 | 0 | 2.8 | 74 | 230 |
| 6D6 | 1st. Det. | 5.4 | 7.8 | 0 | 7.8 | 74 | 230 |
| 37 | Osc. | 5.4 | 0 | 38 | - | - | 130 |
| 6D6 | I.F. | 5.4 | 2.8 | 0 | 2.8 | 74 | 230 |
| 74 | 2nd. Det. | 5.4 | 1 | 0 | - | - | 125 |
| 42 | PWR. | 5.4 | 0 | 4 | 0 | 230 | 215 |
| 80 | Rect. | 4.2 | - | - | - | - | 235 |

Line Voltage 112 V. Aerial and Ground disconnected.

F - Filament  K - Cathode  G1 - Control Grid

G2 Suppressor Grid  G3 - Screen Grid  P - Plate

All measurements taken from points indicated to ground with 1000 ohms per volt D.C. meter ( except filaments ).

---

Balance I.F. transformers at 485 K.C., trimmers on condenser gang at 1500 K.C. and oscillator padder at 600 K.C.

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The screw adjustment at the right hand rear of chassis is a wave trap for the elimination of code interference at the I.F. frequency. Connect 485 K.C. oscillator on antenna and adjust for weakest signal.

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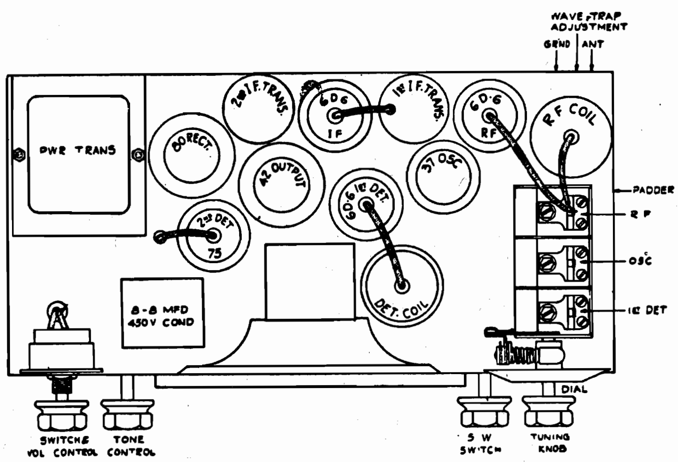
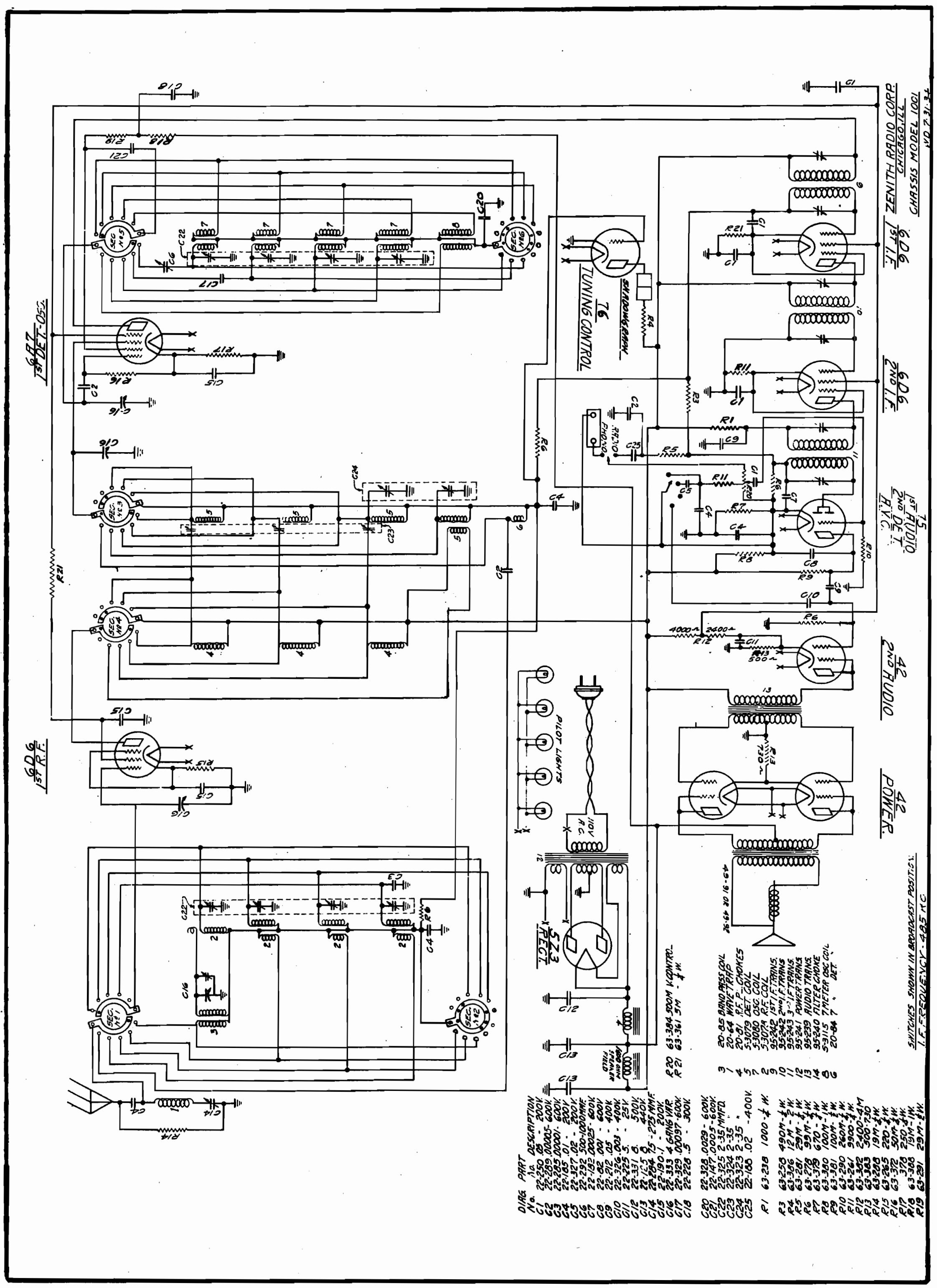



Tube Layout

# ZENITH RADIO CORP.

**MODELS 835,880**
**Chassis 1001,1001-A**
**Schematic**



**MODELS 835,880**
**Chassis 1001,1001-A**
**Voltage, Socket,**
**Alignment, Notes**

# ZENITH RADIO CORP.

## Service Bulletin

MODELS 835-880 CHASSIS 1001-1001A

SERVICE NOTES

Dial Slips or Binds. Tighten lugs on planetary drive. See that both pointers are free. Make sure gang is squarely lined up with dial.

Off Calibration. Check for loose set screws on dial assembly to condenser shaft. Black pointer may be loose on shaft. Check alignment as outlined in Alignment Procedure.

Poor Tone. Defective tubes in audio. One side of push-pull circuit faulty. Check audio and output transformers. See A.V.C. blocking.

Insensitive. Out of alignment, weak tubes or defective by-pass condenser.

Shadowgraph Inoperative. Weak 76 tube, burnt out shadowgraph, open resistor in 76 plate circuit.

Distortion at Medium Volume. Defective 75 tube, defective volume control. Separate green volume control-lead and speaker-lead close to grid of 42 tube.

Insensitive on Any Short Wave Band. Check alignment, make sure R.F.circuit is not aligned to image frequency. Change 6A7 tube. Change position of fixed condensers adjacent to rear section of wave change switch. Location of these condensers in relation to each other and their distance from the chassis will effect dial calibration and sensitivity, especially on the Blue Band.

Stops Oscillating Around 9 M.C. Change 6A7 tube, leakage in 50 mmfd. or .0029 mfd. condenser.

A.V.C. Blocks. Shorted resistor on antenna choke. C-14 padder shorted. Grounded R.F. grid circuit.

Oscillates on Broadcast. Check alignment. Push brown wire away from 6A7 socket. Grounded cathode on 1st I.F. or grounded to 600 K.C. padder. Check for open by-pass condenser.

Noisy. Shorting plates in gang condenser. Poor contact in band switch. Loose shields or shield bases. Static shields may be touching leads under gang condenser.

Overheats. Check pilot light and heater circuits for partial short or ground.

Flutters. Rearrange leads under chassis especially around 6A7.

Oscillates on Short Wave Bands. Make sure brown R.F. grid return lead is pushed away from 6A7 socket. Check for ground on any A.V.C. lead. Open by-pass condenser.

Tone Control Inoperative. Resin joint or poor contact on tone control switch. Defective condensers in tone control circuits.

Continuous Audio Whistle. Rearrange leads in audio circuit.

## Alignment

Separate coils are used for each band. Mounted on the coils are individual trimmers that align each band, independent of the other bands.

Connect 485 K.C. service oscillator to grid of 6A7 and chassis ground. Adjust I.F. trimmers on rear of I.F. transformers for strongest signal.

Connect 485 K.C. service oscillator to antenna and ground. Turn dial to 540 K.C. on broadcast band and adjust wave trap trimmer on right rear side of chassis for weakest signal.

Broadcast - Black Band

Set service oscillator at 1400 K.C., remaining attached to antenna ground posts. Turn dial to same point and adjust #1 trimmer (top one on oscillator coil) to resonance. Adjust #1 R.F. trimmer (top one on R.F. coil); #1 detector trimmer (through hole in chassis base) and band pass trimmer (top front section of gang) all to resonance.

Set service oscillator at 600 K.C. Adjust padder (located in center rear of chassis) for correct dial reading.

Recheck 1400 K.C. alignment.

Orange Band

Set service oscillator at 4 M.C. ( still attached to antenna and ground) and adjust trimmer #2 (2nd from top) on oscillator coil for correct dial reading. Adjust #2 R.F. trimmer (2nd from top on R.F. coil) and #2 detector trimmer (center hole through chassis) to resonance.

Brown Band

Loosen #3 detector trimmer (top one on detector coil). Set service oscillator at 10.5 M.C. Adjust #3 oscillator trimmer (third from top on oscillator coil) for correct dial reading. Adjust #3 R.F. trimmer (third from top of R.F.coil) and #3 detector trimmer (rear one through hole in top of chassis). Adjust #3 detector trimmer on coil to resonance.

Blue Band

Tighten #4 detector trimmer (bottom one on detector coil). Set service oscillator at 21 M.C. Adjust #4 oscillator trimmer (bottom one on oscillator coil) for correct dial reading. Adjust #4 R.F. trimmer (lower one on R.F. coil) and #4 detector trimmer (lower one on detector coil) to resonance.

It is very easy to mistake the image frequency for the fundamental on this band. Rotate dial and if shadowmeter narrows at any point, especially at 15 M.C., the band should be rebalanced.

Green Band

There are no adjustments to be made on this band.

## ZENITH Parts and Prices

Chassis 1001

MODELS 835, 880, 881 and 1101

Dial Assembly

| | | |
|---|---|---|
| 26-66 | Complete Dial and Drive Assembly | $7.50 |
| 26-67 | Dial Scale only | .75 |
| 33-57 | Dial Retaining Frame | .35 |
| 59-28 | Large Z Pointer | .10 |
| 59-29 | Split Second Pointer | .10 |
| 192-4 | Dial Glass | .20 |
| 93-217 | Dial Glass Cushion Washer | .10 |
| 76-151 | Planetary Drive Assembly | 2.00 |
| 32-3 | Pulley Drive Belt | .15 |

Coils & Chokes

| | | |
|---|---|---|
| 20-64 | Wave Trap | .35 |
| 20-81 | R. F. Plate Choke | .65 |
| 20-84 | 7-Meter Detector Coil Assembly | .10 |
| 20-85 | Band Pass Coil Assembly | .60 |
| 95-242 | 1st and 2nd I. F. Coil Assembly | 1.50 |
| 95-243 | 3rd I. F. Coil Assembly | 1.50 |
| S-3078 | R. F. Coil Assembly | 2.75 |
| S-3079 | Detector Coil Assembly | 2.50 |
| S-3080 | Oscillator Coil Assembly | 2.75 |
| S-3115 | 7-Meter Oscillator Coil Assembly | .40 |

Miscellaneous

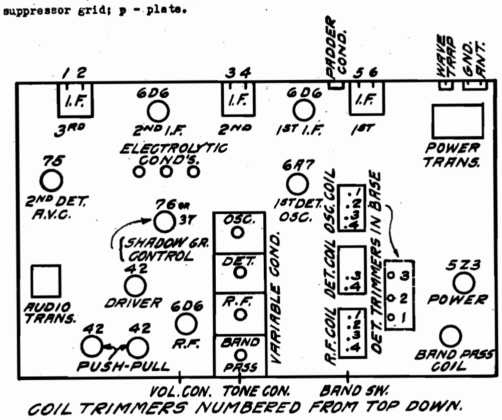
| | | |
|---|---|---|
| 44-7 | Phono Connector Jack ( Export Models Only) | .15 |
| 46-94 | Band Selector Switch Knob | .25 |
| 46-95 | Tone and Volume Knobs | .25 |
| 46-96 | Tuning Knob - Large | .25 |
| 46-97 | Tuning Knob - Small | .20 |
| 49-91 | 10" Dynamic Speaker ( Model 835 ) | 10.00 |
| | Cone and Voice Coil for 49-91 | 3.00 |
| | Output Transformer for 49-91 | 2.00 |
| | Field Coil for 49-91 | 2.00 |
| 49-92 | 12" Dynamic Speaker ( Models 880, 881) | 14.50 |
| | Cone and Voice Coil for 49-92 | 3.25 |
| | Output Transformer for 49-92 | 2.50 |
| | Field Coil for 49-92 | 2.50 |
| 57-455 | Dial Escutcheon Plate for Models 880, 881 | .75 |
| 78-100 | Tube Socket - 6D6 | .10 |
| 78-101 | " " 75 | .10 |
| 78-102 | " " 42 | .10 |
| 78-106 | " " 6A7 | .10 |
| 78-109 | " " 76 | .10 |
| 78-110 | " " 5Z3 | .10 |
| 85-56 | Phono Switch | .38 |
| 85-58 | Band Selector Switch | 4.00 |
| 85-60 | 4-position Tone Switch | .60 |
| 95-239 | Push Pull Input Transformer | 2.00 |
| 95-240 | Power Filter Choke | 2.00 |

SOCKET VOLTAGES

| TUBE | POSITION | Ef | Ek | Eg1 | Eg2 | Eg3 | Ep |
|---|---|---|---|---|---|---|---|
| 6D6 | R. F. | 5.9 | 1.7 | 0 | 85 | 1.7 | 235 |
| 6A7 | 1st. Det. | 5.9 | 2.5 | 0 | 95 | - | 235 |
| | OSC. | | | -1 | - | - | 165 |
| 6D6 | 1st. I. F. | 5.9 | 8 | 0 | 95 | 8 | 235 |
| 6D6 | 2nd. I. F. | 5.9 | 8 | 0 | 95 | 8 | 230 |
| 75 | 2nd. Det. 1st. Aud. | 5.9 | 1.5 | 0 | - | - | 155 |
| 37 or 76 | Shadow-Met. Amp. | 5.9 | 0 | -1 | - | - | 98 |
| 42 | 2nd. Aud. | 5.9 | 21 | 0 | - | - | 230 |
| 42 | PWR. | 5.9 | 33 | 0 | - | - | 340 |
| 42 | PWR. | 5.9 | 33 | 0 | - | - | 340 |
| 5Z3 | Rect. | 4.5 | - | - | - | - | - |

Line Voltage 112 Volts — Antenna and Ground Disconnected.

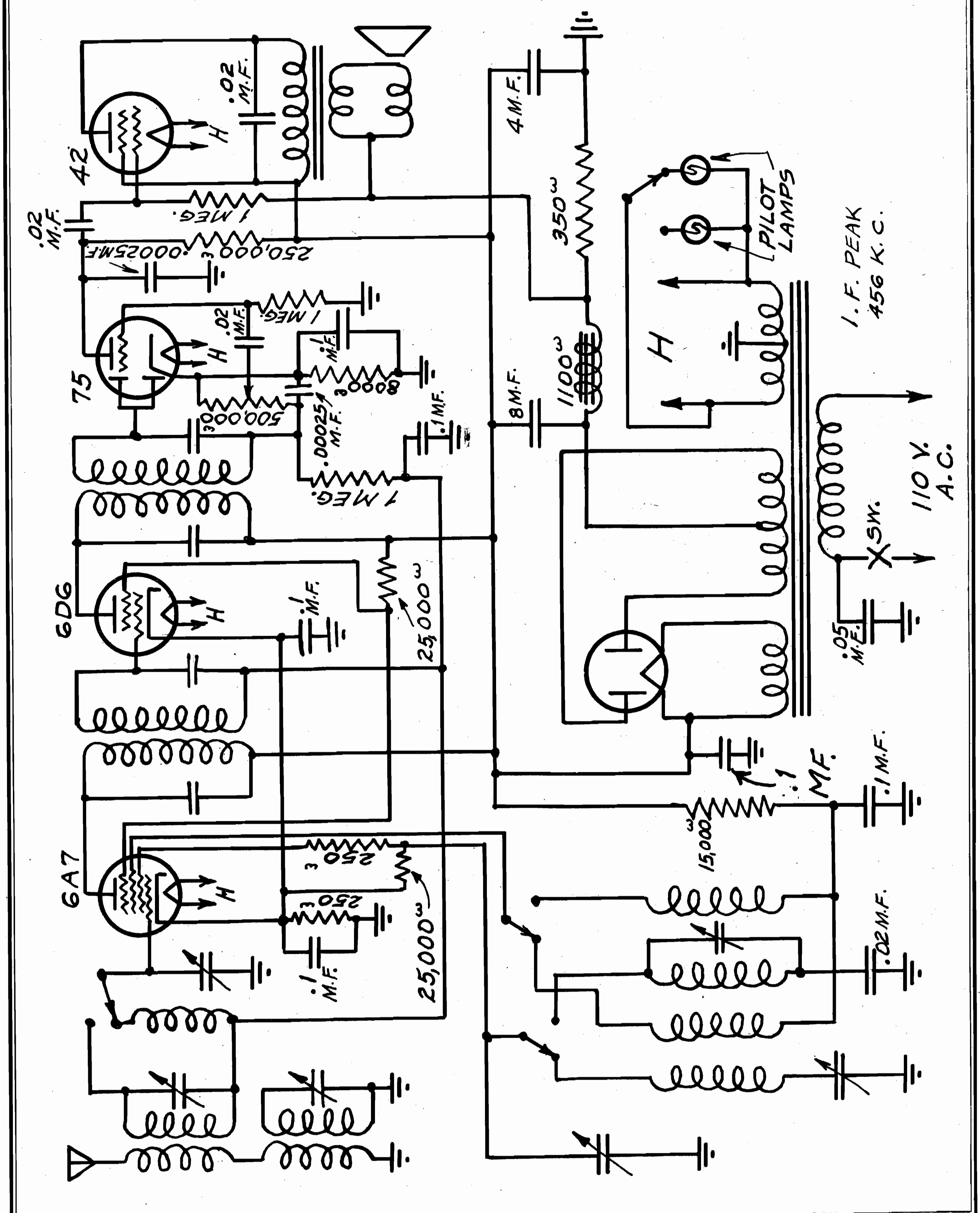
f - filament; k - cathode; g1 - control grid; g 2 - screen grid; g3 - suppressor grid; p - plate.



COIL TRIMMERS NUMBERED FROM TOP DOWN.

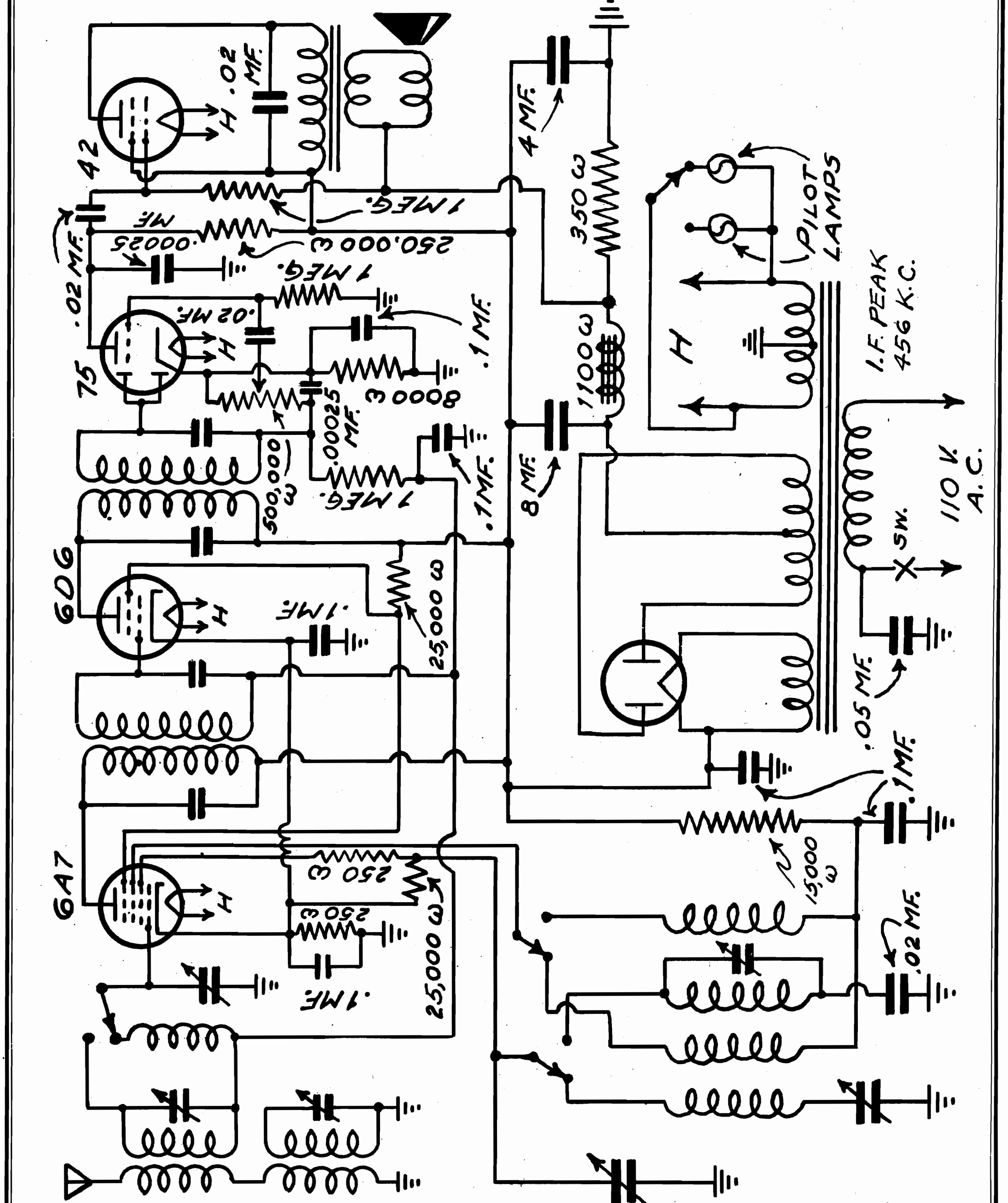
MODEL 61
Schematic

ADMIRAL



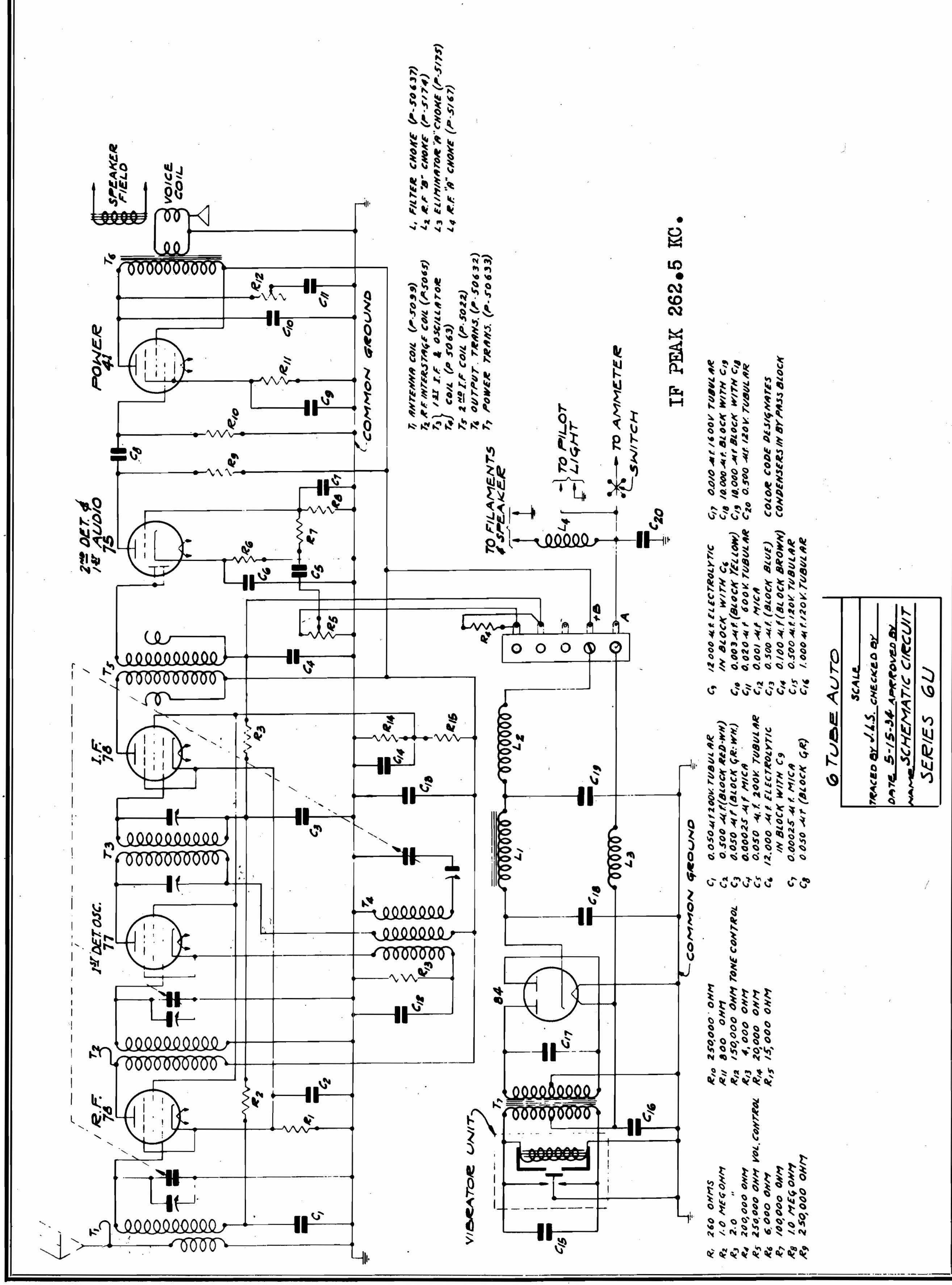
MODEL A-31
Schematic

# AIR CASTLE



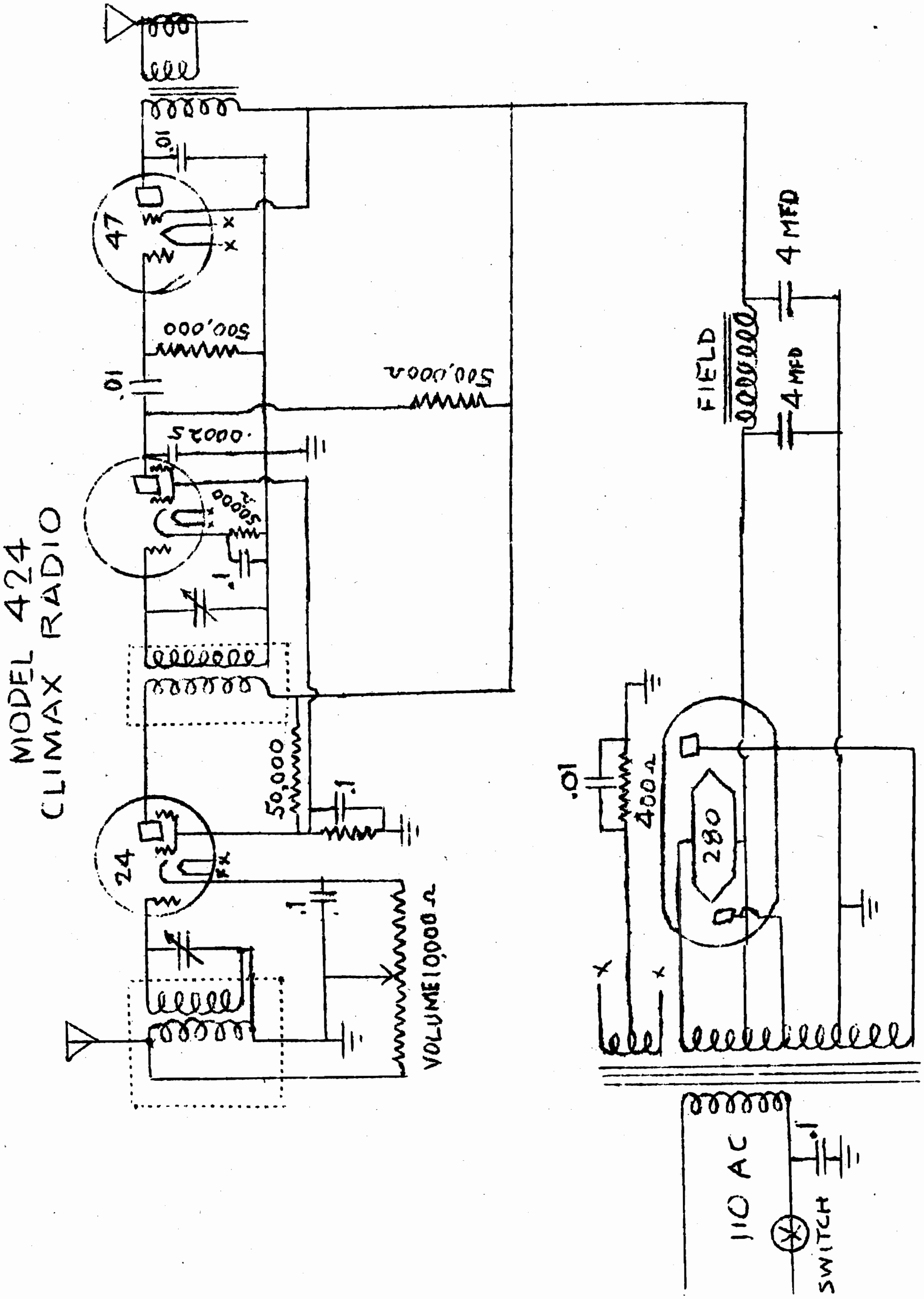
**MODEL 6-U**
**Schematic**

# BLACKHAWK



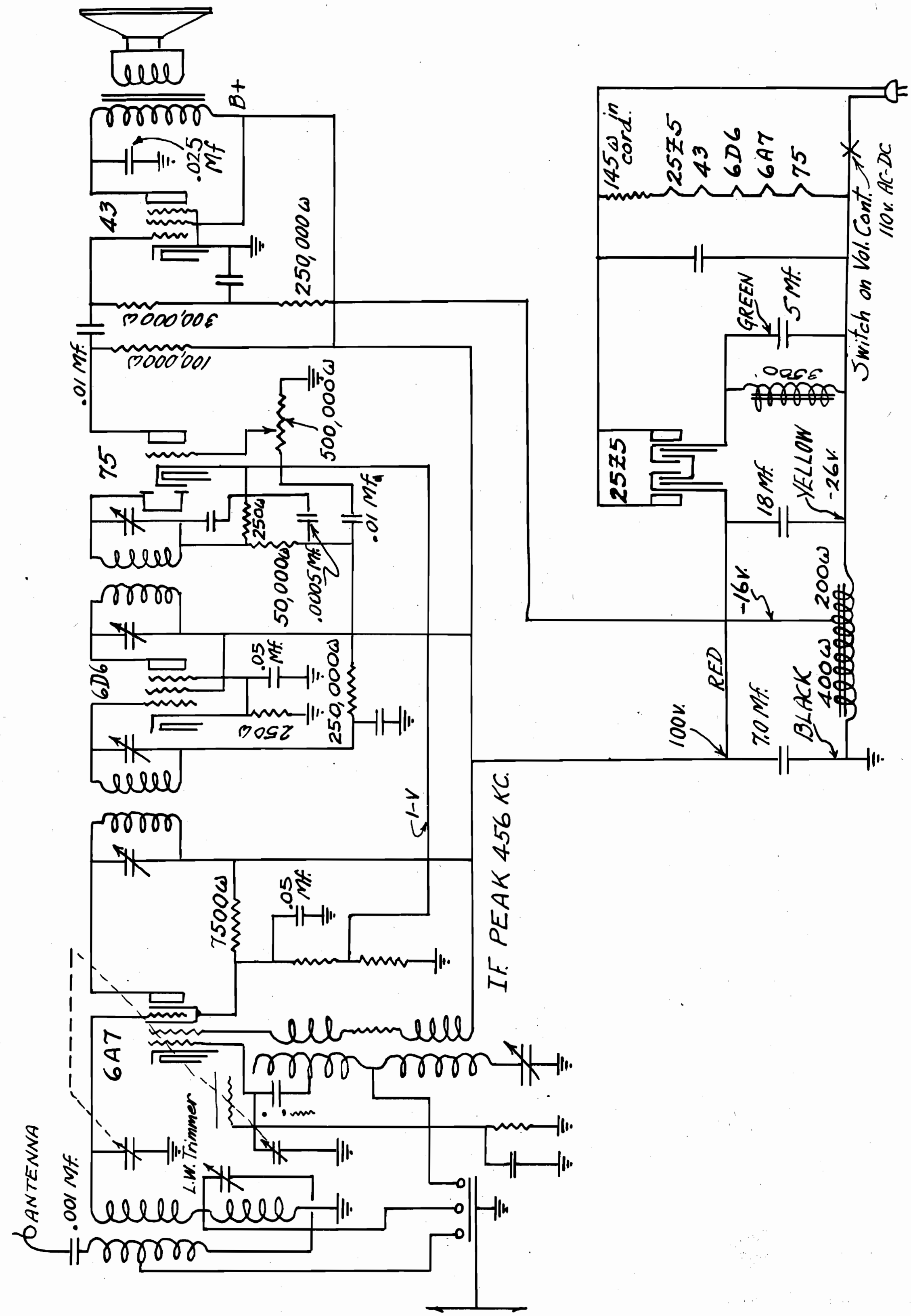
**MODEL 424**

## CLIMAX



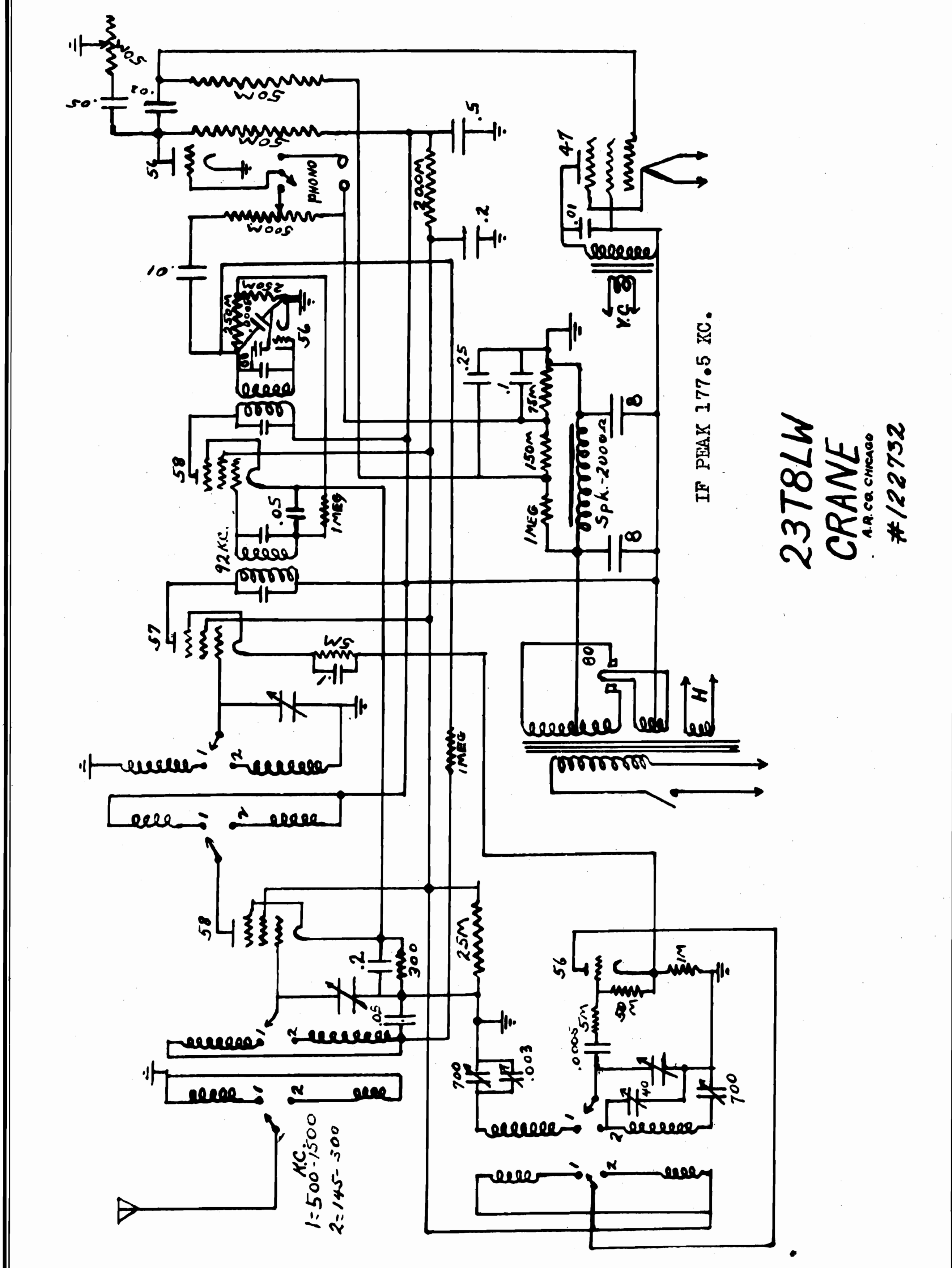
MODEL 150
200-2000 Meters
Schematic

# COMMONWEALTH RADIO MFG. CO.



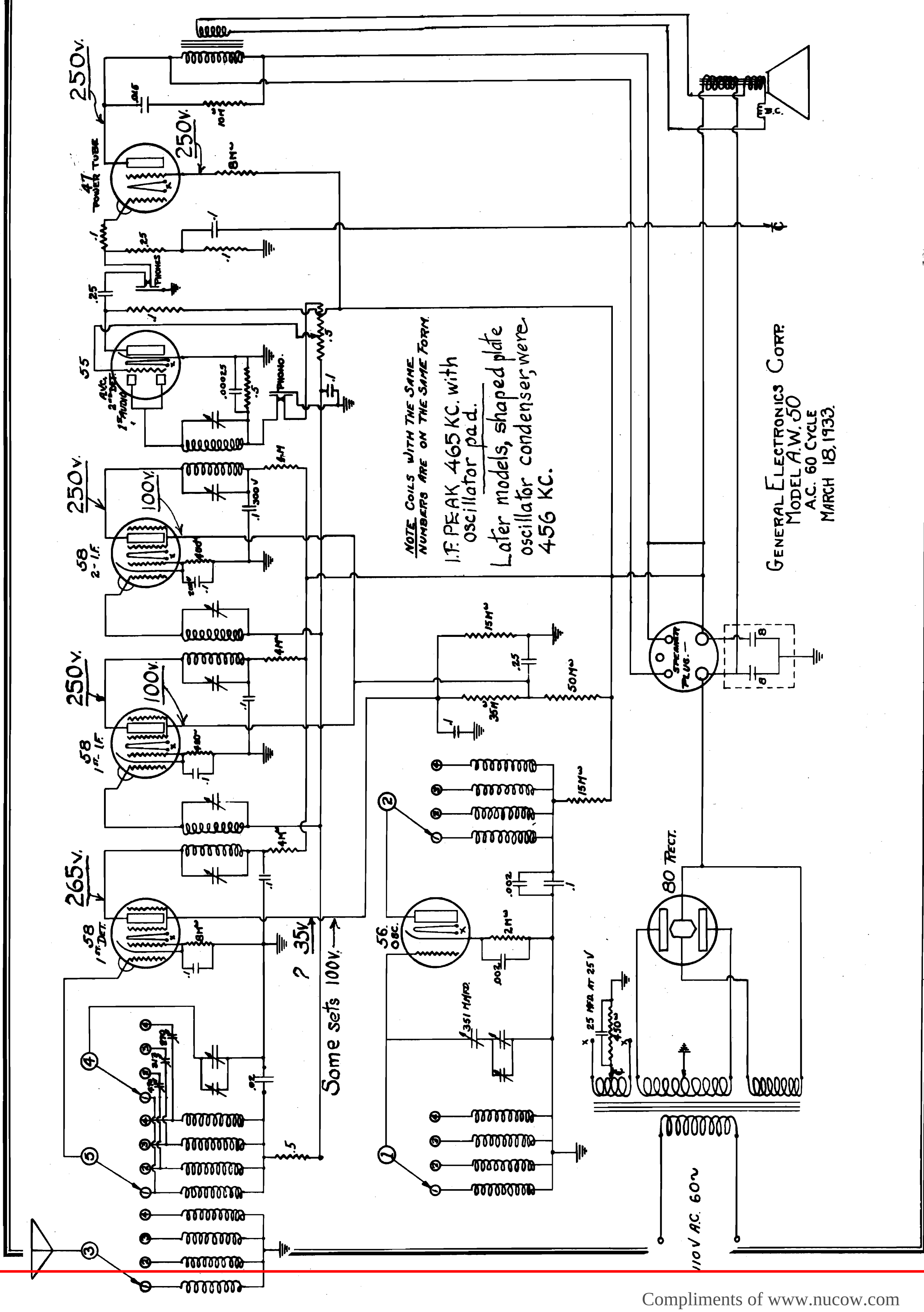
MODEL 23-T8-LW
Schematic

CRANE



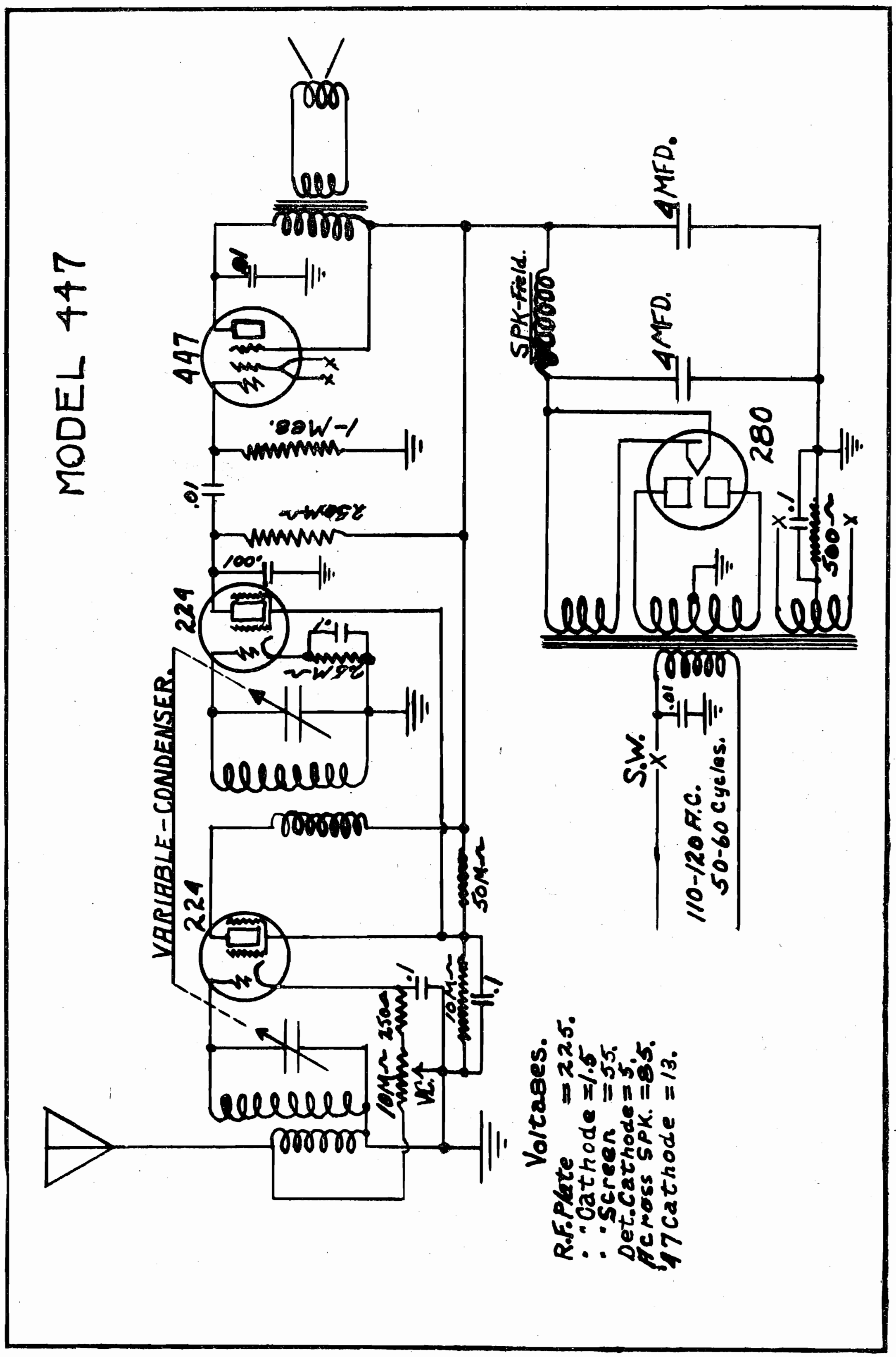
MODEL Baird AW-50
Schematic

# GENERAL ELECTRONICS CORP.

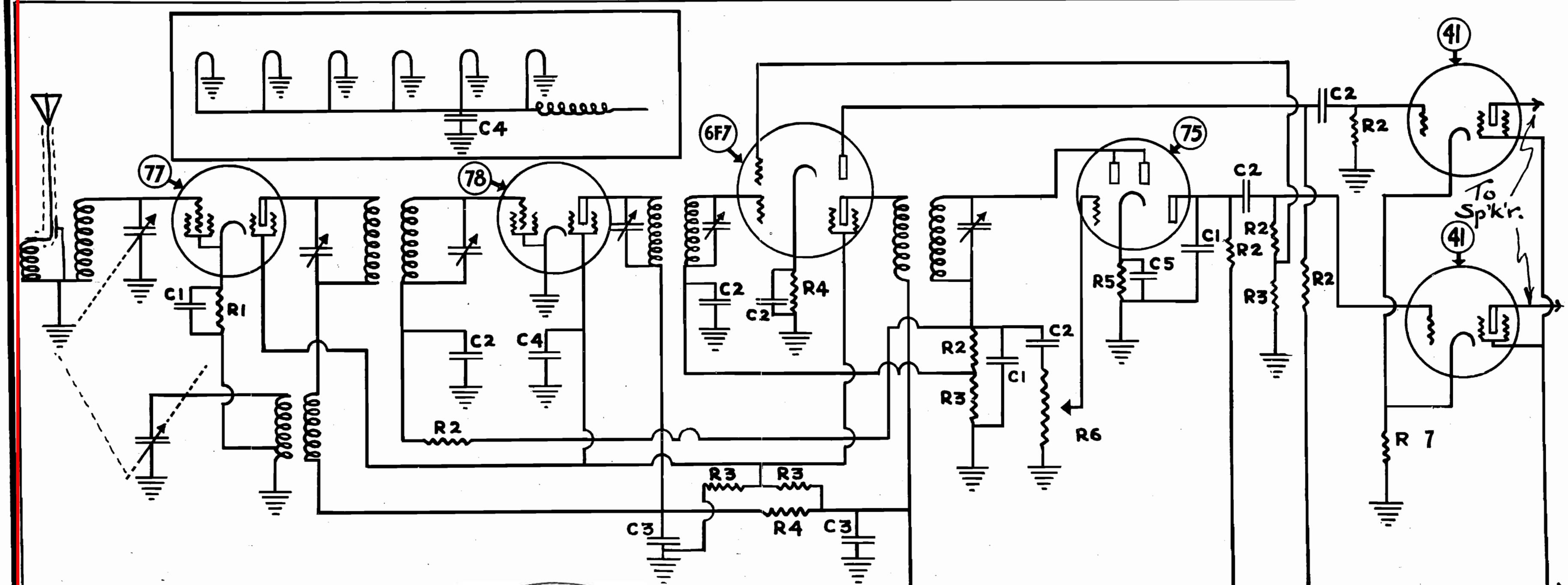


MODEL 447, J-104,
401-A
Schematic

# JACKSON RADIO & TELEVISION CO.

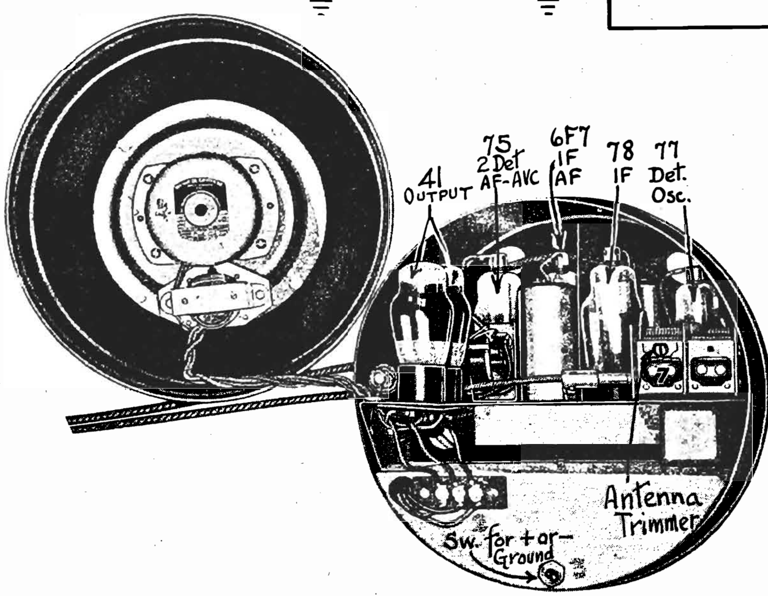


MODEL 56
Schematic
Socket




R-1— 7,000 ohms—¼ watt
R 2—200,000 ohms—¼ watt
R 3— 50,000 ohms—¼ watt
R 4— 250 ohms—¼ watt
R 5— 2,000 ohms—¼ watt
R 6—250,000 ohms Potentiometer
R 7— 700 ohms—½ watt

C 1—.001 Mfds.—200 V.
C 2—.1 Mfds.—200 V.
C 3—.1 Mfds.—400 V.
C 4—.25 Mfds.—200 V.
C 5—25 Mfds.— 8 V.

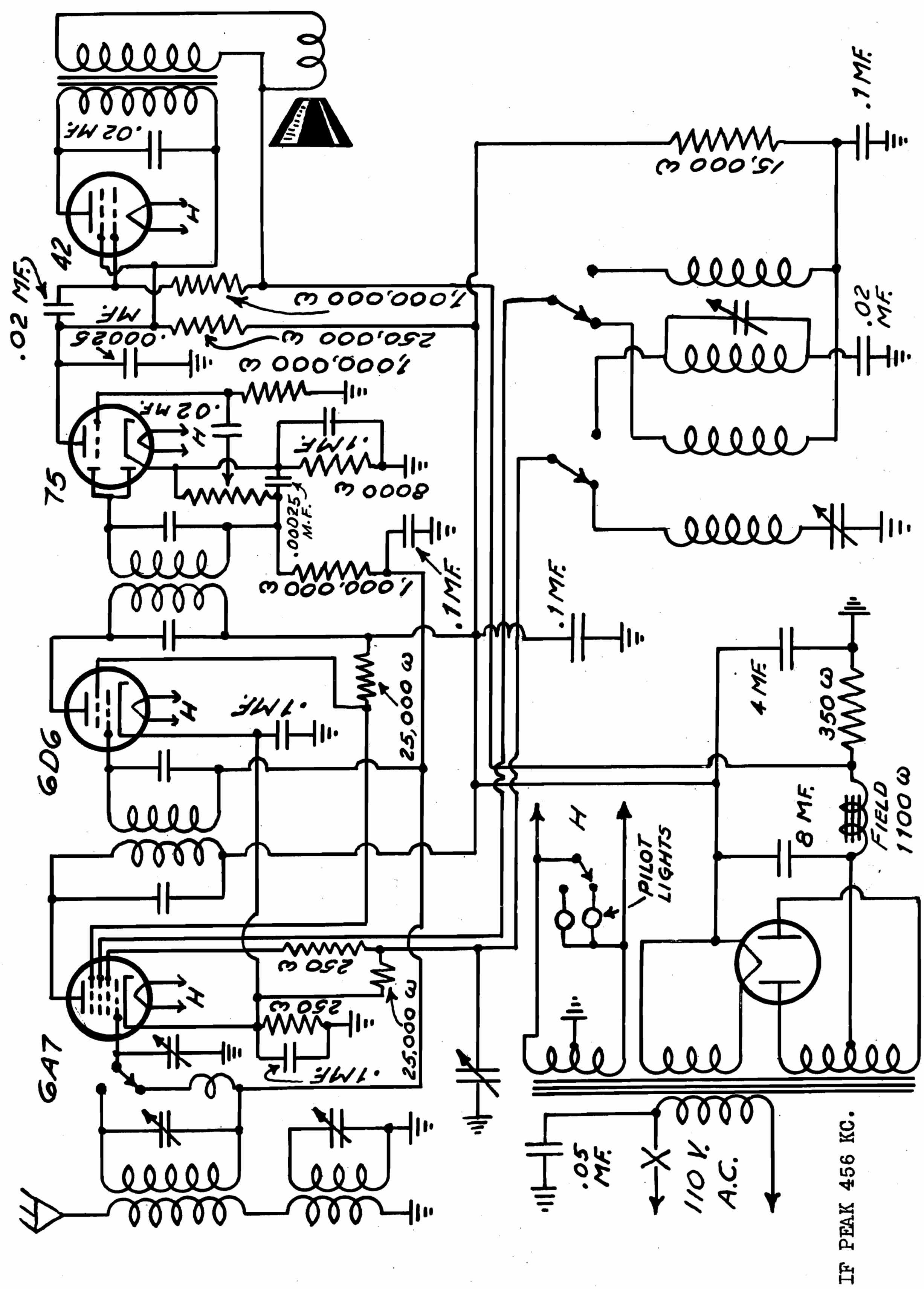



Tube 75 can be replaced with an 85 if greated delayed A V C is desired—Audio Amplification will be decreased when 85 is used.

# Model 56 KARADIO

MODEL A-31
Schematic

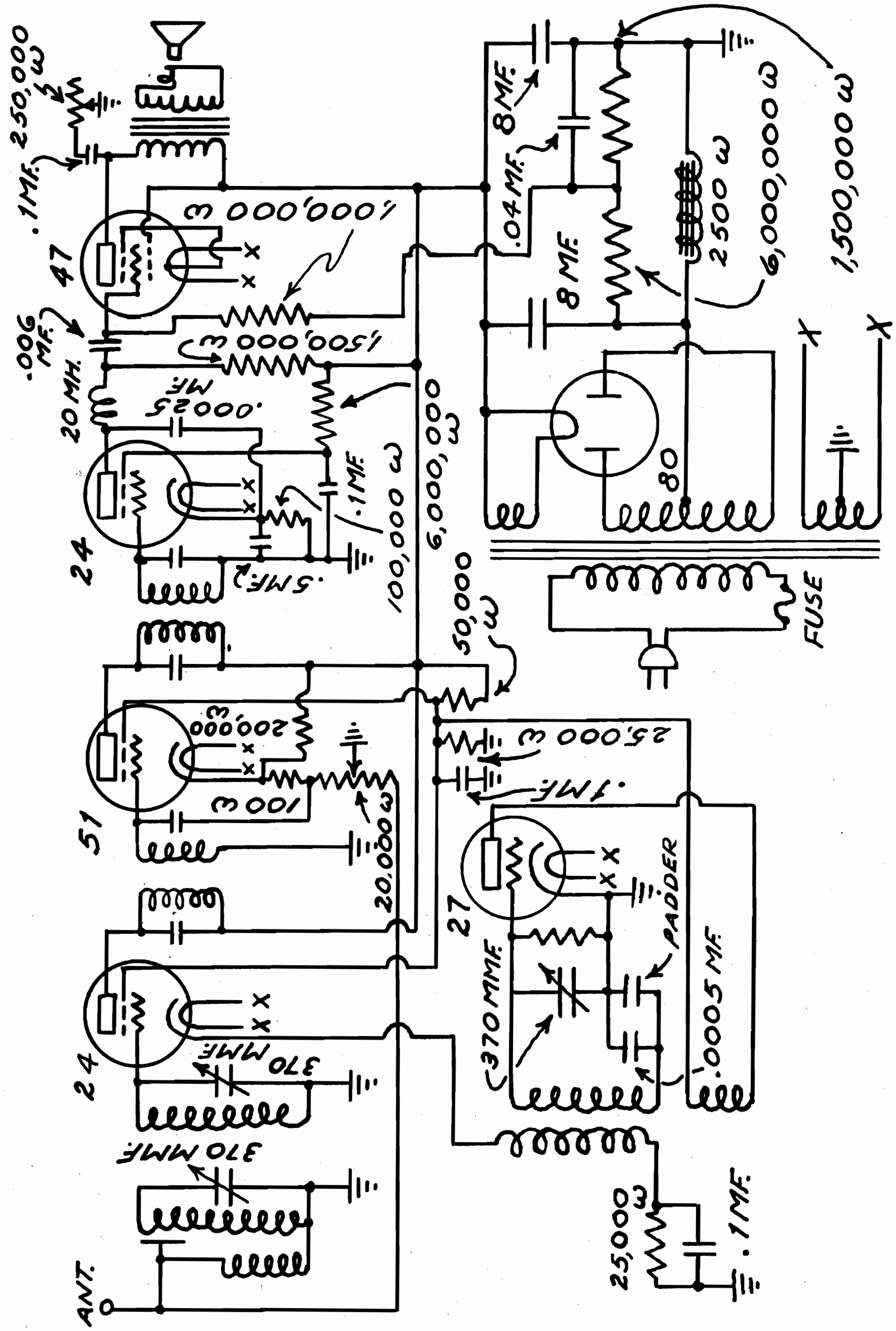
## KNIGHT




IF PEAK 456 KC.

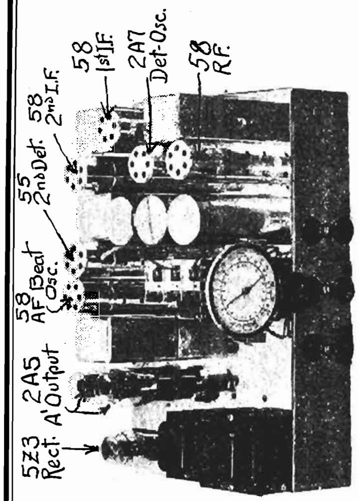
MODEL Suprex Six
Schematic

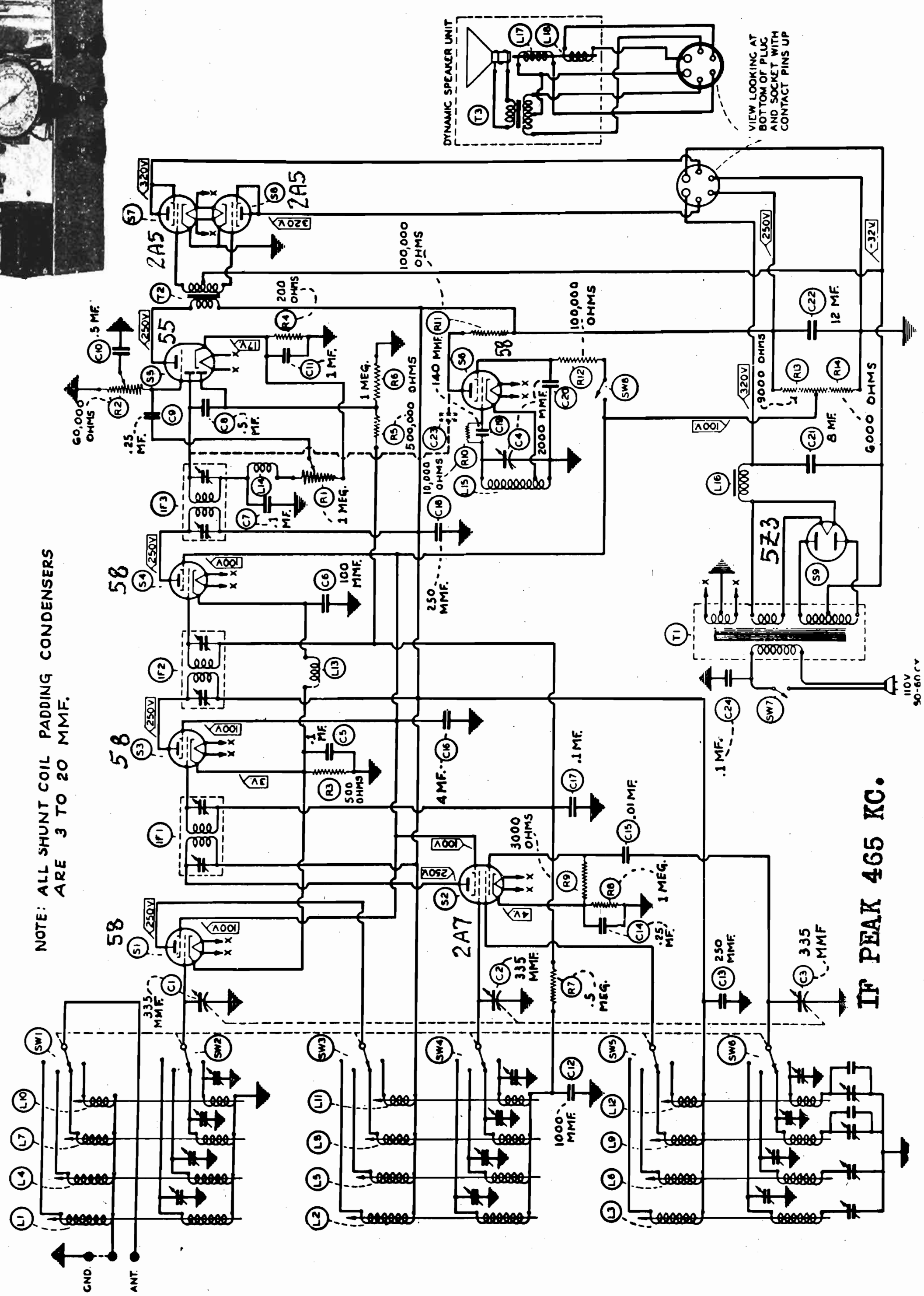
# LEAR-WUERFUL CO.



MODEL World-Wide Nine
Schematic
Socket

# McMURDO SILVER, INC.

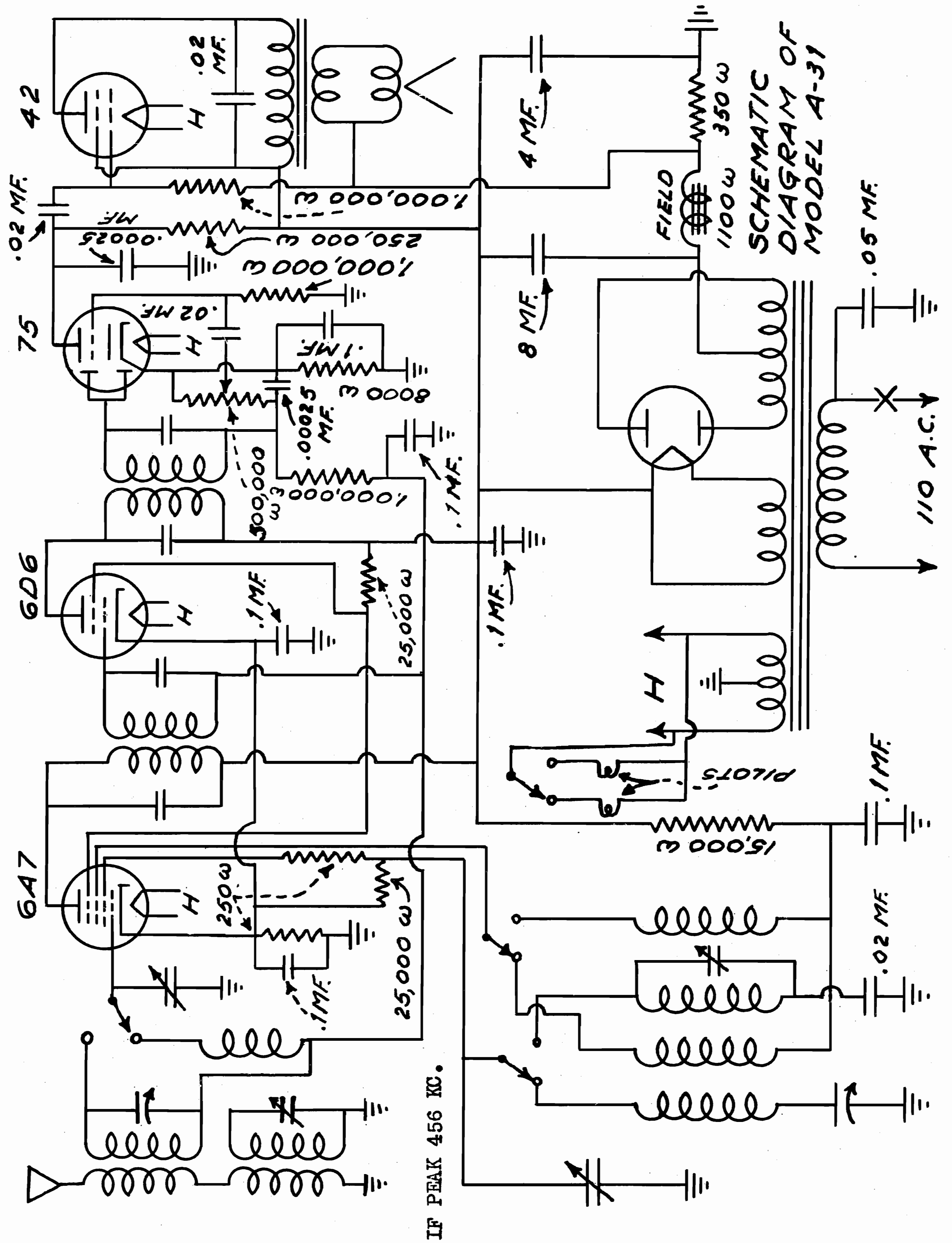



Courtesy "Short Wave Radio"

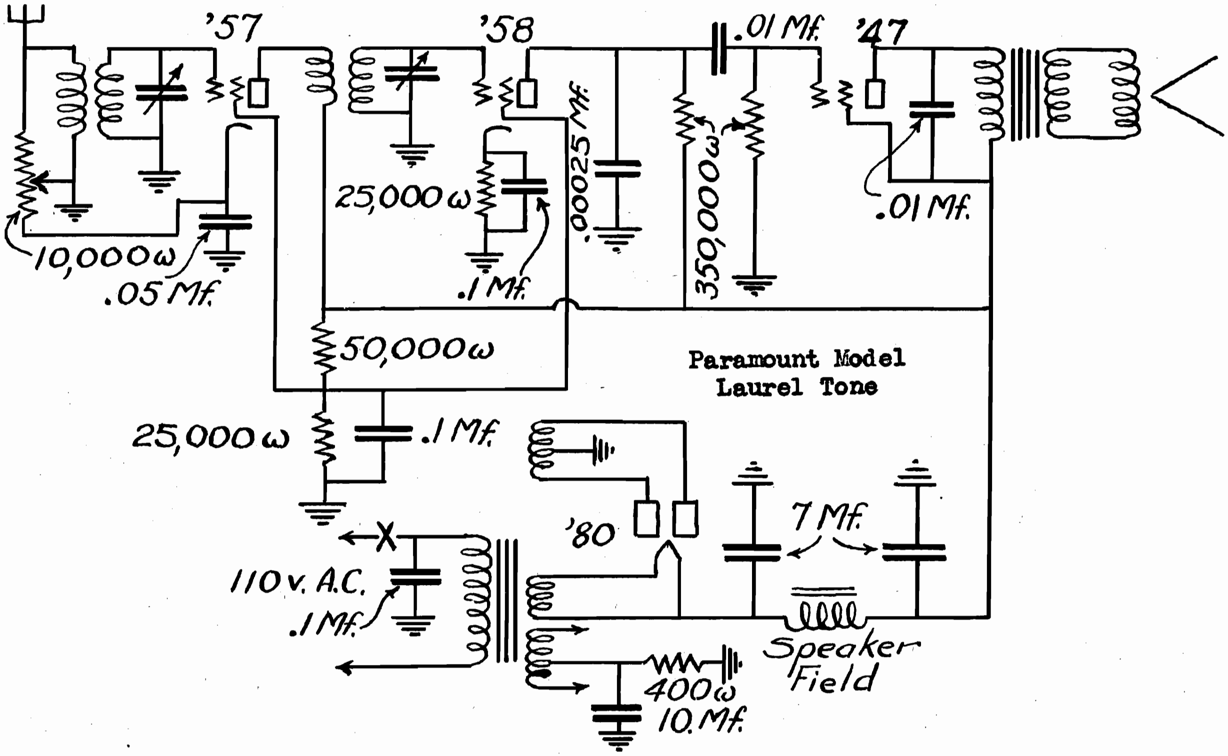
MODEL A-31
Schematic

# MONARCH

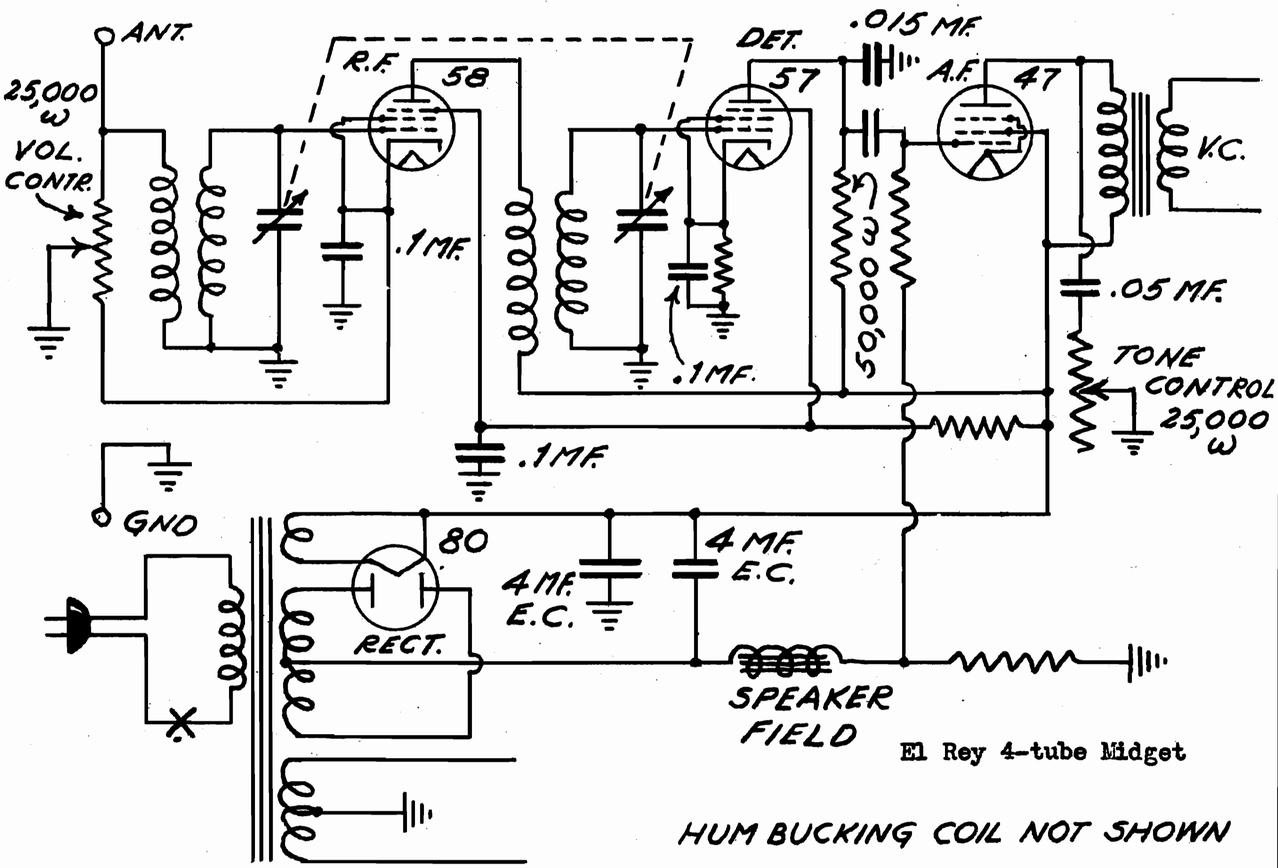


MODEL Laurel Tone
MODEL 4-Tube Midget
Schematic

PARAMOUNT RADIO CO.
EL-REY RADIO MFG. CO.




Paramount Model
Laurel Tone

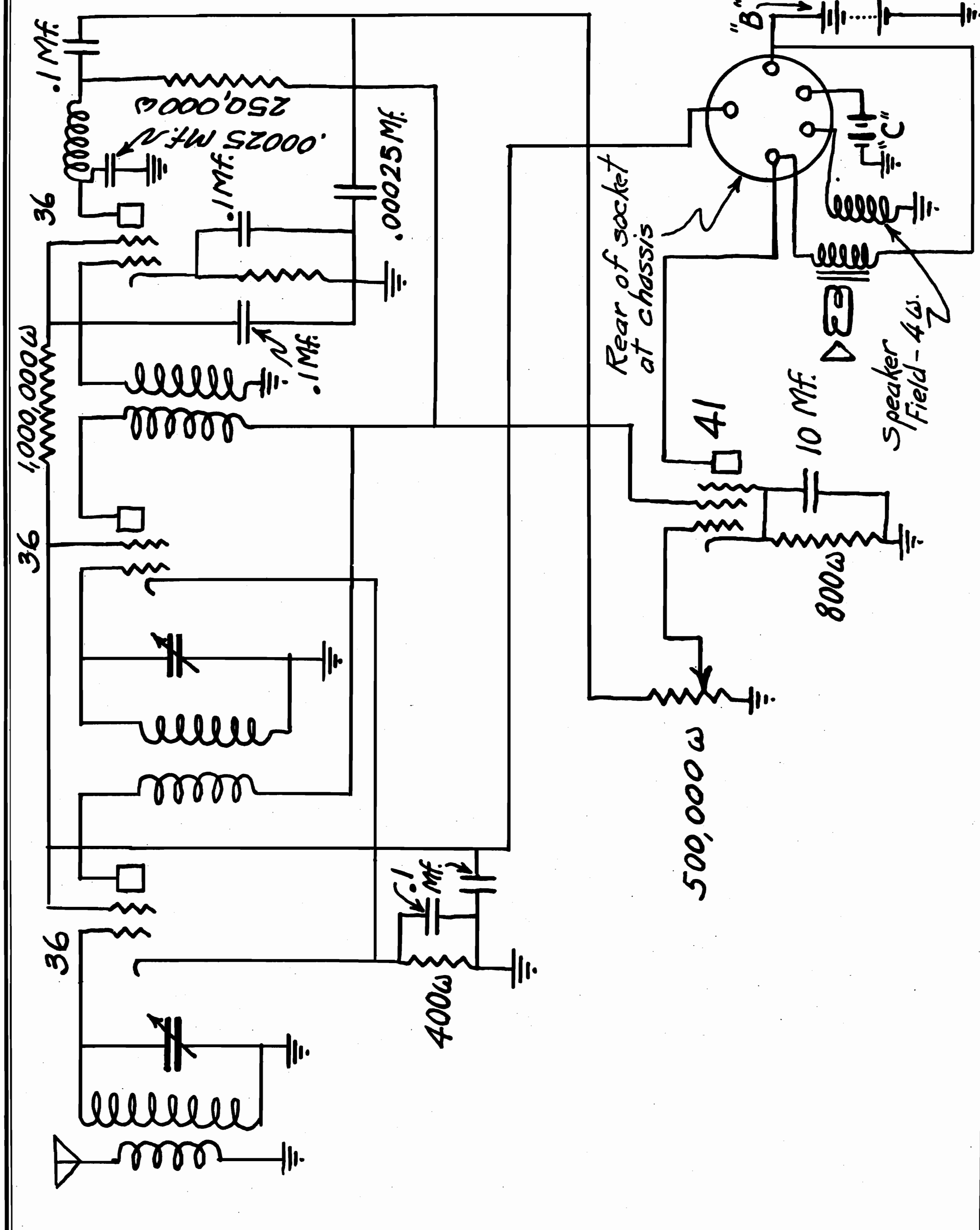



El Rey 4-tube Midget

HUM BUCKING COIL NOT SHOWN

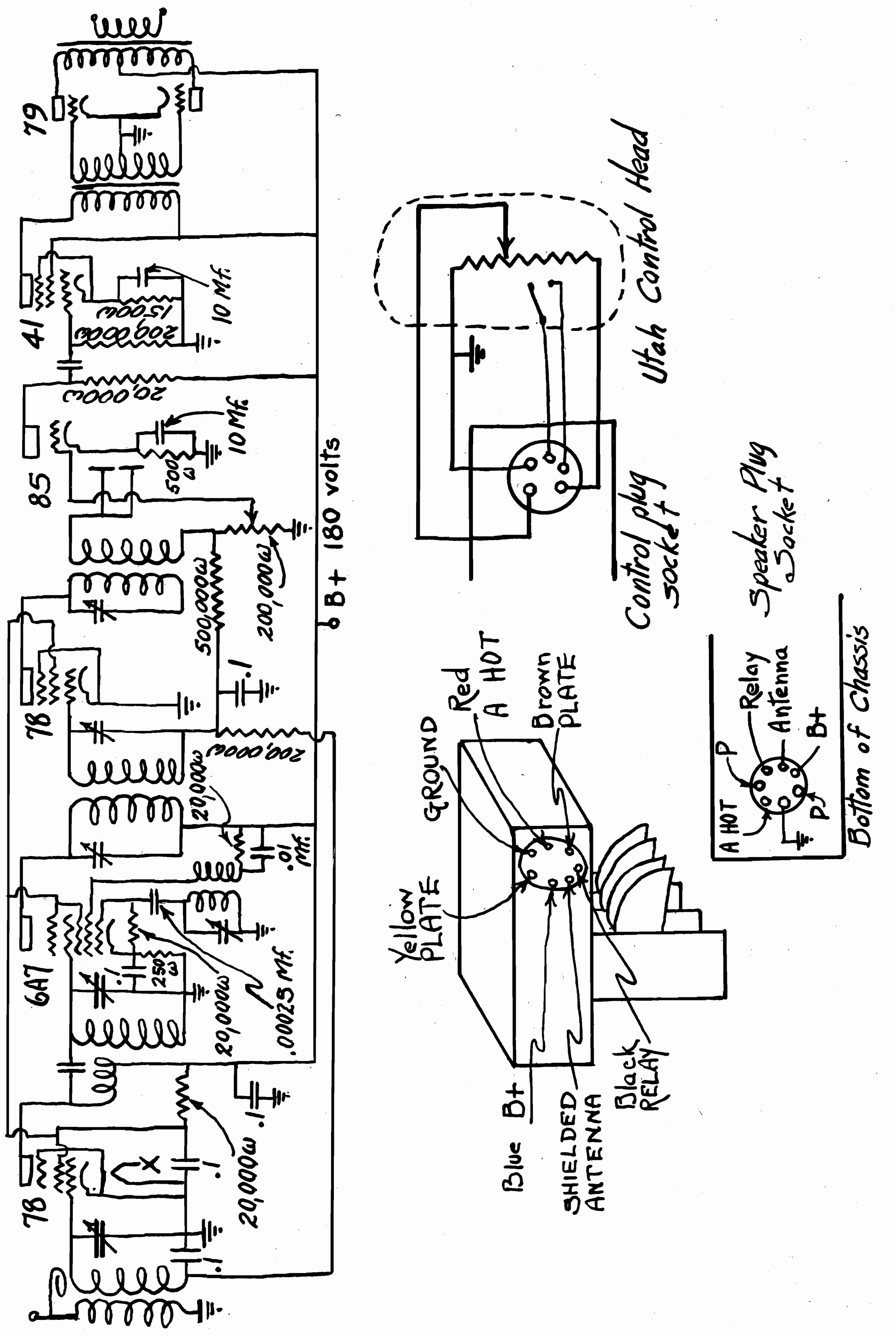
MODEL 4-Tube Receiver
Schematic

PERFECTONE, INC.



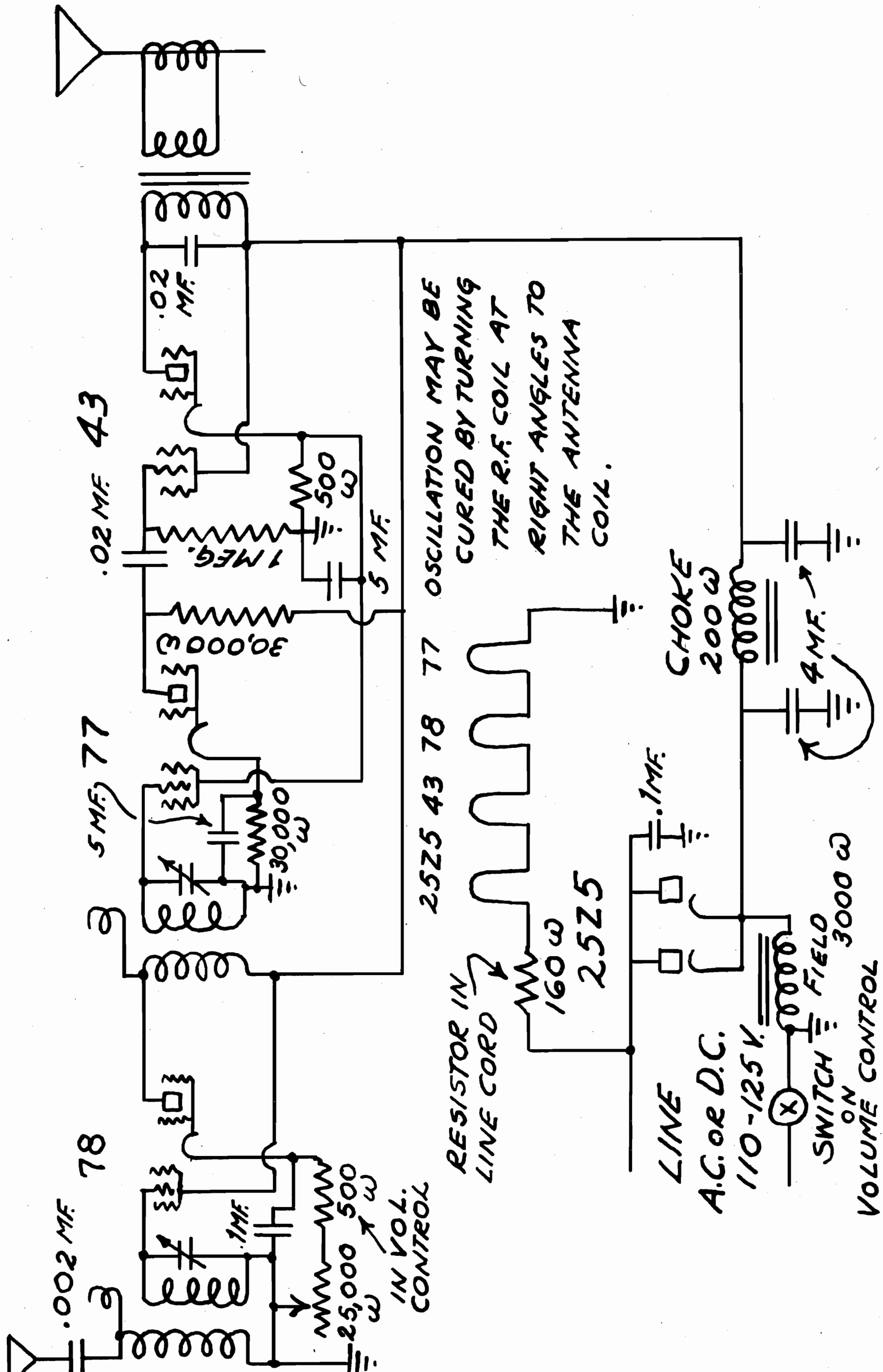
MODEL 55 Auto
Schematic
Data

ROOTS AUTO RADIO MFG. CORP.



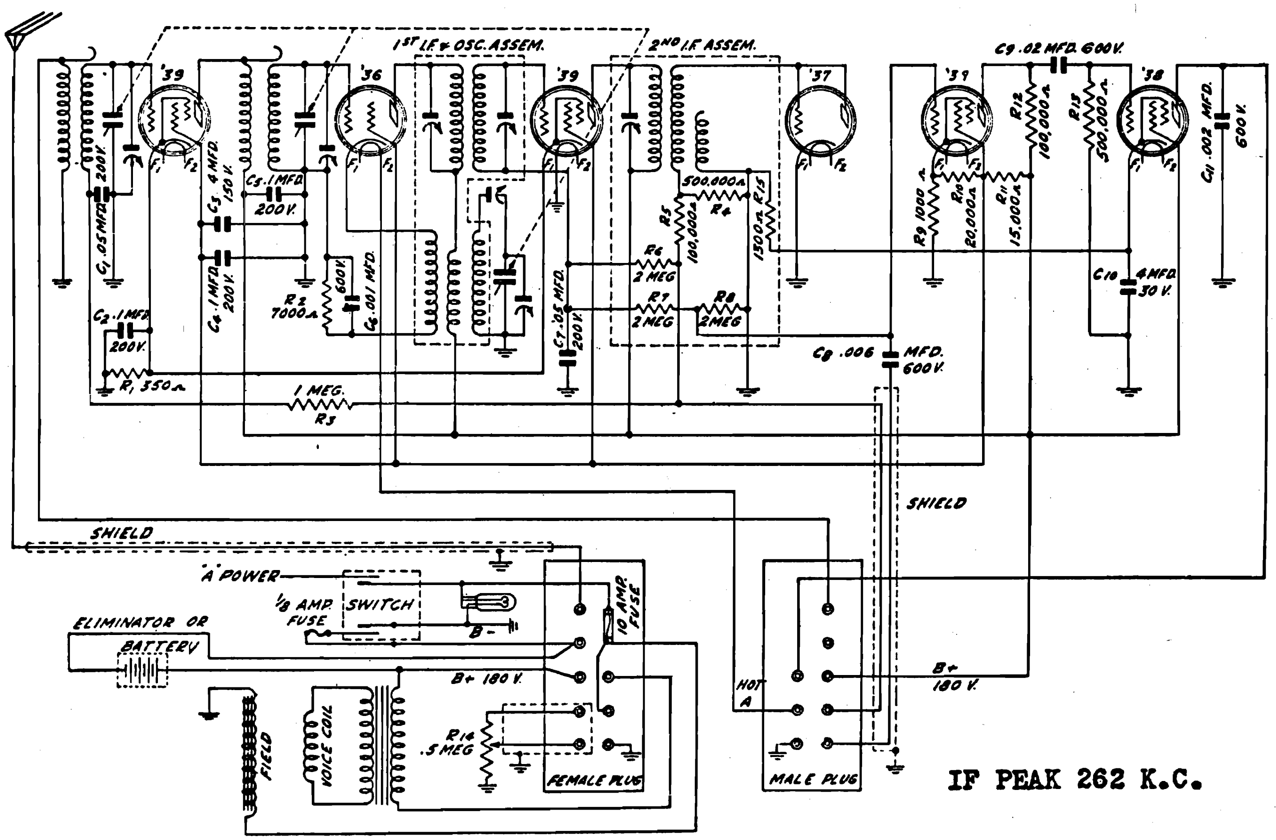
MODEL 9-A
Schematic

# ROYAL

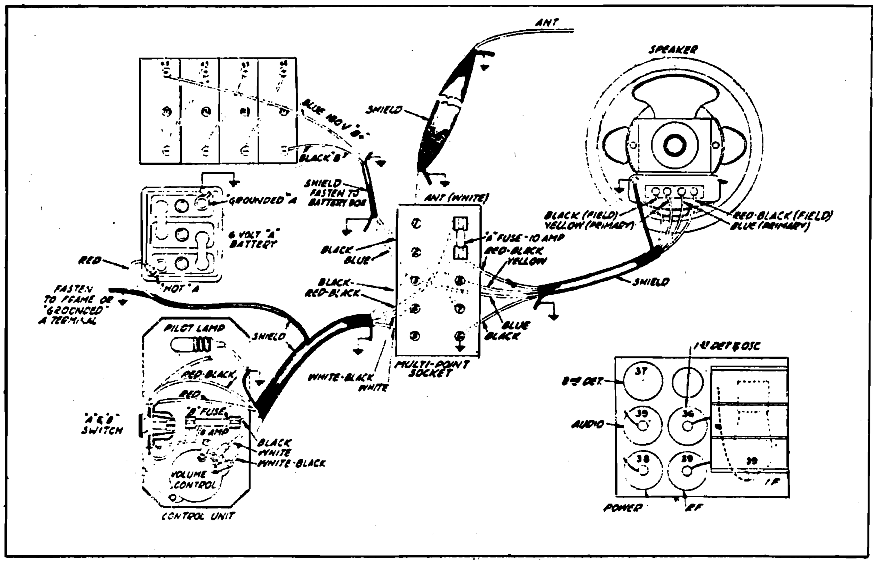


MODEL 062
Schematic
Voltage
Connections

# SOLAR




IF PEAK 262 K.C.



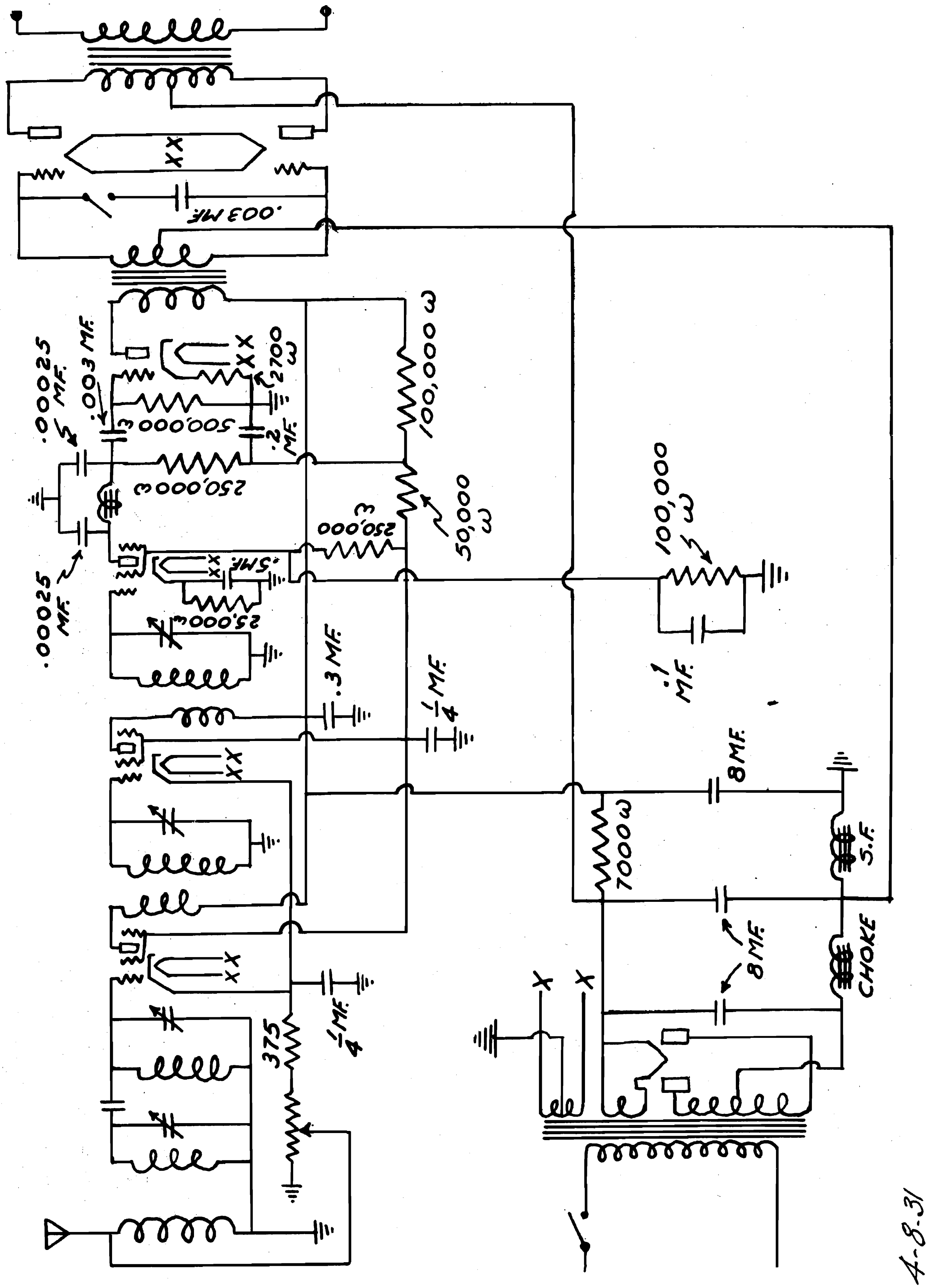
## VOLTAGE DATA

| *Tube* | *Plate* | *Screen* | *Grid* | *Plate MA.* |
|---|---|---|---|---|
| R-F. | 177 | 80 | 3 | 3.6 |
| 1st Det. | 173 | 76 | 7* | .9* |
| I-F. | 177 | 80 | 3 | 3.6 |
| 2nd Det. | 0 | 0 | 0 | 0 |
| 1st A-F. | 54 | 77 | 6 | 1.2 |
| Output | 159 | 165 | 15.5 | 10.0 |

* Will vary with dial setting.

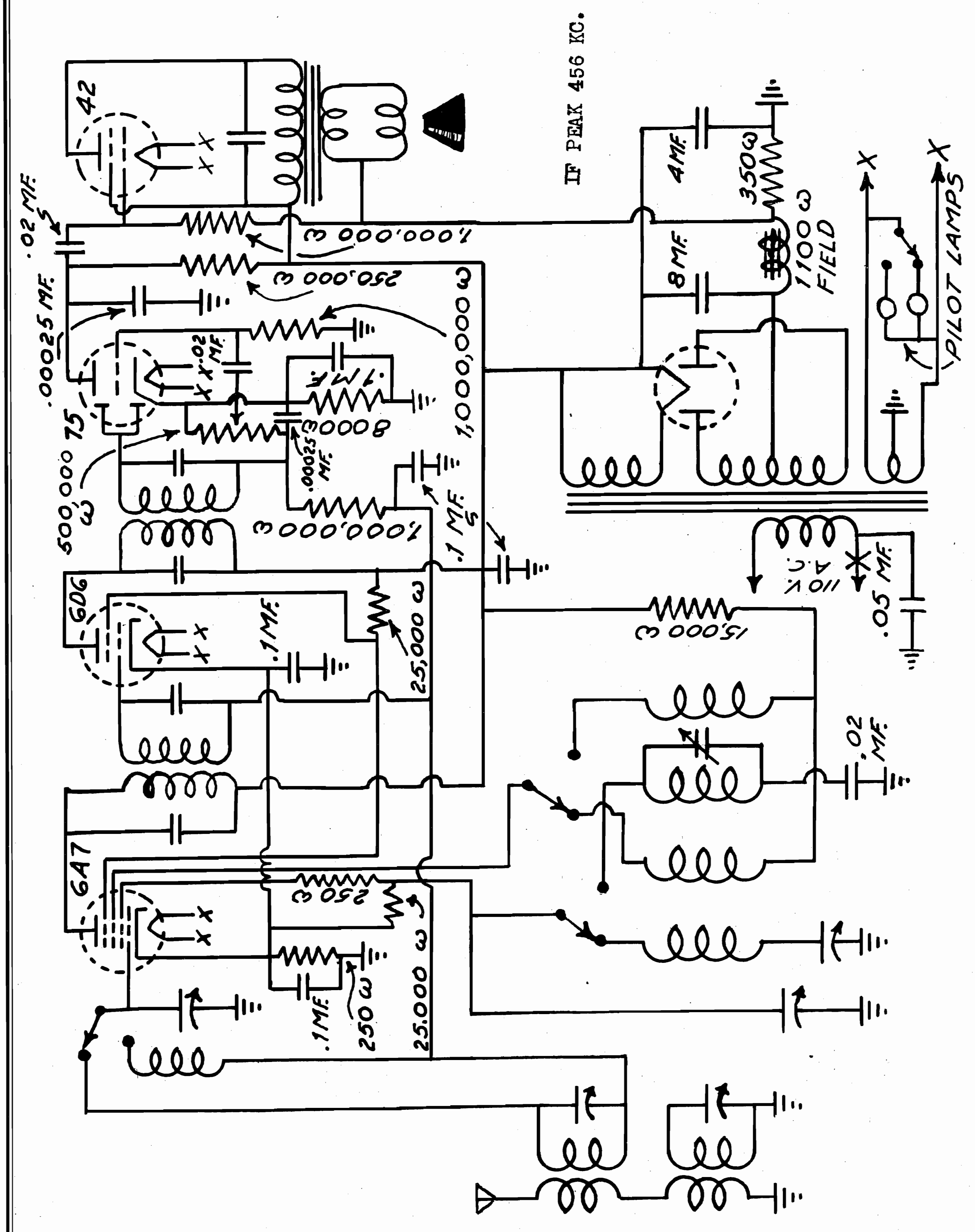
MODEL C-108
Clock Model
Schematic

# STORY & CLARK RADIO CORP.



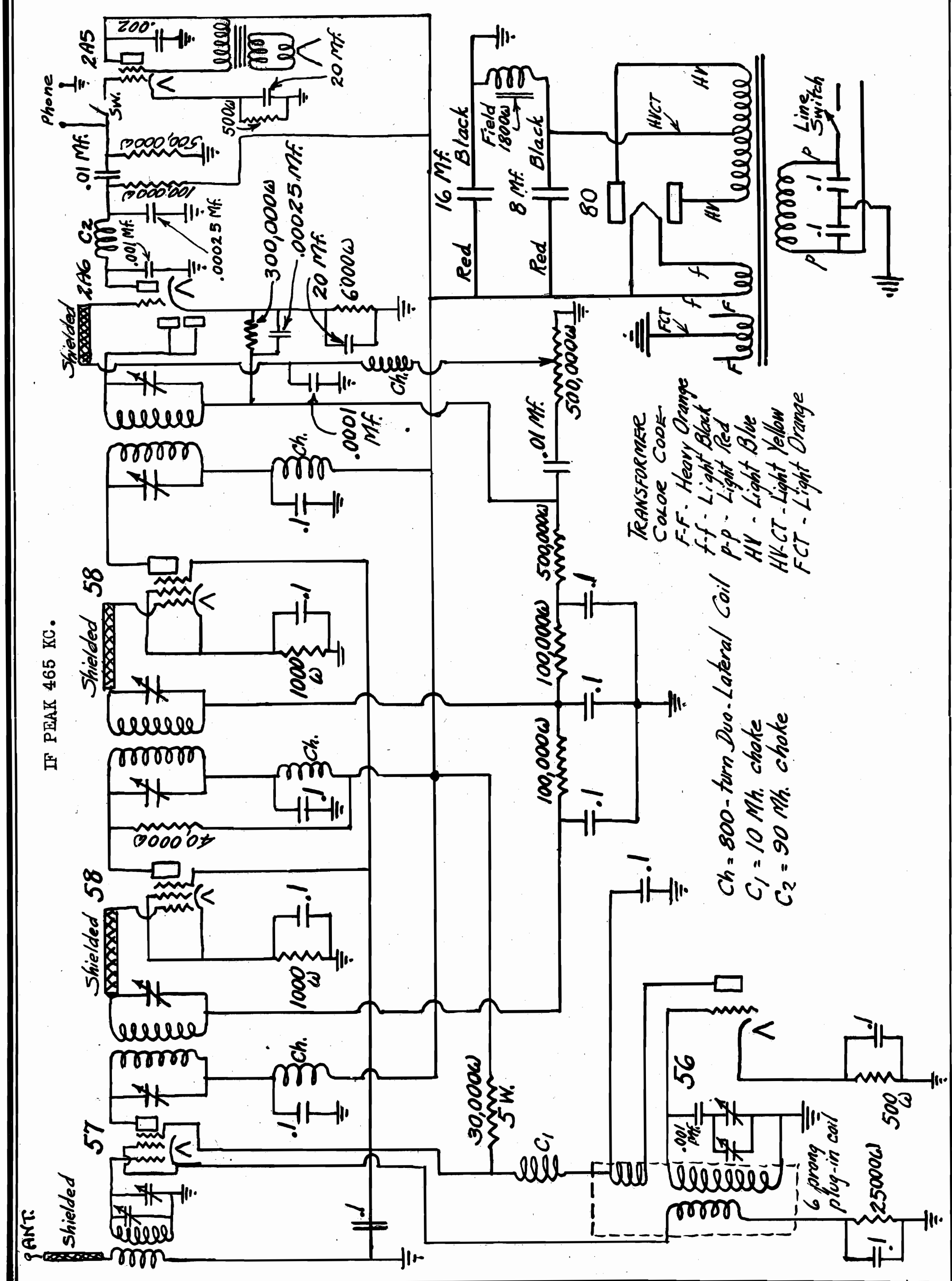
MODEL A-31
Schematic

## SUPERTONE



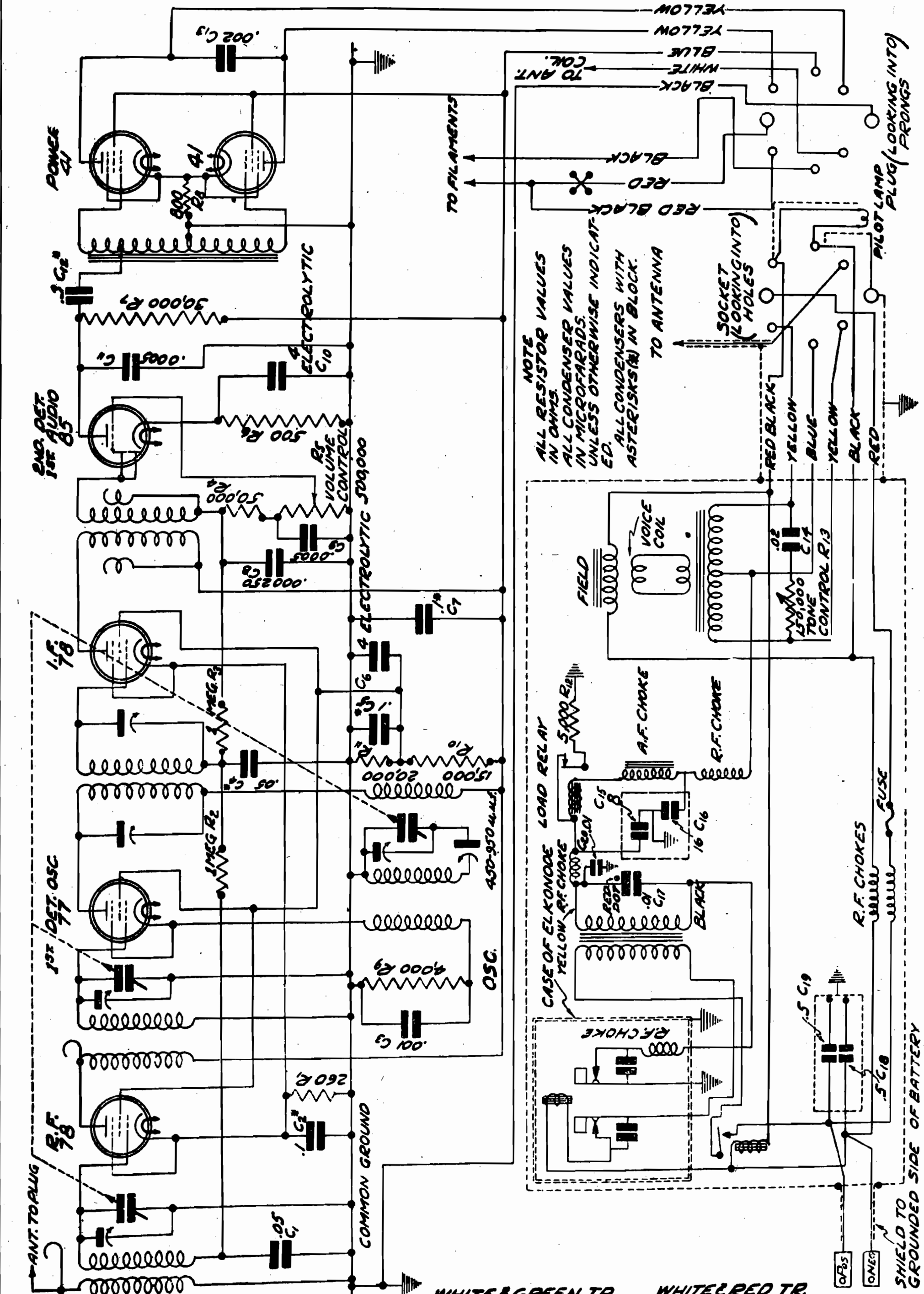
SUPERTONE PRODUCTS CO., INC.

MODEL Superba
Schematic
Color Code



MODEL 06-W
Schematic
Voltage, Socket

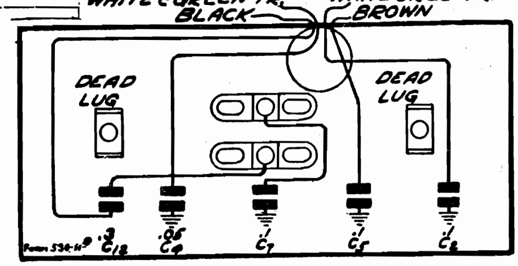
# TROPIC – AIRE



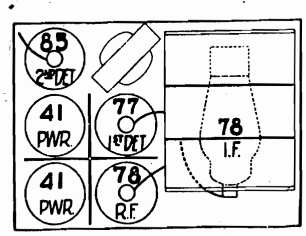

| | Across Heater | Plate to Cathode | Screen to Cathode | Grid to Cathode | Normal Plate MA |
|---|---|---|---|---|---|
| 78 R.F. | 6.1 | 182 | 80 | 3** | 7.0 |
| 77 1st Det.& Osc. | 6.1 | 178 | 77 | 5 x | 1.3 x |
| 78 I.F. | 6.1 | 182 | 80 | 3** | 7.0 |
| 85 2nd Det.& 1st A.F. | 6.1 | 70* | | 1.8** | 3.5 |
| 41 Output | 6.1 | 162 | 168.5 | 17 | 11.0 |

*-Triode Plate to Cathode. **-Cathode to Ground x-Subject to variation
NOTE:- All voltages are at 185 volts input from "B" Eliminator

IF PEAK 262 KC



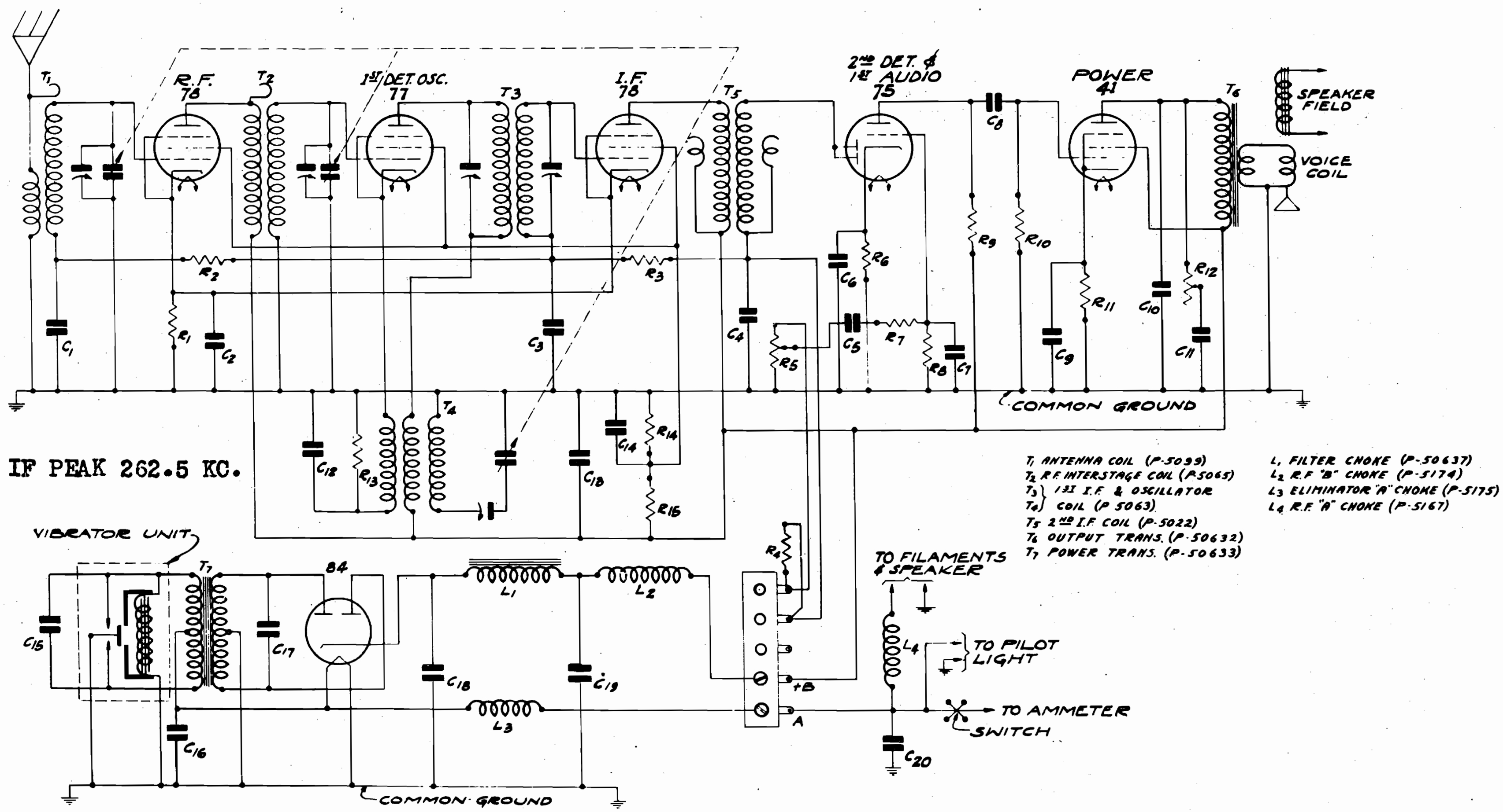

Condenser Block—Internal Wiring




Location of Tubes

MODEL 6-U
Schematic

# TRUEVALUE




IF PEAK 262.5 KC.

$R_1$ 260 OHMS
$R_2$ 1.0 MEGOHM
$R_3$ 2.0 "
$R_4$ 200,000 OHM
$R_5$ 250,000 OHM VOL. CONTROL
$R_6$ 6,000 OHM
$R_7$ 100,000 OHM
$R_8$ 1.0 MEGOHM
$R_9$ 250,000 OHM
$R_{10}$ 250,000 OHM
$R_{11}$ 800 OHM
$R_{12}$ 150,000 OHM TONE CONTROL
$R_{13}$ 4,000 OHM
$R_{14}$ 20,000 OHM
$R_{15}$ 15,000 OHM

$C_1$ 0.050 μf 200V. TUBULAR
$C_2$ 0.500 μf (BLOCK RED-WH)
$C_3$ 0.050 μf (BLOCK GR-WH)
$C_4$ 0.00025 μf MICA
$C_5$ 0.050 μf 200V. TUBULAR
$C_6$ 12.000 μf ELECTROLYTIC IN BLOCK WITH $C_9$
$C_7$ 0.00025 μf MICA
$C_8$ 0.050 μf (BLOCK GR)
$C_9$ 12.000 μf ELECTROLYTIC IN BLOCK WITH $C_6$
$C_{10}$ 0.003 μf (BLOCK YELLOW)
$C_{11}$ 0.020 μf 600V. TUBULAR
$C_{12}$ 0.001 μf MICA
$C_{13}$ 0.500 μf (BLOCK BLUE)
$C_{14}$ 0.100 μf (BLOCK BROWN)
$C_{15}$ 0.500 μf 120V. TUBULAR
$C_{16}$ 1.000 μf 120V. TUBULAR
$C_{17}$ 0.010 μf 1600V TUBULAR
$C_{18}$ 10.000 μf BLOCK WITH $C_{19}$
$C_{19}$ 10.000 μf BLOCK WITH $C_{18}$
$C_{20}$ 0.500 μf 120V. TUBULAR

COLOR CODE DESIGNATES CONDENSERS IN BY PASS BLOCK