

PERPETUAL TROUBLE SHOOTER'S MANUAL

Reg. U.S. Pat. Off.

VOLUME XV



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MEASUREMENT
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AUTOMATIC FREQUENCY CONTROL SYSTEMS



PERPETUAL TROUBLE SHOOTER'S MANUAL

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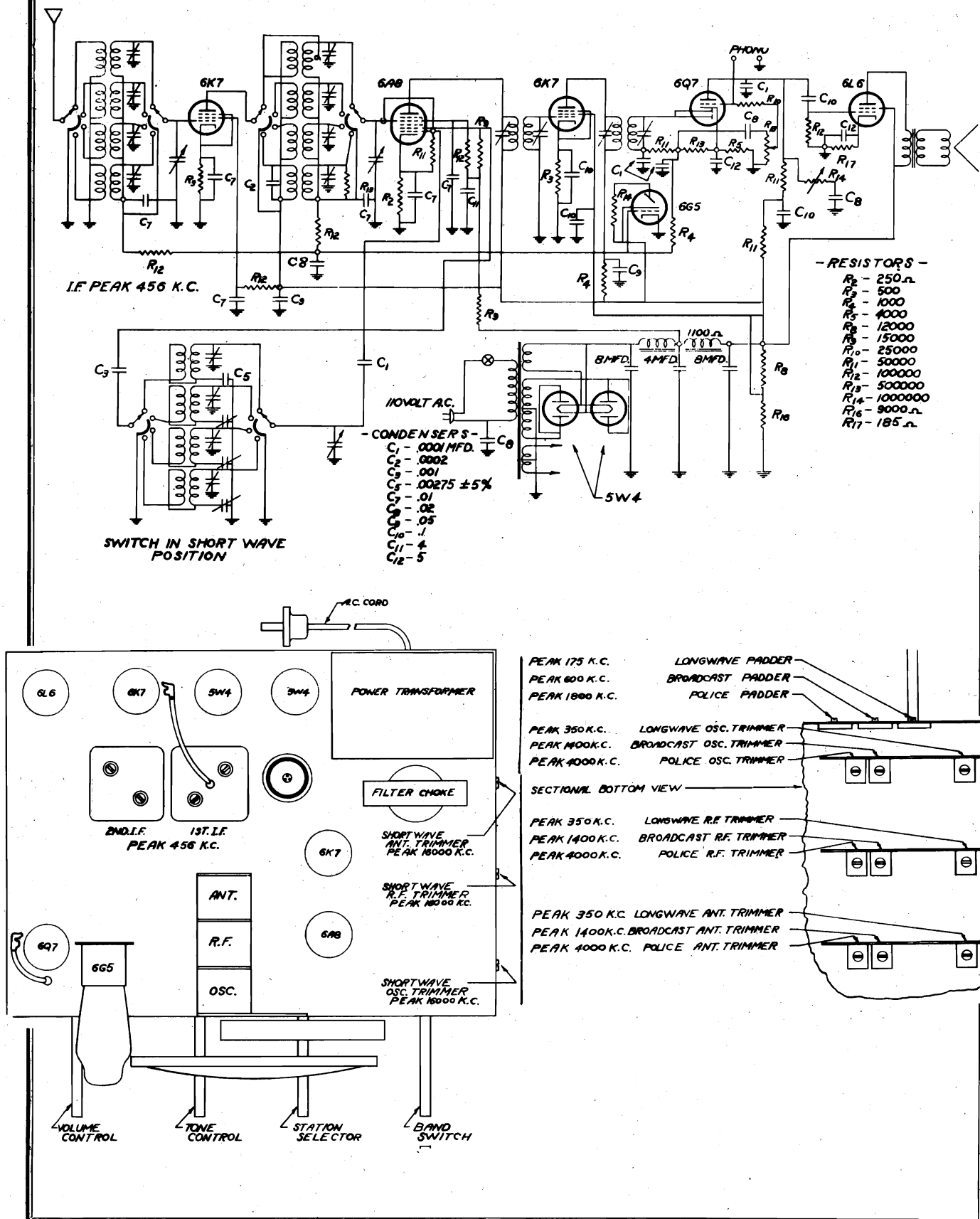
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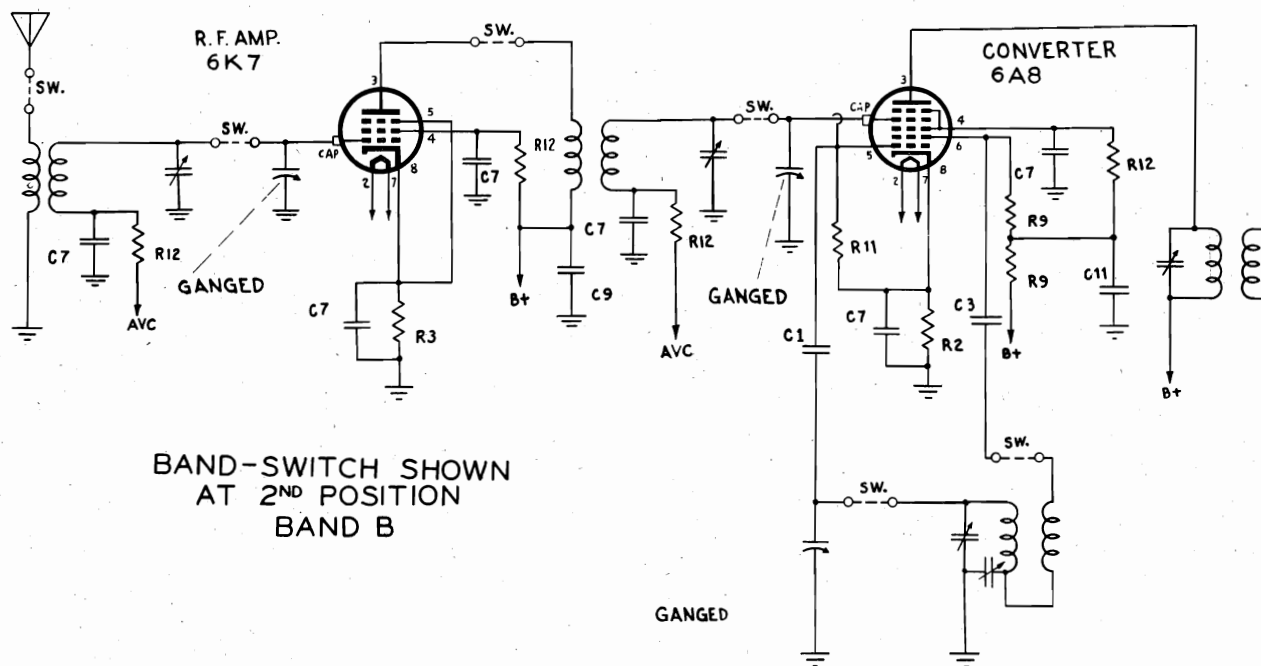
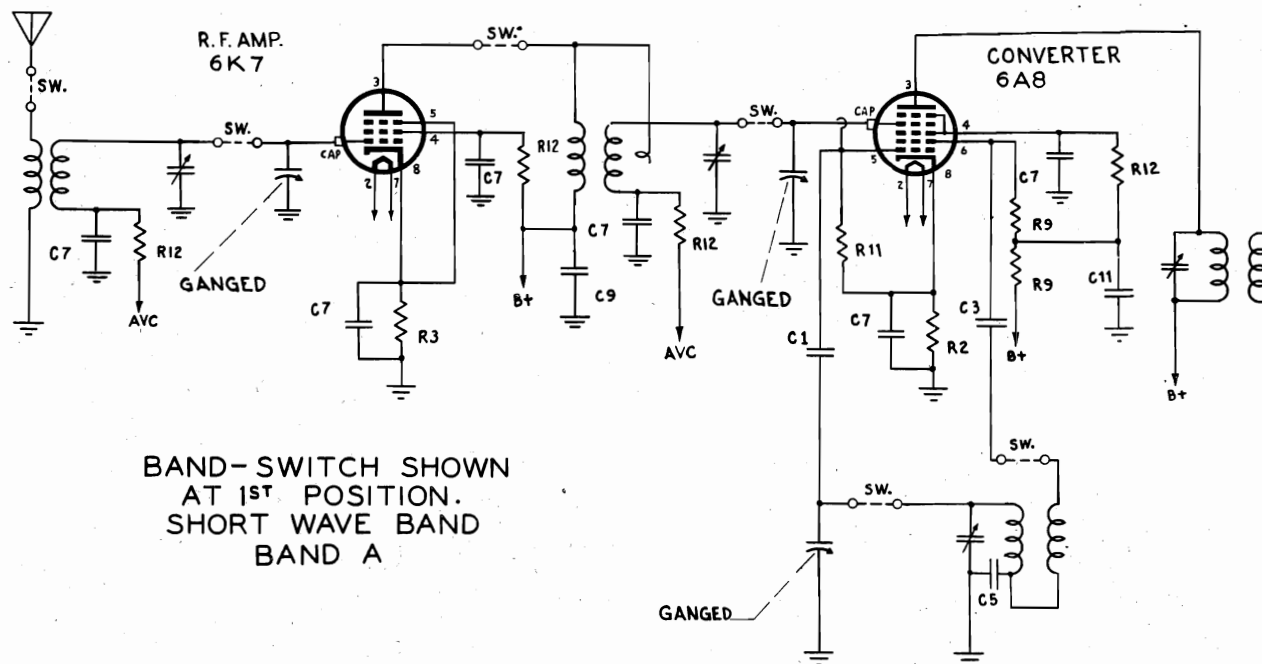
ADMIRAL CORPORATION

MODEL AM3



MODEL AM3
MODEL AM6

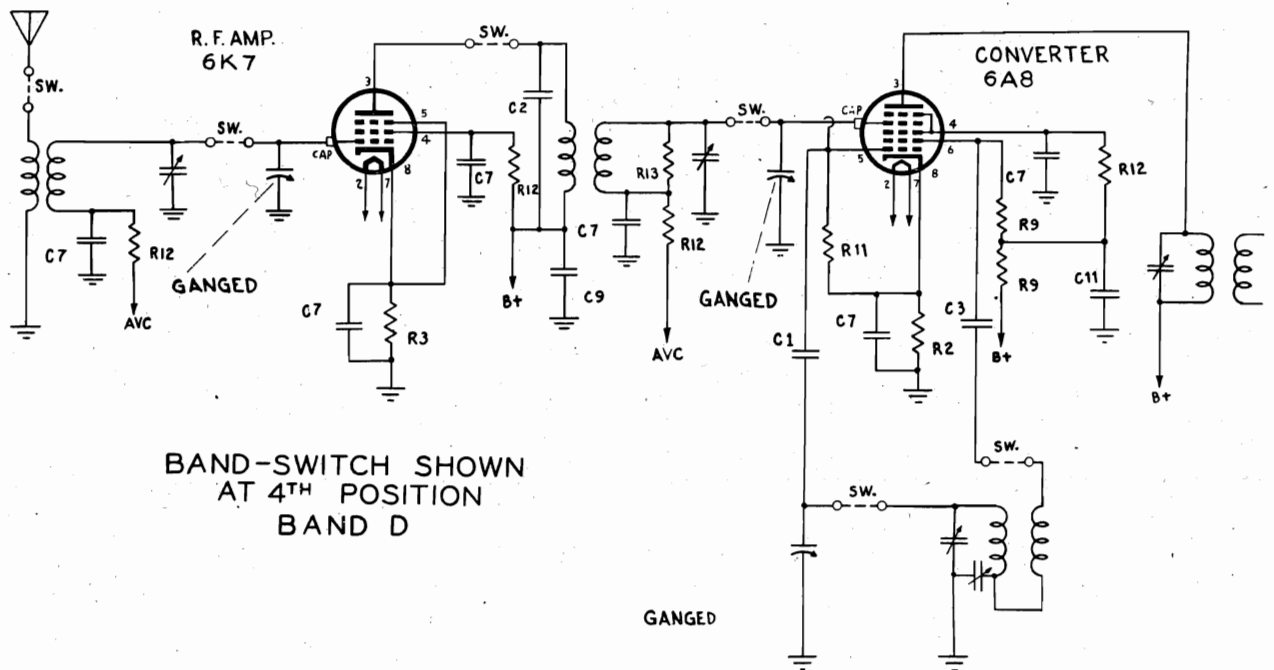
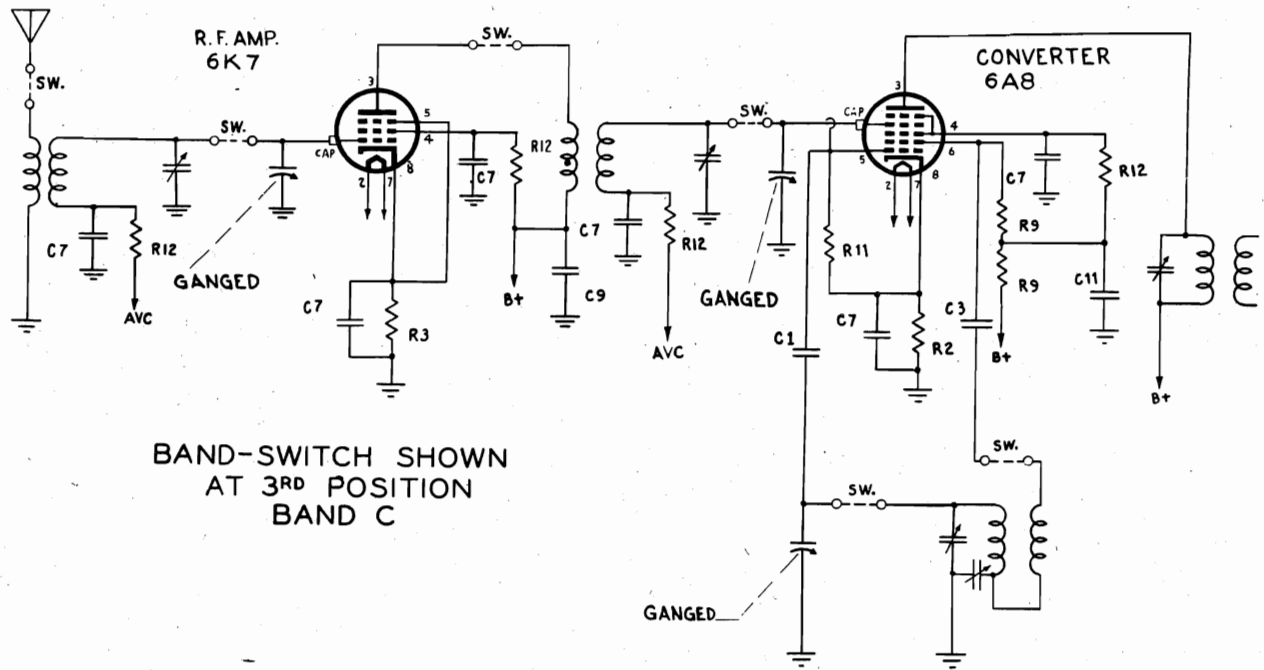
ADMIRAL CORPORATION



ADMIRAL CORPORATION

MODEL AM3

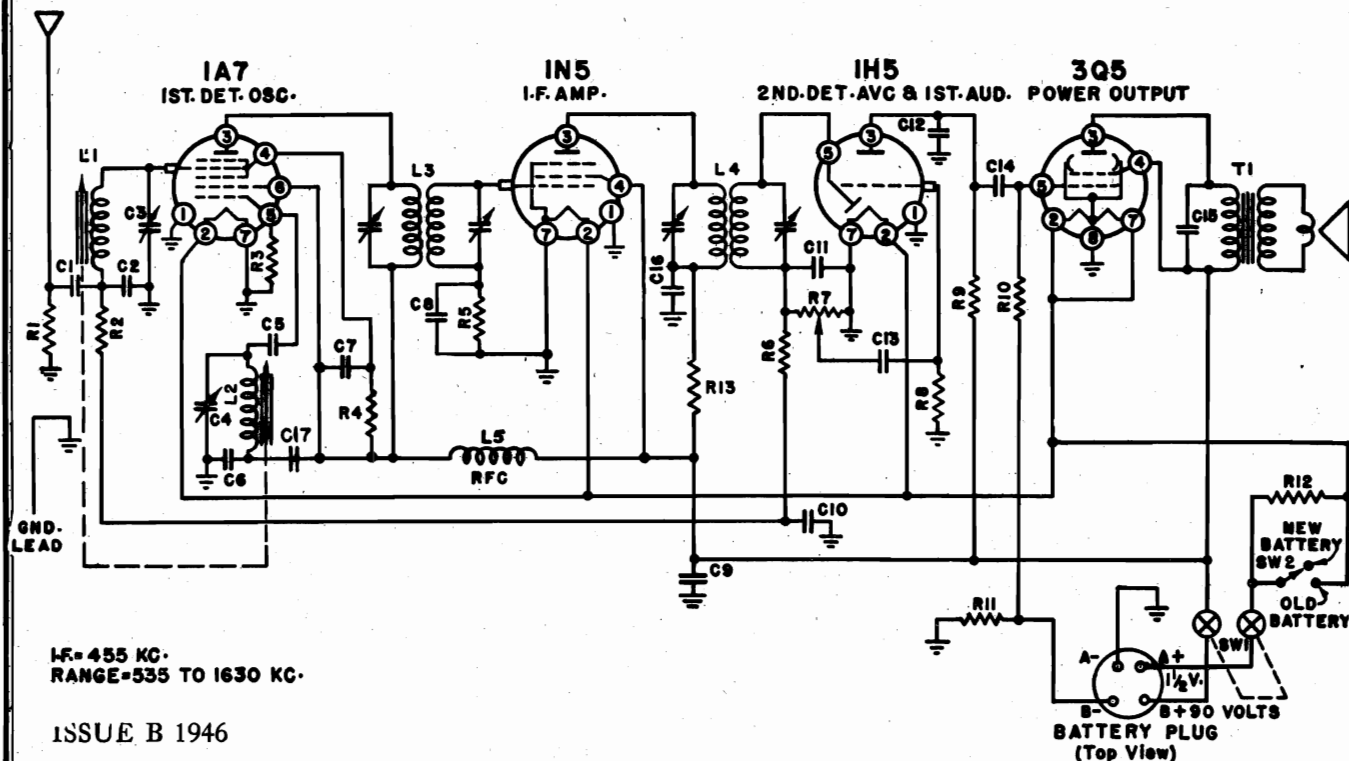
MODEL AM6



MODEL 4A1

Issue B

ADMIRAL CORPORATION

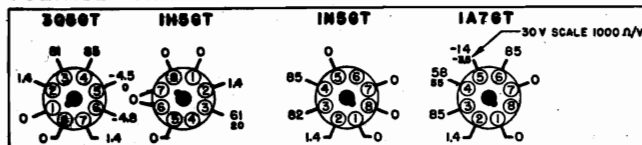


IF= 455 KC.
RANGE=535 TO 1630 KC.

ISSUE B 1946

VOLTAGE CHART

BOTTOM VIEW



BACK OF CHASSIS

VOLTAGE DATA

All readings made between tube socket terminals and chassis. Voltages indicated have been obtained using a Vacuum Tube Voltmeter. A second voltage reading is shown made with a 1000 ohm-per-volt meter, when use of this instrument would result in appreciable lower readings. Measured with a fresh battery, volume control full on, dial at the high frequency end, no signal.

OSCILLATION IN 4A1 BATTERY RADIO CHASSIS

Occasionally audio oscillation may occur in the 4A1 chassis with the volume control in an intermediate position. Should you encounter this trouble, reverse the leads of the primary of the output transformer or ground the speaker frame to the chassis. The speaker leads and the grid lead of the 1H5 should be kept as far as possible from the 3Q5 output tube.

REPLACEMENT PARTS

CONDENSERS

Symbol	Description	Part No.
C1	.01 mfd., 400 Volts	64B1-25
C2	.0008 mfd., Mica	65B5-31
C3	Trimmer, Antenna	66A21-1
C4	Trimmer, Oscillator	
C5	.0001 mfd., Mica	65B7-17
C6	.0008 mfd., Mica	65B5-31
C7	.01 mfd., 400 Volts	64B1-25
C8	.002 mfd., 600 Volts	64B1-14
C9	4. mfd., 150 Volts (Elect)	67A4-2
C10	.05 mfd., 200 Volts	64B1-32
C11	.00025 mfd., Mica	65B7-22
C12	.00025 mfd., Mica	65B7-22
C13	.01 mfd., 400 Volts	64B1-25
C14	.01 mfd., 400 Volts	64B1-25
C15	.005 mfd., 600 Volts	64B1-12
C16	.01 mfd., 400 Volts	64B1-25
C17	.01 mfd., 400 Volts	64B1-25

(C17 omitted in early models)

RESISTORS

R1	15,000 ohm 1/2 w	60B8-153
R2	470,000 ohm 1/4 w	60B2-474
R3	220,000 ohm 1/2 w	60B8-224
R4	33,000 ohm 1/2 w	60B8-333
R5, R8	4,700,000 ohm 1/4 w	60B2-475
R6	2,200,000 ohm 1/4 w	60B2-225
R7	1 meg. Vol. Control	75B1-1
R9, R10	1,000,000 ohm 1/4 w	60B2-105
R11	390 ohm 1/4 w	60B2-391
R12	.75 ohm 1/2 w (wire)	61A2-1
R13	2200 ohm 1/4 w	60B2-222

TRANSFORMERS and COILS

Symbol	Description	Part No.
L1	Antenna Coil	AC105-1
L2	Oscillator Coil	A1020
L3	1st I.F. Transformer	72B5
L4	2nd I.F. Transformer	72B6
L5	Choke Coil (RF)	AB103-1
T1	Output Transformer	*

*Specify all numbers appearing on Output Trans. as well as speaker when ordering.

MISCELLANEOUS

Description	Part No.
Background, Dial	X22B1-1
Cable, Battery (complete with plug)	A1026
Cap, Grid	90A1-2
Cord, Dial (5" on tuner and 53" on dial drive)	50A1-3
Drum and Hub, Tuning	A1035
Iron Slug, with wire (Osc.)	71B1-3
Iron Slug, with wire (Ant.)	71B1-4
Knob	33A1-2

MISCELLANEOUS

Description	Part No.
Plug, Battery 5 Prong	88A4-4
Pointer, Dial	25A3
Pulley, Fibre Dial	17A1-3
Scale, Glass Dial	21B6-1
Screw studs (for iron cores)	27A4
Shield, Tube	87A8
Shaft, Tuning	28A1-1
Socket, octal tube	87A5-1
Speaker and output Transformer	78B3
Spring, Dial Drum Cord Tension	19A1-5
Spring, Tuner slide cord tension	19A1-4
Spring, Tuner slide pressure	18A9
Spring, Tuner, front bearing takeup	19A5
Spring, Tuner, back bearing takeup	19A6
Spring, Hairpin (To hold Ant-Osc. coils)	19A3-1
Switch, SPST (Economizer) SW2	77B1-6
Washer, C	4A4-1
Washer, spring (shaft)	4A6-3-0
Washer, spring (coils)	4A6-12-0

ADMIRAL CORPORATION

MODEL 4A1
Issue B

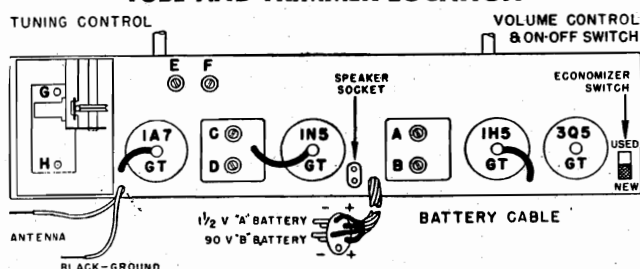
ALIGNMENT PROCEDURE

1. **IMPORTANT**—Check to see that dial pointer reaches each end of dial scale when Station Selector Control is turned from one end to the other.
2. Volume control—Maximum for all adjustments.
3. Connect radio chassis to ground post of signal generator with a short heavy lead.
4. Connect output meter across voice coil of speaker.
5. Connect dummy antenna value in series with generator output lead, when needed (see below).
6. Allow chassis and signal generator to "heat up" for several minutes.
7. Use lowest Output setting of Signal Generator capable of producing adequate Output Meter indication and then proceed in the following sequence.

BAND	SIGNAL GENERATOR		Connection to Radio	Receiver Dial Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Type of Adjustment
	Frequency Setting	Dummy Antenna					
I.F.	455 KC.	.1 mfd.	Grid of 1A7 (Cap)	High Frequency end of dial	C-D—2nd I.F.	Output I.F.	Adjust to maximum output
I.F.	455 KC.	.1 mfd.	Grid of 1A7 (Cap)	High Frequency end of dial	A-B—1st I.F.	Input I.F.	Adjust to maximum output
Broadcast	1630 KC.	.00020 mfd. Mica	Antenna Lead	High Frequency end of dial	E-(See note below) F-(See note below)	Oscillator Antenna	Adjust to maximum output
Broadcast	1300 KC.	.00020 mfd. Mica	Antenna Lead	1300 KC.	G H	Oscillator Antenna	Adjust to maximum output

NOTE: Before adjusting trimmers "E" and "F," make sure that each iron core is $1\frac{1}{2}$ " or more outside of its coil form. If necessary, turn adjustments "G" and "H" to accomplish this.

TUBE AND TRIMMER LOCATION



CIRCUIT

Battery operated 4 Tube Superheterodyne with Single Tuning Range 535 KC. to 1630 KC. Covers standard broadcast band, using antenna and ground. Permeability tuning on Ant. and Osc. circuits. I.F. 455 KC.

POWER SUPPLY

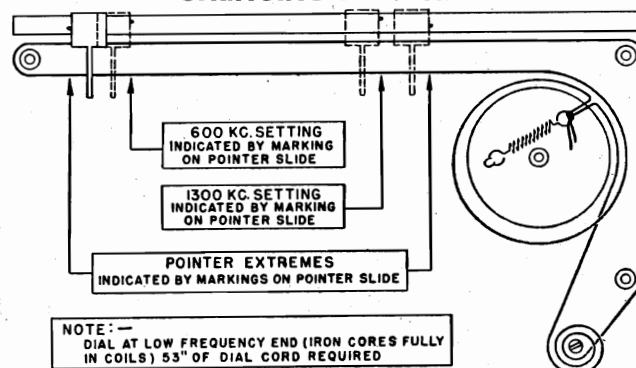
Single unit "AB" battery pack. 90 volt "B" 1 1/2 volt "A". Plug in connection. Use Ensign AB48, Burgess 17G-D60, Eveready 748, General 60DL-11L, Ray-O-Vac AB-82, or Bond 0528 Battery or Equivalent.

ECONOMIZER SWITCH

The battery economizer switch is located on the top of the chassis, right side.

Always have this Economizer Switch in the "NEW" battery position when first placing radio in operation or when installing a new battery.

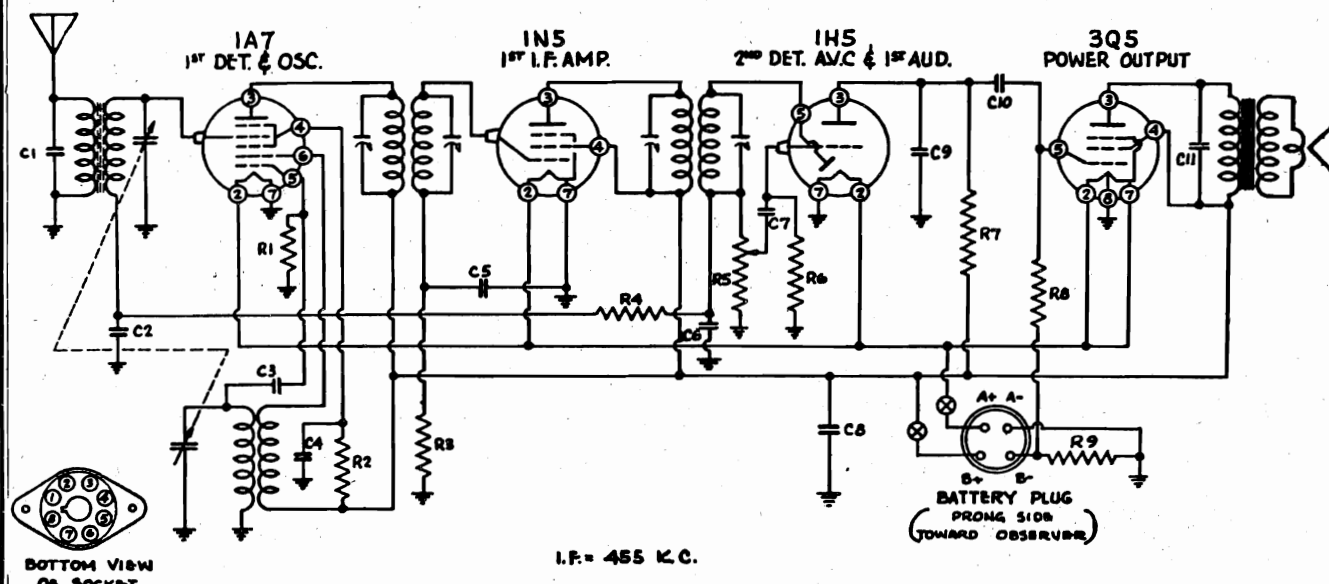
STRINGING DIAGRAM



NOTE:—
DIAL AT LOW FREQUENCY END (IRON CORES FULLY IN COILS) 53" OF DIAL CORD REQUIRED

MODEL C4

ADMIRAL CORPORATION



RESISTORS						CONDENSERS					
No.	Ohms	Watts	No.	Ohms	Watts	No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
R1	200,000	1/2	R6	15,000,000	1/2	C1	.00005	Mica	C8	.01	400
R2	50,000	1/2	R7	1,000,000	1/2	C2	.05	200	C9	6.0 (Elect.)	150
R3	5,000,000	1/2	R8	2,000,000	1/2	C3	.00005	Mica	C10	.00025	Mica
R4	2,000,000	1/2	R9	440—10%	1/2	C4	.05	200	C11	.005	400
R5	1,000,000	V.C.				C5	.001	200	C12	.002	500
						C7	.0001	Mica			

PAPER CONDENSERS

P3203	.001 mfd. 600 volt.....
P1193	.002 mfd. 400 volt.....
P1322	.005 mfd. 600 volt.....
P164	.01 mfd. 400 volt.....
P148	.05 mfd. 200 volt.....

MICA CONDENSERS

P1382	.00005 mfd.
P817	.00025 mfd.
P480	.0001 mfd.

ELECTROLYTIC CONDENSERS

P3024	6 mfd. 150 volt.....
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VARIABLE CONDENSERS

P4310	Gang condenser
-------	----------------------

RESISTORS

P3817	440 ohm 1/2 watt.....
P3853	50,000 ohm 1/2 watt.....
P3864	200,000 ohm 1/2 watt.....
P3882	1,000,000 ohm 1/2 watt.....
P3883	2,000,000 ohm 1/2 watt.....
P3886	5,000,000 ohm 1/2 watt.....
P3891	15,000,000 ohm 1/2 watt.....

VARIABLE RESISTORS

P4309	Volume control and switch...
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TRANSFORMERS AND COILS

G6274	Antenna coil assembly
P4308	Oscillator coil
P4323	1st I.F. transformer
P3980	2nd I.F. transformer

MISCELLANEOUS

P3005	Tube socket
-------	-------------------

P1957	Battery plug
-------	--------------------

P3571	Tube shield
-------	-------------------

P4127	Drive shaft
-------	-------------------

P1399	Horseshoe washer
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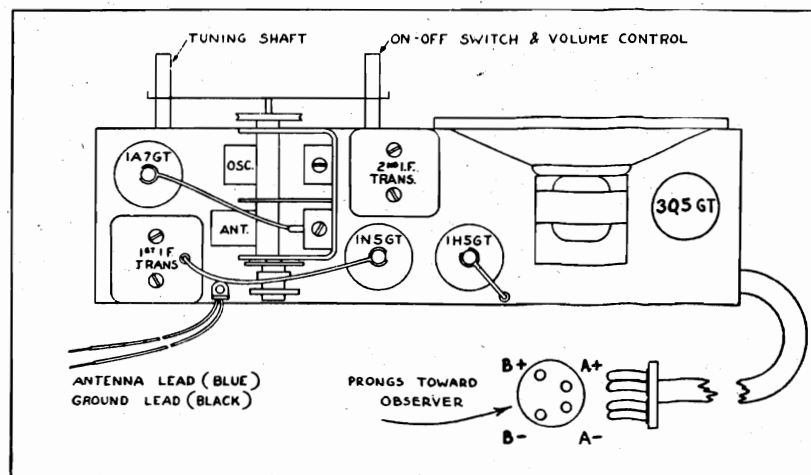
P2925	Cord tension spring
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P470	Grid clip
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P4925	Speaker and output transformer
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P2149	Chassis mounting bolt, 1/2 doz.
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P2863	Battery adapter cable
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ADMIRAL CORPORATION

MODEL C4
MODEL D4, Late

MODEL C4

SERVICE INFORMATION

ALIGNMENT DATA

GENERAL DATA

The alignment of this receiver requires the use of a signal generator that will cover the frequencies of 455, 600, 1400, and 1730, and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the signal generator output as low as possible, to prevent the AVC from operating and giving false readings.

I.F. ALIGNMENT

Adjust the signal generator to 455 KC and connect the output to the grid of the first detector tube (1A7) thru a .05 or .1 mfd. condenser. The ground of the signal generator should be connected to the chassis ground. Align all I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT

Connect the output of the signal generator to the antenna and ground leads of the set through a .0002 condenser and adjust the signal generator to 1730 KC. Set the gang condenser to minimum capacity and adjust the oscillator trimmer to receive this signal. After this has been carefully done, the next step is to set the signal generator to 1400 KC and after tuning in the signal adjust the antenna trimmer to peak. The antenna and oscillator trimmers are located on the gang condenser. The trimmer toward the front on the gang condenser is the oscillator trimmer and the one toward the rear the antenna trimmer. This is all that is necessary for the alignment unless the plates of the gang condenser have been bent out of shape. In case of bent plates, set the signal generator and the receiver to 600 KC and bend the plates into the position for maximum sensitivity over the tuning range.

Speaker (Part No. P4925) 5" PM Type

D.C. voice coil resistance.....3.1 ohms

Voice coil impedance at 400 cycles.....3.5 ohms

Antenna Coil (Part No. G-6274)

Looking at the connection end starting at the chassis in a clockwise direction the terminals are: No. 1, AVC; No. 2, grid; No. 3, Ant.; No. 4, ground. No. 4 is grounded to the mounting bracket.

Primary—No. 3 and No. 4—Resistance 24.6 ohms.

Secondary—No. 1 and No. 2—Resistance 2.2 ohms.

A gimmik coil of 5.5 mmfd. connects to terminals No. 2 and No. 3.

Oscillator Coil (Part No. P4308) (Red & Brown Dots)

Looking at the connection end (with dots) starting at the chassis in a clockwise direction the terminals are: No. 1, grid; No. 2, plate; No. 3, B+; No. 4, ground.

Primary—No. 2 and No. 3—Resistance 2.2 ohms.

Secondary—No. 4 and No. 1—Resistance 5.7 ohms.

First I.F. Transformer (Part No. P4323)

Primary—Blue white, plate; red white, B+ — Resistance 12.1 ohms

Secondary—White, grid; black white, AVC — Resistance 24.9 ohms

Second I.F. Transformer (Part No. P3980)

Primary—Blue white, plate; red white, B+ — Resistance 15.1 ohms

Secondary—White, grid; black white, AVC — Resistance 11.8 ohms

ALIGNMENT DATA

MODEL D4 Late

SERVICE INFORMATION

GENERAL DATA

The alignment of this receiver requires the use of a signal generator that will cover the frequencies of 455, 600, 1400 and 1730, and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the signal generator output as low as possible, to prevent the AVC from operating and giving false readings.

I.F. ALIGNMENT

Remove the chassis from the cabinet, adjust the signal generator to 455 KC and connect the output to the grid of the first detector tube (1A7) thru a .05 or .1 mfd. condenser. The ground of the signal generator should be connected to the chassis ground. Align all I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT

Re-install the receiver completely in its cabinet. Connect the output of the signal generator to the antenna and ground terminals of the set through a .0002 condenser and adjust the signal generator to 1730 KC. Set the gang condenser to minimum capacity and adjust the gang condenser trimmer (oscillator) to receive this signal. After this has been carefully done, the next step is to set the signal generator to 1400 KC and after tuning in the signal adjust the antenna trimmer to peak. The antenna and oscillator trimmers are located on the gang condenser. The trimmer toward the front on the gang condenser is the oscillator trimmer and the one toward the rear the antenna trimmer. This is all that is necessary for the alignment unless the plates of the gang condenser have been bent out of shape. In case of bent plates, set the signal generator and the receiver to 600 KC and bend the plates into the position for maximum sensitivity over the tuning range.

Speaker (Part No. P4040) 6" PM Type

D.C. voice coil resistance.....2.6 ohms

Voice coil impedance at 400 cycles.....3.0 ohms

Antenna Coil (Part No. G-5724)

Looking at the connection end starting at the chassis in a clockwise direction the terminals are: No. 1, AVC; No. 2, grid; No. 3, Ant.; No. 4, ground. No. 4 is grounded to the mounting bracket.

Primary—No. 3 and No. 4—Resistance 24.6 ohms.

Secondary—No. 1 and No. 2—Resistance 2.2 ohms.

A gimmik coil of 5.5 mmfd. connects to terminals No. 2 and No. 3.

Oscillator Coil (Part No. 2412) (Red Dot)

Looking at the connection end (with dot) starting at the chassis in a clockwise direction the terminals are: No. 1, grid; No. 2, plate; No. 3, B+; No. 4, ground.

Primary—No. 2 and No. 3—Resistance 2.2 ohms.

Secondary—No. 4 and No. 1—Resistance 5.3 ohms.

First I.F. Transformer (Part No. P3048)

Primary—Blue white, plate; red white B+ — Resistance 12.1 ohms

Secondary—White, grid; black white, AVC — Resistance 24.9 ohms

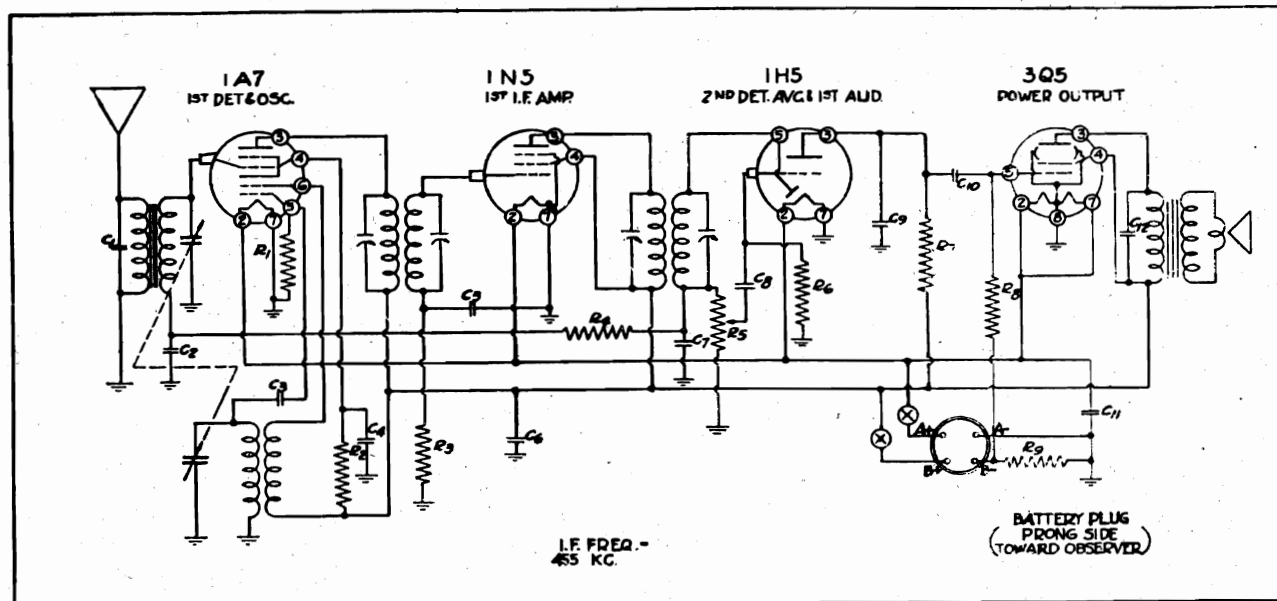
Second I.F. Transformer (Part No. P2606)

Primary—Blue white, plate; red white B+ — Resistance 15.1 ohms

Secondary—White, grid; black white, AVC — Resistance 11.8 ohms

MODEL D4, Late

ADMIRAL CORPORATION



RESISTORS

No.	Ohms	Watts
R1	200,000	1/2
R2	70,000	1/2
R3	5 Meg.	1/4
R4	1 Meg.	1/4
R5	500,000	V.C.

No.	Ohms	Watts
R6	5 Meg.	1/4
R7	250,000	1/4
R8	500,000	1/4
R9	440	10% 1/4

CONDENSERS

No.	Capacity (Mfd.)	Volts
C1	.00005	Mica
C2	.05	200
C3	.00005	Mica
C4	.1	200
C5	.002	400
C6	.001	200

No.	Capacity (Mfd.)	Volts
C7	.00025	Mica
C8	.01	400
C9	.00025	Mica
C10	.01	400
C11	20 (Elect.)	25
C12	.005	400

PAPER CONDENSERS

P1193	.002 mfd. 400 volt.....
P1322	.005 mfd. 600 volt.....
P164	.01 mfd. 400 volt.....
P148	.05 mfd. 200 volt.....
P142	.1 mfd. 200 volt.....

MICA CONDENSERS

P1382	.00005 mfd.
P817	.00025 mfd.

ELECTROLYTIC CONDENSERS

P2602	20 mfd. 25 volt.....
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VARIABLE CONDENSERS

P2596	Gang condenser
-------	----------------------

RESISTORS

P3817	440 ohm 1/2 watt.....
P3857	70,000 ohm 1/2 watt.....
P3864	200,000 ohm 1/2 watt.....
P3868	250,000 ohm 1/2 watt.....
P3876	500,000 ohm 1/2 watt.....
P3882	1,000,000 ohm 1/2 watt.....
P3886	5,000,000 ohm 1/2 watt.....

VARIABLE RESISTORS

P2600	Volume control and switch...
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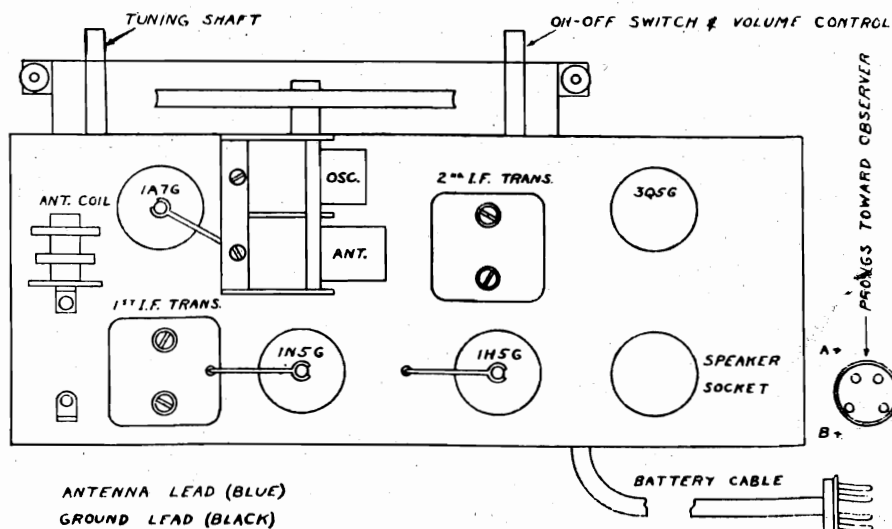
TRANSFORMERS AND COILS

G5724	Antenna coil assembly
P2412	Oscillator coil
P3048	1st I.F. transformer.....
P2606	2nd I.F. transformer.....

MISCELLANEOUS

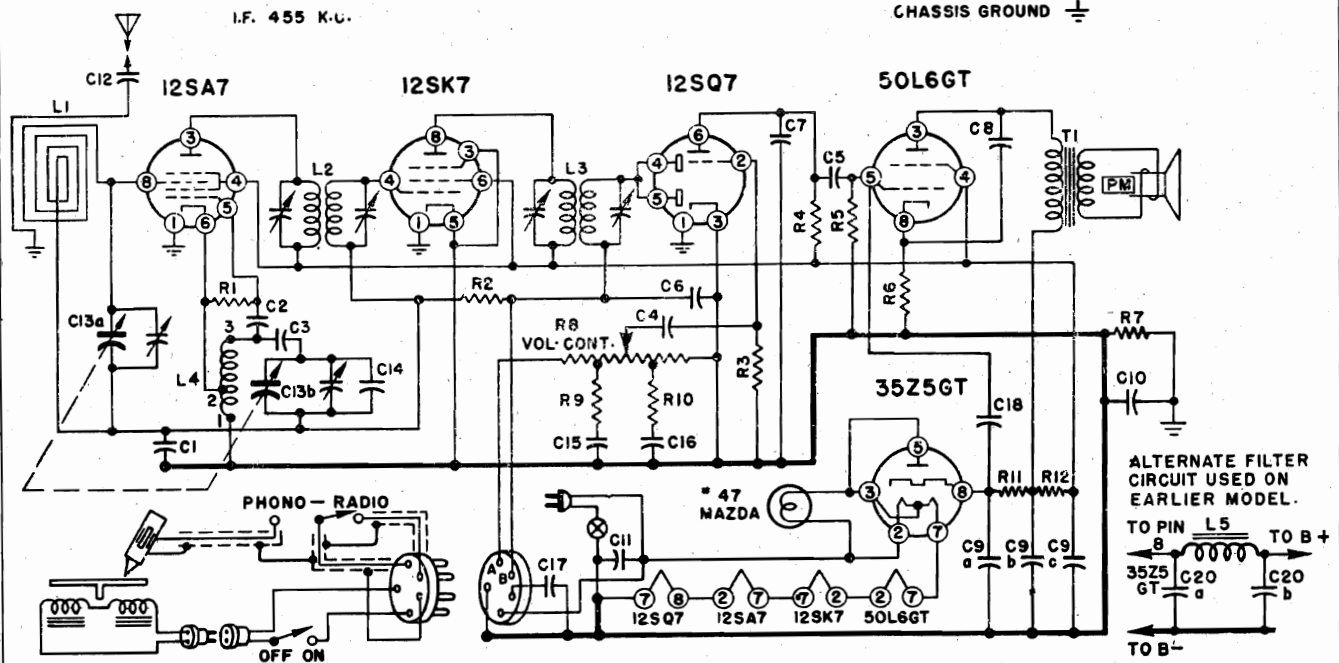
P3005	Tube socket
P2243	Drive shaft
P1587	Spring washer
P1399	Horseshoe washer
P2078	Cord tension spring
P4032	Dial pointer

P945	Speaker socket
P533	Tube shield base.....
P3571	Tube shield
P1957	Battery plug
P470	Grid clip
P3156	Dial background
P3993	Tenite escutcheon
P4039	Metal escutcheon, dial glass and dial scale.....
P4040	6" PM speaker.....
P3389	Knob, push on type.....
P3520	Knob, set screw type.....
P2863	Battery adapter cable.....



ADMIRAL CORPORATION

MODEL 5B1 Phono
Issue A



NOTE: 1. In later production R11 and C9a are disconnected from pin No. 8 of the 35Z5 and a 33-ohm 1-watt resistor (R13) is connected between pin No. 8 and the junction of R11 and C9a. In these sets, condenser C18 was deleted.

2. The jumper between pins 4 and 5 on the 12SQ7 is removed and one pin is connected to the secondary of the second I.F. (L3) and the other pin is connected directly to the junction point of R2 and the secondary of the 1st I.F. (L2).

NOTE: Connect points "A" and "B" with jumper when testing chassis with phono plug removed.

ISSUE A 1946

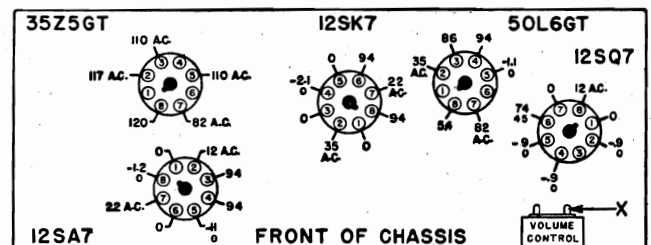
CONDENSERS

Symbol	Capacity	Type
C1	.1	mfd. 200 V.
C2	.00005	mfd. Mica
C3	.02	mfd. 400 V.
C4	.01	mfd. 400 V.
C5	.01	mfd. 400 V.
C6	.00025	mfd. Mica
C7	.0005	mfd. Mica
C8	.02	mfd. 400 V.
C9a	.30.	mfd. (Elect.) 150 V.
C9b	.30.	mfd. (Elect.) 150 V.
C9c	.20.	mfd. (Elect.) 150 V.
C10	.2	mfd. 400 V.
C11	.05	mfd. 400 V.
C12	.005	mfd. 600 V.
C13a	.00042	mfd. (max.) Var.
C13b	.00018	mfd. (max.) Var.
C14	.00002	mfd. Mica
C15	.01	mfd. 400 V.
C16	.01	mfd. 400 V.
C17	.2	mfd. 400 V.
C18	.000035	mfd. Mica
C20a	.30.	mfd. 150 V.
C20b	.50.	mfd. 150 V.

RESISTORS

Symbol	Resistance	Type
R1	22,000 ohms	C $\frac{1}{2}$ W
R2	1 megohm	C $\frac{1}{2}$ W
R3	10 megohms	C $\frac{1}{2}$ W
R4	220,000 ohms	C $\frac{1}{2}$ W
R5	470,000 ohms	C $\frac{1}{2}$ W
R6	150 ohms	C $\frac{1}{2}$ W
R7	150,000 ohms	C $\frac{1}{2}$ W
R8	$\frac{1}{2}$ megohm	Volume Control. Tapped at 100,000 and 200,000 ohms from start.
R9	47,000 ohms	C $\frac{1}{2}$ W
R10	27,000 ohms	C $\frac{1}{2}$ W
R11	150 ohms	C1W
R12	1,000 ohms	C1W
R13	33 ohms	C1W

VOLTAGE DATA



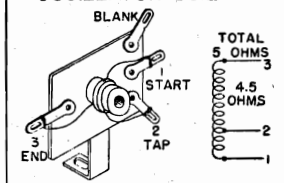
Bottom View of Chassis, Showing Voltages

- All readings made between Tube Socket Terminals and Switch Lug on volume control (Point "X" on drawing).
- Measured on a 117 Volt A.C. line.
- Volume control full on.
- Dial tuned to low frequency end, no signal.
- Voltages obtained on Vacuum Tube voltmeter.
- A second voltage reading is shown with a 1000 ohm-per-volt meter when use of this instrument would result in appreciably lower readings.

COILS

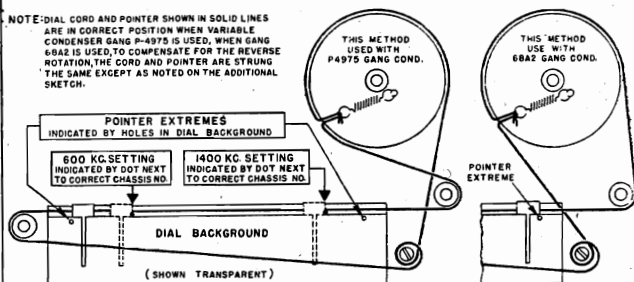
Symbol	Description
L1	Loop
L2	1st I. F. Trans.
L3	2nd I. F. Trans.
L4	Osc. Coil
L5	Choke, Filter

OSCILLATOR COIL



POINTER SETTINGS AND DIAL CORD STRINGING

NOTE: DIAL CORD AND POINTER SHOWN IN SOLID LINES ARE IN CORRECT POSITION WHEN VARIABLE CONDENSER GANG P-4975 IS USED. WHEN GANG 6B42 IS USED, TO COMPENSATE FOR THE REVERSE ROTATION, THE CORD AND POINTER ARE STRUNG THE SAME EXCEPT AS NOTED ON THE ADDITIONAL SKETCH.



RECORD CHANGER SERVICE DATA

Complete service information and parts list are covered by a separate service manual. Check record changer for model number. The RC150 was used by all models having serial numbers below 500,000.

RADIO RECEPTION DURING PHONO

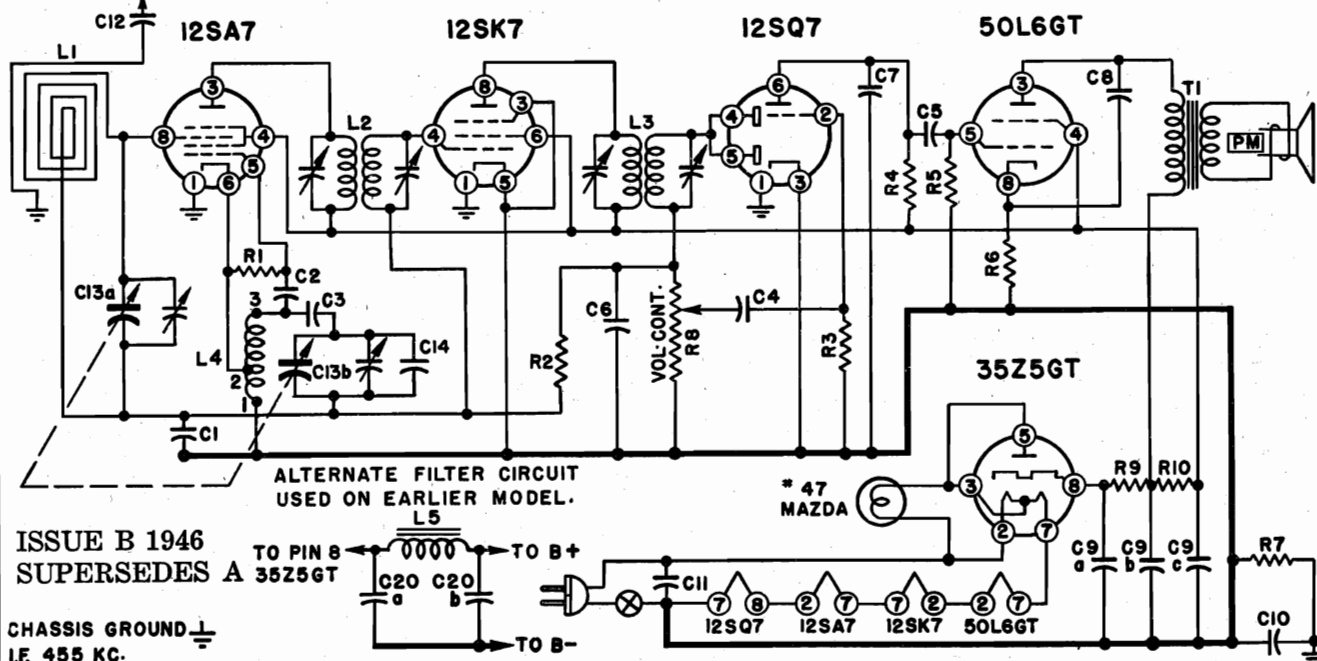
It is normal for strong radio stations to be heard faintly when switched to PHONO, unless the radio dial is tuned between stations. This interference can sometimes be reduced by moving condenser C4 as far from the 12SQ7 socket and as close to the chassis as possible. Also move the I.F. transformer wire, connected to pin 4 or 5 of 12SQ7, as far from condenser C4 and as close to the chassis as possible.

12SA7

12SK7

12SQ7

50L6GT



**ISSUE B 1946
SUPERSEDES**

CHASSIS GROUND \perp
I.F. 455 KC.

NOTE: 1. In later production R9 and C9a are disconnected from pin No. 8 of the 35Z5 and a 33-ohm 1-watt resistor (R11) is connected between pin No. 8 and the junction of R9 and C9a.

CONDENSER'S

Symbol	Capacity	Type
C1	.1 mfd.	200 V.
C2	.00005 mfd.	Micro
C3	.02 mfd.	400 V.
C4	.01 mfd.	400 V.
C5	.01 mfd.	400 V.
C6	.00025 mfd.	Micro
C7	.0005 mfd.	Micro
C8	.02 mfd.	400 V.
C9a	.30 mfd. (Elect.)	150 V.
C9b	.30 mfd. (Elect.)	150 V.
C9c	.20 mfd. (Elect.)	150 V.
C10	.2 mfd.	400 V.
C11	.05 mfd.	400 V.
C12	.005 mfd.	600 V.
C13a	.00042 mfd. (max.)	Var.
C13b	.00018 mfd. (max.)	Var.
C14	.00002 mfd.	Micro
C20a	.30 mfd. (Elect.)	150 V.
C20b	.50 mfd. (Elect.)	150 V.

RESISTORS

Symbol	Resistance	Type
R1.....	22,000 ohms	C½W
R2.....	470,000 ohms	C½W
R3.....	10 meg ohms	C½W
R4.....	220,000 ohms	C½W
R5.....	470,000 ohms	C½W
R6.....	150 ohms	C½W
R7.....	150,000 ohms	C½W
R8.....	1 meg ohm	Volume Control
R9.....	150 ohms	C1W
R10.....	1,000 ohms	C1W
R11.....	33 ohms	C1W

COILS

Symbol	Description
L1	Loop
L2	1st I. F. Trans.
L3	2nd I. F. Trans.
L4	Osc. Coil
L5	Choke, Filter

SPECIFICATIONS

POWER SUPPLY:—

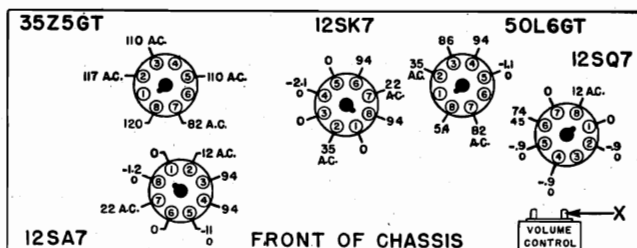
110-120 Volts A.C. or D.C. U.L. approved.
Frequency—50 to 60 cycles
Power consumption—30 watts

CIRCUIT:—

Chassis 5B1 A.C.—D.C. 5 Tube Superheterodyne with single tuning range, 540 Kc. to 1630 Kc., covering standard broadcast band; built-in **AEROSCOPE** loop antenna, with provision for connecting an external antenna.

2. The jumper between pins 4 and 5 on the 12SQ7 is removed and one pin is connected to the secondary of the second I.F. (13) and the other pin is connected directly to the junction point of R2 and the secondary of the 1st I.F. (2).

VOLTAGE DATA:—

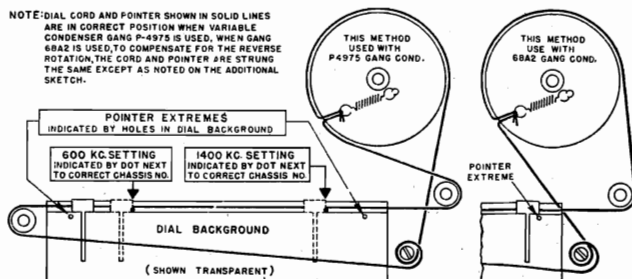


Bottom View of Chassis, Showing Voltages

- All readings made between Tube Socket Terminals and Switch Lug on volume control (Point "X" on drawing).
- Measured on a 117 Volt A.C. line.
- Volume control full on.
- Dial tuned to low frequency end, no signal.
- Voltages indicated obtained on Vacuum Tube voltmeter.
- A second voltage reading is shown made with a 1000 ohm-per-volt meter when use of this instrument would result in appreciably lower readings.

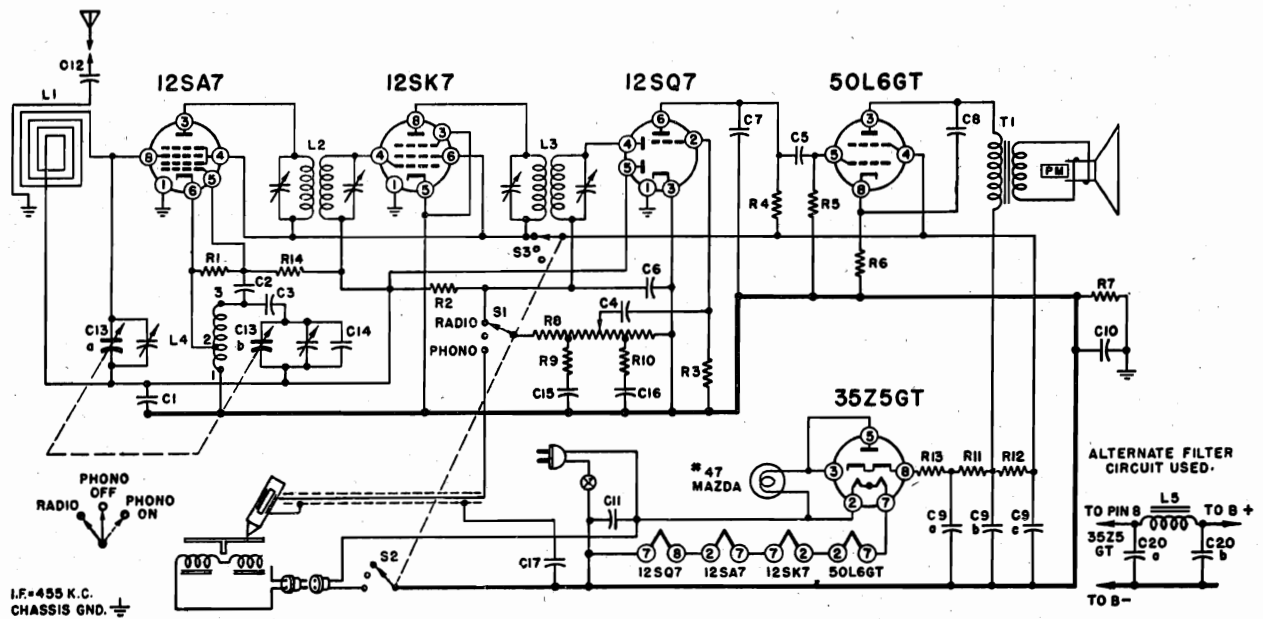
POINTER SETTINGS AND DIAL CORD STRINGING

NOTE: DIAL CORD AND POINTER SHOWN IN SOLID LINES ARE IN CORRECT POSITION WHEN VARIABLE CONDENSER GANG P-4975 IS USED. WHEN GANG 68A2 IS USED, TO COMPENSATE FOR THE REVERSE ROTATION, THE CORD AND POINTER ARE STRUNG THE SAME EXCEPT AS NOTED ON THE ADDITIONAL SKETCH.

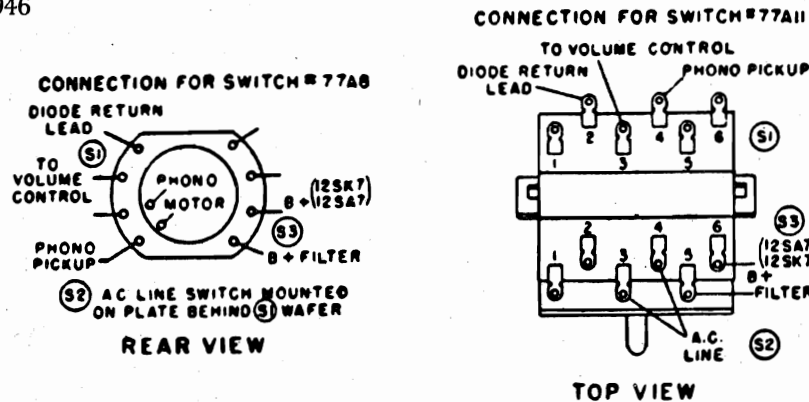


For Alignment and Parts, see P.15-12

ADMIRAL CORPORATION

MODEL 5B1A
Issue B

ISSUE B 1946



REPLACEMENT PARTS

CONDENSERS			RESISTORS			MISCELLANEOUS	
Symbol	Description	Part Number	Symbol	Description	Part Number	Description	Part Number
C1	.1 mfd., 200 Volts	64B1-30	R8	1/2 Megohm, Volume Control and Switch. Tapped at approximately 100,000 and 200,000 ohms from start.	75B3-2	Background, Dial.....	22B7-1
C2	50 mmfd., Mica	65B7-11	R9	47,000 Ohms, 1/2 Watt	60B8-473	Buttons, Snap (Dial).....	13A1-3-2
C3	.02 mfd., 400 Volts	64B1-24	R10	27,000 Ohms, 1/2 Watt	60B8-273	Cabinet Body less cover	
C4	.01 mfd., 400 Volts	65A3-10	R11	150 Ohms, 1 Watt	60B28-1	(6RT41A Mahogany).....	34D2-11
C5	.01 mfd., 400 Volts	65A3-10	R12	1,000 Ohms, 1 Watt	60B28-2	Cabinet Cover (6RT41A Mahogany).....	34D2-10
C6	250 mmfd., Mica	65B7-22	R13	33 Ohms, 1 Watt	60B28-3	Cover Support.....	37A7-1
C7	500 mmfd., Mica	65B7-27	R14	10 Meg., 1/2 Watt	60B9-106	Dial Scale.....	21B4-1
C8	.02 mfd., 400 Volts	64B1-24	TRANSFORMERS and COILS			Drum and Hub Assembly.....	A1012
C9a	30 mfd., 150 V. } Electrolytic	67A8	L1	Antenna, Loop	69B6	Grommet, Rubber Insulating.....	12A1-1
C9b	30 mfd., 150 V. }		L2	Transformer, 1st I. F.	72B3	Grommet, Rubber for Drum.....	12A1-2
C9c	20 mfd., 150 V. }		L3	Transformer, 2nd I. F.	72B4	Knob, Tuning, Volume Control.....	33A1-2
C10	.1 mfd., 400 Volts	64B1-20	L4	Oscillator, Coil	69A5	Knob, Radio-Phono Switch.....	33A11-5
C11	.05 mfd., 400 Volts	64B1-22	L5	Choke Coil (Filter)	74A1	Pilot Light No. 47.....	81A1-8
C12	.005 mfd., 600 Volts	64B1-12	T1	Transformer, Output	98A4	Pilot Light Socket and Leads.....	82A2-1
C13a	.00042 mfd., Gang	68A2 or P4975	PHONOGRAPH PARTS			Plug, Button.....	13A2-1-57
C13b	.00018 mfd., Gang		See Record Changer Service Manual for Detailed Parts List.			Plug, Alden (Motor Leads).....	88A8-1
C14	15 mmfd., Mica	65B5-3	Description	Part Number		Pointer.....	25A1-2
C15	.01 mfd., 400 Volts	65A3-10	Centerpost.....	G400A12		Pulley, Fibre Dial.....	17A1-3
C16	.01 mfd., 400 Volts	65A3-10	Crystal Cartridge.....	409A1		Shaft, Tuning.....	28A1-1
C17	.05 mfd., 400 Volts	64B1-22	Idle Wheel (407B3 Motor).....	G400A23		Socket and Leads (Alden).....	89A6-2
C20a	30 mfd., 150 V. } Electrolytic	67A3	Idle Wheel (407B2 Motor).....	G400A59		Socket, Octal Tube.....	87A5-1
C20b	50 mfd., 150 V. }		Idle Wheel (407B1 Motor).....	G400A57		Speaker, 5" PM & Output Transformer	78B13-1
R1	22,000 Ohms, 1/2 Watt	60B8-223	Motor, 60 cycle 115 volt, A.C. (Types 407B1 & 407B2 also used).....	407B3		Spring, Dial Cord Tension.....	19B1-7
R2	1 Megohm, 1/2 Watt	60B8-105				Switch Rotary Radio-Phono.....	77A8
R3	10 Megohm, 1/2 Watt	60B8-106				Transformer, Output.....	98A4
R4	220,000 Ohms, 1/2 Watt	60B8-224				Washer, Flat Insulating.....	5A1-G
R5	470,000 Ohms, 1/2 Watt	60B8-474				Washer, Offset Insulating.....	5A2-5
R6	150 Ohms, 1/2 Watt	60B8-151				Washer, Spring.....	4A6-3-U
R7	150,000 Ohms, 1/2 Watt	60B8-154					

Record Changer: Admiral Model RC160A

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For Voltage, dial data, see P.15-9; for Alignment, see P.15-1

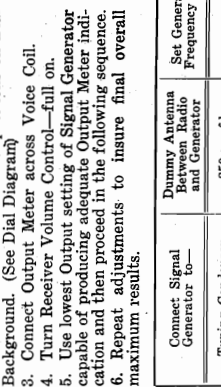
Compliments of www.nucow.com

					T01	T05
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ing, then lite, coil

MODEL 5B1A ALIGNMENT PROCEDURE MODEL 5B1

1. Be sure Radio Receiver and Signal Generator are thoroughly warmed up before starting alignment procedure.



Antenna Stator	455 KC
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Tuning Condenser Antenna Stator	250 mmfd. Condenser	1630 K
Loop radiator or place pickup lead from gen- set to loop of set to ob- tain adequate signal).	No actual connec- tion between set and generator.	1400 K

NOTE: Antenna trimmer "F" must be aligned after chassis is mounted in case cover and removed. It can be made by lifting up the top cover and removing.

MODEL 5B1 - PHONO REPLACEMENT

PAPER CONDENSERS		RESISTORS
Part No.	Symbol	Part No.
Description	Symbol	Symbol

64B1-12	C12	.005 mfd., 600 V....	60B8-474	R5	47
64B1-22	C11	.05 mfd., 400 V....	60B8-105	R2	10
64B1-24	C3, C8	.02 mfd., 400 V....	60B8-106	R3	10
	C15, C16	.01 mfd., 400 V....	75B3-2	R8	1/2
64B1-25	C15	.01 mfd., 400 V....			

TRANSFORM

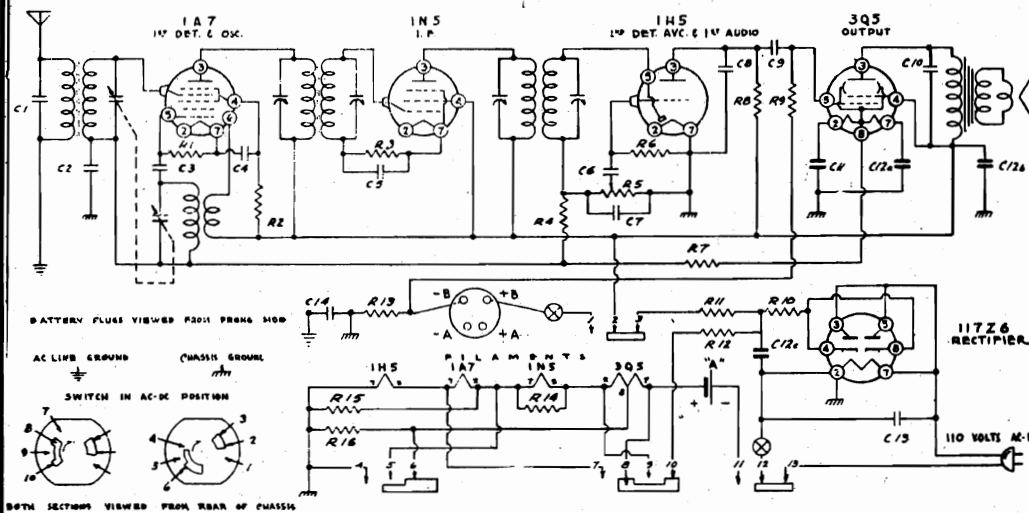
[illegible]

PAPER CONDENSERS

Part No.	Symbol	Description
448H-12	C12	908 mid. 400 V.
448H-13	C13	908 mid. 400 V.
448H-14	C14	908 mid. 400 V.
448H-15	C15	908 mid. 400 V.
448H-16	C16	908 mid. 400 V.
448H-17	C17	908 mid. 400 V.
448H-18	C18	908 mid. 400 V.
448H-19	C19	908 mid. 400 V.
448H-20	C20	908 mid. 400 V.
448H-21	C21	908 mid. 400 V.
448H-22	C22	908 mid. 400 V.
448H-23	C23	908 mid. 400 V.
448H-24	C24	908 mid. 400 V.
448H-25	C25	908 mid. 400 V.
448H-26	C26	908 mid. 400 V.
448H-27	C27	908 mid. 400 V.
448H-28	C28	908 mid. 400 V.
448H-29	C29	908 mid. 400 V.
448H-30	C30	908 mid. 400 V.
448H-31	C31	908 mid. 400 V.
448H-32	C32	908 mid. 400 V.
448H-33	C33	908 mid. 400 V.
448H-34	C34	908 mid. 400 V.
448H-35	C35	908 mid. 400 V.
448H-36	C36	908 mid. 400 V.
448H-37	C37	908 mid. 400 V.
448H-38	C38	908 mid. 400 V.
448H-39	C39	908 mid. 400 V.
448H-40	C40	908 mid. 400 V.
448H-41	C41	908 mid. 400 V.
448H-42	C42	908 mid. 400 V.
448H-43	C43	908 mid. 400 V.
448H-44	C44	908 mid. 400 V.
448H-45	C45	908 mid. 400 V.
448H-46	C46	908 mid. 400 V.
448H-47	C47	908 mid. 400 V.
448H-48	C48	908 mid. 400 V.
448H-49	C49	908 mid. 400 V.
448H-50	C50	908 mid. 400 V.
448H-51	C51	908 mid. 400 V.
448H-52	C52	908 mid. 400 V.
448H-53	C53	908 mid. 400 V.
448H-54	C54	908 mid. 400 V.
448H-55	C55	908 mid. 400 V.
448H-56	C56	908 mid. 400 V.
448H-57	C57	908 mid. 400 V.
448H-58	C58	908 mid. 400 V.
448H-59	C59	908 mid. 400 V.
448H-60	C60	908 mid. 400 V.
448H-61	C61	908 mid. 400 V.
448H-62	C62	908 mid. 400 V.
448H-63	C63	908 mid. 400 V.
448H-64	C64	908 mid. 400 V.
448H-65	C65	908 mid. 400 V.
448H-66	C66	908 mid. 400 V.
448H-67	C67	908 mid. 400 V.
448H-68	C68	908 mid. 400 V.
448H-69	C69	908 mid. 400 V.
448H-70	C70	908 mid. 400 V.
448H-71	C71	908 mid. 400 V.
448H-72	C72	908 mid. 400 V.
448H-73	C73	908 mid. 400 V.
448H-74	C74	908 mid. 400 V.
448H-75	C75	908 mid. 400 V.
448H-76	C76	908 mid. 400 V.
448H-77	C77	908 mid. 400 V.
448H-78	C78	908 mid. 400 V.
448H-79	C79	908 mid. 400 V.
448H-80	C80	908 mid. 400 V.
448H-81	C81	908 mid. 400 V.
448H-82	C82	908 mid. 400 V.
448H-83	C83	908 mid. 400 V.
448H-84	C84	908 mid. 400 V.
448H-85	C85	908 mid. 400 V.
448H-86	C86	908 mid. 400 V.
448H-87	C87	908 mid. 400 V.
448H-88	C88	908 mid. 400 V.
448H-89	C89	908 mid. 400 V.
448H-90	C90	908 mid. 400 V.
448H-91	C91	908 mid. 400 V.
448H-92	C92	908 mid. 400 V.
448H-93	C93	908 mid. 400 V.
448H-94	C94	908 mid. 400 V.
448H-95	C95	908 mid. 400 V.
448H-96	C96	908 mid. 400 V.
448H-97	C97	908 mid. 400 V.
448H-98	C98	908 mid. 400 V.
448H-99	C99	908 mid. 400 V.
448H-100	C100	908 mid. 400 V.

MODEL E5

ADMIRAL CORPORATION



MISCELLANEOUS

- P3005 Tube socket
- P3783 Mounting base (for P4860)
- P1957 Battery plug
- P3571 Tube shield
- P4127 Drive shaft
- Dial cord (per yard)
- P1587 Spring washer
- P1399 Horseshoe washer
- P2925 Cord tension spring
- P470 Grid clip
- Dial scale; order by name and model number
- P1585 Snap button, for dial scale, dozen
- Dial glass; order by name and model number
- Pointer; order by name, model number and color
- Knobs; order by name, model number and color
- P4925 Speaker and output transformer
- P4953 Power change switch
- P2215 Line cord
- P2149 Chassis mounting bolt, 1/2 doz.
- P2863 Battery adapter cable

RESISTORS

CONDENSERS

No.	Ohms.	Watt.	No.	Capacity (Mfd.)	Volts
R1	200,000		C1	.00005	Mica
R2	50,000		C2	.05	200
R3	5,000,000		C3	.00005	Mica
R4	3,000,000	V. C.	C4	.01	400
R5	1,000,000		C5	.001	600
R6	15,000,000		C6	.001	600
R7	10,000,000		C7	.00025	Mica
R8	1,000,000		C8	.00025	Mica
R9	2,000,000		C9	.01	400
R10	30		C10	.002	600
R11	3,500		C11	100.	10
R12	2,600		C12a	100.	25
R13	440		C12b	50.	150
R14	300		C12c	30.	150
R15	300		C13	.05	400
R16	3,000		C14	.25	200

I.F. 455 Kc.

RESISTORS

- P2436 30 ohms wire wound.
- P3813 300 ohms 1/2 watt
- P3817 440 ohms 1/2 watt
- P4952 2,600 ohms 8 watt
- wire wound
- P3833 3,000 ohms 1/2 watt
- P3834 3,500 ohms 1/2 watt
- P3853 50,000 ohms 1/2 watt
- P3864 200,000 ohms 1/2 watt
- P3882 1,000,000 ohms 1/2 watt
- P3883 2,000,000 ohms 1/2 watt
- P3884 3,000,000 ohms 1/2 watt
- P3886 5,000,000 ohms 1/2 watt
- P3889 10,000,000 ohms 1/2 watt
- P3891 15,000,000 ohms 1/2 watt

PAPER CONDENSERS

- P3203 .001 mfd. 600 volt
- P804 .002 mfd. 600 volt
- P164 .01 mfd. 400 volt
- P148 .05 mfd. 200 volt
- P334 .05 mfd. 400 volt
- P141 .25 mfd. 200 volt

MICA CONDENSERS

- P1382 .00005 mfd. mica
- P817 .00025 mfd. mica

ELECTROLYTIC CONDENSERS

- P4831 100 mfd. 10 volt
- P4860 Lug type { 30 mfd. 150 volt
or 50 mfd. 150 volt
P4860A Lead type 100 mfd. 25 volt

TRANSFORMERS AND COILS

- G6464 Antenna coil assembly
- P4308 Oscillator coil
- P4323 1st I.F. transformer
- P3980 2nd I.F. transformer

ALIGNMENT DATA

GENERAL DATA

The alignment of this receiver requires the use of a signal generator that will cover the frequencies of 455, 600, 1400, and 1730, and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the signal generator output as low as possible, to prevent the AVC from operating and giving false readings.

I.F. ALIGNMENT

Adjust the signal generator to 455 KC and connect the output to the grid of the first detector tube (1A7) through a .05 or .1 mfd. condenser. The ground or the signal generator can be connected to the chassis ground. Align all I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT

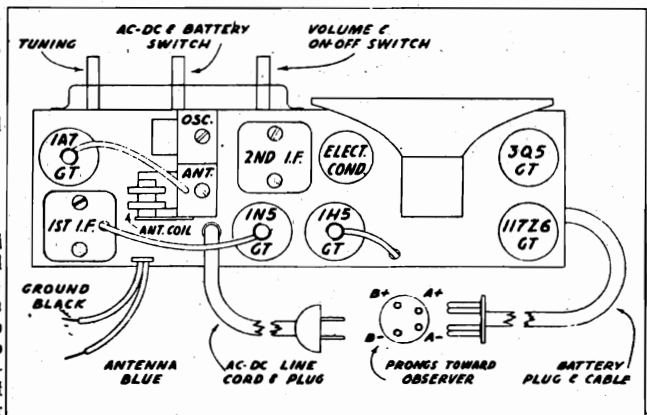
Adjust the signal generator to 1730 KC and connect the output to the antenna lead (Blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum capacity and adjust the oscillator trimmer to receive this signal. After this has been carefully done, the next step is to set the signal generator to 1400 KC and after tuning in the signal adjust the antenna trimmer to peak. This is all that is necessary for the alignment unless the plates of the gang condenser have been bent out of shape. In case of bent plates, set the signal generator and the receiver to 600 KC and bend the plates into the position for maximum output.

VARIABLE CONDENSERS

- P4310 Gang condenser

VARIABLE RESISTORS

- P4309 Volume control and switch

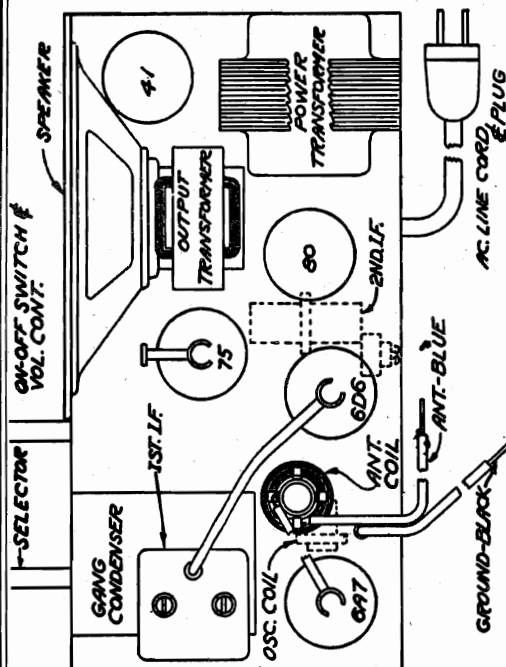


BATTERY OPERATION

This receiver is designed to operate on a single unit General 60B-6L or Burgess 6TA-60. The battery will fit inside the cabinet in back of the chassis.

MODELS 5F, 5F-PH

ADMIRAL CORPORATION



CORRECT ALIGNMENT PROCEDURE

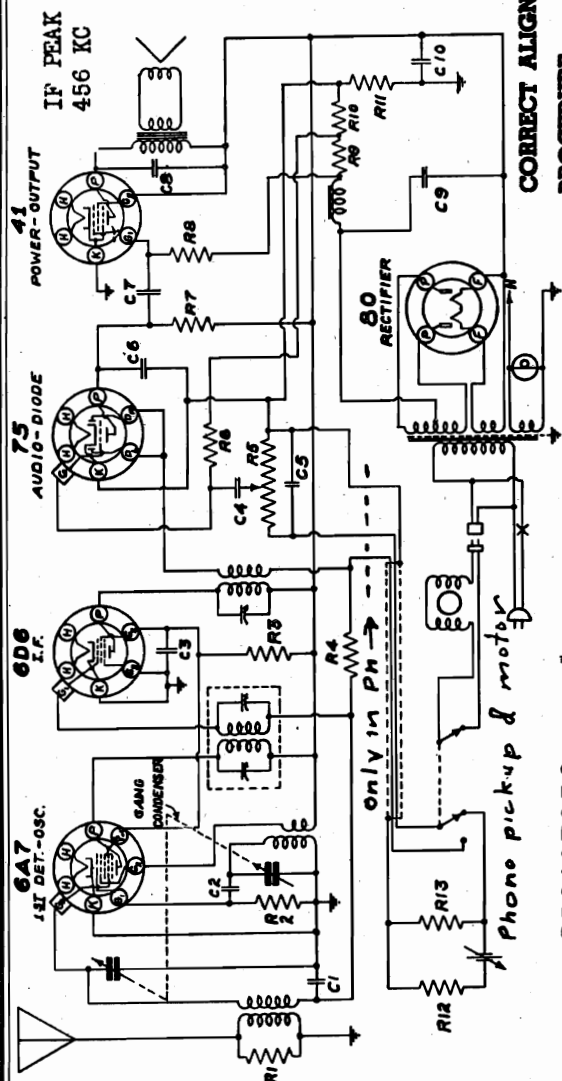
The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band alignment should be the next procedure

I.F. ALIGNMENT

Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all three I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT

Adjust the oscillator to 1730 KC and connect the output to the antenna lead, through a .0002 mfd. mica condenser. Set the gang condenser to minimum capacity and adjust the gang condenser trimmer (oscillator) to receive this signal. After this has been carefully done, the next step is to set the generator to 1400 KC and after tuning in the signal adjust the antenna trimmer to peak. This is all that is necessary for the alignment unless the plates of the gang condenser have been bent out of shape. In case of bent plates, set the test oscillator and the receiver to 600 KC and bend the plates into the position for maximum output.



RESISTORS		CAPACITORS	
OHMS	WATTS	TYPE	TYPE
R1 15,000	1/4	C1 .01	MICA
R2 15,000	1/4	C2 .01	MICA
R3 25,000	1/4	C3 .01	MICA
R4 25,000	1/4	C4 .01	MICA
R5 25,000	1/4	C5 .01	MICA
R6 25,000	1/4	C6 .01	MICA
R7 25,000	1/4	C7 .01	MICA
R8 25,000	1/4	C8 .01	MICA
R9 25,000	1/4	C9 .01	MICA
R10 25,000	1/4	C10 .01	MICA
R11 25,000	1/4	C11 .01	MICA
R12 25,000	1/4	C12 .01	MICA
R13 25,000	1/4	C13 .01	MICA
R14 25,000	1/4	C14 .01	MICA
R15 25,000	1/4	C15 .01	MICA
R16 25,000	1/4	C16 .01	MICA
R17 25,000	1/4	C17 .01	MICA
R18 25,000	1/4	C18 .01	MICA
R19 25,000	1/4	C19 .01	MICA
R20 25,000	1/4	C20 .01	MICA
R21 25,000	1/4	C21 .01	MICA
R22 25,000	1/4	C22 .01	MICA
R23 25,000	1/4	C23 .01	MICA
R24 25,000	1/4	C24 .01	MICA
R25 25,000	1/4	C25 .01	MICA
R26 25,000	1/4	C26 .01	MICA
R27 25,000	1/4	C27 .01	MICA
R28 25,000	1/4	C28 .01	MICA
R29 25,000	1/4	C29 .01	MICA
R30 25,000	1/4	C30 .01	MICA
R31 25,000	1/4	C31 .01	MICA
R32 25,000	1/4	C32 .01	MICA
R33 25,000	1/4	C33 .01	MICA
R34 25,000	1/4	C34 .01	MICA
R35 25,000	1/4	C35 .01	MICA
R36 25,000	1/4	C36 .01	MICA
R37 25,000	1/4	C37 .01	MICA
R38 25,000	1/4	C38 .01	MICA
R39 25,000	1/4	C39 .01	MICA
R40 25,000	1/4	C40 .01	MICA
R41 25,000	1/4	C41 .01	MICA
R42 25,000	1/4	C42 .01	MICA
R43 25,000	1/4	C43 .01	MICA
R44 25,000	1/4	C44 .01	MICA
R45 25,000	1/4	C45 .01	MICA
R46 25,000	1/4	C46 .01	MICA
R47 25,000	1/4	C47 .01	MICA
R48 25,000	1/4	C48 .01	MICA
R49 25,000	1/4	C49 .01	MICA
R50 25,000	1/4	C50 .01	MICA
R51 25,000	1/4	C51 .01	MICA
R52 25,000	1/4	C52 .01	MICA
R53 25,000	1/4	C53 .01	MICA
R54 25,000	1/4	C54 .01	MICA
R55 25,000	1/4	C55 .01	MICA
R56 25,000	1/4	C56 .01	MICA
R57 25,000	1/4	C57 .01	MICA
R58 25,000	1/4	C58 .01	MICA
R59 25,000	1/4	C59 .01	MICA
R60 25,000	1/4	C60 .01	MICA
R61 25,000	1/4	C61 .01	MICA
R62 25,000	1/4	C62 .01	MICA
R63 25,000	1/4	C63 .01	MICA
R64 25,000	1/4	C64 .01	MICA
R65 25,000	1/4	C65 .01	MICA
R66 25,000	1/4	C66 .01	MICA
R67 25,000	1/4	C67 .01	MICA
R68 25,000	1/4	C68 .01	MICA
R69 25,000	1/4	C69 .01	MICA
R70 25,000	1/4	C70 .01	MICA
R71 25,000	1/4	C71 .01	MICA
R72 25,000	1/4	C72 .01	MICA
R73 25,000	1/4	C73 .01	MICA
R74 25,000	1/4	C74 .01	MICA
R75 25,000	1/4	C75 .01	MICA
R76 25,000	1/4	C76 .01	MICA
R77 25,000	1/4	C77 .01	MICA
R78 25,000	1/4	C78 .01	MICA
R79 25,000	1/4	C79 .01	MICA
R80 25,000	1/4	C80 .01	MICA
R81 25,000	1/4	C81 .01	MICA
R82 25,000	1/4	C82 .01	MICA
R83 25,000	1/4	C83 .01	MICA
R84 25,000	1/4	C84 .01	MICA
R85 25,000	1/4	C85 .01	MICA
R86 25,000	1/4	C86 .01	MICA
R87 25,000	1/4	C87 .01	MICA
R88 25,000	1/4	C88 .01	MICA
R89 25,000	1/4	C89 .01	MICA
R90 25,000	1/4	C90 .01	MICA
R91 25,000	1/4	C91 .01	MICA
R92 25,000	1/4	C92 .01	MICA
R93 25,000	1/4	C93 .01	MICA
R94 25,000	1/4	C94 .01	MICA
R95 25,000	1/4	C95 .01	MICA
R96 25,000	1/4	C96 .01	MICA
R97 25,000	1/4	C97 .01	MICA
R98 25,000	1/4	C98 .01	MICA
R99 25,000	1/4	C99 .01	MICA
R100 25,000	1/4	C100 .01	MICA

TRANSFORMERS AND COILS

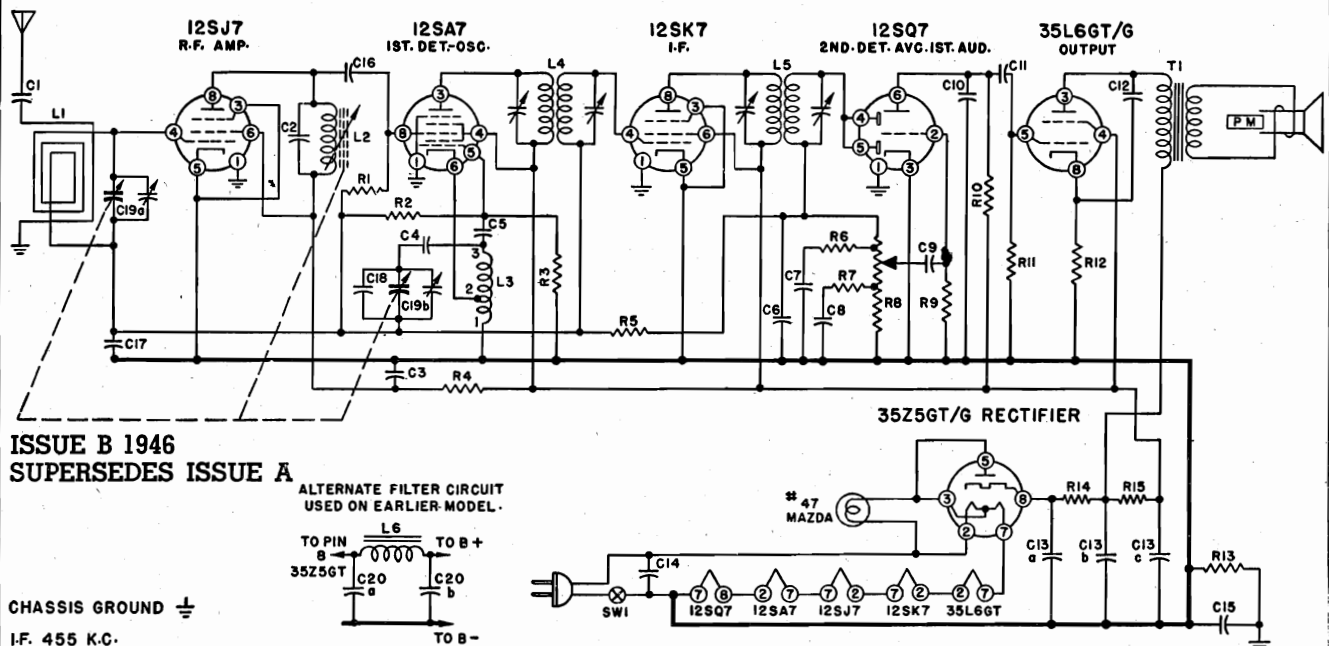
- P2484 1st L.F. Transformer
- P2393 Antenna Coil
- P2485 2nd L.F. Transformer
- P2486 Oscillator Coil
- P2453 Power Transformer

MISCELLANEOUS

- P2450 Volume Control and Switch
- P506 6A7 Tube Socket
- P538 8D6 Tube Socket
- P521 75 Tube Socket
- P1277 41 Tube Socket
- P492 80 Tube Socket
- P531 Tube Shield Cap
- P530 Tube Shield
- P533 Tube Shield Base
- P529 AC Line Cord
- G5648 Dial and Drive Assembly
- P1503 Pilot Light Socket
- P1504 Pilot Light
- P2454 Speaker and Output Transformer
- P2459 Walnut Knobs
- P2480 Ivory Knobs

Reduce to 9%

ADMIRAL CORPORATION



ISSUE B 1946

SUPERSEDES ISSUE A

ALTERNATE FILTER CIRCUIT
USED ON EARLIER MODEL.CHASSIS GROUND \perp

I.F. 455 K.C.

NOTE: 1. In later production R14 and C13a are disconnected from pin #8 of the 35Z5 and a 33-ohm 1W resistor (R16) is connected from pin #8 to the junction of R14 and C13a.

2. The jumper between pins 4 and 5 on the 12SQ7 is removed and one pin is connected to the secondary of the second I.F. (L5) and the other pin is connected directly to the junction point of R5 and the secondary of the 1st I.F. (L4).

CONDENSERS

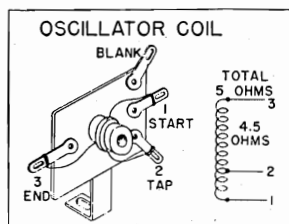
Symbol	Capacity	Type
C-1.....	.005 mfd	600 V.
C-2.....	.785. mmfd	Mica
C-3.....	.05 mfd	400 V.
C-4.....	.02 mfd	400 V.
C-5.....	.50. mmfd	Mica
C-6.....	.250. mmfd	Mica
C-7.....	.01 mfd	400 V.
C-8.....	.01 mfd	400 V.
C-9.....	.01 mfd	400 V.
C-10.....	.500. mmfd	Mica
C-11.....	.01 mfd	400 V.
C-12.....	.02 mfd	400 V.
C-13a.....	.30. mfd	Elect. 150 V.
C-13b.....	.30. mfd	Elect. 150 V.
C-13c.....	.20. mfd	Elect. 150 V.
C-14.....	.05 mfd	400 V.
C-15.....	.2 mfd	400 V.
C-16.....	.250. mmfd	Mica
C-17.....	.1 mfd	200 V.
C-18.....	.20. mmfd	Mica
C-19a.....	.420. mmfd	(max.) Var.
C-19b.....	.180. mmfd	(max.) Var.
C-20a.....	.30. mfd	Elect. 150 V.
C-20b.....	.50. mfd	Elect. 150 V.

COILS

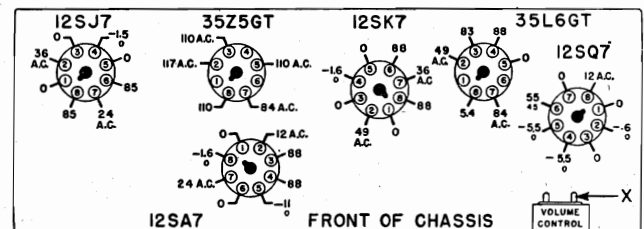
Symbol	Description
L-1.....	(Sec. 2.3 ohms).....Loop
L-2.....	(2.5 ohms).....R. F. Coil
L-3.....	.....Osc. Coil
L-4.....	.....1st I. F. Trans.
L-5.....	.....2nd I. F. Trans.
L-6.....	(325 ohms).....Choke, Filter

RESISTORS

Symbol	Resistance	Type
R-1.....	10,000 ohms	.....C1/2W
R-2.....	10 meg ohm	.....C1/2W
R-3.....	22,000 ohms	.....C1/2W
R-4.....	100 ohms	.....C1/2W
R-5.....	1 meg ohm	.....C1/2W
R-6.....	47,000 ohms	.....C1/2W
R-7.....	27,000 ohms	.....C1/2W
R-8.....	500,000 ohm	Volume Control, (Tapped at 1/3 and 2/3 of Rotation which is 100,000 ohms from the start, due to the taper).
R-9.....	5 meg ohm	.....C1/2W
R-10.....	270,000 ohms	.....C1/2W
R-11.....	470,000 ohms	.....C1/2W
R-12.....	150 ohms	.....C1/2W
R-13.....	150,000 ohms	.....C1/2W
R-14.....	150 ohms	.....C1W
R-15.....	1,000 ohms	.....C1W
R-16.....	33 ohms	.....C1W



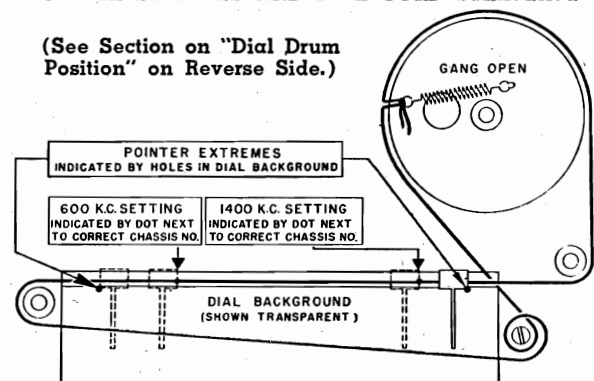
VOLTAGE DATA:—



Bottom View of Chassis, Showing Voltages.

- All readings made between Tube Socket Terminals and Switch Lug on volume control (Point "X" on drawing).
- Measured on a 117 Volt A.C. line.
- Volume control full on.
- Dial tuned to low frequency end, no signal.
- Voltages indicated obtained on Vacuum Tube voltmeter.
- A second voltage reading is shown made with a 1000 ohm-per-volt meter when use of this instrument would result in appreciably lower readings.

POINTER SETTINGS AND DIAL CORD STRINGING



SPECIFICATIONS

POWER SUPPLY:—

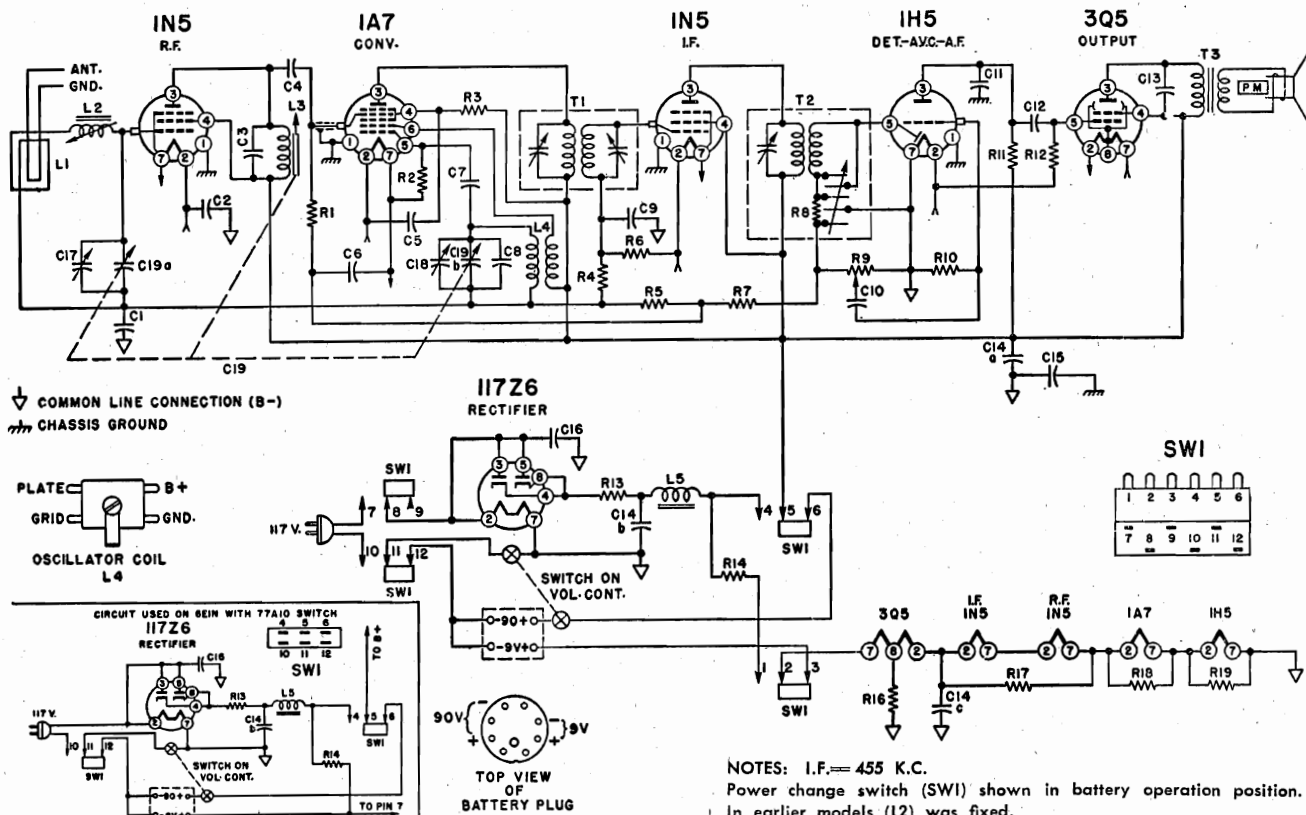
110-120 Volts A.C. or D.C.
Frequency 50-60 cycles.
Power Consumption—30 watts.

CIRCUIT:—

Chassis 6A1 A.C.—D.C. 6 Tube Superheterodyne, with R.F. stage; Single tuning range, 540 Kc. to 1630 Kc., covering standard broadcast band; built-in AEROSCOPE loop antenna, with provision for connecting an external antenna.

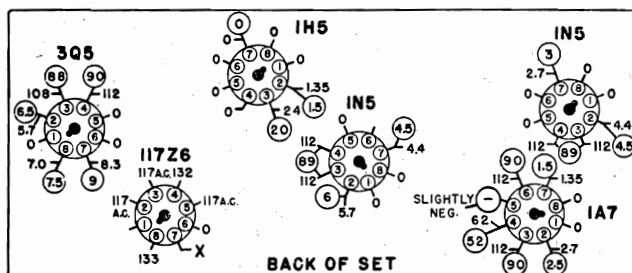
MODELS 6E1, 6E1N

ADMIRAL CORPORATION



ISSUE A 1946

VOLTAGE CHART



VOLTAGE DATA

1. Voltage readings circled (O) are for Battery Operation.
2. All reading made between Tube Socket Terminals and Terminal No. 7 on the 117Z6 (Point (X) on Voltage Chart).
3. A.C. Voltages measured on a 117 Volt A.C. line.
4. Battery Voltages measured with a fresh battery.
5. Dial turned to low frequency end, no signal.
6. All Voltages measured with a 1000 ohm per volt meter.

CONDENSERS

Symbol	Description	Part No.
C1	.05 Mfd. 200 Volt Paper	64B1-32
C2	.25 Mfd. 200 Volt Paper	64B1-28
C3	.00042 Mfd. Mica	65B1-9
C4-C11	.00025 Mfd. Mica	65B5-22
C5, C6, C9, C10, C12	.01 Mfd. 400 Volt Paper	64B1-25
C7	.00005 Mfd. Mica	65B5-11
C8	.000015 Mfd. Mica	65B5-3
C13	.002 Mfd. 600 Volt Paper	64B1-9
C14a	50 Mfd. 150 Volt	Elect. 67C7-42
C14b	30 Mfd. 150 Volt	
C14c	100 Mfd. 25 Volt	
C15	.2 Mfd. 400 Volt Paper	64A2-1
C16	.05 Mfd. 400 Volt Paper	64B1-22
C17	Antenna Trimmer	66A12-5
C18	Oscillator Trimmer (Part of Gang)	
C19 {C19a, C19b}	Condenser Gang	68B4

RESISTORS

R1	100,000 Ohms ½ Watt Carbon	60B8-104
R2	220,000 Ohms ½ Watt Carbon	60B8-224
R3	47,000 Ohms ½ Watt Carbon	60B8-473
R4, R5	4.7 Megohms ½ Watt Carbon	60B2-475

RESISTORS

Symbol	Description	Part No.
R6	4.7 Megohms ½ Watt Carbon	60B2-475
R7	3.3 Megohms ½ Watt Carbon	60B2-335
R8	50,000 Ohms ½ Watt Carbon	60B8-503
R9	1 Megohm Volume Control	75B1-100
R10	15 Megohms ½ Watt Carbon	60B2-156
R11	1 Megohm ½ Watt Carbon	60B2-105
R12	2.2 Megohms ½ Watt Carbon	60B2-225
R13	22 Ohms Wire Wound ½ watt	61A2-2
R14	2,450 Ohms Wire Wound 5 watt	61A3-5
R16	1,500 Ohms ½ Watt Carbon	60B8-152
R17	560 Ohms ½ Watt Carbon	60B8-561
R18	220 Ohms ½ Watt Carbon	60B8-221
R19	120 Ohms ½ Watt Carbon	60B8-121

COILS & TRANSFORMERS

L2	Coil, Loop Loading, (fixed) (early)	AA114
	Coil, Loop Loading, (variable) (late)	AA115
L3	Iron Slug for plate coil	71B1-3
	Coil, Plate	70A1-30
L4	Oscillator Coil	69A7
L5	Choke Filter	74A5
T1	1st I.F. Transformer	72B9-2

COILS & TRANSFORMERS

Symbol	Description	Part No.
T2	2nd I.F. Transformer	72B10-2
T3	Transformer, Output	
	(When ordering furnish all numbers appearing on both the speaker and the transformer.)	
SW1	{ Switch, Power Change (6E1) 77A6 { Switch, Power Change (6E1N) 77A10	

MISCELLANEOUS

Dial background	21A18-2
Dial Cord, 12"	50A1-3
Dial Cord Tension Spring	19A1-2
Dial Scale, Glass	23C11-1
Escutcheon	23C11-2
Knob, Tuning	33A14-4
Knob, Volume	33A14-3
Plug, Battery (9 prong)	88A3-3
Pointer, Tan Tenite	25A14-2
Rubber liner for Dial Scale	23C11-3
Speaker Grill	36A2
Speaker & Output Transformer	78B8
Tube Shields	87A8

ALIGNMENT PROCEDURE

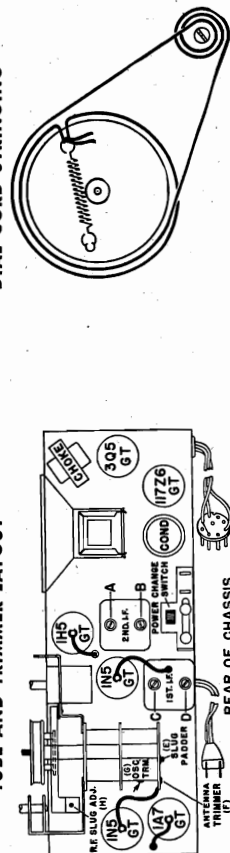
1. Be sure both set and signal generator are thoroughly warmed up before starting alignment.
2. Make alignment using a battery whenever possible.
3. Disconnect Loop Antenna leads from clips on set and remove chassis from cabinet.
4. Connect a 50,000 ohm carbon resistor across the two clips from which the Loop Antenna was removed.
5. Connect Output Meter across the Voice Coil.
6. Connect a fresh battery to the set.
7. Turn receiver Volume Control full on.

DUMMY ANTENNA USED IN STEPS WITH SIGNAL GENERATOR	CONNECT HIGH SIDE SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	RECEIVER CIRCUIT SETTING	TUNING DESIGNATION AND DESCRIPTION	TYPE OF ADJUSTMENT
(1) .00025 Mfd. when using A.C. .1 Mfd. when using Battery	Grid Cap 1A7	455 K.C.	Any point where it does not affect Signal	2nd I.F. (A), (B), 1st I.F. (C), (D).	Maximum Deflection Then repeat
(2) .00025 Mfd. when using A.C. .1 Mfd. when using Battery	Grid Cap 1N5	1620 K.C.	Tuning Gang Wide Open	Oscillator Trimmer (G)	Maximum Deflection
(3) .00025 Mfd. when using A.C. .1 Mfd. when using Battery	Grid Cap 1N5	1400 K.C.	Tune in Generator Signal	R.F. Slug (H)	Maximum Deflection
Replace Set in Cabinet					
(4)	Antenna and Ground Leads	1400 K.C.	Tune in Generator Signal	Antenna Trimmer (F)	Maximum Deflection
(5) .00025 Mfd.	Antenna and Ground Leads	600 K.C.	Tune in Generator Signal	Loop Loading Coil Slug (E)	Maximum Deflection
(6) Disregard the next two steps if the set being aligned is one of the earlier models with a fixed loop loading coil (L2)	Antenna and Ground Leads	1400 K.C.	Tune in Generator Signal	Reset Antenna Trimmer (F)	Maximum Deflection
(7) .00025 Mfd.	Antenna and Ground Leads	1400 K.C.	Tune in Generator Signal	Reset Antenna Trimmer (F)	Maximum Deflection
(8) .00025 Mfd.	Antenna and Ground Leads	1400 K.C.	Tune in Generator Signal	Reset Antenna Trimmer (F)	Maximum Deflection

Seal adjusting screw on the loop loading coil with any quick drying cement.

TUBE AND TRIMMER LAYOUT

QUALITY CORD STRINGING



CIRCUIT CHANGE TO ELIMINATE HUM IN PORTABLE 6EL CHASSIS

Early production 6EL chassis sometimes have a rough modulation hum whenever the user's hand is near to or touches certain parts of the cabinet. This happens only when the set is operated on AC power lines.

In most cases this hum can be eliminated or greatly reduced by reversing the power cord plug at the electric outlet. However, we have reports that some sets in some locations still hum excessively even though the line cord plug is reversed.

As soon as this condition was discovered, we changed the circuit slightly on our production line. This change completely eliminates the difficulty. The change is as follows:

The low ends of the loop aerial and variable condenser are disconnected from the AVC circuit and connected to the chassis. A 0.0025 mica condenser is connected in series with the grid of the $1N5$ R.F. tube, and the grid is connected to the AVC circuit through a one megohm resistor.

If any sets are giving this trouble in the field, the circuit change can be easily made without removing the chassis by mounting a small terminal strip for the new parts on the back of the plate which is on the gang condenser. The procedure is as follows:

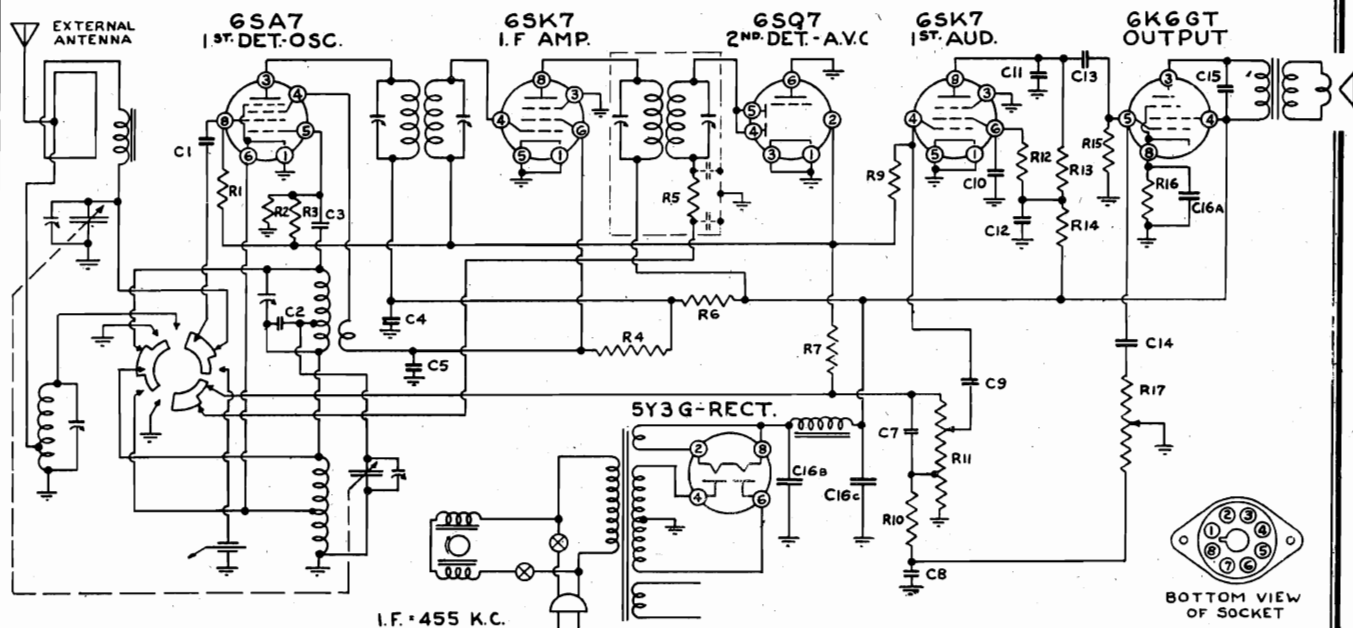
1. Remove the 1A7GT tube.
2. Remove the left hand screw that holds the mounting plate to the gang condenser. Install the terminal strip with this screw.
3. Mount the condenser (.00025 mfd.) and resistor (1 meg.) on strip. Connect them in series.
4. Remove the green grid lead of the 1A7GT tube from the trimmer condenser and connect it to the junction of the .00025 mfd. condenser and the 1 megohm resistor.
5. Connect the other end of the .00025 mfd. condenser to the trimmer terminal from which the green lead was removed.
6. Disconnect the orange wire that now goes to the lug on the tuning condenser and connect it to the open end of the 1 meg. resistor.
7. Connect a short wire from the tuning condenser stator to chassis.

REPLACING R.F. TUNING SLUG

If the R.F. Tuning Slug has to be changed use the following procedure. Set the gang condenser to the point where the plates are fully meshed. Screw the slug adjusting screw about halfway down. Place the slug where the coil in such a position that the top of the slug is flush with the top of the coil. Solder the slug wire to the adjusting screw. Be sure that the position of the slug does not change during the soldering and that the slug wire is straight. Proceed to realign the set as shown in the chart.

MODEL M6

ADMIRAL CORPORATION



RESISTORS					
No.	Ohms	Watts	No.	Ohms	Watts
R1	2,000,000	1/2	R10	20,000	1/2
R2	20,000	1/2	R11	500,000	V.C.
R3	10,000,000	1/2	R12	1,000,000	1/2
R4	15,000	1	R13	200,000	1/2
R5	70,000	1/2	R14	50,000	1/2
R6	100,000	1/2	R15	500,000	1/2
R7	1,000,000	1/2	R16	600,000	1/2
R8	1,000,000	1/2	R17	500,000	T.C.
R9	1,000,000	1/2			

CONDENSERS					
No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.00025	Mica	C10	.05	400
C2	.00025-5%	Mica	C11	.00025	Mica
C3	.00005	Mica	C12	.1	400
C4	.05	400	C13	.01	400
C5	.05	400	C14	.002	400
C6	.05	200	C15	.005	400
C7	.00025	Mica	C16a	20.	25
C8	.02	200	C16b	20.	350
C9	.01	400	C16c	20.	350

R8 and C6 were used only on early models.

Speaker (Part No. P5078) 10" Dyn.

D.C. voice coil resistance.....3.7 ohms
Field coil (hot)1000 ohms

B.C. and S.W. Oscillator Coil (Part No. P4804)

Looking at the mounting strip end in a clockwise direction starting at the chassis, the terminals are: No. 1, S.W. pri.; No. 2, B.C. pri.; other end, No. 3, B.C. tap; No. 4, S.W. pri.; No. 5, S.W. sec.; No. 6, S.W. sec. tap; No. 7, S.W. and B.C. sec:

S.W. Primary—No. 4 and No. 1—
Resistance2 ohm
S.W. Secondary—No. 7 and No. 5—
Resistance11 ohm
B.C. Primary—No. 2 and No. 3—
Resistance3 ohm
B.C. Secondary—No. 3 and No. 7—
Resistance 3.7 ohms

First I.F. Transformer (Part No. P-4108)

Primary—Blue, plate; red, B⁺
Resistance18.2 ohms
Secondary—White, grid; black, AVC
Resistance15.1 ohms

Second I.F. Transformer (Part No. P-4858)

Primary—Blue, plate; red, B⁺
Resistance20.8 ohms
Secondary—White, diode; other end inside can
Resistance17.4 ohms

VOLTAGE CHART

All voltages measured with a 20,000 ohm per volt meter on the 300 volt scale. Line voltage 117 volts A.C. Volume control maximum and no signal tuned in. Power consumption 70 watts.

6SA7 TUBE

Plate (3) to ground..... 270
Screen (4) to ground..... 105

6SK7 (I.F.) TUBE

Plate (8) to ground..... 270
Screen (6) to ground..... 105

6SK7 (A.F.) TUBE

Plate (8) to ground..... 64
Screen (6) to ground..... 23

6K6GT TUBE

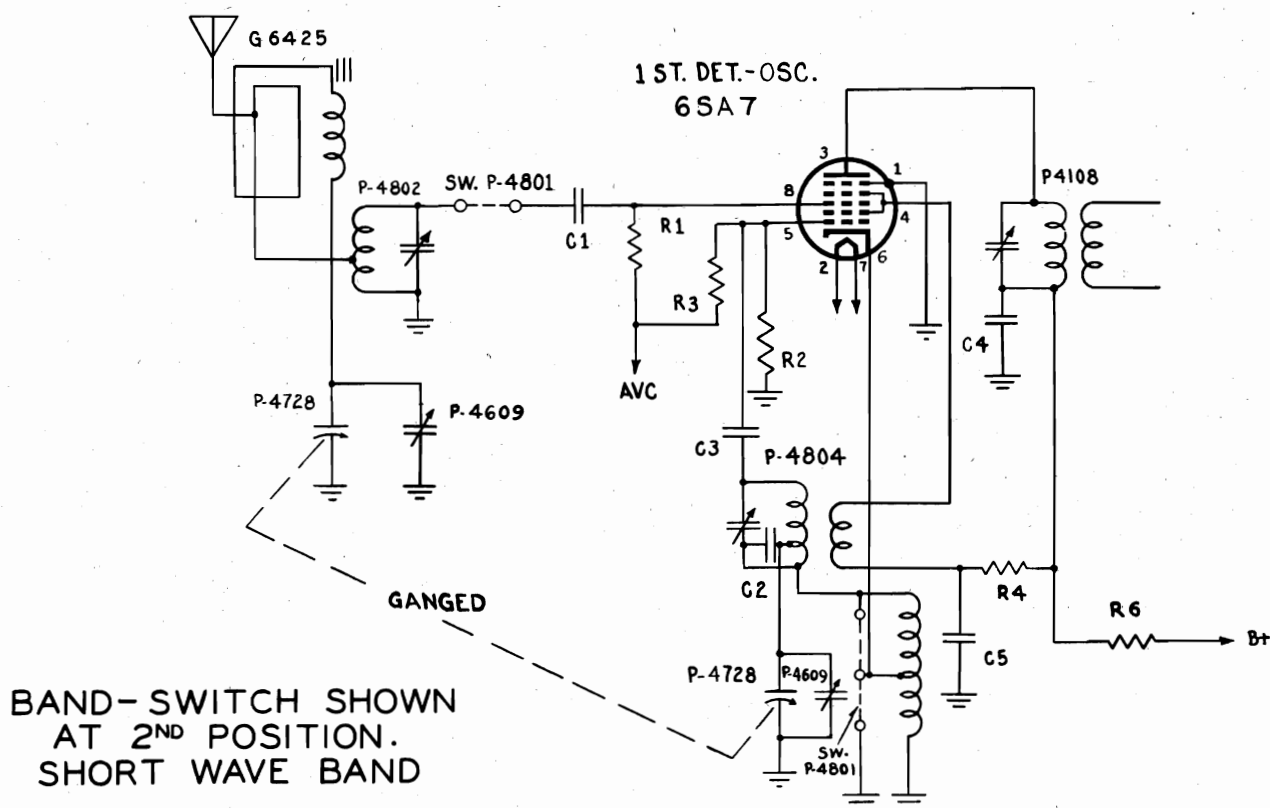
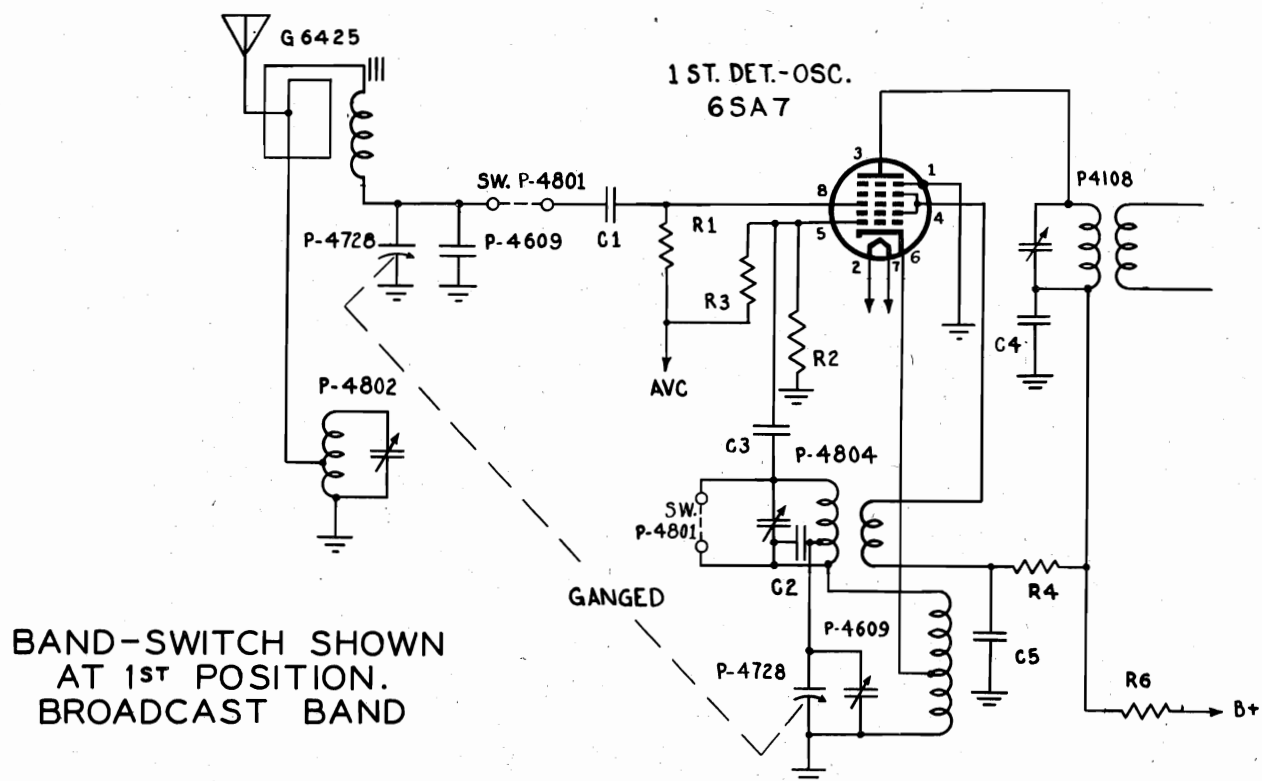
Plate (3) to ground..... 270
Screen (4) to ground..... 245
Cathode (8) to ground..... 19

6X5GT TUBE

Filament (8) to ground..... 340

ADMIRAL CORPORATION

MODEL M6



MODEL M6

ADMIRAL CORPORATION

ALIGNMENT DATA

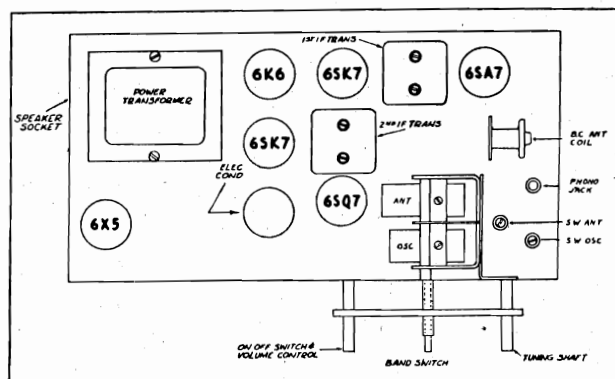


Fig. 2—Top View of Chassis

All of the adjustments have been very carefully set with signal generators at the factory and require no further adjustment, unless it becomes necessary to replace a coil or transformer, or if the adjustments have been tampered with in the field. Under no circumstances attempt any adjustments without first making certain that adjustment is necessary and only after voltages, tubes and condensers have been checked and found to be normal.

The alignment of this receiver requires the use of a signal generator that will cover the frequencies of 455, 1400, 1630 and 9500 kc., and an output meter to be connected across the primary or secondary of the output transformer. All alignments should be

made with the volume control in the maximum position, to prevent the AVC from operating and giving false readings.

I.F. ALIGNMENT

Adjust the signal generator to 455 KC and connect the output to the grid of the first detector tube (6SA7) through a .05 or .1 mfd. condenser. Align all I. F. trimmers to peak or maximum reading on the output meter.

B.C. AND S.W. BAND ALIGNMENT

Disconnect loop leads and set the band switch to the broadcast position. Adjust signal generator to 1630 K.C. and connect thru a .0002 mfd. mica condenser to the green loop lead. Set the gang condenser to minimum capacity and adjust the B.C. oscillator trimmer (see fig. 2) to receive this signal. Set the band switch to the short wave position, adjust the signal generator to exactly 9,500 K.C. and connect thru a 400 ohm resistor to the green loop lead. Set the dial pointer at 9.5 megacycles and carefully peak S.W. oscillator trimmer and then peak S.W. antenna trimmer. Re-install chassis in cabinet and connect loop leads. Set the band switch to the broadcast position. Adjust the signal generator to 1400 K.C. and connect the output to a shielded loop radiator and place this loop about two feet from the loop antenna. If no loop radiator is available the output of the signal generator should be connected to the green loop lead thru a .0002 mfd. mica condenser. Tune signal and carefully peak the B.C. antenna trimmer.

PAPER CONDENSERS

P904	.002 mfd. 600 volt.....
P1322	.005 mfd. 600 volt.....
P164	.01 mfd. 400 volt.....
P393	.02 mfd. 200 volt.....
P148	.05 mfd. 200 volt.....
P334	.05 mfd. 400 volt.....
P276	.1 mfd. 400 volt.....

MICA CONDENSERS

P1382	.00005 mfd.....
P817	.00025 mfd.....
P4806	.00025 mfd. 5%.....

ELECTROLYTIC CONDENSERS

P4130	{ 20 mfd. 25 volt }.....
	{ 20 mfd. 350 volt }.....
	{ 20 mfd. 350 volt }.....

VARIABLE CONDENSERS

P4728	Gang condenser
P4609	Trimmer, condenser

RESISTORS

P3800	100 ohm ½ watt.....
P3821	600 ohm ½ watt.....
P4807	15,000 ohm 1 watt.....
P3844	20,000 ohm ½ watt.....
P3853	50,000 ohm ½ watt.....
P3964	200,000 ohm ½ watt.....

P3876	500,000 ohm ½ watt.....
P3882	1,000,000 ohm ½ watt.....
P3883	2,000,000 ohm ½ watt.....
P3889	10,000,000 ohm ½ watt.....

VARIABLE RESISTORS

P4089	Volume control and switch...
P4729	Tone control
RC4010	Record changer mounting spring
RC7017	Record changer mounting screw
RC6008	Needle
RC3020	Center post
RC50	Record changer (60 cycle)
RC51	Record changer (50 cycle)
P3948	Chassis mounting screw

TRANSFORMERS AND COILS

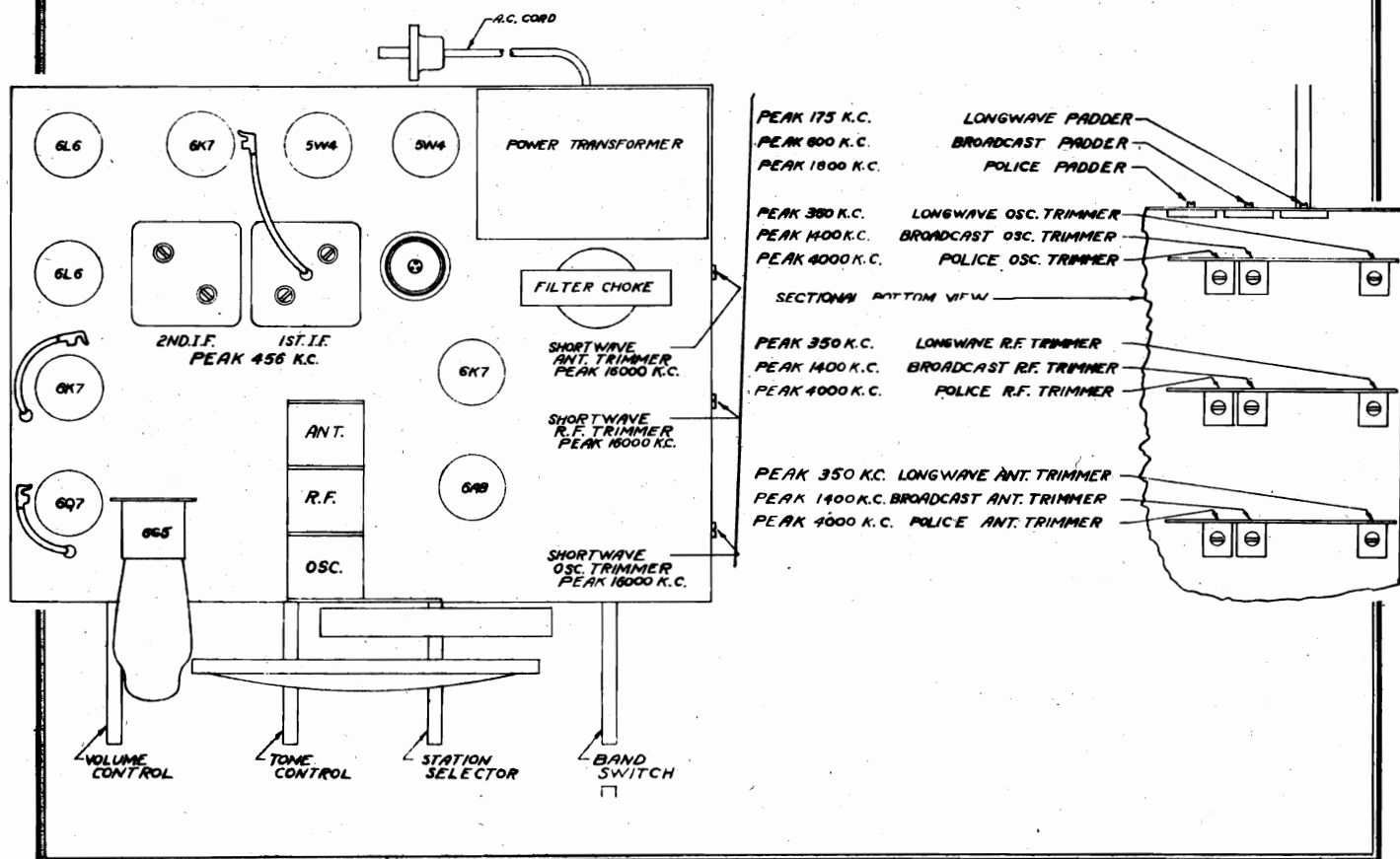
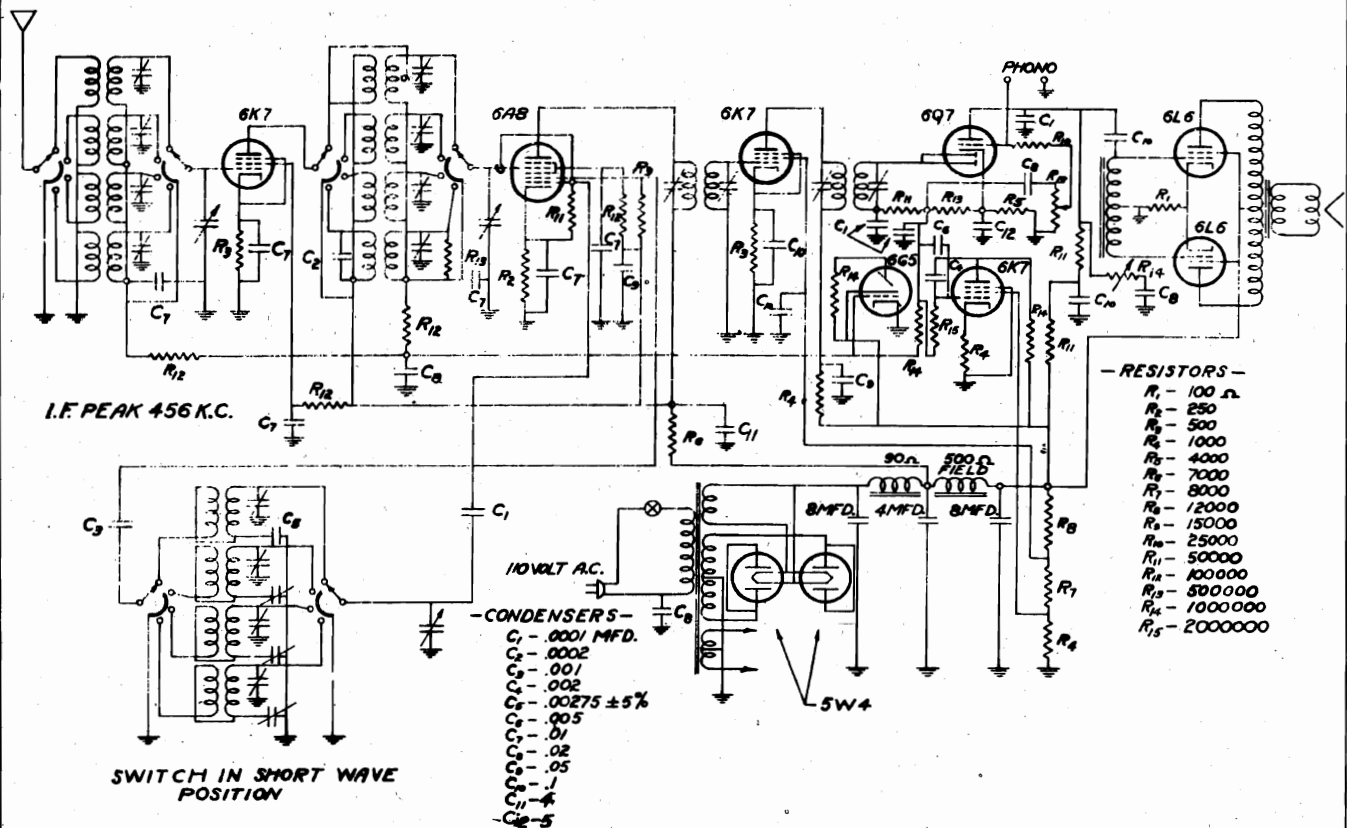
G6425	B.C. antenna coil.....
P4802	S.W. antenna coil.....
P4804	B.C. and S.W. oscillator coil..
P4108	1st I.F. transformer
P4858	2nd I.F. transformer.....
P3926	Filter choke
P4512	Power transformer (60 cycle).
P4513	Power transformer (50 cycle)

MISCELLANEOUS

P3005	Tube socket
P945	Speaker socket
P4138	Electrolytic mounting base..
P4404	Phono jack
P929	Line cord
P3557	Line cord clamp
P4800	Dial background
	Pointer; order by name and model number.....
P4179	Drive shaft
P1399	Horseshoe washer (for drive shaft).....
P1587	Spring washer (for drive shaft).....
P2925	Takeup spring
	Knobs; order by name and model number.....
P4205	Band switch lever.....
P4197	Pilot light socket
P1713	Pilot light bulb
P4248	Pilot light reflector.....
P4801	Band switch
P4805	10" PM speaker and output transformer
P4784	Phono cable
P4542	Phono motor AC cord.....

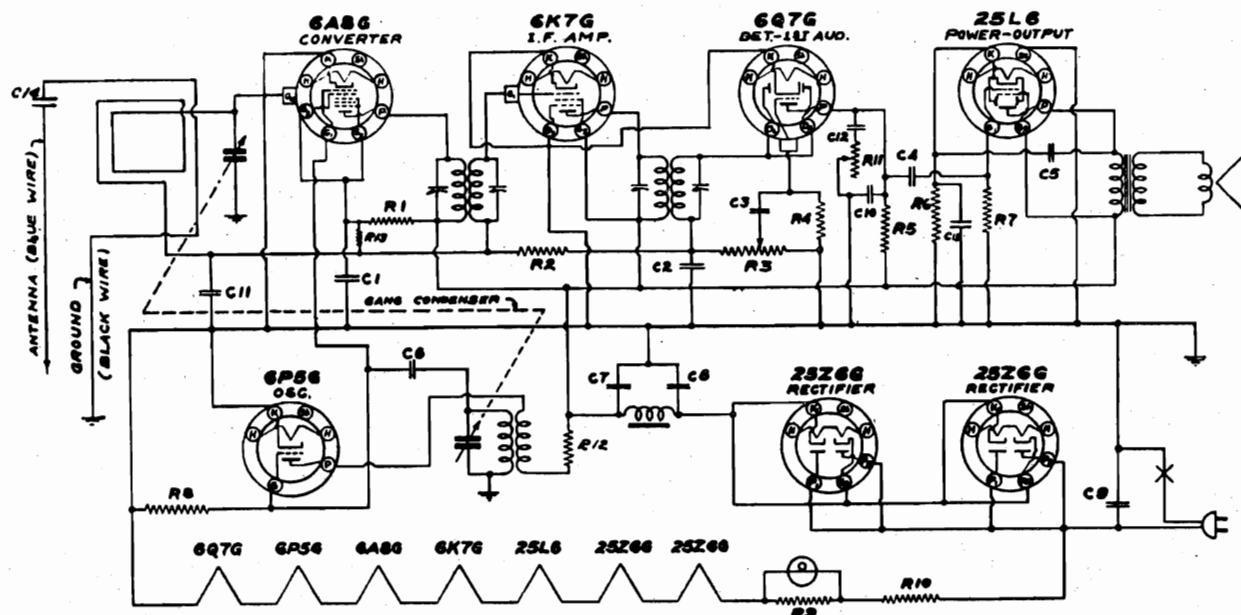
ADMIRAL CORPORATION

MODEL AM6



MODEL 7K

ADMIRAL CORPORATION



CAPACITORS

NO.	MEAS.	VOLTS	NO.	MEAS.	VOLTS
C1	.01	400	C9	.05	400
C2	.00025	MICA	C10	.0005	MICA
C3	.01	400	C11	.05	200
C4	.01	400	C12	.005	600
C5	.005	600	C13	20.0	25
C6	.00005	MICA	C14	.001	400
C7	20.0	150			

RESISTORS

NO.	OHMS	WATTS	NO.	OHMS	WATTS
R1	10,000	1/2	R7	1/2 MEG	1/2
R2	2 MEG.	1/2	R8	50,000	1/2
R3	1/2 MEG. VOL. CONT.		R9	30	7
R4	5 MEG.	1/2	R10	42	
R5	250,000	1/2	R11	500,000 TONE C.	
R6	150	1/2	R12	1000	1/2
			R13	15 MEG	1/2

I.F. - 455 K.C.

SCHEMATIC DIAGRAM
MODEL 7K

SERVICE INFORMATION

Speaker (Part No. P3284)

Field resistance 450 ohms
 D.C. voice coil resistance 4.6 ohms
 Voice coil impedance at 400 cycles 5 ohms

Oscillator Coil (Part No. P3682)

Looking at the connection end (with dot) in a clockwise direction starting at the chassis the terminals are No. 1, grid;

Primary—No. 2 and No. 3—Resistance 1.5 ohms.

Secondary—No. 4 and No. 1—Resistance 4.5 ohms.

First I.F. Transformer (Part No. P3282)

Primary—Blue white, plate; red white B+—Resistance 24.2 ohms.

Secondary—White, grid; black white, AVC—Resistance 23.6 ohms.

Second I.F. Transformer (Part No. P3283)

Primary—Blue white, plate; red white, B+—Resistance 11.9 ohms.

Secondary—White, grid; black white, AVC—Resistance 16.9 ohms.

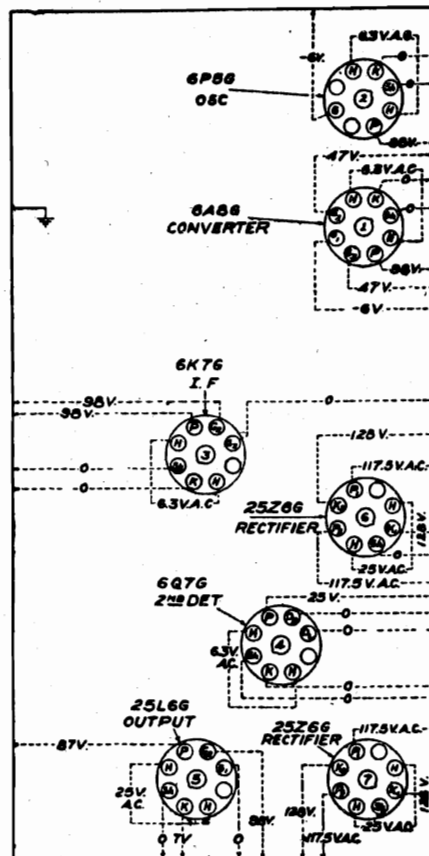
Electrolytic Condenser (Part No. P3531)

Red, 20 mfd., 150 volt; green, 20 mfd., 150 volt; yellow, 20 mfd., 25 volt; black, negative for all three sections.

Loop Antenna

Since the loop antenna acts also as the antenna coil the set will not operate with the loop antenna disconnected.

VOLTAGES AT SOCKETS



Bottom View of Chassis

ADMIRAL CORPORATION

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mfd., 200 mmf.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	455 KC.	.1 MFD.	Grid of 6K7G I.F. tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 2)	Output I.F.	Adjust to maximum output
	455 KC.	.1 MFD.	Grid of 6A8G tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 2)	Input I.F.	Adjust to maximum output
BROAD-	1730 KC.	200 mmf.	Antenna lead	Rotor full open (Plates out of mesh)	Trimmer—Top of Left section of gang (See Fig. 2)	Oscillator	Adjust to maximum output
CAST	1400 KC.	200 mmf.	Antenna lead	Set dial at 1400 KC.	Trimmer—Top of Right section of gang (See Fig. 2)	Antenna	Adjust to maximum output

This is all that is necessary for the alignment unless the plates of the gang have been bent out of shape. In case of bent plates, set the signal generator and receiver to 600 KC and bend the plates into the position for maximum output. Attenuate the signal from the signal generator to prevent the leveling off-action of the AVC. After each band is completed, repeat the procedure as a final check.

FREQUENCY RANGE

540 to 1630 KC

Power output 1 watt undistorted—1.7 watts maximum.

Intermediate Frequency 455 KC.

Power Consumption—50 watts.

REPLACEMENT PARTS LIST

PAPER CONDENSERS

P3203	C14	.001 mfd. 600 volt.....
P1322	C5, C12	.005 mfd. 600 volt.....
P334	C9	.05 mfd. 400 volt.....
P148	C11	.05 mfd. 200 volt.....
P164	C1, C3, C4	.01 mfd. 400 volt.....

MICA CONDENSERS

P817	C2	.00025 mfd.
P1382	C6	.00005 mfd.
P336	C10	.0005 mfd.

ELECTROLYTIC CONDENSERS

P3531	C7, C8, & C13	20 mfd. 150 volt.....
		20 mfd. 150 volt.....
		20 mfd. 25 volt.....

VARIABLE CONDENSERS

P3522		Gang Condenser and Tuner...
-------	--	-----------------------------

RESISTORS

P3444	R9	30 ohm 7 watt.....
P3277	R10	42 ohm 7 watt.....
P3803	R6	150 ohm ¼ watt 10%.....
P3828	R12	1,000 ohm ¼ watt.....
P3841	R1	10,000 ohm ¼ watt.....
P3853	R8	50,000 ohm ¼ watt.....
P3868	R5	250,000 ohm ¼ watt.....
P3876	R7	500,000 ohm ¼ watt.....
P3883	R2	2,000,000 ohm ¼ watt.....
P3886	R4	5,000,000 ohm ¼ watt.....
P3891	R13	15,000,000 ohm ¼ watt.....

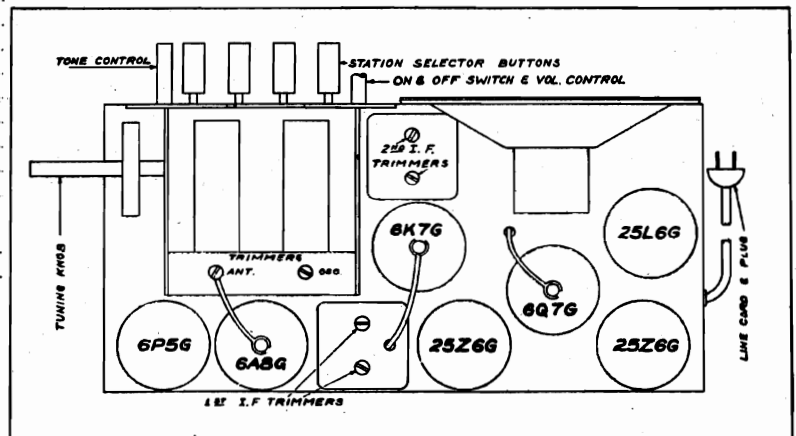
VARIABLE RESISTORS

P3527	R3	Volume Control and Switch.
P3528	R11	Tone Control

TRANSFORMERS AND COILS

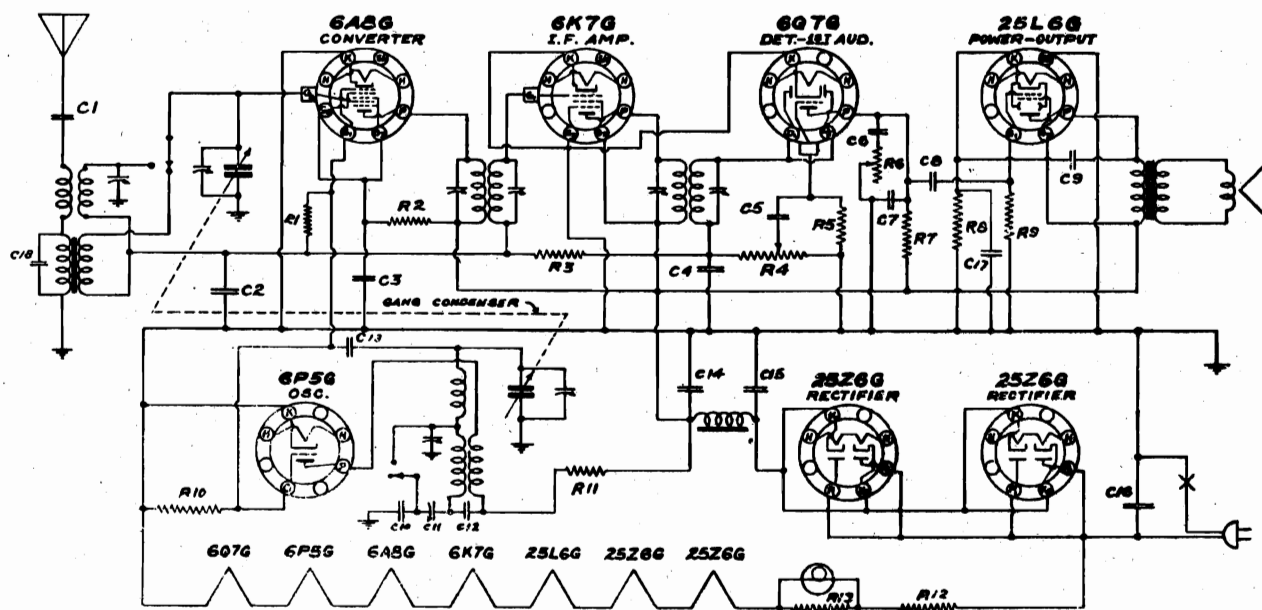
P3682		Oscillator Coil
P3282		1st I. F. Transformer.....
P3283		2nd I. F. Transformer.....
P3278		Output Transformer

P2294	Pulley for Dial Bracket
P2325	Dial Takeup Spring
P3525	Dial Background
P2965	Dial Pointer
P470	Grid Clip
P1713	Pilot Light Bulb
P3681	Pilot Light Socket
G6081	Loop Antenna Assembly
P3284	Speaker
P3088	Rubber Speaker Ring
P3096	Call Letter Sheet
P3073	Push Button
P3078	Felt Washer (For Push Buttons)
P3644	Tuning Knob
P3358	Volume or Tone Knob
P3684	Escutcheon
P3089	Dial Clip
P3090	Escutcheon Screw
P3685	Dial Scale
P3635	Pressed Paper Back
P3673	Chassis Mounting Screw



MODEL 7KS

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CAPACITORS

NO.	MFDs	VOLTS	NO.	MFDs	VOLTS
C1	.002	600	C10	.0022 25% MICA	
C2	.05	400	C11	.00062 VAR. PAD.	
C3	.01	400	C12	.005	600
C4	.00025	MICA	C13	.00005	MICA
C5	.01	400	C14	25.0	150
C6	.005	600	C15	25.0	150
C7	.0005	MICA	C16	.05	400
C8	.01	400	C17	20.0	25
C9	.005	600	C18	.00005	MICA

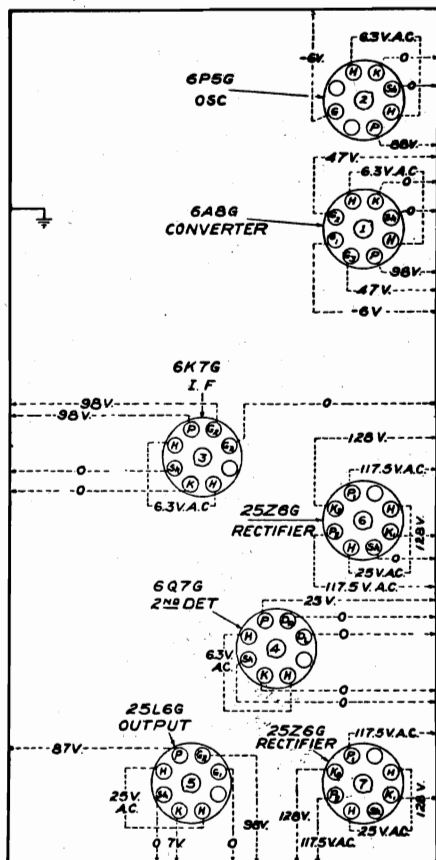
RESISTORS

NO.	OHMS	WATTS	NO.	OHMS	WATTS
R1	15 MEG.	1/2	R8	150	1/2
R2	10K.	1/2	R9	1/2 MEG.	1/2
R3	2 MEG.	1/2	R10	30K.	1/2
R4	1/2 MEG.	1/2	R11	10K.	1/2
R5	3 MEG.	1/2	R12	42	7
R6	1/2 MEG.	1/2	R13	30	7
R7	1/2 MEG.	1/2			

SWITCHES IN BROADCAST POSITION

I. F. 455 K. C.

VOLTAGES AT SOCKETS



Bottom View of Chassis

Speaker (Part No. P3638)

Field resistance	300 ohms
D.C. voice coil resistance	4.6 ohms
Voice coil impedance at 400 cycles	5 ohms

Antenna Coil (Part No. G5960).

Looking at the connection end starting at the mounting strip in a clockwise direction the terminals are: No. 1, (not used); No. 2, AVC; No. 3, grid; No. 4, antenna; No. 5, ground (grounded directly to mounting strip).

Primary—No. 4 and No. 5—Resistance 26 ohms.

Secondary—No. 2 and No. 3—Resistance 2 ohms.

Short Wave Antenna Coil (Part No. P3702)

Looking at the connection end starting at the mounting strip in a clockwise direction the terminals are: No. 1, grid; No. 2, ant.; No. 3, ground; No. 4 (on other end), AVC.

Primary—No. 2 and No. 3—Resistance .03 ohm

Secondary—No. 1 and No. 4—Resistance .1 ohm

Oscillator Coil (Part No. P3700)

Looking at the end with mounting strip, starting at the mounting strip in a clockwise direction the terminals are: No. 1, padder; No. 2, B+; No. 3, (not used); No. 4, switch; No. 5, plate; No. 6, grid.

Primary—No. 2 and No. 5—Resistance .85 ohm

Short Wave Secondary—No. 4 and No. 6—Resistance .07 ohm

Broadcast Secondary—No. 1 and No. 4—Resistance 5.1 ohms.

First I.F. Transformer (Part No. P3282)

Primary—Blue, white, plate; red white B+—Resistance 24.2 ohms.

Secondary—White, grid; black white, AVC—Resistance 23.6 ohms.

Second I.F. Transformer (Part No. P3283)

Primary—Blue white, plate; red white, B+—Resistance 11.9 ohms.

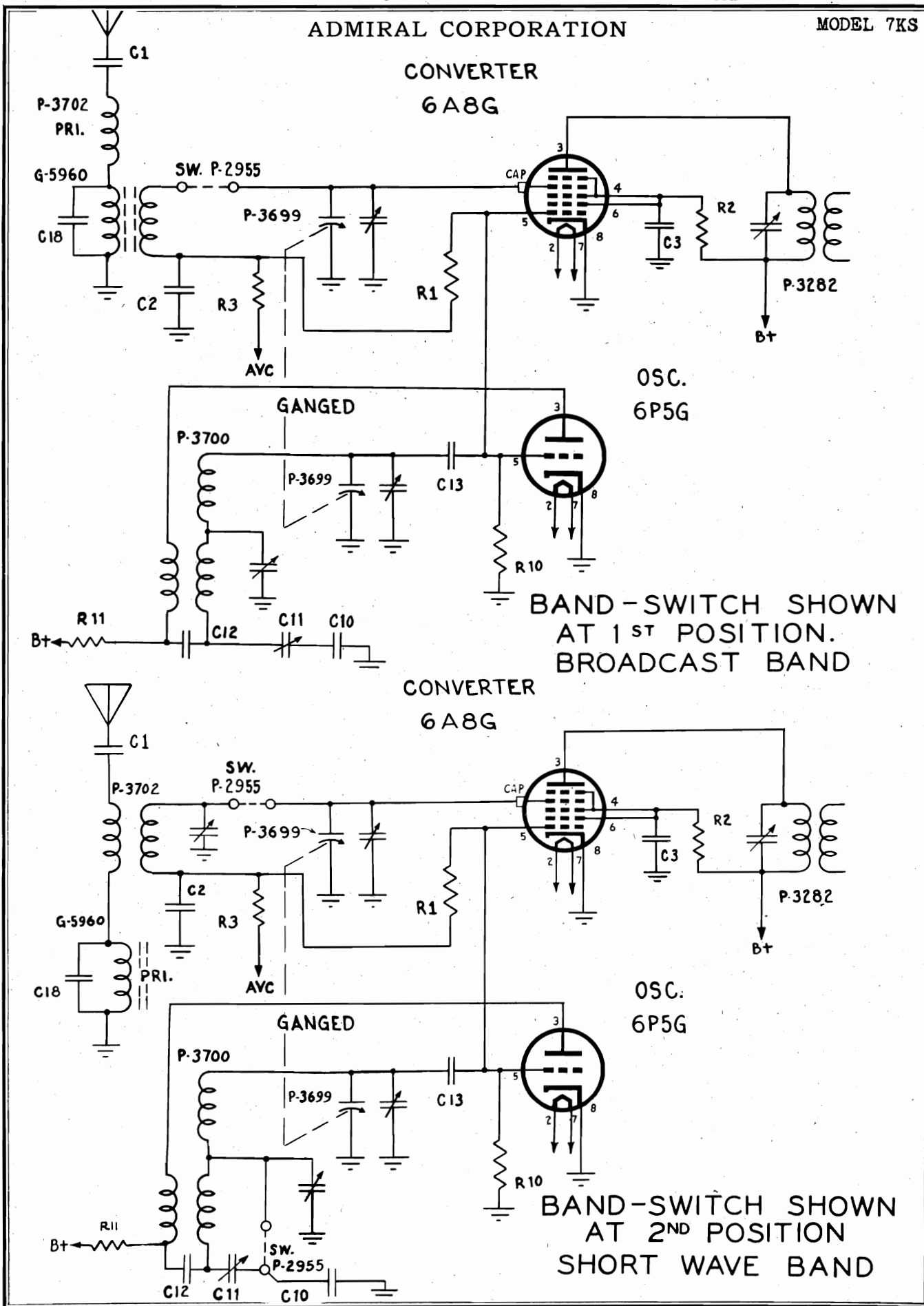
Secondary—White, grid; black white, AVC—Resistance 16.9 ohms.

Electrolytic Condenser (Part No. P3531)

Red, 20 mfd., 150 volt; green, 20 mfd., 150 volt; yellow, 20 mfd., 25 volt; black, negative for all three sections.

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MODEL 7KS



MODEL 7KS

ADMIRAL CORPORATION

which is known to be good until the defective unit is located. Failure to operate, noisy or weak reception is usually due to defective tubes, the tubes making poor contact with sockets or grid clips making poor contact with the caps of the sockets.

ALIGNMENT INSTRUCTIONS

All of the adjustments have been very carefully set with signal generators at the factory and require no further adjustment unless it becomes necessary to replace a coil or transformer, or if the adjustments have been tampered with in the field. Under no circumstances attempt any adjustments without first making certain that adjustments are necessary and only after voltages, tubes and condensers have been checked and found to be normal. To properly re-align this receiver, a signal generator as well as an output meter, must be used.

ALIGNMENT PROCEDURE

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—1 mfd., 200 mmf., 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	Connection to Radio	Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	455 KC. .1 Mfd.	Grid of 6K7G I.F. tube	Rotor full open (Plates out of mesh)	Two trimmers on top	Output I. F.	Adjust to maximum output
	455 KC. .1 Mfd.	Grid of 6A8C tube	Rotor full open (Plates out of mesh)	Two trimmers on top	Input I. F.	Adjust to maximum output
SHORT WAVE	18,100 KC.	Antenna lead	Rotor full open (Plates out of mesh)	Trimmer—Top of left section of gang	Short Wave receiver signal	Adjust to maximum output
	16,000 KC.	Antenna lead	Tune signal	Trimmer—On right side of chassis 3rd from front	Short Wave Antenna	Adjust to maximum output
BROAD-CAST	1730 KC.	Antenna lead	Rotor full open (Plates out of mesh)	Trimmer—On right side of chassis 2nd from front	Broadcast Oscillator	Adjust to maximum output
	1400 KC.	Antenna lead	Set dial at 1400 KC.	Trimmer—Top of right section of gang (See Fig. 2)	Broadcast Antenna	Adjust to maximum output
	600 KC.	Antenna lead	Set dial at 600 KC.	Trimmer—On right side of chassis 1st from front	Oscillator rock dial Series Pad.	Adjust to maximum output See Note 'A'

Note: "A"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of intensity is obtained. Attenuate the signal from the signal generator to prevent the leveling-off action of the A.V.C.
Do not bend variable condenser to correct tracking.

SERVICE NOTES
Voltages taken from the different points of the circuit to check for correct operation. All voltages are taken with the volume control in maximum position. All tubes are sockets and with the 150 volt scale. These voltages are clearly indicated on the chassis upon A.V.C. and affecting accuracy of voltage measurements, aerial and ground leads should be short circuited while making measurements. All voltages should be measured with 1175 volts A.C. input to receiver. Resistance and actual connections of coils and transformers, electrolytic condenser information and speaker data are given under Service Information.
To check for open by pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating.

VARIABLE RESISTORS

Volume control
Tone control

P-1322	C6, C9
P-334	C2, C16
P-164	C3, C5
P-193	C8
P-3527	R4
P-3528	R6

PAPER CONDENSERS

P-1322	C6, C9
P-334	C2, C16
P-164	C3, C5
P-193	C8
P-3527	R4
P-3528	R6

TRANSFORMERS AND COILS

G-5960	Antenna coil assembly
P-3702	Short Wave Antenna Coil
P-3700	Oscillator coil
P-3282	1st IF transformer
P-3283	2nd IF transformer
P-3005	Tube socket (octal)
P-1456	Tube shield base
P-1455	Tube shield
P-2215	Line cord
P-3557	Line cord clamp
P-2294	Pulley for dial bracket
P-3325	Dial takeup spring
P-2965	Dial background
P-470	Dial pointer
P-2955	Grid clip
P-1713	Band switch
P-3681	Pilot light bulb
P-3638	Speaker & output transformer
P-3088	Rubber speaker ring
P-3096	Call letter sheet
P-3073	Push button
P-3078	Felt washer (for push buttons)
P-3644	Tuning knob
P-3358	Volume or tone knob
P-3684	Escutcheon
P-3089	Dial clip
P-3090	Escutcheon screw
P-3703	Dial Scale
P-3673	Chassis mounting screw

MICA CONDENSERS

P-817	C4
P-1382	C13
P-3297	C10
P-336	C7

ELECTROLYTIC CONDENSERS

P-1456	20 mfd. 150 volt
P-2215	20 mfd. 150 volt
P-3557	20 mfd. 25 volt

VARIABLE CONDENSERS

P-3699	Gang condenser & tuner
P-3299	Double trimmer strip
P-3173	Padding condenser

RESISTORS

P-3444	R13
P-3277	R12
P-2339	R1
P-3803	R8
P-3841	R2, R11
P-3853	R10
P-3868	R7
P-3876	R9
P-3883	R3
P-3886	R5
P-3891	R1

PROCEDURE FOR SETTING UP PUSH BUTTONS

There are four push buttons by means of which four stations may be selected (See Fig. 1). Make a list of four stations tuned in regularly. Loosen one of the push buttons by turning the push button knob counter clockwise a half turn or less and push it in; while holding the button in, tune in a desired station by means of the station selector wheel. Turn the selector very slowly back and forth until the signal is clearest. Now while holding the push button in, tighten it by turning clockwise. Release the push button and turn the station selector to one end of the dial; then check the button by pushing it in and if the station is tuned to the center of the area on the dial covered by the station the adjustment is correct.

Release the push button and loosen another push button and repeat the above procedure, doing this for the remaining buttons.

If it is desired to change a button to a different station simply loosen the push button and re-set.

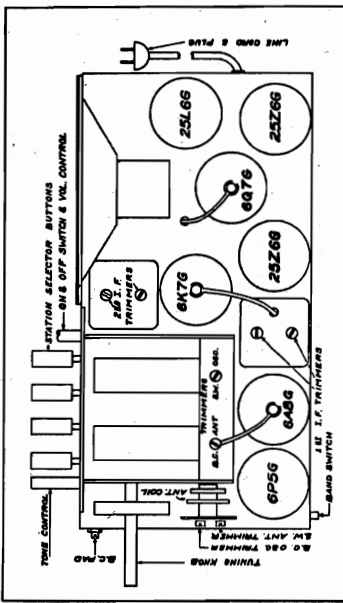
Punch the correct station call letter tabs from the set of sheets supplied and insert them into the recesses above the push buttons.

The dial is now set up for quick tuning and all that is necessary is to push the button under the desired station all the way in and then release.

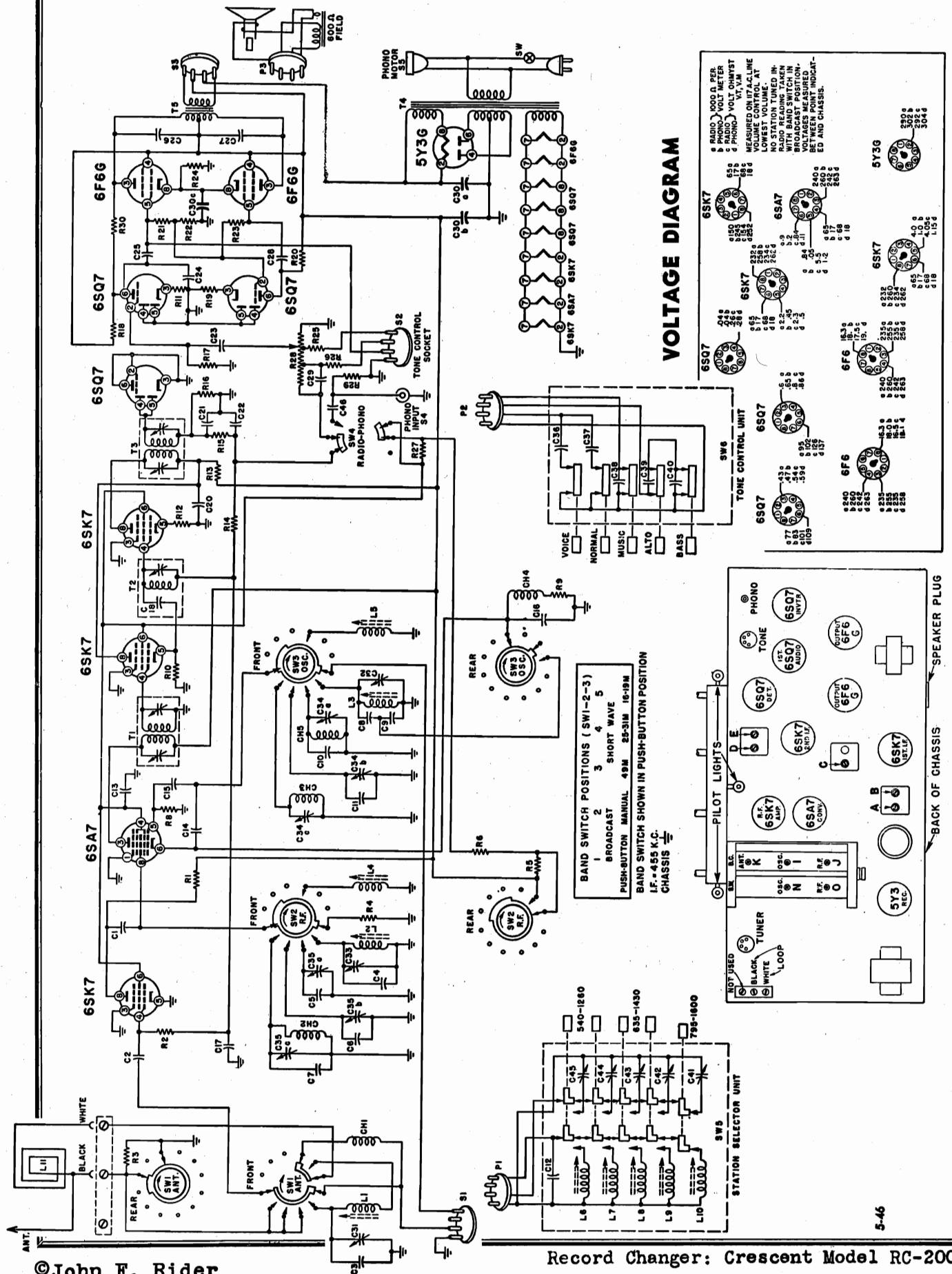
TUBE COMPLEMENT

The tube complement of this receiver consists of the following tubes:

- 1-Type 6A8G—Pentagrid Converter (First Detector)
- 1-Type 6P5G—Triode Amplifier (Oscillator)
- 1-Type 6K7G—Remote cut-off Pentode as an IF Amplifier (455 KC).
- 1-Type 6Q7G—Duplex Diode Triode Second Detector, A.V.C. and First Audio.
- 1-Type 25L6G—Tetrode Power Amplifier.
- 2-Type 25Z6G—Twin Diode High Vacuum Rectifiers.

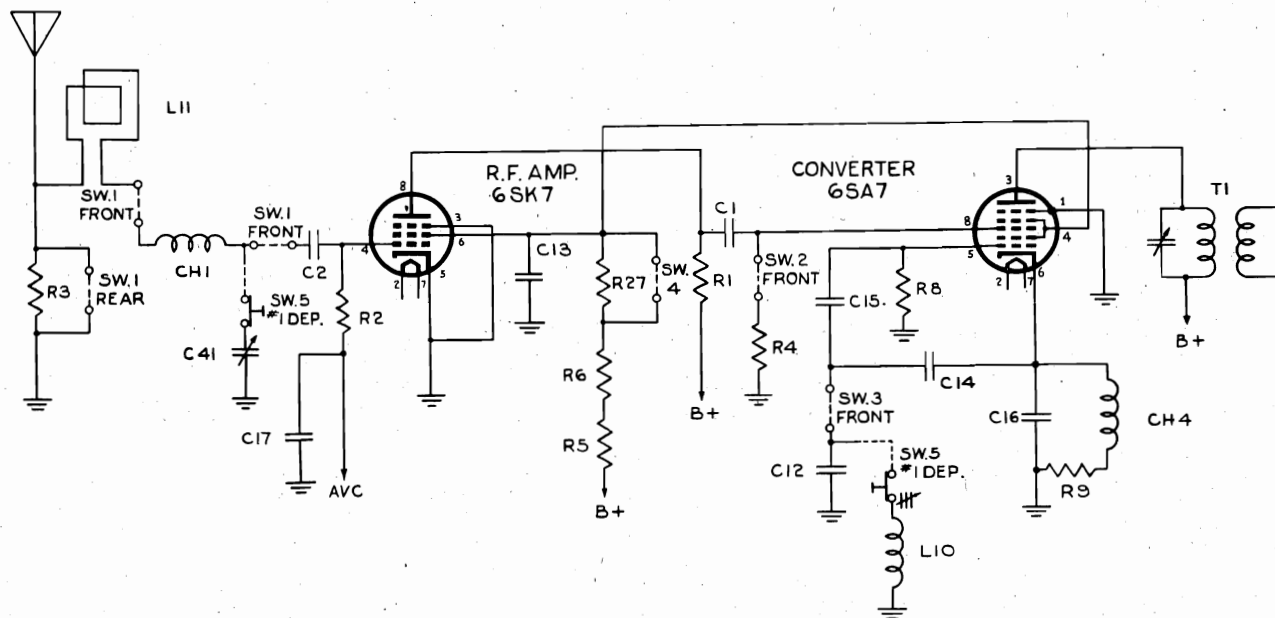


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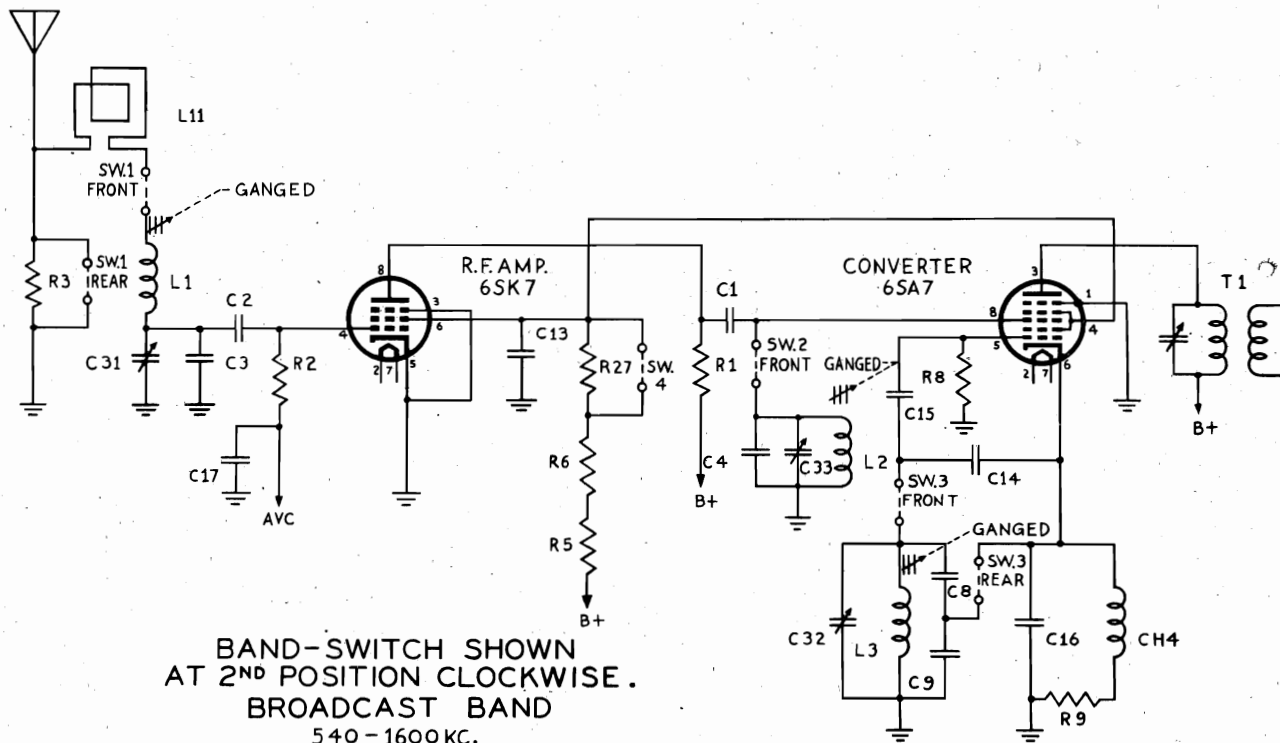


MODEL 10A1

ADMIRAL CORPORATION



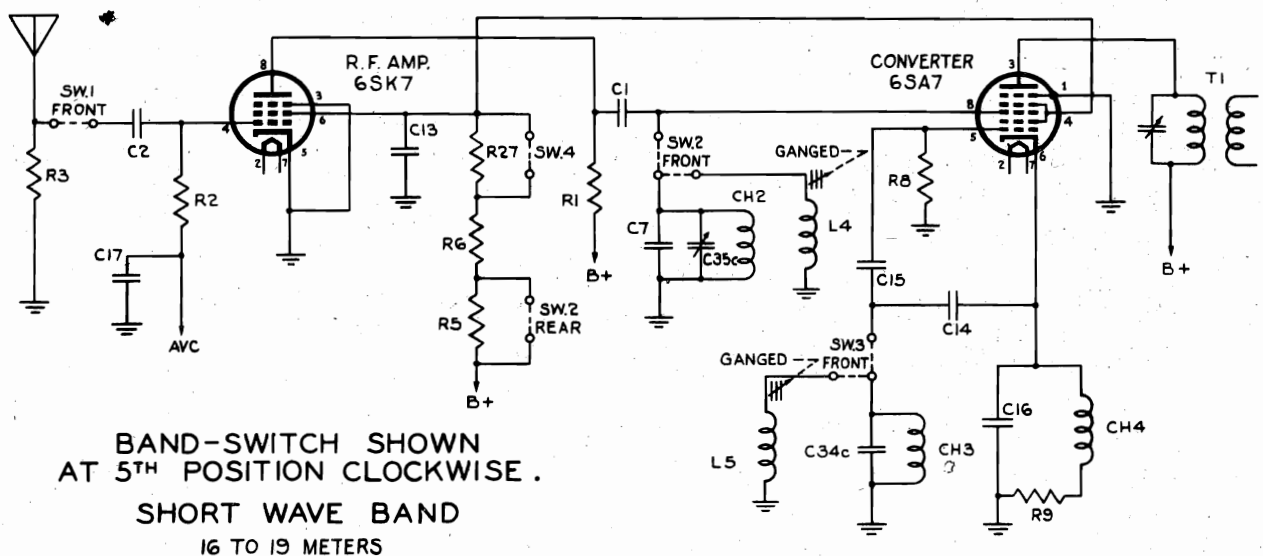
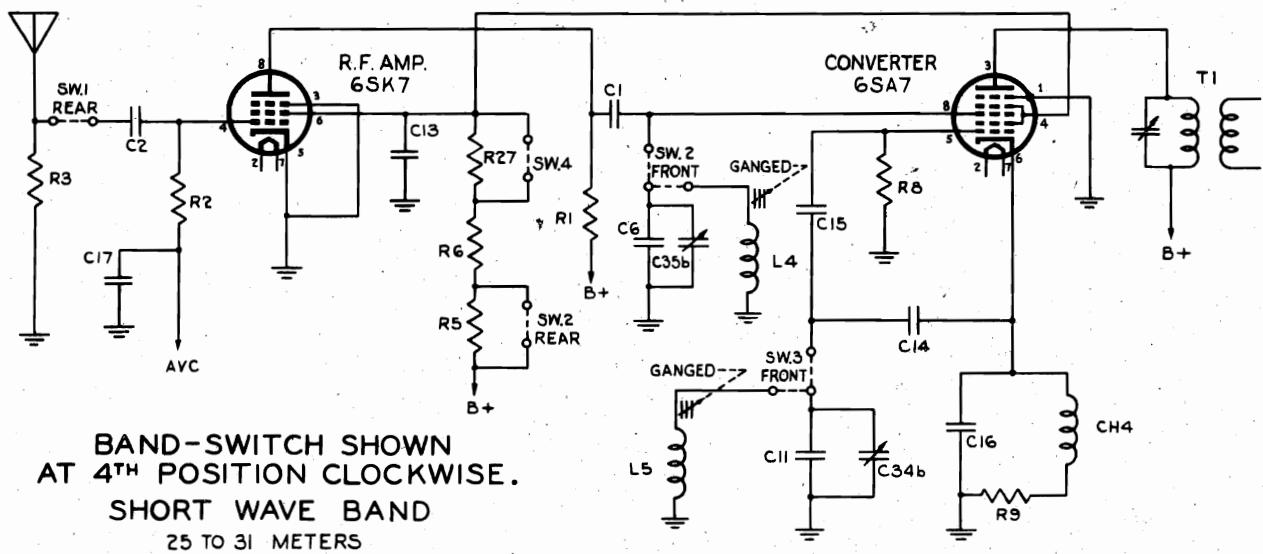
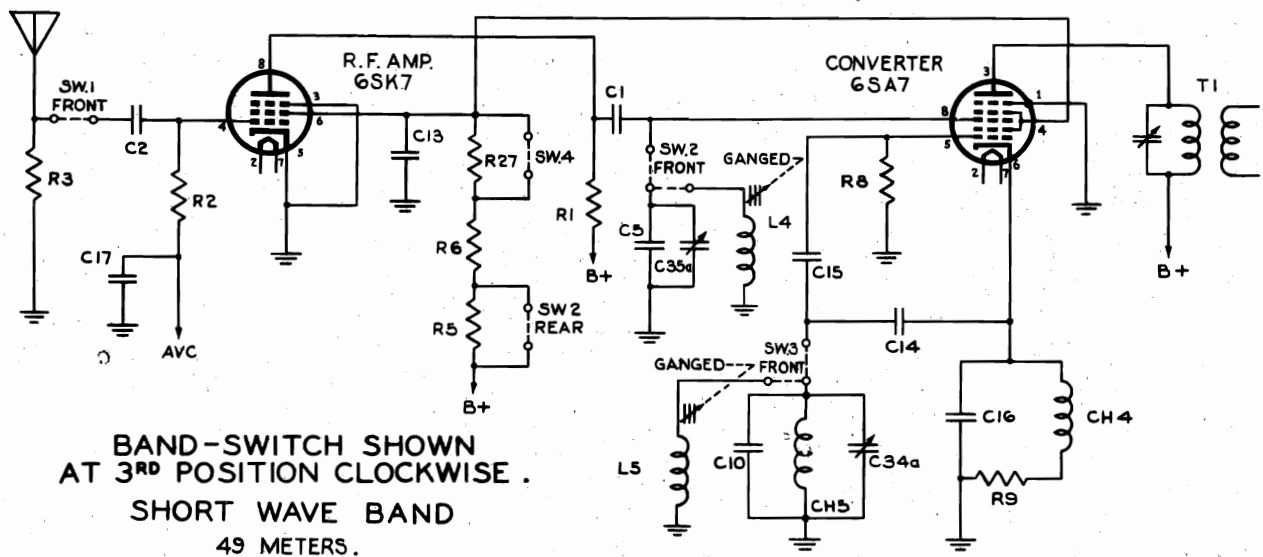
BAND-SWITCH SHOWN
AT 1ST POSITION.
PUSH BUTTON TUNING
(BUTTON #1 DEPRESSED)
795-1600 KC.



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
BROADCAST BAND
540-1600 KC.

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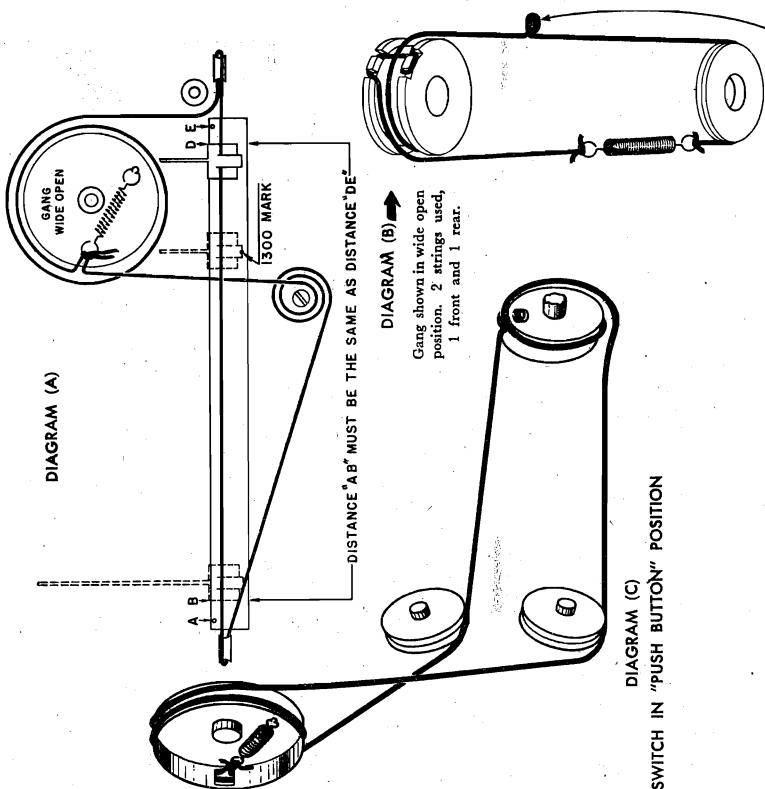
MODEL 10A1



MODEL 10A1

ADMIRAL CORPORATION

STRINGING DIAGRAMS



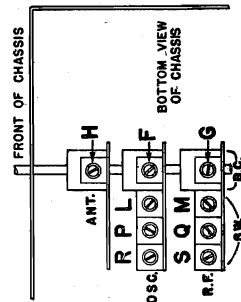
POINTER ADJUSTMENT

Move the dial pointer by means of the tuning control knob to see that it reaches the upper and lower limits in the upper limit position measure the distance D-E and in the lower limit position measure the distance A-B. The distance from A and B must be the same as the distance from D to E. If these distances are not equal, unclamp and move the pointer slide on the string until they are the same. The pointer should be checked again at the upper and lower limit to be sure that it is right. Take care to see that the pointer does not slip during this operation. Reclamp the pointer slide tightly to the string and seal with any quick-drying cement. Set the tuning gang wide open and proceed with operation 3.

REPLACING TUNING SLUG

If it becomes necessary to change a tuning slug proceed in the following manner: Set the gang to its wide open position, unsolder and remove the old slug. Set the slug adjusting screw about half way down. Place the new slug in such a position that 1 3/4 inches of its length is above the coil form. Solder it in this position making sure that it does not slip during the operation and that the slug wire is straight. Proceed to realign the set as shown in the chart.

TRIMMER LAYOUTS



ALIGNMENT PROCEDURE

1. Loop must be connected during alignment. Check the set screws that hold the drum to the shaft to see that they are tight and that the drum has not slipped on the shaft. The correct position of the drum can be seen on stringing diagram (A).
2. In the wide open position the stop on the rear of the dial drum must be against the stop post.
3. With the gang wide open, all slugs should be 1 3/4 inches out of their coil forms. If there is any serious deviation.
4. Be sure both the set and the signal generator are thoroughly warmed up before starting alignment.
5. Turn receiver Volume Control full on.
6. Use lowest output setting of signal generator that gives a satisfactory reading on meter.
7. Proceed in sequence as outlined below.

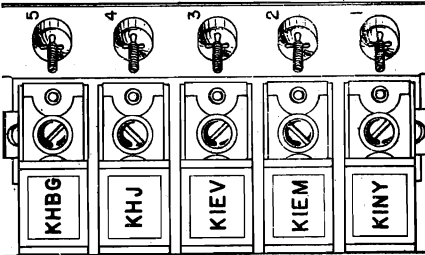
STEP	SIGNAL GENERATOR TO	DUMMY ANTENNA BETWEEN RADIO AND SIGNAL GENERATOR	SIGNAL GENERATOR FREQUENCY	TUNING GANG SETTING	ADJ. TRIMMERS IN FOLLOWING ORDER TO MAX.
1	6SA7 Grid (Pin #8)	.1 MFD.	455 K.C.	Pointer to upper limit	E, D, C, B, A
2	Before proceeding to step 3 check pointer travel as outlined under paragraph below headed "Pointer Adjustment."				
3	White Loop Lead	10 MMFD. If not available wrap several turns of the generator lead around the white loop lead.	1605 K.C.	Pointer to upper limit	F, G, H
4	White Loop Lead		1300 K.C.	Set Pointer to 1300 mark on slide rail (See Dial Diagram A)	I, J, K
5	Set Band Change Switch to 49 Meter Position.				
6	White Loop Lead	400 Ohms	7.5 Mc.	Pointer to upper limit	L, M
7	White Loop Lead	400 Ohms	7.2 Mc.	Set Pointer to 1300 mark on slide rail	N, O
8	Set Band Change Switch to 31-25 Meter Position.				
9	White Loop Lead	400 Ohms	12.5 Mc.	Pointer to upper limit	P, Q
10	Set Band Change Switch to 19-16 Meter Position.				
11	White Loop Lead	400 Ohms	18.0 Mc.	Pointer to upper limit	R, S

PROCEDURE FOR SETTING UP PUSH BUTTONS

Push Button	Frequency Range
1	795 K.C. - 1600 K.C.
2 & 3	635 K.C. - 1430 K.C. *
4 & 5	540 K.C. - 1260 K.C.

Remove the escutcheon covering the push button control unit. Pick the first of the 5 chosen stations. This should be of the proper frequency for button number 5. Set the band switch to broadcast and accurately tune in the station. Now turn the band switch to the push button position and adjust slug screw number 5 until the same station comes in with its loudest volume. Reduce the volume by means of the volume control and adjust the trimmer screw which is adjacent and to the left of the coil just adjusted. Again bring the station to its maximum volume. Set the rest of the push buttons in a like manner, one for each of the stations chosen.

Notes: Since each oscillator (slug) in the push button unit will tune over the entire broadcast band, (540 K.C.-1600 K.C.), care should be taken to set up stations within the frequency ranges associated with each button.



ADMIRAL CORPORATION

REPLACEMENT PARTS

RESISTORS

Symbol	Description	Part Number		
R1	10,000 Ohms, 1 Watt.....	60B14-103	L1	Coil, Tuning (Antenna B.C.).....
R2	470,000 Ohms, 1/2 Watt.....	60B8-474	L2	Coil, Tuning (B.C., R.F.).....
R3	47,000 Ohms, 1/2 Watt.....	60B8-473	L3	Coil, Tuning (B.C., Oscillator).....
R4	470,000 Ohms, 1/2 Watt.....	60B8-474	L4	Coil, Tuning (S.W., R.F.).....
R5	8,200 Ohms, 1 Watt.....	60B14-822	L5	Coil, Tuning (S.W., Oscillator).....
R6	10,000 Ohms, 5 Watt.....	61A1-3	L6	
R8	22,000 Ohms, 1/2 Watt.....	60B8-223	L7	
R9	100 Ohms, 1/2 Watt.....	60B8-101	L8	
R10	1,500 Ohms, 1/2 Watt.....	60B8-152	L9	
R11	1,500 Ohms, 1/2 Watt.....	60B8-152	L10	
R12	470 Ohms, 1/2 Watt.....	60B8-471	L11	Loop (B.C. Antenna).....
R13	1,000 Ohms, 1/2 Watt.....	60B8-102	T1	Transformer, 1st I.F.....
R14	470,000 Ohms, 1/2 Watt.....	60B8-474	T2	Transformer, 2nd I.F.....
R15	47,000 Ohms, 1/2 Watt.....	60B8-473	T3	Transformer, 3rd I.F.....
R16	270,000 Ohms, 1/2 Watt.....	60B8-274	T4	Transformer, Power.....
R17	1.0 Megohm, 1/2 Watt.....	60B8-105	T5	Transformer, Output.....
R18	270,000 Ohms, 1/2 Watt.....	60B8-274		
R19	1,000 Ohms, 1/2 Watt.....	60B8-102		
R20	270,000 Ohms, 1/2 Watt.....	60B8-274		
R21	470,000 Ohms, 1/2 Watt.....	60B8-474		
R22	470,000 Ohms, 1/2 Watt.....	60B8-474		
R23	470,000 Ohms, 1/2 Watt.....	60B8-474		
R24	270 Ohms, 2 Watt.....	60B20-271		
R25	47,000 Ohms, 1/2 Watt.....	60B8-473		
R26	100,000 Ohms, 1/2 Watt.....	60B8-104		
R27	150,000 Ohms, 1/2 Watt.....	60B8-154		
R28	1 Megohm Volume Control.....	75B3-3		
R29	1 Megohm, 1/2 Watt.....	60B8-105		
R30	1 Megohm, 1/2 Watt.....	60B8-105		

CONDENSERS

Symbol	Description	Part Number
C1	20 mmfd. Mica.....	65B7-5
C2	200 mmfd. Mica.....	65B7-21
C3	35 mmfd. Silver Mica.....	65B1-30
C4	390 mmfd. Silver Mica.....	65B1-34
C5	250 mmfd. Silver Mica.....	65B1-35
C6	65 mmfd. Silver Mica.....	65B1-27
C7	40 mmfd. Silver Mica.....	65B1-36
C8	140 mmfd. Silver Mica.....	65B1-26
C9	1000 mmfd. Mica.....	65B7-33
C10	200 mmfd. Silver Mica.....	65B1-14
C11	15 mmfd. Silver Mica.....	65B5-3
C12	60 mmfd. Silver Mica.....	65B5-13
C13	.1 mfd. 400 Volts.....	64B1-20
C14	50 mmfd. Mica.....	65B5-11
C15	50 mmfd. Mica.....	65B5-11
C16	250 mmfd. Mica.....	65B5-22
C17	.05 mfd. 200 Volts.....	64B1-32
C18	20 mmfd. Mica.....	65B5-5
C20	.1 mfd. 400 Volts.....	64B1-20
C21	50 mmfd. Mica.....	65B5-11
C22	50 mmfd. Mica.....	65B5-11
C23	.002 mfd. 600 Volts.....	64B1-14
C24	500 mmfd. Mica.....	65B5-27
C25	.005 mfd. 600 Volts.....	64B1-12
C26	.005 mfd. 600 Volts.....	64B1-12
C27	.005 mfd. 600 Volts.....	64B1-12
C28	.005 mfd. 600 Volts.....	64B1-12
C29	250 mmfd. Mica.....	65B5-22
C30a	30 mfd. 350 Volts.....	
C30b	30 mfd. 350 Volts } Electrolytic.....	67C6-25
C30c	20 mfd. 25 Volts.....	
C31	3-40 mmfd. } Trimmer.....	66A12-5
C32	3-40 mmfd. }	
C33	3-40 mmfd. }	
C34a	3-40 mmfd. } Trimmer.....	66B8-3
C34b	3-40 mmfd. }	
C34c	3-40 mmfd. }	
C35a	3-40 mmfd. } Trimmer.....	66B8-3
C35b	3-40 mmfd. }	
C35c	3-40 mmfd. }	
C36	.002 mfd., 600 Volts.....	64B1-14
C37	.001 mfd., 600 Volts.....	64B1-15
C38	.005 mfd., 600 Volts.....	64B1-12
C39	.01 mfd., 400 Volts.....	64B1-25
C40	.005 mfd., 600 Volts.....	64B1-12
C41	12-170 mmfd. Trimmer.....	66A12-1
C42		
C43	25-290 mmfd. Trimmer.....	66A12-2
C44		
C45	40-400 mmfd. Trimmer.....	66A12-3
C46	.002-600 volts.....	64B1-14

CHOKES, COILS & TRANSFORMERS

Symbol	Description	Part Number
CH1	Choke, Antenna.....	AB103-6
CH2	Choke, R.F. S.W.....	AB103-31
CH3	Choke, Oscillator, S. W.....	AB103-31
CH4	Choke, Oscillator, Cathode.....	AB103-1
CH5	Choke, Oscillator, 49 Meter Shunt.....	AB103-5

L1	Coil, Tuning (Antenna B.C.).....	AC105-2
L2	Coil, Tuning (B.C., R.F.).....	AB100-1
L3	Coil, Tuning (B.C., Oscillator).....	AC101-2
L4	Coil, Tuning (S.W., R.F.).....	AD102-2
L5	Coil, Tuning (S.W., Oscillator).....	AD102-4
L6		
L7		
L8		
L9		
L10		
L11	Loop (B.C. Antenna).....	AC112
T1	Transformer, 1st I.F.....	72B7
T2	Transformer, 2nd I.F.....	72B12
T3	Transformer, 3rd I.F.....	72B8
T4	Transformer, Power.....	80B2
T5	Transformer, Output.....	79A1

SWITCHES, PLUGS & SOCKETS

SW1	Switch, Antenna Circuit.....	76B6-2
SW2	Switch, R.F. Circuit.....	76B6-4
SW3	Switch, Oscillator Circuit.....	76B6-3
SW4	Switch, Phono Radio.....	76A3
SW5	Switch in Station Selector Unit.....	76B5
SW6	Switch in Tone Control Unit.....	76B4
S1	Socket, Station Selector Unit.....	87A4-1
P1	Plug, Station Selector Unit.....	88A3-1
S2	Socket, Tone Control Unit.....	87A4-1
P2	Plug, Tone Control Unit.....	88A3-1
S3	Socket, Speaker.....	87A6-1
P3	Plug, Speaker.....	98A2
S4	Socket, Phono Connector.....	88A1
S5	Phono Motor Cord & Socket.....	89A6-9

CABINET & SLIDE-A-WAY PARTS

Left Door Bracket	15B70-1
Right Door Bracket	15B70-2
Slide Rail	15A71
Bracket Stop	15A72
Hub, Door Bracket	27A13
Roller, Door Bracket	27A14
Hub, Slide Roller (Slide-A-Way).....	27A11
Roller, Slide (Slide-A-Way).....	27A12
Bracket Assembly (Slide-A-Way).....	G400C42
Switch & Cover (Slide-A-Way).....	77B1-44
Plug, Alden 20" Leads (Slide-A-Way).....	89A6-18
Escutcheon, Cover Plate (left).....	23B4-1
Escutcheon, Cover Plate (right).....	23B4-2
Escutcheon, Dial Mounting	23C3
Escutcheon, Lower Rail	23B5-2
Escutcheon, Switch (Slide-A-Way).....	401A67

PHONOGRAPH PARTS

See Record Changer Service Manual for Detailed List

Centerpost	G400A12-2
Crystal Cartridge	409A1
Idler Wheel (407B3 Motor).....	G400A23
Idler Wheel (407B2 Motor).....	G400A59
Idler Wheel (407B1 Motor).....	G400A57
Plug, Phonograph Output.....	88A2-1

MISCELLANEOUS

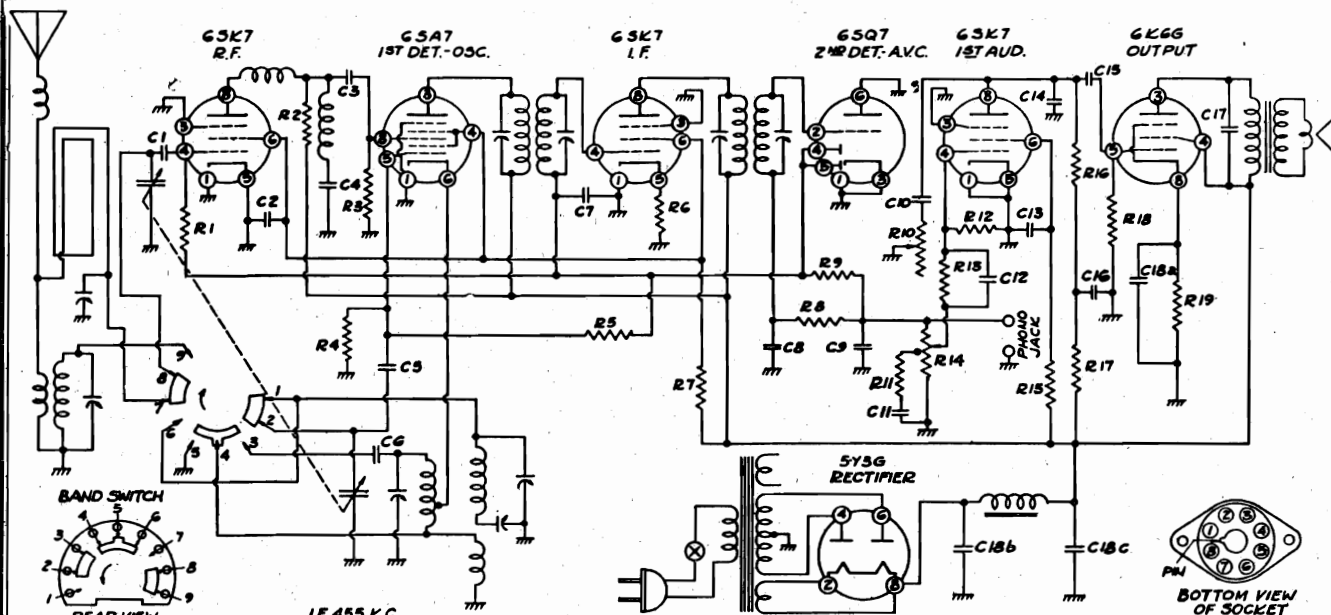
Bulbs, Pilot Light, Mazda No. 47	81A1-8
Dial Cord, 100 inches	50A1-3
Dial, Scale Glass	21C21
Drum, Band Indicator	A1200
Drum, Dial Tuning	A1194
Knobs (Walnut)	33A12-1
Letter, Call Push Button	42A1
Plug, Coil Mounting	32A3-1
Pointer, Dial	25A6-1
Push Button, Numbers 1 and 5.....	33B6-1
Push Button, Numbers 2 and 4.....	33B6-2
Push Button, Number 3.....	33B6-3

When Ordering Slugs Specify Color Code

Slug, Tuning (B.C., R.F.) (B.C., Osc.).....	71B1-3
Slug, Tuning (B.C. Antenna).....	71B1-13
Slug, Tuning (S.W., R.F.) (S.W., Osc.).....	71B1-9
Slug, Push Button Unit.....	71B1-14
Socket, Pilot Light	82A2-1
Speaker, 10" Dynamic	78B12
Spring, Hairpin for mounting coils.....	19A3-1
Stud, Slug Adjusting	27A4
Tube, Pilot Light Cover	82A5-1

MODEL A77

ADMIRAL CORPORATION



IF 455 K.C.

RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	500,000	1/4	R11	15,000	1/4
R2	2,500	1/2	R12	2,000,000	1/4
R3	100,000	1/2	R13	2,000,000	1/4
R4	25,000	1/2	R14	500,000	1/4
R5	5,000,000	1/4	R15	2,000,000	1/4
R6	100	1/4	R16	250,000	1/4
R7	15,000	2	R17	50,000	1/4
R8	50,000	1/4	R18	500,000	1/4
R9	1,000,000	1/4	R19	600-10%	1/2
R10	500,000	T.C.			

IF 455 K.C.

T.C.

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.0001	Mica	C11	.05	200
C2	.05	400	C12	.05	200
C3	.0001	Mica	C13	.25	400
C4	.00006-5%	Mica	C14	.00025	Mica
C5	.0001	Mica	C15	.01	400
C6	.003-5%	Mica	C16	.25	400
C7	.05	200	C17	.002	600
C8	.00005	Mica	C18a	20.	25
C9	.0001	Mica	C18b	30.	350
C10	.002	600	C18c	30.	350

CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.0001	Mica	C11	.05	200
C2	.05	400	C12	.05	200
C3	.0001	Mica	C13	.25	400
C4	.00006-5%	Mica	C14	.00025	Mica
C5	.0001	Mica	C15	.01	400
C6	.003-5%	Mica	C16	.25	400
C7	.05	200	C17	.002	600
C8	.00005	Mica	C18a	20.	25
C9	.0001	Mica	C18b	30.	350
C10	.002	600	C18c	30.	350

TRANSFORMERS AND COILS

G6252	Loop antenna assembly.....
P3198	S. W. antenna coil.....
P4194	B. C. and S. W. oscillator coil.....
G6185	Wave trap coil.....
P4108	1st I.F. transformer.....
P4109	2nd I.F. transformer.....
G6186	Short wave choke.....
P3926	Iron core filter choke.....
P4265	Power transformer.....

MISCELLANEOUS

P4186	Push button shaft.....
P4114	Call letter tab sheet.....
P4192	Band switch.....
P4283	Speaker and output trans- former.....

P4196	Dial pointer.....
G6181	Pointer shaft and pulley....
P4091	Horseshoe washer (pointer shaft).....
P2325	Take up spring (pointer)....
P4105	Fibre pulley.....
P4185	Dial background.....
P4197	Pilot light socket.....
P1713	Pilot light bulb.....
P4248	Pilot light reflector.....
P4101	Drive shaft.....
P1399	Horseshoe washer (drive shaft).....
P3375	Takeup spring (drive).....
P945	Speaker socket.....
P4138	Electrolytic mounting base.....

PAPER CONDENSERS

P1193	.002 mfd. 600 volt.....
P1322	.005 mfd. 600 volt.....
P164	.01 mfd. 400 volt.....
P148	.05 mfd. 200 volt.....
P334	.05 mfd. 400 volt.....
P1789	.25 mfd. 400 volt.....

MICA CONDENSERS

P1382	.00005 mfd.....
P3640	.00006 mfd. 5%.....
P480	.0001 mfd.....
P817	.00025 mfd.....
P2565	.003 mfd. 5%.....

ELECTROLYTIC CONDENSERS

P4264	{ 20 mfd. 25 volt.....
	{ 30 mfd. 350 volt.....
	{ 30 mfd. 350 volt.....

VARIABLE CONDENSERS

P4191	Gang condenser.....
P3734	Trimmer condenser.....
P3299	Trimmer condenser.....
P3173	Padding condenser.....

RESISTORS

P3800	100 ohm 1/2 watt.....
P3821	600 ohm 1/2 watt.....
P3832	2,500 ohm 1/2 watt.....
P3843	15,000 ohm 1/2 watt.....
P1944	15,000 ohm 2 watt.....
P3845	25,000 ohm 1/2 watt.....
P3853	50,000 ohm 1/2 watt.....
P3860	100,000 ohm 1/2 watt.....
P3868	250,000 ohm 1/2 watt.....
P3876	500,000 ohm 1/2 watt.....
P3882	1,000,000 ohm 1/2 watt.....
P3883	2,000,000 ohm 1/2 watt.....
P3886	5,000,000 ohm 1/2 watt.....

VARIABLE RESISTORS

P4089	Volume control and switch.
P4183	Tone control.....

All voltages measured with a 1,000 ohm per volt meter on the 300 volt scale. Line voltage 117 volts A.C. Volume control maximum and no signal tuned in. Power consumption 60 watts.

6SK7 (RF) TUBE

Plate (8) to ground.....	208
Screen (6) to ground.....	93

6SA7 TUBE

Plate (3) to ground.....	255
Screen (4) to ground.....	93

6SK7 (IF) TUBE

Plate (8) to ground.....	255
Screen (6) to ground.....	93

6SK7 (AF) TUBE

Plate (8) to ground.....	20
Screen (6) to ground.....	10

6K6G TUBE

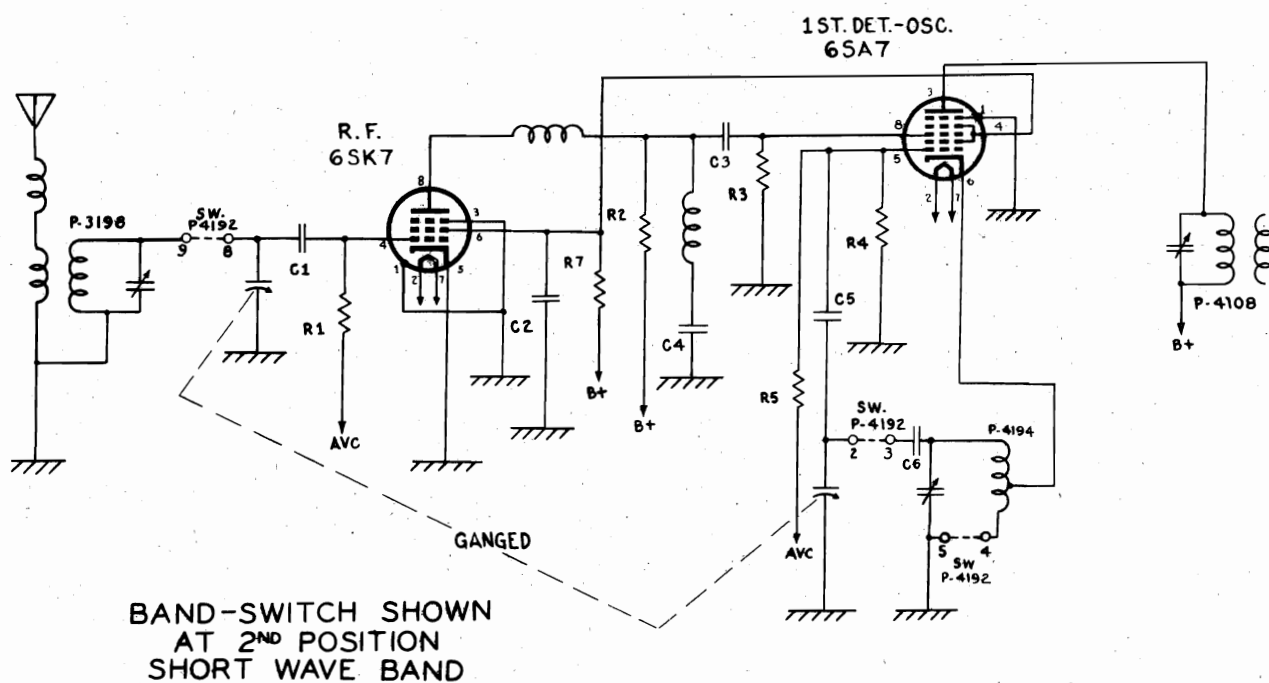
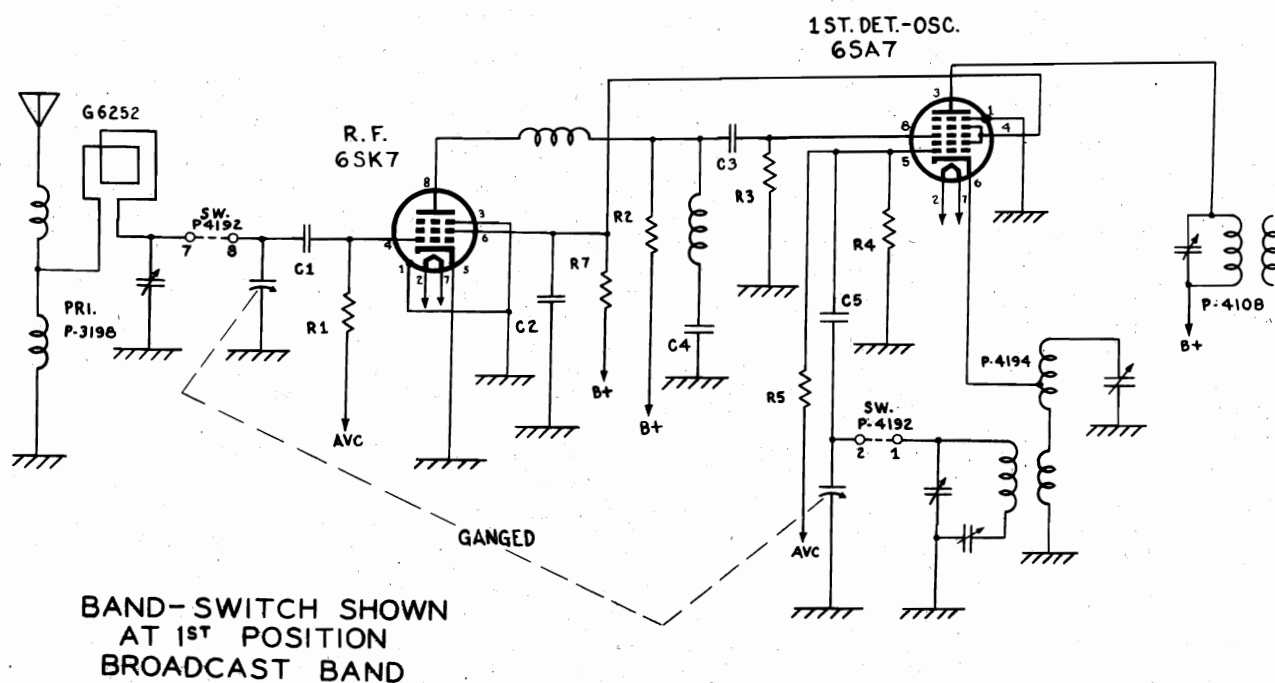
Plate (3) to ground.....	240
Screen (4) to ground.....	258
Cathode (8) to ground.....	18

5Y3G TUBE

Filament (8) to ground.....	266
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ADMIRAL CORPORATION

MODEL A77



MODEL A77

ADMIRAL CORPORATION

ALIGNMENT DATA

Band switch shown in broadcast position in schematic and in short wave position in lower left corner.

Speaker (Part No. P4283) 10" PM.

D. C. voice coil resistance..... 3.7 ohms
Voice coil impedance at 400 cycles..... 4.1 ohms

S. W. Antenna Coil (Part No. P3198)

Looking at the connection end starting at the chassis in a clockwise direction the terminals are: No. 1, plate; No. 2, B+; No. 3, grid; No. 4, pad.

Primary—No. 3 and No. 4—Resistance..... .08 ohm
Secondary—No. 1 and No. 2—Resistance..... .37 ohm

Oscillator Coil (Part No. P4194)

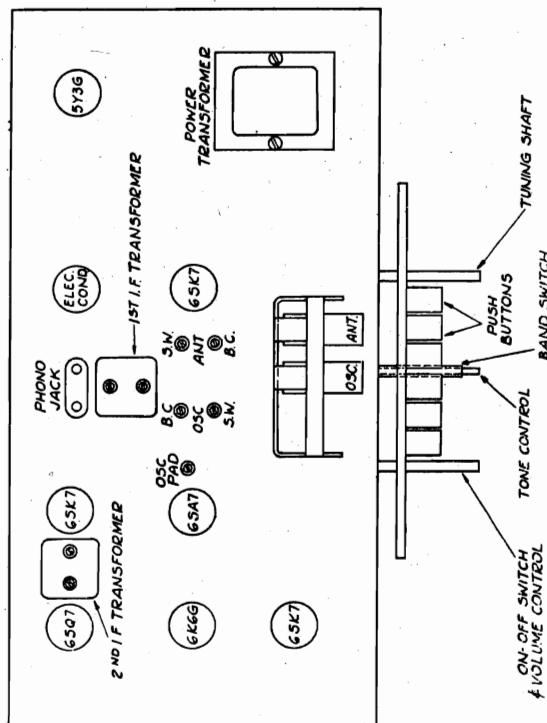
Looking at the mounting strip end in a clockwise direction starting at the chassis, the terminals are: No. 1, ground; No. 2, cathode; No. 3, open; No. 4, pad; No. 5, switch; No. 6, grid; No. 7, grid; No. 8, open.
B.C. Primary—No. 1 and No. 5—Resistance..... .29 ohm
S.W. Primary—No. 5 and No. 2—Resistance..... .06 ohm
B.C. Secondary—No. 4 and No. 6—Resistance..... 5.7 ohms
S.W. Secondary—No. 2 and No. 7—Resistance..... .08 ohm

First I.F. Transformer (Part No. P4108)

Primary—Blue, plate; red, B+—Resistance..... 18.2 ohms
Secondary—White, grid; black, AVC—Resistance..... 15.1 ohms

Second I.F. Transformer (Part No. P4109)

Primary—Blue, plate; red, B+—Resistance..... 20.8 ohms
Secondary—White, diode; black, AVC—Resistance..... 17.4 ohms



GENERAL DATA

The alignment of this receiver requires the use of a signal generator that will cover the frequencies of 445, 600, 1400, 1630, 6,000, 16,000 and 18,100 K.C., and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the signal generator output as low as possible, to prevent the AVC from operating and giving false readings.

I.F. ALIGNMENT

Adjust the signal generator to 455 K.C. and connect the output to the grid of the first detector tube (6SA7) through a .05 or .1 mfd. condenser. Align all I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT

Adjust the signal generator to 1630 K.C. and connect the output to the antenna lead, through a .0002 mfd. mica condenser. Set the gang condenser to minimum capacity and adjust the B.C. oscillator trimmer to receive this signal. After this has been carefully done, the next step is to set the signal generator to 1400 K.C. and after tuning in the signal adjust the B.C. antenna trimmer to peak. Set the signal generator to 600 K.C., tune the signal and then slowly increase or decrease the B.C. oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter.

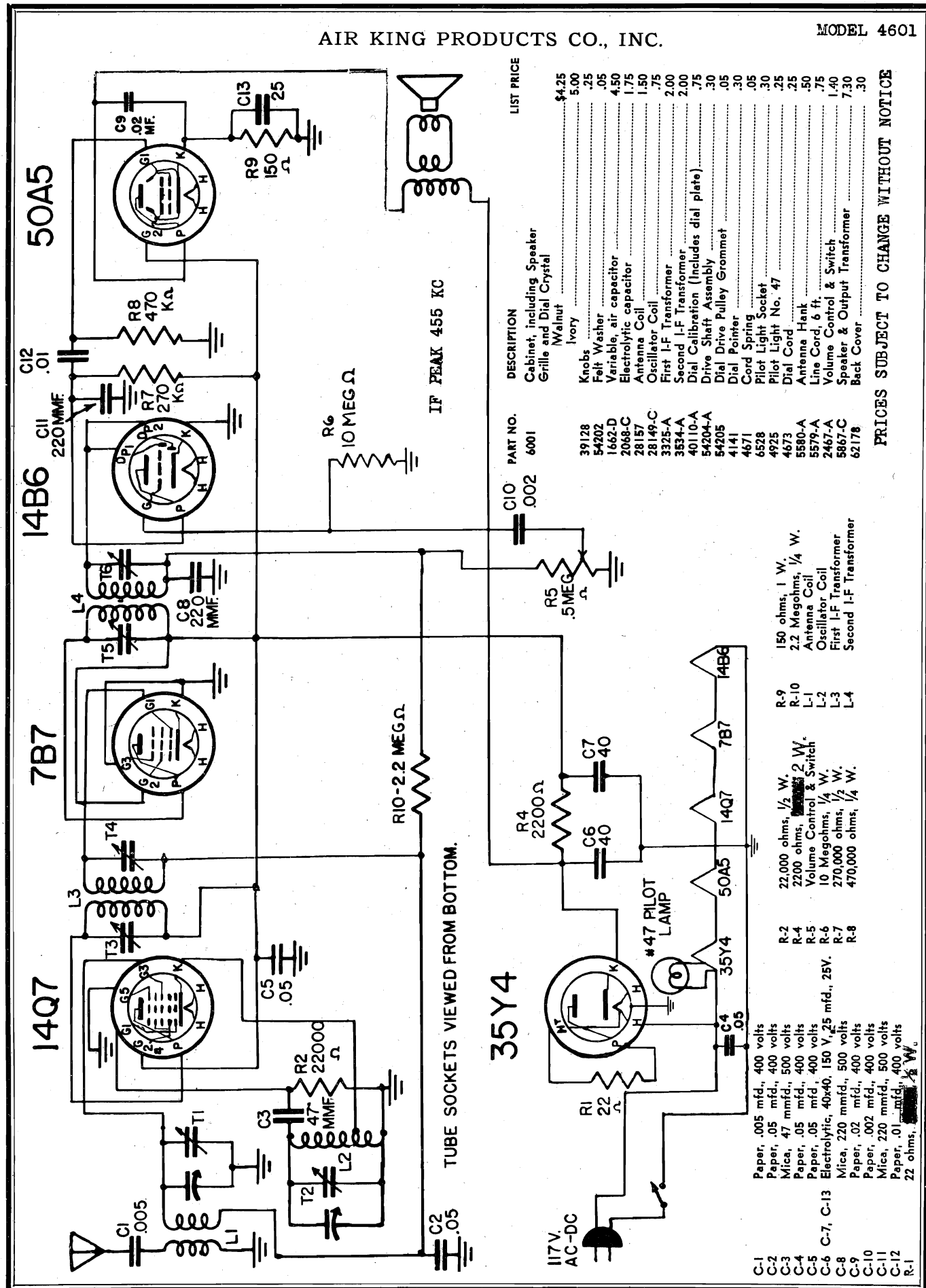
Return to 1400 K.C. and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 K.C.

SHORT WAVE BAND ALIGNMENT

Adjust the signal generator to 18,100 K.C. and connect the output to the antenna lead, through a 400 ohm resistor. Set the gang condenser to minimum capacity and adjust the S.W. oscillator trimmer to receive this signal. Set the signal generator to 16,000 K.C., tune signal and adjust the S.W. antenna trimmer to peak. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 K.C. to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 K.C., the antenna and oscillator coils, as well as the padding condenser, should be tested.

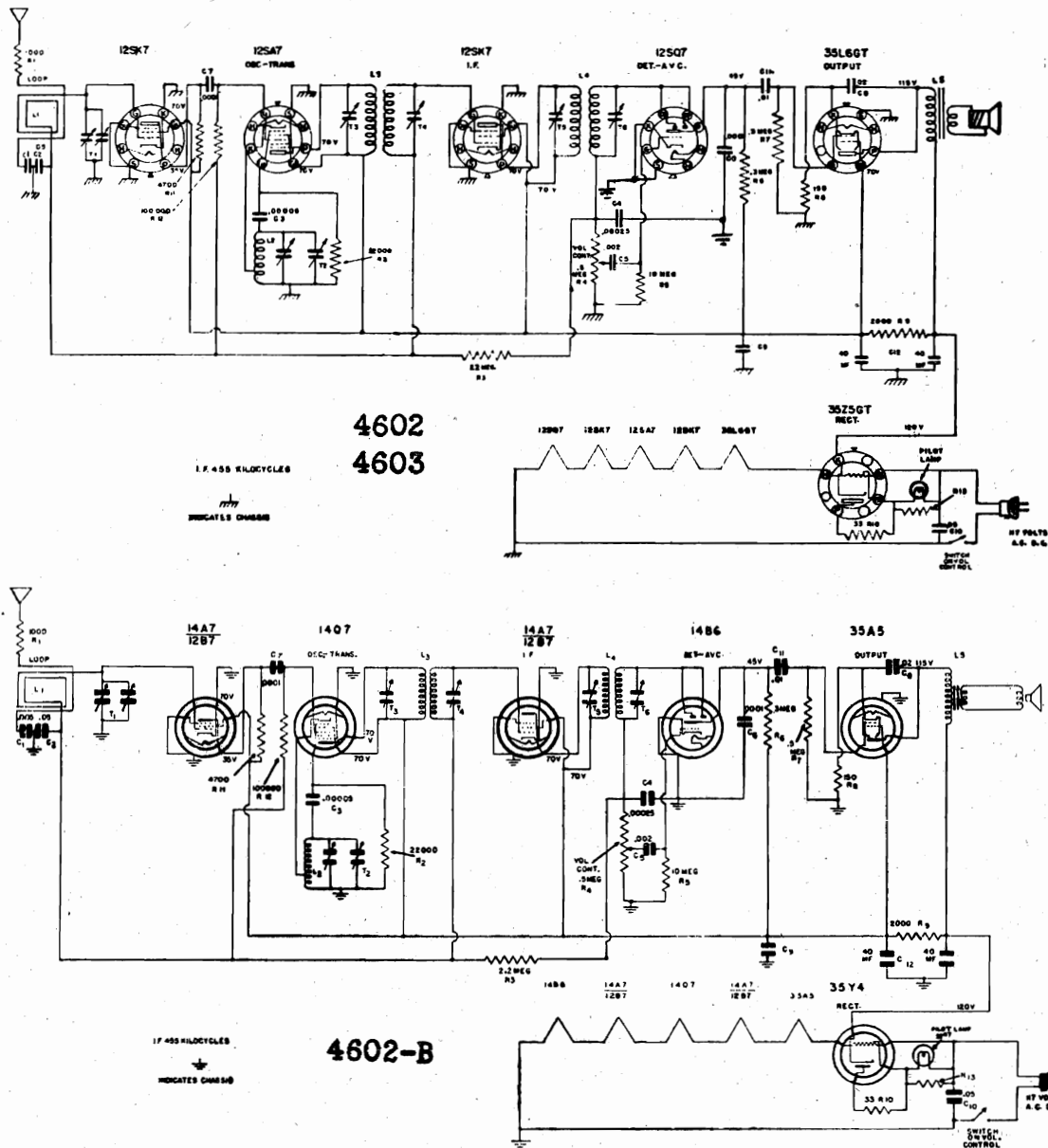
AIR KING PRODUCTS CO., INC.

MODEL 4601



MODELS 4602, 4603
MODEL 4602B

AIR KING PRODUCTS CO., INC.



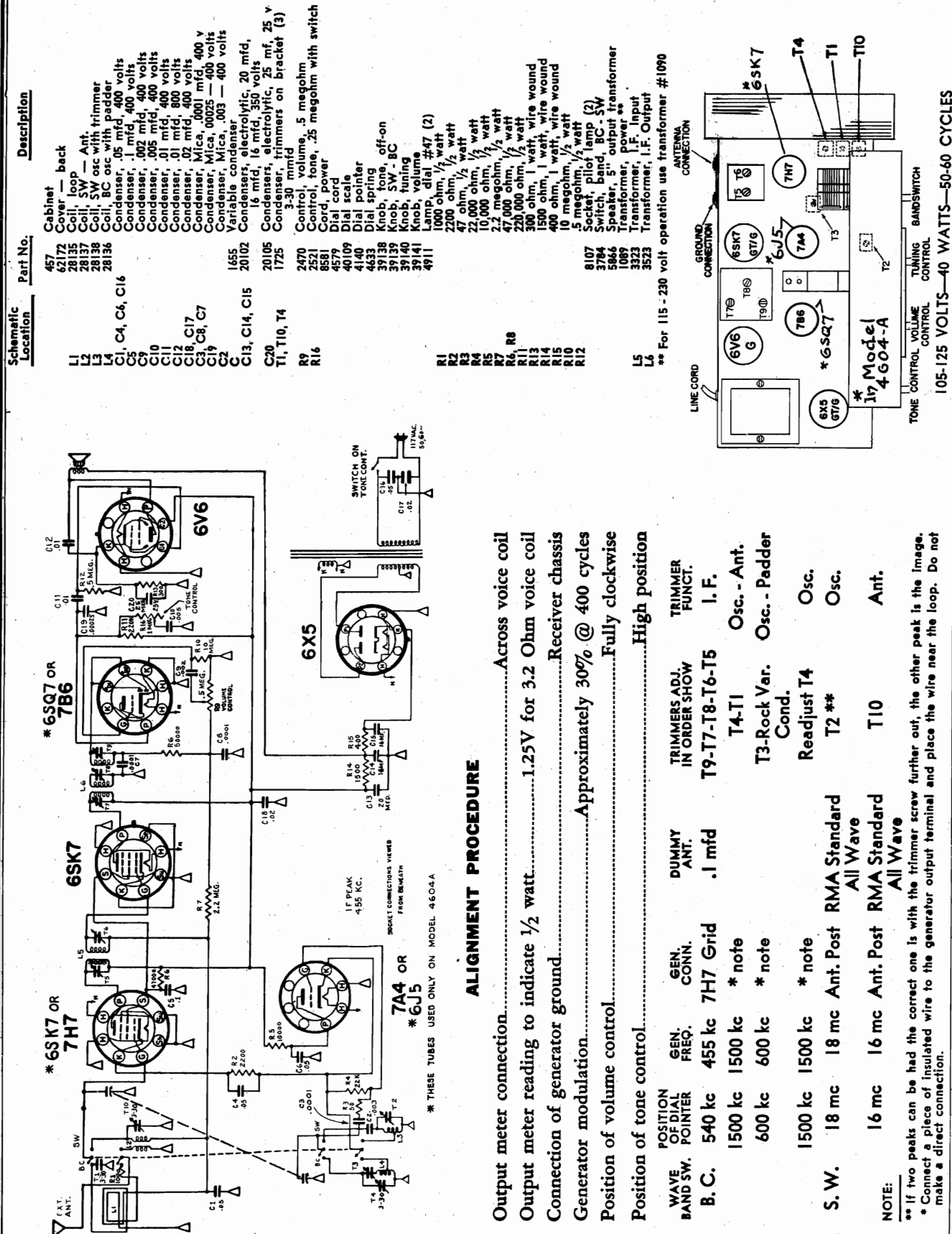
ALIGNMENT PROCEDURE

Output meter connections.....Across primary output transformer
Connection of generator ground.....Chassis
Generator modulation.....App. 30% @ 400 cycles
Position of volume control.....Fully Clockwise

	4602	4602-B			
	4603				
POSITION OF DIAL POINTER	GENERATOR FREQUENCY	GENERATOR CONNECTION	GENERATOR CONNECTION	TRIMMERS ADJUSTED	TRIMMER FUNCTION
540 kc	455 kc	12SA7GT	14Q7	T3, T4, T5, T6	I. F.
1500 kc	1500 kc	***	***	T2, T1	Osc., R. F.
		See Note Below	See Note Below		

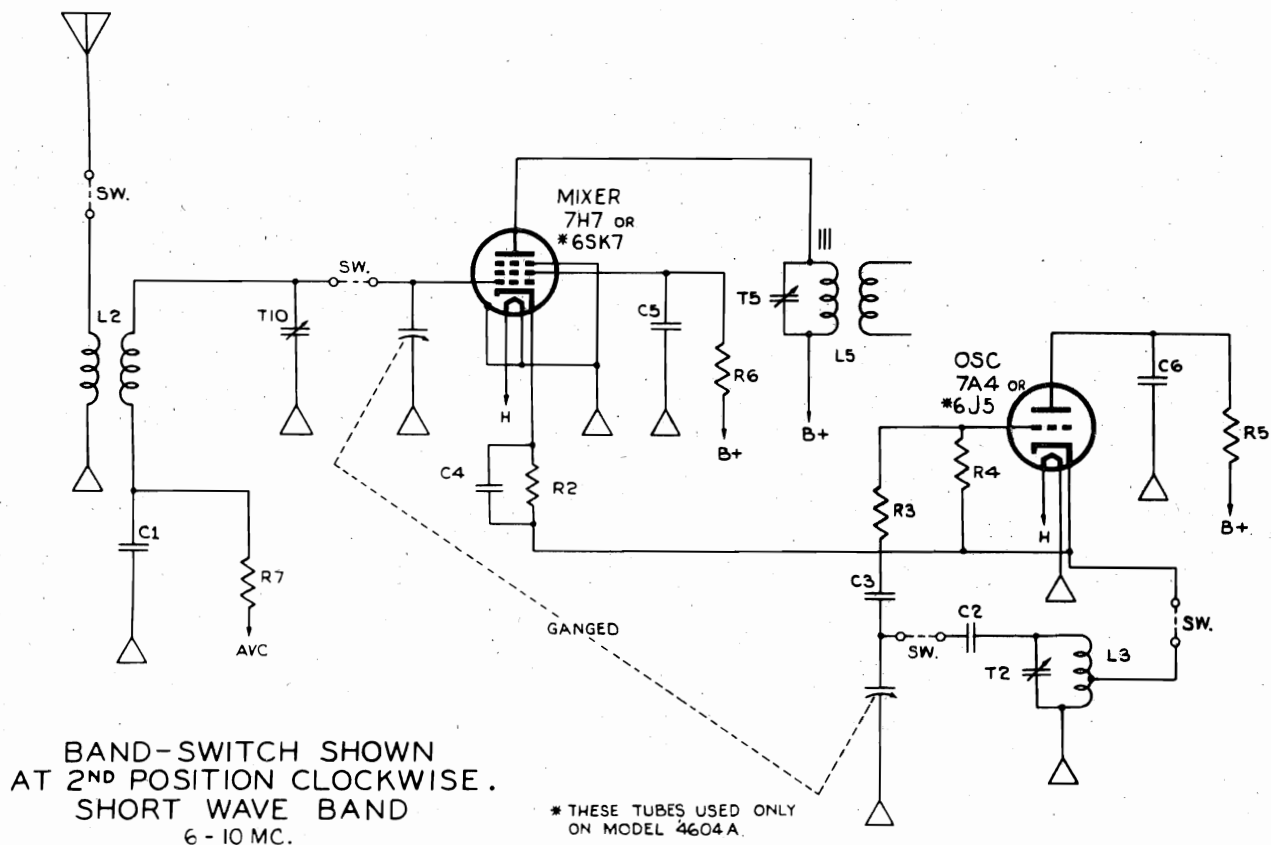
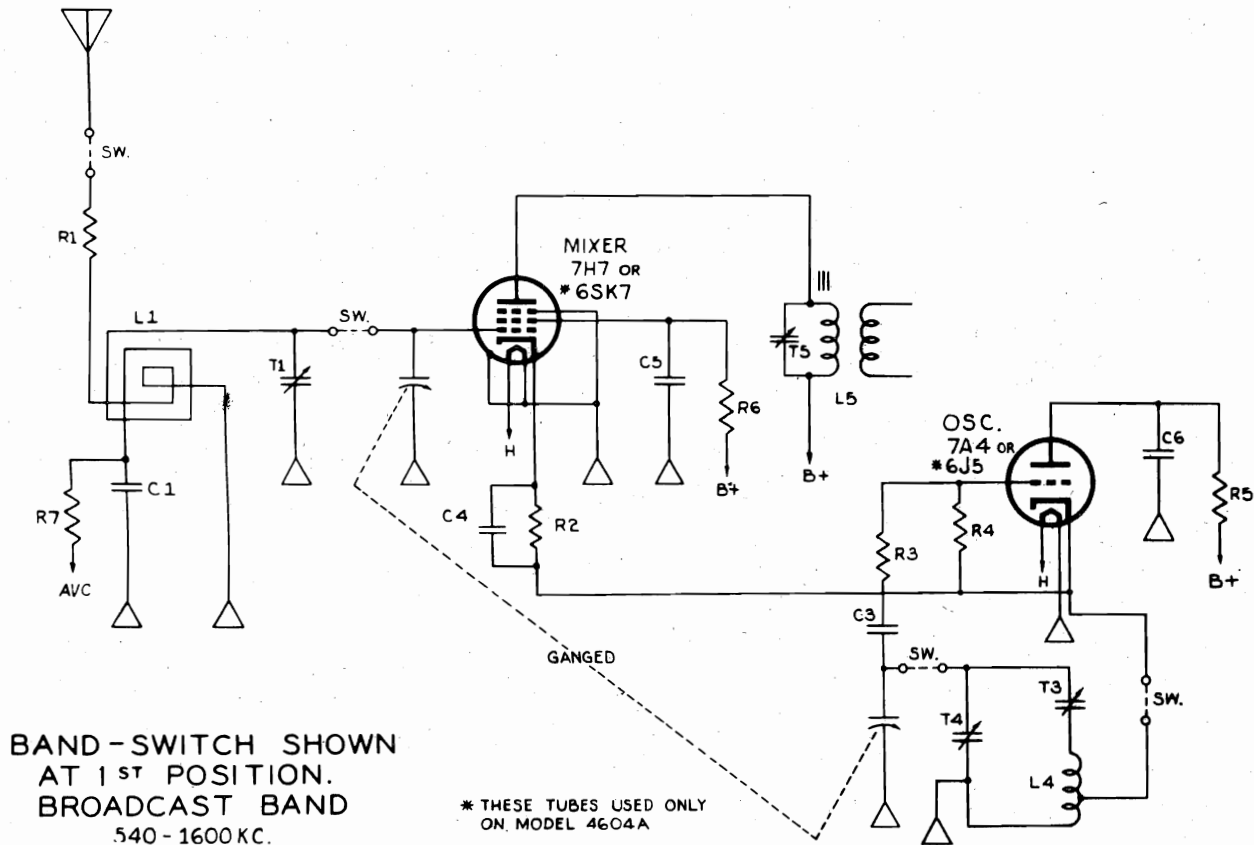
***Run a wire from the output terminal of the generator near the receiver. However, no connection is made between the signal generator and the receiver.

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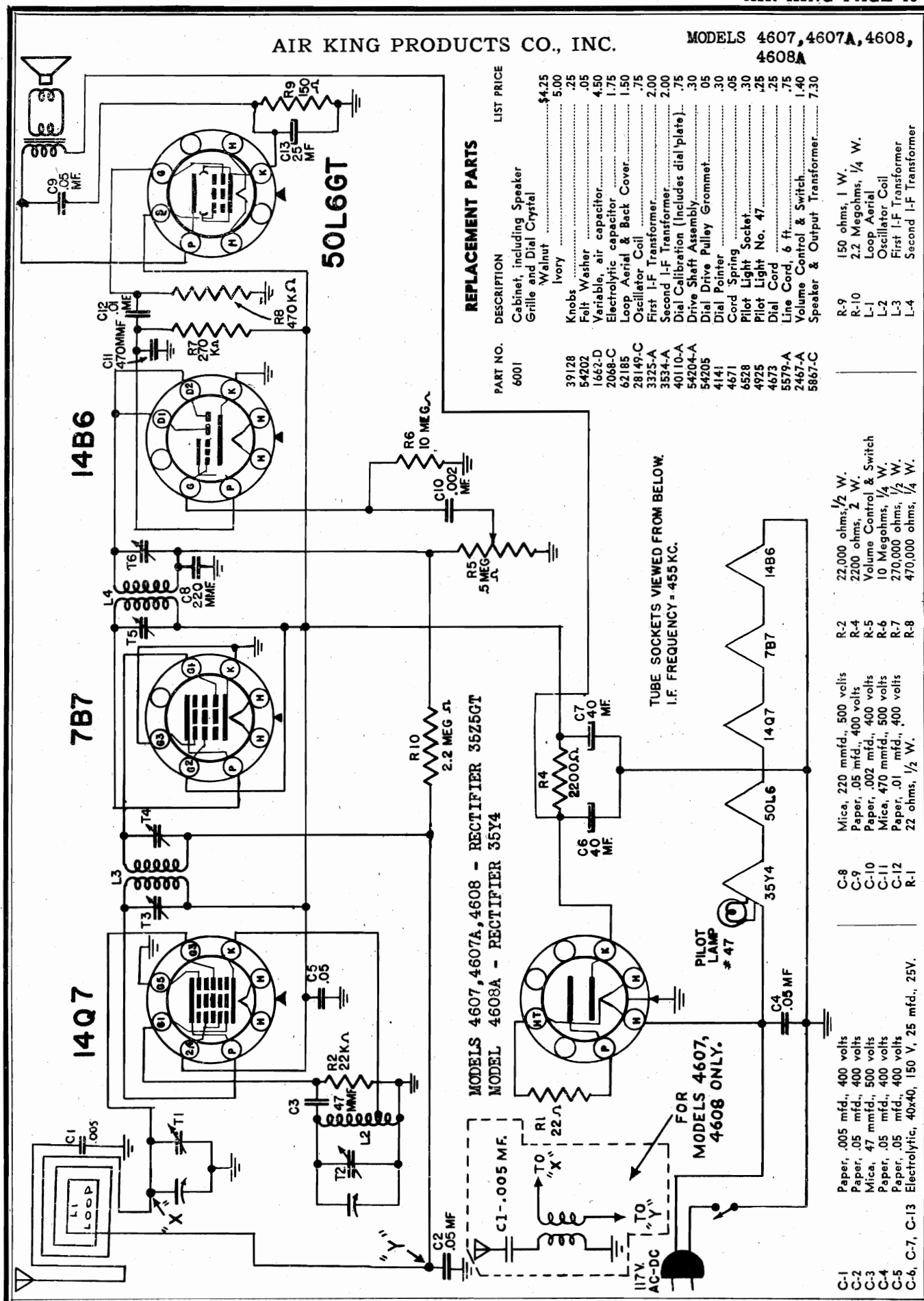
MODELS 4604, 4604A

AIR KING PRODUCTS CO., INC.

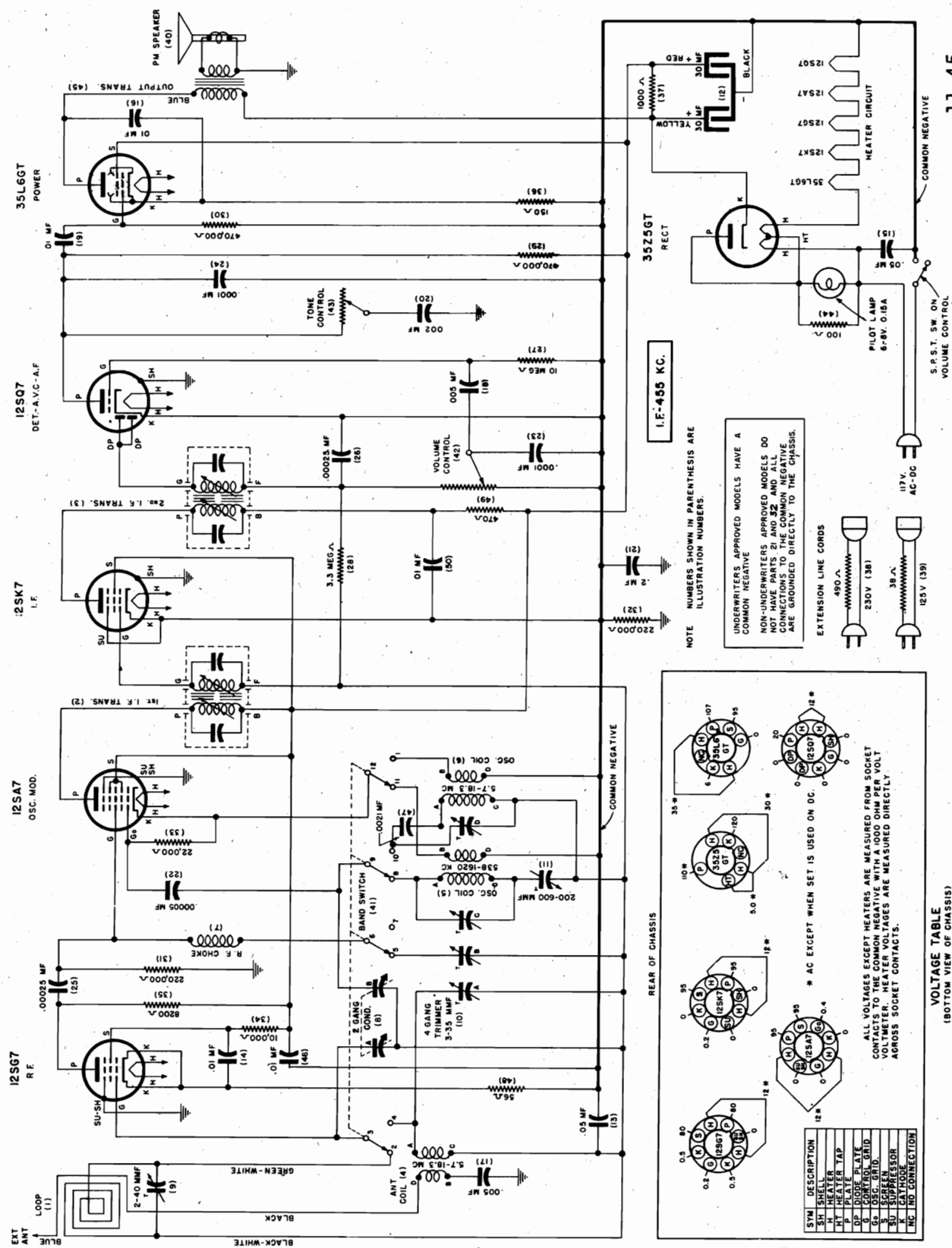


AIR KING PRODUCTS CO., INC.

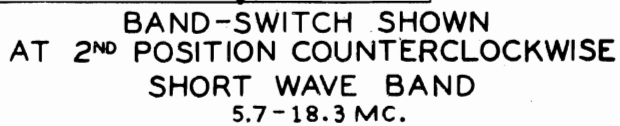
MODELS 4607, 4607A, 4608, 4608A



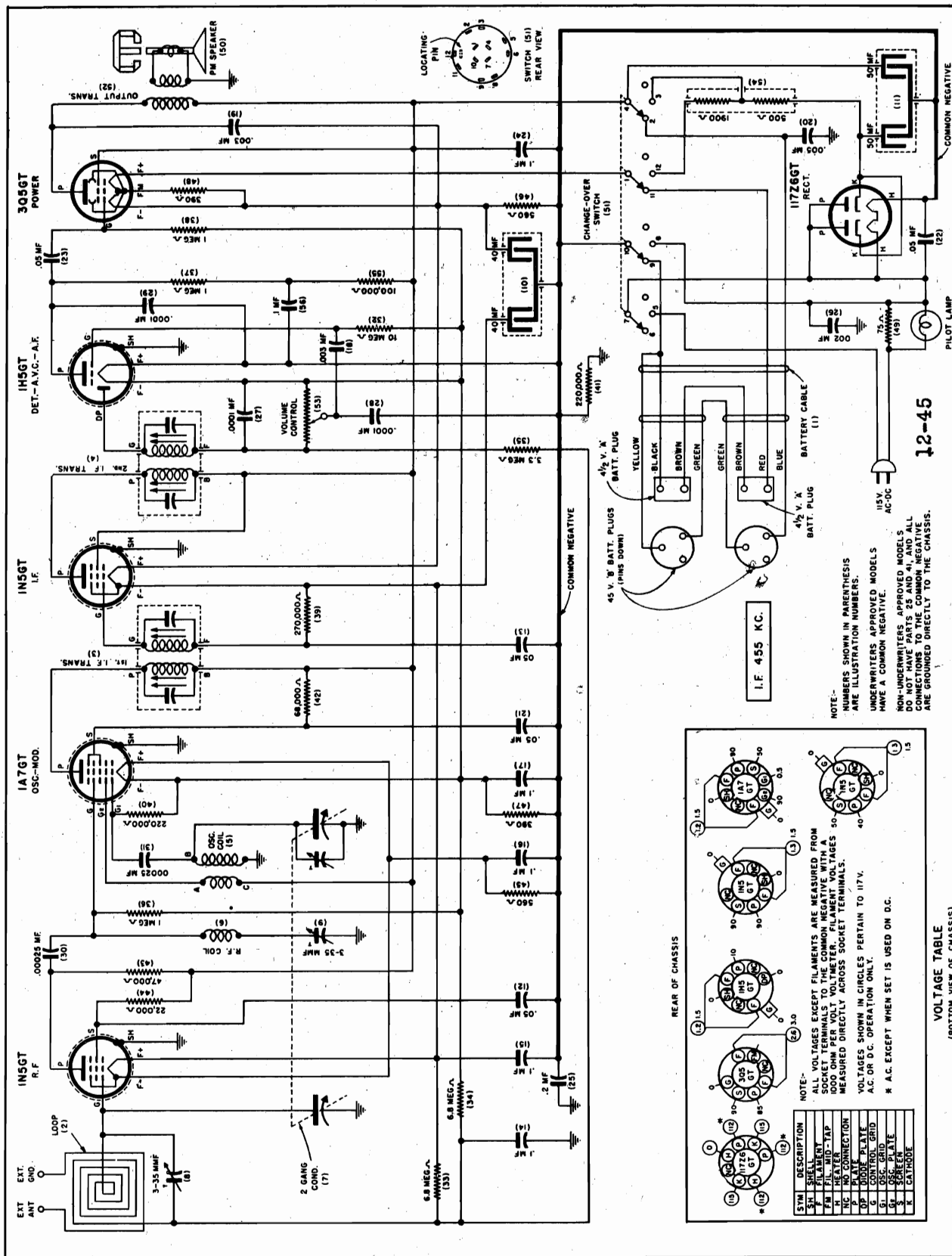
11-45



ALLIED RADIO CORP.



ALLIED RADIO CORP.




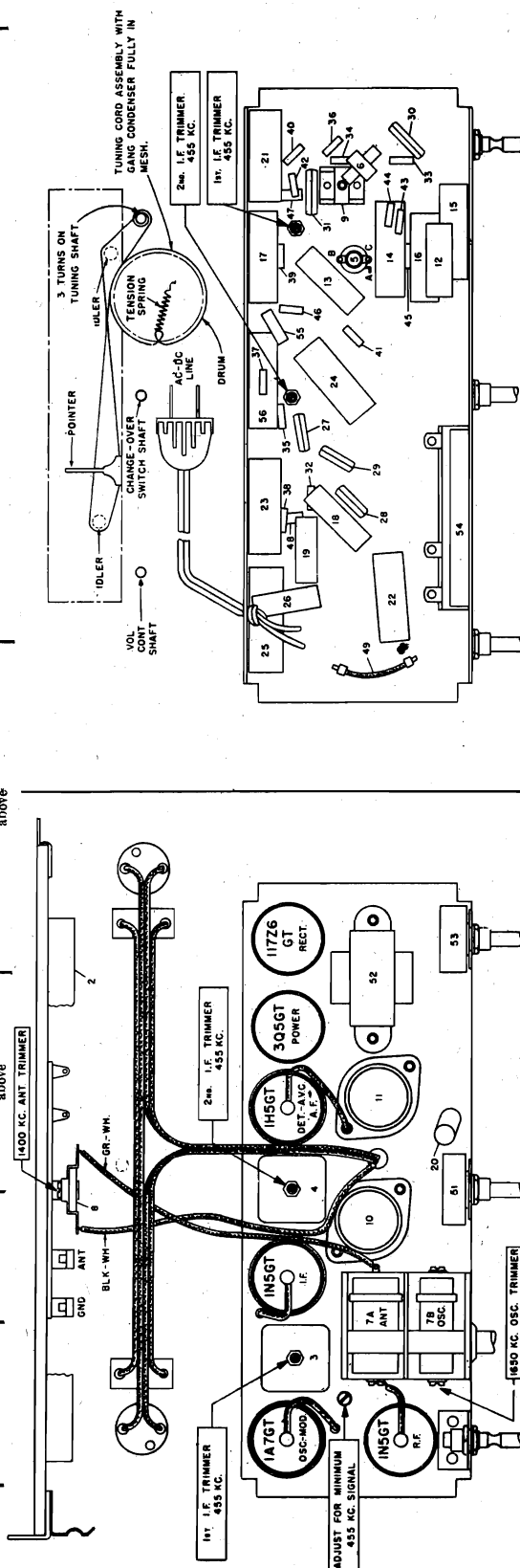
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(a) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.

- (b) Use an accurately calibrated test oscillator with some type of output measuring device.
- (c) WHEN ADJUSTING 1650 KC OSCILLATOR TRIMMER AND 455 KC TRIMMER remove chassis from cabinet and disconnect the white-green and white-black loop connection wires from the 1400 KC loop antenna trimmer. Attach a 1 megohm resistor across these wires and feed output of test oscillator across the 1 megohm resistor.
- (d) THE 1400 KC LOOP ANTENNA TRIMMER is accessible through hole in cabinet back. It should be adjusted only after all other adjustments have been made and with the set mounted in the cabinet and the back IN CLOSED position. When aligning the 1400 KC trimmer connect test oscillator output to the "ANT" and "GND" clips that are attached to the inside of the cabinet back.

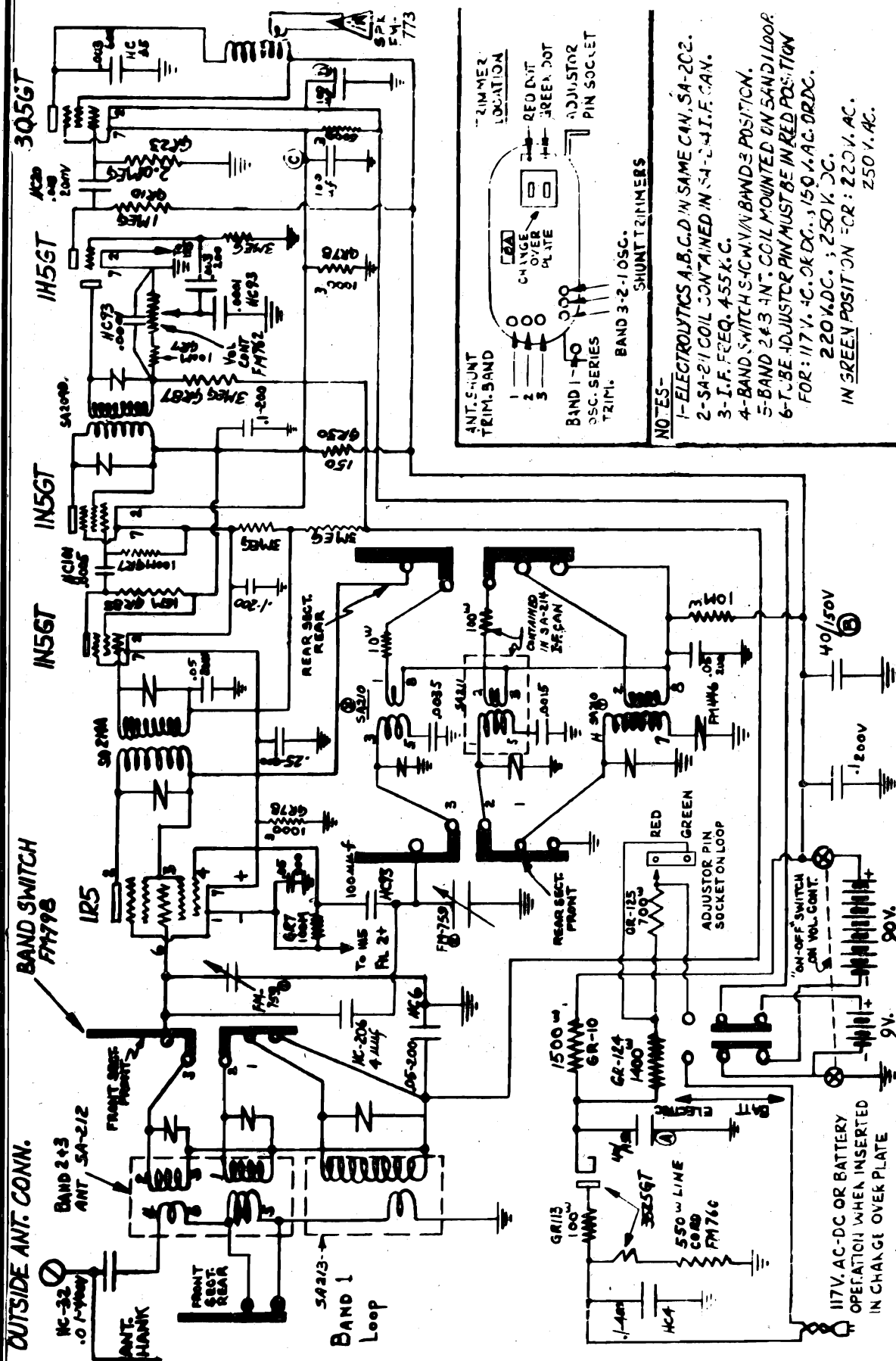
TEST OSCILLATOR

Steps	Set receiver dial to:	Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to	Refer to parts layout diagram for location of trimmers mentioned below:
1	Any point where no interfering signal is received	Exactly 455 K. C.	0.2 Mfd. Condenser	High side to grid of 1A7GT tube. Low side to chassis (if non-Underwriter Approved) or Common Negative (if Underwriter Approved).	Adjust each of the 2nd I.F. transformer trimmer adjustment screws for maximum output, then adjust each of the 1st I.F. transformer trimmer adjustment screws for maximum output.
2	Rotate gang condenser to maximum capacity	Exactly 455 K. C.	 See paragraph (C) above	See paragraph (C) above	Adjust R. F. coil trimmer for <u>minimum</u> 455 K. C. signal.
3	Rotate gang condenser to minimum capacity	Exactly 1650 K. C.			Adjust 1650 K. C. oscillator trimmer for maximum output.
4	Approximately 1400 K. C.	Approx. 1400 K. C.	See paragraph (D) above	See paragraph (D) above	Adjust 1400 K. C. antenna trimmer for maximum output.



NOTE - PARTS 25 AND 41 ARE OMITTED ON NON-UNDERWRITERS APPROVED MODELS. SEE WIRING DIAGRAM.

ANDREA RADIO CORP.

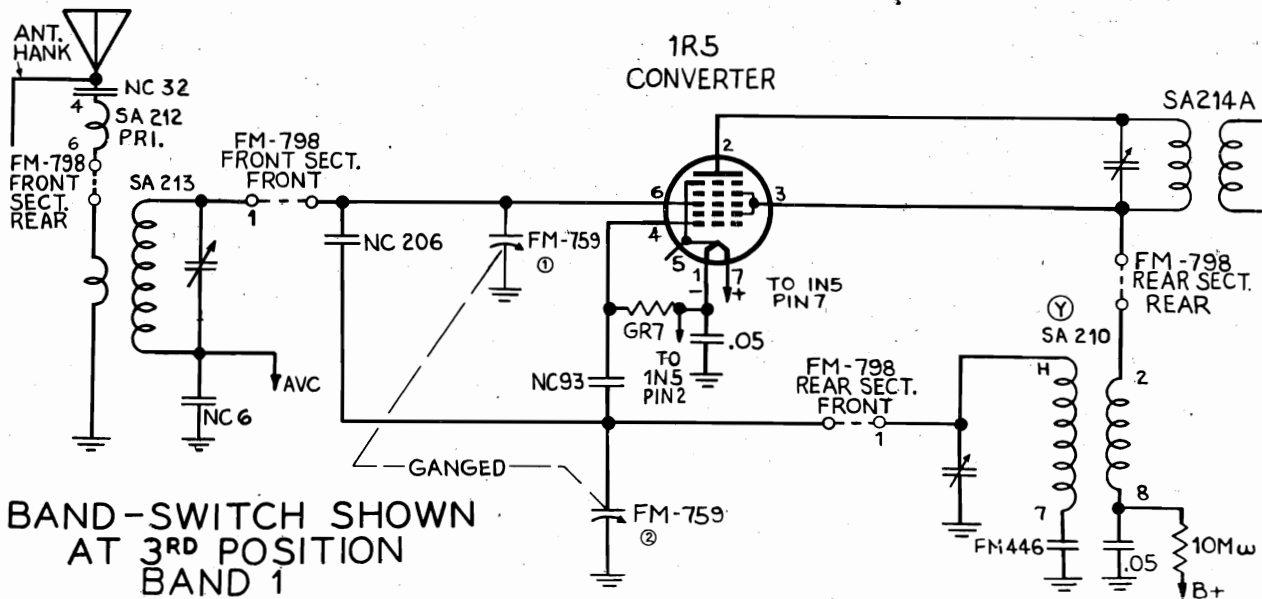
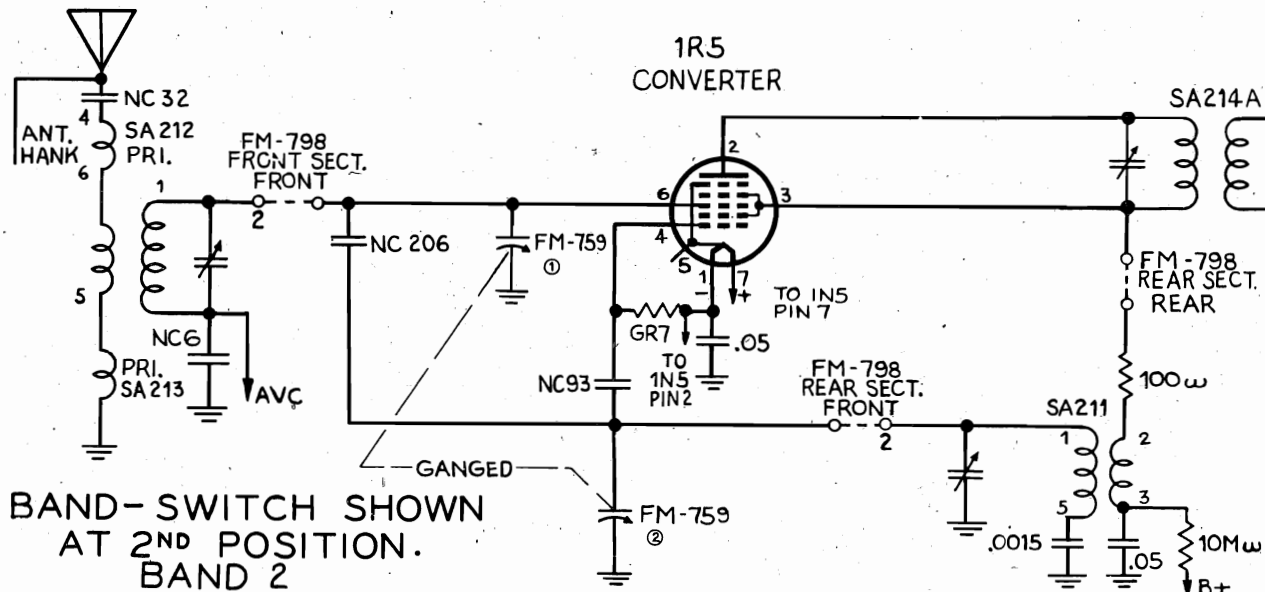
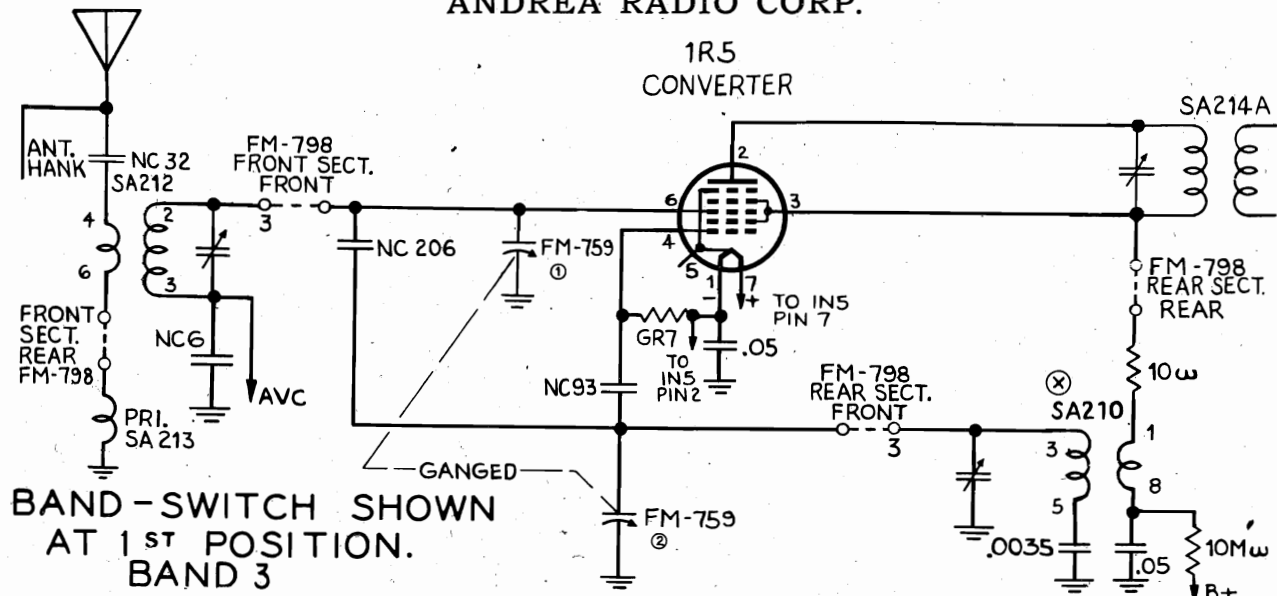


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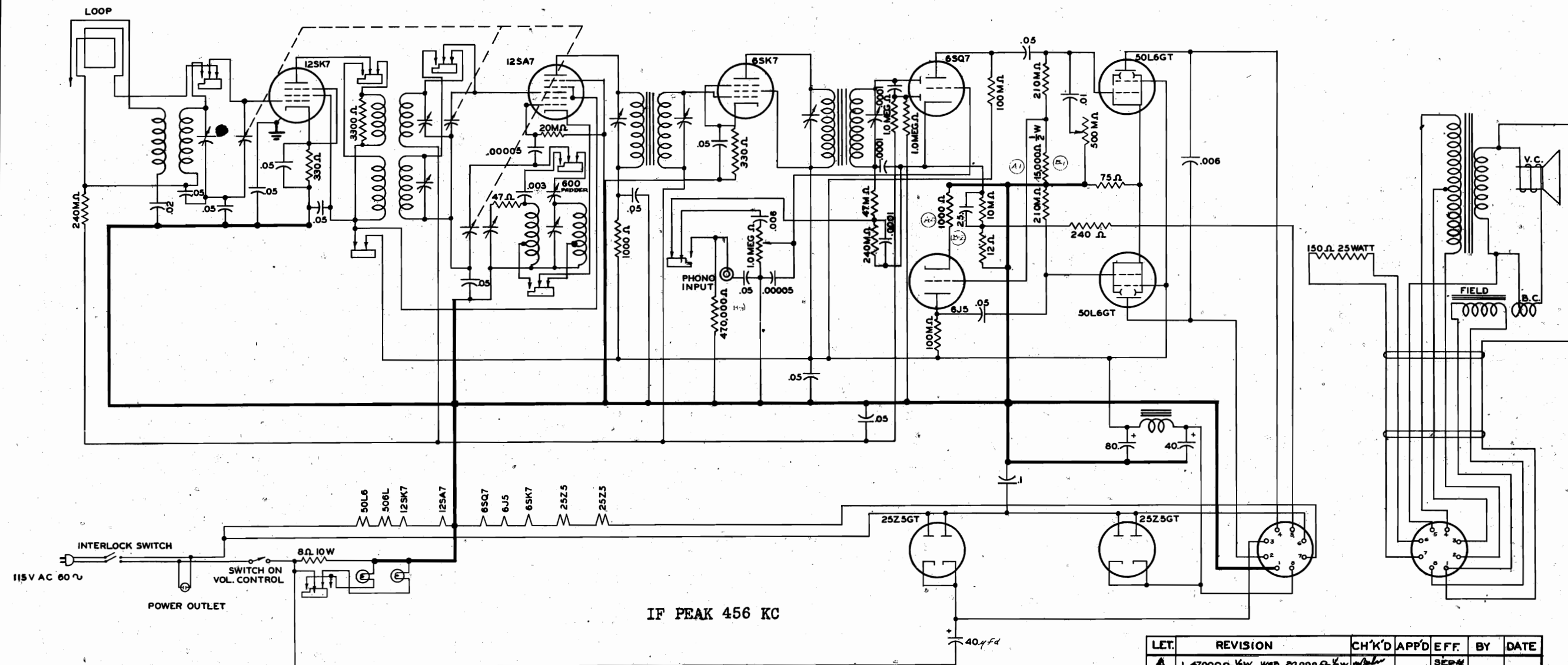
PAGE 15-2 ANDREA

MODEL PI-63

ANDREA RADIO CORP.



ANSLEY RADIO CORP.



IF PEAK 456 KC

LET.	REVISION	CH'K'D	APP'D	EFF.	BY	DATE
A	1. 470,000 Ω 1/2 W WAS 20,000 Ω 1/2 W 2. DELETE 25 μ F CATHODE BY-PASS CONDENSER	<i>m. G. B.</i>	<i>W. W. W.</i>	SER# A-1700	H. H.	9/3/40
B	1. 15,000 Ω 1/2 W WAS 470,000 Ω 1/2 W 2. 10,000 Ω 1/2 W WAS 500,000 Ω 1/2 W 3. ADD 470,000 Ω 1/2 W	<i>m. G. B.</i>	<i>W. W. W.</i>	SER# A-2701	H. H.	9/3/40

NOTE:

- BAND SWITCH IN BROADCAST POSITION.
- ALL CAPACITORS ARE MARKED IN MICROFARADS.
- IN SERIAL NO'S. 3701 THRU 4700 THE VOLUME CONTROL, NORMALLY A 1 MEGOHM POTENTIOMETER, IS .5 MEGOHM AND THE 470,000 Ω 1/2 W RESISTOR ACROSS THE PHONO JACK TO BUS IS 1 MEGOHM 1/2 W.

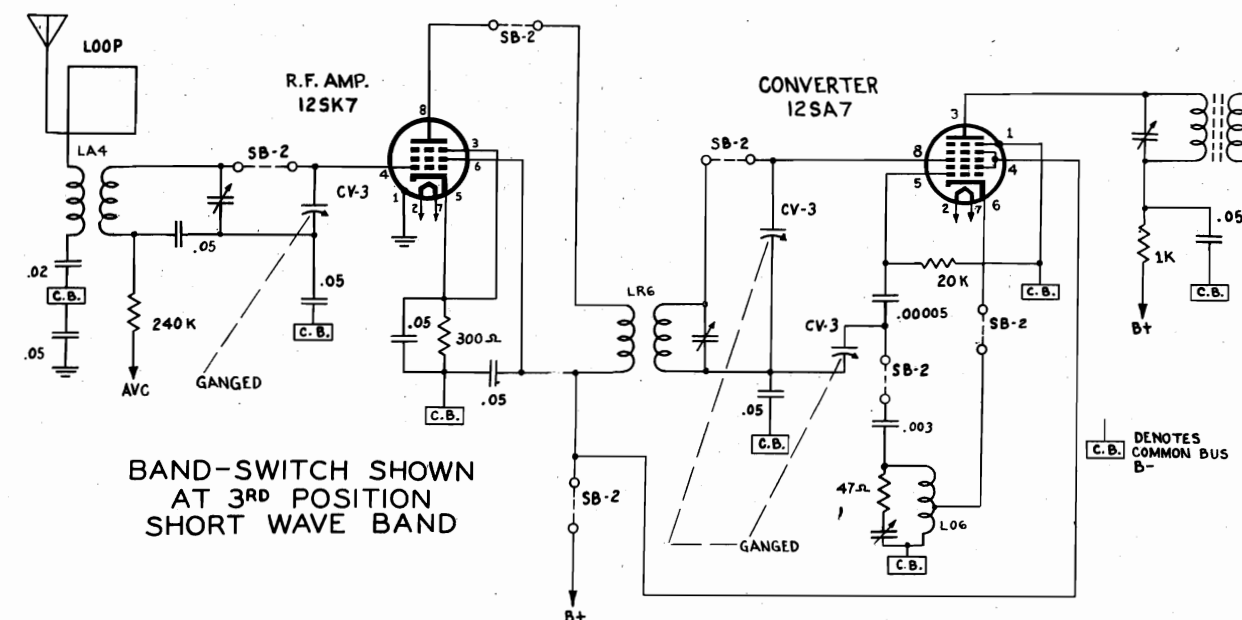
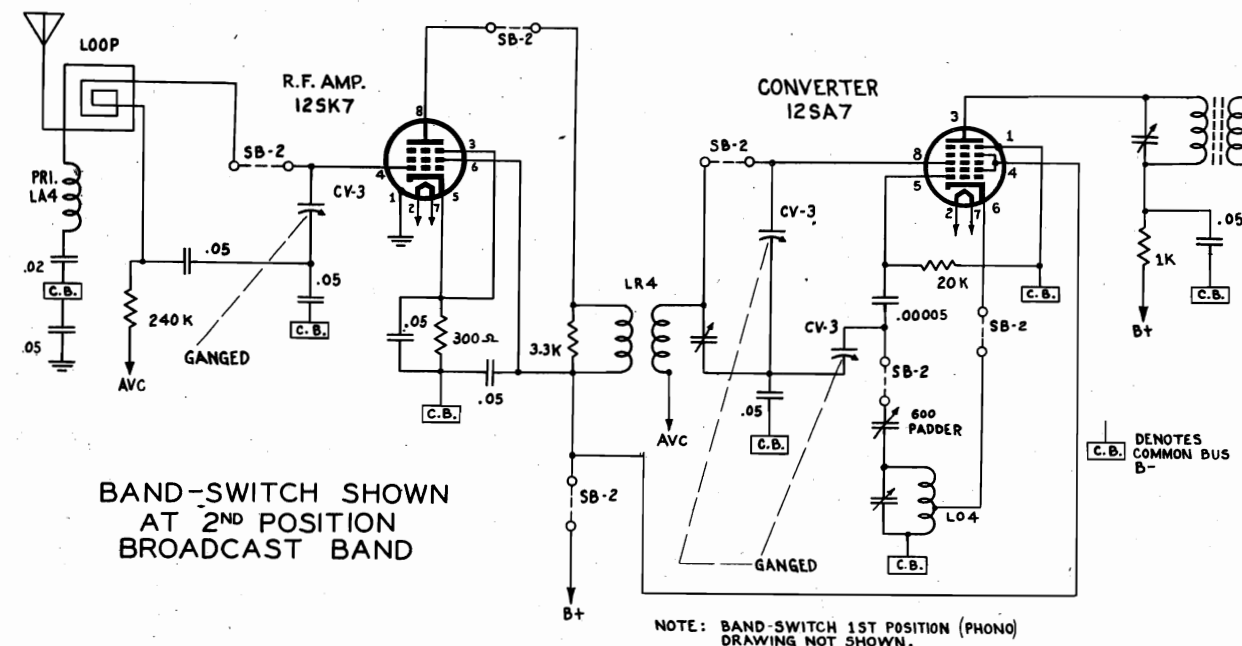
VALUE	QUAN.	DESCRIPTION	PART NO.
.00005 μ F	2	CAPACITOR MICA	CM-1
.0001 μ F	3	MICA	CM-4
.003 μ F	1	MICA	CM-5
.006 μ F	2	MICA	CP-9
.01 μ F	1	PAPER	CP-3
.02 μ F	1	DOMINO	CP-13
.05 μ F	7	PAPER	CP-6
.1 μ F	1	PAPER	CP-10
40 X 80 μ F	1	ELECTROLYTIC	CE-4
40 MFD	1	ELECTROLYTIC	CE-5
25 MFD	1	ELECTROLYTIC	CE-2
.05 MFD	6	CAPACITOR DOMINO	CM-11
200 TO 600 MMFD	1	PADDER CONDENSER	CT-4
4 TO 35 MMFD	1	5 GANG TRIMMER COND.	CT-5
0 TO 420 MMFD	1	3 GANG VARIABLE COND.	CV-3
1.0 MEGOHM	2	RESISTOR	RM-2
8 Ω 10 W	1		RW-9
12 Ω 1/2 WATT	1		RW-19
240 Ω 1/2 WATT	1		RM-19
75 Ω 2 WATT	1		RW-12
150 Ω 25 WATT	1		RW-15
330 Ω 1/2 WATT	2		RW-14

1000 Ω	2		RM-9
3300 Ω	1		RM-15
10,000 Ω	1		RM-13
15,000 Ω	1		RM-23
20,000 Ω	1		RM-7
47,000 Ω	1		RM-6
100,000	2		RM-5
210,000	2		RM-4
240,000	2		RM-3
470,000 1/2 WATT	1	RESISTOR	RM-28
10 H 350 OHM DC	1	LOOP ANTENNA	LP-6
8" 10 WATT	1	FILTER REACTOR	LI-1
#47	2	DYNAMIC SPEAKER	QS-4
12SK7	1	PILOT LIGHTS	IL-2
12SA7	1	TUBE	V-15
6SK7	1		V-17
6SQ7	1		V-5
50L6GT	2		V-7
6J5	1		V-18
25Z5GT	2		V-3
			V-2
1.0 MEGOHM	1	POWER OUTLET	PP-1
	1	VOLUME CONTROL SWITCH	RP-7

	1	PHONO INPUT JACK	J-2
500,000 Ω	1	TONE CONTROL	RP-8
	1	BAND CHANGE SWITCH	SB-2
	1	INTERLOCK SWITCH	SP-2
	1	I.F. TRANS. W/TRIMMER	TI-1
	1	I.F. TRANS. W/TRIMMER	TI-3
	1	BROADCAST OSC. COIL	LO-4
	1	SHORTWAVE OSC. COIL	LO-6
	1	BROADCAST R.F. COIL	LR-4
	1	SHORTWAVE R.F. COIL	LR-6
	1	SHORTWAVE R.F. COIL	LA-4

ANSLEY RADIO CORP.

MODEL 32



MODEL 32

ANSLEY RADIO CORP.

Alignment Instructions - Model 32

1. It is not necessary to remove the RF and IF/Audio Chassis from the housing to align the RF section. The IF section can be aligned, while in the case, by using an offset screwdriver.
2. After removing the metal case from the cabinet, the interlock switch, located on the IF/Audio chassis, must be closed. This can be done by jamming a wooden block between the chassis and the switch button.
3. Connect output meter across the voice coil. The simplest way of accomplishing this is to clip the meter leads on pins # 1 & 5 of the speaker plug socket - on the underside of the chassis.
4. Insert power plug in socket and turn volume control switch on.
5. Padder adjustments can be made by inserting a long thin - insulated shank - screwdriver, from the front, up under the RF chassis to the padder adjustment screw. Trimmer adjustments can be made directly from the front of the set. Location of the various trimmers from left to right (facing front of set) is as follows: SW Ant. Trimmer, SW RF Coil Trimmer, BC RF Coil Trimmer, SW Oscillator Coil Trimmer and BC Oscillator Coil Trimmer.
6. It is not necessary to connect the loop when aligning the set. To align the Broadcast band, connect the signal generator output across the green wire on the antenna terminal strip and bus. To align the Short Wave band, connect signal generator across the blue wire on the antenna terminal strip and bus.
7. Align set in accordance with the table below (Note: Signal generator should be set for 400 cycle 30% modulated output, receiver volume control is set at maximum, and all adjustments are made for maximum reading).

Dummy Antenna	Sig.Gen. Connection	Sig.Gen. Frequency	Band Sw. Position	Tuning Points	Remarks
.05 MFD	Mixer Grid and Bus	456KC	BC	IF Trimmers	Tuning Cond. at Max.
.05 MFD	Green Wire and Bus	620KC	BC	BC OSC Padder	Set Dial at 62 See Below **
.05 MFD	Green Wire and Bus	1620KC	BC	BC OSC Trimmer	Set Dial at 162 See Below **
.05 MFD	Green Wire and Bus	1620 KC	BC	BC RF Trimmer	Set Dial at 162 See Below *
400 ohms	Blue Wire and Bus	17.6	SW	SW OSC Trimmer	Set Dial at 17.6
400 ohms	Blue Wire and Bus	17.6	SW	SW RF Ant. Trimmers	Set Dial at 17.6 See Below *

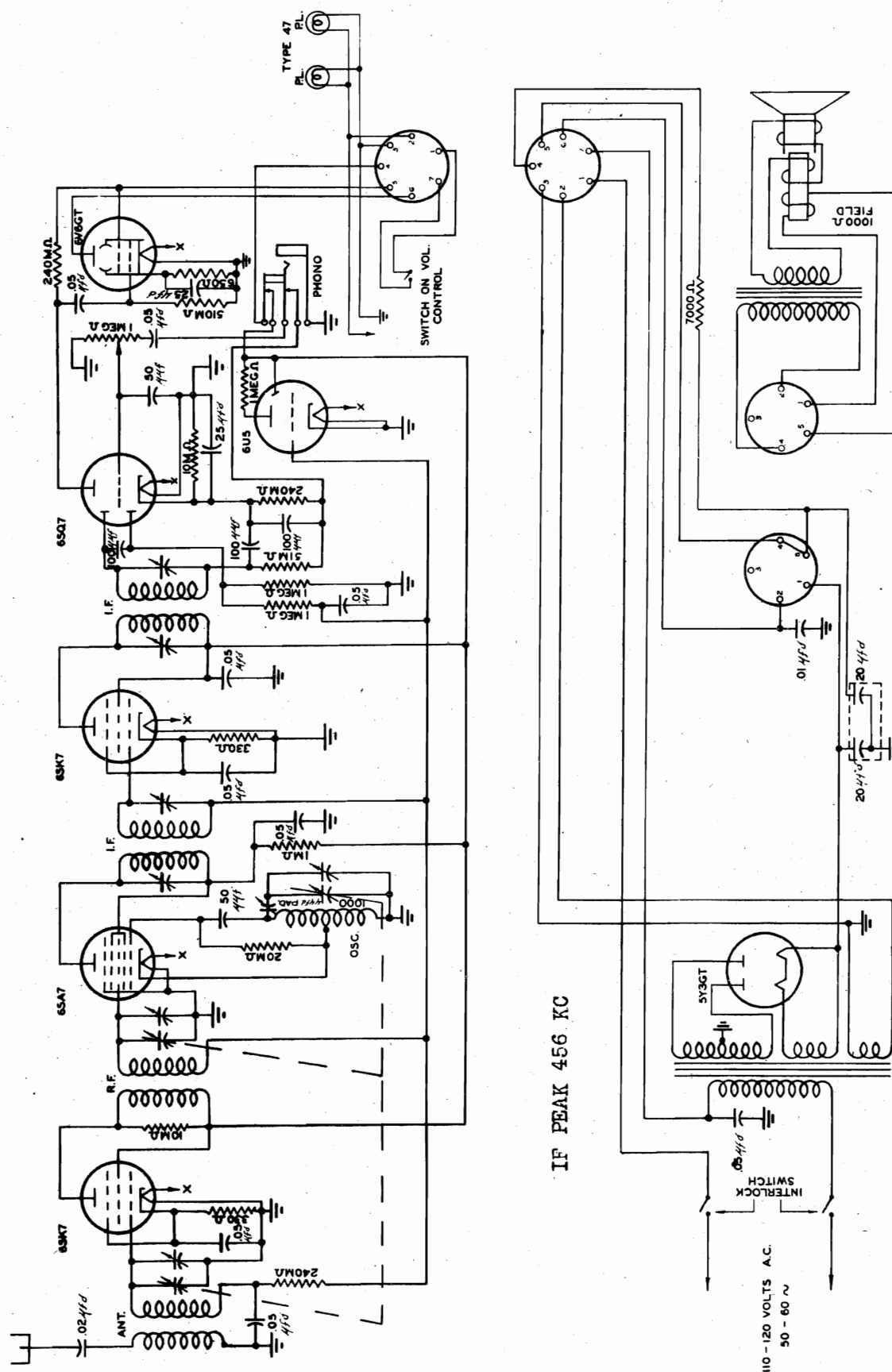
* When aligning the SW band use caution not to align on the image frequency, which will be found lower on the dial.

** Repeat these steps as often as necessary until both ends of Broadcast Band are tracking perfectly.

8. Tracking Check Points are:

BC - 620KC	SW - 6.7 MC
1120KC	12.2 MC
1620KC	17.6 MC

IF PEAK 456 KC



MODELS 41,41A

ANSLEY RADIO CORP.

Alignment Instructions - Model 41 & 41A (Paneltone)

To align the Models 41 & 41A, it is not necessary to remove the chassis from the panel. However, the interlock switch - located on the rectifier chassis must be closed. This can best be done by using a U clamp placed over the button and body of the switch. Such a clamp can be made of a piece of steel 3" x 3/4" x 3/32" bent to form a U with a width of 1 3/8".

To align the IF stages proceed as follows:

- a. Connect signal generator across Mixer trimmer and chassis. Signal generator should be set for 456 kc, 400 cycle, 30% modulated output. The mixer section of the tuning condenser is the section nearest the tuning dial.
- b. Connect output meter across voice coil.
- c. Turn set on.
- d. Adjust IF trimmers for maximum output.

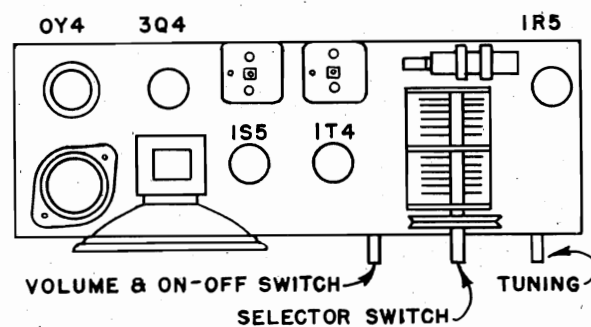
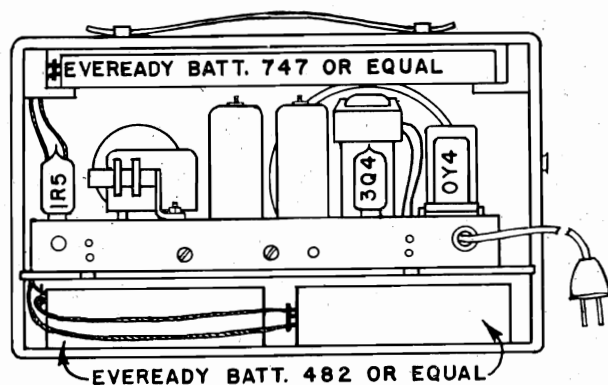
To align the RF section proceed as follows:

- a. Connect signal generator across antenna and ground terminals. Set generator for 620 kc. output (400 cycles, 30% modulated).
- b. Set tuning dial at 62.
- c. Peak oscillator padder at 620 kc. The oscillator padder is located directly under the tuning dial therefore it is necessary to tune the padder from the underside of the chassis, using either a flexible shaft or offset screwdriver.
- d. Retune signal generator for 1670 kc. output and set tuning dial at 167.
- e. Peak Oscillator and Mixer trimmers at 1670 kcs.
- f. Repeat steps a, b, c, d, & e as often as necessary until set is tracking correctly.
- g. Peak Antenna Trimmer at 1670 kcs.

Tracking check points are:- 620, 1140, and 1670 kcs.

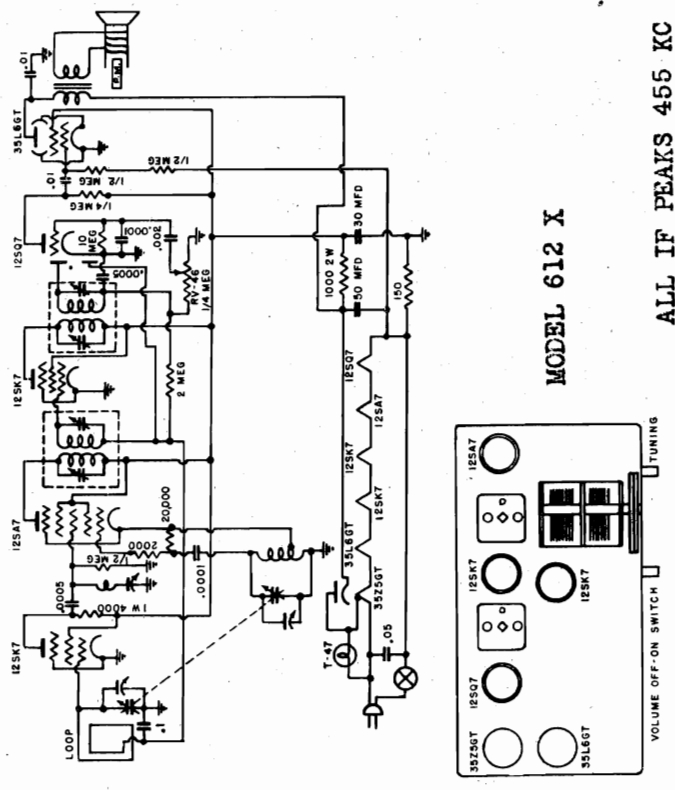
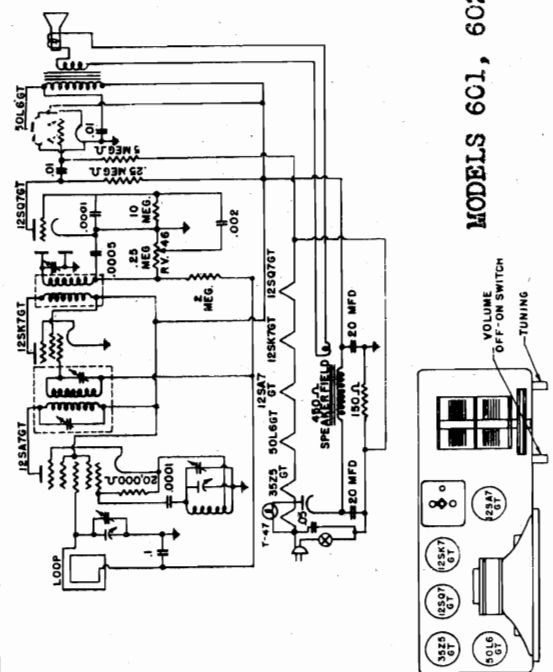
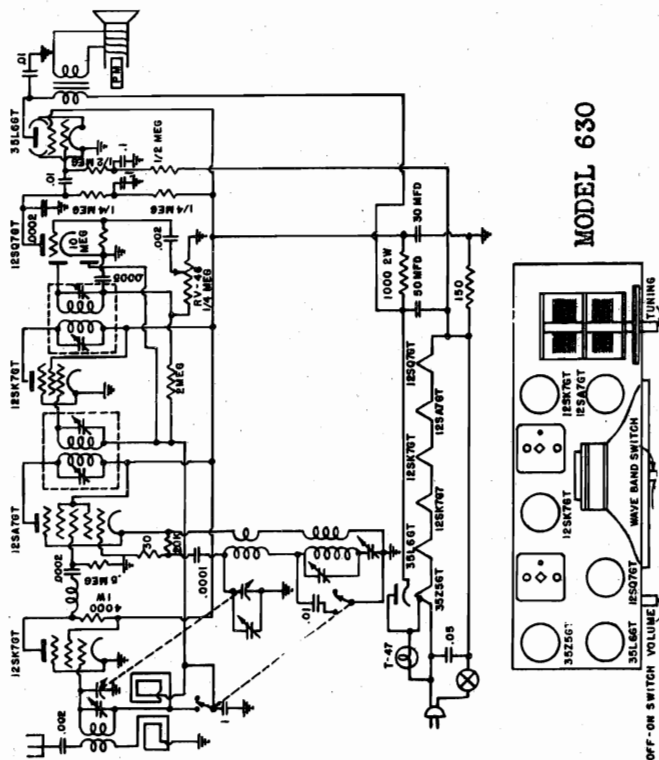
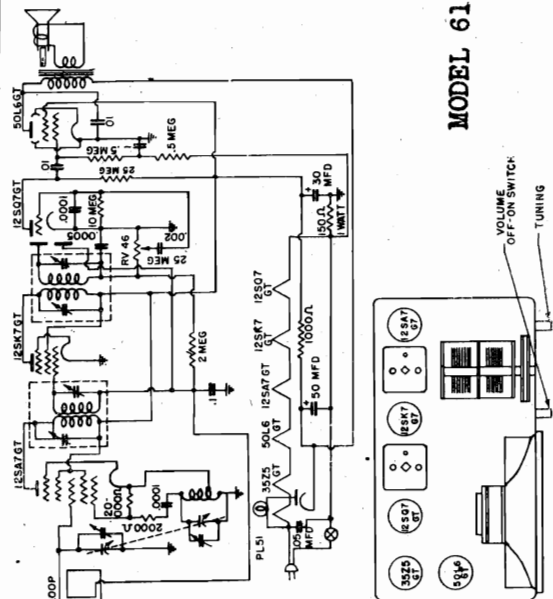
Oscillations which develop during alignment of the RF section can usually be cured by keeping the lead from the Antenna Tuning Condenser to the Antenna coil close to the chassis.

MODEL NO. C-60

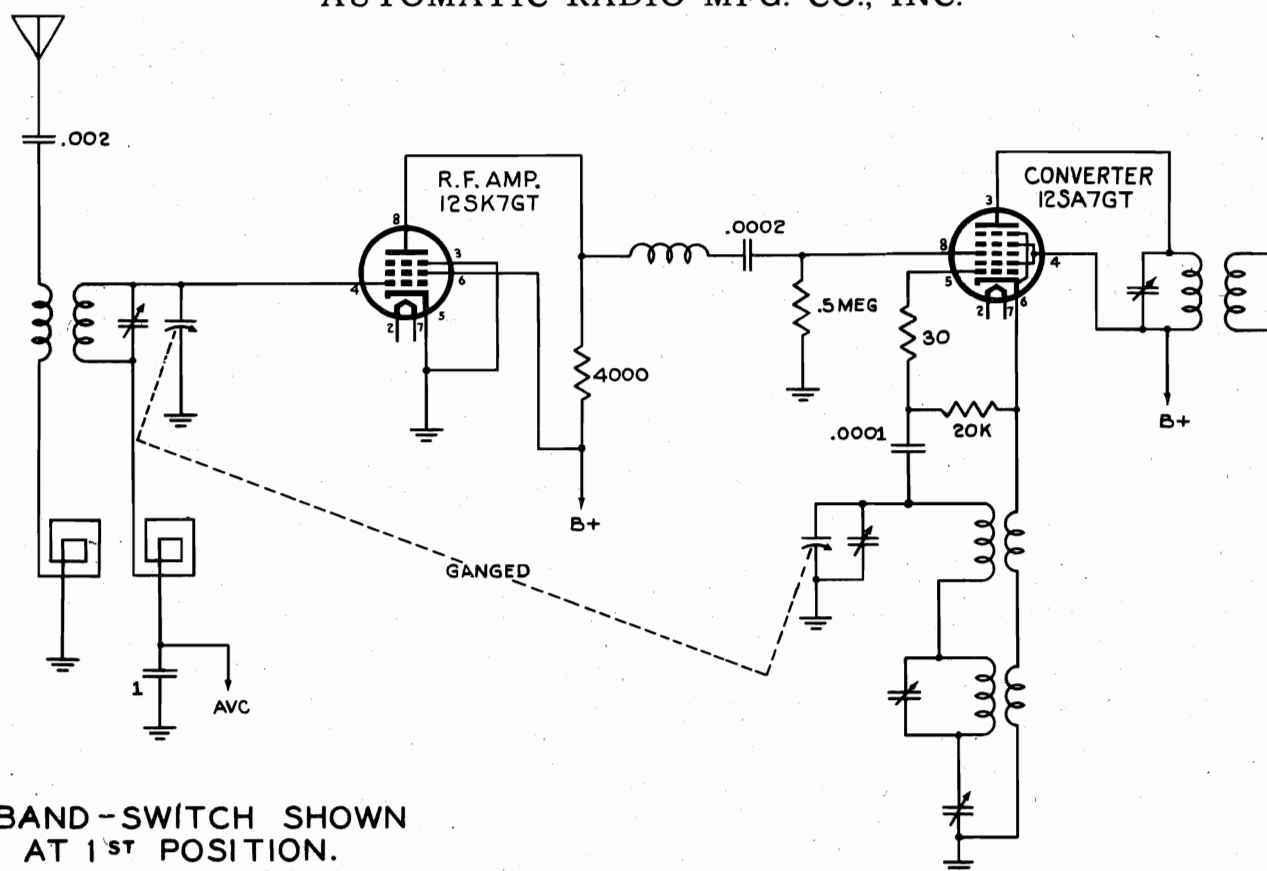


MODELS 601, 602
MODEL 611
MODEL 612X
MODEL 630

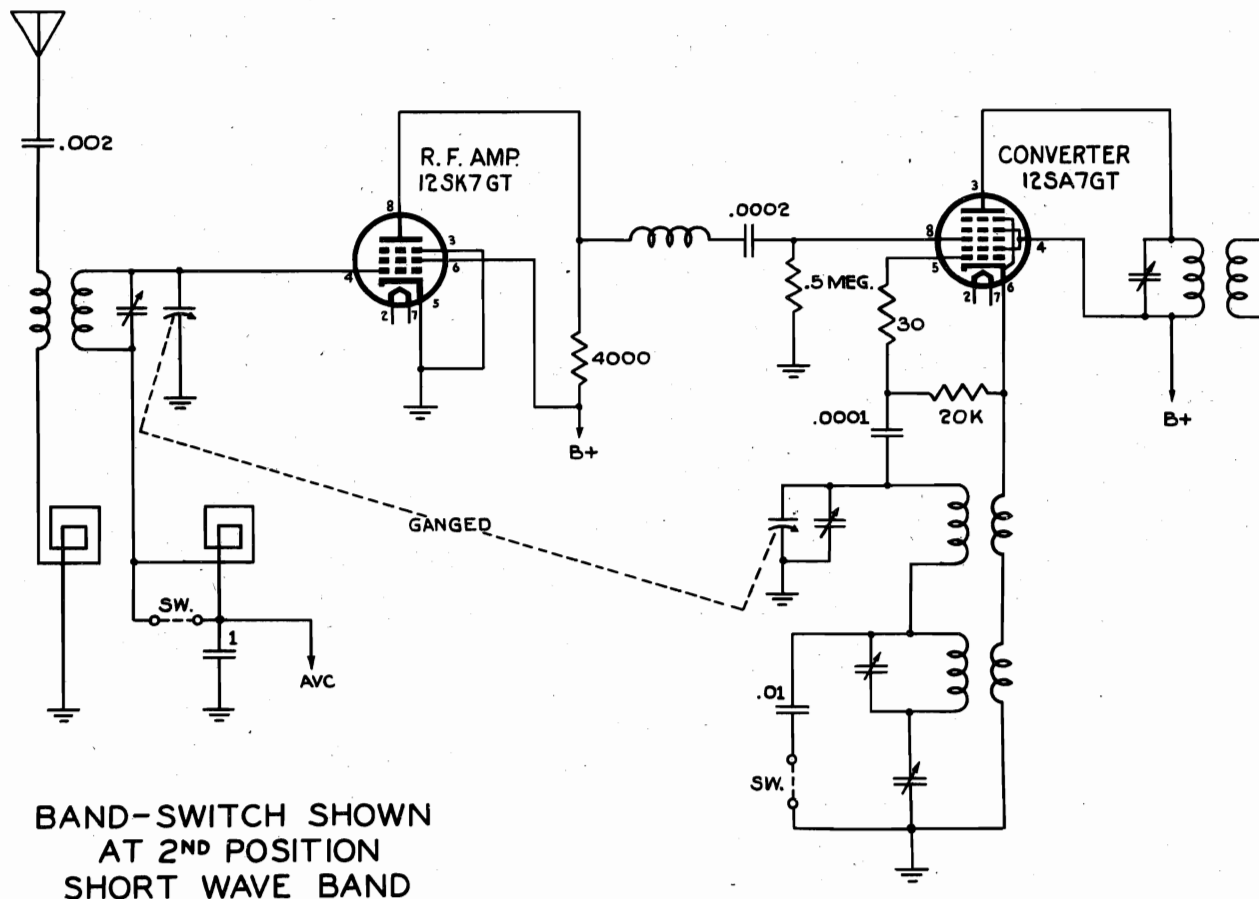
AUTOMATIC RADIO MFG. CO., INC.



AUTOMATIC RADIO MFG. CO., INC.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND



BAND-SWITCH SHOWN
AT 2ND POSITION
SHORT WAVE BAND

MODELS 601, 602
 MODEL 611
 MODEL 612X
 MODEL 613X
 MODELS 614X, 616X
 MODEL 640
 MODEL 650
 MODEL 670
 MODEL 677

AUTOMATIC RADIO MFG. CO., INC.

ALIGNMENT DATA

Models 601, 611, and 640 are aligned the same as the models listed below except no wave trap and no 12SK7 R. F. stage. I. F. and oscillator range setting to be all done from grid of the 12SA7 tube.

MODELS 612X, 613X, 614X, 616X, 650, 670, and 677

1. Connect signal generator, set at 455 KC, through a .1 mfd coupling condenser to the grid of the 12SA7GT tube.
2. Connect an output meter across speaker voice coil.
3. Adjust trimmers on I. F. transformers for a maximum output as indicated on the output meter.

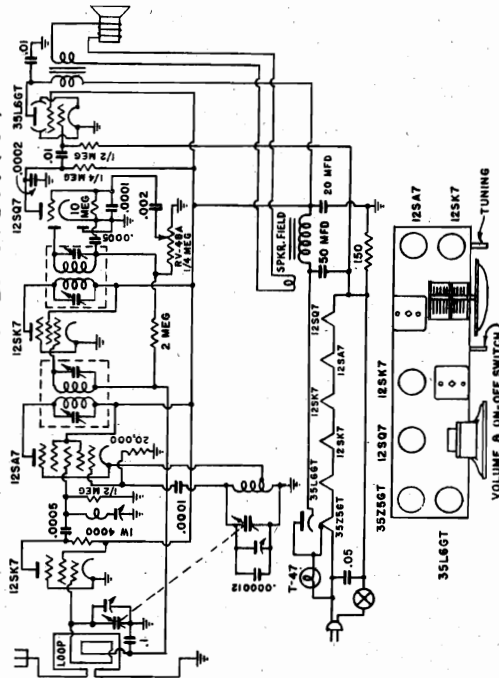
NOTE:

- a. Volume Control should be set at the full position.
- b. Keep signal generator output at a low value so that receiver AVC action will not affect alignment.
4. Connect signal generator, still set at 455 KC, to grid of 12SK7 R. F. tube.
5. Adjust wave trap trimmer, located under chassis, for minimum output.
6. Set signal generator to 1685 KC.
7. Turn tuning condenser to the minimum capacity position, plates out.
8. Adjust front (oscillator) trimmer on tuning condenser until generator signal is picked up.
9. Set signal generator to 1400 KC.
10. Connect output leads of signal generator in the form of a single turn loop and place this loop several inches away from the receiver loop antenna.
11. Tune receiver until generator signal is picked up. (It may be necessary to adjust the signal generator output to a maximum in order for the receiver to pick the signal up in this fashion.)
12. Adjust rear (antenna) trimmer on tuning condenser for maximum output.

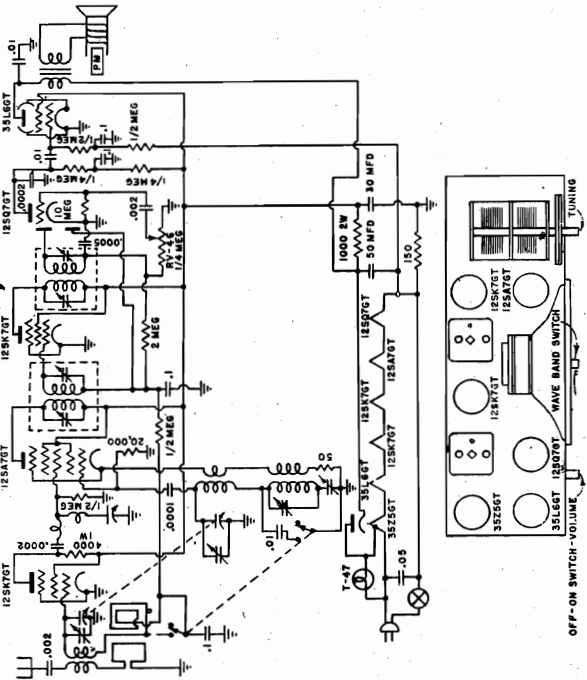
AUTOMATIC RADIO MFG. CO., INC.

MODEL 613X
MODELS 614X, 616X,
Early and Series C
MODELS 660, 662, 666

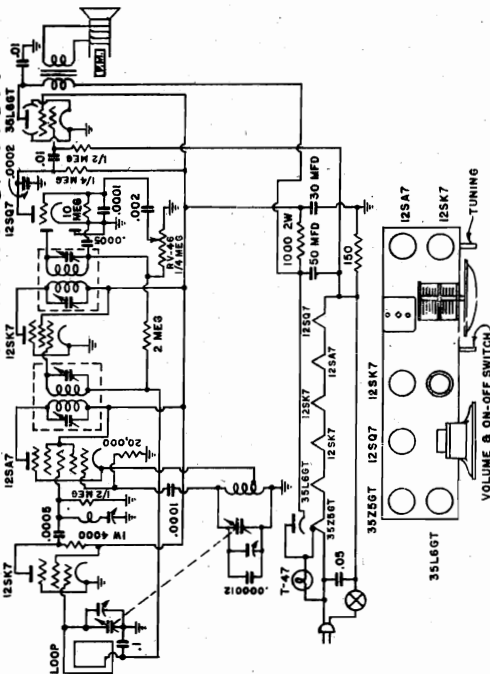
MODEL NO. 614X & 616X (SERIES "C")



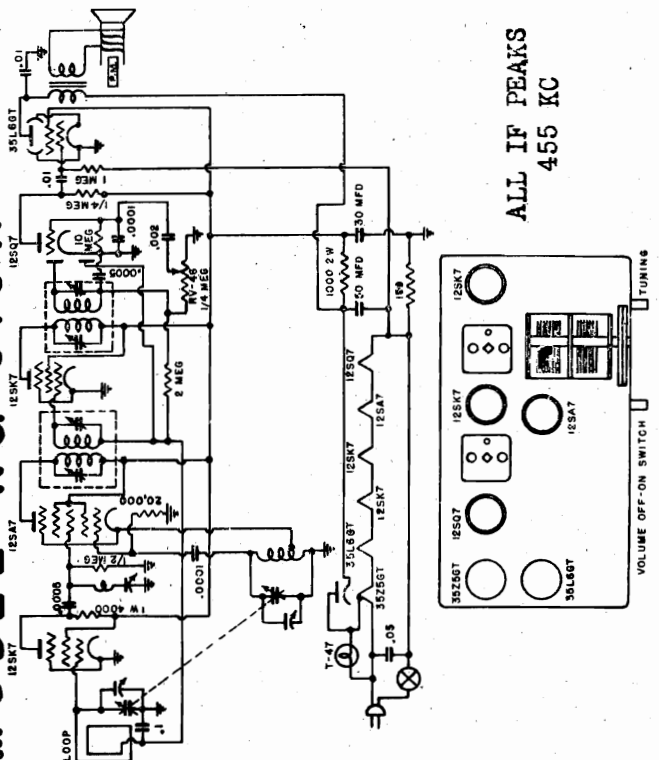
MODEL NO. 660, 662 & 666



MODEL NO. 614X & 616X



MODEL NO. 613X



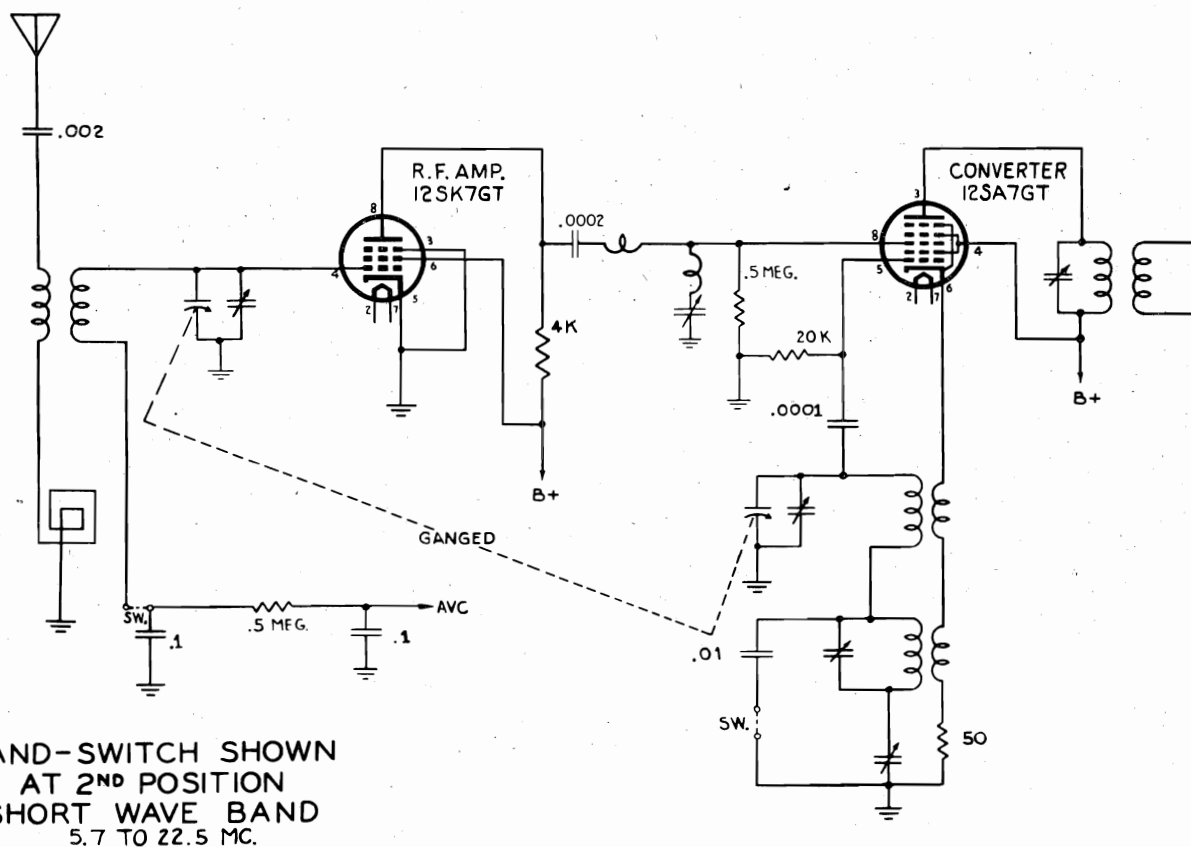
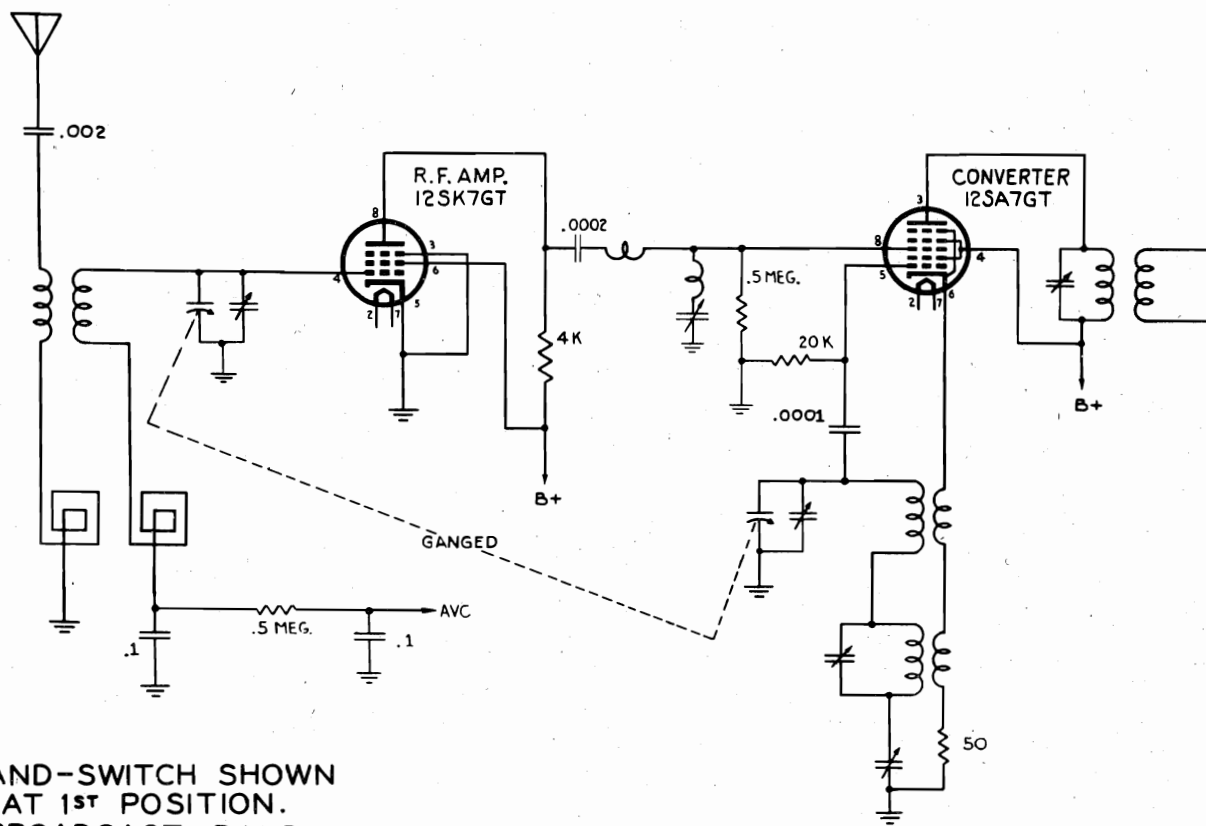
ALL IF PEAKS
455 KC

"clarified schematics"

PAGE 15-6 AUTOMATIC

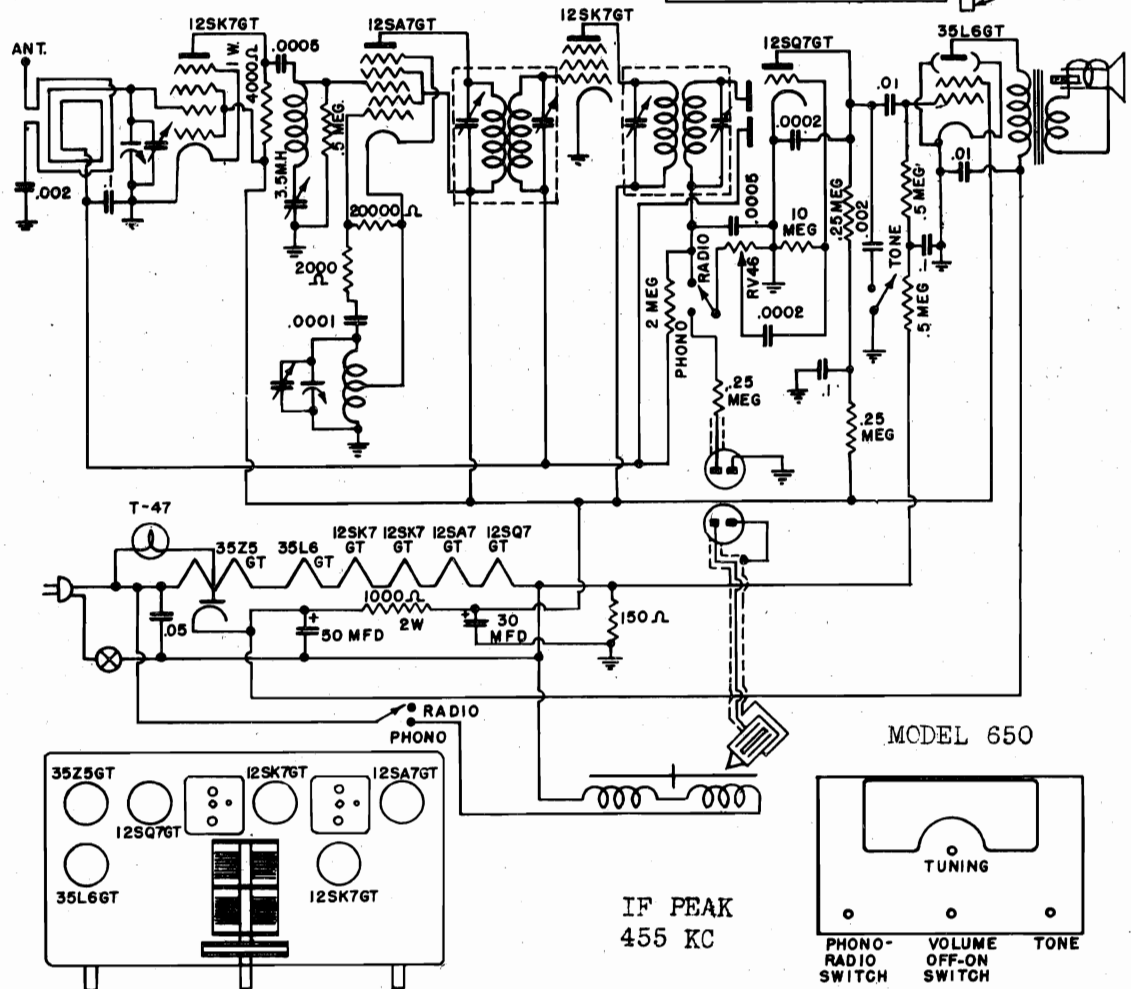
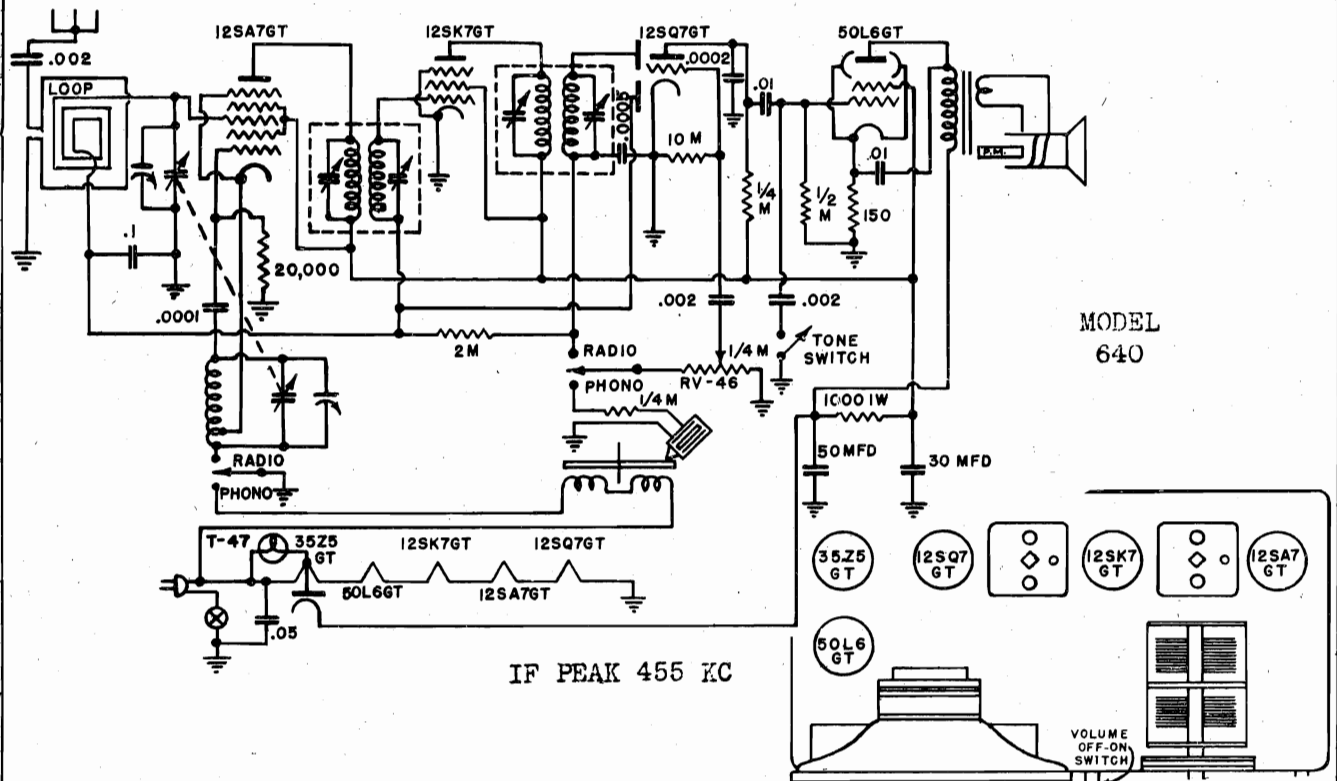
MODELS 660, 662, 666

AUTOMATIC RADIO MFG. CO., INC.



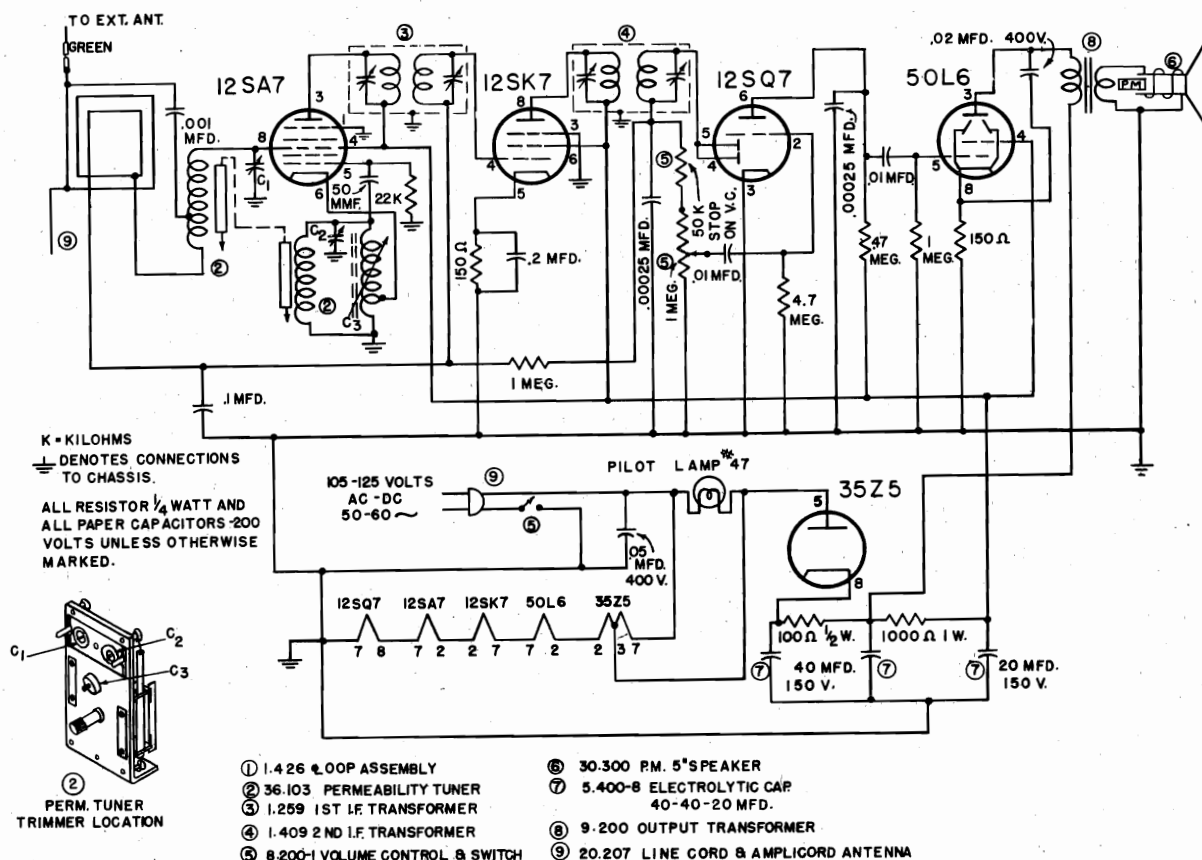
AUTOMATIC RADIO MEG. CO., INC.

MODEL 640
MODEL 650



BELLE ELECTRONICS CORP.

MODEL 125-P



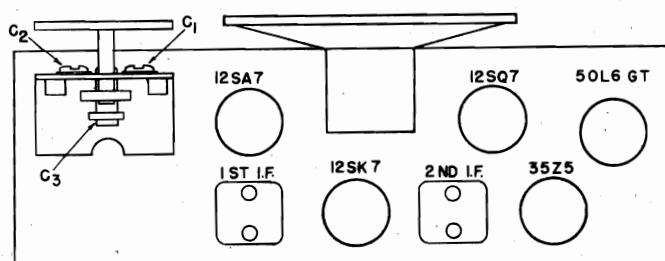
ALIGNMENT: Should it become necessary at any time to check the alignment of this receiver, proceed as follows:

- (1) Set the Signal Generator to 455 KC and connect to the Antenna Trimmer (C1) of the Permeability Tuner. Connect the Signal Generator ground lead to the chassis. Connect a suitable Output Meter across the Speaker Voice Coil Connections. Turn the Volume Control to the maximum position. Turn the Permeability Tuner to the extreme clockwise position (cores out of coils).
- (2) Adjust the trimmers located at the top of the first and second I. F. Transformers for maximum output as indicated on the Output Meter.
- (3) Set the Signal Generator to 1620 KC and loosely couple through a 2 or 3 turn loop to the receiver loop.
- (4) With the Permeability Tuner set at the extreme clockwise position (cores out of coils), tune in the 1620 KC signal by means of the Oscillator Trimmer (C2).
- (5) Set the Signal Generator to 1500 KC and turn the Tuning Control so that this frequency is indicated on the dial. Adjust the Antenna Trimmer (C1) on the Permeability Tuner for maximum output.
- (6) Set the Signal Generator to 600 KC and turn the Tuning Control so that this frequency is indicated on the dial. Adjust the Oscillator Shunt Coil (C3) for maximum response while "rocking" the Signal Generator. Recheck the High Frequency Oscillator Trimmer (C2) and re-peak the Antenna Trimmer (C1) for maximum response.

TUBES:

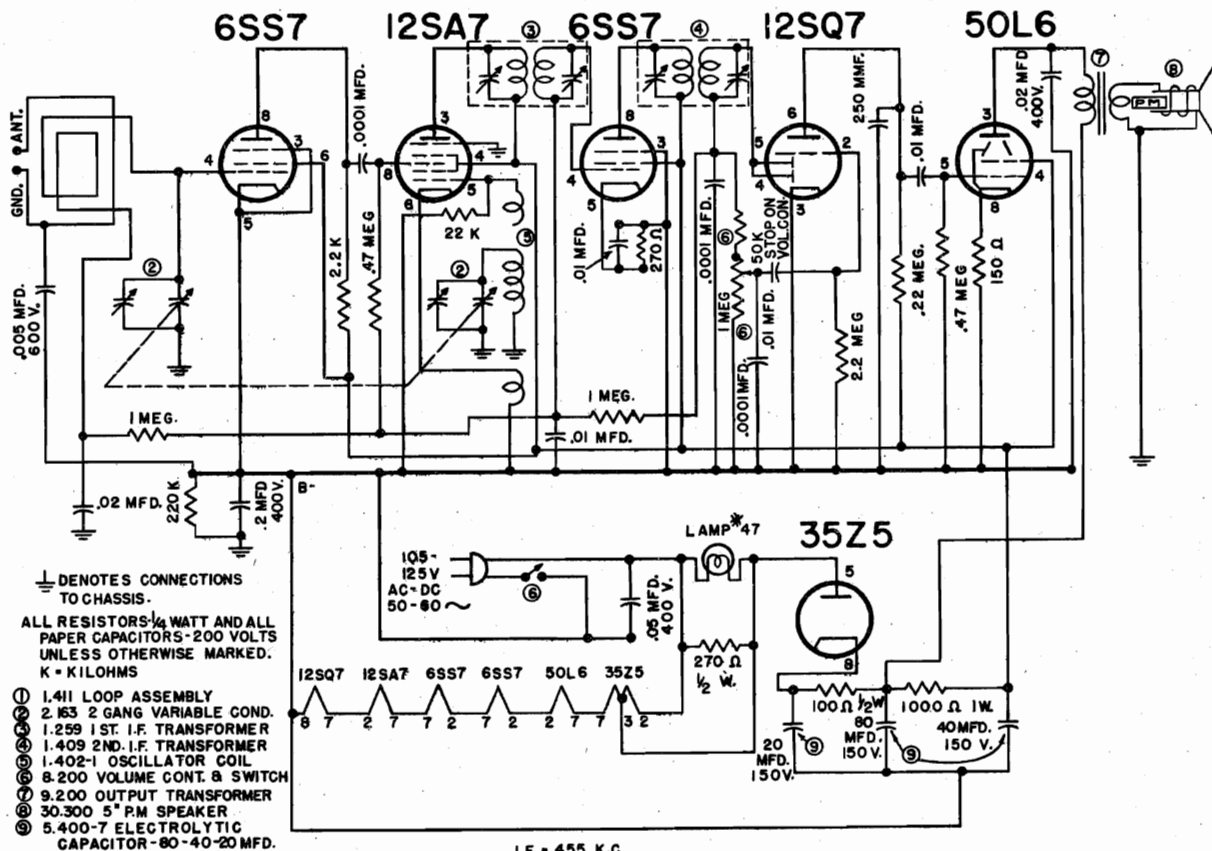
12SA7	Converter
12SK7	I-F Amplifier
12SQ7	Detector, AVC, A-F Ampl.
50L6GT	Beam Power Amplifier
35Z5GT	Rectifier

NOTE: Oscillator and Antenna Coil Saddles have been set and adjusted at the factory. Do not attempt to readjust the Oscillator or Antenna Coil Saddles during the above alignment procedure or serious mis-tracking will occur, resulting in loss of sensitivity at various points in the band.



MODEL 126

BELLE ELECTRONICS CORP.

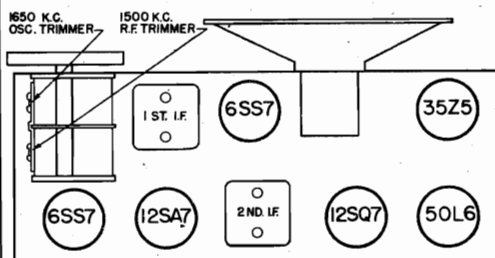


ALIGNMENT: Should it become necessary at any time to check the alignment of this receiver, proceed as follows:

- (1) Set the Signal Generator to 455 KC and connect to the grid of the 6SS7 R. F. Amplifier, or to the Stator Lug on the rear section of the Variable Capacitor. Connect the Signal Generator Ground Lead to a "B" point underneath the chassis. Connect a suitable output meter across the Speaker Voice Coil Connections. First turn the Volume Control to the maximum position. Turn the Variable Capacitor to the extreme clockwise position.
- (2) Adjust the trimmers located at the top of the first and second I. F. Transformers for maximum output as indicated on the Output Meter.
- (3) Loosely couple the Signal Generator lead to the Loop and set to 1650 KC.
- (4) With the Variable Capacitor set at the extreme clockwise position, tune in the 1650 KC signal by means of the Oscillator Trimmer on the Variable Capacitor (front section).
- (5) Set the Signal Generator to 1500 KC and turn the Tuning Control so that this frequency is indicated on the dial. Adjust the Antenna Trimmer on the Variable Capacitor (rear section) for maximum output. No other adjustments are necessary.

TUBES:

6SS7 R. F. Amplifier
 12SA7 Converter
 6SS7 I. F. Amplifier
 12SQ7 Detector, Avc and Audio Amp.
 50L6GT Beam Power Amplifier
 35Z5GT Rectifier



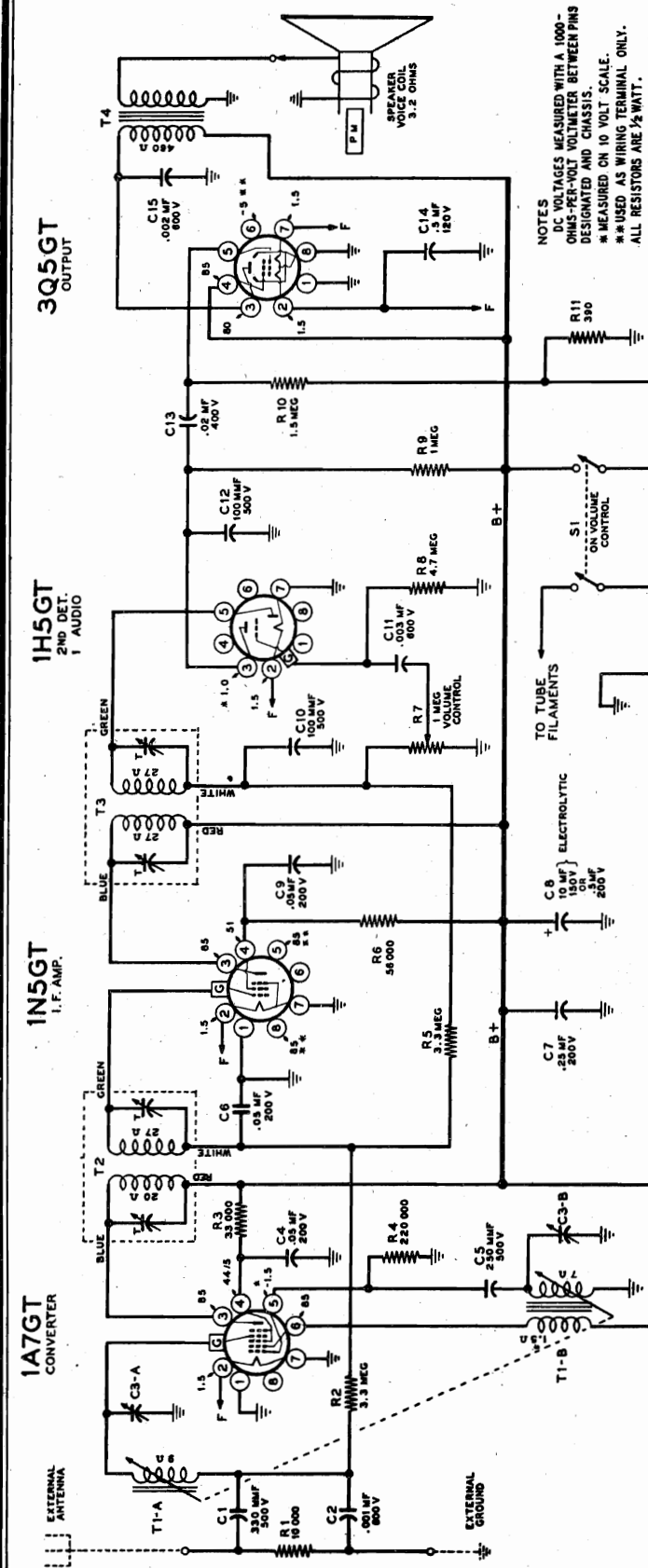
TRIMMER AND TUBE LOCATION DIAGRAM

LINE VOLTAGE: This receiver is designed for operation on 105-125 Volts, 50-60 Cycles, either Alternating or Direct Current (AC-DC)

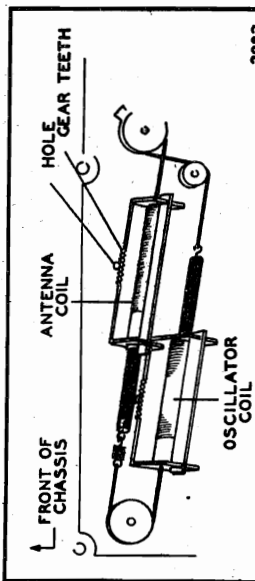
POWER CONSUMPTION: 30 Watts.

TUNING RANGE: Broadcast: 540 to 1650 Kilocycles (180 to 555 meters).

DIAL: The Dial Scale is calibrated in Kilocycles.



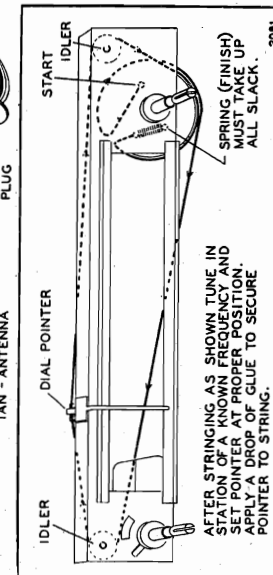
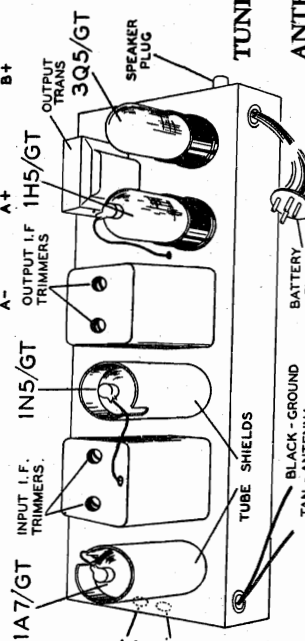
NOTES
DC VOLTAGES MEASURED WITH A 1000-
OHMS-PER-VOLT VOLTMETER BETWEEN PINS
DESIGNATED AND CHASSIS.
* MEASURED ON 10 VOLT SCALE.
** USED AS WIRING TERMINAL ONLY.
ALL RESISTORS ARE 1/2 WATT.



View of Coil Assembly

The antenna coil assembly is movable left or right. When making the adjustment as required in the alignment procedure, move the coil assembly very slowly, either by hand or by pivoting one edge of a screwdriver blade in the hole and engaging the blade in the gear teeth of the coil form.

POWER SUPPLY.....A Battery—1.5 volts, 250
ma.
B Battery—90 volts, 14 ma.
FREQUENCY RANGE.....535 to 1720 kc.
INTERMEDIATE FREQ.....455 kc.



Replacement of Dial Pointer Drive Cord

TUNING.....Two permeability-tuned circuits.
ANTENNA.....External only. Also external ground.
SPEAKER.....5-inch; P.M., 1.5-ounce magnet; voice coil impedance 3.2 ohms.
POWER OUTPUT.....160 milliwatts undistorted.
250 milliwatts maximum.
SENSITIVITY.....20 microvolts average for 50-milliwatt output.
SELECTIVITY.....48 kc broad at 1000 times signal at 1000 kc.

MODEL 4B17
MODELS 4B112, 4B113

BELMONT RADIO CORP.

ALIGNMENT INSTRUCTIONS FOR MODELS 4B17, 4B112, 4B113

- Output meter across 3.2-ohm output load.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.
- Volume control at maximum for all adjustments.
- Connect ground post of signal generator to radio chassis.

SIGNAL GENERATOR			TUNER SETTING	ADJUST FOR MAXIMUM OUTPUT (in order shown)
Frequency	Dummy Antenna	Connection to Radio		
455 kc	.1 mf	Grid (top cap) of 1A7GT	Iron cores all the way out	Trimmers on output and input I.F. cans
1720 KC, 4B17 1700 kc, 4B112, 4B113	.1 mf	Grid (top cap) of 1A7GT	Iron cores all the way out	Oscillator trimmer C3-B
1720 KC, 4B17 1700 kc, 4B112, 4B113	200 mmf	Antenna lead	Iron cores all the way out	Antenna trimmer C3-A
1400 kc	200 mmf	Antenna lead	Turn dial to 1400 kc	Adjust position of antenna coil (see coil view)*

* This adjustment and the previous adjustment are interlocking; therefore repeat the two adjustments alternately for best results.

MODEL 4B17

REPLACEMENT PARTS LIST

MODELS 4B112, 4B113

Ref. No. Part No. Description

CAPACITORS *

C1	C-8F3-11	330 mmf, 20%, mica
C2	C-8D-10929	.001 mf, 600 volts, 10%
C3-A, B	A-8H-10807	Dual trimmer; antenna (42-78 mmf) and oscillator (84-156 mmf)
C4, C6, C9	C-8D-10770	.05 mf, 200 volts, 20%
C5	C-8F3-10	220 mmf, 20%, mica
C7	C-8D-10775	.25 mf, 200 volts, +20%—10%
C8	C-8D-11270	.5 mf, 200 volts, +20%—10%
	or	
	119117	10 mf, 150 volts, electrolytic
C10, C12	C-8F3-113	100 mmf, 10%, mica
C11	C-8D-10786	.003 mf, 600 volts, 20%
C13	C-8D-10774	.02 mf, 400 volts, 20%
C14	10017	.5 mf, 120 volts, +50%—10%
C15	C-8D-10784	.002 mf, 600 volts, 25%

RESISTORS *

R1	C-9B1-19	10,000 ohms, 1/2 watt, 20%
R2, R5	C-9B1-34	3.3 megohms, 1/2 watt, 20%
R3	C-9B1-80	33,000 ohms, 1/2 watt, 10%
R4	C-9B1-27	220,000 ohms, 1/2 watt, 20%
R6	C-9B1-83	56,000 ohms, 1/2 watt, 10%
R7, S1	A-10A-10155	Volume control (1 megohm) and on-off switch
R8	C-9B1-35	4.7 megohms, 1/2 watt, 20%
R9	C-9B1-31	1 megohm, 1/2 watt, 20%
R10	C-9B1-32	1.5 megohms, 1/2 watt, 20%
R11	C-9B1-57	390 ohms, 1/2 watt, 10%

TRANSFORMERS AND COILS

T1-A, B	C-211-10171	Tuning assembly complete, including antenna and oscillator coils
T2	108202C	Input I.F. coil, complete in can (range of trimmers: pri. 60-110 mmf, sec. 40-70 mmf)
T3	108153D	Output I.F. coil, complete in can (range of trimmers: 40-70 mmf each)
T4	10591B	Output transformer

MISCELLANEOUS

B-18A-10164	Speaker, 5", P.M.
121210	Socket, for tubes (4 used)
A-55A-7386-1	Connector, for speaker plug
10724	Plug, on speaker leads
B-14A-10152	Battery cable assembly
A-2G-10162	Pointer, for dial
115396	Tube shield (for 1N5GT, 1A7GT)
A-5B-10170-1	Knob (volume control, tuning)
B-6D-10618	Dial scale
B-2M-7758	Snap-in rivet for dial scale
A-6D-10163	Crystal for dial
A-2F-10165	On-off indicator
A-49A-10173	Spring for on-off indicator
A-3A-10156	Tuning shaft
A-53A-10576	Cord, for dial pointer drive (32")
A-49A-11324	Spring for dial pointer drive cord

Ref. No. Part No. Description

CAPACITORS *

C1	C-8F3-11	330 mmf, 20%, mica
C2	C-8D-10787	.001, 600 volts, 20%
C3-A, B	124165	Dual trimmer, antenna and oscillator. Range of each: 84-156 mmf
C4, C6	C-8D-10770	.05 mf, 200 volts, 20%
C5	C-8F3-10	220 mmf, 20%, mica
C7	C-8D-10775	.25 mf, 200 volts, +20%—10%
C8	C-8D-11270	.5 mf, 200 volts, +20%—10%
	or	
	119117	10 mf, 150 volts, electrolytic
C9	129177	45 mmf, 5%, ceramicon
C10, C12	C-8F3-8	100 mmf, 20%, mica
C11	C-8D-11013	.003 mf, 600 volts, 10%
C13	C-8D-10774	.02 mf, 400 volts, 20%
C14	C-8D-11270	.5 mf, 200 volts, +20%—10%
C15	C-8D-10935	.005 mf, 600 volts, +40%—15%
C16	C-8D-10771	.1 mf, 200 volts, +20%—10%

RESISTORS *

R1	C-9B1-19	10,000 ohms, 1/2 watt, 20%
R2, R5	C-9B1-34	3.3 megohms, 1/2 watt, 20%
R3	C-9B1-80	33,000 ohms, 1/2 watt, 10%
R4	C-9B1-27	220,000 ohms, 1/2 watt, 20%
R6	C-9B1-82	47,000 ohms, 1/2 watt, 10%
R7, S1	101250	Volume control (1 megohm) and on-off switch
R8	C-9B1-35	4.7 megohms, 1/2 watt, 20%
R9	C-9B1-31	1 megohm, 1/2 watt, 20%
R10	C-9B1-33	2.2 megohms, 1/2 watt, 20%
R11	C-9B1-57	390 ohms, 1/2 watt, 10%

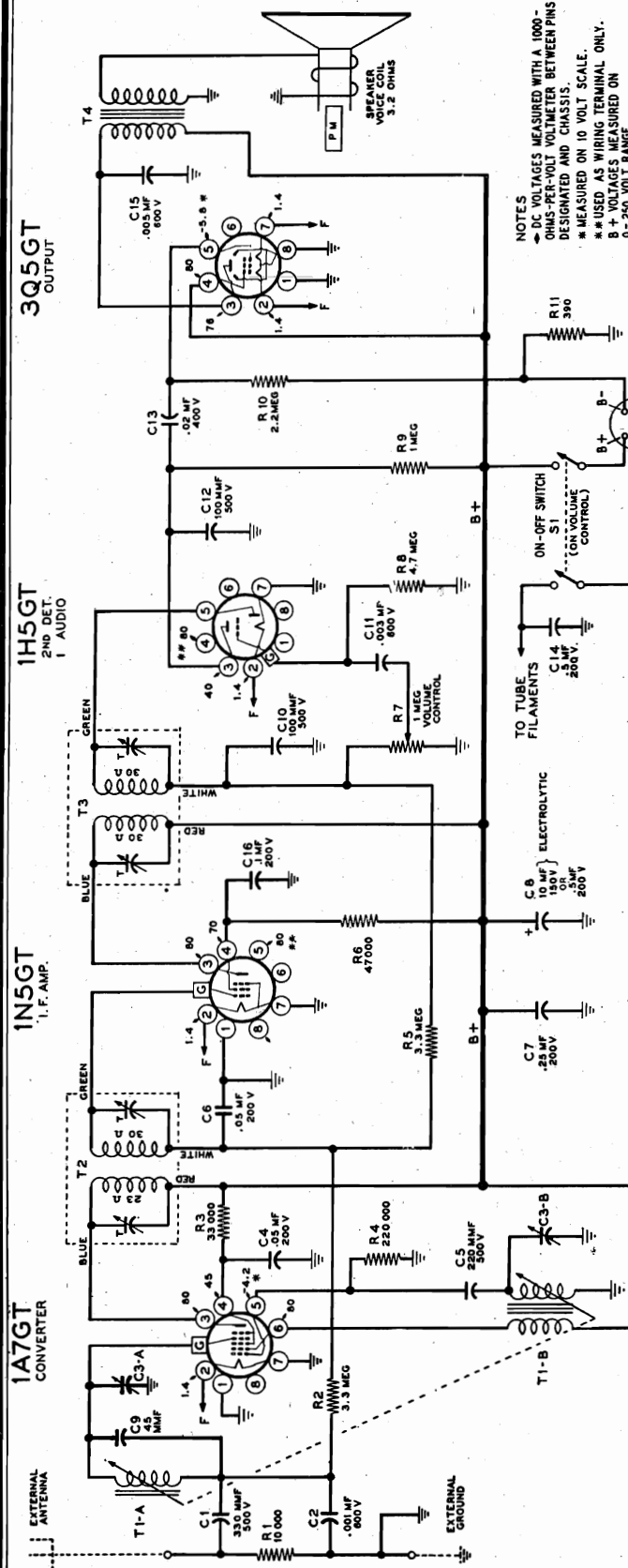
COILS AND TRANSFORMERS

T1-A, B	1364	Tuning assembly complete, including antenna and oscillator coils
T2	108202	Input I.F. coil complete in can. Range of trimmers: primary, 60-110 mmf; secondary, 40-70 mmf
T3	108153B	Output I.F. coil complete in can. Range of trimmers: 40-70 mmf ea.
T4	10591B	Output transformer

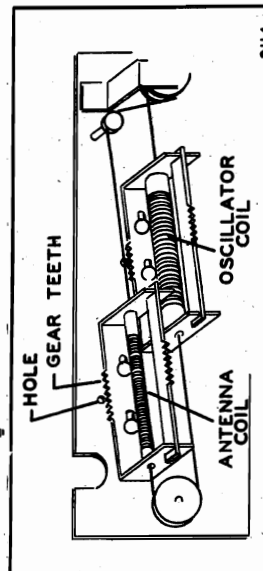
MISCELLANEOUS

114238	Speaker, 5-inch, P.M.
121210	Tube socket
115396	Tube shield
107361	Battery cable assembly
128621-18	Cabinet, walnut
128621-9	Cabinet, ivory
128523-17	Knob, walnut
128523-8	Knob, ivory
128626B	Back for cabinet, walnut
128626	Back for cabinet, ivory
131356	Tee-pins for securing back
112920	Dial scale
13143	Snap-in rivets for dial scale
112914	Crystal for dial
112908B	Pointer
A-53A-10989	Cord for dial pointer drive
120184	Spring for drive cord
112915	On-off indicator
120405	Spring for indicator
120409	Trip for indicator

BELMONT RADIO CORP.



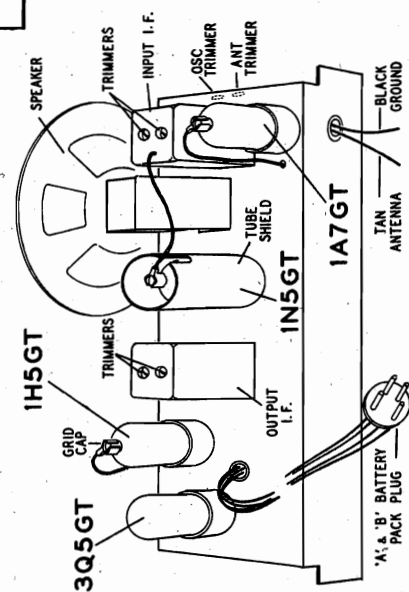
NOTES
 → DC VOLTAGES MEASURED WITH A 1000-
 OHMS-PER-VOLT VOLTMETER BETWEEN PINS
 DESIGNATED AND CHASSIS.
 * MEASURED ON 10 VOLT SCALE.
 ** USED AS WIRING TERMINAL ONLY.
 B+ VOLTAGES MEASURED ON
 0-250 VOLT RANGE.



View of Coil Assembly

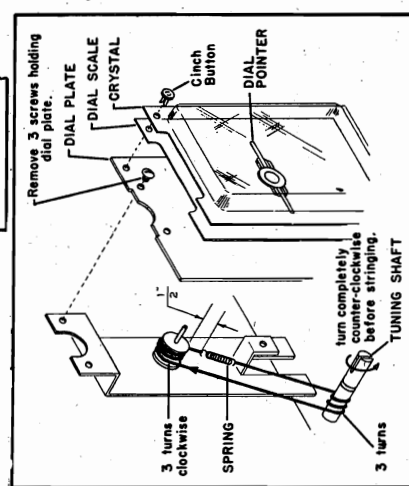
The antenna coil assembly is movable left or right. When making the adjustment as required in the alignment procedure, move the coil assembly very slowly, either by hand or by pivoting one edge of a screwdriver blade in the hole and engaging the blade in the gear teeth of the coil form.

SPEAKER.....5-inch; P.M.; voice coil im-
 pedance 3.2 ohms.
 POWER OUTPUT.....180 milliwatts undistorted.
 300 milliwatts maximum.
 4-22-46



POWER SUPPLY

A Battery—1.5 volts, 250 ma.
 B Battery —90 volts, 14 ma.
 FREQUENCY RANGE.....540 to 1700 kc.
 INTERMEDIATE FREQ.....455 kc.
 TUNING.....Two permeability-tuned cir-
 cuits.
 ANTENNA.....External only. Also external
 ground.



Replacement of Dial Pointer Drive Cord

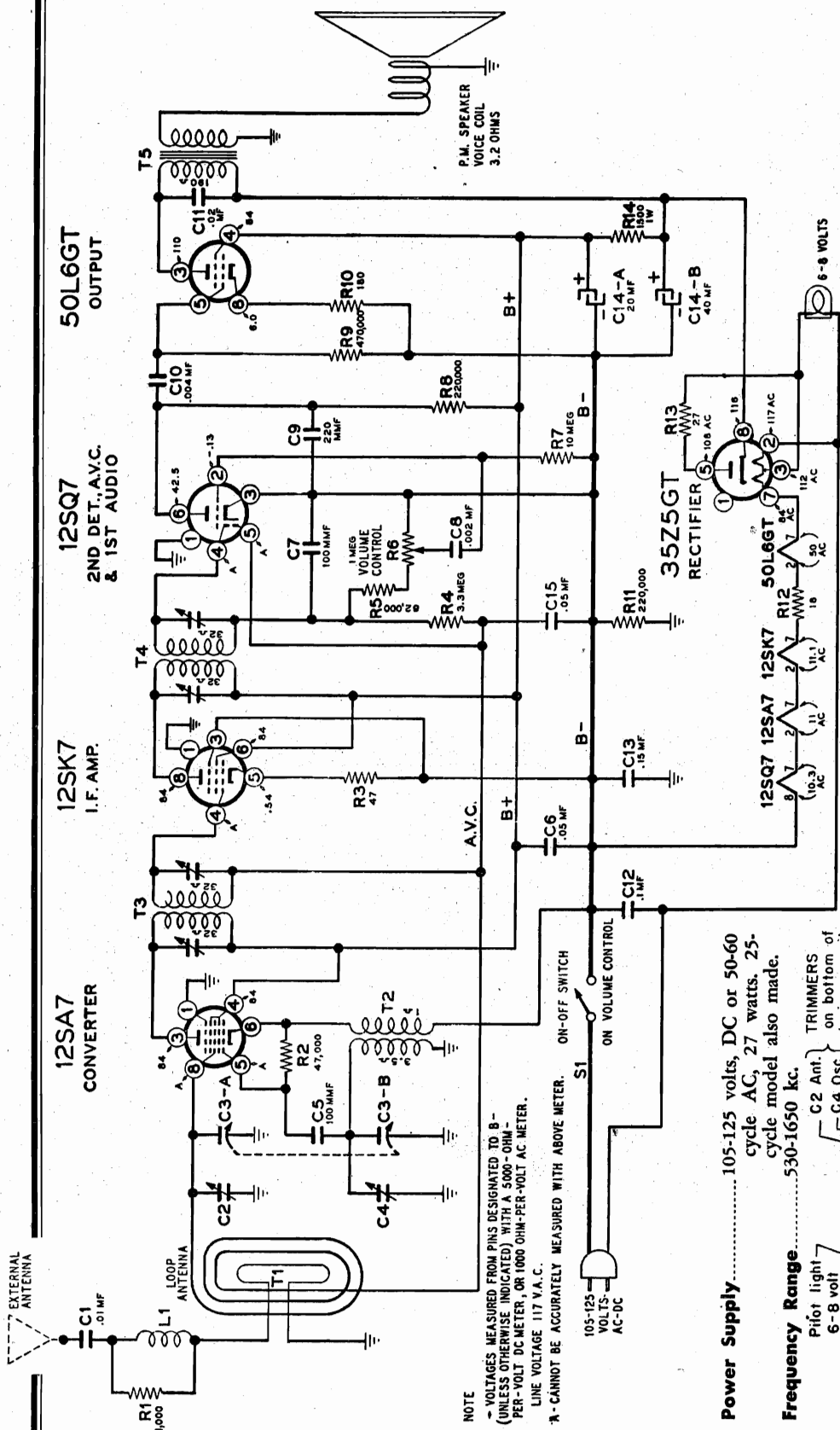
SENSITIVITY.....30 microvolts average for
 50-milliwatt output.
 SELECTIVITY.....48 kc broad at 1000 times
 signal at 1000 kc.

50L6GT
OUTPUT

12SQ7
2ND DET., A.V.
& 1ST AUDI

12SK7
1. F. AMP.

12SA7 CONVERTER



NOTE
- VOLTAGES MEASURED FROM PINS DESIGNATED TO 8 -
(UNLESS OTHERWISE INDICATED) WITH A 5000-OHM -
PER-VOLT DC METER, OR 1000 OHM-PER-VOLT AC METER.

A - CANNOT BE ACCURATELY MEASURED WITH ABOVE METER.

105-125 VOLTS-
ON VOLUME CONT

VOLUME CONTROLS

Power Supply.....105-125 volts, DC or 50-60 cycle AC, 27 watts, 25-cycle model also made.

Frequency Range.....530-1650 kc.

Pilot light 7 C2 Ant. TRIMMERS
6-8 volt C4 Osc. on bottom of tuning capacitor

Intermediate Freq..... 455 kc.
Antenna..... Built-in loop; provisions also for external antenna connection.

Tuning	Two-gang capacitor.
Speaker	5-inch, P.M., voice coil impedance 3.2 ohms.
Power Output	0.94 watt undistorted.

Power Output.....0.94 watt undistorted.
1.4 watts maximum.

Sensitivity.....30 microvolts average for
50-milliwatt output

Selectivity.....52 kc broad at 1000 times
signal at 1000 kc.

After stringing as shown
tune in station of a known
frequency and set pointer
at proper position along dial.
Apply a drop of glue to
secure pointer to string.

Replacement of Dial Pointer Drive Cord

first -
turn pulley to extreme
counter-clockwise position. -6-18-46

-6-18-46

Diagram illustrating the chassis components of a radio receiver, including:

- INPUT I.F.
- ELECTROLYTIC
- 12SQ7
- 12SA7
- trimmers
- 12SK7
- Line cord
- 3575GT
- 50L6GT
- OUTPUT I.F.

BELMONT RADIO CORP.

ALIGNMENT PROCEDURE

- Output meter across 3.2-ohm output load.
- Volume control at maximum.
- Chassis must be removed from cabinet for proper alignment. Slight adjustments of the oscillator and antenna trimmers can be made, without removing the

- chassis, through holes provided on the bottom of the cabinet.
- Connect ground post of signal generator to B— of radio.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.

SIGNAL GENERATOR			TUNER SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)
Frequency	Coupling Capacitor	Connection to Radio		
455 kc	.1 mf	12SA7 grid	Rotor full open (plates out of mesh)	Input and output trimmers on IF cans
1650 kc	.1 mf	12SA7 grid	Rotor full open (plates out of mesh)	Oscillator trimmer C4
1400 kc†	None	See note below	1400 kc	Antenna trimmer C2

† For this adjustment chassis should be remounted in cabinet and loop connected. Lay generator lead near loop and turn up output. Loop will pick up energy. Antenna trimmer can be reached through a hole in the bottom of the cabinet.

REPLACEMENT PARTS LIST

When ordering parts, specify part number, model number, and series

Ref. No.	Part No.	Description
CAPACITORS		
C1	C-8D-10761	.01 mf, 400 volts, 20%
C3-A, B	B-8A-10754	Two-gang, including antenna and oscillator trimmers. Range of gang: 11-388 mmf (ant.) and 8.5-162 mmf (osc.)
C5, C7	C-8F3-8	100 mmf, 20%, mica
C6, C15	C-8D-10770	.05 mf, 200 volts, 20%
C8	C-8D-10789	.002 mf, 600 volts, 20%
C9	C-8F3-10	220 mmf, 20%, mica
C10	C-8D-10788	.004 mf, 600 volts, 20%
C11	C-8D-10774	.02 mf, 400 volts, 20%
C12	C-8D-10760	.1 mf, 400 volts, +20%—10%
C13	C-8D-10953	.15 mf, 400 volts, +20%—10%
C14-A, B	11992	Electrolytic, 60 cycles, 40 mf-20 mf, 150 volts
	11993	Electrolytic, 25 cycles, 60 mf-40 mf, 150 volts
RESISTORS*		
R1	C-9B1-13	1000 ohms, 1/2 watt, 20%
R2	C-9B1-82	47,000 ohms, 1/2 watt, 10%
R3	C-9B1-46	47 ohms, 1/2 watt, 10%
R4	C-9B1-34	3.3 megohms, 1/2 watt, 20%
R5	C-9B1-85	82,000 ohms, 1/2 watt, 10%
R6, S1	101198	Volume control (1 megohm) and on-off switch
R7	C-9B1-37	10 megohms, 1/2 watt, 20%
R8, R11	C-9B1-27	220,000 ohms, 1/2 watt, 20%
R9	C-9B1-29	470,000 ohms, 1/2 watt, 20%
R10	C-9B1-53	180 ohms, 1/2 watt, 10%
R12	C-9B1-41	18 ohms, 1/2 watt, 10%
R13	C-9B1-43	27 ohms, 1/2 watt, 10%
R14	C-9B2-64	1500 ohms, 1 watt, 10%

COILS AND TRANSFORMERS

L1	12311	Load coil
T1	C-212-10895	Loop antenna assembly, including coil L1, resistor R1, and capacitor C1
T2	A-13D-10748	Oscillator coil
T3	B-13B-10091	Input I.F. transformer, complete in can. Range of trimmers: 45-85 mmf each

NOTE ON TUBE REPLACEMENT

Replace a defective metal 12SK7 tube with another metal tube. Replace a glass 12SK7 tube with a metal tube or with an exact duplicate of the tube now in the set.

Ref. No.	Part No.	Description
T4	B-13B-10812	Output I.F. transformer complete in can. Range of trimmers: 56-104 mmf each
T5	B-12C-10735	Output transformer

DIAL AND TUNING PARTS

B-5B-10994-9	Tuning knob
128523-8	Volume knob
A-3F-10995	Locking screw for tuning knob
120588	Locking spring for tuning knob
128292B-8	Pushbutton
A-6D-10758	Dial scale
112857	Dial crystal
112745	Dial pointer
131211	Snap-in rivets for dial scale and crystal
115361R	Lever and roller (roller faces away from gang)
115361L	Lever and roller (roller faces gang)
120283	Return spring for lever
115146	Cams
115143	Keywasher (11 used)
1209	Cord for dial pointer drive (15")
120285	Spring for drive cord

MISCELLANEOUS

114201	Speaker, 5-inch, P.M.
A-15B-10440	Tube socket (all tubes but 12SK7)
121171	Tube socket (for 12SK7)
B-15B-10076	Socket for electrolytic
10798	Line cord and plug
107249	Pilot light, type T-47
107342	Pilot light socket assembly
128561-9	Cabinet
131193	Snap-in rivets, for cabinet back
134123	Rubber foot
112784	Set of call letters
112606	Acetate tabs for pushbuttons

* The values of the resistors listed above are based on RMA standards, equally well with resistors of either group. An illustration of the difference follows: Pre-standardized value—200,000 ohms, 1/2 watt, 10% with resistors of pre-standardized values. This receiver will operate RMA value—220,000 ohms, 1/2 watt, 10%

SETTING THE PUSHBUTTONS—The pushbuttons may be used, after proper adjustment, for the automatic tuning of any five stations on the standard broadcast band. They can be set up in any order.

1. Turn on the radio.
2. Push out the call letters of the five stations from the call-letter sheets supplied with this manual.
3. Insert one call-letter tab in the rectangular opening in the front of each pushbutton, in any order. Press an acetate tab (supplied in small envelope) into each of the pushbuttons.
4. With the screwdriver supplied, check to see that the locking screw in the center of the tuning knob (see front view) is loose. If it is not, turn it several turns to the left (counterclockwise).
5. Press the first pushbutton down *all the way*. With one hand hold the button down firmly and with the other carefully tune in the desired station. Release the pushbutton.

6. Follow this procedure for each of the four other buttons, setting each one for a different station.

7. Rotate the tuning knob on the side of the cabinet as far to the right as it will go. Tighten the locking screw in the center of the knob. *It is important that this screw be tightened very firmly.*

8. The pushbuttons are now properly set for automatic tuning. Any of the five stations may be tuned in simply by pressing the proper button down as far as it will go. If you wish to reset any of the buttons for a new station, loosen the locking screw, set the pushbutton as described above, and re-tighten the locking screw.

REMOVAL OF CHASSIS—If for any reason you wish to remove the radio chassis from the cabinet, proceed as follows: First be sure the line cord is disconnected from the house power receptacle. Then take off the back as described under "Tubes" above.

Pull the volume control knob off its shaft. Unscrew the locking screw in the center of the tuning knob and pull the knob off its shaft. Remove the four chassis mounting screws from the bottom of the cabinet. The chassis can now be slipped out.

After the chassis is replaced the automatic pushbuttons will probably have to be reset.

DIAL LIGHT—If the dial lamp burns out the set should not be operated until a new lamp has been installed. Failure to heed this caution may result in a burned-out 35Z5GT tube. To replace the lamp it is necessary to remove the back (see under "Tubes" below). Use only a type T-47 lamp for replacement.

TUBES—Tubes which have weakened with age may cause poor or erratic reception; therefore have the tubes tested periodically and replace those which are weak. To reach the tubes, pry off the four snap-in rivets which secure the back to the cabinet. Take care not to break the connections of the three wires to the loop antenna

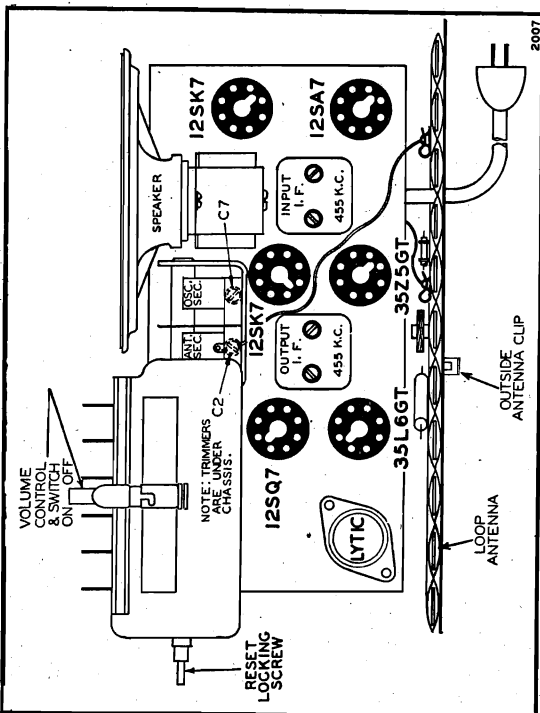
on the inside of the back. Tubes are removed most easily by rocking them back and forth gently while lifting. When replacing tubes, refer to the Chassis View to make sure that the replacements are properly made. **IMPORTANT:** See note in parts list concerning tube replacement.

ANTENNA AND GROUND—If an external antenna is used, check it periodically to make sure that all connections are clean and tight and that the antenna is insulated from the ground at all points.

MODEL 6D111

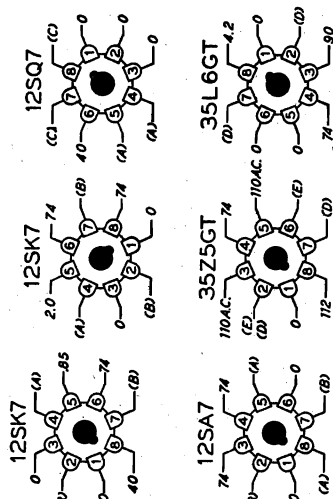
Series A

BELMONT RADIO CORP.



CHASSIS VIEW, SHOWING TUBE LOCATIONS

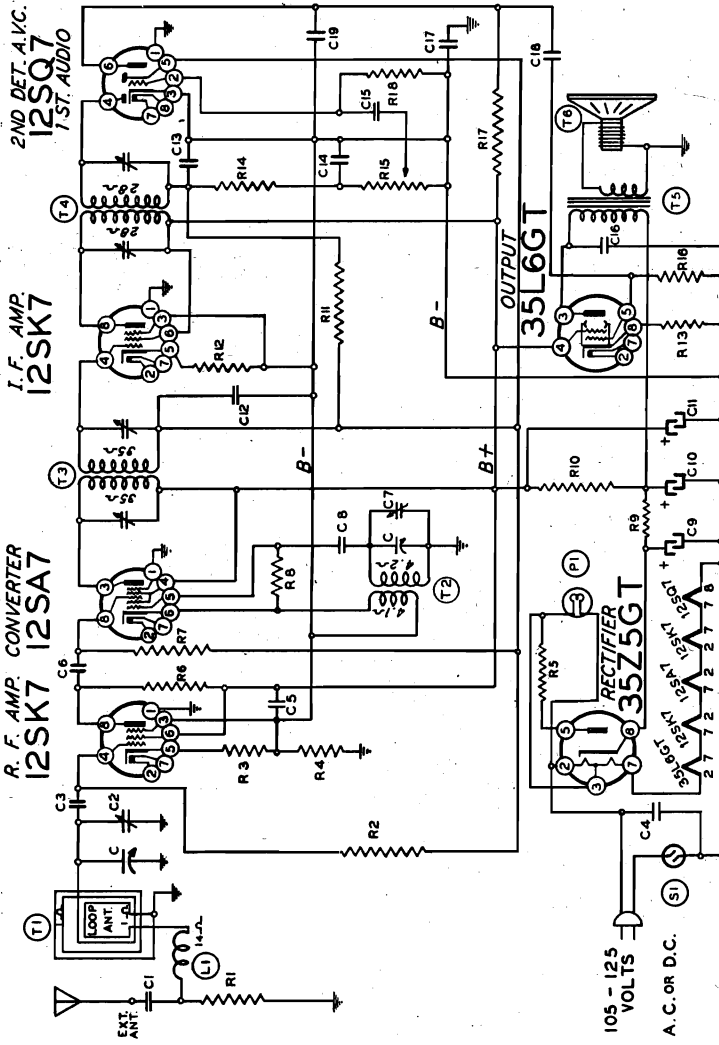
A - CANNOT BE MEASURED WITH VOLTMETER.
B-12 VOLTS A.C. MEASURED ACROSS PINS 2 & 7.
C-12 VOLTS A.C. MEASURED ACROSS PINS 7 & 8.
D-30 VOLTS A.C. MEASURED ACROSS PINS 2 & 7.
E-17 VOLTS A.C. MEASURED ACROSS PINS 2 & 6.



BOTTOM VIEW OF CHASSIS

VOLTAGES AT TUBE SOCKET TERMINALS

Selectivity	55 Kc. broad at 1000 x signal at 1000 Kc.
Power output (in voice coil)	Undistorted
Maximum	0.8 watt
Voice coil impedance	1.0 watt
	3.2 ohms



NOTE: C9, C10, C11 are in same unit. In 25-cycle sets, values are 60 mfd., 40 mfd., 40 mfd.

- RESISTORS**
- R1 4700 ohms, $\frac{1}{2}$ w., $\pm 10\%$
 - R2 1 megohm, $\frac{1}{2}$ w., $\pm 20\%$
 - R3 100 ohms, $\frac{1}{2}$ w., $\pm 10\%$
 - R4 150,000 ohms, $\frac{1}{2}$ w., $\pm 20\%$
 - R5 22 ohms, $\frac{1}{2}$ w., $\pm 10\%$
 - R6 4700 ohms, $\frac{1}{2}$ w., $\pm 20\%$
 - R7 100,000 ohms, $\frac{1}{2}$ w., $\pm 20\%$
 - R8 47,000 ohms, $\frac{1}{2}$ w., $\pm 20\%$
 - R9 180 ohms, 1 w., $\pm 10\%$
 - R10 1200 ohms, $\frac{1}{2}$ w., $\pm 20\%$
 - R11 3.3 megohms, $\frac{1}{2}$ w., $\pm 20\%$
 - R12 390 ohms, $\frac{1}{2}$ w., $\pm 10\%$
 - R13 150 ohms, $\frac{1}{2}$ w., $\pm 10\%$
 - R14 47,000 ohms, $\frac{1}{2}$ w., $\pm 20\%$
 - R15 Volume control, 1 megohm
 - R16 470,000 ohms, $\frac{1}{2}$ w., $\pm 20\%$
 - R17 220,000 ohms, $\frac{1}{2}$ w., $\pm 20\%$
 - R18 4.7 megohms, $\frac{1}{2}$ w., $\pm 20\%$
- CONDENSERS**
- C1 2 gang variable
 - C2 .002 x 600 volts
 - C3 Antenna trimmer on gang
 - C4 .0005 mica
 - C5 1 x 400 volts
 - C6 .25 x 200 volts
 - C7 .0001 mica
 - C8 Oscillator trimmer on gang

MISCELLANEOUS

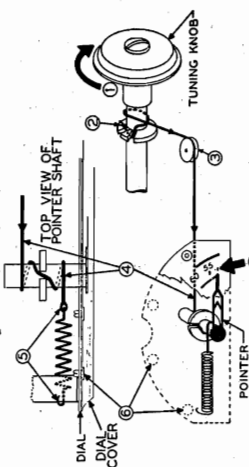
- L1 Loading coil
- P1 Pilot light bulb, type T-47
- S1 On-off switch on volume control
- T1 Loop antenna, complete
- T2 Oscillator coil
- T3 Input I.F. coil, 455 Kc.
- T4 Output I.F. coil, 455 Kc.
- T5 Output transformer for speaker
- T6 5-inch P.M. speaker

Sensitivity (for 0.05 watt output)	10 microvolts average
Intermediate frequency	455 Kc.
Power consumption	35 Watts

REPLACING DIAL POINTER DRIVE CORD

Six inches of cord are required in the set. Use a piece of cord slightly longer so that knots may be tied at each end. Numbers below correspond to circled numbers in diagram.

1. Rotate tuning knob to extreme clockwise position. This closes tuning condenser. Knob should remain in this position until installation is completed.
2. Tie knot at one end of cord and place it in key washer as shown. Wind cord one turn around shaft in direction as shown.
3. Pass cord over idler pulley.
4. Pass cord over pointer shaft; wind it one turn around shaft; pass it through key washer; wind it one more turn around shaft.
5. Hook spring over end of dial support. Tie cord to spring. **IMPORTANT:** Before tying knot stretch spring enough so that full contraction of spring will rotate pointer shaft at least one-half turn.
6. Remove dial crystal by removing Cinch buttons.
7. Make sure tuning knob is in extreme clockwise position. Then rotate pointer clockwise, against friction of shaft, until it is in horizontal position, as shown.



⑦ SETTING THE PUSHBUTTONS

The pushbuttons may be used, after proper adjustment, for the automatic tuning of any six stations which you select. They can be set up in any order.

1. Turn on the radio. Allow it to warm up for at least one minute.
2. Push out the call letters of the six stations from the call-letter sheets supplied with this manual. Press an acetate tab (supplied in small envelope) into each of the pushbuttons.
3. Insert one call-letter tab in the rectangular opening in each of the pushbuttons, in any sequence.
4. Check to see that the locking screw in the center of the tuning knob (see illustration) is loose. If it is not, turn it several turns to the left (counterclockwise). A coin may be used for this purpose.
5. Press the first pushbutton down **all the way**. With one hand hold the button down firmly and with the other carefully tune in the desired station. Release the pushbutton.
6. Follow this procedure for each of the five other buttons, adjusting each one for a different station.
7. Rotate the tuning knob on the side of the cabinet as far to the right as it will go. Tighten the locking screw in the center of the knob. **IT IS IMPORTANT THAT THIS SCREW BE TIGHTENED VERY FIRMLY.**

ALIGNMENT PROCEDURE

- No aligning adjustments should be attempted until all other possible causes of trouble have been checked.
- Chassis must be removed from cabinet for proper alignment.
- Slight adjustments of the oscillator and antenna circuits can be made, without removing the chassis, through two holes provided on the bottom of the cabinet. The two adjustment screws can be reached with a long insulated screwdriver.
- It is important that during alignment the loop antenna

- be maintained at the same distance from the chassis as when the chassis is installed in the cabinet.
- Turn volume control to maximum for all adjustments.
- Connect ground post of signal generator to B— of radio through a 0.1 mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Connect.

Band	Signal Generator Frequency Setting	Dummy Antenna	Connection to Radio	Tuning Condenser Setting	Adjust for Maximum Output (see chassis view)
I.F.	485 Kc.	0.1 mfd.	Grid of 12SA7	Rotor full open (plates out of mesh)	4 trimmers on input and output I.F. transformers
Broadcast	1650 Kc.	0.1 mfd.	Grid of 12SA7	Rotor full open (plates out of mesh)	Oscillator trimmer C7 on bottom of radio
	1400 Kc.	None	See note A	Set dial at 1400 Kc.	Antenna trimmer C2 on bottom of radio

Note A: Lay output lead of generator in back of loop antenna. Turn in generator output. Loop antenna will pick up energy.

Note A: Lay output lead of generator in back of loop antenna. Turn up generator output. Loop antenna will pick up energy.

REPLACEMENT PARTS LIST

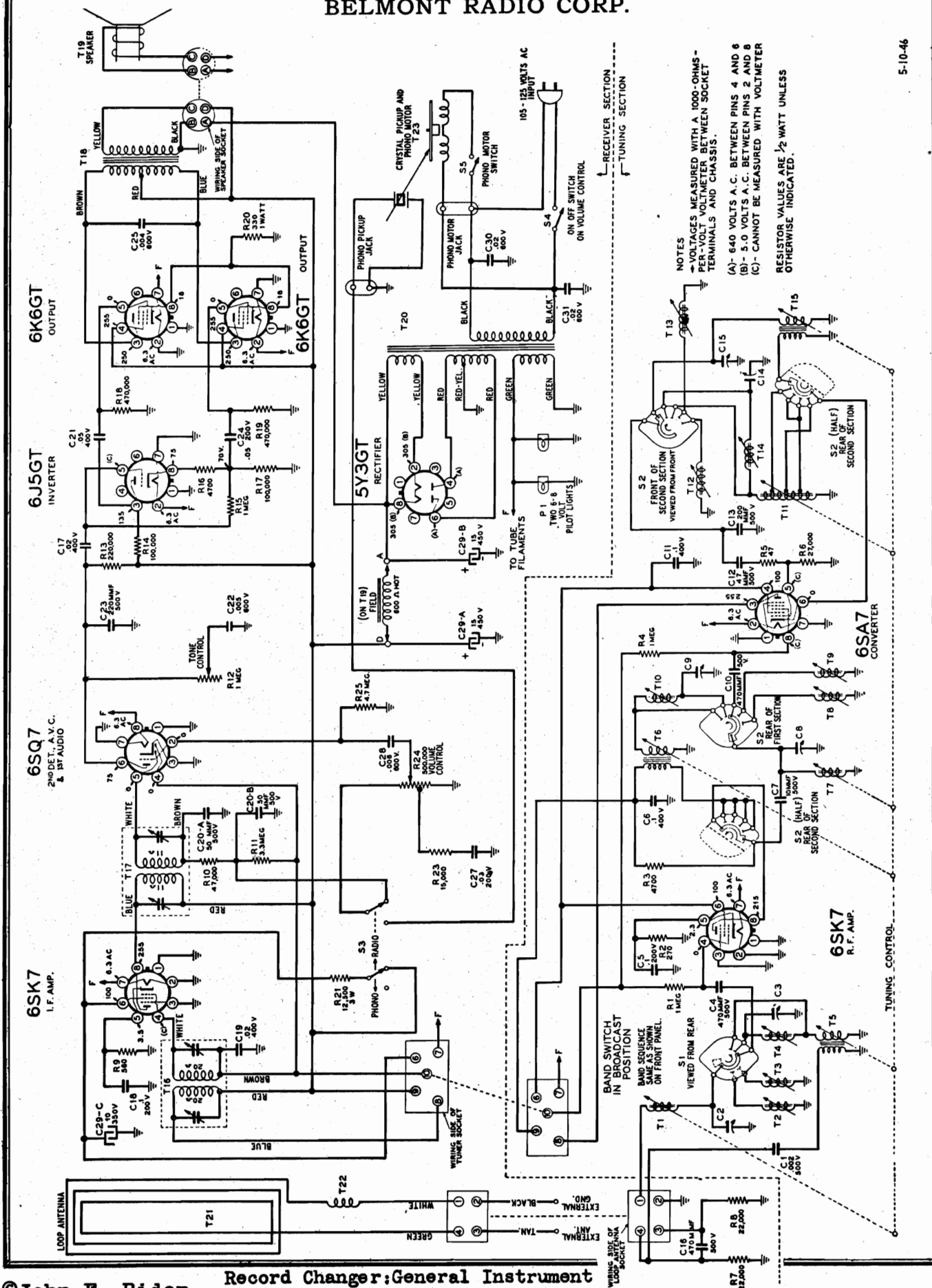
When ordering parts, specify part number, schematic symbol when applicable, receiver model number, and series. Use only genuine factory replacement parts.

Part No.	Schematic Symbol	Description
0025	C1, C15	.002 x 600 volts, $\pm 25\%$
0026	C2	.002 mica, $\pm 20\%$
0030	C3	.002 mica, $\pm 20\%$
0031	C4	.002 mica, $\pm 20\%$
0006	C5	.25 x 200 volts, $\pm 30\%$
0007	C6	.0001, mica, $\pm 20\%$
0008	C8, C19	Electrolytic for 50-cycle sets)
0009	C9, C10, C11	Electrolytic for 50-cycle sets)
0010	C9, C10, C11	30 mfd. x 150 volts
0011	C9, C10, C11	60 mfd. x 150 volts, 40 mfd. x 150
0012	C12	60 mfd. x 150 volts, $\pm 25\%$
0013	C12	.05 x 200 volts, $\pm 25\%$
0014	C14	.05 x 200 volts, $\pm 25\%$
0015	C14	.05 x 200 volts, $\pm 25\%$
0016	C13	.004 x 600 volts, $\pm 10\%$
0017	C13	.004 x 600 volts, $\pm 10\%$
0018	C13	.004 x 600 volts, $\pm 10\%$
0019	C13	.004 x 600 volts, $\pm 10\%$
0020	C13	.004 x 600 volts, $\pm 10\%$
0021	C13	.004 x 600 volts, $\pm 10\%$
0022	C13	.004 x 600 volts, $\pm 10\%$
0023	C13	.004 x 600 volts, $\pm 10\%$
0024	C13	.004 x 600 volts, $\pm 10\%$
0025	C13	.004 x 600 volts, $\pm 10\%$
0026	C13	.004 x 600 volts, $\pm 10\%$
0027	C13	.004 x 600 volts, $\pm 10\%$
0028	C13	.004 x 600 volts, $\pm 10\%$
0029	C13	.004 x 600 volts, $\pm 10\%$
0030	C13	.004 x 600 volts, $\pm 10\%$
0031	C13	.004 x 600 volts, $\pm 10\%$
0032	C13	.004 x 600 volts, $\pm 10\%$
0033	C13	.004 x 600 volts, $\pm 10\%$
0034	C13	.004 x 600 volts, $\pm 10\%$
0035	C13	.004 x 600 volts, $\pm 10\%$
0036	C13	.004 x 600 volts, $\pm 10\%$
0037	C13	.004 x 600 volts, $\pm 10\%$
0038	C13	.004 x 600 volts, $\pm 10\%$
0039	C13	.004 x 600 volts, $\pm 10\%$
0040	C13	.004 x 600 volts, $\pm 10\%$
0041	C13	.004 x 600 volts, $\pm 10\%$
0042	C13	.004 x 600 volts, $\pm 10\%$
0043	C13	.004 x 600 volts, $\pm 10\%$
0044	C13	.004 x 600 volts, $\pm 10\%$
0045	C13	.004 x 600 volts, $\pm 10\%$
0046	C13	.004 x 600 volts, $\pm 10\%$
0047	C13	.004 x 600 volts, $\pm 10\%$
0048	C13	.004 x 600 volts, $\pm 10\%$
0049	C13	.004 x 600 volts, $\pm 10\%$
0050	C13	.004 x 600 volts, $\pm 10\%$
0051	C13	.004 x 600 volts, $\pm 10\%$
0052	C13	.004 x 600 volts, $\pm 10\%$
0053	C13	.004 x 600 volts, $\pm 10\%$
0054	C13	.004 x 600 volts, $\pm 10\%$
0055	C13	.004 x 600 volts, $\pm 10\%$
0056	C13	.004 x 600 volts, $\pm 10\%$
0057	C13	.004 x 600 volts, $\pm 10\%$
0058	C13	.004 x 600 volts, $\pm 10\%$
0059	C13	.004 x 600 volts, $\pm 10\%$
0060	C13	.004 x 600 volts, $\pm 10\%$
0061	C13	.004 x 600 volts, $\pm 10\%$
0062	C13	.004 x 600 volts, $\pm 10\%$
0063	C13	.004 x 600 volts, $\pm 10\%$
0064	C13	.004 x 600 volts, $\pm 10\%$
0065	C13	.004 x 600 volts, $\pm 10\%$
0066	C13	.004 x 600 volts, $\pm 10\%$
0067	C13	.004 x 600 volts, $\pm 10\%$
0068	C13	.004 x 600 volts, $\pm 10\%$
0069	C13	.004 x 600 volts, $\pm 10\%$
0070	C13	.004 x 600 volts, $\pm 10\%$
0071	C13	.004 x 600 volts, $\pm 10\%$
0072	C13	.004 x 600 volts, $\pm 10\%$
0073	C13	.004 x 600 volts, $\pm 10\%$
0074	C13	.004 x 600 volts, $\pm 10\%$
0075	C13	.004 x 600 volts, $\pm 10\%$
0076	C13	.004 x 600 volts, $\pm 10\%$
0077	C13	.004 x 600 volts, $\pm 10\%$
0078	C13	.004 x 600 volts, $\pm 10\%$
0079	C13	.004 x 600 volts, $\pm 10\%$
0080	C13	.004 x 600 volts, $\pm 10\%$
0081	C13	.004 x 600 volts, $\pm 10\%$

Compliments of www.nucow.com

MODEL 8A59

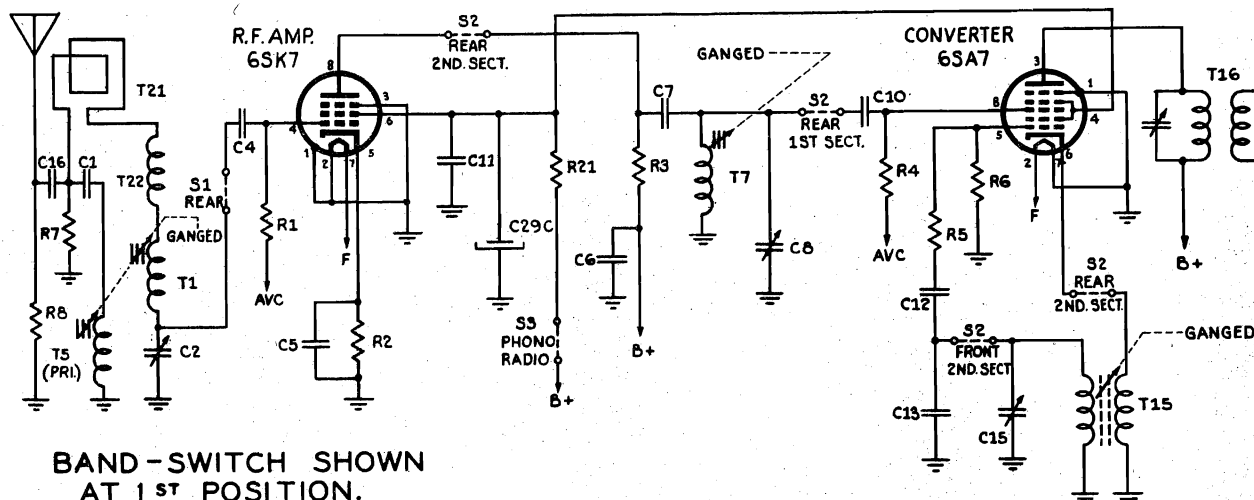
BELMONT RADIO CORP.



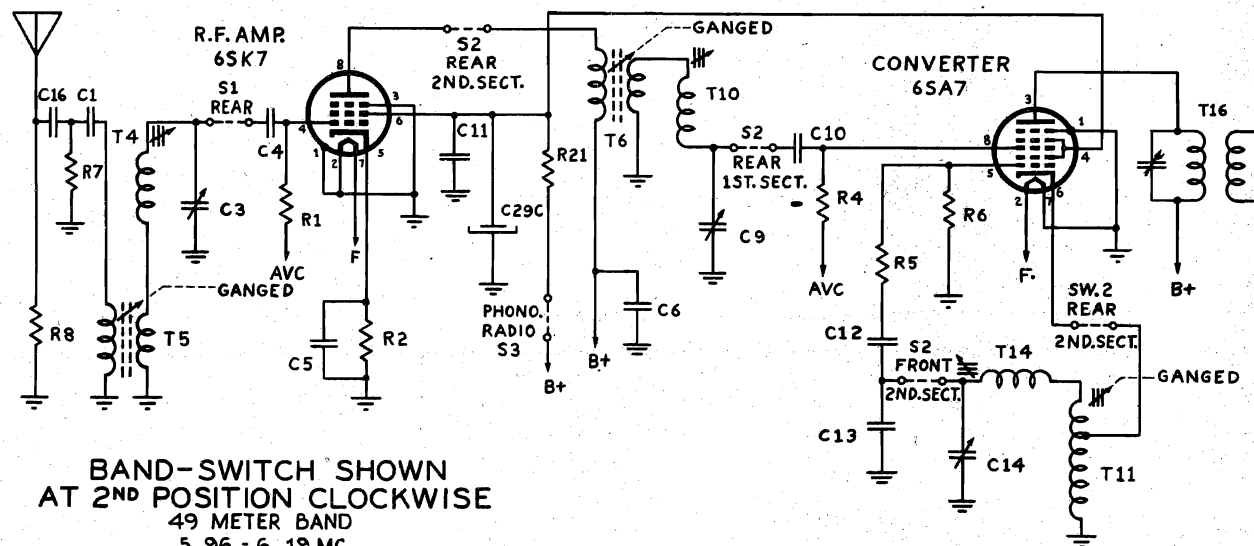
5-10-46

BELMONT RADIO CORP.

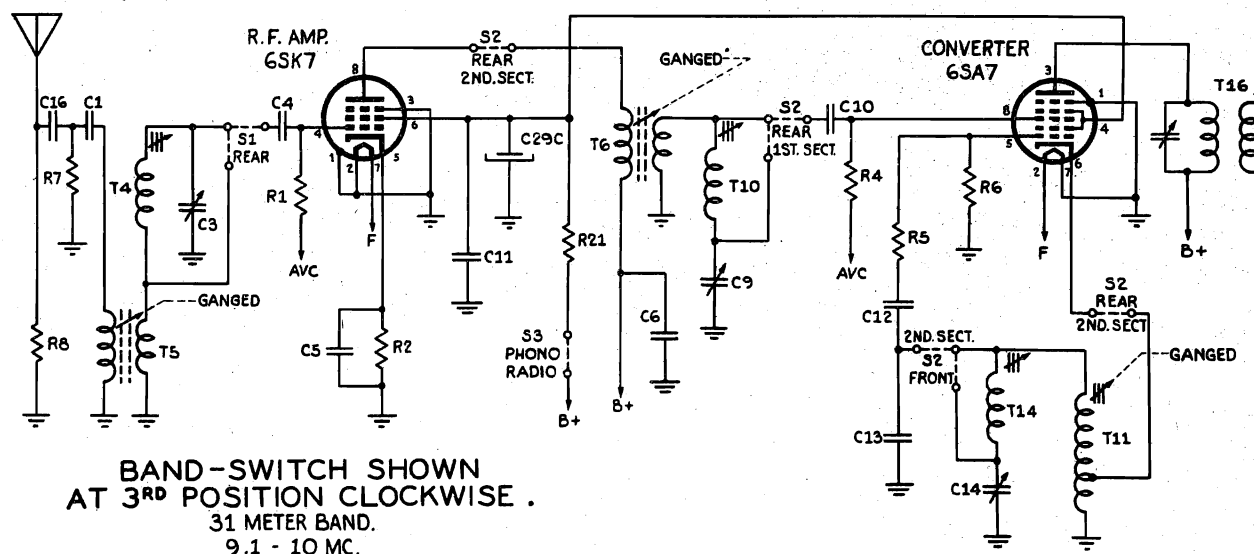
MODEL 8A59



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540-1600 KC



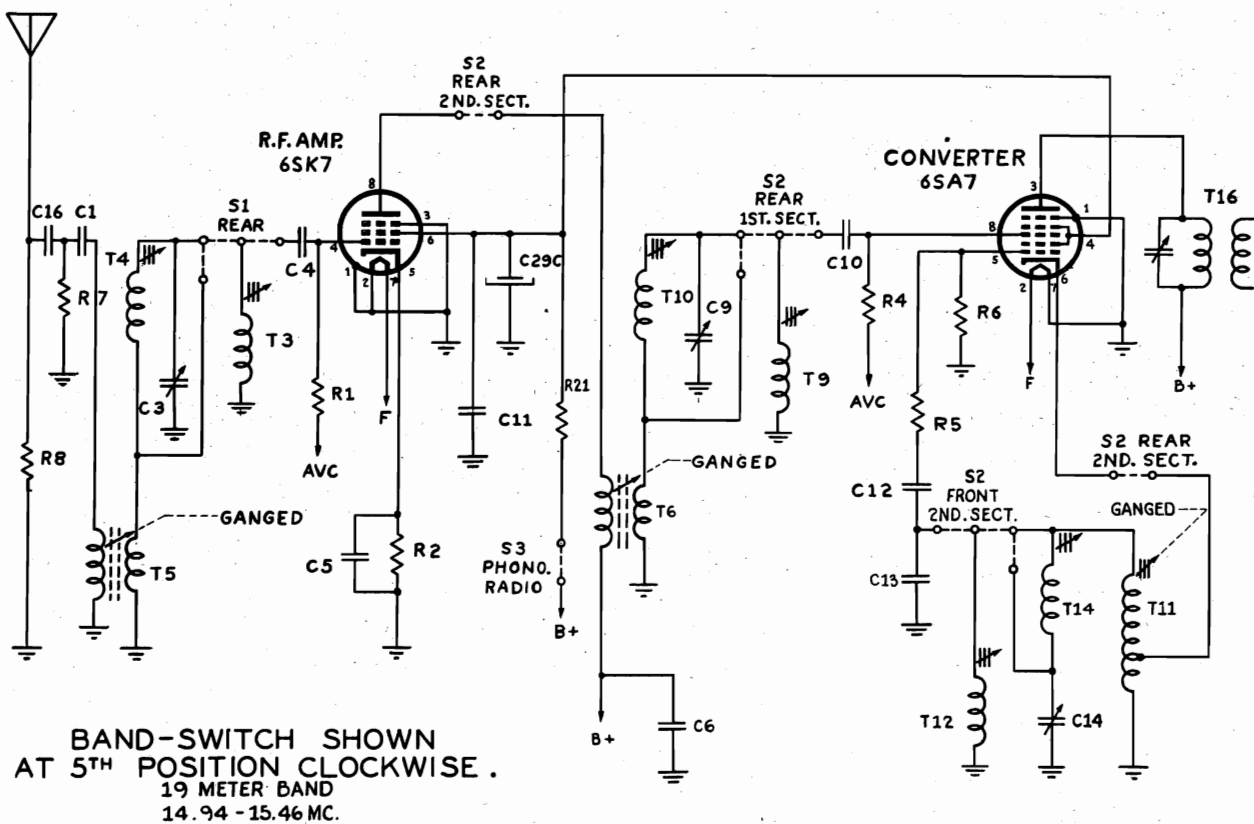
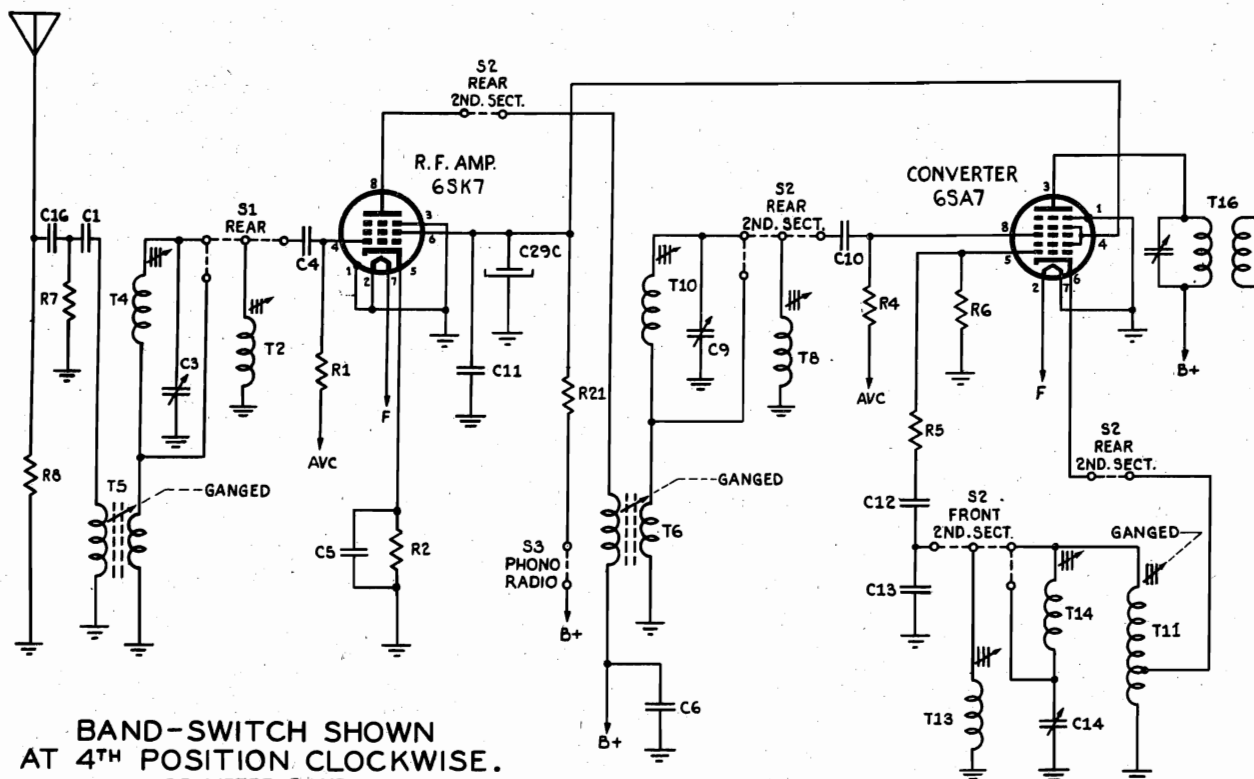
BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
49 METER BAND
5.96 - 6.19 MC.



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE .
31 METER BAND.
9.1 - 10 MC.

MODEL 8A59

BELMONT RADIO CORP.



BELMONT RADIO CORP.

MECHANICAL ADJUSTMENT—The core tuning bar (see illustration of iron cores) and dial pointer must be adjusted mechanically before any electrical alignment is attempted. Rotate the manual tuning control until the core bar is farthest from the coils. For proper adjustment the bar should be approximately $1/32$ of an inch from the two rod guide angles.

With the core bar in this position, adjust the dial pointer to coincide with 1600 kc on the dial scale.

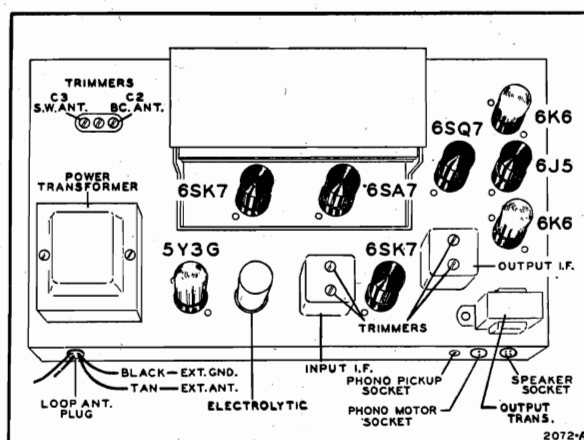
Rotate each of the three broadcast coils (see illustration) until the end of the coil is $1-5/32$ " from the end of the coil form. Rotate the three 9-mc coils until this dimension is $1-1/16$ " for these coils. After these adjustments have been made, the unit can be aligned electrically.

ELECTRICAL ADJUSTMENT—To align the set make the following preliminary adjustments: Set the tone pushbutton for treble tone; set the volume control at maximum; connect the ground post of the signal generator to the radio chassis; connect the output meter across a 3.2-ohm output load; and allow the receiver and signal generator to warm up for several minutes.

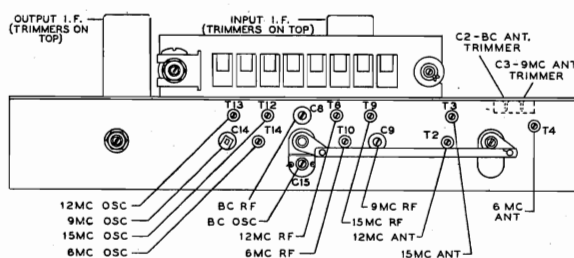
Align the set according to the sequence given in the chart. The indicated dummy antenna is to be connected in series between the signal generator output lead and the receiver. Adjust the set for maximum output; reduce the input as needed to keep the output near 1.3 volts.

Locations of all the trimmers and coils are shown in the illustrations below. After adjustment, seal the coil cores with collodion or a similar substance (do not use cement).

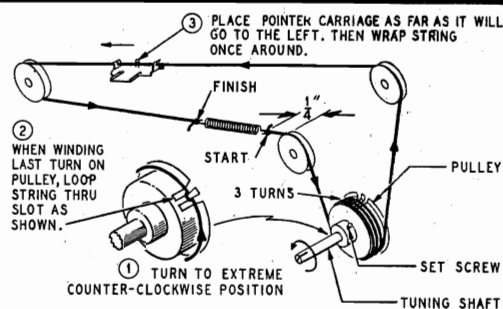
BAND SWITCH SETTING	SIGNAL GENERATOR			DIAL POINTER SETTING	ADJUST TO MAXIMUM OUTPUT (in order shown)
	Frequency	Coupling Capacitor	Connection to Radio		
Broadcast (for I. F.)	455 kc	.1 mf	Grid (pin 8) of converter (6SA7)	1600 kc	Trimmers on output and input I. F. cans
Broadcast	1600 kc	200 mmf	Antenna lead	1600 kc	BC Osc. trimmer C15 BC R. F. trimmer C8 BC Ant. trimmer C2
	1400 kc	200 mmf	Antenna lead	1400 kc	Rotate cores of BC R. F. coil T7 and BC Ant. coil T1
31 Meter	9.6 mc	400 ohms	Antenna lead	9.6 mc	9 mc Osc. trimmer C14 9 mc R. F. trimmer C9 9 mc Ant. trimmer C3
49 Meter	6.1 mc	400 ohms	Antenna lead	6.1 mc	6 mc Osc. coil T14 6 mc R. F. coil T10 6 mc Ant. coil T4
25 Meter	11.8 mc	400 ohms	Antenna lead	11.8 mc	12 mc Osc. coil T13 12 mc R. F. coil T8 12 mc Ant. coil T2
19 Meter	15.2 mc	400 ohms	Antenna lead	15.2 mc	15 mc Osc. coil T12 15 mc R. F. coil T9 15 mc Ant. coil T3



Chassis View

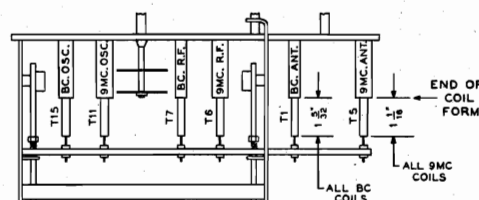


Coils and Trimmers



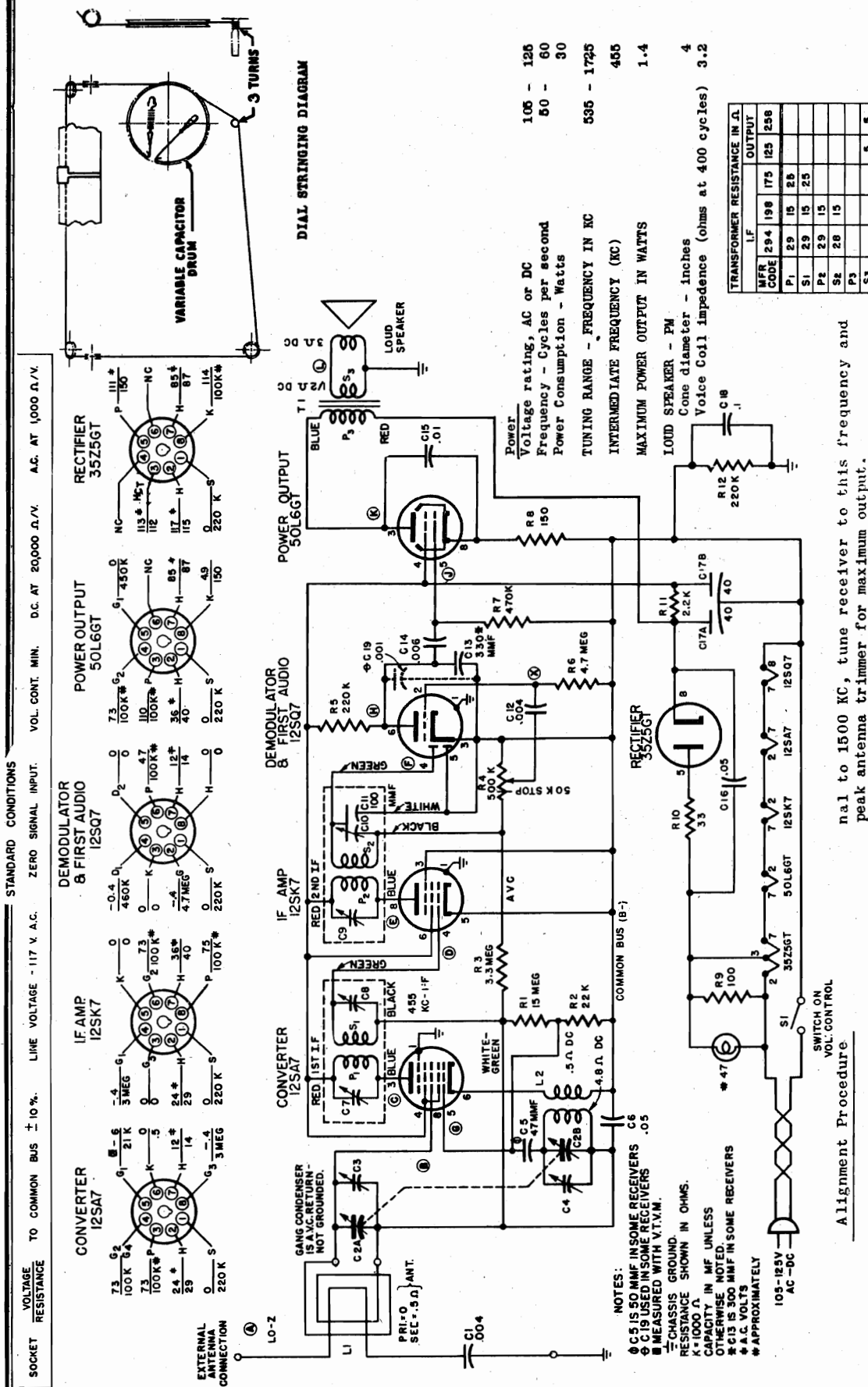
WHEN FINISHED WITH STRINGING, SPRING MUST BE $1/2$ " FROM IDLER AS SHOWN. TO DO THIS:

4. LOOSEN SET SCREW ON PULLEY.
5. HOLD TUNING SHAFT FIRM IN POSITION INDICATED AND TURN PULLEY BY HAND UNTIL SPRING IS $1/2$ " AWAY FROM IDLER.
6. TIGHTEN SET SCREW. NOW SPRING SHOULD TRAVEL BACK AND FORTH WITHOUT TOUCHING THE IDLERS.
7. REPLACE CHASSIS IN CABINET. REPLACE POINTER ON CARRIAGE. TUNE IN STATION OF KNOWN FREQUENCY. HOLD TUNING SHAFT FIRM AND SLIDE POINTER TO CORRECT POSITION ALONG DIAL.
8. GLUE POINTER TO STRING.



BENDIX RADIO DIV.

MODELS 526A,-B,-C,-D,-E
Preliminary



tuned to 1500 KC, tune receiver to this frequency and peak antenna trimmer for maximum output.

Precautions

An isolating transformer should be used between the power supply and the receiver if any of the test equipment is AC operated. The use of isolating capacitors is not recommended as AC through the capacitor may introduce hum modulation and if the capacitors should break down the test instruments will likely be damaged.

Alignment Procedure

Set volume control at maximum and connect output meter across voice coil. Keep input as low as possible at all times. IF - Set signal generator at 455 KC and connect to converter grid through a .05 mfd. capacitor. Tune progressively the 2nd. and 1st. IF trimmers for maximum output.

RF - Set gang tuning condenser wide open. Set signal generator at 1750 KC and loosely couple to antenna. Tune oscillator coil for maximum output. Change sig-

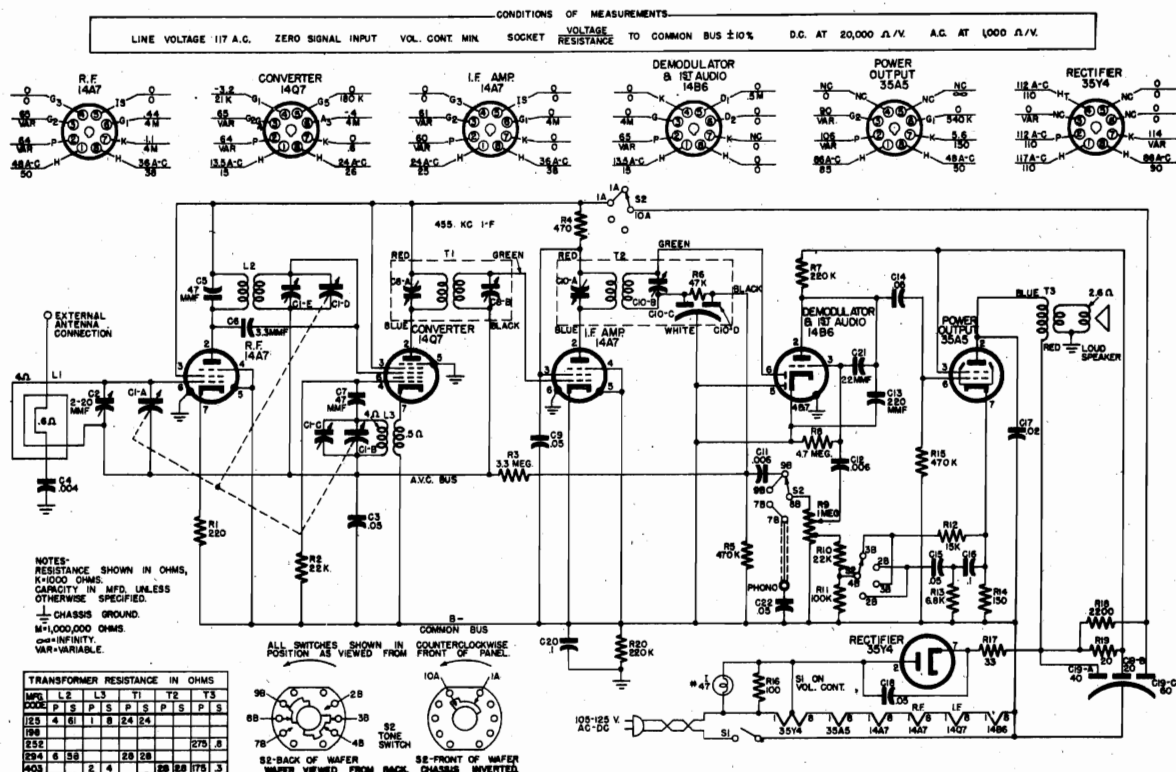
MODELS 526A, -B, -C, -D, -E
Preliminary

BENDIX RADIO DIV.

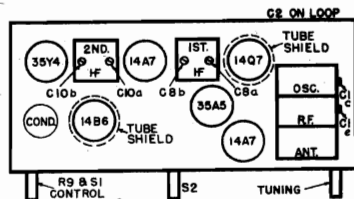
REPLACEMENT PARTS LIST

Stock No.	Description	List Price	Stock No.	Description	List Price
ALOC00	ANTENNA - Loop Assembly (L1).....			PARTS COMMON TO MODEL 0526A & B	
CE2A00	CAPACITOR - Electrolytic - 40-40-150 W.V. (C17A, C17B).....		BTIT00	POST - Binding (Base Plate).....	
CL2A00	CORD - AC Power.....		BZOD00	BAFFLE - Corrugated Paper Speaker.....	
CM5A14	CAPACITOR - 47 mmf. mica (C5).....		DSOA03	DIAL - Plastic Scale (54-170).....	
CM5A34	CAPACITOR - 330 mmf. mica (C13).....		FZOR00	FOOT - Rubber (Vinylite) Mtg.....	
CM5A46	CAPACITOR - .001 mmf mica 500 V.D.C. (C19) ..		HKOR00	RING - Knob Retainer Spring (.015).....	
CP4T20	CAPACITOR - .006 mfd. - 400 V.D.C. Paper (C14).....		HPOB00	PLATE - Base Assy.....	
CP4T31	CAPACITOR - .01 mfd. - 400 V.D.C. Paper (C15).....		HZOS00	STUD - Trimount.....	
CP4T40	CAPACITOR - .05 mfd. - 400 V.D.C. Paper (C6) ..		IDOM00	INDICATOR - Metal Dial (Pointer).....	
CP4T51	CAPACITOR - .1 mfd. - 400 V.D.C. Paper (C18) ..		PIOB01	PLATE - Asbestos Base Insulator.....	
CP6T16	CAPACITOR - .004 mfd. - 600 V.D.C. Paper (C1, C12).....			PARTS FOR MODEL 0526A	
CP6T40	CAPACITOR - .05 mfd. - 600 V.D.C. Paper (C16) ..		KCOB01	KNOB - Mottled Brown - Push on.....	
CVOB01	CAPACITOR - Variable (C2A, C2B, C3RF - 25 mmf max. C4 Osc. 25 mmf. max.).....		ZPOB01	CABINET - Mottled Brown Plastic.....	
LO1B00	COIL - Oscillator (L2).....			PARTS FOR MODEL 0526B	
RC1H40	RESISTOR - 22 K ohms, 1/4 W. Comp. (R2).....		KCOB03	KNOB - Mottled Brown - Push On.....	
RC1H54	RESISTOR - 220 K ohms, 1/4 W. Comp. (R5, R12) ..		ZPO101	CABINET - Ivory Plastic.....	
RC1H58	RESISTOR - 470 K ohms, 1/4 W. Comp. (R7).....			PARTS COMMON TO MODELS 0526C & D	
RC1H68	RESISTOR - 3.3 meg. 1/4 W. Comp. (R3).....		BZOB00	BACK - Teakwood - Catalin Cabinet.....	
RC1H70	RESISTOR - 4.7 meg. 1/4 W. Comp. (R6).....		GFOS00	GASKET - Felt 3/16" X 3-1/4" ID (spkr.).....	
RC1H76	RESISTOR - 15 meg. 1/4 W. Comp. (R1).....		FZOR01	FOOT - Cabinet (Rubber).....	
RC3H12	RESISTOR - 100 ohms, 1 W. Comp. (R9).....		GROD00	GASKET - Rubber Dial (1/16" X 1/8" X 4").....	
RC4G28	RESISTOR - 2200 ohms, 2 W. Comp. (R11).....		GROD01	GASKET - Rubber Dial (3/16" X 1/32" X 1/4") ..	
RVOS00	POTENTIOMETER - with switch - 500 K ohms (R4) ..		HKOC00	CLIP - Knob Retainer Spring.....	
RW1A06	RESISTOR - 33 ohms, 1 W. W. W. (R10).....		HZOS01	STUD - Trimount.....	
RW1B14	RESISTOR - 150 ohms, 1 W.W.W. (R8).....		IDOM01	INDICATOR - Metal Dial (Pointer).....	
SODD00	SOCKET - Dial Lamp.....			PARTS FOR MODEL 0526C	
SOSB00	SOCKET - Octal Tube.....		DSOA00	DIAL - Glass Scale (54 - 170).....	
TIOC00	TRANS. - Converter I.F. (1st).....		DXOR00	RETAINER - Dial, R.H. (Trim).....	
TIOD00	TRANS. - Diode I.F. (2nd).....		DXOR01	RETAINER - Dial, L.H. (Trim).....	
			KCOG00	KNOB - Plain Push-on (Green).....	
			ZCOG00	CABINET - Green & Black Catalin.....	
	SPEAKER AND COMPONENTS			PARTS FOR MODEL 0526D	
SP4R00	SPEAKER - 4" P.M.....		DSOA05	DIAL - Glass (54 - 170).....	
CS4R00	CONE - 4" Cone & V.C. Assy. - Spkr. SP4R00, Code 252.....		DXOR02	RETAINER - Dial, R.H. (Trim).....	
CS4R01	CONE - 4" Cone & V.C. Assy. - Spkr. SP4R00, Code 328.....		DXOR03	RETAINER - Dial, L.H. (Trim).....	
CS4R02	CONE - 4" Cone & V.C. Assy. - Spkr. SP4R00, Code 277.....		KCOG01	KNOB - Brown Push-ON.....	
CS4R03	CONE - 4" Cone & V.C. Assy. - Spkr. SP4R00, Code 258.....		ZCOB00	CABINET - Two-Tone Brown Catalin.....	
CS4R04	CONE - 4" Cone & V.C. Assy. - Spkr. SP4R00, Code 191.....			PARTS FOR MODEL 0526E	
TA0000	TRANSFORMER - Output Trans.....				
	MECHANICAL COMPONENTS				
ADOB00	PLATE ASSEMBLY - Dial Back.....		BZOB01	BACK - Cabinet Teakwood.....	
BT4S00	BOARD - Strip Terminal - 4 lugs.....		BZOD00	BAFFLE - Corrugated Card Board.....	
CDOC01	CABLE - Dial 40 1/2".....		BZOD02	BAFFLE - Paper.....	
GROS00	GROMMET - Cond. Shockmount.....		DSOA07	DIAL GLASS (54-170 K.C.).....	
HBOA00	BRACKET - Loop Antenna.....		DXOR06	RETAINER - Metal Dial.....	
HCOC03	CLAMP - Cable Dial.....		FZOR02	FOOT - Black Rubber.....	
HCOS00	CLIP - Tuning Shaft Spring.....		GFOS06	GASKET - Blk. Felt (1/16 X 1/4 X 5/8).....	
HNOPO0	NUT 3/8 X 32 Palnut.....		GFOS07	GASKET - Blk. Felt (1/16 X 3/16 X 8 1/2).....	
HROS02	RIVET - Shoulder (.218).....		GFOS08	GASKET - Blk. Felt (1/16 X 1/4 X 13/16).....	
HSOC00	SPRING - Dial Cable Tension.....		GZOC01	GRILL-CLOTH - (Dk. Br.).....	
HS6F00	SLEEVE - Spacer - Tuning Cond. Mtg.....		HKOR00	RING - Retainer Spring (.015).....	
ITOC00	TUBE - Capacitor Insulating.....		IDOM03	INDICATOR - Metal Dial Pointer.....	
MPOFO0	PULLEY - Idler (Fiber).....		KCOB07	KNOB - Dk. Mottled Brown (Cont'l).....	
MSOT00	SHAFT TUNING.....		PIOB01	PLATE - Asbestos Base Insulator.....	
PIOC00	PLATE - Mounting Elect. Cap.....		ZW5A00	CABINET ASS'Y - (Wood) BW76.....	
PIOP00	PLATE - Power Cord Insulator.....				

BENDIX RADIO DIV.



Power Consumption-Watts.....	30
TUNING RANGE—FREQUENCY IN KC.....	535-1725
INTERMEDIATE FREQUENCY (KC).....	455
MAXIMUM POWER OUTPUT IN WATTS.....	1.2
LOUD SPEAKER—PM-OVAL	
Cone diameter—inches.....	4x6
Voice Coil Impedance (ohms at 400 cycles).....	3.2



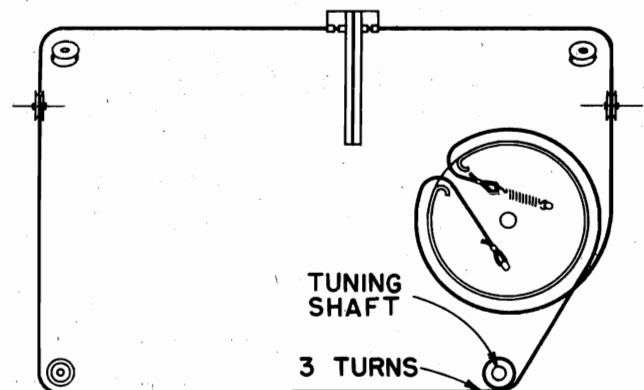
Alignment Procedure

Connect line cord plug to 117 volt, 60 cycles AC power source. Set volume control at maximum clockwise position and tone control (S2) in counterclockwise position. Connect output meter across voice coil. Adjust dial pointer by turning tuning control fully counterclockwise and sliding dial pointer on dial cord until it is exactly $2\frac{3}{16}$ " from left end of dial back plate. Make all adjustments in order given in table and for maximum output. Dial Pointer Positions given measured from left hand end of dial back plate. Keep input as low as possible at all times.

Precautions

An isolating transformer should be used between the power supply and the receiver if any of the test equipment is AC operated. The use of isolating capacitors is not recommended as AC through the capacitor may introduce hum modulation, and if the capacitors should break down the test instruments will likely be damaged.

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Circuit Aligned	Input Freq:	Dial Pointer Position	Adjust- ments
IF	*455 KC	Max. to right	C10b, C10a C8b, C8a
OSC.	**1475 KC	6 3/4"	C1c
RF	**1475 KC	6 3/4"	C1c, C2
	**965 KC	5	Check
	**580 KC	2-23/32"	Calib.

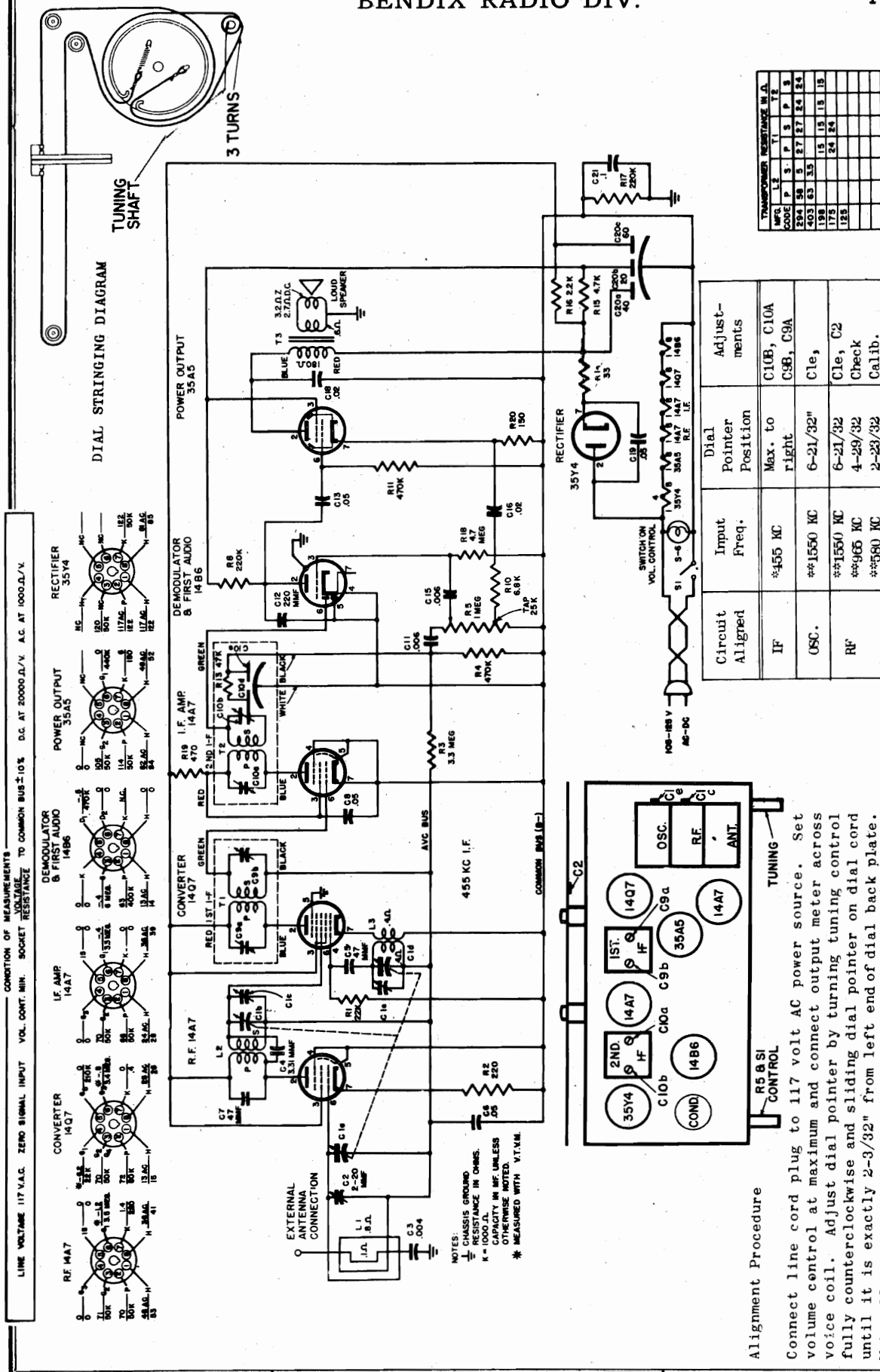
* Applied to Antenna input .1 mfd. or less.

** Applied to Antenna input through 50 mmf. or less.

BENDIX RADIO DIV.

[illegible]

BENDIX RADIO DIV.

MODEL 646A
Preliminary

MODEL 646A

Preliminary

BENDIX RADIO DIV.

Power

Voltage Rating, AC or DC

105 - 125

Frequency - Cycles per second

50 - 60

Power Consumption - Watts

37

MAXIMUM POWER OUTPUT IN WATTS

1.2

LOUD SPEAKER - PM

Cone diameter - inches

6

Voice Coil Impedance (ohms at 400 cycles)

3.2

TUNING RANGE - FREQUENCY IN KC

535 - 1725

INTERMEDIATE FREQUENCY (KC)

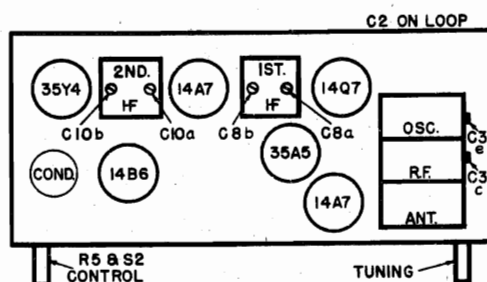
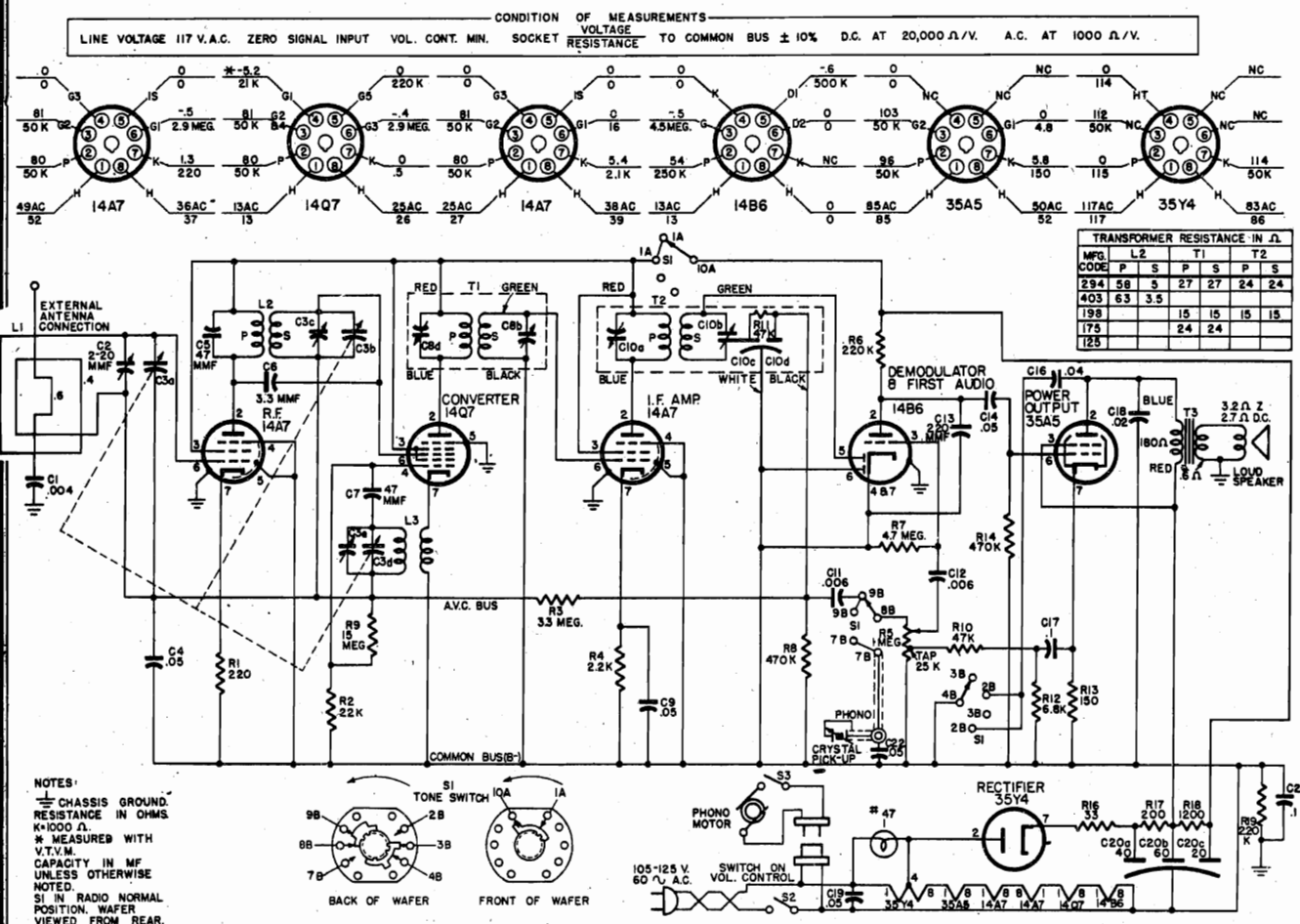
455

REPLACEMENT PARTS LIST

Stock No.	Description	List Price	Stock No.	Description	List Price
ELECTRICAL COMPONENTS					
ALOC03*	ANTENNA - Loop	1.95	HN9P45	PALNUT - 3/8 X 32.....	.01
CC9A16	CAPACITOR - Ceramic 3.3 mmf. (C4).....	.05	HR0S01	RIVET - Shoulder .....	.02
CE3A00	CAPACITOR - Electrolytic (20-40-60 mfd.)....	1.86	HSOC00	SPRING - Coil.....	.04
	150V.D.C. (C20A, B, C)		HSOP01	SPACER - Antenna.....	.01
CL2A01	CORD - A.C. Power Line.....	.47	HS6F00	SLEEVE - Spacer Flared.....	.02
CM5A14	CAPACITOR - Mica 47 mmf. (C5,C7).....	.19	HS6S01	SCREW - Self-Tapping 6 X 1/4.....	.32/C
CM5A30	CAPACITOR - Mica 220 mmf. 500V (C12) .....	.55	IDOM05	INDICATOR - Metal Dial.....	.33
CP4T20	CAPACITOR - Paper .006 mfd. 400V (C11,C15) ..	.15	ITOC01	TUBE - Insulating (Cap).....	.04
CP4T34	CAPACITOR - Paper .02 mfd. 400V (C16,C18) ..	.14	MPOF00	PULLEY - Idler (Fiber).....	.02
CP4T40	CAPACITOR - Paper .05 mfd. 400V (C6,C8,C13, C19) .....	.16	MSOT04	SHAFT - Steel Tuning.....	.16
CP4T51	CAPACITOR - Paper .1 mfd. 400V (C21).....	.18	PIOC00	PLATE - Insulator Mtg.....	.02
CP6T16	CAPACITOR - Paper .004 mfd. 600V (C3).....	.29	PIOP00	PLATE - Insulating Power Cord.....	.01
CT2A01	TRIMMER - 2-20 mmfd. (C2)	7.50	SMOT00	SHIELD - Metal Tubing.....	.05
CVOC00	CAPACITOR - Variable (C1a,1b,1d).....	.94	SPEAKER AND COMPONENTS		
LO6B00	OSCILLATOR - Coil Ass'y. (L3).....	.04	SP6R00*	SPEAKER - 6 P.M. less transf.....	5.79
RC1H16	RESISTOR - 220Ω ±W Comp. (R2).....	.04	CS6R00	CONE & V.C. ASS'Y - Code 285.....	
RC1H20	RESISTOR - 470Ω ±W Comp. (R19).....	.04	CS6R01	CONE & V.C. ASS'Y - Code 159.....	
RC1H32	RESISTOR - 4700Ω ±W Comp. (R15).....	.04	CS6R02	CONE & V.C. ASS'Y - Code 270.....	
RC1H34	RESISTOR - 6800Ω ±W Comp. (R10).....	.04	CS6R03	CONE & V.C. ASS'Y - Code 258.....	
RC1H40	RESISTOR - 22KΩ ±W Comp. (R1).....	.04	CS6R04	CONE & V.C. ASS'Y - Code 191.....	
RC1H54	RESISTOR - 220KΩ ±W Comp. (R17, R8).....	.04	CS6R05	CONE & V.C. ASS'Y - Code 188.....	
RC1H58	RESISTOR - 470KΩ ±W Comp. (R4, R11).....	.04	CS6R06	CONE & V.C. ASS'Y - Code 371.....	
RC1H68	RESISTOR - 3.3 Meg. ±W Comp. (R3).....	.04	TA0003	TRANSFORMER - Output (T3).....	1.95
RC1H70	RESISTOR - 4.7 Meg. ±W Comp. (R18).....	.04	CABINET COMPONENTS		
RC4G28	RESISTOR - 2200Ω 2W Comp. (R16).....	.14	BZOD04	BAFFLE - Board (wood).....	
RV4S02	POTENTIOMETER - with switch 1 Meg. (R5).....	.94	DSOA04	DIAL - Glass (54-170).....	4.80
RW1B14	RESISTOR - 150Ω 1W.W.W. (R20).....	.08	GFOS04	GASKET - Felt (1/16 X 1/4 X 3-3/4) ..	.01
RW2A06	RESISTOR - 33Ω 2W.W.W. (R14).....	.10	GZOC02	GRILLE - Cloth.....	
SOOD03	SOCKET - Dial Light.....	.40	HCOC04	CLAMP - Dial Light.....	.05
SO9S00	SOCKET - Locktal Tube.....	.15	HKOR00	RING - Knob Retainer Spring.....	.01
TIOC01	I. F. TRANSFORMER - 1st (T1).....	3.00	HS6W25	SCREW - #6 X 5/8" F.H. (Statuary Br. ....	.65/C
TIOD01	I. F. TRANSFORMER - 2nd (T2).....	2.43	HS6W26	SCREW - #6 X 1/2" F.H. (Statuary Br. ....	.60/C
TR6L00	R. F. TRANSFORMER ASS'Y. - Interstage (L2) ..	3.75	HS8S50	SCREW - Self-Tapping #8 X1" .....	.56/C
MECHANICAL COMPONENTS					
ADOC03	PLATE ASS'Y - Dial Back .....	.89	HS8W51	SCREW - Wood F.H. #8 (Red iridete)....	
BT1S00	TERMINAL STRIP - 1 Soldering Lug.....	.02	HW8C00	WASHER - #8 Cup Type (D.K. oxidized)...	
BT2S00	TERMINAL STRIP - 2 Soldering Lugs.....	.02	HZOG00	GLIDE - Metal N.P.....	.05
BT4S01	TERMINAL STRIP - 4 Soldering Lugs.....	.05	HZOH01	HINGE - Table (D.K. oxidized)....	.08
CDOC03	CABLE - Dial (47 3/8").....	.18	HZOL01	SUPPORT - Table Drop Leaf.....	1.08/pr
GROSO0	GROMMET - Cap Shockmount.....	.04	JR2S01	RECEPTACLE - 2 contacts.....	.36
HBOA01	BRACKET - Loop.....	.03	KYOM00	KNOB - Control (Engl. Antique)....	.38
HCOC00	CLIP - Coil Mtg.....	.01	KYOM01	KNOB - Dummy (Engl. Antique)....	.38
HCOC03	CLAMP - Cable .....	.04	PIOB00	PLATE - Asbestos Insulator.....	.05
HCOS00	CLIP - Spring .....	.01	PIOB02	PLATE - Asbestos Insulator.....	.01
HCOT00	CLAMP - Tube Shield.....	.01	WFOZ00	WASHER - Felt.....	.16/C
			XS0Z00	REFLECTOR - Strip Ass'y.....	
			ZW6A04*	CABINET - Mahogany.....	57.00

(Prices subject to change without notice)

* Subject to excise tax

MODEL 656A
Preliminary
BENDIX RADIO DIV.

Alignment Procedure

Connect line cord plug to 117 volt AC power source. Set volume control at maximum and tone control in radio normal position. Connect output meter across voice coil. Adjust dial pointer by turning tuning control fully counterclockwise and sliding dial pointer on dial cord until it is exactly $2\frac{3}{8}$ " from left end of dial back plate. Make all adjustments in order given in table and for maximum output. Dial pointer position given in inches measured from left hand end of dial back plate. Keep input as low as possible at all times.

Precautions

An isolating transformer should be used between the power supply and the receiver if any of the test equipment is AC operated. The use of isolating capacitors is not recommended as AC through the capacitor may introduce hum modulation, and if the capacitors should break down the test instruments will likely be damaged.

Power

Voltage Rating, 60 cycles AC 105-125
 Power Consumption—Watts 65

Tuning Range—Frequency in KCS 535-1725

Intermediate Frequency—KCS 455

Maximum Power Output—Watts 1.2

Loud Speaker—PM

Cone Diameter—inches 6
 Voice Coil Impedance (ohms at 400 cycles) 3.2

Circuit Aligned	Input Frequency	Dial Pointer Position	Adjustments
IF	*455 KC	Max. to right	C10b, C10a C8b, C8a
OSC	**1550 KC	7	C3e
RF	**1550 KC ** 965 KC ** 580 KC	7 $5\frac{1}{4}$ $3\frac{1}{16}$	C3e, C2 Check Calib.

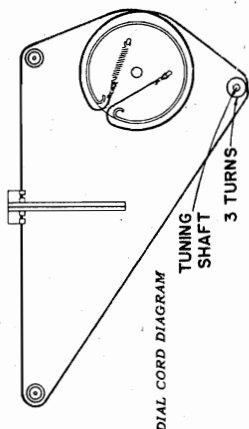
*Applied to antenna input through .1 mfd. or less.

**Applied to antenna input through 50 mmf. or less.

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MODEL 656A
Preliminary
MODELS 676B,-C,-D

BENDIX RADIO DIV.



Stock No.	Description	List Price
MECHANICAL COMPONENTS Con't.		
HS6S01	SCREW—Self Tapping #6 x 1/4"	34/c
HS6S02	SCREW—Self Tapping #8 x 1/4"	48/c
IDM004	INDICATOR—Metal Dial (Pointer)	.33
IR1000	WASHER—Insulating Cover	.04
IR1800	JACK—Receptacle 1 Pinulator	.40/c
JR2S03	JACK—Receptacle 2 Pins	.38
JR2S04	PULLEY—Idler	.02
MPF000	PLATE—Tuning	.15
PI0C00	PLATE—Line Cord Insulator	.01
PI0C00	PLATE—Line Cord Insulator	.01
SM0700	SHIELD—Metal Tube	.05
SM0700	SHIELD—Metal Tube	.05
SM0701	SOCKET—Dial light insulated	.23
SM0702	SOCKET—Dial light insulated	.23
SR4C00	SWITCH—3 Pole 4 Position Rotary (SI)	.84
SPEAKER & COMPONENTS		
SP6R00*	SPEAKER—6" P.M. for SP6R00 Code 85	5.79
SP6R01	CONE & V.C. ASSY. for SP6R00 Code 85	
SP6R02	CONE & V.C. ASSY. for SP6R00 Code 86	
SP6R03	CONE & V.C. ASSY. for SP6R00 Code 70	
SP6R04	CONE & V.C. ASSY. for SP6R00 Code 58	
SP6R05	CONE & V.C. ASSY. for SP6R00 Code 191	
SP6R06	CONE & V.C. ASSY. for SP6R00 Code 181	
SP6R07	CONE & V.C. ASSY. for SP6R00 Code 181	
TA0003	TRANSFORMER—Output for SP6R00 (T3)	1.95
CABINET COMPONENTS		
BZ0A00	BASE—Tubewood	.59
DIAL	DIAL—Glass	.95
BAFFLE	BAFFLE—Light	.95
DX0B00	RETAINER—Dial	.02
DX0R05	RETAINER—Dial	.11
PZ0R01	PLATE—Photo Comb 1 Band	.09
PZ0R01	PLATE—Photo Comb 1 Band	.09
GC0D01	GASKET—Cork Dial (12 1/2")	.01
HK0900	RING—Knob Retainer Spring	.01
HS0P75	SCREW—Phillips Oval Head 10-24 x 1 1/4"	.40/c
HS0P75	SCREW—Phillips Oval Head 10-24 x 1 1/4"	.40/c
HS0S02	SCREW—Self Tapping #6 x 1/4"	.65/c
HS0S23	SCREW—Wood #6 x 3/4" (Statory Bronze)	.78/c
HS0S23	SCREW—Wood #6 x 3/4" F.H. (Statory Bronze)	.70/c
HS0S26	SCREW—Wood #8 x 1" F.H. (Statory Bronze)	.30/c
HZ0000	HINGE—Lid (Statory Bronze)	.81
HZ0000	SUPPORT—Lid (Statory Bronze)	.55/c
HZ0P00	PAD—Brown Felt 1/2" x 1/2"	.38
IR0S02	RECEPTACLE—2 contacts (female)	.11
KC0B04	KNOB—Mottled Brown Push on	.15
PI0B00	PLATE—Insulating (Alabaster)	.14/c
SP4S00	CLAMP—Strip	.14/c
ZW6C00*	CABINET—Walnut	
ELECTRICAL COMPONENTS		
AL02A5*	ANTENNA LOOP	1.98
CS0915	CAPACITOR—Ceramic 3.3 mmf.	.05
CE3A00	CAPACITOR—Ceramic 100-40-60 Mfd. 130 V.D.C. (Cm9, Ccm9, Cm9)	1.86
CLA001	CORD—Power Line	.47
CM5A10	CAPACITOR—Mica 27 mmfd. 500 V. (C7, C5)	.18
CM5A30	CAPACITOR—Mica 420 mmfd. 500 V. (C1)	.22
CM5A30	CAPACITOR—Mica 420 mmfd. 500 V. (C1)	.17
CP1T20	CAPACITOR—Paper .006 mfd. 400 V. (C11)	.14
CP1T34	CAPACITOR—Paper .02 mfd. 400 V. (C18)	.14

Part No.	Description	List Price
TRC000	TRANSFORMER P.F. 5 W. (T3)	1.15
TRGL01	LAMP Bayonet Type Base	3.75
SP6900*	Speaker P. M. 6"	5.79
CS6901	CONDENSER 1000 MFD. 50 V. (C1)	1.15
CS6902	CONDENSER 1000 MFD. 50 V. (C2)	1.15
CS6903	CONDENSER 1000 MFD. 50 V. (C3)	1.15
CS6904	CONDENSER 1000 MFD. 50 V. (C4)	1.15
CS6905	CONDENSER 1000 MFD. 50 V. (C5)	1.15
CS6906	CONDENSER 1000 MFD. 50 V. (C6)	1.15
CS6907	CONDENSER 1000 MFD. 50 V. (C7)	1.15
CS6908	CONDENSER 1000 MFD. 50 V. (C8)	1.15
CS6909	CONDENSER 1000 MFD. 50 V. (C9)	1.15
CS6910	CONDENSER 1000 MFD. 50 V. (C10)	1.15
CS6911	CONDENSER 1000 MFD. 50 V. (C11)	1.15
CS6912	CONDENSER 1000 MFD. 50 V. (C12)	1.15
CS6913	CONDENSER 1000 MFD. 50 V. (C13)	1.15
CS6914	CONDENSER 1000 MFD. 50 V. (C14)	1.15
CS6915	CONDENSER 1000 MFD. 50 V. (C15)	1.15
CS6916	CONDENSER 1000 MFD. 50 V. (C16)	1.15
CS6917	CONDENSER 1000 MFD. 50 V. (C17)	1.15
CS6918	CONDENSER 1000 MFD. 50 V. (C18)	1.15
CS6919	CONDENSER 1000 MFD. 50 V. (C19)	1.15
CS6920	CONDENSER 1000 MFD. 50 V. (C20)	1.15
CS6921	CONDENSER 1000 MFD. 50 V. (C21)	1.15
CS6922	CONDENSER 1000 MFD. 50 V. (C22)	1.15
CS6923	CONDENSER 1000 MFD. 50 V. (C23)	1.15
CS6924	CONDENSER 1000 MFD. 50 V. (C24)	1.15
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CS6965	CONDENSER 1000 MFD. 50 V. (C65)	1.15
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CS6967	CONDENSER 1000 MFD. 50 V. (C67)	1.15
CS6968	CONDENSER 1000 MFD. 50 V. (C68)	1.15
CS6969	CONDENSER 1000 MFD. 50 V. (C69)	1.15
CS6970	CONDENSER 1000 MFD. 50 V. (C70)	1.15
CS6971	CONDENSER 1000 MFD. 50 V. (C71)	1.15
CS6972	CONDENSER 1000 MFD. 50 V. (C72)	1.15
CS6973	CONDENSER 1000 MFD. 50 V. (C73)	1.15</

MODELS 676B, C, D

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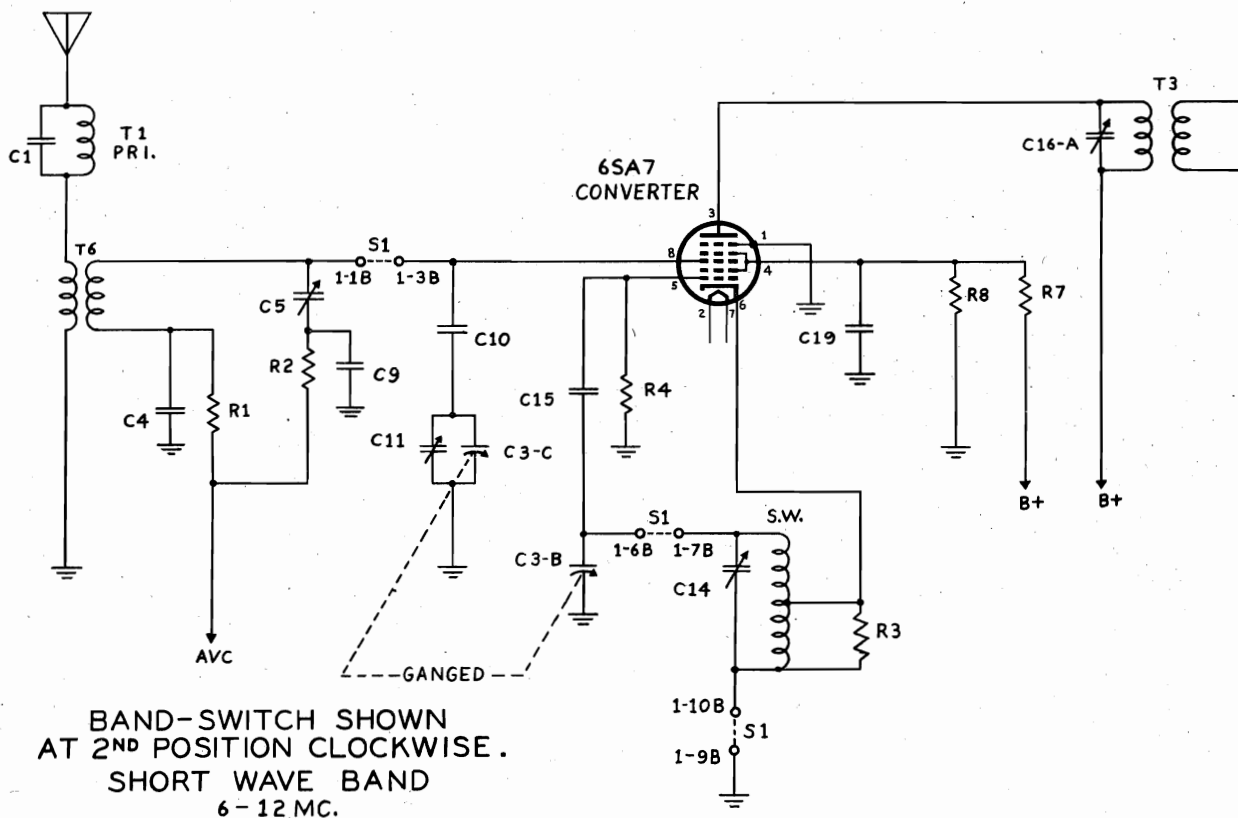
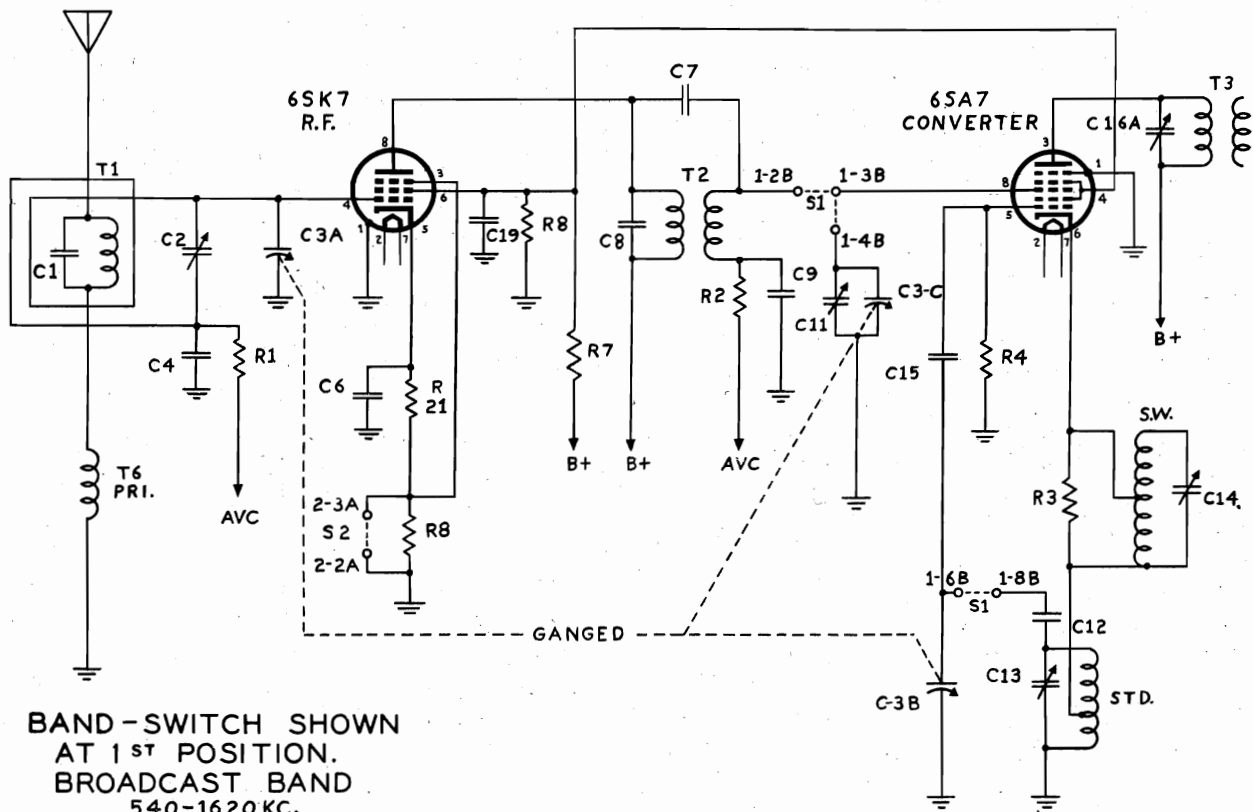
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PAGE 15-10 BENDIX

MODELS 676B, -C, -D

BENDIX RADIO DIV.



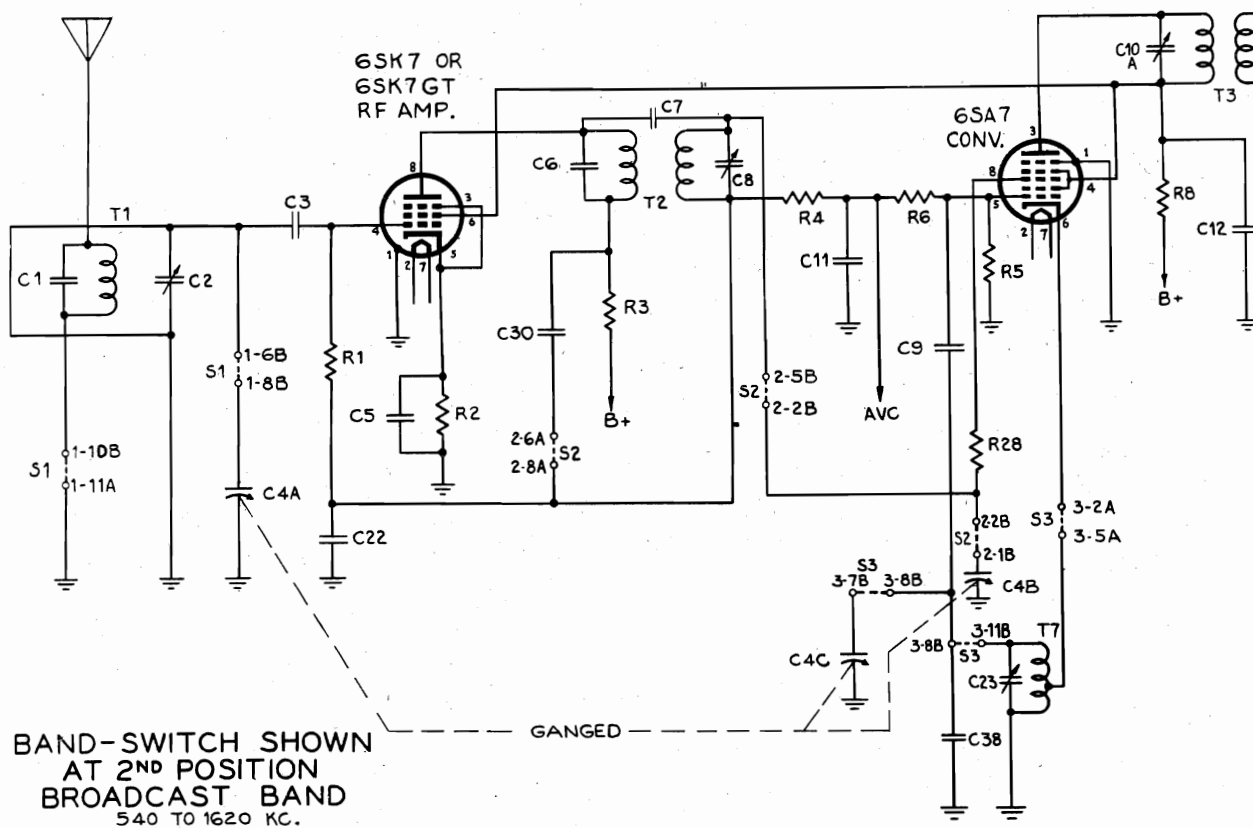
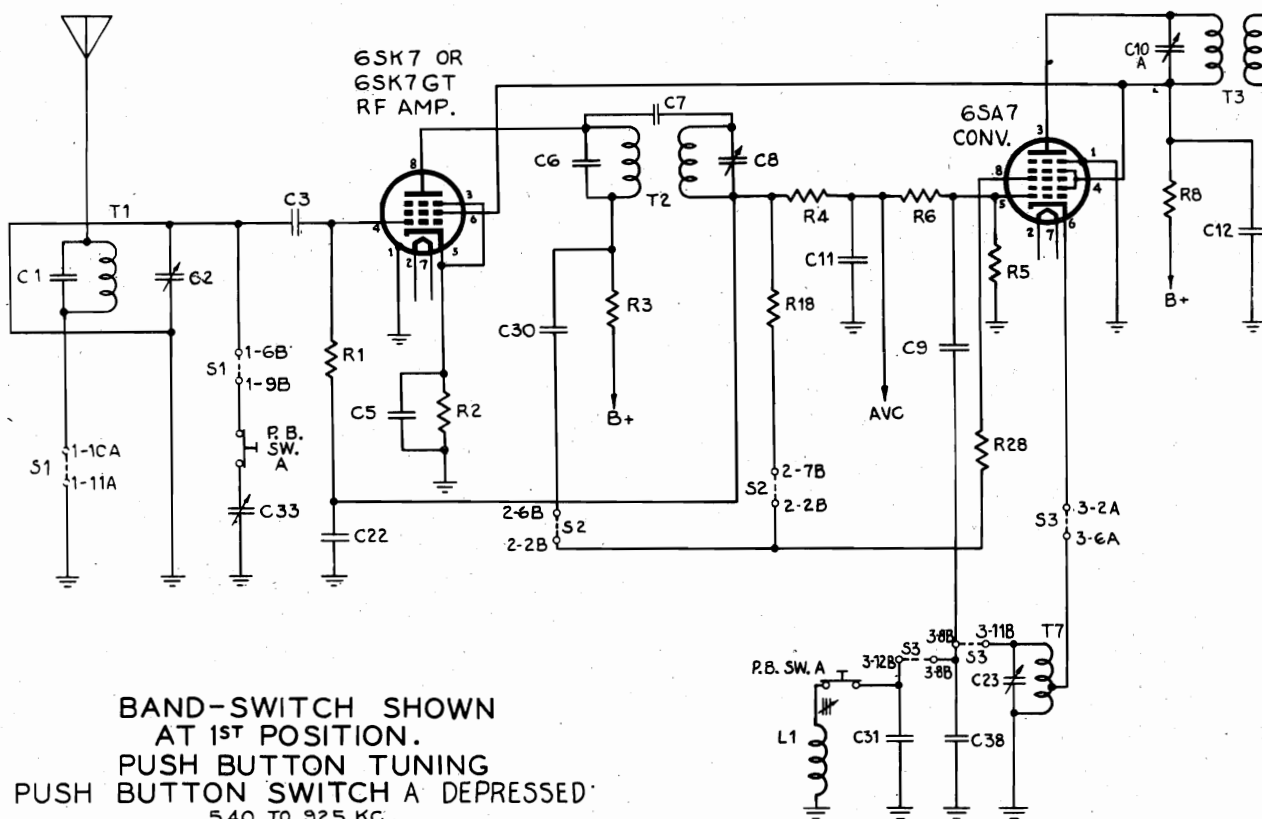


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PAGE 15-12 BENDIX

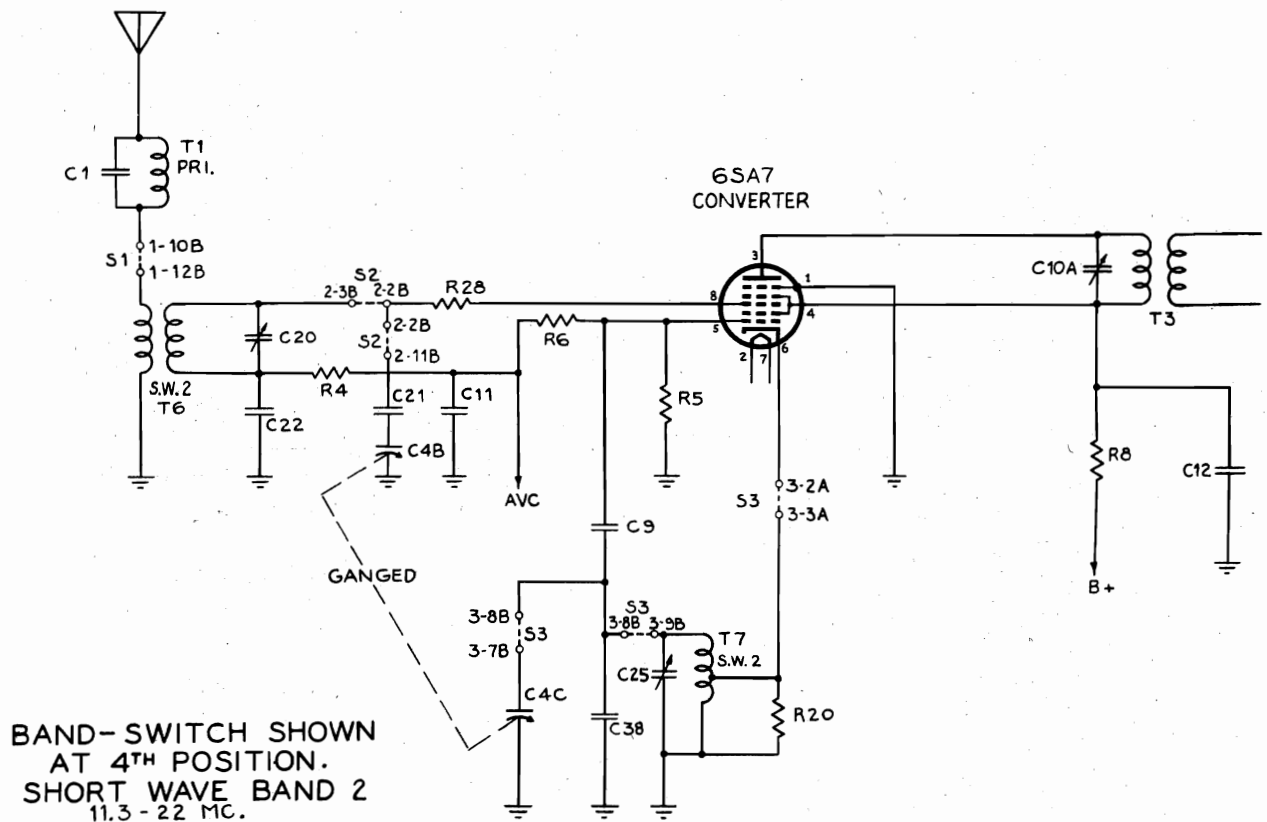
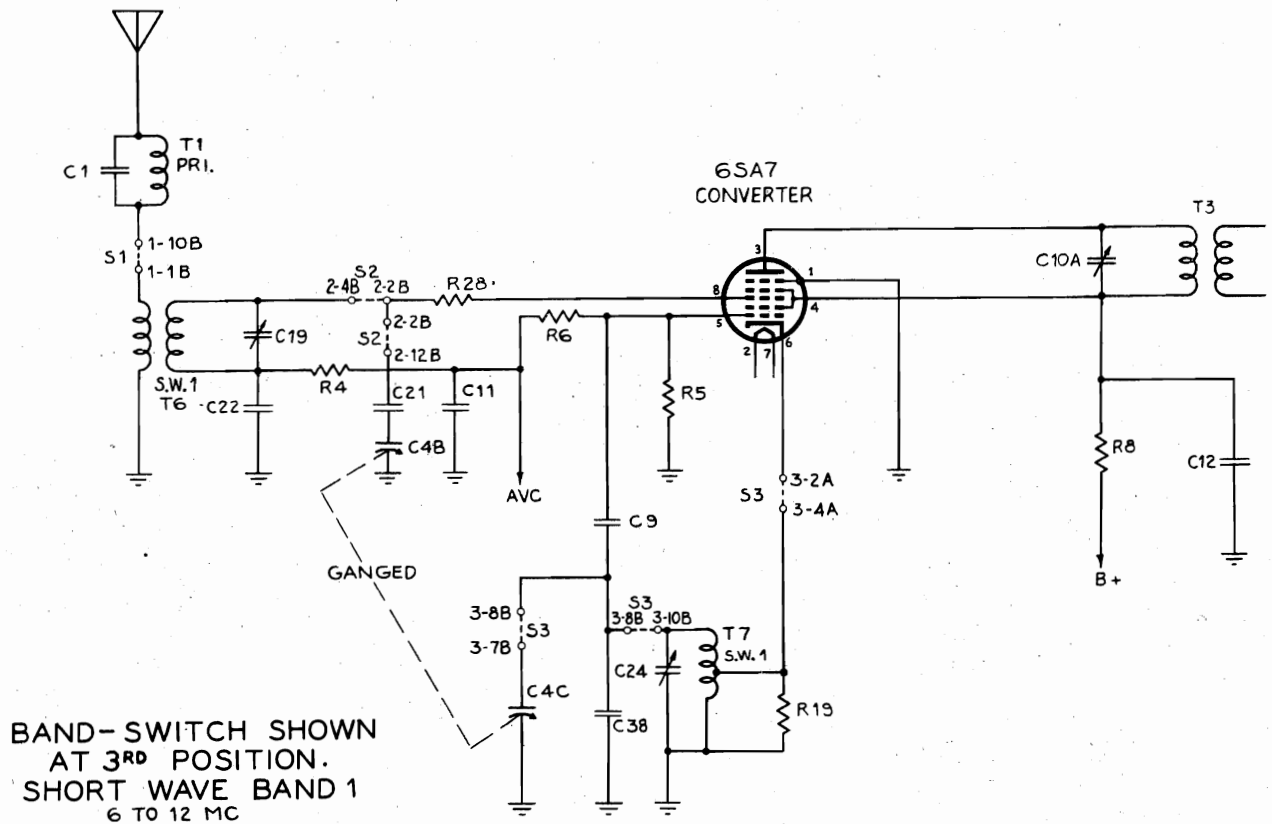
MODEL 736B

BENDIX RADIO DIV.



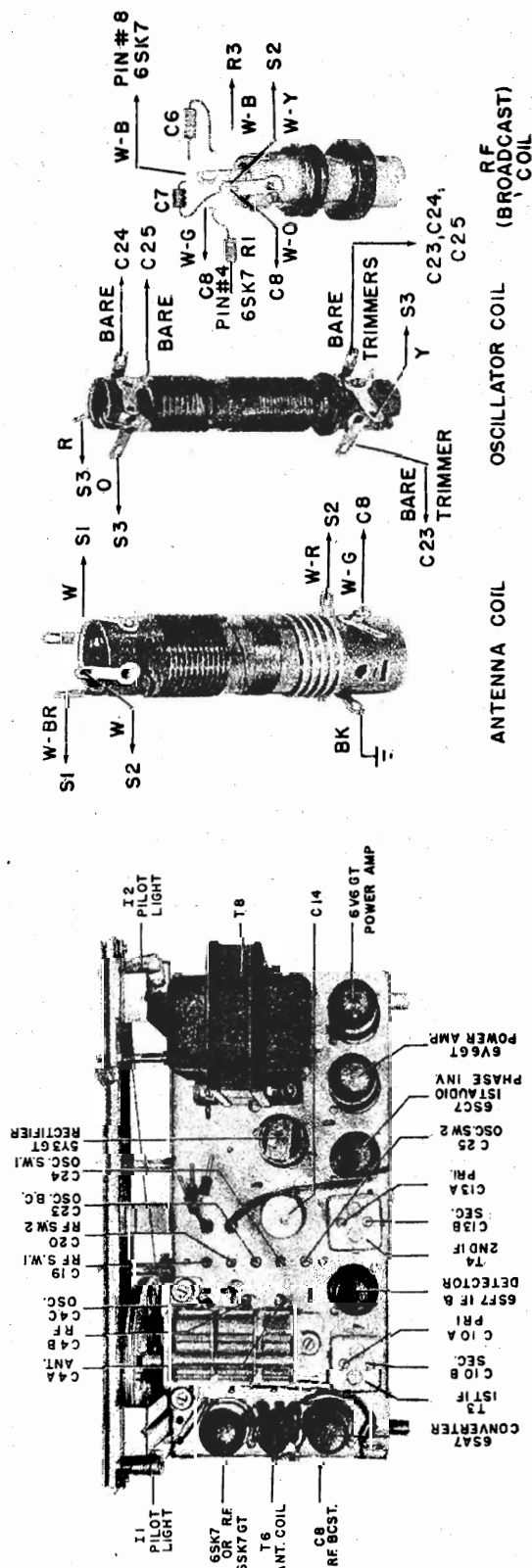
BENDIX RADIO DIV.

MODEL 736B



MODEL 736B

BENDIX RADIO DIV.



Chassis—Top View

Fig. 6

Fig. 8 Coil Connections

CIRCUIT	CONTROL POSITIONS	APPLY	THRU	TO	ADJUST
I. F.	Volume—Maximum			Grid	C13b
	Tone—Radio Treble			6SF7	C13a
	Band Switch—Manual Broadcast	455KC	.01 mfd.	I.F. Amp.	C10b
	Tuning Condenser—Fully Meshed (Adjust pointer to reference mark)			Grid	C10a
Broadcast	Pointer at Mark D	1450	200 mmf.	External Antenna Connection	C23
Short Wave Band No. 1	Band Switch—Short Wave No. 1 Pointer at Mark E	12 mc	400 ohms. in series with .01 mfd. Connection	External Antenna Connection	C24
Short Wave Band No. 2	Band Switch—Short Wave No. 2 Pointer at Mark F	22mc	400 ohms. in series with .01 mfd.	External Antenna Connection	C25
					C20

1. Alignment markers placed along bottom of dial back plate and left edge of pointer used as reference point.
2. Minimum input signal used for perceptible output.
3. After alignment, repeat process for possible slight readjustments.
4. Check calibration of Point A for 600 KC, Point B for 6mc and Point C for 11.5mc. If calibration is inaccurate check gang plates for bending or failure of components.

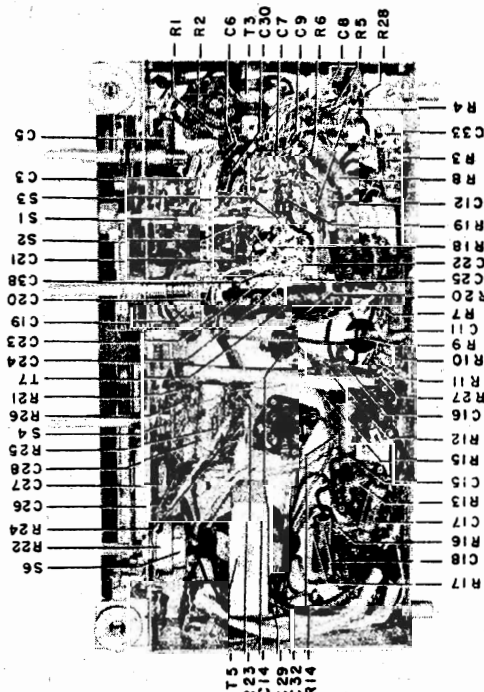
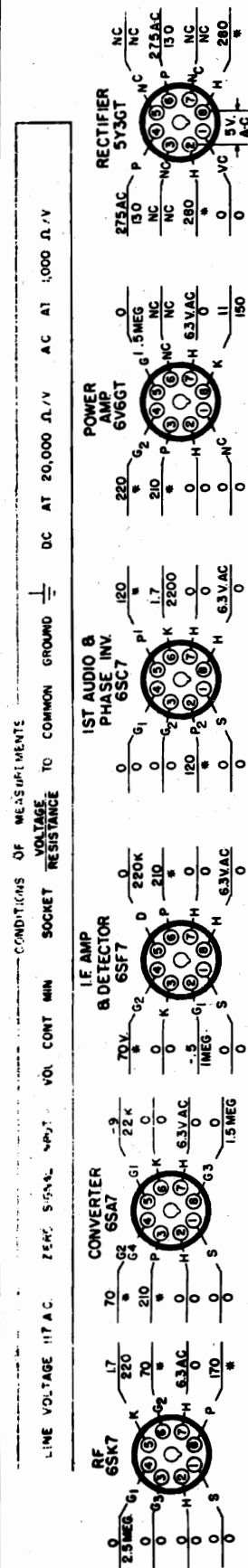


Fig. 7 Chassis—Bottom View

BENDIX RADIO DIV.

MODEL 736B



TRANSFORMER		RESISTANCE IN OHMS		POWER OUTPUT	
SYMBOL	T3	T4	T8	T9	
CODE	123	294	123	123	123
PHI	22	30	123	123	7
SEC.	22	30	123	123	100000

RESISTANCES OF COILS LESS THAN 1 Ω NOT SHOWN

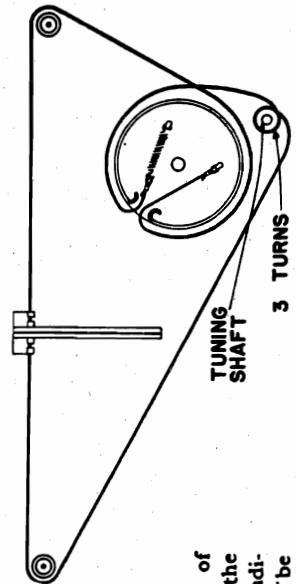
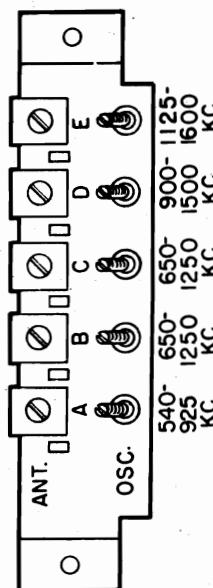


Fig. 4

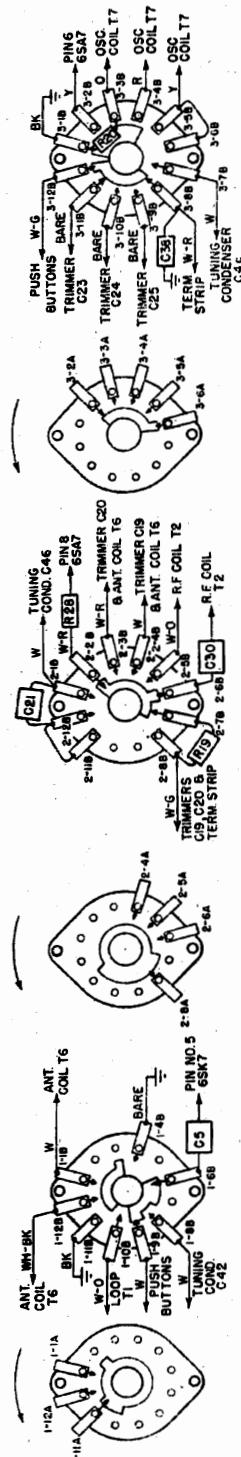
Pushbuttons — The first counterclockwise position of the band switch provides pushbutton operation on the broadcast band. Pushbutton frequency ranges are as indicated in following diagram. The Pushbuttons may be removed by pulling from shaft thereby giving access to adjustment screws. The Osc. and Ant. adjustment screws are indicated in figure 3.



POWER	
Voltage Range	105-125
Frequency—Cycles	60
Consumption—Watts	110
TUNING RANGE	
Broadcast—KCs.	540-1620
Shortwave No. 1—Mcs.	6-12
Short Wave No. 2—Mcs.	11.3-22
POWER OUTPUT—WATTS	
Maximum	7
At 10% Distortion	5
INTERMEDIATE FREQUENCY (KCs)	455
TUNING RATIO	12:1
POINTER TRAVEL	6 in.
LOUDSPEAKER—Electrodynamic	
Cone Diameter—Inches	10
Voice Coil Impedance (Ohms at 400 cycles)	3.2
RECORD PLAYER	Model G-205

Fig. 3

S4 TONE SWITCH



S2 REAR R.F. DECK BAND SWITCH

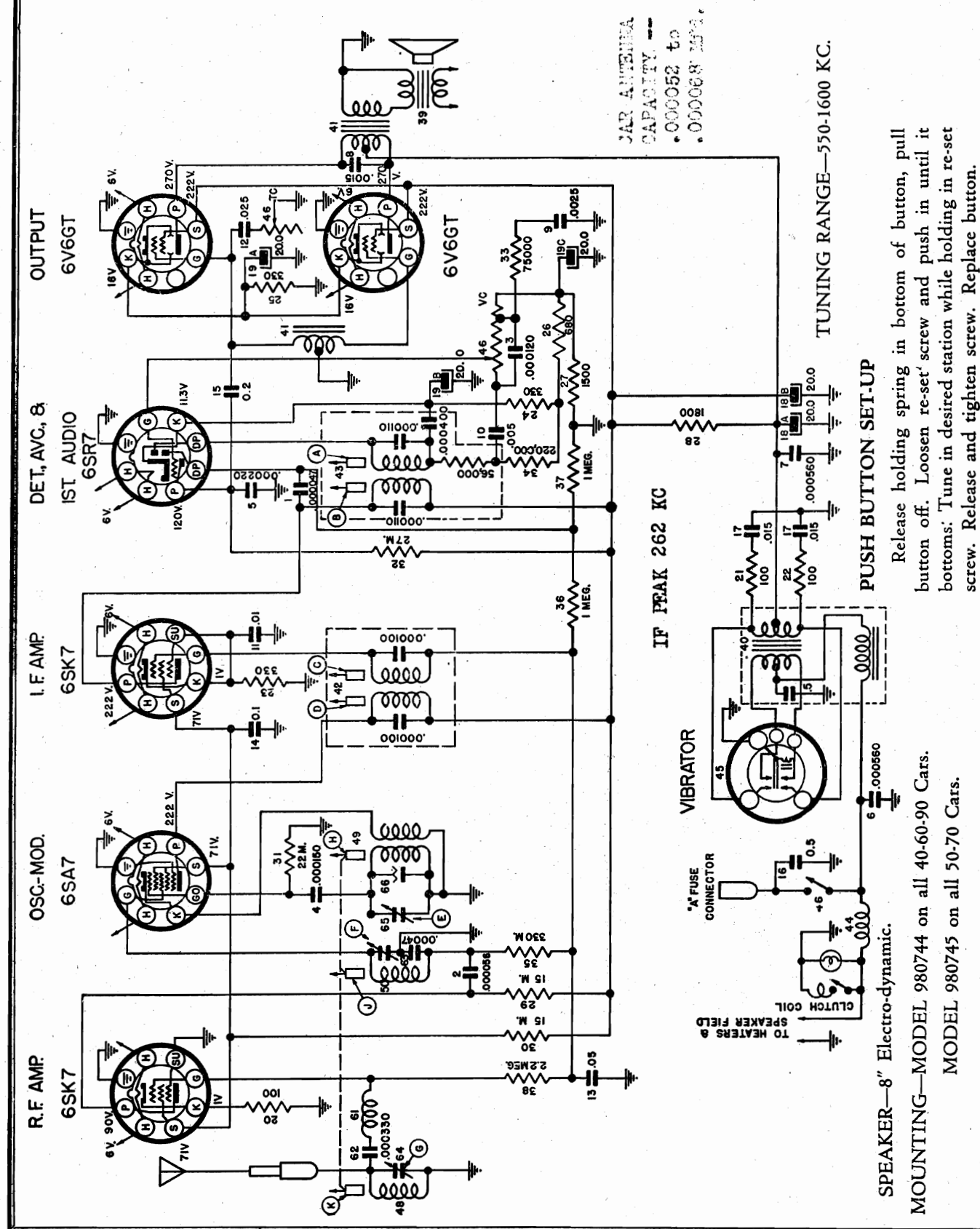
S1 FRONT ANTENNA DECK

FRONT

REAR

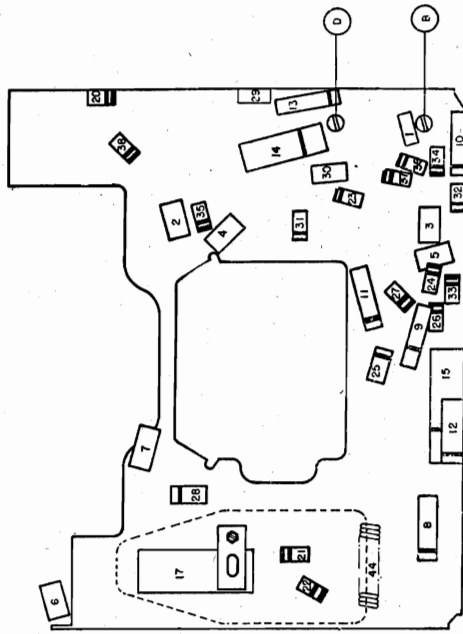
OSCILLATOR DECK

BUICK DIV.-GENERAL MOTORS

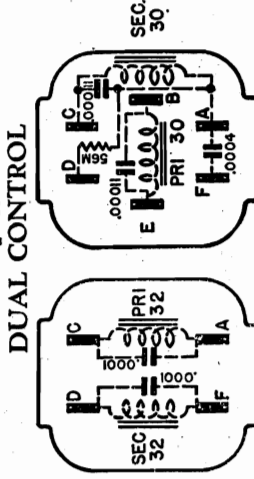
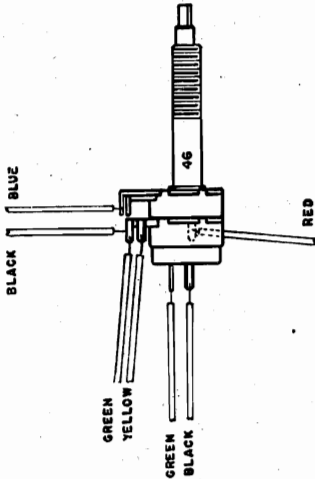
MODELS 980744,
980745

MODELS 980744,
980745

BUICK DIV.-GENERAL MOTORS

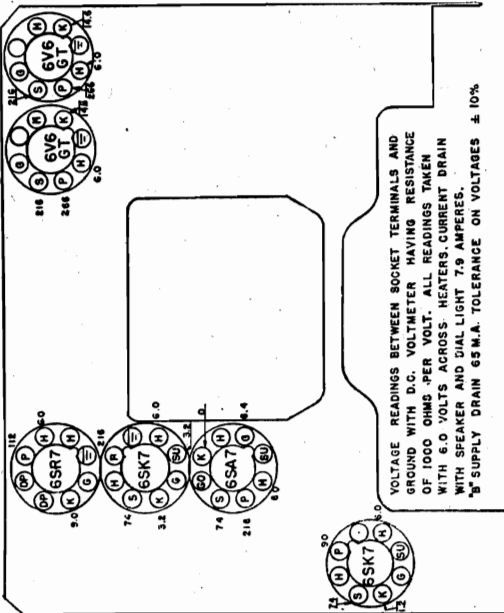


PARTS LAYOUT—CHASSIS VIEW



2nd I. F. TRANS.

1st I. F. TRANS.



TUBE SOCKET VOLTAGE CHART

ALIGNMENT PROCEDURE

Volume Control Maximum.

Signal Generator output minimum for satisfactory output indication.

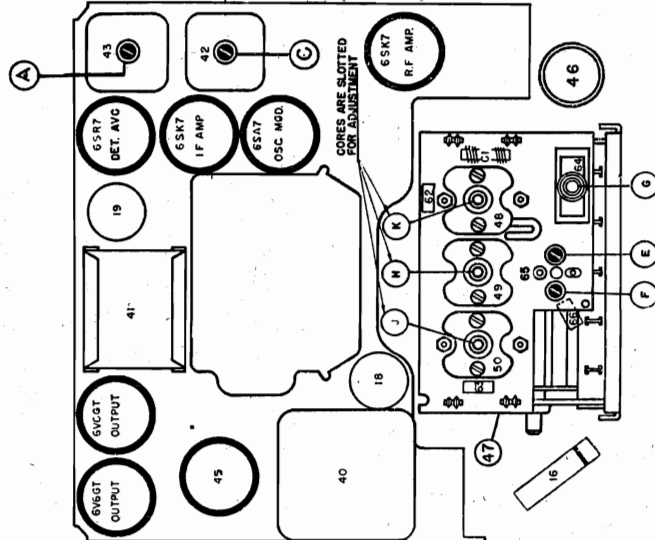
Series Condenser or Dummy Antenna	Connect To	Tune Receiver To	Signal Generator Frequency	Adjust Screws In Order
0.1 Mfd. *.000060 Mfd.	6SA7 Pin #8 Antenna Connector	No Broadcast Sig. Extreme Hi. Freq. End of Dial	262 KC 1615 KC	A B C D E F G
***.000060 Mfd.	Antenna Connector	Signal Generator	1430 KC	**J K

*Before making this adjustment turn core screws J, K, H by means of a bakelite screwdriver, so that the rear end of the cores are $1\frac{1}{8}$ " from the rear of the coil form. The purpose of this adjustment is to set the cores at the correct starting point with respect to the windings.

**Cores J and K are adjusted by means of a bakelite screwdriver through the rear end of the coils. There must not be any metal in part of screwdriver inserted in the coil.

***Should it be necessary to calibrate the pointer after this adjustment, tune signal generator to 1300 KC and the receiver to the signal. Loosen dial cord pulley set screws and adjust pointer to 1300 KC. Tighten set screws.

Adjust trimmer G to match car antenna (at approx. 1400 KC) when radio is installed.

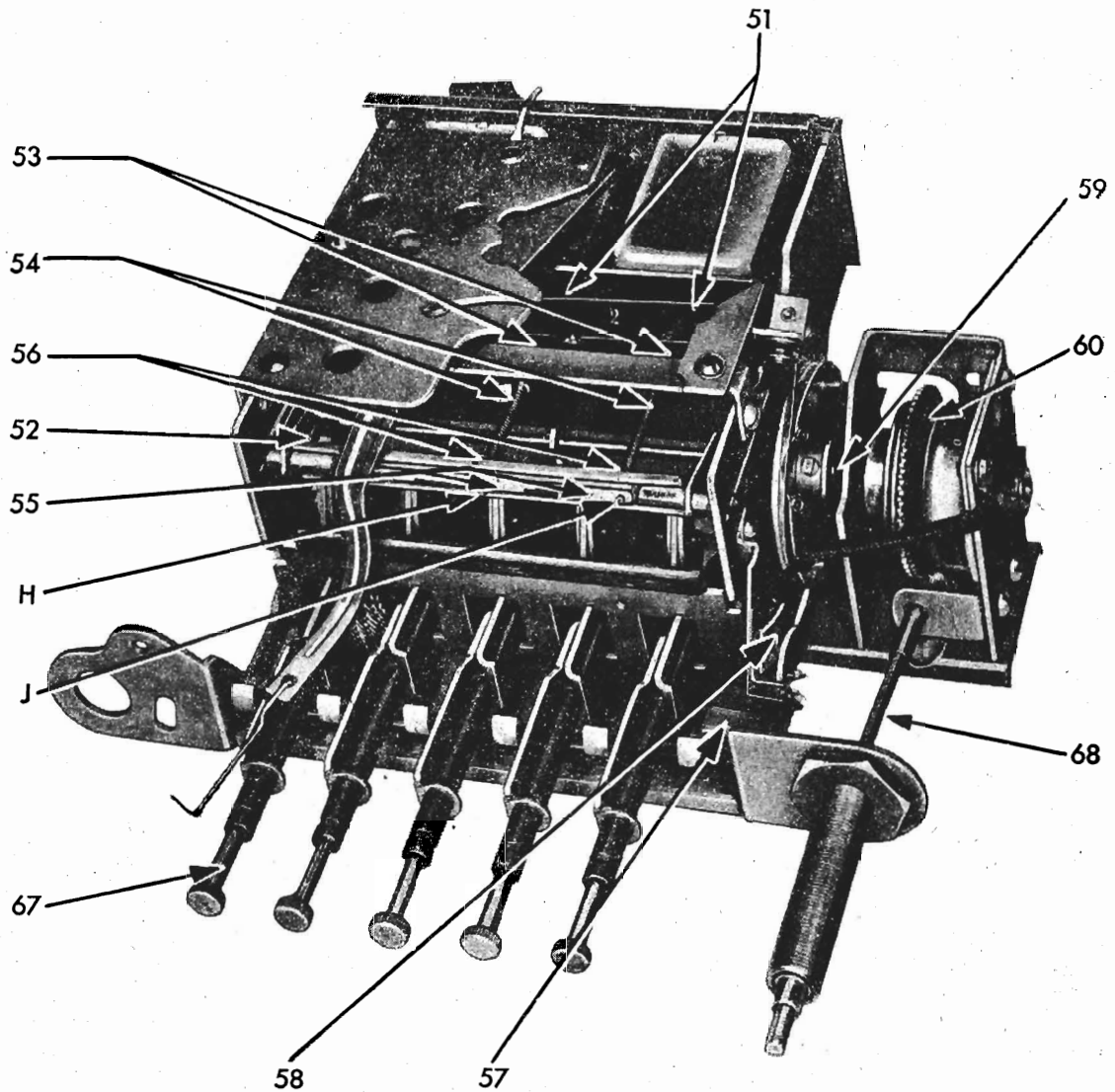


PARTS LAYOUT—TUBE VIEW

BUICK DIV.-GENERAL MOTORS

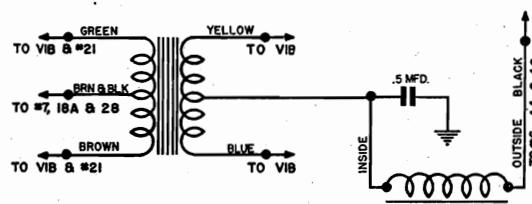
MODELS 980744,
980745

ESCUTCHEON CROSS SECTION

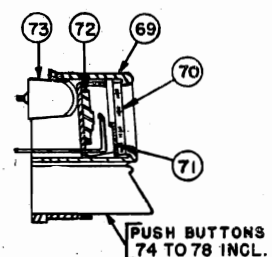
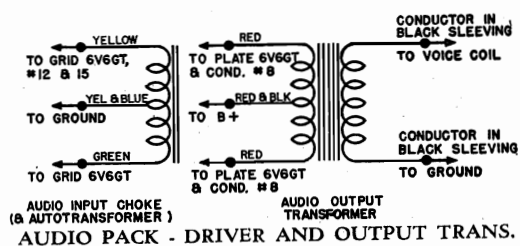


TUNER PICTURE

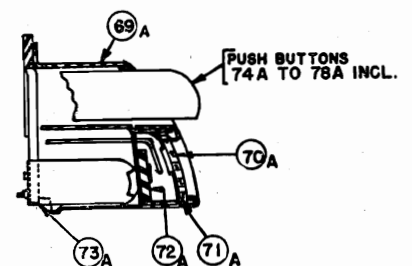
TRANSFORMER CONNECTIONS



POWER TRANSFORMER



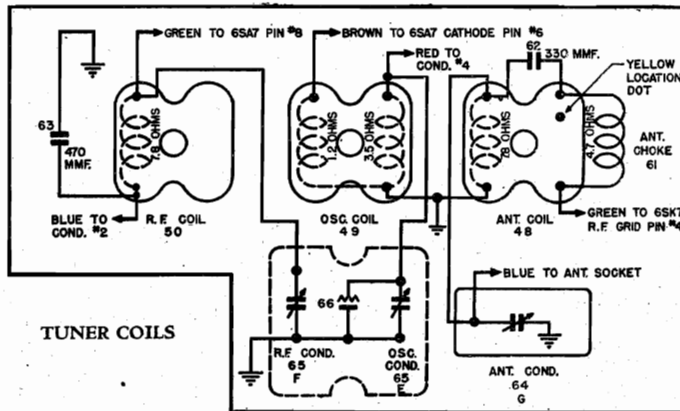
MODEL 980744



MODEL 980745

MODELS 980744,
980745

BUICK DIV.-GENERAL MOTORS

Illus. Service
No. Parts No.

DESCRIPTION

CONDENSERS

1	7233313	.000047 Mfd. Molded	
2	1215188	.000056 Mfd. Molded	
3	7240577	.000120 Mfd. Molded	
4	7230893	.000150 Mfd. Molded	
5	7236105	.000220 Mfd. Molded	
6	7240566	.000560 Mfd. Mica	
7	7240566	.000560 Mfd. Mica	
Alt. for 6 & 7	7255665	.000560 Mfd. Mica—Molded	
8	7236134	.0015 Mfd. 800 V. Tubular	
9	7240578	.0025 Mfd. 400 V. Tubular	
10	7230912	.005 Mfd. 600 V. Tubular	
11	1208600	.01 Mfd. 600 V. Tubular	
12	1211232	.025 Mfd. 400 V. Tubular	
13	7230592	.05 Mfd. 600 V. Tubular	
14	1207908	.1 Mfd. 400 V. Tubular	
15	7240579	.2 Mfd. 400 V. Tubular	
16	7236621	.5 Mfd. 200 V. Tubular	
17	7236075	.015 x .015 1500 V. Dual Tubular	
18	7240612	Electrolytic—2 Section 20-20 Mfd. 400 V.	
19	7238553	Electrolytic—3 Section 20-20-20 Mfd. 25 V.	
62	7232957	.000330 Mfd. Molded	
63	7238879	.000470 Mfd. Molded	
64	7242984	Antenna Trimmer	Included in Tuner Assembly Complete
65	7244037	Dual Trimmer	
66	7255725	Compensating	
RESISTORS			
20	1213217	100 Ohms 1/2 W. Insulated	
21	1213217	100 Ohms 1/2 W. Insulated	
22	1213217	100 Ohms 1/2 W. Insulated	
23	1213224	330 Ohms 1/2 W. Insulated	
24	1213224	330 Ohms 1/2 W. Insulated	
25	1214572	330 Ohms 2 W. Insulated	
26	1214543	680 Ohms 1/2 W. Insulated	
27	1213237	1500 Ohms 1/2 W. Insulated	
28	1214573	1800 Ohms 2 W. Insulated	
29	7237595	15,000 Ohms 1 W. Insulated	
30	7233653	15,000 Ohms 2 W. Insulated	
31	1214550	22,000 Ohms 1/2 W. Insulated	
32	1213342	27,000 Ohms 1 W. Insulated	
33	1213844	68,000 Ohms 1/2 W. Insulated	
34	1214555	220,000 Ohms 1/2 W. Insulated	
35	1214557	330,000 Ohms 1/2 W. Insulated	
36	1213282	1 Megohm 1/2 W. Insulated	
37	1213282	1 Megohm 1/2 W. Insulated	
38	1214563	2.2 Megohm 1/2 W. Insulated	

MOUNTING AND INSTALLATION PARTS

7255666	Control Knob Kit	
	Tuning Knobs—2	
	Dummy Knob	
	Tone Control Knob	
	Washers—2	
	Hex. Nuts—2	
1321177	"A" Lead Cable Assembly—Model 980744	
1321178	"A" Lead Cable Assembly—Model 980745	
120151	Fuse	
1286759	Static Collector Assembly	
1880659	Generator Condenser	
1207820	Distributor Suppressor	
1853686	Suppressor Adaptor	
1324056	Bracket—R. H.—Model 980744	
1324057	Bracket—L. H.—Model 980744	
1323926	Bracket—R. H.—Model 980745	
1323927	Bracket—L. H.—Model 980745	
1320624	Washer	
120380	Lockwasher	
120375	Hex. Nut	
123291	Screw	

MISCELLANEOUS ELECTRICAL PARTS

39	7240469	Speaker—8" Electrodynamic	
40	7240519	Power Transformer Assembly	
41	7240464	Audio Pack-Driver and Output Transformer Assembly	
42	7238546	First I. F. Transformer Assembly	
43	7240467	Second I. F. Transformer Assembly	
44	7241708	"A" Filter Choke	
45	8630	Vibrator—Synchronous	
46	7241967	Volume & Tone Control with Switch—Model 980744	
46A	7241928	Volume & Tone Control with Switch—Model 980745	
61	7240251	Antenna Choke Coil (Included in Tuner Assembly Complete)	

Illus. Service
No. Parts No.

DESCRIPTION

TUNER, DIAL, AND ESCUTCHEON PARTS

47	7244052	Tuner Assembly Complete—Model 980744	
47A	7244027	Tuner Assembly Complete—Model 980745	
48	7244056	Antenna Coil Assembly	
49	7244058	Oscillator Coil Assembly	
50	7244057	R. F. Coil Assembly	
51	7255779	Grommet	
52	7244034	Spring—Connecting Link	
7256014		Iron Core Parts Package	
53		Iron Core	
54		Spring—Core Tension	
55		Nut—Core Coupling	
56		Washer	
57	7240410	Declutching Switch Lever Assembly	
	7242961	Shaft—Declutching Switch Lever	
	7242962	Spring—Declutching Switch Lever	
	7255698	Retainer Spring	
58	7240397	Switch Assembly—Declutching	
59	7240396	Drive Drum Assembly	
60	7240471	Clutch Assembly Complete	
	7237174	Universal Joint Spring	
61	7240251	Antenna Choke Coil	
62	7232957	Condenser—.000330 Mfd. Molded	
63	7238879	Condenser—.000470 Mfd. Molded	
64	7242984	Antenna Trimmer Condenser	
65	7244037	Dual Trimmer Condenser	
66	7255725	Compensating Condenser	
	7242167	Cord and Spring Assembly	
	7242168	Cord and Link Assembly	
67	7240368	Reset Screw Assembly	
68	7241981	Tuning Shaft Assembly	
69	7241966	Escutcheon	
70	7242981	Dial Shield	
71	7240508	Backplate Assembly	
72	7240509	Dial Clamp	
73	7238513	Button Assembly "B"	
74	7242221	Button Assembly "U"	
75	7242222	Button Assembly "I"	
76	7242223	Button Assembly "C"	
77	7242224	Button Assembly "K"	
78	7242225	Cord and Spring Assembly	
	7242005	Cord and Link Assembly	
	7242006	Reset Screw Assembly	
67A	7241982	Tuning Shaft Assembly	
68A	7241980	Escutcheon Assembly	
69A	7242039	Dial	
70A	7244046	Dial Shield	
71A	7241992	Backplate Assembly	
72A	7241987	Dial Clamp	
73A	7242093	Button Assembly "B"	
74A	7242226	Button Assembly "U"	
75A	7242227	Button Assembly "I"	
76A	7242228	Button Assembly "C"	
77A	7242229	Button Assembly "K"	
78A	7242230	Button Assembly "K"	

Parts Included in Tuner Assembly
Complete, Part No. 7244052, Model
980744, Which Are Also Serviced
Separately.Parts Included in Tuner Assembly
Complete, Part No. 7244027, Model
980745, Which Are Also Serviced
Separately.

TUBE COMPLEMENT

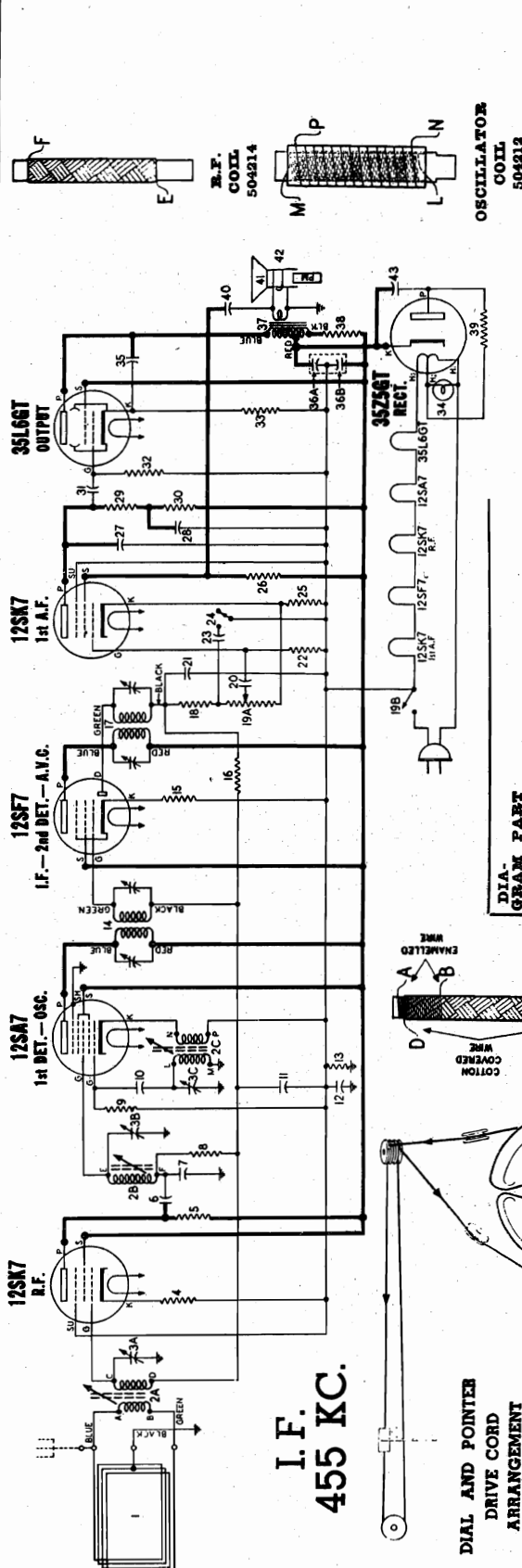
1213637	6V6GT	Push-Pull Output
7240267	6SR7	Detector, A. V. C. and First Audio
7237887	6SK7	I. F. Amplifier
7237887	6SK7	R. F. Amplifier
7237886	6SA7	Oscillator Modulator

MISCELLANEOUS PARTS

7242034	"A" Lead Connector Assembly	
7242035	Antenna Lead Connector Assembly	
7238539	Vibrator Socket	
7236279	Octal Tube Socket	
7240408	Dial Light Assembly (Includes Dial Lamp)	
125588	Bulb—Dial Lamp	

BUTLER BROS.

MODELS N5-RD-250, Chas. 9022N;
N5-RD-251, Chas. 9022H

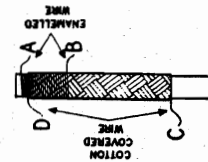


I.F.
455 KC.

DIAL AND POINTER
DRIVE CORD
ARRANGEMENT

To string dial cord, turn the main drive drum to maximum counter-clockwise position and use following parts:

- 114955 Clip on end of cord
- 117057 Cord (55 inches)
- 119087 Ring for dial cord
- 161384 Tension Spring



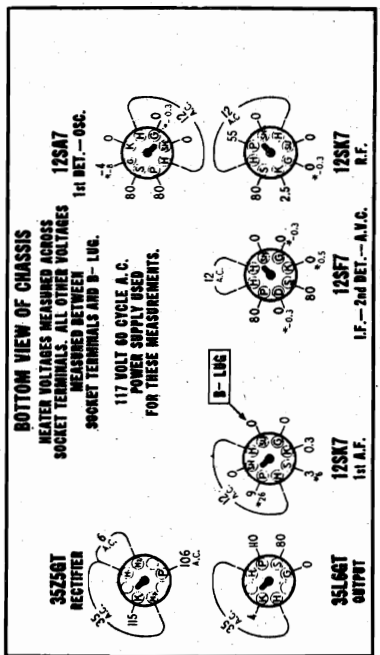
ANTENNA
COUPLING COIL
504210

Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

VOLUME ON FULL WITH NO SIGNAL DIAL TUNED TO 540 KC.



*—Measured with vacuum tube voltmeter

- | DIA-GRAM PART NO. | DESCRIPTION |
|-------------------|---|
| 3-A, B, C 504686 | Condenser trimmer assembly |
| 6 | A. 10 to 160 Mmfd. |
| 7 | B. 20 to 270 Mmfd. |
| 10 | Condenser—mica 260 Mmfd. 500 volt. |
| 11 | Condenser—mica 1,000 Mmfd. 500 volt. |
| 12 | Condenser—mica 50 Mmfd. 500 volt. |
| 13 | Condenser—2 Mfd. 400 volt. |
| 20 | Condenser—.002 Mfd. 400 volt. |
| 21 | Condenser—.002 Mfd. 400 volt. |
| 22 | Condenser—.002 Mfd. 400 volt. |
| 23 | Condenser—.002 Mfd. 400 volt. |
| 24 | Condenser—.002 Mfd. 400 volt. |
| 25 | Condenser—.002 Mfd. 400 volt. |
| 26 | Condenser—.002 Mfd. 400 volt. |
| 27 | Condenser—.002 Mfd. 400 volt. |
| 28 | Condenser—.002 Mfd. 400 volt. |
| 31 | Condenser—.002 Mfd. 400 volt. |
| 35 | Condenser—.002 Mfd. 400 volt. |
| 36-A, B. 500256 | Condenser—electrolytic |
| 40 | A. 40 Mfd. 150 volt |
| 43 | B. 20 Mfd. 150 volt |
| 44 | Condenser—.02 Mfd. 400 volt. |
| 45 | Condenser—.02 Mfd. 400 volt. |
| 4 | Resistor—carbon 330 ohms 1/4 watt. |
| 5 | Resistor—carbon 470 ohms 1/4 watt. |
| 8 | Resistor—carbon 470,000 ohms 1/4 watt. |
| 9 | Resistor—carbon 22,000 ohms 1/4 watt. |
| 13 | Resistor—carbon 220,000 ohms 1/4 watt. |
| 15 | Resistor—carbon 470,000 ohms 1/4 watt. |
| 16 | Resistor—carbon 33 ohms 1/4 watt. |
| 18 | Resistor—carbon 470,000 ohms 1/4 watt. |
| 19-A, B. 502145 | Volume control 500,000 ohms (with switch) |
| 22 | Resistor—carbon 10 Meg. 1/4 watt. |
| 25 | Resistor—carbon 220 ohms 1/4 watt. |
| 26 | Resistor—carbon 22 Meg. 1/4 watt. |
| 29, 30 | Resistor—carbon 220,000 ohms 1/4 watt. |
| 32 | Resistor—carbon 470,000 ohms 1/4 watt. |
| 33 | Resistor—carbon 130 ohms 1/4 watt. |
| 38 | Resistor—carbon 1500 ohms 1/4 watt. |
| 39 | Resistor—carbon 33 ohms 1/4 watt. |

- | DIA-GRAM PART NO. | DESCRIPTION |
|-------------------|--|
| 35L6GT | Output tube |
| 12SF7 | 1st A.F. tube |
| 12SA7 | 1st DET.—A.V.C. |
| 35Z5GT | Rectifier |
| 504211 | Slug core for Ant. coil (yellow end). |
| 504213 | Slug core for Osc. coil (white end). |
| 504215 | Slug core for R.F. coil (purple end). |
| 502102 | Transformer—1st I.F. |
| 502103 | Transformer—2nd I.F. |
| 502104 | Transformer—output (for R-502998 spkr.). |
| 502105 | Transformer—output (for A-502998 spkr.). |
| 502106 | Transformer—output (for W-502998 spkr.). |
| 500546 | Switch—tone control |
| 502473 | Lamp—dial (Mazda 47) 6.3 V. 150 Ma. |
| 502214 | Cone & voice coil for R-502998 spkr. |
| 502903 | Cone & voice coil for A-502998 spkr. |
| 504245 | Cone & voice coil for W-502998 spkr. |
| 502998 | Speaker—P.M. dynamic (5 inch). |
| 502185 | Back for cabinet. |
| 116467 | Base for mtg. electrolytic condenser. |
| 502556 | Cabinet—ivory (Model 9022-H). |
| 502557 | Cabinet—mahogany (Model 9022-N). |
| 500287 | Clamp—dial scale mtg. |
| 500497 | Clip—retainer for cabinet back. |
| 114955 | Connector—on end of dial cord. |
| 116563 | Cord—dial drive (35 in. required). |
| 500374 | Cover—cardboard, for elect. cond. |
| 500375 | Dial scale—glass (under I.F. trans. can) |
| 501196 | Grounding plate (under I.F. trans. can) |
| 502553 | Knob—ivory (Model 9022-H). |
| 502554 | Knob—mahogany (Model 9022-N). |
| 81145 | Retaining ring for tuning shaft. |
| 85078 | Rubber grommet; Ant. & R.F. coil mtg. |
| 119087 | Ring for dial cord. |
| 17064 | Screw—No. 4 x 7/32. |
| 114628 | Shaft—tuning control |
| 502173 | Socket—octal base |
| 116690 | Socket—octal (rectifier) |
| 500499 | Socket—dial lamp (with leads) |
| 504012 | Spring for tuning slug drive cord. |
| 161384 | Spring—dial cord tension. |
| 111456 | Washer—spring washer for tuning shaft |

- | DIA-GRAM PART NO. | DESCRIPTION |
|-------------------|--|
| 35L6GT | Output tube |
| 12SF7 | 1st A.F. tube |
| 12SA7 | 1st DET.—A.V.C. |
| 35Z5GT | Rectifier |
| 504211 | Slug core for Ant. coil (yellow end). |
| 504213 | Slug core for Osc. coil (white end). |
| 504215 | Slug core for R.F. coil (purple end). |
| 502102 | Transformer—1st I.F. |
| 502103 | Transformer—2nd I.F. |
| 502104 | Transformer—output (for R-502998 spkr.). |
| 502105 | Transformer—output (for A-502998 spkr.). |
| 502106 | Transformer—output (for W-502998 spkr.). |
| 500546 | Switch—tone control |
| 502473 | Lamp—dial (Mazda 47) 6.3 V. 150 Ma. |
| 502214 | Cone & voice coil for R-502998 spkr. |
| 502903 | Cone & voice coil for A-502998 spkr. |
| 504245 | Cone & voice coil for W-502998 spkr. |
| 502998 | Speaker—P.M. dynamic (5 inch). |
| 502185 | Back for cabinet. |
| 116467 | Base for mtg. electrolytic condenser. |
| 502556 | Cabinet—ivory (Model 9022-H). |
| 502557 | Cabinet—mahogany (Model 9022-N). |
| 500287 | Clamp—dial scale mtg. |
| 500497 | Clip—retainer for cabinet back. |
| 114955 | Connector—on end of dial cord. |
| 116563 | Cord—dial drive (35 in. required). |
| 500374 | Cover—cardboard, for elect. cond. |
| 500375 | Dial scale—glass (under I.F. trans. can) |
| 501196 | Grounding plate (under I.F. trans. can) |
| 502553 | Knob—ivory (Model 9022-H). |
| 502554 | Knob—mahogany (Model 9022-N). |
| 81145 | Retaining ring for tuning shaft. |
| 85078 | Rubber grommet; Ant. & R.F. coil mtg. |
| 119087 | Ring for dial cord. |
| 17064 | Screw—No. 4 x 7/32. |
| 114628 | Shaft—tuning control |
| 502173 | Socket—octal base |
| 116690 | Socket—octal (rectifier) |
| 500499 | Socket—dial lamp (with leads) |
| 504012 | Spring for tuning slug drive cord. |
| 161384 | Spring—dial cord tension. |
| 111456 | Washer—spring washer for tuning shaft |

MODELS N5-RD-250, Chas. 9022N;
N5-RD-251, Chas. 9022H

BUTLER BROS.

ALIGNMENT PROCEDURE

1. Remove chassis and loop from cabinet. Solder approximately 8" of insulated wire to any B— connection (see voltage chart on opposite side for convenient B— location). Then reinstall chassis and loop in cabinet. The B— lead should extend from under the chassis at the back.
2. Connect ground lead of signal generator to B— lead.
3. Connect output meter across the speaker voice coil (terminals at back of speaker.)
4. Turn the tuning control knob clockwise as far as it will go (tuner mechanism is now in maximum open position with tuning slugs almost completely withdrawn from coils). Dial pointer should then point to 1600 Kc mark on scale. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF GENERATOR TO	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
Set tuner mechanism to maximum open position by turning the tuning control knob clockwise as far as it will go (Dial pointer at 1600 Kc). Then check whether the positions of the tuning slugs correspond to the positions shown in Fig. 1 below. If settings are incorrect, rotate the individual core and threaded stem until desired position is reached. Note that threaded stem is prevented from moving by a dab of speaker cement at top.						
.1 MFD. Condenser	Ungrounded terminal of trimmer No. 6 (see Fig. 2 below for location of trimmer.)	455 KC	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
				3-4	1st I.F.	
300 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	1600 KC	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
300 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	Tune to 1600 KC generator signal	6	Broadcast R.F.	Adjust for maximum output.
				7	Broadcast Antenna	Adjust for maximum output.
300 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1400 KC	Tune to 1400 KC generator signal	Ant. coil tuning slug		Adjust position of slug for maximum output.
				R.F. coil tuning slug		Adjust position of slug for maximum output.
300 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	Tune to 1600 KC generator signal	6	Broadcast R.F.	Recheck adjustment for maximum output.
				7	Broadcast Antenna	Recheck adjustment for maximum output.
Apply a coating of speaker cement at top of each tuning core stem to prevent movement.						

Apply a coating of speaker cement at top of each tuning core stem to prevent movement.

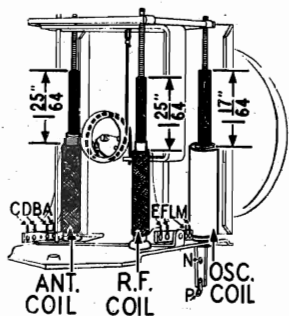


FIG. 1
← ———
**SLUG
TUNER
ASSEMBLY**
(Drive Parts)

117057 Cord (8")
114955 Clip on cord
504012 Spring

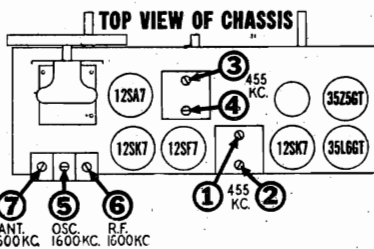


FIG. 2

AUDIO OSCILLATION

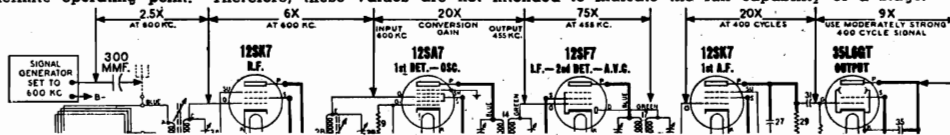
The audio system of this receiver utilizes a two-stage type of inverse feed-back arrangement, and should it ever be necessary to replace the speaker or output transformer, it is important to maintain a definite phase relationship in the feed-back circuit. If the connections to the output transformer are reversed or if the feed-back connection is made to the wrong side of the output transformer secondary, the system will become regenerative instead of degenerative. Under those conditions audio oscillation may result. If that occurs, oscillation may be prevented by reversing the connections to the secondary of the output transformer.

APPROXIMATE STAGE GAIN DATA

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to B—. This provides a definite operating point.
IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



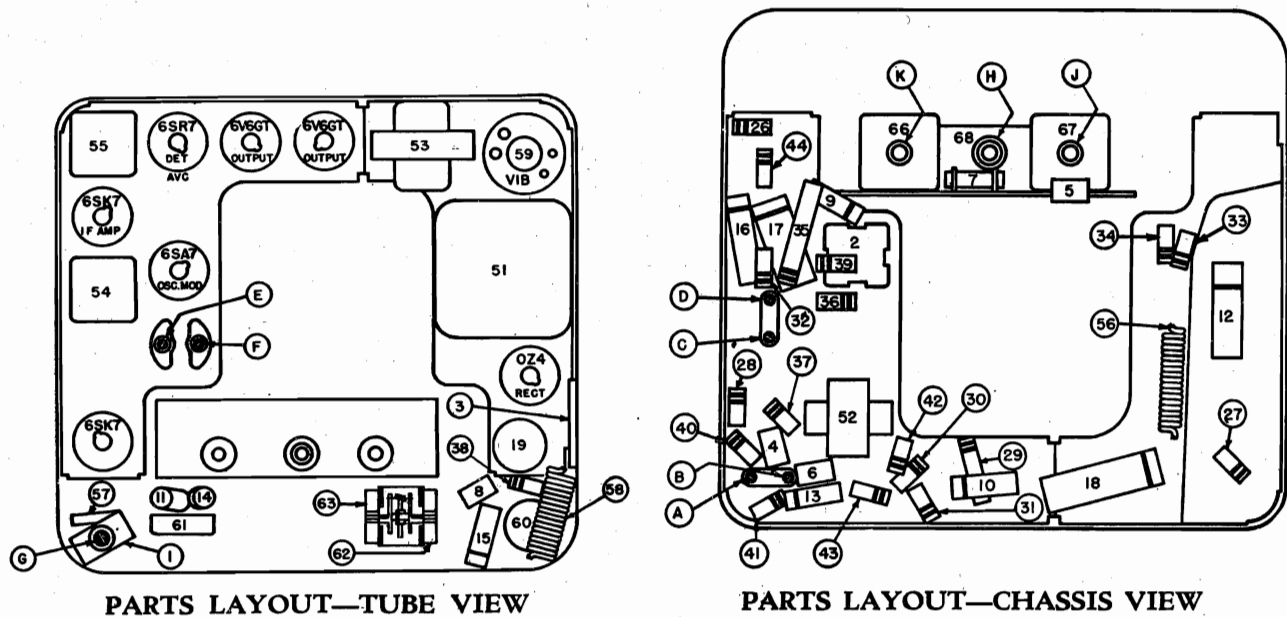
Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

Compliments of www.nucow.com



MODEL 7253207

CADILLAC DIV.-GENERAL MOTORS



PUSH BUTTON SET-UP

Push button in and latch. Turn button until desired station is brought in. Do not hold button in beyond normal latching position while adjusting.

ALIGNMENT PROCEDURE

- Volume Control Maximum.
- Signal Generator output minimum for satisfactory output indications.

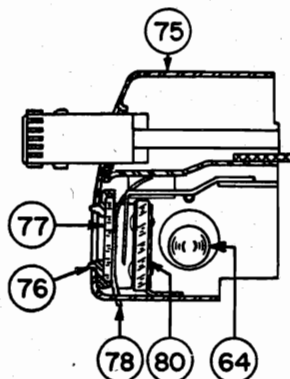
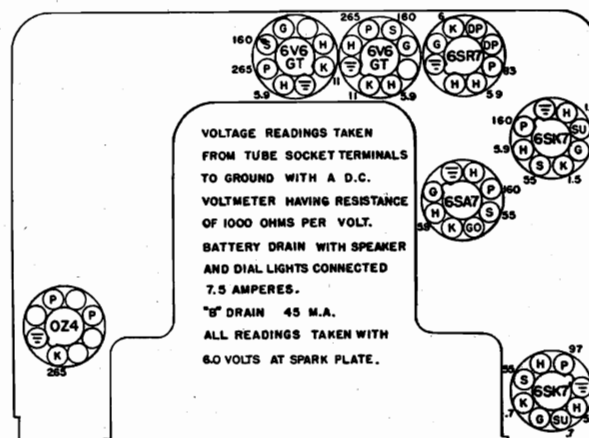
Series Condenser or Dummy Antenna	Connect To	Signal Generator Frequency	Adjust Screws In Order
0.1 Mfd	Pin #8 of 6SA7	262 KC	A B C D
.000070 Mfd	Antenna Connector	1615 KC	E
.000070 Mfd	Antenna Connector	1430 KC	F G

Adjust trimmer G to match car antenna (1430 KC) when radio is installed.

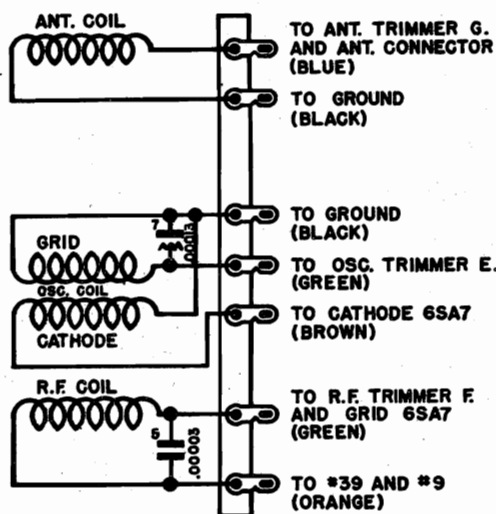
SPECIAL INSTRUCTIONS

Alignment of Iron Cores: Tune to stop at H. F. end of dial. Adjust cores H, J and K to extend 1 5/8" from end of their coil forms. Adjust trimmers E, F and G (SG at 1615 KC). Adjust cores J and K (SG at 1430 KC). Repeat alignment adjustment of trimmers at 1615 KC. and of cores J and K at 1430 KC.

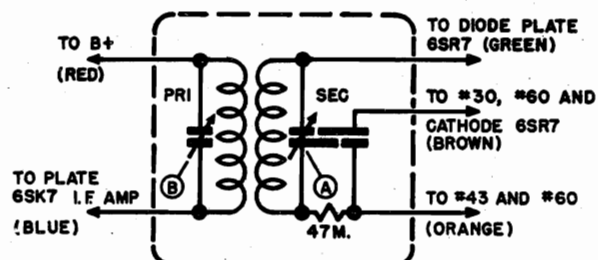
CADILLAC DIV.-GENERAL MOTORS

ESCUTCHEON
CROSS SECTION

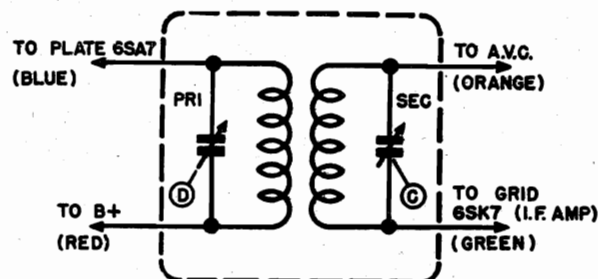
TUBE SOCKET VOLTAGE CHART



TUNER COILS

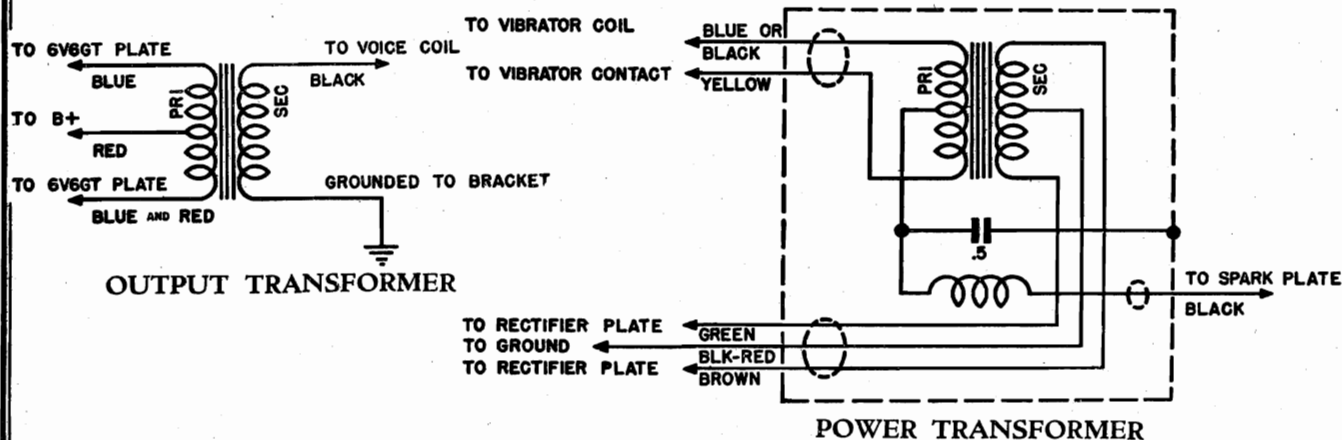


SECOND I. F. TRANSFORMER



FIRST I. F. TRANSFORMER

COIL CONNECTIONS



MODEL 7253207

CADILLAC DIV -GENERAL MOTORS

GENERAL

MOUNTING—All 1946 Cadillac Cars.

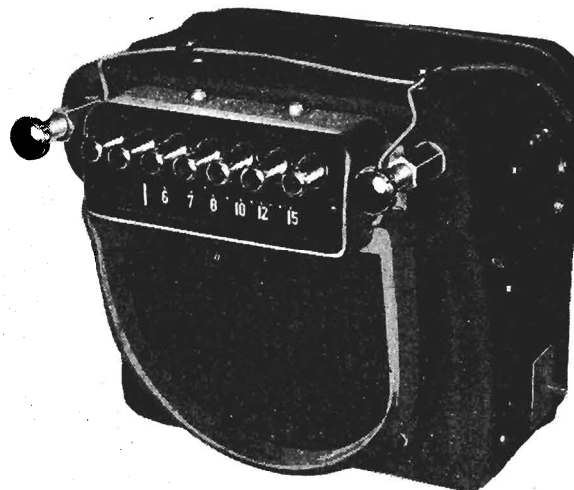
TUBES—Seven—6SK7 (2), 6SA7, 6SR7,
6V6GT (2), 0Z4.

SPEAKER—8" Dynamic.

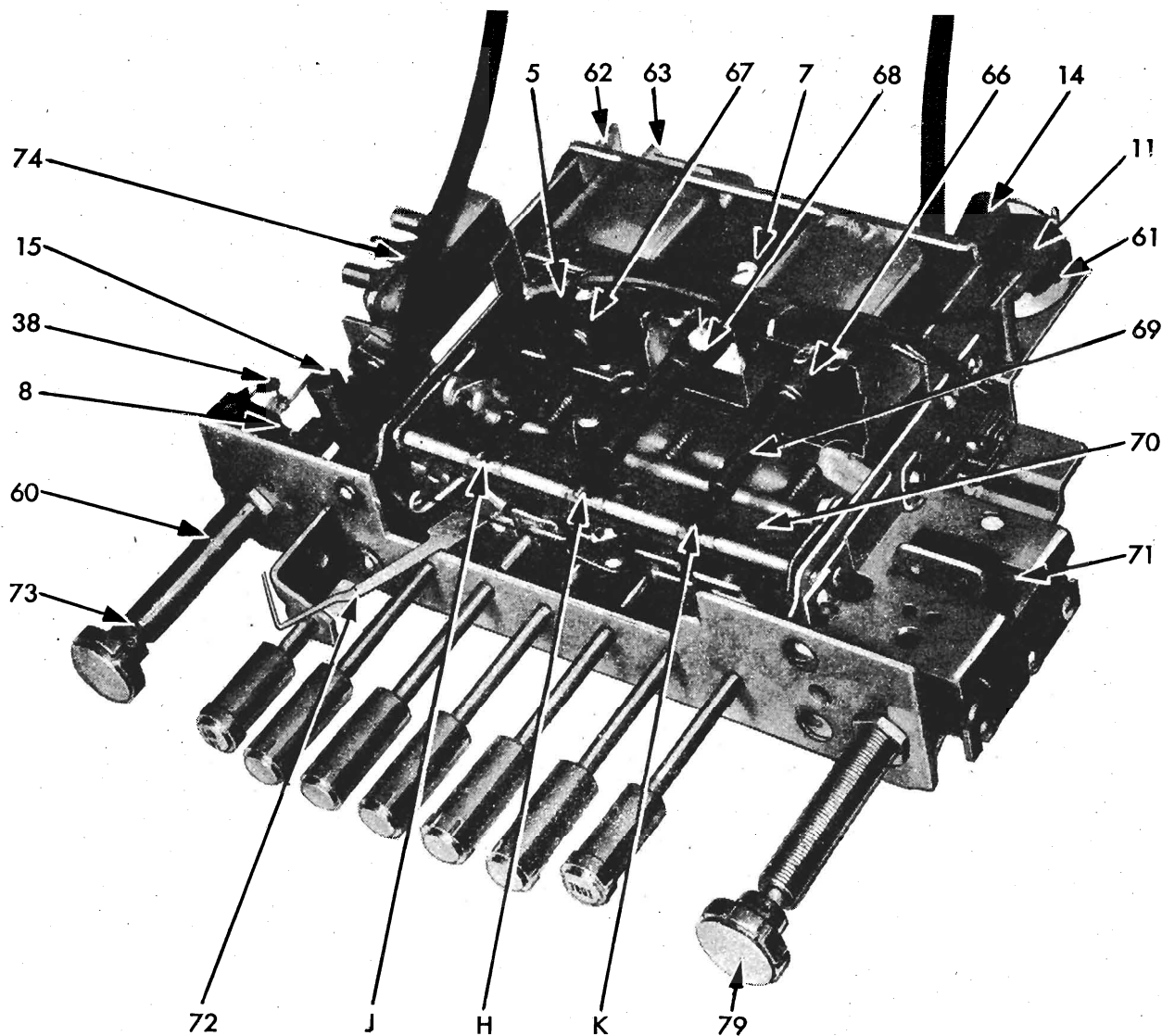
TUNING—Manual and 5 P. B.

CAR ANTENNA CAPACITY—.000065 to .000075
Mfd.

TUNING RANGE—550 - 1600 KC.

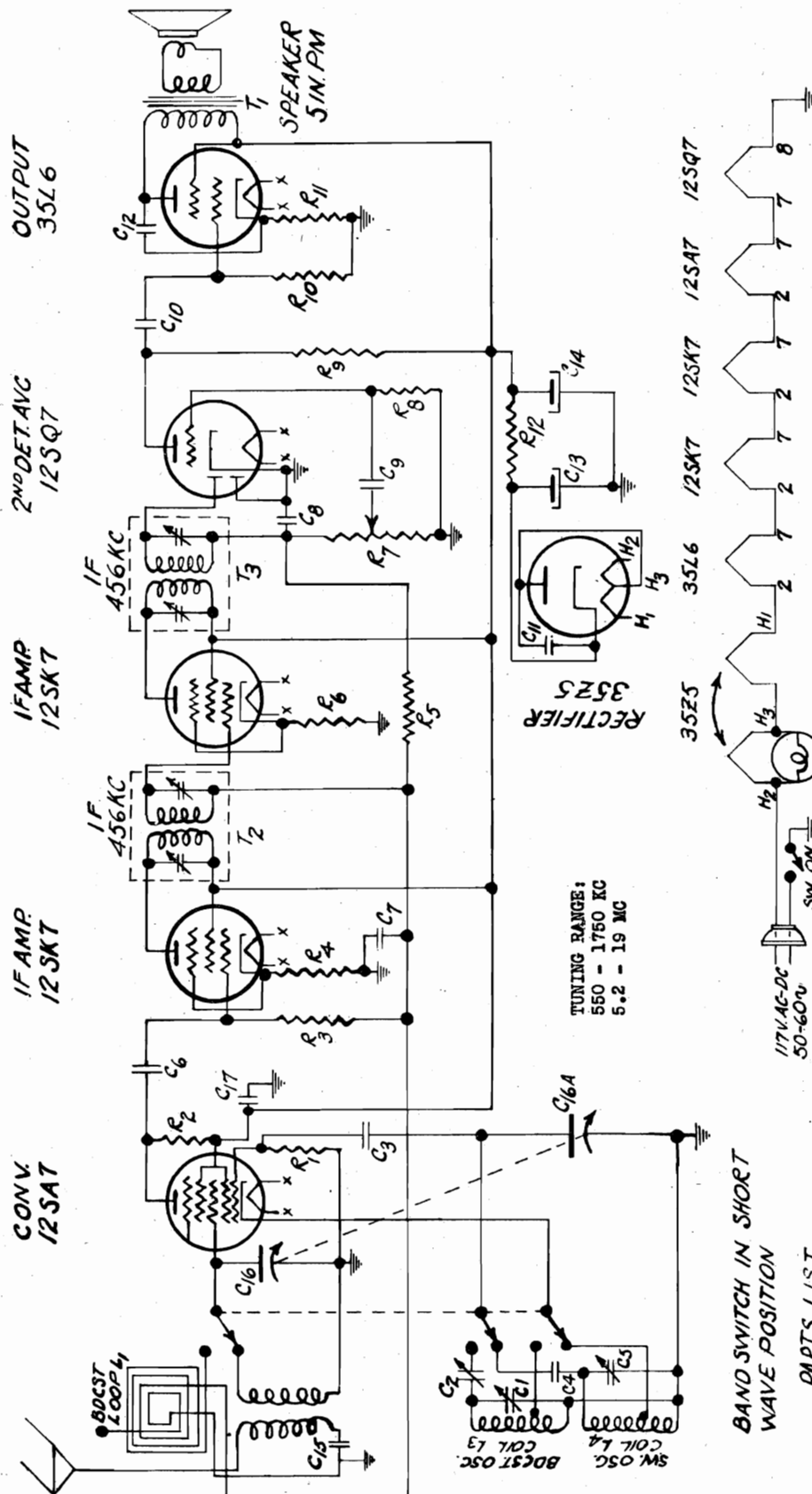


MODEL 7253207



TUNER PICTURE

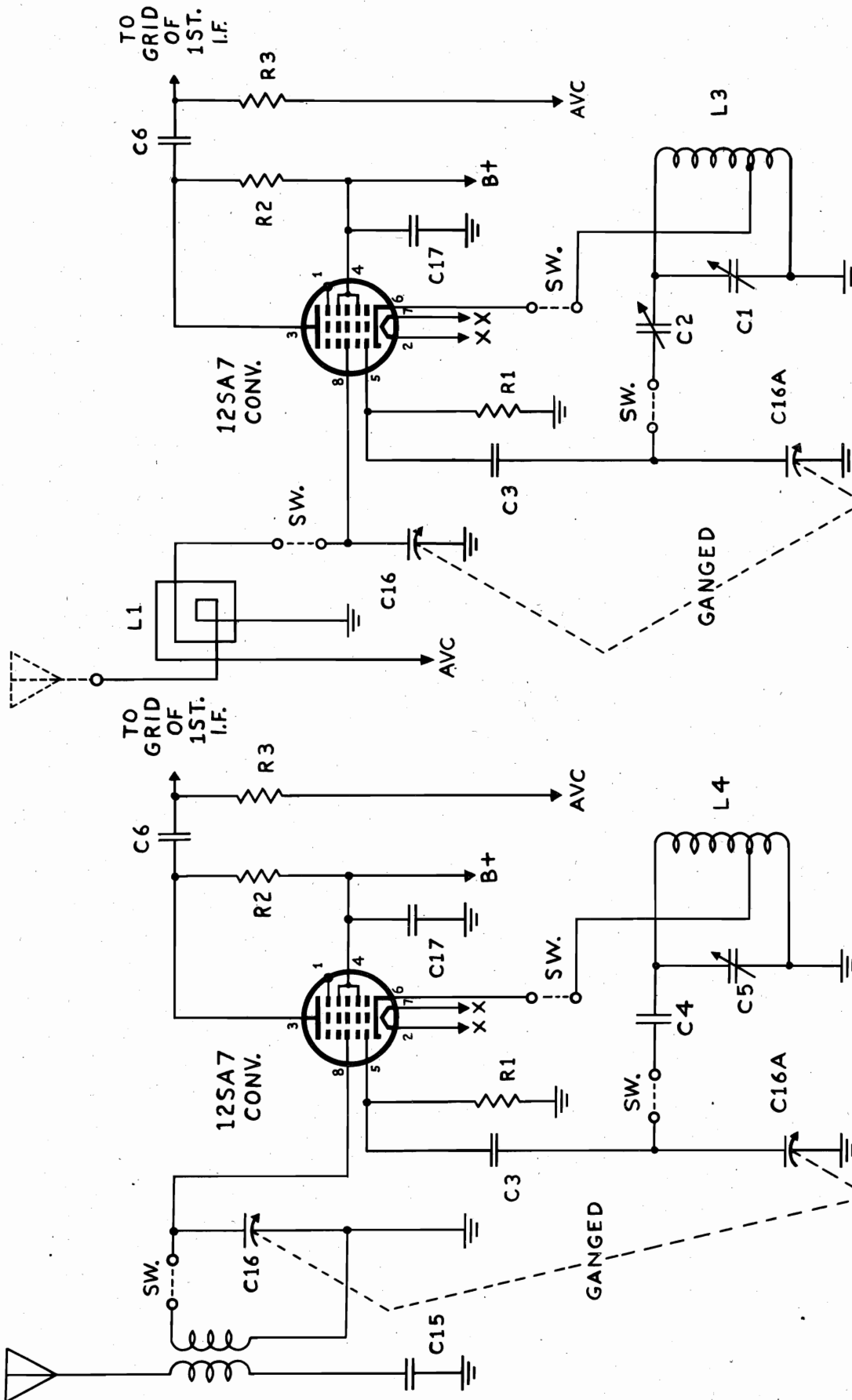
CARR-NAGY CORP.



SCHEMATIC 6 TUBE SUPERHETERODYNE			
MAT.	DATE 8-15-46	CHK'D	
	SCALE	ENGINEER	
FIN.	DRAWN Q. M. Miel	APPROVED	
CARR-NAGY		100-62	
CORP. NEW YORK			

MODEL 100-62

CARR-NAGY CORP.

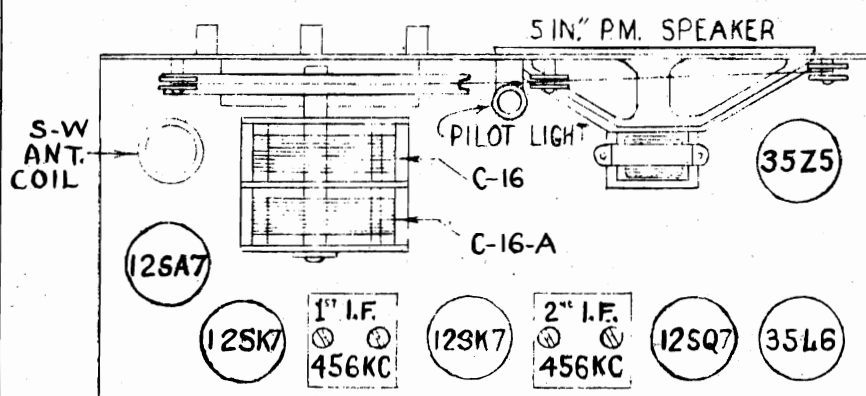
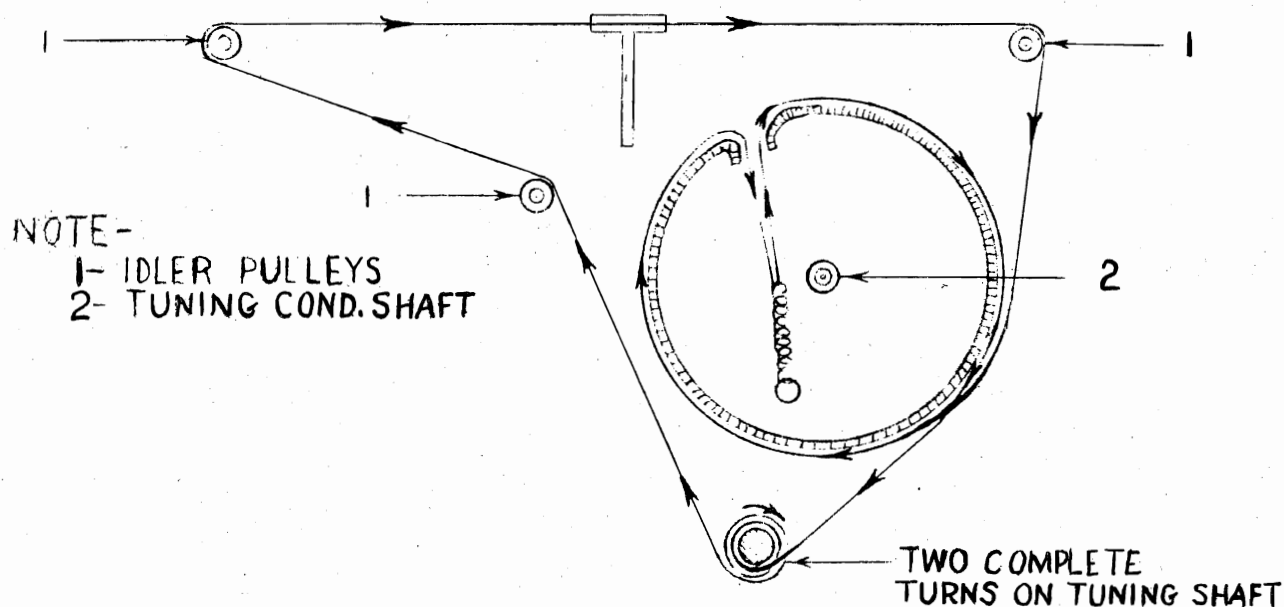


BAND-SWITCH SHOWN
AT 2ND POSITION.
BROADCAST BAND
550-1750 KC.

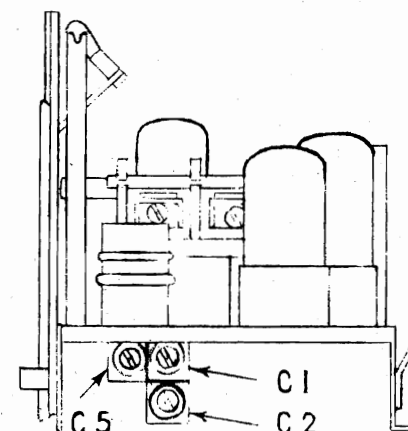
BAND-SWITCH SHOWN
AT 1ST POSITION.
SHORT WAVE BAND
5.2-19 MC.

CARR-NAGY CORP.

MODEL 100-62



TOP VIEW



SIDE VIEW

ALIGNMENT PROCEDURE: Volume control - full on.

I-F ADJUSTMENT: Set Signal Generator at 456 kc. and connect it through a 0.1-mf condenser to pin No.4 of 2nd i-f tube, 12SK7. Peak for maximum response.

Connect generator lead to pin No.4 of 1st i-f tube, 12SK7 and peak first i-f transformer for maximum response.

Repeat above procedure.

OSCILLATOR TRACKING ADJUSTMENT: Set Signal Generator to 600 kc and connect it to independent loop antenna. Place this loop near loop in receiver. Set dial pointer to 600 kc on scale. Adjust C-2 for maximum response, while rocking gang condenser each side of frequency.

R-F ALIGNMENT: Set Signal Generator to 1600 kc. Set dial pointer to 1600 kc on scale.

Adjust C-1 for maximum response.

Disconnect generator lead from loop and connect to Short-Wave Antenna coil primary.

Set frequency of generator to 18 mc. Set dial pointer to 18 mc on SW scale. Turn Band Switch to "SW" position.

Adjust C-5 for maximum response.

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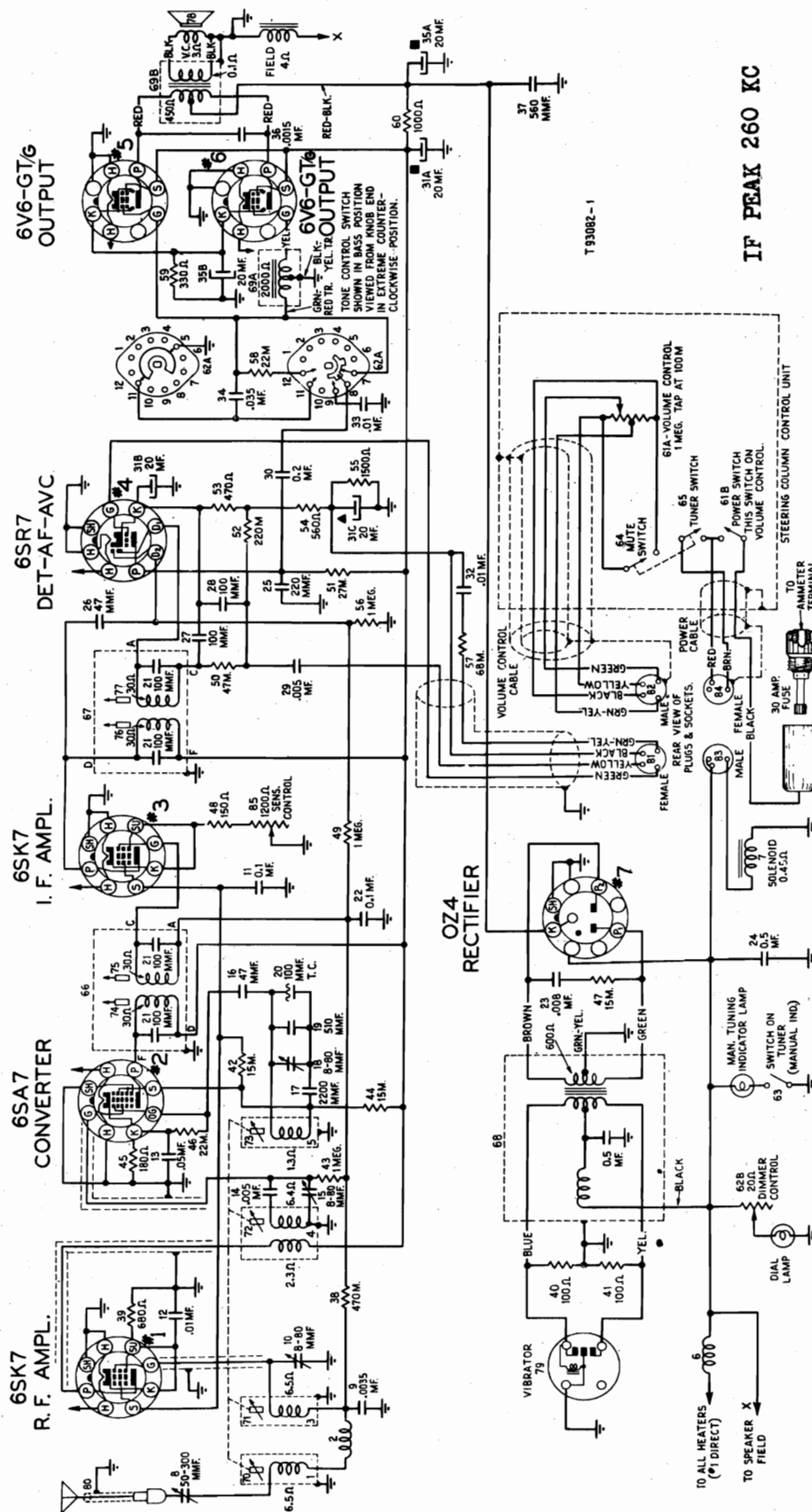


FIG. 1—CIRCUIT DIAGRAM—RADIO

Date 5-1-46

Antenna System: There are two antenna systems available for use with this receiver; the cowl rod antenna, and the telescopic reel type antenna. Either of these antennas will operate efficiently with this Chevrolet radio. After installation, the adjustment described in Paragraph 1 should be made.

MODEL 985986

CHEVROLET DIV.-GENERAL MOTORS

.035 mf. condenser (34) shunts the output of the 6SR7 a.f. amplifier stage, bypassing a large portion of the high audio frequencies to ground, and resulting in minimum high audio frequency response. In the "Soft" position a .01 mf. condenser (33) shunts the output of the 6SR7, but due to it being lower in capacity than 34, the reduction of high frequency response is not so pronounced as in the "Bass" position. In the "Music" position, no shunting capacity is employed, thus resulting in a maximum of high and low frequency response.

In the "Voice" position, the output of the 6SR7 is shunted to ground with a .01 mfd. condenser (33), thus bypassing some of the high frequencies. Simultaneously, a parallel combination of a 22,000 ohm resistor (58), and a .035 mfd. condenser (34) is placed in series with the output of the 6SR7, resulting in reduced low frequency response, thus some attenuation of both high and low frequencies is accomplished, and optimum tone balance for speech programs is reached.

1. Adjusting Antenna Compensating Condenser

This adjustment should be made after the receiver has been properly installed in the car. Tune the receiver to a weak signal at the high frequency end of the band, at about 1200 kilocycles. This signal should be just audible with the volume control on full. Adjust the antenna compensating condenser (8) for maximum signal strength.

Note: When making this adjustment, be sure that the antenna is fully extended.

2. Circuit Alignment

The adjustable condensers and cores in the tuned circuits of this receiver have been carefully adjusted at the factory, and should require no further adjustment unless tempering has occurred, or a defective unit has been replaced. Should the receiver require re-alignment, the following procedure is recommended:

1. Aligning the IF Stages at 260 KC. (Refer to Figure 7 for location of adjusting screws, etc.)

- Connect an output meter across the voice coil of the speaker; or connect one terminal of the output meter in series with a .01 mf. condenser to the plate of one of the 6V6 output tubes, and the other terminal of the output meter to the chassis frame.
- Connect output lead of the signal generator through a 0.1 mf. condenser to the grid (pin No. 4) of the 6SK7 IF tube, and the ground lead of the signal generator to the receiver chassis. Set the signal generator to 260 KC.

NOTE: It is important that the signal generator output be kept as low as possible to avoid AVC action in the receiver.

- Turn receiver volume control full ON.
- Tune receiver dial off any broadcast signal which may be present.

NOTE: It is more satisfactory to eliminate the possibility of RF-IF beat-note interference by suppressing the oscillator section of the 6SA7 completely. This may be accomplished by temporarily connecting a .01 mf. (or larger) condenser from the 6SA7 oscillator grid (pin No. 5) to the receiver chassis.

- Set sensitivity control 85 to mid position.
- Adjust 2nd IF transformer cores 77 and 78 for maximum output meter reading.
- Connect the signal generator output through the 0.1 mf. condenser to the 6SA7 signal grid (pin No. 8), and adjust the 1st IF transformer core screws 75 and 74 for maximum reading.

CONT'D

Circuit Description

The circuit used in this receiver is a conventional superheterodyne type with a stage of tuned RF amplification utilizing a 6SK7 tube, a 6SA7 converter, a 6SK7 IF amplifier, a 6SR7 second detector, audio amplifier and automatic volume control, a push-pull output stage, utilizing two 6V6GT/G tubes, and a rectifier, the rectifier socket being so wired as to permit optional use of either a 0Z4 or a 6X5 type.

The input circuit of the 6SK7 RF amplifier consists of permeability tuned antenna and R.F. coils, with a variable trimmer condenser (10) connected in parallel with the R.F. coil. Connected in series with the antenna lead is a variable trimmer condenser (8) which functions to compensate for slight variations in capacity of the antenna and the shielded antenna cable. The tuned input circuit is kept above ground d.c. potential, to permit application of AVC voltage to the 6SK7 grid. A 680 ohm resistor (39) is in series with the cathode to furnish residual bias for the tube. The output is inductively coupled to the grid circuit of the 6SA7 converter.

The 6SA7 converter has in its input circuit a permeability tuned coil (4) isolated by a blocking condenser (14), and shunted by a variable trimmer (15). AVC voltage is applied to the 6SA7 grid through a 1 Meg. resistor (43). The 180 ohm resistor (45) in series with the cathode is used to furnish residual bias. The oscillator portion of the 6SA7 is a modified Colpitts circuit, consisting of the oscillator coil (5), a fixed series padder condenser (17), and shunt condensers (18, 19 and 20); 20 is a negative temperature coefficient condenser employed to minimize oscillator drift due to temperature variations.

The 260 KC output from the 6SA7 is coupled to the 6SK7 IF amplifier by means of a permeability tuned IF transformer (66). The 1200 ohm potentiometer (85) in the 6SK7 cathode circuit is a sensitivity control, factory adjusted for standard I.F. amplifier gain. By means of another permeability tuned I.F. transformer (67) the output of the 6SK7 is coupled to the signal diode of the 6SR7 2nd detector. Some signal from the 6SK7 I.F. amplifier plate is coupled to the AVC diode plate of the 6SR7 through a 47 mmf. condenser (26). The triode section of the 6SR7 is used for audio amplification.

The AVC voltage is developed across the 1 meg. resistor (56). Since the cathode of the 6SR7 is at a positive potential equal to the sum of the voltage drops in the cathode resistors (53, 54, 55), no AVC voltage is developed until the signal exceeds the 6SR7 cathode potential. The audio signal developed across a 220 M resistor (52) is effectively placed in shunt with the manual volume control (61A). A portion of the audio voltage appearing across the volume control is applied to the grid of the triode section of the 6SR7. Tone compensation is accomplished by means of a tap on the volume control and the compensating resistor and condenser combination (32, 57). A muting switch (64) is mechanically coupled to the tuner switch, and electrically connected in shunt with the volume control, such that when the tuner switch is operated, the audio input to the 6SR7 grid is shorted, and thus the receiver is silent during tuning.

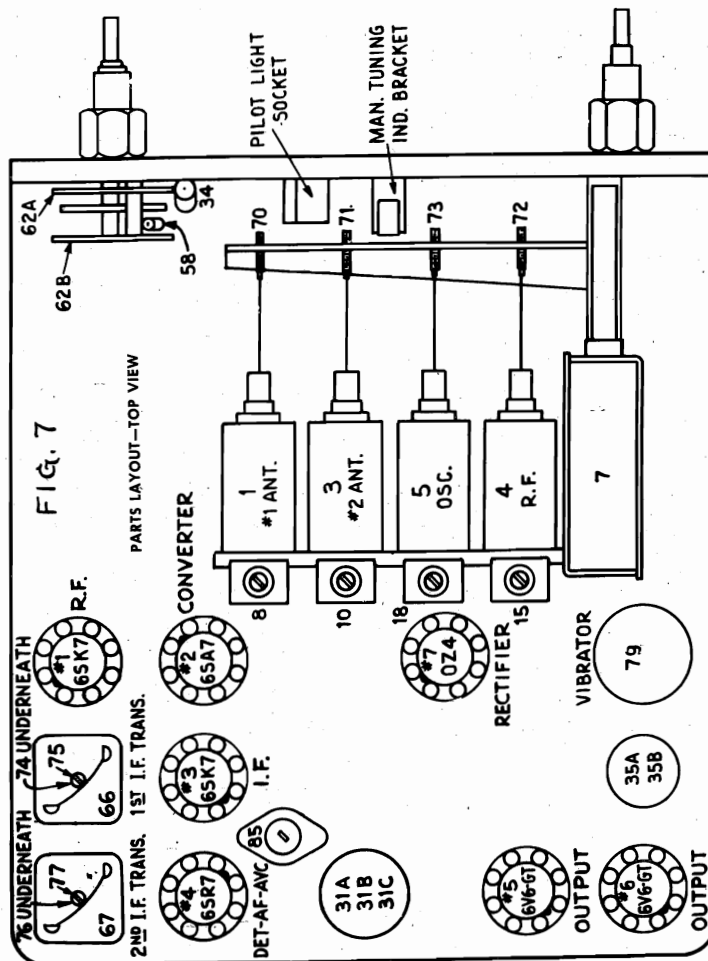
The amplified audio signal from the 6SR7 triode plate is applied to the 6V6GT/G output tubes by way of a four position tone control switch (62A). Phase inversion is accomplished in the center-tapped reactor (69A).

Bias for the 6V6GT/G tubes is obtained through the 330 ohm cathode resistor (59) which is bypassed by a 20 mfd. condenser (35B). The output signal is fed to the speaker by the output transformer (69B).

Tone Control

The four positions of the tone control are: Bass, Soft, Music and Voice. The tone control and its tone compensating network in the circuit are between the audio amplifier and the output stage, as shown in Figure 2. When the switch is in the "Bass" position, a

CHEVROLET DIV -GENERAL MOTORS



These cores are coded with a spot of red, yellow, or green paint on the stud end of the core. As these cores are supplied in matched sets, **they positively should not be replaced individually.** To replace the cores, proceed as follows:

- Remove the escutcheon by removing its four attaching screws.
- Remove the fibre light baffle from the face plate by disengaging the lower part of the baffle from the lances which secure the baffle to the face plate. The baffle can then be moved downward and removed. Care should be exercised that the dial pointer is not bent.
- Using a small thin-bladed screw driver, turn the core adjustment screw in a clockwise direction until the screw is disengaged from the core carriage. The tuning core can then be removed by carefully pushing it out through the rear of the coil.
- Care should be exercised that undue pressure is not applied to the new core when the adjustment screw is engaged into the core carriage.

4. Removal of R.F. Coil Assembly

- Remove 6SA7 and OZ4 tubes.
- Unsolder the shielded antenna lead to the trimmer condenser (8) and the ground connection from tuner frame to chassis.

CONT'D

2. Aligning the RF, Detector and Oscillator Circuits. (Refer to Figure 7 for location of adjusting screws, etc.)

NOTE: In the following outline of RF, Det. and Osc. circuit alignment, it is important that the output of the signal generator be kept at the minimum level required to obtain a reasonable indication on the output meter. This is to avoid AVC action and resultant broad peaking of the circuits.

- Tune receiver dial to the extreme high frequency end of the band.
- Turn each of the core adjustment screws 70, 71, 72, 73, several turns in a counterclockwise direction until the threaded stud extends $\frac{1}{8}$ " through the core bar. This is done in order to remove the cores from the coil windings so that the cores will have no effect on the frequency of the circuits during initial trimmer adjustments.
- Connect the output of the signal generator to the antenna input socket through a 72 mmf. condenser.
- Set frequency of signal generator to 1645 KC. and peak trimmers 18, 15, 10, 8, reducing signal generator output as needed to prevent AVC action.
- Without changing the receiver dial setting, change frequency of signal generator to 1620 KC, then adjust core screws 73, 72, 71, 70 for maximum signal output.
- Change frequency of signal generator to 1200 KC, and tune receiver dial for maximum signal output at 1200 KC.
- Re-adjust core screws 72, 71, 70 for maximum signal output.
- Change frequency of signal generator to 600 KC and tune receiver dial for maximum signal output at 600 KC.
- Re-adjust trimmers 15, 10, 8 for maximum signal output.
- Reset frequency of signal generator to 1200 KC and tune receiver for maximum signal output at 1200 KC.
- Re-adjust core screws 72, 71, 70 for maximum signal output.

(1) A tabulated summary of the foregoing procedure is given below:

Serial Condenser (Dummy Antenna)	Connect To	Signal Generator Frequency	Tune Receiver To	Adjust Screws in Order Shown
0.1 MF.	6SK7 1F Grid (Pin 4)	260 K.C.	*Quiet point in Broadcast Band	77, 76
	6SA7 Grid (Pin 8)		*Quiet point in Broadcast Band	75, 74
72 mmf.	Antenna Socket	1645 K.C.	Extreme high frequency end	18, 15, 10, 8
72 mmf.	Antenna Socket	1620 K.C.	Extreme high frequency end	73, 72, 71, 70
72 mmf.	Antenna Socket	1200 K.C.	Signal Generator	72, 71, 70
72 mmf.	Antenna Socket	600 K.C.	Signal Generator	15, 10, 8
72 mmf.	Antenna Socket	1200 K.C.	Signal Generator	72, 71, 70

*Or connect a 0.01 mf., or larger, capacitor between the oscillator grid (pin No. 5 of 6SA7 converter) and chassis frame.

3. Tuning Cores in RF Tuned Circuits (Method of Replacement)

In order to provide optimum tracking over the tuning range and thus insure highest sensitivity at all frequencies, **matched** tuning cores are used in items 70, 71, 72, 73.

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8. Removal of Tuning Shaft Clutch Assembly

- Remove turret assembly as outlined in Paragraph 7.
- Remove the "C" washer, spring retaining washer and spring from the front of the tuning shaft.
- Remove the tuning shaft assembly from the rear of the tuning shaft bushing.
- Replace with a new tuning shaft assembly.

9. Removal of Dial Pointer Assembly

- Remove the escutcheon by removing its four attaching screws.
- Remove the dial face plate by removing its two attaching screws.
- Remove the two screws which fasten the pointer assembly to the tuner frame.
- Carefully remove the pointer assembly through the front of the receiver.

10. Removal of Solenoid Coil and Bracket Assembly

- Remove screw, lock and flat washer and fibre washers from front of plunger.
- Unsolder coil lead at solder lug on terminal.
- Using a long thin bladed screw driver, remove the two screws which fasten the solenoid bracket to the tuner frame by inserting the blade between the RF coil shield and underside of the solenoid. Be careful not to bend the RF coil shield down and thereby possibly injure the RF coil and tuning core.

11. Erratic Tuning

- Weak core carriage spring. Replace spring if weak.
- Weak turret return leaf spring. Spring is located at rear of turret shaft. Replace with new spring.
- Lack of lubricating at turret shaft front bushing and at rear bracket.
- Bent turret guide shaft.
- Damaged turret setup screw threads. Replace turret assembly.
- Inability to adjust pre-set positions or tune manually may be due to the tuning shaft clutch slipping. Correct by replacing tuning shaft and clutch assembly.

12. Dial Pointer Sticks

- This is sometimes caused by lack of lubrication on the pointer assembly and core carriage guide shaft. Use a very light lubrication which is not affected by low temperature conditions.
- Bent core carriage guide shaft.
- Pointer rubbing on the inside surface of the escutcheon. This can be corrected by moving the pointer back slightly after loosening the screw provided in the pointer holder.
- Weak pointer return spring. This spring is located underneath the assembly in a central location. Replace spring.

13. Solenoid Armature Sticks

- Improper adjustment of the armature adjusting screw. To adjust, turn this screw out of the core several turns, then manually push the armature into the core as far as it will go. Then turn the adjustment screw "in" until it contacts the armature. Then turn the screw out six turns and lock it with the lock nut provided.

CONT'D

- Unsolder the four leads from the chassis to the R.F. and oscillator coils.
- Remove the two screws located at the top rear of the tuner frame, located near the shielded antenna lead.
- Remove the three screws through the holes provided in the chassis (bottom side); two located directly behind the speaker field, and one at the rear of the vibrator transformer can.
- The assembly can then be removed by carefully moving toward the rear of the chassis to disengage the coils from the tuning cores.

NOTE: Only in rare cases will it be necessary to remove the entire coil assembly inasmuch as the cores, coils, and coil shield cans can quite easily be removed individually.

5. Removal of R.F. Coils

- Remove bottom cover of the receiver.
- Remove 6SA7, 6SK7, and OZA tubes.
- Adjust dial pointer to 600 KC.
- Unsolder the leads from the base lugs of coil or coils to be changed.
- Remove the two screws fastening the fibre coil base to the coil bracket.
- Very carefully remove the coil by pulling toward the rear of the chassis until the coil is disengaged from the tuning core.

6. Removal of Tuner Assembly

- Remove screw from tuner frame located at rear of turret assembly.
- Remove 6SA7, 6SK7 IF, and OZA tubes and vibrator.
- Unsolder ground lead from tone control assembly to chassis and disengage the tone control from the tuner assembly.
- Unsolder leads from chassis to RF and oscillator coils and ground strap from tuner frame to chassis.
- Remove the two $\frac{1}{2}$ " x 28 hex. nuts from the tuning and tone control bushings on the front of the receiver.
- The tuner unit can then be removed by lifting the assembly backwards and upwards from the chassis.

7. Removal of Turret Assembly

- Remove tuner as described above. (Paragraph 6.)
- Remove solenoid coil and bracket assembly as described in Paragraph 10.
- Remove the two screws which fasten the rear turret and core carriage shaft bracket to the tuner frame and remove core carriage return spring.
- Carefully note locations of the felt washers, then remove the core carriage shaft from the rear of the tuner.
- Carefully push the core carriage toward the coil shields as far as possible.
- Carefully move the turret assembly back and forth until the front portion of the shaft is disengaged from the shaft housing. The assembly can then be removed upward and out at the front of the tuner.

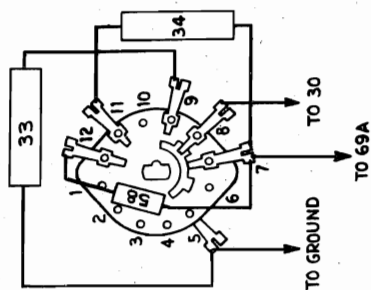
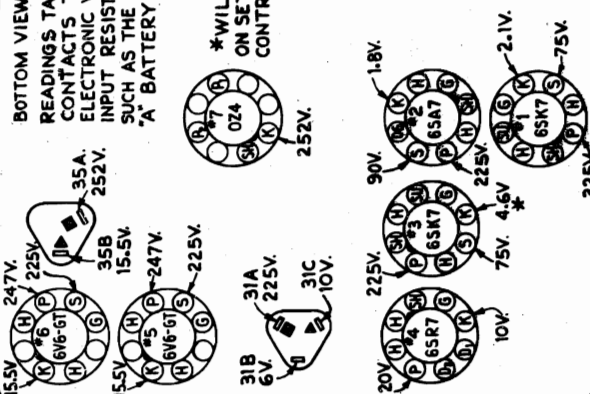
NOTE: Extreme care should be exercised during the above operations to prevent damage to the tuning cores and RF coils.

Exploded view diagram of a mechanical assembly, labeled "PARTS LAYOUT—BOTTOM VIEW". The diagram shows various components numbered 1 through 68, arranged in a layout that corresponds to the top view. Key features include a central rectangular block (1) with a circular feature (2) and a rectangular feature (3). Surrounding this are various other parts, including a large rectangular block (68) at the top, a smaller rectangular block (69A & B) at the bottom, and a central rectangular block (19) with a circular feature (20). The parts are arranged in a way that shows their relative positions and how they fit together.

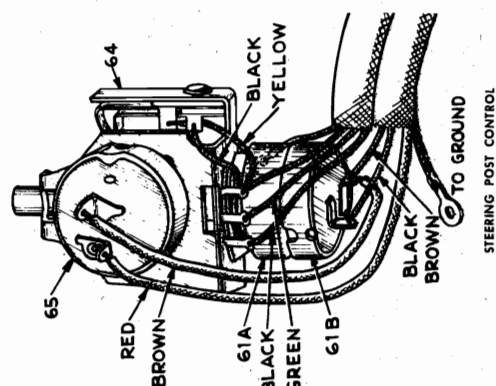
BOTTOM VIEW OF TUBE SOCKETS
READINGS TAKEN FROM TUBE SOCKET
CONTACTS TO GROUND WITH AN
ELECTRONIC VOLTMETER HAVING AN
INPUT RESISTANCE OF 11 MEGOHMS,
SUCH AS THE RCA VOLTHOMYST, JR.
A BATTERY 6.3V.

***WILL VARY DEPENDING
ON SETTING OF SENSITIVITY
CONTROL (85)**

VOLTAGE CHART



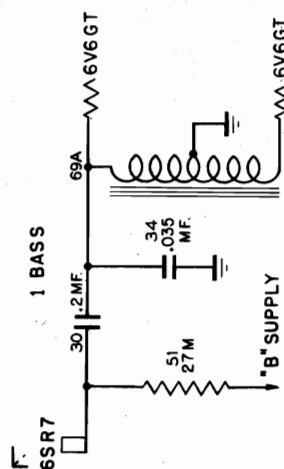
STONE CONTROL SWITCH



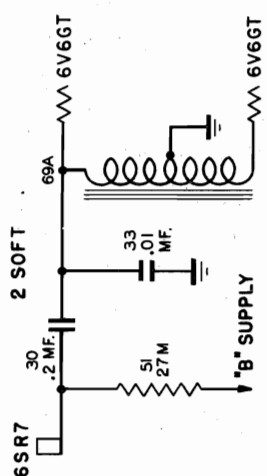
STEERING POST CONTROL

TONE CONTROL CIRCUIT

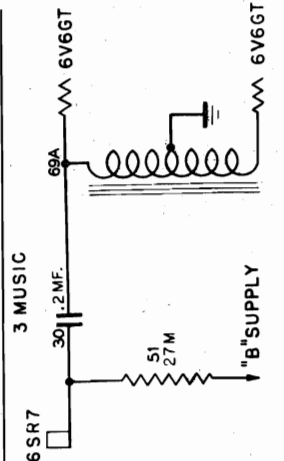
FIG. 2



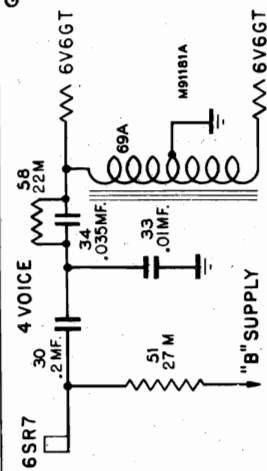
2 SOF.



MUSIC

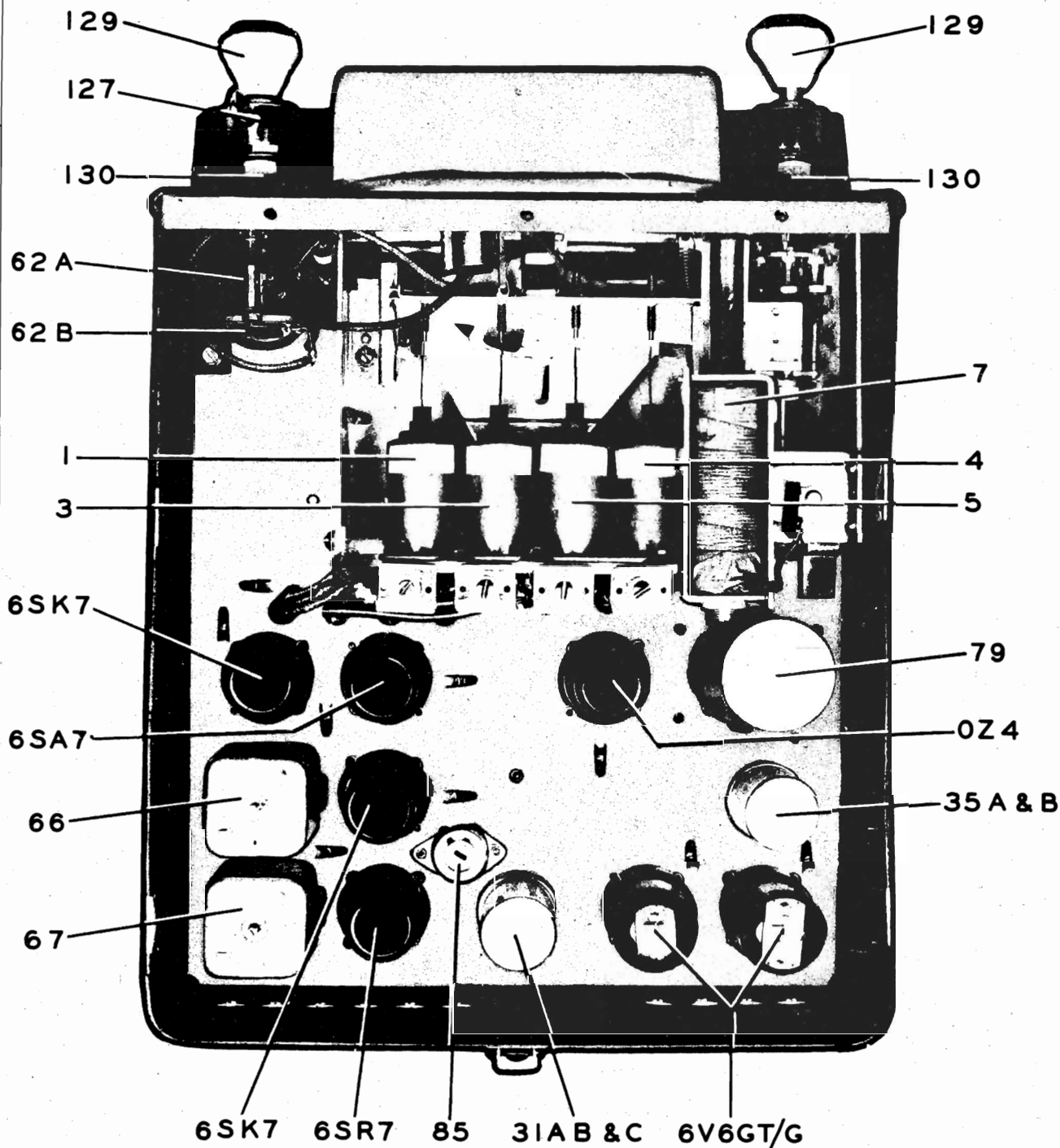


VOICE



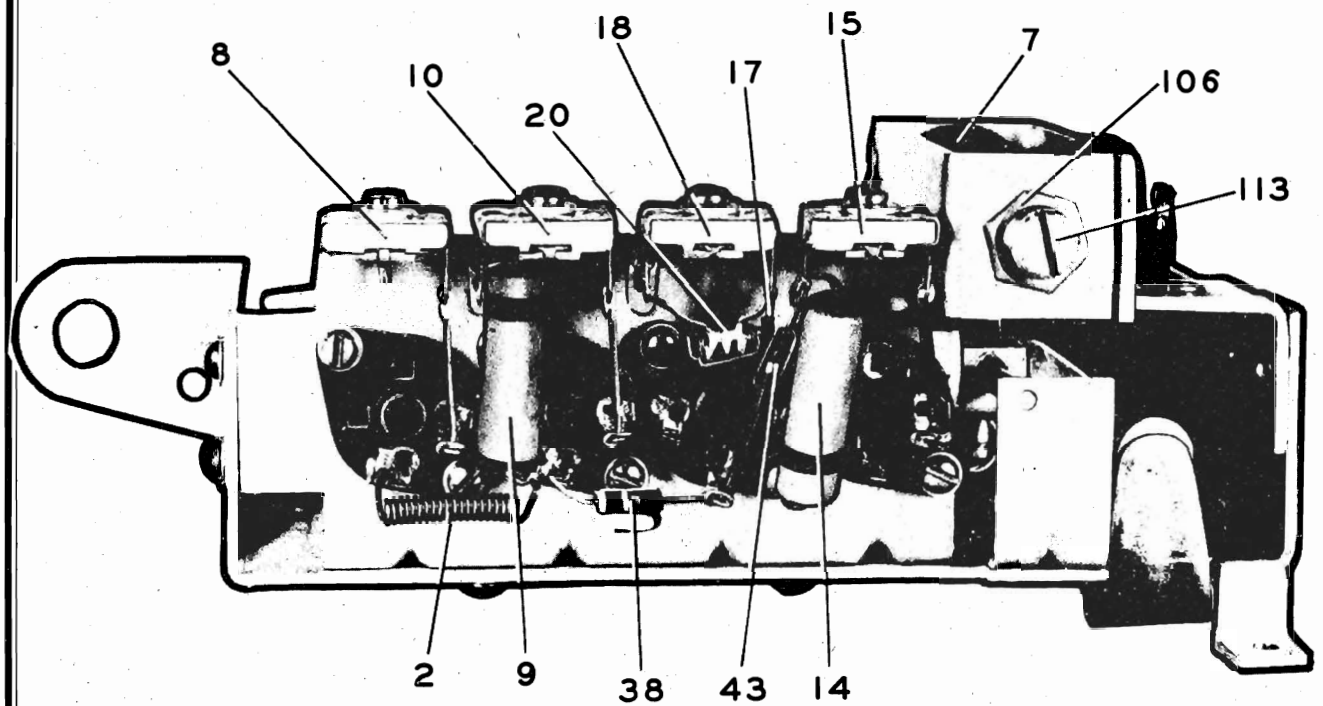
MODEL 985986

CHEVROLET DIV.-GENERAL MOTORS

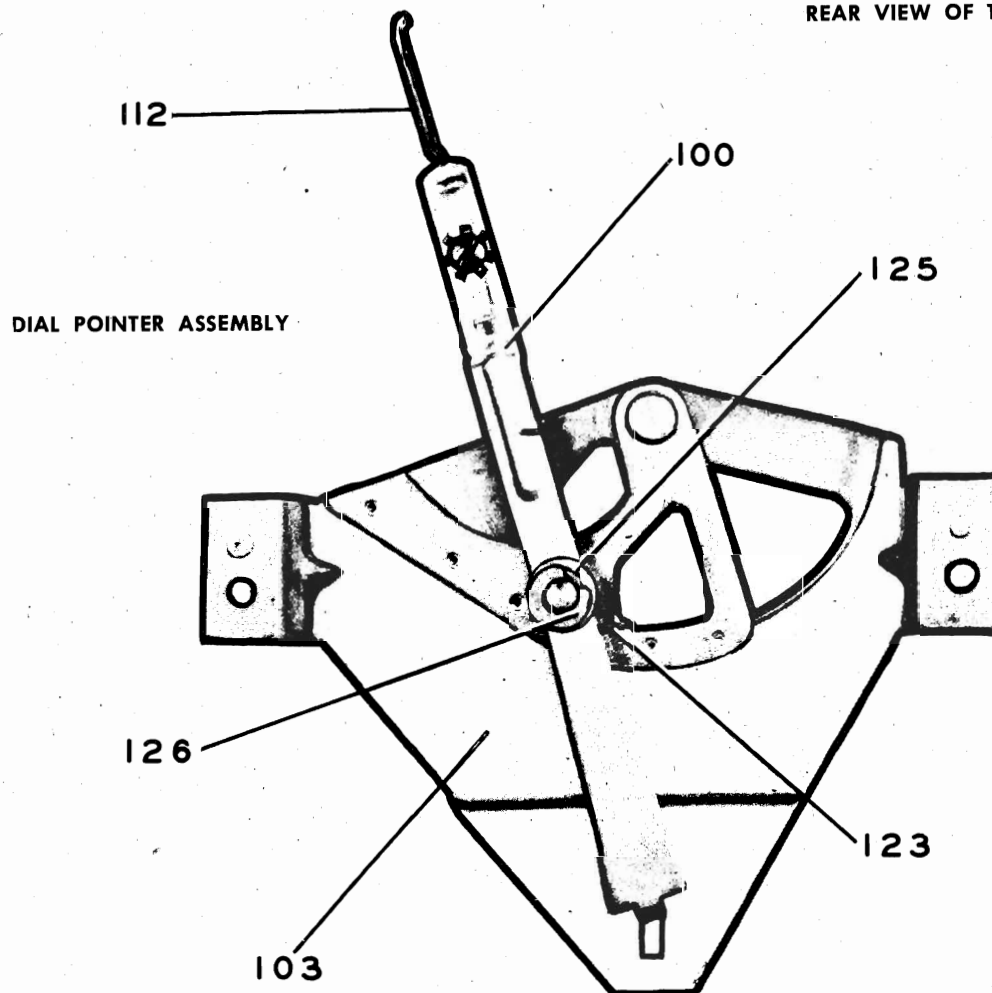


TOP VIEW

CHEVROLET DIV.-GENERAL MOTORS



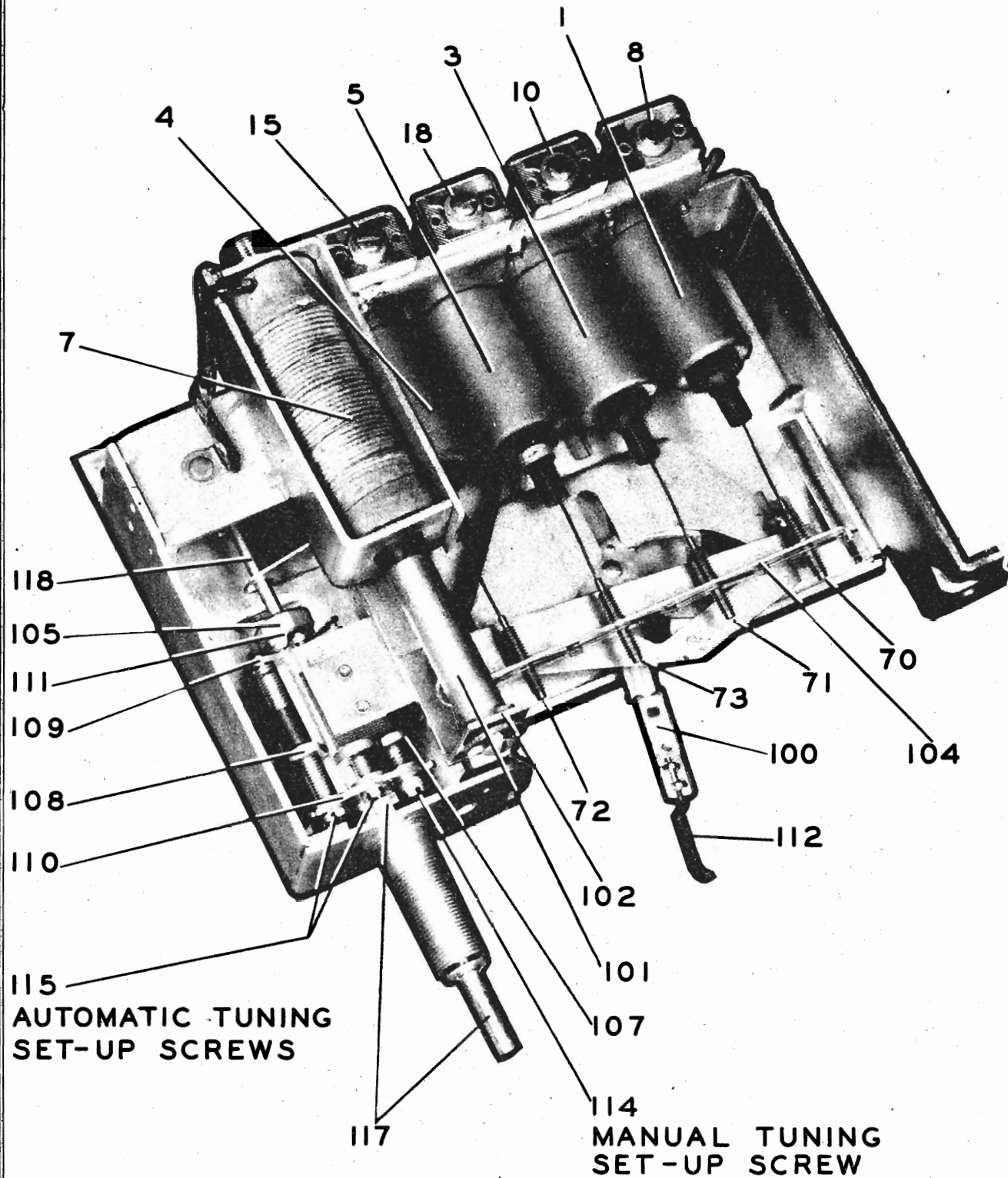
REAR VIEW OF TUNER



DIAL POINTER ASSEMBLY

MODEL 985986

CHEVROLET DIV.-GENERAL MOTORS



TOP VIEW OF TUNER

CHEVROLET DIV.-GENERAL MOTORS

Pro- duction Part No.	Service Part No.	Part Name	Description—Function	Illus. No.	Pro- duction Part No.	Service Part No.	Part Name	Description—Function	Illus. No.
1215800		Coil	Antenna coil and terminal board less shield can...	1	1213217	1211000	Resistor	Insulated—100 ohms, 1/2 w., Vibrator suppressor...	40
1215801		Coil	Choke coil—ignition filter...	2	1213217	1211000	Resistor	Insulated—100 ohms, 1/2 w., Vibrator suppressor...	41
1215800		Coil	Antenna coil and terminal board less shield can...	3	1211089		Resistor	Insulated—15,000 ohms, 1/2 w., R.F. & I.F. screen dropping...	42
1215802		Coil	R.F. coil and terminal board less shield can...	4	1209885		Resistor	Insulated—1 megohm, 1/2 w., Converter tube, AVC filter...	43
1215804		Coil	Oscillator coil and terminal board less shield can...	5					44
1216864		Coil	Choke coil...	6	7233653		Resistor	Insulated—15,000 ohms, 2 w., Oscillator screen...	45
1216852		Coil	Solenoid coil...	7	1215559	1211006	Resistor	Insulated—200 ohms, 1/2 watt, Converter tube cathode...	46
1215074		Condenser	Trimmer—50-300 mmf.	8					47
1216636		Condenser	Tubular—.0035 mfd., 700 volts, RF AVC...	9	1211192	1215182	Resistor	Insulated—22,000 ohms, 1/2 w., oscillator grid...	48
1214456		Condenser	Antenna Coil Trimmer—8-80 mmf.	10	1211089		Resistor	Insulated—15,000 ohms, 1/2 w., OZ4 buffer...	49
1207908		Condenser	Tubular—.01 mfd., 400 volts, R.F. screen...	11	1213220	1211003	Resistor	Insulated—150 ohms, 1/2 w., I.F. (6SK7) cathode...	50
1208600		Condenser	Tubular—.01 mfd., 600 volts, R.F. cathode...	12	1209885		Resistor	Insulated—1 megohm, 1/2 w., AVC filter...	51
7230592		Condenser	Tubular—.05 mfd., 600 volts, converter cathode...	13	1211193	1210116	Resistor	Insulated—50,000 ohms, 1/2 w., Audio filter...	52
7230912		Condenser	Tubular—.005 mfd., 800 volts, converter grid blocking...	14	1213342		Resistor	Insulated—27,000 ohms, 1 w., 6SR7 plate load...	53
1214456		Condenser	R.F. Coil Trimmer—8-80 mmf.	15	1214570	1210119	Resistor	Insulated 220,000 ohms, 1/2 w., Diode load...	54
7233313		Condenser	Moulded .000047 mfd., oscillator grid blocking...	16	1214575	1213486	Resistor	Insulated—470 ohms, 1/2 w., Squelch...	55
1216883		Condenser	Moulded—.0022 mfd., oscillator pad...	17	7233314		Resistor	Insulated—560 ohms, 1/2 w., 6SR7 bias...	56
1214456		Condenser	Oscillator Coil Trimmer—8-80 mmf.	18	1211041		Resistor	Insulated—1500 ohms, 1/2 w., AVC delay...	57
1216881		Condenser	Moulded—.00051 mfd., oscillator grid tuning...	19	1209884		Resistor	Insulated—1 megohm, 1/2 w., AVC developer...	58
1216120	1214932	Condenser	Ceramic—.0001 mfd., oscillator grid temperature compensator...	20	1216884		Resistor	Insulated—68,000 ohms, 1/2 w., Tone compensator...	59
1210275		Condenser	Mica—.0001 mfd., I.F. circuit (See Ill. 66 and 67).	21	1210882	1215182	Resistor	Insulated—22,000 ohms, 1/2 w., Tone control...	60
1207908		Condenser	Tubular—.01 mfd., 400 volts, AVC filter...	22	1214572		Resistor	Insulated—330 ohms, 2 w., 6 V6GT...	61
1215191		Condenser	Tubular—.008 mfd., volts, .024 buffer...	23	1215183		Control	Volume Control—Steering post includes: A—Volume control...	62
1212100		Condenser	Tubular—.05 mfd., 400 volts, 6 volt by-pass...	24	1215610		Switch	B—Power switch...	63
7238792	1209055	Condenser	Moulded—.00022 mfd., Audio plate by-pass...	25	1217035		Switch	Tone Control—Switch—Includes: A—Tone control switch...	64
7233313		Condenser	Moulded—.000047 mfd., AVC source...	26			Switch	B—Dimmer Control switch...	65
1210275		Condenser	Moulded—.0001 mfd., Diode lead by-pass...	27			Switch	Manual indicator lamp switch...	66
1210275		Condenser	Moulded—.0001 mfd., Audio filter...	28			Switch	Muting switch...	67
7230912		Condenser	Tubular—.005 mfd., 600 volts, audio coupling...	29			Transformer	Steering post tuning switch...	68
7240579	7235836	Condenser	Tubular—.02 mfd., 400 volts, audio coupling...	30			Transformer	First I.F. transformer...	69
1214490		Condenser	Electrolytic: A-20 mfd., 350 volts—"B" filter...	31	1216844		Transformer	Second I.F. transformer...	70
			B-20 mfd., 25 volts—cathode by-pass...	32	1216859		Transformer	Vibrating transformer...	71
			C-20 mfd., 25 volts—delay resistor by-pass...	33	1216064		Transformer	Audio transformer...	72
			Tubular—.01 mfd., 800 volts, Tone compensator...	34	1214491		Core	A—Driver...	73
			Tubular—.01 mfd., 200 volts, Tone control...	35	1216628		Core	B—Output...	74
			Tubular—.035 mfd., 400 volts, Tone Control...	36	1216629		Core	Tuning core for coils—yellow...	75
			Electrolytic...	37			Core	Tuning core for coils—yellow...	76
			Tubular—.0015 mfd., 1500 volts, output plate...	38	1217045		Core	Tuning core for coils—yellow...	77
			Moulded—.00035 mfd., R.F. by-pass...	39	1217045		Core	Tuning core for coils—yellow...	78
			Insulated—500,000 ohms, 1/2 w. R.F. (6SK7) AVC filter...	40	1217045		Core	Tuning core for coils—yellow...	79
			Insulated—500 ohms, 1/2 w., R.F. (6SK7) cathode...	41	1217046		Core	Tuning core for coils—green...	80
				42	1217046		Core	Tuning core for coils—green...	81
				43			Core	Tuning core for coils—green...	82

MODEL 985986

CHEVROLET DIV.-GENERAL MOTORS

Steering Post Control Miscellaneous Parts

No.	Part Name	Description—Function
1216211	Cable	Power cable complete with socket, female fuse connector, ferrule and spring.
1216204	Cable	Volume control cable with plug.
1216212	Connector	Female fuse connector.
1216213	Connector	Male section fuse connector.
1216216	Cover	Steering post control housing cover.
1216216	Cushion	Rubber cushion for steering post control strap.
1216216	Ferrule	Ferrule and bushing for fuse connector.
147686	Fuse	30 ampere.
1216217	Grommet	Rubber grommet for steering post control housing.
1216217	Housing	Steering post control housing and strap less cover and rubber pad.
1216220	Plug	Power cable plug (3 contact female).
1216219	Plug	Volume control cable plug (4 contact).
1216228	Screw	No. 4 x 3/8" binder head screw for steering post housing cover.
111583	Screw	No. 2 x 3/8" self-tapping screw to fasten sleeve to volume control shaft.
100978	Screw	No. 10-32 x 1 1/4" oval head screw to fasten steering post control to steering column.
1216222	Shaft	Steering post control flexible shaft and knob.
1216221	Sleeve	Steering post tuning shaft actuating sleeve.
1336876	Spring	Fuse connector spring.
1216223	Spring	Steering post actuating sleeve spring.
115543	Washer	No. 6 internal lockwasher for volume control bracket screws.

Installation Parts

No.	Part Name	Description—Function
1216729	Steering Post Control Assembly	Steering Post Control Assembly
1216634	Package No. 1	Cover—Cable.
1215227	Package No. 1	Receiver Installation Kit
605052	Brace—Lower (1)	Brace—Lower (1)
605053	Brace—Lower (1)	Brace—Lower (1)
604273	Washer—Serrated (1)	Washer—Serrated (1)
604274	Bolt—hex. hd. 3/8-24 x 2 (1)	Bolt—hex. hd. 3/8-24 x 2 (1)
120518	Bolt—Carriage 3/4-20 x 3/4 (2)	Bolt—Carriage 3/4-20 x 3/4 (2)
134556	Nut—hex. 3/8-18" (1)	Nut—hex. 3/8-18" (1)
124818	Nut—hex. 3/4-20" (2)	Nut—hex. 3/4-20" (2)
134551	Knob Kit	Knob Kit
604775	Mounting nut 1/2-28" (2)	Mounting nut 1/2-28" (2)
609635	Knob-wing (1)	Knob-wing (1)
609634	Knob—Dummy (1)	Knob—Dummy (1)
605070	Washer (2)	Washer (2)
605319	Spring Washer (1)	Spring Washer (1)
7242249	Control Knob (2)	Control Knob (2)
1882272	Suppressor Kit	Suppressor Kit
1882053	Condenser—Ignition Coil (.03 mfd.) (1)	Condenser—Ignition Coil (.03 mfd.) (1)
1882054	Clip—Ground (1)	Clip—Ground (1)
1887829	Washer—Ignition Coil Condenser (1)	Washer—Ignition Coil Condenser (1)
7230032	Suppressor—Distributor (1)	Suppressor—Distributor (1)
1888204	Adapter—Distributor (1)	Adapter—Distributor (1)
986035	Power—Tire static (1)	Power—Tire static (1)
1908848	Condenser—Generator (0.1 mfd.) (1)	Condenser—Generator (0.1 mfd.) (1)
605302	Static Collector Kit	Static Collector Kit
494786	Static collector (2)	Static collector (2)
606347	Steering Post Control Mounting Kit	Steering Post Control Mounting Kit
120614	Spring (1)	Spring (1)
	Nut—10-32" (1)	Nut—10-32" (1)

Chassis Miscellaneous Parts

No.	Part Name	Description—Function
73	Core	Tuning core for coils—green.
70	Core	Tuning core for coils—red.
71	Core	Tuning core for coils—red.
72	Core	Tuning core for coils—red.
73	Core	Tuning core for coils—red.
78	Speaker	Complete elliptical speaker.
79	Vibrator	Plug-in vibrator.
85	Control	Sensitivity control.

Chassis Miscellaneous Parts

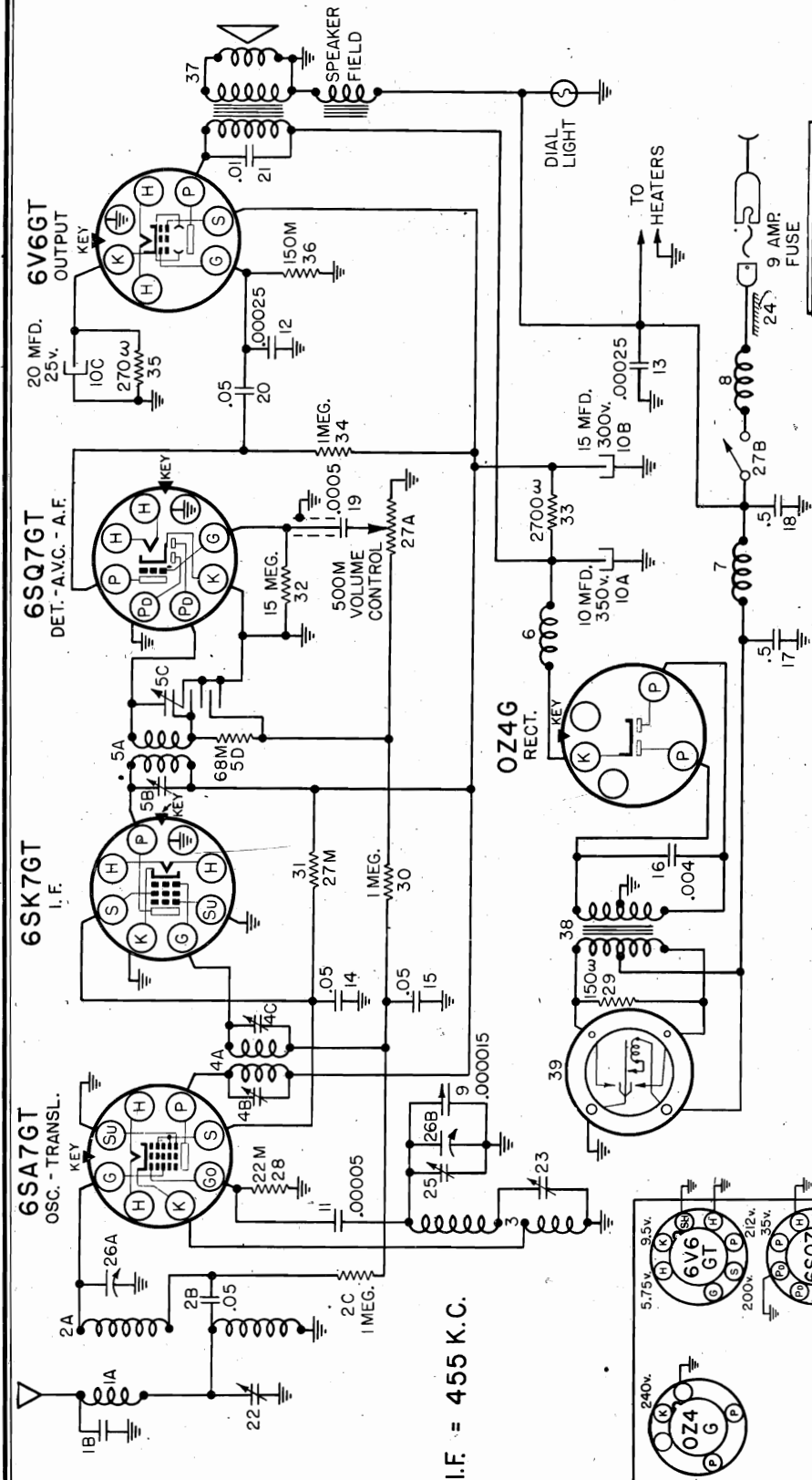
No.	Part Name	Description—Function
80	Cable	Antenna lead-in cable and socket.
1217046	Dial	Dial Assembly.
1217047	Escutcheon	Escutcheon.
1217047	Lamp	Mazda 55.
604275	Nut	Hex. nut (1/2-28 x 3/4") for tone switch tuning shaft.
1216861	Pad	Felt pad for dial window glass.
1216231	Socket	Power cable socket (3 prong male).
1213439	Socket	Tube socket.
1216224	Socket	Volume control cable socket (+ contact).
1216860	Window	Dial glass window only.

Tuner Miscellaneous Parts

No.	Part Name	Description—Function
101	Armature	Solenoid armature.
102	Bracket	Actuating bracket for solenoid armature.
103	Bracket	Pointer assembly mounting bracket and cam.
104	Carriage	Tuning coil carriage.
105	Nut	Hex. nut on rear of turret shaft to lock rear plate and spring plate.
106	Nut	Locknut for solenoid pole piece.
107	Nut	Manual tuning nut (.1640 dia. triple thread).
108	Nut	Stop-nut for set-up screw (No. 8-32).
109	Plate	Turret rear plate.
110	Plate	Turret front plate.
111	Plate	Turret spring plate.
112	Pointer	Dial pointer and holder.
113	Pole Piece	Solenoid pole piece.
114	Screw	Manual tuning screw (.1640 dia. triple thread).
115	Screw	Set-up screw (No. 8-32).
116	Shaft	Tuning coil core carriage guide shaft.
117	Shaft	Tuning knob shaft and key.
118	Shaft	Turret shaft.
119	Spacer	Flat bakelite spacer for mounting solenoid armature in front of bracket.
120	Spacer	Shoulder bakelite spacer for mounting solenoid armature in rear of bracket.
121	Spacer	Tuning screw spacer (fibre).
122	Spring	Coil core carriage return spring.
123	Spring	Pointer return spring.
124	Spring	Tuning shaft return spring.
125	Spring	Turret return spring.
126	Washer	Bearing washer for pointer arm.
	Washer	"C" washer for mounting pointer arm to bracket and cam.

COLONIAL RADIO CORP.

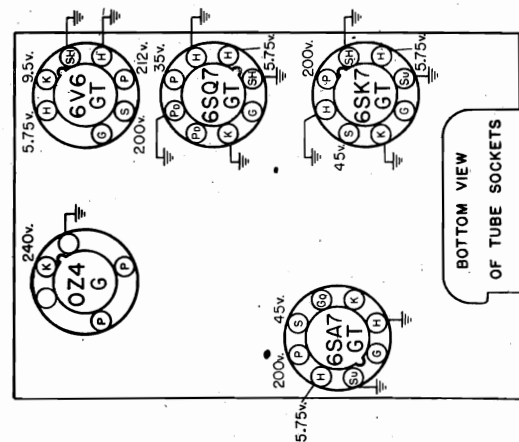
MODEL 600
Chrysler MoPar
Universal



SOCKET VOLTAGES

BOTTOM VIEW OF POWER PACK

Voltage readings taken from tube socket contacts to ground with a D. C. Voltmeter having a resistance of 1000 ohms per volt
 "A" Battery Voltage 5.0 Volts
 "A" Battery Current 6.0 Amps
 "B" Voltage Supply 240 Volts
 "B" Current approximately 50 M. A.



MODEL 600

Chrysler MoPar

Universal

COLONIAL RADIO CORP

CIRCUIT ALIGNMENT

1. Alignment of I. F. at 455 KC.

- (a) Connect test oscillator lead through a .1 mfd. capacitor to the control grid of the 6SA7GT tube (see parts layout - terminal "X" on gang capacitor).
- (b) Connect ground terminal of test oscillator to set chassis.
- (c) If a conventional output meter is used, connect across the speaker voice coil or secondary of the output transformer.
- (d) Turn volume control to maximum.
- (e) Set test oscillator to exactly 455 KC.
- (f) Adjust all of the trimmers on the I. F. transformers (see parts layout - Items 4 and 5) for maximum. These adjustments should be made several times keeping the output of the test oscillator as low as is consistent with obtaining a readable indication on the output meter.

2. Alignment at 1520 KC.

- (a) Leave the test oscillator leads connected the same as for aligning I. F. circuits.
- (b) Turn rotor plates of gang capacitor all the way out against the high frequency stop.
- (c) Set test oscillator to 1520 KC.
- (d) Adjust the oscillator trimmer (see parts layout - Item 25) for maximum output. (It is very important that this frequency be set accurately as a slight missetting will cause the receiver to be out of track over the high frequency end of the dial).

3. Alignment of Antenna Stage.

- (a) Remove the signal lead of the test oscillator from the grid of the 6SA7GT tube and connect to the antenna terminal of the receiver through a .00005 mfd. capacitor connected in place of the .01 capacitor previously used. (It is very important that a .00005 mfd. capacitor be used when aligning the antenna stage of these receivers in order that this circuit can be made to track properly.)
- (b) Set the test oscillator to 1400 KC.
- (c) Turn the station selector knob until this frequency is tuned in with maximum output, again keeping the input signal at a low value.
- (d) Adjust the antenna trimmer (see parts layout - Item 22) for maximum output.

4. Alignment at 600 KC.

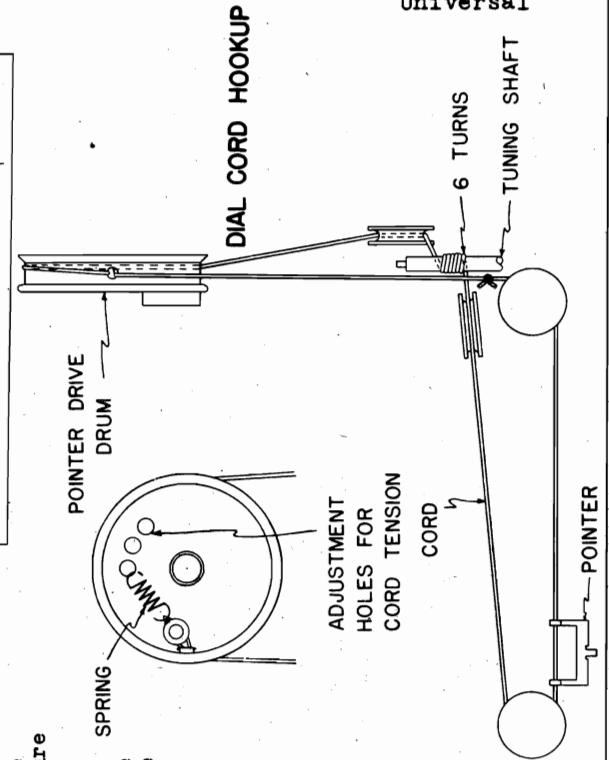
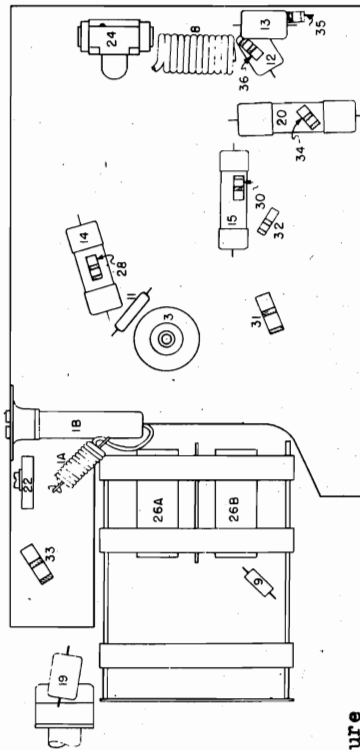
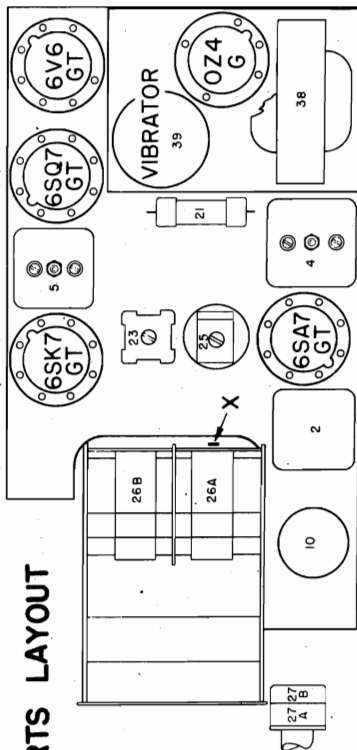
- (a) Set the test oscillator at 600 KC.
- (b) Turn the station selector knob until the signal from the test oscillator is tuned in with maximum output.
- (c) Maintain a low input signal and adjust the oscillator padding capacitor (Item 23) while turning the station selector knob back and forth tuning through the 600 KC signal. This operation should be continued until no further increase in output can be obtained.
- (d) After the above operation, turn the station selector knob until the rotor plates of the variable capacitors are against the high frequency stop. Check the 1520 KC setting and if necessary readjust the oscillator trimmer. Return to 1400 KC repeating operation 3b, 3c, 3d above.

IMPORTANT NOTE

When the entire alignment procedure has been accomplished accurately, the receiver should be uniformly sensitive over the entire frequency range.

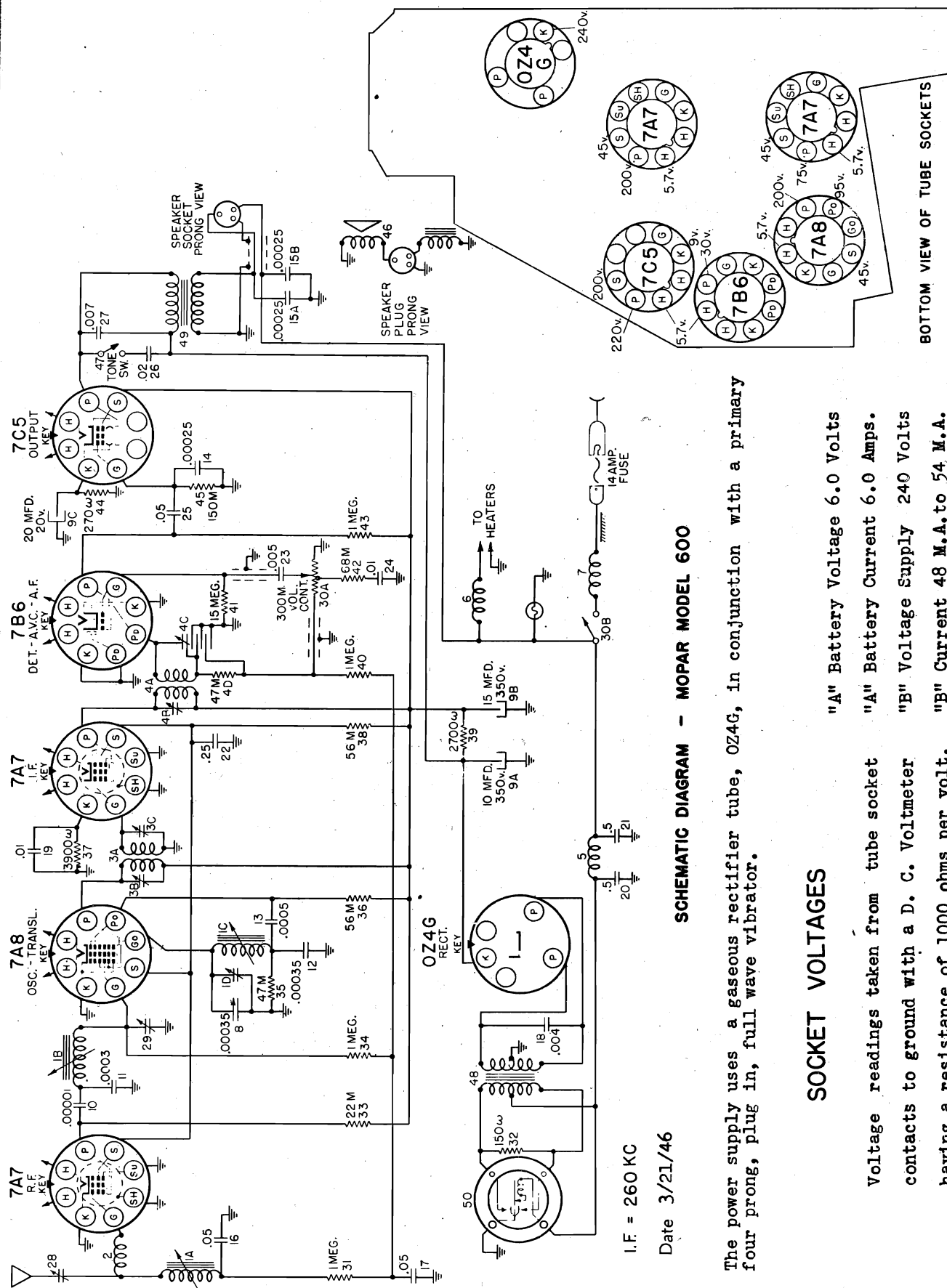
COLONIAL RADIO CORP.

MODEL 600
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PARTS LAYOUT

PARTS LIST			
Schematic Location	Colonial Part No.	Part Name	Description
1	1A	Coil Assembly	Antenna, Filter and Choke
2	1B	Coil Assembly	Antenna Choke
3	2A	Coil Assembly	Connector and Filter Assembly
4	2B	Coil Assembly	Antenna Transformer
5	2C	Coil Assembly	Antenna Coil
6	4A	Coil Assembly	Capacitor AVC Blocking
7	4B	Coil Assembly	Resistor AVC Filter
8	4C	Coil Assembly	Oscillator
9	5A	Coil Assembly	1st I. F.
10	5B	Coil Assembly	I. F. Transformer
11	5C	Coil Assembly	Primary Trimmer
12	5D	Coil Assembly	Secondary Trimmer
13	5A	Coil Assembly	2nd I. F.
14	5B	Coil Assembly	I. F. Transformer
15	5C	Coil Assembly	Primary Trimmer
16	5D	Coil Assembly	Secondary Trimmer and Filter
17	5A	Coil Assembly	68,000 Ohm Diode Filter
18	5B	Coil Assembly	Hash Choke
19	5C	Coil Assembly	Filament Choke
20	5D	Coil Assembly	Spark Choke
21	5A	Coil Assembly	.000015 Mfd. Compensating
22	5B	Coil Assembly	Electrolytic
23	5C	Coil Assembly	10 Mfd. - 350 Volt
24	5D	Coil Assembly	15 Mfd. - 300 Volt
25	5A	Coil Assembly	20 Mfd. - 25 Volt
26	5B	Coil Assembly	.00005 Mfd. Mica
27	5C	Coil Assembly	.00025 Mfd. Mica
28	5D	Coil Assembly	.00025 Mfd. Mica
29	5A	Coil Assembly	.05 Mfd. 200 Volt - High Temp
30	5B	Coil Assembly	.05 Mfd. 200 Volt - High Temp
31	5C	Coil Assembly	.004 Mfd. 1500 Volt - High Temp
32	5D	Coil Assembly	.5 Mfd. 100 Volt - High Temp
33	5A	Coil Assembly	.5 Mfd. 100 Volt - High Temp
34	5B	Coil Assembly	.0005 Mfd. Mica
35	5C	Coil Assembly	.05 Mfd. 400 Volt - High Temp
36	5D	Coil Assembly	.01 Mfd. 600 Volt - High Temp
37	5A	Coil Assembly	Antenna Padder
38	5B	Coil Assembly	Oscillator Padder
39	5C	Coil Assembly	Spark Plate
40	5D	Coil Assembly	Oscillator Trimmer
41	5A	Coil Assembly	Tuner Unit
42	5B	Coil Assembly	Volume and On-Off
43	5C	Coil Assembly	Volume Control 500,000 Ohm
44	5D	Coil Assembly	On-Off Switch
45	5A	Coil Assembly	22,000 Ohm 1/3 Watt
46	5B	Coil Assembly	150 Ohm 1 Watt
47	5C	Coil Assembly	1 Megohm 1/3 Watt
48	5D	Coil Assembly	27,000 Ohm 1 Watt
49	5A	Coil Assembly	15 Megohm 1/3 Watt
50	5B	Coil Assembly	2,700 Ohm 1 Watt
51	5C	Coil Assembly	1 Megohm 1/3 Watt
52	5D	Coil Assembly	270 Ohm 1 Watt
53	5A	Coil Assembly	150,000 Ohm 1/3 Watt
54	5B	Coil Assembly	Dynamic with Output Transform
55	5C	Coil Assembly	Power Supply
56	5D	Coil Assembly	Plug In
57	5A	Coil Assembly	Vibrator
58	5B	Coil Assembly	Resistor
59	5C	Coil Assembly	Resistor
60	5D	Coil Assembly	Resistor
61	5A	Coil Assembly	Resistor
62	5B	Coil Assembly	Resistor
63	5C	Coil Assembly	Resistor
64	5D	Coil Assembly	Resistor
65	5A	Coil Assembly	Resistor
66	5B	Coil Assembly	Resistor
67	5C	Coil Assembly	Resistor
68	5D	Coil Assembly	Resistor
69	5A	Coil Assembly	Resistor
70	5B	Coil Assembly	Resistor
71	5C	Coil Assembly	Resistor
72	5D	Coil Assembly	Resistor
73	5A	Coil Assembly	Resistor
74	5B	Coil Assembly	Resistor
75	5C	Coil Assembly	Resistor
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78	5B	Coil Assembly	Resistor
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238	5B	Coil Assembly	Resistor
239	5C	Coil Assembly	Resistor
240	5D	Coil Assembly	Resistor
241	5A	Coil Assembly	Resistor
242	5B	Coil Assembly	Resistor
243	5C	Coil Assembly	Resistor
244	5D	Coil Assembly	Resistor
245	5A	Coil Assembly	Resistor
246	5B	Coil Assembly	Resistor
247	5C	Coil Assembly	Resistor
248	5D	Coil Assembly	Resistor
249	5A	Coil Assembly	Resistor
250	5B	Coil Assembly	Resistor
251	5C	Coil Assembly	Resistor
252	5D	Coil Assembly	Resistor
253	5A	Coil Assembly	Resistor
254	5B	Coil Assembly	Resistor
255	5C	Coil Assembly	Resistor
256	5D	Coil Assembly	Resistor
257	5A	Coil Assembly	Resistor
258	5B	Coil Assembly	Resistor
259	5C	Coil Assembly	Resistor
260	5D	Coil Assembly	Resistor
261	5A	Coil Assembly	Resistor
262	5B	Coil Assembly	Resistor
263	5C	Coil Assembly	Resistor
264	5D	Coil Assembly	Resistor
265	5A	Coil Assembly	Resistor
266	5B	Coil Assembly	Resistor
267	5C	Coil Assembly	Resistor
268	5D	Coil Assembly	Resistor
269	5A	Coil Assembly	Resistor
270	5B	Coil Assembly	Resistor
271	5C	Coil Assembly	Resistor
272	5D	Coil Assembly	Resistor
273	5A	Coil Assembly	Resistor
274	5B	Coil Assembly	Resistor
275	5C	Coil Assembly	Resistor
276	5D	Coil Assembly	Resistor
277	5A	Coil Assembly	Resistor
278	5B	Coil Assembly	Resistor
279	5C	Coil Assembly	Resistor
280	5D	Coil Assembly	Resistor
281	5A	Coil Assembly	Resistor
282	5B	Coil Assembly	Resistor
283	5C	Coil Assembly	Resistor
284	5D	Coil Assembly	Resistor
285	5A	Coil Assembly	Resistor
286	5B	Coil Assembly	Resistor
287	5C	Coil Assembly	Resistor
288	5D	Coil Assembly	Resistor
289	5A	Coil Assembly	Resistor
290	5B	Coil Assembly	Resistor
291	5C	Coil Assembly	Resistor
292	5D	Coil Assembly	Resistor
293	5A	Coil Assembly	Resistor
294	5B	Coil Assembly	Resistor
295	5C	Coil Assembly	Resistor
296	5D	Coil Assembly	Resistor
297	5A	Coil Assembly	Resistor
298	5B	Coil Assembly	Resistor
299	5C	Coil Assembly	Resistor
300	5D	Coil Assembly	Resistor
301	5A	Coil Assembly	Resistor
302	5B	Coil Assembly	Resistor
303	5C	Coil Assembly	Resistor
304	5D	Coil Assembly	Resistor
305	5A	Coil Assembly	Resistor
306	5B	Coil Assembly	Resistor
307	5C	Coil Assembly	Resistor
308	5D	Coil Assembly	Resistor
309	5A	Coil Assembly	Resistor
310	5B	Coil Assembly	Resistor
311	5C	Coil Assembly	Resistor
312	5D	Coil Assembly	Resistor
313	5A	Coil Assembly	Resistor
314	5B	Coil Assembly	Resistor
315	5C	Coil Assembly	Resistor
316	5D	Coil Assembly	Resistor
317	5A	Coil Assembly	Resistor
318	5B	Coil Assembly	Resistor
319	5C	Coil Assembly	Resistor
320	5D	Coil Assembly	Resistor
321	5A	Coil Assembly	Resistor
322	5B	Coil Assembly	Resistor
323	5C	Coil Assembly	Resistor
324	5D	Coil Assembly	Resistor
325	5A	Coil Assembly	Resistor
326	5B	Coil Assembly	Resistor
327	5C	Coil Assembly	Resistor



SCHEMATIC DIAGRAM - MOPAR MODEL 600

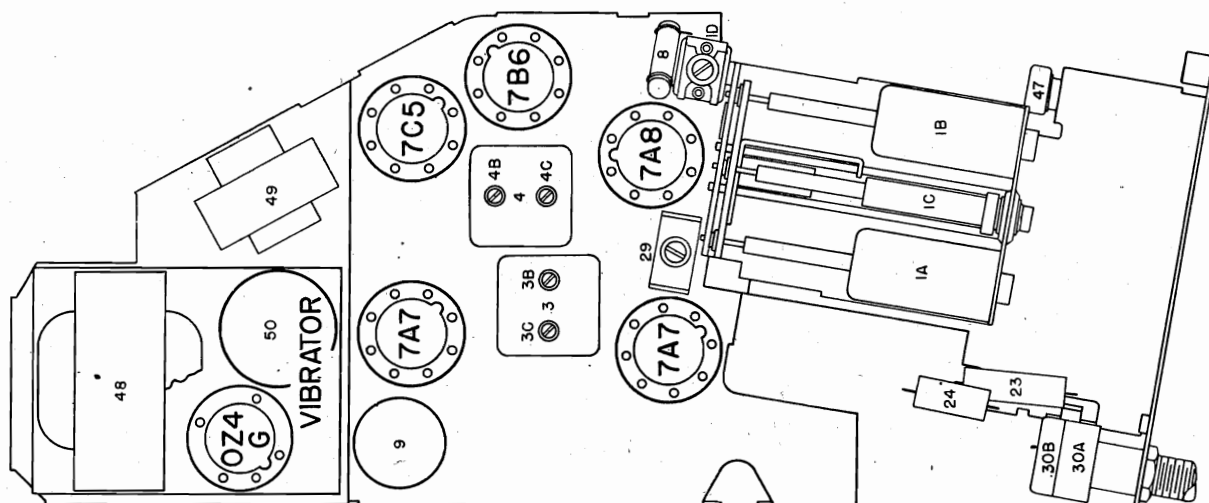
The power supply uses a gaseous rectifier tube, OZ4G, in conjunction with a primary four prong, plug in, full wave vibrator.

SOCKET VOLTAGES

Voltage readings taken from tube socket contacts to ground with a D. C. Voltmeter having a resistance of 1000 ohms per volt.

"A" Battery Voltage 6.0 Volts
"A" Battery Current 6.0 Amps.
"B" Voltage Supply 240 Volts
"B" Current 48 M.A. to 54 M.A.

COLONIAL RADIO CORP.



All capacity adjustments, with the exception of the antenna matching capacitor, are carefully made at the factory and should require no further adjustment. The iron cores in the permeability tuning unit are set at the time the receiver is originally calibrated, and are sealed to eliminate possibility of turning due to vibration. No adjustment of these cores should be necessary unless a core or coil must be replaced. If realignment is found to be necessary the circuits can be properly adjusted only with the use of a calibrated test oscillator or signal generator and an output meter using the procedure outlined below:

1. Alignment of I. F. at 260 KC.

- Connect test oscillator lead through a .1 mfd. capacitor to the control grid of the 7A8 oscillator tube (see parts layout - hot terminal of Item 29).
- Connect ground terminal of test oscillator to set chassis.
- If a conventional output meter is used, connect across the speaker voice coil or secondary of the output transformer.
- Turn volume control to maximum.
- Set test oscillator at exactly 260 KC.

- Adjust padders 3B and 3C on first I. F. transformer and 4B and 4C on second I. F. transformer for maximum output. These adjustments should be made several times, keeping the output of the test oscillator as low as is consistent with obtaining a readable indication on the output meter.

2. Alignment at 1610 KC.

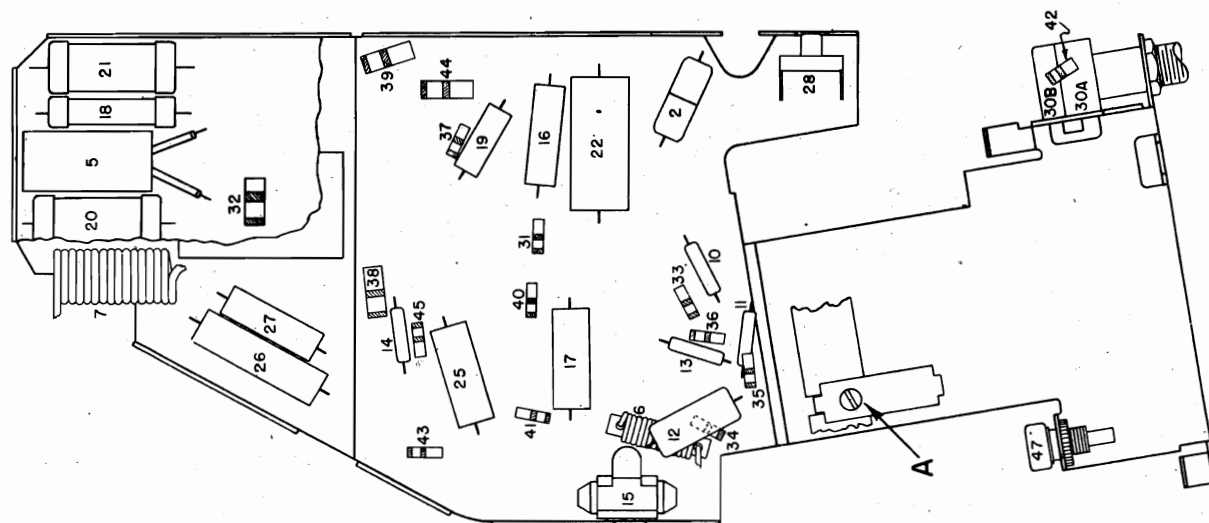
- Remove the signal lead of the test oscillator from the grid of the 7A8 tube and connect to the antenna terminal of the receiver through a .00005 mfd. MICA CAPACITOR connected in place of the .1 mfd. capacitor previously used. (It is very important that a .00005 mfd. mica capacitor be used when aligning the antenna stage of these receivers in order that this circuit can be made to track properly).
- Remove high frequency stop (see parts layout - Illustration "A"). This is no longer required.
- Set the test oscillator to 1610 Kilocycles.
- Turn station selector knob clockwise to the high frequency stop (1610 KC). Adjust the oscillator trimmer capacitor (see parts layout - Item 1D) for maximum output. (It is very important that this frequency be set accurately as a slight missetting will cause the receiver to be out of track over the high frequency end of the dial).
- Set test oscillator to 1410 KC and tune receiver to this frequency. (Do not readjust oscillator trimmer).
- Adjust the R. F. trimmer capacitor (see parts layout - Item 29) for maximum output.
- Adjust the antenna trimmer capacitor (see parts layout - Item 28) for maximum output. With the type of permeability tuning employed, the usual low frequency adjustments are not necessary.

MODEL 629

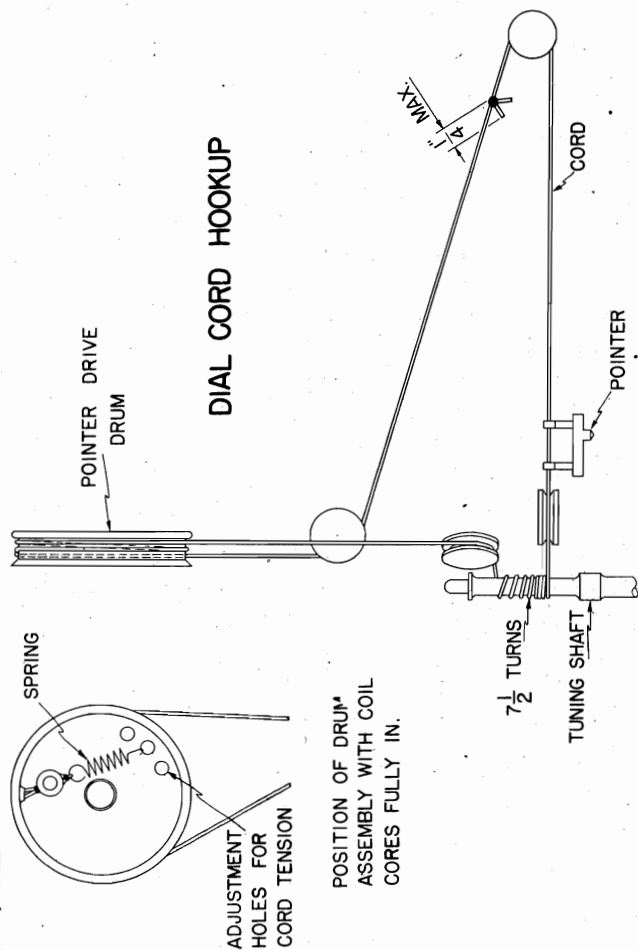
Chrysler MoPar 600

COLONIAL RADIO CORP.

PARTS LAYOUT



DIAL CORD HOOKUP



Schematic Location	Colonial Part No.	Part Name	Description
1 1A	R43699	Coil Assembly	Chrysler, DeSoto, Plymouth
1 1B			Antenna Coil & Core) Not to be serviced
1 1C			R. F. Coil & Core)
1 1D			Oscillator Coil & Core) individually
			Oscillator Trimmer
			Dodge Only
1 1A	R44664	Coil Assembly	Antenna Coil & Core) Not to be serviced
1 1B			R. F. Coil & Core)
1 1C			Oscillator Coil & Core) individually
1 1D			Oscillator Trimmer
2 3A	R43382	Coil Assembly	Antenna Choke
3 3B	R43775	Coil Assembly	1st I. F.
3 3C			I. F. Transformer
4 4A	R43776	Coil Assembly	Primary Trimmer
4 4B			Secondary Trimmer
4 4C			2nd I. F.
4 4D			I. F. Transformer
5 5A	R9044E	Coil Assembly	Primary Trimmer
5 5B	R5115E	Coil Assembly	Secondary Trimmer
6 6A	R9220CH	Coil Assembly	47000 Ohm Diode Filter
7 7A	R43380	Coil Assembly	Hash Choke
8 8A	R43691	Coil Assembly	Filament Choke
9 9A		Capacitor	Spark Choke
9 9B			0.00035 Mfd. Compensating
9 9C			Electrolytic
			10 Mfd. 350 Volts
			15 Mfd. 350 Volts
			20 Mfd. 20 Volts

MODEL 629

Chrysler MoPar 600

COLONIAL RADIO CORP.

Schematic Location	Colonial Part No.	Part Name	Description	Schematic Location	Colonial Part No.	Part Name	Description
10	R41777	Capacitor	.0001 Mfd. Mica	R17392	Fuse	14 Amp. SFE	
11	R43685	Capacitor	.0003 Mfd. Mica	R14914	Lamp	Dial Light #44	
12	R44561	Capacitor	.00035 Mfd. Mica	R9578BN	Lead	Ammeter End	
13	R40122	Capacitor	.0005 Mfd. Mica	R9578BP	Set End	Set End	
14	R20948	Capacitor	.00025 Mfd. Mica	R43779	Nut Wing	Cover Retaining	
15	R43696	Capacitor	Dual	R43781	Pointer	Dial, Chrysler, DeSoto, Plymouth	
15A				R44450	Pointer	Dodge	
15B				R43416	Pulley	Wood	
16	R42204	Capacitor	.00025 Mfd. Mica	R43423	Pulley	Wood	
17	R42204	Capacitor	.05 Mfd. 200 Volt - High Temperature	R44055	Shoe	Cam Locking	
18	R42211	Capacitor	.05 Mfd. 200 Volt - High Temperature	R42477	Socket	Octal 8 Prong	
19	R41478	Capacitor	.004 Mfd. 1500 Volt - High Temperature	R43701	Socket	Rectifier	
20	R21019	Capacitor	.01 Mfd. 200 Volt - High Temperature	R43698	Socket	Vibrator 4 Prong	
21	R21019	Capacitor	.5 Mfd. 100 Volt - High Temperature	R43790	Socket	Pilot Light	
22	R41377	Capacitor	.25 Mfd. 100 Volt - High Temperature	R43818	Spring	Dial Glass Retaining	
23	R42878	Capacitor	.005 Mfd. 400 Volt - High Temperature	R44545	Spring	Tone Button	
24	R42206	Capacitor	.01 Mfd. 100 Volt - High Temperature	R41472C	String	Pointer Drive with Spring	
25	R43661	Capacitor	.05 Mfd. 200 Volt - High Temperature	R43687	Tuner Unit	Includes Push Buttons, Chrysler, DeSoto	
26	R43786	Capacitor	.02 Mfd. 600 Volt - High Temperature	R43653	Tuner Unit	Includes Push Buttons, Plymouth Only	
27	R42445	Capacitor	.007 Mfd. 600 Volt - High Temperature	R44449	Tuner Unit	Includes Push Buttons, Dodge Only	
28	R43695	Capacitor	Antenna Trimmer	R41328	Tube	7A7	
29	R43694	Capacitor	R. F. Trimmer	R41362	Tube	7A8	
30	R44662	Control	Chrysler, DeSoto with Tuning Clutch, Dodge	R41363	Tube	7B6	
30A			Volume Control 300,000 Ohm	R41331	Tube	7C5	
30B			On-Off Switch	R16314	Tube	OZ4G	
30	R43689	Control	Chrysler, DeSoto without Tuning Clutch, and Plymouth				
30A			Volume Control 300,000 Ohm				
30B			On-Off Switch				
31	XY31052	Resistor	1 Megohm 1/3 Watt				
32	ZV31512	Resistor	150 Ohm 1/3 Watt				
33	WY32231	Resistor	22,000 Ohm 1/2 Watt				
34	XY31052	Resistor	1 Megohm 1/3 Watt				
35	XY34732	Resistor	47,000 Ohm 1/3 Watt				
36	XY33631	Resistor	56,000 Ohm 1/3 Watt				
37	XY33921	Resistor	3,900 Ohm 1/3 Watt				
38	ZV33631	Resistor	56,000 Ohm 1 Watt				
39	ZV32721	Resistor	2,700 Ohm 1 Watt				
40	XY31052	Resistor	1 Megohm 1/3 Watt				
41	XY31562	Resistor	15 Megohm 1/3 Watt				
42	XY36831	Resistor	68,000 Ohm 1/3 Watt				
43	XY31052	Resistor	1 Megohm 1/3 Watt				
44	ZY32711	Resistor	270 Ohm 1 Watt				
45	XY31541	Resistor	150,000 Ohm 1/3 Watt				
46	R45914	Speaker	7" Dynamic				
47	R43693	Switch	Tone Control				
48	R43787	Transformer	Power Supply				
49	R43692	Transformer	Audio Output				
50	R43697	Vibrator	Plug In				
	R43679	Button	Tone, Chrysler, DeSoto, Dodge				
	R44080	Button	Tone, Plymouth				
	R43687-1	Button	Push with Adjusting Screw, Chrysler, and DeSoto				
	R44077A	Button	Push with Adjusting Screw, Plymouth				
	R44449-1	Button	1st Push with Adjusting Screw, Dodge				
	R44449-2	Button	2nd Push with Adjusting Screw, Dodge				
	R44449-3	Button	3rd Push with Adjusting Screw, Dodge				
	R44449-4	Button	4th Push with Adjusting Screw, Dodge				
	R43688	Cable	Speaker				
	R43648D	Case	Center Section with Covers				
	R43785	Connector	Antenna				
	R43681	Dial	Station, Chrysler, DeSoto, Plymouth				
	R44428	Dial	Station, Dodge				
	R43673	Escutcheon	Chrysler, DeSoto, Plymouth, No Clutch				
	R44777	Escutcheon	Chrysler, DeSoto, With Clutch				
	R44444	Escutcheon	Dodge				

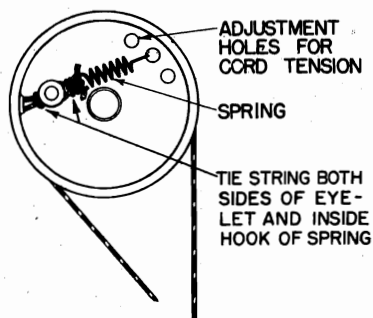
MOUNTING PARTS

R44064	Bolt	5/16 x 2 1/2 Bracket to Brace Mounting
R43810	Bracket	Rear Receiver Mounting
R44177A	Cable	Bonding Strap
R44065	Capacitor	Generator Suppressor
R45183	Clip	Fuse Case Holder
R43830	Filter	Fuel Gauge
R43682	Knob	Volume Control, Station Selector, Chrysler, DeSoto, Dodge
R44083	Knob	Volume Control, Station Selector, Plymouth Only
R43811P	Knob	Dummy
R44066	Nut	5/16-18 Hex Rear Receiver Mounting
R43955	Nut	7/16-18 Hex Front Receiver Mounting
R4118	Nut	Speaker Mounting
R44067	Spacer	Receiver Bracket to Brace
R43954A	Stud	Speaker Mounting
R43765	Suppressor	Distributor
R401-8	Washer	Lock #8 Speaker Mounting
R44068	Washer	Flat - Bracket to Brace Mounting
R400-18	Washer	Lock - 5/16 Split
R15284	Washer	Flat - Bracket to Receiver

IMPORTANT NOTE

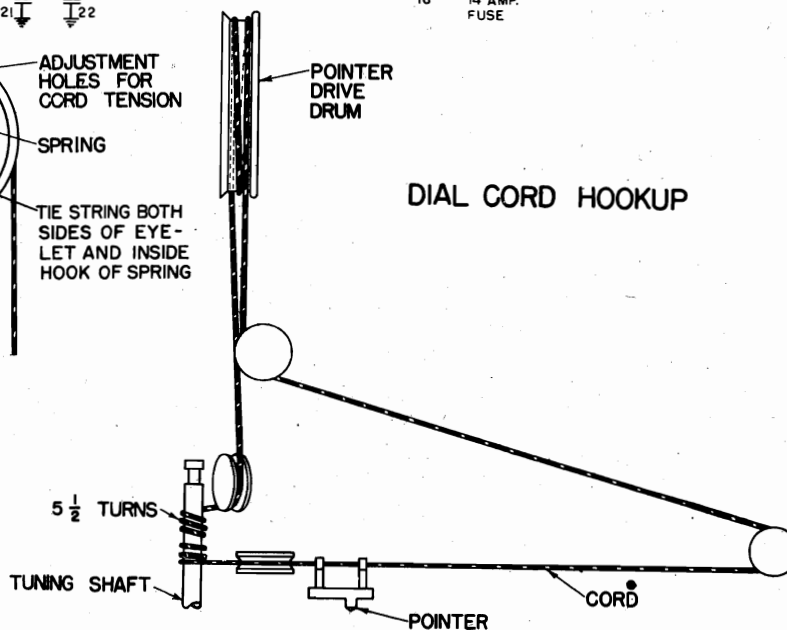
Two versions of the MoPar 600, though identical electrically, differed slightly in the mechanical tuning mechanism. These sets differ mechanically only in that one version employs a clutch in the tuning unit. Where this clutch is used, a change of appearance items are necessary and these will differ depending on the car in which the set is installed.

It is important, therefore, to carefully examine the receiver and determine the correct version before ordering replacement parts.

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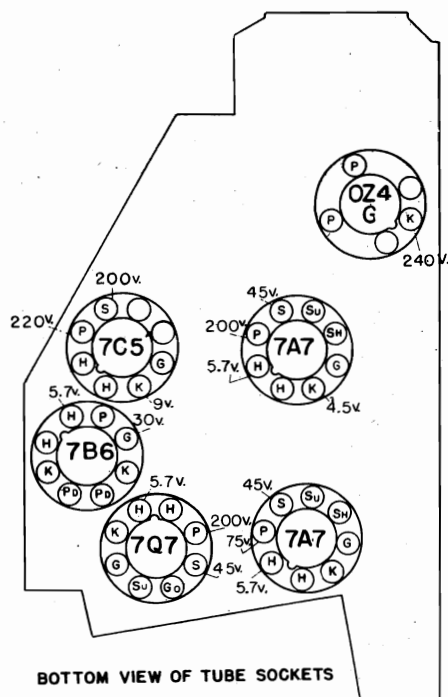
POSITION OF DRUM
ASSEMBLY WITH COIL
CORES FULLY IN.

DIAL CORD HOOKUP



Voltage readings taken from tube socket contacts to ground with a D. C. Voltmeter having a resistance of 1000 ohms per volt.

"B" Current 48 M.A.to 54 M.A.



BOTTOM VIEW OF TUBE SOCKETS

MODELS 671, 671A

Chrysler MoPar 601, 602

COLONIAL RADIO CORP.

All capacity adjustments, with the exception of the antenna matching capacitor, are carefully made at the factory and should require no further adjustment. The iron cores in the permeability tuning unit are set at the time the receiver is originally calibrated, and are sealed to eliminate possibility of turning due to vibration. No adjustment of these cores should be necessary unless a core or coil must be replaced. If realignment is found to be necessary the circuits can be properly adjusted only with the use of a calibrated test oscillator or signal generator and an output meter using the procedure outlined below.

1. Alignment of I. F. at 260 KC.

- (a) Connect test oscillator lead through a .1 mfd. capacitor to the control grid of the 7Q7 oscillator tube (see parts layout - hot terminal of item 30).
- (b) Connect ground terminal of test oscillator to set chassis.
- (c) If a conventional output meter is used, connect across the speaker voice coil or secondary of the output transformer.
- (d) Turn volume control to maximum.
- (e) Set test oscillator at exactly 260 KC.
- (f) Adjust padders 4B and 4C on first I. F. transformer and 5B and 5C on second I. F. transformer for maximum output. These adjustments should be made several times, keeping the output of the test oscillator as low as is consistent with obtaining a readable indication on the output meter.

2. Alignment at 1610 KC.

- (a) Remove the signal lead of the test oscillator from the grid of the 7Q7 tube and connect to the antenna terminal of the receiver through a .00006 mfd. MICA CAPACITOR connected in place of the .1 mfd. capacitor previously used. (It is very important that a .00006 mfd. mica capacitor be used when aligning the antenna stage of these receivers in order that this circuit can be made to track properly).
- (b) Set the test oscillator to 1610 Kilocycles.
- (c) Turn station selector knob clockwise to the high frequency stop (1610 KC). Adjust the oscillator trimmer capacitor (see parts layout - item 31) for maximum output. (It is very important that this frequency be set accurately as a slight missetting will cause the receiver to be out of track over the high frequency end of the dial).
- (d) Set test oscillator to 1410 KC and tune receiver to this frequency. (Do not readjust oscillator trimmer).
- (e) Adjust the R. F. trimmer capacitor (see parts layout - item 30) for maximum output.
- (f) Adjust the antenna trimmer capacitor (see parts layout - item 29) for maximum output.

IMPORTANT NOTE

With the type of permeability tuning employed, the usual low frequency adjustments are not necessary.

When the entire alignment procedure has been accomplished accurately, the receiver should be uniformly sensitive over the entire frequency range.

CIRCUIT DESCRIPTION

A special compensating capacitor in the oscillator circuit minimizes frequency drift due to normal variations in car voltage and temperature. The antenna, high gain radio and oscillator circuits are tuned by varying the inductance of the coils with special iron cores (permeability tuning). Frequency range 540 KC. to 1610 KC.

The circuit employed is of the conventional superheterodyne type with an intermediate frequency of 260 KC.

The triode section of the second detector is a driver resistance coupled to the 7C5 audio output tube.

POWER SUPPLY

The power supply uses a gaseous rectifier tube, 0Z4G, in conjunction with a primary four prong, plug in, full wave vibrator.

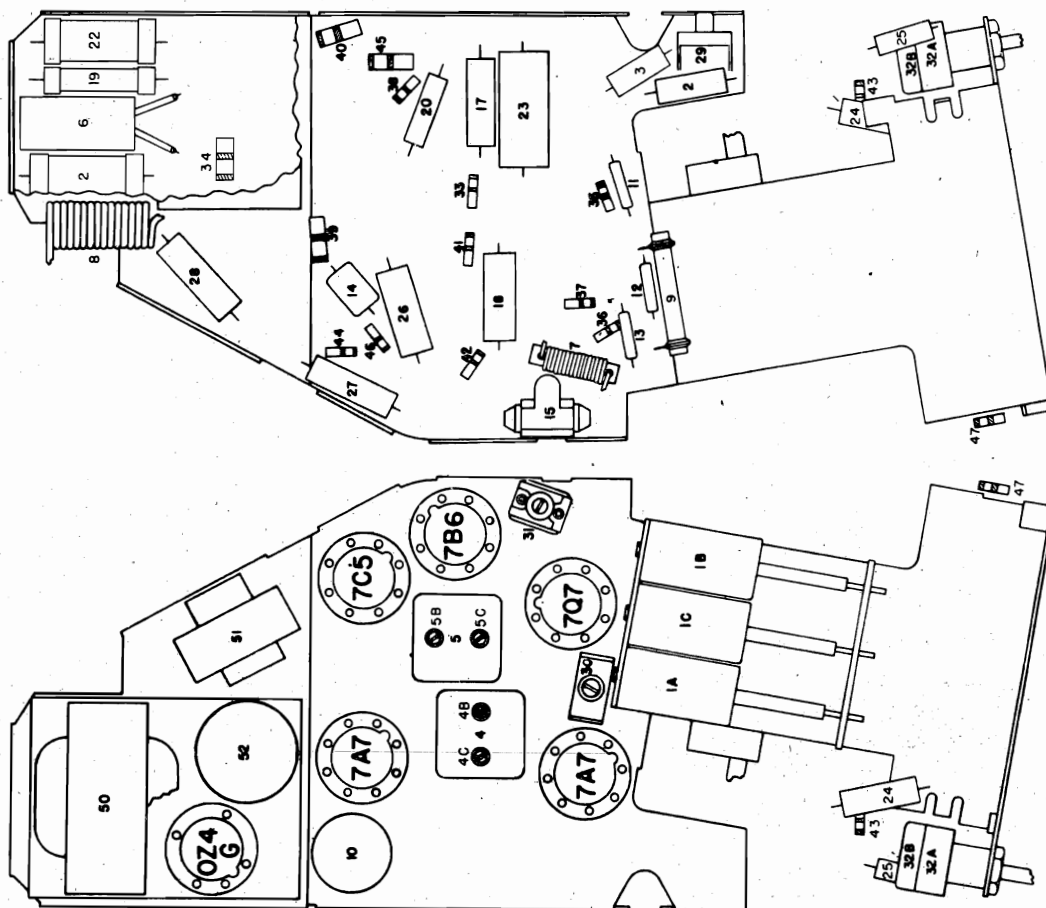
MODELS 671, 671A

Chrysler MoPar 601, 602

COLONIAL RADIO CORP.

PARTS LAYOUT

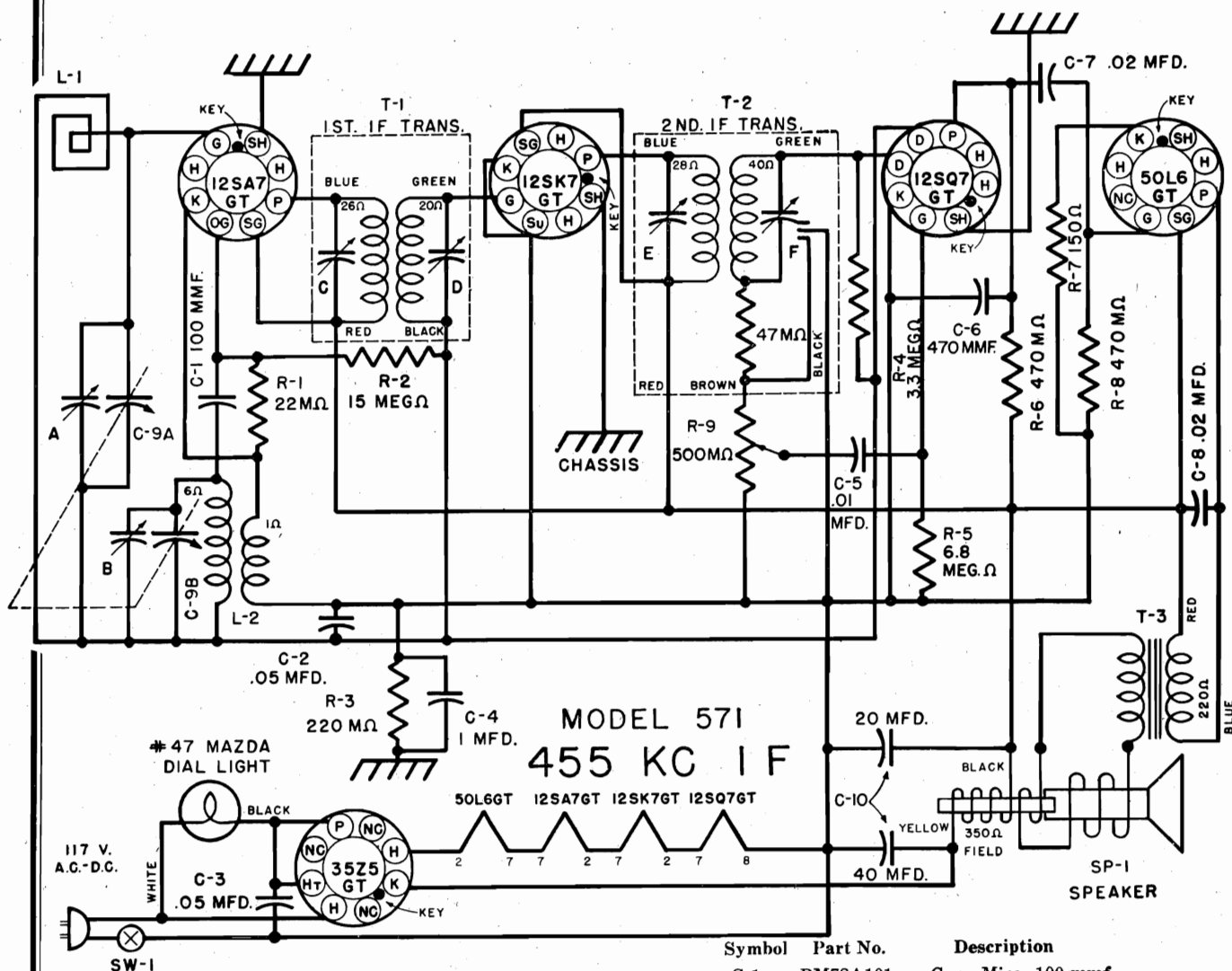
PARTS LAYOUT



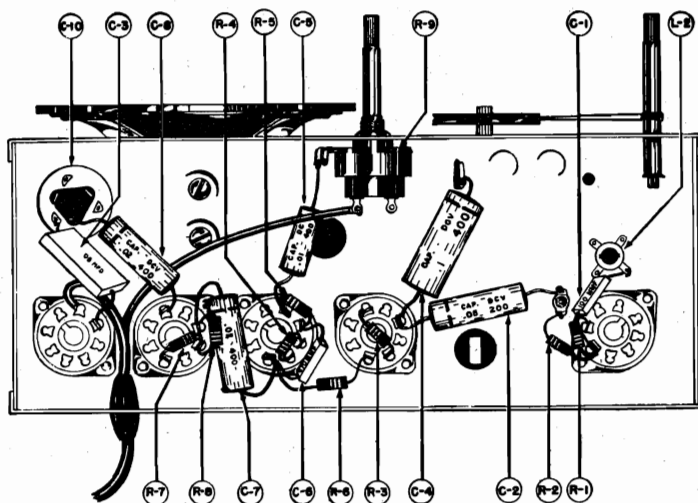
Schematic Location	Colonial Part No.	Part Name	Description
1	1A	Coil Assembly	Antenna Coil & Core (Not to be serviced individually)
2	1B	Coil	R. F. Coil & Core (Not to be serviced individually)
3	1C	Coil	Oscillator Coil & Core (Not to be serviced individually)
4	4A	Coil Assembly	Antenna Choke
5	4B	Coil	Grid Filter Choke
6	4C	Coil	1st I. F. Transformer
7	5A	Coil Assembly	Primary Trimmer
8	5B	Coil	Secondary Trimmer
9	5C	Coil	2nd I. F. Transformer
10	10A	Capacitor	I. F. Transformer
11	10B	Capacitor	Primary Trimmer
12	10C	Capacitor	Secondary Trimmer & Filter
13	R9044E	Capacitor	68,000 Ohm Diode Filter
14	R9115E	Capacitor	Hash Choke
15	R9220CH	Capacitor	Spark Choke
16	R46462	Capacitor	.000165 Mfd. Compensating
17	R43691	Capacitor	Dry Electrolytic
18	R41777	Capacitor	10 Mfd. - 350V
19	R43685	Capacitor	15 Mfd. - 350V
20	R43685	Capacitor	20 Mfd. - 20V
21	R43685	Capacitor	.00001 Mfd. Mica
22	R43685	Capacitor	.00003 Mfd. Mica
23	R43685	Capacitor	.00005 Mfd. Mica
24	R43685	Capacitor	.00025 Mfd. Mica
25	R43685	Capacitor	Dual
26	R43685	Capacitor	.00025 Mfd. Mica
27	R43685	Capacitor	.00025 Mfd. Mica
28	R43685	Capacitor	.00025 Mfd. Mica
29	R43685	Capacitor	.00025 Mfd. Mica
30	R43685	Capacitor	.00025 Mfd. Mica
31	R43685	Capacitor	.00025 Mfd. Mica
32	R43685	Capacitor	.00025 Mfd. Mica
33	R43685	Capacitor	.00025 Mfd. Mica
34	R43685	Capacitor	.00025 Mfd. Mica
35	R43685	Capacitor	.00025 Mfd. Mica
36	R43685	Capacitor	.00025 Mfd. Mica
37	R43685	Capacitor	.00025 Mfd. Mica
38	R43685	Capacitor	.00025 Mfd. Mica
39	R43685	Capacitor	.00025 Mfd. Mica
40	R43685	Capacitor	.00025 Mfd. Mica
41	R43685	Capacitor	.00025 Mfd. Mica
42	R43685	Capacitor	.00025 Mfd. Mica
43	R43685	Capacitor	.00025 Mfd. Mica
44	R43685	Capacitor	.00025 Mfd. Mica
45	R43685	Capacitor	.00025 Mfd. Mica
46	R43685	Capacitor	.00025 Mfd. Mica
47	R43685	Capacitor	.00025 Mfd. Mica
48	R43685	Capacitor	.00025 Mfd. Mica
49	R43685	Capacitor	.00025 Mfd. Mica
50	R43685	Capacitor	.00025 Mfd. Mica
51	R43685	Capacitor	.00025 Mfd. Mica
52	R43685	Capacitor	.00025 Mfd. Mica

CONCORD RADIO CORP.

MODEL 6D51B, Ch. 571;
MODEL 6D51I, Ch. 571A;
MODEL 6D51W, Ch. 571B



ALL TUBE SOCKETS SHOWN FROM PIN END VIEW



Parts Layout
Chassis Models 571, 571A
and 571B

Symbol	Part No.	Description
C-1	BM78A101	Cap., Mica, 100 mmf.
C-2	BD210503	Cap., Paper, .05 mfd., 200 v.
C-3	BC31B503	Cap., Mold., Paper, .05 mfd.
C-4	BD410104	Cap., Paper, .1 mfd., 400 v.
C-5	BD410103	Cap., Paper, .01 mfd., 400 v.
C-6	BM78A471	Cap., Mica, 470 mmf.
C-7, 8	BD410203	Cap., Paper, .02 mfd., 400 v.
C-9	C-51155-1	Cap., Variable, 2. Section
C-10	A-8948	Cap., Electro., 40-20 mfd., 150 v.
L-2	B-51159	Coil, Osc. Assembly
R-1	BR17B223	Resistor, 22M ohm 1/3 w.
R-2	BR17B156	Resistor, 15 meg. 1/3 w.
R-3	BR17B224	Resistor, 220M ohm 1/3 w.
R-4	BR17B335	Resistor, 3.3 meg. 1/3 w.
R-5	BR17B685	Resistor, 6.8 meg. 1/3 w.
R-6, 8	BR17B474	Resistor, 470M ohm 1/3 w.
R-7	BR16C151	Resistor, 150 ohm. 1/2 w.
R-9	B-9051-1	Control, Vol. & Sw. 500M ohm.
T-1	B-51010-1	Trans., Assembly, 1st IF
T-2	B-51011-1	Trans., Assembly, 2nd IF
SP-1	C-51014	Speaker, 5" Dynamic, 350 ohm.
	A-2163	Cable, Drive
	A-6158	Lamp, Pilot No. 47 Mazda 6.3 v.
	A-51160-1	Cord, AC-DC Line, 6 ft.
	B-51162-1	Shaft, Drive
	A-51163	Clip, Spring
	B-51177	Brkt. Assy., Dial (571A-571B only)
	A-51202	Link, Insulating
	A-51206	Arm, Dial Drive
	B-51330-1	Channel, Rubber (571 only)
	A-51331	Spring, Dial Bracket
	C-51335	Bracket, Dial (571 only)
	A-51787	Spring, Cable

MODEL 6D51B, Ch. 571;
 MODEL 6D51I, Ch. 571A;
 MODEL 6D51W, Ch. 571B

CONCORD RADIO CORP.

Electrical and Mechanical Specifications

Frequency Range	540-1600 kc.	Power Output (Undistorted) .....	.75 watts
Intermediate Frequency	455 kc.	Power Output (Maximum)	1.5 watts
Power Supply	105-125 volts AC-DC	Tuning Drive Ratio	3 to 1
Loudspeaker	Dynamic	Weight 7 $\frac{1}{4}$ lbs. (net)	10 lbs. (shipping)
V.C. Impedance	3.5 ohms at 400 cycles		
1—12SA7GT Oscillator and Mixer tube		1—12SK7GT IF Amplifier tube	
1—50L6GT Power Output tube		1—35Z5GT Rectifier tube	

1—12SQ7GT Second Detector and First Audio tube

NOTE: The above glass tubes are interchangeable with their metal equivalent.

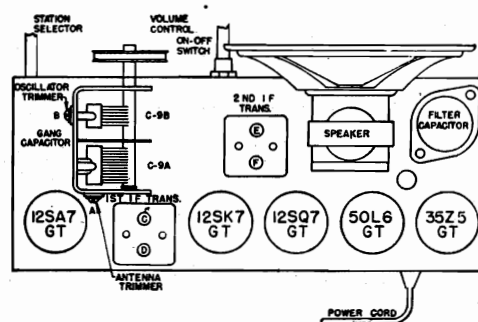
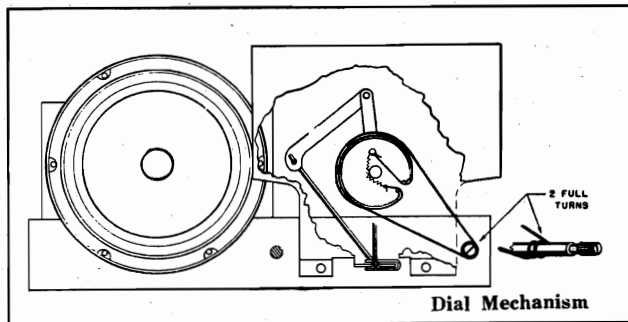
ALIGNMENT PROCEDURE

The following equipment is necessary to properly align this chassis:

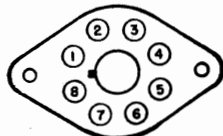
1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Dummy antenna: — .1 mfd., — RMA loop.

NOTE: Intermediate Frequency and Oscillator adjustments may be made with the loop disconnected provided a resistor of 10,000 to 50,000 ohms is substituted to close the 12SA7GT grid circuit. The loop alignment must be done with the loop and chassis mounted in operating position in the cabinet. A single turn loosely coupled to loop may be substituted for RMA loop.

GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TO TUNE TRIMMERS	REMARKS
IF 455 kc.	12SA7GT grid	.1 mfd.	HF end	IF trimmers C D E F	Tune to max.
1620 kc.	Through loop	RMA loop	HF end	Osc. trimmer B	Set limit of band
1400 kc.	Through loop	RMA loop	1400 kc.	Ant. trimmer A	Tune to max.

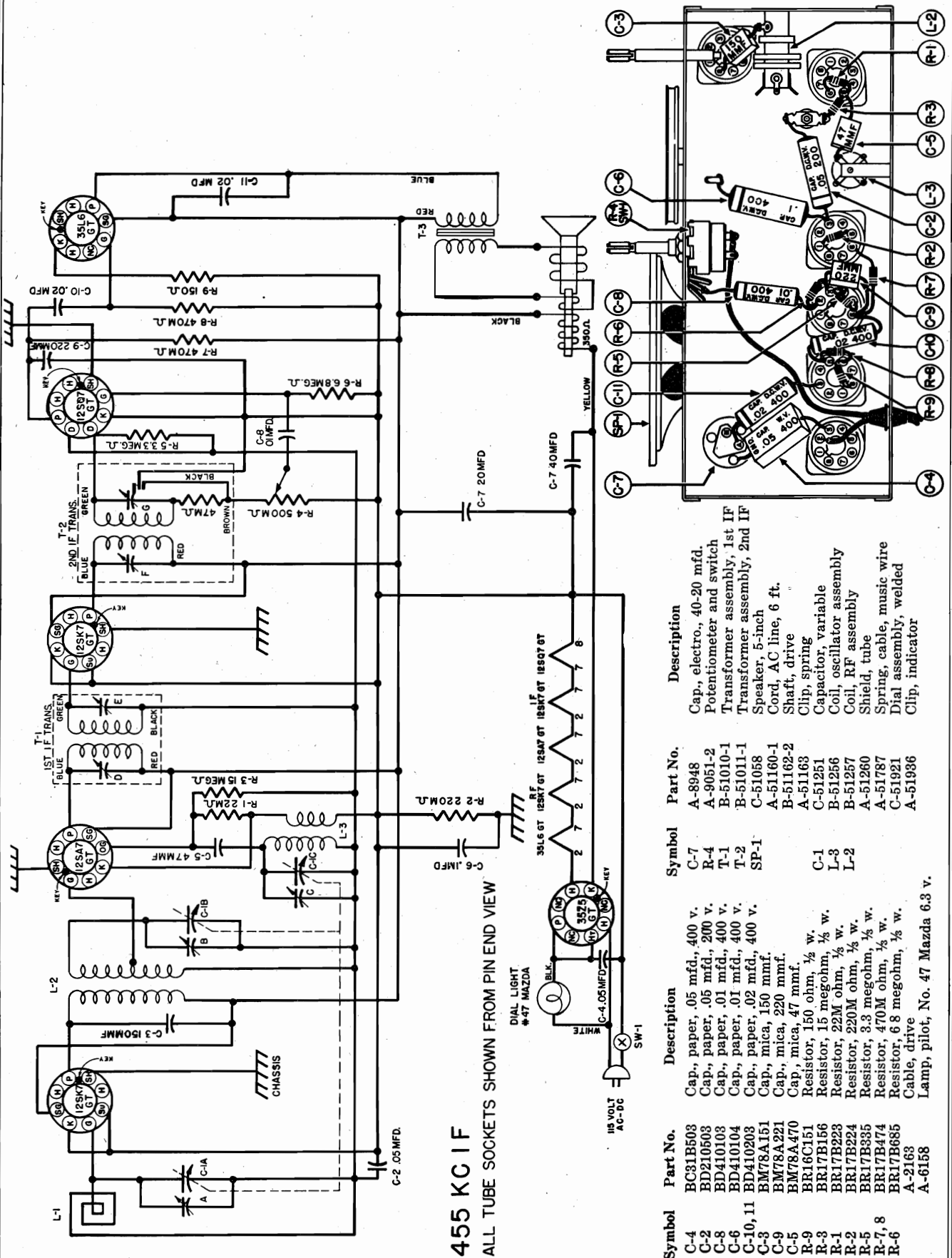
**SOCKET VOLTAGES**

TUBE	POSITION	1	2	3	4	5	6	7	8
12SA7GT	Osc. and Mixer	0	37.5 AC	99	99	4.2	0	24.5 AC	0
12SK7GT	IF Amplifier	0	24.5 AC	0	0	0	99	12.5 AC	99
12SQ7GT	2nd Det.—1st Audio	0	0	0	0	0	16	12.5 AC	0
50L6GT	Power Output	0	85 AC	91.5	99	0	0	37.5 AC	5.9
35Z5GT	Rectifier	0	117 AC	112 AC	0	112 AC	0	85 AC	112



NOTE: All DC voltages measured with a 1000 ohm per volt meter from ON-OFF switch (—B) to socket contact indicated. All AC voltages are measured from ON-OFF switch (—B) to socket contact indicated.
 All voltages are positive DC unless otherwise marked.
 Volume control full on.
 Line voltage 117 volts AC.

CONCORD RADIO CORP.

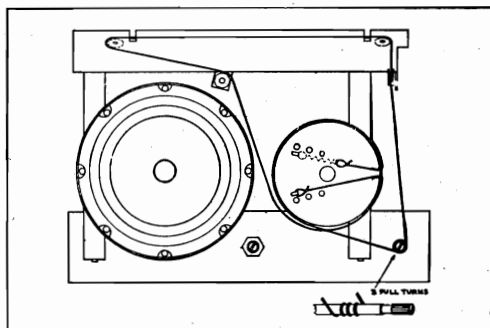
MODELS 6D61B, 6D61X,
Ch. 579

MODELS 6D61B, 6D61X,
Ch. 579

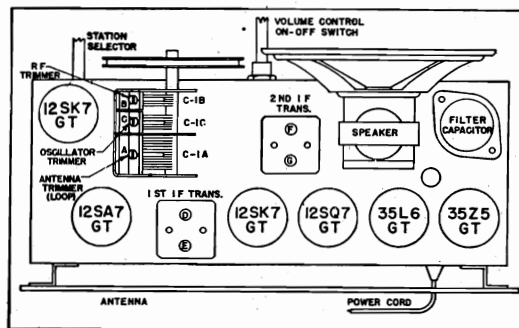
CONCORD RADIO CORP.

Frequency Range 540-1600 kc. V.C. Impedance 3.5 ohms at 400 cycles
 Intermediate Frequency 455 kc. Power Output (Undistorted)65 watts
 Power Supply 105-125 volts AC-DC Power Output (Maximum) 1.4 watts
 Loudspeaker Dynamic Tuning Drive Ratio 6 to 1
 1—12SK7GT RF Amplifier tube 1—12SQ7GT Detector and 1st Audio tube
 1—12SA7GT Converter tube 1—35L6GT Output tube
 1—12SK7GT IF Amplifier tube 1—35Z5GT Rectifier tube

NOTE: The above glass tubes are interchangeable with their metal equivalent.



Dial Mechanism



Tube Layout

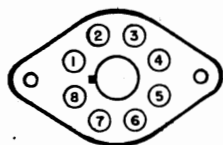
The following equipment is necessary to properly align this chassis:

1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Dummy antenna: .1 mfd. — RMA loop.

NOTE: Intermediate Frequency and Oscillator adjustments may be made with the loop disconnected provided a resistor of 10,000 to 50,000 ohms is substituted to close the 12SK7GT grid circuit. The loop alignment must be done with the loop and chassis mounted in operating position in the cabinet. A single turn loosely coupled to loop may be substituted for RMA loop.

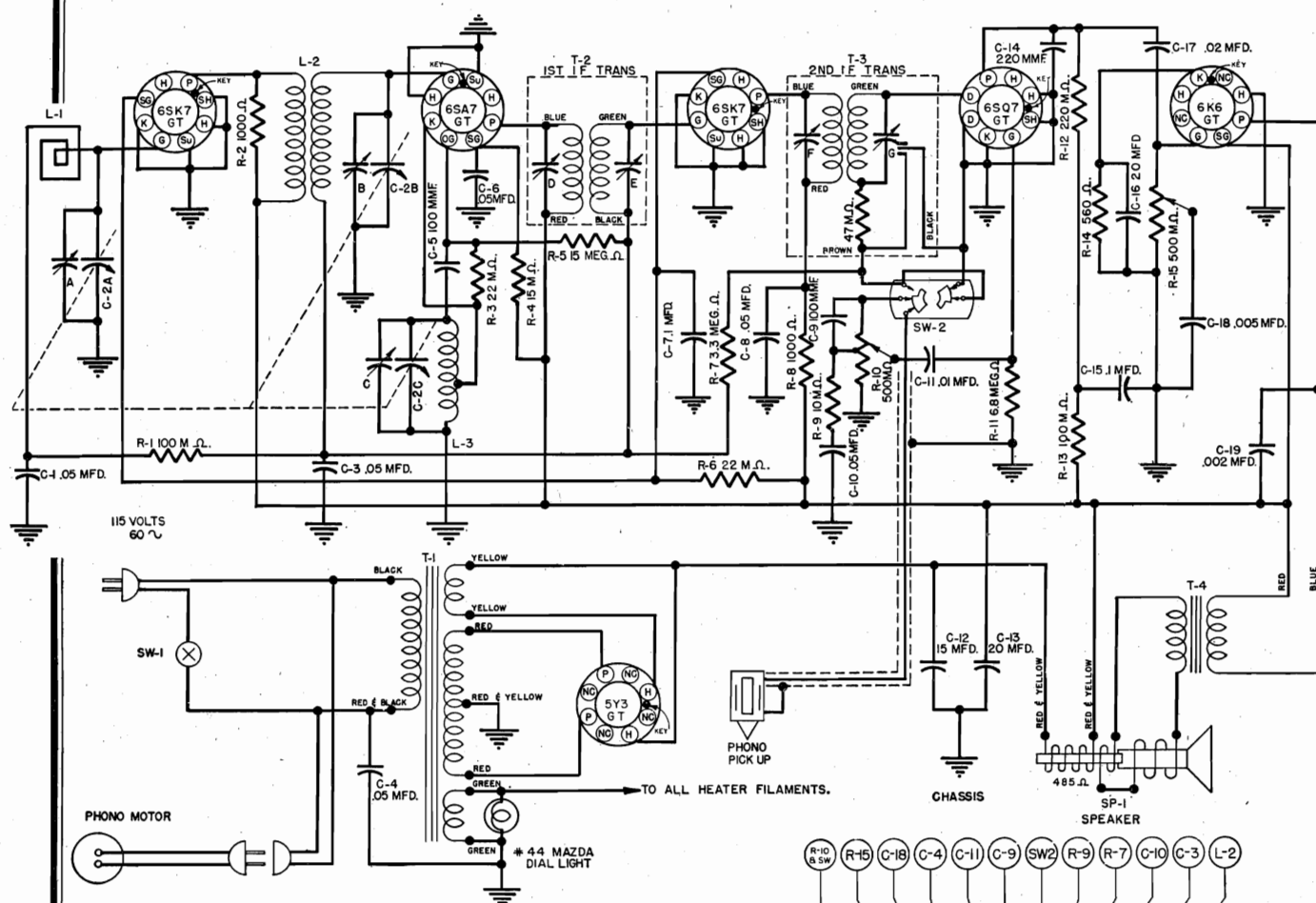
CONNECT TEST OSCILLATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	SET DIAL AT	TRIMMERS	PURPOSE
12SA7GT grid	.1 mfd.	455 kc.	HF end	D E F G	Align IF
12SK7GT RF grid	.1 mfd.	1620 kc.	HF end	C	Set limit of band
12SK7GT RF grid	.1 mfd.	1400 kc.	1400 kc.	B	Align RF
RMA loop	Through loop	1400 kc.	1400 kc.	A	Align antenna

TUBE	POSITION	1	2	3	4	5	6	7	8
12SK7GT	RF Amplifier	0	50 AC	0	0	0	97	38 AC	97
12SA7GT	Converter	0	25 AC	97	97	-6	0	38 AC	0
12SK7GT	IF Amplifier	0	25 AC	0	0	0	97	12 AC	97
12SQ7GT	Detector, 1st Audio	0	0	0	0	0	30	12 AC	0
35L6GT	Output	0	85 AC	92	97	0	0	50 AC	5.7
35Z5GT	Rectifier	0	117 AC	112 AC	0	112 AC	0	86 AC	125



NOTE: All DC voltages measured with a 1000 ohm-per-volt meter from ON-OFF switch (—B) to socket contact indicated. All AC voltages are measured from ON-OFF switch (—B) to socket contact indicated. All voltages are positive DC unless otherwise marked. Volume Control full on. No signal. Line voltage 117 volts AC.

CONCORD RADIO CORP.



455 KC IF

ALL TUBE SOCKETS SHOWN FROM PIN END VIEW.
ALL SWITCHES SHOWN IN COUNTERCLOCKWISE
POSITION, SHAFT END VIEW.

Symbol	Part No.	Description
C-4	BC31B503	Cap., Molded, .05 mfd., 400 v.
C-1, 3, 10	BD210503	Cap., Paper, .05 mfd., 200 v.
C-11	BD410103	Cap., Paper, .01 mfd., 400 v.
C-7, 15	BD410104	Cap., Paper, .1 mfd., 400 v.
C-17	BD410203	Cap., Paper, .02 mfd., 400 v.
C-6, 8	BD410503	Cap., Paper, .05 mfd., 400 v.
C-19	BD610202	Cap., Paper, .002 mfd., 600 v.
C-18	BD610502	Cap., Paper, .005 mfd., 600 v.
C-5, 9	BM78A101	Cap., Mica, 100 mmf.
C-14	BM78A221	Cap., Mica, 220 mmf.
R-14	BR16E561	Resistor, 560 ohm, 1 w.
R-2, 8	BR17B102	Resistor, 1000 ohm, 1/2 w.
R-9	BR17B103	Resistor, 10M ohm, 1/2 w.
R-1, 13	BR17B104	Resistor, 100M ohm, 1/2 w.
R-5	BR17B156	Resistor, 15 meg., 1/2 w.
R-3	BR17B223	Resistor, 22M ohm, 1/2 w.
R-12	BR17B224	Resistor, 220M ohm, 1/2 w.
R-7	BR17B335	Resistor, 3.3 meg., 1/2 w.
R-11	BR17B685	Resistor, 6.8 meg., 1/2 w.
R-6	BR17E223	Resistor, 22M ohm, 1 w.
R-4	BR17G153	Resistor, 15M ohm, 2 w.
	A-2163	Cable, Dial
	A-3123	Clamp, Cable
	A-9285	Lamp, Pilot, Mazda No. 44
	A-51160-3	Cord, Power, 6 ft.
	A-51163	Clip, Spring

C-12, 13	A-51356	Cap., Electro., 15-20-20 mfd.
C-2	C-51501-1	Capacitor, Variable, 3-section
T-1	C-51502	Transformer, Power
L-2	B-51511	Coil, Assembly, RF
SP-1	C-51512	Speaker, 5" Dynamic, 485 ohm
L-3	B-51522	Coil Assembly, Osc.
	A-51531	Shaft, Drive
T-2	B-51416-2	Trans. Assembly, 1st IF
T-3	B-51417-2	Trans. Assembly, 2nd IF
	B-51591	Spring, Dial Bracket
	A-51787	Spring, Cable
	A-51801	Rivet, Pronged, 3/32 x 1/8
	B-55300-1	Channel, Rubber
SW-2	B-55500-1	Switch (Radio-Phono)
R-15	B-55550-1	Potentiometer, 500M ohm
R-10	B-55575-1	Potentiometer & Switch, 500M ohm

MODEL 6D61P, Ch. 554

CONCORD RADIO CORP.

1—6SK7GT.....RF Amplifier tube 1—6SQ7GT.....Detector—AVC—1st Audio tube
 1—6SA7GT.....Converter tube 1—6K6GT.....Power Output tube
 1—6SK7GT.....IF Amplifier tube 1—5Y3GT.....Rectifier tube

NOTE: The above glass tubes are interchangeable with their metal equivalent.

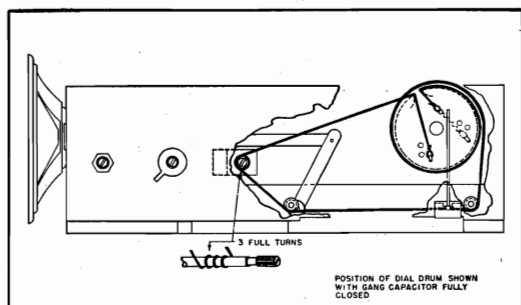
Frequency Range.....540-1600 kc. V.C. Impedance.....3.5 ohms at 400 cycles
 Intermediate Frequency.....455 kc. Power Output (Undistorted).....1 watt
 Power Supply.....105-125 volts, 60 cycle A.C. Power Output (Maximum).....4 watts
 Loudspeaker.....Electrodynamic Tuning Drive Ratio.....4 $\frac{3}{4}$ to 1

ALIGNMENT PROCEDURE

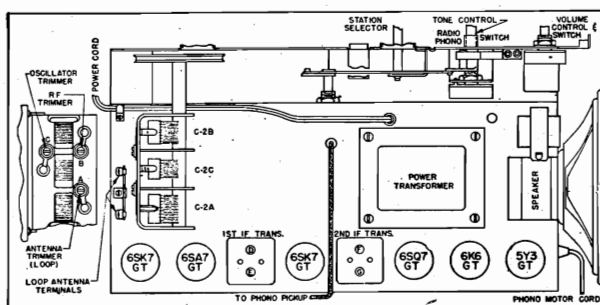
The following equipment is necessary to properly align this chassis:

1. A signal generator which will provide an accurately calibrated signal at the frequencies listed,
2. An output meter.
3. A non-metallic screwdriver.
4. Dummy antenna: — .1 mfd. — RMA loop.

CONNECT GEN- ERATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL AT	TRIMMERS	PURPOSE
6SA7GT grid	.1 mfd	455 kc.	Broadcast	HF end	D E F G	Align IF
6SK7GT RF grid	.1 mfd	1620 kc.	Broadcast	HF end	C	Set limit of band
6SK7GT RF grid	.1 mfd	1400 kc.	Broadcast	1400 kc.	B	Align RF
RMA loop	Through loop	1400 kc.	Broadcast	1400 kc.	A	Align antenna



Dial Mechanism



Tube Layout

TUBE	POSITION	1	2	3	4	5	6	7	8
6SK7GT	RF Amplifier	0	0	0	0	0	93	6.3 AC	270
6SA7GT	Converter	0	6.3 AC	270	113	-7.5	0	0	0
6SK7GT	IF Amplifier	0	0	0	0	0	93	6.3 AC	260
6SQ7GT	Detector—AVC—1st Audio	0	0	0	0	0	88	6.3 AC	0
6K6GT	Power Output	0	0	250	270	0	175	6.3 AC	19
5Y3GT	Rectifier	0	310	0	290 AC	0	290 AC	0	310

NOTE: All voltages measured from chassis to socket contact indicated.

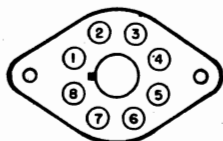
DC voltages measured with a 1000 ohm-per-volt meter.

All voltages are positive DC unless otherwise marked.

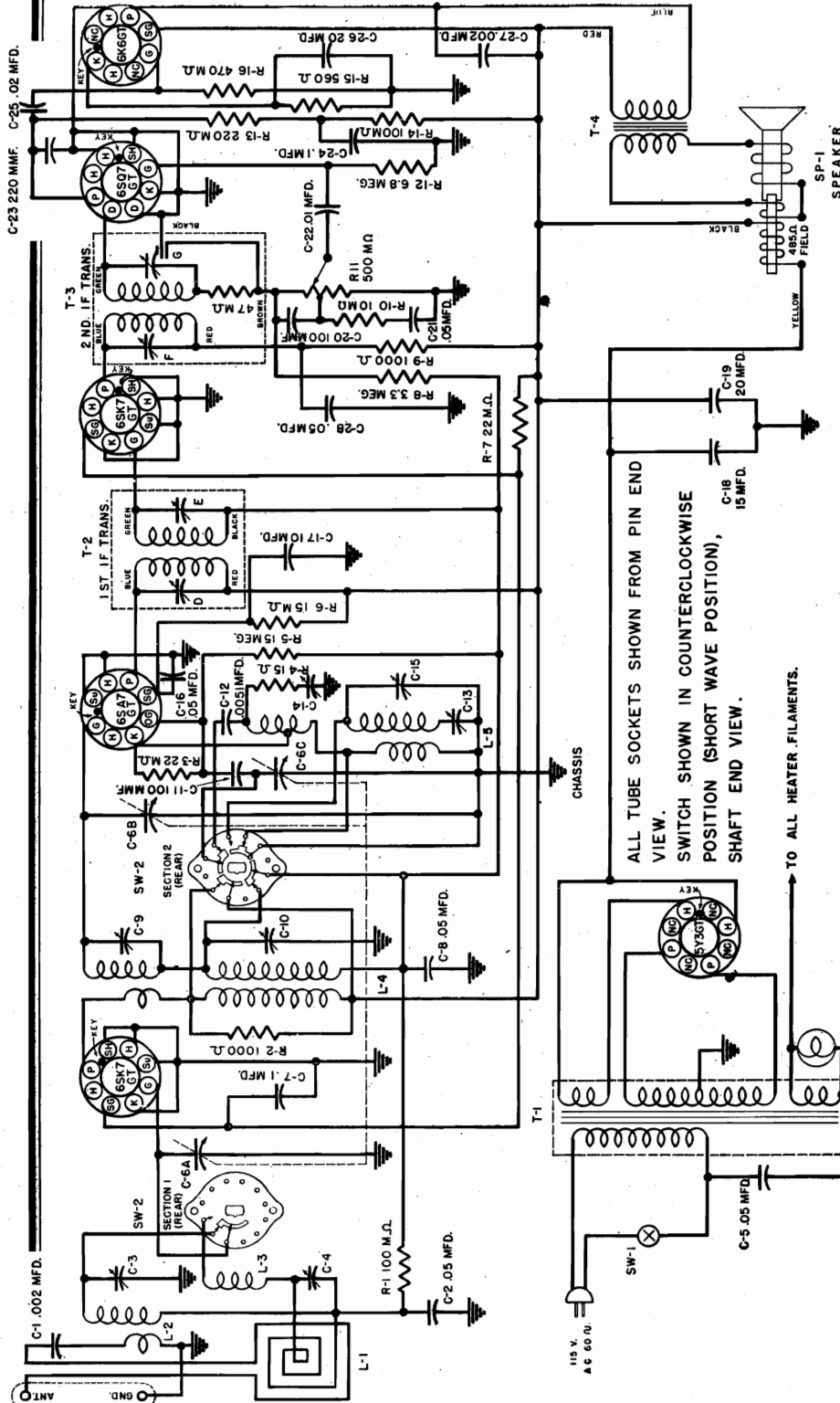
Volume control full oh. No signal.

Tone Control in clockwise position.

Line Voltage 117 volts AC.

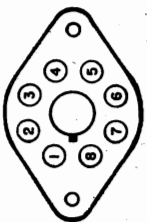


CONCORD RADIO CORP.



TUBE	POSITION	1	2	3	4	5	6	7	8
6SK7GT	RF Amplifier	0	0	0	0	0	107	6 AC	255
6SA7GT	Converter	0	6 AC	250	103	0	0	0	0
6SK7GT	IF Amplifier	0	0	0	0	0	105	6 AC	237
6SQ7GT	Det.—AVC—Audio	0	0	0	0	0	34	6 AC	0
6K6GT	Power Output	0	0	230	240	0	0	6 AC	18
5Y3GT	Rectifier	0	310	0	300 AC	0	300 AC	0	310

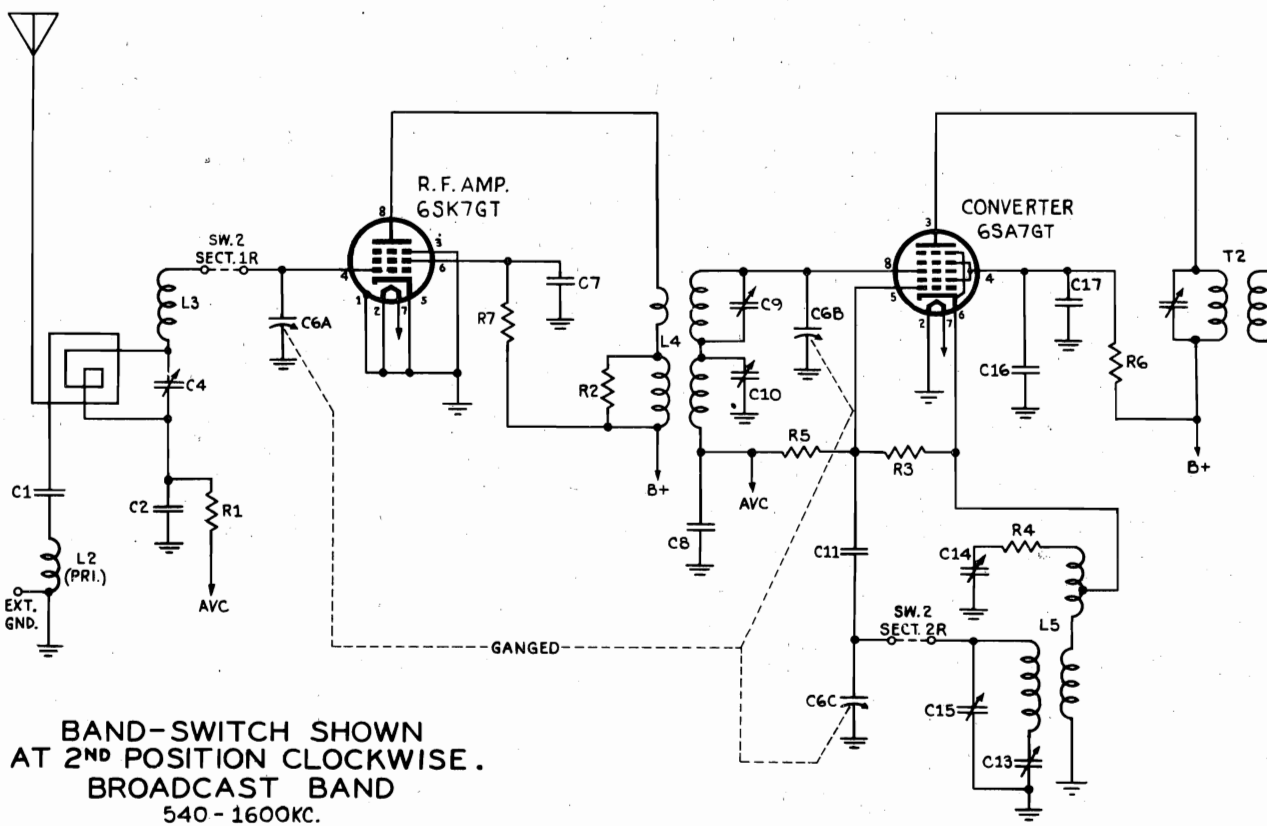
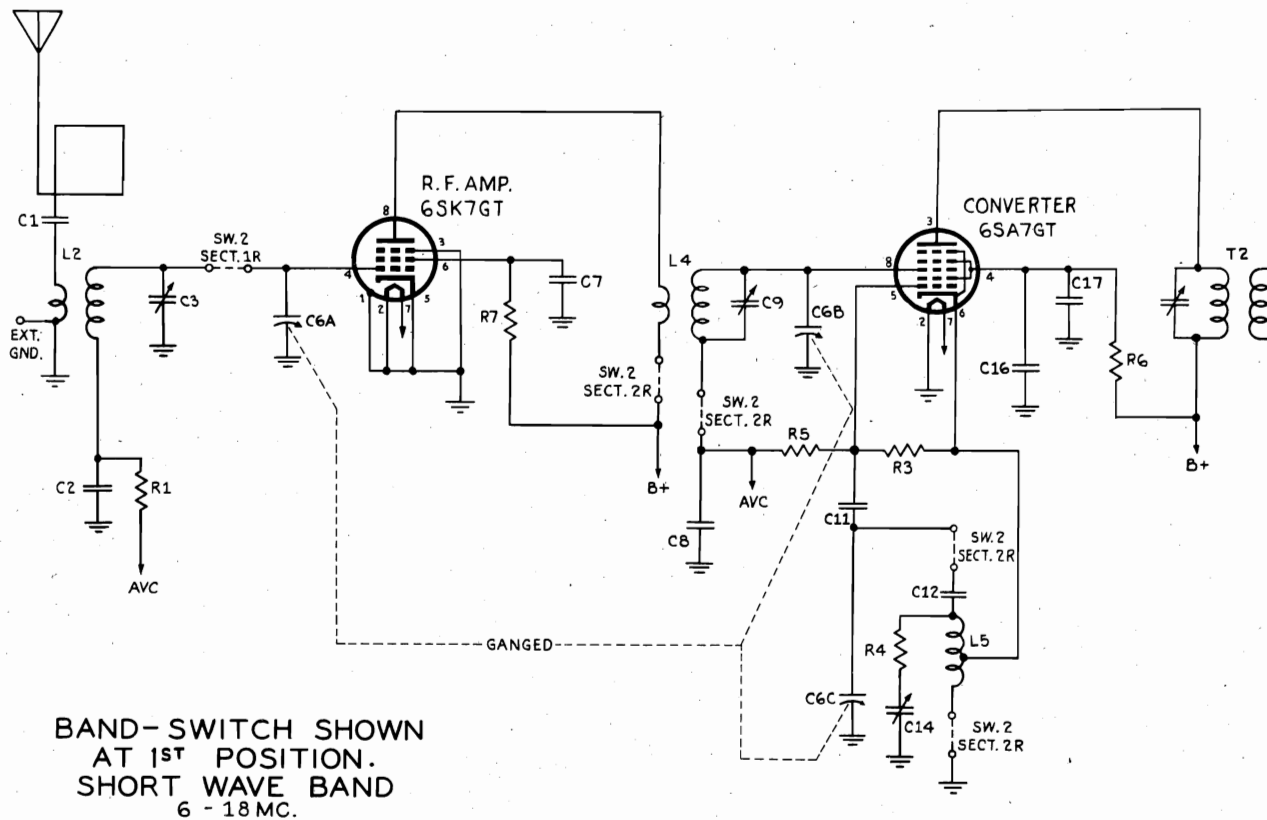
NOTE: All voltages measured from chassis to socket contact indicated. DC voltages measured with a 1000 ohm-per-volt meter.
All voltages are positive DC unless otherwise marked.
Volume control full on. Receiver not tuned to station.
Line voltage 117 volts AC.



Dial Mechanism

MODEL 6D62W, Ch. 572

CONCORD RADIO CORP.



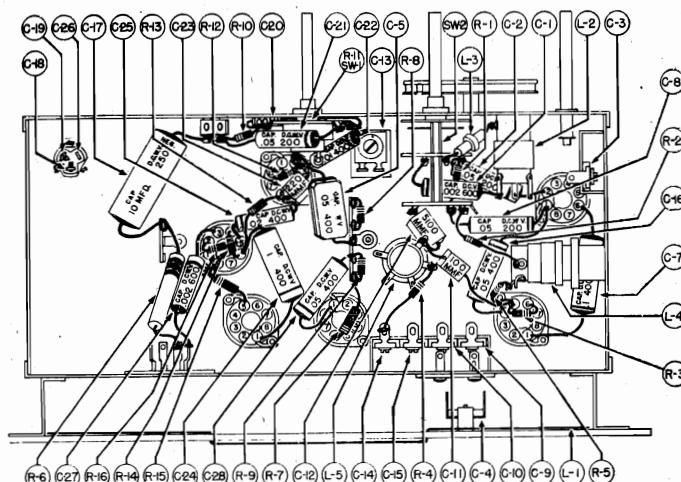
CONCORD RADIO CORP.

Frequency Range.....	540-1600 kc., 6-18 mc.	Power Output (Undistorted)	1 watt
Intermediate Frequency	455 kc.	Power Output (Maximum)	4 watts
Power Supply.....	105-125 volts, 60 cycle AC	Weight 15¾ lbs. (net).....	18½ lbs. (shipping)
Loudspeaker Type.....	5" Electro Dynamic	Tuning Drive Ratio.....	6 to 1
V.C. Impedance.....	3.2 ohms		
1—6SK7GT.....	RF Amplifier tube	1—6SQ7GT.....	Detector—AVC—Audio tube
1—6SA7GT.....	Converter tube	1—6K6GT.....	Power Output tube
1—6SK7GT.....	IF Amplifier tube	1—5Y3GT.....	Rectifier tube

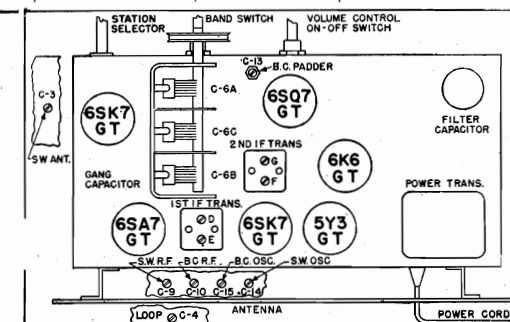
The following equipment is necessary to properly align this chassis:

- A signal generator which will provide an accurately calibrated signal at the frequencies listed.
- An output meter.
- A non-metallic screwdriver.
- Dummy antenna: .1 mfd. — 400 ohm resistor—RMA loop.

CONNECT TEST OSCILLATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL AT	TRIMMERS	PURPOSE
6SA7GT grid	.1 mfd.	455 kc.	Broadcast	HF end	D E F G	Align IF
6SK7GT RF grid	.1 mfd.	18.3 mc.	Short wave	HF end	C-14	Set limit of band
6SK7GT RF grid	.1 mfd.	16 mc.	Short wave	16 mc.	C-9	Align RF
Antenna post	400 ohms	16 mc.	Short wave	16 mc.	C-3	Align antenna
6SK7GT RF grid	.1 mfd.	1620 kc.	Broadcast	HF end	C-15	Set limit of band
6SK7GT RF grid	.1 mfd.	1400 kc.	Broadcast	1400 kc.	C-10	Align RF
6SK7GT RF grid	.1 mfd.	600 kc.	Broadcast	600 kc.	C-13	Rock gang and adjust to max.
RMA loop	Through loop	1400 kc.	Broadcast	1400 kc.	C-4	Align antenna



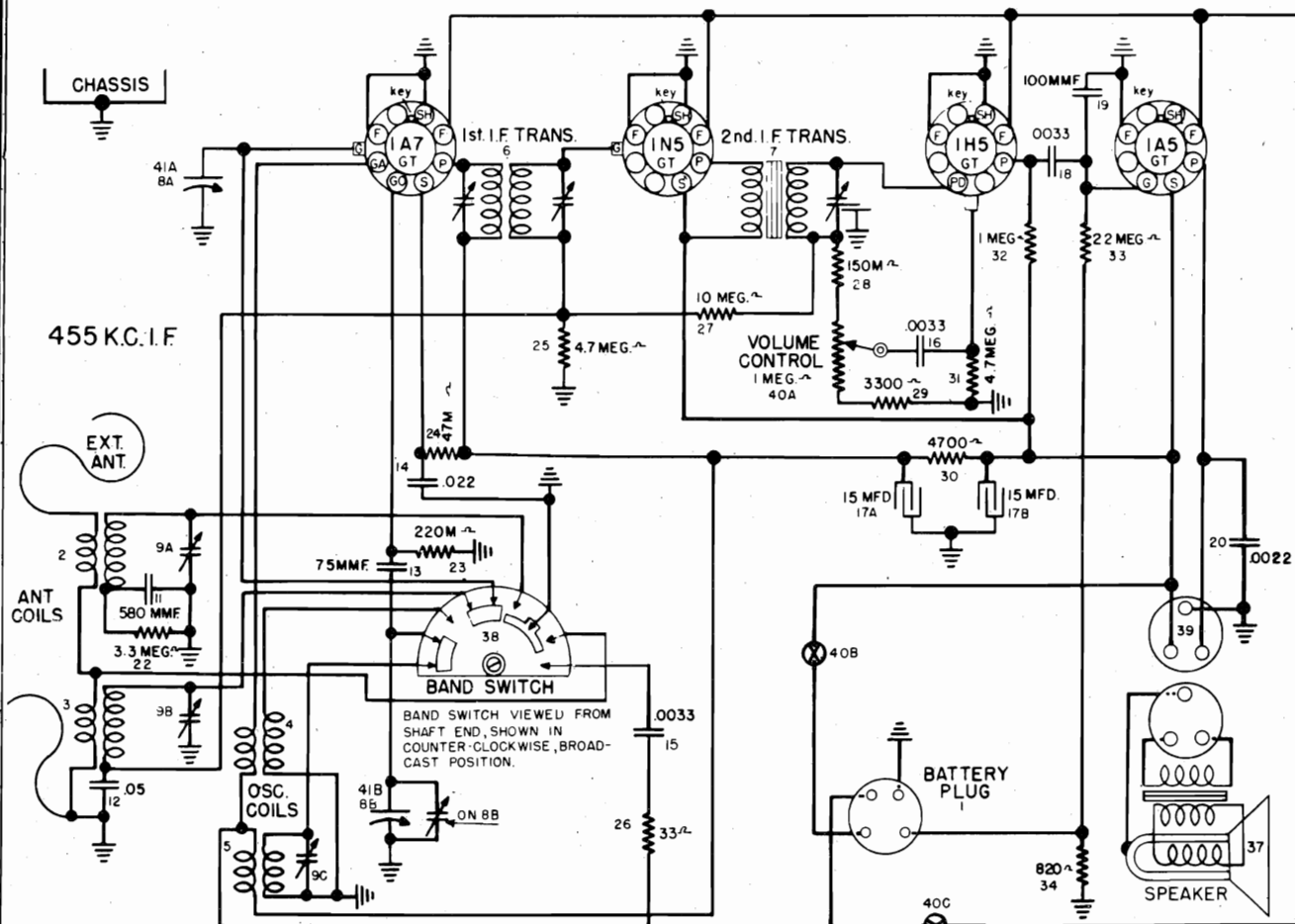
Symbol	Part No.	Description
C-5	BC31B503	Cap., .05 mfd., 400 v. paper
C-2, 8, 21	BD210503	Cap., .05 mfd., 200 v. paper
C-22	BD410103	Cap., .01 mfd., 400 v. paper
C-7, 24	BD410104	Cap., .1 mfd., 400 v. paper
C-25	BD410203	Cap., .02 mfd., 400 v. paper
C-16, 28	BD410503	Cap., .05 mfd., 400 v. paper
C-1, 27	BD610202	Cap., .002 mfd., 600 v. paper
C-12	BM58D512	Cap., 5100 mmf., mica
C-11, 20	BM78A101	Cap., 100 mmf., mica
C-23	BM78A221	Cap., 220 mmf., mica
R-15	BR16E561	Resistor, 560 ohm, 1 w.
R-2, 9	BR17B102	Resistor, 1000 ohm, ½ w.
R-10	BR17B103	Resistor, 10M ohm, ½ w.
R-1, 14	BR17B104	Resistor, 100M ohm, ½ w.
R-4	BR17B150	Resistor, 15 ohm, ½ w.
R-5	BR17B156	Resistor, 15 meg., ½ w.
R-3	BR17B223	Resistor, 22M ohm, ½ w.
R-13	BR17B224	Resistor, 220M ohm, ½ w.
R-8	BR17B335	Resistor, 3.3 meg., ½ w.



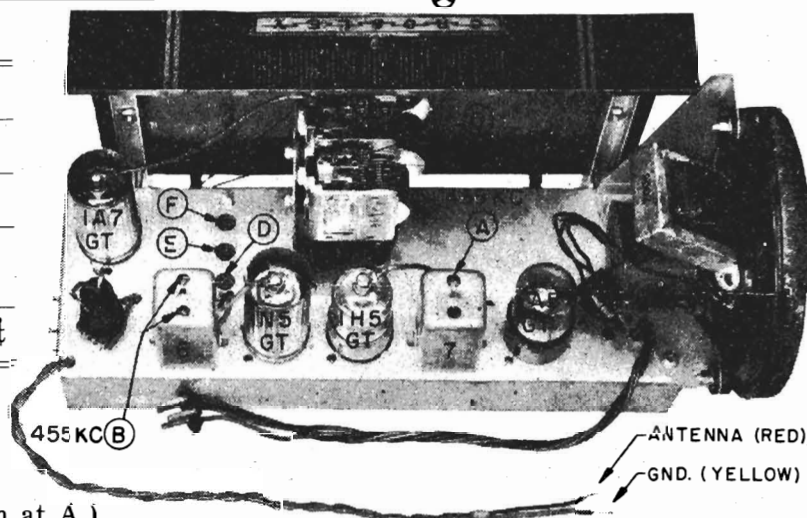
R-16	BR17B474	Resistor, 470M ohm, ½ w.
R-12	BR17B685	Resistor, 68 meg., ½ w.
R-7	BR17E223	Resistor, 22M ohm, 1 w.
R-6	BR17G153	Resistor, 15M ohm, 2 w.
	A-2163	Cable, drive
	A-9285	Lamp, pilot, Mazda No. 44
	A-51160-1	Cord, power, 6 ft.
	B-51162-3	Shaft, drive
	A-51163	Clip, spring
	A-51260	Shield, tube
C-18, 19, 26	A-51356	Cap., electro., 15-20-20 mfd.
C-6	C-51401-1	Capacitor, variable
SP-1	C-51413	Speaker assembly, 5-inch
T-2	B-51416-1	Trans. assembly, 1st IF
T-3	B-51417-1	Trans. assembly, 2nd IF
C-17	A-51419	Cap., electro., 10 mfd., 250 v.
L-5	B-51420	Coil assembly, oscillator
T-1	C-51421	Transformer, power
L-3	B-51422	Coil assembly, antenna loading
L-4	B-51425	Coil assembly, RF
C-13	B-51428-5	Capacitor, padder
L-2	B-51430	Coil assembly, SW antenna
SW-2	B-51435-1	Switch assembly, 2-band
R-11	B-51445-1	Control, Pot. & switch 500,000 ohm.
C-9, 10, 14, 15	A-51656	Cap. assembly, trimmer (4)
C-3	A-51657	Cap. assembly, trimmer (spec.)
	A-51787	Spring, cable
C-4	B-51859-1	Cap. assembly, Ant.—BC

THE CROSLEY CORP.

MODELS 46FA, 46FB



Type	Function
1A7GT/G	Mixer
1N5GT/G	I.F. Amplifier
1H5GT/G	Detector, AVC, 1st A.F. Amplifier
1A5GT/G	A.F. Power Output



FREQUENCY RANGE: American Band, 540 to 1600 kc. (Selector Switch at A.)

Overseas Short-wave Band, 5.8 to 15 mc. (Selector Switch at 0.)

INTERMEDIATE FREQUENCY: 455 kc.

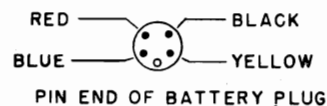
POWER SUPPLY: Crosley "A-B" Battery Pack, CR69.

VOLTAGE RATING: 1½ v. "A"; 90 v. "B"

POWER OUTPUT: 120 mw. minimum.

Speaker mounted on cabinet on Model 46FB

- (A) - 2ND. I.F. TRIMMER (D) - "OVERSEAS" ANT. TRIM.
 (B) - 1ST. I.F. TRIMMER (E) - "AMERICAN" OSC. TRIM.
 (C) - "OVERSEAS" OSC. TRIM. (F) - "AMERICAN" ANT. TRIM.



For satisfactory operation it is necessary that an antenna and ground be connected to this receiver.

THE CROSLEY CORP.

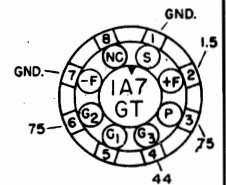
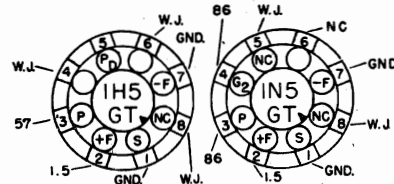
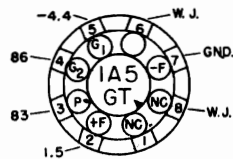


THE CROSLEY CORP.

SOCKET VOLTAGE CHART

NOTES:-

1. THESE ARE BOTTOM VIEWS OF SOCKETS.
2. MEASURE VOLTAGES FROM SOCKET LUGS TO CHASSIS (1-B, -A, GROUND).
3. THESE VOLTAGES MEASURED USING AN ELECTRONIC VOLTMETER.
4. W.J. - WIRING JUNCTION.
5. NC - NO CONNECTION.
6. SOCKET VOLTAGE TOLERANCE, 10%.



ALIGNMENT PROCEDURE

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r.f. signal input from the signal generator should be connected to the antenna lead (red) as indicated in the alignment chart. Connect the low side (ground) of the signal generator to the chassis.
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series with	To	Band Switch	Tuning Dial	
1	455	200 mmf.	Ant.	A	1,620	A & B
2	15,300	400 ohms	Ant.	O	15,300	C*
3	15,000	400 ohms	Ant.	O	15,000	D
4	1,620	200 mmf.	Ant.	A	1,620	E
5	1,400	200 mmf.	Ant.	A	1,400	F

*** NOTE:** When aligning the short-wave oscillator trimmer (C), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiver dial. To check: Tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak; i.e., the oscillator trimmer may be adjusted to the image or one of the harmonics instead of the fundamental frequency. The correct peak is the second one heard as the trimmer adjustment screw is opened from the completely closed position.

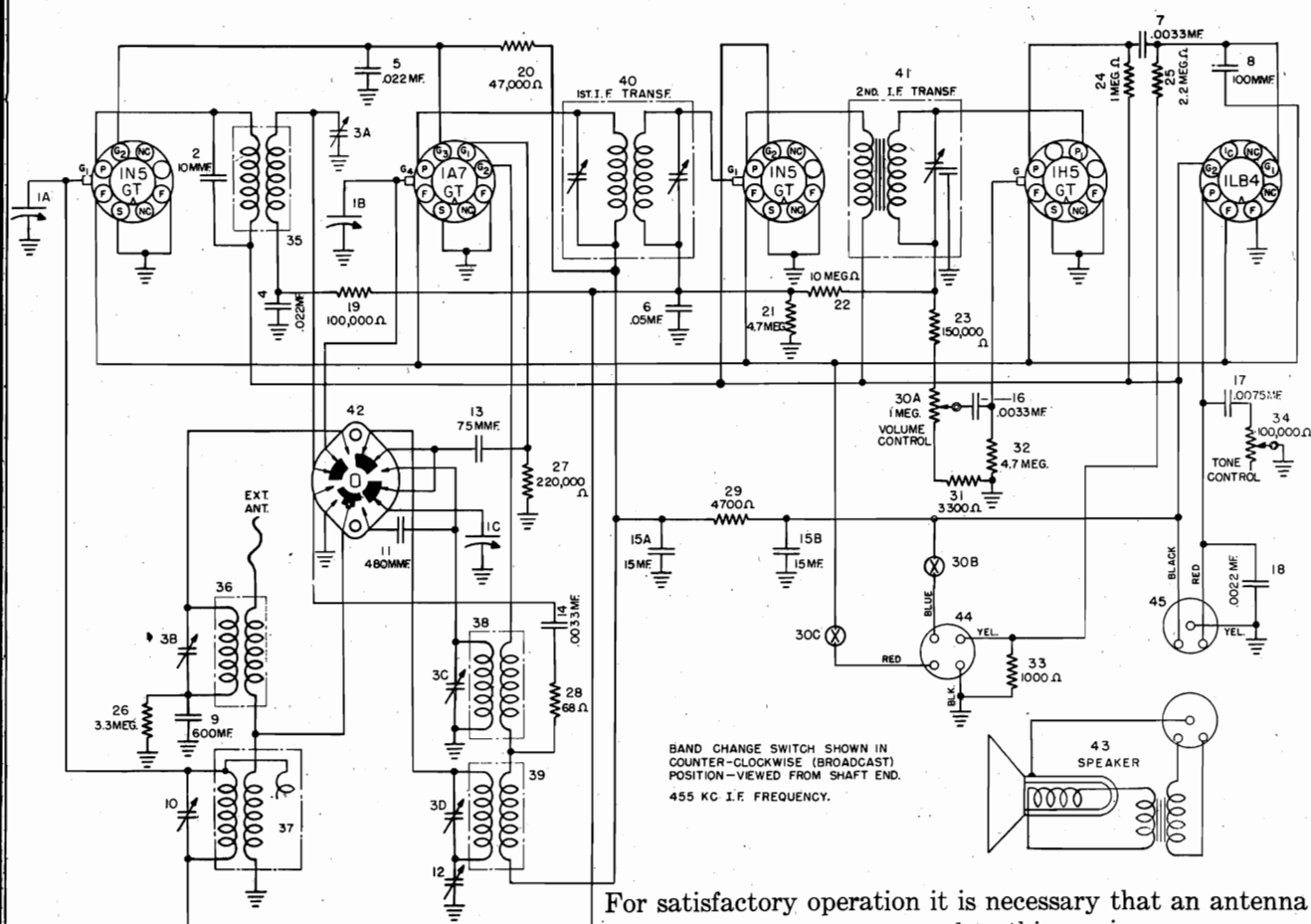
MODELS 56FA, 56FB

Item No.	Part No.	Description	Item No.	Part No.	Description	Item No.	Part No.	Description
1	B-130493	Battery Cable and Plug	23	39281-26	Dial Face Assembly	23	39281-26	Resistor, 150,000 ohm, 1/2 w.
2	AW-133777	Coil, H. F. Antenna	24	B-134571	Dial Pointer	24	39281-31	Resistor, 1.0 megohm, 1/2 w.
3	AW-133783	Coil, B. C. Antenna	25	W-134917	Dial Cord Spring	25	39281-33	Resistor, 2.2 megohm, 1/2 w.
4	AW-133757	Coil, H. F. Osc. Dual	26	W-134917	Drive Shaft	26	39281-34	Resistor, 3.3 megohm, 1/2 w.
5	AW-133757	Coil, B. C. Osc. (Coil)	27	W-134667	Dial Pointer Clip	27	39281-27	Resistor, 220,000 ohm, 1/2 w.
6	AW-134348	1st. I. F. Transformer	28	W-134916	Spring Washer	28	39281-6	Resistor, 68 ohm, 1/2 w.
7	AW-134349	2nd. I. F. Transformer	29	W-51071	Retaining Ring	29	39281-17	Resistor, 4700 ohm, 1/2 w.
8A	B-134995	Variable Condenser (Ant.)	30A	G-39204	Tube Socket	30A	B-130520-3	Control, Volume (1.0 megohm)
8B		Variable Condenser (Osc.)	30B	W-46447-1	Tube Shield	30B		Switch (Plate Supply)
9A	B-132386-5	Trimmer Condenser	30C	W-134055	Grommet	30C		Switch (Filament Supply)
9B		Trimmer Condenser						Resistor, 3300 ohm, 1/2 w.
9C		Trimmer Condenser						Resistor, 4.7 megohm, 1/2 w.
11	GC-210685-143	Condenser, 580 mmf., Mica	31	39281-16		31	39281-16	Resistor, 3300 ohm, 1/2 w.
12	39001-65	Condenser, .05 mfd., 200 v., Paper	32	39281-35		32	39281-35	Resistor, 4.7 megohm, 1/2 w.
13	39004-6	Condenser, 75 mmf., Mica	33	39279-25		33	39279-25	Resistor, 1,000 ohm, 1/2 w.
14	39001-63	Condenser, .022 mfd., 200 v., Paper	34	B-135198		34	B-135198	Control, Tone (100,000-ohm)
15	39001-10	Condenser, .0033 mfd., 600 v., Paper	35	AW-135133		35	AW-135133	Coil Assembly (R. F.)
16	39001-10	Condenser, .0033 mfd., 600 v., Paper	36	AW-135147		36	AW-135147	Coil Assembly (H. F. Ant.)
17	W-49664	Condenser, 15 mfd., 140 v., Two Section	37	AW-135134		37	AW-135134	Coil Assembly (B. C. Ant.)
17A		Condenser, 15 mfd., 140 v., Two Section	38	AW-135140		38	AW-135140	Coil Assembly (H. F. Osc.)
17B		Condenser, 15 mfd., 140 v., Elect. Filter	39	AW-135141		39	AW-135141	Coil Assembly (B. C. Osc.)
18	39001-10	Condenser, .0033 mfd., 600 v., Paper	40	AW-132803		40	AW-132803	Transformer (1st I. F.)
19	39004-7	Condenser, 100 mmf., Mica	41	AW-132804		41	AW-132804	Transformer (2nd I. F.)
20	39001-9	Condenser, .0022 mfd., 600 v., Paper	42	B-135079		42	B-135079	Switch (Band Change)
22	39281-34	Resistor, 3.3 Megohm, 1/2 w.	43	C-135199		43	C-135199	Speaker
23	39281-27	Resistor, 220,000 Ohm, 1/2 w.	44	B-130493		44	B-130493	Cable and Plug (Battery)
24	39281-23	Resistor, 47,000 Ohm, 1/2 w.	45	W-132822-2		45	W-132822-2	Cable and Plug (Speaker)
25	39281-35	Resistor, 4.7 Megohm, 1/2 w.						Socket (1LB4 Tube)
26	39281-4	Resistor, 30 Ohm, 1/2 w.						Socket (Tube)
27	39281-37	Resistor, 10 Megohm, 1/2 w.						Shield (Tube)
28	39281-26	Resistor, 150,000 Ohm, 1/2 w.						"A-B" Battery Pack
29	39281-16	Resistor, 3,300 Ohm, 1/2 w.						Dial Face Assembly (56FA)
30	39281-17	Resistor, 4,700 Ohm, 1/2 w.						Dial Face Assembly (56FB)
31	39281-35	Resistor, 4.7 Megohm, 1/2 w.						Pointer (Dial)
32	39281-31	Resistor, 1 Megohm, 1/2 w.						Clip (Dial Pointer)
33	39281-33	Resistor, 2.2 Megohm, 1/2 w.						Shaft (Drive)
34	39279-24	Resistor, 820 Ohm, 1/2 w.						Ring (Retaining)
37	C-133786	Speaker						Washer (Spring)
38	W-133782	Band Change Switch						Spring (Dial Cord)
39	W-132822-1	Speaker Plug and Cable						Cabinet (56FA)
40A	B-130520-3	Volume Control, 1 Megohm						Cabinet (56FB)
40B		Power Switch ("B" Supply) Assembly						Lens, Dial (56FA)
		Power Switch ("A" Supply)						Lens, Dial (56FB)
								Grille Cloth (56FA)
		Plastic Cabinet- Brown (46FA)						Knob
		Wood Cabinet (46FB)						Rubber Mtg.
		"A-B" Battery Pack						Screw (Chassis Mtg.)
		Dial Lens						
		Knob						
		Spacer (46FA)						
		Grille Cloth (46FA)						
		Trim Cloth Stud, Dial Lens (46FA)						

Figures in first column correspond to figures in schematic diagram

Figures in first column correspond to figures in schematic diagram.

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For satisfactory operation it is necessary that an antenna and ground be connected to this receiver.

FREQUENCY RANGE: American Broadcast Band, 540 to 1600 kc. (Selector Switch at A.)

Overseas Short-wave Band, 5.8 to 15 mc. (Selector Switch at O.)

Type	Function
1A7GT/G	Mixer
1N5GT/G	I. F. Amplifier,
1N5GT/G	R. F. Amplifier
1H5GT/G	Detector, AVC 1st A. F. Amplifier
1LB4	A. F. Power Output

- (H) SHORT WAVE ANT. TRIMMER (1400 KC) 38
(E) INTERSTAGE TRIMMER (1400 KC) 3A
(C) BROADCAST OSC. TRIMMER (20 KC) 30
(G) SHORT WAVE OSC. TRIMMER (5.5 MC) 3C

- (F) BROADCAST ANT. TRIM (1400 KC) 10

- (D) BROADCAST OSC. PADDER (20 KC) 12

POWER SUPPLY: Crosley "A-B" Battery Pack, CR69.

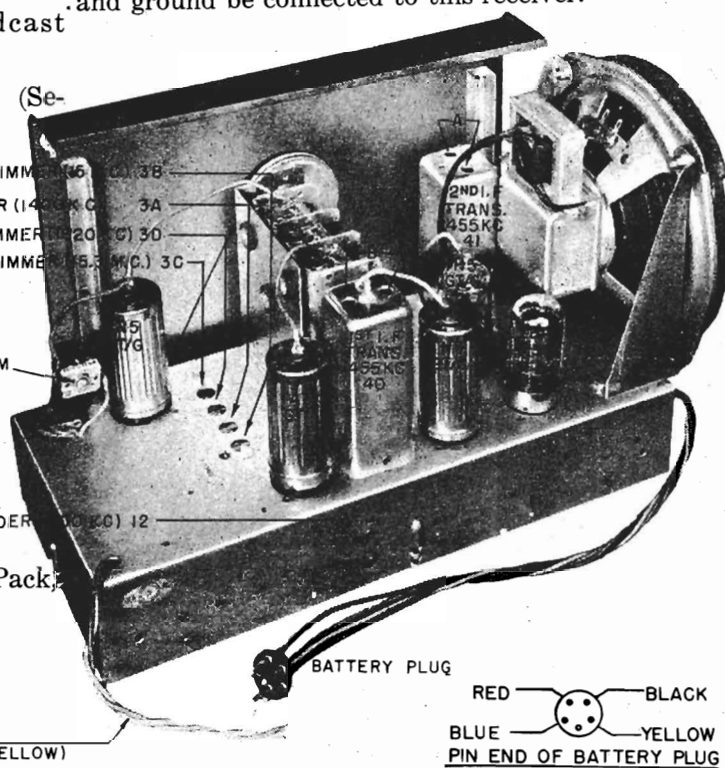
VOLTAGE RATING: 1½ v. "A"; 90 v. "B".

POWER OUTPUT: 170 mw. minimum.

EXT. ANT. (RED)
EXT. GROUND (YELLOW)

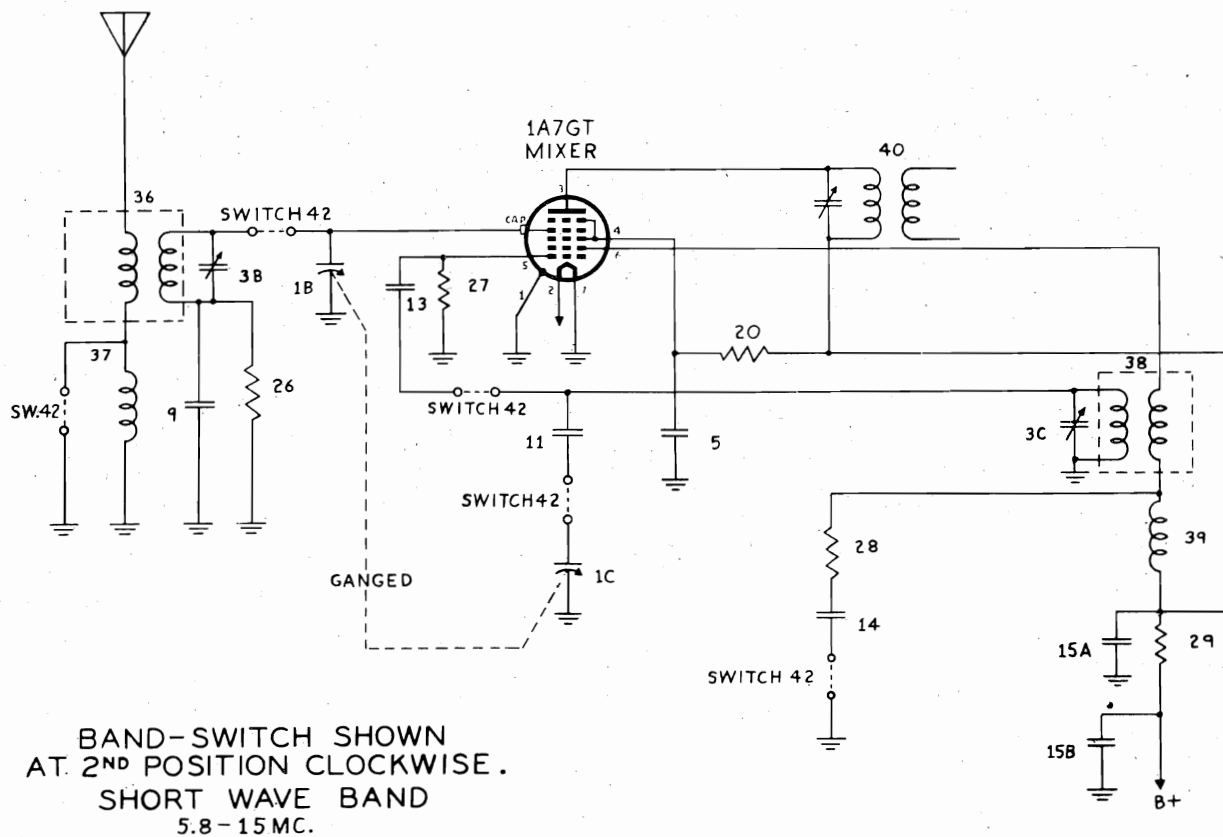
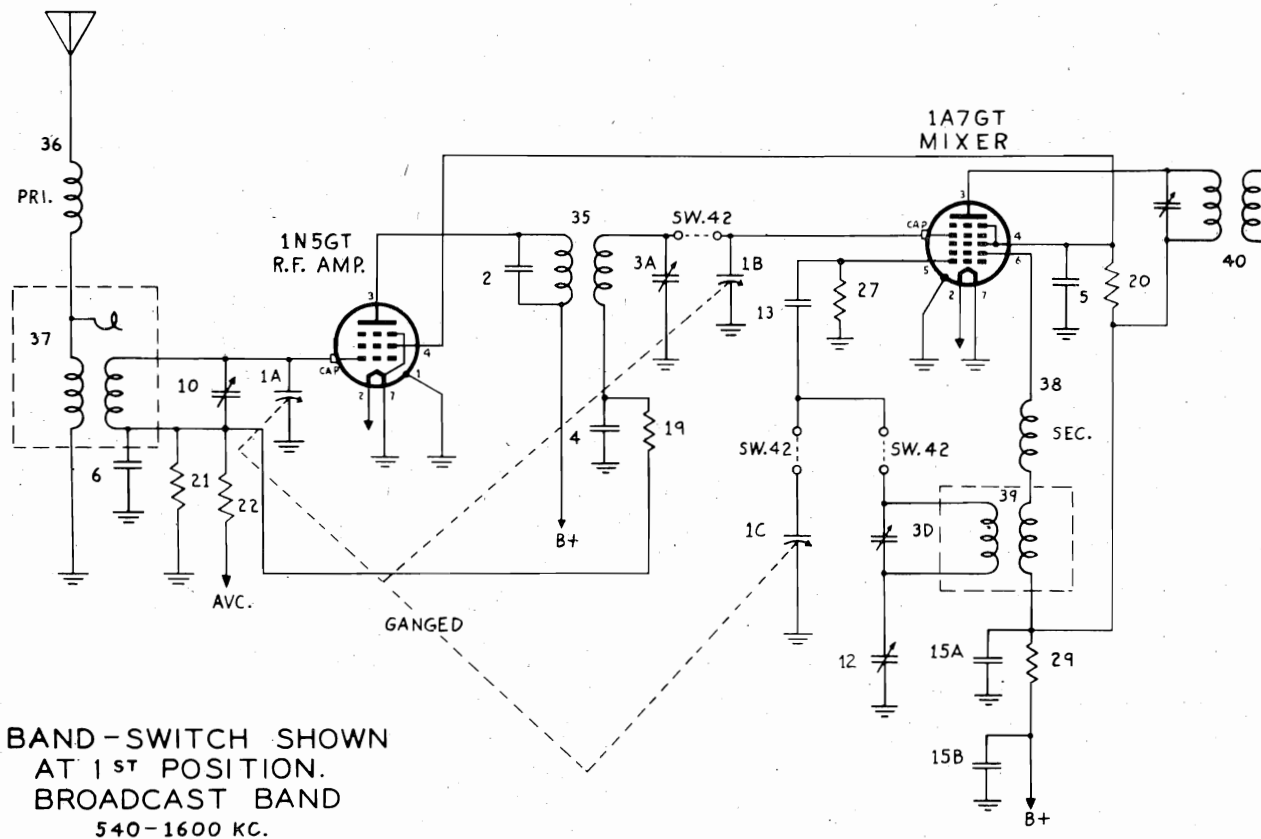
FEBRUARY, 1946

Speaker mounted on cabinet on Model 56FB



MODELS 56FA, 56FB

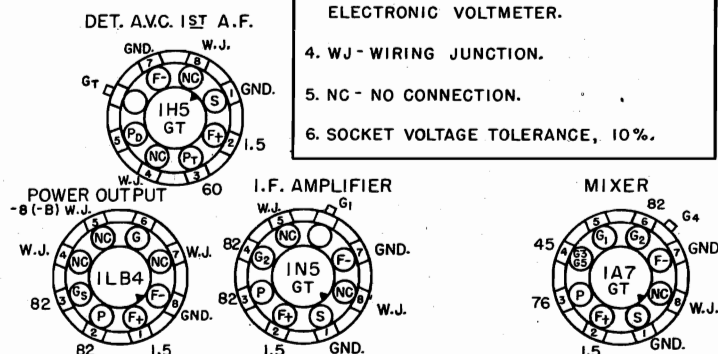
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MODELS 56FA, 56FB

SOCKET VOLTAGE CHART



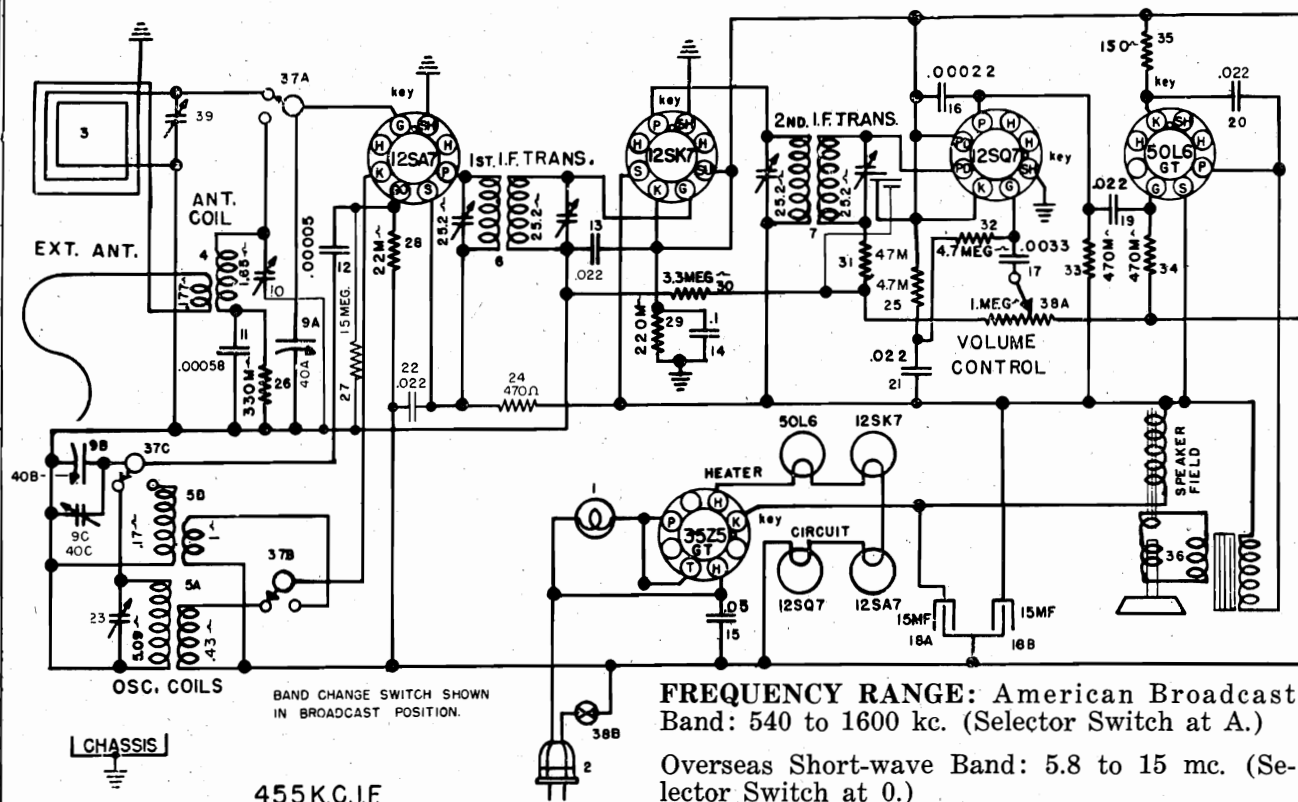
1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r.f. signal input from the signal generator should be connected to the antenna lead (red) as indicated in the alignment chart. Connect the low side (ground) of the signal generator to the chassis.
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series with	To	Band Switch	Tuning Dial	
1	455	200 mmf.	Ant.	A	1,620	A & B
2	1,620	200 mmf.	Ant.	A	1,620	C
3	600	200 mmf.	Ant.	A	600	D
4	1,620	200 mmf.	Ant.	A	1,620	C
5	1,400	200 mmf.	Ant.	A	1,400	E & F
6	600	200 mmf.	Ant.	A	600	D
7	15,300	400 ohms	Ant.	O	15,300	G*
8	15,000	400 ohms	Ant.	O	15,000	H

* NOTE: When aligning the short-wave oscillator trimmer (G), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiver dial. To check: Tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak; i.e., the oscillator trimmer may be adjusted to the image or one of the harmonics instead of the fundamental frequency. The correct peak is the second one heard as the trimmer adjustment screw is opened from the completely closed position.

MODELS 56TA, 56TC,
56TW

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RESISTANCE OF SPEAKER FIELD: 450 ohms.
SPEAKER FIELD CURRENT: 60 ma.

FREQUENCY RANGE: American Broadcast
Band: 540 to 1600 kc. (Selector Switch at A.)

Overseas Short-wave Band: 5.8 to 15 mc. (Se-
lector Switch at 0.)

INTERMEDIATE FREQUENCY: 455⁺kc.

POWER SUPPLY: a.c—d.c.

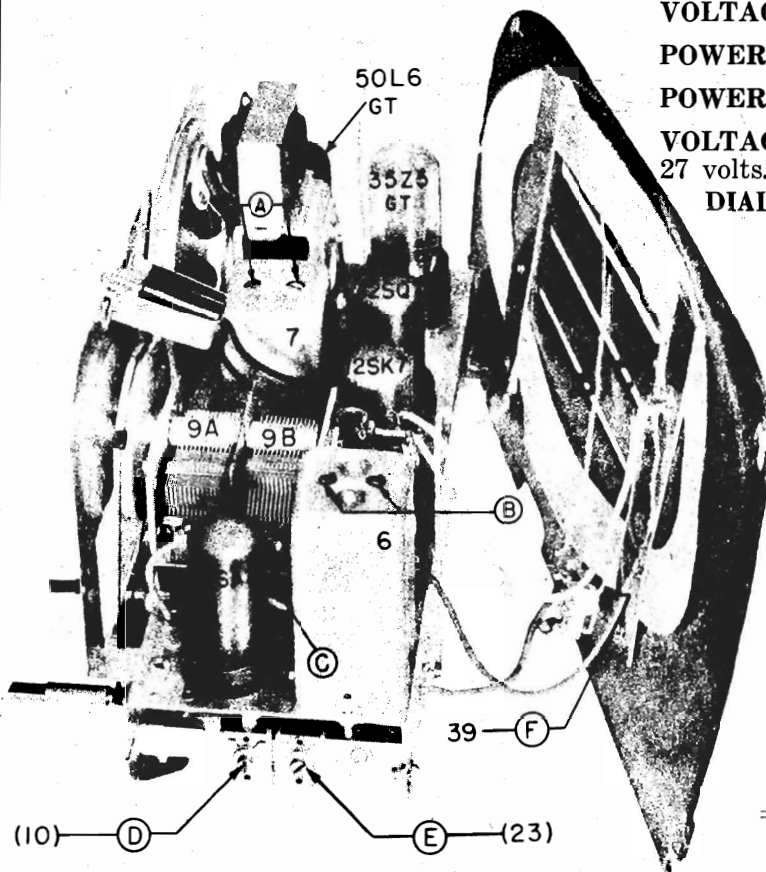
VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 35 watts nominal.

POWER OUTPUT: 1 watt maximum.

VOLTAGE DROP ACROSS SPEAKER FIELD:
27 volts.

DIAL BULB: Type 47, 6.3 volts, .15 amp.



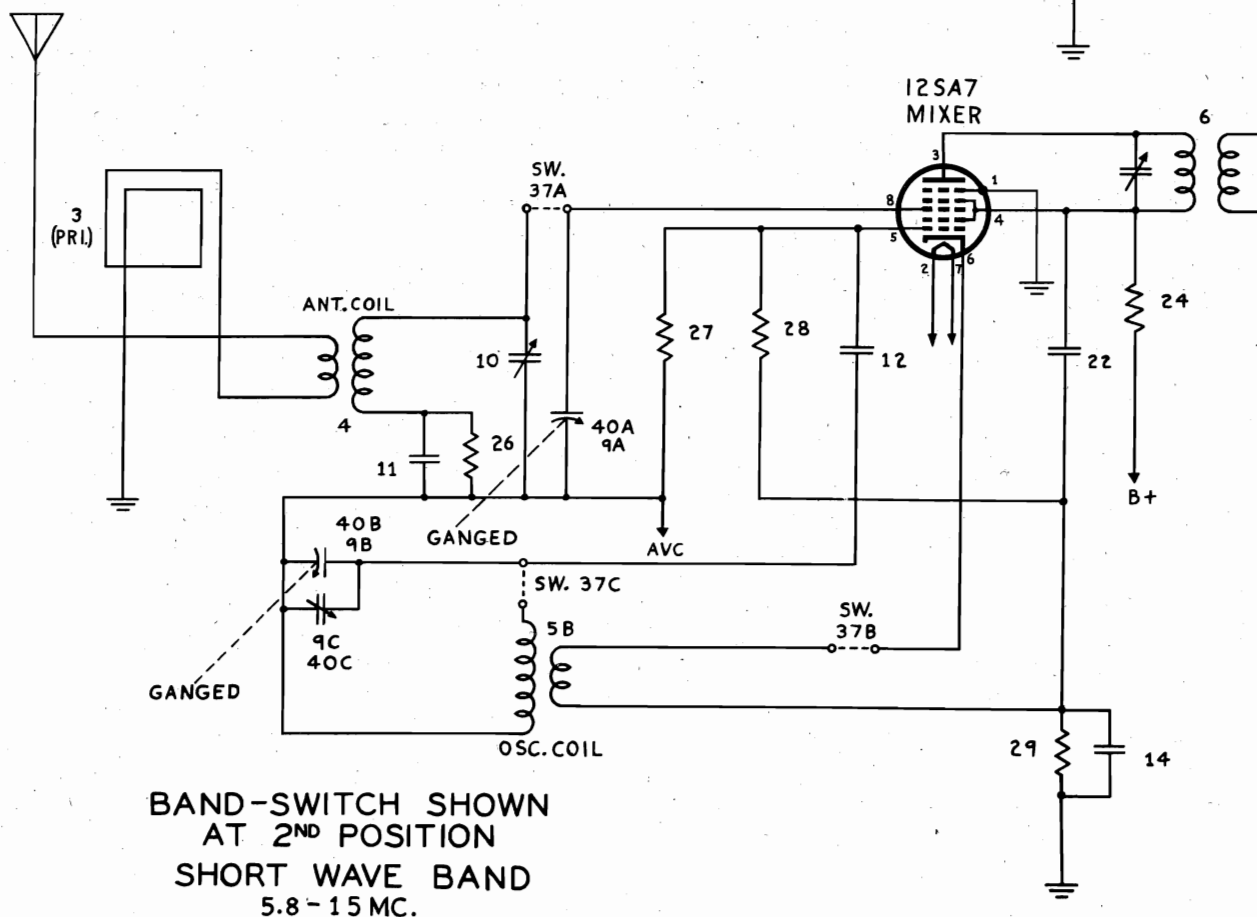
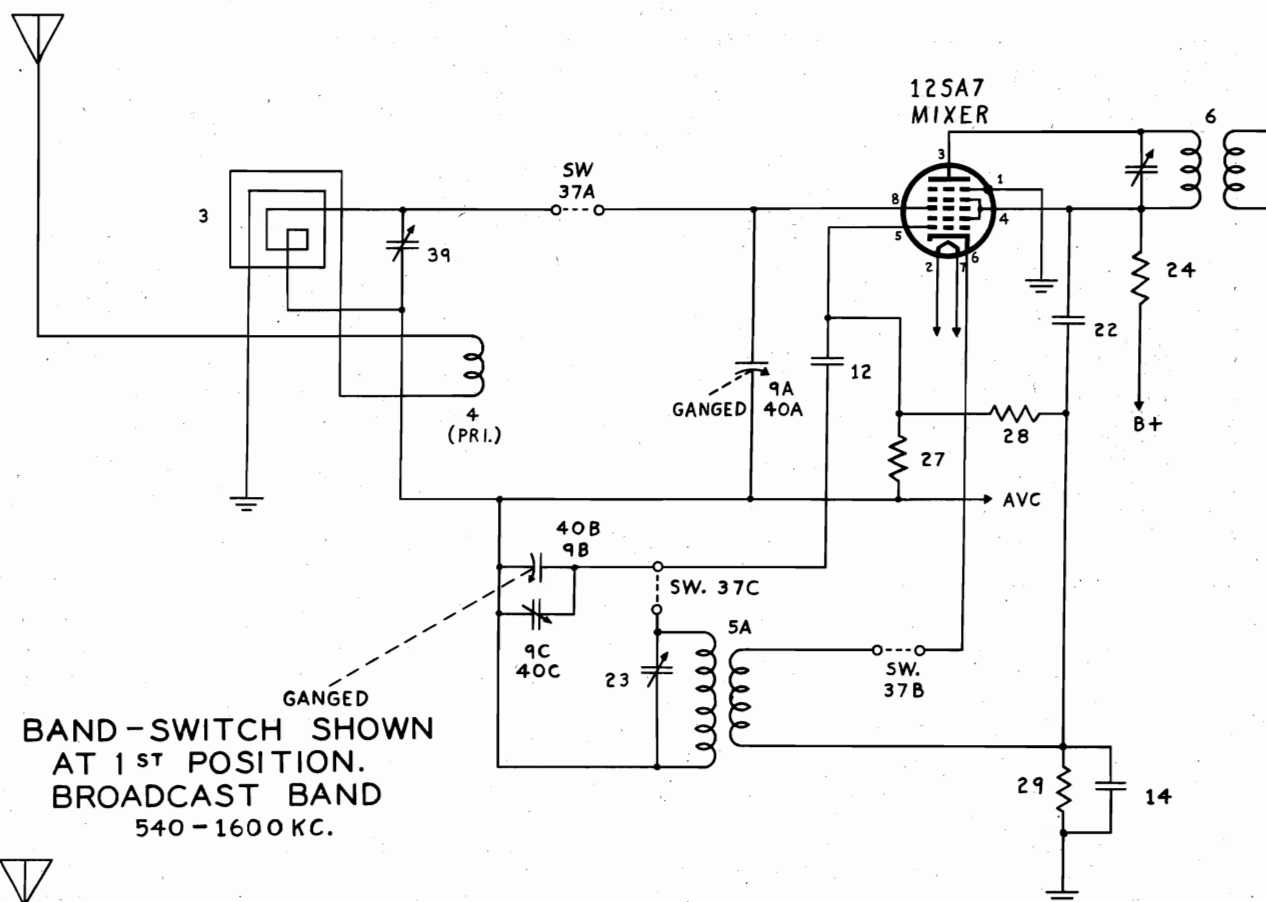
CHASSIS, SIDE VIEW—

-MODELS 56TA, 56TW, 56TC

Type	Function
12SA7 (or GT/G)	Mixer
12SK7 (or GT/G)	I.F. Amplifier
12SQ7 (or GT/G)	Detector, AVC, 1st A.F. Amplifier
50L6GT	A.F. Power Output
35Z5GT/G	Rectifier

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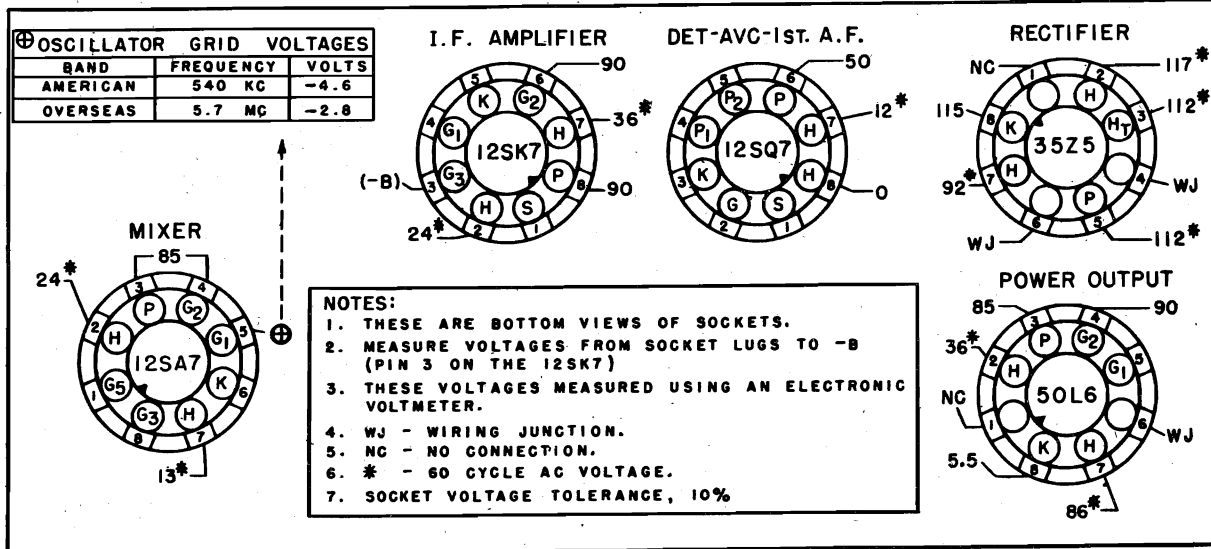
MODELS 56TA, 56TC,
56TW



MODELS 56TA, 56TC, 56TW
MODELS 56TA-L, 56TC-L,
56TW-L

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MODELS 56TA, 56TW, 56TC



ALIGNMENT PROCEDURE

MODELS 56TA, 56TW, 56TC

MODELS 56TA-L, 56TW-L, 56TC-L

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r.f. signal input from the signal generator should be connected to the external antenna lead. Connect the signal generator ground through a 0.1 mfd. condenser to -B (pin 3 on 12SK7 tube socket Models 56TA, 56TW, 56TC) (pin 4 on 14A7 tube socket Models 56TA-L, 56TW-L, 56TC-L).
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series with	To	Band Switch	Tuning Dial	
1	455	200 mmf.	Ant.	A	1,620	A & B
2	15,300	400 ohms	Ant.	O	15,300	C
3	15,000	400 ohms	Ant.	O	15,000	D
4	1,400	200 mmf.	Ant.	A	1,400	E & F

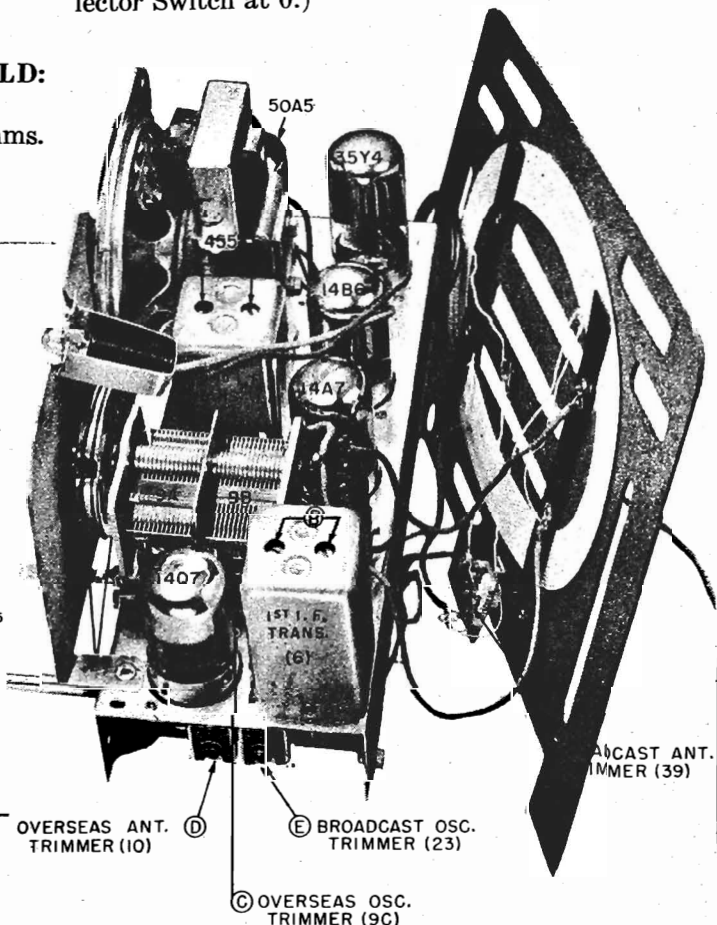
NOTE: When aligning the short-wave oscillator trimmer (C), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiver dial. To check: Tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak; i.e., the oscillator trimmer may be adjusted to the image or one of the harmonics instead of the fundamental frequency. The correct peak is the second one heard as the trimmer adjustment screw is opened from the completely closed position.

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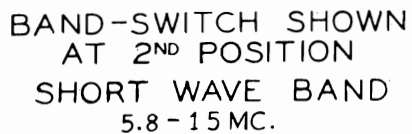
FREQUENCY RANGE: American Broadcast Band, 540 to 1600 kc. (Selector Switch at A.)
Overseas Short-wave Band, 5.8 to 15 mc. (Selector Switch at 0.)

NOTES:

1. THESE ARE BOTTOM VIEWS OF TUBE SOCKETS.
2. MEASURE VOLTAGES FROM SOCKET LUGS TO -B (PIN 4 ON THE 14A7).
3. THESE VOLTAGES WERE MEASURED USING AN ELECTRONIC VOLTMETER.
4. W.J. - WIRING JUNCTION.
5. N.C. - NO CONNECTION.
6. * - 60 CYCLE A.C. VOLTAGES.
7. SOCKET VOLTAGE TOLERANCE, 10%.



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MODELS 56TA, 56TC, 56TW
MODELS 56TA-L, 56TC-L,
56TW-L
MODELS 56TA, 56TW, 56TC

Item No.	Part No.	Description
1	W-48858	Dial Light, 6.3 V.
2	C-132300-1	Power Cable and Plug
3		Ant. Loop (Part of Antenna Loop and Back Assembly. See Cabinet Parts.)
4	AW-134994	H. F. Ant. Coil
5A	AW-134993	H. F. Ant. Coil
5B		H. F. Ant. Coil
6	AW-134065	1st I. F. Transformer
7	AW-134158	2nd I. F. Transformer
9A	B-134995	Variable Condenser
9B		Variable Condenser
10	AB-135088	H. F. Ant. Trimmer
11	GC-210685-143	Condenser, 580 mmf., 300 V. Mica
12	39004-5	Condenser, 50 mmf., 500 V., Mica
13	39001-63	Condenser, .022 mfd., 200 V. Paper
14	39001-67	Condenser, .1 mfd., 200 V. Paper
15	39001-65	Condenser, .05 mfd., 200 V. Paper
16	39004-9	Condenser, 220 mmf., 500 V., Mica
17	39001-10	Condenser, .0033 mfd., 600 V. Paper
18A	W-134177	Condenser, 15 mfd., 140 V. Section
18B		Condenser, 15 mfd., 120 V. Elect. Filter
19	39001-63	Condenser, .022 mfd., 200 V. Paper
20	39001-63	Condenser, .022 mfd., 200 V. Paper
21	39001-63	Condenser, .022 mfd., 200 V. Paper
22	39001-63	Condenser, .022 mfd., 200 V. Paper
23	Part of Item #10	B. C. Osc. Trimmer
24	39281-11	Resistor, 470 Ohm, $\frac{1}{2}$ W.
25	39281-17	Resistor, 330,000 Ohm, $\frac{1}{2}$ W.
26	39281-28	Resistor, 15 Megohm, $\frac{1}{2}$ W.
27	39281-38	Resistor, 22,000 Ohm, $\frac{1}{2}$ W.
28	39281-21	Resistor, 220,000 Ohm, $\frac{1}{2}$ W.
29	39281-34	Resistor, 3.3 Megohm, $\frac{1}{2}$ W.
30	39281-23	Resistor, 47,000 Ohm, $\frac{1}{2}$ W.
31	39281-35	Resistor, 4.7 Megohm, $\frac{1}{2}$ W.
32	39281-29	Resistor, 470,000 Ohm, $\frac{1}{2}$ W.
33	39281-29	Resistor, 470,000 Ohm, $\frac{1}{2}$ W.
34	39281-8	Resistor, 150 Ohm, $\frac{1}{2}$ W.
35	GC-49675-9	Speaker
36	49772-3	Band Change Switch
37A		Band Change Switch
37B		Band Change Switch
37C		Band Change Switch
38A	C-46846-6	Control, Volume (1 Megohm)
38B		Switch (Power)
39	Part of Item #3	B. C. Ant. Trimmer
		Cable Lock Plate
		Dial Face
		Dial Pointer
		Dial Pointer Clip
		Dial Cord Spring
		Dial Light Socket Assembly
		Drive Shaft
		Retaining Ring

Item No.	Part No.	Description
	W-134916	Spring Washer
	G-39204	Tube Socket
	W-49770	Trimount Stud, (Dial Face and Chassis Bottom Cover)
	W-134055	Grommet
	W-135164	Rubber Bumper
	W-46662	Palnut (3/32)
	D-132136-1	Plastic Cabinet—Brown (56TA)
	AW-134738	Plastic Cabinet—Ivory (56TW)
	D-134586	Wood Cabinet (56TC)
	AC-134618	Ant. Loop and Back Assembly (56TA, 56TW)
	AC-134288	Ant. Loop and Back Assembly (56TC)
	B-134610	Dial Lens
	W-134882	Knob (56TA, 56TC)
	W-134883	Knob (56TW)
	39220-32	Mounting Screw
	W-136630	Trimount Stud (Dial Lens, 56TA, 56TW)
	W-132124	Trimount Stud (Ant. Loop and Back Assembly, 56TA, 56TW)

MODELS 56TA-L, 56TW-L, 56TC-L

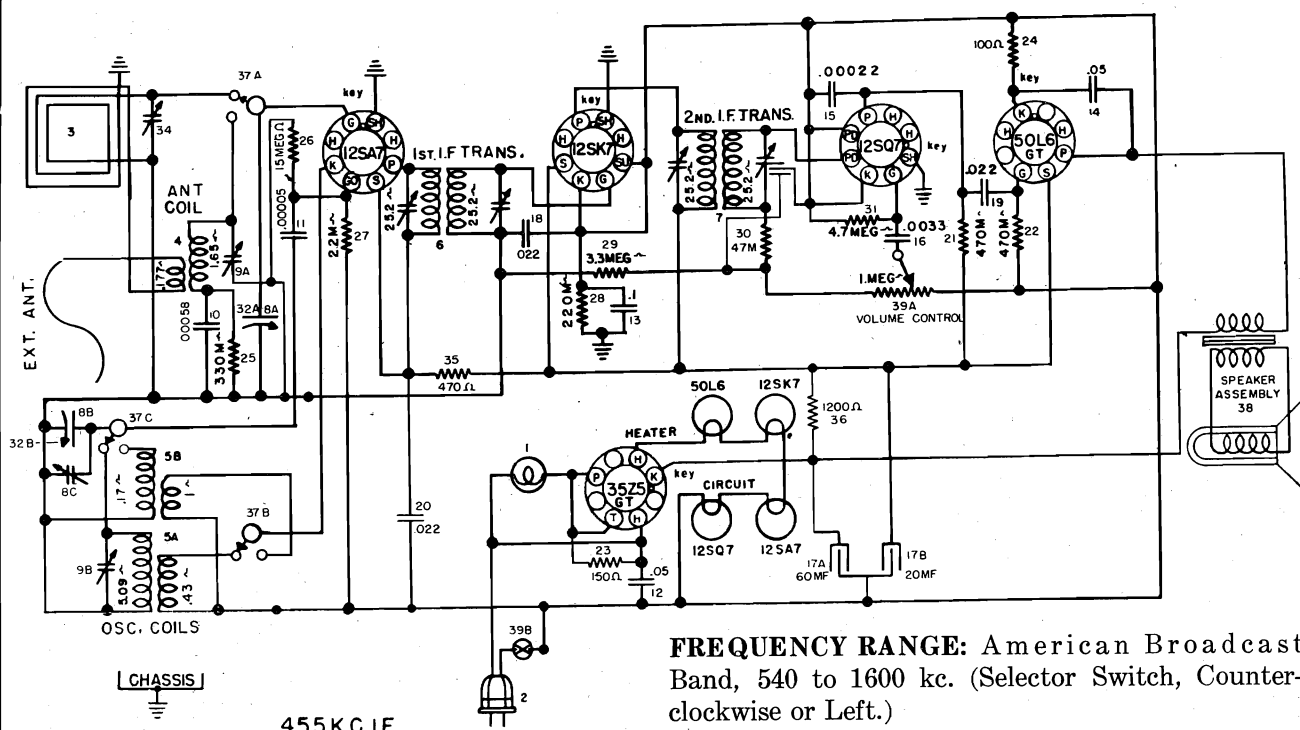
Item No.	Part No.	Description
1	W-48858	Dial Light, 6.3 v.
2	C-132300-1	Power Cable and Plug
3		Ant. Loop (Part of Antenna Loop and Back Assembly. See Cabinet Parts.)
4	AW-134994	H. F. Ant. Coil
5A	AW-134993	H. F. Ant. Coil
5B		H. F. Ant. Coil
6	AW-134065	1st I. F. Transformer
7	AW-134158	2nd I. F. Transformer
9A	B-134995	Variable Condenser
9B		Variable Condenser
10	AB-135088	H. F. Ant. Trimmer
11	GC-210685-143	Condenser, 580 mmf., 300 v., Mica
12	39004-5	Condenser, 50 mmf., 500 v., Mica
13	39001-63	Condenser, .022 mfd., 200 v., Paper
14	39001-67	Condenser, .1 mfd., 200 v., Paper
15	39001-65	Condenser, .05 mfd., 200 v., Paper
16	39004-9	Condenser, 220 mmf., 500 v., Mica
17	39001-10	Condenser, .0033 mfd., 600 v., Paper
18A	W-134177	Condenser, 15 mfd., 140 v. Section
18B		Condenser, 15 mfd., 120 v. Elect. Filter
19	39001-63	Condenser, .022 mfd., 200 v., Paper
20	39001-63	Condenser, .022 mfd., 200 v., Paper

Item No.	Part No.	Description
21	39001-63	Condenser, .022 mfd., 200 v., Paper
22	39001-63	Condenser, .022 mfd., 200 v., Paper
23	Part of Item #10	B. C. Osc. Trimmer
24	39281-11	Resistor, 470 Ohm, $\frac{1}{2}$ w.
25	39281-17	Resistor, 330,000 Ohm, $\frac{1}{2}$ w.
26	39281-28	Resistor, 15 Megohm, $\frac{1}{2}$ w.
27	39281-38	Resistor, 22,000 Ohm, $\frac{1}{2}$ w.
28	39281-21	Resistor, 220,000 Ohm, $\frac{1}{2}$ w.
30	39281-34	Resistor, 3.3 Megohm, $\frac{1}{2}$ w.
31	39281-23	Resistor, 47,000 Ohm, $\frac{1}{2}$ w.
32	39281-35	Resistor, 4.7 Megohm, $\frac{1}{2}$ w.
33	39281-29	Resistor, 470,000 Ohm, $\frac{1}{2}$ w.
34	39281-29	Resistor, 470,000 Ohm, $\frac{1}{2}$ w.
35	39281-8	Resistor, 150 Ohm, $\frac{1}{2}$ w.
36	GC-49675-9	Speaker
37A	49772-3	Band Change Switch
37B		Band Change Switch
37C		Band Change Switch
38A	C-46846-6	Control, Volume (1 Megohm)
38B		Switch (Power)
39	Part of Item #3	B. C. Ant. Trimmer
	W-47577	Cable Lock Plate
	C-135175	Dial Face
	B-134570	Dial Pointer
	W-134667	Dial Pointer Clip
	W-51752	Dial Cord Spring
	39017-4	Dial Light Socket Assembly
	W-134917	Drive Shaft
	W-51071	Retaining Ring
	W-134916	Spring Washer
	W-136371	Tube Socket
	W-49770	Trimount Stud (Dial Face and Chassis Bottom Cover)
	W-134055	Grommet
	W-135164	Rubber Bumper
	W-46662	Palnut (3/32)
	D-132136-1	Plastic Cabinet—Brown (56TA-L)
	AW-134738	Plastic Cabinet—Ivory (56TW-L)
	D-134586	Wood Cabinet (56TC-L)
	AC-134618	Ant. Loop and Back Assembly (56TA-L, 56TW-L)
	AC-134288	Ant. Loop and Back Assembly (56TC-L)
	B-134610	Dial Lens
	W-134882	Knob (56TA-L, 56TC-L)
	W-134883	Knob (56TW-L)
	39220-32	Mounting Screw
	W-136630	Trimount Stud (Dial Lens, 56TA-L, 56TW-L)
	W-132124	Trimount Stud (Ant. Loop and Back Assembly, 56TA-L, 56TW-L)

Figures in first column correspond to figures in Schematic Diagram

MODEL 56TX

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FREQUENCY RANGE: American Broadcast Band, 540 to 1600 kc. (Selector Switch, Counter-clockwise or Left.)

Overseas Short-wave Band: 5.8 to 15 mc. (Selector Switch, Clockwise or Right.)

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: a.c—d.c.

VOLTAGE RATING: 105-125 volts.

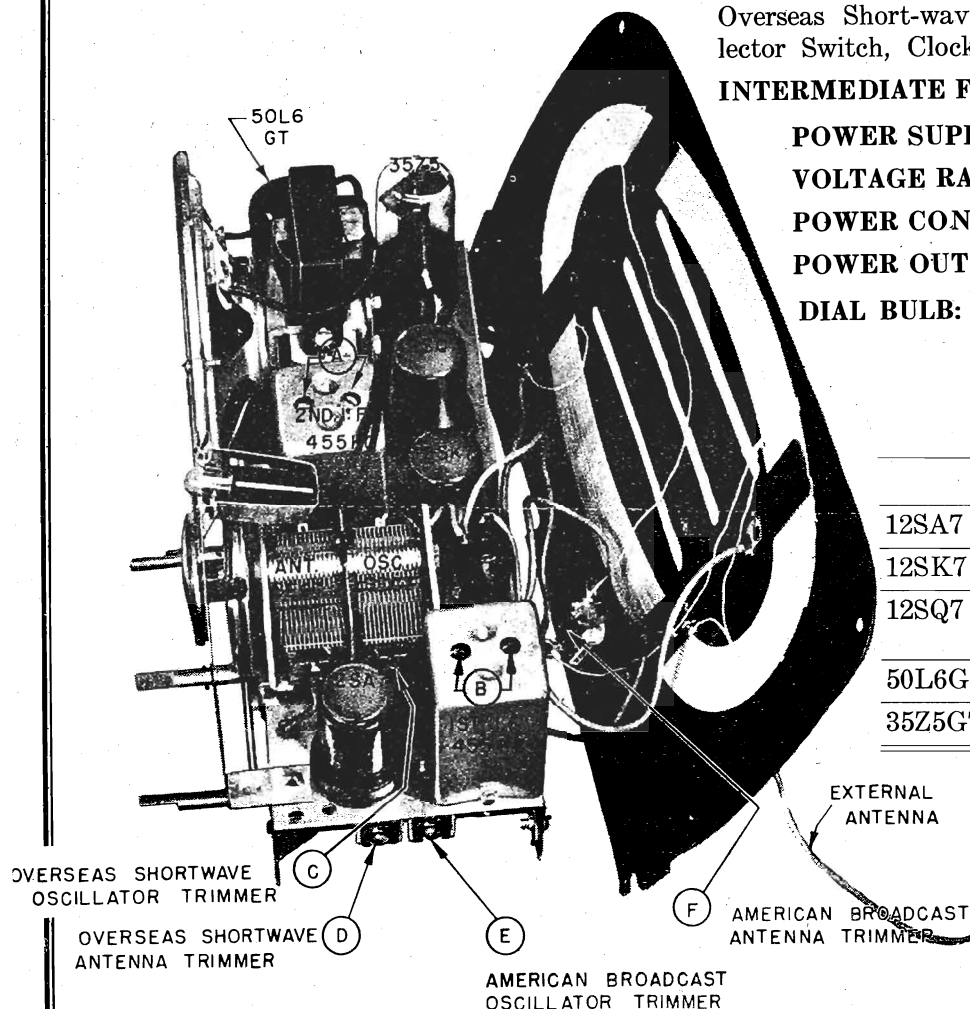
POWER CONSUMPTION: 35 watts nominal.

POWER OUTPUT: 1.5 watts minimum.

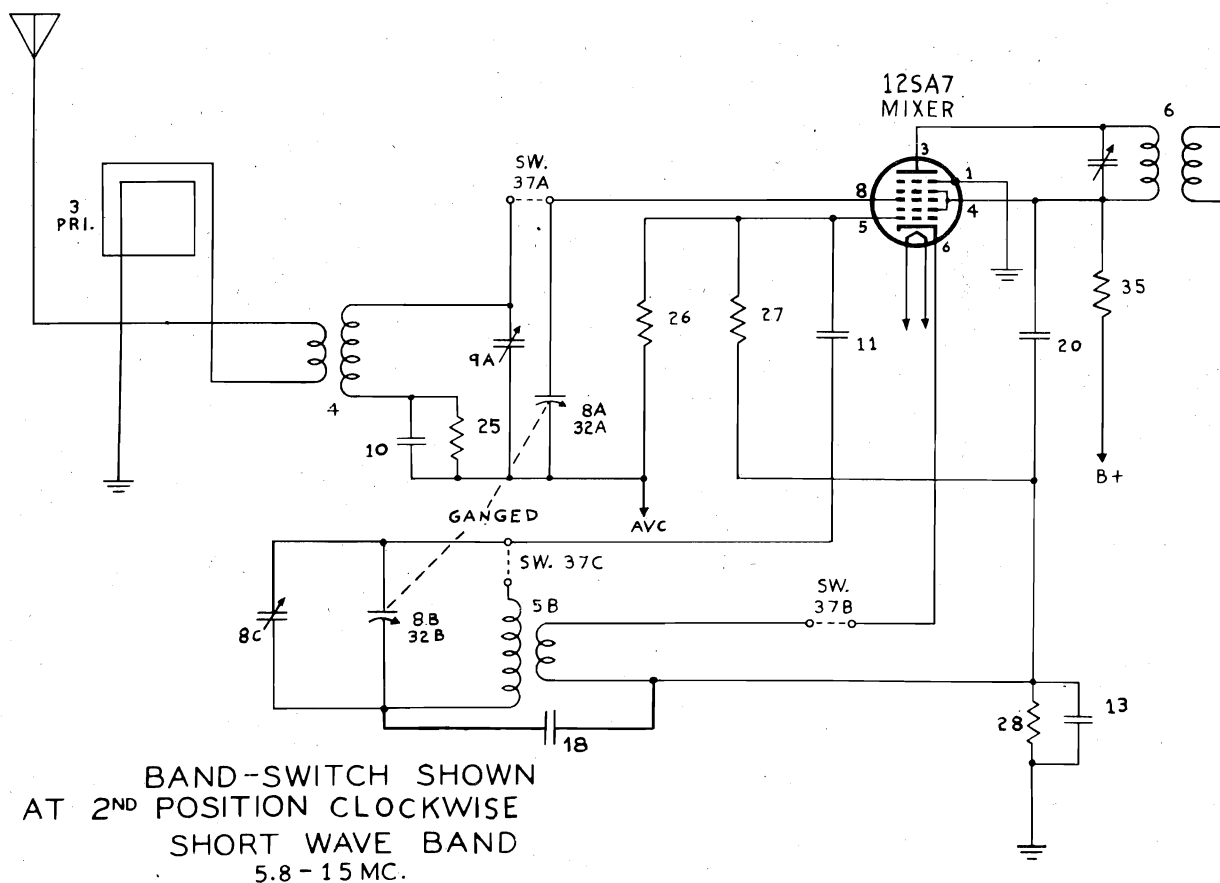
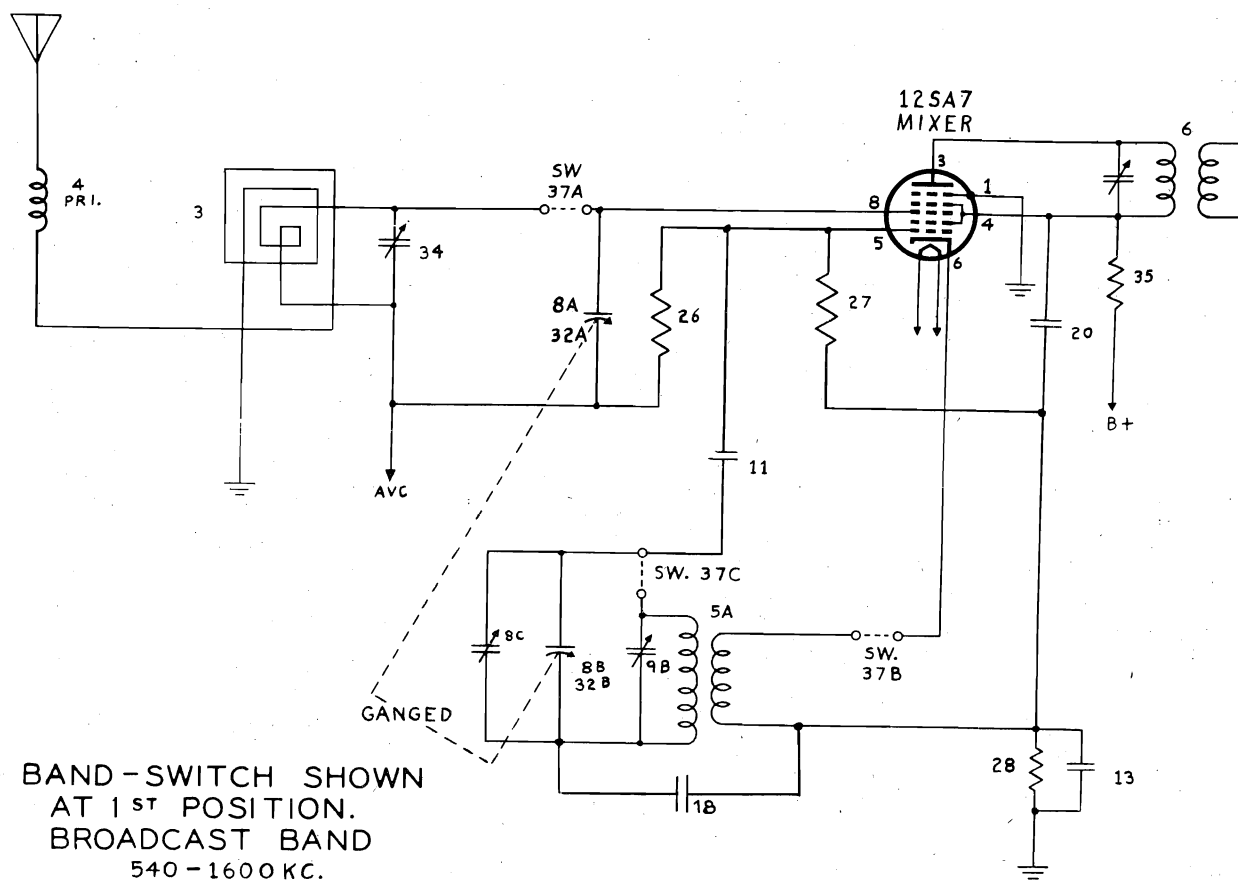
DIAL BULB: Type 47, 6.3 volts, .15 amp.

TUBE COMPLEMENT:

Type	Function
12SA7 (or GT/G)	Mixer
12SK7 (or GT/G)	I.F. Amplifier
12SQ7 (or GT/G)	Detector, AVC, 1st A.F. Amplifier
50L6GT	A.F. Power Output
35Z5GT/G	Rectifier



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MODEL 56TX

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NOTE: 9

OSCILLATOR GRID VOLTAGES	
BAND	FREQUENCY VOLTS
AMERICAN	540 KC - 4.9
OVERSEAS	5.7 MC - 3.8

I.F. AMPLIFIER DET-A.V.C.-1st A.F. RECTIFIER

MIXER

POWER OUTPUT

NOTES:

1. TUBE SOCKETS ARE BOTTOM VIEWS.
2. MEASURE VOLTAGES FROM SOCKET LUG TO -B (PIN 3 ON THE 12SK7).
3. VOLTAGES AS MEASURED WITH AN ELECTRONIC VOLTMETER.
4. WJ - WIRING JUNCTION
5. NC - NO CONNECTION
6. * - A.C. TOLERANCES
7. VOLTAGE TOLERANCE, 10 %
8. LINE VOLTAGE 117V, 60 \angle A.C.

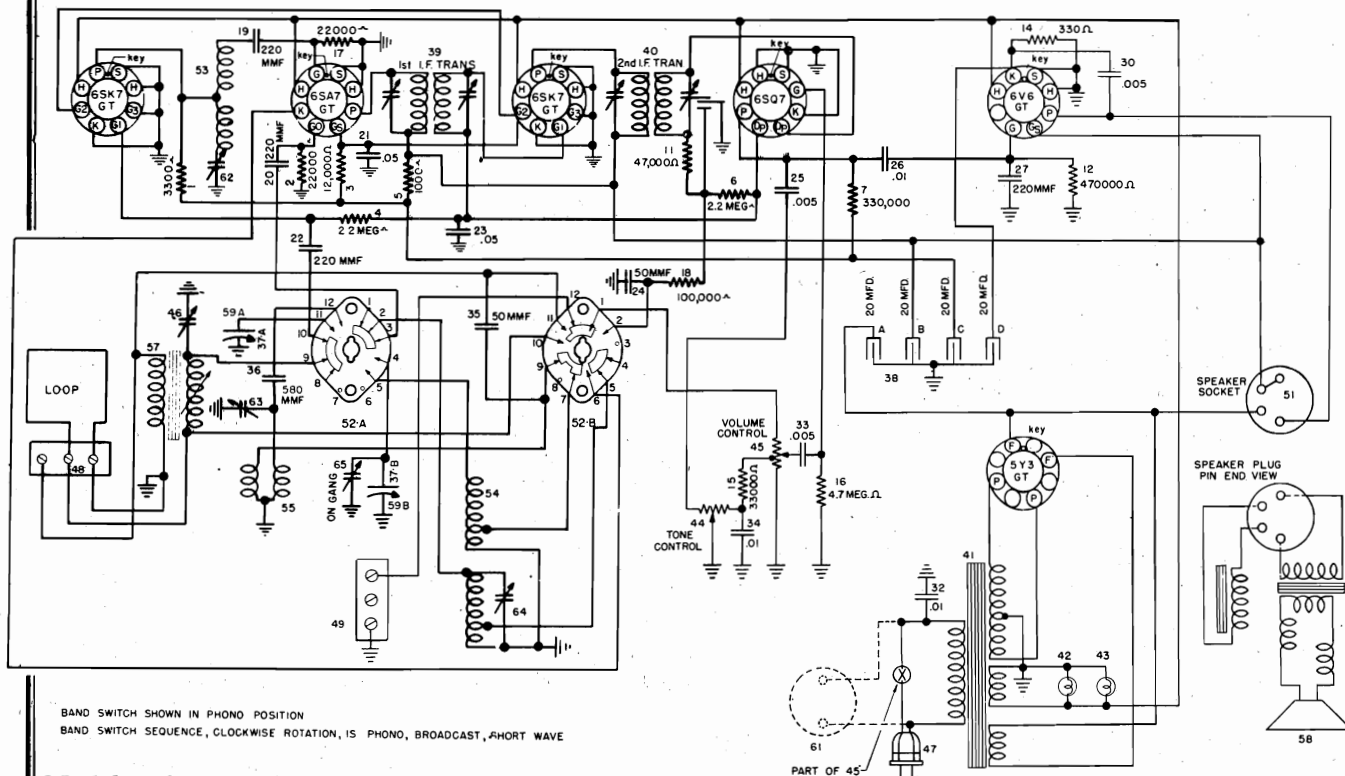
Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series with	To	Band Switch	Tuning Dial	
1	455	200 mmf.	Ant.	Left	1,620	A & B
2	15,300	400 ohms	Ant.	Right	15,300	C
3	15,000	400 ohms	Ant.	Right	15,000	D
4	1,400	200 mmf.	Ant.	Left	1,400	E & F

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r.f. signal input from the signal generator should be connected to the external antenna lead. Connect the signal generator ground through a 0.1 mfd. condenser to -B (pin 3 on 12SK7 tube socket).
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

Item No.	Part No.	Description
1	W-4858	Bulb (Dial Light), Type 47, 6.3v., .15 amp.
2	C-132300-1	Cable and Plug (power)
3	AC-134618	Antenna Loop Assembly
4	AW-134994	Antenna Coil Assembly
5A	AW-134993	Coil (B.C. Oscillator) Two Section
5B	AW-134993	Coil (H.F. Oscillator) Two Section
6	AW-134065	Transformer (1st I.F.)
7	AW-134158	Transformer (2nd I.F.)
8A	B-134995	Condenser (Variable) Two Section
8B	B-134995	Condenser (Variable) Two Section
8C	B-134995	Condenser (Trimmer) Two Section
9A	AB-135088	Condenser (Trimmer) Two Section
9B	AB-135088	Condenser (Trimmer) Two Section
10	GC-210635-143	Condenser, 580 mmf., 300v., Mica
11	39004-5	Condenser, 50 mmf., 500v., Mica
12	39001-65	Condenser, .022 mfd., 200v., Paper
13	39001-67	Condenser, .05 mfd., 200v., Paper
14	39001-65	Condenser, .1 mfd., 200v., Paper
15	39004-9	Condenser, .05 mfd., 200v., Paper
16	39004-9	Condenser, .220 mmf., 500v., Mica
17A	W-134988	Condenser, 330 mmf., 500v., Paper
17B	W-134988	Condenser, 60 mfd., 150 w.v. Section
18	39001-63	Condenser, 20 mfd., 100 w.v. Section
19	39001-63	Condenser, .022 mfd., 200v., Paper
20	39001-63	Condenser, .022 mfd., 200v., Paper
21	39281-29	Resistor, 470,000 ohms, $\frac{1}{2}$ w.
22	39281-29	Resistor, 470,000 ohms, $\frac{1}{2}$ w.
23	39281-8	Resistor, 150 ohm, $\frac{1}{2}$ w.
24	39281-7	Resistor, 100 ohm, $\frac{1}{2}$ w.
25	39281-28	Resistor, 330,000 ohm, $\frac{1}{2}$ w.
26	39281-38	Resistor, 18 megohm, $\frac{1}{2}$ w.
27	39281-21	Resistor, 22,000 ohm, $\frac{1}{2}$ w.
28	39281-27	Resistor, 220,000 ohm, $\frac{1}{2}$ w.
29	39281-34	Resistor, 3.3 megohm, $\frac{1}{2}$ w.
30	39281-23	Resistor, 47,000 ohm, $\frac{1}{2}$ w.
31	39281-35	Resistor, 4.7 megohm, $\frac{1}{2}$ w.
32	39281-11	Resistor, 470 ohm, $\frac{1}{2}$ w.
33	39015-26	Resistor, 1200 ohm, 1 w.
34	W-49772-3	Switch (Band Change) Three Section
35	W-49772-3	Switch (Band Change) Three Section
36	W-49772-3	Switch (Band Change) Three Section
37A	B-134942	Speaker
37B	B-134942	Control, Volume (1 megohm) Assembly
37C	B-134942	Control, Volume (1 megohm) Assembly
38	C-46846-6	Switch (power)
39A	B-134940	Transformer (Output)
39B	G-39204	Socket (Tube)
39C	39017-4	Socket Assembly (Dial Light)
40	C-135175	Face (Dial)
41	B-134952	Pointer (Dial)
42	W-134667	Clip (Dial Pointer)
43	W-134917	Shaft (Drive)
44	W-51071	Ring (Retaining)
45	W-134916	Washer (Spring)
46	51752	Spring (Dial Cord)
47	W-134055	Grommet
48	AW-134738	Cabinet
49	B-134610	Lens (Dial)
50	W-134883	Knob (Dial)
51	W-136630	Stud, Trimount
52	W-132124	Stud, Trimount

MODELS 66CA, 66CP, 66CQ

THE CROSLEY CORP.

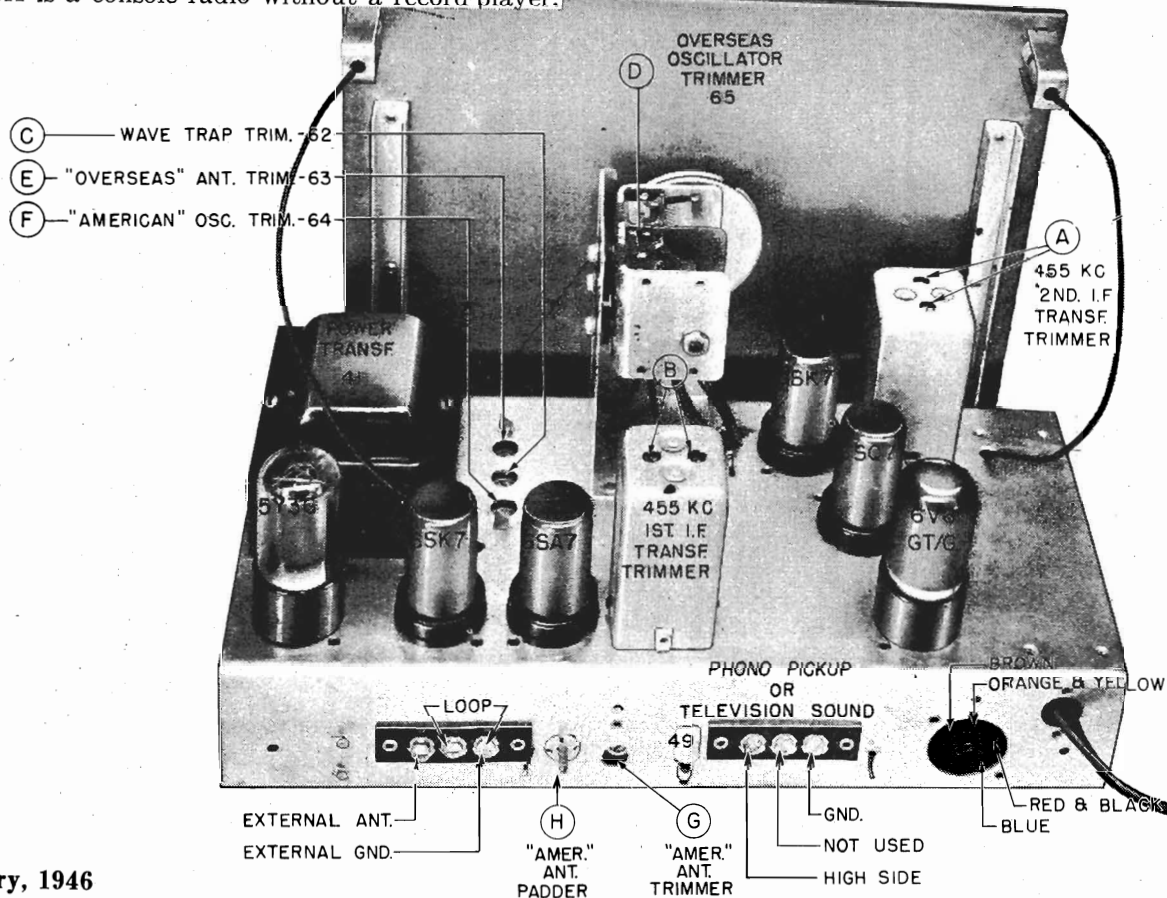


BAND SWITCH SHOWN IN PHONO POSITION
BAND SWITCH SEQUENCE, CLOCKWISE ROTATION, IS PHONO, BROADCAST, SHORT WAVE

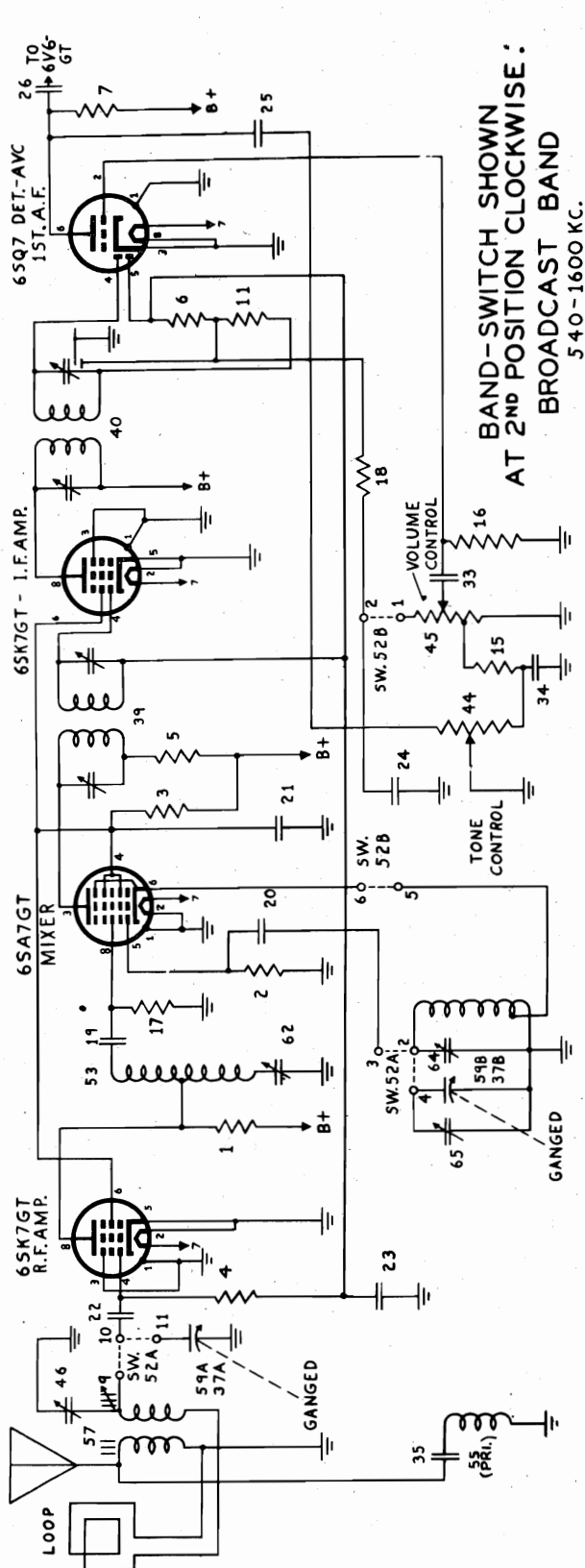
Model 66CP uses the Model K (Part No. D-134945-1) automatic record changer.

Model 66CQ uses the Model G (Part No. D-135039) automatic record changer.

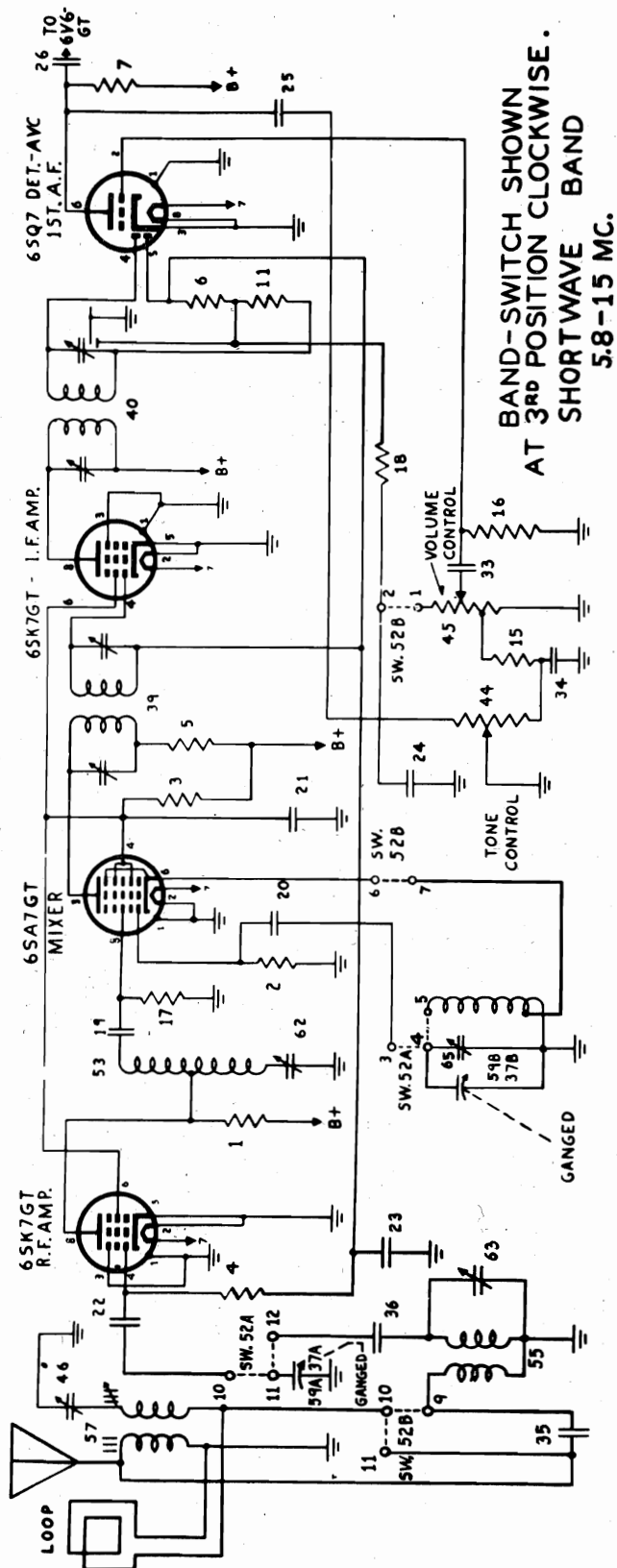
Model 66CA is a console radio without a record player.



January, 1946



NOTE: 1ST. POSITION (PHONO.) DRAWING NOT SHOWN



THE CROSLEY CORP.

ALIGNMENT PROCEDURE

Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.

Connect the output meter across the speaker voice coil.

The r. f. signal input from the signal generator should be connected to the external antenna post as indicated in the alignment chart. Connect the low side (ground) of the signal generator to the chassis.

Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain the signal generator output as low as possible to prevent AVC action in the receiver.

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series With	To	Band Switch	Tuning Dial	
1	455	200 mmf.	Ant.	A	1620	A & B
2	455	200 mmf.	Ant.	A	1620	C*
3	15,300	400 ohms	Ant.	O	15,300	D
4	15,000	400 ohms	Ant.	O	15,000	E
5	1620	200 mmf.	Ant.	A	1620	F
6	1400	200 mmf.	Ant.	A	1400	G
7	600	200 mmf.	Ant.	A	600	H
8	1400	200 mmf.	Ant.	A	1400	Recheck G

*Adjust for Minimum Output (Wave Trap).

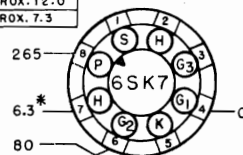
NOTE: When aligning the "Overseas" oscillator trimmer (D), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiver dial. To check: tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak of the trimmer from the closed position.

SOCKET VOLTAGE CHART

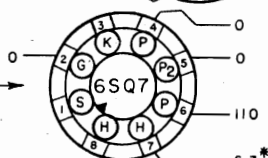
NOTE: OSCILLATOR GRID VOLTAGES

BAND	FREQUENCY	VOLTS
AMERICAN	550 KC	APPROX. 12.0
OVERSEAS	5.8 M.C	APPROX. 7.3

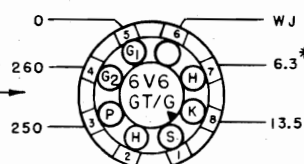
I.F. AMPLIFIER →



DET. AVC. 1ST. A.F. →



AUDIO OUTPUT →

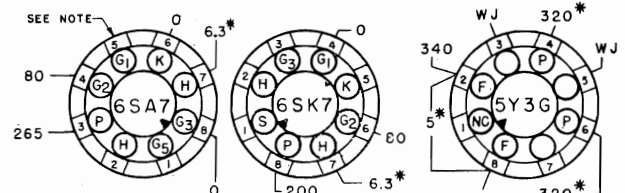


NOTES :-

1. THESE ARE BOTTOM VIEWS OF SOCKETS
2. MEASURE VOLTAGES FROM SOCKET LUG TO CHASSIS.
3. THESE VOLTAGES MEASURED USING AN ELECTRONIC VOLTMETER.
4. WJ - WIRING JUNCTION.
5. NC - NO CONNECTION.
6. * - 60 CYCLE AC VOLTAGE.

POWER TRANSFORMER

MIXER R.F. AMPLIFIER RECTIFIER



MODELS 66CA, 66CP, 66CQ

THE CROSLEY CORP.

FREQUENCY RANGE: American Broadcast Band, 540 to 1600 kc. (Selector Switch at A.)

POWER CONSUMPTION: 60 watts maximum.

Overseas Short-wave Band, 5.8 to 15 mc. (Selector Switch at 0.)

POWER OUPUT: 4.5 watts minimum.

INTERMEDIATE FREQUENCY: 455 kc.

VOLTAGE DROP ACROSS SPEAKER FIELD: 76 volts.

POWER SUPPLY: 60 cycle a. c. only.

RESISTANCE OF SPEAKER FIELD: 900 ohms.

VOLTAGE RATING: 105-125 volts.

DIAL BULB: Type 51, 7.5 volts, .25 amp.

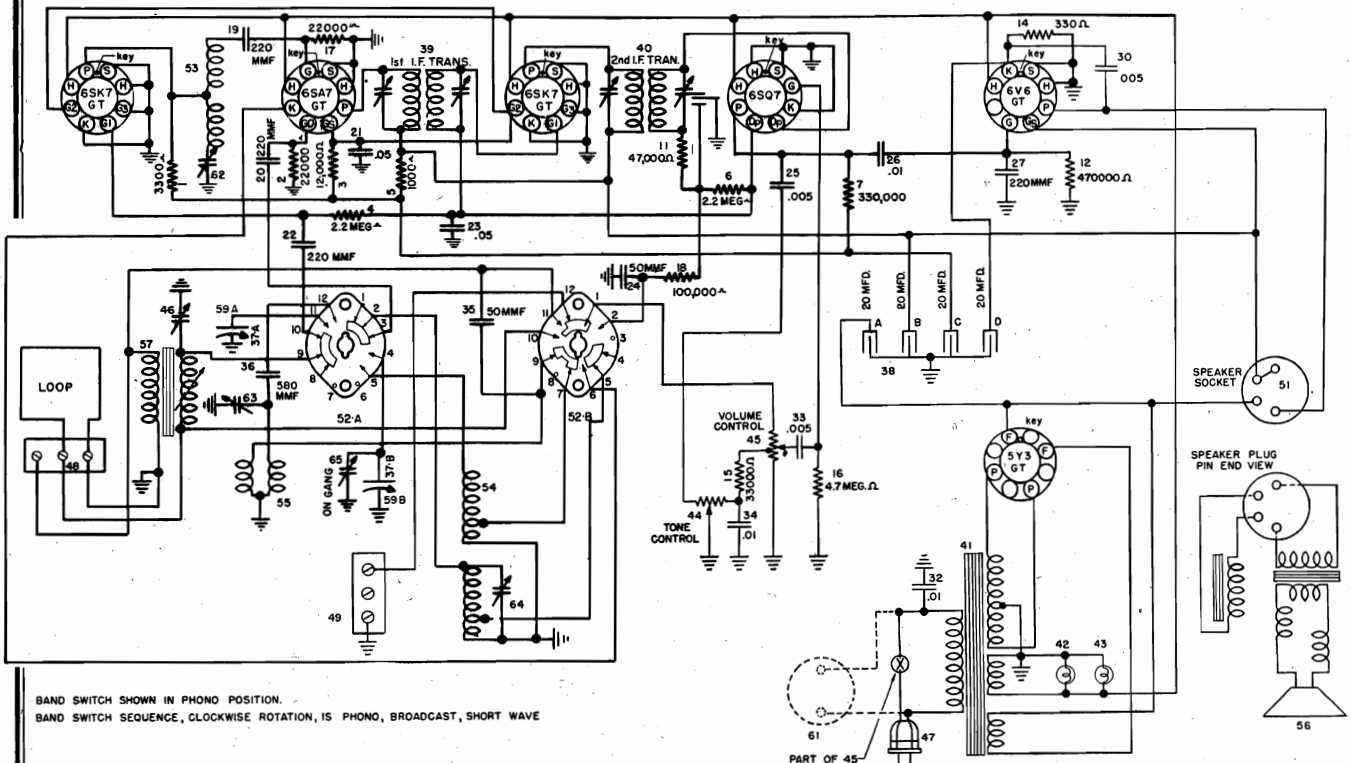
PARTS LIST—MODELS 66CA, 66CP, 66CQ

Figures in first column correspond to figures in Schematic Diagram.

Item No.	Part Number	Description	Item No.	Part Number	Description
1	39281-16	Resistor, 3300 ohm, $\frac{1}{2}$ w.	54	AW-135908	Oscillator Coil Assembly
2	39281-21	Resistor, 22,000 ohm, $\frac{1}{2}$ w.	55	AW-135909	Antenna Coil Assembly
3	39016-38	Resistor, 12,000 ohm, 2 w.	57	AW-135910	Antenna Loading Coil Assembly
4	39281-33	Resistor, 2.2 megohm, $\frac{1}{2}$ w.	58	B-134700	Speaker
5	39040-13	Resistor, 1,000 ohm, 1 w.	62	B-132386-7	Condenser (Trimmer) Three
6	39281-33	Resistor, 2.2 megohm, $\frac{1}{2}$ w.	63		Condenser (Trimmer) Section
7	39281-28	Resistor, 330,000 ohm, $\frac{1}{2}$ w.	64		Condenser (Trimmer) Assembly
11	39281-23	Resistor, 47,000 ohm, $\frac{1}{2}$ w.		G-39012-8	Core (Iron)
12	39281-29	Resistor, 470,000 ohm, $\frac{1}{2}$ w.		G-39204	Socket (Tube)
14	39015-19	Resistor, 330 ohm, 1 w.		39017-3	Socket (Dial Light)
15	39281-22	Resistor, 33,000 ohm, $\frac{1}{2}$ w.		AW-134793	Dial Face Assembly
16	39281-35	Resistor, 4.7 megohm, $\frac{1}{2}$ w.		B-134571	Pointer (Dial)
17	39281-21	Resistor, 22,000 ohm, $\frac{1}{2}$ w.		W-134667	Clip (Dial Pointer)
18	39281-25	Resistor, 100,000 ohm, $\frac{1}{2}$ w.		W-51752	Spring (Dial Cord)
19	39004-9	Condenser, 220 mmf., 500 v., Mica		W-134917	Shaft (Drive)
20	39004-9	Condenser, 220 mmf., 500 v., Mica		W-51071	Ring (Retaining)
21	39001-41	Condenser, .05 mfd., 400 v., Paper		W-134916	Washer (Spring)
22	39004-9	Condenser, 220 mmf., 500 v., Mica		W-132366-2	Nut (Iron Core Locking)
23	39001-65	Condenser, .05 mfd., 200 v., Paper		39196-29	Screw (Dial Mtg.)
24	39004-5	Condenser, 50 mmf., 500 v., Mica		W-134055	Grommet (Variable Condenser Mtg.)
25	39001-11	Condenser, .005 mfd., 600 v., Paper		R-135237	Cabinet (66CA)
26	39001-37	Condenser, .01 mfd., 400 v., Paper		R-134957	Cabinet (66CP)
27	39004-9	Condenser, 220 mmf., 500 v., Mica		R-134350	Cabinet (66CQ)
30	39001-11	Condenser, .005 mfd., 600 v., Paper		C-134773	Lens (Dial)
32	W-30805	Condenser, .01 mfd., 400 v., Paper		AC-135299	Antenna Loop Assembly (66CA)
33	39001-11	Condenser, .005 mfd., 600 v., Paper		AC-134782	Antenna Loop Assembly (66CP)
34	39001-61	Condenser, .01 mfd., 200 v., Paper		AC-135100	Antenna Loop Assembly (66CQ)
35	39004-5	Condenser, 50 mmf., 500 v., Mica		D-134945-1	Record Changer (66CP)
36	GC-210685-143	Condenser, 580 mmf., 300 v., Mica		D-135039	Record Changer (66CQ)
37A	B-134995	Condenser (variable) Two		AB-134935	Floating Jewel Needle Assembly (66CP, 66CQ)
37B		Condenser (variable) Section		W-134959	Cable, Phono (66CP)
38A	B-132807	Condenser, 20 mfd., 360 w.v. Four		W-135128	Cable, Phono (66CQ)
38B		Condenser, 20 mfd., 275 w.v. Section		W-130197	Knob (66CA, 66CQ)
38C		Condenser, 20 mfd., 245 w.v. Elect.		W-135248	Knob (66CP)
38D		Condenser, 20 mfd., 25 w.v. Filter		W-45056	Rubber Mtg. (66CA, 66CQ Chassis Mtg.)
39	AW-134065	Transformer (1st I. F.)		W-45580	Rubber Mtg. (66CA, 66CP, 66CQ)
40	AW-134158	Transformer (2nd I. F.)			Speaker Mtg., 66CP Chassis Mtg.)
41	B-134625	Transformer (Power)		W-136539	Lid Support, Cabinet (66CP, 66CQ)
42	W-43567	Bulb (Dial Light, Type 51, 7.5 v., .25 amp.)			
43	W-43567	Bulb (Dial Light, Type 51, 7.5 v., .25 amp.)			
44	B-135651	Control, Tone (3 megohm)			
45	B-135859	Control, Volume (1 megohm) & Switch			
46	W-132267-1	Condenser (Trimmer)			
47	B-132300-1	Cable and Plug (Power)			
48	39019-3	Terminal Board Assembly			
49	39019-3	Terminal Board Assembly			
51	W-134968-1	Socket (Speaker)			
52A	B-134639	Switch (Band Change) Two			
52B		Switch (Band Change) Section			
53	AW-135907	R. F. Coil Assembly			

MODELS 66TA, 66TC, 66TW

THE CROSLEY CORP.



FREQUENCY RANGE: American Broadcast Band: 540 to 1600 kc. (Selector switch at A.)

Overseas Short-wave Band: 5.8 to 15 mc. (Selector switch at 0.)

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: 60 cycle a.c. only.

VOLTAGE RATING: 110-120 volts.

POWER CONSUMPTION: 60 watts maximum.

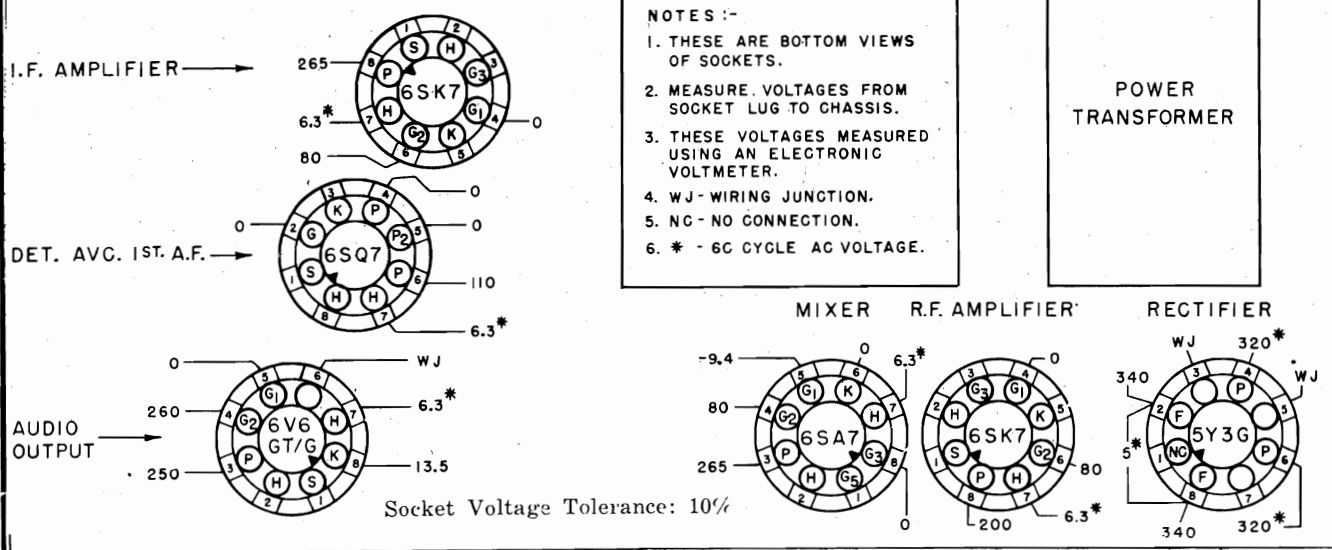
POWER OUTPUT: 4.5 watts minimum.

VOLTAGE DROP ACROSS SPEAKER FIELD: 76 volts.

RESISTANCE OF SPEAKER FIELD: 900 ohms.

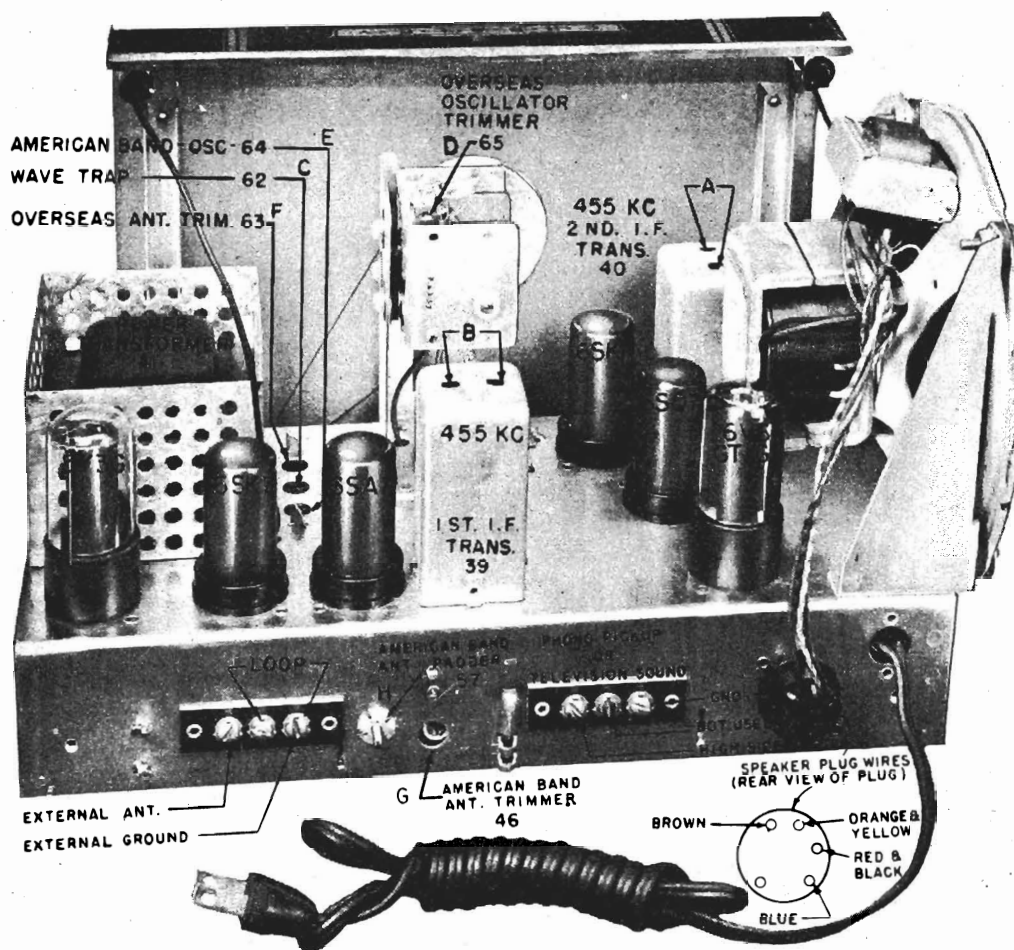
DIAL BULB: Type 51, 7.5 volts, 0.2 amp.

September, 1945



MODELS 66TA, 66TC, 66TW

THE CROSLEY CORP.



CHASSIS, REAR VIEW - MODELS 66TA, 66TW, 66TC

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series with	To	Band Switch	Tuning Dial	
1	455	200 mmf	Ant.	A	1620	A & B
2	455	200 mmf	Ant.	A	1620	C*
3	15,300	400 ohms	Ant.	O	15,300	D
4	15,000	400 ohms	Ant.	O	15,000	E
5	1620	200 mmf	Ant.	A	1620	F
6	1400	200 mmf	Ant.	A	1400	G
7	600	200 mmf	Ant.	A	600	H

*Adjust for minimum output (wavetrap).

NOTE: When aligning the short-wave oscillator trimmer (D), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiver dial. To check: Tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak; i.e., the oscillator trimmer may be adjusted to the image or one of the harmonics instead of the fundamental frequency. The correct peak is the second one heard as the trimmer adjustment screw is opened from the completely closed position.

THE CROSLEY CORP.

ALIGNMENT PROCEDURE

Turn the volume control on full, and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

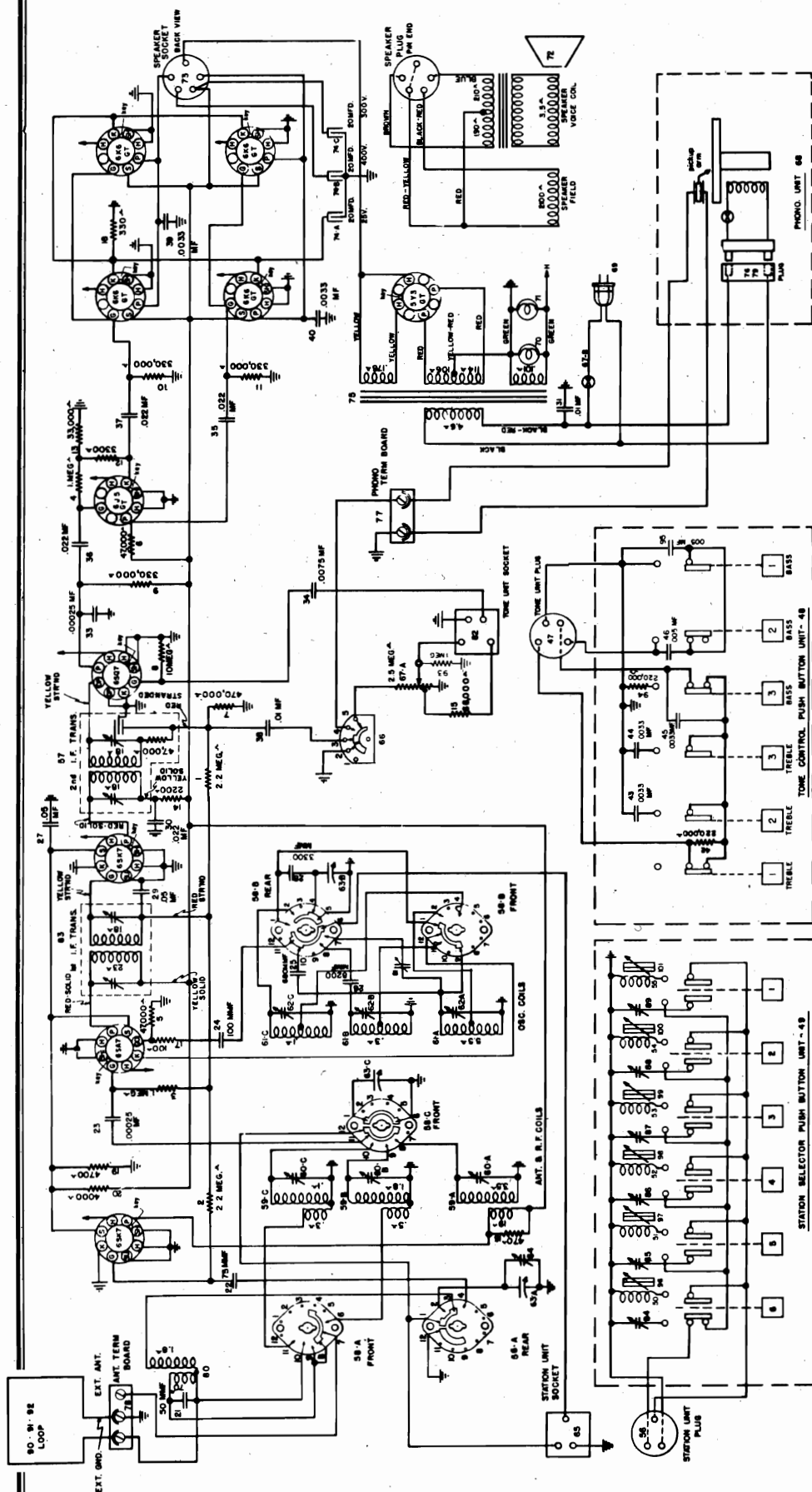
MECHANICAL PARTS

CABINET PARTS		
Item No.	Part No.	Description
	R-134592	Plastic Cabinet—Brown (66TA)
	AW-134737	Plastic Cabinet—Ivory (66TW)
	R-135025	Wood Cabinet (66TC)
	AC-134673	Antenna Loop and Back Assembly (66TA, 66TW)
	AC-134672	Antenna Loop and Back Assembly (66TC)
	C-132688	Dial Lens (66TA, 66TW, 66TC)
	W-132709	Grille Cloth (66TA)
	W-132766	Grille Cloth (66TW)
	W-130197	Knob (66TA, 66TC)
	W-134635	Knob (66TW)
	W-136630	Trimount Stud (66TA, 66TW)
	W-132124	Trimount Stud (66TA, 66TW)
	39220-38	Screw Mounting—8 x 1¼ Hex. Hd. (66TA, 66TW, 66TC)
	W-45580	Rubber Mounting (66TC)
	W-133584	Rubber Washer (66TA, 66TW Chassis Mtg.)

Figures in first column correspond to figures in Schematic Diagram

MODEL 106CP

THE CROSLEY CORP.



Model 106CP uses the Model SL (Part No. D-134946-1) automatic record changer. DIAL BULB: Type 51, 7.5 volts, .25 amp.

TYPE: Ten-tube, three-band, superheterodyne.

FREQUENCY RANGE: American Broadcast Band, 540 to 1600 kc. (Selector Switch at AMERICAN position.)

Police Broadcast Band, 2.2 to 6 mc. (Selector Switch at POLICE position.)

Overseas Short-wave Band, 5.8 to 18 mc. (Selector Switch at O'SEA position.)

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: 60 cycle ac. only.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 85 ~~watts~~ watts

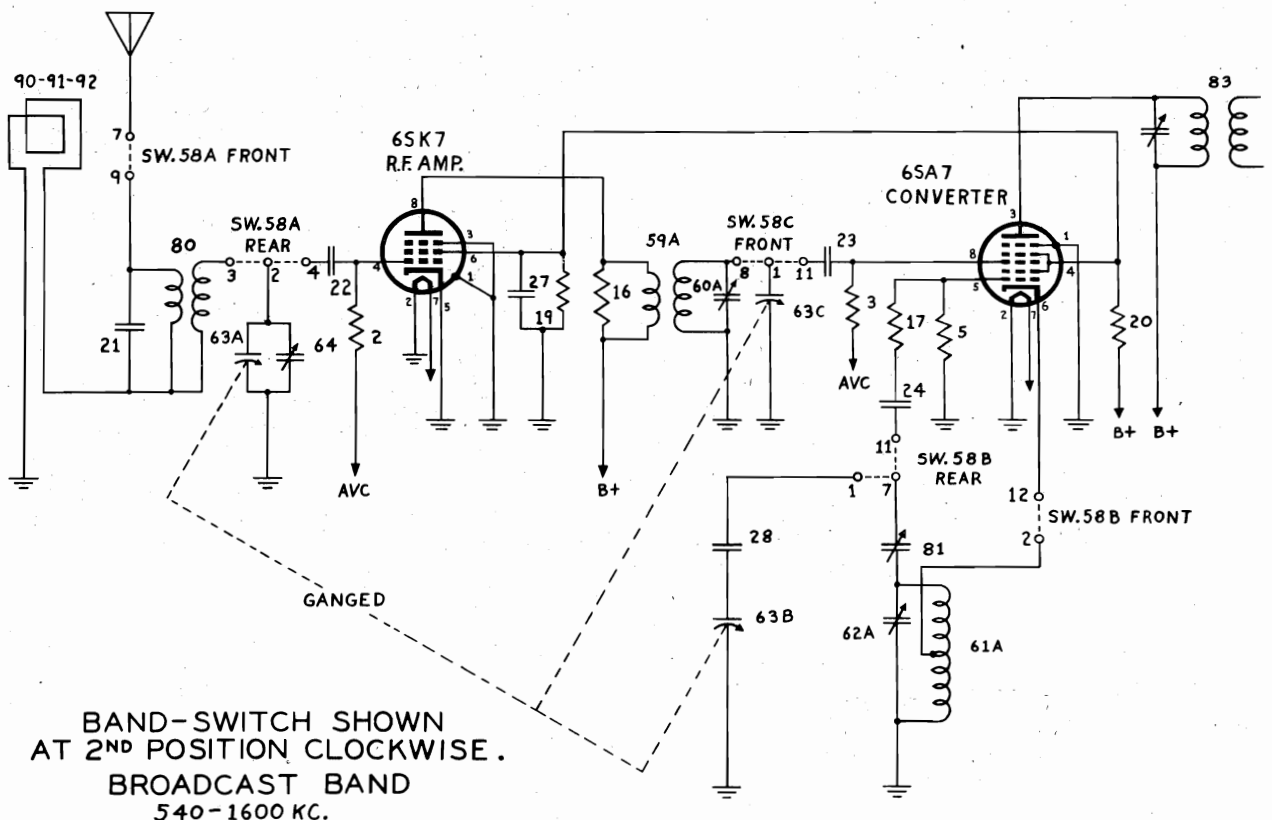
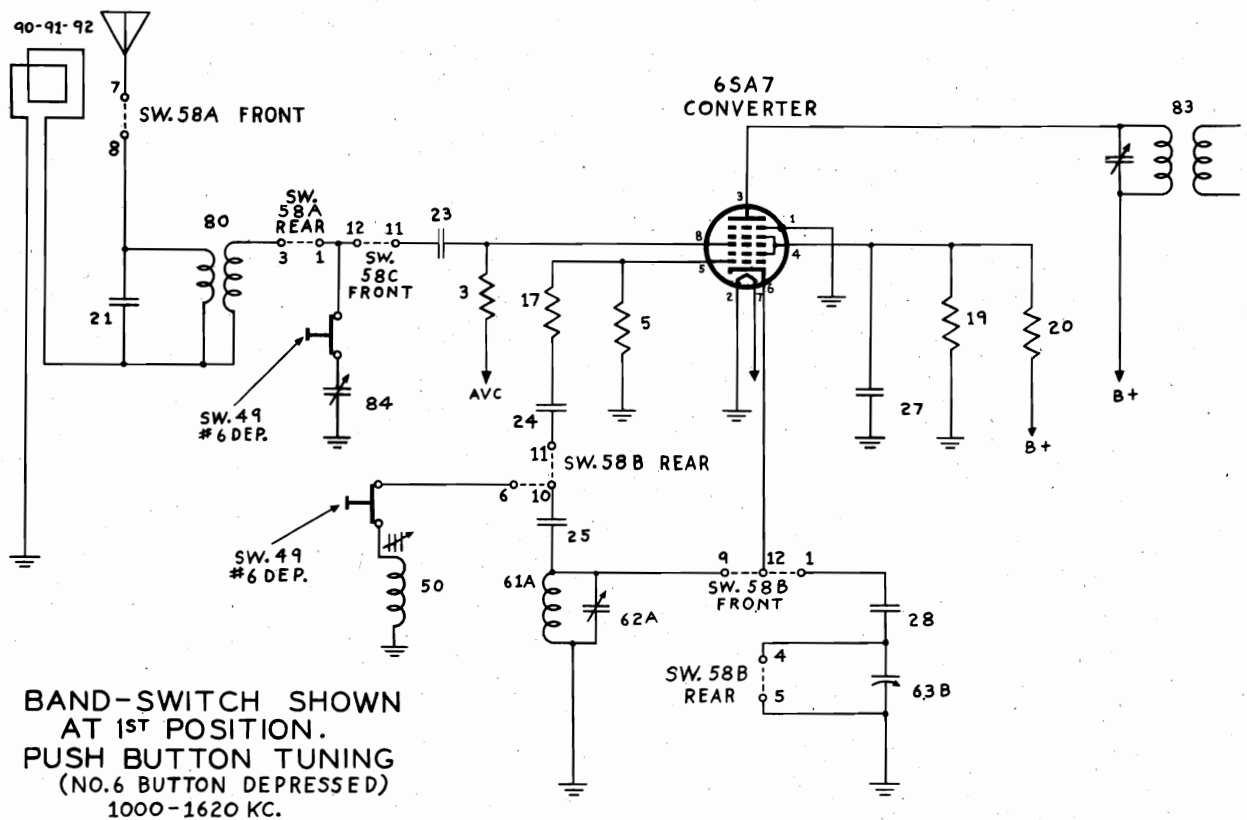
POWER OUTPUT: 8.5 watts minimum.

VOLTAGE DROP ACROSS SPEAKER FIELD: 130 volts.

RESISTANCE OF SPEAKER FIELD: 2100 ohms.

May, 1946

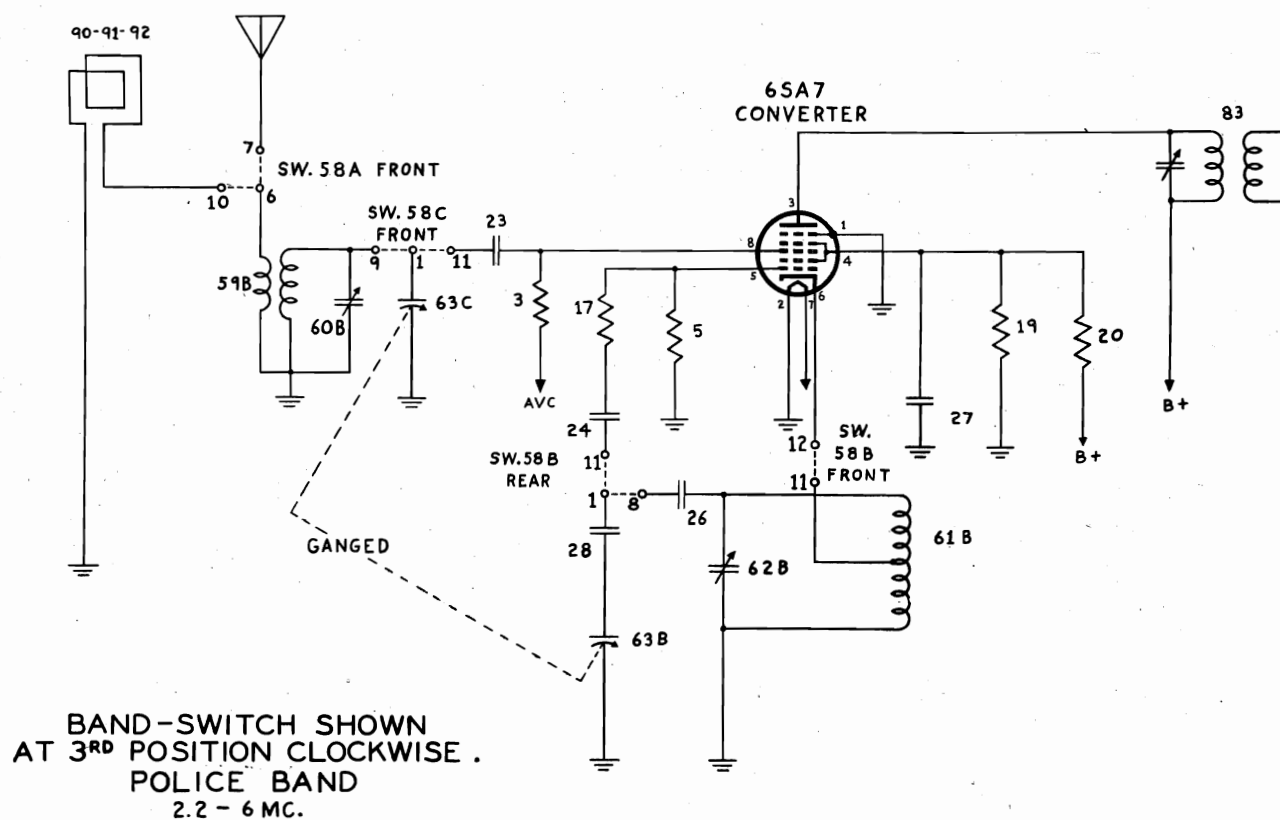
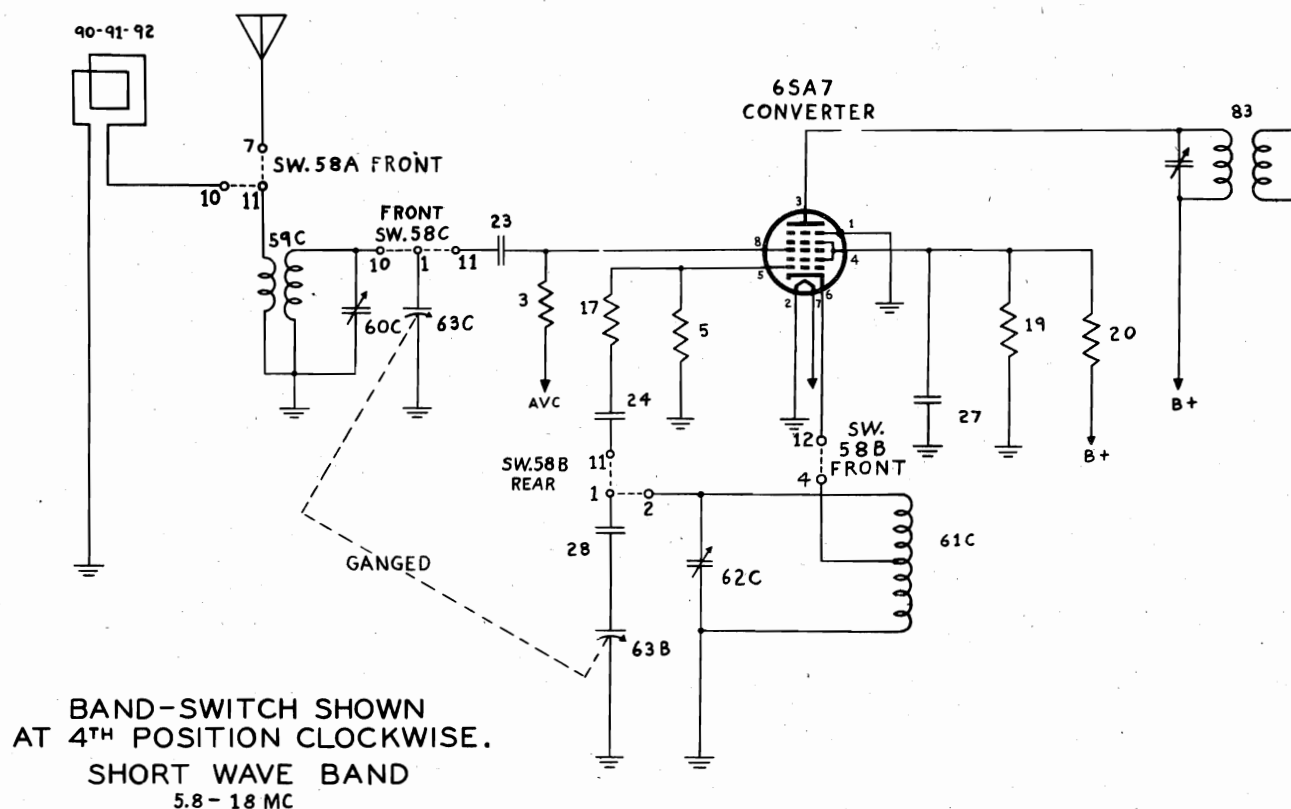
THE CROSLEY CORP.



"clarified schematics"

MODEL 106CP

THE CROSLLEY CORP.



THE CROSLEY CORP.

ALIGNMENT PROCEDURE

Turn the tuning capacitor to the completely closed position against the stop, and set the dial pointer to the reference line at the end of the dial scale.

Set the tone control buttons all the way out.

NOTE: If the chassis is removed from the cabinet, connect the shorting bar from the volume control (67A) to the coupling capacitor (34) on the tone unit socket.

Connect the output meter across the speaker output transformer connections on the 6K6 tubes.

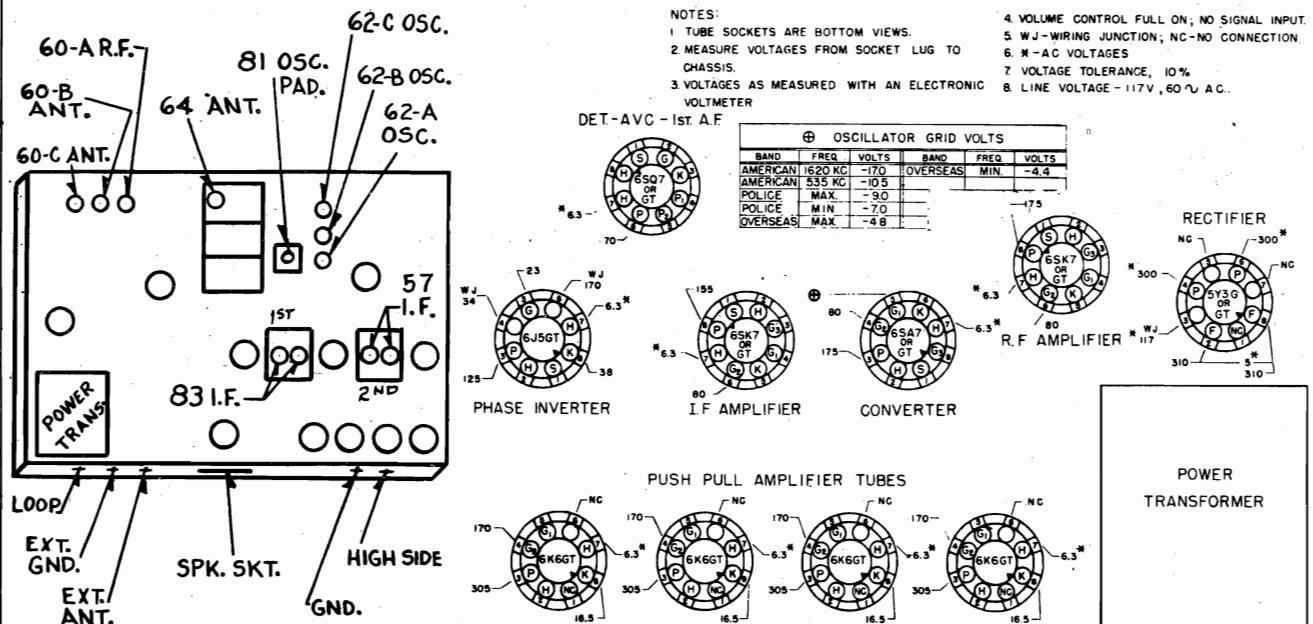
The r. f. signal input from the signal generator should be connected as indicated in the alignment chart. Connect the low side (ground) of the signal generator to the chassis.

Turn the volume control on full and adjust the signal generator output to produce a noticeable output meter reading.

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series With	To	Band Switch	Tuning Dial	
1	455	200 mmf.	Rear Gang Section	American BC	Fully Open	57 & 83
2	1400	200 mmf.	Ext. Ant.	American BC	1400	62-A
3	1400	200 mmf.	Ext. Ant.	American BC	1400	60-A & 64
4	600	200 mmf.	Ext. Ant.	American BC	600	81
5	6500	400 ohms	Ext. Ant.	Police	Fully Open	62-B
6	6000	400 ohms	Ext. Ant.	Police	6000	60-B
*7	18,300	400 ohms	Ext. Ant.	Overseas	Fully Open	62 C
8	18,000	400 ohms	Ext. Ant.	Overseas	18,000	60-C

The American Broadcast Band must be aligned with the loop antenna connected.

*NOTE: When aligning the short-wave oscillator trimmer (62C), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiving dial. To check: tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak; i. e., the oscillator trimmer may be adjusted to the image or one of the harmonics instead of the fundamental frequency. The correct peak is the second one heard as the trimmer adjustment screw is opened from the completely closed position.



MODEL 106CP

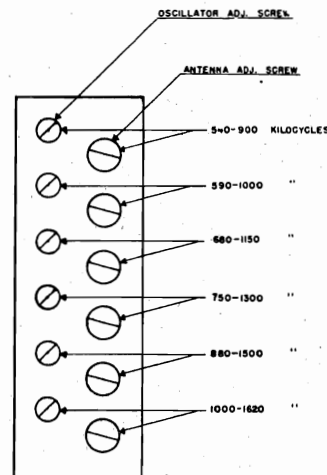
THE CROSLEY CORP.

Each of the six push buttons, for automatic tuning, has two adjusting screws by which it may be set to any nearby American broadcast station whose frequency in kilocycles is within the kilocycle range covered by that button. To gain access to these screws, carefully pry off the push button cover.

To set the top push button to a desired position, proceed as follows:

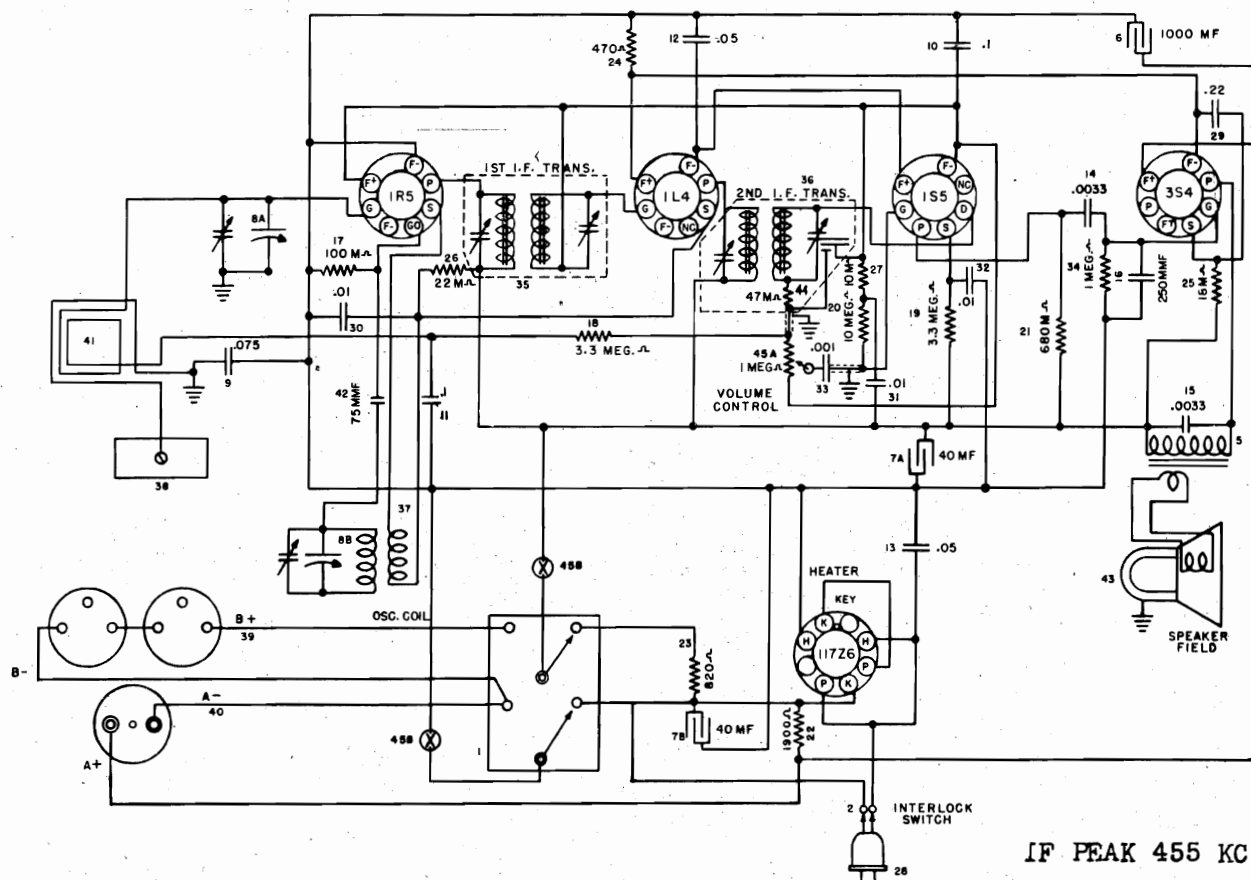
1. Turn the ANTENNA ADJ. SCREW clockwise until moderately tight, then turn the OSCILLATOR ADJ. SCREW counter-clockwise until the threaded portion extends approximately $\frac{3}{4}$ inch. Use a small screw-driver and do not exert pressure.
2. Turn the band selector switch to the "AMERICAN" position and manually tune in the station to which the push button is to be set. The frequency of the station selected must be between 540 and 900 kilocycles. Carefully adjust the tuning control to the point of clearest reception.
3. Turn the band selector switch to the "AUTOMATIC" position and slowly turn the OSCILLATOR ADJ. SCREW clockwise until the same station is heard. Adjust the screw for the maximum volume.
4. Adjust the ANTENNA ADJ. SCREW for the maximum volume.
5. Turn the band selector switch from "AUTOMATIC" to "AMERICAN" and back again to check if the adjustment has been correctly made. There should be no change in tone quality when switched from one to the other.
6. Place the tab with the call letters of the station, to which the push button has been set, in a celluloid "V" and slide it into the button from the side.
7. The remaining push buttons may be set in a similar manner.

No adjustment of master tone control push buttons is required.



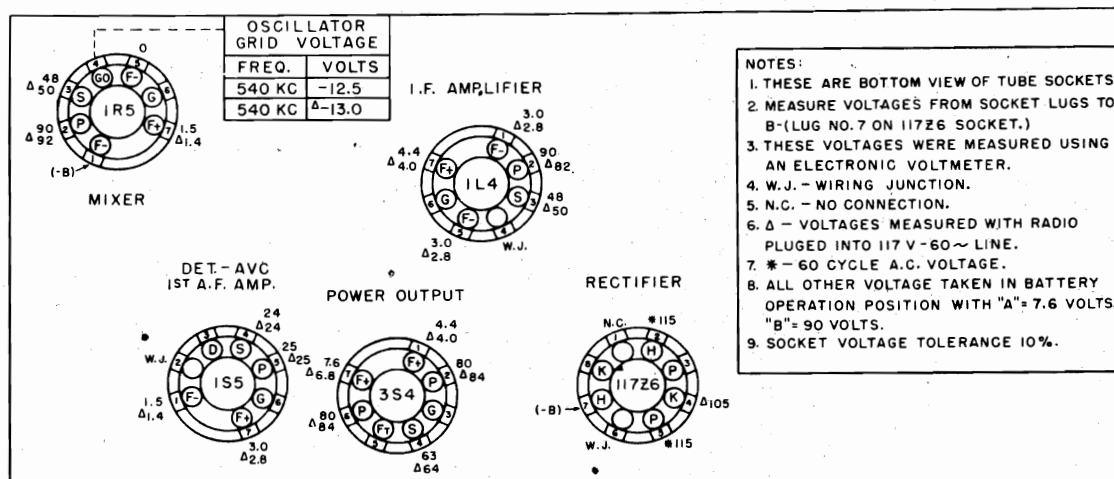
Item No.	Part No.	DESCRIPTION	Item No.	Part No.	DESCRIPTION
1	39281-33	Resistor, 2.2 megohm, $\frac{1}{2}$ w.	63A	B-135036	Condenser (Variable) } Three
2	39281-33	Resistor, 2.2 megohm, $\frac{1}{2}$ w.	63B		Condenser (Variable) } Section
3	39281-31	Resistor, 1.0 megohm, $\frac{1}{2}$ w.	63C		Condenser (Variable) } Assembly
4	39281-31	Resistor, 1.0 megohm, $\frac{1}{2}$ w.	64	Part of Item 63A	Condenser (Trimmer)
5	39281-23	Resistor, 47,000 ohm, $\frac{1}{2}$ w.	65	W-47133	Socket (Station Selector Unit)
6	39281-23	Resistor, 47,000 ohm, $\frac{1}{2}$ w.	66	B-135049	Switch (Radio-Phono.)
7	39281-29	Resistor, 470,000 ohm, $\frac{1}{2}$ w.	67A	B-132299-3	Control, Volume (1 megohm) }
8	39281-37	Resistor, 10 megohm $\frac{1}{2}$ w.	67B		Switch, Power } Assembly
9	39281-28	Resistor, 330,000 ohm, $\frac{1}{2}$ w.	68	D-134946-1	Record Changer
10	39281-28	Resistor, 330,000 ohm, $\frac{1}{2}$ w.	69	C-132300-1	Cable and Plug (power)
11	39281-28	Resistor, 330,000 ohm, $\frac{1}{2}$ w.	70	W-43567	Bulb (Dial) Type 51, 7.5 v., .25 amp.
12	39281-16	Resistor, 3,300 ohm, $\frac{1}{2}$ w.	71	W-43567	Bulb (Dial) Type 51, 7.5 v., .25 amp.
13	39281-22	Resistor, 33,000 ohm, $\frac{1}{2}$ w.	72	GC-131880-7	Speaker
14	39281-15	Resistor, 2,200 ohm, $\frac{1}{2}$ w.	73	W-134968-1	Socket (Speaker)
15	39281-24	Resistor, 68,000 ohm, $\frac{1}{2}$ w.	74A	W-134999	Condenser, 20 mfd., 400 w.v. } Three
16	39281-11	Resistor, 470 ohm, $\frac{1}{2}$ w.	74B		Condenser, 20 mfd., 300 w.v. } Section Elect
17	39281-7	Resistor, 100 ohm, $\frac{1}{2}$ w.	74C		Condenser, 20 mfd., 25 w.v. } Filter
18	39244-19	Resistor, 330 ohm, 2 w.	75	B-135018	Transformer (power)
19	39016-33	Resistor, 4,700 ohm, 2 w.	76	W-135174	Cable and Plug (Phono.)
20	W-132458	Resistor, 4,000 ohm, 3 w.	77	39019-2	Terminal Board (Phono.)
21	B-226638-53	Condenser, 50 mmf., 500 v., Ceramic	78	39019-3	Terminal Board (Antenna)
22	B-226638-54	Condenser, 75 mmf., 500 v., Ceramic	80	AW-135028	Coil (Antenna Loading)
23	39001-73	Condenser, 250 mmf., 500 v., Paper	81	W-49652-3	Condenser (Padder)
24	39004-7	Condenser, 100 mmf., 500 v., Mica	82	W-132303	Socket (Tone Control Unit)
25	G-131502-20	Condenser, 680 mmf., 400 v., Silver, Mica	83	AW-135024	Transformer (1st I.F.)
26	GC-210685-171	Condenser, .0082 mfd., 300 v., Mica	84	Part of AW-132427	Condenser (Trimmer)
27	39001-41	Condenser, .05 mfd., 400 v., Paper	85	Part of AW-132427	Condenser (Trimmer)
28	GC-210685-168	Condenser, .0033 mfd., 500 v., Mica	86	Part of AW-132427	Condenser (Trimmer)
29	39001-65	Condenser, .05 mfd., 200 v., Paper	87	Part of AW-132427	Condenser (Trimmer)
30	39001-39	Condenser, .022 mfd., 400 v., Paper	88	Part of AW-132427	Condenser (Trimmer)
31	W-30805	Condenser, .01 mfd., 400 v., Paper	89	Part of AW-132427	Condenser (Trimmer)
33	39001-73	Condenser, 250 mmf., 500 v., Paper	90	AC-135157	Antenna Loop Assembly
34	39001-12	Condenser, .0075 mfd., 600 v., Paper	93	39281-31	Resistor, 1.0 megohm, $\frac{1}{2}$ w.
35	39001-39	Condenser, .022 mfd., 400 v., Paper	94	39281-27	Resistor, 220,000 ohm, $\frac{1}{2}$ w.
36	39001-39	Condenser, .022 mfd., 400 v., Paper	95	39001-11	Condenser, .005 mfd., 600 v., Paper
37	39001-39	Condenser, .022 mfd., 400 v., Paper	**96	G-39012-7	Iron Core (P.B. Osc. Coils)
38	39001-13	Condenser, .01 mfd., 600 v., Paper	**97	G-39012-7	Iron Core (P.B. Osc. Coils)
39	39001-10	Condenser, .0033 mfd., 600 v., Paper	**98	G-39012-7	Iron Core (P.B. Osc. Coils)
40	39001-10	Condenser, .0033 mfd., 600 v., Paper	**99	G-39012-7	Iron Core (P.B. Osc. Coils)
**42	39281-27	Resistor, 220,000 ohm, $\frac{1}{2}$ w.	**100	G-39012-7	Iron Core (P.B. Osc. Coils)
**43	39001-10	Condenser, .0033 mfd., 600 v., Paper	**101	G-39012-7	Iron Core (P.B. Osc. Coils)
**44	39001-10	Condenser, .0033 mfd., 600 v., Paper	**	W-132366-2	Locking Nut (P.B. Iron Cores)
**45	39001-10	Condenser, .0033 mfd., 600 v., Paper		G-39204	Socket (Tube)
**46	39001-11	Condenser, .005 mfd., 600 v., Paper		AW-135042	Face (Dial Assembly)
**47	AG-132437-5	Cable & Plug Assembly (Tone Control Unit)		W-51752	Spring (Drive Cord)
*	AW-135072	Switch & Bracket Assembly (P.B. Tone Control)		AW-134979	Flywheel Adapter Assembly
**48	AW-134088	Tone Control Push Button Unit		AB-135052	Toggle Arm & Link Assembly (Phono. Switch)
**	AW-132427	Switch, Bracket & Trimmer As'y (P.B. Sta. Selector)		AW-135053	Toggle Arm & Link Assembly (Band Switch)
49	AW-134087	Station Selector Push Button Unit		W-49829	Spring (Lock)
**50	AW-134091	Oscillator Coil (1000 to 1620 kc.) P.B. No. 6		B-134572	Pointer (Dial)
**51	AW-134090	Oscillator Coil (880 to 1500 kc.) P.B. No. 5		W-134064	Clip (Dial Pointer)
**52	AW-134231	Oscillator Coil (750 to 1300 kc.) P.B. No. 4		W-134977	Shaft (Drive)
**53	AW-134230	Oscillator Coil (680 to 1150 kc.) P.B. No. 3		39017-3	Socket Assembly (Dial Light)
**54	AW-134089	Oscillator Coil (590 to 1000 kc.) P.B. No. 2		W-134055	Grommet
**55	AW-134092	Oscillator Coil (540 to 900 kc.) P.B. No. 1		R-135022	Cabinet
**56	AG-132437-2	Cable & Plug Assembly (Station Selector, P.B. Unit)		AD-134762	Dial Glass and Escutcheon
57	AW-134066	Transformer (2nd I.F.)		C-134929	Plate (R.H. Push Button)
58A	B-134054	Switch (Band Change) } Three		C-134745	Plate (L.H. Push Button)
58B		Switch (Band Change) } Section		B-134763	Button, Tone (2 Bass)
58C		Switch (Band Change) } Assembly		B-134764	Button, Tone (1 Bass)
59A	AW-135031	Coil, R.F. (B.C.) } Three		B-134765	Button, Tone (3 Bass)
59B		Coil, Ant. (Police) } Section		B-134766	Button, Tone (3 Treble)
59C		Coil, Ant. (S.W.) } Assembly		B-134767	Button, Tone (1 Treble)
60A	B-132386-5	Condenser (Trimmer) } Three		B-134768	Button, Tone (2 Treble)
60B		Condenser (Trimmer) } Section		B-134769	Button (Station)
60C		Condenser (Trimmer) } Assembly		W-134074-3	Knob (Large)
61A	AW-135033	Coil, Oscillator } Three		W-134951	Knob (Small)
61B		Coil, Oscillator } Section		W-45580	Grommet
61C		Coil, Oscillator } Assembly		W-132322	Spring, Chassis Mtg. (Top)
62A	B-132386-5	Condenser (Trimmer) } Three		W-132323	Spring, Chassis Mtg. (Bottom)
62B		Condenser (Trimmer) } Section		AB-134935	Needle, Floating Jewel Assembly
62C		Condenser (Trimmer) } Assembly		W-135129	Screw (No. 10-24x2 $\frac{1}{4}$ Hex. Hd. Pilot Pt. Mach.)
				W-132434-3	Call Letter Sheet
				W-134140-1	Call Letter Cover

THE CROSLEY CORP.



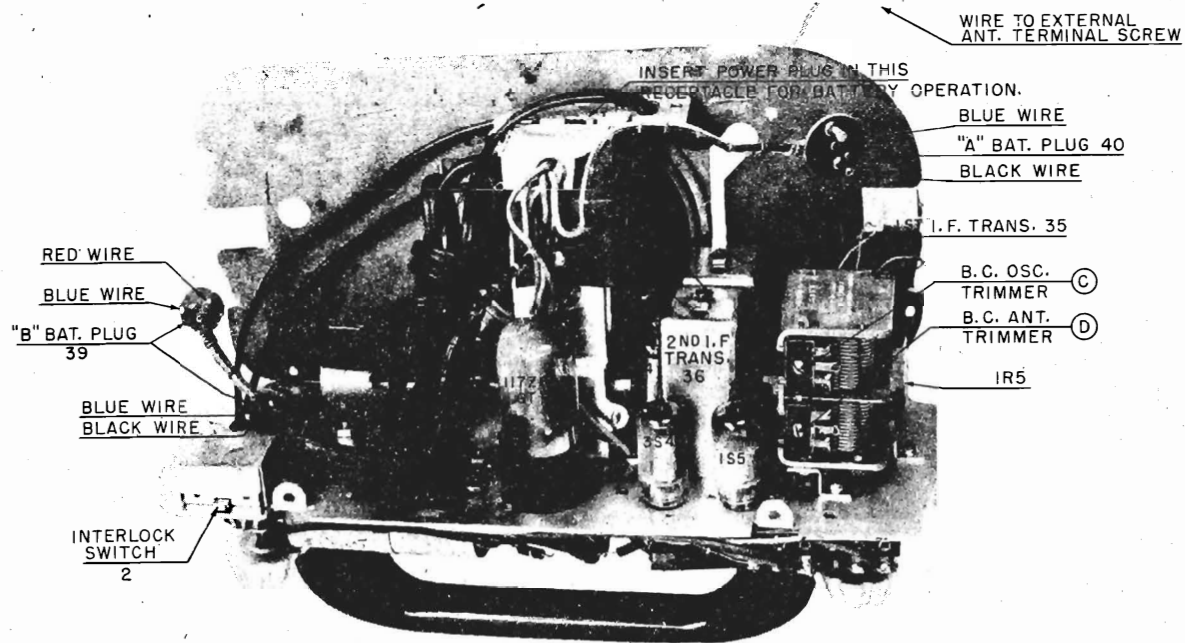
SCHEMATIC DIAGRAM—MODELS 56PA and 56PB

SOCKET VOLTAGE CHART



October, 1946

THE CROSLEY CORP.



CHASSIS VIEW—MODELS 56PA and 56PB

ALIGNMENT PROCEDURE

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. Connect the high side of the signal generator to the external antenna wire of the loop, that connects to the terminal screw on the bottom of the cabinet, as indicated in the alignment chart. Connect signal generator ground through a 0.1 mt. condenser to B— (No. 1 pin on 1R5 tube).
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

Alignment Sequence	Signal Generator Output			Position of Tuning Dial KC	Adjust for Maximum Outout
	Frequency in KC	In Series with	To		
1	455	200 mmf.	Ant.	1620	A & B
2	1620	200 mmf.	Ant.	1620	C
3	1400	200 mmf.	Ant.	1400	*D

***NOTE:** Batteries should be placed against battery stop in front half of cabinet when making loop alignment to avoid error due to capacity effect of batteries. If receiver is to be used on AC or DC only (without batteries) it will be necessary to realign loop adjustment "D" for maximum output, after batteries have been removed.

THE CROSLEY CORP.

TYPE: Five-tube, combination, battery Portable and AC-DC Superheterodyne.

FREQUENCY RANGE: 540 to 1600 kilocycles.

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: AC-DC or BATTERY.

VOLTAGE RATING: AC-DC, 110 to 120 volts. Battery "A" 7½ volts "B" 90 volts.

POWER OUTPUT: 180 M.W. maximum.

POWER CONSUMPTION: 25 watts.

BATTERIES USED: one Crosley CR 90, 7.5 volt "A" Battery. Two Crosley CR 77, 45 volt "B" Batteries.

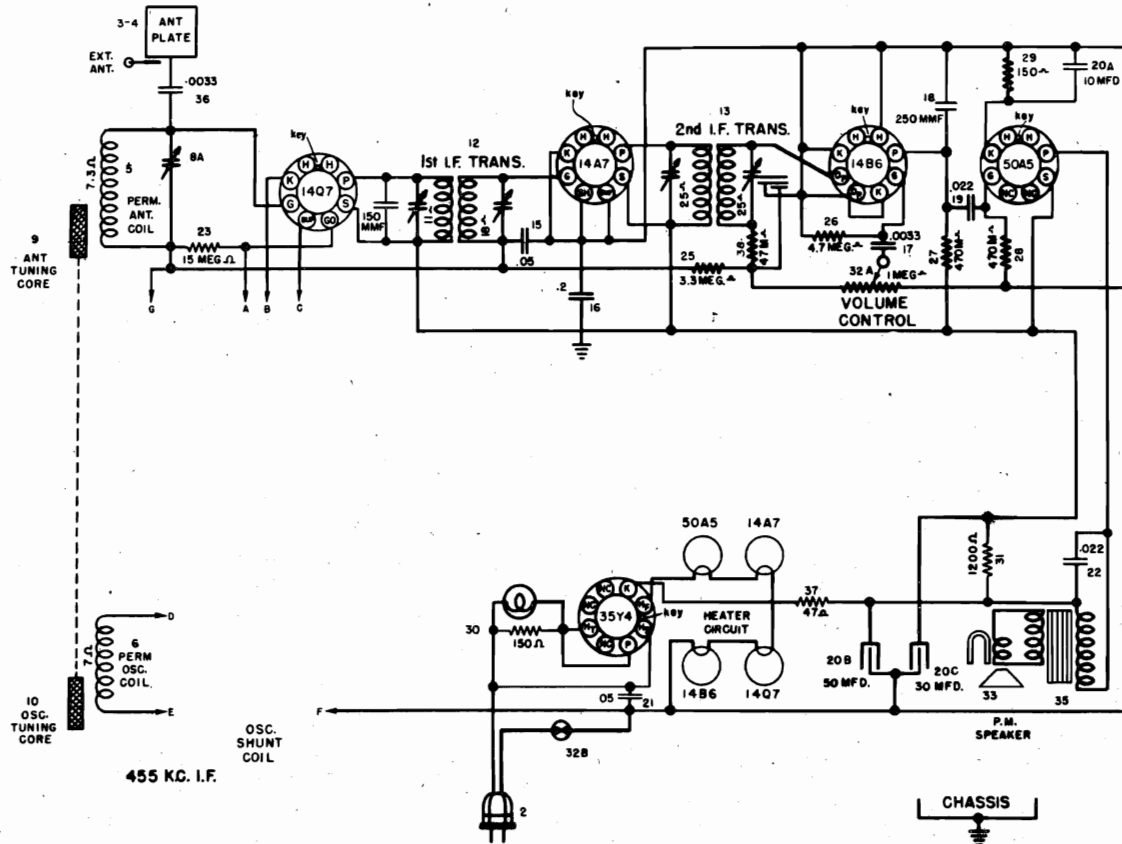
PARTS LIST—MODELS 56PA, 56PB

Item No.	Part No.	Description	Item No.	Part No.	Description
1	W-135359	Switch (A.C., D.C. or Battery)	38	39017-7	Terminal Board
2	W-135355	Switch (Interlock)	39	W-47353	Plug ("B" Cable)
5	B-135878	Transformer (Output.)	40	W-136099	Plug ("A" Cable)
6	B-135459	Condenser, 1000 mfd., 10 w. v., Elect.	41	AC-136082	Antenna loop and Back Assembly
7A	B-135555	Condenser, 40 mfd., 100 w.v., Two Section	42	B-226638-54	Condenser 75 mmf., 500 v., ceramic
7B		Condenser, 40 mfd., 150 w.v., Elect. Filter	43	AD-136156	Speaker (Less Transformer)
8A	AB-136366	Condenser, Variable/Two	44	Part of Item 36	Resistor 47,000 ohm, ½ w.
8B		Condenser, Variable/Section	45A	B-135353	Control, Volume (1 megohm) } Assembly
9	39001-17	Condenser, .05 mfd., 600 v., paper.	45B		Switch (Power)
10	39001-19	Condenser, .1 mfd., 600 v., paper	39368-14		Control (Volume)
11	39001-19	Condenser, .1 mfd., 600 v., paper	39369-2		Switch (Power)
12	39001-17	Condenser, .05 mfd., 600 v., paper	39232		Socket (Tube) 117Z6
13	39001-17	Condenser, .05 mfd., 600 v., paper	W-131346		Socket (Tube)
14	39001-17	Condenser, .003 mfd., 600 v., paper	AB-135453		Background Assembly (Dial)
15	39001-76	Condenser, .003 mfd., 600 v., paper	W-51535		Pulley, Idler (Dial Cord)
16	39001-73	Condenser, 250 mmf., 600 v., paper	B-135307		Pointer (Dial)
17	39294-25	Resistor, 100,000 ohm, ½ w.	W-51752		Spring (Dial Cord)
18	39294-34	Resistor, 3.3 megohm, ½ w.	W-136630		Trimount Stud
19	39294-34	Resistor, 3.3 megohm, ½ w.	W-48200		Trimount Stud
20	39294-37	Resistor, 10 megohm, ½ w.	B-134926		Cover (Switch)
21	39294-30	Resistor, 680,000 ohm, ½ w.	W-135349		Insulator (Switch Cover)
22	W-132502	Resistor, 1900 ohm, 5w. (Candohm)	R-134910		Cabinet Half (Back, 56PA)
23	39014-24	Resistor, 820 ohm, ½ w.	R-134911		Cabinet Half (Front, 56PA)
24	39294-11	Resistor, 470 ohm, ½ w.	R-135305		Cabinet Half (Front, 56PB)
25	39014-40	Resistor, 18,000 ohm, ½ w.	R-135306		Cabinet Half (Back, 56PB)
26	39294-21	Resistor, 22,000 ohm, ½ w.	C-135318		Handle (56PA)
27	39294-19	Resistor, 10,000 ohm, ½ w.	C-135595		Handle (56PB)
28	C-132300-3	Cable and Plug (Power)	W-135571		Insert (Handle)
29	39001-87	Condenser, .25 mfd., 600 v., paper	W-135342		Screw, Special (56PB Cabinet)
30	39001-13	Condenser, .01 mfd., 600 v., paper	W-136093		Dial Glass (56PA)
31	39001-13	Condenser, .01 mfd., 600 v., paper	B-135376		Dial Glass (56PB)
32	39001-13	Condenser, .01 mfd., 600 v., paper	B-137229		Knob (56PA)
33	39001-7	Condenser, .001 mfd., 600 v., paper	W-135345		Knob (56PB)
34	39294-31	Resistor, 1.0 megohm, ½ w.	W-135590		"A" Battery
35	AW-135774	Transformer (1st. I.F.)	1-CR 90		"B" Battery
36	AW-135769	Transformer (2nd. I.F.)	2-CR 77		
37	AW-135620	Coil (Oscillator)			

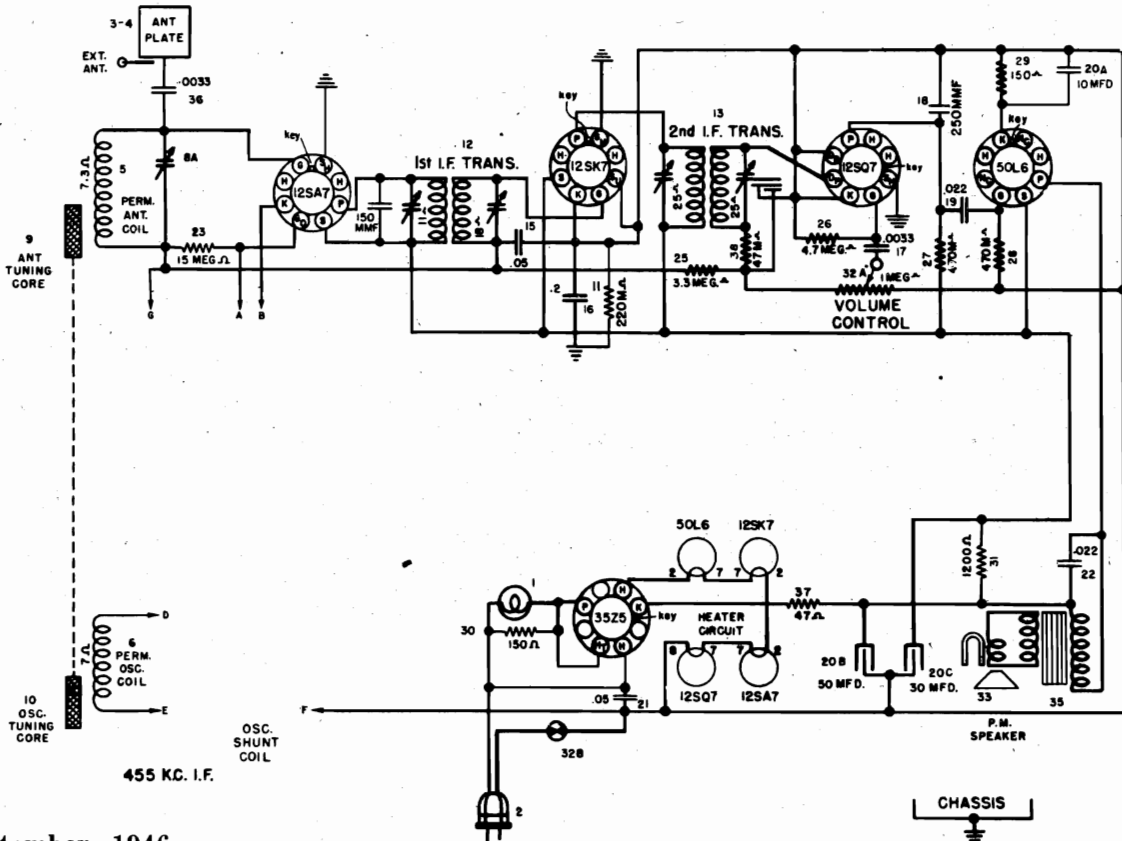
*These parts will replace the original equipment parts.

MODELS 56TG, 56TH, 56TJ
56TG-0, 56TH-0, 56TJ-0

THE CROSLEY CORP.



SCHEMATIC DIAGRAM—MODEL 56TG, 56TH, 56TJ (LOCTAL)



SCHEMATIC DIAGRAM—MODEL 56TG-0, 56TH-0, 56TJ-0 (OCTAL)

September, 1946

The schematic diagram illustrates the internal circuitry of a vacuum tube radio receiver, Model 15. The components and their connections are as follows:

- Antenna and Tuning Core:** The antenna (ANT. PLATE) is connected to the primary of the first intermediate frequency transformer (1st I.F. TRANS.) through a 3-4 ohm resistor and a 0.0033 microfarad capacitor. The antenna is also connected to the 9 ANT. TUNING CORE.
- Oscillator and Tuning Core:** The 10 OSC. TUNING CORE is connected to the 6 PERM. OSC. COIL, which is in series with a 7 ohm resistor. The oscillator is tuned to 455 KC. I.F.
- First Intermediate Frequency Stage:** The 1st I.F. TRANS. is connected to the 12B6 vacuum tube. The secondary of the transformer is connected to the 12B6 tube, which is also connected to the 15 MEG. OHM. resistor and the 15 MEG. OHM. resistor.
- Second Intermediate Frequency Stage:** The 2nd I.F. TRANS. is connected to the 12B6 vacuum tube. The secondary of the transformer is connected to the 12B6 tube, which is also connected to the 15 MEG. OHM. resistor and the 15 MEG. OHM. resistor.
- Detector and Volume Control:** The 12B6 vacuum tube is connected to the 15 MEG. OHM. resistor and the 15 MEG. OHM. resistor. The volume control is connected to the 12B6 tube and the 15 MEG. OHM. resistor.
- Heater Circuit:** The heater circuit is connected to the 12B6 vacuum tube and the 15 MEG. OHM. resistor. The heater circuit is connected to the 12B6 vacuum tube and the 15 MEG. OHM. resistor.
- Speaker:** The speaker is connected to the 12B6 vacuum tube and the 15 MEG. OHM. resistor. The speaker is connected to the 12B6 vacuum tube and the 15 MEG. OHM. resistor.

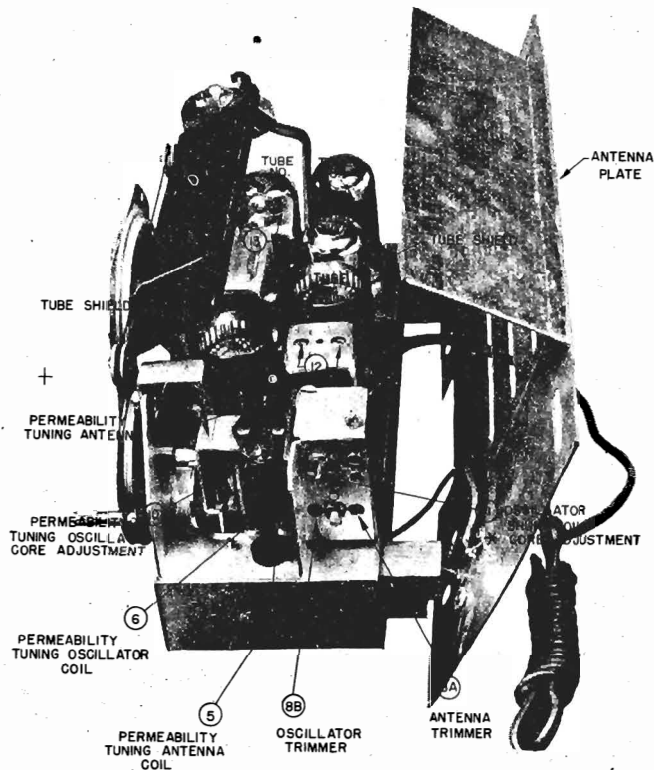
The diagram shows a bridge circuit with four nodes labeled A, B, C, and D. A variable capacitor, represented by a coil with a diagonal arrow through it, is connected between nodes A and B and is labeled with a value of $11 \mu\text{F}$. A resistor with a value of $22 \text{ M}\Omega$ is connected between nodes C and D. A DC voltage source, represented by two parallel lines of unequal length, is connected between nodes B and C and is labeled with a value of 14 . The circuit is powered by a 50 MHz AC source, indicated by a circle with a dot inside, connected to nodes C and D.

Compliments of www.nucow.com

MODELS 56TG, 56TH, 56TJ

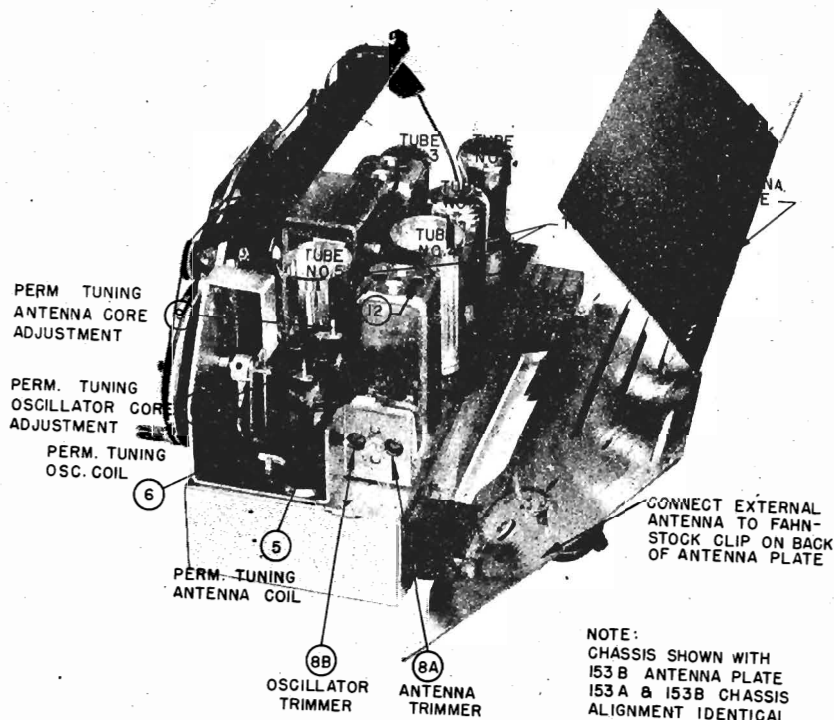
1st, 2nd Production
3rd Production

THE CROSLEY CORP.
CHASSIS SIDE VIEWS



*The second production models do not have an Oscillator Shunt Core. The alignment procedure is identical to the 3rd production procedure.

56TG, 56TH, 56TJ—1st and 2nd Production



56TG, 56TH, 56TJ—3rd Production

The tube numbers 1, 2, 3, 4, 5, which are not circled in the above charts, correspond to the tube numbers in the first column of the TUBE COMPLEMENT COMPARISON CHART shown on page 1.

THE CROSLEY CORP.

MODELS 56TG, 56TH, 56TJ.
56TG-0, 56TH-0, 56TJ-0,
56TG-M, 56TH-M, 56TJ-M

- When using direct current it may be necessary to reverse the position of the power plug in the electric outlet for correct polarity.
- Reversing the position of the power plug when alternating current is used may reduce power hum.
- Under no circumstances should a ground be connected to the receiver.*
- ### ALIGNMENT PROCEDURE
- (1st Production Models)
1. With the tuning knob turned to the extreme right against the stop, set the dial pointer to the last reference line at the 540 kilocycle end of the dial.
 2. Connect the output of a signal generator directly to the receiver antenna clip. Connect the ground of the signal generator through a .01 mfd. condenser to the receiver chassis.
 3. Connect the output meter across the speaker voice coil.
 4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.
 5. Set the signal generator to 455 Kc. Set the receiver dial pointer against the stop at the high frequency (540 Kc.) end of the dial. Adjust the 2nd I.F. trimmers (13) and the 1st I.F. trimmers (12) for maximum output. (See CHASSIS SIDE VIEW at bottom of P.15-34 for adjustment locations.)
 6. Set the dial pointer against the stop at the low frequency (540 Kc.) end of the dial. Pre-set the antenna tuning core (9) and the oscillator tuning core (10) so that the top of each core is approximately 1/16-inch below the upper edge of the coil form.
 7. Set the signal generator to 535 Kc. and with the dial pointer against the stop at the 540 Kc. end of dial, adjust the oscillator trimmer (8B) for maximum output.
 8. Set the signal generator to 1620 Kc. Set the dial pointer against the stop at the high frequency (1600 Kc.) end of the dial. Adjust the oscillator tuning core (10) for maximum output.
- NOTE: Repeat steps 7 and 8 until the correct dial calibration is obtained.
9. Tune both the signal generator and the receiver to 600 Kc. and adjust the antenna trimmer (8A) for maximum output.
 10. Tune both the signal generator and the receiver to 1400 Kc. and adjust the antenna tuning core (9) for maximum output.
- NOTE: Repeat steps 9 and 10 until the antenna trimmer (8A) is properly adjusted for maximum output at 1400 Kc. as it is at 600 Kc.
- When the receiver is to be used without an external antenna, disconnect the signal generator output from the receiver. Tune in a weak signal between 1400 Kc. and 1000 Kc. and adjust the antenna trimmer (8A) for maximum output.

ALIGNMENT PROCEDURE

(2nd and 3rd Production Models)

1. With the tuning knob turned to the extreme right against the stop, set the dial pointer to the last reference line at the 540 Kc. end of the dial.
2. Connect the output of a signal generator directly to the receiver antenna clip. Connect the ground of the signal generator through a .01 mfd. condenser to the receiver chassis.
3. Connect the output meter across the speaker voice coil.

13. Repeat steps 11 and 12 until (8A) is properly adjusted for maximum output at 600 Kc., as it is at 1400 Kc.

6. Open oscillator trimmer (8B) approximately one-half turn from the closed position. Adjust oscillator shunt core (11) to its extreme outer position.

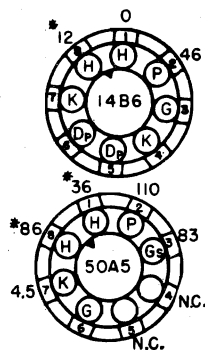
7. Set the dial pointer against the stop at the low frequency (540 Kc.) end of the dial. Tune the signal generator until the signal is heard in speaker of the receiver. The frequency of this signal from the signal generator should be between 500 Kc. and 800 Kc.

NOTE: Check to make sure the circuit is aligned at the correct frequency and not the image frequency which is a weaker signal, 910 Kc. higher as indicated by the receiver dial.

MODELS 56TG, 56TH, 56TJ,
56TG-O, 56TH-O, 56TJ-O,
56TG-M, 56TH-M, 56TJ-M

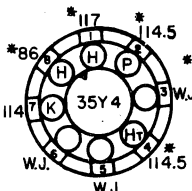
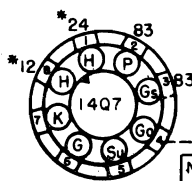
THE CROSLEY CORP. SOCKET VOLTAGE CHARTS

DET.-AVC-1ST A.F. AMPLIFIER

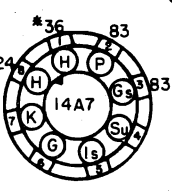


POWER OUTPUT

MIXER



RECTIFIER



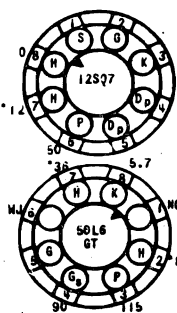
I.F. AMPLIFIER

OSCILLATOR GRID VOLTAGE		
BAND	FREQUENCY	VOLTS
AMERICAN	550 KC	-8.4

- NOTES:
1. THESE ARE BOTTOM VIEWS OF TUBE SOCKETS.
 2. MEASURE VOLTAGES FROM SOCKET LUGS TO -B (PIN 4 ON THE 14A7).
 3. THESE VOLTAGES WERE MEASURED USING AN ELECTRONIC VOLTMEETER.
 4. W.J. - WIRING JUNCTION
 5. N.C. - NO CONNECTION
 6. * - 60 CYCLE A.C. VOLTAGES.
 7. SOCKET VOLTAGE TOLERANCE, 10%.
 8. SOCKET VOLTAGES MEASURED USING 117 VOLTS, 60 CYCLE LINE VOLTAGE.

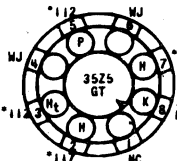
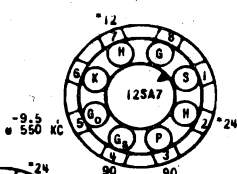
56TG, 56TH, 56TJ (LOCTAL)

DET.-A.V.C.-1ST A.F. AMPLIFIER

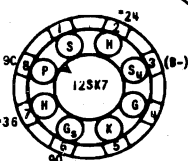


POWER OUTPUT

MIXER



RECTIFIER

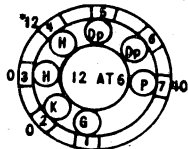


I.F. AMPLIFIER

- NOTES:
1. BOTTOM VIEW OF SOCKETS.
 2. MEASURE VOLTAGE FROM SOCKET LUGS TO B- (PIN 3 ON THE 12SK7).
 3. VOLTAGES MEASURED WITH AN ELECTRONIC VOLTMEETER.
 4. W.J. - WIRING JUNCTION.
 5. N.C. - NO CONNECTION
 6. * - 60 CYCLE A.C. VOLTAGES.
 7. SOCKET VOLTAGES MEASURED USING 117 VOLTS, 60 CYCLE POWER SUPPLY.
 8. SOCKET VOLTAGE TOLERANCE 10%.

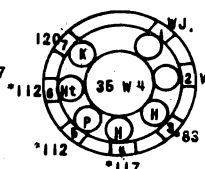
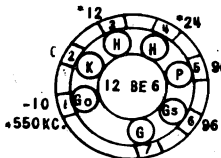
56TG-O, 56TH-O, 56TJ-O (OCTAL)

DET. - AVC-1ST A.F. AMPLIFIER

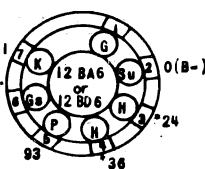


POWER OUTPUT

CONVERTER



RECTIFIER



I.F. AMPLIFIER

- NOTES:
1. These are bottom views of tube sockets.
 2. Measure voltages from socket lugs to -B (Pin 2 on the 12BA6 or 12BD6).
 3. These voltages were measured with an electronic voltmeter.
 4. W.J. - Wiring Junction
 5. N.C. - No Connection.
 6. * - 60 Cycle A.C. Voltage
 7. Socket Voltage Tolerance 10%
 8. Socket Voltages measured at normal line Voltage. (117 Volts- 60 Cycle)

56TG-M, 56TH-M, 56TJ-M (MINIATURE)

NOTE: To check voltages, find the socket in the above charts which corresponds to the socket in the radio.

THE CROSLEY CORP.

MODELS 56TG, 56TH, 56TJ,
56TG-O, 56TH-O, 56TJ-O,
56TG-M, 56TH-M, 56TJ-M

FREQUENCY RANGE: 540 to 1600 Kc.
INTERMEDIATE FREQUENCY: 455 Kc.
POWER SUPPLY: a.c.-d.c.

VOLTAGE RATING: 105-125 volts.
POWER CONSUMPTION: 35 watts nominal.
POWER OUTPUT: 1.75 watts minimum.

PARTS LIST

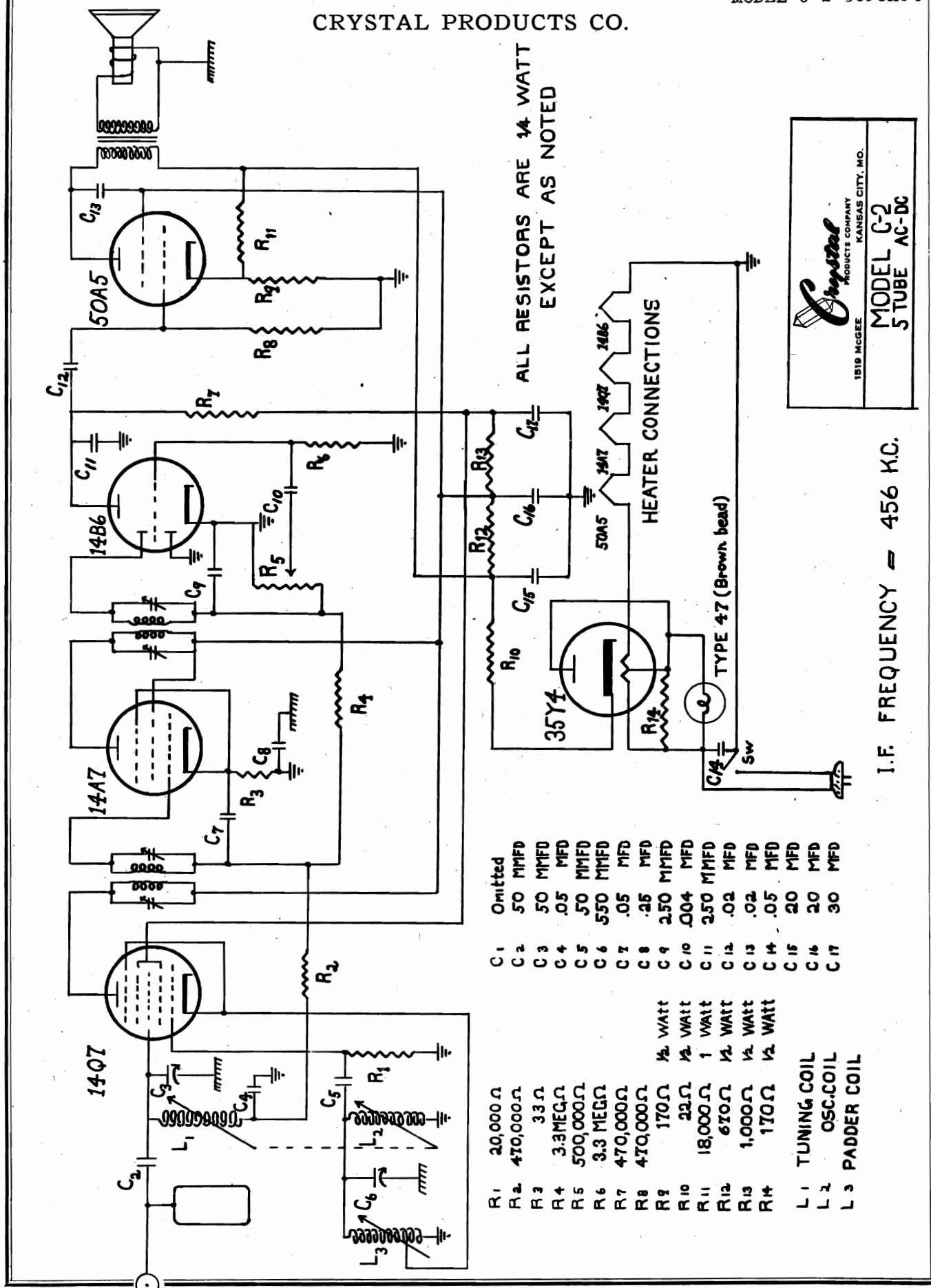
MODEL 56TG, 56TG-O, 56TG-O1234, 56TG-M, 56TG(M12), 56TG-O(M12), 56TG(M12)034
MODEL 56TH, 56TH-O, 56TH-O1234, 56TH-M, 56TH(M12), 56TH-O(M12), 56TH(M12)034
MODEL 56TJ, 56TJ-O, 56TJ-O1234, 56TJ-M, 56TJ(M12), 56TJ-O(M12), 56TJ(M12)034

Figures in first column correspond to figures in Schematic Diagram

ITEM No.	PART No.	DESCRIPTION	ITEM No.	PART No.	
1	W-48858	Bulb (dial), Type 47, 6.3 v., 15 amp.	37	*W-137367	Resistor, 47 ohm, 1 w. (2nd and 3rd Production)
2	C-132300-1	Cord and Plug (Power)	38	Part of Item #13	Resistor, 47,000 ohm, ½ w.
3	AW-136476	Ant. Plate (56TJ Series)	39	39294-8	Resistor, 150 ohm, ½ w. (56TG-M, 56TH-M, 56TJ-M)
4	AW-136574	Ant. Plate (56TG, 56TH Series)		W-135371	Socket, Octal Tube
5	AW-136438	Coil, Ant. Tuning		W-131346	Socket, Miniature Tube
6	AW-136657	Coil, Osc. Tuning		39204	Socket, Octal Tube
7	*AW-136658	Coil, Osc. Shunt (Part of AD- 136695, 1st Production)		39017-5	Socket, Dial Light
7	*AW-137532	Coil, Osc. Shunt (Part of AD- 136695-H, 2nd Production)		W-46447-1	Shield, Tube
7	*AW137720	Coil, Osc. Shunt (3rd Production)		*AD-136695	Permeability Tuner, Complete Assy. (1st Production)
8A	W-136699	Trimmer, Ant.		*AD-136695-H	Permeability Tuner, Complete Assy. (2nd Production)
8B		Trimmer, Osc.		*AW-137722	Permeability Tuner, Complete Assy. (3rd Production)
9	G-39012-49	Iron Core, Ant. Tuning		AW-137689	Slide Assy. Permeability Tuner
10	G-39012-49	Iron Core, Osc. Tuning		AW-137688	Hub and Cam Assy., Permeability Tuner
11	*G39012-48	Iron Core, Osc. Shunt (Part of AD-136695, 1st Production)		W-136520	Spring, Retractor (Permeability Tuner)
11	39294-27	Resistor, 220,000 ohm, ½ w. (56TG-O, 56TH-O, 56TJ-O)		W-136533	Grommet, Ant. Coil Mtg. (Permeability Tuner)
12	AW-137658	Transformer, 1st I.F.		W-45580	Grommet, Osc. Coil Mtg. (Permeability Tuner)
13	AW-137667	Transformer, 2nd I.F.		*W-132366-2	Nut, Iron Core Locking (Part of AD-136695, 1st Production)
14	*B-226638-53	Condenser, 50 mmf. (1st and 2nd Production)		W-51993	Fastener, Iron Core
15	39001-65	Condenser, .05 mfd., 200 v., paper		W-52063	Spring, Iron Core
16	39001-105	Condenser, .2 mfd., 200 v., paper		AB-135135	Plate Assy., Dial
17	39001-10	Condenser, 3300 mmf., 200 v., paper		W-135074	Pulley, Idler
18	39001-73	Condenser, 250 mmf., 600 v., paper		B-135094	Pointer, Dial
19	39001-63	Condenser, .022 mfd., 200 v., paper		B-135075	Shaft, Drive
20A	B-136769	Condenser, 10 mfd., 25 v. } Three		W-134916	Washer, Spring
20B		Condenser, 50 mfd., 150 v. } Section		W-51071	Ring Retaining
20C		Condenser, 30 mfd., 150 v. } Filter		W-136630	Trimount Stud
21	39001-65	Condenser, .05 mfd., 200 v., paper		W-131154-1	Cotter, External
22	39001-63	Condenser, .022 mfd., 200 v., paper		D-137263	Cabinet (56TJ Series)
23	39294-38	Resistor, 15 megohm, ½ w.		R-135404	Cabinet (56TG Series)
24	39294-21	Resistor, 22,000 ohm, ½ w.		AB-135446	Cabinet and Handle Assy. (56TH Series)
25	39294-34	Resistor, 3.3 megohm, ½ w.		B-135403	Handle (Part of AB-135446)
26	39294-35	Resistor, 4.7 megohm, ½ w.		AW-135444	Cabinet (Part of AB-135446)
27	39294-29	Resistor, 470,000 ohm, ½ w.		B-136633	Dial Glass
28	39294-29	Resistor, 470,000 ohm, ½ w.		W-135455	Knob (56TG, 56TJ Series)
29	39294-8	Resistor, 150 ohm, ½ w.		W-135454	Knob (56TH Series)
30	39294-8	Resistor, 150 ohm, ½ w.		W-132124	Trimount Stud (56TH, 56TG Series)
31	39015-26	Resistor, 1200 ohm, 1 w.			
32A	C-135127	Control, Volume (1 megohm) } Assembly			
32B		Switch (Power)			
33	B-136768	Speaker			
35	B-135077	Transformer (Output)			
36	*39001-10	Condenser, 3300 mmf., 200 v., paper (2nd and 3rd Production)			

*1st Production models are identified by the adjustable Iron Core in the Oscillator Shunt Coil which is mounted on rear of the Tuner. 2nd Production models do not have the adjustable Iron Core in the Oscillator Shunt Coil which is mounted on the rear of the Tuner. 3rd Production models do not have the adjustable Iron Core in the Oscillator Shunt Coil which is mounted under the chassis.

ALL RESISTORS ARE 1/4 WATT
EXCEPT AS NOTED



I.F. FREQUENCY = 456 K.C.

Crystal
PRODUCTS COMPANY
1818 MCGEE
KANSAS CITY, MO.

MODEL C-2
5 TUBE AC-DC

CRYSTAL PRODUCTS CO.

CORONET MODEL C-2 PARTS

C-1—Omitted
 C-2—50 mmfd. mica capacitor
 C-3—50 mmf. nominal trimmer, range 55-75
 C-4—.05 mfd., 400v paper capacitor
 C-5—50 mmfd. mica capacitor
 C-6—Nominal 550 mmf. range 450-700 trimmer
 C-7—.05 mfd., 400v paper capacitor
 C-8—.25 mfd., 200v paper capacitor
 C-9—250 mmfd. mica capacitor
 C-10—.004 mfd., 200v paper capacitor

C-11—250 mmfd. mica capacitor
 C-12—.02 mfd., 600v paper capacitor
 C-13—.02 mfd., 600v paper capacitor
 C-14—.05 mfd., 400v paper capacitor
 C-15, C-16, C-17—20-20-30 mfd., 150v electrolytic condenser
 R-1—20,000 ohm, $\frac{1}{4}$ w resistor
 R-2—470,000 ohm, $\frac{1}{4}$ w resistor
 R-3—33 ohm, $\frac{1}{4}$ w resistor
 R-4—3.3 meg., $\frac{1}{4}$ w resistor
 R-5—500,000 ohm standard taper potentiometer

R-6—3.3 meg., $\frac{1}{4}$ w resistor
 R-7—470,000 ohm, $\frac{1}{4}$ w resistor
 R-8—470,000 ohm, $\frac{1}{4}$ w resistor
 R-9—170 ohm, $\frac{1}{2}$ w resistor
 R-10—22 ohm, $\frac{1}{2}$ w resistor
 R-11—18,000 ohm, $\frac{1}{2}$ w resistor
 R-12—670 ohm, $\frac{1}{2}$ w resistor
 R-13—1,000 ohm, $\frac{1}{2}$ w resistor
 R-14—170 ohm, $\frac{1}{2}$ w resistor
 L-1—Antenna Tuning
 L-2—Oscillator Tuning
 L-3—Oscillator Padder

Line Cord 560 ohm for 220-volt operation.

TECHNICAL DATA

Tuning range.....	540 to 1700 Kc.
Intermediate frequency.....	456 Kc.
Power consumption.....	35 watts
Sensitivity (for 0.05 watt output).....	15 microvolts average
Power output (in voice coil)	
Undistorted	0.8 watts
Maximum	1.0 watts
Voice coil impedance.....	3.2 ohms

ALIGNMENT PROCEDURE

No aligning adjustments should be attempted until all other possible causes of trouble have been checked.

Turn volume control to maximum for all adjustments.

Keep signal generator output low as possible.

Connect ground post of signal generator to chassis of radio through an 0.1 mfd. condenser.

Connect signal generator output leads to antenna leads.

Connect output meter across secondary of output transformers.

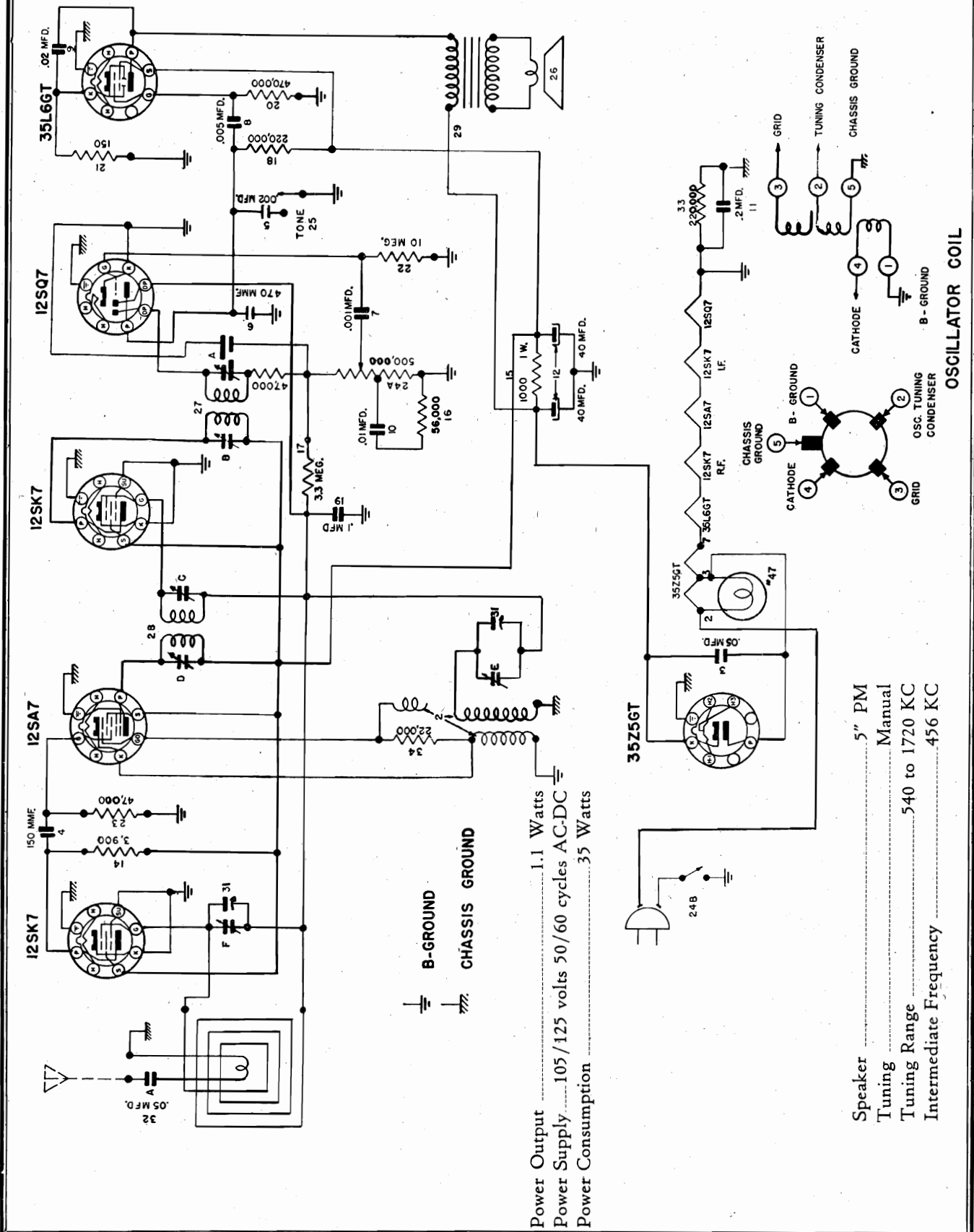
Band	Signal Generator Frequency Setting	Dummy Antenna	Connection to Radio	Tuning Condenser Setting	Adjust for Maximum Output
I.F.	456 Kc.	0.1 mfd.	Grid of 14Q7	Slugs out of coil 1700 Kc.	4 trimmers on input and output transformers
Broadcast	1700 Kc.	Antenna lead		Slugs out of coil 1700 Kc.	Osc. slugs, L2, L1, and C6
Broadcast	600 Kc.	Antenna lead		Slugs in coil 600 Kc.	L3
Broadcast	1400 Kc.	Antenna lead		Set dial at 1400 Kc.	C3

FINAL ADJUSTMENT

With the top off the radio, place the band around the set and connect antenna lead to the band and adjust C-3 for greatest noise level at 800 Kc.

DELCO RADIO DIV.-GENERAL MOTORS

MODELS R-1234,
R-1235



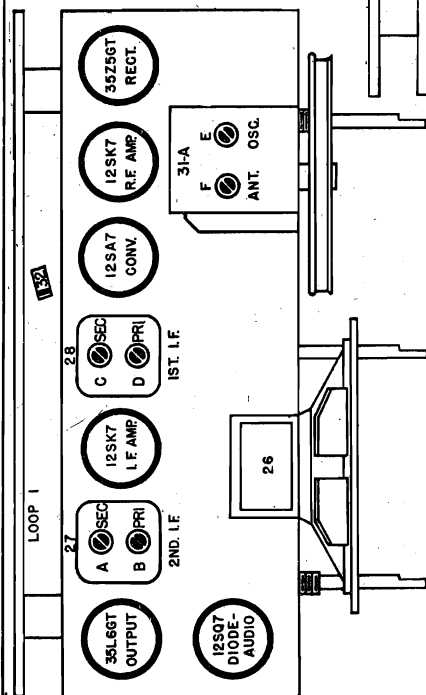
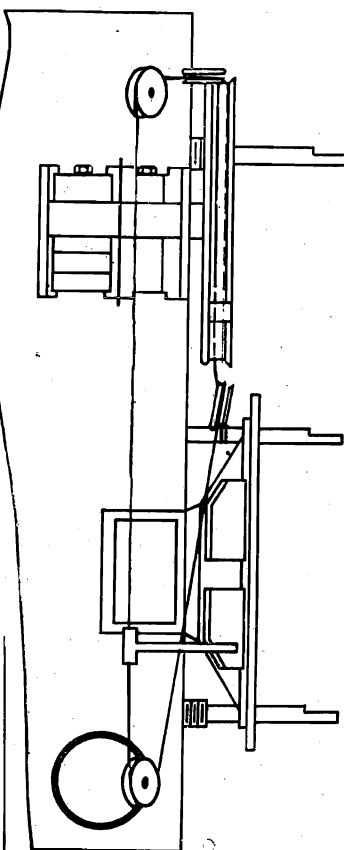
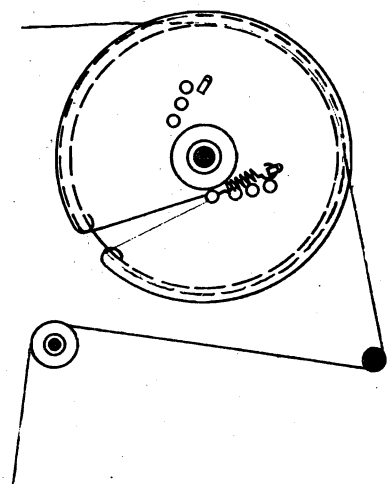
MODELS R-1234, R-1235

DELCO RADIO DIV.-GENERAL MOTORS

Output Meter Connections Plate and Screen of 35L6
 Generator Ground To Chassis through .01 MFD
 Dummy Antenna In Series with generator
 Volume Control Position Fully on

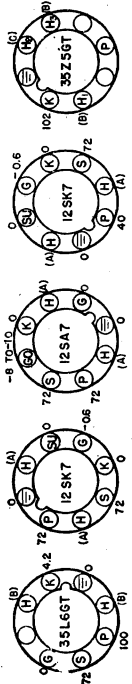
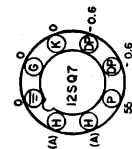
Steps	Series Condenser or Dummy Antenna	Connect Signal Generator To	Adjust Signal Generator To	Turn Radio Dial To	Adjust Trimmers
1	.02 Mfd. Cond.	12SA7 Grid (Pin #8)	456 KC	Quiet Point near H. F. end	A-B (2nd IF Trans) C-D (1st IF Trans)
2	200 Mmf Cond.	Ant. lead	1720 KC	1720 KC	E (Osc.)
3	200 Mmf Cond.	Ant. lead	1400 KC	1400 KC	F (Ant.)

DIAL STRING DRAWING

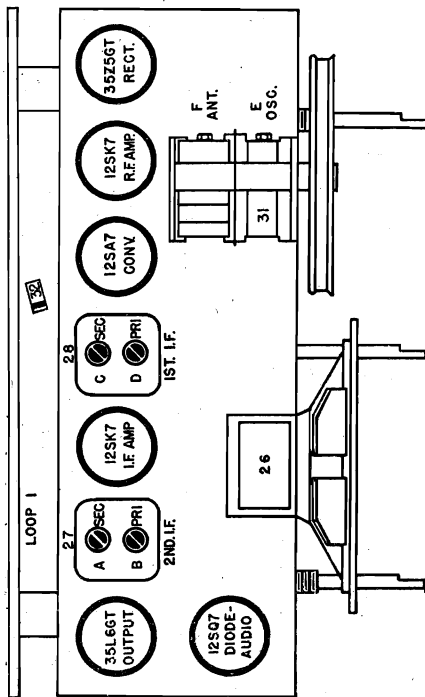


PARTS LAYOUT — TUBE VIEW
 TRIMMERS ON TOP OF TUNING CONDENSER

DC VOLTAGES MEASURED WITH ELECTRONIC VOLTMETER BETWEEN
 SOCKET TERMINALS AND B+.
 (A) 250 VOLTS BETWEEN PINS 1 & H
 (B) 35 VOLTS BETWEEN PINS 1 & H
 (C) 6 VOLTS BETWEEN PINS 2 & 3
 AC LINE VOLTAGE 117 VOLTS



TUBE SOCKET VOLTAGE CHART

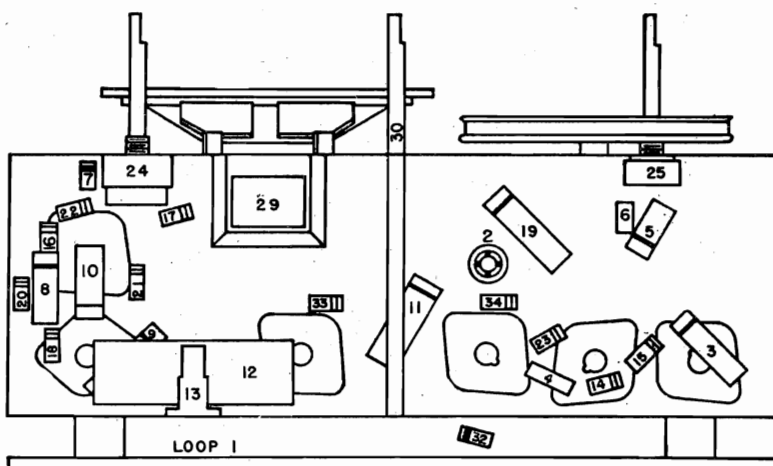


PARTS LAYOUT — TUBE VIEW
 TRIMMERS ON SIDE OF TUNING CONDENSER

DELCO RADIO DIV.-GENERAL MOTORS

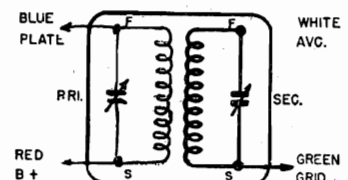
MODELS R-1234,
R-1235

Illus. No.	Service Part No.	Name	Description
1	1216621	Antenna Assembly	Loop and Back Cover
2	1216915	Coil	Oscillator Coil Complete
3	7230592	Condenser	.05 Mfd. 600 V. Tubular
4	7230893	Condenser	150 MMF Moulded
5	1209148	Condenser	.002 Mfd. 800 V. Tubular
6	7238879	Condenser	470 MMF Moulded
7	1212097	Condenser	.001 Mfd. 800 V. Tubular
8	7230912	Condenser	.005 Mfd. 600 V. Tubular
9	1212099	Condenser	.02 Mfd. 600 V. Tubular
10	1208600	Condenser	.01 Mfd. 600 V. Tubular
11	7231594	Condenser	.25 Mfd. 400 V. Tubular
12	1217026	Condenser	40-40 Mfd. 150 V. Electrolytic
13	1216559	Clip	Condenser Clip
14	1214546	Resistor	3,900 Ohms 1/2 Watt Insulated
15	1211037	Resistor	1,000 Ohms 1 Watt Insulated
16	1213267	Resistor	56,000 Ohms 1/2 Watt Insulated
17	1214564	Resistor	3.3 Meg. 1/2 Watt Insulated
18	1214555	Resistor	220,000 Ohms 1/2 Watt Insulated
19	1207908	Condenser	.10 Mfd. 400 V. Tubular
20	1214559	Resistor	470,000 Ohms 1/2 Watt Insulated
21	1213220	Resistor	150 Ohms 1/2 Watt Insulated
22	1215548	Resistor	10 Meg. 1/2 Watt Insulated
23	1214553	Resistor	47,000 Ohms 1/2 Watt Insulated
24	1216505	Control and Switch	Volume Control and Switch
25	1216544	Switch	Tone Control
26	1217361	Speaker	Speaker (5" P. M.) and Brkt. Assy.
27	1216570	Coil	2nd I. F. Coil Assembly
28	1216605	Coil	1st I. F. Coil Assembly
29	1216557	Transformer	Output Transformer Complete
30	1216650	Shaft	Drive Shaft
	7245333	Washer	"C" Washer
31	1217414	Condenser and Pulley Parts Package	
		Variable Condenser and Pulley Assembly	
		Grommet (3)	Lockwasher (2)
		Spacer - Sleeve (3)	Solder Lug
		Screw (3)	
31A	1217415	Condenser and Pulley Parts Package (Alt. for 1217414)	
		Variable Condenser and Pulley Assembly	
		Grommet (3)	Lockwasher (2)
		Spacer - Sleeve (3)	Solder Lug
		Screw (3)	
32	7230592	Condenser	.05 Mfd. 600 V. Tubular
33	1214555	Resistor	220,000 Ohms 1/2 Watt Insulated
34	1214550	Resistor	22,000 Ohms 1/2 Watt Insulated
	1216512	Cord	Power Cord
	1212233	Cord	Dial Drive (49" Length)
	1216562	Indicator	Dial Pointer
	47	Lamp	Dial Light (Mazda #47)
	1216564	Socket	Dial Light Assy. (Includes Mazda #47)
	7236279	Socket	Tube Socket
	1217323	Spring	Cord Tension
	1213813	Tube 12SQ7	
	1213809	Tube 12SA7	
	1213812	Tube 12SK7	
	1213848	Tube 35Z5GT	
	1213818	Tube 35L6GT	

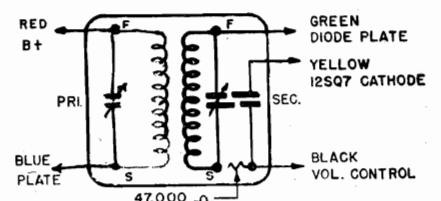


PARTS LAYOUT — CHASSIS VIEW

COIL CONNECTIONS



I. F. INPUT TRANSFORMER

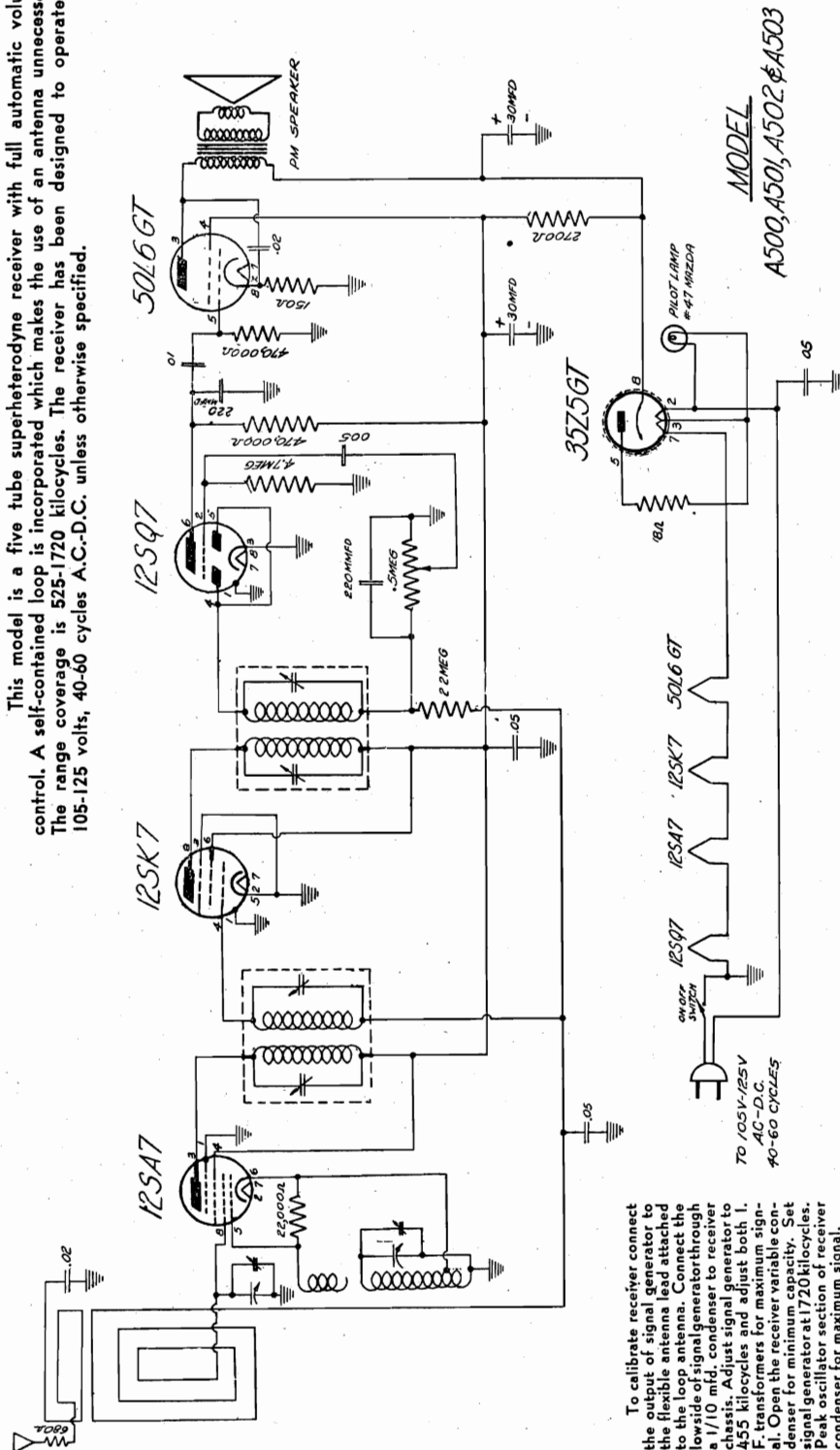


I. F. OUTPUT TRANSFORMER

DEWALD RADIO MFG. CORP.

MODELS A500, A501, A502,
A503

This model is a five tube superheterodyne receiver with full automatic volume control. A self-contained loop is incorporated which makes the use of an antenna unnecessary. The range coverage is 525-1720 kilocycles. The receiver has been designed to operate at 105-125 volts, 40-60 cycles A.C.-D.C. unless otherwise specified.



MODEL
A500, A501, A502 & A503

REPLACEMENT PARTS

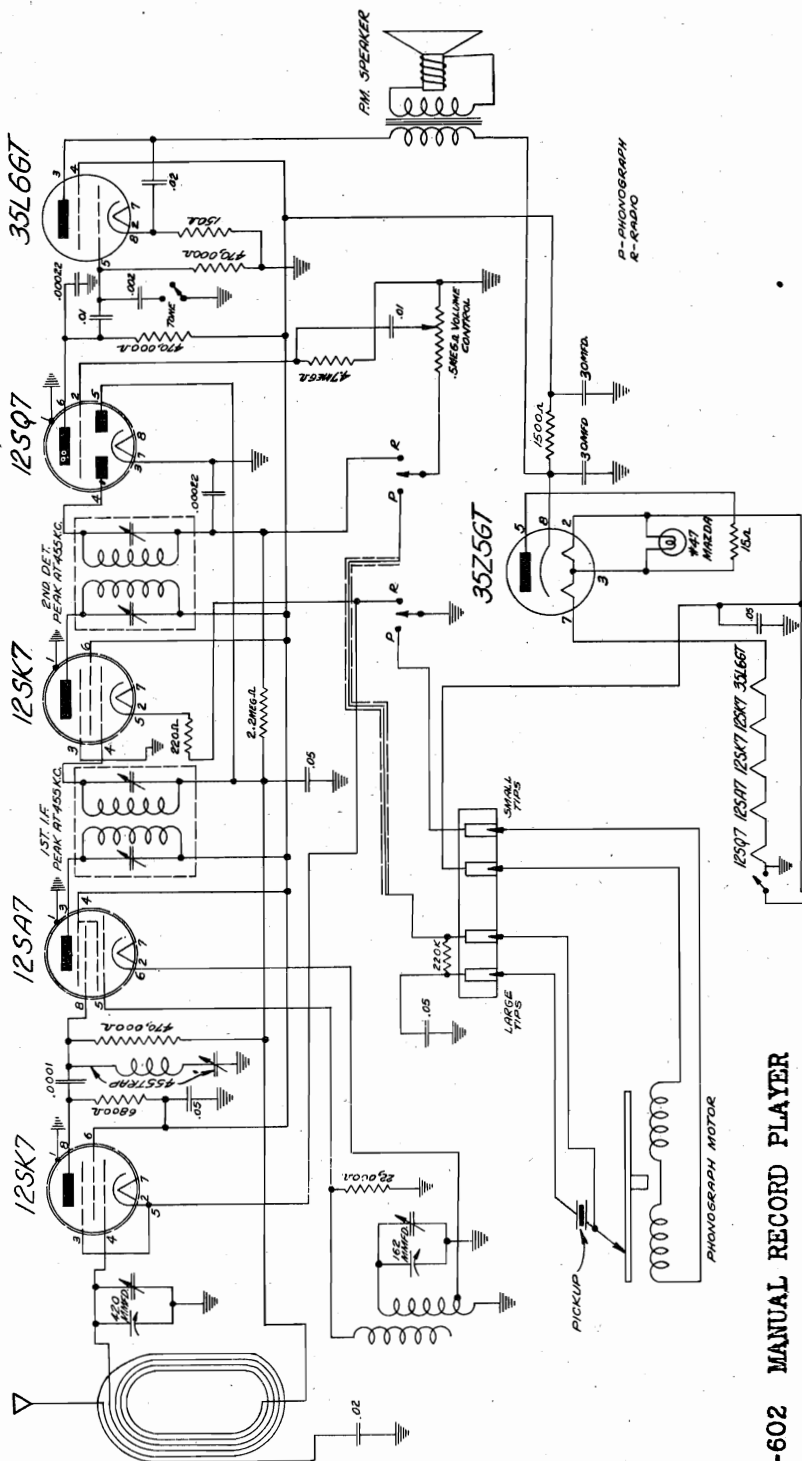
1001 ant. loop	3002 vol. cont. and switch	A-500	A-501	A-502	A-503
1003 oscillator coil	5000 line cord	4004	4281B	4000	4016
1000 1st I.F. coil	6000 dial scale	4017	4010	4003	4017
1002 2nd detector coil	7000 speaker	4018	4013	4019	4020
2000 paper condensers	8001 pilot lamp socket				
2001 mica condensers	9000 shaft				
2002 comb. electrolytic	9002 bushing				
2003 var. condenser	9762 drive spring				
3000 1/4 W. resistors	#20 dial cord				
3001 2 W. resistors	#47 pilot lamp				

IF PEAK 455 KC

To calibrate receiver connect the output of signal generator to the flexible antenna lead attached to the loop antenna. Connect the low side of signal generator through a 1/10 mfd. condenser to receiver chassis. Adjust signal generator to 455 kilocycles and adjust both I. F. transformers for maximum signal. Open the receiver variable condenser for minimum capacity. Set signal generator at 1720 kilocycles. Peak oscillator section of receiver condenser for maximum signal. Next set signal generator at 1500 kilocycles. Tune in this signal. Adjust R. F. section of receiver variable condenser for maximum signal strength. Keep the signal generator output as low as possible when making all of these measurements.

MODELS A602, A605

DEWALD RADIO MFG. CORP.



MODEL A-602 MANUAL RECORD PLAYER

MODEL A-605 AUTOMATIC RECORD CHANGER

ALIGNMENT INSTRUCTIONS

Connect signal generator to flexible antenna lead attached to the loop antenna; connect low side of signal generator through 0.1-mf condenser to receiver chassis. Open wavetrapp condenser to 455 kc; adjust both i-f transformers for maximum signal. Repeat wavetrapp condenser for minimum 455-kc signal. Set signal generator to 1720 kc. Open receiver variable condenser for minimum capacity. Set signal generator to 1500 kc; tune in this signal. Adjust r-f section of receiver variable condenser for maximum signal strength. Keep signal generator output to minimum.

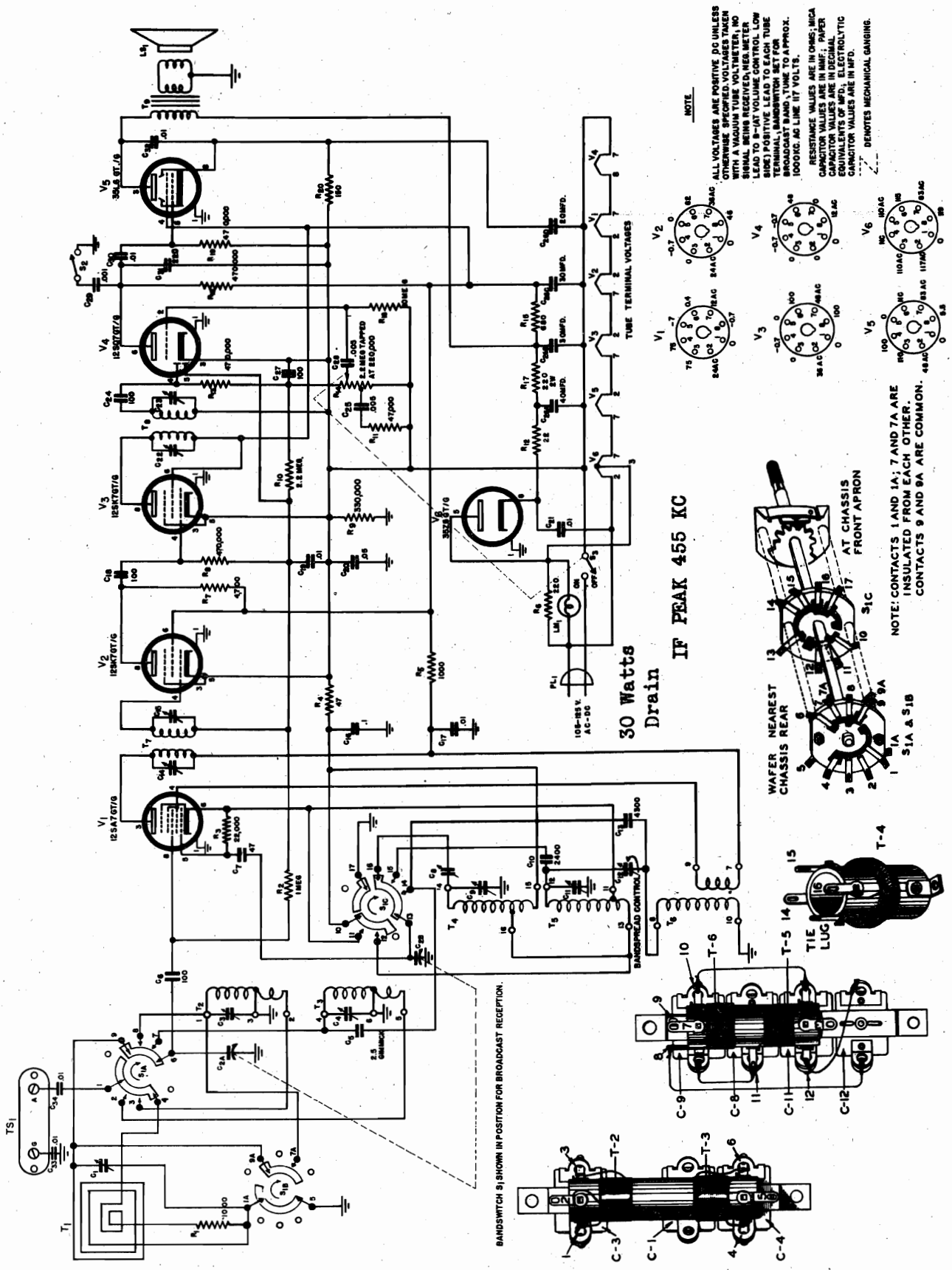
REPLACEMENT PARTS

- | | | | | | |
|------|--------------------|------|------------------------|------|-----------------------|
| 1004 | ant. loop | 3003 | 1/2 W. resistor | 8008 | aut. record changer |
| 1006 | oscillator coil | 3004 | 2 W. resistor | 8011 | manual record changer |
| 1000 | 1st i-f. coil | 1005 | wave trap | 8009 | crystal pick-up |
| 1002 | 2nd detector coil | 3002 | vol. contr. and switch | 9010 | shaft |
| 2000 | paper condenser | 8003 | tone contr. and switch | 9818 | bushing |
| 2001 | mica condenser | 8004 | phono. switch | 9762 | drive spring |
| 2005 | comb. electrolytic | 5000 | line cord | #20 | dial cord |
| 2003 | var. condenser | 6002 | dial scale | #47 | pilot lamp |
| 2006 | trimmer condenser | 7001 | speaker | 4017 | knob |
| 3000 | 1/4 W. resistor | 8001 | pilot lamp socket | | |

- | | |
|---------|------|
| A-602 | |
| CABINET | 4005 |
| BACK | 4022 |
| A-603 | |
| 4007 | |
| 4021 | |

ECHOPHONE RADIO A HALLICRAFTERS PRODUCT

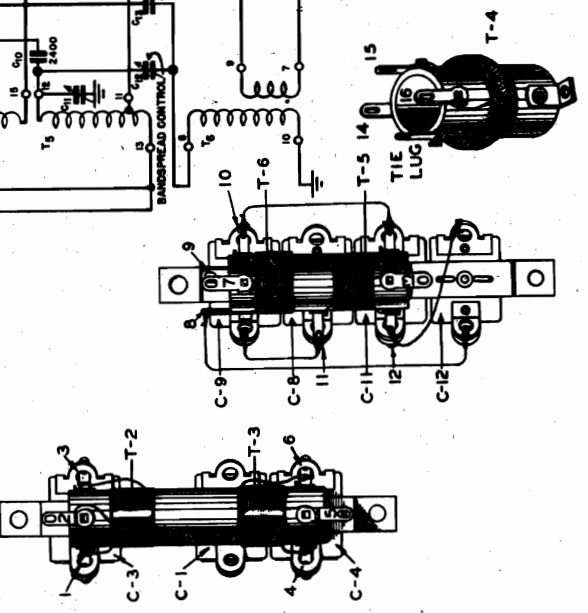
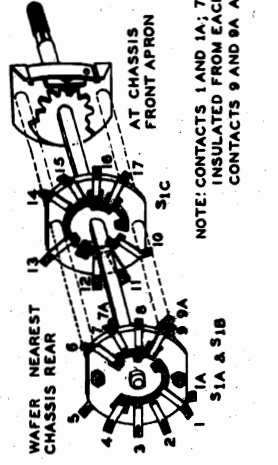
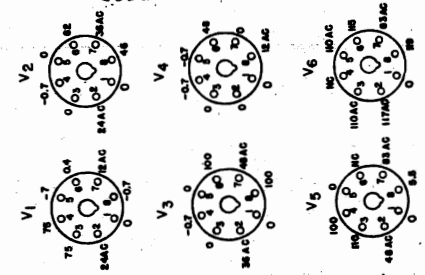
MODELS EC-112, EC-113



NOTE
ALL VOLTAGES ARE POSITIVE DC UNLESS OTHERWISE SPECIFIED. VOLTAGES TAKEN AT TUBE SOCKETS. NO BATTERY IS REQUIRED. A 100 OHM RESISTOR IS REQUIRED TO BE CONNECTED TO THE LEAD TO B-YAT VOLUME CONTROL. LOW SIDE POSITIVE LEAD TO EACH TUBE TERMINAL, BANDWIDTH SET FOR BROADCAST BAND, TUNE TO APPROX. 1000 KC. NO LINE IF VOLTAGE.

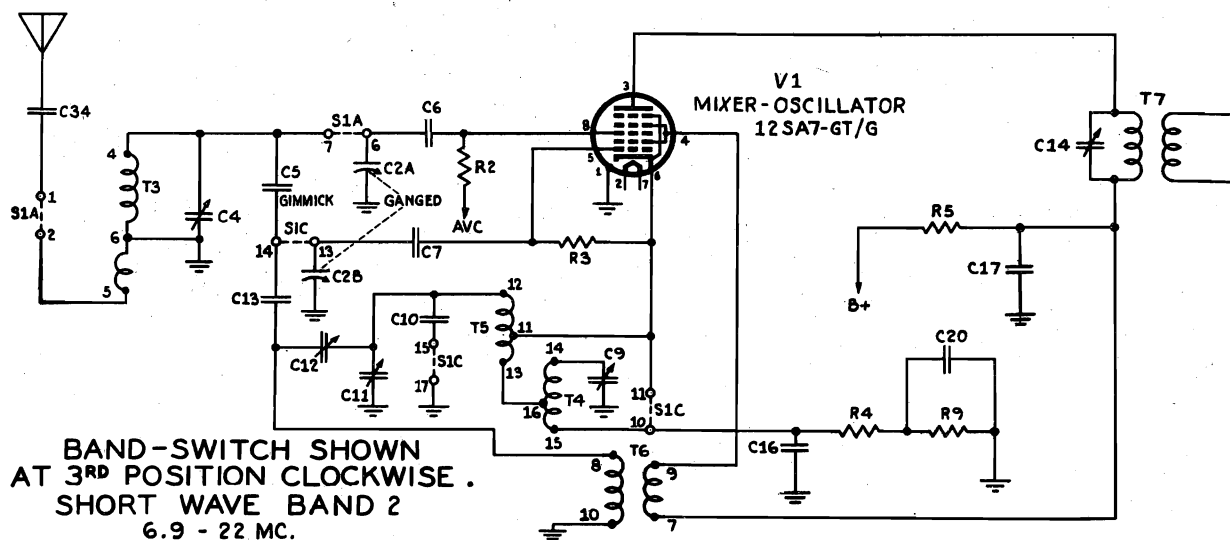
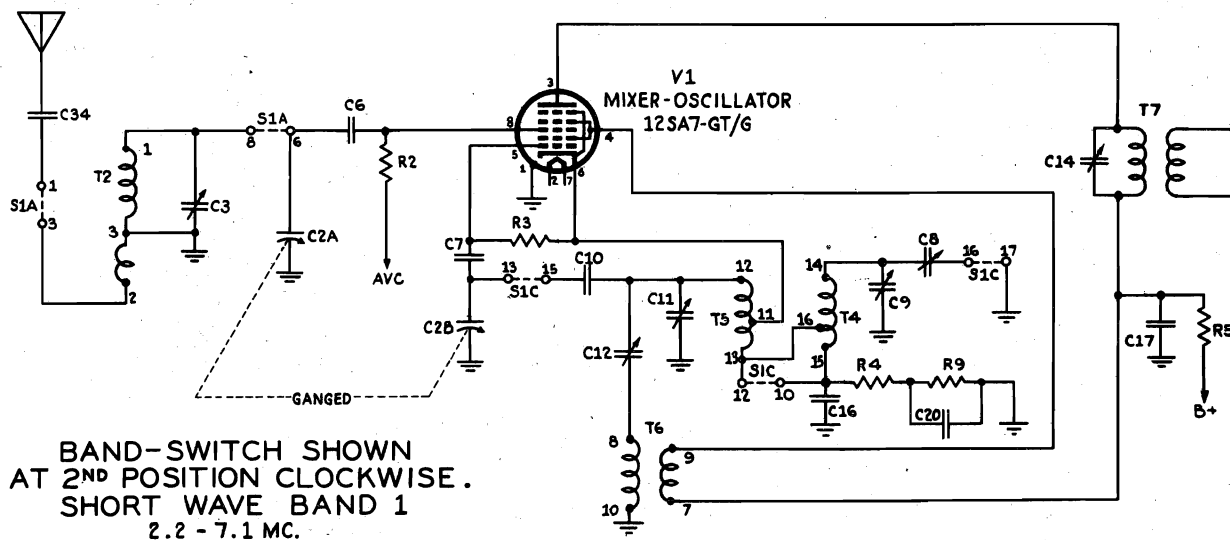
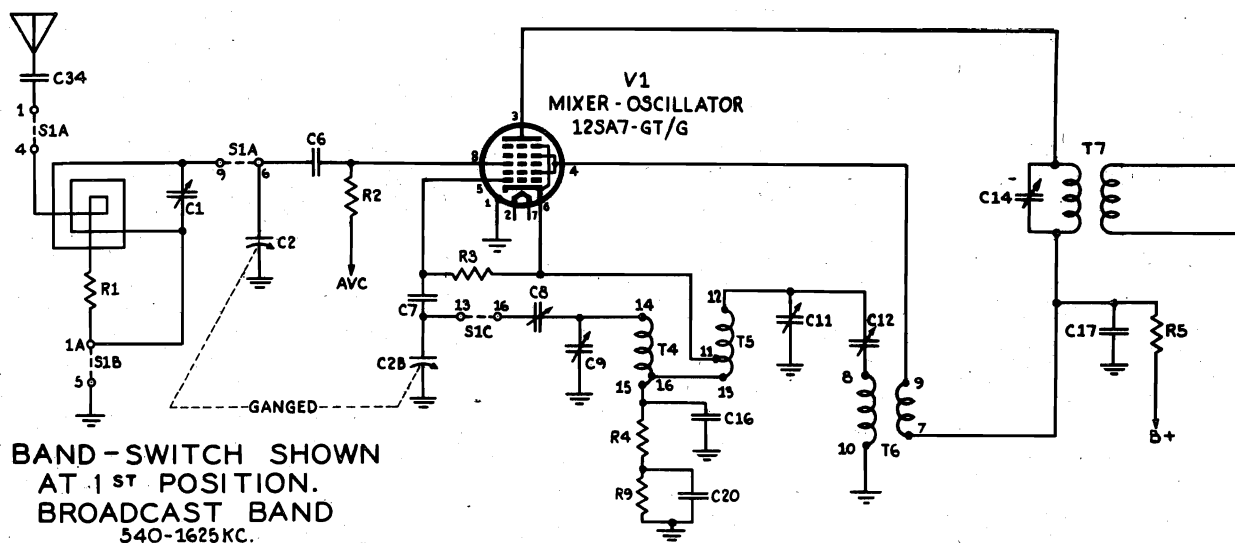
RESISTANCE VALUES ARE IN OHMS; MICA CAPACITOR VALUES ARE IN MMF.; PAPER CAPACITOR VALUES ARE IN DECIMAL MICROFARADS. ELECTROLYTIC CAPACITOR VALUES ARE IN MFD.

Z DENOTES MECHANICAL GAINING.



MODELS EC-112, EC-113

ECHOPHONE RADIO
HALLICRAFTERS PRODUCT



ECHOPHONE RADIO A HALLICRAFTERS PRODUCT

NOTE: Bandsread indicator **MUST** be at ZERO when making all adj. Band 2 osc. trim. (9) must be set AFTER bandsread trim. (8) (Range 3 osc. trim.) is aligned. *Standard RMA dummy ant. consists of a 200mmf cond. in series with a 20ohm r-f choke, the choke being shunted by a 400mmf cond. in series with a 400 ohm carbon res. **Connect Sig. Gen. ground lead to receiver negative return, not to chassis. This applies only to I-F adjustment.

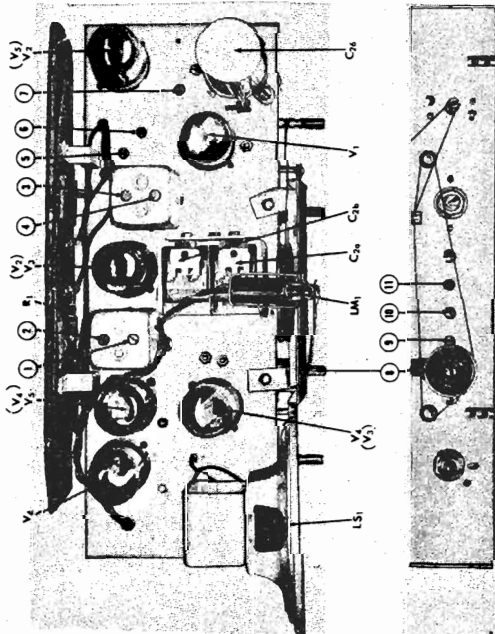


Fig. 6. Top and front views of the receiver showing tube locations and location of paddler, trimmer and i-f adjustment points.

- EQUIPMENT:**
1. Signal Generator capable of ranges indicated in the ALIGNMENT CHART, including a 400 cycle audio modulator.
 2. Output meter capable of handling 1 watt of audio power.
 3. Standard RMA dummy antenna consisting of a 200 mmf condenser in series with a 20ohm r-f choke, the choke being shunted by a 400 mmf condenser in series with a 400 ohm carbon resistor.
 4. Non-metal screw-driver.
- CONNECTIONS:** Connect the Sig. Gen. "cold" lead to "G" on the antenna terminal strip except for i-f adjustments (see chart below); the "hot" lead is connected as indicated in the chart.
- Connect the output meter across voice coil of the speaker and adjust the meter for 3 ohm impedance.
- Caution:** Set the meter at a sufficiently high range to prevent possible damage from overload. Band 3 must be aligned before band 2 in all instances.
- CONTROL SETTINGS:** After allowing about a ten minute warm up period, set the receiver's control as follows:
- VOLUME** control at full clockwise.
- BANDSPREAD** tuning control at "0", (min. cap.).

ALIGNMENT CHART

DUMMY ANT. IN SERIES WITH SIG. GENERATOR	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GEN. FREQUENCY SETTING	BAND SWITCH SETTING	RECEIVER DIAL SETTING	ADJUST SLUG PADDLER OR TRIMMER NO.	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT MAKE ADJUSTMENT FOR:	STEP NO.
IF ADJUSTMENT								
None	**On mixer section stator of tuning condenser gang	455kc	Range 1 (Broadcast)	1625kc	3 & 4 1 & 2	Diode IF Input IF	Maximum output Maximum output Repeat steps 1 & 2	1 2 3
RANGE 1 (Broadcast band)—Standard RMA Dummy*								
	Couple to loop aerial	1500kc 1500kc 600kc	Range 1 (Broadcast)	1500kc 1500kc 600kc	11 6 10	Osc. Trimmer Antenna shunt trimmer Osc. paddler	Maximum output Maximum output Maximum output Repeat step 4	4 5 6 7
RANGE 3 (Short wave range 6.9 to 22mc)—Align oscillator for this band with bandsread indicator drive pulley set screw loose and pointer set at zero. After completing the OSCILLATOR alignment, tighten the screws securely without changing the pointer setting from zero.								
Standard RMA Dummy*	"A" on antenna terminal strip	22mc 20mc	Range 3	22mc 20mc	8 15	Bandsread & Osc. trimmer Antenna shunt trimmer	Maximum output Maximum output	8 9
RANGE 2 (Short wave range 2.2 to 7.1mc.)—Standard RMA Dummy*								
	"A" on antenna terminal strip	6mc 6mc	Range 2	6mc 6mc	9 7	Osc. trimmer Antenna shunt trimmer	Maximum output Maximum output	10 11

ECHOPHONE RADIO
A HALLICRAFTERS PRODUCT

DETAILED SERVICE INFORMATION

IF FREQUENCY	RECEIVER OVERALL SELECTIVITY	IMAGE RATIO	*RECEIVER OVERALL SENSITIVITY	AUDIO OUTPUT
455kc	8.5kc wide at 6db down 16kc wide at 20db down 32kc wide at 40db down (for 500 milliwatt out-put)	65:1 at 1000kc (loop) 20:1 at 2.5mc (ant.) 8:1 at 7.0mc (ant.) 6:1 at 15.0mc (ant.) 3:1 at 20.0mc (ant.)	45 microvolt at 1000 kc 80 microvolt at 2.5 mc 35 microvolt at 6mc 140 microvolt at 8mc 50 microvolt at 20mc	0.8 watt with less than 10% distortion

*Readings for 500 milliwatt constant output. Speaker disconnected and replaced with a 3.2 ohm load resistor. Signal from generator modulated 30% at 400 cycles.

To restring the main tuning dial cord, cut a 25" length of 18 lb test dial cord and tie one end to the tension spring of the main tuning capacitor drive pulley at position "A" on the diagram. Following the letters "A" through "S", wind the cord on the pulley and knob drive shaft. At position "S", stretch the tension spring and tie the cord securely. Cut off the excess cord. Note that three turns are wound on the knob drive shaft.

To restring the bandspring tuning dial cord, cut a 30" length of the dial cord and follow the procedure as explained above, except start at position "1" on the diagram and proceed through position "14". Then turn knob pulley maximum clockwise, slide pointer to 100 and insert cord in clip on pointer. Note that the knob pulley has two turns.

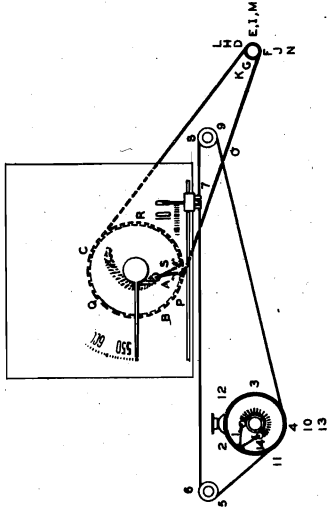
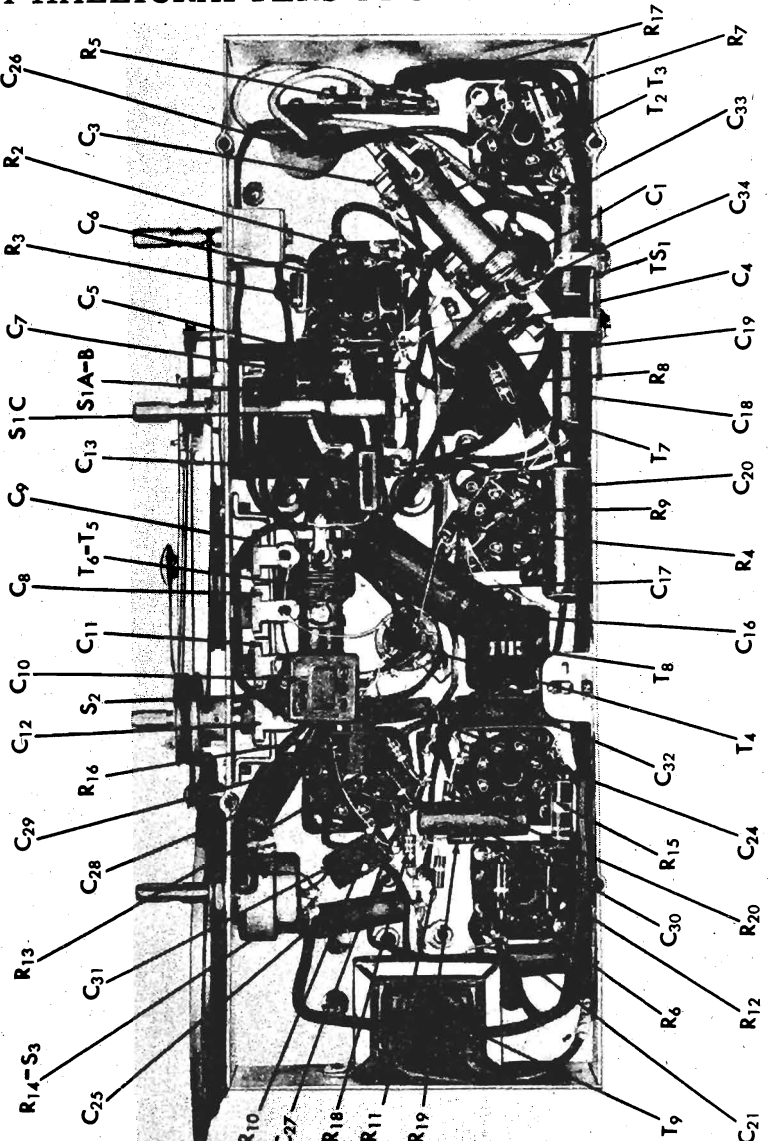


Fig. 3. Dial cable stringing procedure; main tuning is indicated by letters, and band spread tuning is indicated by numbers.



Model EC-112 and EC-113 bottom view of chassis showing location of component parts.

ECHOPHONE RADIO A HALLICRAFTERS PRODUCT

REF. NO.	DESCRIPTION	HALLICRAFTERS PART NUMBER	LIST PRICE PER COMPONENT	REF. NO.	DESCRIPTION	HALLICRAFTERS PART NUMBER	LIST PRICE PER COMPONENT
C-1, 3 & 4	Antenna trimmers; 3 section unit.	44A162	\$.40	S-1	Banswitch; rotary; 2 section; 3 position.	60B750	\$ 1.35
C-2	Main tuning capacitor; 2 sections, ganged; 12.3 to 354.6 mmf, each section; air.	48B165	2.17	S-2	Tone control switch.	60A246	.25
C-5	2.5mmf/gimmick; twisted insulated leads. NOT FURNISHED AS A REPLACEMENT PART. SHOWN FOR REFERENCE ONLY.	CM20A101M	.10	S-3	Receiver on/off switch; part of resistor R-14 assembly. NOT FURNISHED AS A SEPARATE REPLACEMENT PART. SEE LISTING REF. NO. R-14.		
C-6, 18, 24 & 27	100 mmf; 20%; 500 vdcw; mica.	CM20A101M	.10				
C-7	47 mmf; 20%; 500 vdcw; mica.	CM20A470M	.10				
C-8, 9, 11 & 12	Oscillator trimmer; 4 section.	44B161	.10				
C-10	2400 mmf; 20%; 500 vdcw; mica.	CM30A242M	.25				
C-13	4300 mmf; 10%; 500 vdcw; mica.	CM35A432K	.35				
C-14 & 15	Trimmers for IF transformer, T-7. NOT A REPLACEMENT PART. FURNISHED WITH REPLACEMENT TRANSFORMER T-7. SEE LISTING REF. NO. T-7.		.10				
C-16	0.1 mfd; +40-15%; 600 vdcw; tubular paper.	46AX104J	.10				
C-17, 19, 21 & 32	0.01 mfd; 20%; 600 vdcw; tubular paper.	46AX103F	.10				
C-28	0.001 mfd; +40-15%; 600 vdcw; tubular paper 46AZ502J		.10				
C-20	0.05 mfd; +40-15%; 600 vdcw; tubular paper 46AY503J		.15				
C-22 & 23	Trimmers for IF transformer, T-8. NOT A SEPARATE REPLACEMENT PART. FURNISHED WITH REPLACEMENT TRANSFORMER T-8. SEE LISTING REF. NO. T-8.		.10				
C-26A, B, C & D	Electrolytic; 4 section unit; sect. A—40 mfd, 150 vdcw; sect. B & C—each 30 mfd, 150 vdcw; sect. D—20 mfd, 25 vdcw.		1.10				
C-29	0.001 mfd; 20%; 600 vdcw; tubular paper.	46B095	.10				
C-31	220 mfd; 20%; 500 vdcw; mica.	46AZ102H	.15				
C-25	0.005 mfd; 20%; 600 vdcw; tubular paper.	CM20A221M	.10				
		46AZ502J	.10				
LM-1	6/8 volt @ 150 ma; brown bead; bayonet base; G.E. type 47.	39A004	.10				
LS-1	Loud Speaker	85B038	3.02				
PL-1	Line cord with two prong plug; 6 ft. cord.	87A078	.35				
R-1 & 5	1000 ohm; 20%; 1/2 watt; carbon; (NOTE: R-1 is included with antenna loop transformer ref. no. T-1, but is available as a separate replacement part.)	RC20A102M	.10				
R-2	1 megohm; 20%; 1/2 watt; carbon.	RC20AE105M	.10				
R-3 & 11	47,000 ohm; 20%; 1/2 watt; carbon.	RC20AE473M	.10				
R-4	470 ohm; 20%; 1/2 watt; carbon.	RC20AE470M	.10				
R-6	220 ohm; 20%; 1 watt; carbon.	RC20AE221M	.10				
R-7	4700 ohm; 20%; 1 watt; carbon.	RC20AE472M	.10				
R-8, 13, 18 & 19	470,000 ohm; 20%; 1/2 watt; carbon.	RC20AE474M	.10				
R-9	330,000 ohm; 20%; 1/2 watt; carbon.	RC20AE334M	.10				
R-10	2.2 megohm; 20%; 1/2 watt; carbon.	RC30AE225M	.10				
R-12	22 ohm; 20%; 1 watt; carbon.	RC30AE220M	.10				
R-14 & S-3	VOLUME control; 2.2 megohm, tapped at 220,000 ohm, variable; includes SPST toggle action switch, S-3 on rear.	25A561	.80				
R-15	680 ohm; 20%; 1 watt; carbon.	RC30AE681M	.10				
R-16	10 megohm; 20%; 1/2 watt; carbon.	RC20AE106M	.10				
R-17	470 ohm; 20%; 1/2 watt; carbon.	RC20AE471M	.10				
R-20	150 ohm; 20%; 1/2 watt; carbon.	RC20AE151M	.10				

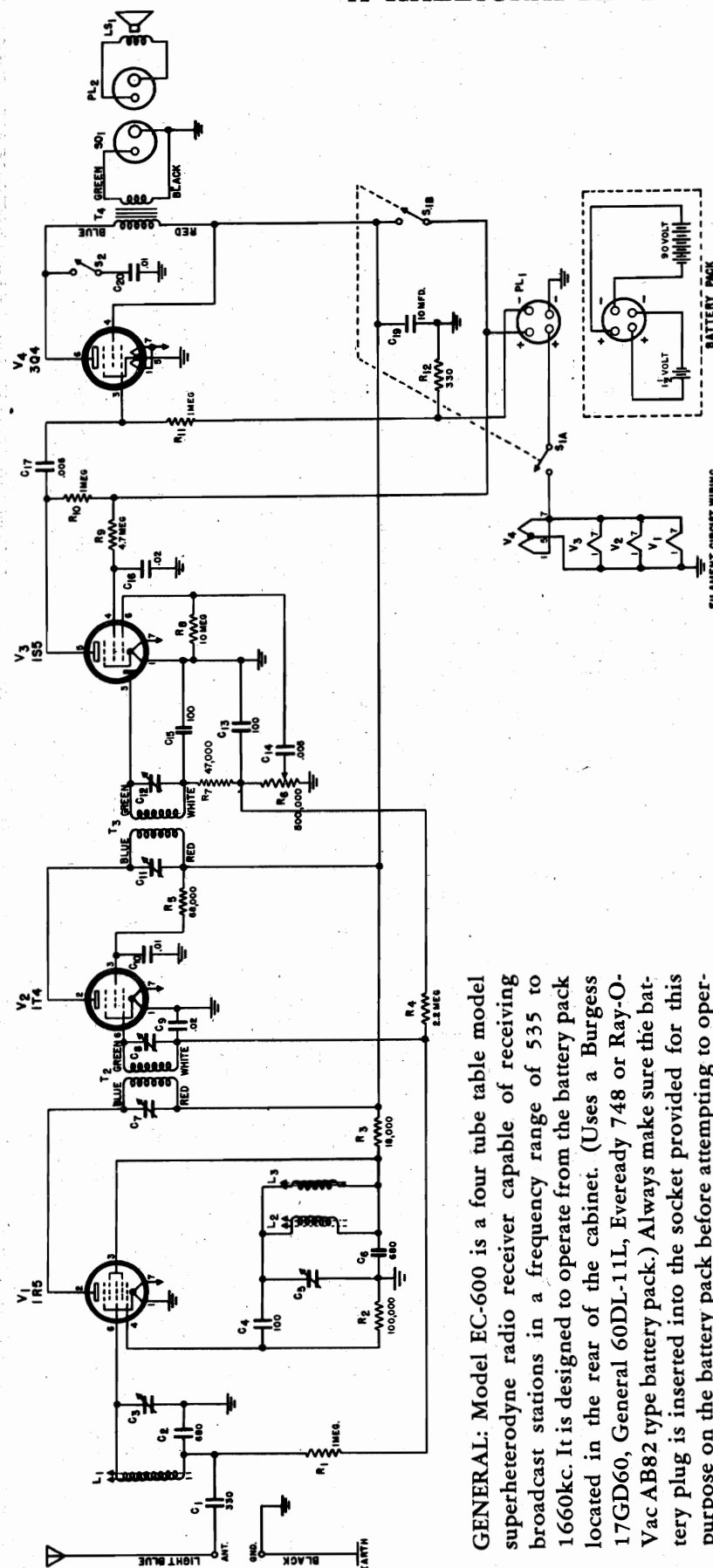
* Prices available on request.
When ordering, please specify Model number of receiver and part number of item.
NOTE: All prices subject to change without notice.

POWER SUPPLY DATA: Both receiver models are designed to operate from a line voltage of 105 to 125 volts AC/DC with a power drain of 30 watts nominal. Power to the receivers is supplied through the line cord extending from the rear of the cabinets.

TUBE TYPES AND FUNCTIONS: 12SA7GT/G-mixer-oscillator; 2-12SK7GT/G's as I-F amplifiers; 12SQ7GT/G-Detector, AVC and First audio amplifier; 35L6GT/G-Audio power amplifier; 35Z5GT/G-Power rectifier for a-c operation.

MODEL EC-600

ECHOPHONE RADIO A HALLICRAFTERS PRODUCT



TUBES, TYPES and FUNCTIONS:
 Type 1R5-mixer/oscillator
 Type 1T4- IF amplifier
 Type 1S5- detector, AVC,
 audio amplifier
 Type 3Q4- audio power amp.

GENERAL: Model EC-600 is a four tube table model superheterodyne radio receiver capable of receiving broadcast stations in a frequency range of 535 to 1660kc. It is designed to operate from the battery pack located in the rear of the cabinet. (Uses a Burgess 17GD60, General 60DL-11L, Eveready 748 or Ray-O-Vac AB82 type battery pack.) Always make sure the battery plug is inserted into the socket provided for this purpose on the battery pack before attempting to operate the receiver. The filament current drain is 0.25 amp.; B plus drain is 14 ma. Leads are provided at rear of chassis for connection to an external antenna and ground. Note that the loudspeaker is connected to the receiver through the plug on the rear of the chassis. Always make sure the speaker is plugged in before turning the set on.

DETAILED SERVICE INFORMATION

IF FREQUENCY	RECEIVER OVERALL SELECTIVITY	IMAGE RATIO	RECEIVER OVERALL SENSITIVITY	AUDIO OUTPUT
455 kc	6 kc wide at 6 db down 13 kc wide at 20 db down 41 kc wide at 60 db down (1000 kc input to the antenna; output constant)	83:1 at 1000 kc	50 microvolt at 1000 kc for 0.05 watt output	0.15 watt with less than 10% distortion. Audio section bandpass: 45 to 10,000 C.P.S.

A HALLICRAFTERS PRODUCT

EQUIPMENT:

1. Signal generator capable of the ranges indicated on the alignment chart, including a 400 cycle audio modulator.
2. Output meter capable of handling 1.5 watts of audio power.
3. *Standard RMA dummy antenna.
4. Non-metallic screw driver.

*Standard RMA dummy antenna consists of a 200 mmf condenser in series with a 20uh r-f choke which is shunted by a 400mmf condenser in series with a 400 ohm carbon resistor.

CONNECTIONS: Connect the signal generator "cold" lead to the receiver chassis, the "hot" lead as indicated in the chart.

Connect the output meter across the speaker voice coil.

CONTROL SETTINGS: After allowing about a ten minute warm up period, set the receiver controls as follows: Volume control—maximum clockwise; tuning control is set as indicated in the chart.

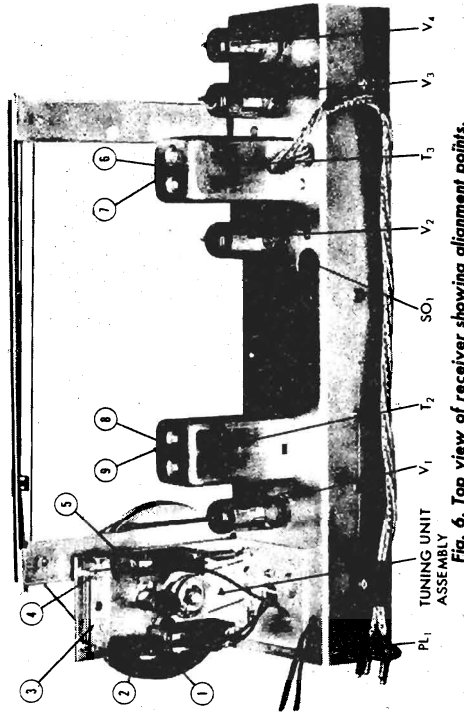


Fig. 6. Top view of receiver showing alignment points.

ALIGNMENT CHART

DUMMY ANT. IN SERIES WITH SIG. GENERATOR	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GEN. FREQUENCY SETTING	RECEIVER DIAL SETTING	ADJUST. SLUG, PADDLE, OR TRIMMER NO.	DESCRIPTION	TYPE OF ADJUSTMENT MAKE ADJUSTMENT FOR	STEP NO.
IF ADJUSTMENT							
None	Antenna lead at chassis rear	455kc	1000kc	6 & 7 8 & 9	Diode IF Input IF	Maximum output Maximum output Repeat steps 1 & 2	1 2 3
BROADCAST BAND ADJUSTMENT							
Standard RMA Dummy	Antenna lead at chassis rear	1660kc	Maximum clockwise	3	Osc. Trimmer	Maximum output	4
		1660kc	Maximum clockwise	4	Ante. Trimmer	Maximum output	5
		1400kc	Maximum clockwise	5	Ant. coil	Maximum output by moving coil mounting up or down on chassis	6
		600kc	600kc	22	Osc. Padder slug	Repeat step 4 * Maximum output	7 8

NOTE: Repeat adjustments 4 through 7 as often as necessary, in order listed.

Do NOT change the position of the OSCILLATOR coil (ref. 1 on Fig. 2). Adjusting the ANTENNA coil location is sufficient.

* Rotate the tuning control when making this adjustment.

MODEL EC-600

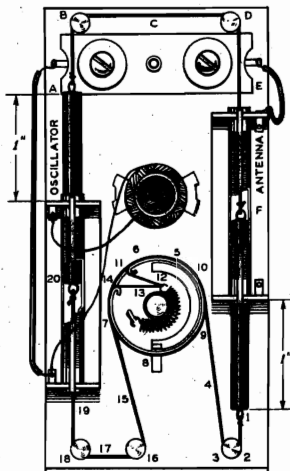
ECHOPHONE RADIO A HALLICRAFTERS PRODUCT

HOW TO RESTRING TUNING ASSEMBLY DRIVE CORDS

Cut a 6" length of 18 lb. test dial cord and tie one end to osc. coil slug eye at point "A" as shown in diagram. Following letters "A" through "F" tie other end to antenna coil slug at point "F". When complete, be sure slugs take the position shown in diagram. Cut off excess cord.

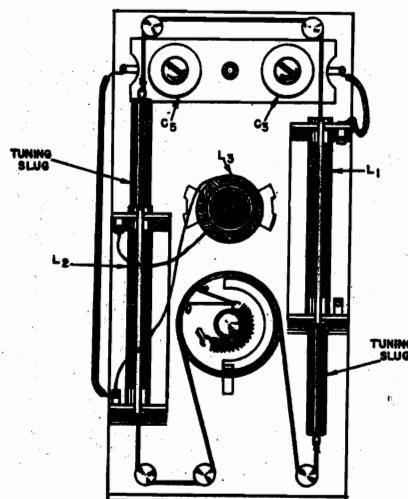
To restring cord at other end of slugs, cut a 9" length of 18 lb. test dial cord and tie one end to slug eye at position "1" as shown on diagram. Following the numbers "1" through "20" bring cord under post, around pulley, through slot to tension spring, back out through slot, then under the two posts to slug eye on oscillator coil slug at position "20." Pull on cord so as to put tension on spring and tie securely. Cut off excess cord.

Receiver calibration will depend on relative position of slugs in coils. Slugs must be in position as shown on drawing.



NOTE: TUNING SLUGS FOR L_1 AND L_2 ARE MECHANICALLY GANGED

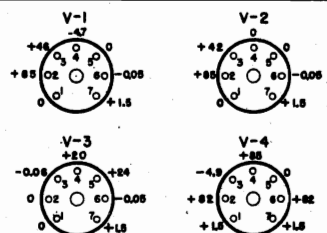
PICTORIAL VIEW OF
TUNING UNIT



HOW TO RESTRING DIAL CORD

To restring the main dial cord, cut a 35" length of 18 lb. test dial cord and tie one end to the tension spring of the main tuning dial drive pulley at position "1" on the diagram. Following the numbers 1 through 28, wind the cord on the pulley, knob drive shaft and two pointer drive pulleys. At position "28" stretch the tension spring and tie the cord securely. Cut off the excess cord. Note that four complete turns are wound on the knob drive shaft.

TUBE TERMINAL AND VOLTAGE INFORMATION



VOLTAGE READINGS WERE TAKEN WITH AN ELECTRONIC VOLTMETER, NO SIGNAL BEING RECEIVED, CONTROLS SET AS FOLLOWS:

BATTERY SWITCH — CLOCKWISE (ON)
VOLUME CONTROL — (MIN) COUNTER CLOCKWISE
TONE — COUNTER CLOCKWISE ("NORMAL")
TUNING — SET AT 1000KC ON TUNING DIAL

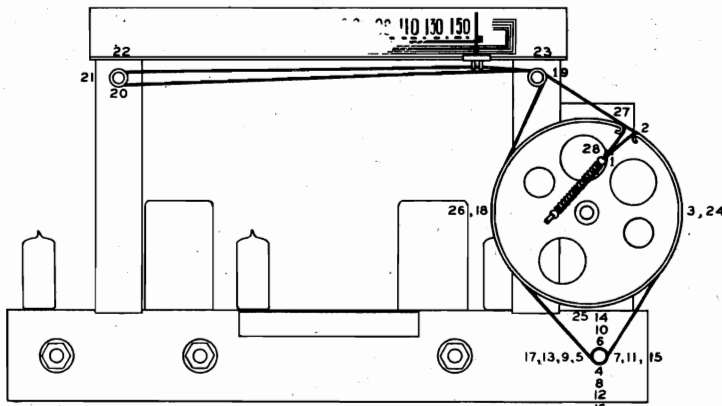
ALL VOLTAGES ARE POSITIVE D.C. UNLESS OTHERWISE SPECIFIED.

NEG. METER LEAD TO CHASSIS; POS. METER LEAD TO EVERY TERMINAL OF EACH TUBE.

NOTE

RESISTANCE VALUES ARE IN OHMS, MICA
CAPACITOR VALUES ARE IN MMF, PAPER
CAPACITOR VALUES ARE IN DECIMAL EQUIVALENTS
OF MFD. ELECTROLYTIC CAPACITOR VALUES ARE
IN MFD.

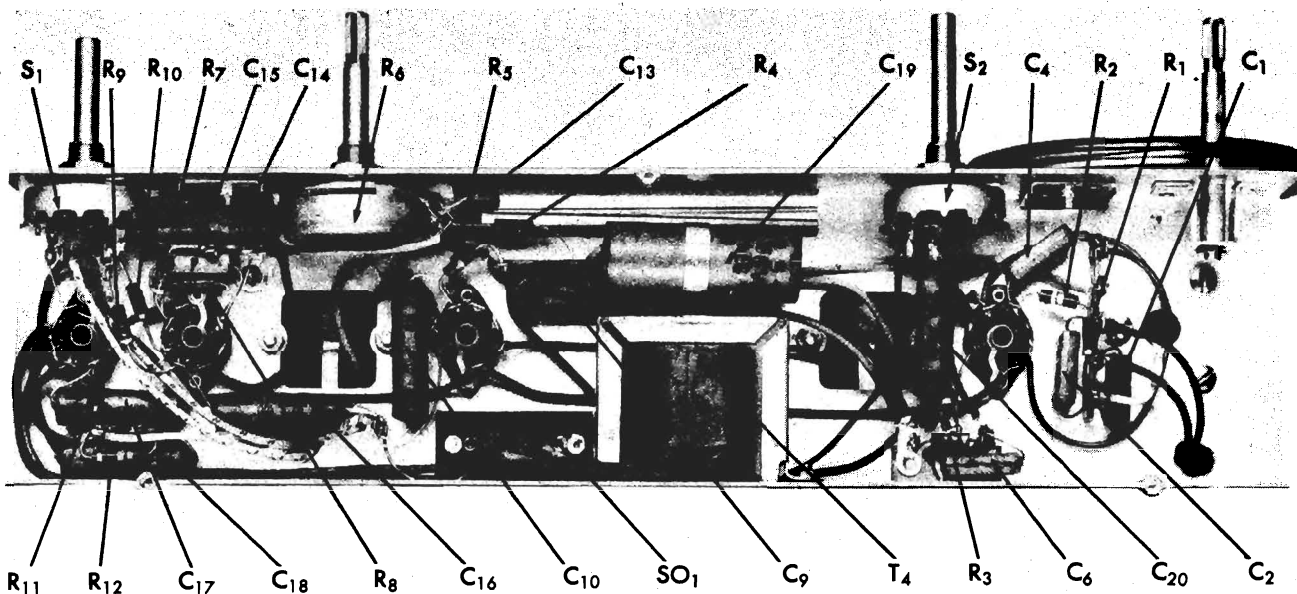
--- DENOTES MECHANICAL GANGING.



ECHOPHONE RADIO A HALLICRAFTERS PRODUCT

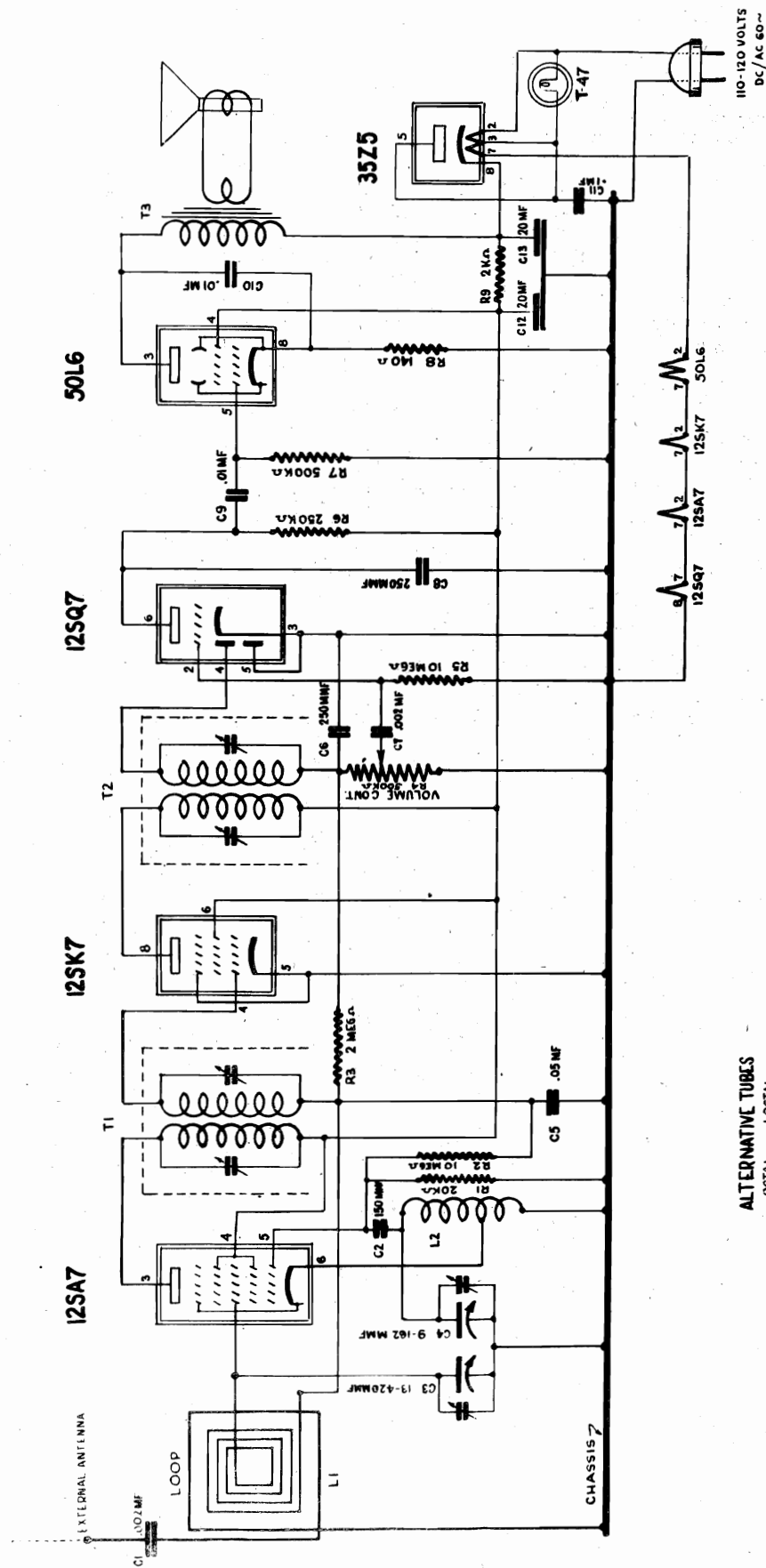
MODEL EC-600

REF. NO.	DESCRIPTION	HALLICRAFTER'S PART NUMBER	LIST PRICE	REF. NO.	DESCRIPTION	HALLICRAFTER'S PART NUMBER	LIST PRICE PER COMPONENT
CAPACITORS				SWITCHES			
C-1	330 mmf; 20%; 500 vdcw; mica	CM20A331M	.15	S-1A & B	On/Off battery switch; DPST; rotary action	60A258	.54
C-2 & 6	680 mmf; 20%; 500 vdcw; mica	CM20A681M	.20	S-2	Normal/Bass tone switch; SPST; Rotary action	60A259	.48
C-3	Trimmer for mixer coil; part of tuning unit assembly; shown for reference only; NOT AVAILABLE AS A SEPARATE REPLACEMENT PART			TUNING UNIT ASSEMBLY			
C-4, 13 & 15	100 mmf; 20%; 500 vdcw; mica	CM20A101M	.10	Complete tuning unit; includes mixer coil L-1 and its trimmer C-3; also oscillator coil L-2, its trimmer C-5 and its padding adjustment slug tuned coil L-3; supplied as one complete assembly only			
C-5	Trimmer for oscillator coil; part of tuning unit assembly; shown for reference only; NOT AVAILABLE AS A SEPARATE REPLACEMENT PART			TRANSFORMERS			
C-7 & 8	Trimmer for input IF transformer T-2; shown for reference only; NOT AVAILABLE AS A SEPARATE REPLACEMENT PART			T-2	Input IF transformer; 455 kc; includes trimmer capacitors C-7 and C-8	50C196-3	.95
C-9 & 16	0.02 mfd; 20%; 200 vdcw; tubular paper	46AU203F	.10	T-3	Diode IF transformer; 455 kc; includes trimmer capacitors C-11 and C-12	50C196-4	.95
C-10 & 20	0.01 mfd; 20%; 200 vdcw; tubular paper	46AU103F	.10	T-4	Audio output transformer; matches the output of a tube type 3Q4 to the voice coil of a 3 ohm, PM type loudspeaker	55B085	1.08
C-11 & 12	Trimmer for diode IF transformer, T-3; shown for reference only; NOT AVAILABLE AS A SEPARATE REPLACEMENT PART			MISCELLANEOUS MECHANICAL COMPONENTS			
C-14 & 17	0.005 mfd; +40-10%; 200 vdcw; tubular paper	46AU502J	.10				
C-18	0.05 mfd; 20%; 200 vdcw; tubular paper	46AU503F	.10	QUANTITY IN EQUIPMENT	DESCRIPTION	HALLICRAFTER'S PART NUMBER	LIST PRICE PER COMPONENT
C-19	Electrolytic; 10 mfd; 150 vdcw; dry	45B098	.36	4	Tube socket; 7 prong miniature; bakelite	6A219	.10
PLUGS				3	Idle pulley; bakelite	28A023	.10
PL-1	Battery connector plug and cable assembly	87A1555	*	1	Dial pointer; painted metal	82A113	.15
PL-2	Loudspeaker voice coil connector plug; part of speaker assembly, LS-1; also is available as a separate replacement part	10A243	.10	1	Calibrated dial scale plate	83B272	.73
LOUDSPEAKER				1	Glass dial window	22B163	.10
LS-1	6" diam. cone; PM type; 3 ohm voice coil; includes two connector cable and plug for connection to output transformer secondary winding through socket SO-1	85C039	3.43	2	Dial window mounting bracket	67A617	.15
RESISTORS				2	Dial plate mounting bracket	67B612	.10
R-1, 10 & 11	1 megohm; 20%; ½ watt; carbon	RC20AE105M	.10	1	Tuning shaft mounting bracket	67A582	.10
R-2	100,000 ohm; 10%; ½ watt; carbon	RC20AE104K	.10	1	Tuning shaft; steel	74A192	.10
R-3	18,000 ohm; 10%; ½ watt; carbon	RC20AE183K	.10	1	Drive pulley; for tuning unit assembly	28A025	.10
R-4	2.2 megohm; 20%; ½ watt; carbon	RC20AE225M	.10	1	Dial tension spring for drive pulley	75A102	.10
R-5	68,000 ohm; 20%; ½ watt; carbon	RC20AE683M	.10	3	Knobs; bakelite; walnut	15B068-1	.10
R-6	Volume Control; 500,000 ohm; no taps	25A567	.58	1	Cabinet; wood; walnut	66F328	*
R-7	47,000 ohm; 20%; ½ watt; carbon	RC20AE473M	.10	1	Knob; bakelite; walnut with dot	15B077-1	.10
R-8	10 megohm; 20%; ½ watt; carbon	RC20AE106M	.10	* Price available on request.			
R-9	4.7 megohm; 20%; ½ watt; carbon	RC20AE475M	.10	NOTE: Prices subject to change without notice. When ordering parts, specify model number of set and part number of item.			
R-12	330 ohm; 20%; ½ watt; carbon	RC20AE331M	.10				



Radio Receiver Model EC-600, bottom view showing location of components.

ELECTROMATIC MFG. CORP.



ALTERNATIVE TUBES

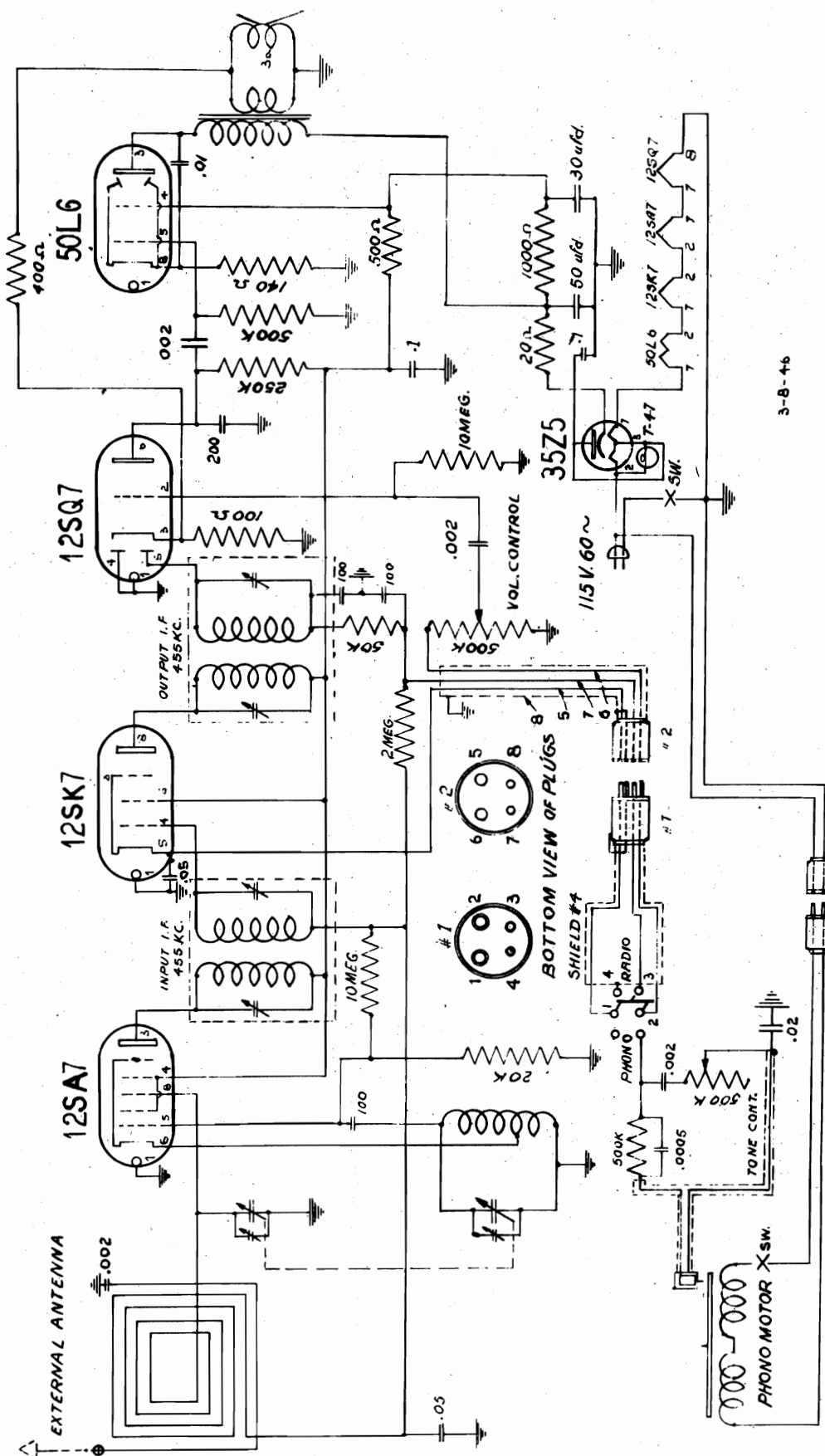
OCTAL	LOCTAL
12SA7	as 14Q7
12SK7	as 14A7/287
12SQ7	as 1486
50L6	as 50A5
35Z5	as 35Y4

MODEL AR-501

1.5-455 KC

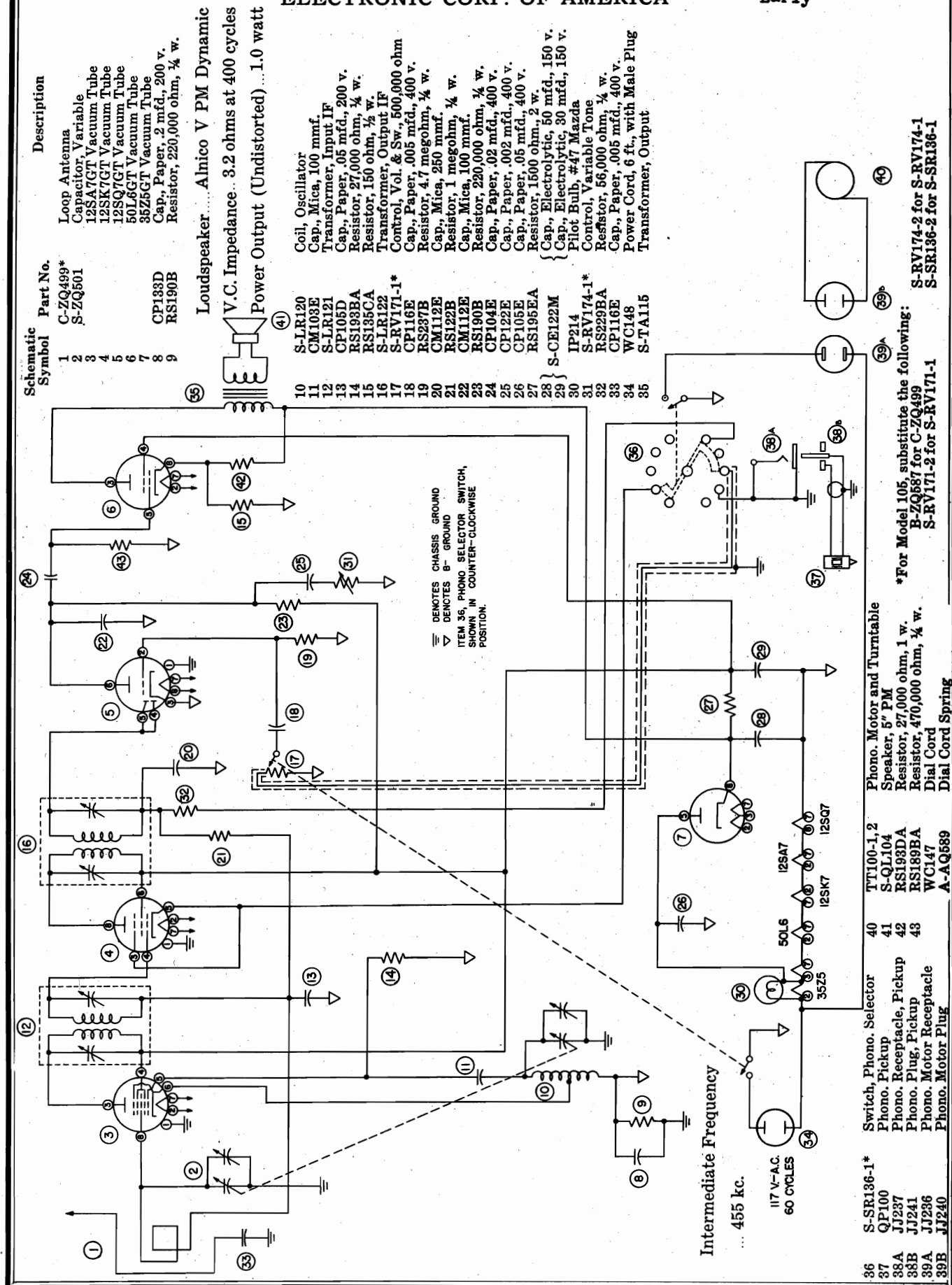
INPUT POWER - 30 WATTS

3-8-46



MODELS 104, 105, 106
Early

ELECTRONIC CORP. OF AMERICA



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Record Changer: General Instrument Model 205
For Alignment, see P. 15-6

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MODELS 104, 105, 106
Early

ELECTRONIC CORP. OF AMERICA

ALIGNMENT PROCEDURE

The following equipment is necessary to properly align this chassis:

1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Any loop similar to the one used in the receiver.

PROCEDURE

1. Mount the loop in a vertical position on a block of wood so that it may be coupled parallel to the set loop.
2. Connect the loop to the output terminals of the signal generator.

INPUT SIGNAL	DISTANCE BETWEEN GEN. AND SET LOOP	SET DIAL AT	TRIMMERS	PURPOSE
455 kc.	Close	HF end	1 2 3 4	Align IF
1720 kc.	Close	HF end	5	Set limit of band
1400 kc.	1½'	1400 kc.	6	Align antenna

SOCKET VOLTAGES

TUBE	POSITION	1	2	3	4	5	6	7	8
12SA7GT	Oscillator and Mixer	0	24 AC	84	84	-11*	0	125 AC	0
12SK7GT	IF Amplifier	0	24 AC	0	0	0	84	35 AC	84
12SQ7GT	2nd Det.—1st Audio	0	0	0	0	0	18	0	125 AC
50L6GT	Power Output	0	83 AC	108	84	0	0	35 AC	6
35Z5GT	Rectifier	0	117 AC	111 AC	0	111 AC	0	83 AC	117

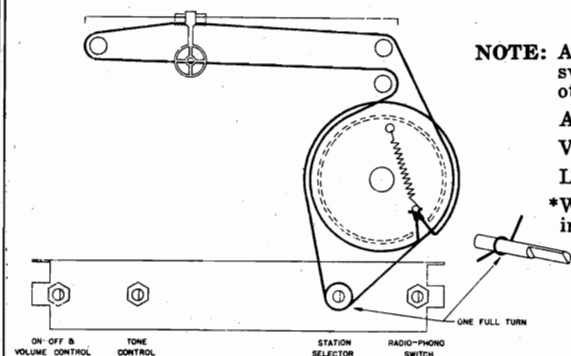
NOTE: All DC voltages measured with a 1000 ohm-per-volt meter from ON-OFF switch (—B) to socket contact indicated. All voltages are positive DC unless otherwise marked.

AC switch on.

Volume control in minimum position; no signal.

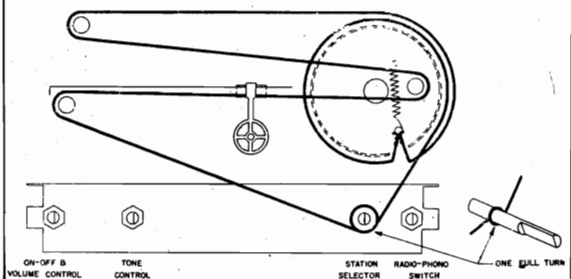
Line voltage 117 volts AC.

*When a vacuum tube voltmeter with approximately 10 megohms or higher input resistance is used.



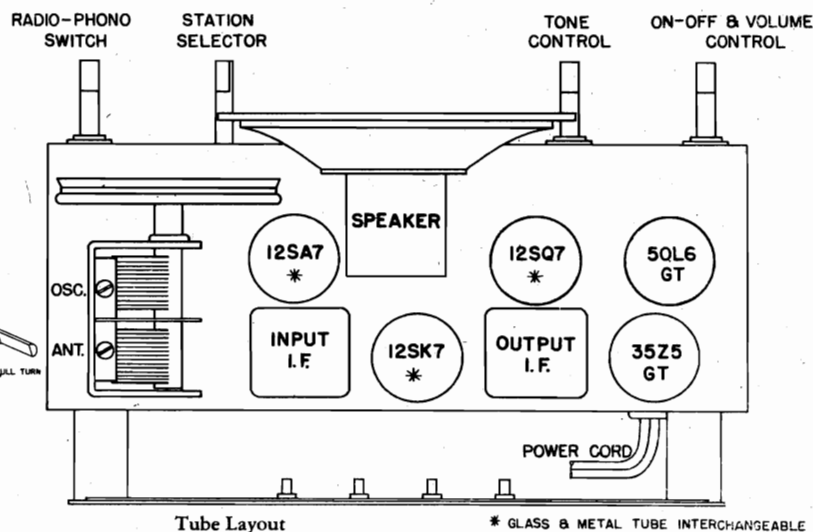
Dial Mechanism

Models 104, 106



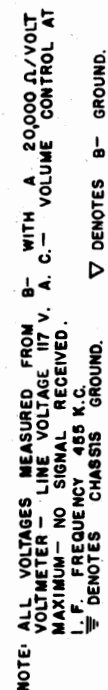
Dial Mechanism

Model 105



Tube Layout

* GLASS & METAL TUBE INTERCHANGEABLE



MODELS 101,102,133
MODEL 121

ELECTRONIC CORP. OF AMERICA

SET INDICATOR TO
THIS DIMENSION WITH
GANG FULLY MESHED

INDICATOR
PART NO. A-AQ 760

DRIVE CORD
PART NO. WC 147

NOTE: GANG FULLY
MESHED

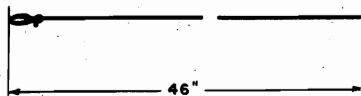
SPRING
PART NO. A-AQ 589

MODELS
101
102
133
CHASSIS
AA

TWO FULL TURNS

GUIDE PULLEY
PART NO. A-HQ 772

DRIVE SHAFT
PART NO. A-OQ 190-1



SET INDICATOR TO
THIS DIMENSION WITH
GANG FULLY MESHED

INDICATOR
PART NO. A-AQ 765-2

SPRING
PART NO. A-AQ 589

NOTE: GANG FULLY
MESHED

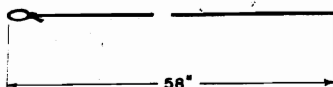
DRIVE CORD
PART NO. WC 147

MODEL
121
CHASSIS
AP

TWO FULL TURNS

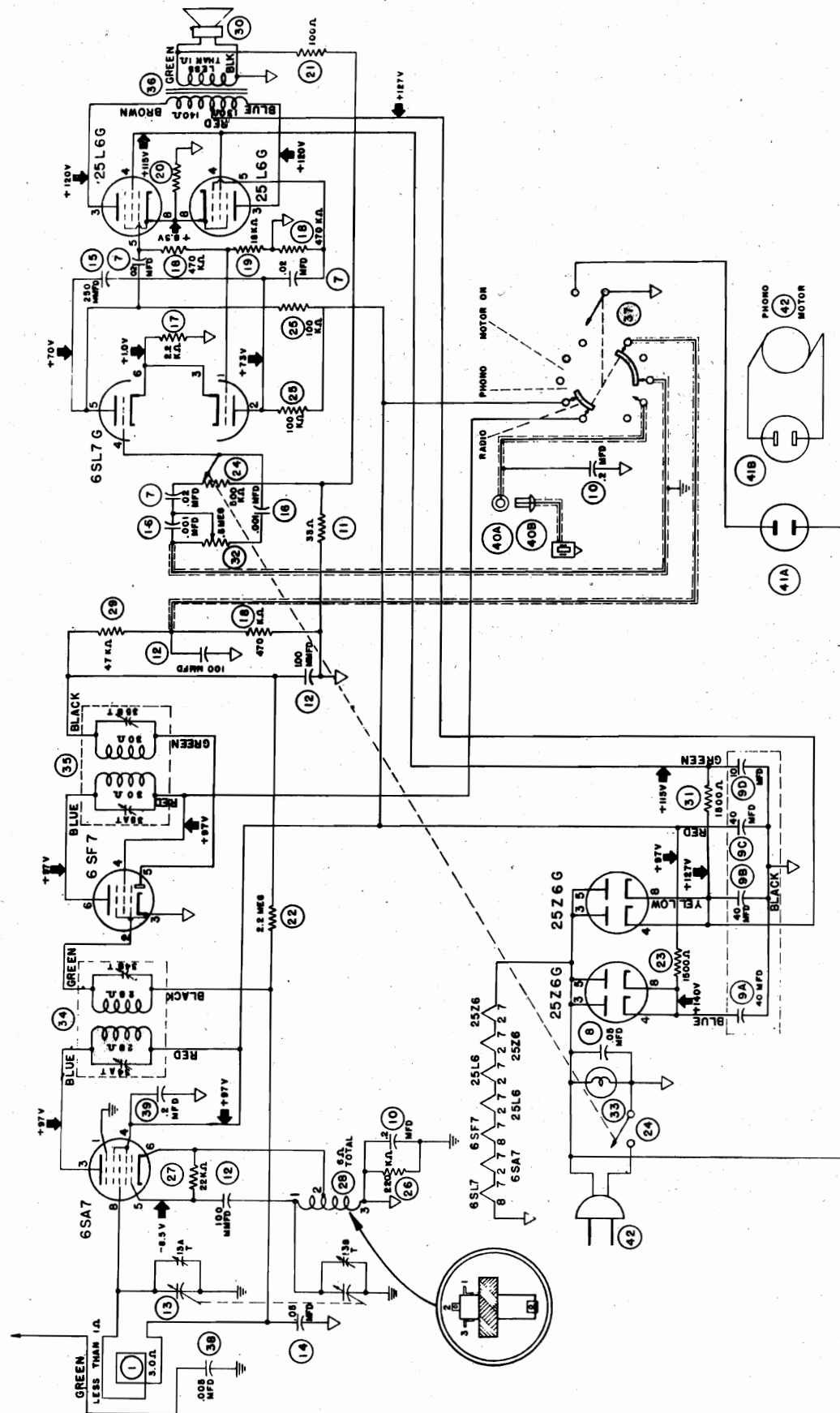
GUIDE PULLEY
PART NO. A-HQ 772

DRIVE SHAFT
PART NO. A-OQ 190-1



ELECTRONIC CORP. OF AMERICA

MODEL 121,,Ch.AP



NOTE: ALL VOLTAGES MEASURED FROM B- WITH A 20,000 Ω/VOLT VOLTMETER —
 LINE VOLTAGE 117 V. A.C. — VOLUME CONTROL AT MAXIMUM — NO SIGNAL RECEIVED
 1-1 F. FREQUENCY 455 K.C. —
 ▽ DENOTES B — GROUND.

MODELS 101,102,133

MODELS 104,105,106

MODEL 121

ELECTRONIC CORP. OF AMERICA

In order to make a proper alignment, the following equipment is required:

1. A signal generator capable of providing a modulated radio frequency output over the frequencies required.
2. A suitable output meter or sensitive AC voltmeter with a .1 mfd series blocking condenser.
3. A coupling loop, made of three turns of stiff hookup wire, 4 inches in diameter, mounted on a suitable block of wood or stand.
4. A non-metallic screwdriver.

With the receiver on and the volume control at maximum, connect the signal generator to the coupling loop and bring the loop close to the receiver chassis. Adjust the signal generator output to minimum necessary to give a suitable indication on the output meter, which should be connected from B minus to the plate of one output tube. CAUTION: Make sure the output meter is isolated from DC by a series blocking condenser.

ALIGNMENT DATA

MODELS 104, 105, 106, 102, 101, 133

I.F. FREQ. - 455KC.

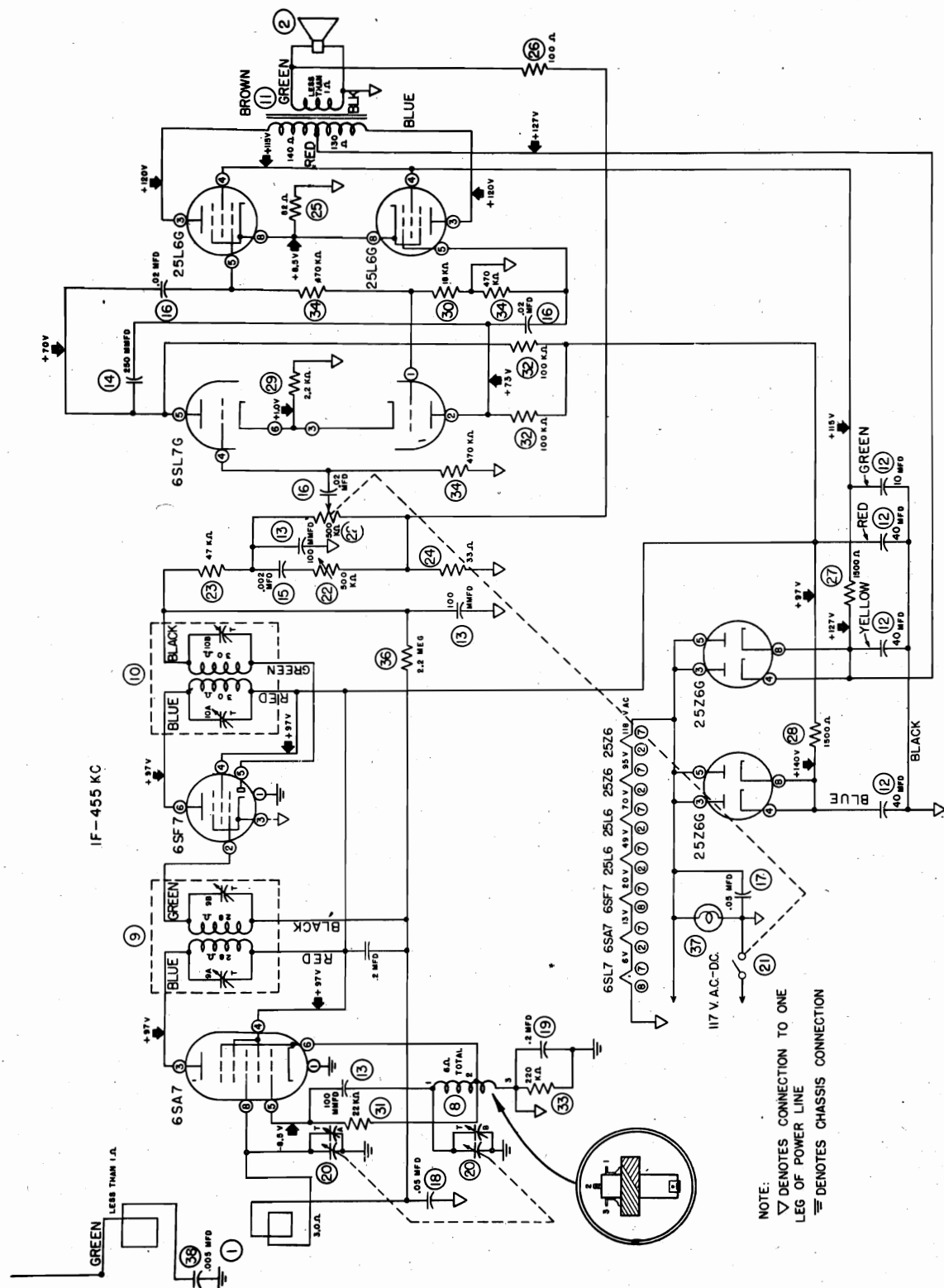
SET SIGNAL GENERATOR AT	SET GANG	LOOP DISTANCE	ADJUST TRIMMER	TUNE FOR	OPERATION
455 KC	Fully Meshed	Close	12a 12b 16a 16b	Max.	Align I.F.
1720 KC	Fully Open	Close	2b	Max.	Set Osc.
1400 KC	1400 KC	Close	2a	Max.	Align R.F.

MODEL 121

I.F. FREQ. - 455 KC.

SET SIGNAL GENERATOR AT	SET GANG	LOOP DISTANCE	ADJUST TRIMMER	TUNE FOR	OPERATION
455 KC	Fully Meshed	Close	34a 34b 35a 35b	Max.	Align I.F.
1720 KC	Fully Open	Close	13b	Max.	Set Osc.
1400 KC	1400 KC	Close	13a	Max.	Align R.F.

ELECTRONIC CORP. OF AMERICA



In order to make a proper alignment, the following equipment is required:

- With the receiver on and the volume control at maximum, connect the signal generator to the coupling loop and bring the loop close to the receiver chassis. Adjust the signal generator output to minimum necessary to give a suitable indication on the output meter, which should be connected from B minus to the plate of one output tube. CAUTION: Make sure the output meter is isolated from DC by a series blocking condenser.

SET SIGNAL GENERATOR AT	SET GANG	LOOP DISTANCE	ADJUST TRIMMER	TUNE FOR	OPERATION
455 KC	Meshed	Close	9a 9b 10a 10b	Max.	Align - I.F.
1720 KC	Fully Open	Close	20a	Max.	Align Oscillator
1400 KC	1400 KC	Close	20b	Max.	Align - R.F.

Chassis Top View

Callouts for Top View:

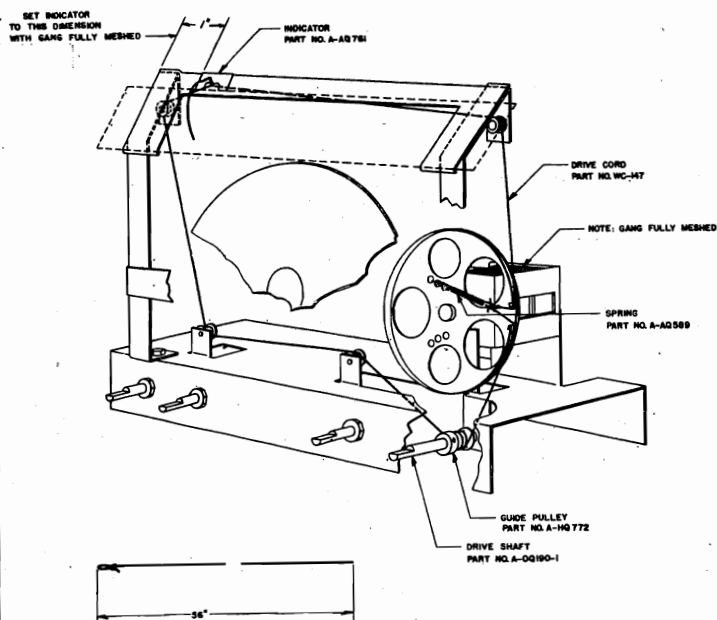
- 10A
- 1D
- 10B
- 1
- 9A
- 9
- 9B
- 25L6 GT
- 25Z6 GT
- 25Z6 GT
- 6SL7 GT
- 25L6 GT
- 6SF7
- 6SA7

ELECTRONIC CORP. OF AMERICA

Replacement of Dial Drive Cord

Completely remove remainder of defective dial cord. Inspect all pulleys and make sure they revolve freely. Determine that no grease or oil is present on any pulley surface. Attach the cord spring, part #A-AQ589, to one end of the drive cord. Fully mesh the gang condenser and hook the spring to the hole closest to the cord cutout on the dial drum. Proceed to string dial cord in accordance with the detail drawing. Take two full turns around the drive drum, part #A-HQ772. Pull the cord snug at this point. Wrap one complete turn around gang drum and pull cord snug. Securely tie free end of cord to the cord spring. Next, adjust spring tension by moving the hook end of the spring into the next spring hole.

Clip the pointer on to the dial cord with sufficient tension so as to prevent slippage and adjust pointer position, so that with fully meshed gang, the left edge of the pointer saddle is one inch from the edge of the dial support frame. Insert chassis in cabinet and check pointer and scale agreement. Then make final adjustment of pointer position. Remove the chassis and firmly crimp the pointer prongs on the dial cord, and secure with a small drop of speaker cement.



Replacement of Audio Output Transformers

When replacing the audio output transformer, original lead dress must be maintained. If either primary or secondary windings are reversed, the set will have a severe audio oscillation, due to the inverse feedback network.

Replacement of I.F. Transformers

When replacing intermediate frequency transformers, either input or output, use caution to observe original lead dress.

MODEL 108

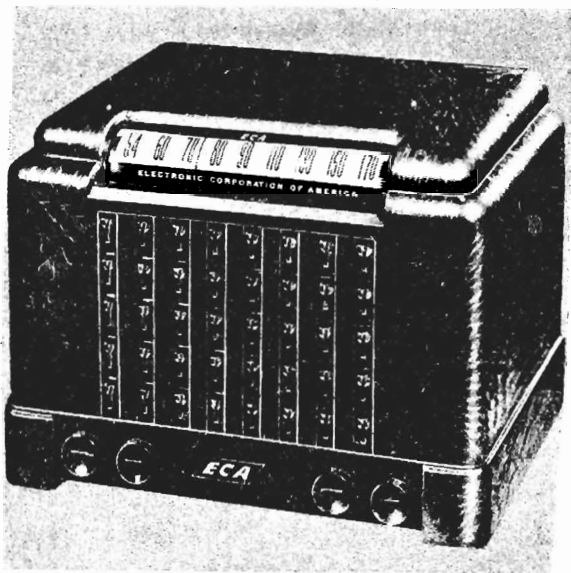
ELECTRONIC CORP. OF AMERICA Service Parts List

No.	PART NAME	PART NO.	No.	PART NAME	PART NO.
1	Loop Antenna	C-ZQ-522*	30	Resistor, Fixed, 18K ohm, 1/4 W., 10%	RS-222B
2	Speaker	S-QL-105E*	31	" " 22K " 1/4 W.	RS-197B
8	Oscillator Coil	S-LR-120*	32	" " 100K " 1/4 W., 10%	RS-120B
9	Input I.F. Transformer	S-LR-127*	33	" " 220K " 1/4 W.	RS-190B
10	Output I.F. Transformer	S-LR-128*	34	" " 470K " 1/4 W., 10%	RS-189B
11	Output Transformer	S-TA-116*	36	" " 2.2 meg.	RS-223B
12	Electrolytic Condenser	S-CE-126M*	37	Pilot Bulb, G.E., 3 W., 110 V.	IP-115
13	Condenser, Mica, 100 mmf.	CM-103E	38	Condenser, Paper, .005 mf., 200 V.	CP-116D
14	" " 250 mmf.	CM-112E		Cabinet, Bakelite	E-AQ-640*
15	" " Paper, .002 mf., 400 v.	CP-122E		Knob Assembly	A-ZQ-577*
16	" " .02 mf.	CP-104E		Dial Scale	C-NP-157-3*
17	" " .05 mf.	CP-105E		Pointer	A-AQ-761*
18	" " .05 mf., 200 v.	CP-105D		Dial Cord Spring	A-AQ-589*
19	" " .2 mf., 200 V.	CP-133D		Tuning Shaft	A-OQ-190-1*
20	Variable Capacitor and Drum	S-ZQ-500*		"C" Washer	HN-405*
21	On-off Switch	S-SR-137*		Dial Cord Bushing	A-HQ-772*
22	Vol. Control, Tone Control, 500K ohms	S-RV-174-1*		Pilot Light Socket	S-XQ-164*
23	Resistor, Fixed, 47K ohm, 1/4 W.	RS-186B		Dial Background Plate	B-AQ-758*
24	" " 33 " 1/4 W.	RS-220B		Loop Spacer Block	A-AQ-637*
25	" " 82 " 1 W., 10%	RS-221D		Felt Knob Washers	HN-365*
26	" " 100 " 1/4 W.	RS-114B		Dial and Speaker Support	C-ZQ-619*
27	" " 1500 " 1/2 W., 10%	RS-195C		5 Lug Terminal Panel	EQ-380*
28	" " 1500 " 2 W., 10%	RS-195E		Line Cord and Plug	WC-148*
29	" " 2.2K " 1/4 W.	RS-185B			

Note: All items followed by an asterisk (*) will be stocked by the Electronic Corporation of America. All unmarked items may be replaced by any high quality component of equal electrical value.

All DC voltage measurements in this Service Bulletin have been made with a 20,000 ohms per volt voltmeter, using B minus as a common reference point. All AC voltage measurements are with 1000 ohms per volt voltmeter. Line voltage was maintained at 117 volts for all voltage measurements. The condenser gang should be fully meshed and the volume control at its minimum point. Voltages may vary $\pm 10\%$ from the indicated nominal value.

Measurements of oscillator grid bias voltage should be made with a 50,000 ohm resistor in series with the negative probe of the meter, and the positive prod connected to B minus. Rotate the tuning condenser throughout its complete range with the meter connected. Absence of bias voltage at any point is an indication that the oscillator is not functioning.

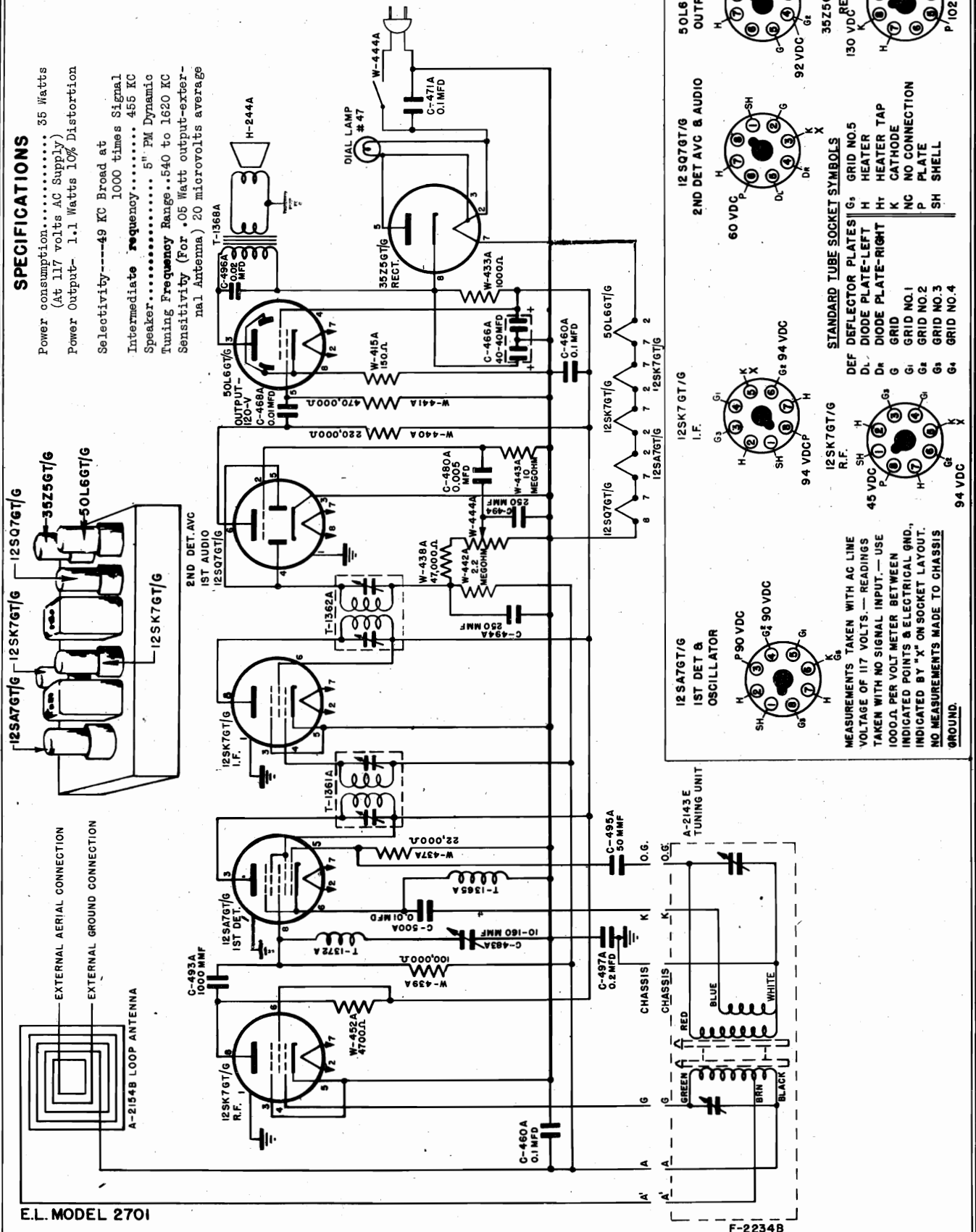


CABINET Plastic, Walnut Finish
 CIRCUIT 7 Tube, Superheterodyne
 FREQUENCY RANGE . . . 540 to 1720 KC
 INTERMEDIATE FREQ. . 455 KC
 POWER INPUT 110 to 125 V. AC-DC
 POWER CONSUMPTION . . 60 Watts
 ANTENNA Built-in Loop
 SPEAKER Alnico V PM Dynamic 6"
 V.C. IMPEDANCE 3.2 ohms at 400 Cycles
 POWER OUTPUT 3 Watts Undistorted

ELECTRONIC LABORATORIES, INC.

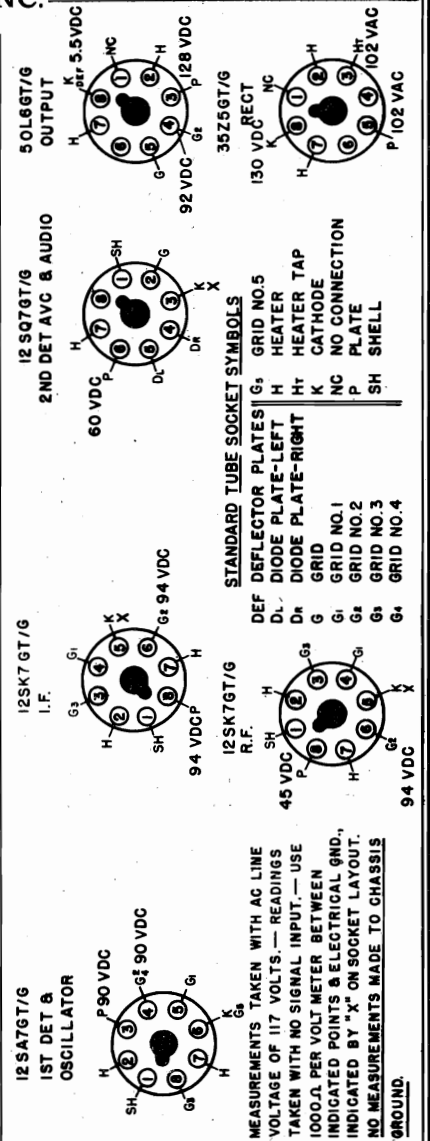
SPECIFICATIONS

Power consumption..... 35 Watts
(At 117 volts AC Supply)
Power Output- 1.1 Watts 10% Distortion
Selectivity-----49 KC Broad at
1000 times Signal
Intermediate frequency..... 455 KC
Speaker..... 5" PM Dynamic
Tuning Frequency Range...540 to 1620 KC
Sensitivity (For .05 Watt output-external Antenna) 20 microvolts average



E.L. MODEL 2701

F-22348



MEASUREMENTS TAKEN WITH AG LINE
VOLTAGE OF 117 VOLTS.— READINGS
TAKEN WITH NO SIGNAL INPUT.— USE
1000.0 PER VOLT METER BETWEEN
INDICATED POINTS & ELECTRICAL GND.
INDICATED BY "X" ON SOCKET LAYOUT.
NO MEASUREMENTS MADE TO CHASSIS
GROUND.

MODEL 2701

ELECTRONIC LABORATORIES, INC.

ALIGNMENT PROCEDURE

Volume Control-Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

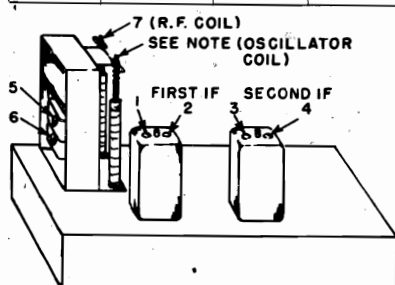
The equipment in column at right is required for Aligning:

Signal Generator which will provide an accurately calibrated signal at test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas-.01 mf., and 400 ohms.

SIGNAL GENERATOR			DUMMY ANTENNA	TUNER SETTING	TRIMMER ADJUSTMENT (SEE DIAGRAM)	NOTES
FREQUENCY	ANTENNA CONNECTION	COUPLING				
I.F. 455 KC	Grid of RF tube 12SK7	Ground generator to chassis	0.01 mfd	Out	Adjust for Max. 1, 2, 3 and 4	No signal will be heard unless trimmer condenser under chassis is unscrewed and reduced from original setting
I.F. 455 KC	Grid of RF tube 12SK7	Ground generator to chassis	0.01 mfd	Out	Trim condenser under chassis for Min. output.	If it is found that regeneration prevails when the loop antenna is put in its normal position close to the tubes, then the under chassis trimmer is incorrectly set, and should be adjusted to prevent the regenerative condition.
1620 KC	Inductive Coupling to Loop	Loop coupling with leads brought out	400 ohms in series with Antenna & Gnd. leads	Out	Adjust Osc. #5 per Max. signal	
1400 KC	Inductive Coupling to Loop	Loop coupling with leads brought out	400 ohms in series with Antenna & Gnd. leads	Dial set for 1400KC	Adjust RF trimmer #6 per Max. Signal.	
700 KC	Inductive Coupling to Loop	Loop Coupling with leads brought out	400 ohms in series with Antenna & Gnd. leads	Dial set for 700KC	Adjust RF tuning core #7 for Max. (care should be taken not to disturb carriage position of tuner)	



ALIGNMENT NOTES

A. MECHANICAL ALIGNMENT:- The following mechanical adjustments should be made before alignment:

1. Rotate shaft of tuning unit until carriage is against top stop position.
2. Space oscillator coil slug 1-5/32" out from top of oscillator coil form.
3. Space R.F. coil slug 1-29/64" out from top end of R.F. coil winding. (Note: The distance 1 and 2 should be measured from mounted end of the slug)

4. Adjust screw on trimmer of wave trap towards open position so that condenser plates are open at least 1/32".

B. I.F. ALIGNMENT PROCEDURE

1. Feed I.F. frequency from the signal generator through a 0.01 mfd condenser to the control grid of the R. F. tube.
2. No signal will be heard unless trimmer condenser under chassis is unscrewed and reduced from original setting.
3. Turn volume control full on.
4. Make preliminary I.F. adjustment with signal level approximately 50 Mv.
5. Tune I.F. trimmers for maximum signal, reducing I.F. signal input to coupling loop to keep output voltage less than 0.5 V.
6. When maximum output has been secured, adjust trimmer condenser in the I.F. trap (under chassis) by turning clockwise to the minimum signal.

C. R.F. ALIGNMENT PROCEDURE

1. Volume control full on.
2. Adjust tuning unit to top stop position.
3. Feed 1620 kc signal into external loop. Hold audio output below 0.5 V. Adjust the oscillator trimmer condenser to maximum output.
4. Move slugs in by means of tuning dial so that pointer is approximately 1" from the stop end, and a signal received from the external loop on a frequency of 1400 kc. Adjust lower trimmer (R.F. trimmer) to maximum output. Reduce R.F. input to keep signal output voltage below 0.5 V.
5. Rotate tuning shaft until pointer is approximately 1" from the other end of the scale. Feed to the external loop a test signal at 700 kc. Adjust the R. F. coil slug by rotation to maximum output.

D

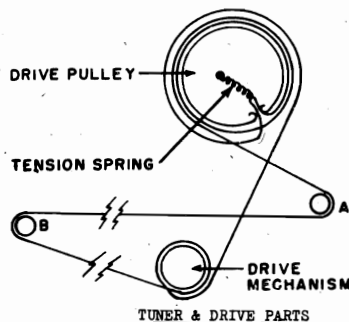
1. Alternately adjust R.F. trimmers at 1400 kc. and R.F. slug at 700 Kc. until maximum sensitivity is attained at both frequencies.

- E. When set is correctly aligned, the low frequency end of the tuning range should fall at 540 Kc.

CAUTION: Extreme care should be taken in the 700 kc. position to make sure that the tuner carriage is not moved by the adjusting tools or hand pressure on the slug screw. Carriage should not be held against the frame, but should be allowed to assume its normal position when adjusting the R.F. coil slug.

DRIVE CORD REPLACEMENT

Turn the tuner to the fully open position. Use a new cord 50" long and tie one end to the tension spring. Fasten the other end of the tension spring to the drive pulley. Pass cord through slot in pulley ring; add spring tension and continue one and one-half turns counterclockwise over top of pulley. Then pass cord around idler pulley A, starting over top and going around clockwise. Pass cord over idler pulley B, starting over top and going around counterclockwise. Wind one full turn counterclockwise around drive mechanism. Then wind one full turn counterclockwise around drive pulley, pass through slot in pulley and tie string to tension spring. Cut off excess string. Attach dial pointer to cord.



A-2143E Tuner Assembly
L-2450A Pulley-Drive
L-2451A Pulley-Idler

U-1442A Shoulder Rivet
H-247B Glass Dial
H-246A Translucent Screen
U-1445A Snap for Screen
U-1461A Pointer
U-1444A Spring
S-599A Pilot Light Socket Assembly
A-2155A Dial Drive Assembly

RESISTORS

W-415A 150 ohm, 0.5 Watt Carbon
W-452A 4700 ohm, 0.5 Watt Carbon
W-433A 1000 ohm, 1.0 Watt Carbon
W-437A 22,000 ohm, 0.25 Watt Carbon
W-438A 47,000 ohm, 0.25 Watt Carbon
W-439A 100,000 ohm, 0.25 Watt Carbon
W-440A 220,000 ohm, 0.25 Watt Carbon
W-441A 470 ohm, 0.25 Watt Carbon
W-442A 2.2 megohm, 0.25 Watt Carbon
W-443A 10 megohm, 0.25 Watt Carbon
W-444A Switch & Pot, 500,000 ohm, Carbon

COILS

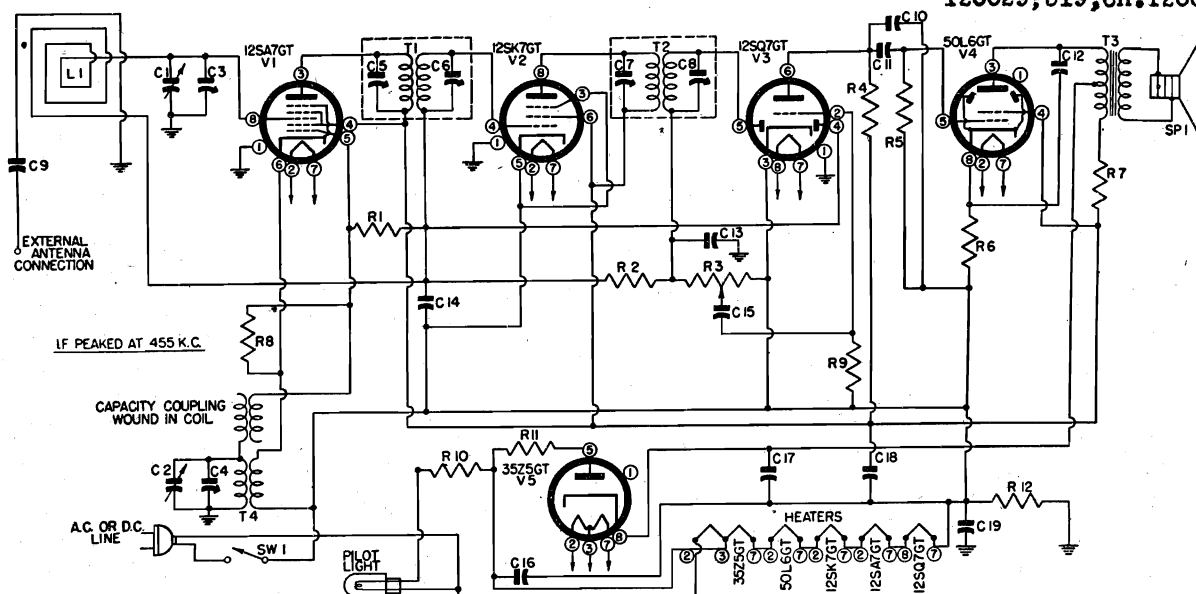
A-2154B Antenna & Back Cover Assembly
T-1361A 1st I.F. Transformer 455 KC
T-1362A 2nd I.F. Transformer 455 KC
T-1365A R. F. Choke Coil 1.4 MH
T-1368A Audio Transformer
T-1372A R.F. Choke Coil 3.0 MH

CAPACITORS

C-471A 0.1 mfd, 400 V Tubular
C-493A 1000 mmf, 350 V Ceramic
C-494A 250 mmf, 350 V Ceramic
C-495A 50 mmf, 500 V Ceramic
C-480A 0.005 mfd, 400 V Tubular
C-466A 40-40 mfd, 150 V Electrolytic
C-483A 10-160 mmf Trimmer
C-496A 0.02 mfd, 200 V Tubular
C-460A 0.1 mfd, 200 V Tubular
C-497A 0.2 mfd, 400 V Tubular
C-500A 0.01 mfd, 400 V Molded

EMERSON RADIO & PHONO. CORP.

MODELS 501, 502, 503, 504,
510, 520, Ch. 120, 000,
120029; 519, Ch. 120030



The following voltage readings are d-c measurements taken from B— (line switch) in the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (*), which should be taken with a d-c vacuum-tube voltmeter. Line voltage for these readings was 117 volts, 60 cycles, a.c. Measurements made with 117 volts d.c. will be lower than those given below. Take readings with the volume control set at minimum and the variable condenser closed.

TUBE	PIN NUMBER							
	1	2	3	4	5	6	7	8
12SA7			89	89	*-10			*-1.6
12SK7				*-1.6		89		89
12SQ7		*-0.7		*-1.6	-0.5	37.5		
50L6GT			110	89				6.2
35Z5GT				116		116		117

An oscillator with frequencies of 455, 600 and 1425 kc is required.

An output meter should be connected across the primary or secondary of the output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Plug the receiver into the power supply outlet in such a way that the ground side of the power line is connected to the receiver B—.

Location of Coils and Trimmer Adjustments

The first i-f transformer (T1) is mounted on top of the chassis deck to the right of the variable condenser. The trimmers (C5, C6) are accessible through holes in the top of the can.

The second i-f transformer (T2) is mounted on top of the chassis between the variable condenser and the speaker. The trimmers (C7, C8) are accessible through holes in the top of the can.

The trimmer for the antenna (C3) and the trimmer for the oscillator coil (C4) are located on the variable condenser. The trimmer on the front section is for the oscillator coil.

The oscillator coil (T4) is located underneath the chassis. The loop antenna acts as the antenna coil.

FREQUENCY RANGE: 540-1620 kc.

NUMBER OF TUBES: Five.

TYPE OF TUBES:

- 1—12SA7, pentagrid oscillator-modulator
- 1—12SK7, first i-f amplifier
- 1—12SQ7, diode detector, a-f amplifier, a.v.c.
- 1—50L6GT, beam power output
- 1—35Z5GT, half-wave rectifier

I-F Alignment

1. Rotate the variable condenser to the minimum capacity position.
2. Feed 455 kc to the converter grid (stator of the r-f section of the variable condenser) and adjust the four i-f trimmers (C5, C6, C7, C8) for maximum response.

R-F Alignment

1. Connect the oscillator to a coil composed of three to four turns of wire wound in a circle approximately 12" in diameter. This coil should be held parallel to and in line with the loop antenna of the receiver at a distance of 15 to 20 inches.
2. Radiate a signal at 1425 kc, set the dial indicator to 1425 kc, and adjust the trimmers on the variable condenser (C3, C4) for maximum response.
3. Radiate a 600 kc signal and tune in the signal on the receiver. Adjust the loose outside turn of the loop antenna for maximum response. This loose turn may be moved to either side of the center. Fasten it in the position which gives maximum response.
4. Repeat steps 2 and 3 until no further improvement is evident.

POWER SUPPLY: A.C. or D.C.

VOLTAGE RATING: 105-125 volts.

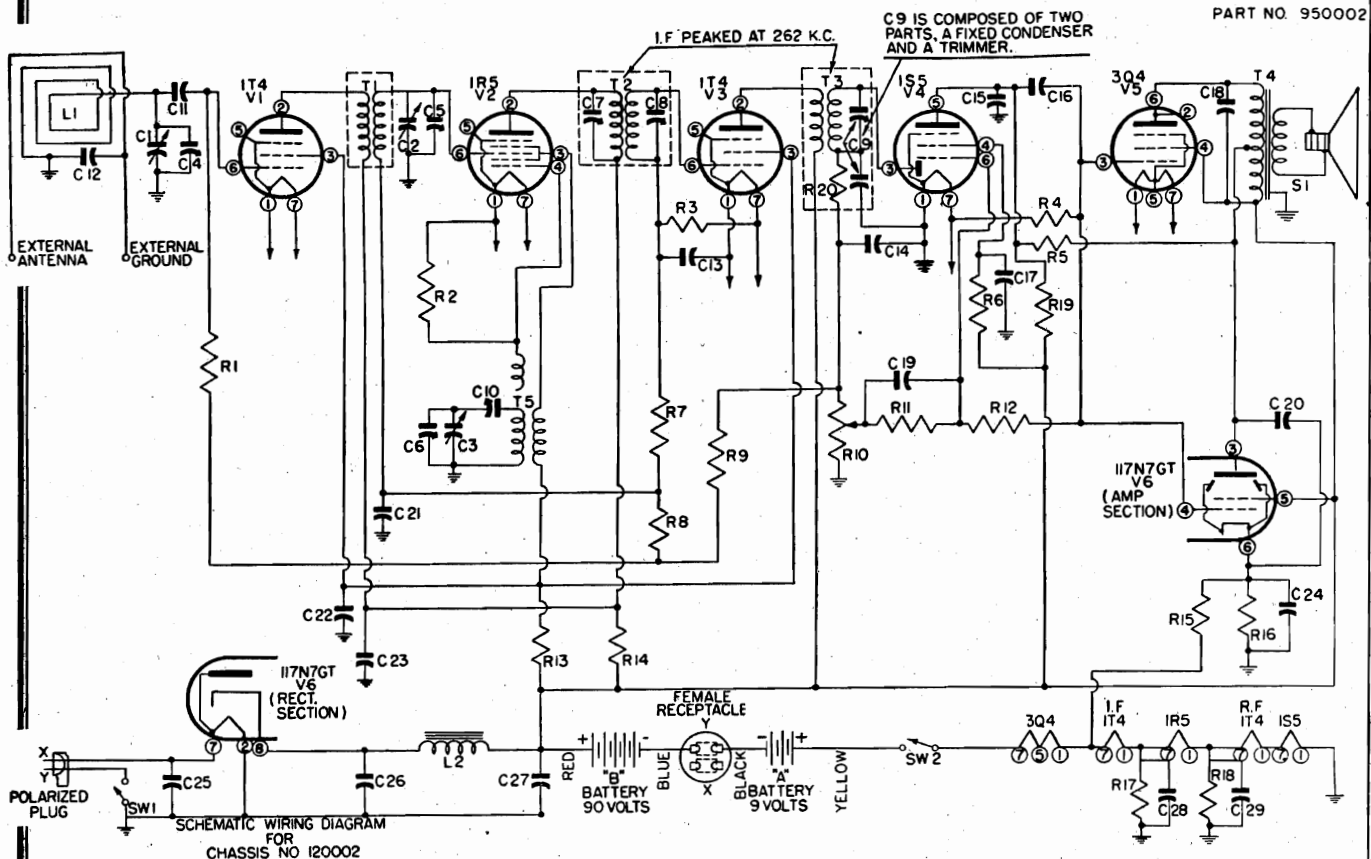
POWER CONSUMPTION: 30 watts.

DIAL CORD REPLACEMENT

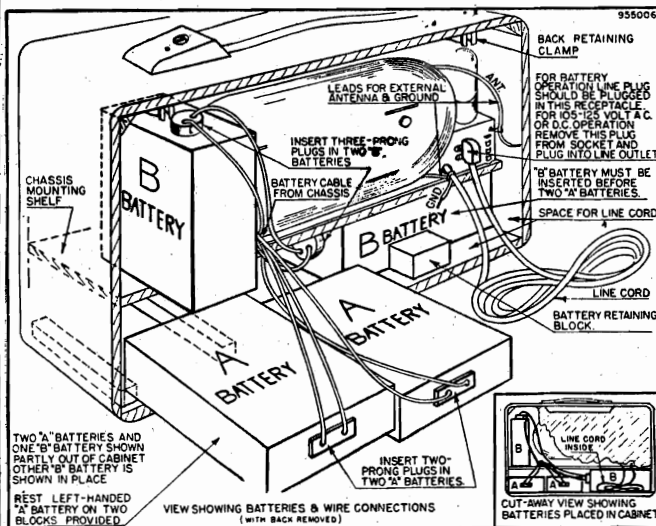
Draw the cord snugly around the condenser pulley and knot it, with no slack, near the notch in the pulley, after which the spring may be hooked to the cord and pulley.

EMERSON RADIO & PHONO. CORP. MODEL 505, Ch. 120002

PART NO. 950002



Battery Installation



TYPE OF TUBES:

- 1—1R5, oscillator-modulator
- 2—1T4, r-f and i-f amplifiers
- 1—1S5, 2nd detector, a.v.c., a-f amplifier
- 1—3Q4, beam power output (battery operation)
- 1—117N7, beam power output and half-wave rectifier (line operation)

POWER SUPPLY: Battery, a.c. or d.c.

VOLTAGE RATING: 105-125 volts a.c.-d.c. (line operation).

POWER CONSUMPTION: 20 watts (line operation).

CURRENT DRAIN:

"A" Battery—0.05 amp.

"B" Battery—0.01 amp.

BATTERY COMPLEMENT

The cabinet is designed to house the complete set of batteries. The battery complement should be as follows:

Battery Type	Number Required	Eveready Part No.	Rayovac Part No.	Burgess Part No.
4½ volt "A"	2	746 (plug-in type)	P83A or EM-83 (plug-in type)	3G (plug-in type)
45 volt "B"	2	482 Minimax (plug-in type)	—	—

MODEL 505, Ch. 120002

EMERSON RADIO & PHONO. CORP.

Schematic Symbol	Part No.	DESCRIPTION	PRICE
C1, C2, C3	900080	Three-gang variable condenser	\$5.50
*C4		Trimmer part of C1	
*C5		Trimmer, part of C2	
*C6		Trimmer, part of C3	
*C7, C8		Trimners, part of T2	
*C9		Trimmer and fixed condenser, part of T3	
C10	900110	Padding condenser .....	.45
C11, C13	920060	0.05 mfd., 200 V. condenser .....	.20
C12, C18	920010	0.002 mfd., 600 V. condenser .....	.20
C14	910010	110 mmfd., mica condenser .....	.20
C15	910050	400 mmfd., mica condenser .....	.25
C16, C19, C21, C22, C29	920100	0.02 mfd., 200 V. condenser .....	.20
C17, C20	920090	0.01 mfd., 400 V. condenser .....	.20
C23	920020	0.02 mfd., 400 V. condenser .....	.20
C24	925090	100 mfd., 25 V. electrolytic condenser .....	.90
C25	920030	0.05 mfd., 400 V. condenser .....	.20
C26, C27	925050	20-40 mfd., 135 V. dual electrolytic condenser	1.20
C28	920110	0.25 mfd., 100 V. condenser	1.20
L1	700090	Loop antenna	
L2	370710	Filter choke	1.95
R1, R3, R5, R6, R7, R8	311330	3.3 meg., $\frac{1}{4}$ watt resistor .....	.12
R2	310970	100,000 ohms, $\frac{1}{4}$ watt resistor .....	.12
R4, R19	321130	470,000 ohms, $\frac{1}{4}$ watt resistor .....	.12
R9	321290	2.2 meg., $\frac{1}{4}$ watt resistor .....	.12
R10	390020	Volume control, 500,000 ohms	1.10
R11	311390	5.6 meg., $\frac{1}{4}$ watt resistor .....	.12
R12	321450	10 meg., $\frac{1}{4}$ watt resistor .....	.12
R13	340770	15,000 ohms, $\frac{1}{2}$ watt resistor .....	.14
R14	340630	3,900 ohms, $\frac{1}{2}$ watt resistor .....	.14
R15	310130	33 ohms, $\frac{1}{4}$ watt resistor .....	.12
R16	310610	3,300 ohms, $\frac{1}{4}$ watt resistor .....	.12
R17	310570	2,200 ohms, $\frac{1}{4}$ watt resistor .....	.12
R18	310450	680 ohms, $\frac{1}{4}$ watt resistor .....	.12
*R20		47,000 ohms, $\frac{1}{4}$ watt resistor, part of T4	
S1	180006	Permanent magnet speaker, 5"	5.00
*SW1		Line switch on volume control R10	
*SW2		Battery switch on volume control R10	
T1	713000	R.F. coil	1.60
T2	720170	First i-f transformer	1.65
T3	720190	Second i-f transformer	2.20
T4	734040	Output transformer	1.85
T5	716030	Oscillator coil	1.10
	140002	Cabinet	7.50
	460470	Knob .....	.10
*Not supplied separately.			
DIAL PARTS			
	280133	Drive shaft .....	.15
	587000	Drive cord spring .....	.05
	520039	Dial backplate .....	.10
	525120	Pointer assembly .....	.20
	460040	Dial crystal .....	.75

List price each effective as of January 1, 1946. (Prices subject to change without notice.)

GENERAL NOTES

- The color coding of the i-f transformer leads is as follows:
Grid—green Plate—blue
Grid return—black B+—red
- The color coding of the battery cable is as follows:
Red—B+, 90 Volts Yellow—A+, 9 Volts
Blue—B— Black—A—
- If replacements are made in the r-f section of the circuit, the receiver should be carefully realigned.
- A.C.-D.C. Operation: Remove the rear cover; it is held in place by two spring latches. Take out the line cord, removing the plug from its receptacle at the rear of the chassis. Insert the plug in the wall outlet. If the power supply is d.c. and the receiver does not operate at first, remove the plug from the wall outlet, turn it half way around and reinsert it in the outlet, thus obtaining the proper polarity.

TUBE	PIN NUMBER							
	1	2	3	4	5	6	7	8
1T4(VI)	1.2	88	56		1.2	*0.3	2.4	
1R5	2.4	88	56	-8	2.4	*1.5	3.7	
1T4(V2)	3.7	98	56		3.7	*2.3	4.9	
1S5	0		*0.3	*19	*50	*0.2	1.2	
3Q4	4.9	92	*1.1	98	4.9	92	4.9	
117N7			92	*1.1	98	6.25		125

The following voltage readings are d-c measurements taken with a line voltage of 117 volts, 60 cycles from B— (chassis) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (*), which should be taken with a d-c vacuum-tube voltmeter. Take readings with the volume control set at minimum and the variable condenser closed.

An oscillator with frequencies of 262, 600 and 1425 kc is required.

An output meter should be connected across the primary or secondary of the output transformer for observing maximum response.

Always use as weak a test signal as possible, turning down the output of the test oscillator as the alignment of the receiver progresses.

Plug the receiver into the power supply in such a way that the ground side of the power line is connected to the receiver B—.

Location of Coils and Trimmer Adjustments

The oscillator coil (T5) is located beneath the chassis. The trimmer for the oscillator (C6) is on the middle section of the variable condenser.

The interstage coil (T1) is the shielded coil located beneath the chassis. Its trimmer (C5) is on the front section of the variable condenser.

The trimmer for the loop antenna (C4) is on the last section of the variable condenser (the section nearest the loop).

The i-f transformers are mounted on top of the chassis. The first i-f transformer (T2) is mounted next to the loop. The second i-f transformer (T3) is mounted next to the dial.

The series padder (C10) is located on the chassis between the variable condenser and the shielded 1T4 tube.

I-F Alignment

Rotate the variable condenser to the minimum capacity position. Feed 262 kc to the converter grid and adjust the three i-f trimmers for maximum response.

Interstage Alignment

- Set the dial indicator to 1425 kc, feed 1425 kc to the r-f grid, and adjust the oscillator and interstage trimmers for maximum response.
- Set the dial indicator to 600 kc, feed 600 kc to the r-f grid, and adjust the oscillator padding trimmer by rocking in the signal for maximum response.
- Repeat steps 1 and 2 until no further improvement is possible.

Loop Alignment

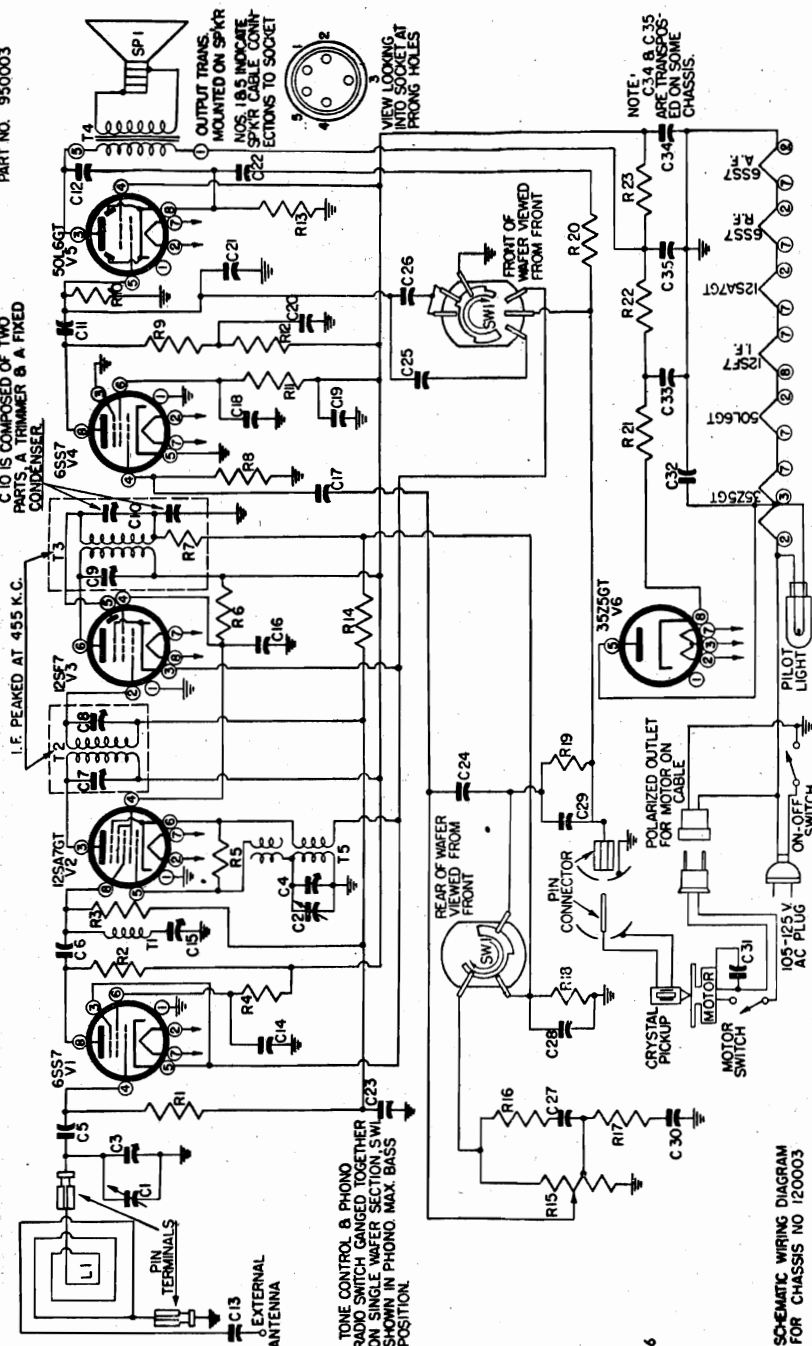
Connect the test oscillator to a coil composed of three or four turns of wire wound in a loop approximately 12" in diameter. This coil should be held parallel to and in line with the receiver's loop at a distance of 15 to 20 inches.

- Radiate a signal at 1425 kc, tune in the signal on the receiver, and adjust the loop trimmer for maximum response.
- Radiate a signal at 600 kc, tune in the signal on the receiver, and adjust the loose outside turn of the loop antenna for maximum response. This loose turn may be moved to either side of the center. Fasten it in the position which gives maximum response.
- Repeat steps 1 and 2 until no further improvement is possible.

EMERSON RADIO & PHONO. CORP.

PART NO. 950003

C.10 IS COMPOSED OF TWO PARTS: A TRIMMER & A FIXED CONDENSER.



The following voltage readings are d-c measurements taken from B— (chassis) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (*), which should be taken with a d-c vacuum-tube voltmeter. Line voltage for these readings was 117 volts, 60 cycles, a.c. Take readings with the volume control set at minimum, the variable condenser closed, and the phonograph-radio switch in the treble radio position.

The color coding of the i-f transformer leads is as follows:
 Plate—blue
 B+—red
 Grid return—black
 Grid—green

- 2—6SS7, r-f and a-f amplifiers
- 1—12SA7, pentagrid oscillator-modulator
- 1—12SF7, diode detector, i-f amplifier, a.v.c.
- 1—50L6GT, beam power output
- 1—35Z5GT, half-wave rectifier

POWER SUPPLY: A.C. only, 60 cycles.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION:

30 watts for the receiver.
 20 watts for the phono motor.

TUBE	1	2	3	4	5	6	7	8
6SS7(V1)				*0.9		55		52
12SA7			92	84	*8.6			*0.82
12SF7				84		92		
6SS7(V4)				*7.5		*9		*42
50L6GT			100	93		75		5.6
35Z5GT				115		108		120

EMERSON RADIO & PHONO. CORP.

Schematic Symbol	Part No.	DESCRIPTION	PRICE
C1, C2	900180	Two-gang variable condenser	\$4.50
C3	900190	1.6-12 mfd. trimmer	.25
C4	910000	Trimmer, part of C2	.20
C5	910000	0.00022 mfd. mica condenser	.20
C6, C7	910010	0.00011 mfd. mica condenser	.20
C8		Trimmers, part of T3	
C9		Trimmer, part of T3	
C10	920020	Trimmer and fixed condenser, part of T3	.20
C11	920180	0.02 mfd., 400 V. condenser	.20
C12	920180	0.005 mfd., 400 V. condenser	.20
C13	920010	0.002 mfd., 600 V. condenser	.20
C14	920060	0.05 mfd., 200 V. condenser	.20
C15		Trimmer, part of T1	
C16	925100	8 mfd., 150 V. electrolytic condenser	.60
C17	910050	0.0004 mfd. mica condenser	.25
C18	920040	0.1 mfd., 200 V. condenser	.20
C19	910030	0.000226 mfd. mica condenser	.20
C20	920010	0.002 mfd., 600 V. condenser	.20
C21	910040	0.00025 mfd. mica condenser	.20
C22	920170	0.001 mfd., 600 V. condenser	.20
C23	920500	0.05 mfd., 200 V. condenser	.20
C24	920030	0.05 mfd., 400 V. condenser	.20
C25	920080	20, 40, 80 mfd., 150 V. multiple electrolytic condensers; C33-40 mfd., C34-20 mfd., C35-80 mfd.	1.75
C26		Loop antenna	1.25
C27	700070	10 meg., $\frac{1}{2}$ watt resistor	.12
C28	321210	10,000 ohms, $\frac{1}{2}$ watt resistor	.12
C29	310910	22,000 ohms, $\frac{1}{2}$ watt resistor	.12
C30	310850	33,000 ohms, $\frac{1}{2}$ watt resistor	.12
C31	340490	1,000 ohms, $\frac{1}{2}$ watt resistor	.14
C32		47,000 ohms, $\frac{1}{2}$ watt resistor, part of T3	.12
C33	321450	10 meg., $\frac{1}{2}$ watt resistor	.12
C34	321050	220,000 ohms, $\frac{1}{2}$ watt resistor	.12
C35	321130	470,000 ohms, $\frac{1}{2}$ watt resistor	.12
C36		2.2 meg., $\frac{1}{2}$ watt resistor	.12
C37	310890	47,000 ohms, $\frac{1}{2}$ watt resistor	.12
C38	340290	150 ohms, $\frac{1}{2}$ watt resistor	.14
C39	321330	3.3 meg., $\frac{1}{2}$ watt resistor	.12
C40	390050	2.5 meg. volume control and switch	1.15
C41	320970	15,000 ohms, $\frac{1}{2}$ watt resistor	.12
C42	320700	15,000 ohms, $\frac{1}{2}$ watt resistor	.12
C43	370410	180 ohms, $\frac{1}{2}$ watt resistor	.16
C44	180004	470 ohms, 1 watt resistor	.16
C45	510100	Speaker, $\frac{6\frac{1}{2}}{8}$ " permanent magnet (less output transformer)	7.00
C46	708000	Phono and tone switch	1.15
C47	720270	Wave trap	.90
C48	720370	First i-f transformer	1.65
C49	734030	Second i-f transformer	2.00
C50	716050	Output transformer	2.00
C51	716060	Oscillator coil, or	.80
C52	363090	Oscillator coil	.80
C53	140015	Line cord	.60
C54	460470	Cabinet, walnut	42.50
C55	460470	Cabinet, mahogany	42.50
C56	560080	Knob, volume and selector	.10
C57	560080	Knob, phono-radio	.10
C58	819005	Bottom cover	.85
C59	819005	Record changer, or	45.00
C60	819003	Record changer	40.00
C61	807010	Pilot light No. 51	.09
C62	507110	Pilot light socket	.20
C63	411070	Dial plate	.40
C64	525100	Pointer	.30
C65	280153	Drive shaft	.15
C66	587000	Drive cord spring, dial	.05
C67	587070	Drive cord spring, variable condenser	.05

DIAL PARTS

*Not supplied separately.

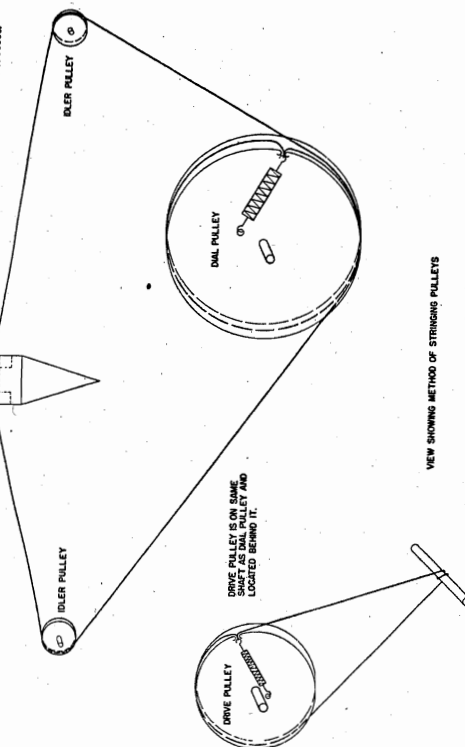
I-F Alignment and Wave Trap Alignment

1. Set the variable condenser to the minimum capacity position.
2. Feed 455 kc to the grid (pin 8) of the 12SA7 tube through a .001 mfd. condenser and adjust the four i-f trimmers (C7, C8, C9, C10) for maximum response.
3. Feed 455 kc to the external antenna lead and adjust the wave trap (T1, C15) for minimum response.

R-F Alignment

1. Set the variable condenser at maximum capacity and the front edge of the pointer opposite the maximum capacity marker on the lower edge of the dial plate. The markers are small triangular indentations on the front edge. Looking at the front of the set from left to right are calibration points for maximum capacity, 600 kc, 1425 kc, and 1600 kc.
2. Connect the test oscillator to a coil composed of three or four turns of wire wound in a circle approximately 12" in diameter. Place the coil parallel to and in line with the receiver loop at a distance of approximately 15 to 20 inches. During alignment procedure, make sure the relative positions of the receiver and loop are similar to actual operating positions when mounted on the cabinet.
3. Radiate a signal at 1425 kc, set the dial indicator opposite the 1425 kc marker, and adjust both oscillator and antenna trimmers for maximum response.
4. Radiate a 600 kc signal, tune in the signal on the receiver, and adjust the loose outside turn of the loop antenna for maximum response. This loose turn may be moved to either side of the center. Fasten it in the position which gives maximum response.
5. Repeat steps (3) and (4) until no further improvement is possible.

NO. 98303



VIEW SHOWING METHOD OF STRINGING PULLEYS

An oscillator with frequencies of 455, 600, and 1425 kc is required.

An output meter should be connected across the primary or secondary of the output transformer for observing maximum and minimum response, as required.

Always use as weak a test signal as possible, turning down the output of the test oscillator as the alignment of the receiver progresses.

Turn the volume control on full and set the tone control in the most brilliant position.

Location of Coils and Trimmer Adjustments

The first i-f transformer (T2) is mounted on top of the chassis deck next to the 12SA7 tube. The trimmers (C7, C8) are accessible through holes in the top of the can.

The second i-f transformer (T3) is mounted on top of the chassis next to the 50L6 tube. The trimmers (C9, C10) are accessible through holes in the top of the can.

The trimmer (C2) for the oscillator coil (T5) is located on the rear section of the variable condenser.

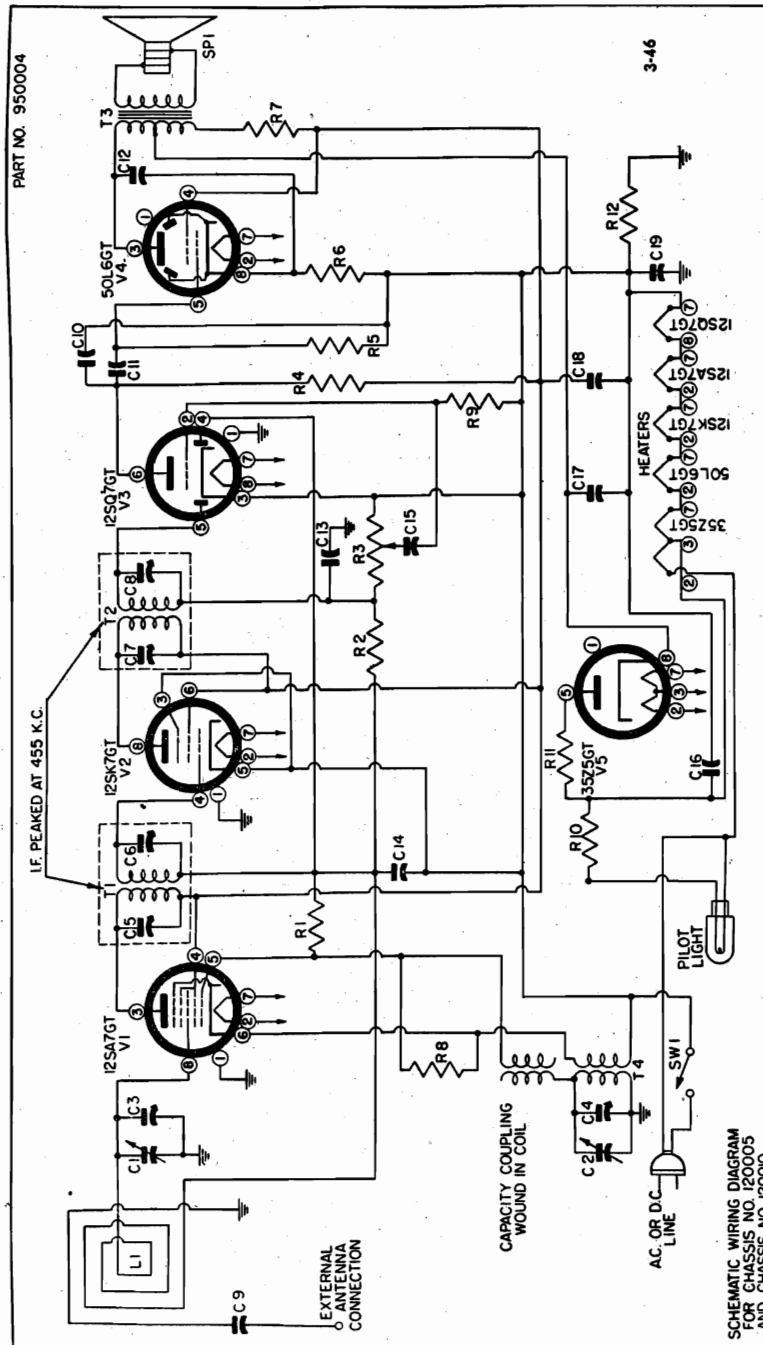
The antenna trimmer (C3) is mounted on the variable condenser mounting bracket.

The oscillator coil is located underneath the chassis. The loop antenna acts as the antenna coil.

The wave trap (T1) is located on the top deck of the chassis base adjacent to the 12SA7 tube.

Specify part numbers when ordering. List price each effective as of January 1, 1946. (Prices subject to change without notice.)

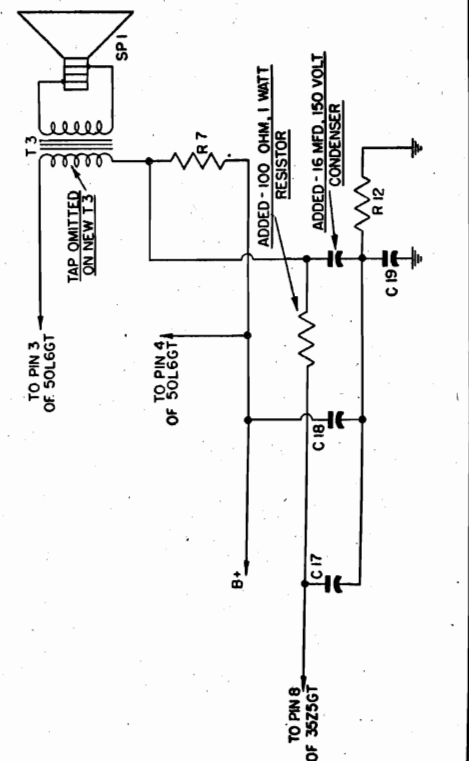
EMERSON RADIO & PHONO. CORP. MODELS 507, 509, 511, 518, Ch. 120005, 120010



NOTE

Some 120005 chassis have a modified filter circuit and untapped output transformer. The partial schematic circuit diagram at the left indicates the revision.

PART NO. 950016



MODELS 507, 509, 511,
518, Ch. 120005, 120010

EMERSON RADIO & PHONO. CORP.

An oscillator with frequencies of 455, 600, and 1425 kc. is required.

An output meter should be connected across the primary or secondary of the output transformer for observing maximum response.

Plug the receiver into the power supply outlet in such a way that the ground side of the power line is connected to the receiver B—.

Always use as weak a test signal as possible, turning down the output of the test oscillator as the alignment of the receiver progresses.

Location of Coils and Trimmer Adjustments

The first i-f transformer (T2) is mounted on top of the chassis deck to the right of the variable condenser. The trimmers (C6, C7) are accessible through holes in the top of the can.

The second i-f transformer (T3) is mounted on top of the chassis between the variable condenser and the speaker. The trimmers (C8, C9) are accessible through holes in the top of the can.

The trimmer for the antenna (C5) and the trimmer for the oscillator coil (C11) are located on the variable condenser. The trimmer on the front section is for the oscillator coil.

The oscillator coil (T4) is located underneath the chassis. The loop antenna acts as the antenna coil.

TYPE: Single-band superheterodyne.

FREQUENCY RANGE: 540-1620 kc.

NUMBER OF TUBES: Five.

TYPE OF TUBES:

- 1—12SA7, pentagrid oscillator-modulator
- 1—12SK7, first i-f amplifier
- 1—12SQ7, diode detector, a-f amplifier, a.v.c.
- 1—50L6, beam power output
- 1—35Z5, half-wave rectifier

POWER SUPPLY: A.C. or D.C.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 30 watts.

I-F Alignment

1. Rotate the variable condenser to the minimum capacity position.
2. Feed 455 kc. to the converter grid (stator of the r-f section of the variable condenser) and adjust the four i-f trimmers for maximum response.

R-F Alignment

1. Connect the oscillator to a coil composed of three to four turns of wire wound in a circle approximately 12" in diameter. This coil should be held parallel to and in line with the loop antenna of the receiver at a distance of 15 to 20 inches.
2. Radiate a signal at 1425 kc., set the dial indicator to 1425 kc., and adjust the trimmers on the variable condenser (C5, C11) for maximum response.
3. Radiate a 600 kc. signal and tune in the signal on the receiver. Adjust the loose outside turn of the loop antenna for maximum response. This loose turn may be moved to either side of the center. Fasten it in the position which gives maximum response.
4. Repeat steps (2) and (3) until no further improvement is evident.
1. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully realigned.
2. In operating the receiver on d.c., it may be necessary to reverse the line plug for correct polarity.
3. The color coding of the i-f transformer leads is as follows:

Grid—green	Plate—blue
Grid return—black	B+—red
4. All models have self-contained antennas and do not require additional antenna connections. For permanent home installations, however, if it is desired to improve reception of weak stations, an additional outdoor antenna may be used. For this purpose a lead has been brought out of the rear of the chassis near the line cord.
5. Some models have the loop antenna molded into the rear cover and others have a separate loop antenna assembly. Both antennas have directional properties. It is important, therefore, once the station is tuned in, to rotate the cabinet back and forth through a quarter of a circle (90 degrees), leaving it at the position where the station is received with maximum volume.

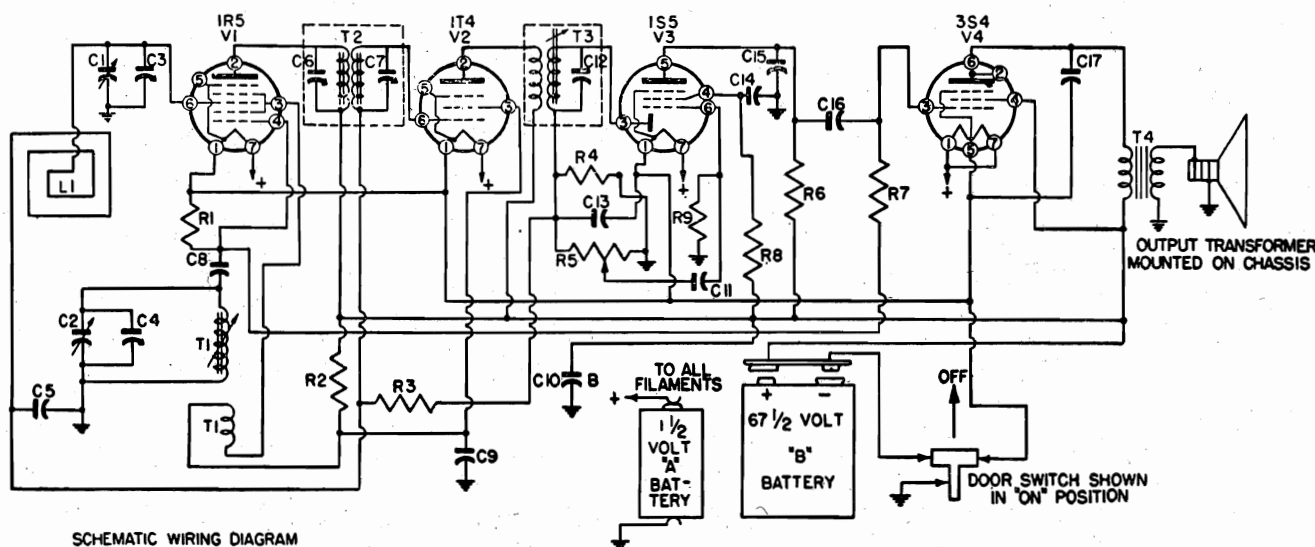
VOLTAGE ANALYSIS

The following voltage readings are d-c measurements taken from B— (line switch) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (*), which should be taken with a d-c vacuum-tube voltmeter. Line voltage for these readings was 117 volts, 60 cycles, a.c. Measurements made with 117 volts d.c. will be lower than those given below. Take readings with the volume control set at minimum and the variable condenser closed.

TUBE	PIN NUMBER							
	1	2	3	4	5	6	7	8
12SA7			89	89	*-10			*-1.6
12SK7				*-1.6		89		89
12SQ7		*-0.7		*-1.6	*-0.5	37.5		
50L6			110	89				6.2
35Z5				116		116		117

EMERSON RADIO & PHONO. CORP.

NO. 950005



SCHEMATIC WIRING DIAGRAM
FOR
CHASSIS NO. 120008

FREQUENCY RANGE: 540-1600 kc.

NUMBER OF TUBES: Four.

TYPE OF TUBES:

- 1—1R5, oscillator-modulator
- 1—1T4, i-f amplifier
- 1—1S5, 2nd detector, a.v.c., a-f amplifier
- 1—3S4, pentode output

POWER SUPPLY: "A" and "B" batteries.

VOLTAGE RATING:

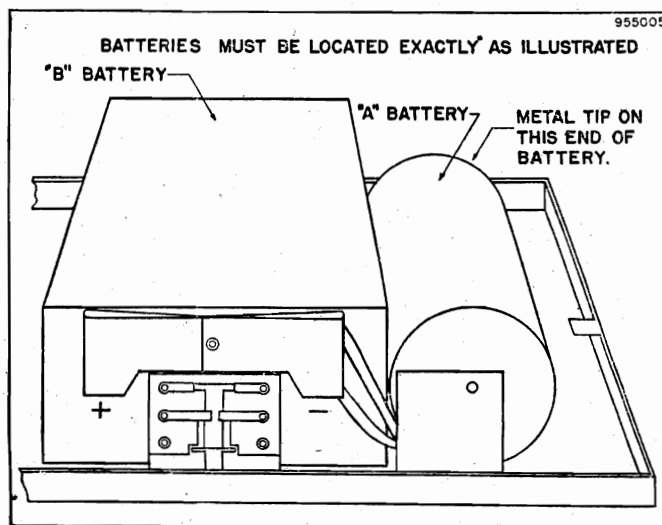
- "A" Battery—1.5 volts
- "B" Battery—67.5 volts

CURRENT DRAIN:

- "A" Battery—0.25 amp.
- "B" Battery—0.0075 amp.

The receiver is turned on when the door is open and turned off when the door is closed.

1. Slide the button on the catch near the handle in the direction of the arrow. This loosens the rear cover, making the batteries accessible.
2. Insert batteries as shown in the accompanying diagram.
3. To reassemble fit the two slots on the end of the plastic shell opposite the handle to the tongues on the lower end of the metal frame. Keep the "B" battery in place.
4. Carefully close the shell until it fits and catches in place.



VOLTAGE ANALYSIS

The following voltage readings are d-c measurements taken from B— (chassis) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (*), which should be taken with a d-c vacuum-tube voltmeter. Take readings with the volume control set at minimum and the variable condenser closed. Use fresh batteries.

TUBE	PIN NUMBER						
	1	2	3	4	5	6	7
1R5		67.5	40	*7.0		*0.3	1.5
1T4		67.5	40			*0.3	1.5
1S5			*0.35	*16.5	*39	*0.3	1.5
3S4	1.5	65	*7.0	67.5		65	1.5

MODEL 508, Ch. 120008

EMERSON RADIO & PHONO. CORP.

An oscillator with frequencies of 455, 600, 1500, and 1610 kc is required.

An output meter should be connected across the primary or secondary of the output transformer for observing maximum response.

Always use as weak a test signal as possible, turning down the output of the test oscillator as the alignment of the receiver progresses.

Turn the volume control on full.

Location of Coils and Trimmer Adjustments

The first i-f transformer (T2) is located next to the output transformer (T4). The trimmers (C6, C7) are accessible through holes in the top of the can.

The second i-f transformer (T3) is located between the 1T4 and 1S5 tubes. The single trimming core screw (C12) extends from the end of the can.

The oscillator coil (T1) is located next to the first i-f transformer. The trimmer for the oscillator (C4) is located on the smaller variable condenser section. The 600 kc oscillator core adjustment is the brass screw protruding from the end of the oscillator coil.

The loop antenna acts as the antenna coil. The trimmer for the loop (C3) is located on the larger section of the variable condenser.

I-F Alignment

1. Rotate the variable condenser to the minimum capacity position.
2. Feed 455 kc to the grid (pin 6) of the 1R5 tube through a 0.01 mfd. condenser.
3. Adjust the three i-f trimmer screws (C6, C7, C12) for maximum response. (Clip the test signal lead to the stator of the larger capacity section of the variable condenser.)

R-F Alignment

1. Connect the test oscillator to a coil composed of three or four turns of wire wound in a circle approximately 12 inches in diameter. This coil should be placed parallel to and in line with the receiver loop at a distance of approximately 15 to 20 inches.
2. Radiate a signal at 1610 kc, rotate the variable condenser to minimum capacity, and adjust the oscillator trimmer (C4), on the smaller section of the variable condenser, for maximum response.
3. Radiate a signal at 1500 kc, tune in the 1500 kc signal, and adjust the antenna trimmer (C3), on the larger section of the variable condenser, for maximum response.
4. Radiate a signal at 600 kc, set the dial indicator to 60, and adjust the oscillator coil core trimmer while rocking the variable condenser for maximum response.
5. Return to 1610 kc and check alignment. If readjustment is necessary, repeat steps (2) to (4) until no further improvement is noted.

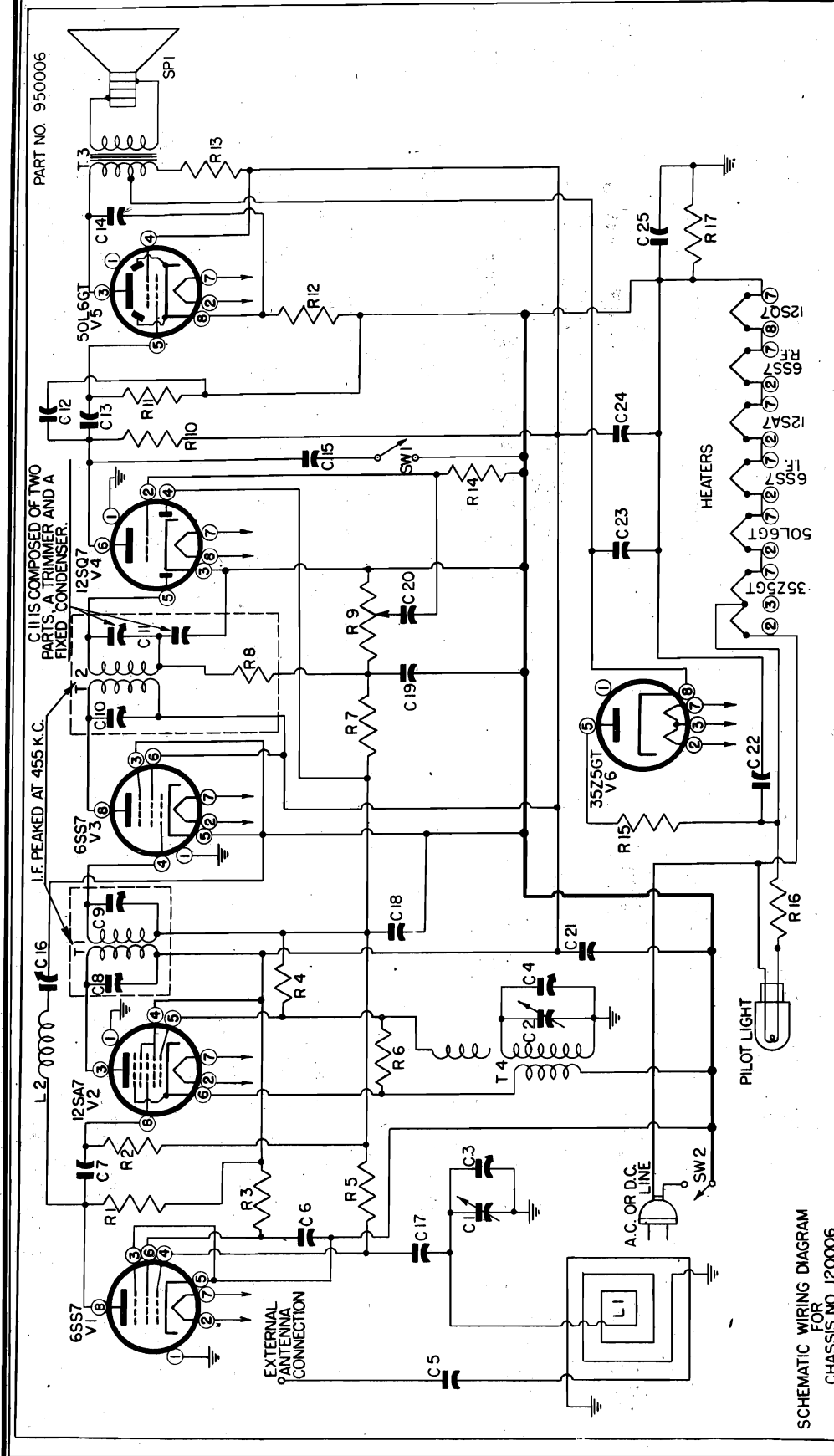
Battery Type	Number Required	Model
1½-volt "A"	1	Standard D-size flashlight cell (1½" diameter)
67½-volt "B"	1	Eveready "Minimax" No. 467

Specify part numbers when ordering. List price each effective as of January 1, 1946. (Prices subject to change without notice.)

Schematic Symbol	Part No.	DESCRIPTION	PRICE
C1, C2	900120	Variable condenser, or.....	\$2.50
C1, C2	900140	Variable condenser.....	3.50
*C3, C4		Trimmers, part of C1, C2.....	
C5, C9, C14	920120	0.02 mfd., 100 V. roll-type condenser.....	.60
*C6, C7		Trimmers, part of T2.....	
C8	910110	0.0002 mfd. mica condenser, or.....	.20
C8	928020	0.0002 mfd. ceramic condenser.....	.20
C10	925070	8 mfd., 100 V. dry electrolytic condenser.....	.60
C11, C17	920140	0.003 mfd., 150 V. roll-type condenser.....	.25
*C12		Condenser, part of T3.....	
C13, C15	928010	0.0001 mfd., ceramic condenser.....	.25
C16	920130	0.001 mfd., 100 V. flat roll-type condenser.....	.25
L1	700030	Loop assembly.....	.65
R1	320970	100,000 ohms, ¼ watt resistor.....	.12
†R2	310730	10,000 ohms, ¼ watt resistor.....	.12
R3	321330	3.3 meg., ¼ watt resistor.....	.12
R4, R7	321210	1 meg., ¼ watt resistor.....	.12
R5	390040	Volume control 3 meg. ohms.....	.65
R6	321130	0.47 meg., ¼ watt resistor.....	.12
R8	321370	4.7 meg., ¼ watt resistor.....	.12
R9	321450	10 meg., ¼ watt resistor.....	.12
T1	716040	Oscillator coil.....	1.20
T2	760240	First i-f transformer.....	2.20
T3	720260	Second i-f transformer.....	1.75
T4	734090	Output transformer.....	1.80
	180002	Permanent magnet dynamic speaker.....	5.00
	585000	"B" battery cable.....	.45
	510040	Lid switch.....	.50
	460020	Plastic shell (black).....	1.35
	460030	Plastic door.....	.75
	630000	Plastic loop cover (black).....	.25
	410389	Metal front (maroon).....	2.25
	460050	Plastic tuning wheel (black).....	.20
	460060	Plastic volume wheel (black).....	.20
	595000	Leather handle.....	.25
	410969	Release catch, male.....	.20
	410959	Release catch, female.....	.40

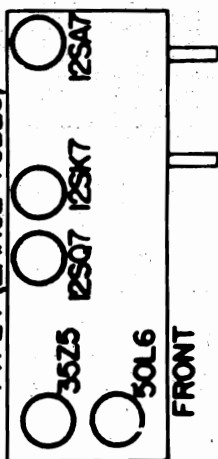
†Some units contain R2 resistors varying in value from 8200 to 22,000 ohms, as selected in production. *Not supplied separately

EMERSON RADIO & PHONO. CORP.

MODELS 512, 515,
516, Ch. 120006

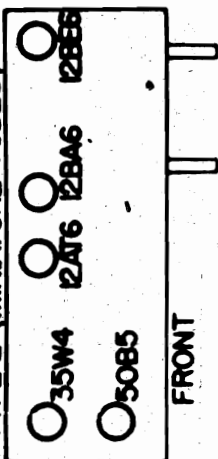
EMERSON RADIO & PHONO. CORP.

TYPE I (LARGE TUBES)

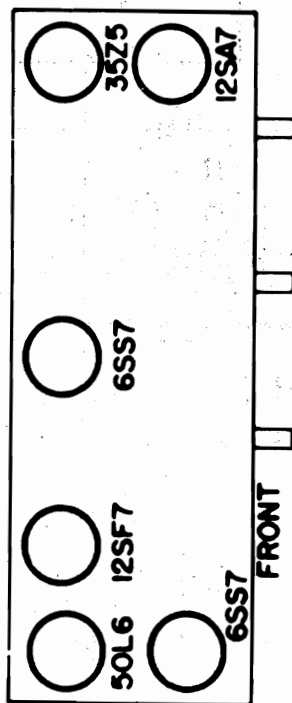


MODELS: 501, 502, 503, 504, 507, 509, 510, 511,
517, 518, 519, 520, 525, 539, 541

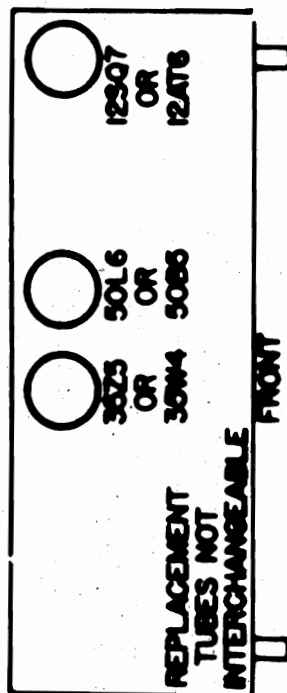
TYPE 2 (MINIATURE TUBES)



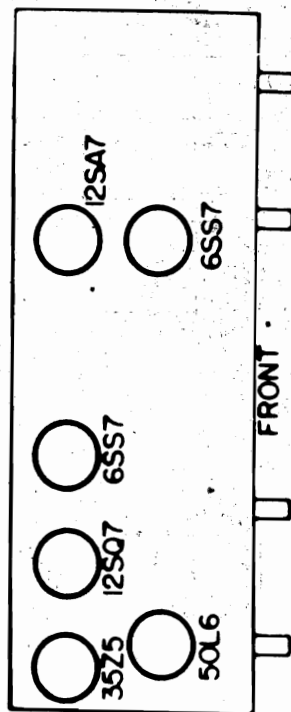
MODELS: 513, 514



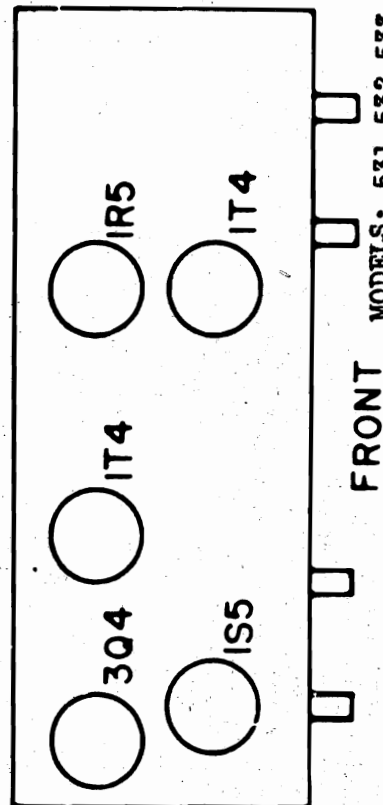
MODEL 506



MODELS: 521, 542



MODELS: 512, 515, 516



MODELS: 531, 532, 533

EMERSON RADIO & PHONO. CORP.

MODELS 505, 523

MODEL 508

FOR BATTERY OPERATION:

Insert plug in socket on chassis. Place hanked cord into space under shelf.

IMPORTANT

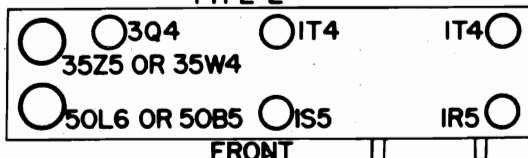
Remove batteries from receiver as soon as they are exhausted.

Batteries for Use with this Receiver

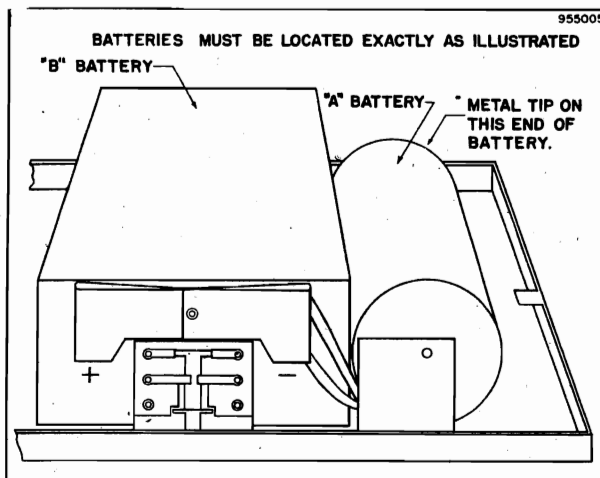
Mfr.	4½ V. "A"	45 V. "B"
Eveready	746 2 required	482 Minimax 2 required
Ray-O-Vac	P-83A or EM-83 2 required	—
Burgess	G3 2 required	—

FOR 105-125 V. A.C. OR D.C. OPERATION:

Remove plug from chassis and insert it in wall outlet. On d.c. if set does not operate, reverse line plug in wall outlet.

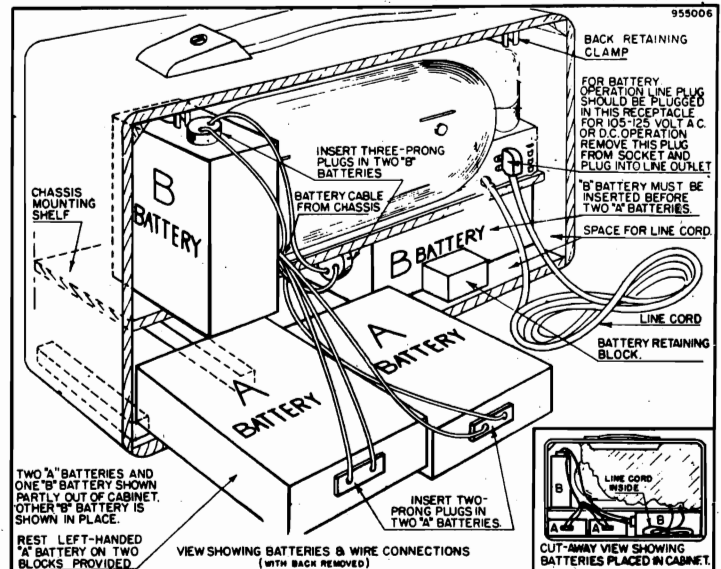
TYPE 2

35Z5 AND 35W4 NOT INTERCHANGEABLE
50L6 AND 50B5 NOT INTERCHANGEABLE

EMERSON RADIO MODEL 508**BATTERIES USED IN THIS RECEIVER**

TYPE	MANUFACTURER'S NUMBER
1½ Volt "A"	Standard "D" size (1 1/16" diameter) flashlight unit cell.
67½ Volt "B"	Eveready Minimax No. 467.

IMPORTANT: Remove batteries as soon as they are exhausted. The "A" battery will require more frequent replacement than the "B" battery.

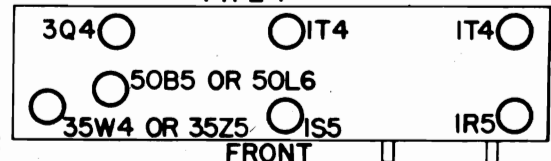
**BATTERY INSTALLATION**

NOTE: Plug with Red Lead Should be connected to "B" Battery at Side of Chassis.

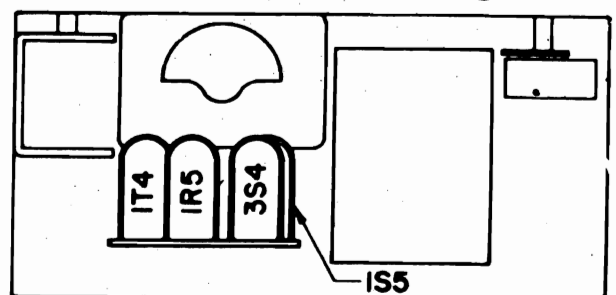
TUBE LOCATIONS

MODELS: 505, 523

7 TUBES

TYPE 1**TO REASSEMBLE THE CASE**

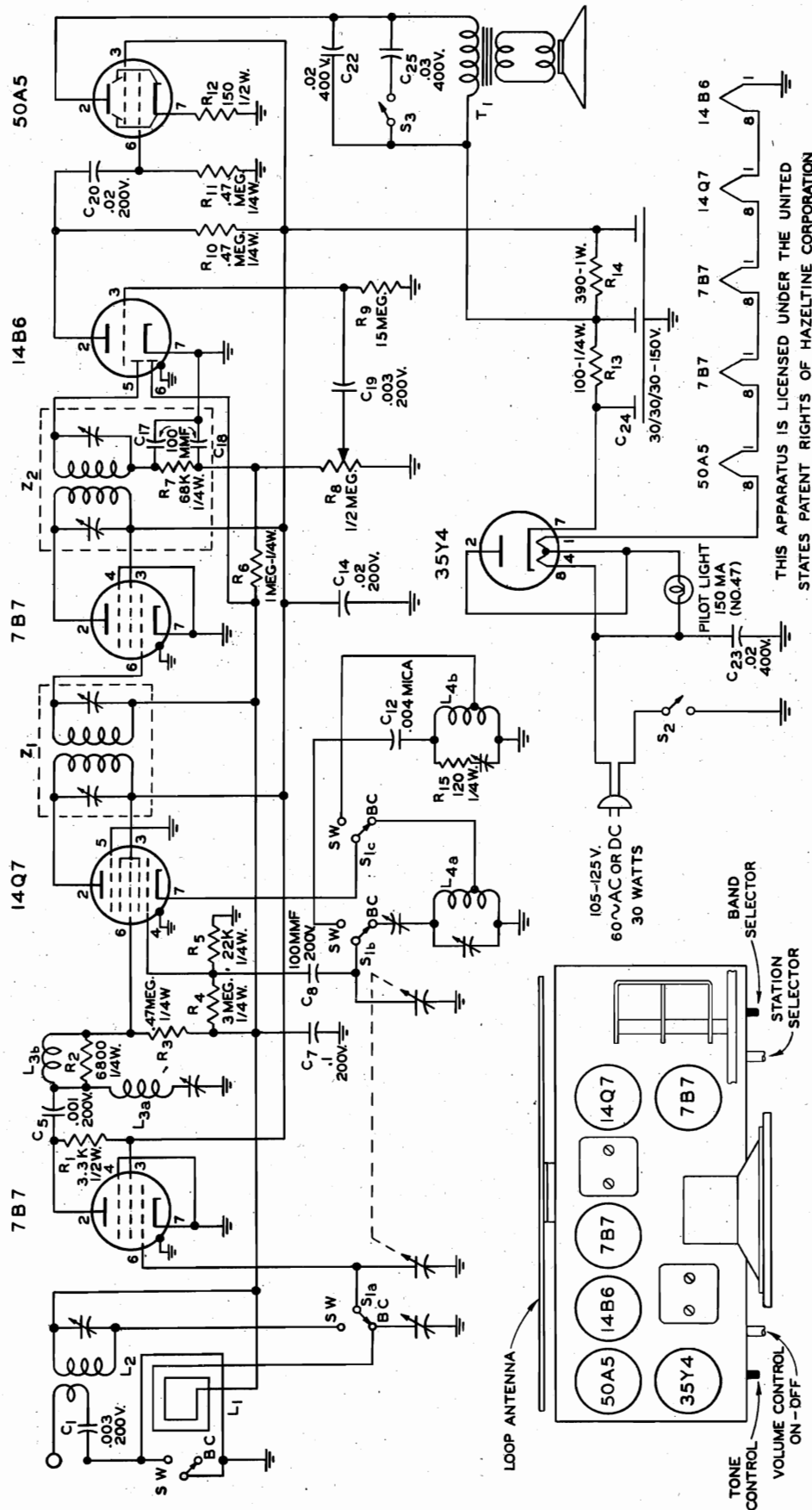
1. Hold the chassis face down with the batteries in place and the plastic door open.
2. Note the two tongues at one end of the metal front. Place the plastic housing over the chassis so that these two tongues fit into the corresponding slots at one end of the plastic housing.
3. Press the other end of the housing so that it snaps into place.

TUBE LOCATIONS

BACK

955043

ESPEY MFG. CO. INC.



1P FRANK 485 XC

MODEL NO. RR-13L

CAUTION:

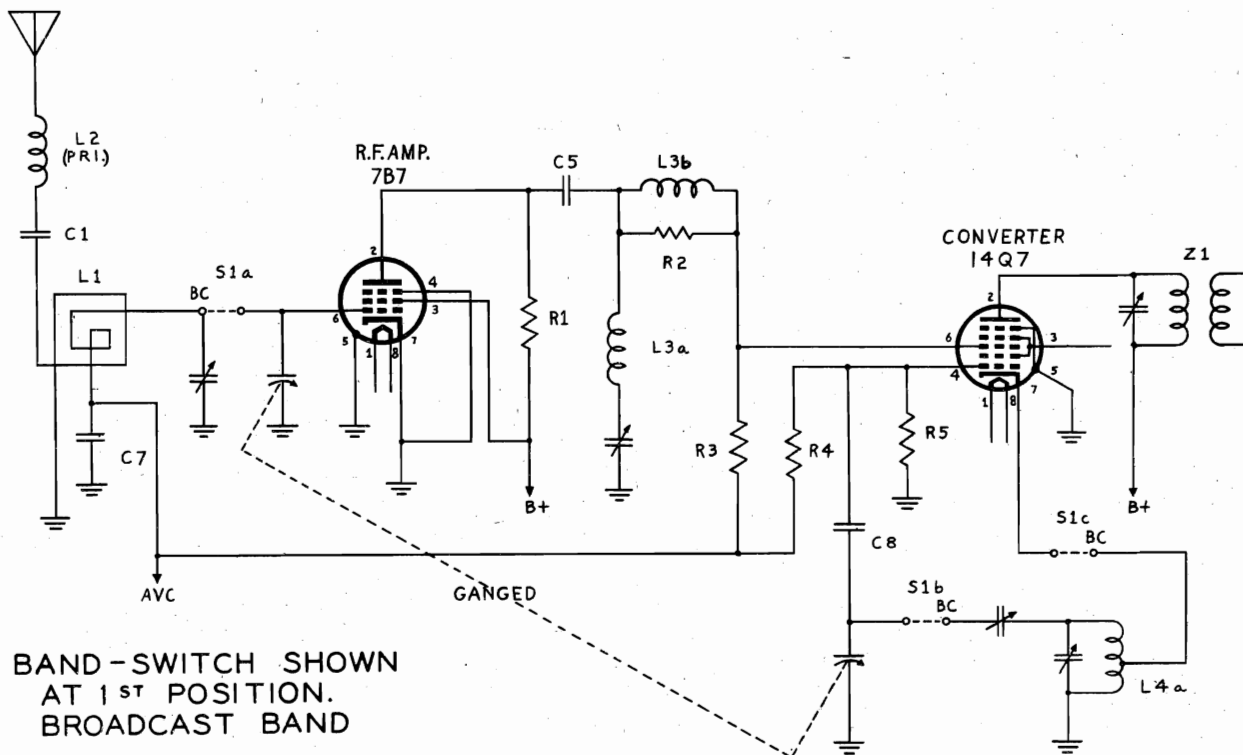
TO REPLACE TUBES, REMOVE SCREW & WASHER AT CENTER OF LOOP ANTENNA, AFTER FIRST REMOVING PLUG FROM CURRENT OUTLET

THIS APPARATUS USES INVENTIONS OF UNITED STATES PATENTS LICENSED BY RADIO CORPORATION OF AMERICA
PATENT NUMBERS SUPPLIED UPON REQUEST.

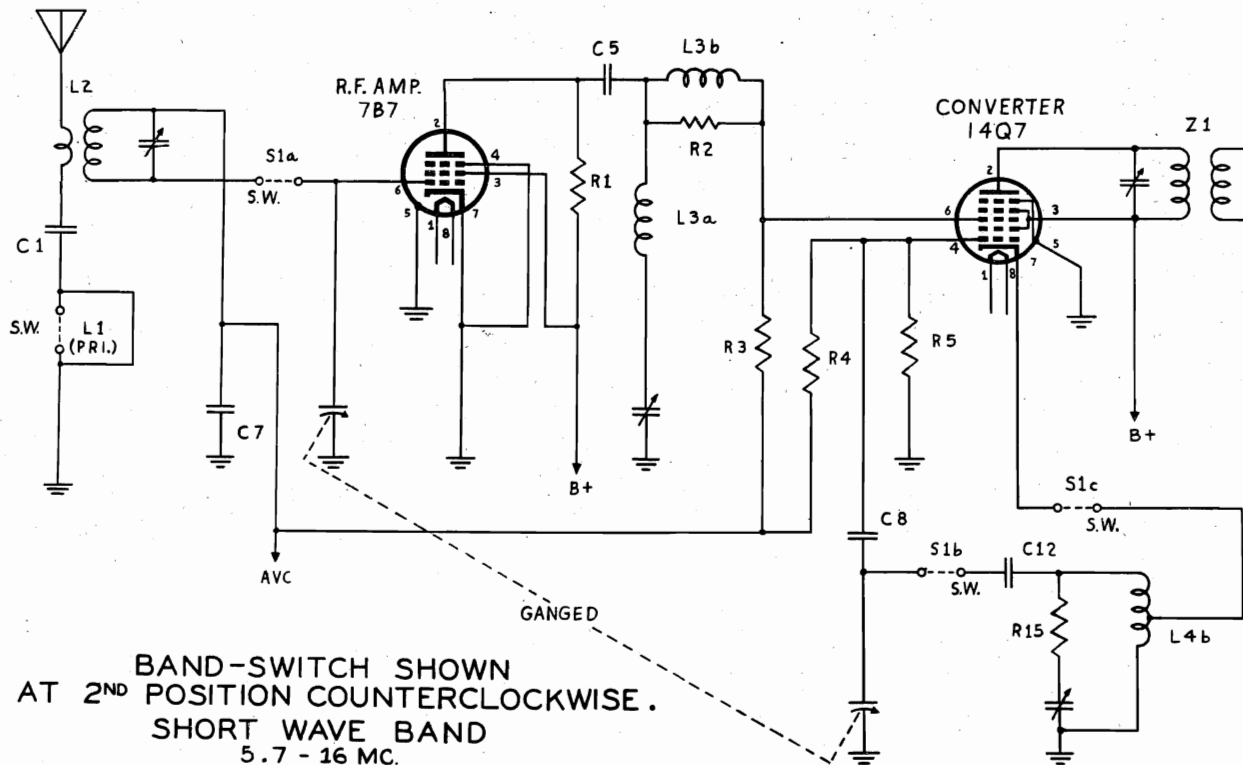
NOTICE: IF SET IS INOPERATIVE ON DC REVERSE LINE PLUG

MODEL RR-13L

ESPEY MFG. CO. INC.

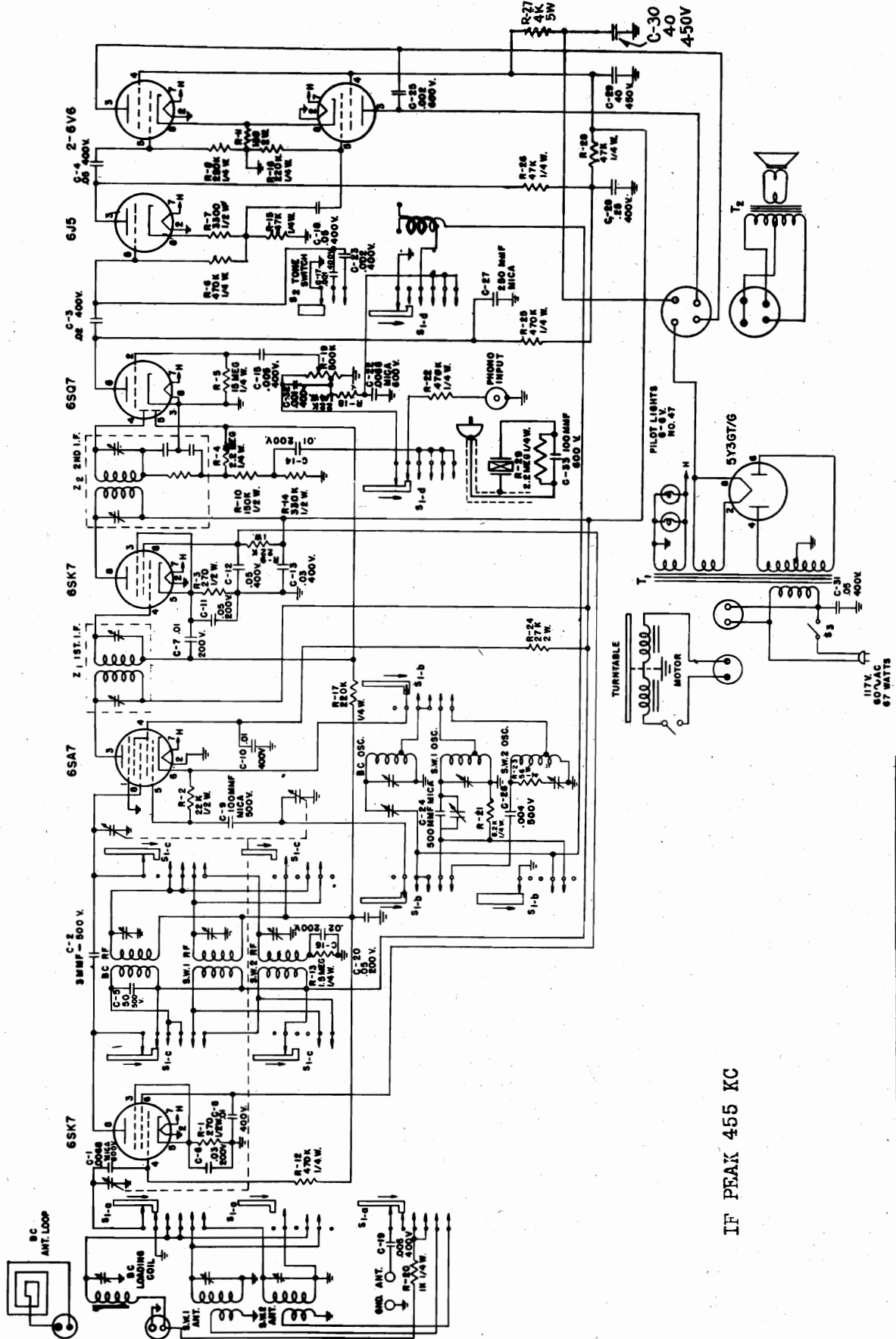


BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND



BAND-SWITCH SHOWN
AT 2ND POSITION COUNTERCLOCKWISE.
SHORT WAVE BAND
5.7 - 16 MC.

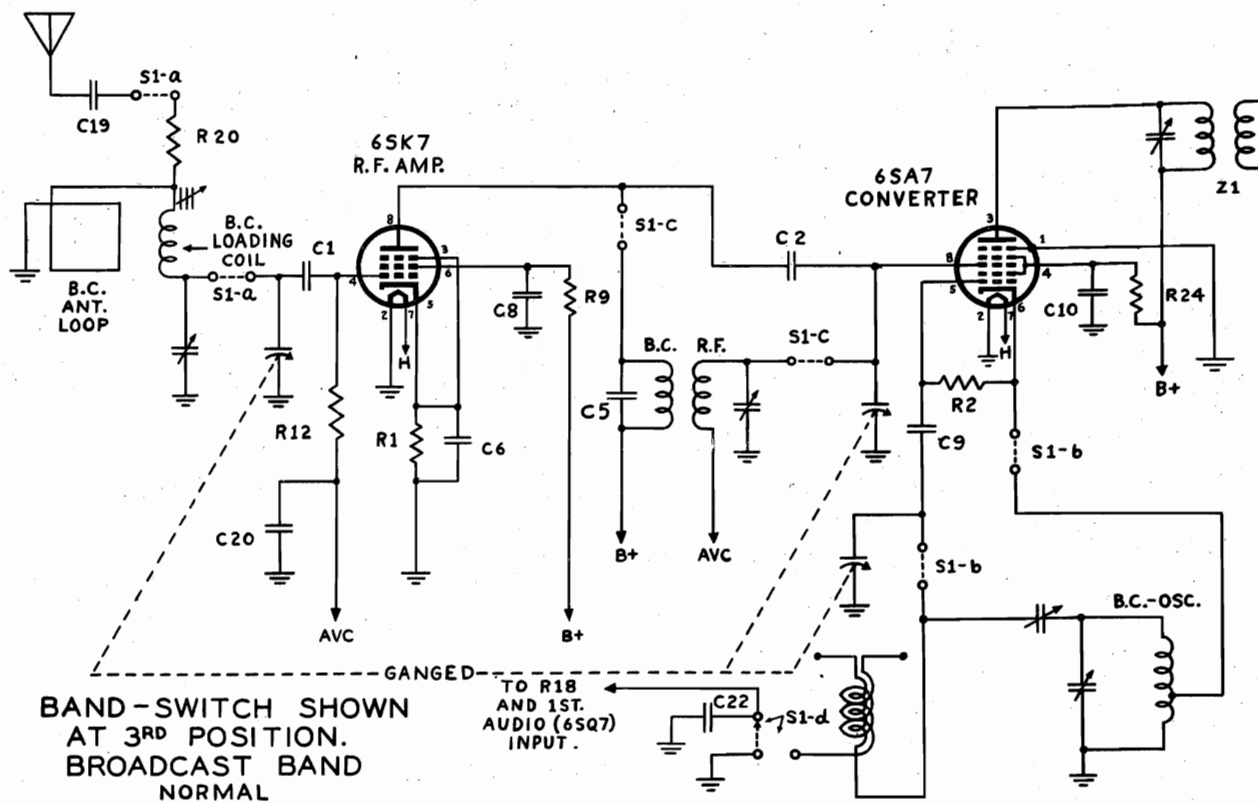
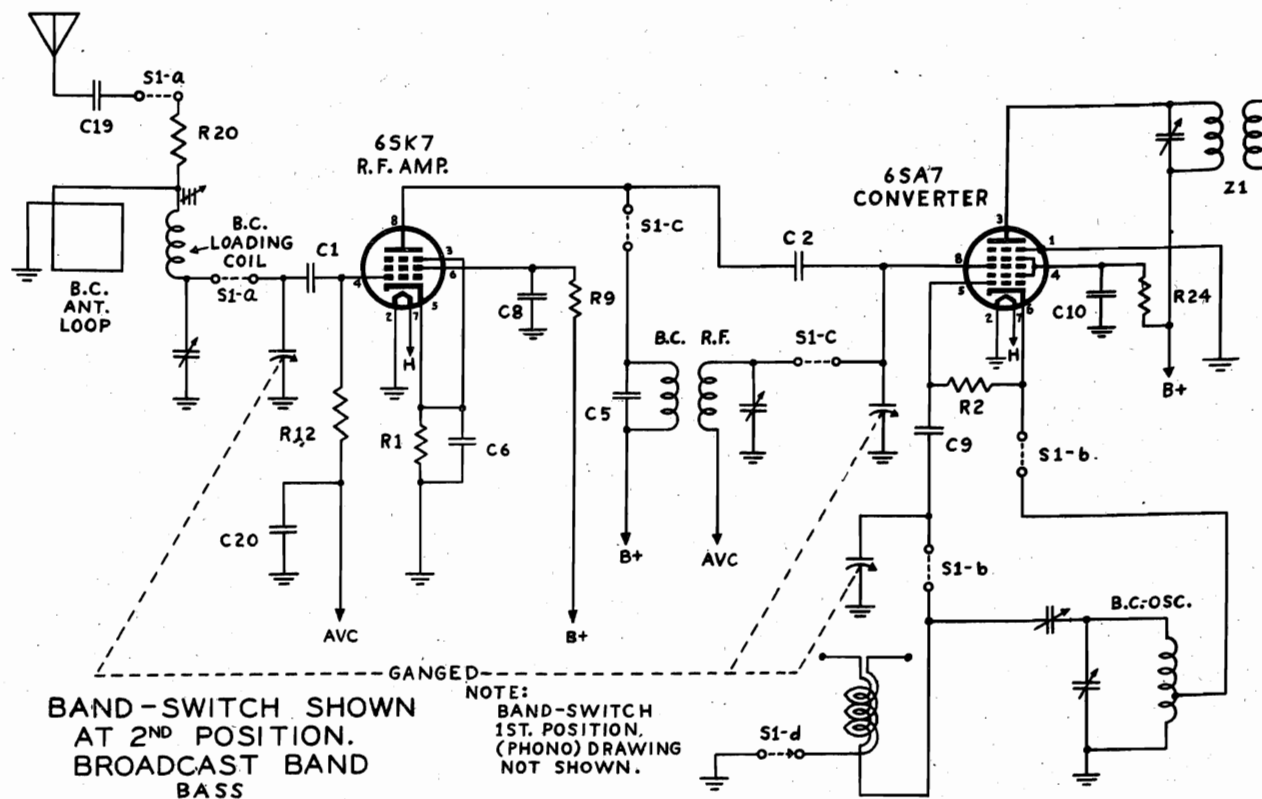
ESPEY MFG. CO. INC.



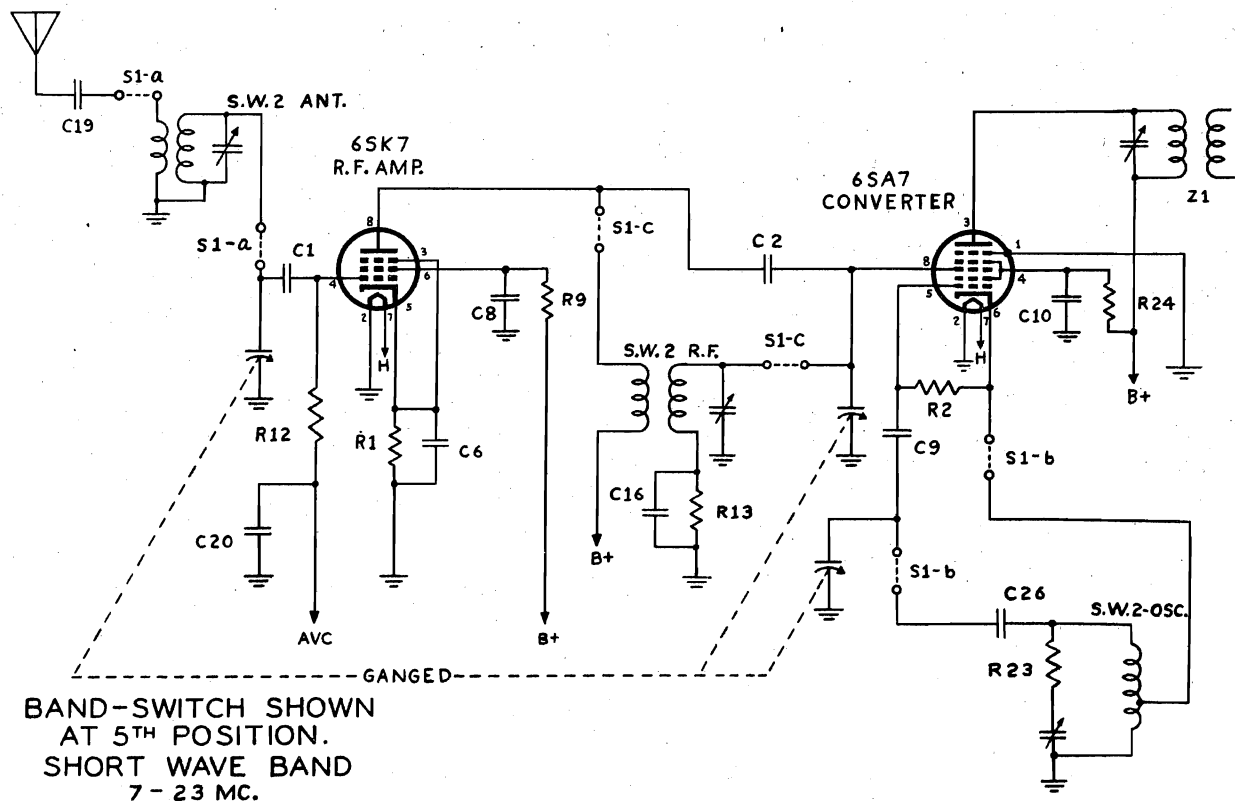
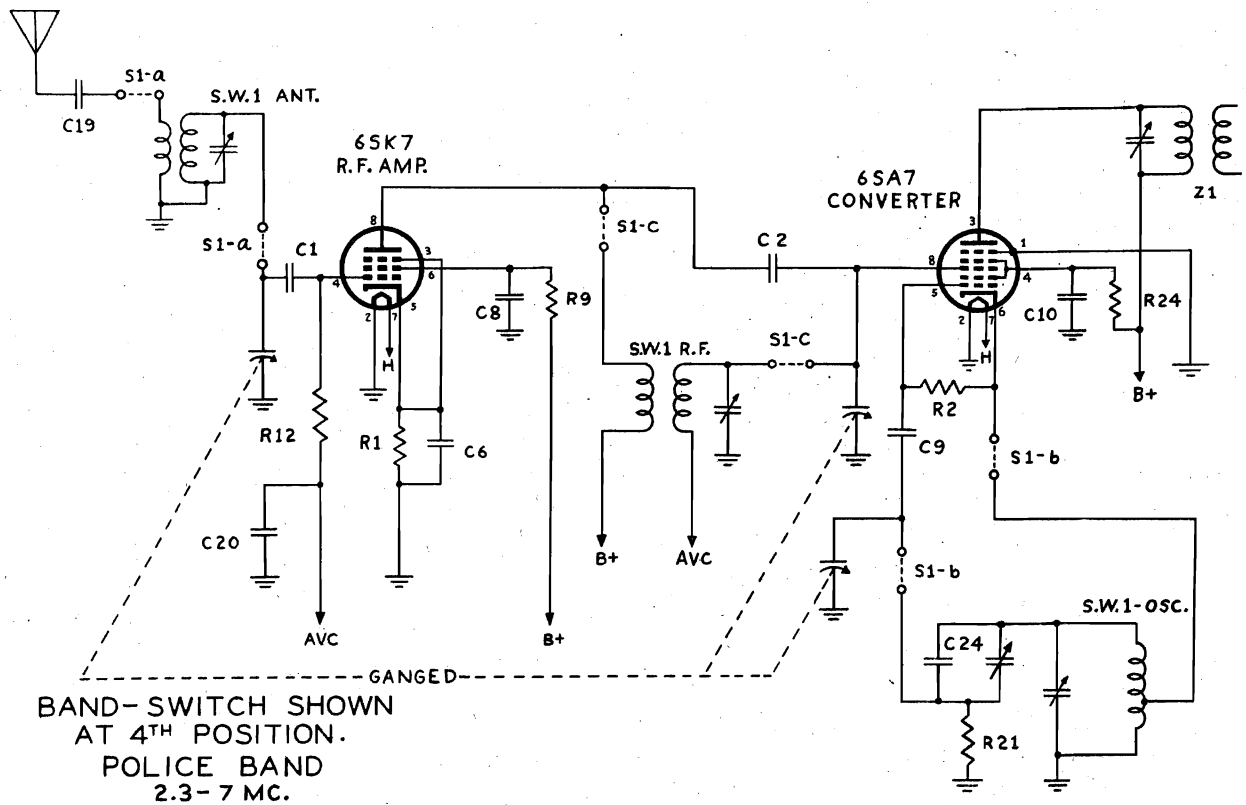
REVISIONS		ISSUES		SCHEMATIC RR-14	
NO.	DESCRIPTION	NO.	DATE	BWC NO.	DATE
1	1-12-46	1	3-12-46	13117C	3-17-46
2	2-12-46	2			
3	3-12-46	3			
4	4-12-46	4			
5	5-12-46	5			
6	6-12-46	6			
7	7-12-46	7			
8	8-12-46	8			
9	9-12-46	9			
10	10-12-46	10			
11	11-12-46	11			
12	12-12-46	12			

MODEL RR-14

ESPEY MFG. CO. INC.



ESPEY MFG. CO. INC.

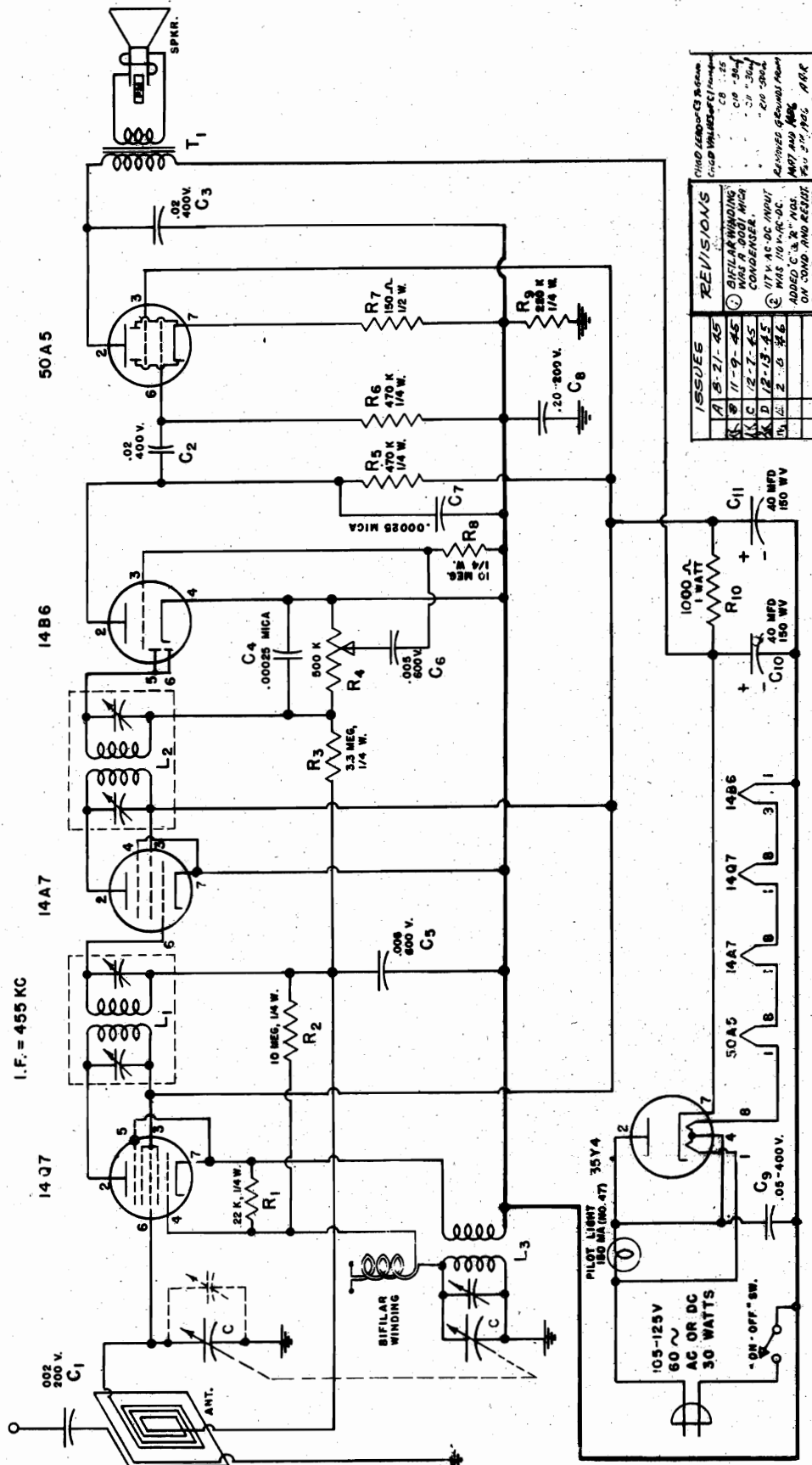


ESPEY MFG. CO. INC.



SPEAKER CONNECTOR IS USED ON PHONO COMBINATION MODELS ONLY.

ESPEY MFG. CO. INC.



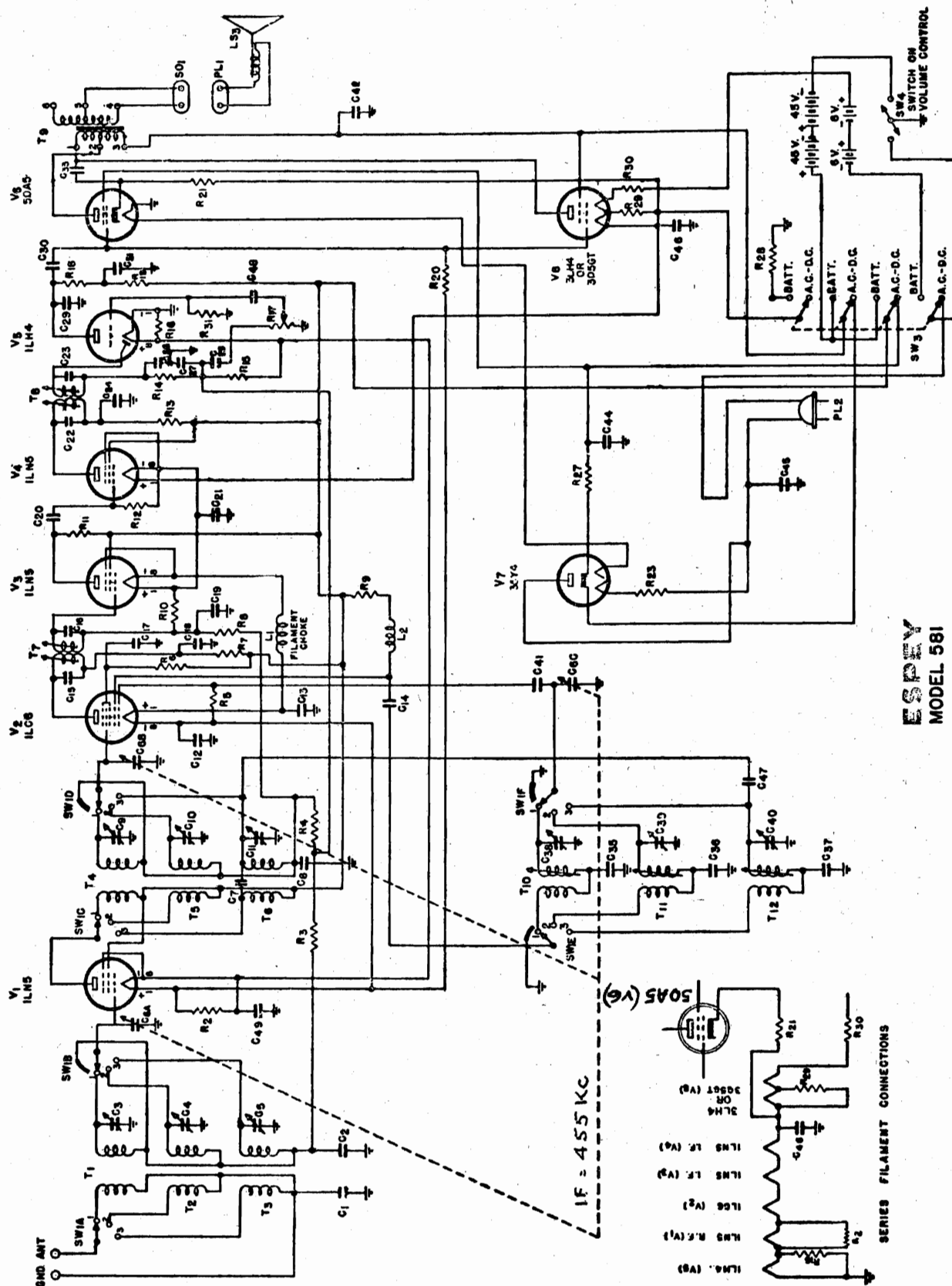
ISSUE	REVISIONS
A	11-9-45
B	11-9-45
C	12-7-45
D	12-13-45
E	2-3-46

105-125V 60W
AC OR DC 30W
WMS 117 V. 60W
AC OR DC
CHASSIS GND.
SYMBOL REMOVED
12-13-45 H.J.
APP. S.K.

FOR	DATE	CHKD	DATE
11-9-45			
11-9-45			

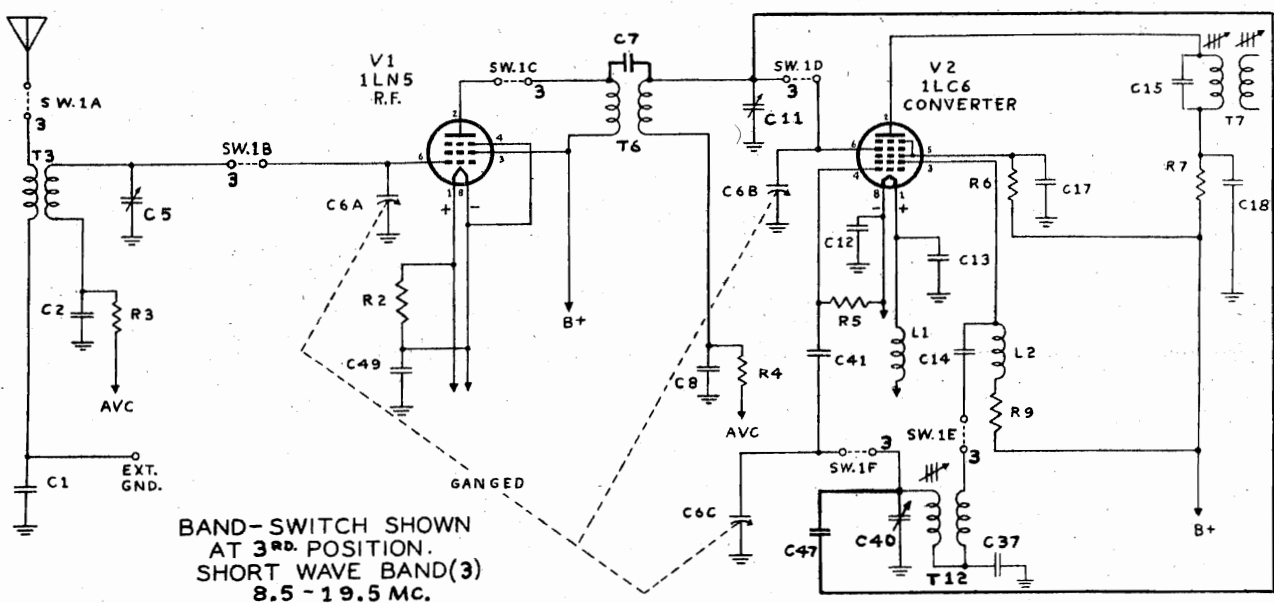
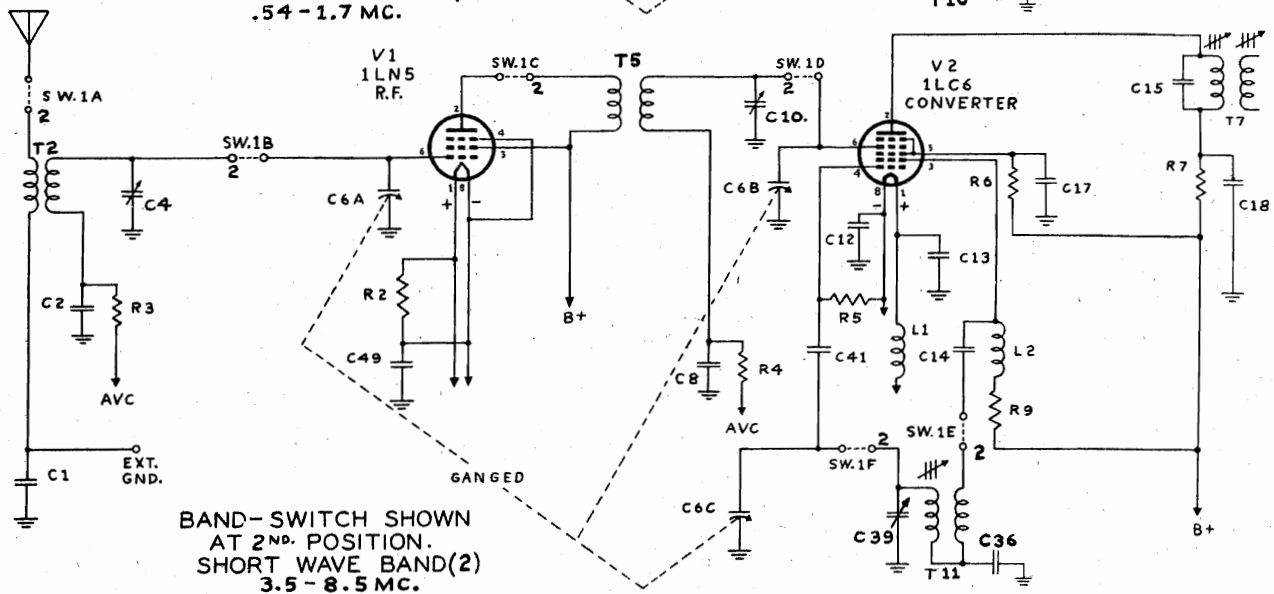
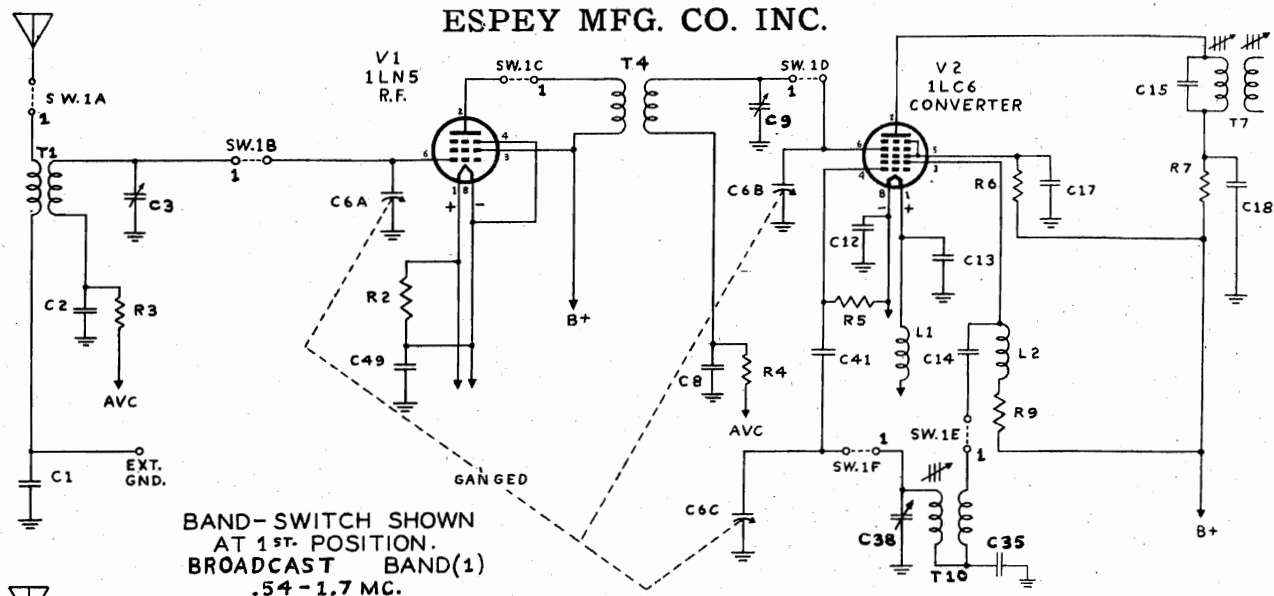
MODEL 581

ESPEY MFG. CO. INC.



ESPEY
MODEL 581

ESPEY MFG. CO. INC.



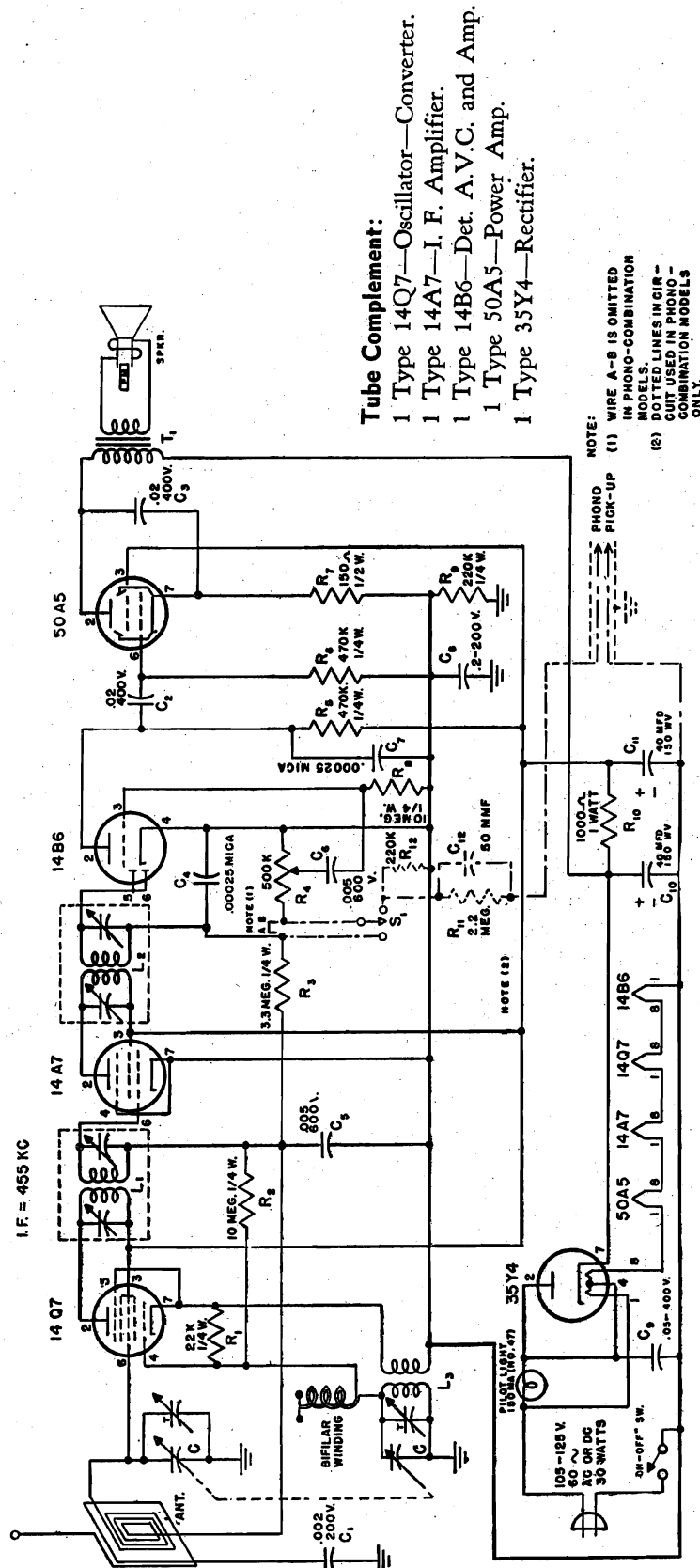
such as: Ever-Ready #718 or equivalent.
 "B" Batteries: 45 Volt; Length, $4\frac{3}{16}$ " ; Width, $2\frac{19}{32}$ " ; Height, $5\frac{3}{8}$ " ;
 such as: Ever-Ready #762-S, Burgess #5308, or equivalent.

L2—Plug, line cord

- Control knob for C6
- Control knob for R17 & SW1
- Dial cord
- Dial pointer
- Dial plate
- Dial window

ESPEY MFG. CO. INC.

MODELS 651, 652, 653, 6511
6511/2, 6514, 6516, 6520,
6541, 6545, 6547, Ch. FJ97

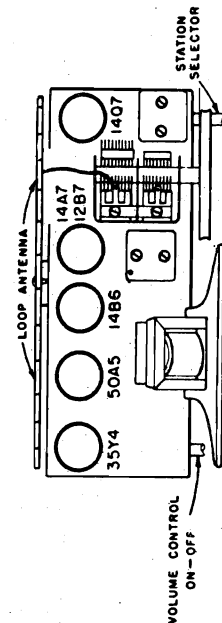


Tube Complement:

- 1 Type 14Q7—Oscillator—Converter.
- 1 Type 14A7—I. F. Amplifier.
- 1 Type 14B6—Det. A.V.C. and Amp.
- 1 Type 50A5—Power Amp.
- 1 Type 35Y4—Rectifier.

NOTE:
PHONO PICK-UP (1) WIRE A-B IS OMITTED IN PHONO-COMBINATION MODELS.
(2) DOTTED LINES IN CIR- CUIT USED IN PHONO - COMBINATION MODELS ONLY.

Fig. 1—Tube and Trimmer locations:



Alignment Procedure:

Steps	Connect output of oscillator to	Tune osc. to	Tune radio dial to	Adjust the following for max. peak output
1.	Tuning condenser stator (ant.) in series with .01 mfd.	455	Quiet point at high frequency end of dial.	1st and 2nd I. F. Transformers
2.	Antenna term. of Ant. loop in series with 100 mmf.	1720	Full clockwise (out of mesh)	Osc. trimmer
3.	Antenna term. of Ant. loop in series with 100 mmf.	1500	1500	Ant. trimmer

Output meter is connected across voice coil. Receiver volume is turned to maximum. NOTE: Trimmers may be located on either long or short side of variable condenser.

MODELS 651, 652, 653, 6511,
6511/2, 6514, 6516, 6520,
6541, 6545, 6547, Ch. FJ97

ESPEY MFG. CO. INC.

C 6—.005 Mfd., 400V (or 600V) paper	A-25.019
C 7—.00025 Mfd., mica	
C 8—.25 Mfd. (or .20 Mfd.), 200V paper	
C 9—.05 Mfd., 400V, molded bakelite	
C10, 11—Dual 40 Mfd., 150V	
*C12—50 Mmf., 20%	
R 1—22K, $\frac{1}{4}$ W, 20%	A-9.066
R 2—10 meg, $\frac{1}{4}$ W, 20%	
R 3—3.3 meg, $\frac{1}{4}$ W, 20%	
R 4—500K variable, audio taper, with SPST	
R 5—470K, $\frac{1}{4}$ W, 20%	
R 6—470K, $\frac{1}{4}$ W, 20%	
R 7—150 ohms, $\frac{1}{2}$ W, 10%	
R 8—10 meg, $\frac{1}{4}$ W, 20%	
R 9—220K, $\frac{1}{4}$ W, 20%	
R10—1000 ohms, 2W (or 1W), 20%	
*R11—2.2 meg, $\frac{1}{4}$ W, 20%	
*R12—220K, $\frac{1}{4}$ W, 20%	
L 1—Transformer, IF input, 455KC	C-2.191-1
L 2—Transformer, IF output, 455KC	C-2.191-2
L 3—Coil, oscillator	B-2.192
Antenna, loop	B-5.006
Loudspeaker, PM, 5", Transformer to match 50A5	B-11.037
Pilot light, Mazda No. 47, 150 Ma.	

* Used in phono combinations only.

Nylon cord of the tuning and dial system may be replaced by following the diagram below

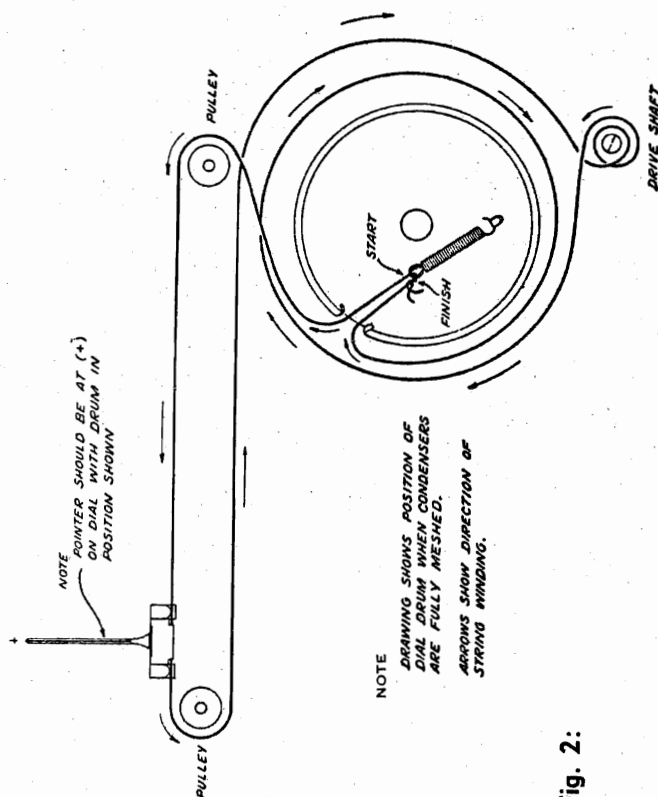


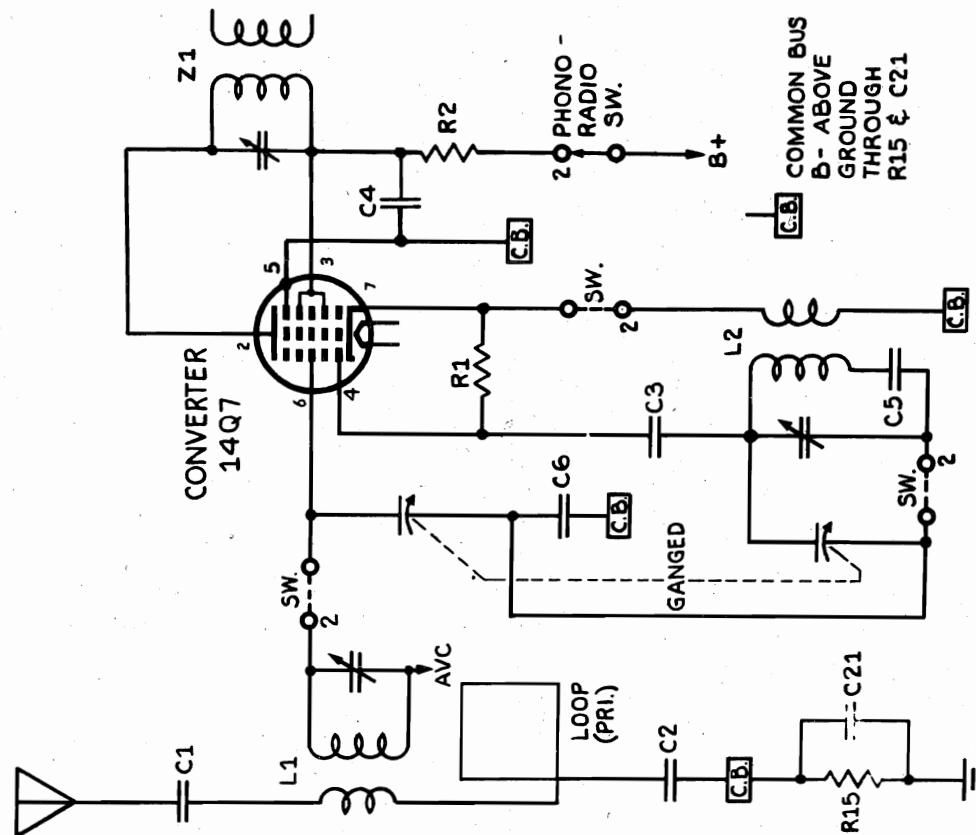
Fig. 2:

Parts List:	Part No.
C —Two gang variable cond. with trimmers.	C-6.032
C 1—.002 Mfd., 200V paper	
C 2—.02 Mfd., 400V paper	
C 3—.02 Mfd., 400V paper	
C 4—.00025 Mfd., mica	
C 5—.005 Mfd., 600V paper	

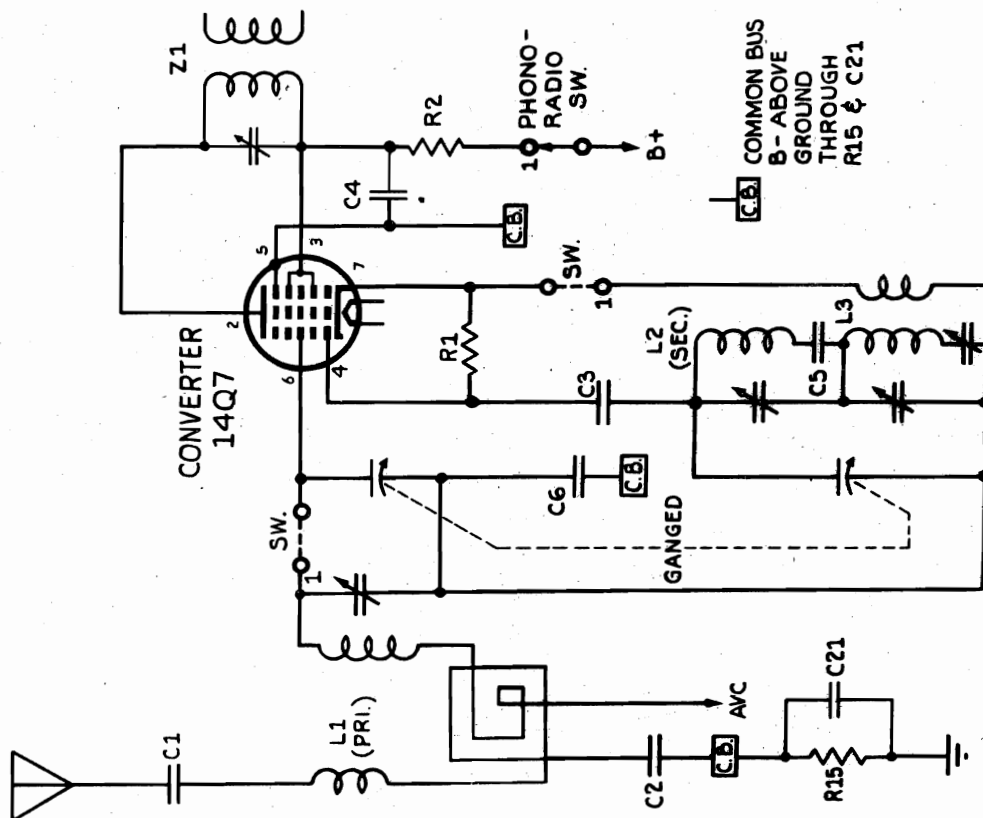
"clarified schematics"

MODELS 6611, 6613, 6630,
6632, 6634, Ch. FJ-97A

ESPEY MFG. CO. INC.

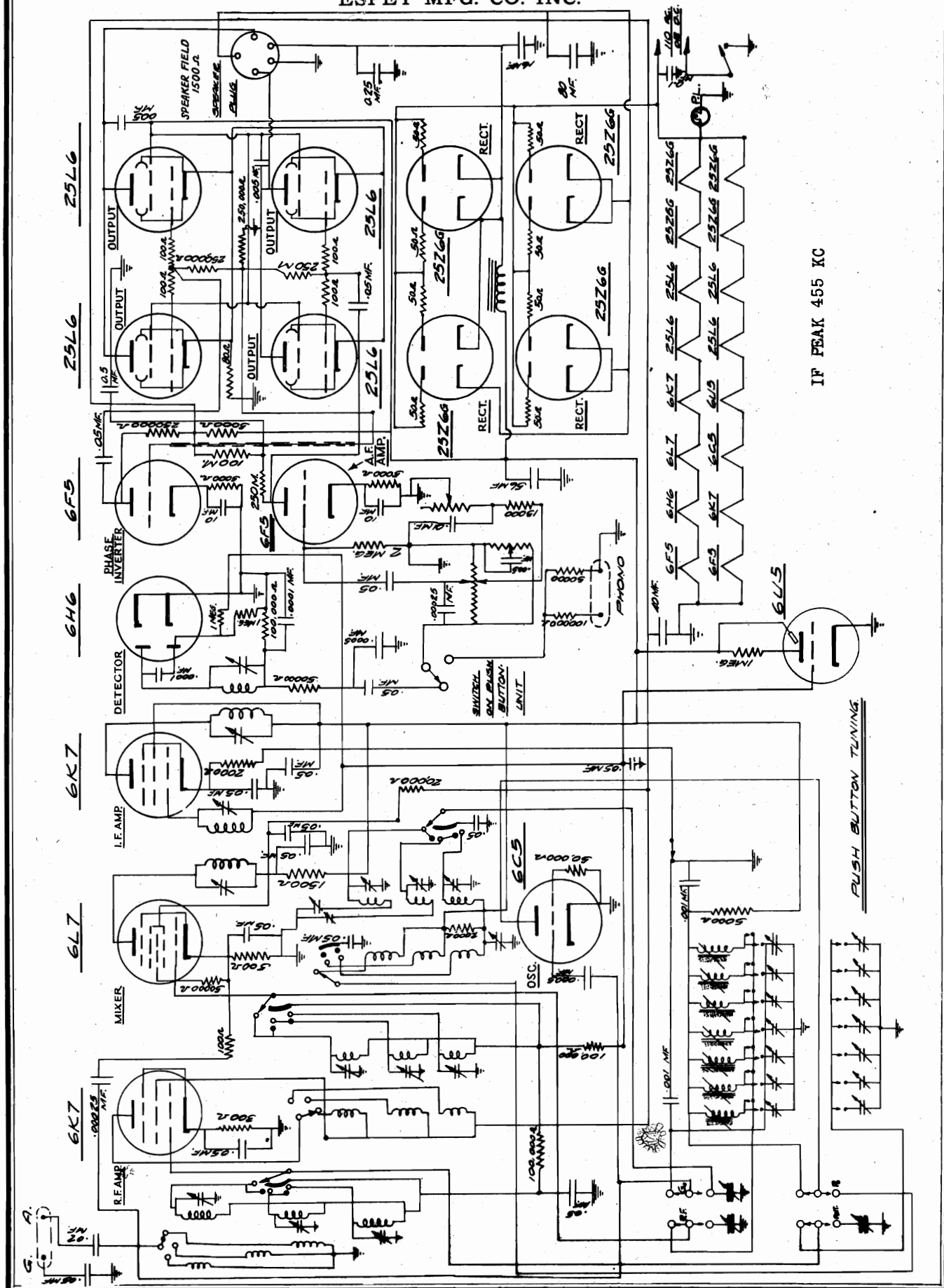


BAND-SWITCH SHOWN
AT 2ND POSITION.
SHORT WAVE BAND
5.5 - 18 MC.

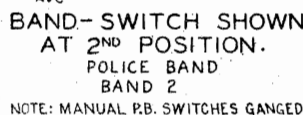


BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND

IF PEAK 455 KC

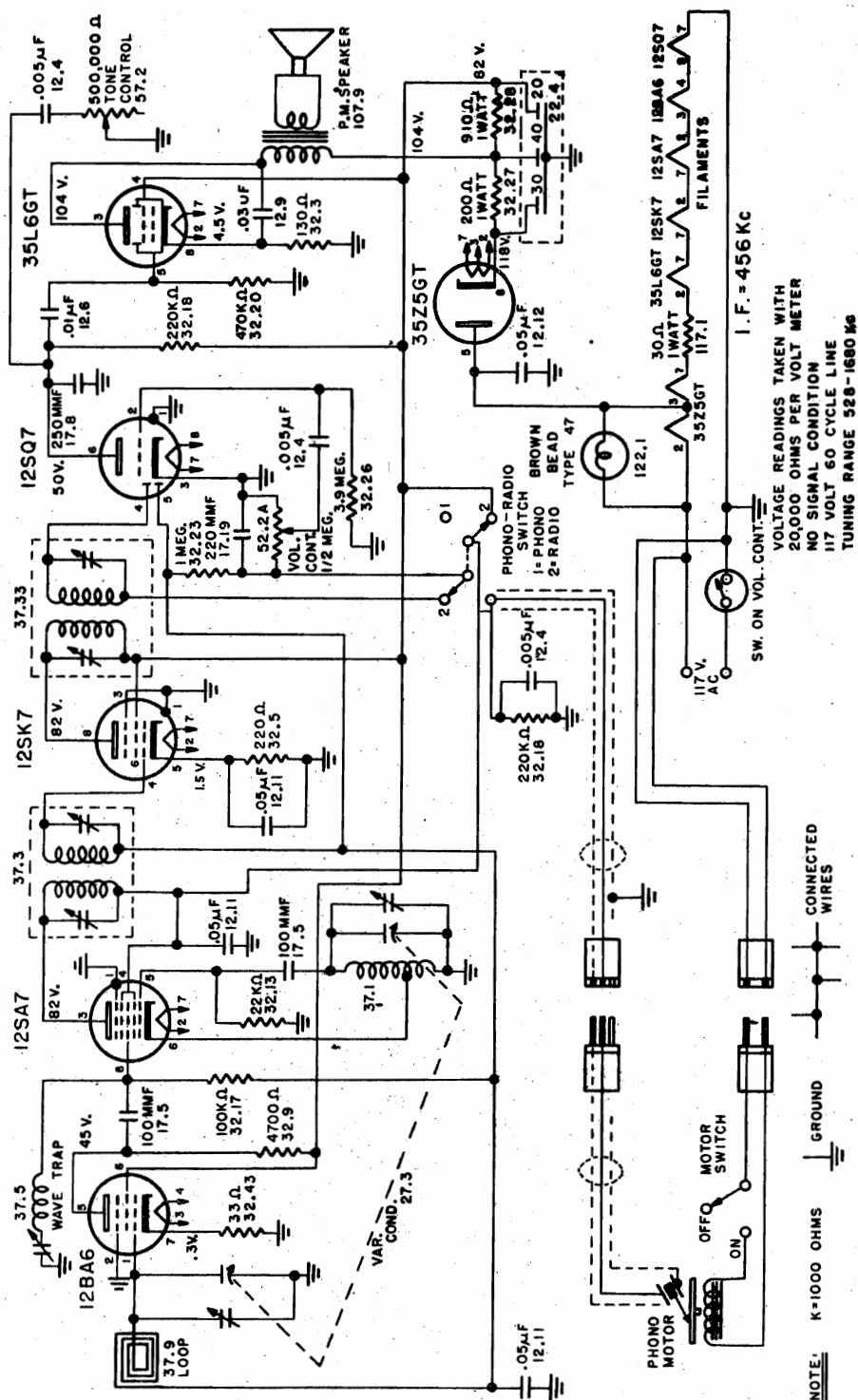


ESPEY MFG. CO. INC.



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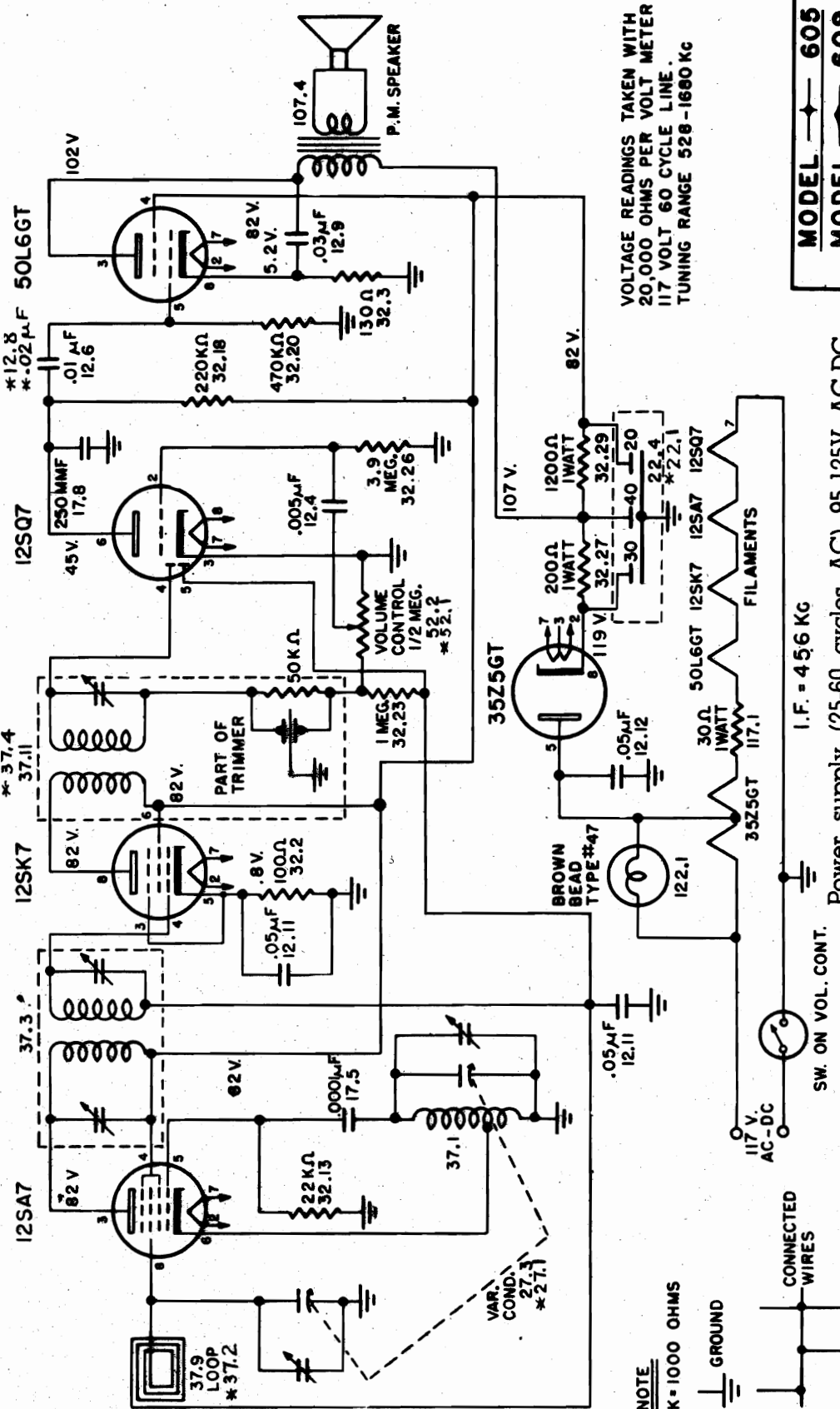


MODEL 605
MODEL 609

FADA RADIO & ELEC. CO. INC.

MODEL — 605
MODEL — 609
SCHEMATIC
FADA RADIO & ELECTRIC CO. INC.
LONG ISLAND CITY, N.Y. U.S.A.

MODELS 605 AND 609 ARE IDENTICAL
WITH THE EXCEPTION OF THE .01- μ F
CONDENSER, NO. 12.6, WHICH IN MODEL
609 IS .02 μ F, NO. 12.8. THOSE
PARTS INDICATED BY AN ASTERISK (*)
APPLY TO MODEL 609; OTHER PART
NUMBERS ARE THE SAME FOR BOTH MODELS



Tubes: Osc.-Converter
I.F. Amplifier
Det. Avc. A.F.
Power Output
Rectifier

FADA RADIO & ELEC. CO. INC.

MODEL 605

MODEL 609

ALIGNMENT PROCEDURE

No attempt should be made to realign the various circuits until all other causes have been checked, unless the condition is so obvious as to indicate that realignment is necessary. Then proceed as follows:

Volume Control full on.

Low range A.C. meter connected across voice coil to indicate output.

Keep signal generator attenuated so as to maintain 1/2 scale reading on output meter.

Make certain that dial pointer is exactly on index line (top left side of dial plate) when variable condenser is fully meshed.

MODELS 605 AND 609

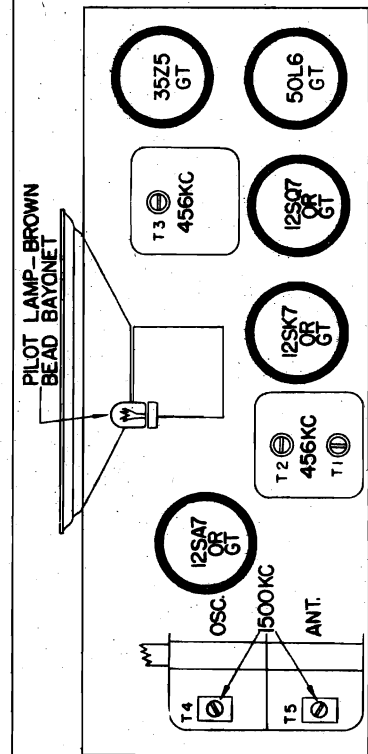
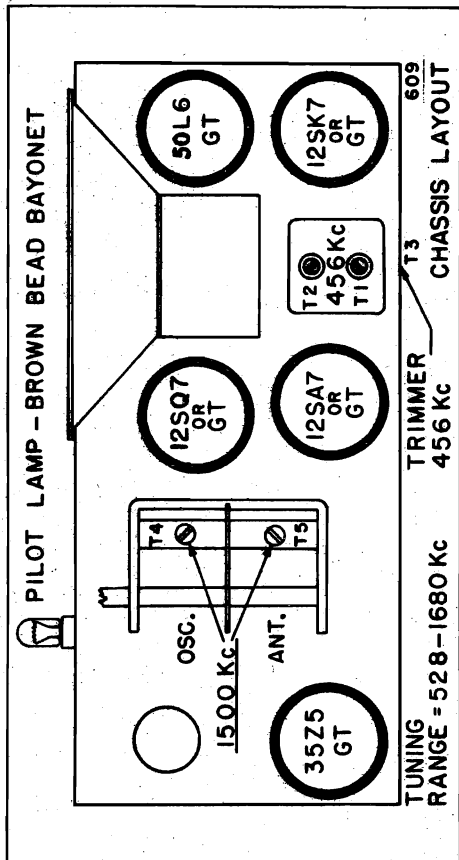
Receiver Dial at	Signal Generator	Dummy Antenna	Connect Signal Generator to:	Refer to Chassis Layout for Location of Trimmers
1 Full Open	Exactly 456 KC	.1 MF	Control Grid 12SA7 Tube (Top) Rear Section Variable Condenser	Adjust for Maximum Output T1, T2 & T3
2 Exactly 1680 KC	Exactly 1680 KC		Radiating Loop (1/2 meter) 20" from Receiver Loop	Adjust for Maximum Output T4
3 Approx. 1500 KC	Approx. 1500 KC		Radiating Loop (1/2 meter) 20" from Receiver Loop	Adjust for Maximum Output T5
4 Approx. 600 KC	Approx. 600 KC		Radiating Loop (1/2 meter) 20" from Receiver Loop	Check tracking and bend slotted end plate (rear section) of variable if necessary.
5				

605 SERIES PARTS LIST

Part No.	Description	Part No.	Description
12.4	Tubular Condenser .005 mf 600 V	12.4	Tubular Condenser .005 mf 600 V
12.6	Tubular Condenser .01 mf 400 V	12.8	Tubular Condenser .02 mf 400 V
12.9	Tubular Condenser .03 mf 400 V	12.9	Tubular Condenser .03 mf 400 V
12.11	Tubular Condenser .05 mf 200 V	12.11	Tubular Condenser .05 mf 400 V
12.12	Tubular Condenser .05 mf 400 V	12.12	Tubular Condenser .05 mf 200 V
17.5	Mica Condenser 100 mmf $\pm 10\%$	17.5	Mica Condenser 100 mmf $\pm 10\%$
17.8	Mica Condenser 250 mmf $\pm 20\%$	17.8	Mica Condenser 250 mmf $\pm 20\%$
22.4	3 Section Electrolytic Condenser	22.1	3 Section Electrolytic Condenser
27.3	Variable Condenser 30-40-20 mf	27.1	Variable Condenser 30-40-20 mf
37.1	Oscillator Coil 150 W.V.	37.1	Oscillator Coil 150 W.V.
37.9	Loop Antenna	37.2	Loop Antenna
37.3	Input I.F. Transformer complete	37.3	Input I.F. Transformer complete
37.11	Output I.F. Transformer complete	37.4	Output I.F. Transformer complete
52.2	Volume Control w/switch	52.1	Volume Control with Switch
72.1	Power Cord (Approved)	72.1	Power Cord (Approved)
77.16	Dial Pointer	77.1	Dial Scale (Calibrated)
77.18	Dial Scale (Calibrated)	77.6	Dial Pointer
97.12W	Cabinet—Walnut Bakelite	77.7	Dial Crystal
142.4W	Cabinet Knobs—Walnut	97.2W	Cabinet Bakelite—Walnut
97.11	Cabinet Back	97.2V	Cabinet Bakelite—Ivory
107.4	4" P.M. Speaker with Transformer	97.3	Cabinet Back
107.41	4" P.M. Speaker less Transformer	142.4W	Cabinet Knobs—Walnut
42.1	Speaker Transformer for Above	142.4V	Cabinet Knobs—Ivory
117.1	30 ohm 1 W Resistor	107.1	4" P.M. Speaker with Transformer
		107.2	4" P.M. Speaker less Transformer
		42.1	Speaker Transformer for above
		117.1	30 ohm 1 W. Resistor

609 SERIES PARTS LIST

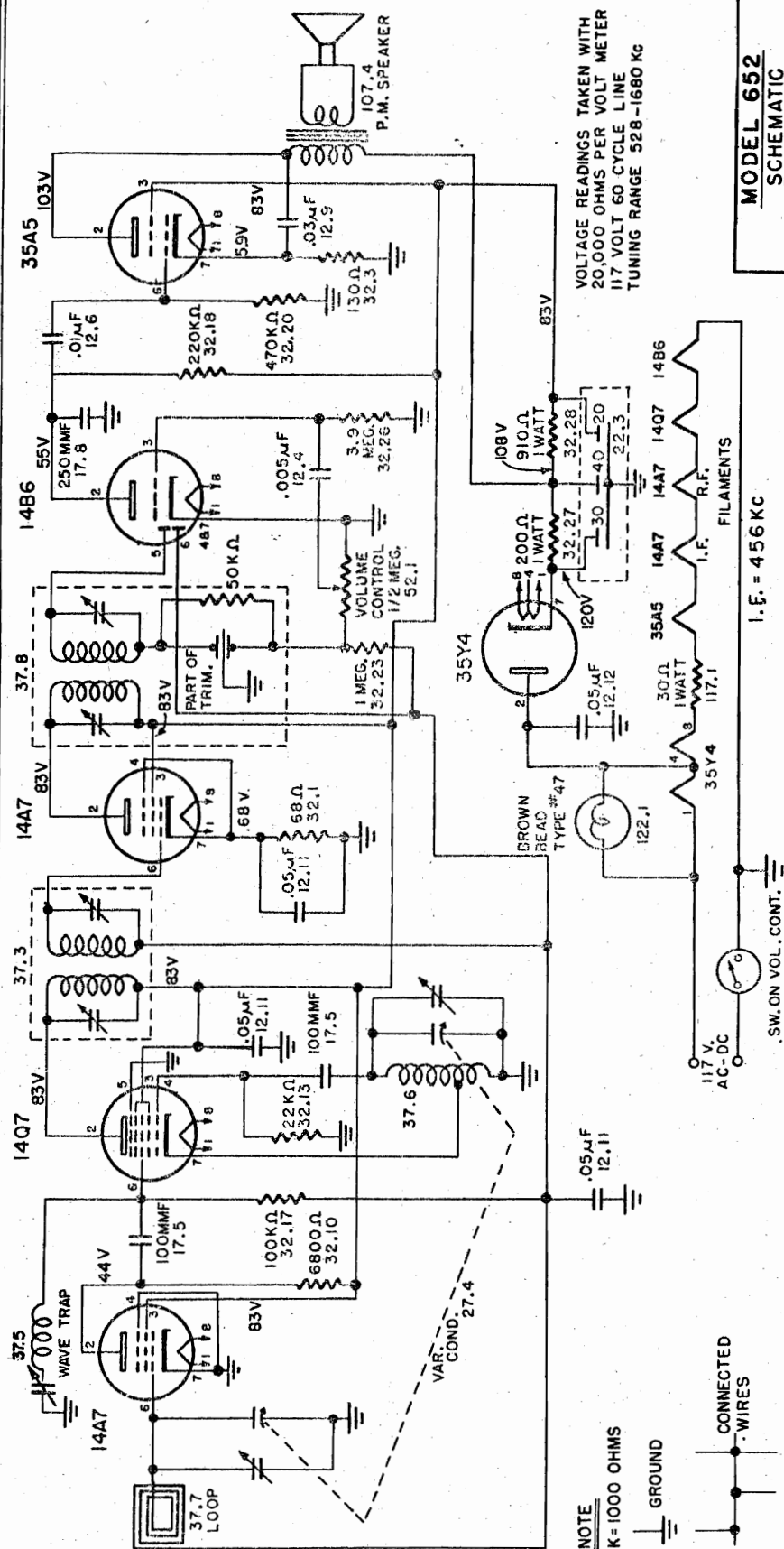
Part No.	Description	Part No.	Description
12.4	Tubular Condenser .005 mf 600 V	12.4	Tubular Condenser .005 mf 600 V
12.6	Tubular Condenser .01 mf 400 V	12.8	Tubular Condenser .02 mf 400 V
12.9	Tubular Condenser .03 mf 400 V	12.9	Tubular Condenser .03 mf 400 V
12.11	Tubular Condenser .05 mf 200 V	12.11	Tubular Condenser .05 mf 400 V
12.12	Tubular Condenser .05 mf 400 V	12.12	Tubular Condenser .05 mf 200 V
17.5	Mica Condenser 100 mmf $\pm 10\%$	17.5	Mica Condenser 100 mmf $\pm 10\%$
17.8	Mica Condenser 250 mmf $\pm 20\%$	17.8	Mica Condenser 250 mmf $\pm 20\%$
22.4	3 Section Electrolytic Condenser	22.1	3 Section Electrolytic Condenser
27.3	Variable Condenser 30-40-20 mf	27.1	Variable Condenser 30-40-20 mf
37.1	Oscillator Coil 150 W.V.	37.1	Oscillator Coil 150 W.V.
37.9	Loop Antenna	37.2	Loop Antenna
37.3	Input I.F. Transformer complete	37.3	Input I.F. Transformer complete
37.11	Output I.F. Transformer complete	37.4	Output I.F. Transformer complete
52.2	Volume Control w/switch	52.1	Volume Control with Switch
72.1	Power Cord (Approved)	72.1	Power Cord (Approved)
77.16	Dial Pointer	77.1	Dial Scale (Calibrated)
77.18	Dial Scale (Calibrated)	77.6	Dial Pointer
97.12W	Cabinet—Walnut Bakelite	77.7	Dial Crystal
142.4W	Cabinet Knobs—Walnut	97.2W	Cabinet Bakelite—Walnut
97.11	Cabinet Back	97.2V	Cabinet Bakelite—Ivory
107.4	4" P.M. Speaker with Transformer	97.3	Cabinet Back
107.41	4" P.M. Speaker less Transformer	142.4W	Cabinet Knobs—Walnut
42.1	Speaker Transformer for Above	142.4V	Cabinet Knobs—Ivory
117.1	30 ohm 1 W Resistor	107.1	4" P.M. Speaker with Transformer
		107.2	4" P.M. Speaker less Transformer
		42.1	Speaker Transformer for above
		117.1	30 ohm 1 W. Resistor



MODEL 652

FADA RADIO & ELEC. CO. INC.

MODEL 652
SCHEMATIC
FADA RADIO & ELECTRIC CO., INC.
LONG ISLAND CITY, N.Y., U.S.A.

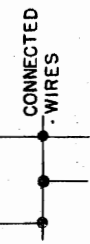


VOLTAGE READINGS TAKEN WITH
20,000 OHMS PER VOLT METER
117 VOLT 60 CYCLE LINE
TUNING RANGE 528-1680 KC

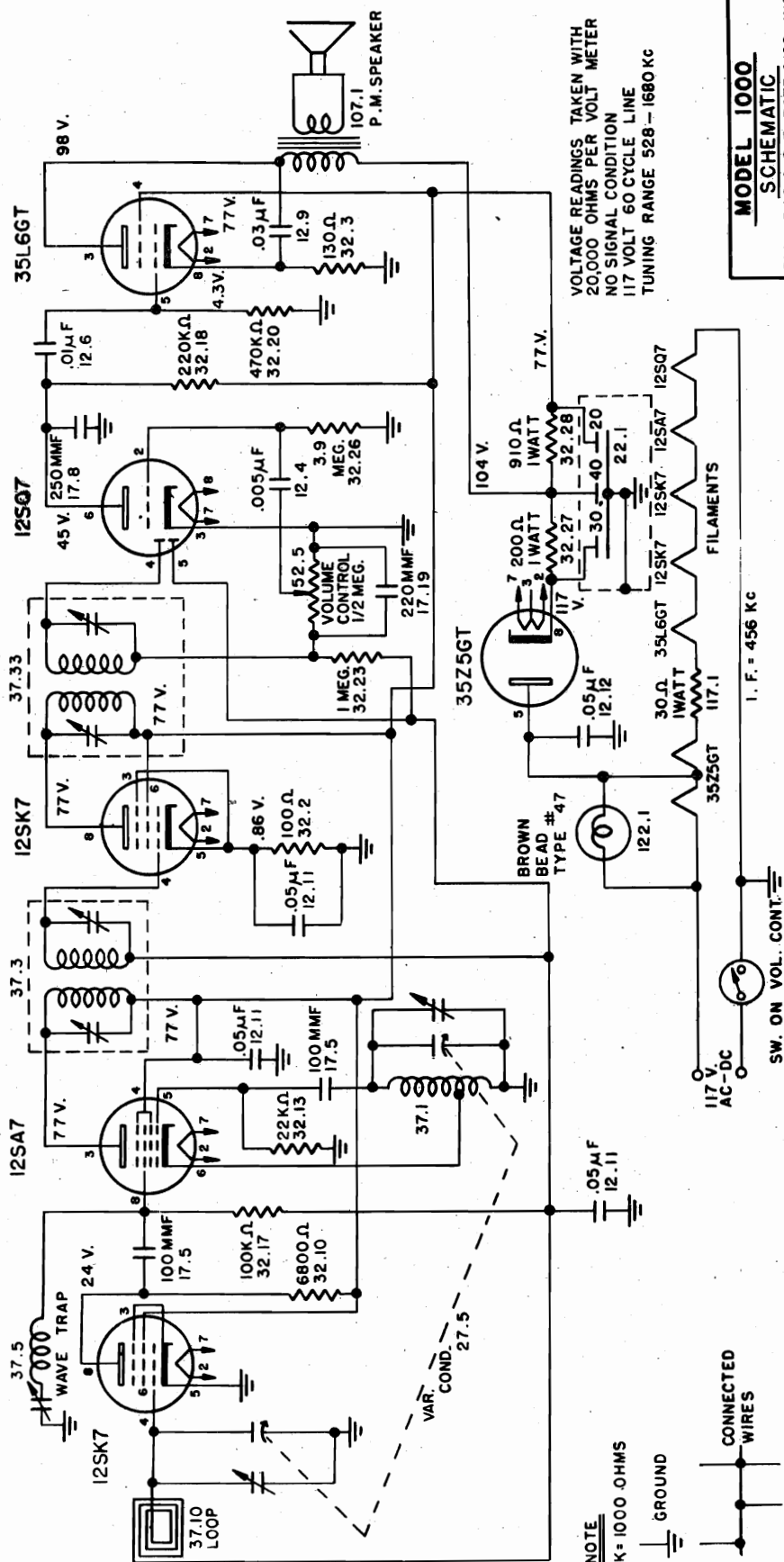
Power supply (25-60 cycles AC) 95-125V AC-DC
Speaker 4" P.M. 1 oz. Alnico V Magnet
Speaker Transformer 2500 ohms—400 cycles
Speaker Voice Coil 3.2 ohms

Power consumption 30 Watts
Frequency Range 1680-530 KC
Tubes: R.F. Amplifier 14A7
Osc. Converter 14Q7
I.F. Amplifier 14A7
Det. A.V.F. 14B6
Power Output 35A5
Rectifier 35Y4

NOTE
K = 1000 OHMS
GROUND







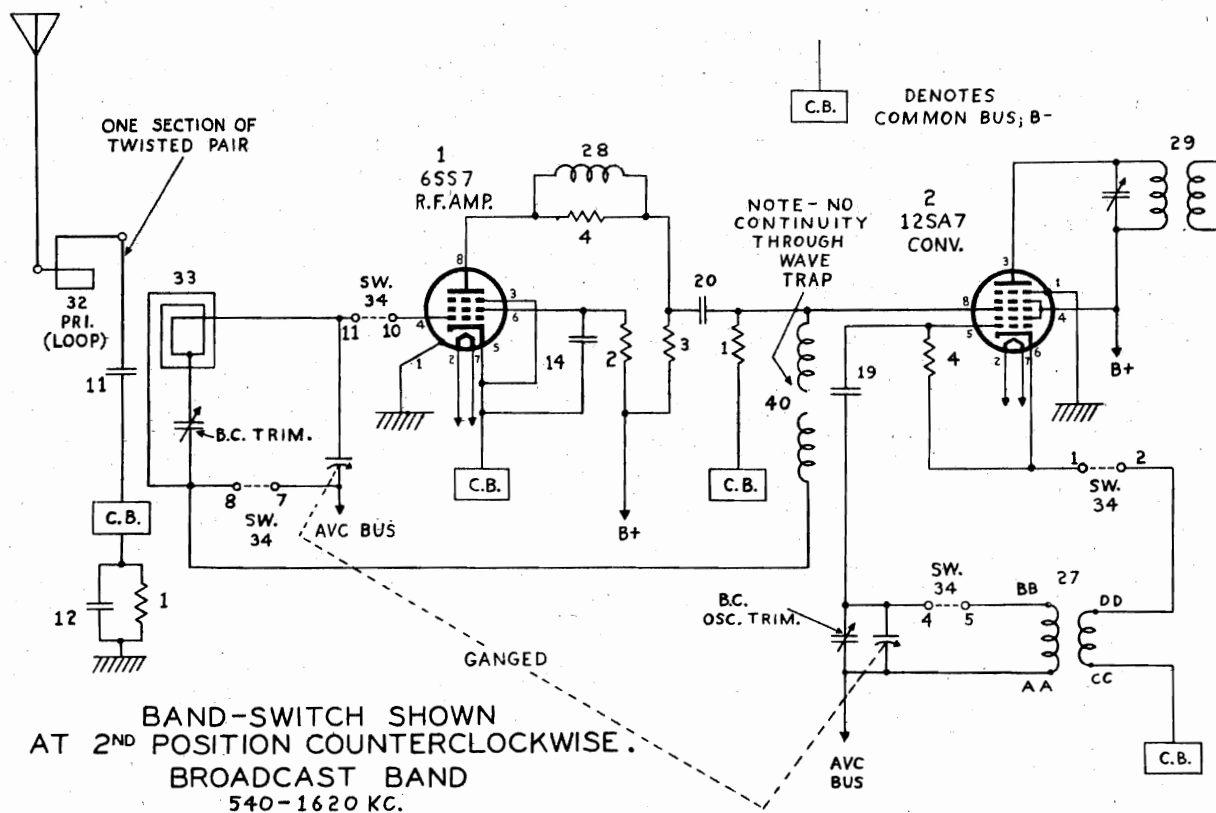
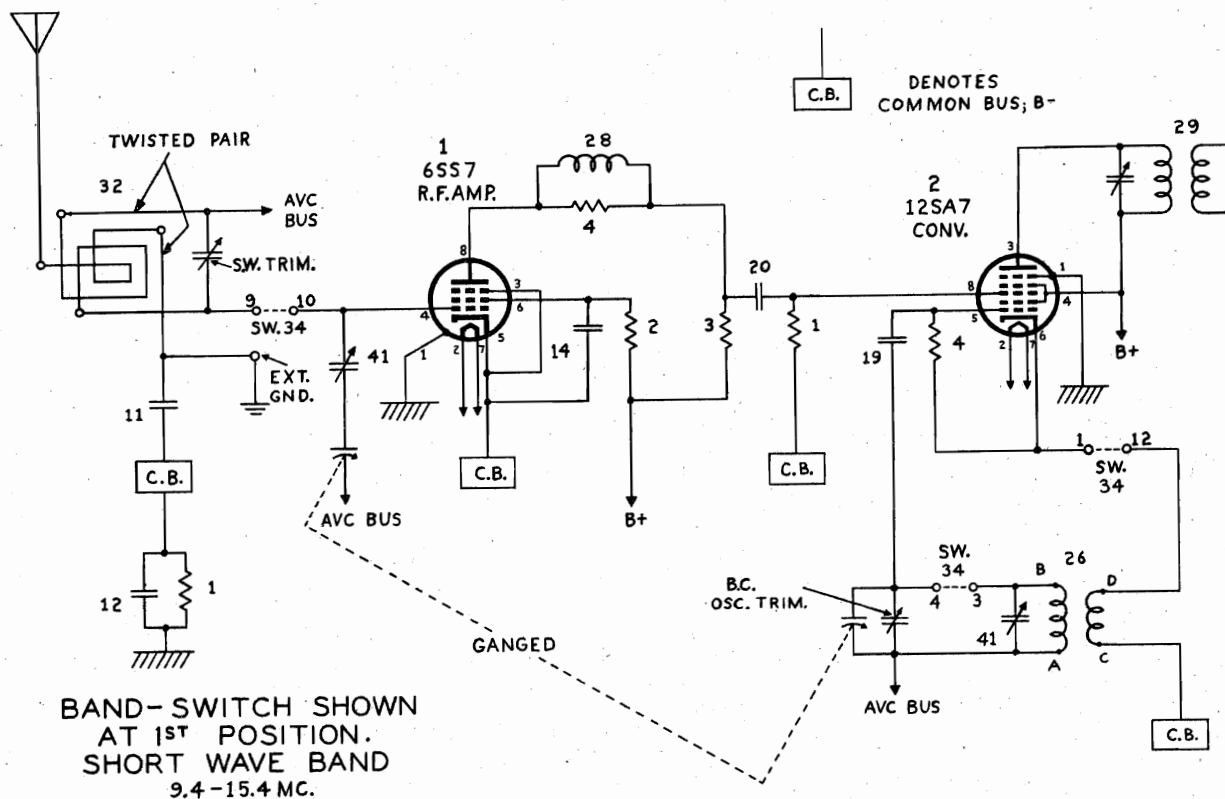
Tubes:	R.F. Amplifier	12SK7GT	Power supply (25-60 cycles AC)	95-125V AC-DC
	Osc. Converter	12SA7GT	Power consumption	30 Watts
	I.F. Amplifier	12SK7GT	Frequency Range	1680-528 KC
	Det. Avc. A.F.	12SQ7GT	I.F. Circuits	456 KC

Power Output 35L6GT
Rectifier 35Z5GT
Speaker 4" P.M. 1 oz. Alnico V Magnet
Speaker Transformer 2500 ohms—400 cycles
Speaker Voice Coil 3.2 ohms



MODELS ET-060,
ET-061, ET-063
Ch. C-150

FARNSWORTH TELEV. & RADIO CORP.



FARNSWORTH TELEV. & RADIO CORP.

MODELS ET-060
ET-061, ET-063

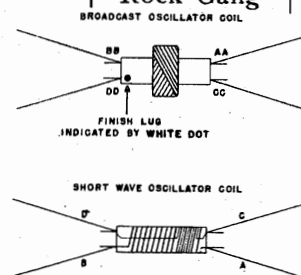
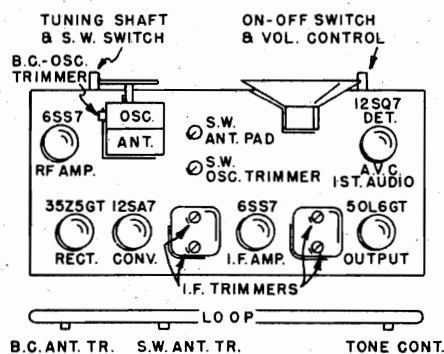
A Signal Generator calibrated at 455 Kc., 600 Kc., 1000 Kc., 1500 Kc., 15 Mc., 12.5 Mc., and 10 Mc., and an output indicator are required to properly align this receiver. All adjustments should be made with the volume control set for maximum, keeping the signal generator output as low as possible to prevent AVC action and incorrect adjustments.

Connect the low side of the Signal Generator to the chassis through a .1 Mfd. condenser. Connect the high side to antenna lead at rear of set through dummy load of 100 MMF for Broadcast and 400 ohms for Shortwave.

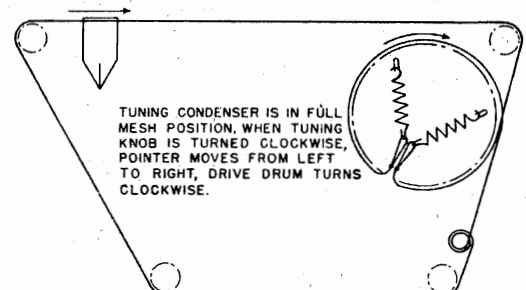
The loop antenna should be placed in approximately the position relative to chassis as when chassis is installed in cabinet.

When aligning the Shortwave Oscillator, use the peak found farthest out from maximum capacity on the oscillator trimmer. Use the peak nearest maximum capacity on the loop trimmer.

STEPS	DUMMY ANTENNA	SET GENERATOR AT	SET GANG AT	ADJUST	LOCATED	TO OBTAIN
1	SET VOLUME CONTROL FOR MAXIMUM OUTPUT					
2	100 MMF	455 Kc.	Minimum Capacity	2nd. I.F. Trimmers	Top of I.F. Transformer	Maximum Output
3				1st. I.F. Trimmers		
4		1500 Kc.	1500 Kc.	B.C. Osc. Trimmer	On Tuning Capacitor	
5		1500 Kc.	1500 Kc.	B.C. Ant. Trimmer	*On Loop Antenna	
6	Check Pointer for Calibration at 1000 Kc. and 600 Kc.					
SHORT WAVE BAND						
7	400 Ohms	15 Mc.	Minimum Capacity	S.W. Osc. Trimmer	*Chassis Near Rear	Maximum Output
8		12.5 Mc.	12.5 Mc. Rock Gang	S.W. Ant. Trimmer	*On Loop	
9	Check	10 Mc.	10 Mc. Rock Gang	S.W. Ant. Padder	*Chassis Near Front	



CATHODE C-D, HAVING 4 TURNS IS WOUND ON END OF FORM NEAREST TERMINALS A & G



MODELS ET-060,
ET-061, ET-063

FARNSWORTH TELEV. & RADIO CORP.

Refer. No.	Part No.	DESCRIPTION	List Price
1	77216	220 M Ohms.....	\$.15
2	77265	15 M Ohms.....	.15
3	77211	4700 Ohms.....	.15
4	77266	22 M Ohms.....	.15
5	77259	150 Ohms.....	.15
6	77261	470 Ohms.....	.15
7	77270	2.2 Megohms.....	.15
8	77273	6.8 Megohms.....	.15
9	77217	470 M Ohms.....	.15
11	25197	.001 Mfd. 600 V.....	.15
12	25215	.1 Mfd. 600 V.....	.20
14	25196	.05 Mfd. 600 V.....	.30
15	25195	.02 Mfd. 600 V.....	.20
16	25194	.01 Mfd. 600 V.....	.20
17	25184	.003 Mfd. 600 V.....	.20
19	25193	47 Mmf. Mica.....	.30
20	25188	100 Mmf. Mica.....	.25
21	25187	240 Mmf. Mica.....	.30
23	25022	20 Mfd.—30 Mfd.—150 V. Elect. Cap.....	1.15
24	26154	Gang Capacitor.....	4.45
24	26239	Gang Capacitor, (see note).....	3.95
26	38549	S. W. Oscillator Coil (White dot) for 26154.....	.70
26	38709	S. W. Oscillator Coil (Yellow dot) for 26239 (see note).....	.70
27	38483	B. C. Oscillator Coil (White dot) for 26154.....	.60
27	38707	B. C. Oscillator Coil (Yellow dot) for 26239 (see note).....	.60
28	38550	Peaking Coil.....	.40
29	38536	1st. I. F. Transformer.....	1.70
30	38537	2nd. I. F. Transformer.....	1.70
31	94091	Output Transformer.....	1.50
32	38535	S. W. Loop Assembly.....	.60
33	38465	B. C. Loop and Back Cover Ass'y ET-060 and ET-061.....	3.15
33	38480	B. C. Loop and Back Cover Ass'y ET-063.....	3.20
34	90095	Band Switch.....	1.50
35	42186	Dial Lamp (Mazda 47).....	.15
36	78070	Volume Control.....	1.10
37	90073	Tone Control Slide Switch.....	.20
38	81091	Speaker.....	6.35
39	27118	Line Cord.....	.70
40	38484	Wave Trap.....	.55
41	26214	B. C. and S. W. Antenna Trimmer Strip.....	.60
	31276	Dial Background.....	.35
	31319	Dial Window.....	.50
	07334	Dial Pointer Assembly.....	.95
	31277	Dial Scale for ET-060 and ET-061.....	.40
	31279	Dial Scale for ET-063.....	.45
	41106	Universal Drive Cord Kit.....	.40
	56994	Drive Drum.....	.15
	09195	Knob and Set Screw for ET-060 and ET-063.....	.45
	09196	Knob and Set Screw for ET-061 Red.....	.50
	09224	Knob and Set Screw for ET-061 Blue.....	.50
	09225	Knob and Set Screw for ET-061 Black.....	.50
	54118	Band Switch Lever ET-060 and ET-061.....	.15
	54091	Band Switch Lever ET-063.....	.15
	H-231	Cabinet and Packing for ET-060.....	6.15
	H-254	Cabinet and Packing for ET-061.....	8.75
	59168	Grille for ET-060.....	2.00
	59190	Grille for ET-061 Red.....	2.00
	59247	Grille for ET-061 Blue.....	2.00
	59248	Grille for ET-061 Black.....	2.00

NOTE: Models with R.F. trimmer on loop require removal of R. F. trimmer from gang capacitor having such trimmer. Late production gang capacitor 26239 (identified by red dot) with 19 plate oscillator section requires B.C. Oscillator Coil 38706 and S.W. Oscillator Coil 38709 (Marked with yellow dots).

The Service Department policy is to furnish ½ Watt 5% Carbon Resistors and 600 Volt Tub-

The parts shortage has resulted in the substitution of various types of tuning capacitors without change in part numbers stamped on them. In ordering replacement tuning capacitors for ET-060, 061, 063, 064, 065, 066, 069; EK-263, 264, and 265 the following suggestions should be observed:

Gang Capacitor with 21 plate oscillator section requires the removal of trimmer from R.F. section of gang if the loop antenna has a R. F. trimmer located on it. This capacitor uses B. C. oscillator coil No. 38483 and if a S. W. oscillator coil is used, requires S. W. oscillator coil No. 38549. Both of these coils have a white dot to indicate finish lug.

No. 23239 gang capacitor with 19 plate oscillator section (identified by red dot on rear) may require the removal of R. F. trimmer as explained above. This capacitor requires B. C. oscillator coil No. 38706 and S. W. oscillator coil (if used) No. 38709. These oscillator coils are marked with a yellow dot at the finish lug.

Prices subject to change without notice.



MODELS ET-064,
ET-065, Ch. C-158;
ET-066, Ch. C-159

FARNSWORTH TELEV. & RADIO CORP.

EQUIPMENT AND PROCEDURE FOR ALIGNMENT

To properly align this receiver, a signal generator calibrated at 455 Kc., 600 Kc., and 1500 Kc., and an output indicator are required. All adjustments should be made with the volume control set for maximum volume, keeping the signal generator output as low as possible to prevent A. V. C. action and incorrect alignment.

Connect the low side of the signal generator to one of the wires found at the rear of the set. The high side of the signal generator is connected to the other lead.

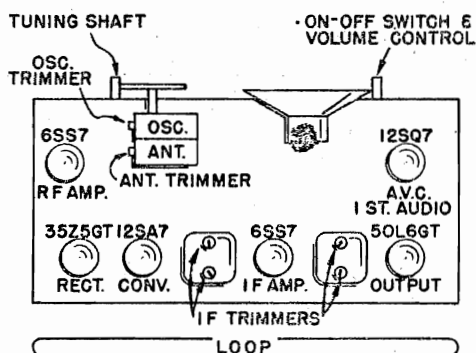
The loop should be spaced 3/4 inch from the chassis or the approximate position relative to the chassis as when installed in cabinet.

TABULATION FOR ALIGNMENT

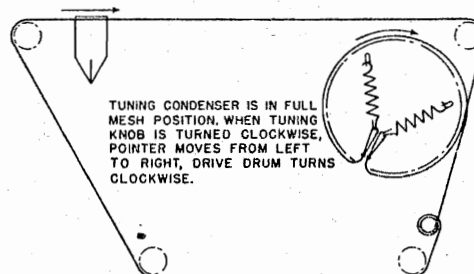
Steps	Dummy Antenna	Set Generator At	Set Gang At	Adjust	Located	To Obtain
1	Set Volume Control For Maximum Output					
2	100 MMF	455 Kc.	Minimum Capacity	2nd. I.F. Trimmers	Top of I.F. Transformer	Maximum Output
3				1st. I. F. Trimmers		
4		1500 Kc.	1500 Kc.	Osc. Trimmer	On Tuning Condenser	
5		1500 Kc.	1500 Kc.	Ant. Trimmer	On Tuning Condenser*	
6	Check Pointer Calibration at 600Kc.					

*On models using gang condenser #26154, the antenna trimmer is located on loop.

SIX TUBE LAYOUT



DIAL STRINGING



MODELS EC-260,
EK-262, EK-263,
EK-264, EK-265

FARNSWORTH TELEV. & RADIO CORP.

MODELS ET-064,
ET-065, ET-066

PARTS PRICE LIST
EC-260, EK-262, EK-263, EK-264, EK-265

Reference No.	Part No.	Description	List Price
1	77214	100 M Ohms	
2	77211	4700 Ohms	
3	77266	22 M Ohms	
4	77281	470 Ohms	
5	77155	12 M Ohms 2 Watt	
6	77270	2.2 Megohms	
7	77216	220 M Ohms	
8	77213	47 M Ohms	
9	77217	470 M Ohms	
10	77273	6.8 Megohms	
11	77174	270 Ohms 1 Watt	
12	77258	100 Ohms	
13	77301	2200 Ohms 2 Watt	
14	25196	.05 Mfd. Tubular 600 V	
15	25215	.1 Mfd. Tubular 600 V	
16	25184	.005 Mfd. Tubular 600 V	
17	25182	.002 Mfd. Tubular 600 V	
18	25183	.003 Mfd. Tubular 600 V	
19	25184	.005 Mfd. Line Buffer 600 V	
20	25184	100 Mmf. Mica	
21	25187	47 Mmf. Mica	
22	25188	Electrolytic Capacitor 30 Mf. 350 V - 20 Mf. 300 V - 20 Mf. 250 V	
23	25180	Gang Condenser and Drive Drum	
24	15136	Volume Control	
25	78071	Tone Control and Phono Switch	
26	90148	Wave Trap	
27	38484	Oscillator Coil	
28	38536	1st. I. F. Transformer	
29	38537	2nd. I. F. Transformer	
30	94025	Power Transformer	
31	94197	Output Transformer EC-260, EK-265	
32	94198	Output Transformer EK-262	
33	94199	Output Transformer EK-263, EK-264	
34	26032	Antenna Trimmer	
35	38533	Loop Antenna for EK-262 and EK-264	
36	38534	Line Cord for EC-260, EK-263 and EK-265	
37	11210	Phono A.C. Cable and Plug	
38	42185	Phono Input Socket	
39	80030	Speaker EC-260, EK-265	
40	81125	Speaker EK-263, EK-264	
41	81123	Speaker EK-262	
42	80256	Antenna Socket	
43	80252	Antenna Plug	
44	80139	Molded Octal Tube Socket	
45	07348	Dial Pointer Assembly	
46	41106	Universal Drive Cord Kit	
47	31318	Dial Glass for EC-260, EK-264	
48	31280	Dial Glass for EK-262, EK-263, EK-265	
	59211	Dial Escutcheon EC-260, EK-263, EK-265	
	59199	Dial Background for EK-262, EK-263, EK-265	
	58006	Dial Background for EC-260, EK-264	
	58039	Dial Light Current Supply Spring	
	64360	Cabinet and Packing for EK-260	
	H-231	Cabinet and Packing for EK-263	
	H-232-1	Cabinet and Packing for EK-263 Walnut	
	H-232-2	Cabinet and Packing for EK-263 Blonde	
	H-233	Cabinet and Packing for EK-265	
	H-230-1	Cabinet and Packing for EK-264 Walnut	
	H-230-2	Cabinet and Packing for EK-264 Blonde	
	59134	Knob for EK-260, EK-262, EK-263 Walnut, EK-264 Walnut	
	59243	Knob for EK-263 Blonde, EK-264 Blonde	
	71223	Phono Needle	
	22147	P. U. Cable	

PRICES NOT AVAILABLE AT PRESENT

PARTS PRICE LIST

ET-064, ET-065, ET-066

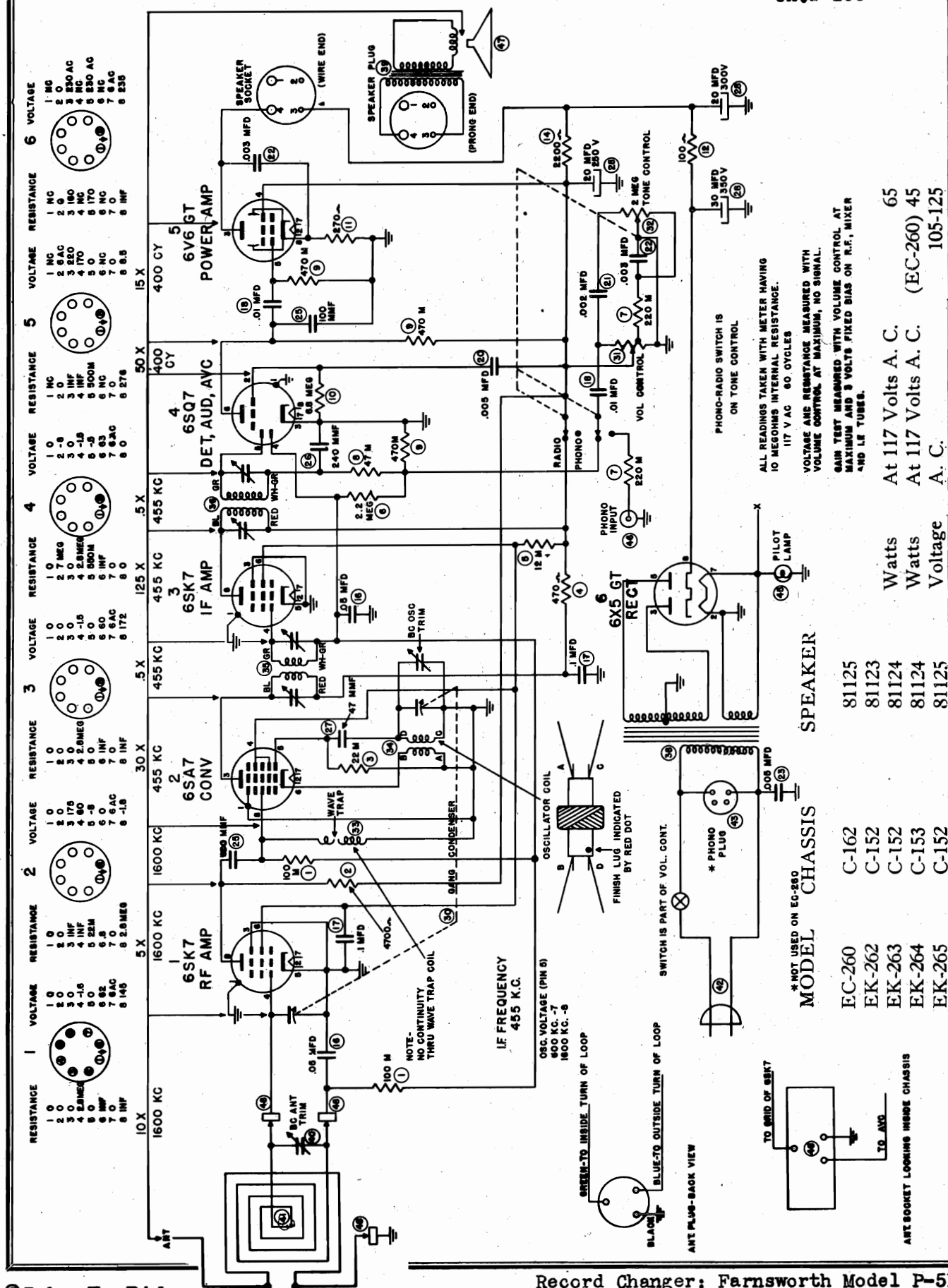
Refer. No.	Part No.	Description	List Price
1	77216	220 M Ohms	
2	77265	15 M Ohms	
3	77211	4700 Ohms	
4	77266	22 M Ohms	
5	77259	150 Ohms	
6	77261	470 Ohms	
7	77270	2.2 Meg Ohms	
8	77273	6.8 Meg Ohms	
9	77217	470 M Ohms	
10	25215	.1 Mfd. 600 V	
11	25196	.05 Mfd. 600 V	
12	25184	.005 Mfd. 600 V	
13	25182	.002 Mfd. 600 V	
14	25183	.003 Mfd. 600 V	
15	25194	.01 Mfd. 600 V	
16	25194	Two Gang Condenser & Drive Drum	
17	09130	47 Mmf. Mica	
18	25193	100 Mmf. Mica	
19	25188	240 Mmf. Mica	
20	25187	Elect. Cond. 30 Mfd. & 20 Mfd.	
21	25022	500 M Volume Control	
22	78048	Oscillator Coil Assembly	
23	38483	1st. I. F. Transformer	
24	38536	2nd. I. F. Transformer	
25	38537	Output Transformer	
26	94091	Speaker	
27	81091	Loop and Back Cover Assembly	
28	38478	Loop and Back Cover Assembly for ET-066	
29	38479	Dial Lamp	
30	42186	Line Cord	
31	27118	Wave Trap	
32	38484	Antenna Trimmer used with Gang Cond. #26154 Only	
33	26233	Drive Cord Assembly	
34	41106	Dial Pointer Assembly	
35	31265	Dial Scale	
36	31278	Dial Scale for ET-066	
37	59193	Knob	
	59134	Knob for ET-066	
	H-239	Cabinet and Packing for ET-064	
	H-240	Cabinet and Packing for ET-065	
	H-235	Cabinet and Packing for ET-066	

PRICES NOT AVAILABLE AT PRESENT

The Service Department policy is to furnish 1/2 Watt 5% Carbon Resistors and 600 Volt Tubular Condensers.

Prices subject to change without notice.

EK-263, EK-265,
Ch. C152; EK-264,
Ch. C-153



FARNSWORTH TELEV. & RADIO CORP.

MODELS EC-260,
Ch.C-162;EK-262,
EK-263,EK-265,
Ch.C-152;EK-264,
Ch.C-153

A Signal Generator calibrated at 455 Kc., 600 Kc. and 1500 Kc., and an output indicator are necessary to properly align this set. All adjustments should be made with the volume control set for maximum and the tone control for maximum treble, keeping the signal generator output as low as possible to prevent A.V.C. action and false settings.

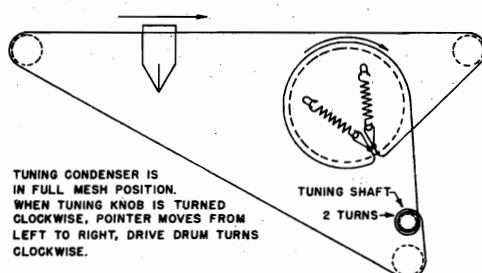
The low side of the signal generator is connected to the chassis.

TABULATION FOR ALIGNMENT

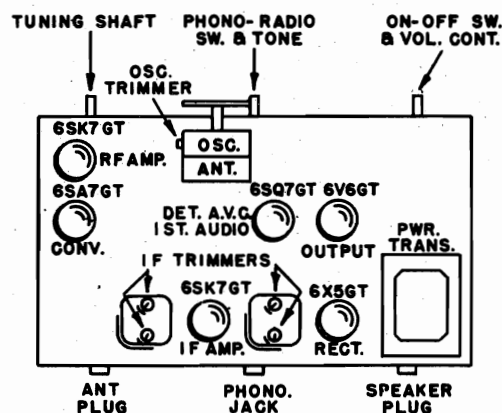
Steps	Connect High Side of Generator to	Set Generator At	Set Gang At	Adjust	Located	To Obtain
1	Set Volume Control at Maximum and Tone Control at Maximum Treble					
2	Stator of Ant. Section of Gang with .1 Mf. In Series	455 Kc.	Minimum	2nd. I.F. Transformer	Top of 2nd. I.F. Transformer	Maximum Output
3				1st. I. F. Transformer	Top of 1st. I.F. Transformer	
4				Ant. Lead With 250 Mmf. In Series*	1500 Kc.		1500 Kc.	Osc. Trimmer	On Gang
5	1500 Kc.	1500 Kc.	Ant. Trimmer		On Loop	
6	Check Pointer Calibration on 600 Kc.					

*Antenna wire protrudes from loop.

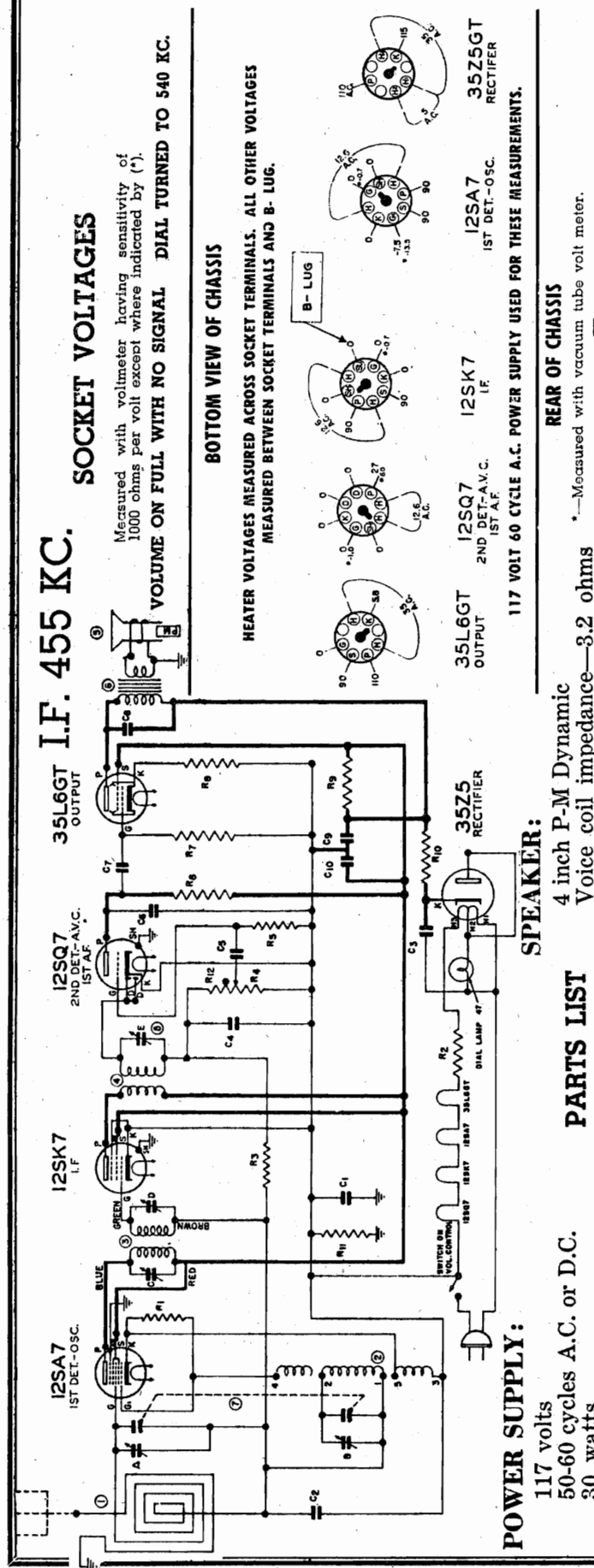
DIAL STRINGING



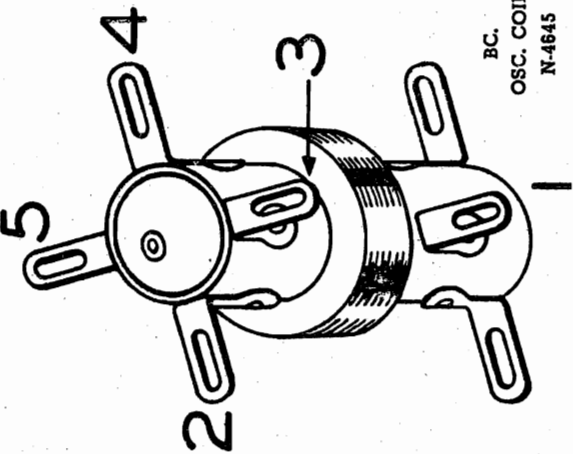
CHASSIS LAYOUT



THE FIRESTONE TIRE & RUBBER CO.

MODEL 4A2,
Commentator

DIA-GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
CONDENSERS			
C1	N-1345	Condenser .05 MFD 200 Volt	...
C2	N-1345	Condenser .05 MFD 200 Volt	...
C3	N-1345	Condenser .05 MFD 400 Volt	...
C4	N-1374	Condenser—Mica .0001 MFD 500 Volt	...
C5	N-4894	Condenser .0005 MFD 600 Volt	...
C6	N-4890	Condenser .0005 MFD 600 Volt	...
C7	N-1346	Condenser .01 MFD 400 Volt	...
C8	N-1374	Condenser .02 MFD 400 Volt	...
C9-C10	N-3302	Condenser—Electrolytic C9-35 C10-30 MFD 150 Volt	...
RESISTORS			
R1	N-4025	Resistor—Carbon 22,000 Ohm .5 Watt	...
R2	N-4023	Resistor—Carbon 82 Ohm 2.0 Watt	...
R3	N-1262	Resistor—Carbon 1.0 Megohm .5 Watt	...
R4	(N-4843)	Vol. Con., 500,000 ohm with switch—no shaft	...
R5	(N-4999)	Vol. Con., 500,000 ohm with switch & shaft	...
R6	N-4028	Resistor—Carbon 6.8 Megohm .5 Watt	...
R7	N-4026	Resistor—Carbon 220,000 Ohm .5 Watt	...
R8	N-4024	Resistor—Carbon 470,000 Ohm .5 Watt	...
R9	N-4027	Resistor—Carbon 220,000 Ohm .5 Watt	...
R10	N-3341	Resistor—Carbon 1,000 Ohm .5 Watt	...
R11	N-4022	Resistor—Carbon 33 Ohm .5 Watt	...
R12	N-4026	Resistor—Carbon 220,000 Ohm .5 Watt (In Volume Control)	...
OTHER ELECTRICAL PARTS			
1	N-3875	Coil—Loop with Cabinet Back	...
2	N-4645	Coil—Oscillator	...
3	N-4813	Coil—1st I.F.	...
4	N-4813	Coil—2nd I.F.	...
5	N-4890	Speaker—4" P.M. Dynamic	...
6	N-3899	Transformer—Output	...
7A, 7B	N-3230	Condenser—Variable, 2 Gang & Pulley Assy	...
8	N-4048	Condenser—Trimmer—70 to 130 MMFD	...
MISCELLANEOUS PARTS			
143	Cabinet	Cabinet	...
N-5250	Cord, Dial Drive (3 feet required)	...	...
N-4749	Knob	Knob	...
N-1147	Lamp, Dial—Mazda 47 6-8 V. 150 Ma.	...	...
N-3881	Pointer, Dial	...	...
N-3879	Pulley, Idler	...	...
N-3926	Scale, Dial	...	...
N-3872	Shaft, Tuning	...	...
N-5184	Vol. Control	...	...
N-3882	Socket, Dial Lamp—with leads	...	...
N-4666	Socket, Tube—Laminated	...	...
N-3229	Socket, Tube—Molded	...	...
N-4864	Speednut	...	...
N-2656	Spring, Dial Cord	...	...
N-4854	Terminal, Screw	...	...
N-3243	Washer, "C"—For Tuning Shaft	...	...



NUMBERED TERMINALS IN ILLUSTRATION CORRESPOND TO SIMILARLY NUMBERED TERMINALS ON THE CIRCUIT DIAGRAM.

MODEL 4A2.
Commentator

THE FIRESTONE TIRE & RUBBER CO.

ALIGNMENT PROCEDURE

1. Remove the chassis and loop antenna from the cabinet at the same time. To accomplish this remove the two fasteners holding the top of the back to the cabinet and remove the two screws on the rear apron of the chassis.
2. Note that there are five calibrating lines stamped into the metal dial frame. When gang condenser is fully meshed, dial pointer should be in the position indicated by first line at the left. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
3. Connect an output meter across the speaker voice coil or from plate of 35L6GT tube to B— through a .1 Mfd. condenser (see voltage chart for convenient B— connection).
4. Connect ground lead from signal generator to B— through a .25 Mfd. condenser.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.

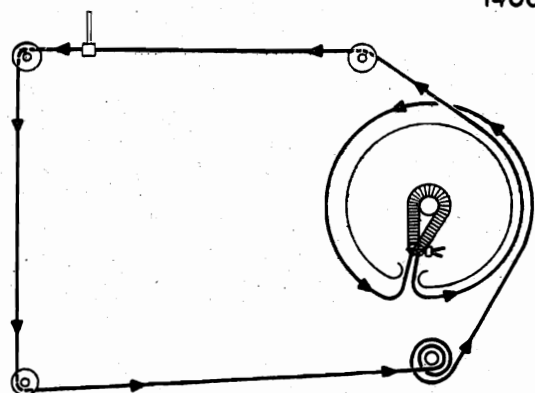
IMPORTANT—Align this receiver in exactly the order shown below.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF GENERATOR TO	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.05 MFD. Paper Condenser	Control Grid of 12SA7	455 KC	Any point where it does not affect the signal.	E C-D	2nd I.F. 1st I.F.	Adjust for maximum output. Then repeat adjustment.
100 MMFD. Mica Condenser	External Antenna Blue Lead on Loop	1720 KC	Set pointer to extreme right.	B	Oscillator	Adjust for maximum output.
100 MMFD Mica Condenser	External Antenna Blue Lead on Loop	1400 KC	Tune to 1400 KC generator signal.	A	Antenna	Adjust for maximum output.
100 MMFD. Mica Condenser	External Antenna Blue Lead on Loop	600 KC	Tune to 600 KC generator signal.	—	—	Check sensitivity.

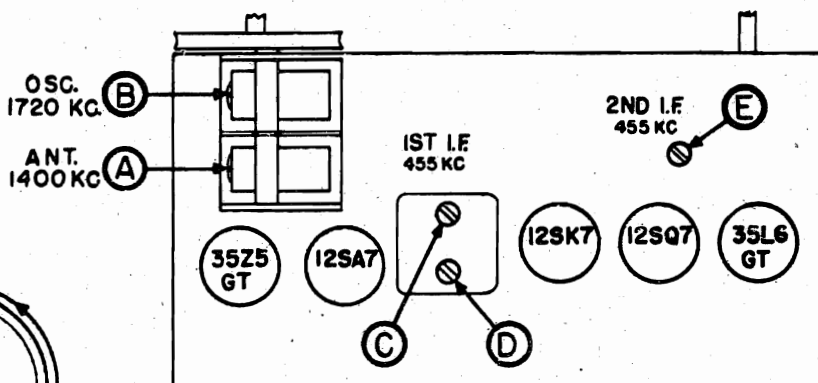
TOP VIEW OF CHASSIS

POWER OUTPUT:

Undistorted — 1.0 watts
Maximum — 1.3 watts

DIAL AND POINTER
DRIVE CORD
ARRANGEMENT

To string dial cord, set gang condenser to fully meshed position and use following parts:
N-2656 Tension Spring
N-5250 Cord (3 feet)



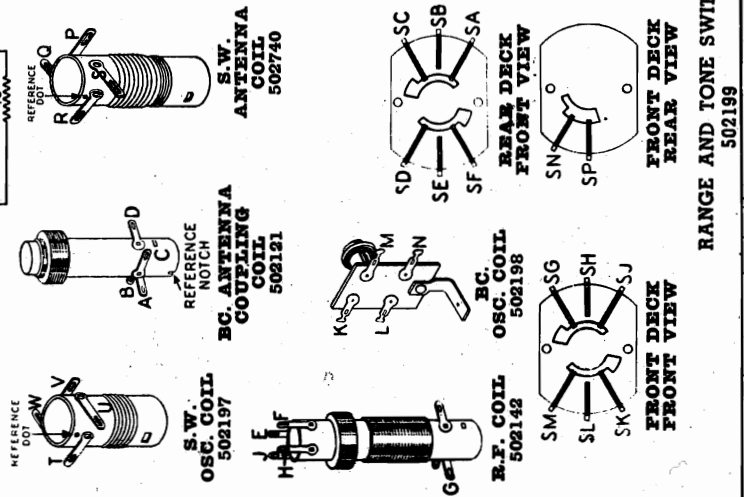
FREQUENCY RANGES:

Standard { 535-1720
Broadcast { K.C.
Band

TUBE COMPLEMENT:

12SA7.....Osc.—1st Det.
12SK7.....I.F. Amp.
12SQ7.....2nd Det.—A.V.C.—1st Audio
35L6GT.....Power Output
35Z5GT.....Rectifier

I.F. 455 KC.

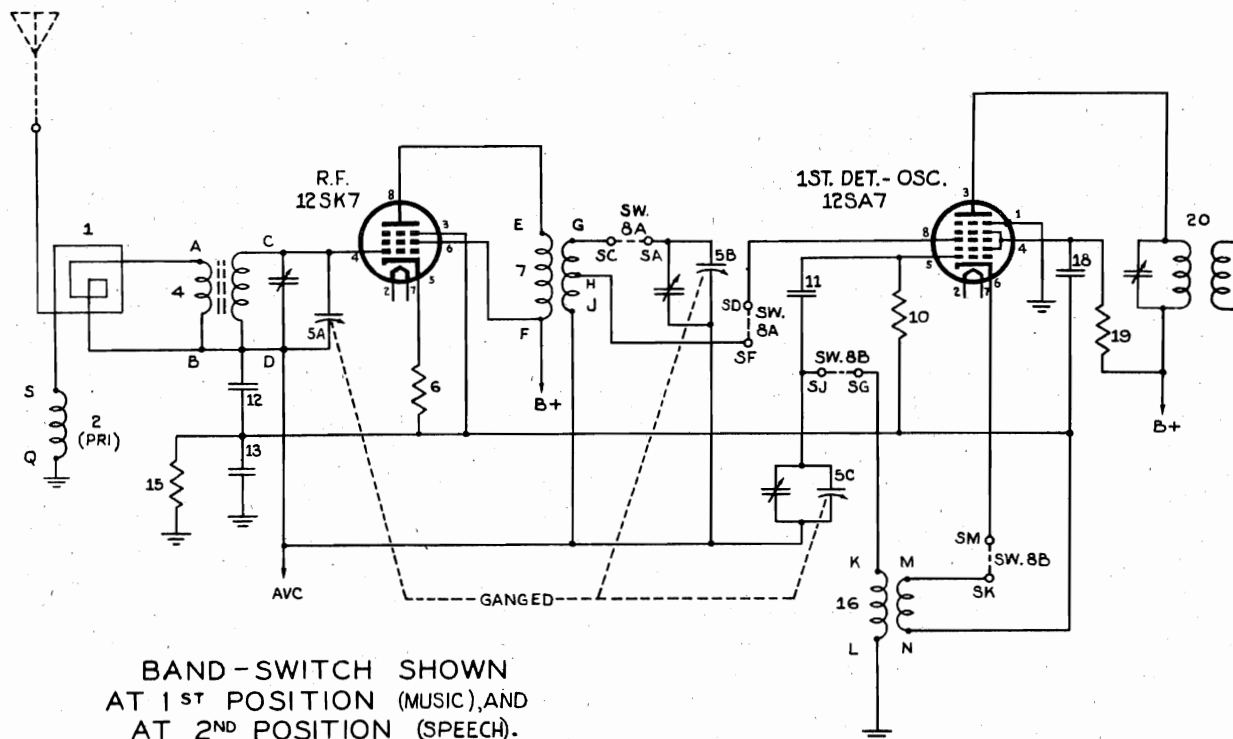


RANGE AND TONE SWITCH
502199

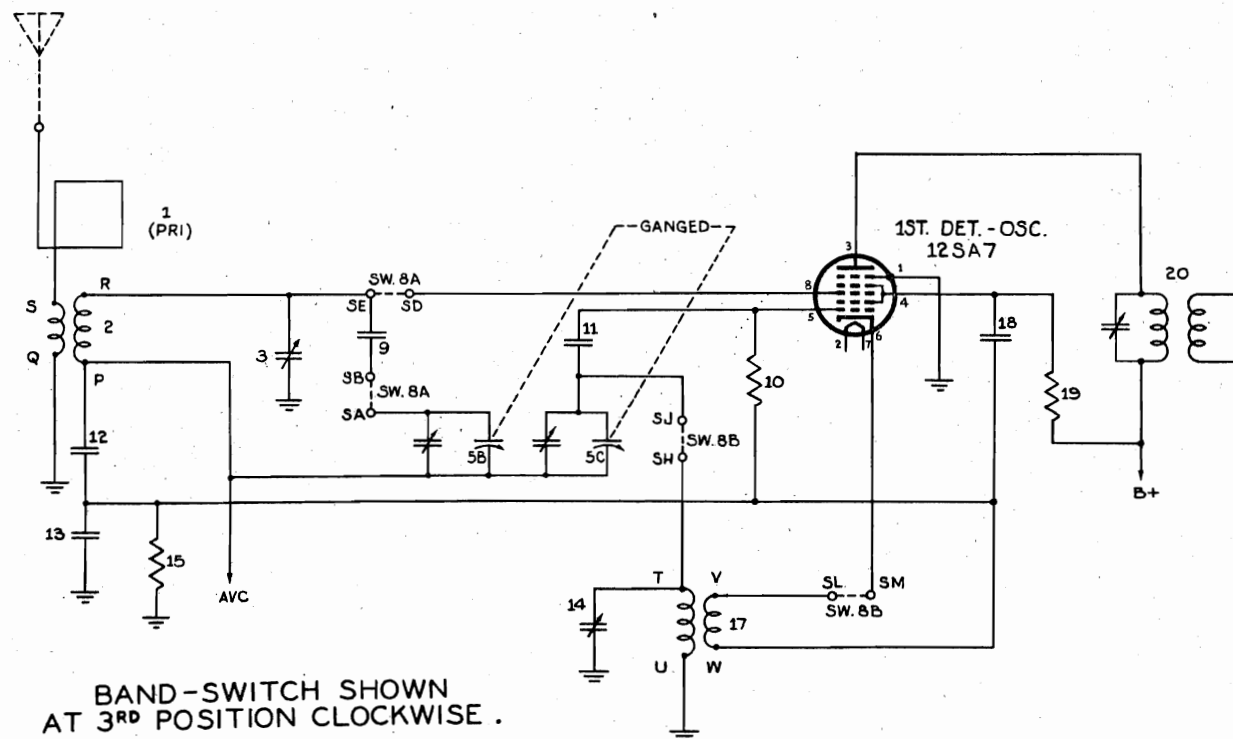
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODEL 4A20

THE FIRESTONE TIRE & RUBBER CO.



BAND-SWITCH SHOWN
AT 1ST POSITION (MUSIC), AND
AT 2ND POSITION (SPEECH).
BROADCAST BAND
540-1650 KC.



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE .
SHORT WAVE BAND
9-12 MC

THE FIRESTONE TIRE & RUBBER CO.

MODEL 4A20

ALIGNMENT PROCEDURE

Remove chassis and loop antenna from cabinet (do not remove loop of wire stapled to cabinet.) After chassis has been removed, replace loop antenna in cabinet. Stand the chassis on one end and space it approximately same distance from loop as when installed in cabinet. Then reconnect all leads to loop antenna and to loop of wire stapled on cabinet.

Note that there are four calibrating lines stamped into the metal dial frame. When gang condenser is fully meshed, dial pointer should be in the position indicated by first line at the left. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.

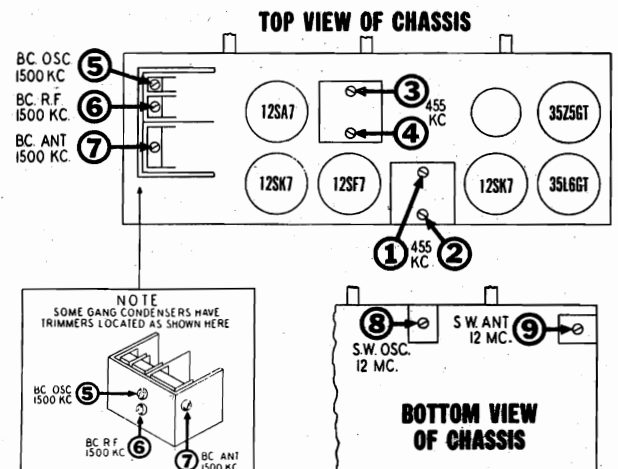
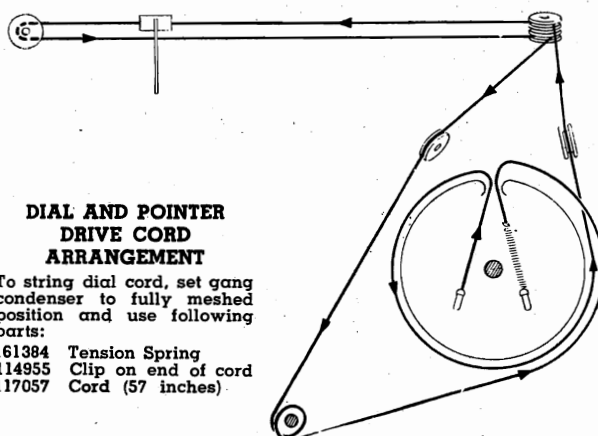
Connect an output meter across the speaker voice coil or from plate of 35L6GT tube to B— through a .1 Mfd. condenser (see voltage chart for convenient B— connection).

Connect ground lead from signal generator to B— through a .25 Mfd. condenser.

Set volume control at maximum volume position and use a weak signal from the signal generator.

IMPORTANT:—Align this receiver in exactly the order shown below. Broadcast band must be aligned before short wave band.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
200 MMFD. Mica Condenser	Control Grid of 12SA7	455 KC	Broadcast	Any point where it does not affect the signal	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast	Set pointer to 1500 KC reference line stamped into metal dial plate (first line at the right)	3-4	1st I.F.	
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast	Tune to 1500 KC generator signal	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast	Tune to 1500 KC generator signal	6	Broadcast R.F.	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast	Tune to 1500 KC generator signal	7	Broadcast Antenna	Adjust for maximum output.
400 OHM Resistor	External Antenna Clip on Loop Frame	12 MC	Short Wave	Set pointer to 12 MC. Reference line stamped into metal dial plate (second line from the right)	8	Short Wave Oscillator	Adjust to bring in signal. Check to see if proper peak was obtained by tuning in image at approx. 11.1 MC. If image does not appear, realign at 12 MC. with trimmer screw farther out. Recheck image.
400 OHM Resistor	External Antenna Clip on Loop Frame	12 MC	Short Wave	Tune to 12 MC generator signal	9	Short Wave Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.



MODEL 4A2

MODEL 4A20

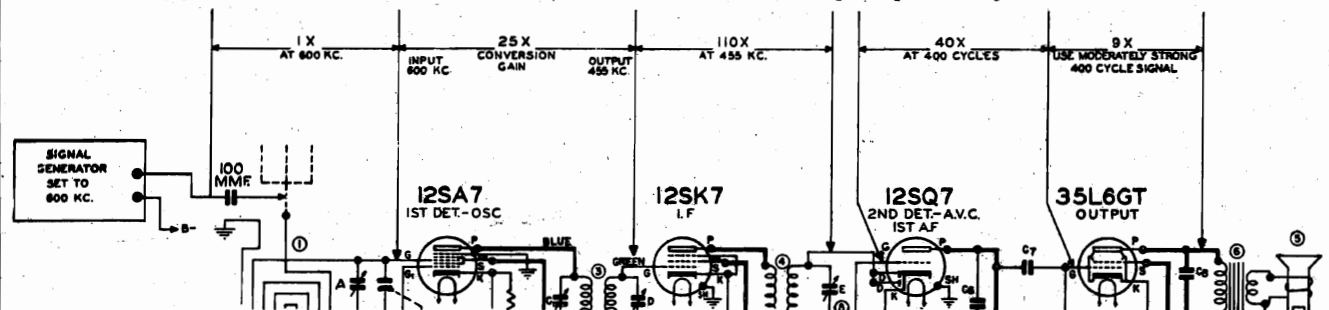
THE FIRESTONE TIRE & RUBBER CO.

APPROXIMATE STAGE GAIN DATA MODEL 4A2

Be sure Ant. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes).
2. For I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to B—. This provides a definite operating point.
IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning).
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



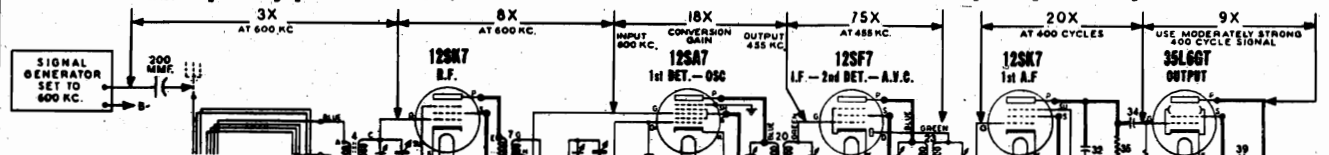
Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

APPROXIMATE STAGE GAIN DATA- MODEL 4A20

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to B—. This provides a definite operating point.
IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated (*).

FREQUENCY RANGES:

Standard Broadcast Band } 540-1650 KC.
Short Wave Band } 9-12 MC.

POWER SUPPLY:

117 volts
50-60 cycles A.C. or D.C.
30 watts

POWER OUTPUT:

Undistorted — 1.0 watts
Maximum — 1.6 watts

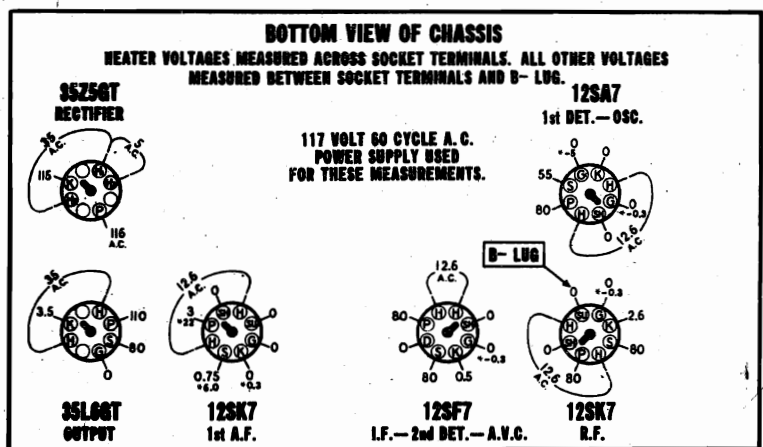
SPEAKER:

5 inch P-M Dynamic
Voice coil impedance—3.5 ohms

MODEL 4A20

VOLUME ON FULL WITH NO SIGNAL

DIAL TUNED TO 540 KC.



REAR OF CHASSIS

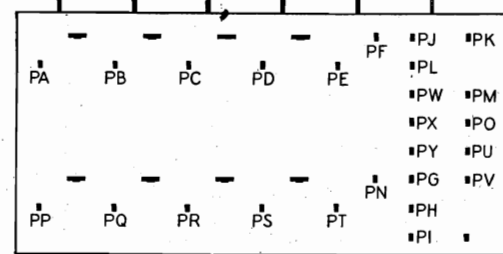
*—Measured with vacuum tube voltmeter

THE FIRESTONE TIRE & RUBBER CO.

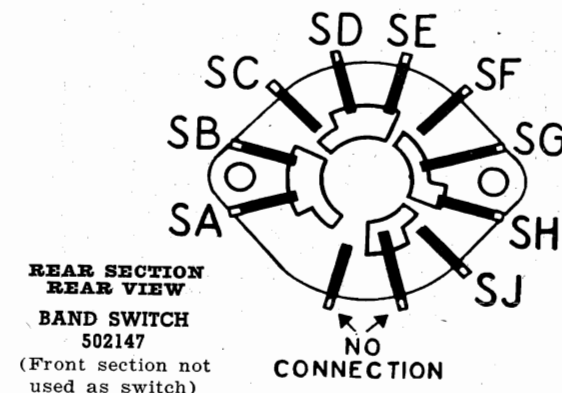
MODELS 4A21, 4A22
Adam

PUSH-BUTTON RANGES:

Button No. 1 —540-1000 KC.
Button No. 2 & 3—650-1300 KC.
Button No. 4 & 5—975-1600 KC.



PUSH-BUTTON SWITCH
502177

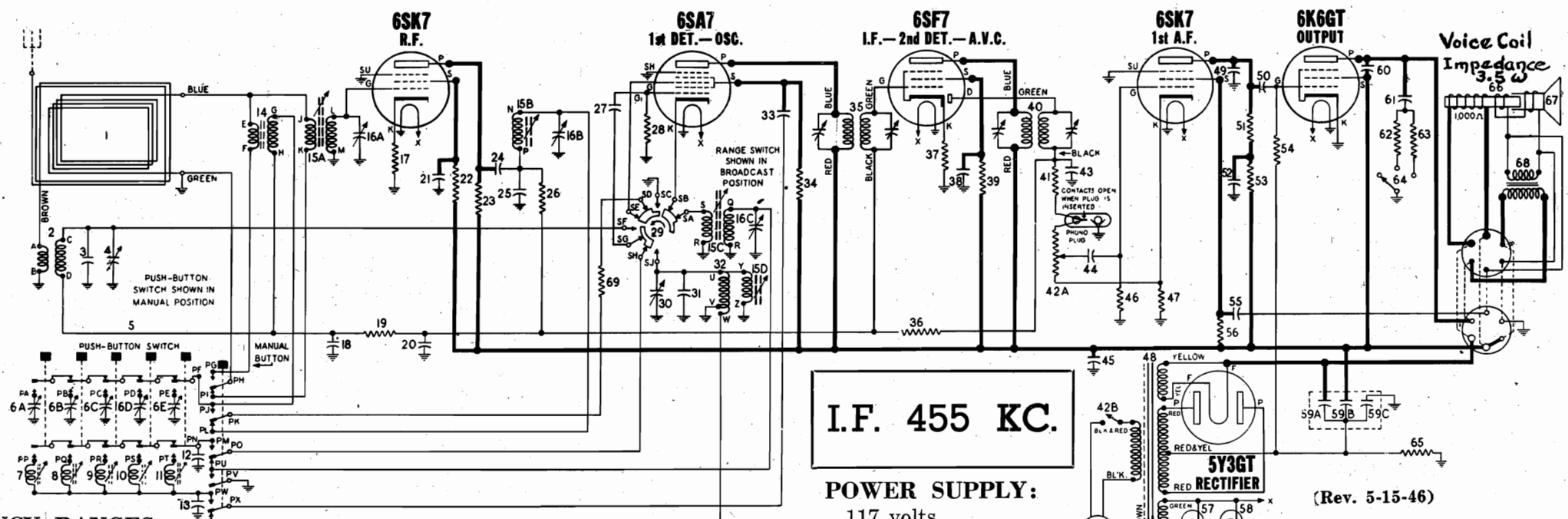


REAR SECTION
REAR VIEW
BAND SWITCH
502147

(Front section not used as switch)

DIA-GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
CONDENSERS			
3	502884	Condenser—mica 120 Mmfd. 500 volt.	\$0.24
4	502171	Condenser—trimmer; 5 to 35 Mmfd.	.24
6A to E	502910	Condenser—trimmer assem. for P-B tuner	3.00
12	502161	Condenser—mica 270 Mmfd. 500 volt.	.45
13	502165	Condenser—mica 1,000 Mmfd. 500 volt.	.45
16A, B, C	504086	Condenser—trimmer assembly	1.10
		A — 20 to 270 Mmfd.	
		B — 40 to 370 Mmfd.	
		C — 40 to 370 Mmfd.	
18	502153	Condenser—.05 Mfd. 200 volt.	.24
20	502155	Condenser—.1 Mfd. 200 volt.	.30
21	502157	Condenser—.05 Mfd. 400 volt.	.24
24	502271	Condenser—mica 260 Mmfd. 500 volt.	.24
25	502165	Condenser—mica 1,000 Mmfd. 500 volt.	.45
27	502159	Condenser—mica 50 Mmfd. 500 volt.	.24
30	502172	Condenser—trimmer; 25 to 100 Mmfd.	.36
31	502159	Condenser—mica 50 Mmfd. 500 volt.	.24
33	502151	Condenser—.01 Mfd. 400 volt.	.20
38	502157	Condenser—.05 Mfd. 400 volt.	.24
43	502271	Condenser—mica 260 Mmfd. 500 volt.	.24
44	502150	Condenser—.004 Mfd. 600 volt.	.20
45	502157	Condenser—.05 Mfd. 400 volt.	.24
49	502160	Condenser—mica 110 Mmfd. 500 volt.	.24
50	502152	Condenser—.02 Mfd. 400 volt.	.24
52	502410	Condenser—.1 Mfd. 400 volt.	.30
55	502405	Condenser—.25 Mfd. 400 volt.	.36
59A, B, C	502207	Condenser—electrolytic	
		A — 20 Mfd. 400 volt	
		B — 10 Mfd. 400 volt	
		C — 20 Mfd. 25 volt	
60	502150	Condenser—.004 Mfd. 600 volt.	.20
61	502154	Condenser—.05 Mfd. 600 volt.	.24
RESISTORS			
17	502127	Resistor—carbon 560 ohms 1/4 watt.	.12
19	502134	Resistor—carbon 470,000 ohms 1/4 watt.	.12
22	502132	Resistor—carbon 100,000 ohms 1/4 watt.	.12
23	502291	Resistor—carbon 4700 ohms 1/4 watt.	.12
26	502134	Resistor—carbon 470,000 ohms 1/4 watt.	.12
28	502130	Resistor—carbon 22,000 ohms 1/4 watt.	.12
34	502466	Resistor—carbon 33,000 ohms 1 watt.	.16
36	502135	Resistor—carbon 2.2 Meg. 1/4 watt.	.12
37	502264	Resistor—carbon 47 ohms 1/4 watt.	.12
39	502467	Resistor—carbon 68,000 ohms 1/2 watt.	.12
41	502131	Resistor—carbon 47,000 ohms 1/4 watt.	.12
42A, B	502148	Volume control 500,000 ohms (with switch)	1.25

FREQUENCY RANGES:
Standard Broadcast Band } 540-1600 KC.
Short Wave Band } 9.35-9.88 MC.



I.F. 455 KC.

POWER SUPPLY:

117 volts
50-60 cycles A.C.
55 watts

NOTE

The above circuit applies to chassis which have a letter "S" stamped on rear surface adjacent to model number. Early production chassis without the "S" designation do not contain Resistor No. 69.

If a broad tuning peak or a dead spot is encountered when attempting to align Broadcast Band oscillator trimmer No. 5 at 1600 Kc. (in chassis without "S" designation), this action is probably due to spurious oscillation resulting from extraneous coupling between leads. To prevent this condition, add Resistor No. 69 at position shown in above circuit.

DIA-GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
MISCELLANEOUS PARTS			
502249		Back for cabinet	\$0.80
502229		Background for dial	.16
116467		Base for mtg. electrolytic condenser	.04
502194		Cabinet (Model 4-A-21)	14.10
502195		Cabinet (Model 4-A-22)	14.10
119739		Call letter tabs for push-buttons	.48
119559		Clamp—dial glass	.08
112745		Clip—coil mtg.	.01
114955		Clip—retainer on end of dial cord	.01
116563		Connector—antenna leads	.01
117057		Cord—dial drive (54 in. required) per ft.	.05
504292		Dial scale—glass	1.10
500283		Escutcheon (Model 4-A-22)	1.15
501496		Escutcheon (Model 4-A-21)	1.15
502704		Knob—volume or tuning (Model 4-A-21)	.16
502705		Knob—tone or band switch (Model 4-A-21)	.20
502706		Knob—volume or tuning (Model 4-A-22)	.16
502707		Knob—tone or band switch (Model 4-A-22)	.20
504097		Plug—speaker	.25
502601		Pointer	.18
501497		Push-button (Model 4-A-21)	.15
501651		Push-button (Model 4-A-22)	.15
81145		Retaining ring for tuning shaft	.01
119087		Ring for dial cord	.01
85078		Rubber grommet for mtg. B.C. Ant.	
		Coupling and R.F. coils	.03
116584		Rubber spacer for mtg. dial scale	.02
504045		Rubber grommet for mtg. S.W. osc. and B.C. Osc. coils	.04
83552		Screw—No. 10x7/8"; for mtg. chassis	.03
114914		Screw—No. 2x3/8"; for mtg. escutcheon	.02
501777		Screw—No. 4x1/2"; for mtg. loop & back	.02
118606		Shaft—tuning control	.18
112818		Socket—dial lamp with lead	.10
116690		Socket—octal base	.12
160392		Socket—octal (rectifier)	.16
502210		Socket—speaker	.25
161384		Spring—dial cord tension	.06
504012		Spring—tuning slug drive cord	.05
119911		Terminal strip—phono	.16
111456		Washer—spring washer for tuning shaft	.005
500487		Washer—felt; for knobs	.01

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

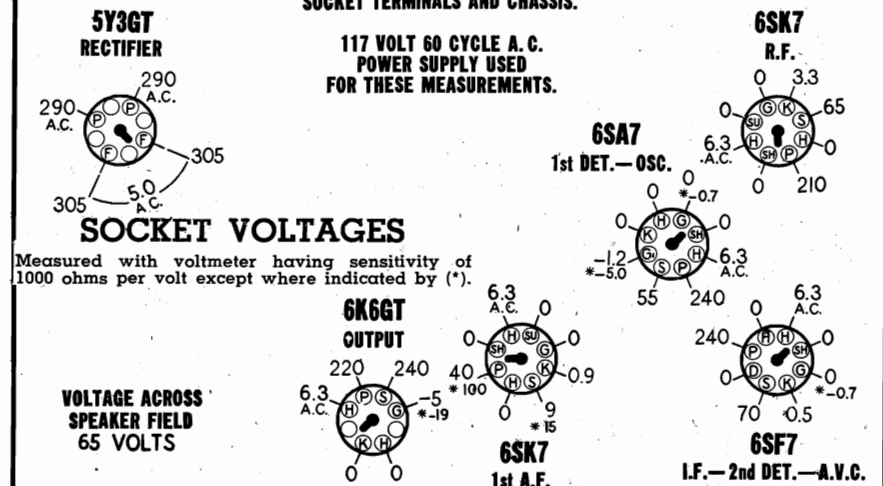
POWER OUTPUT:

Undistorted — 2.3 watts
Maximum — 4.0 watts

VOLUME ON FULL WITH NO SIGNAL
BAND SWITCH IN BROADCAST POSITION

DIAL TUNED TO 540 KC.
MANUAL BUTTON PUSHED IN

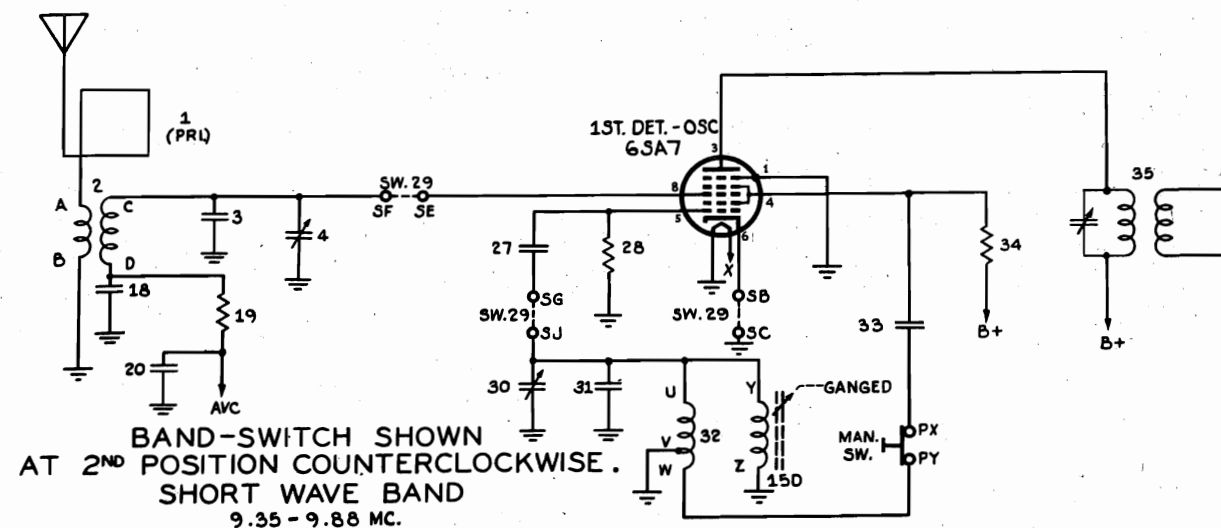
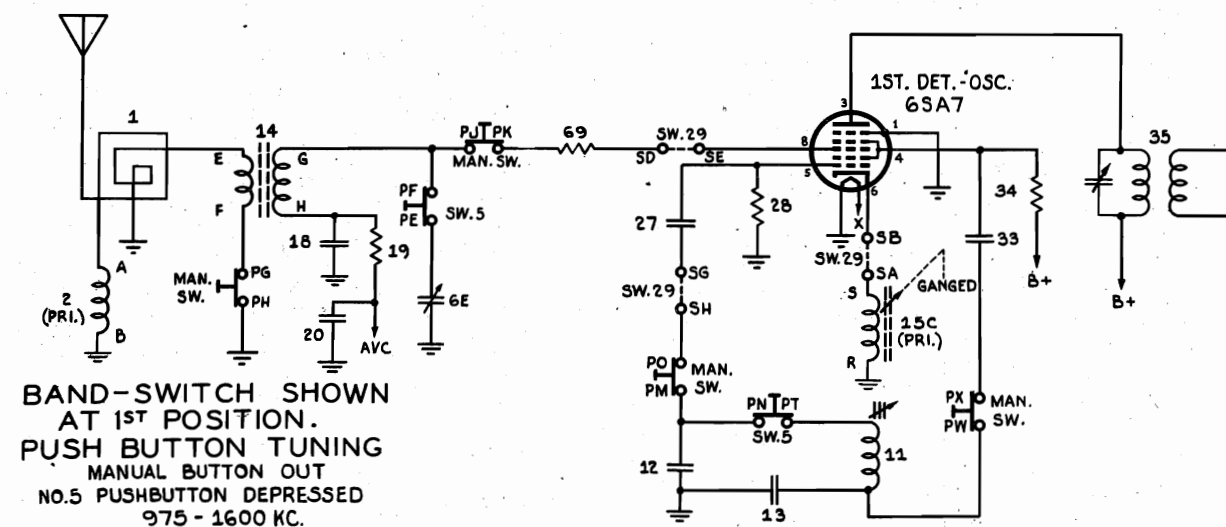
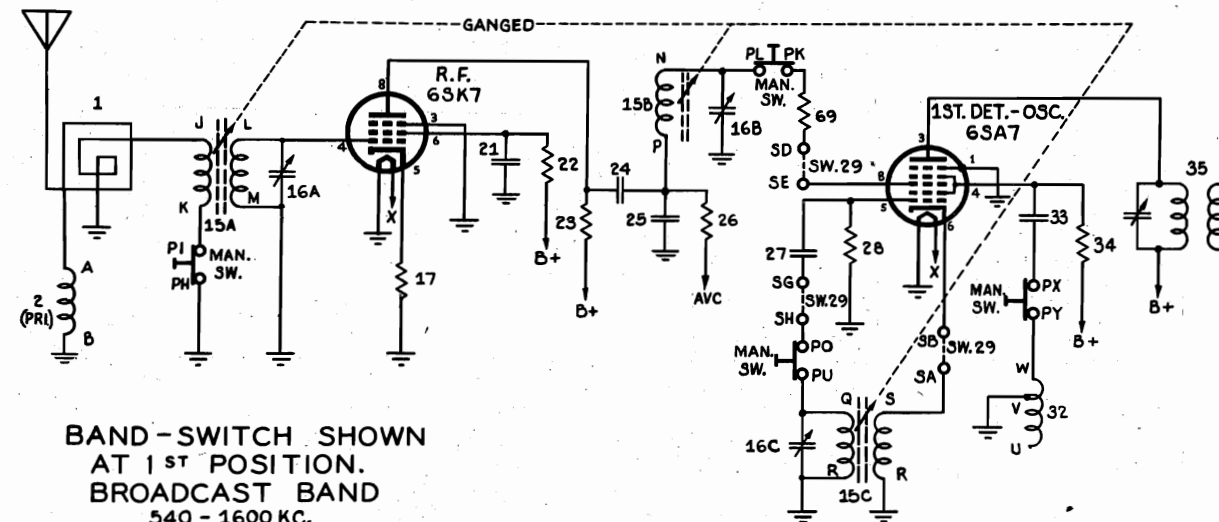
BOTTOM VIEW OF CHASSIS ALL VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS.



VOLTAGE ACROSS
SPEAKER FIELD
65 VOLTS

NOTE:—The 6K6GT grid bias of —19 volts can be measured across resistor No. 65.
*—Measured with vacuum tube voltmeter.

THE FIRESTONE TIRE & RUBBER CO. MODELS 4A21, 4A22, Adam



MODELS 4A21, 4A22 Adam

THE FIRESTONE TIRE & RUBBER CO.

ALIGNMENT PROCEDURE

1. Remove chassis and loop antenna from cabinet (do not remove loop of wire stapled to cabinet). After chassis has been removed, replace loop antenna in cabinet. Stand the chassis on one end and space it approximately same distance from loop as when installed in cabinet. Then reconnect all leads to loop antenna and to loop of wire stapled on cabinet.
2. Turn the tuning control knob clockwise as far as it will go (tuner mechanism is now in maximum open position with tuning slugs almost completely withdrawn from coils). Dial pointer should then point to 1600 KC mark on scale. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
3. Connect output meter across speaker voice coil or from 6K6GT plate to chassis through a .1 Mfd. condenser.
4. Connect the ground lead of the signal generator to the receiver chassis.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.
6. Push in the manual button and leave it in that position throughout the alignment procedure.

IMPORTANT:—Align this receiver in exactly the order shown below.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. Condenser	Terminal "N" on Tuner Unit (See Fig. 2).	455 KC	Broadcast (Clockwise)	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I.F.	
500 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	Broadcast (Clockwise)	1600 Kc. Tune to 1600 Kc. generator signal.	5	Broadcast Oscillator	Adjust for maximum output.
					6	Broadcast R.F.	Adjust for maximum output.
500 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1400 KC	Broadcast (Clockwise)	Set pointer to 1400 Kc. mark on dial scale. Do not attempt to tune to generator signal.	7	Broadcast Ant.	Adjust for maximum output.
					BC. Osc. coil tuning slug		Adjust position of slug for maximum output.
500 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	Broadcast (Clockwise)	Set pointer to 1600 Kc. mark on dial scale. Do not attempt to tune to generator signal.	5	Broadcast Oscillator	Adjust for maximum output.
					6	Broadcast R.F.	Adjust for maximum output.
500 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1400 KC	Broadcast (Clockwise)	Tune to 1400 Kc. generator signal.	7	Broadcast Antenna	Adjust for maximum output.
					BC. R.F. coil tuning slug		Adjust position of slug for maximum output.
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	9.6 MC	Short wave (Counter-Clockwise)	9.6 Mc.	8	S.W. Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by setting the signal generator to 10.5 Mc. and then tune radio in vicinity of 9.6 Mc. If image signal is not heard, realign at 9.6 Mc. with trimmer screw farther out. Recheck image.
					9	S.W. Antenna	Adjust for maximum output. Try to increase output by de-tuning trimmer and retuning receiver dial until maximum output is obtained.

Apply a coating of speaker cement at top of each tuning core stem to prevent movement.

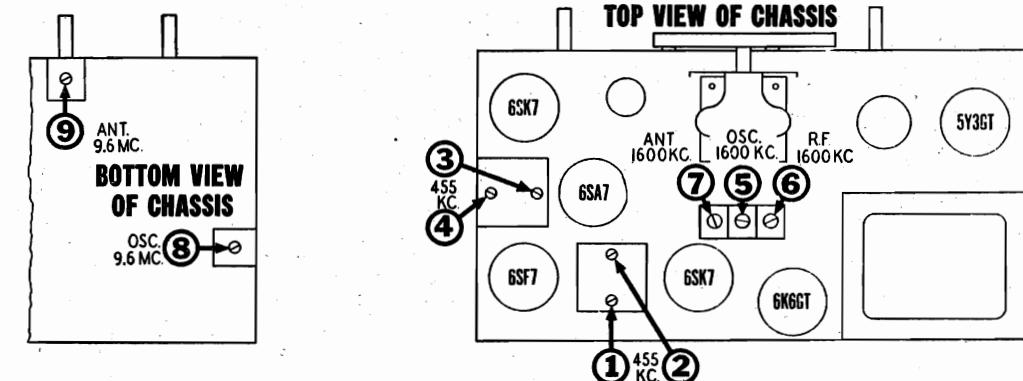


FIG. 1—TRIMMER LOCATIONS

THE FIRESTONE TIRE & RUBBER CO.

MODELS 4A21, 4A22

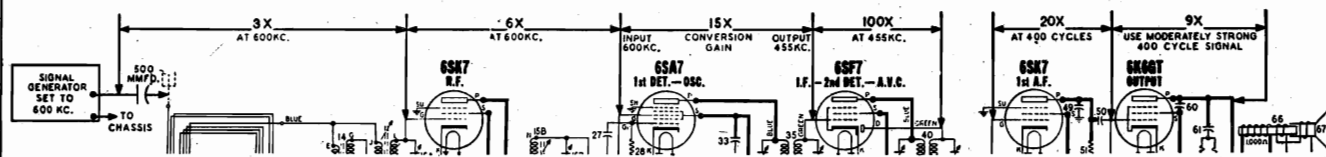
Adam

APPROXIMATE STAGE GAIN DATA

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead at terminal "D" of S.W. Ant. coil. Then connect positive battery lead to receiver chassis. This provides a definite operating point. **IMPORTANT:** Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

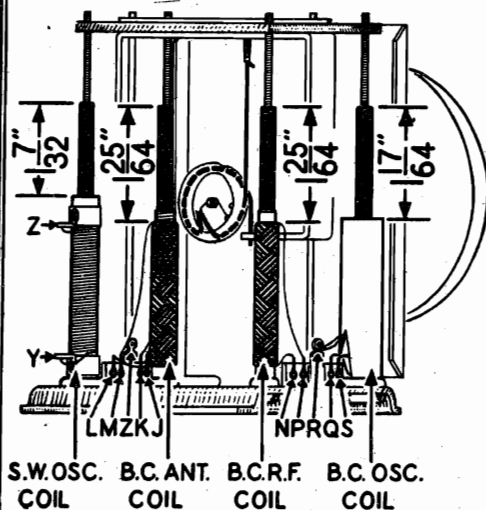


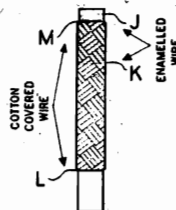
FIG. 2—SLUG TUNER ASSEMBLY (Rear View)

(Drive Parts)

- 117057 Cord (8")
114955 Clip on cord
504012 Spring

SLUGS
FOR MANUAL
TUNING COILS

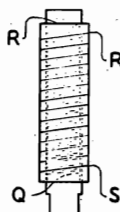
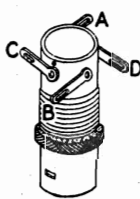
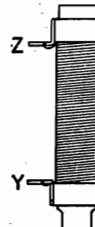
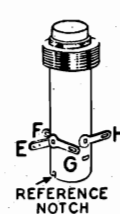
- 504211—For B.C. Ant.
and S.W. Osc.
504213—For B.C. Osc.
504215—For B.C. R.F.

B.C. ANTENNA
COUPLING COIL
504210

DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, turn the main drive drum to maximum counter-clockwise position and use following parts:

- 114955 Clip on end of cord 119087 Ring for dial cord
117057 Cord (54 inches) 161384 Tension Spring

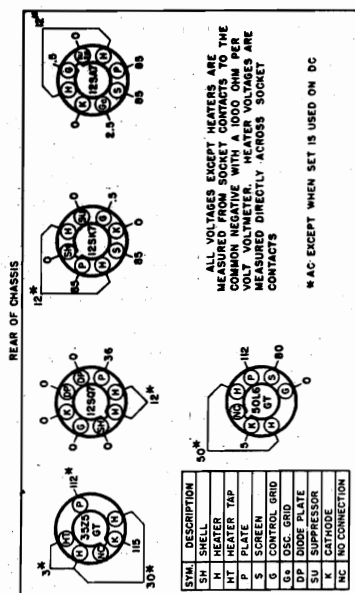
B.C. R.F.
COIL
504214B.C. OSCILLATOR
COIL
504295S.W. ANTENNA
COUPLING COIL
504296S.W. OSCILLATOR
COIL
504342S.W. OSCILLATOR
COIL
502111B.C. ANT. COUPLING
COIL (PUSH-BUTTON)
502112

Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

VOLTAGE READINGS AND

PARTS LIST FOR

MODEL 4 A 25



VOLTAGE TABLE BOTTOM VIEW OF CHASSIS)

SYM.	DESCRIPTION
SH	SHELL
H	HEATER
HT	HEATER TAP
P	PLATE
S	SCREEN
G	CONTROL GRID
G _o	OSC. GRID
DP	DIODE PLATE
SU	SUPPRESSOR
K	CATHODE
NC	NO CONNECTION

Description	
Carbon, 10 Megohm	1/3 Watt
Carbon, 3.3 Megohm	1/3 Watt
Carbon, 3.3 Megohm	1/3 Watt
Carbon, 470,000 Ohm	1/3 Watt
Carbon, 220,000 Ohm	1/3 Watt
Carbon, 22,000 Ohm	1/3 Watt
Carbon, 2,200 Ohm	1 Watt
Carbon, 150 Ohm	1/3 Watt
Carbon, 100 Ohm	1/3 Watt
Carbon, 47 Ohm	1/2 Watt
5" PM	

With S.P.S.T. Switch

Output for Speaker

Mica, .0001 Mfd.

Carbon, 68,000 Ohm, 1/3 W.

With S.P.S.T. Switch..

Output for Speaker...

Mica, .0001 Mfd...

Carbon, 68,000 Ohm, 1/3 W...

Description	Q	R	S	T	U	V	W	X	Y	Z
Bearing for Drive Shaft.....										
Dial Indicator.....										
Tension Spring for Drive Cord For Ivory Cabinet.....										
Pilot Lamp Socket Assembly.....										

**6-8 Volt .150 Amp.
Type 47 Lamp**

MISCELLANEOUS PARTS

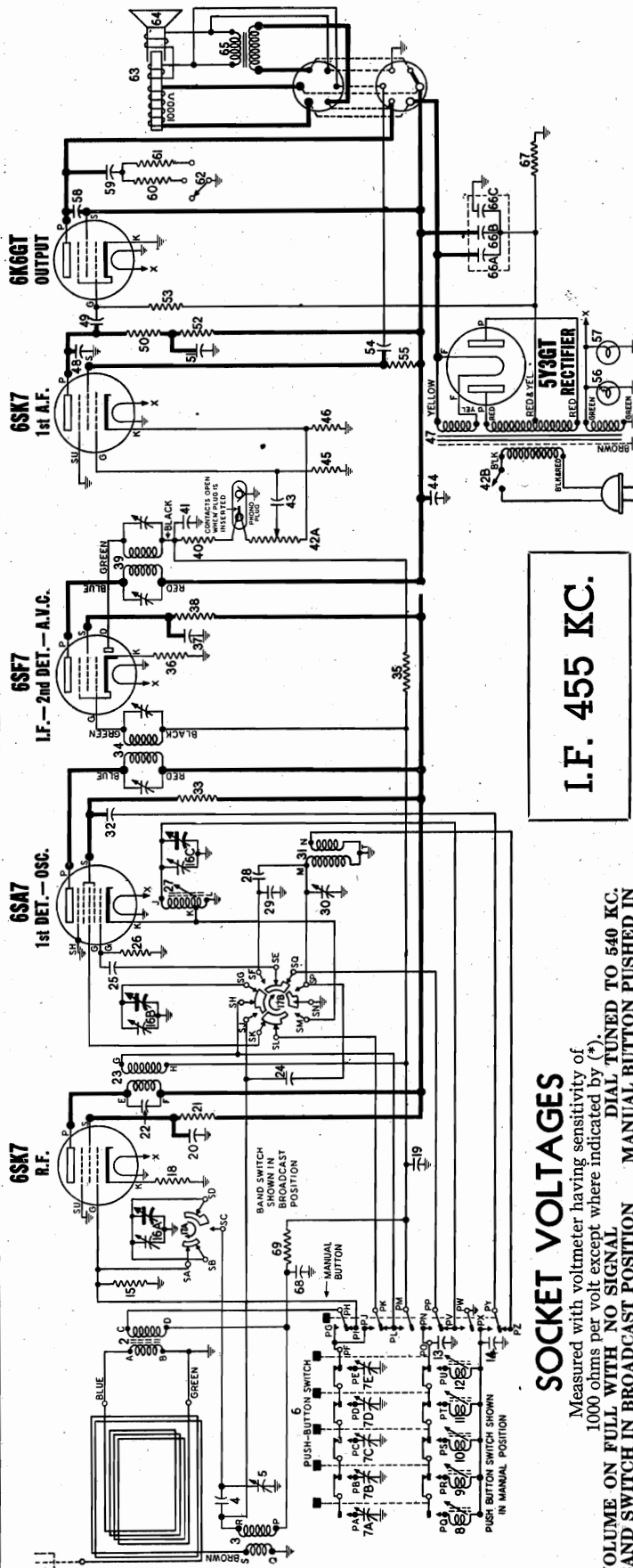
II. No.	Part Name	Description	III. No.	Part No.	Part Name
1	20E24	Antenna	17	27E106	Resistor
2	20E21	Coil	18	27E335	Resistor
3	20E22	Coil	19	27E335	Resistor
4	20E13	Coil	20	27E474	Resistor
5	24E2	Condenser	21	27E224	Resistor
	or		23	27E223	Resistor
5	24E18	Condenser	24	27E222-3	Resistor
7	25E1	Condenser	25	27E151	Resistor
		Tuning, 2 Gang (2 Hole Mtg.)	26	27E101	Resistor
		Dry Electrolytic, 50-50	27	27E470-2	Resistor
		Mfd. 150 V.	30	159	Speaker
9	23E416	Condenser	31	28E1	Volume Control
10	23E218	Condenser	32	22E2	Transformer
11	23E211	Condenser	40	23E39	Condenser
12	23E211	Condenser	42	27E583	Resistor
13	23E211	Condenser			
14	23E39	Condenser			
15	23E39	Condenser			
16	23E39	Condenser			

Part No.	Part Name	Description	Part No.	Part Name
7E76-2	Cabinet	Ivory Plastic		
7E83	Cabinet Back	For Ivory Plastic Cabinet		
41E1	Cord	6 Ft. Rubber Line Cord		
20E12	Dial Plate	Dial Back Plate Assem. Less Scale		
		Assem.		
4E1	Dial Cord	30" of 18 lb. Dial Drive Cord		
36E23	Dial Scale	Calibrated Scale		
		Dial Shaft		
		Dial Shaft		
		Bearing		
		Dial Pointer		
		Dial Spring		
		Knob		
		Pilot Lamp		
		Socket		
		Pilot Lamp		

SETTING-UP THE PUSH-BUTTONS MODELS 4A21 AND 4A22

1. Set band switch to "AM" position and allow set to operate 15 minutes before making adjustments.
2. Note two rows of adjusting screws on back of radio chassis (visible and accessible through opening in cabinet back). Each **vertical pair** of adjusting screws is used to tune in a station for one of the push-buttons. A label under the row of screws specifies the frequency or tuning range that each screw will cover.
3. Select five powerful stations, each of which falls within the frequency range of the adjusting screw to be used to tune in that station.
4. Push in "MANUAL" button and listen to the program of the lowest frequency station you selected.
5. Now push in the first button on the left. Return to rear of radio and use vertical pair of adjusting screws on **extreme right** to tune in the same station. Adjust bottom screw first until desired station is heard. If station is not heard, change setting of top screw to a position where the slight static noise or rushing sound is the loudest. Then try adjusting bottom screw again; repeat this procedure until desired station is found. After locating station, carefully set bottom screw for deepest tone and top screw for maximum volume.
6. The set-up of the first push-button is now complete. Use a similar procedure to set-up the remaining buttons.

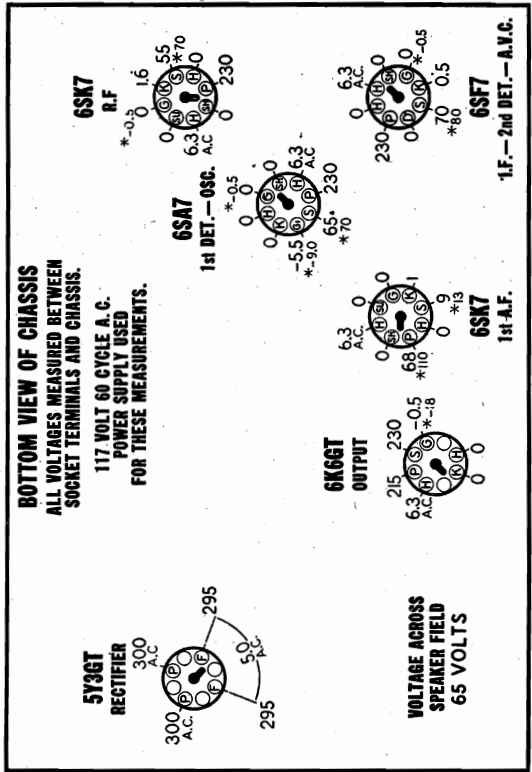
THE FIRESTONE TIRE & RUBBER CO.



I.F. 455 KC.

SOCKET VOLTAGES

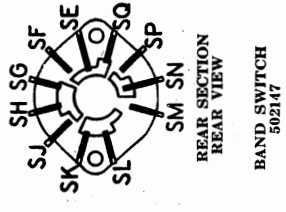
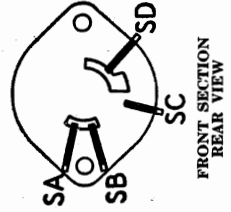
Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*). VOLUME ON FULL WITH NO SIGNAL BAND SWITCH IN BROADCAST POSITION MANUAL BUTTON PUSHED IN.



PA	PB	PC	PD	PE	PF	PG	PH
PQ	PR	PS	PT	PU	PO	PJ	PK
PL	PM	PV	PW	PX	PN	PP	PS

PUSH-BUTTON SWITCH #50217

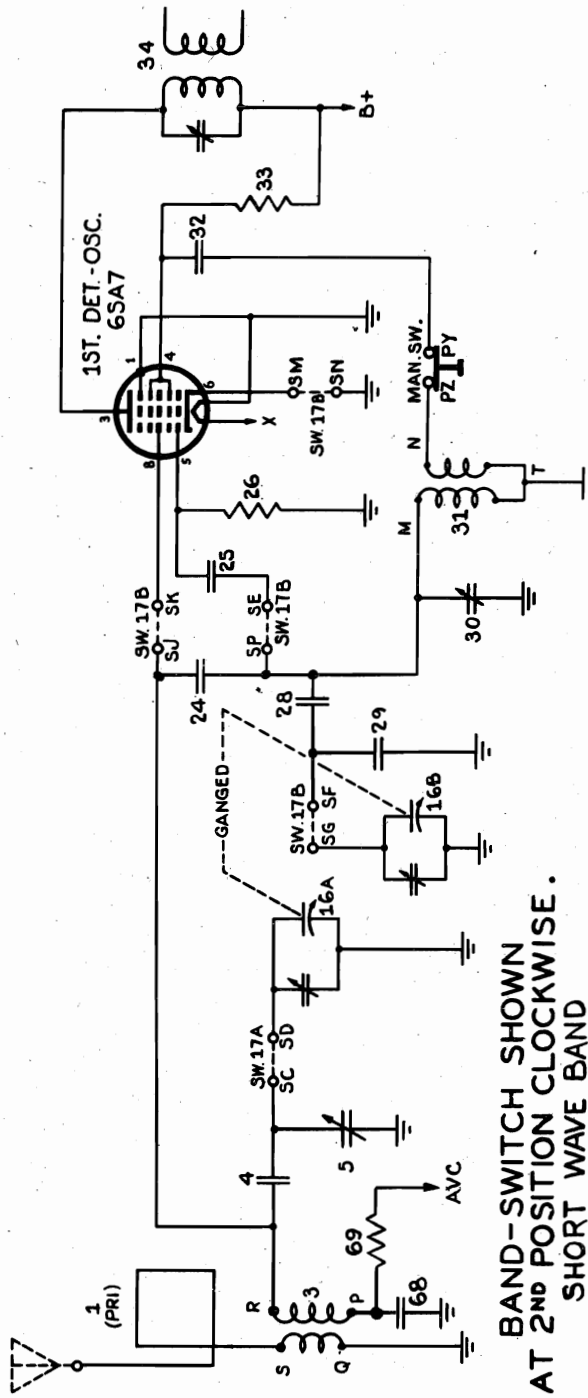
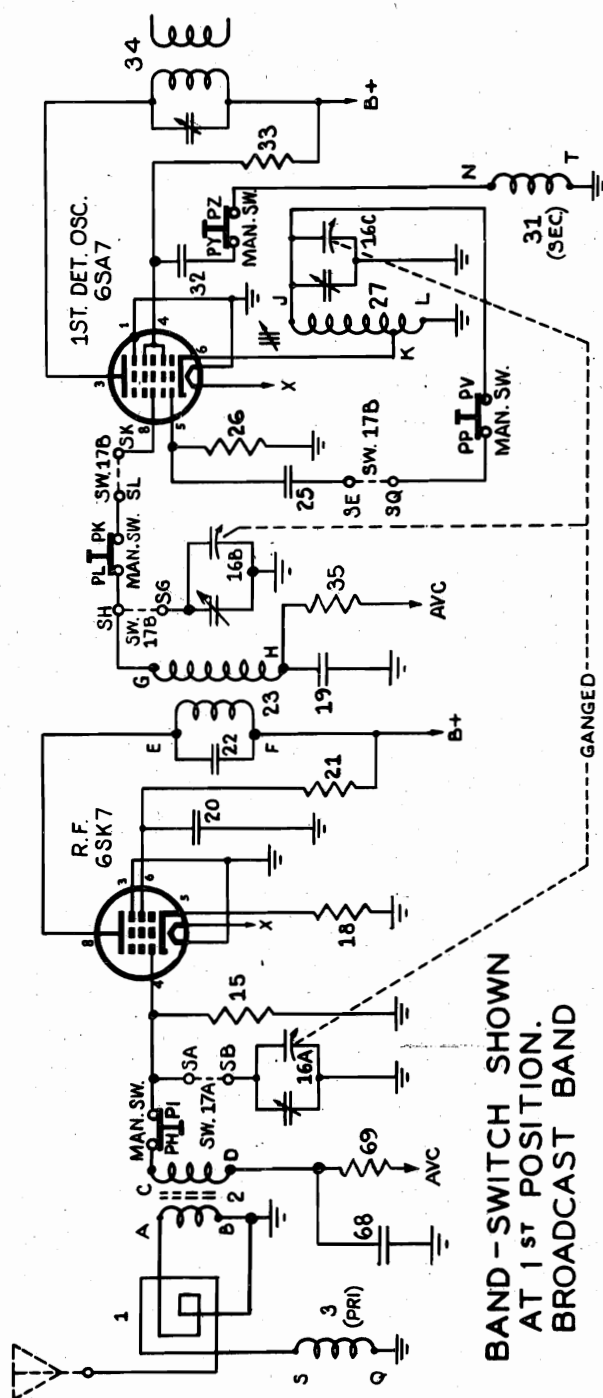
LETTERED TERMINALS IN ILLUSTRATIONS CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM.



Oct. 1, 1946

MODELS 4A21X, 4A22X

THE FIRESTONE TIRE & RUBBER CO.



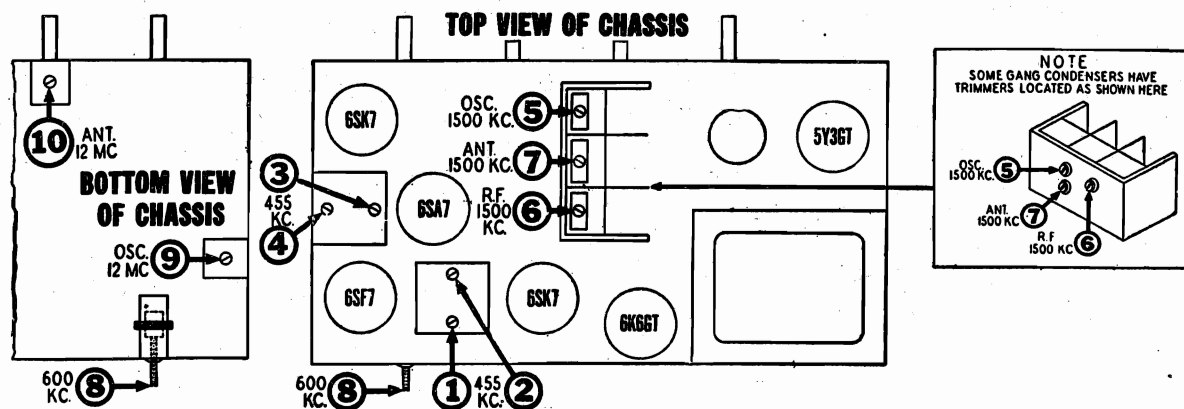
THE FIRESTONE TIRE & RUBBER CO.

ALIGNMENT PROCEDURE

1. Remove chassis and loop antenna from cabinet (do not remove loop of wire stapled to cabinet). After chassis has been removed, replace loop antenna in cabinet. Stand the chassis on one end and space it approximately same distance from loop as when installed in cabinet. Then reconnect all leads to loop antenna and to loop of wire stapled on cabinet.
2. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 55 on the dial. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
3. Connect output meter across speaker voice coil or from plate of 6K6GT tube to chassis through a .1 Mfd. condenser.
4. Connect the ground lead of the signal generator to the receiver chassis.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.
6. Push in the manual button and leave it in that position throughout the alignment procedure.

IMPORTANT:—Align this receiver in exactly the order shown below. Broadcast band must be aligned before short wave band.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. Condenser	Trimmer on rear section of gang	455 KC	Broadcast (Clockwise)	Any point where it does not affect the signal.	1-2 3-4	2nd I.F. 1st I.F.	Adjust for maximum output. Then repeat adjustment.
500 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast (Clockwise)	1500 KC	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
500 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast (Clockwise)	Tune to 1500 Kc. generator signal.	6	Broadcast R.F.	Adjust for maximum output.
500 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast (Clockwise)	Tune to 1500 Kc. generator signal.	7	Broadcast Antenna	Adjust for maximum output.
500 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	600 KC	Broadcast (Clockwise)	Tune to 600 Kc. generator signal.	8	Adjustable core of Broadcast Oscillator Coil.	Adjust for maximum output. Try to increase output by rotating core in and out and retuning receiver dial until maximum output is obtained.
500 MFD. Mica Condenser	External Antenna Clip on Loop Frame	Repeat adjustment of trimmers 5, 6 and 7 at 1500 Kc. Then re-check adjustment of trimmer 8 at 600 Kc.					
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	12 MC	Short wave (Counter-Clockwise)	12 MC	9	S.W. Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 11.1 MC. If image does not appear, realign at 12 MC, with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	12 MC	Short wave (Counter-Clockwise)	Tune to 12 MC. generator signal.	10	S.W. Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.



MODELS 4A21X, 4A22X

THE FIRESTONE TIRE & RUBBER CO.

POWER SUPPLY:

117 volts
50-60 cycles A.C.
55 watts

POWER OUTPUT:

Undistorted—2.3 watts
Maximum —3.5 watts

SPEAKER:

6 inch Electro-Dynamic
Voice coil impedance—3.5 ohms

BUILT-IN ANTENNA:

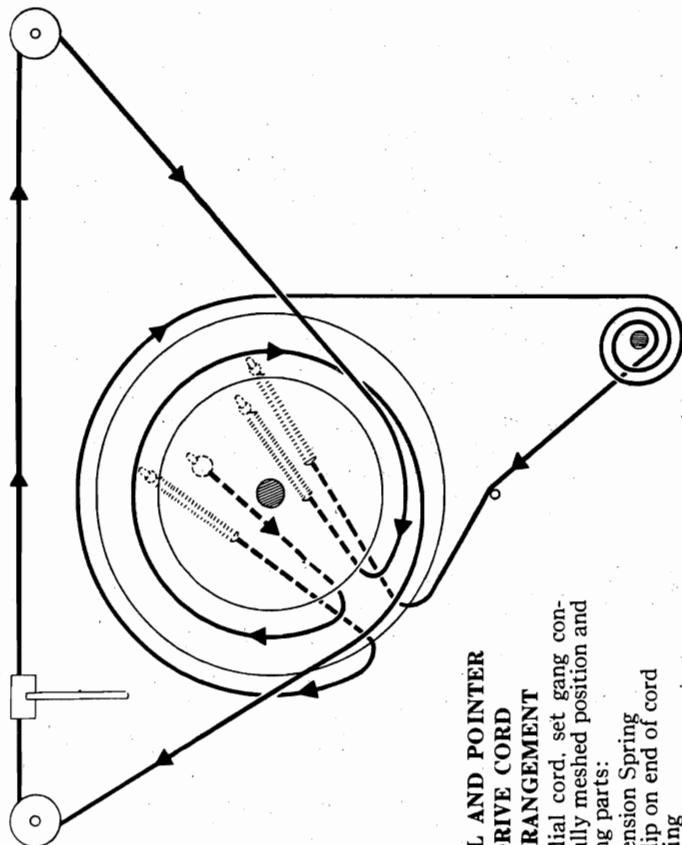
Noise reducing
low impedance loop

FREQUENCY RANGES:

Standard Broadcast Band	540-1725 KC.	Short Wave Band	9-12 MC.
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PUSH-BUTTON RANGES:

Button No. 1 —540-1000 KC.
Button No. 2 & 3—650-1300 KC.
Button No. 4 & 5—975-1600 KC.



DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully meshed position and use following parts:

113177 Tension Spring
114955 Clip on end of cord
119087 Ring (5 1/2 feet)
117057 Cord 3 feet for pointer drive
2 1/2 feet for tuning drive

SETTING-UP THE PUSH-BUTTONS

1. Set band switch to "AM" position and allow set to operate 15 minutes before making adjustments.
2. Note two rows of adjusting screws on back of radio chassis (visible and accessible through opening in cabinet back). Each **vertical pair** of adjusting screws is used to tune in a station for one of the push-buttons. A label under the row of screws specifies the frequency or tuning range that each screw will cover.
3. Select five powerful stations, each of which falls within the frequency range of the adjusting screw to be used to tune in that station.
4. Push in "MANUAL" button and listen to the program of the lowest frequency station you selected.
5. Now push in the first button **on the left**, Return to rear of radio and use vertical pair of adjusting screws **on extreme right** to tune in the same station. Adjust bottom screw first until desired station is heard. If station is not heard, change setting of top screw to a position where the slight static noise or rushing sound is the loudest. Then try adjusting bottom screw again; repeat this procedure until desired station is found. After locating station, carefully set bottom screw for deepest tone and top screw for maximum volume.
6. The set-up of the first push-button is now complete. Use a similar procedure to set-up the remaining buttons.

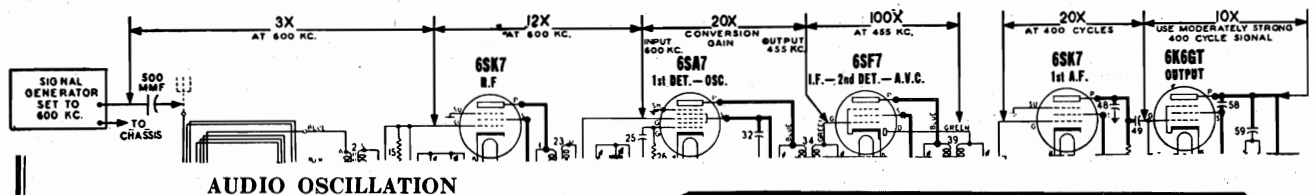
THE FIRESTONE TIRE & RUBBER CO. MODEL 4A24

MODELS 4-A-21X, 4-A-22X APPROXIMATE STAGE GAIN DATA

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

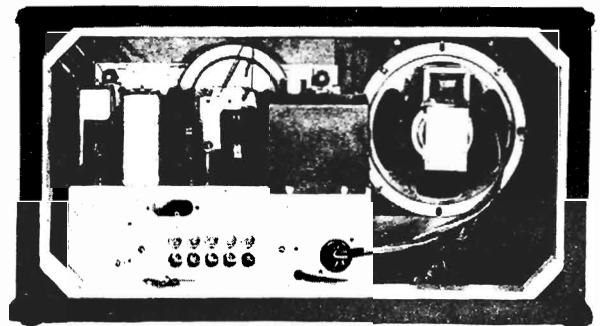
1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead at terminal "P" of short wave antenna coil; then connect positive battery lead to chassis. This provides a definite operating point.
IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



AUDIO OSCILLATION

The audio system of this receiver utilizes a two stage type of inverse feed-back arrangement and, should it ever be necessary to replace the speaker or output transformer, it is important to maintain a definite phase relationship in the feed-back circuit. If the connections to the output transformer are reversed or if the feed-back connection is made to the wrong side of the output transformer secondary, the system will become regenerative instead of degenerative. Under those conditions audio oscillation may result. If that occurs, oscillation may be prevented by reversing the connections to the primary of the output transformer.



MODEL 4-A-24

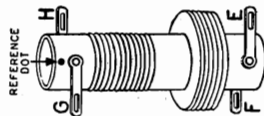
Illus. No.	Part No.	Part Name	Description	Illus. No.	Part No.	Part Name	Description
1	20E58	Cable	Battery, with 4 Prong Plug.....	15	23E42	Condenser	Mica, .00025
2	20E32	Coil	Antenna	16	23E11	Condenser	Fixed Ceramic, .0001 Mfd.....
3	20E21	Coil	1st I.F. Transformer.....	17	23E11	Condenser	Fixed Ceramic, .0001 Mfd.....
4	20E35	Coil	2nd I.F. Transformer.....	18	27E475	Resistor	Carbon, 4.7 Megohm, 1/3 W.....
5	20E77	Coil	Oscillator	19	27E335	Resistor	Carbon, 3.3 Megohm, 1/3 W.....
6	24E4	Condenser	Tuning 2 Gang, 3 hole mounting.....	20	27E106	Resistor	Carbon 10, Megohm, 1/3 W.....
6	24E19	Condenser	Tuning 2 Gang, 2 hole mounting.....	21	27E335	Resistor	Carbon, 3.3 Megohm, 1/3 W.....
7	25E9	Condenser	Tubular, Dry Elect. 10 Mfd. 100 V.	22	27E105	Resistor	Carbon, 1 Megohm, 1/3 W.....
8	23E224	Condenser	Tubular, .5 Mfd. 200 V.....	23	27E104	Resistor	Carbon, 100,000 Ohm, 1/3 W.....
9	23E224	Condenser	Tubular, .5 Mfd. 200 V.....	24	27E223	Resistor	Carbon, 22,000 Ohm, 1/3 W.....
10	23E216	Condenser	Tubular, .05 Mfd. 200 V.....	25	27E561	Resistor	Carbon, 560 Ohm, 1/3 W.....
11	23E216	Condenser	Tubular, .05 Mfd. 200 V.....	26	1E15	Speaker	6" P. M.....
12	23E151	Condenser	Tubular, .01 Mfd. 120 V.....	27	28E15	Volume Control	With D.P.S.T. Switch.....
13	23E151	Condenser	Tubular, .01 Mfd. 120 V.....	28	22E4	Transformer	Output
14	23E204	Condenser	Tubular, .001 Mfd. 200 V.....	29	27E470	Resistor	Carbon, 47 Ohm, 1/3 W.....

MISCELLANEOUS PARTS

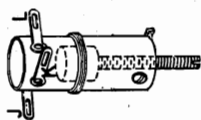
Part No.	Part Name	Description	Part No.	Part Name	Description
7E57	Cabinet	Wood Table Model.....	9E7	Dial Crystal	Clear Acetate Crystal.....
4E1	Dial Cord	18 Lb. Drive Cord.....	19E3	Dial Shaft Bearing	Bearing for Drive Shaft.....
65E2	Dial Cord Spring	Dial Cord Tension Spring.....	65E3	Dial Indicator Spring	Tension Spring for "On-Off" Indicator..
68E1	Dial Shaft	Drive Shaft	12E103-F10	Dial Shaft Washer	"C" Retainer Washer for Drive Shaft..
36E21	Dial Scale	Calibrated Scale	37E30-1	Knob	.....
35E10	Dial Pointer	Dial Needle	17E3-4	Plug	4-Prong Battery Plug.....
36E20	Dial Indicator	"On-Off" Indicator	46E5	Throw Arm	Operates "On-Off" Indicator.....

MODELS 4A21X, 4A22X

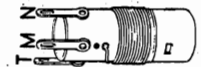
THE FIRESTONE TIRE & RUBBER CO.



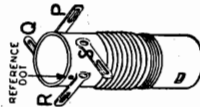
BC. ANTENNA COUPLING COIL 502112



BC. OSCILLATOR COIL 502114



S.W. OSCILLATOR COIL 502111



S.W. ANTENNA COIL 502110

Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

DIA-GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE	DIA-GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
CONDENSERS				COILS & TRANSFORMERS			
4.....	502202	Condenser—ceramic 150 Mmfd. 500 volt.....	\$0.50	42A, B.....	502148	Volume control 500,000 ohms (with switch) .125	\$1.25
5.....	502172	Condenser—trimmer; 25 to 100 Mmfd. 500 volt.....	.36	45.....	502468	Resistor—carbon 4.7 Meg. 1/4 watt.....	.12
7A to E.....	502910	Condenser—trimmer; 25 to 100 Mmfd. 500 volt.....	.36	46.....	502128	Resistor—carbon 2200 ohms 1/4 watt.....	.12
13.....	502161	Condenser—mica 270 Mmfd. 500 volt.....	3.00	50.....	502133	Resistor—carbon 220,000 ohms 1/4 watt.....	.12
14.....	502165	Condenser—mica 1,000 Mmfd. 500 volt.....	.45	52.....	502134	Resistor—carbon 100,000 ohms 1/4 watt.....	.12
16A, B, C.....	502122	Condenser—variable gang.....	6.60	53.....	502134	Resistor—carbon 470,000 ohms 1/4 watt.....	.12
19.....	502155	Condenser—1 Mfd. 200 volt.....	.24	55.....	502291	Resistor—carbon 2.2 Meg. 1/4 watt.....	.12
20.....	502157	Condenser—1 Mfd. 400 volt.....	.24	60.....	502291	Resistor—carbon 4700 ohms 1/4 watt.....	.12
22.....	502295	Condenser—ceramic 10 Mmfd. 500 volt.....	.10	61.....	502127	Resistor—carbon 560 ohms 1/4 watt.....	.25
24.....	502159	Condenser—mica 50 Mmfd. 500 volt.....	.24	67.....	502137	Resistor—wire wound 330 ohms 2 watt.....	.25
25.....	502201	Condenser—mica 50 Mmfd. 500 volt.....	.24	69.....	503134	Resistor—carbon 470,000 ohms 1/4 watt.....	.12
28.....	502182	Condenser—ceramic 39 Mmfd. 500 volt.....	.24	MISCELLANEOUS PARTS.			
29.....	502171	Condenser—trimmer; 5 to 35 Mmfd. 500 volt.....	.24	502249		Back for cabinet.....	\$0.80
30.....	502151	Condenser—1 Mfd. 400 volt.....	.24	502229		Background for dial.....	.16
32.....	502151	Condenser—1 Mfd. 400 volt.....	.24	502194		Base for mfg. electrolytic condenser.....	.04
37.....	502151	Condenser—1 Mfd. 400 volt.....	.24	502194		Cabinet for (Model 4-A-21X).....	14.10
41.....	502271	Condenser—mica 260 Mmfd. 500 volt.....	.30	502195		Cabinet for (Model 4-A-22X).....	14.10
43.....	502150	Condenser—mica 260 Mmfd. 500 volt.....	.30	502195		Call letter tabs for push-buttons.....	.48
44.....	502157	Condenser—mica 110 Mmfd. 500 volt.....	.24	119739		Clamp—for dial glass.....	.08
48.....	502157	Condenser—mica 110 Mmfd. 500 volt.....	.24	119559		Clip—coil mtg.....	.01
49.....	502152	Condenser—1 Mfd. 400 volt.....	.24	112745		Clip—retainer on end of dial cord.....	.01
51.....	502410	Condenser—25 Mfd. 400 volt.....	.36	501151		Clip—for mfg. push-button coils.....	.08
54.....	502405	Condenser—104 Mfd. 400 volt.....	.24	116563		Connector—for antenna lead.....	.01
58.....	502150	Condenser—104 Mfd. 400 volt.....	.24	117057		Cord—dial drive (5 1/4 ft. required) per ft.....	.05
59.....	502154	Condenser—electrolytic.....	.24	502218		Dial scale—glass.....	1.00
66A, B, C.....	502207	Condenser—20 Mfd. 400 volt.....	2.20	117029		Drum—for dial drive.....	.70
68.....	502153	Condenser—20 Mfd. 200 volt.....	.24	500283		Escutcheon (Model 4-A-21X).....	1.15
RESISTORS				501496		Escutcheon (Model 4-A-22X).....	1.15
15.....	502468	Resistor—carbon 4.7 Meg. 1/4 watt.....	.12	502704		Knob—volume or tuning (Model 4-A-21X).....	.16
18.....	502195	Resistor—carbon 220 ohms 1/4 watt.....	.12	502705		Knob—tone or band switch (Model 4-A-21X).....	.20
21.....	502132	Resistor—carbon 100,000 ohms 1/4 watt.....	.12	504097		Plug for speaker.....	.25
26.....	502130	Resistor—carbon 33,000 ohms 1/4 watt.....	.12	502601		Pointer.....	.18
33.....	502466	Resistor—carbon 2.2 Meg. 1/4 watt.....	.12	501497		Push-button (Model 4-A-21X).....	.15
35.....	502135	Resistor—carbon 47 ohms 1/4 watt.....	.12	501651		Push-button (Model 4-A-22X).....	.15
36.....	502264	Resistor—carbon 68,000 ohms 1/4 watt.....	.12	81145		Retaining ring for tuning shaft.....	.01
38.....	502467	Resistor—carbon 47,000 ohms 1/4 watt.....	.12	119087		Ring—for dial cord.....	.01
40.....	502131	Resistor—carbon 47,000 ohms 1/4 watt.....	.12	116584		Rubber spacer for mfg. dial scale.....	.02
OTHER ELECTRICAL PARTS				83552		Screw—No. 10 1/2"; for mfg. chassis.....	.03
6.....	502177	Switch—push-button.....	4.10	85827		Screw—No. 8 3/4"; for dial drum.....	.02
17A, B.....	502147	Switch—band.....	2.00	501777		Screw—No. 2 1/2"; for mfg. escutcheon.....	.02
56, 57.....	106329	Lamp—(Mazda No. 44) 6.3 V. 0.25 Amps.....	.15	501777		Screw—No. 4 1/2"; for mfg. loop & back.....	.02
62.....	502146	Switch—tone control.....	.70	501777		Shaft—tuning control.....	.18
63.....	502168	Speaker—Electro-Dynamo (6 inch).....	9.50	112818		Socket—dial lamp with lead.....	.10
64.....	504062	Cone & voice coil for R-502168 spkr.....	2.75	116692		Socket—octal base.....	.12
	504123	Cone & voice coil for N-502168 spkr.....	2.75	502210		Socket—octal (rectifier).....	.15
	504123	Cone & voice coil for D-502168 spkr.....	2.75	502210		Spring—dial cord tension.....	.09
	504123	Cone & voice coil for D-502168 spkr.....	2.75	119011		Terminal strip-phonograph.....	.16
	504123	Cone & voice coil for D-502168 spkr.....	2.75	117450		Washer—spring washer for tuning shaft.....	.005
	504123	Cone & voice coil for D-502168 spkr.....	2.75	119886		Washer—felt; for knobs.....	.005

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

PUSH-BUTTON RANGES:

6SK7

I.F. FREQUENCY:

455 KC.

6SK7

6SQ7
2nd DET — A V C

6SJ7
1st A F

6K6GT

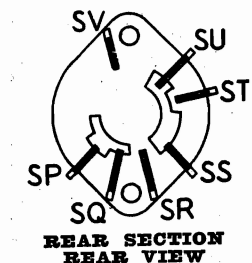


FREQUENCY RANGES:

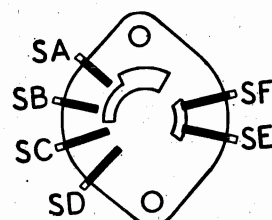
Standard Broadcast Band } 540-1725 KC.

Foreign Band } 11.4-15.5 MC.

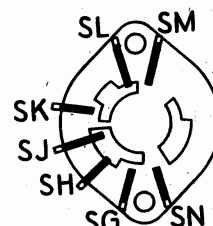
31-M } **5.9-10.0 MC.**
Band



**REAR SECTION
REAR VIEW**



FRONT SECTION
REAR VIEW



**REAR SECTION
FRONT VIEW**

BAND SWITCH 502119

Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

DIA-GRAM PART			LIST PRICE	DIA-GRAM PART			LIST PRICE	DIA-GRAM PART			LIST PRICE
NO.	DESCRIPTION	NO.		DESCRIPTION	NO.	DESCRIPTION					
CONDENSERS											
3	502166	Condenser—ceramic 82 Mmfd. 500 volt.	\$0.30	40	502125	Resistor—carbon 220 Ohms 1/4 watt.	.12	502228	Background for dial.	\$0.15	
4	502164	Condenser—mica 670 Mmfd. 500 volt.	.70	41	502135	Resistor—carbon 2.2 Meg. 1/4 watt.	.12	116487	Base for mtg. electrolytic condenser.	.04	
5A, B	502109	Condenser—trimmer assembly Section A 2 to 15 Mmfd. Section B 10 to 40 Mmfd.	.65	43	502467	Resistor—carbon 68,000 Ohms 1/2 watt.	.12	502193	Cabinet	14.50	
7A to E	502910	Condenser—trimmer assem. for P-B tuner	3.00	45	502131	Resistor—carbon 47,000 Ohms 1/4 watt.	.12	502046	Cabinet back	.70	
13	502161	Condenser—mica 270 Mmfd. 500 volt.	.45	47A, B	502117	Volume control 500,000 ohms (with switch)	1.25	117315	Call letter tabs for push-button.	.55	
14	502165	Condenser—mica 1,000 Mmfd. 500 volt.	.45	50	502468	Resistor—carbon 4.7 Meg. 1/4 watt.	.12	500420	Clamp—for dial glass.	.15	
16A, B, C	502122	Condenser—variable gang	6.60	51	502128	Resistor—carbon 2200 Ohms 1/4 watt.	.12	112745	Clip—coil mtg.	.01	
18	502182	Condenser—ceramic 39 Mmfd. 500 volt.	.40	55	502133	Resistor—carbon 220,000 Ohms 1/4 watt.	.12	114955	Clip—retainer on end of dial cord.	.01	
22	502157	Condenser—.05 Mfd. 400 volt.	.24	57	502132	Resistor—carbon 100,000 Ohms 1/4 watt.	.12	501151	Clip—for mtg. push-button coils.	.08	
23	502155	Condenser—.1 Mfd. 200 volt.	.30	58	502134	Resistor—carbon 470,000 Ohm 1/4 watt.	.12	116563	Connector—for antenna leads.	.01	
25	502295	Condenser—ceramic 10 Mmfd. 500 volt.	.30	60	502135	Resistor—carbon 2.2 Meg. 1/4 watt.	.12	117057	Cord—dial drive (102 in. required), per ft.	.05	
27	502159	Condenser—mica 50 Mmfd. 500 volt.	.24	65	502291	Resistor—carbon 4700 Ohms 1/4 watt.	.12	502215	Dial scale—glass	3.85	
29	502411	Condenser—2 Mmfd. 500 volt.	.10	66	502127	Resistor—carbon 560 Ohms 1/4 watt.	.12	113402	Drum—for dial drive.	.70	
31A, B	502108	Condenser—trimmer assem. Section A 2 to 15 Mmfd. Section B 2 to 15 Mmfd.	.75	72	502137	Resistor—wire wound 330 Ohms 2 watt.	.25	502699	Escutcheon for push-buttons.	1.70	
32	502182	Condenser—ceramic 39 Mmfd. 500 volt.	.40	74	502134	Resistor—carbon 470,000 Ohms 1/4 watt.	.12	502704	Knob—volume or tuning.	.16	
33	502167	Condenser—ceramic 68 Mmfd. 500 volt.	.40	COILS & TRANSFORMERS				502705	Knob—tone or band switch.	.20	
34	502163	Condenser—mica 430 Mmfd. 500 volt.	.60	1	502186	Loop antenna	3.15	160620	Pointer	.22	
37	502151	Condenser—.01 Mfd. 400 volt.	.20	2	502110	Coil—S.W. antenna	1.10	501495	Push-button	.25	
42	502157	Condenser—.05 Mfd. 400 volt.	.24		502025	Complete coil—trimmer assem. for P-B tuner	8.80	81145	Retaining ring for tuning shaft.	.01	
46	502271	Condenser—mica 260 Mmfd. 500 volt.	.30	8	502907	Coil less slug (540-1000 Kc.)	1.50	119087	Ring for dial cord.	.01	
48	502150	Condenser—.004 Mfd. 600 volt.	.24	9, 10	502908	Coil less slug (850-1300 Kc.)	1.50	116584	Rubber spacer for mtg. dial scale.	.02	
49	502157	Condenser—.05 Mfd. 400 volt.	.24	11, 12	502909	Coil less slug (975-1600 Kc.)	1.50	502702	Rubber spacer on frame behind escutcheon	.04	
53	502160	Condenser—mica 110 Mmfd. 500 volt.	.24		502911	Slug for coils 502907, 502908, 502909	.25	83552	Screw—No. 10x7/8"; for mtg. chassis.	.03	
54	502152	Condenser—.02 Mfd. 400 volt.	.24		501151	Clip—for mtg. push button coils	.08	85827	Screw—No. 8-32 for dial drum.	.02	
56	502410	Condenser—.1 Mfd. 400 volt.	.30	15	502112	Coil—BC. antenna	1.70	501777	Screw—No. 4x1/2"; for mtg. loop & back	.02	
59	502405	Condenser—.25 Mfd. 400 volt.	.36	26	502113	Coil—BC. R.F.	1.85	502116	Shaft—tuning control	.10	
63	502150	Condenser—.004 Mfd. 600 volt.	.20	30	502114	Coil—BC. oscillator	1.45	114876	Socket—octal base (rectifier).	.15	
64	502154	Condenser—.05 Mfd. 600 volt.	.24	36	502111	Coil—S.W. oscillator	1.10	119791	Socket—octal base	.12	
71A, B, C	502207	Condenser—Electrolytic A—20 Mfd. 25 volt. B—20 Mfd. 400 volt. C—10 Mfd. 400 volt.	2.20	39	502102	Transformer—1st I.F.	2.30	500459	Socket—dial lamp (with mtg. bracket).	.15	
73	502153	Condenser—.05 Mfd. 200 volt.	.24	44	502103	Transformer—2nd I.F.	2.30	502980	Spacer for leads to push-button switch.	.10	
RESISTORS				52	502174	Transformer—power	7.50	11377	Spring—dial cord tension.	.09	
20	502468	Resistor—carbon 4.7 Meg. 1/4 watt.	.12	54	504206	Transformer—output for M-504205 speaker	2.00	119911	Terminal strip—phono	.16	
21	502127	Resistor—carbon 560 Ohms 1/4 watt.	.12	58	504208	Transformer—output for R-504205 speaker	2.00	111456	Washer—spring; for tuning shaft.	.005	
24	502132	Resistor—carbon 100,000 Ohms 1/4 watt.	.12	504124	Transformer—output for D-504205 speaker	2.00	119886	Washer—felt; for knobs.	.005		
28	502130	Resistor—carbon 22,000 Ohms 1/4 watt.	.12	OTHER ELECTRICAL PARTS							
38	502466	Resistor—carbon 33,000 Ohms 1 watt.	.16	6	502120	Switch—push-button	4.00				
				17A, B, C	502119	Switch—band	2.80				
				61, 62	110629	Switch—dial (Mazda 44) 6.3 V. 250 Ma.	.15				
				67	502118	Lamp—dial (Mazda 44) 6.3 V. 250 Ma.	.15				
				69	504205	Switch—tone control	.70				
					504209	Speaker—Electro-dynamic (6 inch).	9.00				
					504209	Cone & Voice coil for R-504205 speaker	3.00				
				70	504207	Cone & Voice coil for M-504205 speaker	3.00				
					504125	Cone & Voice coil for D-504205 speaker	3.00				

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

NOTE

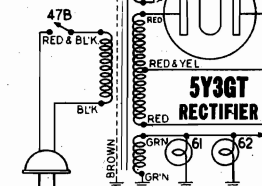
The above circuit applies to chassis which have a letter "S" stamped on rear surface adjacent to model number. Early production chassis which do not contain the "S" designation have the following circuit differences.

1. Terminal D of B.C. Antenna Coil No. 15 and terminal P of S.W. Antenna Coil No. 2 are connected to ground and not to A.V.C. as shown above.
2. Condenser No. 73 and resistor No. 74 are omitted.

Improved sensitivity on Push-Button tuning and Short Wave operation may be obtained for chassis that do not contain the "S" designation by connecting coils No. 2 and No. 15 as shown on this page and adding parts No. 73 and No. 74.

POWER SUPPLY:

117 volts
50-60 cycles A.C.
55 watts



POWER OUTPUT:

Undistorted — 2.3 watts
Maximum — 3.5 watts

SPEAKER:

6 inch Electro-Dynamic
Voice coil impedance—3.5 ohms

SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

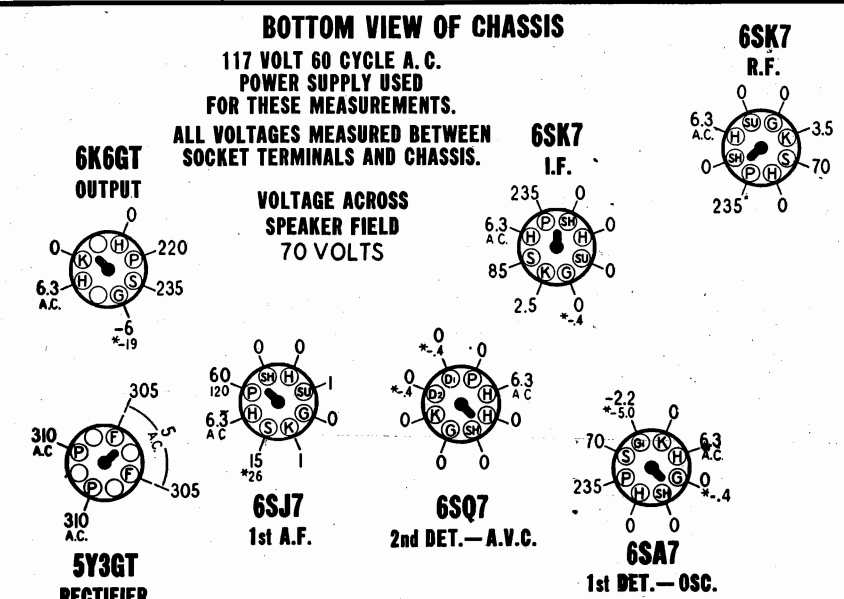
**VOLUME ON FULL WITH NO SIGNAL
RANGE SWITCH IN BROADCAST POSITION**

DIAL TUNED TO 540 KC.
MANUAL BUTTON PUSHED IN

BOTTOM VIEW OF CHASSIS

**117 VOLT 60 CYCLE A. C.
POWER SUPPLY USED
FOR THESE MEASUREMENTS.**

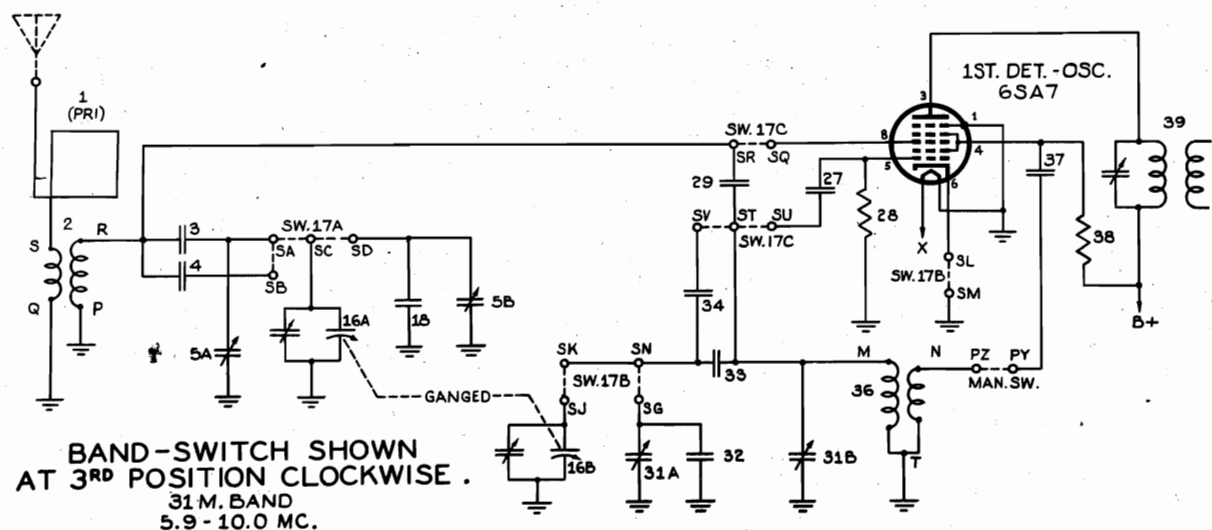
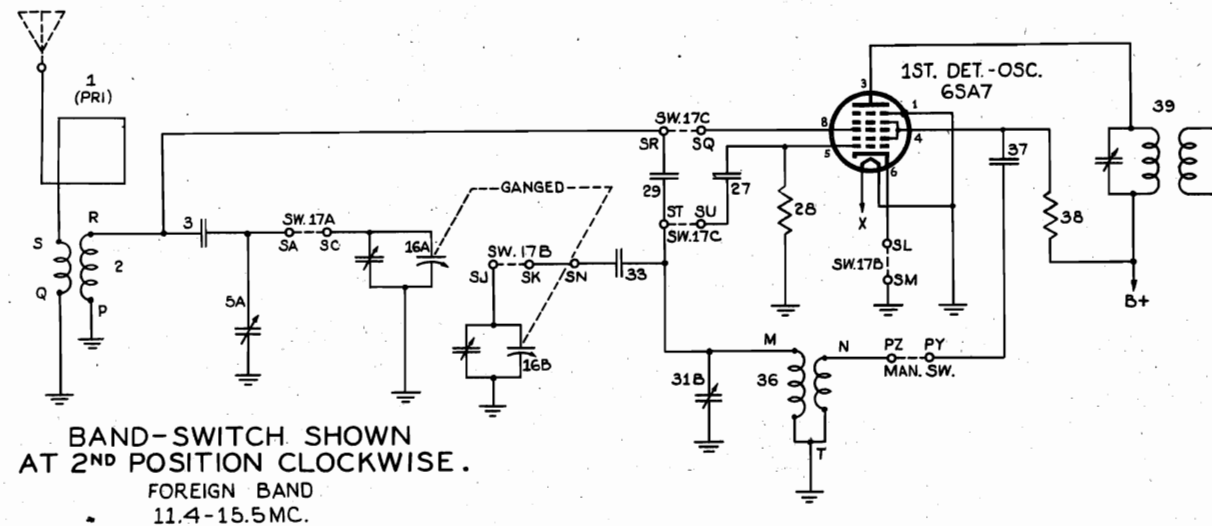
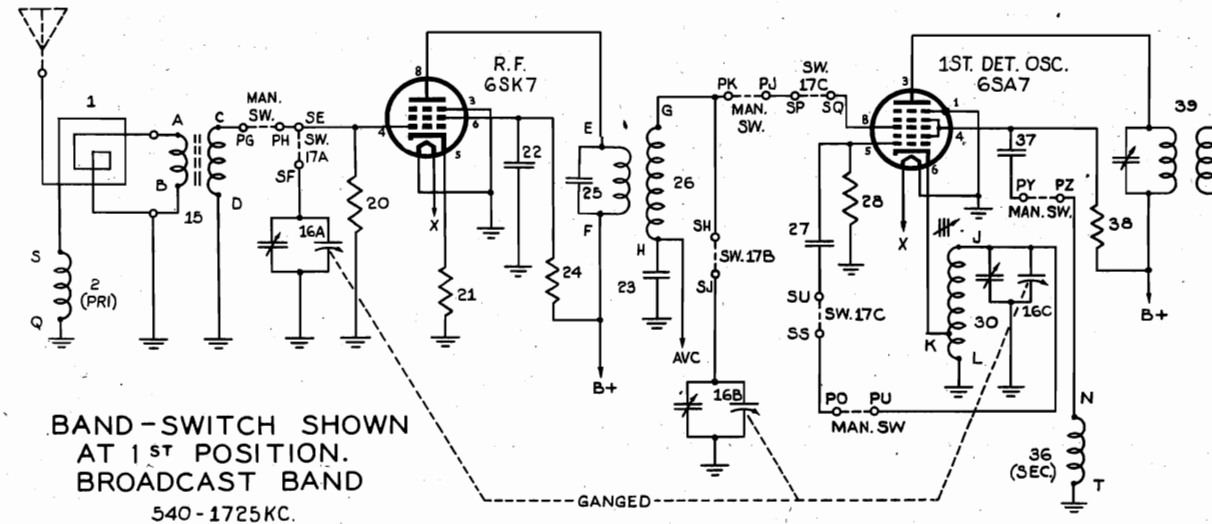
**ALL VOLTAGES MEASURED BETWEEN
SOCKET TERMINALS AND CHASSIS.**



NOTE:—The 6K6GT grid bias of -19 volts can be measured across resistor No. 72.
*—Measured with vacuum tube voltmeter.

THE FIRESTONE TIRE & RUBBER CO.

MODEL 4A23,
Interceptor

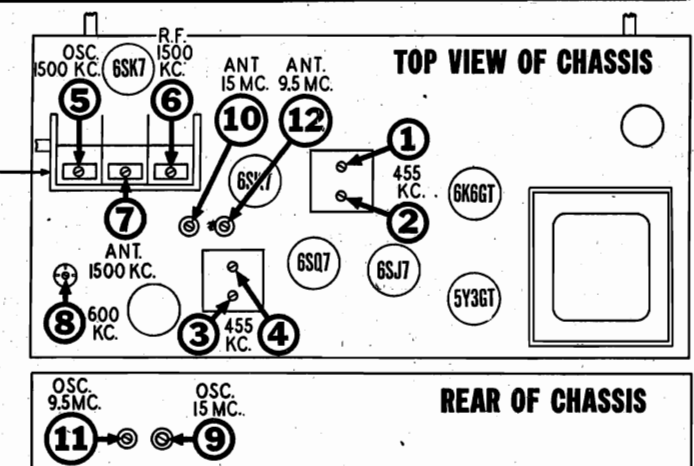
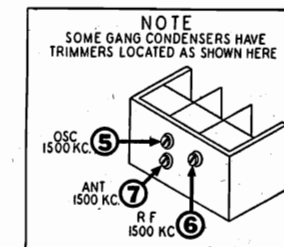


MODEL 4A23,
Interceptor

THE FIRESTONE TIRE & RUBBER CO.

1. The chassis and loop antenna should remain in their normal position in the cabinet throughout the following procedure.
 2. Check arrangement of leads to push-button switch as shown in illustration on following page.
 3. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 55 on the dial. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
 4. Connect output meter across speaker voice coil.
 5. Connect the ground lead of the signal generator to the receiver chassis.
 6. Set volume control at maximum volume position and use a weak signal from the signal generator.
 7. Push in the manual button and leave it in that position throughout the alignment procedure.
- IMPORTANT:—Align this receiver in exactly the order shown below. Broadcast band must be aligned before short wave bands.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. Condenser	Trimmer on rear section of gang	455 KC	Broadcast (counter-clockwise)	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
.003 MFD. Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast (counter-clockwise)	1500 KC	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
.003 MFD. Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast (counter-clockwise)	Tune to 1500 KC Generator Signal	6	Broadcast R.F.	Adjust for maximum output.
.003 MFD. Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast (counter-clockwise)	Tune to 1500 KC Generator Signal	7	Broadcast Antenna	Adjust for maximum output.
.003 MFD. Condenser	External Antenna Clip on Loop Frame	600 KC	Broadcast (counter-clockwise)	Tune to 600 KC Generator Signal	8	Adjustable core of Broadcast Oscillator Coil.	Adjust for maximum output. Try to increase output by rotating core in and out and retuning receiver dial until maximum output is obtained.
.003 MFD. Condenser	External Antenna Clip on Loop Frame	Repeat adjustments of trimmers 5, 6 and 7 at 1500 Kc. Then re-check adjustment of trimmer 8 at 600 Kc.					
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	15 MC	Short wave	15 MC	9	S.W. Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 14.1 MC. If image does not appear, readjust at 15 MC. with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	15 MC	Short wave	Tune to 15 MC Generator Signal	10	S.W. Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	9.5 MC	31 M (Clockwise)	9.5 MC	11	31 M Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 8.6 MC. If image does not appear, readjust at 9.5 MC. with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	9.5 MC	31 M (Clockwise)	Tune to 9.5 MC Generator Signal	12	31 M Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.



AUDIO OSCILLATION

The audio system of this receiver utilizes a two stage type of inverse feed-back arrangement and should it ever be necessary to replace the speaker or output transformer it is important to maintain a definite phase relationship in the feedback circuit. If the connections to the output transformer are reversed or if the feed-back connection is made to the wrong side of the output transformer secondary, the system will become regenerative instead of degenerative. Under those conditions audio oscillation may result. If that occurs, oscillation may be prevented by reversing the connections to the primary of the output transformer.

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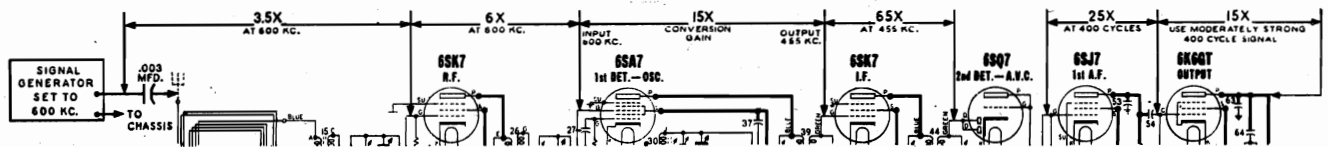
MODEL 4A23,
Interceptor

APPROXIMATE STAGE GAIN DATA

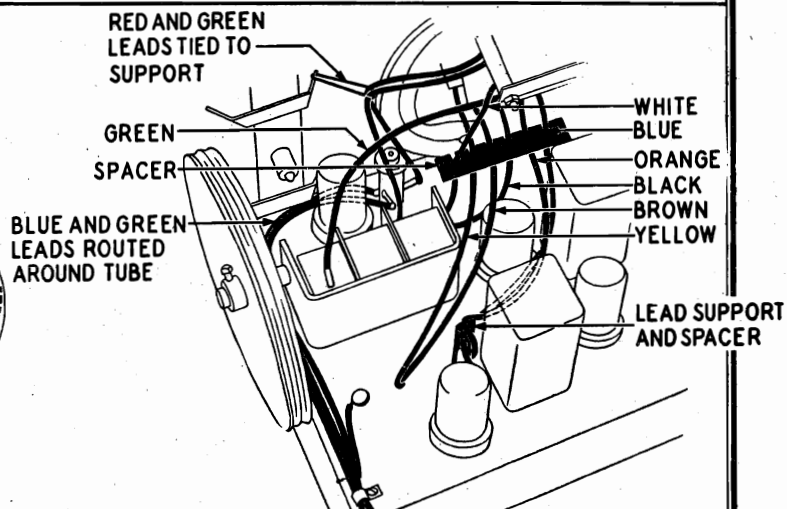
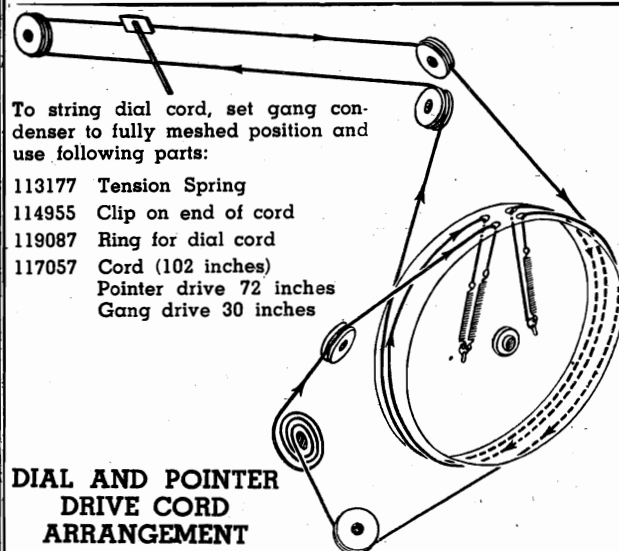
Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to chassis. This provides a definite operating point. IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under no.mcl operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



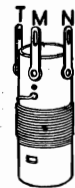
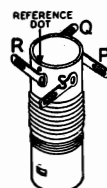
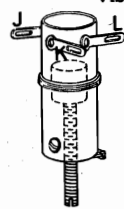
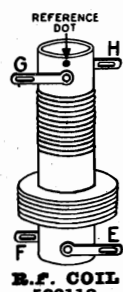
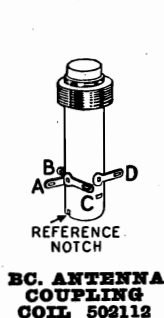
Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.



IMPORTANCE OF MAINTAINING FIXED POSITIONS FOR LEADS AT TOP OF CHASSIS

The wires shown in the above illustration are associated with tuned circuits which carry radio frequency currents. Therefore, care must be exercised to insure that they are properly routed and spaced. Anchoring and fixing spacing of wires minimizes freedom of movement and is utilized to maintain a stable arrangement.

Since the relative positions of these wires may affect tuned circuits it is important to avoid any change in arrangement after the receiver has been aligned. If the position of the wires has been disturbed, it is advisable to re-check alignment.



Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

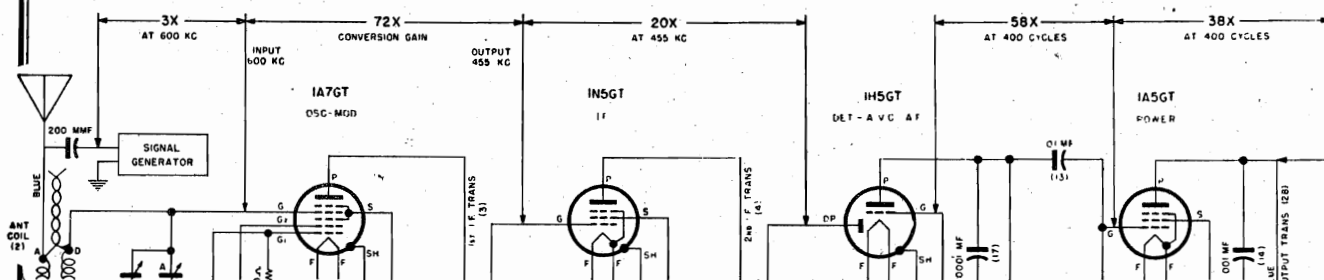
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PART NO. 4-A-24

VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

POWER OUTPUT Undistorted- 100 milliwatts
Maximum - 200 milliwatts

TUNING RANGE 528 to 1730 KC



1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)

2. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)

3. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

THE FIRESTONE TIRE & RUBBER CO.

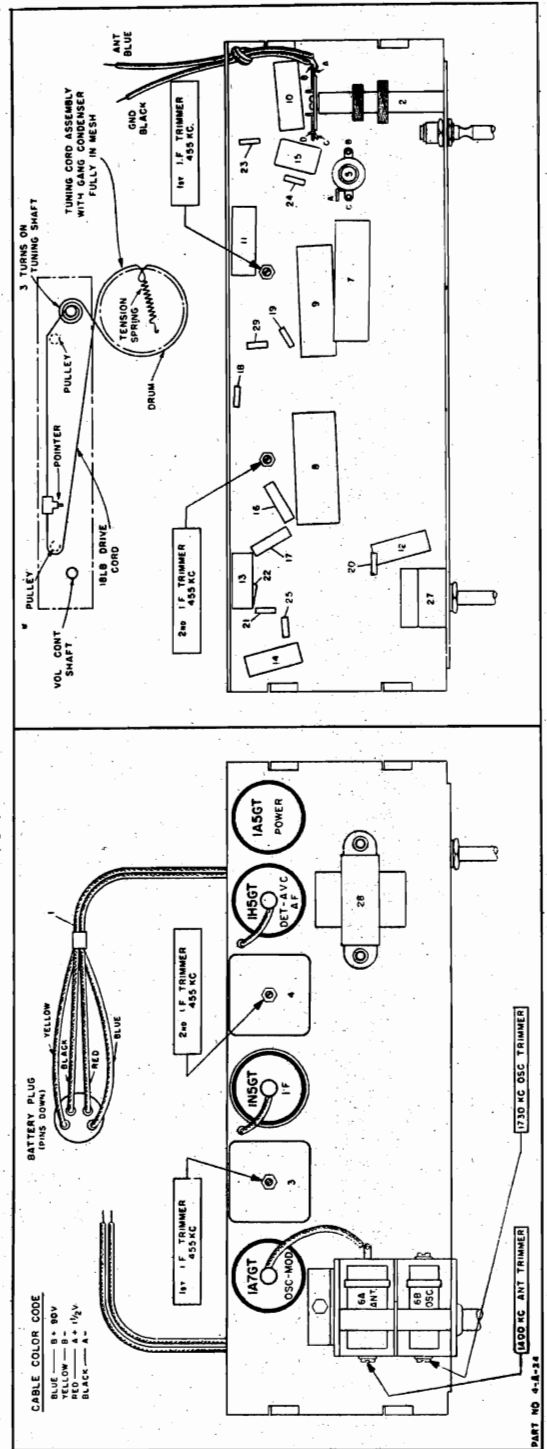
Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. Make the adjustment marked (1) first, (2) next, etc.

Before starting alignment:

- (a) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.
- (b) Use an accurately calibrated test oscillator with some type of output measuring device.

TEST OSCILLATOR

Steps	Set receiver dial to:	Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below:
1	I.F. Any point where no interference signal is received	455 K. C.	.02 MFD. condenser	High side to grid terminal of 1A7GT tube DO NOT REMOVE CAP. Low side to receiver black ground lead.	Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. trimmers for maximum output.
2	Exactly 1730 K. C.	Exactly 1730 K. C.	.00025 MFD. condenser	Receiver blue antenna lead Receiver black ground lead	Adjust 1730 K. C. oscillator trimmer for maximum output.
3	Exactly 1400 K. C.	Exactly 1400 K. C.	.00025 MFD. condenser	Receiver blue antenna lead Receiver black ground lead	While rocking gang condenser adjust 1400 K. C. antenna trimmer for maximum output.



The schematic diagram illustrates the internal circuitry of a radio receiver, organized into three main functional sections: POWER, I.F. (Intermediate Frequency), and OSC-MOD (Oscillator-Modulator).

- POWER SECTION (50L6GT):** This section is responsible for providing power to the other stages. It features a 50L6GT vacuum tube. Key components include a 250,000 Ω resistor (24), a 50 μF capacitor (25), a 150 Ω resistor (22), a 470,000 Ω resistor (20), a 220,000 Ω resistor (21), a 0.001 μF capacitor (16), a 3.3 MEG. Ω resistor (18), a 0.001 μF capacitor (13), a 10 μF capacitor (14), a 1,000 μF capacitor (15), and a 48,000 Ω resistor (12). A 2.5 MEG. Ω resistor (11) is also present. The section includes a 2.5 MEG. Ω resistor (11) and a 2.5 MEG. Ω resistor (11).
- I.F. SECTION (12SK7):** This section handles the intermediate frequency signals. It features a 12SK7 vacuum tube. Key components include a 1.5T I.F. TRANS. (2), a 1.5T I.F. TRANS. (3), a 1.5T I.F. TRANS. (4), a 1.5T I.F. TRANS. (5), a 1.5T I.F. TRANS. (6), a 1.5T I.F. TRANS. (7), a 1.5T I.F. TRANS. (8), a 1.5T I.F. TRANS. (9), a 1.5T I.F. TRANS. (10), a 1.5T I.F. TRANS. (11), a 1.5T I.F. TRANS. (12), a 1.5T I.F. TRANS. (13), a 1.5T I.F. TRANS. (14), a 1.5T I.F. TRANS. (15), a 1.5T I.F. TRANS. (16), a 1.5T I.F. TRANS. (17), a 1.5T I.F. TRANS. (18), a 1.5T I.F. TRANS. (19), a 1.5T I.F. TRANS. (20), a 1.5T I.F. TRANS. (21), a 1.5T I.F. TRANS. (22), a 1.5T I.F. TRANS. (23), a 1.5T I.F. TRANS. (24), a 1.5T I.F. TRANS. (25), a 1.5T I.F. TRANS. (26), a 1.5T I.F. TRANS. (27), a 1.5T I.F. TRANS. (28), a 1.5T I.F. TRANS. (29), a 1.5T I.F. TRANS. (30), a 1.5T I.F. TRANS. (31), a 1.5T I.F. TRANS. (32), a 1.5T I.F. TRANS. (33), a 1.5T I.F. TRANS. (34), a 1.5T I.F. TRANS. (35), a 1.5T I.F. TRANS. 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LOUD SPEAKER

VOICE COIL IMPEDANCE

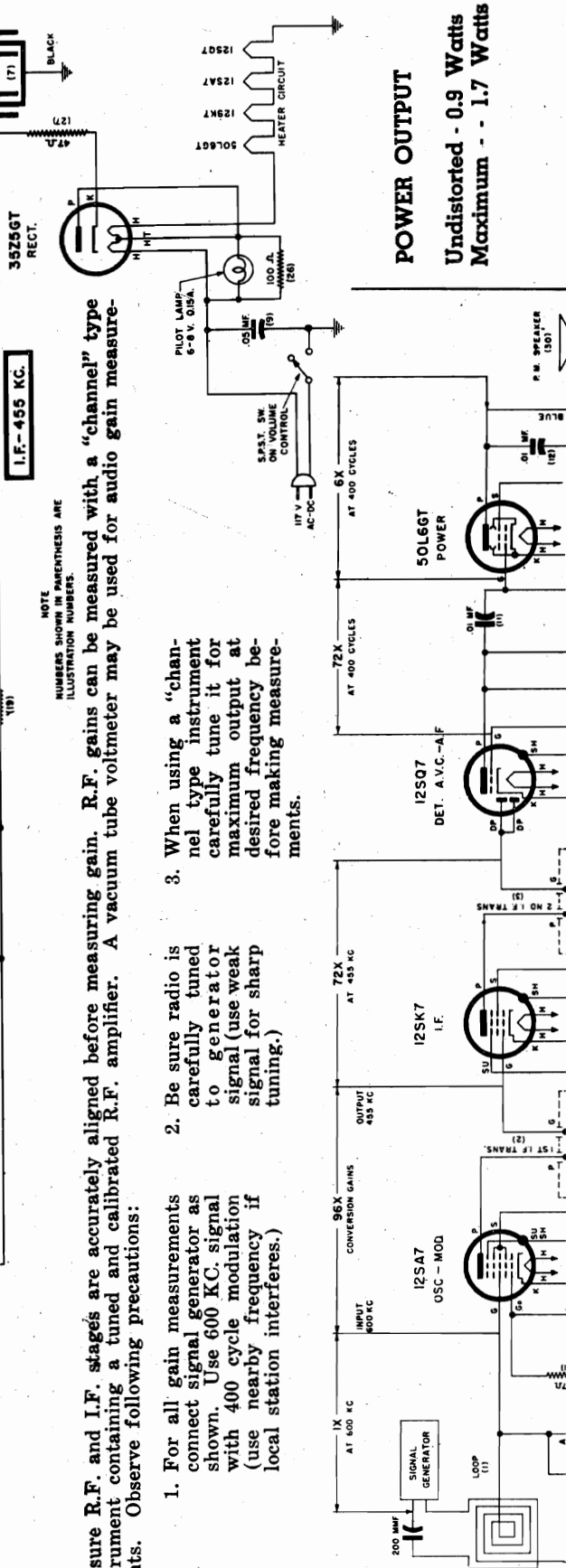
3.2 OHM at 400 Cycles

I.F.-455 KC.

NOTE
NUMBERS SHOWN IN PARENTHESIS ARE
ILLUSTRATION NUMBERS.

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
3. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

THE FIRESTONE TIRE & RUBBER CO.

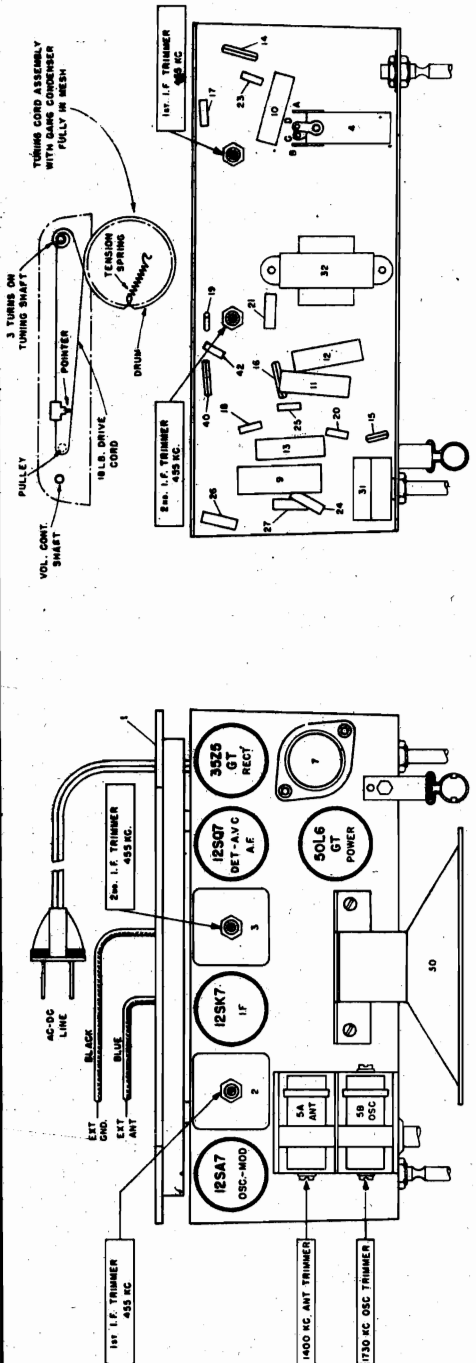
ALIGNMENT PROCEDURE

For alignment procedure read tabulations from left to right, and make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment:

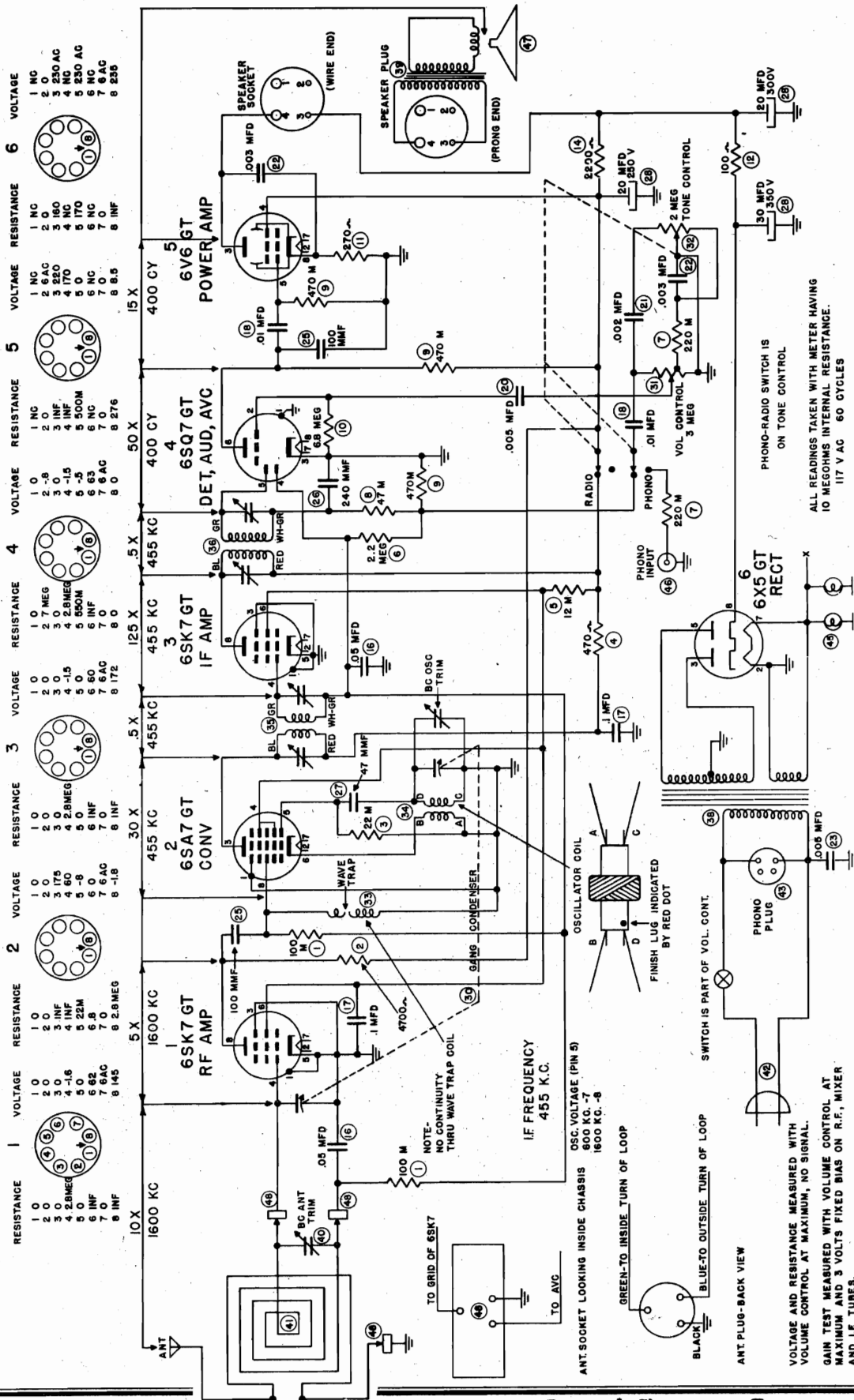
- (a) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.
- (b) Use an accurately calibrated test oscillator with some type of output measuring device.
- (c) PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET.

Steps	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
	Set receiver dial to:	Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:
1	Any point where no interfering signal is received.	455 K. C.	.02 MFD. condenser	High side to front stator plates of tuning condenser. Low side to frame of condenser through a .02 Mfd. blocking condenser.
2	Exactly 1730 K. C.	Exactly 1730 K. C.	.00025 MFD. condenser	Receiver blue antenna lead Receiver black ground lead
3	Approx. 1400 K. C.	Approx. 1400 K. C.	.00025 MFD. condenser	Receiver blue antenna lead Receiver black ground lead



MODEL 4A31,
Rhapsody

THE FIRESTONE TIRE & RUBBER CO.



Tuning range 540 Kc. to 1620 Kc. 65 watts at 117 volts.

Power Output
Radio—5.4 watts
Phono—6.6 watts

Speaker: 10" P.M. Dynamic
Voice coil impedance—3.5 ohms

DATE 4-30-46

MODEL 4A31,
Rhapsody

THE FIRESTONE TIRE & RUBBER CO.

EQUIPMENT AND PROCEDURE FOR ALIGNMENT

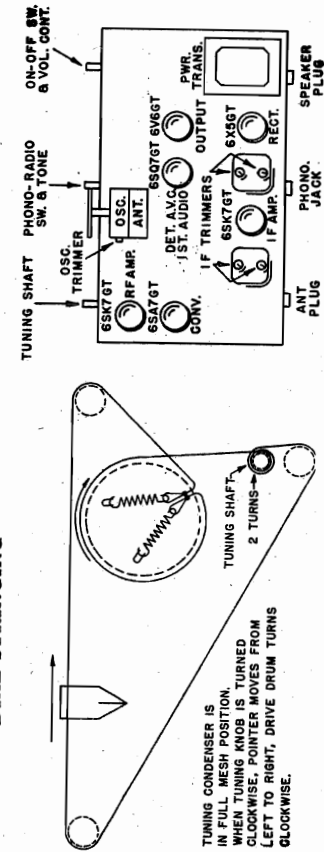
A Signal Generator calibrated at 455 Kc., 600 Kc. and 1500 Kc., and an output indicator are necessary to properly align this set. All adjustments should be made with the volume control set for maximum and the tone control for maximum treble, keeping the signal generator output as low as possible to prevent A.V.C. action and false settings.

The low side of the signal generator is connected to the chassis.

Steps	Connect High Side of Generator to	Set Generator At	Adjust	Located	To Obtain
1	Set Volume Control at Maximum and Tone Control at Maximum Treble.				
2	Stator of Ant. Section of Gang with .1 Mf. In Series	455 Kc.	Minimum	2nd. I.F. Trimmers	Top of 2nd. I.F. Transformer
3				1st. I.F. Trimmers	Top of 1st. I.F. Transformer
4	Ant. Lead With 250 Mmf. In Series*	1500 Kc.	1500 Kc.	Osc. Trimmer	On Gang
5		1500 Kc.	1500 Kc.	Ant. Trimmer	On Loop
6	Check Pointer Calibration on 600 Kc.				

*Antenna wire protrudes from loop.

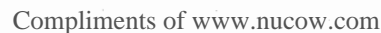
DIAL STRINGING

PARTS PRICE LIST
STOCK No. 4-A-31. CODE No. 177-5-4A31

Refer. No.	Part No.	DESCRIPTION	List Price
1	77214	100 M Ohms	.15
2	77211	4700 Ohms	.15
3	77266	22 M Ohms	.15
4	77261	470 Ohms	.15
5	77155	12 M Ohms 2 Watt.	.25
6	77270	2.2 Megohms	.15
7	77216	220 M Ohms	.15
8	77213	47 M Ohms	.15
9	77217	470 M Ohms	.15
10	77273	6.8 Megohms	.15
11	77174	270 Ohms 1 Watt.	.15
12	77258	100 Ohms	.15
14	77301	2200 Ohms 2 Watt.	.20
16	25196	.05 Mfd. Tubular 600 V.	.20
17	25215	.1 Mfd. Tubular 600 V.	.20
18	25194	.01 Mfd. Tubular 600 V.	.20
20	25183	.005 Mfd. Tubular 600 V.	.15
21	25185	.002 Mfd. Tubular 600 V.	.15
22	25184	.003 Mfd. Tubular 600 V.	.20
23	25031	.005 Mfd. Line Buffer 600 V.	.30
25	25188	100 Mmf. Mica	.25
26	25187	240 Mmf. Mica	.30
27	25193	47 Mmf. Mica	.30
28	25180	Electrolytic Cap. 30 Mf. 350 V.—20 Mf. 250 V.—1.95	
30	45154	Gang Condenser and Drive Drum.	4.35
31	78119	Volume Control	1.20
32	90148	Tone Control and Phono Switch.	1.05
33	38484	Wave Trap	.55
34	38483	Oscillator Coil	.60
35	38536	1st. I. F. Transformer	1.70
36	38537	2nd. I. F. Transformer	1.70
38	94025	Power Transformer	4.75
39	94199	Output Transformer	3.45
40	26032	Antenna Trimmer	.20
41	38632	Loop Antenna	3.35
42	27118	Line Cord	.70
43	11274	Phono A. C. Cable and Plug.	.75
44	42185	Dial Lamp (Mazda 44) 6.3 V. 250 Ma. (Two required)	.15
45	80030	Phono Input Socket	.10
46	81124	Speaker	13.25
47	80256	Antenna Socket	.10
48	80250	Speaker Socket	.10
	80252	Antenna Plug	.10
	80139	Molded Octal Tube Socket	.15
	11259	Dial Pointer Assembly	.85
	05090	Drive Cord Assembly	.20
	31287	Dial Glass	1.05
	04038	Dial Background	.40
	59264	Knob	.25
	71223	Phono Needle	1.20
	22147	P. U. Cable	1.00

Prices subject to change without notice

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THE FIRESTONE TIRE & RUBBER CO.

MODEL 4B1, Supreme

Although the set is relatively free of critical lead placement, when changing parts see that wires are in the same approximate position. If they are not, the set may oscillate or behave badly.

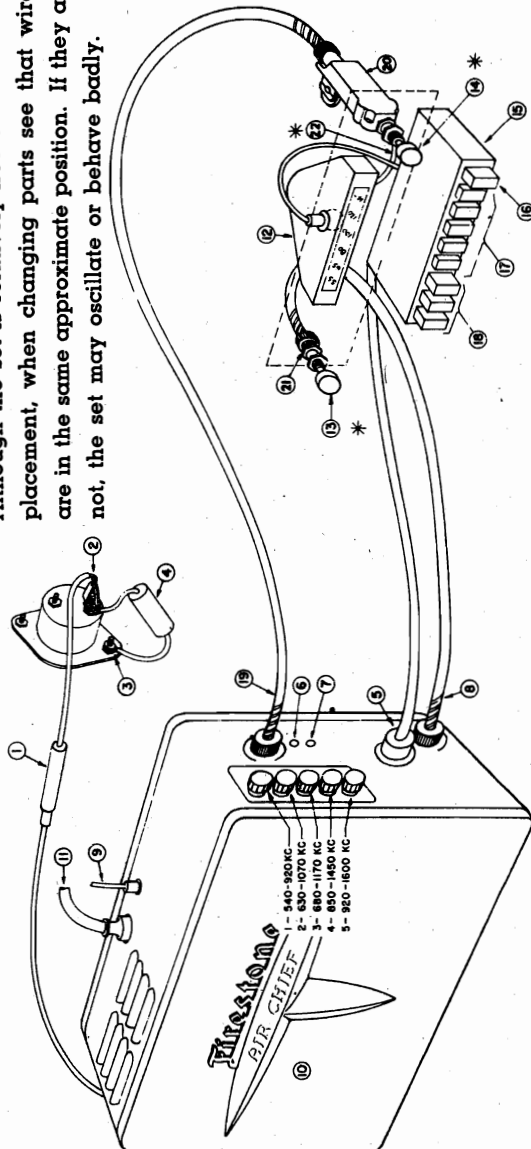


Fig. 3

1. Fuse Holder { Part No. 11160
2. "A" Power Lead {
3. Ground Connection
4. Ignition Interference Capacitor, Part No. 25120
5. Plug for Monomatic Tuner, Part of Part No. 15536
6. Antenna Trimmer, Manual Tuning
7. Antenna Trimmer, Automatic Tuning
8. Volume Control Flexible Cable, Part No. 15057
9. Antenna Lead (Part of Antenna)
10. Receiver PM-15
11. Speaker Cable, Part No. 27178
12. Slide Rule Dial, Part No. 13428
13. Volume Control Knob { Part No. 59314
14. Manual Control Knob {
15. Monomatic Tuner, Part No. 15536
16. Push Button Station Selector, Part of Part No. 15536
17. Station Indicators, Part of Part No. 15536
18. Tone Control Push Buttons, Part of Part No. 15536
19. Manual Tuning Control Cable, Part No. 15057
20. Tuning Control "Worm Reduction", Part No. 13538
21. Volume Control Shaft Bushing, Part No. 13537
22. Dial Drive Flexible Cable, Part No. 27298

All items except 13, 14, and 22 are packed with the receiver, other items are packed with the control kit.

PUSH BUTTON ADJUSTMENT

It is advisable to adjust the push buttons while set is still on the bench. With set operating and connected to the antenna, make a list of the five stations for which you desire Monomatic tuning. The stations chosen must be such that each will come within a different frequency range, as indicated by the following list. For example, it would not be possible to choose both a 550 kc station and a 600 kc station, since 600 kc does not come within the range of position #2. Arrange the stations in order of their frequency; that is,

the station of lowest frequency will be #1; of next higher frequency, #2, next.

STATION	FREQUENCY RANGE
#1	540 to 920 kc
#2	680 to 1170 kc
#3	850 to 1450 kc
#4	850 to 1450 kc
#5	920 to 1570 kc

Operate the Monomatic button (marked Push) until the dial becomes illuminated, indicating that the receiver is adjusted for Dial Tuning. Then tune

your #5 station, using the Station Selector knob. Operate the Monomatic button until the #5 station indicator (furthest right of the station indicators) becomes illuminated.

Turn the knob, located on the side of the set, which has the range 920-1570 kc indicated below it, until the desired station is heard at maximum volume.

After setting button #5, the antenna should be matched by adjusting the screw marked P.B. Antenna Trimmer in Figure 3, as #7. This screw is covered by a snap button. Slowly turn this screw until maximum volume is secured.

Return to Manual then tune in until your #1 indicator becomes illuminated. Then proceed to adjust the knob for this station until maximum signal is heard.

Assuming the lid is removed, place a $\frac{5}{16}$ open end wrench on adjusting nut immediately ahead of heavy compression spring and adjust for further increase in signal, then readjust red knob for maximum signal. This is actually a tracking operation and will give optimum performance. This operating should be repeated for each button position.

After the car installation is made, it is recommended that all the red buttons be rechecked for maximum response.

After this re-check is completed, it is necessary to adjust the manual antenna trimmer, see #6. The adjusting screw for this is accessible after removing the snap button.

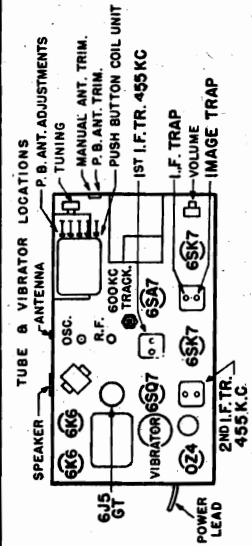
Return the set to dial tuning, turn the manual tuning control until a station near 1400 kc is heard, then adjust this screw for maximum volume. Now with set in car, depress monomatic button until #5 station is again illuminated. Check #7 trimmer for maximum signal.

MODEL 4B1, Supreme
MODEL 4B2, DeLuxe

THE FIRESTONE TIRE & RUBBER CO.

MODEL 4-B-2 CODE 7-6-PM14

Part No.	Name of Part	Part No.	Name of Part
1. 77180	10 M Ohm	29. 25112	.01-200 V.
2. 78031	Sensitivity C	30. 25189	500 MMF.
3. 77181	1 Meg.	31. 561367	Antenna Cable Recp.
4. 77069	22 M Ohm, 1/2 W.	32. 38279	Antenna Spark Choke
5. 77172	47 M Ohm	33. 38281	Permeability Tuner
6. 78042	.5 Meg. Vol. Control	34. 38280	Shunt Tracking Coil
7. 77182	10 Meg.	35. 26116	Trimmer Assembly
8. 77178	220 M Ohm	36. 26115	Antenna Trimmer
9. 77173	470 M Ohm	37. 38274	1st I.F. Assembly
10. 77179	330 Ohm	38. 38275	2nd I.F. Assembly
11. 77123	1000 Ohm	39. 94080	Output Transformer
12. 77176	100 Ohm	40. 11164	Speaker & Cable
13. 77183	33 M Ohm	41. 94078	Power Transformer
14. 77069	22 M Ohm, 1 W.	42. 76001	Vibrator
15. 25111	.05-200 V.	43. 38277	Vibrator Choke
16. 25102	.05-200 V.	44. 38278	A. Choke
17. 25188	100 MMF.	45. 48007	Fuse, 20 Amp.
18. 25104	.005-400 V.	46. 25124	Silver Mica Cond., 420 MMF.
19. 25116	.005-400 V.	47. 41083	Extra Length Control Cable
20. 25113	.01-400 V.	48. 11160	Fuse Holder
21. 25119	.002-200 V.	49. 11160	"A" Lead Assembly
22. 25103	1-400-V.	50. 25120	Capacitor
23. 25099	Electrolytic	51. 15057	Flexible Shaft Tuning
24. 25110	.006-1200 V.	52. 15057	Flexible Shaft Volume Control
25. 25109	.007-1600 V.	53. 11172	Pilot Light and Cable Assembly
26. 25118	.5-100 V.	54. 13428	Slide Rule Dial
27. 25100	Spark Plate	55. 13538	Tuning Control Worm Reduction
28. 25121	20 MMF.	56. 13537	Volume Control Shaft Bushing



MODEL 4-B-1 CODE 7-C-PM15

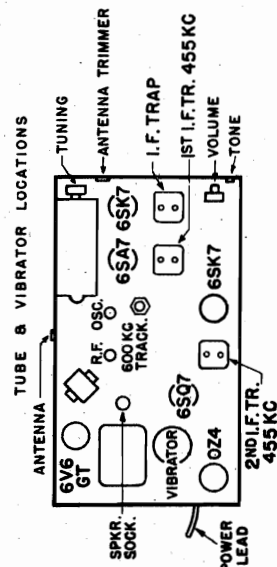
Part No.	Name of Part	Part No.	Name of Part
1. 77180	10 K Ohms	37. 26114	Trimmer Ass'y
2. 77169	22 K Ohms	38. 38276	R.F. Coil Ass'y
3. 77181	1 Meg. Ohms	39. 38274	1st I.F. Ass'y
4. 77176	100 Ohms	40. 38275	2nd I.F. Ass'y
5. 78042	.5 Meg. Vol. Control	41. 94111	Output Transformer
6. 77172	47 K Ohms	42. 11163	Speaker & Cable Ass'y
7. 77179	330 Ohms	43. 94078	Power Transformer
8. 77178	10 Meg. Ohms	44. 76001	Vibrator
9. 77178	220 K Ohms	45. 38277	Vibrator Choke
10. 77194	2200 Ohms	46. 38278	A. Choke
11. 77173	470 K Ohms	47. 48007	Fuse, 20 Amp.
12. 77125	470 Ohms, 1 Watt	48. 41100	Control Unit
13. 77167	100 K Ohms	49. 90070	Switch & Stepper Ass'y
14. 77123	1000 Ohms, W. W., 1 W.	50. 38273	Permeability Tuner
15. 78031	Sensitivity Control	51. 38280	Shunt Tracking Coil
16. 25112	.01-200 V.	52. 38311	P.B. Coil Ass'y
17. 25188	100 MMF.	53. 80136	Control Socket
18. 25111	.05-200	54. 38279	Ant. Spark Choke
19. 25106	100 MMF., XM-262	55. 561367	Ant. Cable Recp.
20. 25117	Compensating Cap	56. 41084	Monometric Tuner with Extra Length Cable
21. 25190	270 MMF., Sil. Mica Cap	57. 15100	Extra Length Control Cable Kit
22. 25121	20 MMF.	58. 77183	33 K Ohms
23. 25187	250 MMF.	59. 11160	Fuse Holder
24. 25189	500 MMF.	60. 25120	"A" Power Lead
25. 25105	.005-400 V.	61. 15057	Ignition Interference Capacitor
26. 25114	.25-200 V.	62. 27178	Volume Control Flexible Cable
27. 25116	.005-400 V.	63. 13428	Slide Rule Dial
28. 25102	.05-200	64. 59314	Volume Control Knob
29. 25105	.05-400	65. 59314	Manual Control Knob
30. 25110	.006-1200 V.	66. 15536	Monometric Tuner
31. 25103	1-400 V.	67. 15057	Manual Tuning Control Cable
32. 25118	.5-100 V.	68. 13538	Tuning Control "Worm Reduction"
33. 25109	.007-1600 V.	69. 13537	Volume Control Shaft Bushing
34. 25100	Spark Plate	70. 27298	Dial Drive Flexible Cable
35. 25099	Electrolytic		
36. 26113	Trimmer		

Volume control full on, tone control on To adjust image rejector, return set to button #5. speech position. Keep generator input low Set generator to 1500 kc. Adjust button for maximum signal at 1500 kc. Then set generator to image frequency 24100 and adjust image rejector for minimum signal. Use high generator output. speaker.

Generator Frequency	Dial	Dummy Antenna	Adjustments
455 kc	540 kc	.1 Mid	1st & 2nd IF
455 kc	* 540 kc	.1 Mid	IF Trap
1600 kc	Highest Frequency 600 kc	.0001 Mid	Osc., RF, Antenna
600 kc		.0001 Mid	600 kc Track

Connect signal generator ground lead to receiver chassis.
Connect signal generator output lead to antenna.

Compliments of www.nucow.com



MODEL 4B2, DeLuxe

THE FIRESTONE TIRE & RUBBER CO.

CONNECTING THE RECEIVER

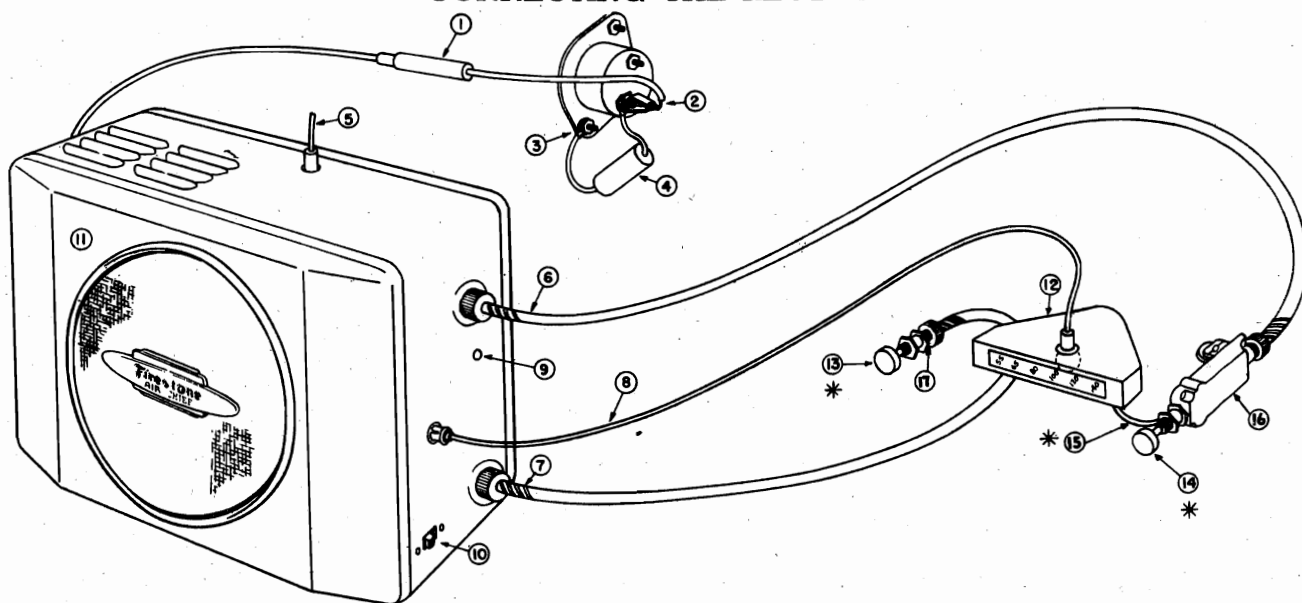


Fig. 3

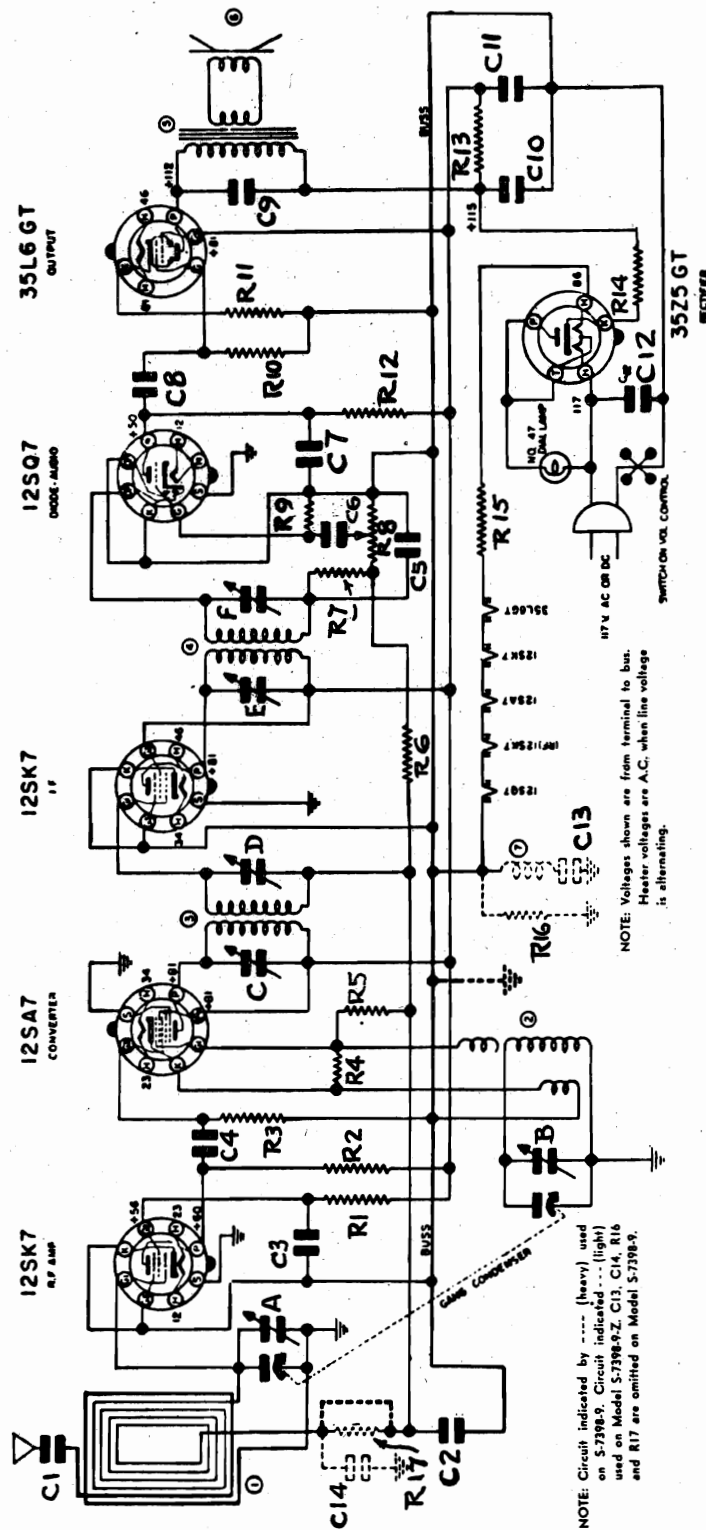
Name	Part No.	Name	Part No.
1. Fuseholder	11160	10. Tone Control	90071
2. Ammeter Connector	36621	11. Receiver	PM-14
3. Ground Connection	64270	12. Slide Dial Assembly	13428
4. Capacitor	25120		
5. Antenna Lead	—	The following items are supplied by Crowe Nameplate:	
6. Flexible Tuning Shaft	15057	13. Volume Control Knob	Included in Crowe
7. Flexible Volume Control Shaft	15057	14. Tuning Control Knob	Assy. #A-11540-C
8. Pilot Light Lead	11172	15. Flexible Dial Coupling Shaft	
9. Antenna Trimmer Adjustment Hole	—	16. Dial Drive Tuning Assembly	Assy. #A-11827

SOCKET VOLTAGES

VOLTAGE	1	RESISTANCE	VOLTAGE	2	RESISTANCE	VOLTAGE	3	RESISTANCE
1. 0		1. 0	1. 0		1. 0	1. 0	1. 0	
2. 0		2. 0	2. 0		2. 0	2. 0		
3. 0		3. 0	3. 224		3. 0	3. 0	3. 0	
4. -1		4. 2.6 MEG.	4. 58		4. INF.	4. 0	4. 11Ω	
5. .7		5. 50 Ω	5. 0		5. 22 K Ω	5. 1.4	5. 150 Ω	
6. 58		6. INF.	6. 0		6. .2	6. .6	6. INF.	
7. 6.6		7. .4 Ω	7. 6.6		7. .4	7. 6.6	7. .4	
8. 150		8. INF.	8. -.5		8. 2.5 MEG.	8. 224	8. INF.	
VOLTAGE	4	RESISTANCE	VOLTAGE	5	RESISTANCE	VOLTAGE	6	RESISTANCE
1. 0		1. 0	1. 0		1. 0	1. 0	1. 0	
2. -6		2. 10 MEG.	2. 0		2. 0	2. NO CONN.		
3. 0		3. 0	3. 265		3. INF.	3. 320 A.C.	3. 220 Ω	
4. 0		4. 550 K Ω	4. 225		4. INF.	4. 0	4. NO CONN.	
5. 0		5. 550 K Ω	5. 0		5. 470 K Ω	5. 320 A.C.	5. 220 Ω	
6. 100		6. INF.	6. 0		6. INF.	6. 0	6. NO CONN.	
7. 6.6		7. .4	7. 6.6		7. .4	7. 0	7. NO CONN.	
8. 0		8. 0	8. 12		8. 330 Ω	8. 270	8. INF.	

BOTTOM VIEW OF SOCKETS

THE FIRESTONE TIRE & RUBBER CO.

MODELS 7398-9,
7398-9Z, 7403-1

5	N-3782	Output Transformer	.....	\$1.00
6	N-3781	5" P. M. Speaker	.....	3.75
	N-4052	2 Gang Condenser	.....	3.00

MISCELLANEOUS PARTS

Part No.	Description	List Price
N-4054	Dial scale (glass)	..... \$ 0.80
N-4055	Dial background plate	..... .80
N-4053	Dial pointer	..... .50
N-3787	Dial drive shaft	..... .50
N-3238	Dial drive shaft bushing	..... .40
N-3243	"C" Washer—dial drive shaft retainer	..... .07
N-2655	Dial drive string	..... .10
N-3925	Dial drive spring	..... .10
N-4075	Dial lamp socket	..... .50
N-1958	Rubber line cord	..... .45
N-3812	Wood dowel spacers—loop mounting	..... .10
N-3795	Screw—6-32x2 1/4" round head	..... .12
N-3642	Washer—fibre—chassis mounting	..... .10
N-4687	Cabinet back	..... .65
N-4688	Knobs	..... .20
N-4886	Clips—dial scale fastening	..... .10
N-4696	Speaker baffle	..... .16
N-4697	Grille cloth	..... .22

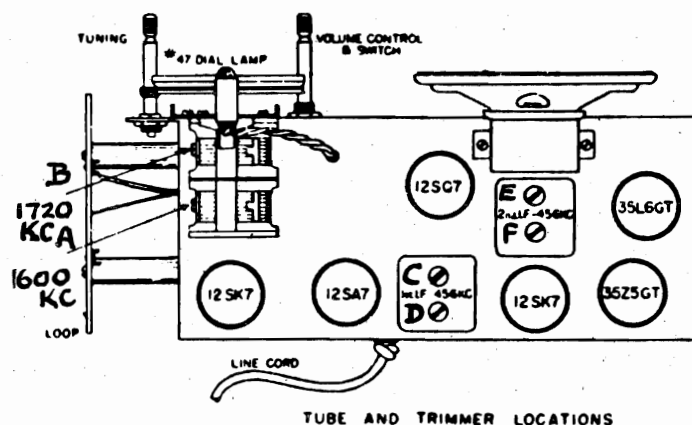
Part No.	Description	List Price
N-3814	15,000 Ohm .5 W.	20% \$ 0.20
N-3964	2,000 Ohm .5 W.	10% ..... .20
N-1260	50,000 Ohm .5 W.	20% ..... .20
N-1627	20,000 Ohm .5 W.	20% ..... .20
N-1263	10 Megohm .5 W.	20% ..... .20
N-1682	3 Megohm .5 W.	20% ..... .20
N-1460	30,000 Ohm .5 W.	20% ..... .20
N-4076	0.5 Megohm Volume Control	..... 2.25
N-2189	4 Megohm .5 W.	20% ..... .20
N-1264	500,000 Ohm .5 W.	20% ..... .20
N-3663	150 Ohm .5 W.	10% ..... .20
N-1377	200,000 Ohm .5 W.	20% ..... .20
N-3819	1,200 Ohm 1 W.	10% ..... .30
N-1742	25 Ohm .5 W.	20% ..... .20
N-3869	30 Ohm 1 W.	10% ..... .30
N-1377	200,000 Ohm .5 W.	20% ..... .20
N-1262	1 Megohm .5 W.	20% ..... .20
N-3784	Antenna Loop Coil	..... .90
N-3298	Oscillator Coil	..... .70
N-3816	1st I.F. Transformer	..... 1.20
N-3804	2nd I.F. Transformer	..... 1.20

Prices subject to change without notice.

DECEMBER 8, 1941

MODELS 7398-9,
7398-9Z, 7403-1

THE FIRESTONE TIRE & RUBBER CO.



ALIGNMENT DATA AND SERVICING

Lack of sensitivity and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved not to be the cause.

NOTE: IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

ALIGNMENT PROCEDURE

GENERAL DATA

The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400 and 1720 KC and an output meter to be connected across the primary and secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE

The intermediate frequency (I. F.) stages should be aligned properly as the first step. After the I. F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

I. F. ALIGNMENT

With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the ground bus, indicated in circuit diagram. Align all four I. F. trimmers to peak or maximum reading on the output meter.

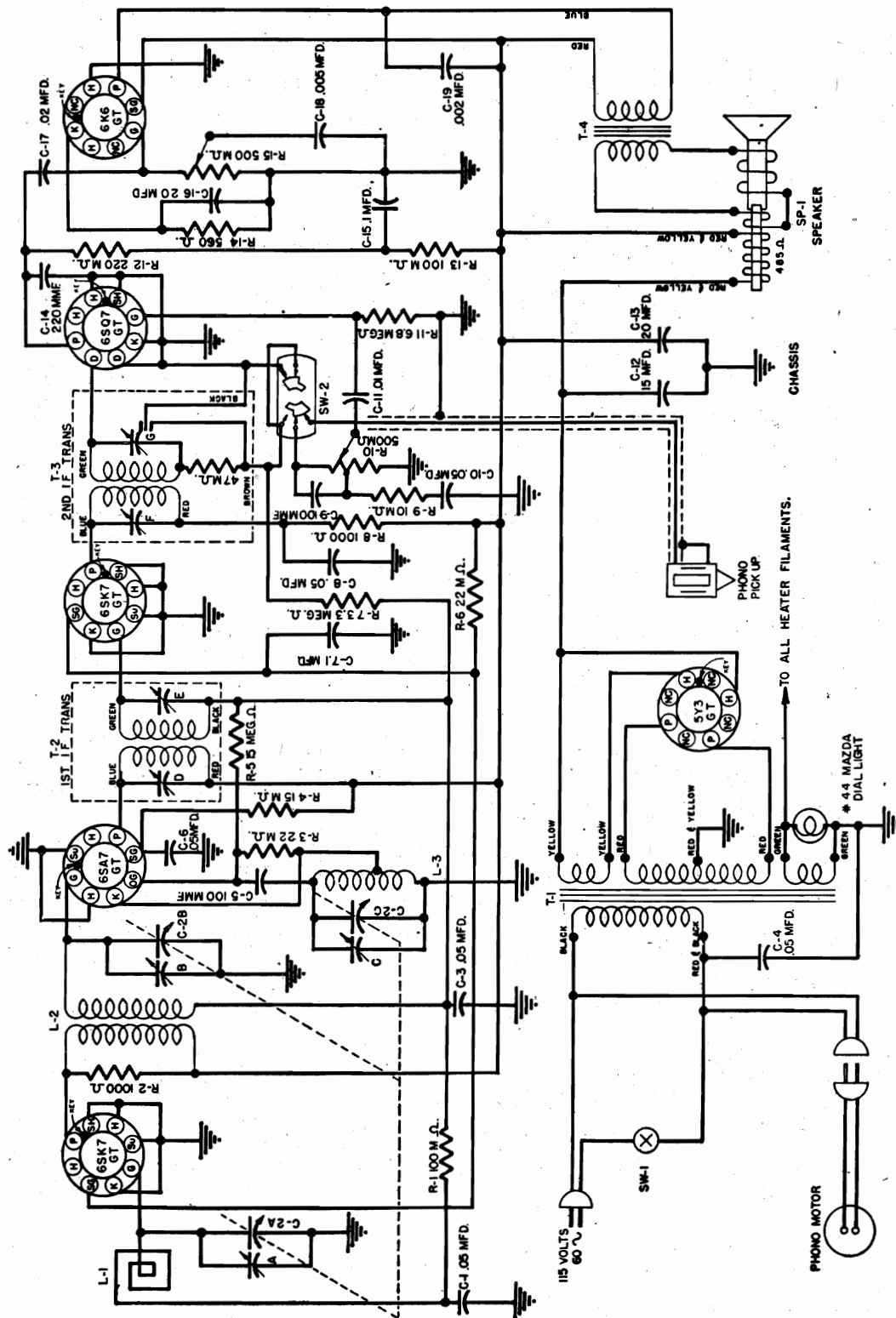
BROADCAST BAND ALIGNMENT

Remove the chassis from the cabinet and set on a bench, taking care that no metal is near the loop. Do not make this setup on a metal bench. Connect the test oscillator to the antenna of the set through a 200 mmfd. (.0002) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1720 KC, and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

455 KC IF

ALL TUBE SOCKETS SHOWN FROM PIN END VIEW.

ALL SWITCHES SHOWN IN COUNTERCLOCKWISE POSITION, SHAFT END VIEW.



THE FIRESTONE TIRE & RUBBER CO.

Electrical and Mechanical Specifications

Frequency Range.....540-1600 kc. V.C. Impedance.....3.5 ohms at 400 cycles
 Intermediate Frequency.....455 kc. Power Output (Undistorted)....1 watt
 Power Supply.....105-125 volts, 60 cycle A.C. Power Output (Maximum).....4 watts
 LoudspeakerElectrodynamic Tuning Drive Ratio.....4¾ to 1

TUBE COMPLEMENT

1—6SK7GT.....RF Amplifier tube 1—6SQ7GT.....Detector—AVC—1st Audio tube
 1—6SA7GT.....Converter tube 1—6K6GT.....Power Output tube
 1—6SK7GT.....IF Amplifier tube 1—5Y3GT.....Rectifier tube

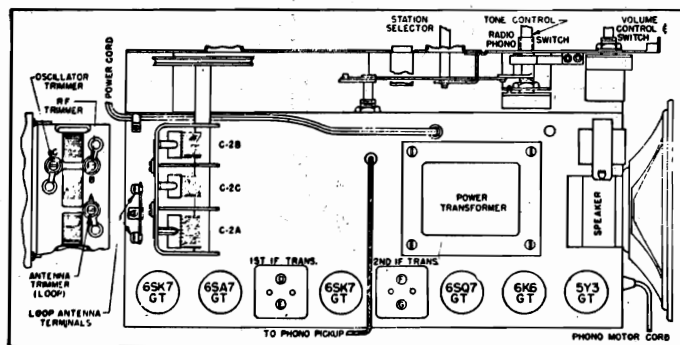
NOTE: The above glass tubes are interchangeable with their metal equivalent.

ALIGNMENT PROCEDURE

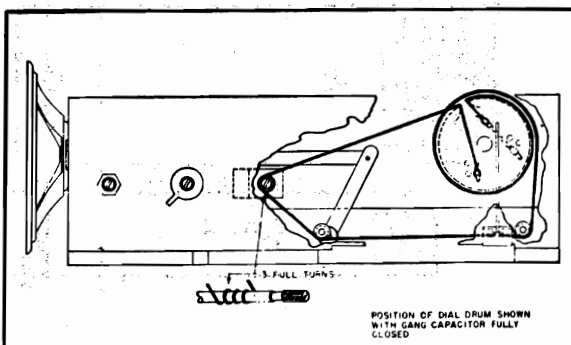
The following equipment is necessary to properly align this chassis:

1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Dummy antenna: — .1 mfd. — RMA loop.

CONNECT GEN- ERATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL AT	TRIMMERS	PURPOSE
6SA7GT grid	.1 mfd	455 kc.	Broadcast	HF end	D E F G	Align IF
6SK7GT RF grid	.1 mfd	1620 kc.	Broadcast	HF end	C	Set limit of band
6SK7GT RF grid	.1 mfd	1400 kc.	Broadcast	1400 kc.	B	Align RF
RMA loop	Through loop	1400 kc.	Broadcast	1400 kc.	A	Align antenna



Tube Layout

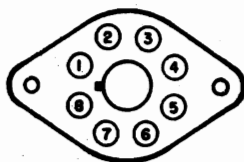


Dial Mechanism

THE FIRESTONE TIRE & RUBBER CO.

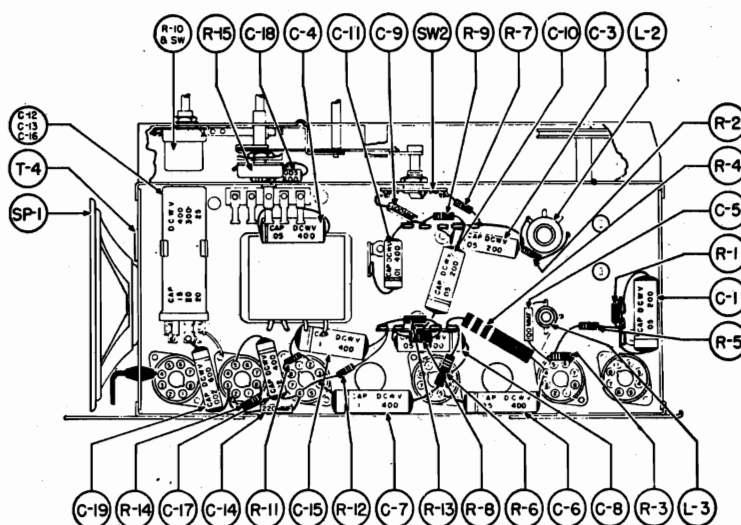
SOCKET VOLTAGES

TUBE	POSITION	1	2	3	4	5	6	7	8
6SK7GT	RF Amplifier	0	0	0	0	0	93	6.3 AC	270
6SA7GT	Converter	0	6.3 AC	270	113	-7.5	0	0	0
6SK7GT	IF Amplifier	0	0	0	0	0	93	6.3 AC	260
6SQ7GT	Detector—AVC—1st Audio	0	0	0	0	0	88	6.3 AC	0
6K6GT	Power Output	0	0	250	270	0	0	6.3 AC	19
5Y3GT	Rectifier	0	310	0	290 AC	0	290 AC	0	310



NOTE: All voltages measured from chassis to socket contact indicated.
 DC voltages measured with a 1000 ohm-per-volt meter.
 All voltages are positive DC unless otherwise marked.
 Volume control full on. No signal.
 Tone Control in clockwise position.
 Line Voltage 117 volts AC.

Parts Layout

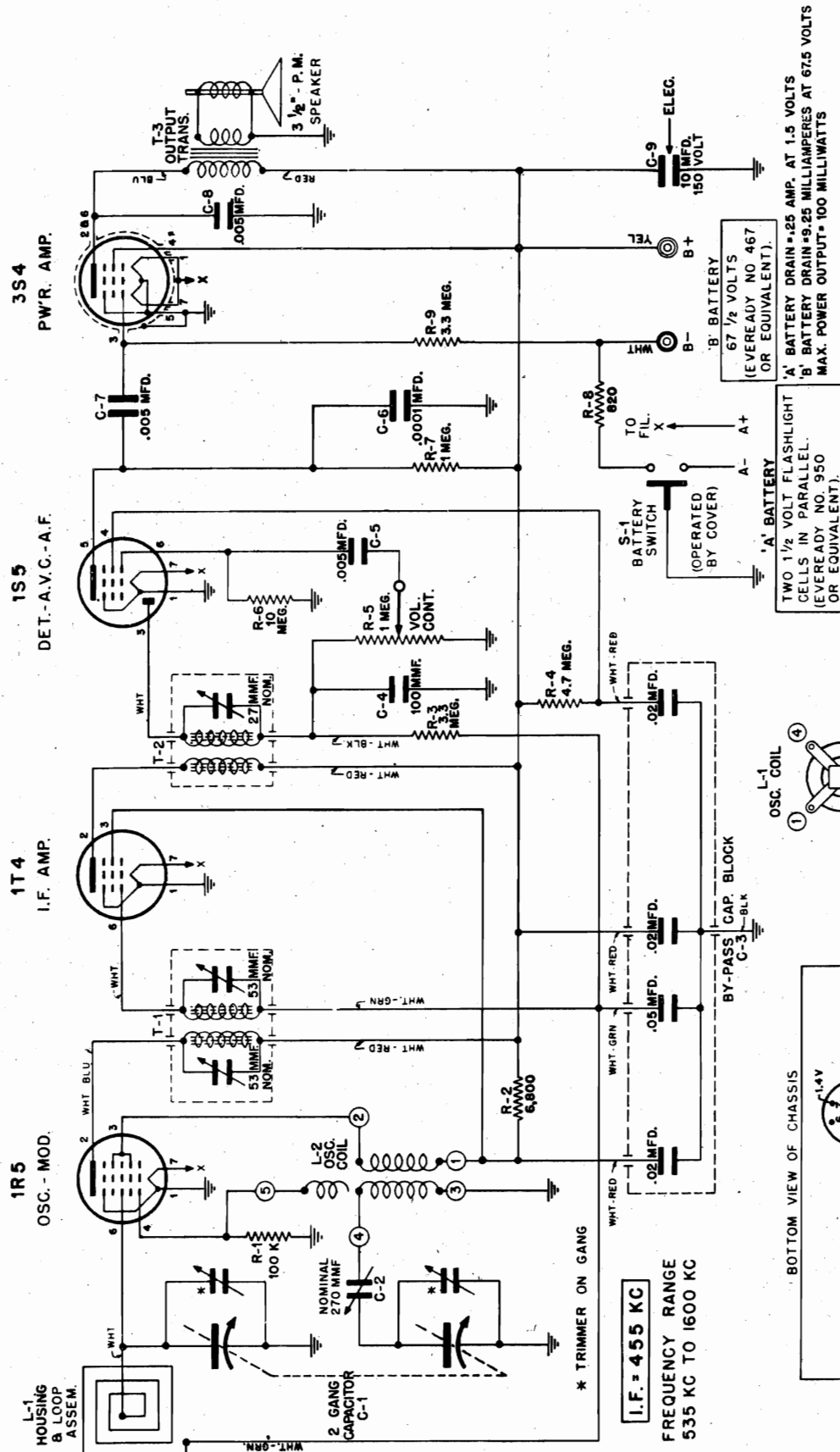


SERVICE PARTS LIST

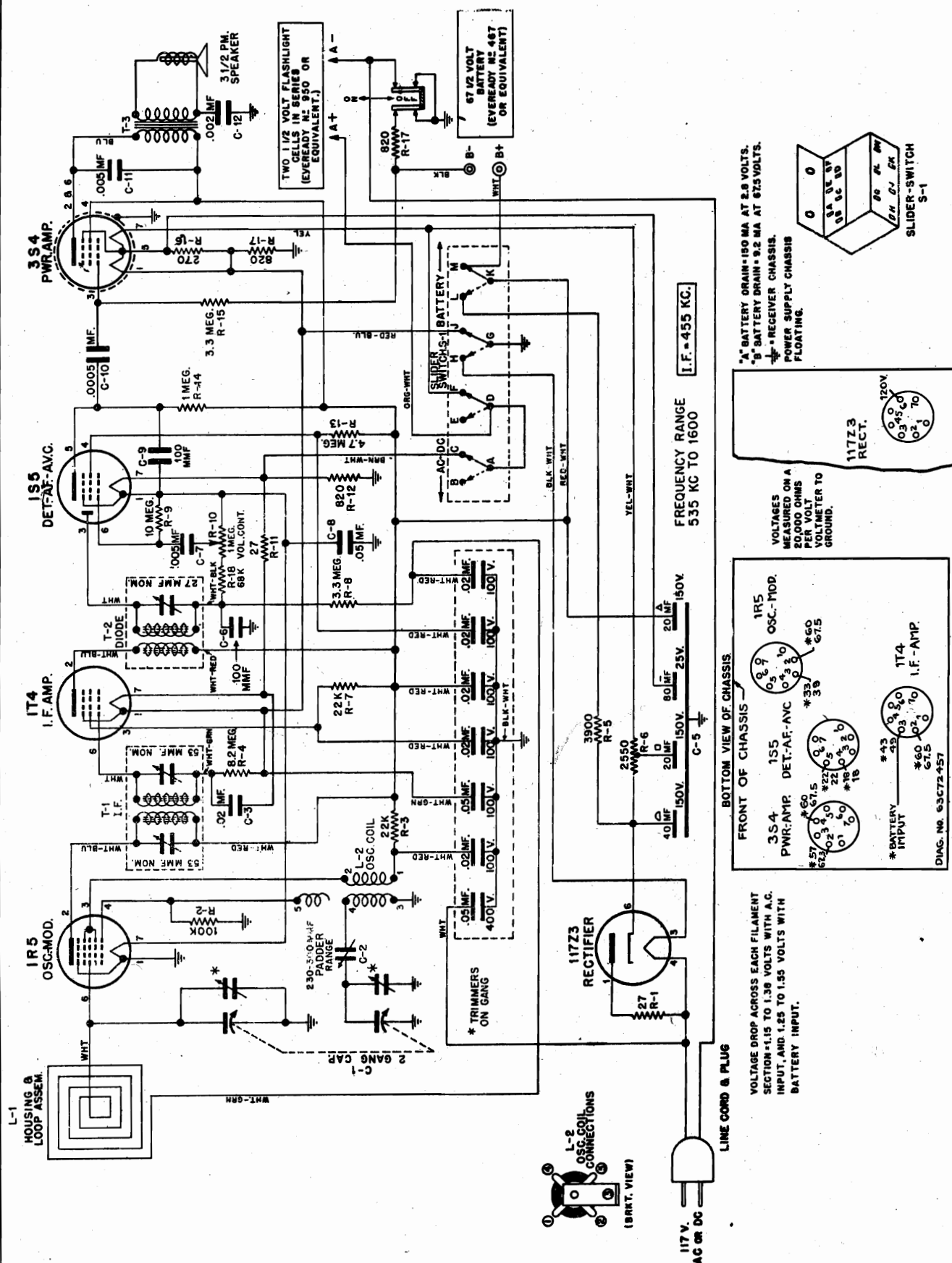
Symbol	Part No.	Description	Symbol	Part No.	Description
C-1, 3, 10	BD210503	Cap., Paper, .05 mfd., 200 v.	A-2163		Cable, Dial
C-11	BD410103	Cap., Paper, .01 mfd., 400 v.	A-3123		Clamp, Cable
C-7, 15	BD410104	Cap., Paper, .1 mfd., 400 v.	A-9285		Lamp, Pilot, Mazda No. 44
C-17	BD410203	Cap., Paper, .02 mfd., 400 v.	A-51160-3		Cord, Power, 6 ft.
C-6, 8, 4	BD410503	Cap., Paper, .05 mfd., 400 v.	A-51163		Clip, Spring
C-19	BD610202	Cap., Paper, .002 mfd., 600 v.	C-12, 13	A-51356	Cap., Electro., 15-20-20 mfd.
C-18	BD610502	Cap., Paper, .005 mfd., 600 v.	C-2	C-51501-1	Capacitor, Variable, 3-section
C-5, 9	BM78A101	Cap., Mica, 100 mmf.	T-1	C-51502	Transformer, Power
C-14	BM78A221	Cap., Mica, 220 mmf.	L-2	B-51511	Coil, Assembly, RF
R-14	BR16E561	Resistor, 560 ohm, 1 w.	SP-1	C-51512	Speaker, 5" Dynamic, 485 ohm
R-2, 8	BR17B102	Resistor, 1000 ohm, 1/2 w.	L-3	B-51522	Coil Assembly, Osc.
R-9	BR17B103	Resistor, 10M ohm, 1/2 w.		A-51531	Shaft, Drive
R-1, 13	BR17B104	Resistor, 100M ohm, 1/2 w.	T-2	B-51416-2	Trans. Assembly, 1st IF
R-5	BR17B156	Resistor, 15 meg., 1/2 w.	T-3	B-51417-2	Trans. Assembly, 2nd IF
R-3	BR17B223	Resistor, 22M ohm, 1/2 w.		B-51591	Spring, Dial Bracket
R-12	BR17B224	Resistor, 220M ohm, 1/2 w.		A-51787	Spring, Cable
R-7	BR17B335	Resistor, 3.3 meg., 1/2 w.		A-51801	Rivet, Pronged, 3/32 x 1/8
R-11	BR17B685	Resistor, 6.8 meg., 1/2 w.		B-55300-1	Channel, Rubber
R-6	BR17E223	Resistor, 22M ohm, 1 w.	SW-2	B-55500-1	Switch (Radio-Phono)
R-4	BR17G153	Resistor, 15M ohm, 2 w.	R-15	B-55550-1	Potentiometer, 500M ohm
			R-10	B-55575-1	Potentiometer & Switch, 500M ohm

Order parts not listed by specifying (1) Part Name, (2) Model Number (include number following dash and (3) Run No.

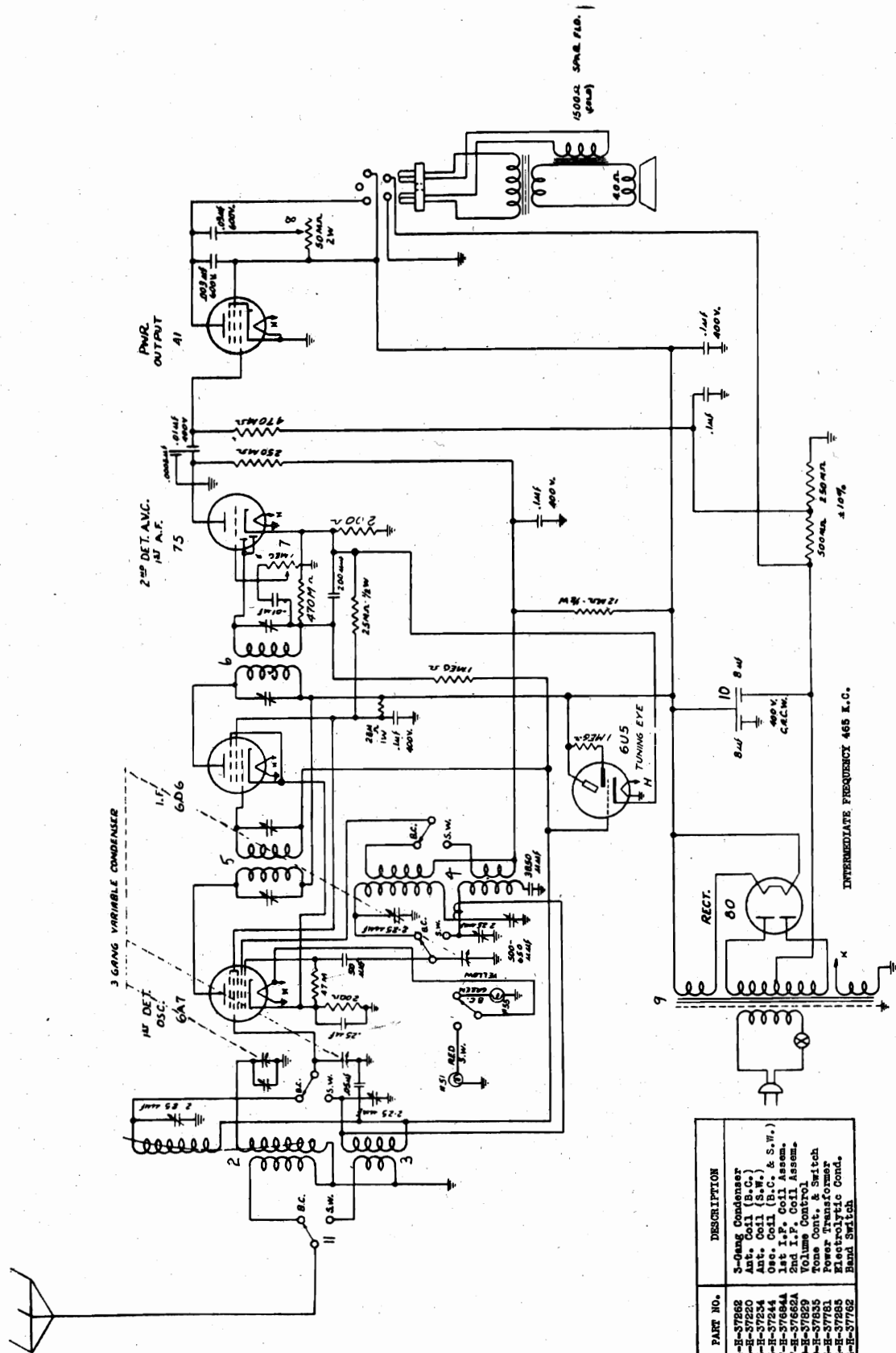
GALVIN MFG. CORP.



GALVIN MFG. CORP.



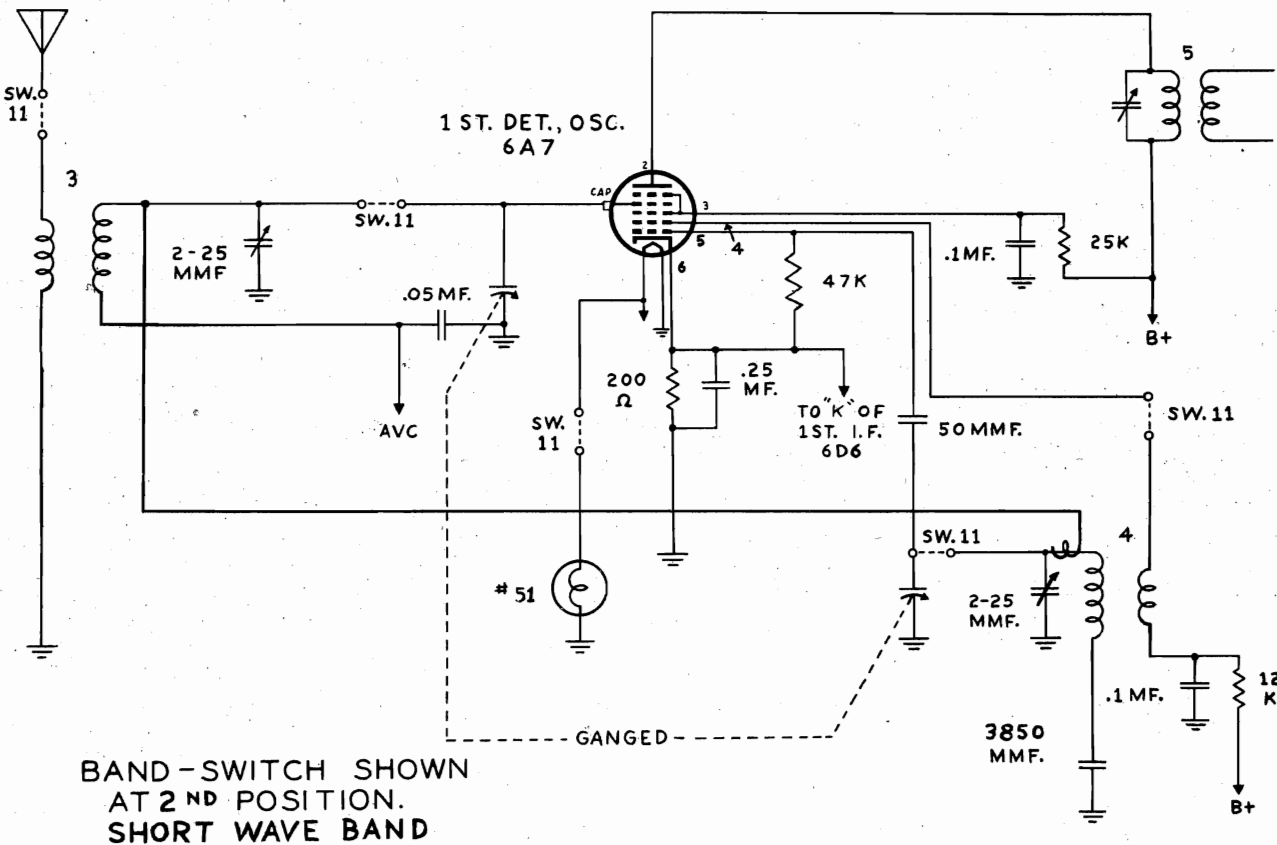
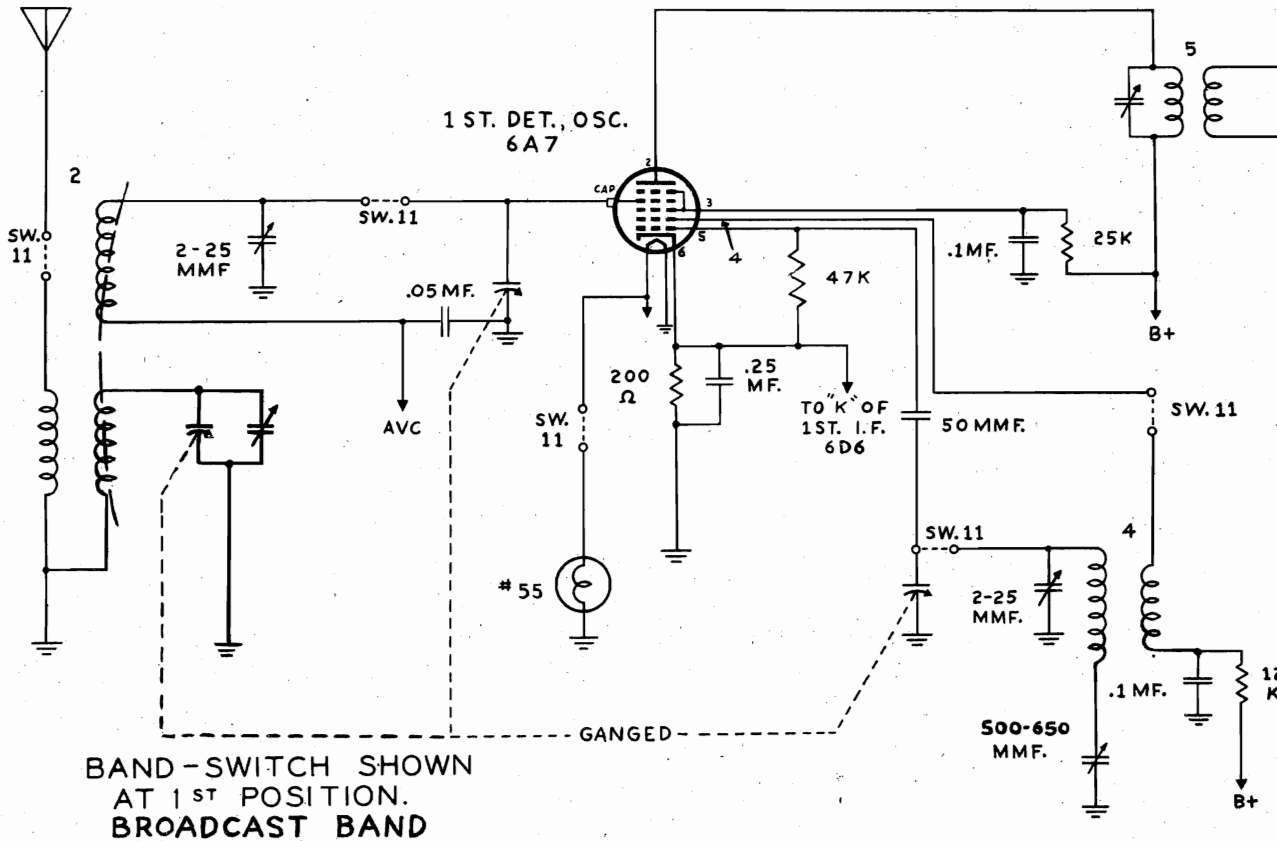
GALVIN MFG. CORP.



DRAW NO.	PART NO.	DESCRIPTION
1	14-S-37262	3-gang Condenser
2	13-S-37220	Ant. Coil (S.C.)
3	13-S-37220	Ant. Coil (S.C.)
4	13-S-37234	Ant. Coil (S.C.)
5	47-S-37262	Org. Coil (B.C. & S.W.)
6	47-S-37262	Org. Coil (B.C. & S.W.)
7	47-S-37262	Ant. i.p. Coil
8	60-S-37829	Ant. i.p. Coil
9	60-S-37829	Volume Control
10	60-S-37835	Tone Cont. & Switch
11	54-S-37781	Power Transformer
12	54-S-37781	Power Transformer
13	14-S-37262	Electrostatic Cont.
14	14-S-37262	Electrostatic Cont.

MODEL 6A1, Ch. 6-5

GALVIN MFG. CORP.



GALVIN MFG. CORP.

MODEL 6A1, Ch. 6-5
 MODELS 52T, 52Y, Ch. B5-1
 MODELS 56T, 56Y, Ch. B5-2

MODEL 6A1 (CHASSIS 6-5)

ALIGNMENT PROCEDURE

CHASSIS 5-1, 5-2, 5-3, 6-1 and 6-5

Connect signal generator to control grid of first detector tube (6A7) through a .05 MF condenser, and to chassis. Do not remove grid cap. Also connect output meter across speaker voice coil. Turn band switch to "American Programs" position. Turn condenser gang completely out of mesh.

Set signal generator at 465 K.C. and carefully adjust the four I.F. trimmers (located in top of I.F. coil cans) to point showing highest reading on output meter.

Leave band switch in "American Programs" position. Connect signal generator to antenna and ground leads using a .0002 MF condenser in antenna lead.

Set signal generator and receiver dial both at 1700 K.C. Adjust B.C. OSC. trimmer until 1700 K.C. signal is heard.

Set signal generator at 1400 K.C. and turn condenser gang to the signal at 1400 K.C. Adjust antenna section and second section of preselector to point showing highest reading on output meter.

Set signal generator at 600 K.C. and rock pointer at 600 K.C. position on dial scale, while adjusting B.C. padder, until combination is found which gives highest output reading. (Note: If there is noise level at 600 K.C., padder can be adjusted to maximum noise without rocking gang and without use of signal generator. Use short wire for pick-up if necessary.)

Turn band switch to "Foreign Programs" position. Replace .0002 MF condenser in signal generator antenna lead with a 400 ohm carbon resistor.

Set signal generator and receiver dial both at 18.0 MC. Adjust SW OSC. trimmer until 18.0 MC signal is heard.

Set signal generator at 16.0 MC and turn condenser gang to the signal at 16.0 M.C. Adjust SW ANT. trimmer to point giving greatest output reading, while slightly rocking condenser gang.

SW padder is fixed (no adjustment necessary.)

NOTE: I.F. Sensitivity at 465 K.C. is 50 microvolts for 50 milliwatts output

Ant. Sensitivity at 600 K.C. is 30 microvolts for 50 milliwatts output (Chassis 5-1)

Ant. Sensitivity at 600 K.C. is 25 microvolts for 50 milliwatts output (Chassis 5-2 and 6-1)

MODELS 52T, 52Y (CHASSIS B5-1)

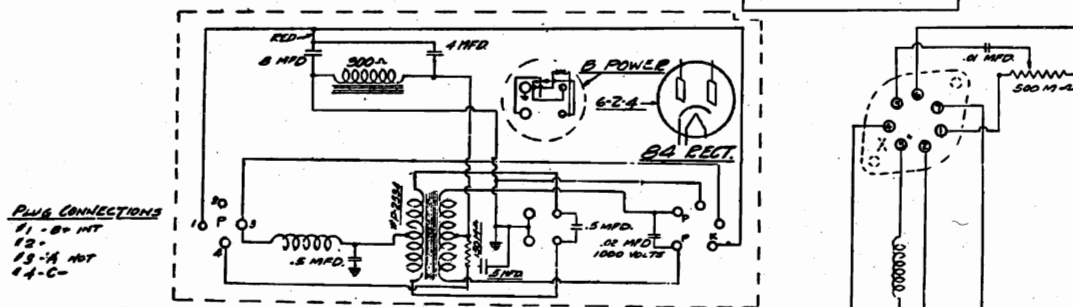
ALIGNMENT PROCEDURE (CHASSIS B5-1)

1. Connect signal generator to control grid of first detector tube (1C7G) through a .05 MF condenser, and to chassis. Do not remove grid cap. Also connect output meter across speaker voice coil. Turn condenser gang completely out of mesh.
2. Set signal generator to 465 KC and carefully adjust the four I.F. trimmers (located in top of I.F. coil cans) to point showing highest reading on output meter.
3. Connect signal generator to antenna and ground leads using a .0002 MF condenser in antenna lead.
4. Set signal generator and receiver dial both at 1700 KC. Adjust osc. trimmer (on condenser gang) until 1700 KC signal is heard.
5. Set signal generator at 1400 KC and turn condenser gang to the signal at 1400 KC. Adjust antenna trimmer (under side of chassis) to point showing highest reading on output meter.

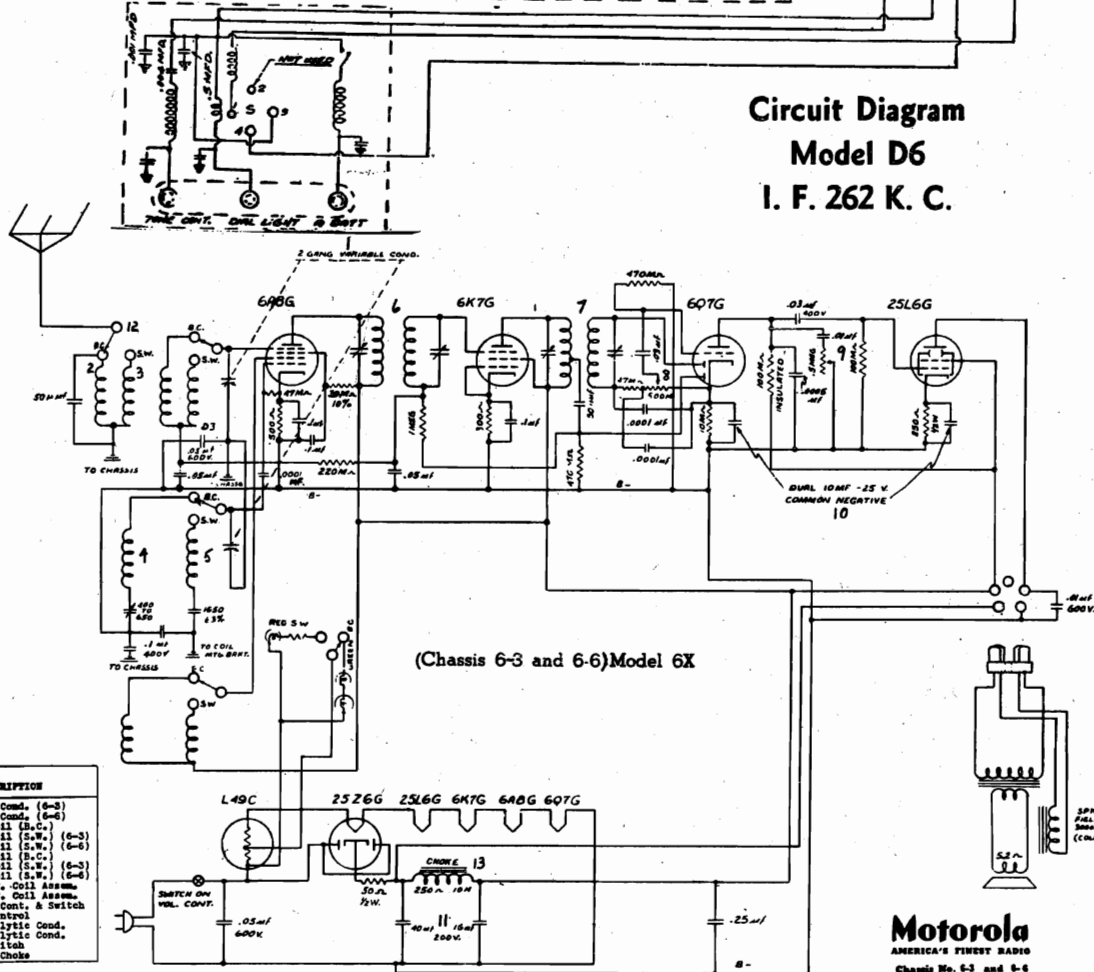
MODELS 56T, 56Y (CHASSIS B5-2)

NOTES ON SHORT WAVE ALIGNMENT

When aligning short-wave bands of Chassis B5-2, check to make sure you are aligning on a fundamental frequency and not on an image. This can be checked as follows: After aligning, turn signal generator to maximum output and swing it to a point 930 KC (double the IF) above the alignment frequency, leaving the condenser gang set at the alignment frequency. If the alignment was correct, you will pick up an image signal at that point. If no image signal is heard, swing generator back to alignment frequency, decrease the capacity of the trimmers until another signal is heard, and repeat the alignment procedure. For example, after aligning a short-wave band at 5.8 MC, an image should be heard when the generator is swung to 6.73 MC. Likewise, after alignment at 18.7 MC, an image should be heard with the signal generator at 19.63 MC. Remember that while making this test, the condenser gang should not be moved with the signal generator, but should remain at the alignment frequency.



Circuit Diagram
Model D6
I. F. 262 K. C.



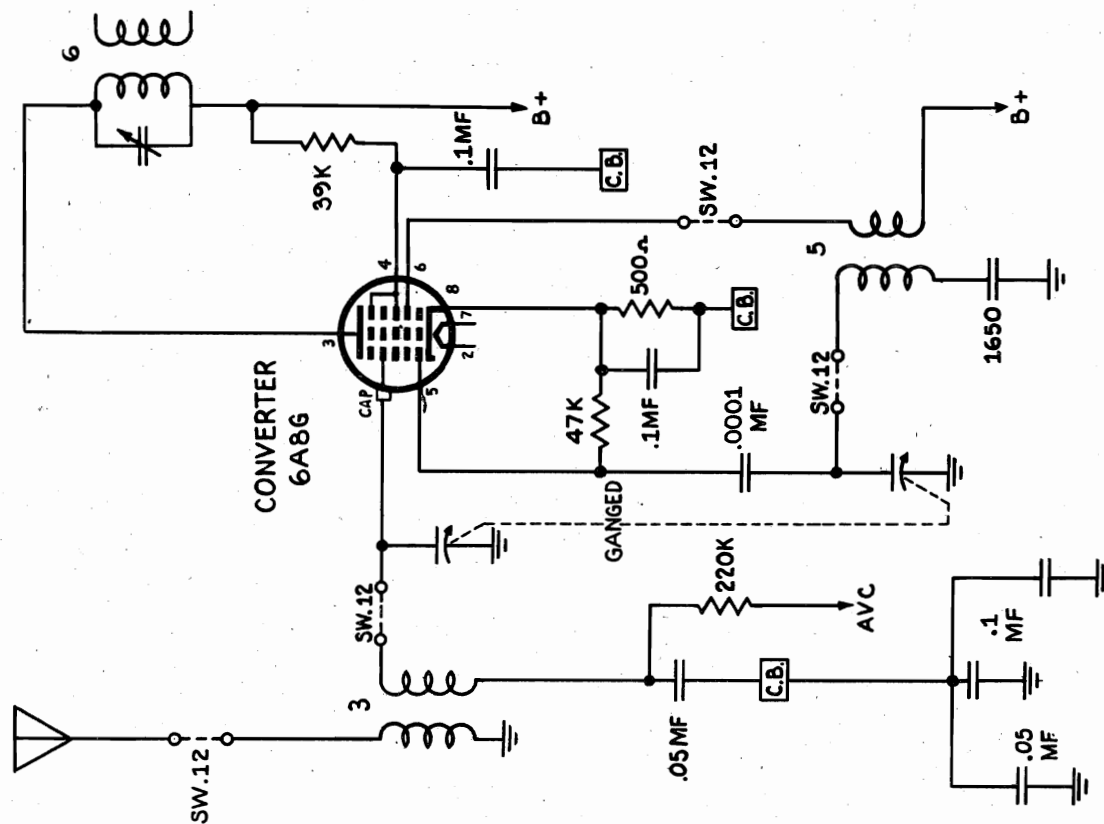
ITEM NO.	PART NO.	DESCRIPTION
1	14-B-37269	2 Gang Cond. (6-3)
1A	14-B-37267	2 Gang Cond. (6-6)
2	13-B-7281	Ant. Coil (B.C.)
3	13-B-7281	Ant. Coil (S.W.) (6-3)
3A	13-B-72815	Ant. Coil (S.W.) (6-6)
4	13-B-7286	Osc. Coil (B.C.)
5	13-B-37226	Osc. Coil (S.W.) (6-3)
5A	13-B-37258	Osc. Coil (S.W.) (6-6)
6	47-B-37677 A	1st I.F. Coil Assm.
6A	47-B-37647 A	2nd I.F. Coil Assm.
7	60-B-37832	Volume Cont. & Switch
9	60-B-37886	Tone Control
10	14-B-37284	Electrolytic Cond.
11	14-B-37266	Electrolytic Cond.
12	14-B-37268	4.5W. Switch
13	12-B-37212	Filter Choke

Motorola

Chassis No. 6-3 and 6-9

(AC-DC)

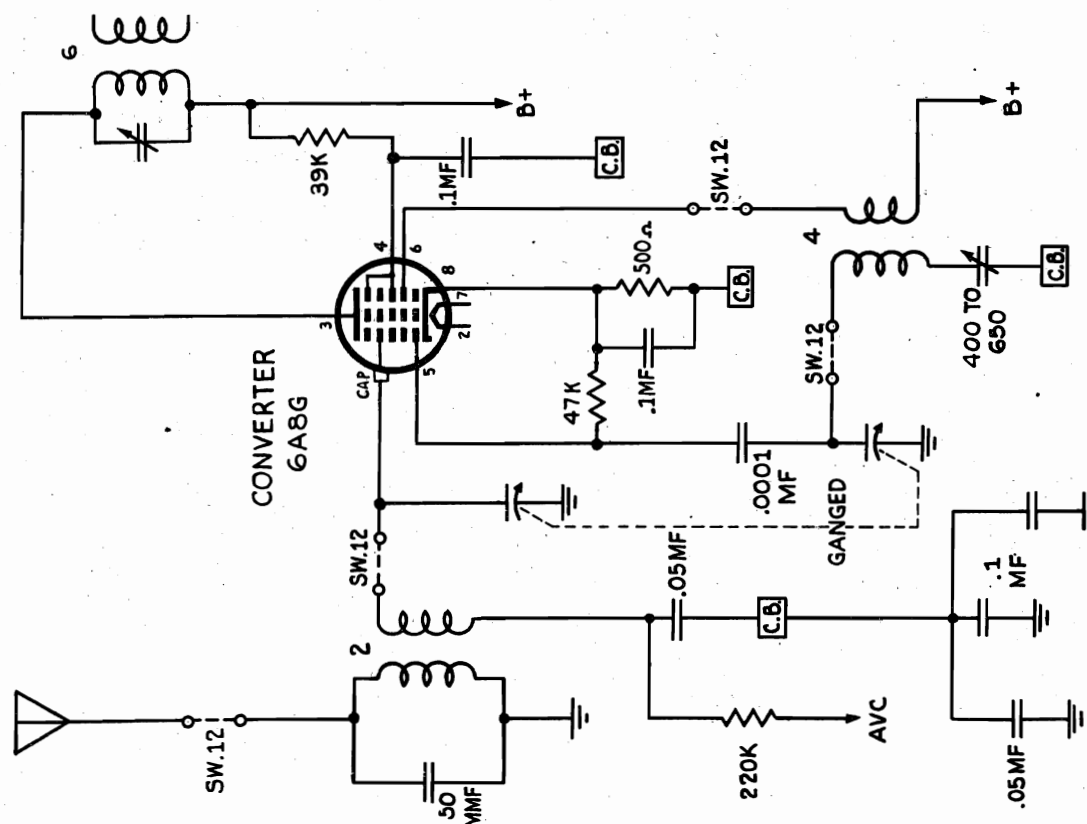
GALVIN MFG. CORP.



DENOTES
 COMMON
 BUS B-

 DENOTES CHASSIS (GROUND)

BAND - SWITCH SHOWN
AT 2ND POSITION.
SHORT WAVE BAND

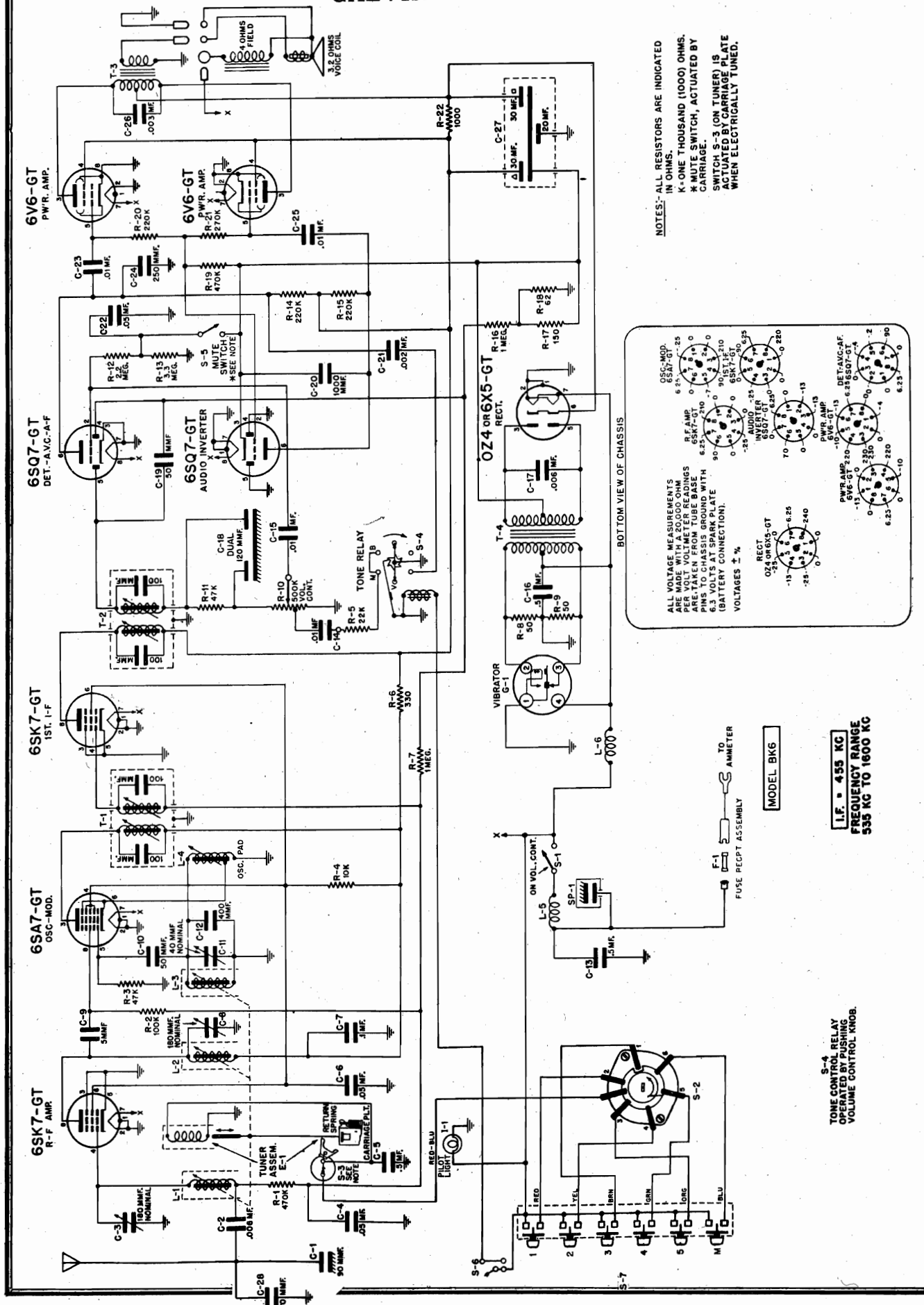



**DENOTES
COMMON
BUS B -**

 DENOTES CHASSIS (GROUND)

**BAND - SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND**

GALVIN MFG. CORP.

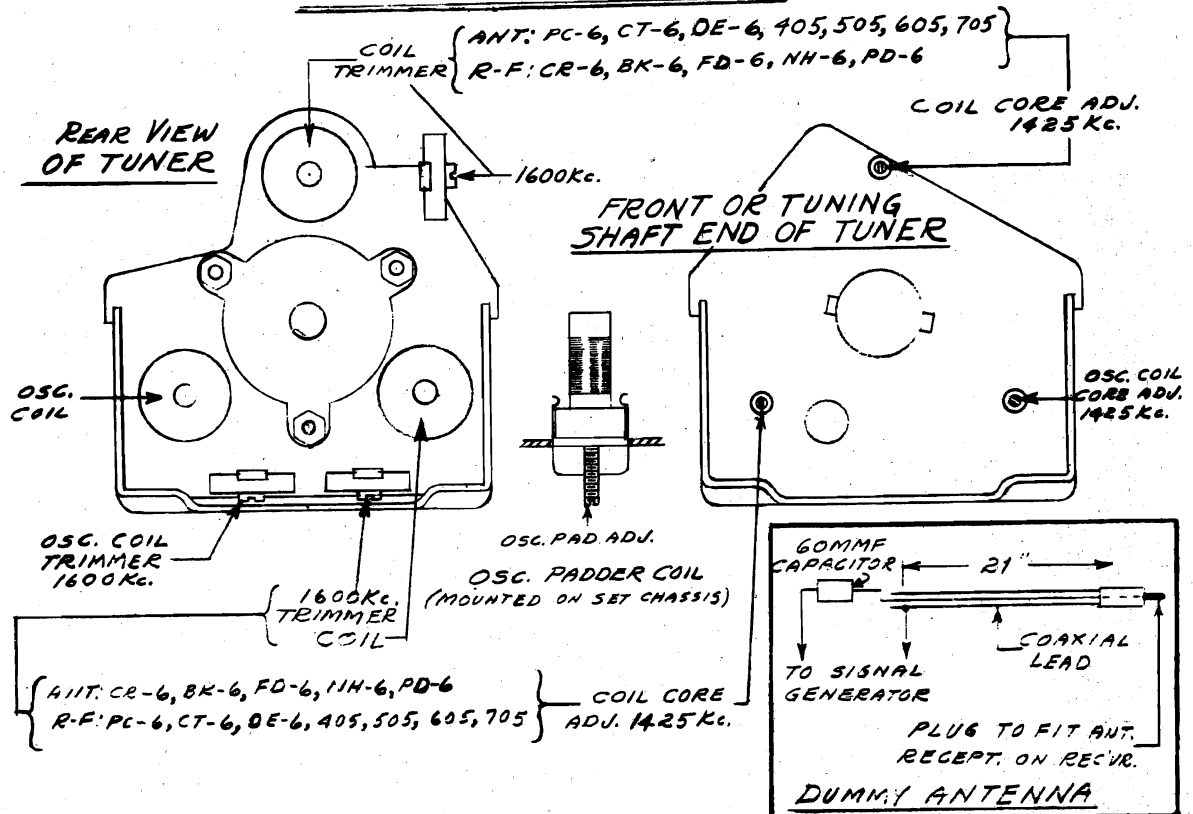


GALVIN MFG. CORP.

MODEL BK-6
 MODEL CR-6
 MODELS CT-6, OE-6, FC-6
 MODELS FD-6, NH-6
 MODEL 405
 MODEL 505
 MODEL 605
 MODEL 705

Motorola

ALIGNMENT INSTRUCTIONS FOR 1946 AUTO SETS



A special tool for adjusting the tuner cores will be required. Use Alignment Tool, Motorola Part Number 66A76278. Keep volume control at maximum throughout alignment. For maximum accuracy, use an output meter connected across the voice coil.

Operations in Order	Tuner Set At	Dummy Antenna	Generator connected to (through dummy)	Adjust following cores or trimmers	Generator Set At
1.	High frequency end.	.1 mf	Osc-Med grid	Peak: 4 I.F. core screws	455 Kc.
2.	High frequency end (cores are to be projecting 1-1/8" from ends of cans and tuning shaft up against its stop).	60 mmf & 21" coaxial lead. Capacitor to be at generator end. (See Detail)	Antenna Receptacle	Peak: Osc. trimmer R.F. trimmer ANT. trimmer	1600 Kc.
3.	EXACTLY one full turn in from high frequency end, as indicated by marking manual tuning shaft insulated coupling).	"	"	Peak: Osc. core R.F. core ANT. core	1425 Kc.
4.	EXACTLY four more full turns in (as indicated by marking manual tuning shaft insulated coupling).	"	"	Peak: Osc-padder core (mounted on chassis) for maximum noise.	Generator power turned off, but leave generator and dummy antenna connected to antenna receptacle.
5.	1400 Kc.	Install set in car & connect car antenna.	—	Peak: Antenna trimmer for maximum noise.	—

NOTE: If padder core adjustment is too far off, repeat entire procedure (except I.F.). It may be necessary to repeat it more than once if the padder adjustment has been indiscriminately tampered with.

NOTES: ALL RESISTORS ARE INDICATED IN OHMS.

- K=ONE THOUSAND (1000) OHMS.
- # MUTE SWITCH, ACTUATED BY CARRIAGE.
- SWITCH S-3 (ON TUNER) IS ACTUATED BY CARRIAGE PLATE WHEN ELECTRICALLY TUNED.
- S-4 TONE SWITCH
- VOICE POSITION-OPEN
- CLOSE POSITION #1 - 2 CONTACTS
- CLOSE POSITION #1-2-3 CONTACTS CLOSED.
- F-18 CHANGED TO 56 OHMS IN LATE MODELS.
- C-22 CHANGED TO .1 MF. IN LATE MODELS

[illegible]

DIAG. NO. 63079007

MODEL CR6

I.F. = 455 KC
FREQUENCY RANGE
535 KC TO 1600 KC

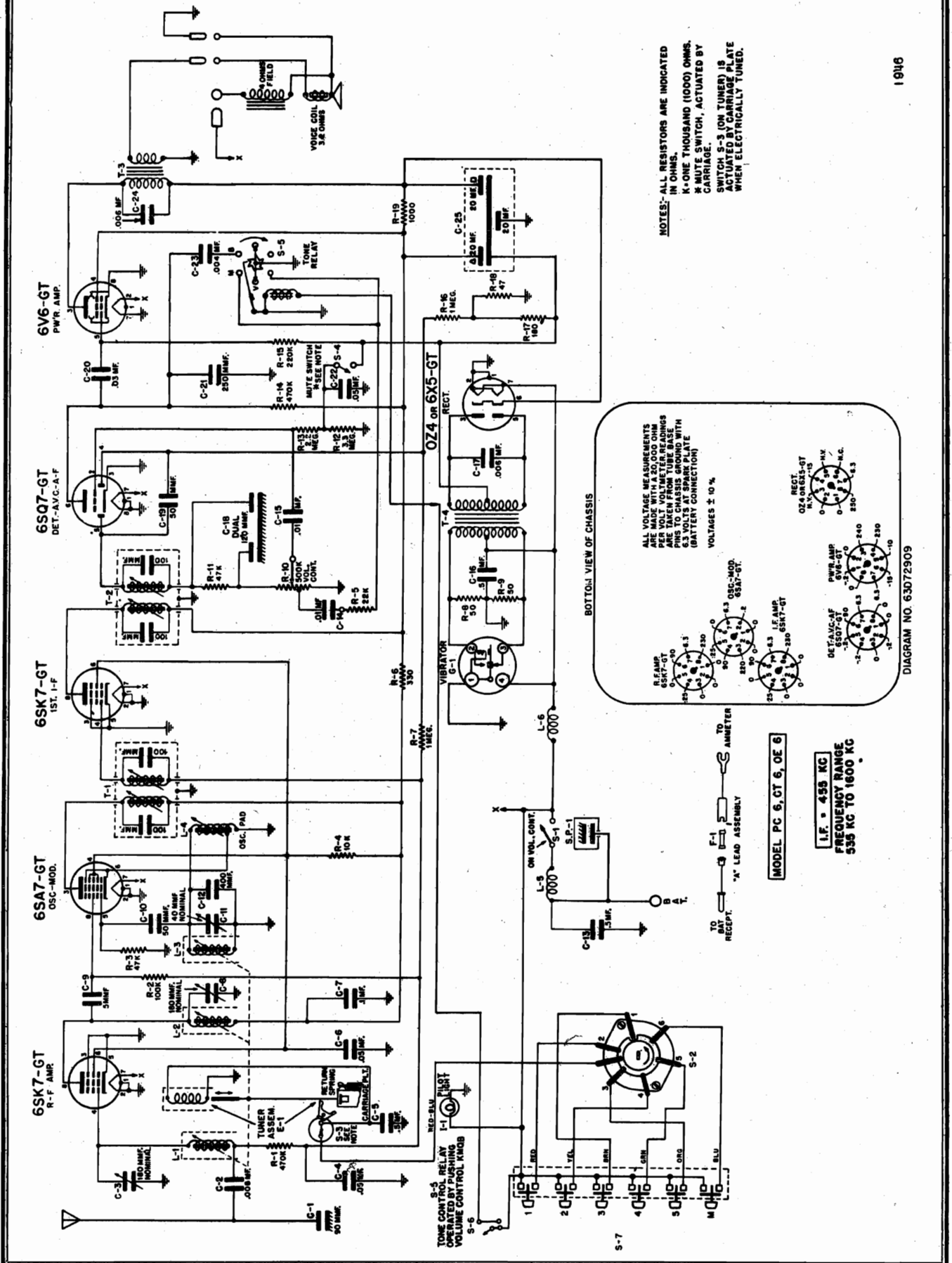
For Alignment, see P.15-9

Compliments of www.nucow.com.

GALVIN MFG. CORP.

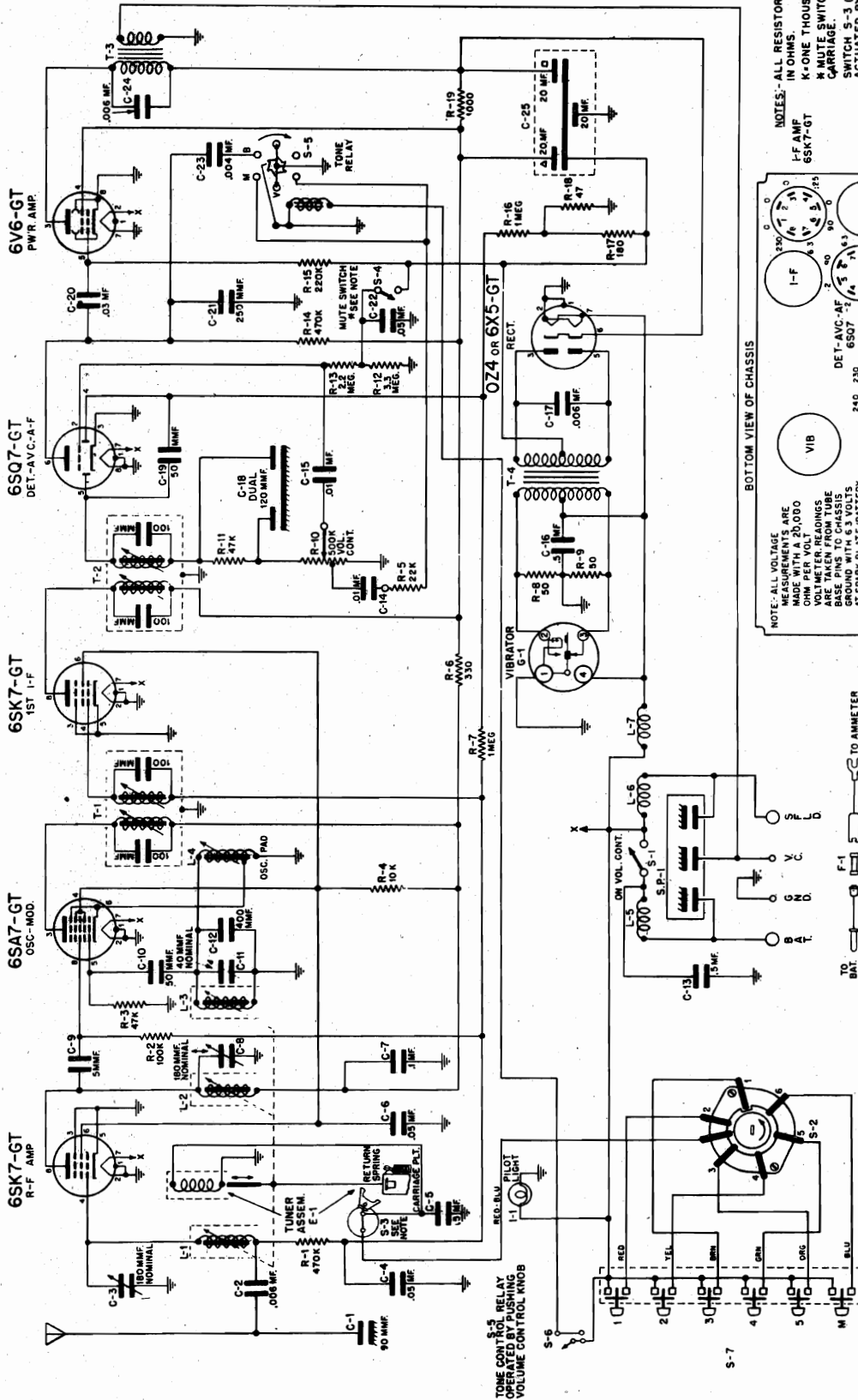
MODELS CT-6, OE-6, PC-6,
Ch. AS-24, 18, 23

1946

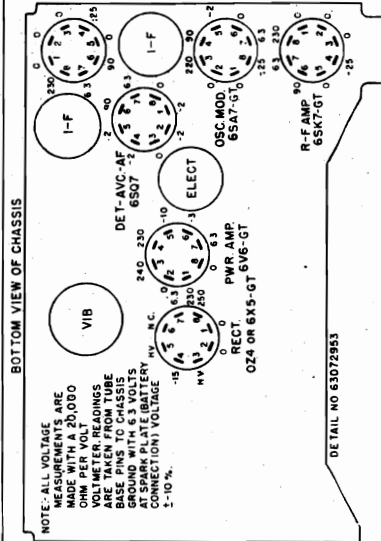


MODELS FD-6, NH-6,
Ch. AS-27, 30

GALVIN MFG. CORP.



NOTES: ALL RESISTORS ARE INDICATED
IN OHMS.
K-ONE THOUSAND (1000) OHMS.
M MUTE SWITCH, ACTUATED BY
CARRIAGE.
SWITCH S-3 (ON TUNER) IS
ACTUATED BY CARRIAGE PLATE
WHEN ELECTRICALLY TUNED.



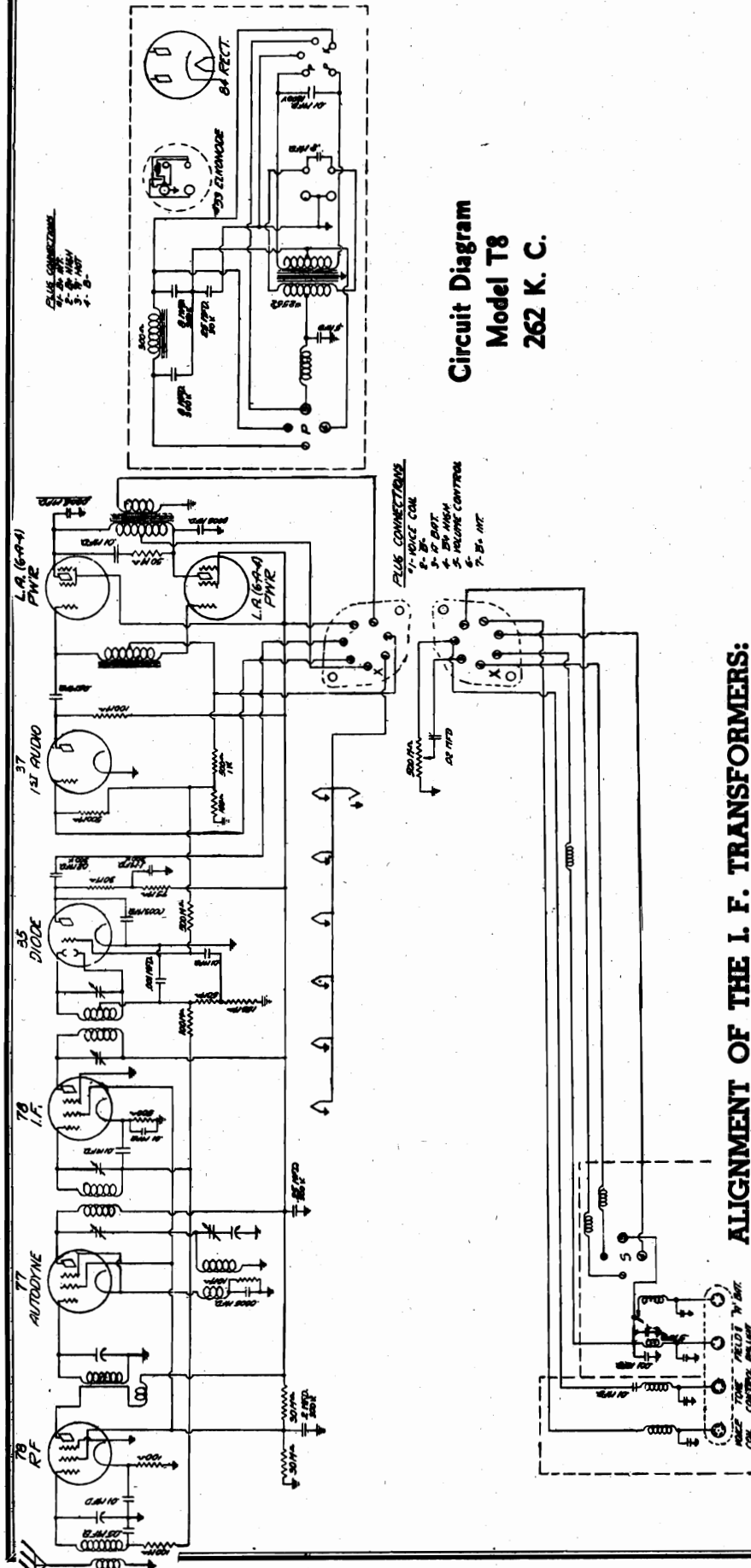
NOTE: ALL VOLTAGE
MEASUREMENTS ARE
MADE WITH A 20,000
OHM PER VOLT
VOLTAGE METER.
VOLTAGE MEASUREMENTS
ARE TAKEN FROM THE
BASE PINS TO CHASSIS
GROUND WITH 6.3 VOLTS
AC PLATE SUPPLY.
CONNECTION VOLTAGE
1-10 %.

TO BATT. RECEPT.
F-1 LEAD ASSEMBLY
TO AMMETER

MODEL FD6-NH6

I.F. = 455 KC
FREQUENCY RANGE
535 KC TO 1600 KC

GALVIN MFG. CORP.



Circuit Diagram
Model T8
262 K. C.

ALIGNMENT OF THE I. F. TRANSFORMERS:

Models No. T8, No. D6, No. 75 and No. 100—Connect the feeder from the oscillator to the grid of the No. 77 autodyne tube. Remove the grid connection and connect a 500 M resistor from grid of the tube to ground.

Rotate the variable condensers to full open position.

Set the oscillator to a frequency of 262 K. C. adjust the I. F. and diode feeder trimmers to obtain maximum reading on the output meter.

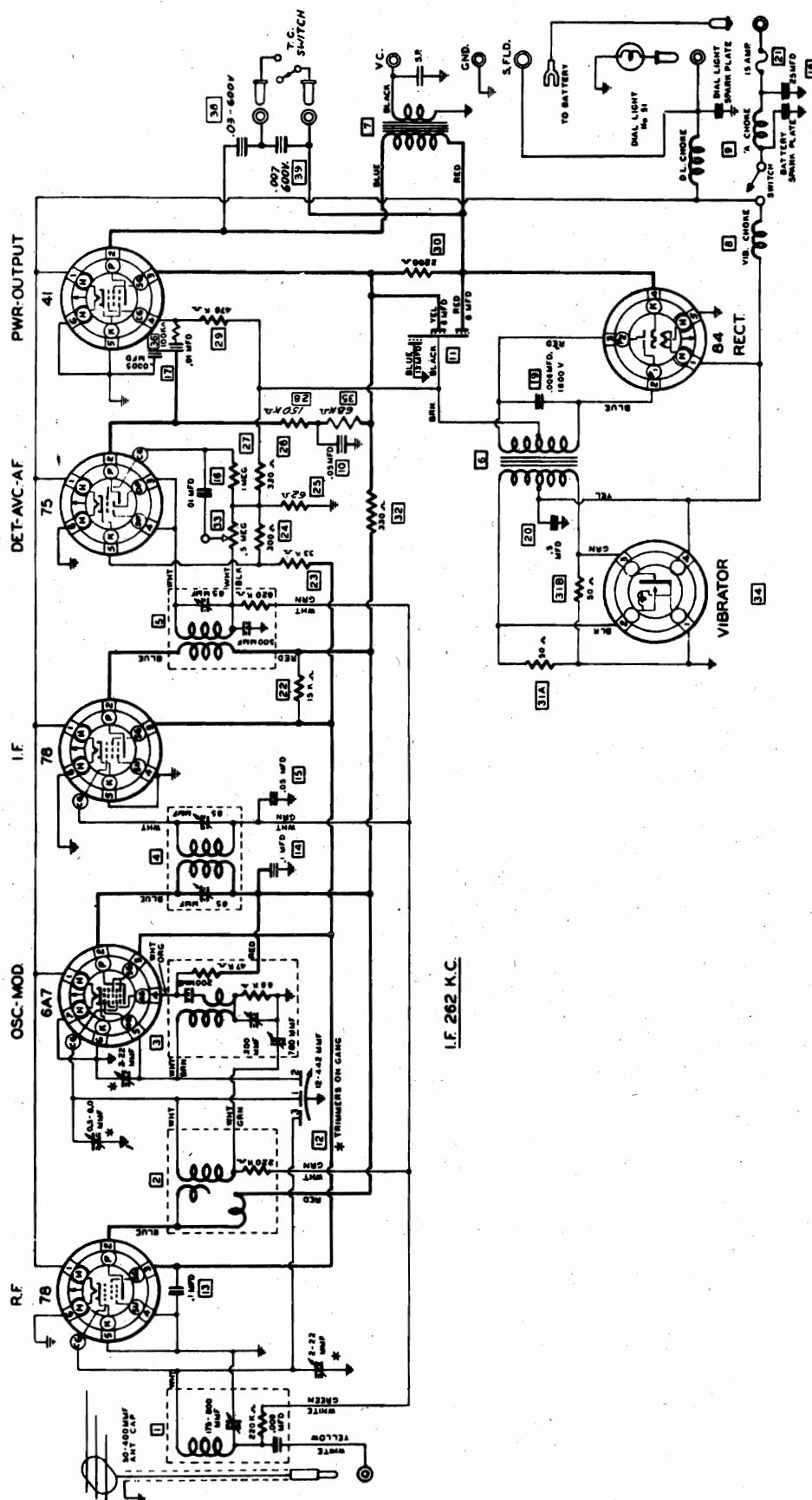
ALIGNMENT OF VARIABLE CONDENSERS:

All Models—connect the feeder from a service oscillator to the antenna lead of the set and adjust the oscillator to 1540 K. C. Next, completely open the condenser, going to minimum capacity, and adjust the oscillator trimmer on the condenser gang for greatest reading on the output meter.

Now set the service oscillator to 1400 K. C. and rotate the variable condenser for a peak reading on the output meter of the signal from the oscillator. Then adjust the R. F. and antenna trimmers on the condenser gang for maximum reading of the output meter.

Next set the service oscillator to 600 K. C. Close the condenser gang until the signal is again tuned in and rotate the condensers back and forth while adjusting the oscillator padder condenser for highest reading on the output meter. The variable condensers should now track perfectly and coincide with the dial calibration.

I.F. 262 K.C.



Model 9-39

VOLTAGE CHART

POSITION	PLATE	SCREEN	CATHODE	OSC. PLATE
RF *	185	85	-	-
Osc.-Mod.*	185	85	-	100
IF *	185	85	-	-
Det.-Avc.	150	-	-2	-
Output **	235	200	-	-
Rect.	AC	-	250	-

**** Bias -17 V from B stick**

Current - 6.5 Amps. at 6.3 Volts

Maximum power output - 3.5 Watts

All readings from chassis ground with 1000 ohms per volt meter.

ALIGNMENT CHART MODELS 65BP1A, 2A, 3A and 4A

OPERATIONS IN ORDER	GANG CONDENSER SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMERS NO.	GENERATOR SET AT
1	Minimum 1600 K.C.	.1 Mfd.	Osc.-Mod. Grid	1-2-3-4	455 K.C.
2	Minimum 1600 K.C.	200 Mmf.	External Ant.	5	1600 K.C.
3	1400 K.C.	200 Mmf.	External Ant.	6	1400 K.C.
4	1400 K.C.	200 Mmf.	External Ant.	7	1400 K.C.
5	600 K.C.	200 Mmf.	External Ant.	8	600 K.C.

Volume Control Set at Maximum

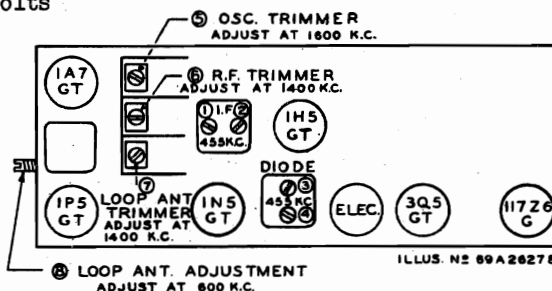
SENSITIVITY AND STAGE GAIN MEASUREMENTS MODELS 65BPLA, 2A, 3A, and 4A

Average Microvolt Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
7100	455	I.F. Grid	.1 Mfd.	.5 Meg	.38
185	455	Mod. Grid	.1 Mfd.	.5 Meg	.38
200	600	Mod. Grid	.1 Mfd.	.5 Meg	.38
11	600	R.F. Grid	.1 Mfd.	.5 Meg	.38
2	600	Ant. Terminal	200 Mmf.	None	.38

Volume Control Set at Maximum

* .05 Watts = .38 Volts

** Output meter connected
across voice coil.



GALVIN MFG. CORP.

ALIGNMENT PROCEDURE

Place the radio on the service bench with the front cover removed, but with the speaker and battery connected to it.

Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.

NOTE: Do not adjust the trimmer in the oscillator coil can that is covered with Scotch Tape. The original adjustment, made in the factory, should not be tampered with. (Fig. 7 below, shows all trimmer locations.)

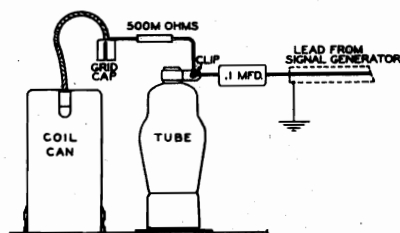
I.F. ALIGNMENT

1. Connect the signal generator to the control grid of the Osc.-Mod. tube (6A7) through a .1 MF condenser, having first removed the grid cap from the top of the tube. Connect a 500,000 ohm leak resistor from the grid of the tube to the grid cap just removed from the tube. (See Fig. 6.) Turn the condenser gang completely out of mesh. Connect an output meter across speaker voice coil.

2. Set the signal generator at 262 K.C. and carefully adjust the single trimmer in the Diode coil can to the point showing the highest reading on the output meter.

3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.

4. Repeat the I.F. and Diode adjustment several times for maximum accuracy.



SETTING THE RANGE

1. Connect the signal generator to the control grid of the R.F. tube (78) using the same .1 MF condenser and the same 500,000 ohm leak resistance.

2. Set the signal generator at 1560 K.C. and with the condenser gang completely out of mesh adjust the trimmer on the oscillator section of the condenser gang to the point showing the highest output reading.

3. Set the signal generator at 535 K.C. Turn the condenser gang completely in mesh and adjust the 600 K.C. trimmer in the Oscillator coil can for the highest output reading.

NOTE: The adjustments above set the range so the receiver will track with the calibrations in the control head.

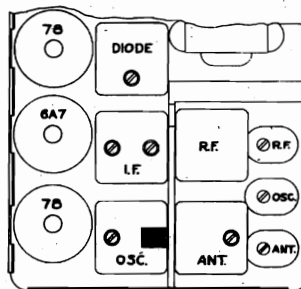
R.F. AND ANTENNA ALIGNMENT

1. Connect the signal generator to the antenna lead through a 40 MMF condenser and to chassis ground. Set the signal generator at 600 K.C. and turn the condenser gang until the signal is heard. Adjust the trimmer on the antenna coil can for the maximum output reading.

2. Set the signal generator at 1400 K.C. Turn the condenser gang until the signal is heard. Adjust the trimmer on the antenna section of the condenser gang for maximum output reading.

3. Adjust the trimmer on the R.F. section of the condenser gang for maximum output reading.

4. Recheck steps 1, 2, and 3, for accuracy.



TRIMMERS

SENSITIVITY AND STAGE GAIN MEASUREMENTS

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to I.F., Osc.-Mod., R.F. and finally to the antenna terminal, the circuit in which the trouble exists will quickly be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the table.

All stage-gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the top grid terminal of the tube through a .1 MF condenser, with a 500M Ohm resistor connected as a leak resistance between the grid of the tube and the grid cap which has been removed.

When measuring over-all sensitivity at the antenna terminal, use a 40 MMF condenser in place of the .1 MF. It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

Average Microvolt Input *	Generator Set at	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
.25 Volts	400 Cycles	75 Grid	.1 MF	.5 Meg	2.2 Volts
25,000	262 K.C.	78 Grid (I.F.)	.1 MF	.5 Meg	2.2 Volts
700	262 K.C.	6A7 Grid	.1 MF	.5 Meg	2.2 Volts
800	600 K.C.	6A7 Grid	.1 MF	.5 Meg	2.2 Volts
45	600 K.C.	78 Grid (R.F.)	.1 MF	.5 Meg	2.2 Volts
3	600 K.C.	Ant. Lead	40 MMF	None	2.2 Volts

* For one watt output.

V.C. Resistance - 5 ohms at 400 cycles.

** Meter connected across voice coil.

2.2 Volts equals 1 watt output.

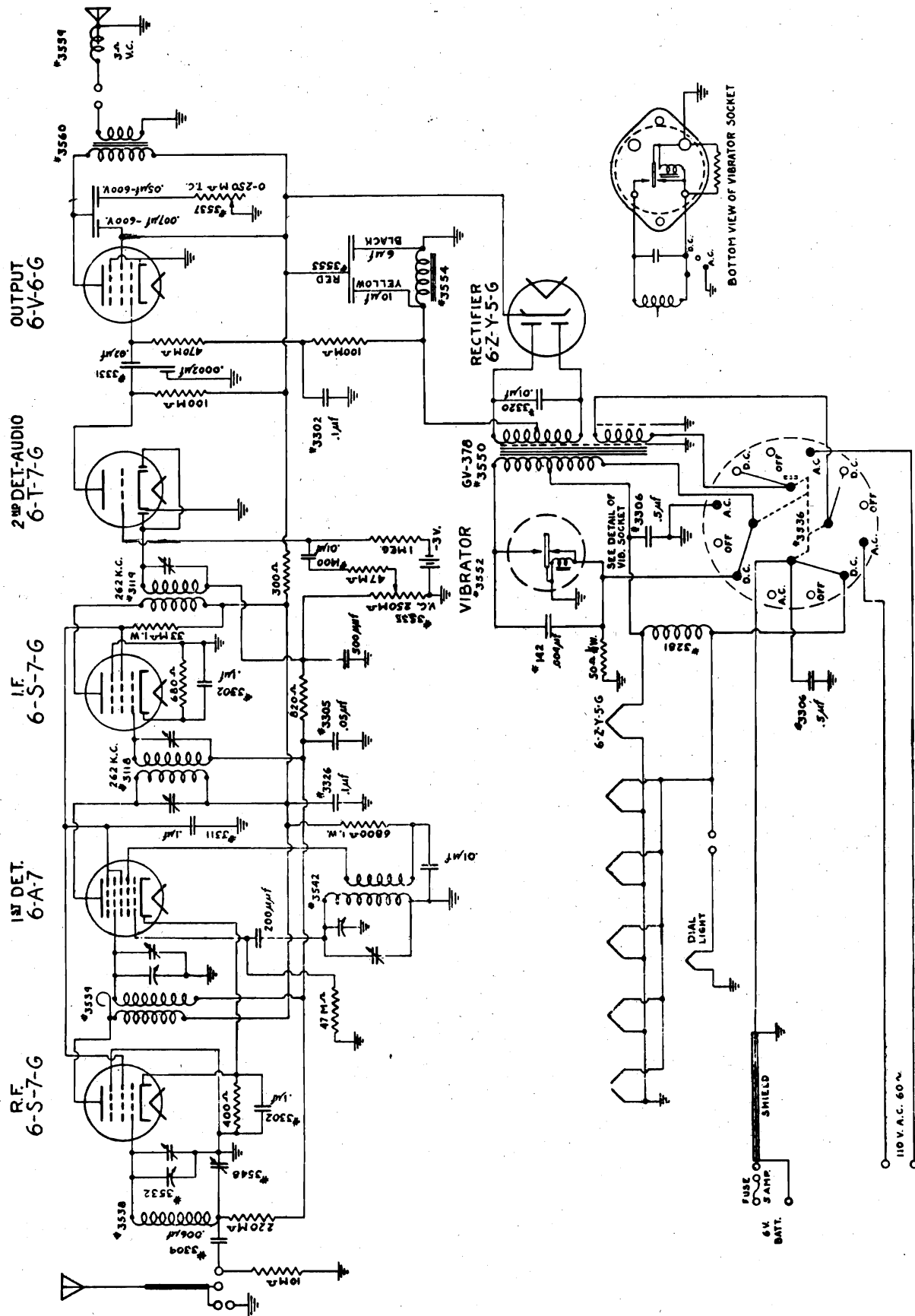
GALVIN MFG. CORP.

Diag. No.	Part No.	Description	List Price	Diag. No.	Part No.	Description	List Price
MAJOR PARTS							
34	48A3333	Vibrator.		24	686008	Carbon Resistor (300-1/2-20).	DOZ.
33	18A4046	Vol. Cont. & Switch (.5 Meg.)	\$2.50	26	686009	Carbon Resistor (330-1/2-20).	DOZ.
2	1X4051	R.F. Coil & Shield Assembly	1.00	32	686010	Carbon Resistor (330-1/2-20).	DOZ.
9	1X4070	Spark Plate Assembly	1.50	29	686011	Carbon Resistor (470,000-1/3-20).	DOZ.
12	1X4080	"A" Choke Assembly	.60	23	686012	Carbon Resistor (33,000-1/2-20).	DOZ.
8	19B4110	Variable Condenser (3 Gang)	.30	22	686013	Carbon Resistor (15,000-1/2-20).	DOZ.
11	24A4290	Vibrator Choke.	3.65	28	686015	Carbon Resistor (220,000-1/2-20).	DOZ.
	24X4835	Dial Light Choke (81-3/8 I.D.)	.35	27	686071	Carbon Resistor (1 Meg-1/3-20).	DOZ.
	23A5186	Electrolytic Condenser.	1.10	25	686081	Carbon Resistor (68-1/3-20).	DOZ.
	9B6650	Tube Socket (Saddle Type 41).	.15	HARDWARE, BRACKETS, SCREWS, ETC.			
	9B6651	Tube Socket (Saddle Type 75).	.15	4A1957	"C" Washer.		DOZ.
	9B6652	Tube Socket (Saddle Type 78).	.15	2LX2194	Small Pin Terminal.		DOZ.
	9B6653	Tube Socket (Saddle Type 84).	.15	28X2195	Large Pin Terminal.		DOZ.
	9B6654	Tube Socket (Saddle Type 6A7).	.15	28B3003	Transformer Shield.		DOZ.
	9B6657	Vibrator Socket (Saddle Type).	.15	7A3004	Volume Control Mtg. Bracket		.40
	15K12552	Rear Housing (Finished)	1.90	42A3094	Tube Shield Ground Spring		.10
	1X12553	Front Housing & Speaker Assembly	7.25	3A3134	"J" Bolt.		.05
	15012554	Speaker (5" Dynamic)	2.50	28A3192	Large Pin Terminal & Bushing (Blk) (For Dial Light)		.75
10	50B12560	Speaker Replacement	3.00	9A3195	Large Pin Receptacle.		DOZ.
7	25A12569	Output Transformer	1.75	42K3219	Snap-In Cond. Holder (9/16)		.35
6	25B12570	Power Transformer	1.00	7A4025	Antenna Ferrule Mtg. Bracket.		.40
5	1X12602	Diode Coil & Shield Assembly	3.00	42X4041	Grid Clip (Large) Collar Grip		.35
4	1X12603	I.F. Coil & Shield Assembly	1.50	28A4068	Electrolytic Condenser Shield		.15
3	1X12604	Osc. Coil & Shield Assembly	1.75	28B4074	Tube Shield (Sectional Type)		.30
1	1X12605	Antenna Coil & Shield Assembly	2.00	42X4098	Grid Cap (Large-Special)		.15
ACCESSORIES							
	9A2370	Dial Light Socket & Shell	.10	42A4215	Vibrator Grounding Clip		.75
	14X2423	Fuse Insulator.	.20	9X4435	Fuse Receptacle		.10
	6X4141	Distributor Suppressor.	DOZ.	28X4816	Tube Shield (Half)		.05
	65X4151	Bulb (6-8 V.-1/2 W. Rnd. Bay. Base).	.30	28B5350	Spade Lug		.30
	1X4164	Battery Lead Assembly	.15	287001	Nut (5/16-18x19/32 USS Hex) CP..(Fits "J" bolt)		.25
	65X4165	Fuse (15 Amp.)	.05	397100	Set Screw (6-32x3/16 Slab Hd.)		.50
21	1X4170	Antenna Lead Assembly	.75	397A56	Housing Screw (#8x1/4 Achd PK A) Cop. Oxd.		.65
	1X4171	Flexible Shaft & Housing Assem.	PAIR.	487853	Lockwasher (1-1/4 OD-5/16 ID) CP..(Fits "J" bolt)		.45
	1X4181	Dial Light Assembly	2.00	38X10394	Plug Button (1/8") Cop. Oxd.		.25
	8A4491	Generator Condenser	.35	38X10544	Plug Button (1/4") Cop. Oxd.		.25
	1X12561	Receiver Accessories Assembly (Complete)	3.90	MISCELLANEOUS			
	1X12562	Mtg. & Filter Parts Assembly (Complete)	1.00	14A2371	Ins. Bushing & Contact Eyelet		DOZ.
	9A13070	Antenna Junction Box (Female)	.10	41A2372	Backing Coil Spring		DOZ.
CONDENSERS							
16	8A1400	Tubular Condenser (.01-100 V.)	.15	5A13595	Antenna Trimmer Tag		DOZ.
15	8A3305	Tubular Condenser (.05-100 V.)	.15	32K4062	Fibre Spacer Washer (Bakelite)		DOZ.
13	8A3310	Tubular Condenser (.1-200 V.)	.15	14X4076	Fuse Backing Washer (Bakelite)		DOZ.
17	8A3329	Tubular Condenser (.01-.0005-400 V.)	.20	14X4077	Fuse Ins. Bushing & Cont. Eyelet.		DOZ.
20	8A4020	Tub. Cond. & Strap (.5-100 V.)	.35	31A4078	Terminal Strip (5 Ins. #4 Mtg.)		DOZ.
18	8A4089	Tubular Condenser (.25-100 V.)	.20	31A4079	Term. Strip (1 Ins. End Mtg.)		DOZ.
14	8A4092	Tub. Cond. & Strap (.1-400 V.)	.25	47A4113	Tuning Drive Shaft & Pinion Assembly		.25
	8A4529	Tubular Condenser (.006-100 V.)	.15	1X4118	Antenna Receptacle Assembly		DOZ.
	21B6500	Molded Mica Cond. (500 MTF.-20%)	.15	37A4163	Rubber Grommet		DOZ.
	21B6501	Molded Mica Cond. (200 MTF.-20%)	.15	37A4187	Condenser Mounting Grommet.		DOZ.
19	8A12565	Tub. Cond. & Strap (.006-1600 V.)	.35	56X4420	Accessories Carton Only		DOZ.
RESISTORS							
	686000	Carbon Resistor (820,000-1/3-20)	DOZ.	41A4508	Fuse Backing Coil Spring (Long)		DOZ.
	686001	Carbon Resistor (68,000-1/2-20)	DOZ.	1X4531	Gang Drive Split Gear Assembly		DOZ.
	686002	Carbon Resistor (47,000-1/2-20)	DOZ.	41A4532	Split Gear Coil Spring		DOZ.
	686003	Carbon Resistor (220,000-1/3-20)	DOZ.	39X4817	Shirt Market (Rattle Clip)		DOZ.
	686005	Carbon Resistor (50-1/2-20)	DOZ.	4K4823	Cond. Mtg. Cup Washer (Cop. Pl.)		DOZ.
31	686006	Carbon Resistor (2,200-1-20)	.10	10M9405	Copper Rope (259 Str. #36)		PER FT.
30				11M9513	Saturated Sleeve (#13 Vel.)		PER FT.
				64K12557	Speaker Screen & Flocking		.60
				32B12558	Speaker Gasket (Cardboard)		.05
				54X12559	Instruction Sheet & Drilling Template		.20
				1X12563	Receiver Carton Assembly		.05
				13K12684	Medallion (Motorola)		.15
				30A13437	Spiral Shield		.05

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

MODEL 10T

GALVIN MFG. CORP.



GALVIN MFG. CORP.

TUNER	USED ON	VOLUME
E-15-T	103K1	12-53
E-16-T	103F1, 103F2	12-57, 12-58
E-19-T	103CK2	12-54
E-22-T	83K1	12-51
E-23-T	83F1, 93F1	12-49, 12-55

APPROXIMATE VOLTAGE AND RESISTANCE READINGS:

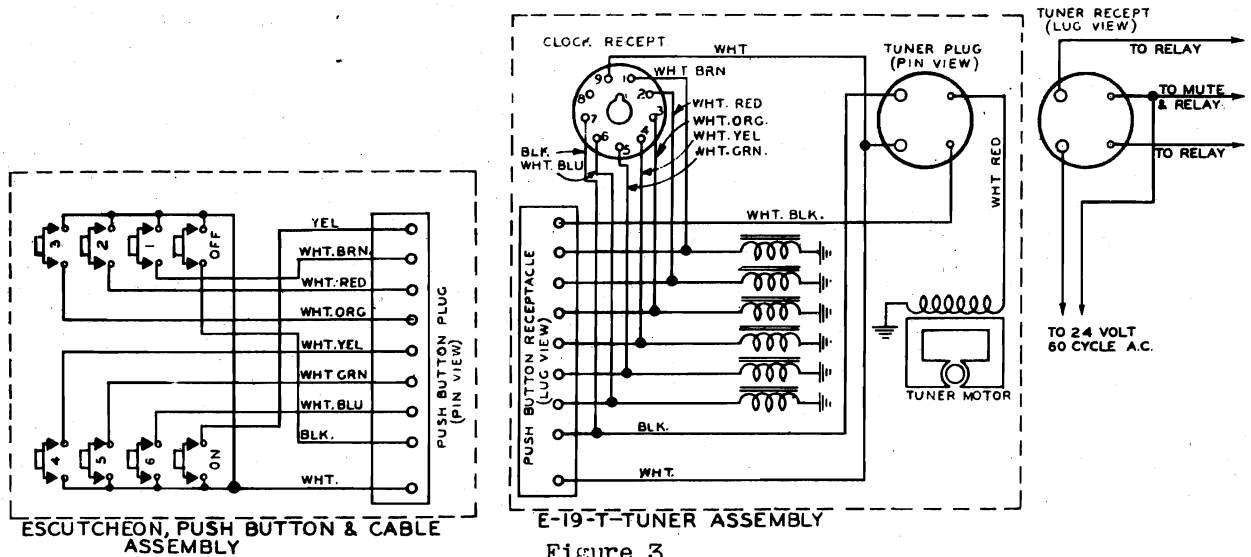
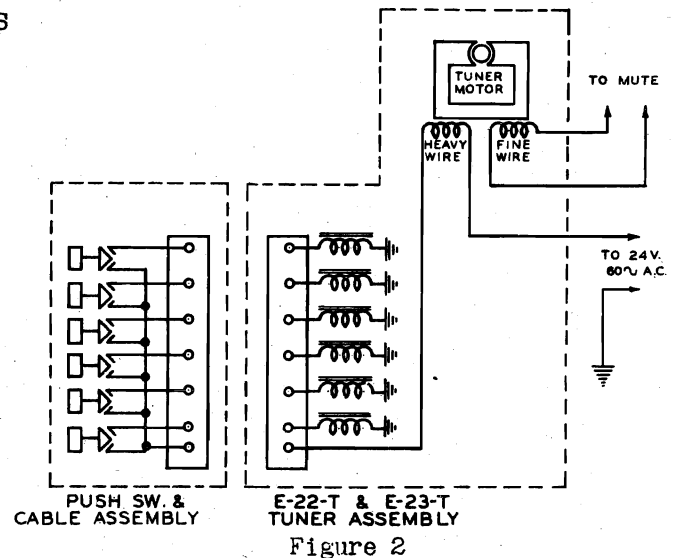
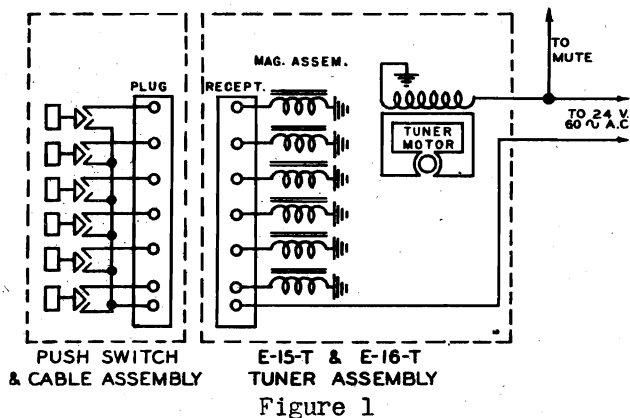
INPUT TO TUNER: 24V (PUSH BUTTON DEPRESSED)
 VOLTAGE ACROSS MOTOR: 18V (PUSH BUTTON DEPRESSED)
 VOLTAGE ACROSS MAGNET: 6V (PUSH BUTTON DEPRESSED)
 D.C. RESISTANCE OF MAGNETS: .78 Ω (COLD)
 D.C. RESISTANCE OF MOTOR FIELD COIL: .675 Ω (COLD)
 D.C. RESISTANCE OF MUTE WINDING (ON E-22-T & E-23-T ONLY): 23 Ω (COLD)

POINTS OF LUBRICATION:

ALL MOVING PARTS AND BEARINGS (EXCEPT MOTOR BEARINGS AND FIBRE DRIVE GEAR) ARE TO BE LIGHTLY LUBRICATED WITH 11M8930 MILK WHITE GREASE (KEYSTONE #78-6).

USE A LIGHT MOTOR OIL ON MOTOR BEARINGS

CAUTION DO NOT OVER LUBRICATE!



MODELS E15T, E16T, E19T,
E22T, E23T Tuners

GALVIN MFG. CORP.

PARTS PRICE LIST

MODELS E-15-T, E-16-T, E-19-T, E-22-T, E-23-T

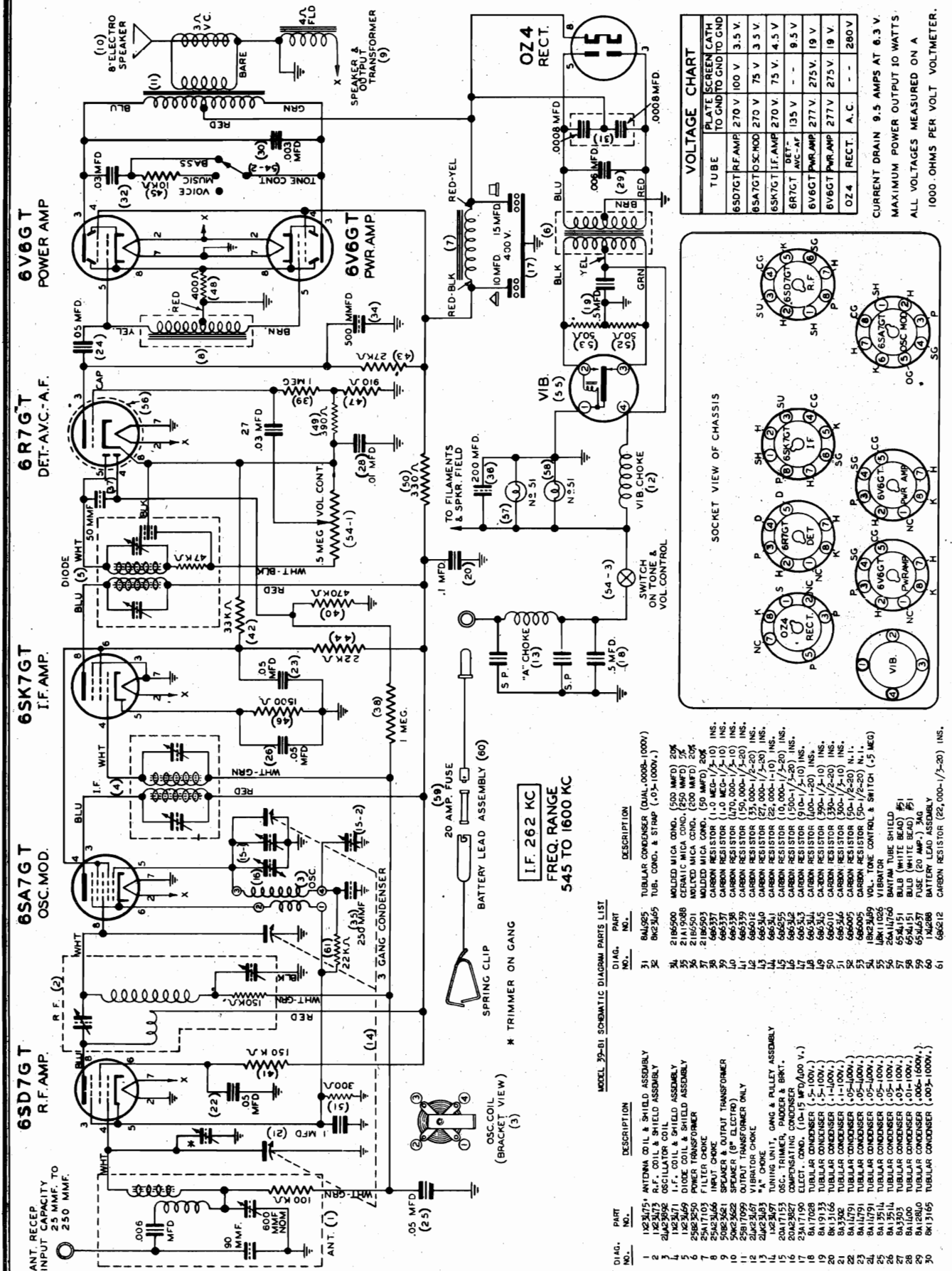
PART NO.	DESCRIPTION	LIST
2S7007	Nut 8-32x1/4 Hex CP (Rods)	PER C. \$0.50
2S7009	Nut 10-32x3/8 Hex CP (Magnets)	PER C. .40
3S7100	Set Screw 8-32x3/16 Slab Hd. (Bush.)	DOZ. .50
3S7163	Screw 8-32x1/4 CP (Fibre Gear)	PER C. .35
3S7205	Lockscrew 8-32x1/4 CP (Brkt.)	PER C. .95
3S7247	Lockscrew 6-32x3/16 CP (Mtr.Mtg.)	PER C. 1.00
3S7257	Screw 8-32x5/8 CP (Brkt.)	PER C. .65
3S7323	Lockscrew 6-32x3/16 PhBh CP (Gang)	DOZ. .30
3S7324	Screw 6-32x13/16 CP (Mtr.Mtg.)	PER C. .55
3S7326	Lockscrew 8-32x3/16 CP (Magnets)	PER C. .95
4S7562	Washer 7/16-.187-.031 CP (Magnets)	DOZ. .20
4S7614	Washer 11/16-.171-.037 CP (Brkt.)	PER C. .70
4S7651	Lockwasher #8 Int. CP (Rods)	PER C. .50
37A13682	Tuner Mtg. Grommet (Brkt.)	DOZ. .30
43A13743	Tuner Space Bushing (Brkt.)	DOZ. .40
9X14302	9 Prong Recept. & Shell (Cable) E19T	.30
1X20751	E19T Electric Tuner Cpt. - 103 CK.	14.50
28K21195	Molded Plug Base (4 prong) E19T.	.10
43A21407	Clutch Bushing 1/4 Brass	DOZ. .80
4A21408	Clutch Spring Washer 7/16 Bronze	PER C. .75
4A21409	Clutch Flat Washer 7/16 CP	PER C. .45
2A21416	Tie Rod Nut 8-32x1/4 Spec. CP.	DOZ. .25
44A21417	Clutch Pinion 3/8 P.D.	DOZ. .50
14A21424	Clutch Fibre Washer 7/16	PER C. .65
19B21431	Variable Condenser (3 gang) E15,19,22T	2.95
59B21434	Tuner Motor (24V-AC) E15,16,19T.	2.80
1X21440	E15T Electric Tuner Cpt. - 103K.	13.00
1X21441	E16T Electric Tuner Cpt. - 103F.	13.30
1X21550	E22T Electric Tuner Cpt. - 83K.	13.50
1X21551	E23T Electric Tuner Cpt. - 83F,93F.	14.25
1X21554	Magnet & Channel Assembly - E15,22T.	1.35
1B21561	Tuner Magnet Assembly - Black.	.15
1X21576	Fibre Gear, Spring & Bush. Assembly.	.20
4X21577	"C" Washer 1/8" Notched (Rods)	PER C. .65
1X21579	Split Gear & Bushing Assembly.	.30
2A21766	Motor Spacer Nut 15/32 Hex	DOZ. .50
1X21825	Channel Brkt. & Recept. Assembly E15,16,22,23T	.40
44A21873	Cond. Drive Pinion 7/8 P.D. Brass.	.20
19B22050	Variable Condenser (3 gang) E16,23T.	2.95
1X22290	Channel Brkt. & Recept. Assembly E19T.	.45
1X22292	Magnets & Channel Assembly E16,23T	1.35
59K22419	Tuner Motor (Mute) E22,23T	3.50
41A22471	Cushion Spring (Fibre Gear)	DOZ. .50
41A22507	Coil Spring (Armature)	DOZ. .35
37A22664	Rubber Grommet (Magnets) E19T.	DOZ. .25
7A22715	Bracket (Gang Support)	.15
1X23009	Magnets & Channel Assembly E19T.	1.95

MODEL E-6-P POWER RELAY
(Used on Model 103-CK2)

2S7048	Nut 10-32x5/16 Hex CP - Magnet	PER C. .75
3S7163	Screw 8-32x1/4 SLHMS CP	PER C. .35
3S7326	Lockscrew 8-32x3/16 PLHH CP - Brkt	PER C. .95
4S7557	Washer 3/8-.171-.031 CP.	PER C. .30
41A13262	Armature Spring - Switch Guide	DOZ. .30
41A14244	Armature Spring - Latch.	DOZ. .40
28X15021	Plug Base - Nine Contact	.15
4A22156	Magnet Adjusting Washer.	PER C. .70
7A22160	Magnet Mounting Bracket.	.10
1A22164	Tuner Magnet Switch Assembly - 5 leads	.75
1A22165	Rectifier Switch Assembly - 3 leads.	.60
7A22167	Armature Retainer Bracket.	.15
1X22319	Housing & Mtg. Bracket Assembly.	.55
1K22321	Magnet Assembly.	.40
1X22322	Armature & Latch Plate Assembly.	.35
1X22323	Armature & Switch Guide Assembly	.40

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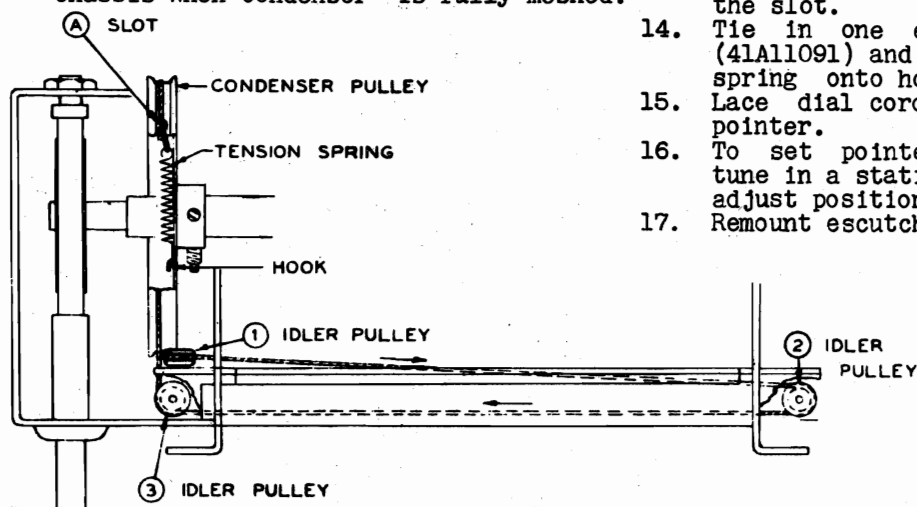


MODEL 39B-1
MODEL 39B-2

GALVIN MFG. CORP.

MODELS 39B-1 and 39B-2 POINTER CORD

1. Remove the chassis from housing.
2. Pull out the five push-buttons.
3. Remove the four screws which hold the escutcheon and remove same from front cover.
4. Remove broken cord.
5. Rotate condenser gang to fully meshed position.
6. Cut 28 inch length of 30 pound silk fish cord.
7. Thread one end of cord through slot (A). This is the slot nearest the front of chassis when condenser is fully meshed.
8. Run cord up and over rear idler pulley No. 1 in clockwise direction.
9. Continue cord across chassis to idler pulley No. 2 and around it in a clockwise direction.
10. Run cord back across chassis to front idler pulley No. 3 and around it in clockwise direction.
11. Run cord under brake shoe and around condenser pulley to slot (A).
12. Thread through slot (A).
13. Knot both ends of cord securely inside the slot.
14. Tie in one end of tension spring (41A11091) and hook other end of tension spring onto hook in condenser pulley.
15. Lace dial cord through hooks in dial pointer.
16. To set pointer to correct frequency, tune in a station of known frequency and adjust position of pointer on string.
17. Remount escutcheon plate.



SENSITIVITY AND STAGE GAIN MEASUREMENTS MODEL 39B-2

Average Microvolt Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
12,000	455 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	1.74
600	455 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
575	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
30	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	1.74
11	600 K.C.	Antenna	***	None	1.74

Volume Control Set at Maximum

* 1 Watt = 1.74 Volts

Tone Control Set At Voice.

** Output meter connected across voice coil.

*** Use Special Dummy Part No. 1X26767 or Booster Coil 24A26751 in series with a 35Mmf. Cond

SENSITIVITY AND STAGE GAIN MEASUREMENTS MODEL 39B-1

Average Microvolt Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
24,500	262 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	1.74
1,100	262 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
1,200	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
12	600 K.C.	R.F. Grid	.1 Mfg.	.5 Meg.	1.74
8	600 K.C.	Antenna	***	None	1.74

Volume Control Set at Maximum

* 1 Watt = 1.74 Volts

Tone Control Set At Voice

** Output meter connected across voice coil.

*** Use Special Dummy Part No. 1X26767 or Booster Coil 24A26751 in series with a 35Mmf. Cond

GALVIN MFG. CORP.

MODEL 39B-1

MODEL 39B-2

MODELS 39B-1 and 39B-2 DIAL CORD INSTRUCTIONS

DIAL DRIVE CORD

Remove the chassis from the housing, and place on service bench with the tubes up. Remove the broken string.

Turn the condenser gang to fully meshed position.

Cut a length of 30# silk fish cord 26 inches long.

Thread one end of cord through slot in drive pulley and with an ordinary paper clip fasten to tuning shaft bracket so the cord will stay in place.

In a counter clock-wise direction wind cord one full turn around drive pulley and up to tuning shaft.

Wind cord in clock-wise direction 7 turns around tuning shaft and down to drive pulley.

In a counter clock-wise direction, wind cord around drive pulley to slot (B).

Knot the two ends of cord together inside of drive pulley and fasten one end of spring (41A14759) to cord and the other end to hole in condenser pulley.

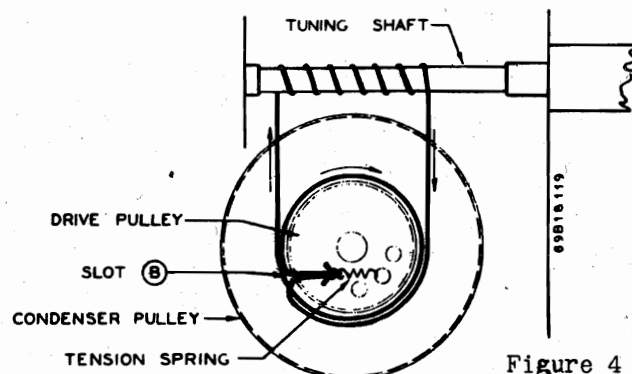
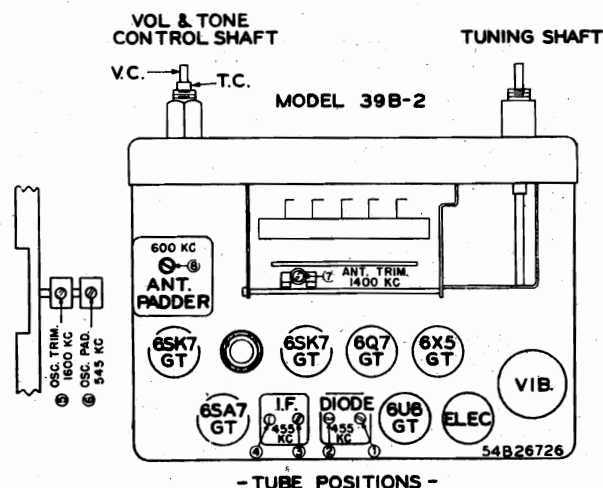
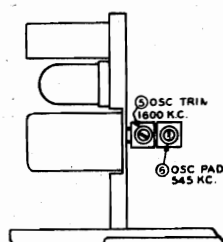
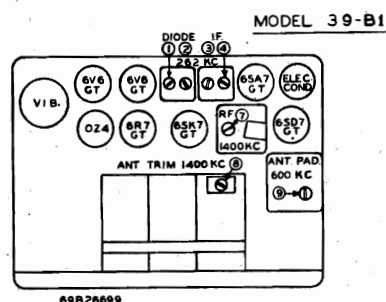


Figure 4

ALIGNMENT CHART MODEL 39B-1

Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum	.1 Mfd.	Osc.-Mod. Grid	1-2-3-4	262 K.C.
2	1600 K.C.	.1 Mfd.	Osc.-Mod. Grid	5	1600 K.C.
3	545 K.C.	.1 Mfd.	Osc.-Mod. Grid	6	545 K.C.
4	1400 K.C.	*	To Special Dummy	7	1400 K.C.
5	1400 K.C.	*	To Special Dummy	8	1400 K.C.
6	600 K.C.	*	To Special Dummy	9	600 K.C.

* Use Special Dummy Part No. 1X26767 or Booster Coil Part No. 24A26751 in series with a 35 Mmf. Condenser.



ALIGNMENT CHART MODEL 39B-2

Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum	.1 Mfd.	Osc.-Mod. Grid	1-2-3-4	455 K.C.
2	1600 K.C.	.1 Mfd.	Osc.-Mod. Grid	5	1600 K.C.
3	545 K.C.	.1 Mfd.	Osc.-Mod. Grid	6	545 K.C.
4	1400 K.C.	*	To Special Dummy	7	1400 K.C.
5	600 K.C.	*	To Special Dummy	8	600 K.C.

* Use Special Dummy Part No. 1X26767 or Booster Coil Part No. 24A26751 in series with a 35 Mmf. Condenser.

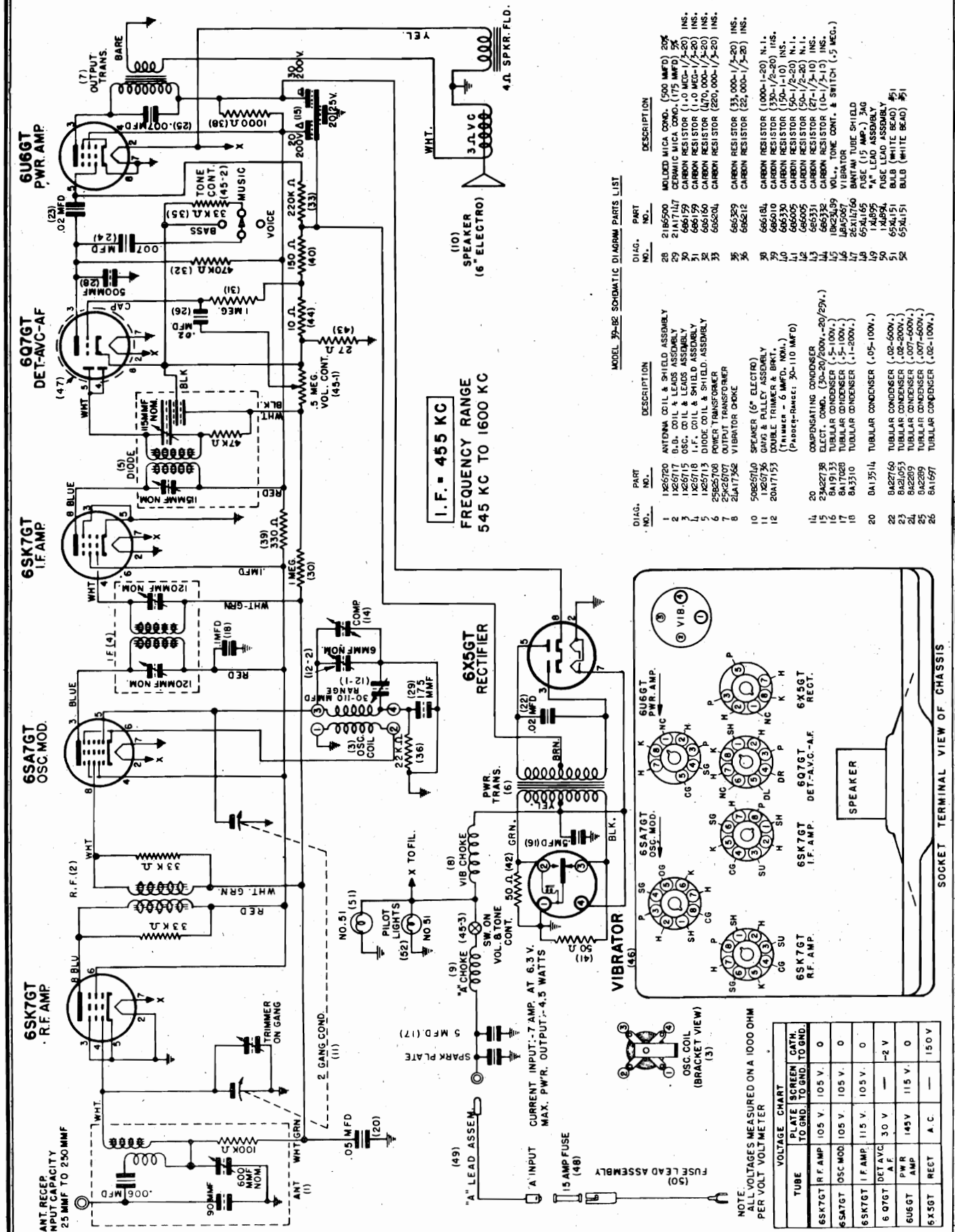
MODEL 39B-1

GALVIN MFG. CORP.

PART NO.	DESCRIPTION	LIST	PART NO.	DESCRIPTION	LIST
MODEL 39B-1			CONDENSERS		
MAJOR PARTS			8A1400	Tubular Condenser .01-100v.	\$.15
48K11026	Vibrator - Black.	\$2.50	8A3302	Tubular Condenser .1-100v. . . . .	.15
25A17103	Filter Choke. . . . .	.75	8A3303	Tubular Condenser .03-100v. . . . .	.20
23A17190	Electrolytic Condenser (FP)	1.00	8A4925	Dual Tub. Cond. .0008-.0008-1000v. . . . .	.25
25B23250	Power Transformer	3.65	21B6500	Molded Mica Condenser 500mmf-20%. . . . .	.15
16C23259	Housing Shell & Back.	2.75	21B6501	Molded Mica Condenser 200mmf-20%. . . . .	.15
25A23466	Input Choke	1.70	21B6503	Molded Mica Condenser 50mmf-20%. . . . .	.15
24K23467	Vibrator Choke.- 6 Pie Wound. . . . .	.50	8A12840	Tubular Condenser .006-1600v. . . . .	.35
1X23468	Oscillator Coil & Leads Assembly. . . . .	.65	8A13014	Condenser-Resistor .006-100v-100K . . . . .	.25
1X23469	Diode Coil & Shield Assembly.	1.50	8K13165	Tubular Condenser .003-1000v. . . . .	.15
1X23471	I.F. Coil & Shield Assembly	1.40	8K13166	Tubular Condenser .1-400v. . . . .	.15
1X23473	R.F. Coil & Leads Assembly.	1.75	8A13514	Tubular Condenser .05-100v. . . . .	.15
1X23475	Antenna Coil & Shield Assembly.	2.75	8A14791	Tubular Condenser .05-400v. . . . .	.15
24K23483	"A" Choke . . . . .	.25	8A17027	Condenser-Resistor .03-100v.-33K. . . . .	.20
1X23487	Front Cover & Bushing Assembly.	1.25	8A17028	Tubular Condenser .5-100v. . . . .	.25
18K23489	Volume & Tone Control	1.50	20A17153	Double Trimmer & Spec. Brkt. . . . .	.35
1X23517	Bottom Housing Assembly . . . . .	.70	20A17935	Antenna Padder - Single . . . . .	.35
50B23621	Speaker & Output Transformer.	5.50	21A19088	Ceramic Condenser 250mmf-5%. . . . .	.20
50B24493	Speaker & Output Transformer.	5.50	8A19133	Tubular Condenser .5-100v. . . . .	.30
50B24929	Speaker & Output Transformer.	5.50	20A22747	Trimmer Diode - Small . . . . .	.40
	Speaker Exchange.	3.25	20A22751	Double Trimmer 120mmf-Nom. - I.F. . . . .	.30
1X24948	Gang, Pulley & Brake Assembly	5.00	20A23102	R. F. Trimmer & Padder. . . . .	.55
ACCESSORIES			8K23465	Tubular Condenser .03-1000v. & Strap. . . . .	.25
6X4141	Distributor Suppressor. . . . .	.30	20A23827	Compensating Condenser. . . . .	.25
1X4288	Battery Lead Assembly . . . . .	.40	RESISTORS		
8A4491	Generator Condensor . . . . .	.40	6B6005	Carbon Resistor 50-1/2-20 N.I. . . . .	.DOZ. .60
65X4637	Fuse 20 AMP 3 AG. . . . .	.05	6B6010	Carbon Resistor 330-1/2-20 Ins. . . . .	.DOZ. .60
1X4894	Fuse Lead Assembly - 20". . . . .	.25	6B6012	Carbon Resistor 33,000-1/2-20 . . . . .	.DOZ. .60
1X4895	"A" Lead Assembly - 1C". . . . .	.25	6B6070	Carbon Resistor 150,000-1/3-20 N.I. . . . .	.DOZ. .60
9B6734	Tube Socket - Saddle 4 Prong. . . . .	.15	6B6212	Carbon Resistor 22,000-1/3-20 Ins. . . . .	.DOZ. .60
9B6771	Tube Socket - Saddle Octal. . . . .	.15	6B6255	Carbon Resistor 10,000-1/3-20 Ins. . . . .	.DOZ. .60
9A6774	Tube Socket - Saddle Octal. . . . .	.15	6B6321	Carbon Resistor 47,000-1/3-20 Ins. . . . .	.DOZ. .60
37A17216	Speaker Gasket. . . . .	.15	6B6337	Carbon Resistor 1 meg-1/3-10 Ins. . . . .	.DOZ. .60
1X23520	Receiver Accessories Assembly	1.20	6B6338	Carbon Resistor 470,000-1/3-10 Ins. . . . .	.DOZ. .60
38A23693	Call Letters & Instructions . . . . .	.45	6B6339	Carbon Resistor 150,000-1/3-20 Ins. . . . .	.DOZ. .60
64K23876	Speaker Screen. . . . .	.25	6B6340	Carbon Resistor 27,000-1/3-20 Ins. . . . .	.DOZ. .60
DIAL & DRIVE			6B6341	Carbon Resistor 22,000-1-10 Ins. . . . .	.10
65X4151	Bulb 6-8v. Rnd. Bay. Clr. #51 . . . . .	.15	6B6342	Carbon Resistor 1,500-1/3-20 Ins. . . . .	.DOZ. .60
43X4326	Steel Ball .125	PER C. .35	6B6343	Carbon Resistor 910-1/3-5 Ins. . . . .	.DOZ. .60
5S7811	Eyelet 5/16 Blk. - Gang Mtg. . . . .	.DOZ. .20	6B6344	Carbon Resistor 400-1-20 Ins. . . . .	.10
11M8709	Dial Cord (Blk) 26"-Shaft . . . . .	.YARD .05	6B6345	Carbon Resistor 390-1/3-10 Ins. . . . .	.DOZ. .60
11M8744	Dial Cord (Blk. Wnt.) 26"-Pntr. . . . .	.YARD .05	6B6346	Carbon Resistor 300-1/3-10 Ins. . . . .	.DOZ. .60
41A11091	Tension Coil Spring - Large . . . . .	.DOZ. .25	SCREWS, WASHERS		
37A12691	Rubber Grommet - Gang Mtg. . . . .	.DOZ. .25	2S7003	Nut 8-32x11-32 CP - Spkr.	PER C. .50
41A14759	Tension Coil Spring - Small . . . . .	.DOZ. .25	2S7022	Nut 1-4x20x7/16 CP - Set Mtg.	PER C. .60
7B17002	Cond. Mtg. Bracket - Left . . . . .	.10	3S7118	Set screw 8-32x5/16 BO - Knob. . . . .	.DOZ. .90
35A17160	Push Button Strip - Felt. . . . .	.DOZ. .20	3S7160	Screw 8-32x3/16 CP - Slider Brkt.	PER C. .35
1B17171	Push Button Plunger Assembly. . . . .	.20	3S7454	Screw 8x1/4 PK Z PLHH CP. . . . .	.DOZ. .20
35A17224	Knob Washer - Felt - Vol.	PER C. .40	3S7456	Housing Screw 8x1/4 ACHD PK A CO.	PER C. .65
43X17241	Nut Bearing Assembly. . . . .	.DOZ. .35	3S7457	Screw 8x7/8 CP - Coil Mtg. . . . .	.DOZ. .25
1A23246	Pointer . . . . .	.10	3S7461	Screw 8x5/16 CO - Esc. . . . .	.DOZ. .15
34A23248	Dial Scale. . . . .	.25	3S7499	Screw 8x5/8 CO - Ant.	PER C. 1.00
64A23249	Dial Retainer Plate . . . . .	.DOZ. .25	4S7609	Washer 1&5/16x.218x.050 CP. . . . .	.DOZ. .35
47K23492	Tuning Drive Shaft. . . . .	.35	4S7635	Washer 7/8 CP - Set Brkt. . . . .	.DOZ. .25
1X23494	Drive Shaft Brackets Assembly . . . . .	.30	4S7657	Lockwasher 8 Ext. BO - Spkr.	PER C. .50
1X23495	Slider, Plunger & Pulley Assembly . . . . .	.45	4S7670	Lockwasher 1/4" Blk. Oxd.-Set Brkt.	PER C. .50
1X23503	Dial Light Assembly - L.H. . . . .	.10	3S8126	Screw 8x1&1/4 CP - Pwr. Trans. . . . .	.DOZ. .20
1X23504	Dial Light Assembly - R.H. . . . .	.10	3S8131	Screw 8x1&7/8 SS - Choke. . . . .	.DOZ. .65
1X23518	Dial Scale & Esc. Assembly.	1.50	3A13748	Screw 8-32x17/32 CP - Gang Mtg. . . . .	.DOZ. .20
1X23519	Push Button Cpt. . . . .	.20	3A17181	Thumbscrew 8-32 CO - Bot. Cvr. . . . .	.DOZ. .25
1X23521	Dial Brkt. & Background Assembly. . . . .	.35	2K17206	Mounting Nut - Front. . . . .	.DOZ. .75
36B24330	Tone Control Lever 1&9/32 . . . . .	.35	2K23491	Spacer Nut 1/2-28x5/8 - Vol. . . . .	.15
36A24331	Tuning Knob 1/4 Hole. . . . .	.20	3A23753	"J" Bolt - Set Mtg. . . . .	.DOZ. .60
36K24332	Volume Knob 3/16 Hole . . . . .	.20	4A24333	Tuning Nut Cup Washer . . . . .	.DOZ. .50
MISCELLANEOUS			42B5480	Grid Clip - Small - Collar Grip . . . . .	.DOZ. .15
37A4187	Condenser Mounting Grommet.	DOZ. \$.25	38X10544	Plug Button 1/4 CO - Ant. . . . .	.DOZ. .25
42A4215	Vibrator Grounding ClipDOZ. .75	26X14760	Bantam Tube Shield.05
4K4823	Cup Washer Cop. Pl.DOZ. .10	56X23774	Packing Carton & Fillers.40

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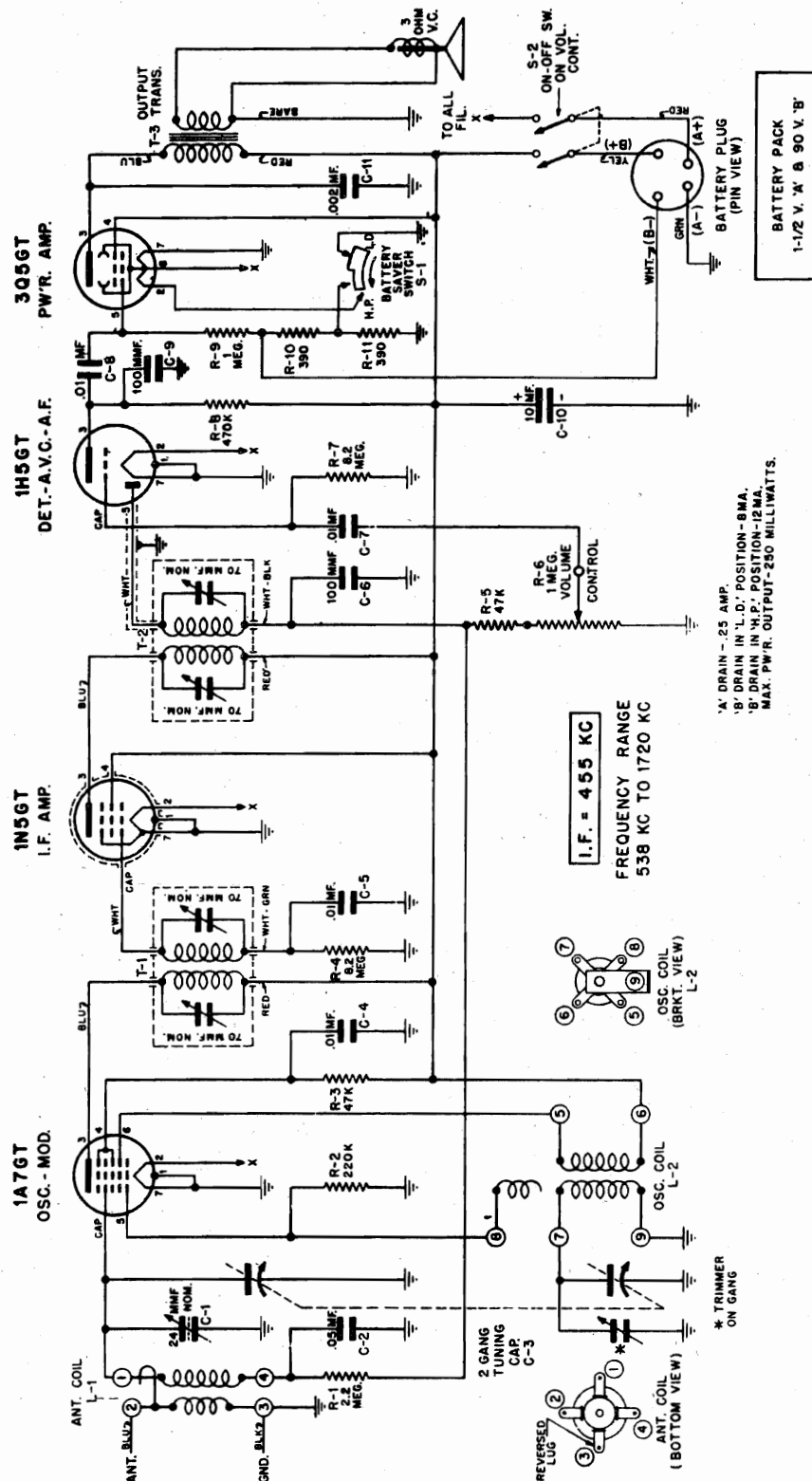


MODEL 39B-2

GALVIN MFG. CORP.

PART NO.	DESCRIPTION	LIST	PART NO.	DESCRIPTION	LIST
MODEL 39B-2			CONDENSERS		
MAJOR PARTS					
48A5067	Vibrator	2.50	8A1697	Tubular Condenser .02-100v.	\$.15
24A17362	Vibrator Choke (8 Pie) . . . . .	.35	8A2299	Tubular Condenser .007-600v . . . . .	.20
23A22738	Electrolytic Condenser FP . . . . .	.75	8A3310	Tubular Condenser .1-200v . . . . .	.15
18K23489	Volume & Tone Control	1.50	21B6500	Molded Mica Condenser 500mmf-20% . . . . .	.15
25K26707	Output Transformer	1.00	8A13014	Condenser Res. .006-100v.-100K. . . . .	.25
25B26708	Power Transformer (Shielded)	2.60	8A13514	Tubular Condenser .05-100v. . . . .	.15
1X26713	Diode Coil & Shield Assembly	1.55	8A17028	Tubular Condenser .5-100v . . . . .	.25
1X26715	Osc. Coil & Leads Assembly . . . . .	.65	21A17147	Ceramic Mica Condenser 175mmf . . . . .	.20
1X26717	B.B. Coil & Leads Assembly . . . . .	.85	20A17153	Double Trimmer & Spec. Brkt . . . . .	.35
1X26718	I.F. Coil & Shields Assembly	1.40	20A17935	Antenna Padder - Single . . . . .	.35
1X26720	Antenna Coil & Shield Assembly	2.10	8A19133	Tubular Condenser .5-100v . . . . .	.30
1X26729	Front Cover & Bushing Assembly	1.05	21A20877	Metal Mica Condenser 90mmf-10% . . . . .	.15
50B26740	Speaker 6" Electro.	3.25	20A22747	Diode Trimmer - Small . . . . .	.40
	Speaker Exchange	1.90	20A22751	I.F. Trimmer - Double . . . . .	.30
15K26744	Housing Shell, Back & Brkts	3.00	8A22760	Tubular Condenser .02-600v. . . . .	.15
1X26748	Bottom Cover Assembly . . . . .	.65	8A24033	Tubular Condenser .02-200v. . . . .	.10
1X27101	Gang, Brake & Pulley Assembly	4.65			
ACCESSORIES			RESISTORS		
14X2423	Fuse Insulator - "A" Lead . . . . .	.20	6B6005	Carbon Resistor 50-1/2-20 N.I . . . . .	.60
6X4141	Distributor Suppressor . . . . .	.30	6B6010	Carbon Resistor 330-1/2-20 Ins. . . . .	.60
65X4151	Bulb 6-8v. Rnd. Bay. Clr. #51 . . . . .	.15	6B6037	Carbon Resistor 33,000-1/3-20 N.I . . . . .	.60
65X4165	Fuse 15 AMP 3AG . . . . .	.05	6B6159	Carbon Resistor 1 meg-1/3-20 Ins. . . . .	.60
1X4872	Battery Lead Assembly . . . . .	.50	6B6180	Carbon Resistor 470,000-1/3-20 N.I. . . . .	.60
1X4894	Fuse Lead Assembly - 20" . . . . .	.25	6B6184	Carbon Resistor 1,000-1-20 N.I. . . . .	.10
1X4895	Short "A" Lead Assembly - 10" . . . . .	.25	6B6204	Carbon Resistor 220,000-1/3-20 Ins. . . . .	.60
9B6734	Tube Socket - Saddle 4 Prong. . . . .	.15	6B6212	Carbon Resistor 22,000-1/3-20 Ins. . . . .	.60
9B6771	Tube Socket - Saddle Octal. . . . .	.15	6B6321	Carbon Resistor 47,000-1/3-20 Ins. . . . .	.60
1X12820	Antenna Receptacle Assembly . . . . .	.15	6B6329	Carbon Resistor 33,000-1/3-20 Ins. . . . .	.60
37A18689	Rubber Gasket 2" - Spkr . . . . .	.05	6B6330	Carbon Resistor 150-1-10 Ins. . . . .	.10
1X23503	Dial Light Assembly (Short) - Less Bulb. . . . .	.10	6B6331	Carbon Resistor 27-1/3-10 Ins. . . . .	.60
1X23504	Dial Light Assembly (Long) - Less Bulb. . . . .	.10	6B6332	Carbon Resistor 10-1/3-10 Ins. . . . .	.60
1X26759	Receiver Accessories Assembly	1.20			
DIAL & DRIVE			SCREWS, WASHERS ETC.		
5S7811	Eyelet 5/16x.210 Blk. - Gang Mtg. . . . .	.20	43X4326	Steel Ball .125 . . . . .	.35
11M8709	Dial Cord Blk. 26" - Shaft. . . . .	.05	2S7003	Nut 8-32x11/32 CP - Spkr. . . . .	.50
11M8744	Dial Cord Blk.-Wht. 28" - Pntr. . . . .	.05	2S7005	Nut 6-32x1/4 CP - B.B. Coil . . . . .	.40
41A11091	Tension Coil Spring - Large . . . . .	.25	2S7022	Nut 1/4-20x7/16 CP - Set Mtg. . . . .	.60
37A12691	Rubber Grommet - Gang Mtg. . . . .	.25	3S7118	Setscrew 8-32x5/16 BO - Knob. . . . .	.90
41A14759	Tension Coil Spring - Small . . . . .	.25	3S7160	Screw 8-32x3/16 CP - P.P.& P. . . . .	.35
7B17002	Gang Mtg. Bracket - Left. . . . .	.10	3S7457	Screw 8x7/8 CP - Can Mtg. . . . .	.25
38A17093	Call Letters Tab Cover. . . . .	.05	3S7461	Screw 8x5/16 PK-A AH CO . . . . .	.15
35A17160	Push Button Pad (Felt) Strip. . . . .	.20	3S7499	Screw 8x5/8 Cop. Oxd. - Ant. Recept.	1.00
35A17224	Knob Washer (Felt) 3/64 - Vol. . . . .	.40	3S7506	Screw 6x1/4 CP - Osc. . . . .	.50
13K23244	Dial Escutcheon - Chrome.	1.25	3S7508	Screw 8x1/4 Blk. - Ant. Coil. . . . .	.65
1A23246	Dial Pointer Assembly . . . . .	.10	4S7573	Washer 11/16-.187 Wrt. - Choke. . . . .	.15
3A423248	Dial Scale. . . . .	.25	4S7635	Washer 7/8-.281 CP - Set Mtg. . . . .	.25
64A23249	Dial Retainer Plate . . . . .	.25	4S7657	Lockwasher #8 Ext. BO - Spkr. . . . .	.50
47K23492	Tuning Drive Shaft. . . . .	.35	4S7670	Lockwasher 1/4 Int.-Set Mtg. . . . .	.50
1X23495	Pointer, Plunger & Pulley Assembly. . . . .	.45	3S8126	Screw 8x1&1/4 CP - Pwr. Trans. . . . .	.20
1X23518	Dial Scale & Esc. Assembly.	1.50	3S8133	Screw 8x1 SS - Choke. . . . .	.35
1X23519	Push Button Complete. . . . .	.20	3S13748	Screw 8-32x17/32 CP - Gang Mtg. . . . .	.20
1X23521	Dial Brkt. & Background Assembly. . . . .	.35	2K17206	Nut 1/2-28x5/8 Brass - Front Mtg. . . . .	.75
36C24330	Tone Control Lever 1&9/32 . . . . .	.35	43X17241	Nut Bearing Assembly - Tun. Shaft . . . . .	.35
36A24331	Tuning Knob 1/4" . . . . .	.20	2K23491	Spacer Nut 1/2-28x5/8 - Vol. . . . .	.15
36K24332	Volume Knob 3/16" . . . . .	.20	3A23753	"J" Bolt - Set Mtg. . . . .	.60
38K26752	Push Button Number Tabs . . . . .	.05	4A4333	Tuning Nut Cup Washer . . . . .	.50
MISCELLANEOUS			PRICES SUBJECT TO CHANGE WITHOUT NOTICE		
42A4215	Vibrator Grounding Clip . . . . .	.75			
42B5480	Grid Clip - Small - Collar Grip . . . . .	.15			
38X10544	Plug Button 1/4 Cop. Oxd. - Ant . . . . .	.25			
26X14760	Pantam Tube Shield. . . . .	.05			
56X26749	Packing Carton & Fillers. . . . .	.40			

GALVIN MFG. CORP.



This receiver is a 4 tube battery operated superheterodyne, covering the broadcast band from 538 to 1720 kc. The I.F. frequency is 455 kc.

POWER DRAIN:

'A' drain - .25 AMP. at 1.5 V.

'B' drain in 'L.D.' position - 8 MA. at 90 V.

'B' drain in 'H.P.' position - 12 MA. at 90 V.

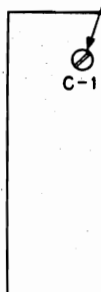
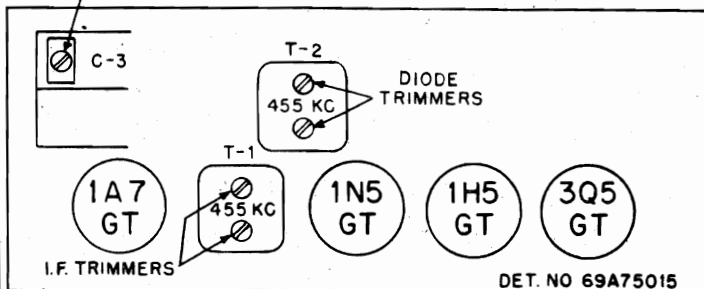
GALVIN MFG. CORP.

Turn Battery Saver Switch to 'H.P.' (high power) position.
Connect output meter across speaker voice coil (.38V = .05 watts).
Volume control set at maximum for all operations.
The adjusting screwdriver or alignment tool should be of the insulated type, such as Motorola Part No. 66A71008.

OPERATIONS IN ORDER	GANG CAPACITOR SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMER NO.	GENERATOR SET AT (400~ 30% MODULATED)	AVERAGE INPUT FOR .38V OUTPUT
1. Adjust I.F.'s for maximum	Minimum Capacity	.1 mf	Osc.-Mod. grid	T-1&T-2 (2 trim- mers on each)	455 Kc	3750 microvolts to I.F. grid. 80 microvolts to Osc.-Mod. grid.
2. Set Oscilla- tor trimmer	Minimum Capacity	.1 mf	Osc.-Mod. grid	Trimmer on C-3	1720 KC	100 microvolts
3. Adjust R.F. trimmer for maximum	1400 Kc.	200 mmf	Antenna Lead	C-1 ANT. COIL TRIMMER ADJUST AT 1400 KC	1400 Kc	10 microvolts

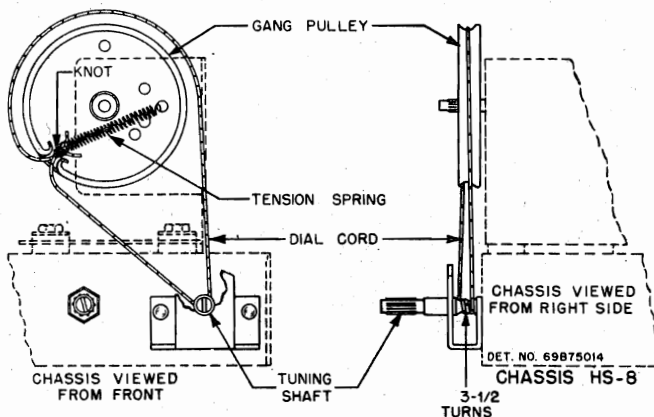
4. Repeat above steps for maximum accuracy.

OSC. TRIMMER
ADJUST AT 1720 KC



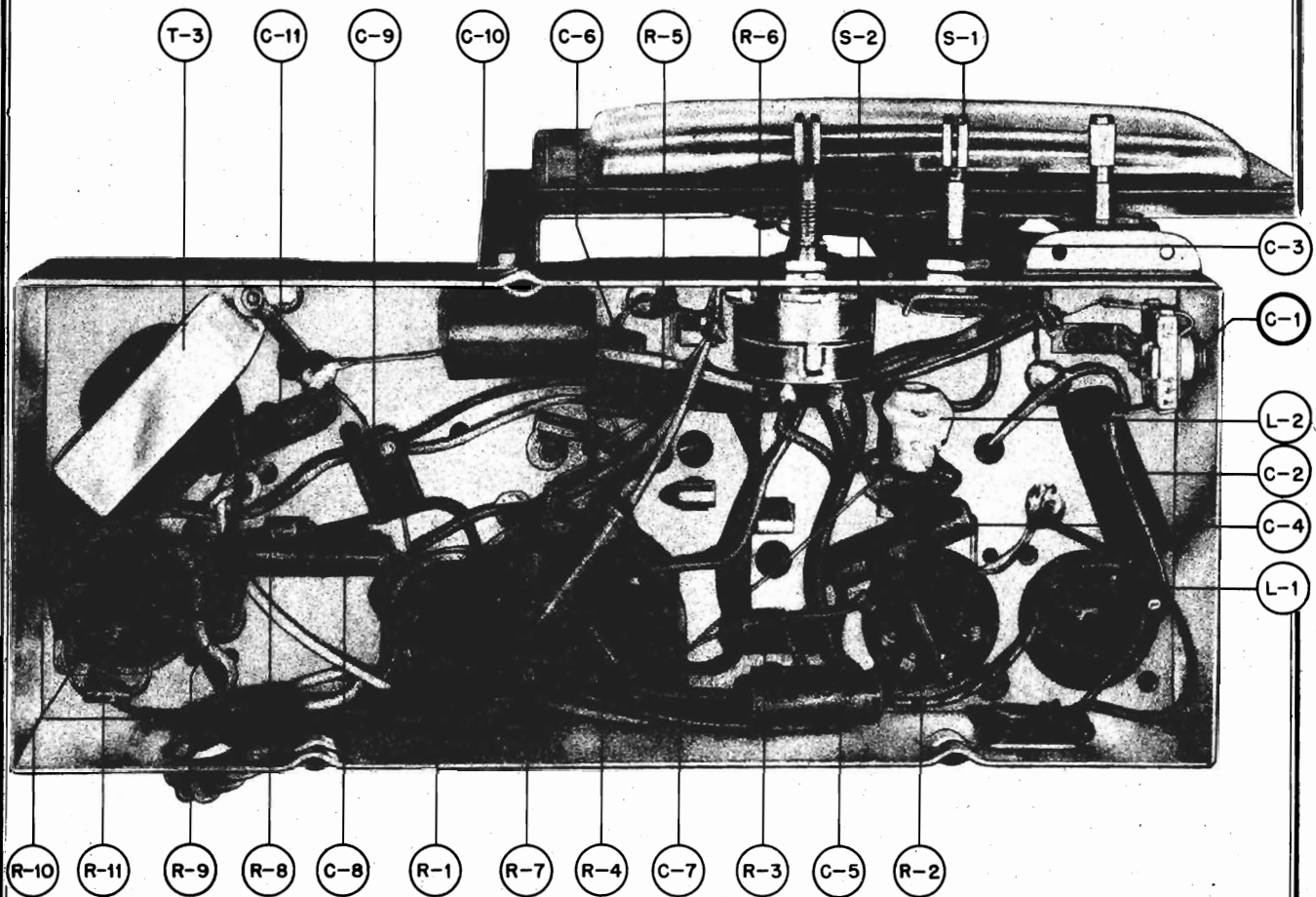
TO REPLACE DIAL CORD

1. Remove set from cabinet by pulling the knobs off and unscrewing the three chassis retaining screws from the bottom.
2. Remove the dial crystal by pushing out the four snap-in eyelets. Avoid damaging crystal and dial scale by pushing the eyelets out from the back. Do not remove the dial scale.
3. Remove the dial pointer by carefully pulling it off.
4. Next the dial plate is taken off by removing two screws.
5. Remove the old cord and replace with a new piece of 24 lb. fish line. See Figure 1. 2. 3. 4.
6. Secure the cord knot with a drop of cement.
7. Reassemble dial mechanism by working in reverse order. The pointer should be adjusted so that it is horizontal and pointing to the low frequency end when the gang capacitor is fully closed.



DIAL CORD LAYOUT

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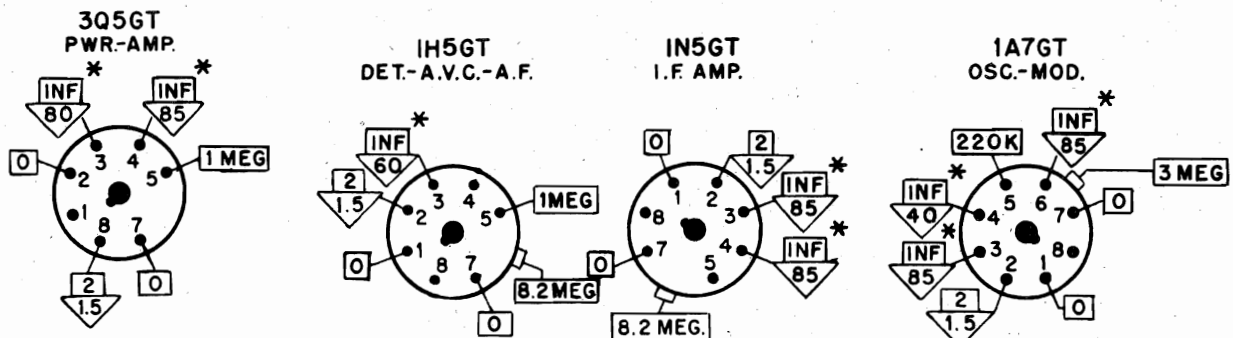


CHASSIS BOTTOM VIEW

VOLTAGES MEASURED ON A 20,000 Ω PER
VOLT VOLT-METER TO CHASSIS WITH
BATTERY SAVER SWITCH IN H.P. POSITION.

= VOLTAGE MEASUREMENTS.
 = RESISTANCE MEASUREMENTS.

* DISCONNECT ONE SIDE OF ELECTROLYTIC CAPACITOR C-10 WHEN MAKING RESISTANCE MEASUREMENTS. CHECK ELECTROLYTIC CAPACITOR BY PUTTING POSITIVE OF CAPACITOR TO POSITIVE TERMINAL OF OHM-METER BATTERY. THE RESISTANCE SHOULD BE .5 MEG. OR SO.



BOTTOM VIEW OF CHASSIS

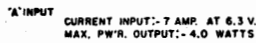
VOLTAGE AND RESISTANCE CHART

MODEL 45B12, Ch. HS-8

GALVIN MFG. CORP.

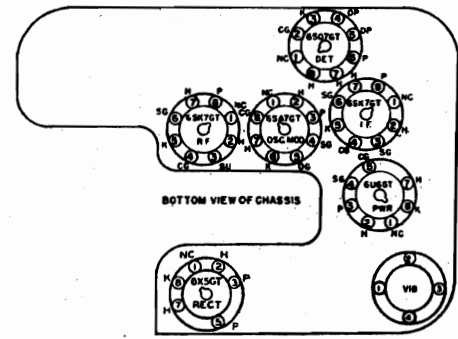
REF. PART NO.	NO.	DESCRIPTION	LIST	REF. PART NO.	NO.	DESCRIPTION	LIST
C-1	20A26941	Capacitor, trimmer: 24 mmf nominal; includes mounting bracket.	.30	R-5	6R6321	Resistor, fixed: carbon; 47,000 20% 1/3W Ins.	doz. .60
C-2	889805	Capacitor, fixed: paper; .05 mf 20% 100 VDC.	.20		or 6R6056	Resistor, fixed: carbon; 47,000 20% 1/2W Ins.	
C-3	1X20506	Capacitor, variable: 2 gang. Cut oscillator plates; (includes pulley).	3.70	R-6	18A19979	Resistor, variable, carbon; 1 meg. With DPST switch.	.85
C-4	889801	Capacitor, fixed: paper; .01 mf 20% 200 VDC.	.15	R-7	6R6310	Resistor, fixed: carbon; 8.2 meg 20% 1/3W Ins.	doz. .60
C-5	889801	Capacitor, fixed: paper; .01 mf 20% 200 VDC.	.15		or 6R3938	Resistor, fixed: carbon; 8.2 meg 20% 1/2W Ins.	
C-6	21R6641	Capacitor, fixed: mica; 100 mmf 20% 500 VDC.	.20	R-8	6R6160	Resistor, fixed: carbon; 470,000 20% 1/3W Ins.	doz. .60
C-7	889801	Capacitor, fixed: paper; .01 mf 20% 500 VDC.	.15		or 6R6032	Resistor, fixed: carbon; 470,000 20% 1/2W Ins.	
C-8	889825	Capacitor, fixed: paper; .01 mf 20% 200 VDC.	.15	R-9	6R6159	Resistor, fixed: carbon; 1 meg 20% 1/3W Ins.	doz. .60
C-9	21R6641	Capacitor, fixed: mica; 100 mmf 20% 500 VDC.	.20		or 6R6004	Resistor, fixed: carbon; 1 meg 20% 1/2W Ins.	
C-10	23A14727	Capacitor, electrolytic; 10 mf 150 V.	.75	R-10	6R6345	Resistor, fixed: carbon; 390 10% 1/5W Ins.	doz. .60
	20A20323	Capacitor, trimmer: dual; 70 mmf nominal (in I.F. & diode cans).	.60		or 6R5554	Resistor, fixed: carbon; 390 10% 1/2W Ins.	
	or 20A72754	Capacitor, trimmer: dual; 70 mmf nominal (in I.F. & diode cans).		R-11	6R6345	Resistor, fixed: carbon; 390 10% 1/3 W Ins.	doz. .60
					or 6R5554	Resistor, fixed: carbon; 390 10% 1/2W Ins.	
L-1	24A30442	Coil, antenna: iron core type	2.15	S-1	40A30444	Switch, battery saver; SPDT.	.75
L-2	24A27349	Coil, oscillator.	.85	S-2	Part of R-6	Switch, ON-OFF: DPST.	
R-1	6R6202	Resistor, fixed: carbon; 2.2 meg 20% 1/3W Ins.	doz. .60	T-1	1X28276	Transformer, I.F.: 455 Kc; complete with shield and trimmers.	2.40
	or 6R3927	Resistor, fixed: carbon; 2.2 meg 20% 1/2W Ins.		T-2	1X28277	Transformer, Diode: 455 Kc; complete with shield and trimmers.	2.35
R-2	6R6204	Resistor, fixed: carbon; 220,000 20% 1/3W Ins.	doz. .60	T-3	25X15786	Transformer, output	1.95
	or 6R8015	Resistor, fixed: carbon; 220,000 20% 1/2W Ins.			1X21246	Battery Cable Assembly	.85
R-3	6R6321	Resistor, fixed: carbon; 47,000 20% 1/3W Ins.	doz. .60		7B18748	Bracket, gang mounting	.25
	or 6R6056	Resistor, fixed: carbon; 47,000 20% 1/2W Ins.			7A14610	Bracket, tuning shaft	.10
R-4	6R6310	Resistor, fixed: carbon; 8.2 meg 20% 1/3W Ins.	doz. .60		16C70088	Cabinet, table model: wood (complete)	13.10
	or 6R3938	Resistor, fixed: carbon; 8.2 meg 20% 1/2W Ins.			42K13135	Clamp, cable	doz. .15
	61B27421	Crystal, dial	.50		35K70089	Cloth, grille (Olek #421.12)	.20
	37A14809	Cushion, socket (for 1A7 socket)	doz. .35		1X19897	Coil Shield & Clips Assem. (for I.F. & Diode coils)	.35
	1X27422	Dial Plate & Indicator Assem.	.85		11M8749	Cord, dial: 24 lb., black	yd. .10
	587805	Eyelet, Snap-In: .156 x .141; CP (dial scale mtg.)	per/c .70	37K20865	Rubber, channel: 9/16 long (for dial plate support bracket)	per/c .80	
	5A19658	Eyelet, steel: .296 x .212. Cop. Pl. (gang mtg.)	doz. .40	382683	Screw: #6 x 3/16 PK Z PLHH; CP (osc. coil mtg.)	per/c 1.00	
	587820	Eyelet, brass: .470 x .129 (spkr. lead tip).	per/c .60	387152	Screw: 6-32 x 1/4 SLHHMS; CP (gang & lug mtg.)	per/c .95	
	587855	Eyelet, brass: .484 x .156 (spkr. lead tip).	doz. .20	387350	Screw (lockscrew): 6-32 x 1/4 SLHHMS; CP (gang mtg.)	per/c .80	
	37A12691	Grommet, rubber (gang cushioning)	doz. .35	387454	Screw: #8 x 1/4 PK Z PLHH; CP (dial plate mtg.)	doz. .20	
	37A14810	Grommet, rubber (1A7 tube socket).	doz. .30	387248	Screw: 8-32 x 1/8 PL HHMS; CP (dial plate mtg.)	per/c .50	
	52A27419	Indicator, ON-OFF.	.20	387512	Screw: #8 x 1/2 PK Z PLHH; CP (gang brkt mtg.)	per/c .70	
	36A15813	Knob, control: molded; blank (for tuning and volume shafts).	.10	388117	Screw: #6 x 1 PK Z SLHWH; anti-tique copper pl. (chassis mtg.)	doz. .20	
	36K21243	Knob, control: molded; lined (for battery saver switch).	.15	34B27418	Scale, dial	.30	
	487666	Lockwasher, steel: #6 external; CP (osc. coil mtg.)	per/c .35	47A14635	Shaft, tuning control	.15	
	487680	Lockwasher, phosphor bronze: #6 external (spkr. mtg.)	per/c .60	26A14760	Shield, tube: bantam (for 1N5)	.05	
	29R5207	Lug, soldering (gang gnd.)	doz. .20	9A8738	Socket, tube: octal, saddle (for 1N5, 1H5 & 3Q5)	.15	
	29R5209	Lug, soldering: dumb-bell type (chassis gnd.)	per/c 1.00	9A8766	Socket, tube: octal, wafer (for 1A7)	.15	
	287070	Nut: 6/32 x 1/4. Inverted Palmnut (ant. coil mtg.)	per/c .50	50B71087	Speaker: 6" PM; 3 ohm V.C.	6.75	
	287000	Nut, brass: 8-32 x 5/16 (speaker mtg.)	doz. .25	41A14244	Spring, tension coil (dial cord).	doz. .60	
	287051	Nut: 3/8-32 x 9/16, Palmnut; CP (volume control)	doz. .30	41A19997	Spring, indicator (actuates ON-OFF indicator)	doz. .40	
	28X11368	Plug, 4 prong (for bat cable)	.10	41A72508	Spring, tension (for ON-OFF indicator)	.10	
	52K27662	Pointer, dial	.25	14A19980	Strip, antenna & ground lead insulating	doz. .30	
	587707	Rivet, steel: 5/32 x .122. Pol. Nkl. (tube socket mtg.)	per/c .45	4A70015	Washer "C" (used on tuning shaft)	per/c .70	
	587701	Rivet, steel: 3/16 x .122; Pol. Nkl. (output trans mtg. etc.)	per/c .45	35K19943	Washer, paper: 11/16 x 17/64 1/32 thick (used under knobs)	per/c .60	
	587703	Rivet, steel: 7/32 x .122; Pol. Nkl. (Ant. & Gnd strip mtg.)	per/c .45	487825	Washer, steel: 1/4 x .128 x .018 thick; CP (1A7 tube socket)	per/c .50	
	587732	Rivet, steel: 1/2 x .122; Pol. Nkl. (1A7 tube socket mtg.)	doz. .40	487846	Washer, steel: 11/16 x 3/16 x .065 thick; Cop. Pl. (chassis mtg.)	per/c .80	

Prices Subject To Change Without Notice.



NOTE.
ALL VOLTAGES MEASURED ON A 1000 OHM PER VOLV VOLT/METER

VOLTAGE CHART				
TUBE	PLA2 TO GND.	SCREEN TO GND.	CATH. TO GND.	
6SK7GT	RF AMP	115V.	74V.	0
6SA7GT	OSC MOD.	115V.	115V.	0
6SK7GT	1F AMP	120V.	74V.	0
6X07GT	DETAY A F	20V.	—	-2.5V.
6UM6 GT	PWR R RECT	140V.	120V.	0
6X5GT	AMP	A.C.	—	145V.



DIAG.
NO.
46 V

48A5067	46	Vibrator	2.50	1H30869	Front Cover & Speaker Assy.	5.10
48A5333		Vibrator	2.50		ACCESSORIES	
24A17010	8	Vibrator Choke	.35	41X2157	Backing Coil Spring	Fuse Rec. PerC .50
23A22738	15	Electrolytic Condenser FP	.75	14X2423	Fuse Insulator	Doz..20
25A23059	7	Output Transformer Sub. 1H29746	xxxxx	9X4075	Fuse Receptacle	Doz. .20
25B23068		Power Transformer	2.35	14X4076	Bakelite Washer Fuse Rec.	Doz. .10
24A23092	9	"A" Choke & Bracket	.35	14X4077	Contact Bushing-Fuse Recept.	Doz. .20
1X23094	5	Diode Coil & Shield Assy.	1.50	6X4141	Distributor Suppressor	.30
1X23096	4	IFC-Coil & Shield Assy.	1.35	65X4151	47 Bulb 6-SV.25 Amp Bayonet Type	.15
1X23098	2	R. F. Coil & Shield Assy.	1.30	65X4165	48 Fuse 15 Amp. 3AG	.05
25B23103	6	Power Transformer Sub. 25B23068	2.35	9X4168	"A" Lead Male Ferrule	Doz. .25
1X23107	1	Antenna Coil & Shield Assy.	2.65	8A4491	Generator Condenser	.40
1X24020	11	Tuning Unit Assy. Opt. w/dial scale	7.60	8K4661	Ammeter Condenser	.40
1J24021		Tuning Unit & Pulley Assy. Sub. 1H24020xxxxx	39X13513		Static Collector	.10
24A24045	3	Oscillator Coil & Mtg. Strip	.70	42X15164	Ammeter Bronze Clip	.10
18B24046	45	Volume & Tone Control & Switch	1.50	36A17205	Tone Control Lever	.40
50B24158	10	Speaker 6" Electro	3.50	39A17479	Grounding Wiper (Curved)	.05
		Speaker Exchange	2.05	15B24256	Ash Tray Assembly	.45
15K29727		Outer Housing	2.10	7C24336	Receiver Mounting Bracket	.20
15K29730		Front Cover Only	1.70	1H29827	"A" Lead Assy (20")	.15
1J29746		Output Trans. & Eyelet Assy.	1.15	1H30775	Receiver Accessories Kit Assy.	2.15
1H30746		Rear Cover Assy.	1.75	1H30778	50 Fuse Lead Assy.	.20

MODEL 46-C, Ch. A06

GALVIN MFG. CORP.

ACCESSORIES (Cont'd)			CONDENSERS (Cont'd)			SCREWS, WASHERS, ETC. (Cont'd)		
1H30791	49	Filter Lead A. y.	.45	20A17935	Antenna Padder (Single)	.35	457573	Washer 11/16 CP-Choke Mtg.
41A2372		DIAL & DRIVE PARTS		21A20877	Metal Mica Condenser 90mmf. 10%	.15	457585	Washer 7/8 CP -Set Mtg.
37A4187		Dialite Backing Coil Spring	.10	20A22747	Diode Trimmer -Small	.40	457653	Lockwasher 5/16 Int./Ext CP-Set Mtg.
587811		Rubber Grommet-Trimmer Eye Bkt. Doz.	.25	20A22751	I.F. Trimmer-Double	.30	457657	Lockwasher #6 Ext. CP-Sprk.
11M6709		Eyalet 5/16 x.210 Blk. Gang Mtg. Doz.	.20	8A22760	Resistor Condenser .02-600V	.15	457665	Lockwasher #6 Sp. c. Blk.-Ant. Coil Per C
11M6709		Dial Cord 10" Shaft Drive	Yard.05	20A23102	R. F. Trimmer & Padder	.55	457666	Lockwasher #6 Int. Blk. Ant. Coil Per C
11M6744		Dial Cord 22" Pointer Drive	Yard.05	21A23110	Geremio Mica Condenser 300mmf 5%	.25	457680	Lockwasher #6 Int. PBR-Osc.
41A1091		Tension Coil Spring-Large	.25	20A23135	Osc. Padder & Eye Bracket	.20	457688	Lockwasher 1/4 Int./Ext CP Set Mtg. Doz.
60A11579		Dial Light Socket & Clip	.05	8A23146	Tubular Condenser .05-200V	.10	5A12748	Screw 8-32x17/32 CP-Tuner Mtg.
37A12691		Rubber Grommet- Gang Mtg.	.25	20A23827	Compensating Condenser	.25	4A15962	Tuning Unit Cup Washer
41A1459		Tension Coil Spring	.25	8A24053	Tubular Condenser .02-800V	.10	2A16990	Shoulder Screw 6/32 Torque Spring Doz.
49A16986		Cord Guide Pulley -.218 Brass	.20	8A28389	Tubular Condenser .5-100V	.40	2517206	Nut 1/2-28x5/8 Brass Vol. Cont.
37A17013		Brake Shoe Rubber Tubing	.20		RESISTORS		2517222	Nut 1/2-28x5/8 Cop. Pl.-Vol. Cont.
35A17160		Push Button Pad (Felt)	.20	686005	41 Carbon Res. 50-1/2-20 N.I.	.60	4A19232	Spring Washer 7/16 Tuning Shaft
35A17224		Knob Washer (Felt) Vol. Shaft PerC.	.40	686010	39 Carbon Res. 350-1/2-20 Ins.	.60	4A21577	"C" Washer-Tuning Shaft
35A17640		Knob Washer (Felt)-Tun. Shaft	.15	686012	34 Carbon Res. 33,000-1/2-20	.60	4A24047	Spacer Washers Set Mtg.
41A18022		Compression Coil Spring	.50	686159	30 Carbon Res. 1 Meg.-1/3-20 Ins.	.60	4E24124	"C" Washer Push Buttons
49A18258		Cord Guide Pulley 7/32 Wood	.20	686160	32 Carbon Res. 470,000-1/3-20 NI	.60	4E24207	Flat Washer: Chrome Set Mtg.
41A21895		Brake Arm Torque Spring R.H.	.75	686184	38 Carbon Res. 1,000-1-20-N.I.	.10	3A24808	Upset Screw Coils
41A21896		Brake Arm Torque Spring L. H.	.75	686204	33 Carbon Res. 220,000-1/3-20-Ins.	.60	4A29614	Cup Washer Set Mtg.
1A23996		Pointer & Slider Assy.	.10	686212	36 Carbon Res. 22,000-1/3-20-Ins.	.60	357454	Screw #8x1/4 CP Misc. Mtg.'s
7A23997		Tuning Unit Mtg. Bkrt.	.20	686256	53 Carbon Res. 68,000-1/3-20 Ins.	.60	357455	Screw #8x3/8 co. Housing
7A23999		Volume Control Mtg. Bracket	.40	686321	Carbon Res. 47,000-1/3-20 Ins.	.60	357457	Screw #8x7/8 CP Coil Mtg.
1A24027		Plunger Pointer & Pulley Assy.	.50	686329	35 Carbon Res. 33,000-1/3-20 Ins.	.60	357461	Screw #8x5/16 OO-Housing
1A24536		Gang Mtg. Bkrt Assy.-R.H.	.30	686330	40 Carbon Res. 150-1-10 Ins.	.10	357475	Screw #8x1/4 CP-Esc. Mtg.
47A24539		Tuning Drive Shaft	.15	686331	43 Carbon Res. 27-1/3-10 Ins.	.60	357499	Screw #8x5/8 CO -Housing
36A29593		Control Knob 1/4" Tuning	.35	686332	44 Carbon Res. 10-1/3-10 Ins.	.60		MISCELLANEOUS
36A29594		Control Knob 3/16" Volume	.35	686339	Carbon Res. 150,000-1/3-20 Ins.	.60	42A4215	Vibrator Grounding Clip
1H30833		Dial Escutcheon Assy.	2.15	686456	Carbon Res. 150-1-10 Ins	.10	29B5239	Soldering Lug (Long Tab)
1H30836		Scale & Background Assy.	.70		SCREWS, WASHERS, ETC.		986734	Tube Socket Saddle 4-Fromg
1A30867		Light Socket & Lead Assy	.10	4A4683	Cup Washer eye Bkrt. Mtg.	.10	986771	Tube Socket Saddle Octal
1A30863		Push Button & Washer Assy.	.15	287003	Nut 8-32x5/16 Hex CP-Sprk.	.50	9A6774	Tube Socket Saddle Octal
1A30889		Dial Scale & Strip Assy.	.35	287005	Nut 6-32x1/4 Hex CP Ant. Coil	.40	587620	Eyalet Brass CP Sprk. Lead
1A30891		Background & Strip Assy.	.25	287022	Nut 1/4-20x7/16 Hex CP Set Mtg.	.60	587624	Eyalet Brass Dial Cord
		CONDENSERS		287070	Nut 6-32x1/4 Inv. Pal CP-Coils	.50	39A10644	Plug Button 1/4" Cop Ox.
8A1697	26	Tubular Condenser .02-100V	.15	287093	Nut 6-32x1/4 Pal CP-Coils	.45	9A12725	Elect Ins.Wafer 1A5/16
8A2289	24	Tubular Condenser .007-600V	.20	357160	Screw 8-32x5/16 CP Elumger Assy	.35	31A14655	Terminal Strip 3 Ins.-45 Mtg.
8A3310	18	Tubular Condenser .1-200V	.15	357163	Screw 8-32x1/4CP Oss.	.35	9A14906	Elect. Ins. Wafer Armitte
21A6500	27	Mica Condenser 500MMF.-20%	.15	357215	Screw 1/4" PHBMS CP Eye Bkrt.	.25	37A17899	Sponge Rubber Pad-Rear Cover Doz.
8A13014		Condenser Resistor .006-100V 100K	.25	357217	Screw 1" Brass Ant. Padder Mtg.	.90	42A18168	Cable Clamp-Filter Lead
8A13514	20	Tubular Condenser .05-100V	.15	357224	Screw 1/4" Brass Ant. Core Mtg.	.50	42A18169	Cable Clamp-Filter Lead
8A14095	17	Tubular Condenser .4-100V	.30	357250	Screw 8-32x1" Bra. Choke Mtg.	1.00	37C24048	Speaker Gasket Rubber
20A1727	13	Trimmer & Eye Bkrt. 5mmf.	.20	357295	Screw 1/4-20x3/4CP Set Mtg.	.30	39A24662	Hood Wiper-Sprk. Omdg.
							26A26253	5/ Tube Shield
							1E29709	Choke Spark Plate Assy.

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MODELS 47-D1, Ch. A03,
47-D1A

GALVIN MFG. CORP.

PARTS LIST MODEL 47-D1

DIAG. NO.	PART NO.	DESCRIPTION	LIST	PART NO.	DESCRIPTION	LIST	DIAG. NO.
MAJOR PARTS				DIAL & DRIVE (Cont'd.)			
67	48K11026	Vibrator - Blk.	\$2.50	1X23782	Dial Light Assembly Less Bulb	\$0.10	
	1X17346	Choke & Brackets Assembly . . . . .	.60	34B23882	Dial Scale. . . . .	.30	
65	1K17377	Vol. Control & Shaft Assembly	1.00	36A24412	Control Knob. . . . .	.20	
CONDENSERS							
6	25A23649	Output Transformer.	1.25	8A1697	Tubular Condenser .02-100v. . . . .	.15	53
15	23A23651	Electrolytic Condenser. . . . .	.85	8A3302	Tubular Condenser .1-100v. . . . .	.15	47
7	25B23652	Power Transformer	2.80	8A3314	Tubular Condenser .004-120v. . . . .	.20	58
	19B23653	Tuning Unit & Gang - Subs. 1X24944.	XXXX	20A4604	Compensating Trimmer Condenser. . . . .	.35	14
5	1X23654	Diode Coil & Shield Assembly.	1.55	8A4925	Dual Tub. Condenser .0008-.0008-1000v. . . . .	.25	61
4	1X23656	I.F. Coil & Shield Assembly	1.40	21B6500	Molded Mica Condenser 500mmf-20%. . . . .	.15	62
				21B6501	Molded Mica Condenser 200mmf-20%. . . . .	.15	63
2	1X23670	R.F. Coil & Shield Assembly	1.75	8A13014	Condenser Resistor .006-100v.-100K. . . . .	.25	
1	1X23673	Antenna Coil & Shield Assembly.	2.65	8K13166	Tubular Condenser .1-400v. . . . .	.15	44
	1X23675	Osc. Coil & Leads Assembly. . . . .	.65	8A13506	Tubular Condenser .007-1000v. . . . .	.15	59
				8A13514	Tubular Condenser .05-100v. . . . .	.15	48
				8A14095	Tubular Condenser .4-100v. . . . .	.30	43
				8K15166	Tubular Condenser .007-1600v. . . . .	.35	60
	1X23772	Tone Switch Assembly Cpt.	1.30	20A17237	Trimmer & Eye Brkt. 6 mmf. . . . .	.20	13
				20A17935	Antenna Padder - Single . . . . .	.35	
	1X24944	Gang, Pulley & Brake Assembly.	5.10	8A19133	Tubular Condenser .5-100v. . . . .	.30	42
ACCESSORIES				21A20877	Metal Mica Condenser 90mmf-10%. . . . .	.15	
	7B24365	Receiver Mounting Bracket . . . . .	.25	20A22747	Trimmer Diode - Small . . . . .	.40	
	8A4491	Generator Condenser . . . . .	.40	20A22751	Double Trimmer (120mmf Nom.) I.F. . . . .	.30	
69	65X4637	Fuse 20 Amp 3 AG. . . . .	.05	21A23110	Ceramic Mica Condenser 300mmf-5%. . . . .	.25	64
	39X4817	Shirt Marker - Rattle Clip. . . . .	.25	20A23135	Osc. Padder & Eye Bracket . . . . .	.20	12
	43A13745	Spacer Bushing - Short (Spkr.). . . . .	.40	8K23690	Tubular Condenser .01-400v. . . . .	.10	54
	6X17117	Dist. Suppressor - Plug-In. . . . .	.35	RESISTORS			
	1X17263	Antenna Brkt. & Recept. Assembly . . . . .	.25	6B6005	Carbon Resistor 50-1/2-20 . . . . .	.60	39
	1X17358	Speaker Cable & Plug. . . . .	.25	6B6013	Carbon Resistor 15,000-1-20 N.I. . . . .	.10	29
	43A17389	Cover Mtg. Spacer Sleeve - Long . . . . .	.10	6B6070	Carbon Resistor 150,000-1/3-20 N.I. . . . .	.60	
	43A17390	Cover Mtg. Spacer Sleeve - Short. . . . .	.05	6B6159	Carbon Resistor 1 Meg-1/3-20 Ins. . . . .	.60	19
	39A17391	Housing Wiper . . . . .	.05	6B6160	Carbon Resistor 470,000-1/3-20 N.I. . . . .	.60	22
	64B17583	Speaker Screen & Gasket . . . . .	.35	6B6184	Carbon Resistor 1000-1-20 N.I. . . . .	.10	36
	43A17931	Receiver Mtg. Sleeve. . . . .	.10	6B6201	Carbon Resistor 3.3 meg-1/3-20 Ins. . . . .	.60	18
70	1X18174	Fuse Lead Assembly 7" . . . . .	.15	6B6204	Carbon Resistor 220,000-1/3-20 Ins. . . . .	.60	26
	1X18175	"A" Lead Assembly 18" . . . . .	.15	6B6212	Carbon Resistor 22,000-1/3-20 Ins. . . . .	.60	28
				6B6254	Carbon Resistor 330-1-10 Ins. . . . .	.10	37
	1X24313	M333 Fuel Gauge Filter. . . . .	.10	6B6240	Carbon Resistor 2,200-1/3-20 Ins. . . . .	.60	34
DIAL & DRIVE				6B6321	Carbon Resistor 47,000-1/3-20 Ins. . . . .	.60	
	43X4326	Steel Ball (Tun. Cont.) . . . . .	.35	6B6335	Carbon Resistor 1000-1/3-10 Ins. . . . .	.60	
	5S7811	Eyellet 5/16x.210 Blk (Gang Mtg.). . . . .	.20	6B6348	Carbon Resistor 10 meg-1/3-20 Ins. . . . .	.60	16
	11M8709	Dial Cord 30# Blk. 10". . . . .	.05	6B6349	Carbon Resistor 220,000-1/3-10 Ins. . . . .	.60	23
	11M8744	Dial Cord 18# Blk.-Wht. . . . .	.05	6B6350	Carbon Resistor 6,800-1/3-10 Ins. . . . .	.60	30
68	65X10867	Bulb 6-Sv. Tub. Bay. Clr. #44 . . . . .	.10	6B6351	Carbon Resistor 4,700-1/3-10 Ins. . . . .	.60	31
	41A11091	Tension Coil Spring (Large) . . . . .	.25	6B6352	Carbon Resistor 4,700-1-20 Ins. . . . .	.10	32
	14A11212	Insulating Bushing (Gang Brkt.) . . . . .	.25	6B6353	Carbon Resistor 2,200-1/3-10 Ins. . . . .	.60	33
	37A12691	Rubber Grommet - Pure Gum (Gang Mtg.) . . . . .	.25	6B6367	Carbon Resistor 68-1/3-20 Ins. . . . .	.60	38
	41A14759	Tension Coil Spring (Small) . . . . .	.25	17A24172	Regulating Resistor . . . . .	.25	
	32A16633	Fibre Spacer Washer (P.B.). . . . .	.55	SCREWS, WASHERS, ETC.			
	38A16972	Push Button & Stud. . . . .	.15	2S7005	Nut 6-32x1/4 Hex CP - Gang Mtg. . . . .	.40	
	43X17241	Nut Bearing Assembly (Tun. Shaft) . . . . .	.35	2S7018	Nut 3/8-32x1/2 Hex CP - Vol. Cont. . . . .	.15	
	62A17367	Dial Crystal. . . . .	.10	2S7022	Nut 1/4-20x7/16 Hex CP - Set Brkt. . . . .	.60	
	1K17373	Tuning Shaft Assembly . . . . .	.35	2S7030	Nut 10-24x3/8 Hex Br. - Cvr. Mtg. . . . .	.75	
	1K17407	Tuning Control Assembly . . . . .	.40	2S7035	Nut 5/16-18x5/8 CP - Set Mtg. . . . .	.20	
	38A17410	Call Letters & Instructions . . . . .	.30	3S7215	Screw 8-32x3/16 CP - Trimmer. . . . .	.25	
	35A17428	Push Button Cushion (Felt) 6 hole . . . . .	.35	3S7274	Screw 4-36x3/16 CP - Tone Ratchet . . . . .	.15	
	38A17573	Tone Button Tab . . . . .	.05	3S7347	Screw 5-40x1/2 CP - Tone Sw . . . . .	.55	
	38K17574	Tone Tab Cover. . . . .	.20	3S7350	Lockscrew 6-32x1/4 CP - T.C. Mtg. . . . .	.80	
	38A18447	Push Button Jacket. . . . .	.05	3S7454	Screw 8x1/4 PK Z PLHH CP. . . . .	.20	
	60A23728	Dial Background . . . . .	.15	3S7455	Screw 8x3/8 PK A SLAH CO - Hag. . . . .	.20	
				3S7456	Screw 8x1/4 PK A ACHD Cop. Oxd. . . . .	.65	
	1K23766	Dial Pointer. . . . .	.10	3S7457	Screw 8x7/8 PK A CP - Coil Mtg. . . . .	.25	
	1X23770	Pointer, Pulley & Mtg. Assembly.30	3S7499	Screw 8x5/8 PK A Cop. Oxd.-Hag.	1.00	

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GALVIN MFG. CORP.

MODELS 47-D1, 47-D1A
MODEL 47-D2

MODEL 47-D1 Continued

PART NO.	DESCRIPTION	LIST PART NO.	DESCRIPTION	LIST
337506	Screw 6x1/4 Pk A CP - Osc. Coll.	374187	Rubber Grommet - Trimmer. . . . .	.15
337512	Screw 8x1/2 Pk Z CP - Gang Mtg.	414823	Cup Washer Cop. Pl. - Trimmer. . . . .	.20
337516	Screw 8x3/8 Pk A Bk. Omd.-Wiper.	986774	Tube Socket Saddle 4 prong. . . . .	.20
437552	Washer 7/16 CP - Gang Mtg.	986771	Tube Socket Saddle Octal. . . . .	.15
437513	Washer 3/4 BO - Cover	986772	Tube Socket Saddle Octal. . . . .	.15
437535	Washer 7/8 CP - Set Bkkt.	38X10544	Plug Button 1/4" Cop. Omd. . . . .	.05
437549	Washer 1 & 5/16 Wrt. CP-Set Mtg.	14X11244	Insulating Washer - Gang Bkkt.	2.50
437560	Lockwasher 1/4 Int. CP - Gang Mtg.	7A17349	Vol. Control Mtg. Bracket. . . . .	.60
437565	Lockwasher 3/8 Split Bk. - V.C. Sw.	24A17362	Vibrator Choke - 8 pie. . . . .	.35
437567	Lockwasher 3/8 Ext. BO - 5m. Tone Bkkt.	24A17363	"A" Choke - 2 pie. . . . .	.35
437568	Lockwasher 1/4 Int. Bk. - Cvr. Mtg.	38X17663	Plug Button (1/2 for 1/16) CO . . . . .	.25
437570	Lockwasher 1/4 Int. - Set Bkkt.	58X17663	Plug Button (1/2 for 1/16) CO . . . . .	.40
437574	Lockwasher 5/16 Int. CP-Set Mtg.	58X17663	Plug Button (1/2 for 1/16) CO . . . . .	.40
437578	Lockwasher 1/4 Ext. BO - Set Bkkt.	64A11245	Switch Holding Plate - Tone Sr. . . . .	.25
389126	Screw 8x1/4 Pk A-Pwr. Trans.	41A33713	Coil Spring - Large - Tone Button . . . . .	.25
4X11782	"C" Washer 11/32 CP - Vol. Cont.	45A33713	Ratchet Pawl (Tinned) Tone Drum . . . . .	.30
3A17398	Cover Mtg. Screw 10-24 Spec.	7A33722	Tone Indicator Strip. . . . .	.10
2A17369	Wing Nut 10-24x1/8 CO - Cover	1A33722	Pawl Bkkt. & Shaft Assembly . . . . .	.10
1X17921	Screw & Bushing Assembly - Spkr	1A33742	Tone Control Mating Switch. . . . .	.50
3A18008	Serrated Cap Screw - Set Mtg.	67B33747	Indicator Drum & Cam. . . . .	.25
2A20464	Speaker Mounting Nut.	41A3759	Coil Spring (Small) Tone Drum . . . . .	.70
4A37516	Clamping Washer Plate - Tone Drum	45K3760	Ratchet Pawl (Phos.Brz.) Tone Drum . . . . .	.30
2A34411	Mounting Nut.	45K3760	Spacer Bushing - T.C. Mtg. . . . .	.25
4A21408	Clutch Spring Washer 7/16 Brz. Per C.	15K3796	R.H. Bottom Cover	1.30
6A12978	Trim Strip Chrome	15K3797	L. H. Top Cover	1.40
38B29608	Push Button & Stud Plain	50B29974	Speaker 7" Electro	4.75
38B29611	Push Button & Stud Tone		Speaker Exchange	2.80
15B2979	Receiver Access. Kit Assy.	50B29975	Speaker 7" Electro	4.75
15K29795	Housing Shell	68B29976	Front Housing	1.85
48A5067	Vibrator			
48X11086	Vibrator (Black)	1X23673	Antenna Coil & Shield Assy.	2.65
1X17346	Chokes & Bracket Assy.	1X23675	Oscillator Coil & Leads Assy. . . . .	.65
24A17362	Vibrator Choke 8 Pie	1X23676	Tuning Unit Assy.	6.75
24A17363	"A" Choke (2pie)	48A27593	Vibrator (Heavy Duty)	2.50
25A23649	Output Transformer	16K29795	Housing Shell	1.45
23A23651	Electrolytic Condenser	50B29974	Speaker 7" Electro	4.75
25B23652	Power Transformer		Speaker Exchange	2.80
19B23653	Tuning Unit & Gang Sub. 1B23676	50B29975	Speaker 7" Electro	4.75
1X23654	Diode Coil & Shield		Speaker Exchange	2.80
1X23656	I.F. Coil & Shield Assy.	1X30377	Vol. Control Shaft & Mtg. Assy. . . . .	.90
1X23670	R. F. Coil & Shield Assy.	1X30737	Bottom Cover Assy R. H.	1.40
		1X30743	Top Cover Assy. L. H.	1.50

CIRCUIT SAME AS 47 D1

MODEL 47D1A PARTS PRICE LIST MAJOR PARTS

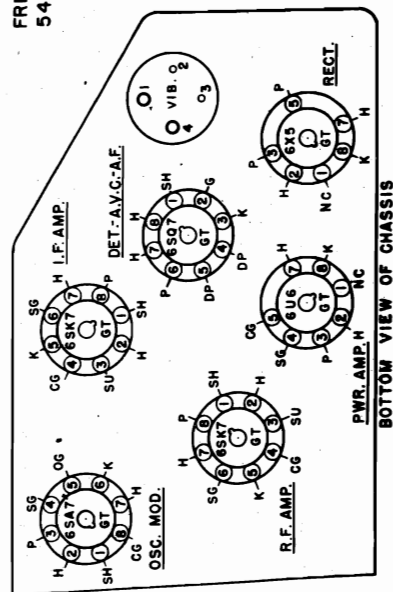
8A1400	Tubular Condenser .01-100V	8A12941	Tubular Condenser .05-300V	.15
8A2289	Tubular Condenser .007-600V	21A12943	Ceramic Condenser 50 mmf-20-100	.15
14X2423	Fuse Insulator	31X14509	Terminal Strip 4 ins. #5 Mtg.	.05
8A5310	Tubular Condenser .1-200V	9X14906	Elect. Ins. Wafer Armite	.15
14X4077	Contact Baking Fuse	14X15252	Malite Bushing Contact	.20
68X1465	Fuse 15 Amp 3AG	1X17360	Light Socket & Lead Assy.	.20
48A5333	Vibrator	20A18179	Compensating Condenser	.25
68G010	Carbon Resistor 330-1/2-20 Ins.	1X20526	Speaker Cable & Tips Assy.	.20
68G054	Carbon Resistor 10,000-1/2-20 Ins.	24A22758	Electrolytic Condenser FP	.75
68G165	Carbon Resistor 100,000-1/2-20 Ins.	8A22760	Tubular Condenser .02-600V	.15
68G330	Carbon Resistor 150-1-10 Ins.	25A23059	Output Transformer	1.00
68G332	Carbon Resistor 10-1/2-10 Ins.	25B23068	Power Transformer	2.35
68G6354	Carbon Resistor 8,200-1/2-10 Ins.	24A23792	Oscillator Coil	.65
68G355	Carbon Resistor 39,000-1/2-20 Ins.	19B23793	Tuning Unit & Gang Sub. 1B23685	xxxx
68G356	Carbon Resistor 22-1/2-10 Ins.	25K23794	Power Transformer Sub. 25B23068	2.35
68G456	Carbon Resistor 150-1-10 Ins.	1X23796	Diode Coil & Shield Assy.	1.65
587820	Eyellet Speaker Cable Small	1X23798	IF Coil & Shield Assy.	1.40
587855	Eyellet Speaker Cable Large	1X23805	Antenna Coil & Shield Assy.	2.00
		1X23810	Oscillator Coil & Leads Assy.	.65
		1X23825	Tuning Unit Assy.	4.50
		21A28226	Tubular Ceramic Condenser 50mmf	.10
		39X26814	Grounding Wiper	.50
		40A26969	Tone Control Switch	.45
		1X29793	Receiver Accessory Kit Assy.	1.75

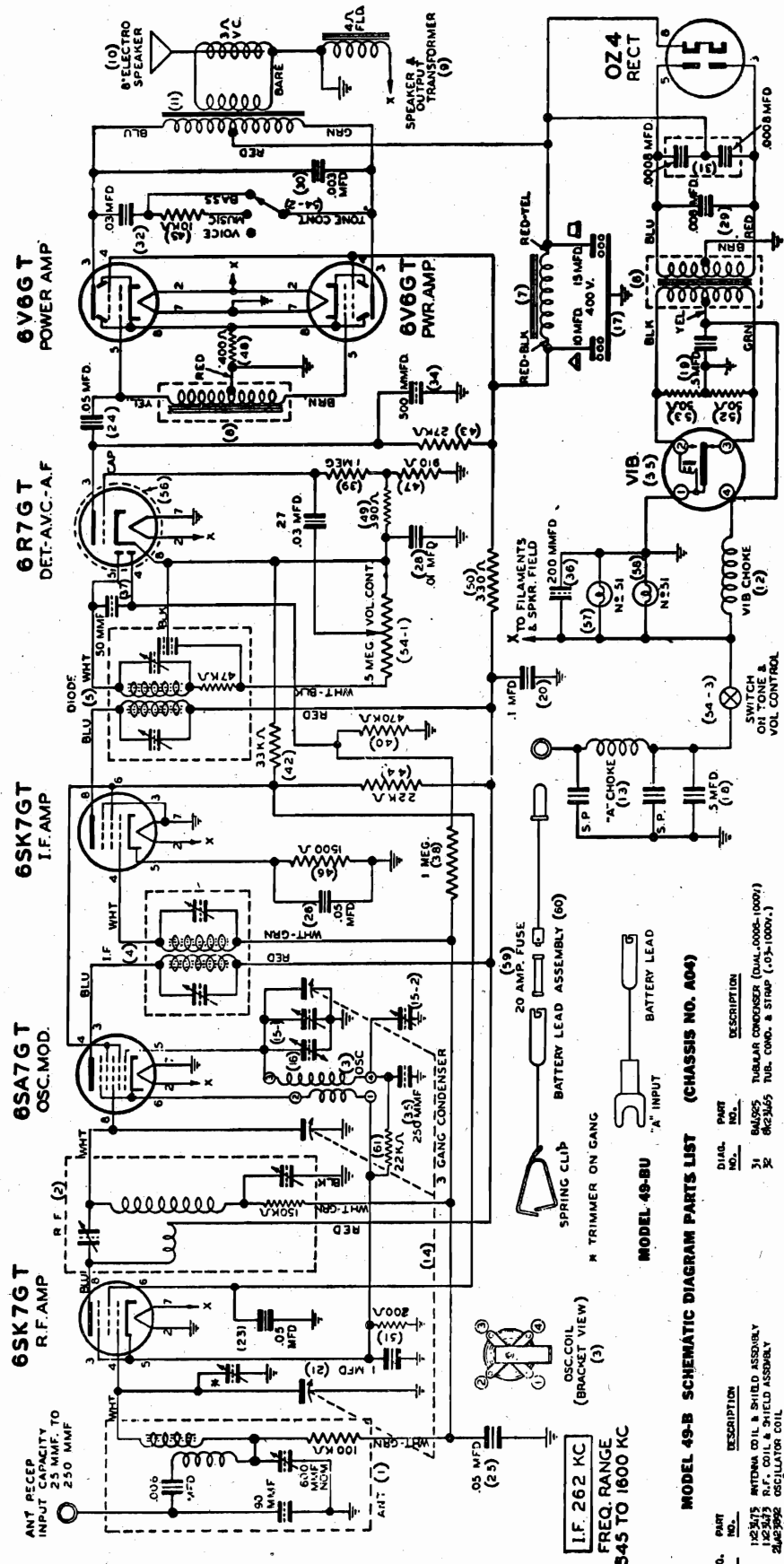
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FREQUENCY RANGE -
545 KC TO 1600 KC

VOLTAGE CHART		
TUBE	PLATE SCREEN CATH. TO GND. TO GND. TO GND.	
6X5GT	RF AMP	105 V. 100 V. 0
6X5GT	OSC. MOD.	100 V. 100 V. 0
6X5GT	IF. AMP.	105 V. 100 V. 0
6X5GT	DET. A.V.C.	35 V. — 135 V.
6X5GT	PWR. AMP.	135 V. 105 V. 0
6X5GT	RECT.	A. C. — 140 V.

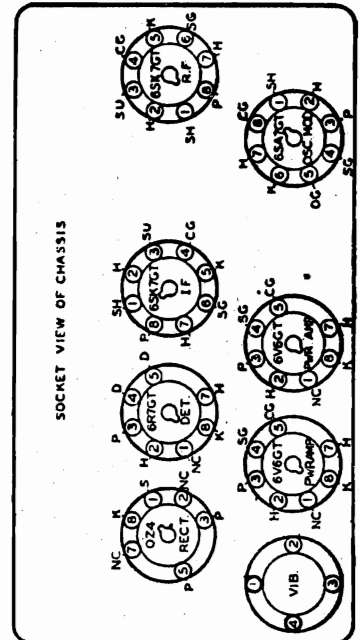
ALL MEASUREMENTS MADE WITH A
1000 OHM PER VOLT METER

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VOLTAGE CHART	
TUBE	PLATE SCREEN CATH. TO GRID TO GRID TO GRID
6X5GT	AF AMP 75 V 3.5 V
6SA7GT	5C MOD 270 V 75 V 3.5 V
6SN7GT	IF AMP 270 V 75 V 4.5 V
6RTGT	DET AF AMP 135 V - 9.5 V
6V6GT	PAR AMP 277 V 275 V 19 V
6V8GT	PAR AMP 277 V 275 V 19 V
024	RECT. A.C. - - 280 V

CURRENT DRAIN 0.5 AMPS AT 6.3 V
MAXIMUM POWER OUTPUT 10 WATTS
ALL VOLTAGES MEASURED ON A
1000 OHMS PER VOLT VOLTMETER



MODEL 49-B SCHEMATIC DIAGRAM PARTS LIST (CHASSIS NO. A04)

DIAL.	PART	DESCRIPTION	DIAL.	PART	DESCRIPTION
NO.	NO.		NO.	NO.	
1	124175	ANTENNA TO I.L. SHIELD ASSEMBLY	31	BA4255	TUBULAR CONDENSER (240,000-1,000,000)
2	124243	R.F. COIL & SHIELD ASSEMBLY	32	BA62365	TUBULAR COND. & STRAP (.05-1,000,000)
3	124247	FLUOROCRYSTAL COIL	33	BA18500	MILDED CONO. (500 MFD) 20K
4	124251	FLUOROCRYSTAL COIL	34	21417000	WELDED MICA COND. (500 MFD) 20K
5	124269	DIODE COIL & SHIELD ASSEMBLY	35	2185261	WELDED MICA COND. (500 MFD) 20K
6	2502350	POWER TRANSFORMER	37	BA185993	MILDED MICA COND. (50 MFD) 20K
7	25017103	FILTER CHOK	38	BA18599	MILDED RESISTOR (10 RES-1/2-20) 1MS
8	25017103	FILTER CHOK	39	BA18599	MILDED RESISTOR (10 RES-1/2-20) 1MS
9	5045361	SPEAKER & OUTPUT TRANSFORMER	40	BA63328	CARBON RESISTOR (470,000-1/2-10) 1MS
10	5045362	SPEAKER (8" ELECTRO)	41	BA60012	CARBON RESISTOR (131,000-1/2-20) 1MS
11	25017099	DIODE (8" ELECTRO)	42	BA60012	CARBON RESISTOR (22,000-1/2-10) 1MS
12	25017099	DIODE (8" ELECTRO)	43	BA60012	CARBON RESISTOR (22,000-1/2-10) 1MS
13	25017099	DIODE (8" ELECTRO)	44	BA60012	CARBON RESISTOR (22,000-1/2-10) 1MS
14	1242307	TUNING UNIT, GANG & RALLY ASSEMBLY	45	BA63255	CARBON RESISTOR (10,000-1/2-20) 1MS
15	20A17153	SEC. TRIUMER, PHASER & HYK.	46	BA6332	CARBON RESISTOR (1500-1/2-20) 1MS
16	20A29257	COMPENSATING CONDENSER (100-1,000)	47	BA6332	CARBON RESISTOR (1500-1/2-20) 1MS
17	BA17008	TUBULAR CONDENSER (1.5-100K) (40 V.)	48	BA6332	CARBON RESISTOR (1500-1/2-20) 1MS
18	BA19133	TUBULAR CONDENSER (1.5-100K)	49	BA6332	CARBON RESISTOR (1500-1/2-20) 1MS
19	BA19133	TUBULAR CONDENSER (1.5-100K)	50	BA6610	CARBON RESISTOR (1300-1/2-20) 1MS
20	BA13166	TUBULAR CONDENSER (1-100K)	51	BA7552	CARBON RESISTOR (2300-1/2-10) 1MS
21	BA4332	TUBULAR CONDENSER (1-100K)	52	BA7552	CARBON RESISTOR (2300-1/2-10) 1MS
22	BA4332	TUBULAR CONDENSER (1-100K)	53	BA6005	CARBON RESISTOR (50K-1/2-20) 1/2
23	BA41791	TUBULAR CONDENSER (.05-100K)	54	BA6005	VOL. TONE CONTROL & SWITCH (.5-5 KHZ)
24	BA41791	TUBULAR CONDENSER (.05-100K)	55	BA611068	VIBRATOR
25	BA43514	TUBULAR CONDENSER (.05-100K)	56	BA611068	BATTARY TUBE SHIELD
26	BA43514	TUBULAR CONDENSER (.05-100K)	57	BA611068	BATTARY TUBE SHIELD
27	BA43514	TUBULAR CONDENSER (.05-100K)	58	BA611068	BATTARY TUBE SHIELD
28	BA1100	TUBULAR CONDENSER (100-1,000)	59	BA611068	BATTARY TUBE SHIELD
29	BA1100	TUBULAR CONDENSER (100-1,000)	60	BA611068	BATTARY TUBE SHIELD
30	BA13165	TUBULAR CONDENSER (100-1,000)	61	BA611068	BATTARY TUBE SHIELD
			62	BA611068	BATTARY TUBE SHIELD
			63	BA611068	BATTARY TUBE SHIELD
			64	BA611068	BATTARY TUBE SHIELD

MODEL 49-B, Ch. A04,
49-BU, Ch. A11

GALVIN MFG. CORP.

MODEL 49-Bu PARTS PRICE LIST
SAME AS MODEL 49-B EXCEPT:

4S7688	Lockwasher 1/4 Int. Ext. Set Mtg.	Doz.	.20	15K30749	Welded Shell & Back	3.75
3S8039	Cap Screw 1/4-20x3/8 CP Set Mtg.	Doz.	.40	7A30754	Receiver Mounting Bracket R. H.	.15
11M8709	Dial Cord 30 lb. Blk.	Yard	.05	7K30755	Receiver Mounting Bracket L. H.	.15
11M8744	Dial Cord 18 lb. Blk. Wht.	Yard	.05	50B31086	Speaker & Output Transformer	6.35
37A17285	Light Bracket Band	Doz.	.20		Speaker Exchange	3.75
1X24844	Fuse Lead Assy.		.10	1H31143	Battery Lead Assy.	.25
1H29794	Receiver Accessories Kit Assy.		1.25	1J31179	Escutcheon & Pad Assy.	1.60
60A30048	Dial Scale Background		.15	1J31186	Dial Scale & Pads Assy.	.25
18B30314	Volume & Tone Switch		1.70	1J31187	Push Button Assy.	.15
47K30318	Tuning Drive Shaft		.25	1H31192	Background & Strips Assy1	.20
36K30341	Tuning Control Knob 1/4" Hole		.25	50B31555	Speaker & Output Transformer	6.35
36K30342	Volume Control Knob 3/16" Hole		.25		Speaker Exchange	3.75
37A30716	Dial Scale Pad	Per C.	.80			

MODEL 49-B PARTS PRICE LIST
MAJOR PARTS

48K11026	Vibrator Blk.	2.50	15K30286	Welded Back & Shell	3.75
25B17099	Output Transformer	1.50	18B30643	Volume & Tone Control	1.70
25A17103	Filter Choke	.75		ACCESSORIES	
23A17190	Electrolytic Condenser FF	1.00	41X2157	Backing Coil Spring Fuse Lead	Per .50
25B23250	Power Transformer	3.65	14X2423	Fuse Insulator Fuse Lead	Doz. .20
25A23466	Input Choke	1.70	9X4075	Fuse Receptacle Fuse Lead	Doz. .20
24K23467	Vibrator Choke 6 Pie	.50	14X4076	Backing Washer Fuse Lead	Doz. .10
1X23468	Oscillator Coil & Leads Assy.	.65	14X4077	Contact Bushing Fuse Lead	Doz. .20
1X23469	Diode Coil & Shield Assy	1.50	6X4141	Distributor Suppressor	.50
1X23471	I.F. Coil & Shield Assy.	1.40	9X4168	"A" Lead Male Ferrule	Doz. .25
1X23473	R. F. Coil & Shield Assy.	1.75	1X4288	Battery Lead Assy.	.40
1X23475	Antenna Coil & Shield Assy.	2.75	8A4491	Generator Condenser	.40
24K23483	"A" Choke	.25	65X4637	Fuse 20 Amp 3AG	.05
1X23487	Front Cover & Bushing Assy.	1.25	1X4894	Fuse Lead Assembly 20"	.25
50B23621	Speaker & Output Transformer	5.50	1X4895	"A" Lead Assembly 10"	.25
	Speaker Exchange	3.25	65X12712	Fuse 20 Amp SFE	.05
1X24205	Tuning Unit Assy Cpt. W Dial	6.80	1H29790	Receiver Accessory Kit Assy.	1.20
50B24493	Speaker & Output Transformer	5.50		DIAL & DRIVE PARTS	
50B24929	Speaker & Output Transformer	5.50	41A2372	Dialite Backing Coil Spring	Doz. .10
48A27393	Vibrator Heavy Duty	2.50	65X4151	Bulb 6-SVRnd. Bay Clr. #51	.15
1H29928	Bottom Cover Assy.	.85	41A11091	Tension Coil Spring Pointer Drive	Doz. .25
1J30145	Trimmers Brkt. & Grommet Assy.	.40	41A14759	Tension Coil Spring Shaft Drive	Doz. .25

GALVIN MFG. CORP.

MODEL 49-B, Ch. A04;
49-BU, Ch. A11

DIAL & DRIVE PARTS (Cont'd)

14K15252	Dialite Contact Bushing	Doz	.20
38A17093	Call Letter Tab Cover		.05
38A17094	Call Letter Backing		.05
35A17160	Push Button Pad Felt	Doz.	.20
1B17171	Push Button Plunger Assy.		.20
60A17178	Dial Light Socket & Bracket		.05
35A17224	Knob Washer Felt	Per C	.40

CONDENSERS

8K13166	Tubular Condenser .1-400V		.15
8A13514	Tubular Condenser .05-100V		.15
8A14791	Tubular Condenser .05-400V		.15
8A17028	Tubular Condenser .5-100V		.25
20A17153	Double Trimmer & Spec.Brkt.		.35
20A17935	Antenna Padder Single		.35
21A19088	Ceramic Condenser 250mmf 5%		.20
8A19183	Tubular Condenser .5-100V		.30
21A20877	Metal Mica Condenser 90mmf 10%		.15
20A22747	Diode Trimmer		.40
20A22751	I. F. Trimmer Double		.30
20A23102	R. F. Trimmer & Padder		.55
20A23827	Compensating Condenser		.25
8K23465	Tubular Cond. & Strap .03-1000V		.25

RESISTORS

6B5558	Carbon Resistor 200-1/3-10 Ins.	Doz.	.60
6B6005	Carbon Resistor 50-1/2-20 N.I.	Doz.	.60
6B6010	Carbon Resistor 330-1/2-20 Ins.	Doz.	.60
6B6012	Carbon Resistor 33,000-1/2-20 Ins.	Doz.	.60
6B6159	Carbon Resistor 1 Meg-1/3-20 Ins.	Doz.	.60
6B6212	Carbon Resistor 22,000-1/3-20 Ins.	Doz.	.60
6B6255	Carbon Resistor 10,000-1/3-20 Ins.	Doz.	.60
6B6321	Carbon Resistor 47,000-1/3-20 Ins.	Doz.	.60
6B6338	Carbon Resistor 470,000-1/3-10 Ins.	Doz.	.60
6B6339	Carbon Resistor 150,000-1/3-20 Ins.	Doz.	.60
6B6340	Carbon Resistor 27,000-1/3-10 Ins.	Doz.	.60
6B6341	Carbon Resistor 22,000-1-10 Ins.		.10
6B6342	Carbon Resistor 1,500-1/3-20 Ins.	Doz.	.60
6B6343	Carbon Resistor 910-1/3-5 Ins.	Doz.	.60
6B6344	Carbon Resistor 400-1-20 Ins.		.10
6B6345	Carbon Resistor 390-1/3-10 Ins.	Doz.	.60
6B6457	Carbon Resistor 22,000-1-10 Ins.		.10

SCREWS, WASHERS, ETC.

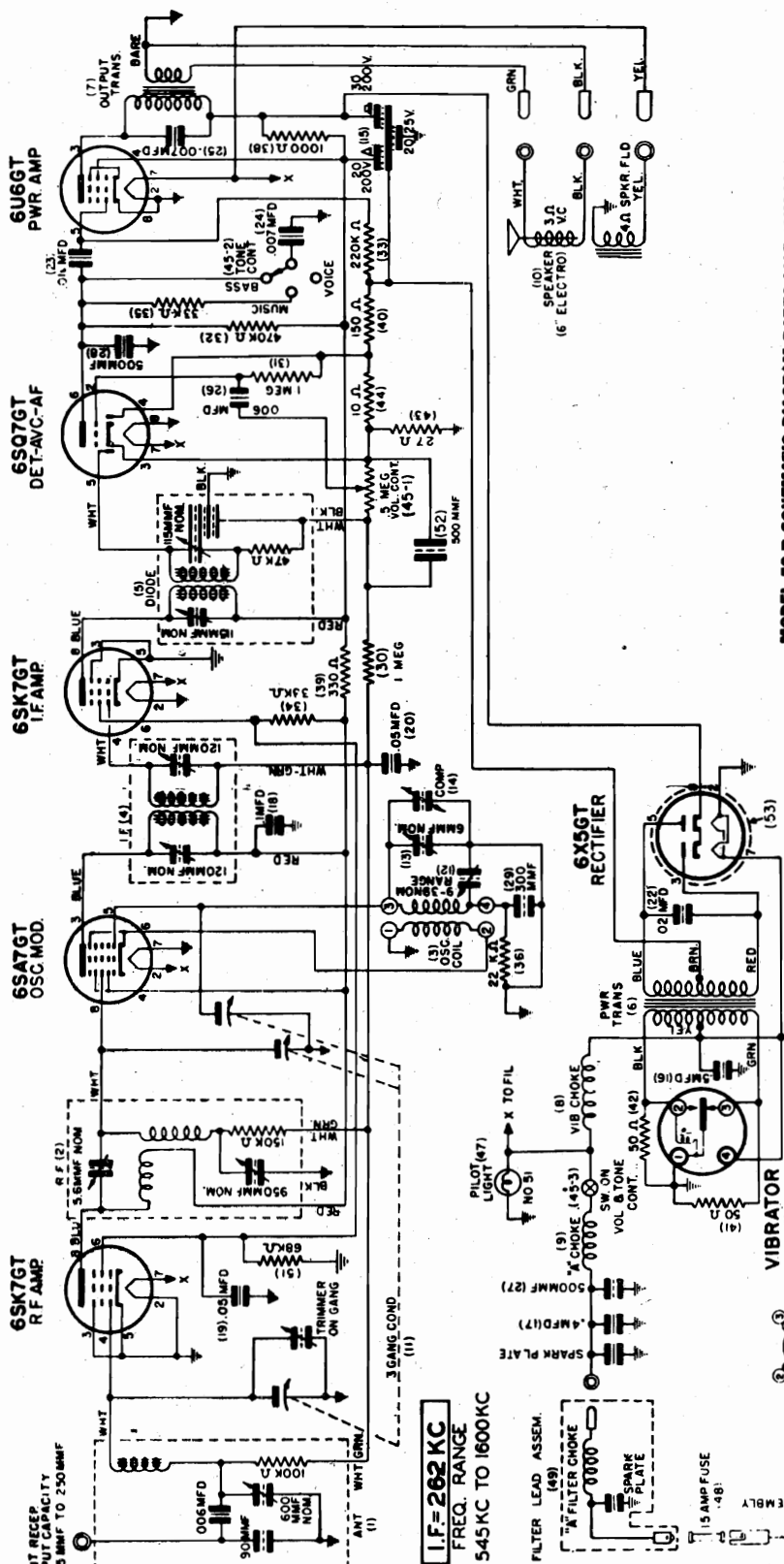
4K4823	Cup Washer Cop. Pl Trimmer Mtg.	Doz.	.10
2S7003	Nut 8032x5/16 Hex CP Spkr.	Per C	.50
2S7005	Nut 6-32x1/4 Hex CP Ant. Coil	Per C	.40
2S7022	Nut 1/4-20x7/16 Hex Set Mtg.	Per C	.60
2S7070	Nut 6-32x1/4 Inv. Pal Coils	Per C	.50
2S7093	Nut 6-32x1/4 Pal Cop. Pl Coils	Per C	.45
3S7160	Screw 3/16" CP Plunger Bkt. Mtg	Per C	.35

SCREWS, WASHERS, ETC. (Cont'd)

3S7217	Screw 1" Brass Ant. Padder Mtg.	Per C	.90
3S7224	Screw 1/4" Brass Coils	Per C	.50
3S7454	Screw #8x1/4 CP Misc. Mtg.	Doz.	.20
3S7456	Screw #8x1/4 Cop. Ox. Housing	Per C	.65
3S7457	Screw 7/8" CP Coil Mtgs.	Doz.	.25
3S7461	Screw 5/16" Cop Ox. Housing	Doz.	.15
3S7499	Screw 5/8" Cop. Ox. Housing	Per C	.00
3S7506	Screw #6x1/4CP Osc. Mtg.	Per C	.50
3S7508	Screw 1/4" Blk Tuning Unit Mtg.	Per C	.65
4S7609	Washer 1-5/16" CP Set Mtg	Doz.	.35
4S7635	Washer 7/8" CP Set Mtg.	Doz.	.25
4S7650	Lockwasher #6 Int. CP Eye Bkt. Mtg.	Per C	.50
4S7657	Lockwasher #8 Ext. Spkr.	Per C	.50
4S7665	Lockwasher #6 Spec. Coils	Per C	.75
4S7666	Lockwasher #6 Ext. Ant. Coil	Per C	.50
4S7670	Lockwasher 1/4" Int. -Set Mtg.	Per C	.50
5S7831	Eyelet 13/16" Long-P.B. Plunger Doz.		.25
3S8126	Screw 1-1/2" CP -Pwr. Trans.	Doz.	.20
3S8131	Screw 1-7/8" SS -Choke Mtg.	Doz.	.65
3A13748	Screw 17/32" CP-Gang Bkt. Mtg.	Doz.	.20
2K18722	Nut Cop. Pl Hex -Vol.Cont.	Doz.	.75
2K23491	Spacer Nut Hex Vol. Cont.		.15
3A23753	"J" Bolt -Set Mtg.	Doz.	.60
4K24124	"C" Washer -Tuning Shaft	Per C	.85
4A24333	Cup Washer -Chrome Tuning Nut	Doz.	.50
MISCELLANEOUS			
31A493	Terminal Strip 2 ins. #2 Mtg.		.05
31A3224	Terminal Strip 3 ins. #3 Mtg.		.10
37A4187	Rubber Grommet-Eye Bkt. Mtg.	Doz.	.25
39X4205	Hood Wiper-Power Trans.	Doz.	.25
42A4215	Vibrator Grounding Clip	Doz.	.75
29B5249	Soldering Lug	Per C	.75
29B5265	Soldering Lug.	Doz.	.20
29B5404	Insl. Pin Terminal Rqd "A" Lead		.05
42B5480	Grid Clip Small Collar Grip	Doz.	.15
9B6734	Tube Socket Saddle 4 Prong		.15
9B6771	Tube Socket Saddle Octal		.15
9A6774	Tube Socket Saddle Octal		.15
9A6782	Tube Socket Inverted Octal		.15
38X10544	Plug Button 1/4" Cop. Ox.	Doz.	.25
37A12691	Rubber Grommet Gang Mtg.	Doz.	.25
37X14051	Rubber Sleeve "A" Lead	Doz.	.20
26X14760	Bantam Tube Shield		.05
37A15831	Sponge Rubber Pad- Bottom Cover	Doz.	.45
39A17179	Grounding Wiper-Bottom Cover		.05
37A17216	Speaker Gasket Front Cover		.15
32A18493	Fibre Space Washer Dial Lights	Per C	.35
26A26283	Tube Shield		.05
26C24534	Hash Shield		.05
64K30296	Speaker Screen		.10

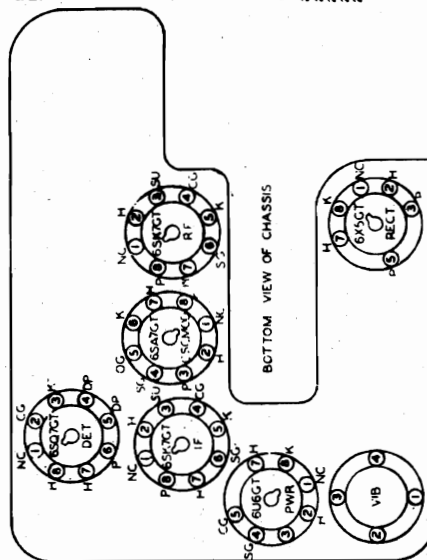
Prices subject to change without notice.

GALVIN MFG. CORP.:



MODEL 50-P SCHEMATIC DIAGRAM PARTS LIST (CHASSIS TYPE A05)

DWG. NO.	PART NO.	DESCRIPTION	DWG. NO.	PART NO.	DESCRIPTION
1	112381	ANTENNA COIL & SHIELD ASSEMBLY	26	BAL595	TUBULAR CONDENSER (.005-.006")
2	112382	OSCILLATOR COIL & SHIELD ASSEMBLY	27	112383	SLIDED mica CRD. (.500 MATD.) 202
3	112383	OSCILLATOR COIL & LEADS ASSEMBLY	28	211600	SLIDED mica CRD. (.500 MATD.) 202
4	112384	"I" COIL & SHIELD ASSEMBLY	29	212101	CERAMIC mica CRD. (.500 MATD.) 202
5	112385	DIODE COIL & SHIELD ASSEMBLY	30	666-195	CARBON RESISTOR (1.0 MEG./1-20) INS.
6	112386	POWER TRANSFORMER	31	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
7	211700	PISTON	32	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
8	211701	PISTON	33	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
9	211702	"A" OHME & BRACKET	34	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
10	211703	SPARKER (6" ELECTRO)	35	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
11	204311	CON. PLUGGER & SHIELD ASSEMBLY	36	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
12	204312	CON. PLUGGER & SHIELD ASSEMBLY	37	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
13	204313	TRIMMER & BRACKET (6 BATT. MOD.)	38	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
14	204314	COMPENSATING CONDENSER	39	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
15	204315	SLIDED mica CRD. (.500 MATD.) 202	40	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
16	204316	TUBULAR CONDENSER (.01-.001")	41	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
17	811600	TUBULAR CONDENSER (.01-.001")	42	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
18	813110	TUBULAR CONDENSER (.01-.001")	43	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
19	813116	TUBULAR CONDENSER (.01-.001")	44	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
20	813116	TUBULAR CONDENSER (.01-.001")	45	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
21	813116	TUBULAR CONDENSER (.01-.001")	46	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
22	813116	TUBULAR CONDENSER (.01-.001")	47	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
23	813116	TUBULAR CONDENSER (.01-.001")	48	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
24	813116	TUBULAR CONDENSER (.01-.001")	49	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
25	813116	TUBULAR CONDENSER (.01-.001")	50	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
26	813116	TUBULAR CONDENSER (.01-.001")	51	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
27	813116	TUBULAR CONDENSER (.01-.001")	52	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
28	813116	TUBULAR CONDENSER (.01-.001")	53	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
29	813116	TUBULAR CONDENSER (.01-.001")	54	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
30	813116	TUBULAR CONDENSER (.01-.001")	55	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
31	813116	TUBULAR CONDENSER (.01-.001")	56	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
32	813116	TUBULAR CONDENSER (.01-.001")	57	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
33	813116	TUBULAR CONDENSER (.01-.001")	58	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
34	813116	TUBULAR CONDENSER (.01-.001")	59	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
35	813116	TUBULAR CONDENSER (.01-.001")	60	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
36	813116	TUBULAR CONDENSER (.01-.001")	61	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
37	813116	TUBULAR CONDENSER (.01-.001")	62	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
38	813116	TUBULAR CONDENSER (.01-.001")	63	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
39	813116	TUBULAR CONDENSER (.01-.001")	64	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
40	813116	TUBULAR CONDENSER (.01-.001")	65	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
41	813116	TUBULAR CONDENSER (.01-.001")	66	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
42	813116	TUBULAR CONDENSER (.01-.001")	67	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
43	813116	TUBULAR CONDENSER (.01-.001")	68	666-195	CARBON RESISTOR (.270 .000-1/2-20) INS.
44	813116				



VOLTAGE CHART			
TUBE	PLATE TO GRID	SCREEN TO GRID	CATH. TO GRID
6SK7GT	115V.	74V.	0
6SK7GT	115V.	115V.	0
6SK7GT	120V.	74V.	0
6SK7GT	35V.	---	-2.8V
6SK7GT	140V.	120V.	0
6SK7GT	A C	A C	145V

NOTE
ALL VOLTAGES MEASURED ON A 1000 OHM
PER VOLT VOLT-METER

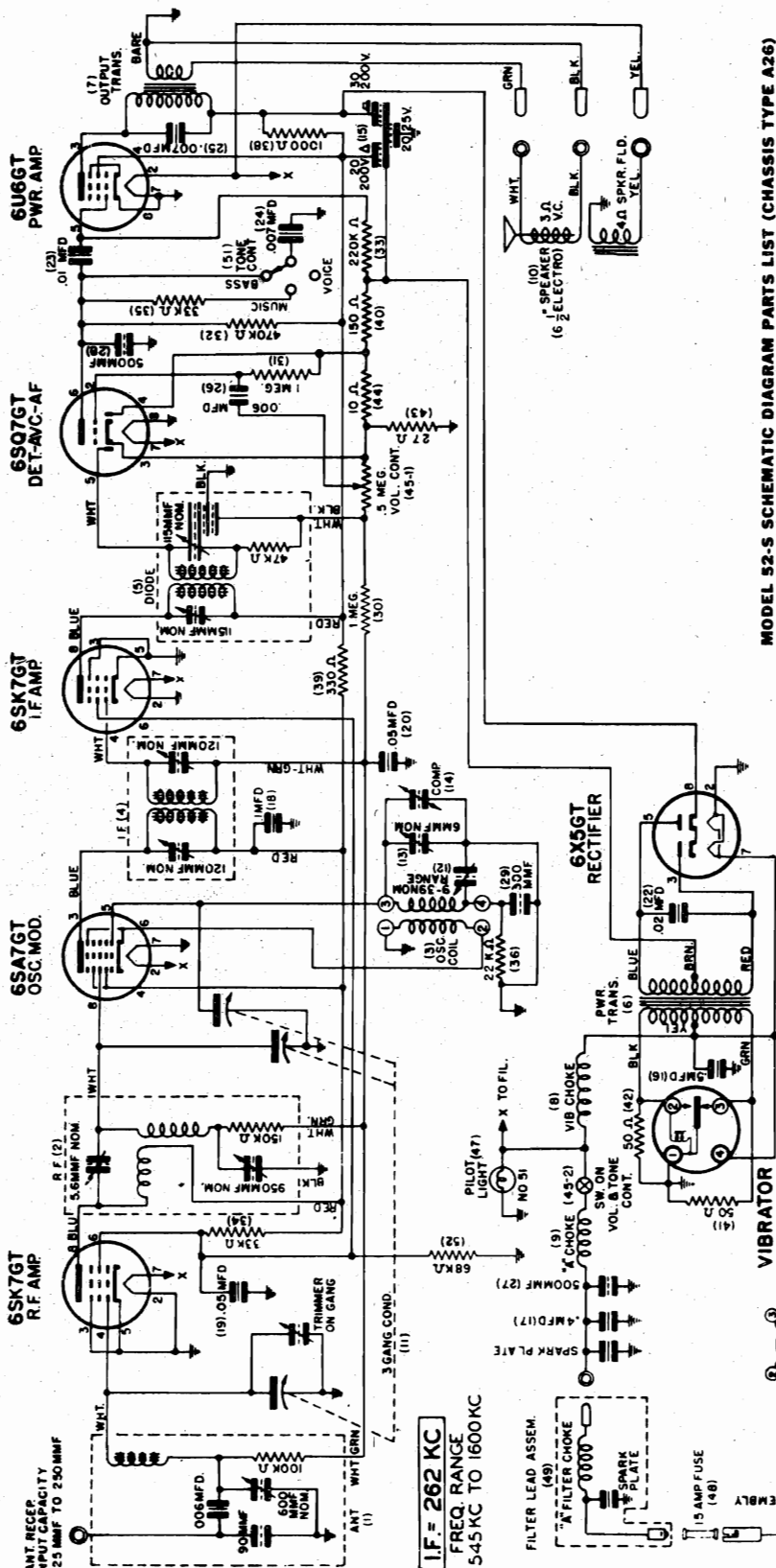
**MODEL 50P PARTS PRICE LIST
A05 CHASSIS ASSEMBLY
MAJOR PARTS**

MODEL AND PARTS PRICE LIST AND CHASSIS ACCESSORIES MAJOR PARTS		
4114759	Tension Coil Spring Dr. Pul.	Doz. .25
4115252	Dialite Bushing Contact	Doz. .20
4011686	Cord Guide Pulley .218 Brass	Doz. .20
37717013	Brake Shoe Rubber	Doz. .20
35117254	Knob Washer Felt Vol.	Per C .40
35117640	Knob Washer Felt Tun.	Doz. .15
41118022	Compression Coil Spring P.B. Assy.	Per C .50
40121741	Cord Pulley 3/8"	Doz. .20
41121886	Brake Arm Torque Spring R. H.	Doz. .75
41121886	Brake Arm Torque Spring L. H.	Doz. .75
1123416	Pointer Assy.	.10
7823459	Gang Mfg. Bracket Left	.15
7823450	Gang Mfg. Bracket Right	.15
7423856	Malite Mounting Bracket	Doz. .20
1123884	Plunger Pointer & Pulley Assy.	.20
1123886	Dial Background & Bkkt. Assy.	.45
1123887	Dial Zentechon Assy.	1.70
36824356	Tone Control Lever 1/4 9/32	.35
7424680	Tuning Unit Mfg. Bkkt. Strip	Doz. .20
47124848	Tuning Drive Shaft	.15
43424853	Tuner Shaft Mfg. Bushing	.15
1124858	Bracket & Pulleys Assy.	.15
36123857	Control Knob 3/16"	.25
38123857	Push Button & Stud	.15
CONDENSERS		
8412289	Tubular Condenser .007-.000V	.20
8413510	Tubular Condenser .11-.000V	.15
844589	Tubular Condenser .006-.100V	.15
2115500	Molded Mica Condenser 500Mmf 2 1/2"	.15
8413014	Condenser Resistor .005-.100V100K	.25
8413514	Tubular Condenser .05-.100V	.15
8414095	Tubular Condenser .4-.100V	.20
20117237	Trimmer & Eye Bkkt. 6mmf.	.30
20117955	Antenna Padder Single	.35
20120358	Compensating Condenser	.25
20122747	Trimmer Diode Small	.40
20122751	Diode Trimmer I. F.	.30
8412760	Tubular Condenser .02-.000V	.15
84123053	Tubular Condenser .01-.000V	.10
20123102	R. F. Trimmer & Padder	.55
21123110	Ceramic Mic Condenser 500Mmf 5 1/2"	.25
20123135	Opt. Padder & Eye Bracket	.80
84123146	Tubular Condenser .04-.000V	.10
84123839	Tubular Condenser .50100V	.40
RESISTORS		
686005	Carbon Res. 50-1/2-20 M.I.	Doz. .60
686010	Carbon Res. 330-1/2-20 Ins.	Doz. .60
686012	Carbon Res. 33,000-1/2-20	Doz. .60
686159	Carbon Res. 1 Meg-1/2-20 Ins.	Doz. .60
686160	Carbon Res. 470,000-1/2-20 M.I.	Doz. .60
ACCESORIES		
4112423	Fuse Insulator "A" Lead	Doz. .20
6814141	Distributor Suppressor	.50
5015 Amp 340	Fuse 15 Amp 340	.05
6814185	Flood Wire	Doz. .25
844491	Generator Condenser	.40
844661	Armature Condenser	.40
991914779	Grounding Wiper Curved	.05
1123408	Fuse Lead Assy 16"	.15
7023651	Speaker Gasket Only	.45
33232903	Bushing .665-.625 3/4 Set Mtg.	.10
991924662	Grounding Wiper Brass Chas.	Doz. .40
332329036	Shrt Makker	Per C .80
1123751	Receiver Accessories Assy	1.60
11231241	Filter Lead Assy	.50
DIAL & DRIVE PARTS		
1112372	Dialite Backing Coil Spring	Doz. .10
587611	Eyellet 9/16x.210 Blk Gang Mtg.	Doz. .20
587624	Eyellet 3/16x.100 Brass Dial Cord	Per C .25
1118744	Dial Cord Blk Wht Ftr.	Yard .05
1118877	Dial Cord Nylon Shaft	Yard .10
111111091	Tension Coil Spring Large	Doz. .25
20111579	Dialite Socket & Clip	.05
58111854	Hub 6/16V-15A Tub Bay. CLR. #47	.10
77111891	Rubber Grommet Gang Mtg.	Doz. .25
5113748	Locking Screw 8-32x1/2 22 CP Gang	Doz. .20
CARBON RES.		
686194	Carbon Res. 1,000-1/2-20 M.I.	Doz. .25
68604	Carbon Res. 220,000-1/2-20 Ins.	Doz. .60
686216	Carbon Res. 22,000-1/2-20 Ins.	Doz. .60
686232	Carbon Res. 68,000-1/2-20 Ins.	Doz. .60
686321	Carbon Res. 47,000-1/2-20 Ins.	Doz. .60
686329	Carbon Res. 33,000-1/2-20 Ins.	Doz. .60
686330	Carbon Res. 150-1-10 Ins.	Doz. .10
686331	Carbon Res. 27-1/2-10 Ins.	Doz. .60
686332	Carbon Res. 10-1/2-10 Ins.	Doz. .60
686339	Carbon Res. 150,000-1/2-20 Ins	Doz. .60
SCREWS, WASHERS, ETC.		
237003	Nut 6-32x5/16 Hex CP Sprk.	Per C .50
237070	Nut 6-32x1/4 Inv. Pal CP Colls	Per C .50
337160	Screw 6-32x3/16 CP P.B. & P Assy.	Per C .35
337215	Screw 6-32x3/16 CP Trim Mtg.	Doz. .25
337250	Screw 6-32x1/2 Brass Choke	Per C 1.00
337295	Screw 1/4-28x3/4 CP Set Mtg.	Doz. .30
337454	Screw 1/4-28x3/4 PK Z PLHR CP	Doz. .20
337457	Screw 1/8 CP Per. Trans.	Doz. .25
337461	Screw 5/16 CP Housing	Doz. .15
337499	Screw 5/16 CP. Ogd. Ant. Mfg.	Per C 1.00
337506	Screw 6x1/4 PK CP Osc. Mtg.	Per C .50
437573	Washer 11/16.043-.187 CP Choke	Doz. .15
437535	Washer 7/8-.281-.050 CP Set Mtg.	Doz. .25
437652	Lockwasher #6 Ext. 30 Sprk	Per C .50
437666	Lockwasher #6 Ext. Blk Osk. Coll	Per C .50
437678	Lockwasher 1/4" Ext. CP Set Mtg.	Per C .50
437692	Lockwasher 1/2 Int. Blk Vol. Cont.	Doz. .20
3116990	Shoulder Screw 6-32 Spec.	.35
2317206	Nut 1/2-28x5/8 Hex Brass Vol. Cont.doz.	.75
4119232	Spring Washer 7/16 Tms. Shaft	Doz. .20
4119237	"C" Washer 1/8" Tms. Shaft	Per C .65
4119371	Spacer Washer 3/4" O.D. CP. Frt. Mfg. Doz.	.35
4119424	"C" Washer P.B. Shaft	Per C .85
4343433	Tuning Nut Cup Washer	Doz. .50
4313148	Cup Washer Trim Mtg.	Per C 1.00
MISCELLANEOUS		
27441197	Rubber Grommet	Doz. .25
2895239	Soldering Lug Long Tab.	Doz. .15
996754	Tube Socket Saddle 4 Pong	.15
996760	Tube Socket Octal 90° Blk	.15
996771	Tube Socket Saddle Octal	.15
946774	Tube Socket Saddle Octal	.15
946782	Tube Socket Inverted Octal	.15
537820	Eyellet .470-.125-.230. Brs. CSP	Per C .60
537855	Eyellet 1/2x.156 Brass	Per C .70
31110099	Terminal Strip 3 Ind. #2 Mfg.	Doz. .10
38110544	Plug Button 1/4" Cop. Osk.	Doz. .25
Prices subject to change without notice.		

Prices subject to change without notice.

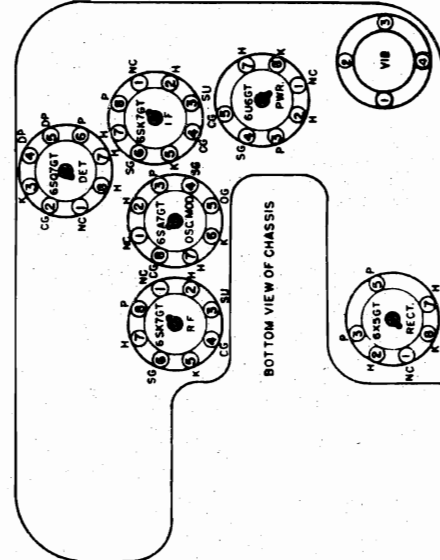
MODEL 52-S

GALVIN MFG. CORP.



MODEL 52-S SCHEMATIC DIAGRAM PARTS LIST (CHASSIS TYPE A26)

DI. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
1	1A23107	ANTENNA COIL & SHIELD ASSEMBLY	27	21B5500	MOLDED MICA COND. (500 MFD.) 20K
2	1A23098	R.F. COIL & SHIELD ASSEMBLY	28	21B5500	MOLDED MICA COND. (500 MFD.) 20K
3	21A23098	OSCILLATOR COIL	29	21A23110	CERAMIC MICA COND. (500 MFD.) 5K
4	1A23096	I.F. COIL & SHIELD ASSEMBLY	30	685159	CARBON RESISTOR (1.0 MEG-1/2-20) 5K
5	21A23096	DIODE COIL & SHIELD ASSEMBLY	31	685159	CARBON RESISTOR (1.0 MEG-1/2-20) 5K
6	21A23103	OSCILLATOR COIL	32	685159	CARBON RESISTOR (1.0 MEG-1/2-20) 5K
7	21A23097	OUTPUT TRANSFORMER	33	685159	CARBON RESISTOR (1.0 MEG-1/2-20) 5K
8	21A17210	VIBRATOR CHOK	34	685159	CARBON RESISTOR (1.0 MEG-1/2-20) 5K
9	21A23098	"A" CHOK & BRACKET	35	685159	CARBON RESISTOR (1.0 MEG-1/2-20) 5K
10	50A23098	SPEAKER (6-1/2" ELECTRO)	36	685159	CARBON RESISTOR (1.0 MEG-1/2-20) 5K
11	21A23103	OSCILLATOR COIL	37	685159	CARBON RESISTOR (1.0 MEG-1/2-20) 5K
12	21A23103	OSCILLATOR COIL	38	685159	CARBON RESISTOR (1.0 MEG-1/2-20) 5K
13	21A23103	OSCILLATOR COIL	39	685159	CARBON RESISTOR (1.0 MEG-1/2-20) 5K
14	21A23103	OSCILLATOR COIL	40	685159	CARBON RESISTOR (1.0 MEG-1/2-20) 5K
15	21A23103	OSCILLATOR COIL	41	685159	CARBON RESISTOR (1.0 MEG-1/2-20) 5K
16	21A23103	OSCILLATOR COIL	42	685159	CARBON RESISTOR (1.0 MEG-1/2-20) 5K
17	21A23103	OSCILLATOR COIL	43	685159	CARBON RESISTOR (1.0 MEG-1/2-20) 5K
18	21A23103	OSCILLATOR COIL	44	685159	CARBON RESISTOR (1.0 MEG-1/2-20) 5K
19	21A23103	OSCILLATOR COIL	45	685159	CARBON RESISTOR (1.0 MEG-1/2-20) 5K
20	21A23103	OSCILLATOR COIL	46	685159	CARBON RESISTOR (1.0 MEG-1/2-20) 5K
21	21A23103	OSCILLATOR COIL	47	685159	CARBON RESISTOR (1.0 MEG-1/2-20) 5K
22	21A23103	OSCILLATOR COIL	48	685159	CARBON RESISTOR (1.0 MEG-1/2-20) 5K
23	21A23103	OSCILLATOR COIL	49	685159	CARBON RESISTOR (1.0 MEG-1/2-20) 5K
24	21A23103	OSCILLATOR COIL	50	685159	CARBON RESISTOR (1.0 MEG-1/2-20) 5K
25	21A23103	OSCILLATOR COIL	51	685159	CARBON RESISTOR (1.0 MEG-1/2-20) 5K
26	21A23103	OSCILLATOR COIL	52	685159	CARBON RESISTOR (1.0 MEG-1/2-20) 5K



NOTE: ALL VOLTAGES MEASURED ON A 1000 OHM PER VOLT VOLTAGE METER

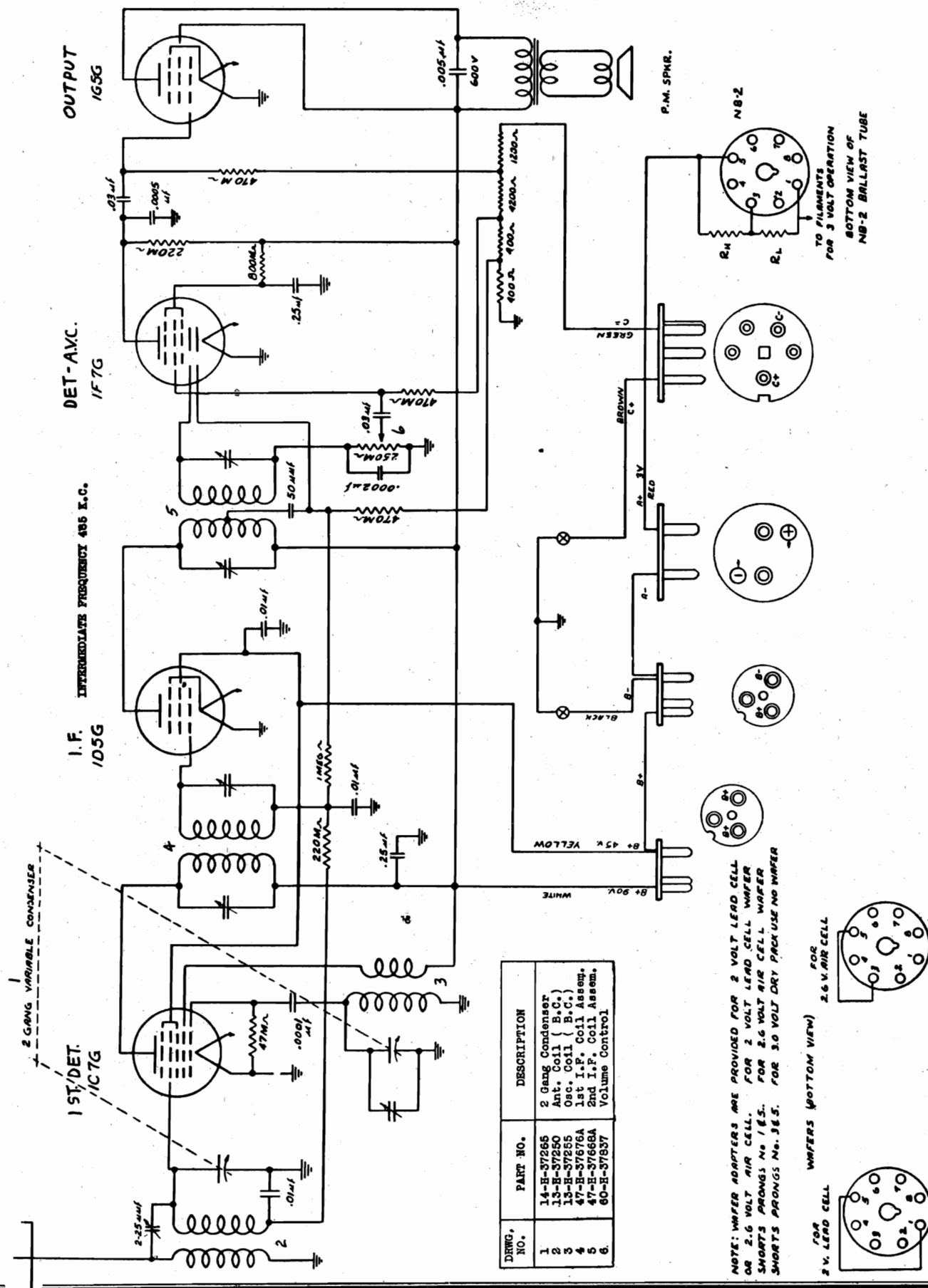
TUBE	PLATE TO GND	FILAMENT TO GND	SCREEN TO GND
6SK7GT RF AMP	115V	60V	0
6SA7GT OSC MOD.	115V	115V	0
6SQ7GT IF AMP	120V	60V	0
6U6GT DET. AVC	35V	-8V	0
6U6GT PWR. AMP	145V	120V	0
6X5GT RECT.	A C	145V	0

GALVIN MFG. CORP.

52-S PARTS PRICE LIST
MAJOR PARTS

		List		
			CONDENSERS	
48A5067	Vibrator	2.50	8A2289	Tubular Condenser .007 600V .20
48A5333	Vibrator	2.50	8A3310	Tubular Condenser .1 200V .15
24A17010	Vibrator Choke	.35	8A4529	Tubular Condenser .006 100V .15
23A22738	Electrolytic Condenser Fp.	.75	21B6500	Molded Mica Condenser 500mf 20% .15
24A23058	Oscillator Coil-Ceramic	.40	8A13014	Condenser Resistor .006 100V 100K .25
25A23059	Output Transformer	1.00	8A13514	Tubular Condenser .05 100V .15
25B23068	Power Transformer	2.35	8A14095	Tubular Condenser .4 100V .30
24A23092	"A" Choke & Bracket	.35	20A17257	Trimmer & Eye Bracket 6 MMF .20
1X23094	Diode Coil & Shield Assembly	1.50	20A17935	Antenna Padder Single .35
1X23094	IF Coil & Shield Assembly	1.35	20A22747	Diode Trimmer Small .40
1X23098	R. F. Coil & Shield Assembly	1.30	20A22751	Double Trimmer 120 Mmf Nom. .30
1X23107	Antenna Coil & Shield Assembly	2.65	8A22760	Tubular Condenser .02 600V .15
1X23143	Oscillator Coil & Leads Assembly	.40	8A23053	Tubular Condenser .01 200V .10
40A24606	Tone Control Switch-Midget	.40	20A23102	R. F. Trimmer & Padder .55
18A24657	Volume Control & Switch	.80	21A23110	Ceramic Mica Condenser 300 Mmf 5% .25
1X24697	Tuning Unit Assembly	7.25	20A23135	Oscillator Padder & Eye Bracket .20
1X27094	Gang Pulley & Brake Assembly	5.15	8A23146	Tubular Condenser .05 200V .10
15K29715	Outer Shell	2.50	20A23827	Compensating Condenser .25
15K29718	Front Covers	1.75	8A23229	Tubular Condenser .5 100V .40
50B30644	Speaker 8" Electro	3.80	RESISTORS	
	Speaker Exchange	2.25	6B6005	Carbon Resistor 50-1/2-20 N.I. Doz. .60
1X31263	Back Cover Assembly	1.85	6B6010	Carbon Resistor 330-1/2-20 Ins. Doz. .60
ACCESSORIES			6B6012	Carbon Resistor 33,000-1/2-20 Doz. .60
14X2423	Fuse Insulator "A" Lead Doz. .20		6B6159	Carbon Resistor 1 Meg 1/3-20 Ins. Doz. .60
9X4075	Fuse Receptacle Doz. .20		6B6160	Carbon Resistor 470,000 1/3 20 N.I. Doz. .60
14X4077	Fuse Insulator Bushin G & Contact Eyelet Doz. .20		6B6184	Carbon Resistor 1,000-1-20 N.I. Doz. .10
6X4141	Distributor Suppressor Doz. .50		6B6204	Carbon Resistor 220,000 1/3 20 Ins. Doz. .60
65X4151	Bulb 6-8 Volt 25 Amp Rnd. Ray. .15		6B6212	Carbon Resistors 22,000 1/3 20 Ins. Doz. .60
65X4165	Fuse 15 Amp. 3AG .05		6B6256	Carbon Resistors 68,000 1/3 20 Ins. Doz. .60
8A4491	Generator Condenser Doz. .40		6B6321	Carbon Resistor 47,000 1/3 20 Ins. Doz. .60
64B4607	Speaker Screen & Flocking .60		6B6329	Carbon Resistor 33,000 1/3 20 Ins. Doz. .60
29B5401	Large Pin Terminal .156 x11/16 NP Doz. .20		6B6330	Carbon Resistor 150-1-10 Ins. Doz. .10
9B6734	Tube Socket Saddle 4 Prong .15		6B6331	Carbon Resistor 27-1/3-10 Ins. Doz. .60
9B6771	Tube Socket Saddle Octal .15		6B6338	Carbon Resistor 10-1/3-10 Ins. Doz. .60
1X12820	Antenna Receptacle Assembly .15		6B6339	Carbon Resistor 150,000 1/3 20 Ins. Doz. .60
39B17479	Grounding Wiper Curved .05		6B6456	Carbon Resistor 150-1-10- Ins. Doz. .10
1X18174	Fuse Lead Assembly 7" .15		SCREWS, WASHERS, ETC.	
14A23136	Lead Stabilizer Doz. .25		14A1374	Extruded Fibre Washer Doz. .95
37C24621	Speaker Gasket .40		14X4076	Fuse Backing Washer -Bakelite Doz. .10
1X29792	Receiver Accessories Kit Assembly 1.60		4K4823	Condenser Mounting Cup Washer Cop. Pl. Doz. .10
1X31262	Filter Lead Assembly .55		237003	Nut 8/32x5/16 Hex CP. Per C .50
DIAL & DRIVE PARTS			237018	Nut 3/8 x 1/2 Hex CP Turn Shaft Doz. .15
41A2157	Backing Coil Spring -Fuse Per C .50		237035	Nut 5/16 18x5/8 Sp. Hex CP Fits "J2 Bolt Doz. .20
41A2372	Dialite Backing Coil Spring Doz. .10		237087	Speednut .233 x 29/64 Blued Per C .75
537811	Eyelet 5/16 x.210 Blk Doz. .20		237160	Screw 8-32x 3/16 S1HMS CP Slider Bkt. Per C .35
537820	Eyelet .470-129 .230 Brass CSP Doz. .60		337215	Screw 8-32x 3/16 P H BHMS CP Doz. .25
537855	Eyelet 1/2x.156 Brass Per C .70		337250	Screw 8-32x1" PLHMS Brass Per C 1.00
60A11579	Dial Light Socket & Clip Or Brkt. .05		337368	Screw 8-32x 1 1/2 25/32 S1HMS CP Doz. .25
14K15252	Dialite Bushing Contact Doz. .20		337454	Screw 8x1/4 PK Z PLHH CP Doz. .20
37A17013	Brake Shoe Rubber Tubing Doz. .20		337455	Screw 8x3/8 PK A SLAH CO For Cab. Back Doz. .20
1B7171	Push Button Plunger Assembly .20		337456	Housing Screw 8x1/4 Cop. Oxd. ACHD PKA Per C .65
1X17175	Brake Rod & Arm Assembly .10		337457	Screw 8x7/8 PK A PLHH CP Doz. .25
36A17205	Tone Control Lever .40		337461	Screw 8x5/16 PK A AH CO Doz. .15
7A17282	Dial Light Mounting Bracket .05		337475	Screw 8x.1/4 PK Z SLACHO CP Per C .65
41A21885	Brake Arm Torque Spring R. H. Doz. .75		337499	Screw 8x5/8PK A AH Cop. Oxd. Hsg. Per C 1.00
41K21886	Brake Arm Torque Spring L. H. Doz. .75		337506	Screw 6x1/4 PK Z PLHH CP Per C .50
7A23074	Tuning Unit Mounting Bracket Strip Doz. .20		437555	Washer 1/4 .128 .032 CP Per C .85
35K24149	Felt Washer 7/16x3/16 Blk Vol Knob Per C .75		437573	Chassis Mtg. Washer 11/16 -3/16 .046 Doz. .15
13D24452	Dial Escutcheon-Chrome .65		437605	Washer 3/4 .328 .031 CP Doz. .35
35A24602	Push Button Cushion Doz. .45		437650	Lockwasher #6 Int. CP. Per C .50
64A24604	Dial Scale Backing Plate .10		437657	Lockwasher #8 Ext. B.O. Per C .50
47A24611	Tuning Drive Shaft .15		437666	Lockwasher #6 Ext. Blk. Per C .50
7B24617	Gang Mounting Bracket Left .20		437668	Lockwasher 3/8 Ext. Blk. Per C .50
1X24699	Gang Mounting Bracket Right .35		437674	Lockwasher 5/16 Int. CP Set Mtg. Per C .55
1X24702	Slider, Plunger & Pulleys Assembly .50		3A13748	Locking Screw Automatic 8-32x17/32 Doz. .20
1X24703	Dial Background & Bracket Assembly .35			HHCP Doz. .35
1X24704	Background Assembly .30		3A16990	Shoulder Screw 6-32 Spec Doz. .35
1X24706	Pointer Slider & Extension .10		4A21577	"C" Washer 1/8" Notched Per C .65
1K24707	Pointer Assembly .15		4K24124	"C" Washer .487 for .250 Per C .85
34K29719	Dial Scale .30		35K24148	Felt Washer 1/8 Blk. Tun. Knob Per C .85
38K29752	Push Button & Stud .15		4A24554	Spring Washer 3/8 HT Tun. Doz. .40
36K29753	Tuning & Control Knob .20		4A24723	"C" Washer Tone Cont. Per C .55
1X31260	Dial And Escutcheon Assembly 3.10		4K24724	Cum Washer 7/8 .171 Doz. .55
1X31261	Push Button Assembly(5) .70		MISCELLANEOUS	
Prices subject to change without notice.			37A4187	Rubber Grommet Doz. .25
			42A4215	Vibrator Grounding G Clip Doz. .75
			29B5239	Soldering Lug (Long Tab) Doz. .15
			29B5265	Soldering Lug Doz. .20
			38X10544	Plug Button 1/4" Cop. Oxd. Doz. .25
			37A12681	Rubber Grommet-(Gang Mtg.) Doz. .25
			9A12705	Elect. Ins. Wafer 1-5/16 Doz. .10
			37X14051	Rubber Sleeve Doz. .20
			31K14509	Terminal Strip 4 ins. #3 Mt.g Doz. .05
			9K14906	Elect. Ins. Wafer Armita Doz. .15
			39A24524	Tube Base Grounding Wiper Doz. .20
			39A24662	Hoof Wiper Doz. .40
			39X28036	Shirt Marker Per C .80

P.M. SPKR.



For Alignment, see P.15-5

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GALVIN MFG. CORP.

MODELS 55X11, 55X12, 55X13,
Ch. HS-1; 55X11A, 55X12A,
55X13A, Ch. HS-50

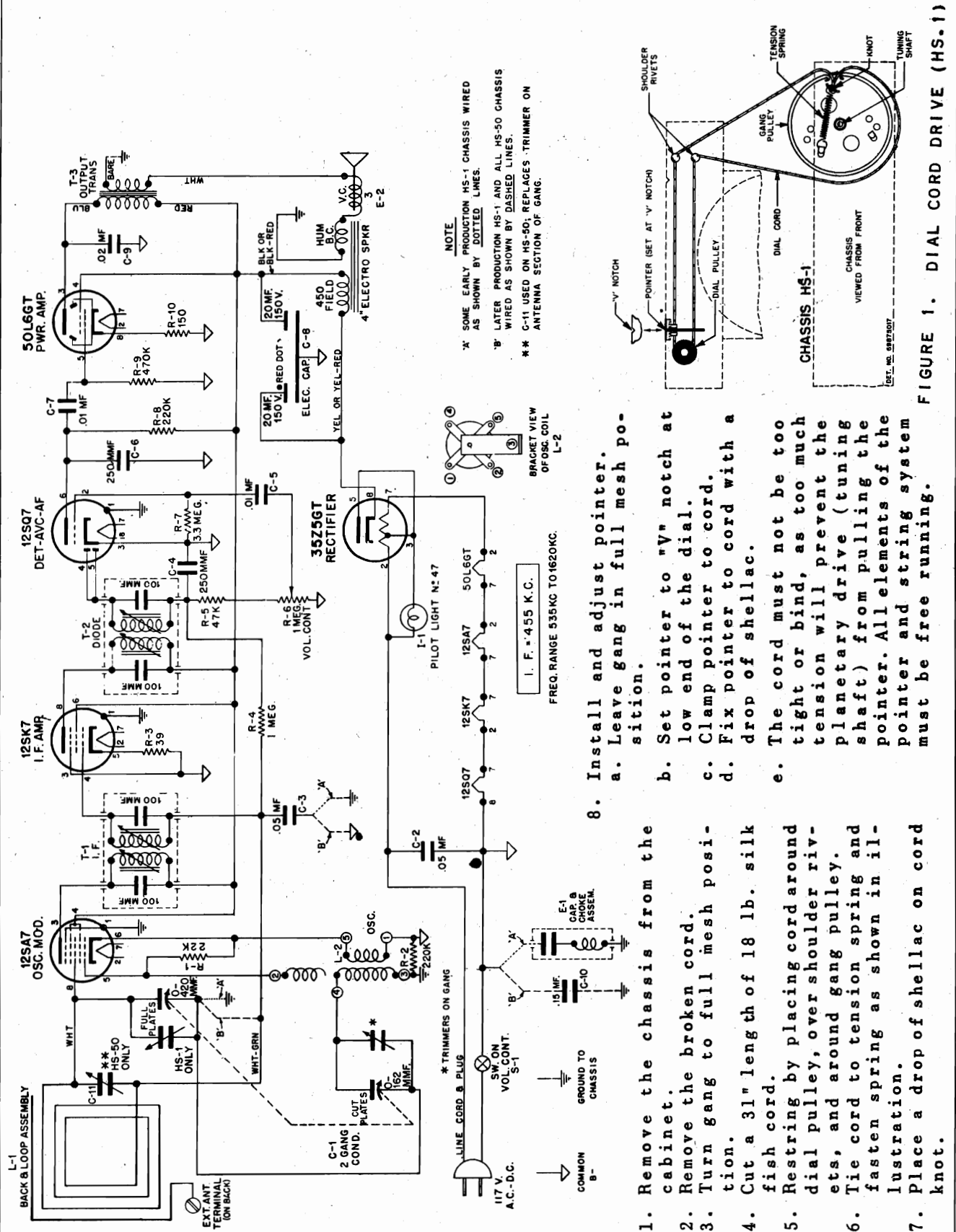


FIGURE 1. DIAL CORD DRIVE (HS-1)

1. Remove the chassis from the cabinet.
2. Remove the broken cord.
3. Turn gang to full mesh position.
4. Cut a 31" length of 18 lb. silk fish cord.
5. Restring by placing cord around dial pulley, over shoulder rivets, and around gang pulley.
6. Tie cord to tension spring and fasten spring as shown in illustration.
7. Place a drop of shellac on cord knot.
8. Install and adjust pointer.
 - a. Leave gang in full mesh position.
 - b. Set pointer to "V" notch at low end of the dial.
 - c. Clamp pointer to cord.
 - d. Fix pointer to cord with a drop of shellac.
 - e. The cord must not be too tight or bind, as too much tension will prevent the planetary drive (tuning shaft) from pulling the pointer. All elements of the pointer and string system must be free running.

MODELS 55X11, 55X12, 55X13,
Ch. HS-1

GALVIN MFG. CORP. .

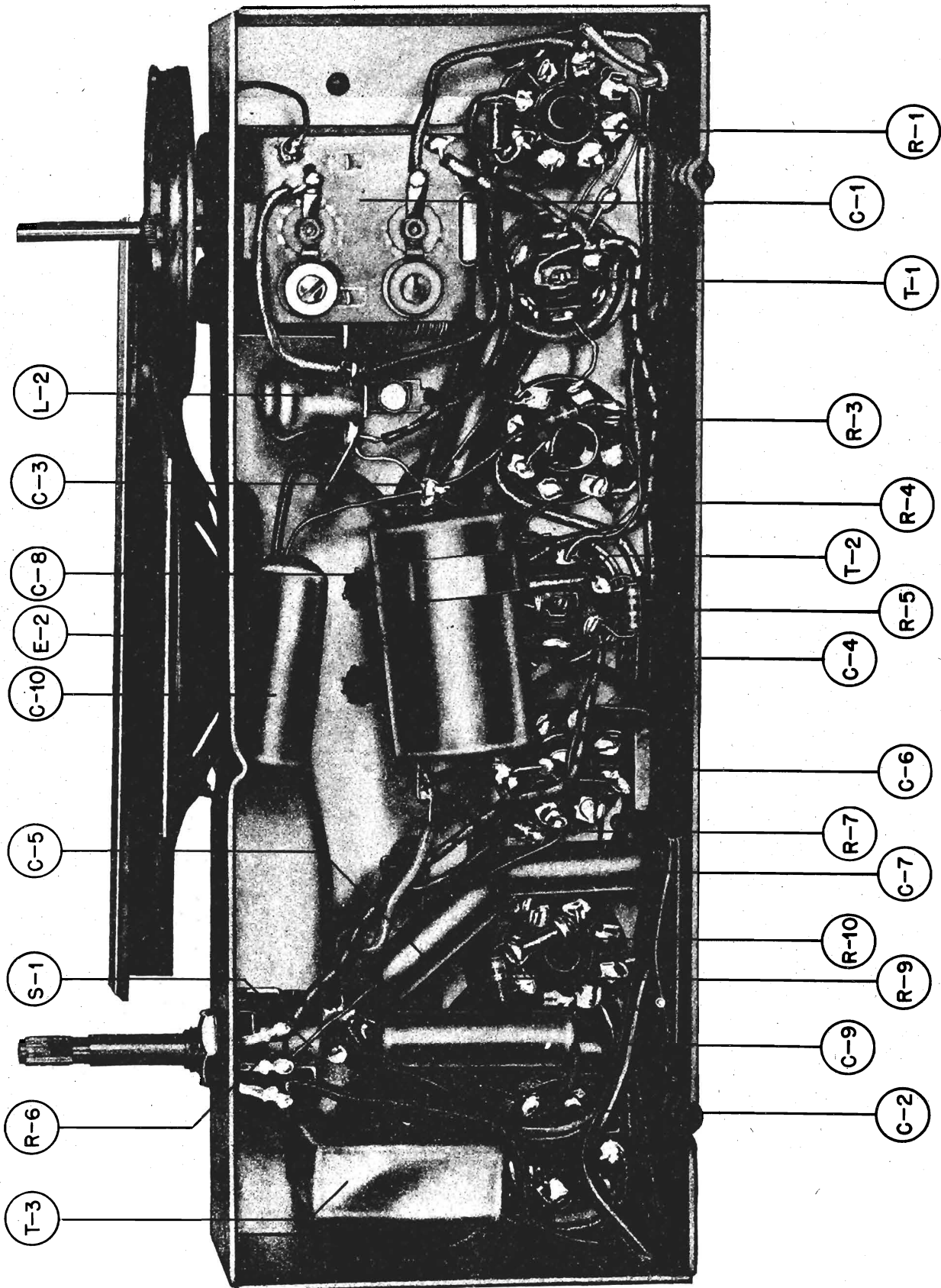


FIGURE 6. BOTTOM VIEW (CHASSIS HS.1)

GALVIN MFG. CORP.

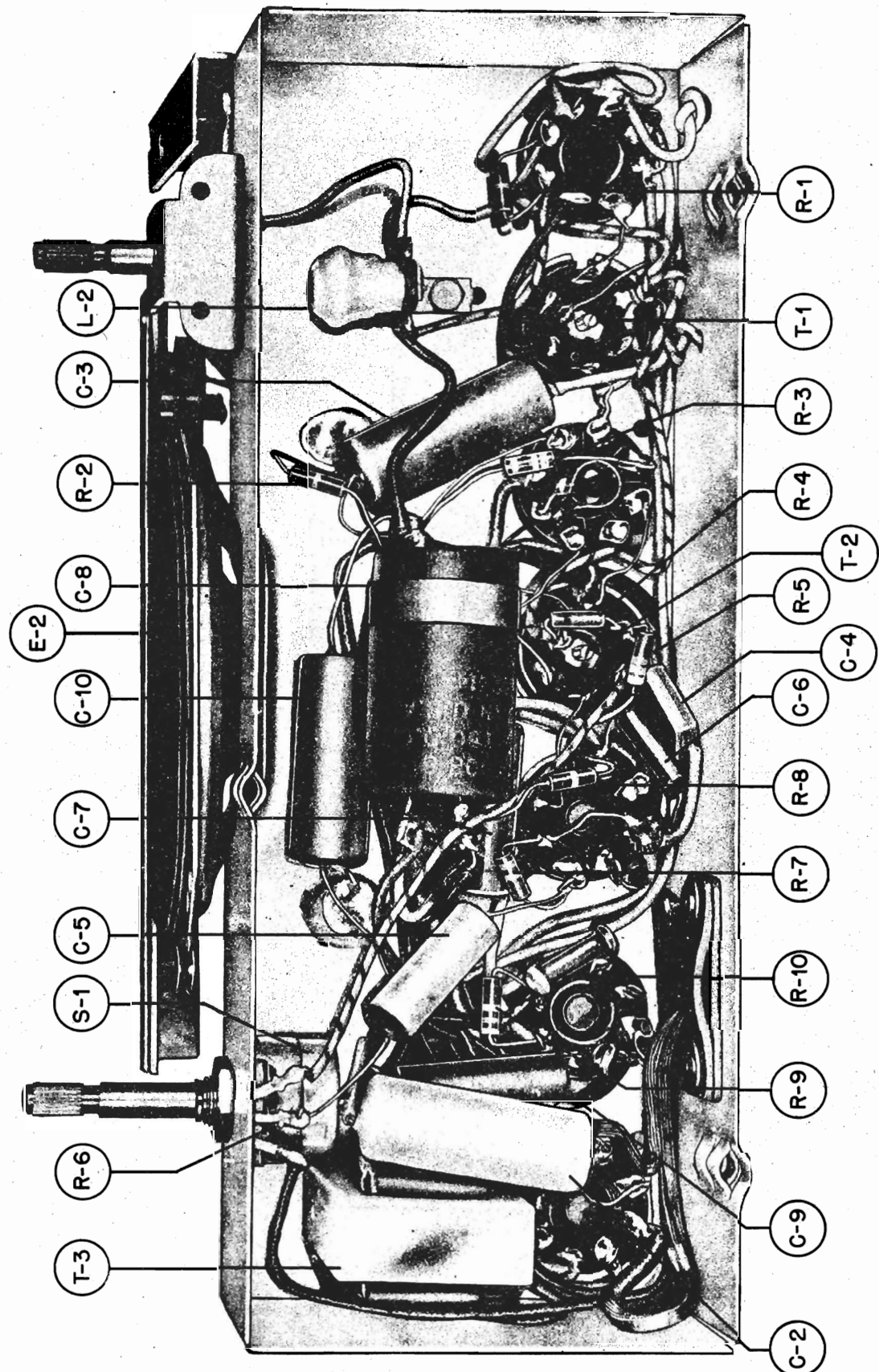


FIGURE 7. BOTTOM VIEW (CHASSIS HS-50)

MODELS 55X11, 55X12, 55X13,
Ch.HS-1; 55X11A, 55X12A, GALVIN MFG. CORP.
55X13A, Ch.HS-50

ALIGNMENT CHART

Connect output meter across speaker voice coil (.38 V = .05 watt)
Volume control set at maximum for all operations
The adjusting screwdriver or alignment tool should be of the
insulated type, such as Motorola Part No. 66A71008

OPERATIONS IN ORDER	GANG CAPACITOR SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST GENERATOR SET AVERAGE MICRO-VOLT INPUT FOR 30% MODULATED	3000 Microvolts to I. F. Grid
1. Align I.F. and Diode for Maximum	Minimum	.1 mf	Osc.-Mod.* Grid & B-	1-2-3-4	455 Kc
2. Set Oscillator to dial scale	1620 Kc	.1 mf	Osc.-Mod.* Grid & B-	5	1620 Kc
3. Align R.F. for Maximum	1400 Kc	None	**Radiation	6	1400 Kc

4. Repeat above steps for maximum accuracy.

- * A convenient point for connection to B- is the common terminal of the electrolytic capacitor, located in the middle of the chassis (bottom).
- ** Connect output of signal generator to a 5" diameter, 3 turn loop. With volume on full, and output meter connected across voice coil, bring loop close enough to receiver loop until output of 50 milliwatts is obtained (.38V on output meter). Vary distance between generator and receiver loops to maintain this output during alignment.

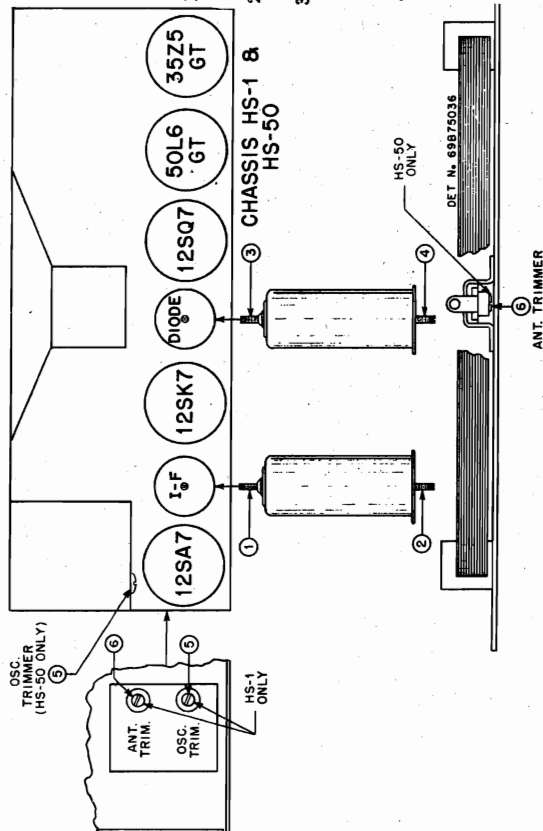
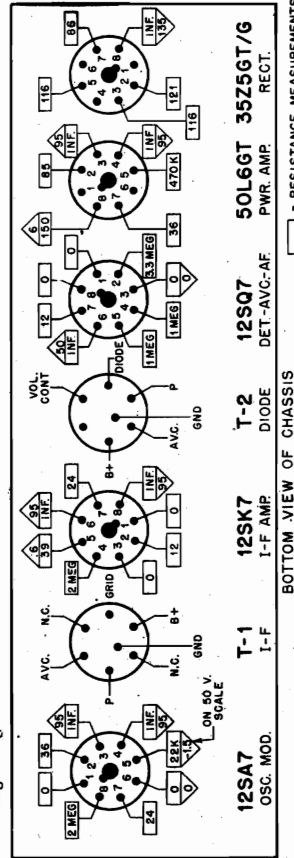


FIGURE 2. TUBE AND TRIMMER LOCATION



NOTE: ALL VOLTAGES MEASURED ON A 20,000 OHM PER VOLT VOLTMETER TO B-.
ALL RESISTANCES ARE MEASURED IN OHMS UNLESS OTHERWISE SPECIFIED TO B-.
K=ONE THOUSAND (1000) OHMS.
B- IS INDICATED BY ∇ ON SCHEMATIC DIAG.

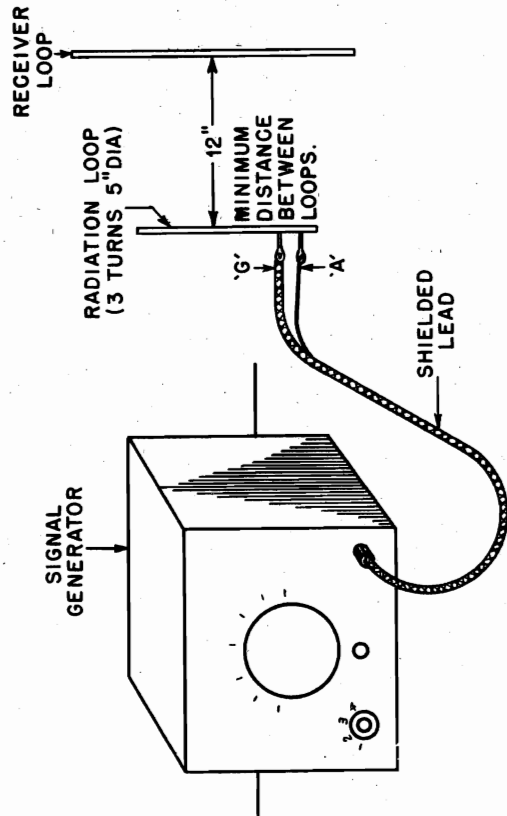


FIGURE 4. METHOD OF RADIATING SIGNAL TO THE RECEIVER

FIGURE 5. VOLTAGE AND RESISTANCE CHART

Chassis HS-1 is used in Models 55X11, 55X12 and 55X13. Chassis HS-50 is used in Models 55X11A, 55X12A and 55X13A. Models differ in cabinet and hardware (see parts list.) Chassis differ in circuit

GALVIN MFG. CORP.

MODELS 55X11, 55X12, 55X13,
55X11A, 55X12A, 55X13A

EF. PART NO. NO.	DESCRIPTION	LIST	REF. PART NO. NO.	DESCRIPTION	LIST
49A12648	Pulley, Cord: 7/32" groove (dial string 55X11A, 12A & 13A)	.05	387119	Screw, Steel: 6/32 x 1/4 S1 ABHD; Cad. Pl. (Replace gang brkt.)	doz. .35
49A15045	Pulley, Cord: 11/64" groove (dial string 55X11A, 12A & 13A)	doz. .20	387528	Screw, Steel: #8 - 1-1/8 PKA S1 HH; Cad. Pl. (Chassis mtg. 55X13 & 13A)	doz. .30
49A21552	Pulley, Cord: 1/2" groove (dial string)	doz. .20	29A70422	Screw, terminal (loop and back)	doz. .35
or 49A71078			47A72859	Shaft, Tuning (55X11A, 12A & 13A)	.25
5A13896	Rivet, shoulder: .312" Sh; Pol. Nkl. (dial string)	doz. .40	1A71049	Shield and Sleeve Assembly (I.F. & Diode Coils)	.50
5A15045	Rivet, shoulder: .437" Sh; Pol. Nkl. (dial string 55X11A, 12A & 13A)	doz. .20	41A70705	Spring, Coil (used in T1 & T2)	doz. .40
587708	Rivet, Steel: 9/32 x .122; Pol. Nkl. (line cord lock)	per/c .60	41A73619	Spring, Tension Coil (dial cord 55X11A, 12A & 13A)	.05
587707	Rivet, Steel: 5/32 x .122; Pol. Nkl. (tube socket mtg. & C-8 mtg.)	per/c .45	41A22596	Spring, Tension Coil (dial cord 55X11, 12 & 13)	doz. .35
587716	Rivet, Steel: 5/32 x .122; Pol. Nkl. (mounting clip - loop and back)	per/c .45	42A70423	Strap, ground (loop and back)	doz. .25
587718	Rivet, Steel: 3/16 x .122; Ant. Cop. (Terminal strip mtg. loop)	per/c .45	35A70074	Strip, Dial background	.20
34B74430	Scale, dial: glass (55X11A, 12A & 13A)	.60	31K15028	Strip, terminal: 2 Ins. #2 mtg: 3/8" (loop and back 55X11, 12 & 13)	.05
34B70435	Scale, dial: glass (55X11, 12 & 13)	.45	46A72766	Stud, Trimount; black	
387401	Screw, Steel: #2 x 3/8 PHOWS; Ant. Cop. (55X13 & 55X13A dial brkt. mtg.)	.25	9A70070	Socket, Pilot Light and Leads	.25
387506	Screw, Steel: #6 x 1/4 PKZ P1 HH; Cad. Pl. (gang cover and L-2 mtg.)	per/c .50	9A8790	Socket, tube; octal; (for 35Z5, 50L6, 12SA7, & 12SQ7)	.15
387331	Screw, Steel: 6-32 x 3/8 S1 FHMS; Cad. Pl. (gang mtg. 55X11, 12 & 13)	per/c .45	or 9A8787		
388117	Screw, Steel: #8 x 1 PKZP S1 HH; Ant. Cop. (Chassis mtg. 55X11, 12, 11A & 12A)	doz. .20	or 9A8788		
			9A8792	Socket, tube; octal; (for 6SK7)	.15
			or 9A70165		
			4S1770	Washer, brass: .365-.234-.025 (gang mtg. 55X11, 12 & 13)	
			4A70015	Washer "C" (Tuning shaft 55X11A, 12A & 13A)	per/c .70
			4K22505	Washer, paper: 11/16 x 17/64 x 1/32 (under knobs 55X12A)	doz. .20
			35K70460	Washer, paper: 11/16 x 9/64 x 1/32 (used under tuning knob 55X11, 12 & 13)	per/c .95
			35K19943	Washer, paper: 11/16 x 17/64 x 1/32 (used under knobs 55X11A 13A and under volume control 55X11, 12 & 13)	per/c .60
			32A20575	Washer, spacer: 3/8-.171-.062 (Chassis mtg. 55X11 & 12)	per/c .50
			488204	Washer, Steel: 1"- .203-.087; Cop. Pl. Chassis mtg. 55X13 & 13A only)	doz. .25
			481719	Washer, Steel: 3/8-.140-.030; Cad. Pl. (Line cord lock mtg.)	per/c .55

Prices Subject to Change Without Notice

- Remove the chassis from the cabinet.
- Remove the broken cord.
- Turn gang to full mesh position.
- Cut a 27" length of 18 lb. silk fish cord.
- Replace new cord as follows:
 - Tie one end of cord to tension spring on gang pulley.
 - Make one complete turn around gang pulley in a counter-clockwise direction.
 - Route the cord under and over shoulder rivets #1 and #2.
 - Route the cord the length of dial scale, around the dial pulley, and over shoulder rivet #3.
 - Make 3-1/2 turns around the tuning shaft in a counter-clockwise direction.
 - Place cord over the bracket pulley and shoulder rivet #4 to the gang pulley.
 - Place cord around the gang pulley counter-clockwise to the tension spring and tie. Place a drop of shellac on the cord knots.
- Install and adjust pointer.
 - Leave gang in full mesh position.
 - Set pointer to "V" notch at low end of the dial.
 - Clamp pointer to cord.
 - Fix pointer to cord with a drop of shellac or household cement.

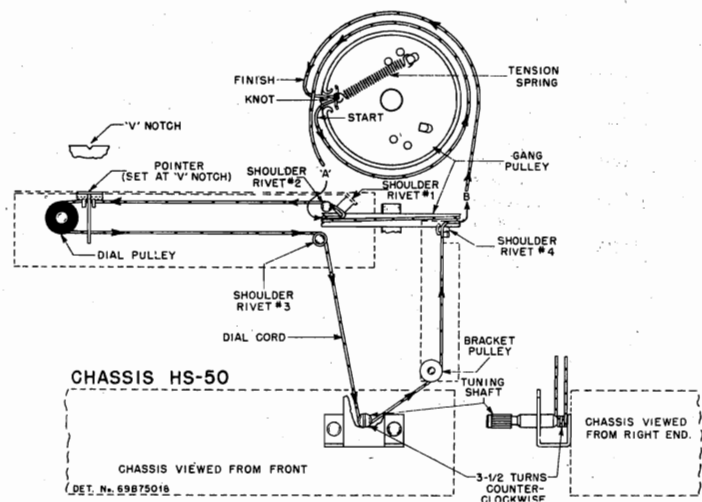
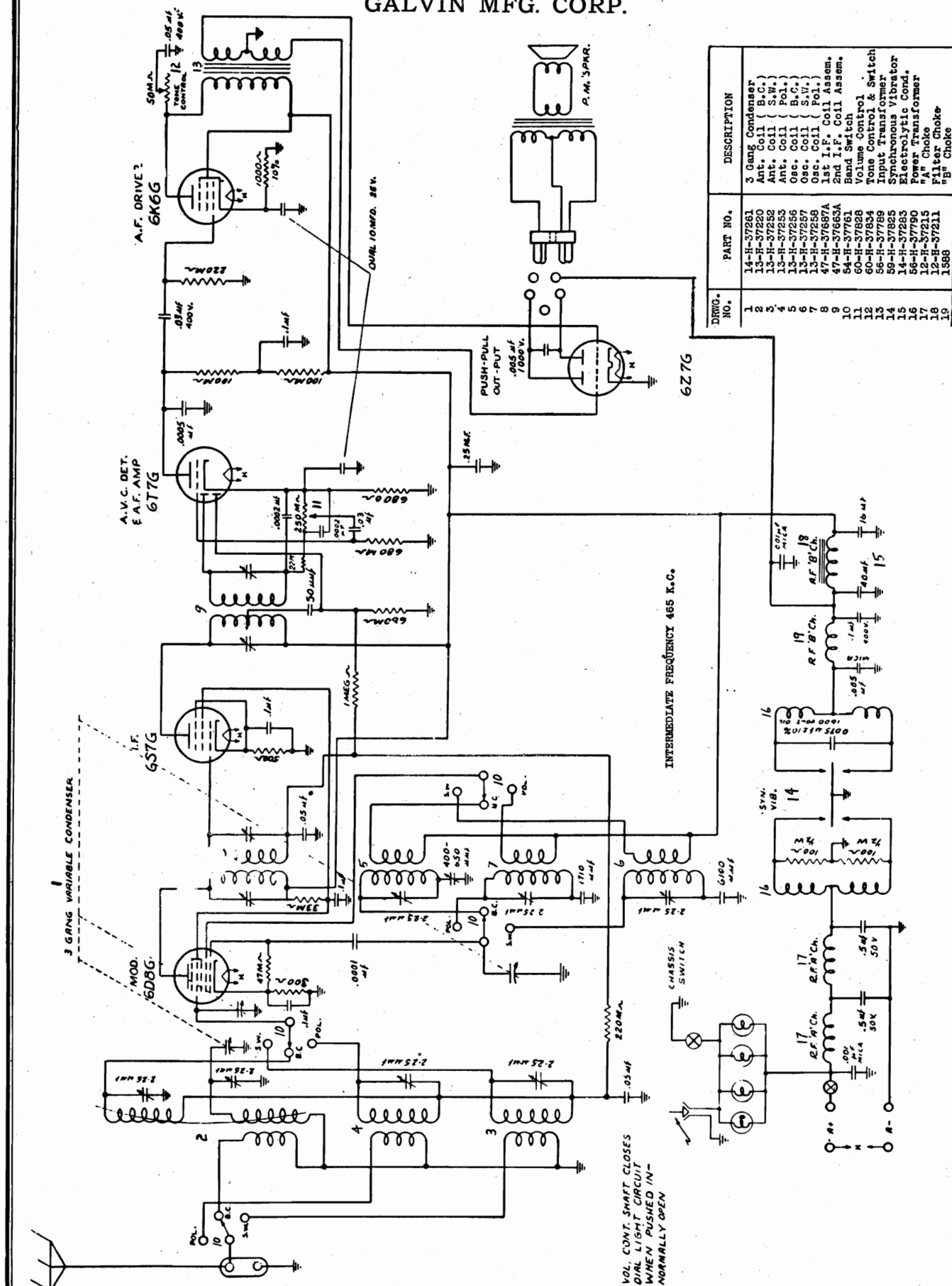


FIGURE 3. DIAL CORD DRIVE (HS-50)

**MODELS 55X11, 55X12, 55X13,
55X11A, 55X12A, 55X13A**
GALVIN MFG. CORP.
PARTS PRICE LIST

REF. NO.	PART NO.	DESCRIPTION	LIST	REF. NO.	PART NO.	DESCRIPTION	LIST
C-1	19B70080	Capacitor, variable: 2 gang and pulley assembly (55X11, or 1X72550 Capacitor, variable: 2 gang and pulley assembly 12&13)	\$3.90	T-1	24B70531	Transformer, I.F.; 455 Kc; complete less shield	1.05
C-1	1X74747	Capacitor, variable: 2 gang and pulley assembly (55X11A, 12A & 13A)	3.50	T-2	24B70533	Transformer, diode; 455 Kc; complete less shield	1.40
C-2	889816	Capacitor, fixed: paper; .05 mf 20% 400 vdc	.20	T-3	25B70063	Transformer, output	1.95
C-3	889816	Capacitor, fixed: paper; .05 mf 20% 400 vdc	.20		1X72550	Assembly, pulley and bushing (55X11, 12 & 13 replacement)	
C-4	21R6648	Capacitor, fixed: mica; 250 mmf 20% 500 vdc	.20		1X74746	Assembly, gang mtg. brkt: less gang (55X11A, 12A, 13A)	.30
C-5	889809	Capacitor, fixed: paper; .01 mf 20% 400 vdc	.15		1X74738	Assembly dial background mtg. (55X11A, 12A & 13A)	.45
C-6	21R6648	Capacitor, fixed: mica; 250 mmf 20% 500 vdc	.20		1X70084	Bracket, dial brkt. and pulley (55X11, 12 & 13)	.35
C-7	889809	Capacitor, fixed: paper; .01 mf 20% 400 vdc	.15		7A72488	Bracket, dial scale retainer; cad. pl (55X13 & 13A)	.05
C-8	23A70008	Capacitor, fixed: electrolytic; dual 20 mf 150 vdc	1.35		7A14684	Bracket, tuning shaft; cad. pl; (55X11A, 12A & 13A)	.10
C-9	889802	Capacitor, fixed: paper; .02 mf 20% 400 vdc	.15		38A10544	Button, plug; 1/4" for 1/16"; cop. oxd. (55X11, 12 & 13)	.30
C-10	8A72686	Capacitor, fixed: paper; .15 mf 20% 200 vdc	.25		16E70027	Cabinet, plastic; brown finish (55X11)	3.25
	or 8A75566	Capacitor, fixed: paper; .15 mf 20% 400 vdc			16K70475	Cabinet, plastic; ivory finish (55X12)	4.55
	20A74404	Capacitor, trimmer; includes "A" brkt (loop back) 55X11A, 12A & 13A	.30		51X70401	Cabinet, walnut veneer (55X13)	10.00
	21B70826	Capacitor, fixed: mica; dual (used in T1 & T2)	.45		16K72776	Cabinet, plastic; brown finish (55X11A)	3.60
E-1	1X70081	Capacitor and choke assembly	.30		56K72777	Cabinet, plastic; ivory finish (55X12A)	4.50
E-2	50B70076	Speaker, electrodynamic; 4 inch (HS-1 & HS-50)	5.45		16K72779	Cabinet, walnut veneer (55X13A)	10.50
	or 50K76379	Speaker, electrodynamic; 4 inch (HS-50 only)			42B70721	Clip, coil (used on T1 & T2)	doz. .30
I-1	65X11854	Bulb: 6.3V - .15A; tubular bayonet #47	.15		42A18764	Clip, mounting (loop and back)	per/c .95
L-1	24C70439	Coil; antenna loop and panel assembly 55X11	1.80		35K70445	Cloth, grille (55X13 & 13A)	.10
	24K70440	Coil; antenna loop and panel assembly 55X12	2.25		11M8944	Cord; dial; 18' black; 27"	yd. .10
	24K70441	Coil; antenna loop and panel assembly 55X13	2.10		30A151	Cord. line; 6 ft. and plug	.45
	24C74406	Coil; antenna loop and panel 55X11A	2.20				
	24C74407	Coil; antenna loop and panel 55X12A	2.10		48A70023	Core, Iron and Screw (used in T1 & T2)	.15
L-1	24K74408	Coil; antenna loop and panel (55X13A)	1.00		15A70026	Cover, gang (55X11, 12 & 13)	.10
L-2	24A70424	Coil; oscillator (55X11, 12 & 13)	.85		5A70078	Eyelet, gang mounting (55X11, 12 & 13)	per/c 1.20
	24A74616	Coil; oscillator (55X11A, 12A & 13A)	.85		587805	Eyelet, snap-in; .156 x .141; cad. pl. (dial background)	per/c .70
R-1	6R8028	Resistor; fixed; carbon; 22,000 ohms 20% 1/2W Ins.	doz. .60		37K15841	Foot, rubber; 3/4 dia. (55X13 & 13A)	doz. .35
R-2	6R8015	Resistor, fixed; carbon; 220,000 ohms 20% 1/2W Ins.	doz. .60		5A72680	Grommet; rubber (gang cushion 55X11, 12 & 13)	doz. .50
R-3	6R2085	Resistor, fixed; carbon; 39 ohms 10% 1/2W Ins.	doz. .60		37A12691	Grommet; rubber (gang cushion 55X11A, 12A & 13A)	doz. .35
R-4	6R8004	Resistor, fixed; carbon; 1 megohm 20% 1/2W Ins.	doz. .60		36K25724	Knob, control; molded; ivory (volume control 55X12, Tuning and volume 55X12A)	.10
R-5	6R8056	Resistor, fixed; carbon; 47,000 ohms 20% 1/2W Ins.	doz. .60		36K70486	Knob, control; molded; ivory with clip (Tuning control 55X12)	.15
R-6	18A70032	Resistor, variable; carbon; 1 megohm with SPST. switch	1.00		36A21887	Knob, control; molded; brown (vol- ume control 55X11 & 13 Tuning and volume 55X11A & 13A)	.10
R-7	6R2118	Resistor, fixed; carbon; 3.3 megohms 20% 1/2W Ins.	doz. .60		36A70447	Knob, control; molded; brown with clip (tuning control 55X11 & 13)	.15
R-8	6R6015	Resistor, fixed; carbon; 220,000 ohms 20% 1/2W Ins.	doz. .60		32A24815	Lock, line cord	doz. .30
R-9	6R6032	Resistor, fixed; carbon; 470,000 ohms 20% 1/2W Ins.	doz. .60		387205	Lockscrew, steel: 8-32 x 1/4 S1 HH; Cad. Pl. (speaker Mtg)	per/c .95
R-10	6R6392	Resistor, fixed; carbon; 150 ohms 10% 1/2 W N.I.	doz. .60		487895	Lockwasher; #5 Int. Cad. Pl. (loop and back 55X11, 12 & 13)	doz. .45
S-1		Switch, SPST; part of R6 (vol- ume control)			287051	Nut: 3/8-32 x 9/16, Palnut: C.P. (volume control)	doz. .30
					2B70703	Nut, Special Palnut (used in T1 & T2)	doz. .25
					2A70775	Nut, Speed: Timmerman #520 (dial brkt. mtg.)	doz. .25
					2A70434	Nut, Speed: Timmerman #156 (dial scale mtg. 55X11, 12 & 13)	doz. .25
					38A25507	Plug, split; 5/8" Cop. Ox. (Back and loop)	doz. .20
					52A71079	Pointer, dial	.20

GALVIN MFG. CORP.



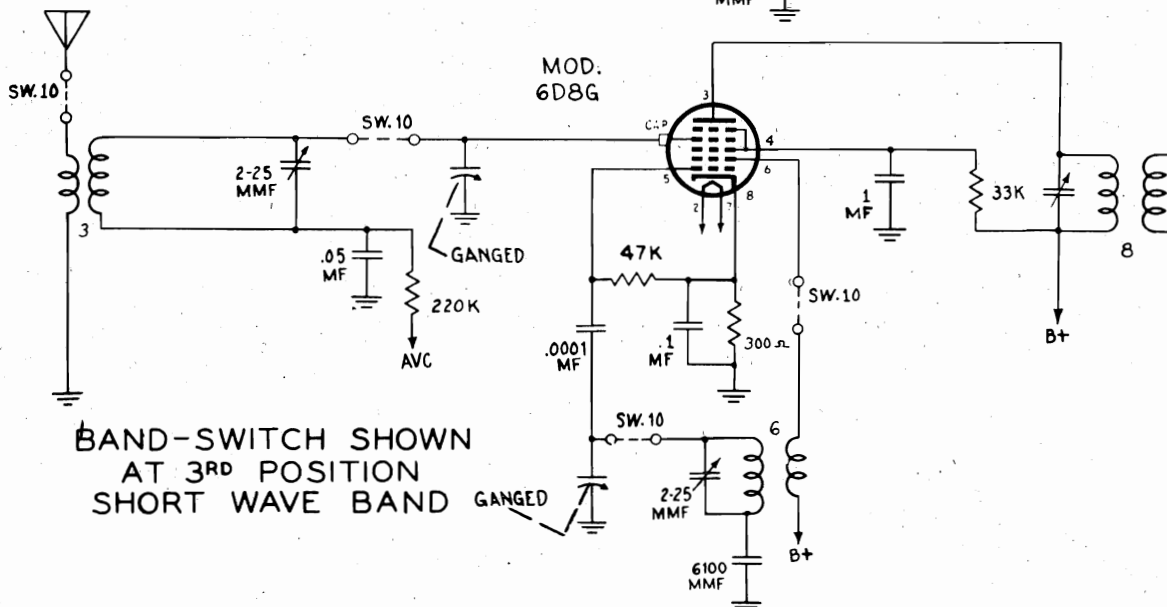
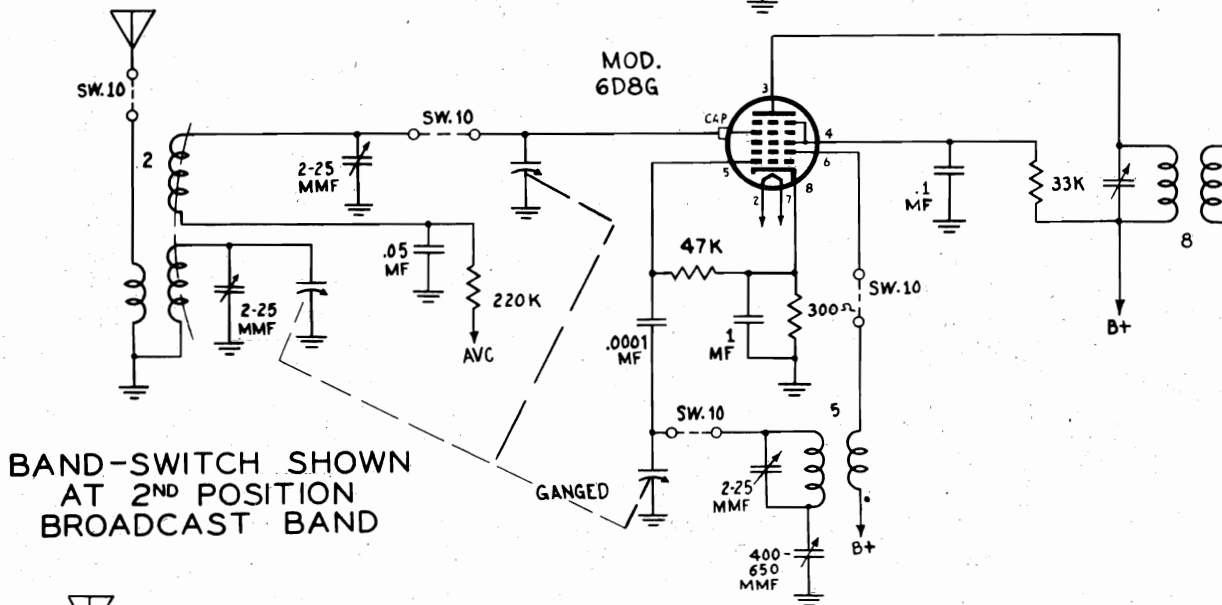
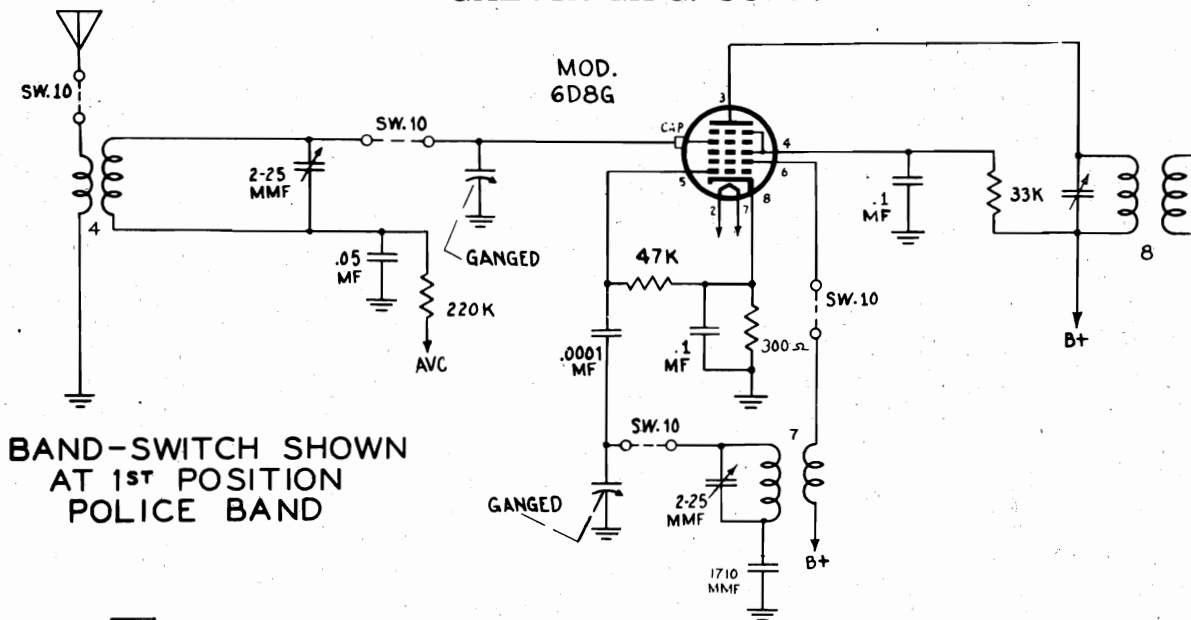
DWG. NO.	PART NO.	DESCRIPTION
1	14-H-37261	3 Gang Condenser
2	13-H-37260	Ant. Coil (B.C.)
3	13-H-37259	Ant. Coil (S.W.)
4	13-H-37258	Ant. Coil (Pol.)
5	13-H-37256	Osc. Coil (B.C.)
6	13-H-37257	Osc. Coil (S.W.)
7	13-H-37258	Osc. Coil (Pol.)
8	47-H-37497A	1st I.F. Coil Assem.
9	47-H-37496A	2nd I.F. Coil Assem.
10	54-H-37761	Band Switch
11	54-H-37762	Band Control
12	56-H-37763	Tone Transistor
13	60-H-37734	Input Transformer
14	59-H-37825	Synchronous Vibrator
15	14-H-37283	Electricity Cond.
16	56-H-37790	Power Transformer
17	12-H-37215	"A" Choke
18	12-H-37211	Filter Choke
19	13-H-37211	"B" Choke
20	13-H-37211	"B" Choke

"clarified schematics"

PAGE 15-52 MOTOROLA

MODELS 56T, 56Y

GALVIN MFG. CORP.



GALVIN MFG. CORP.

MODELS 56T, 56Y
Ch. B5-2

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9-Top Grid
6D8G	1st det.-osc.	0	6	150	70	-7.5	150	0	2.0	0
6S7G	I. F.	0	6	150	70	2.6	....	0	2.6	0
6T7G	2nd det.-AVC	X	6	75	0	0	X	0	.8	0
6K6G	A. F.	X	6	145	150	0	....	0	12	....
6Z7G	Output	X	6	160	0	0	160	0	0	....

"X" indicates socket terminals used as dummy tie points.

All voltages measured from point indicated to chassis ground, using 1000 ohms per volt meter.

Battery voltage 6.

Battery drain 2.5 amps. at no signal.

Maximum power output 3 watts.

ALIGNMENT PROCEDURE

Connect signal generator to control grid of first detector tube (6D8G) through a .05 MF condenser, and to chassis. Do not remove grid cap. Also connect output meter across speaker voice coil. Turn band switch to "American Programs" position. Turn condenser gang completely out of mesh.

Set signal generator at 465 K.C. and carefully adjust the four I.F. trimmers (located in top of I.F. coil cans) to point showing highest reading on output meter.

Leave band switch in "American Programs" position. Connect signal generator to antenna and ground terminals using a .0002 MF condenser in antenna lead.

Set signal generator and receiver dial both at 1700 K.C. Adjust B.C. OSC. trimmer until 1700 K.C. signal is heard.

Set signal generator at 1400 K.C. and turn condenser gang to the signal at 1400 K.C. Adjust antenna section and second section of preselector trimmers to point showing highest reading on output meter.

Set signal generator at 600 K.C. and rock pointer at 600 K.C. position on dial scale, while adjusting B.C. paddler, until combination is found which gives highest output reading. (Note: If there is noise level at 600 K.C., paddler can be adjusted to maximum noise without rocking gang and without use of signal generator. (Use short wire for pick-up if necessary).)

Turn band switch to "Police and Aircraft" position. Replace .0002 MF condenser in signal generator antenna lead with a 400 ohm carbon resistor.

Set signal generator and receiver dial both at 7.0 MC. Adjust POLICE OSC. trimmer until 7.0 MC signal is heard.

Set signal generator at 5.8 MC and turn condenser gang to signal at 5.8 MC. Adjust POLICE ANT. trimmer to point giving greatest output reading, while slightly rocking condenser gang.

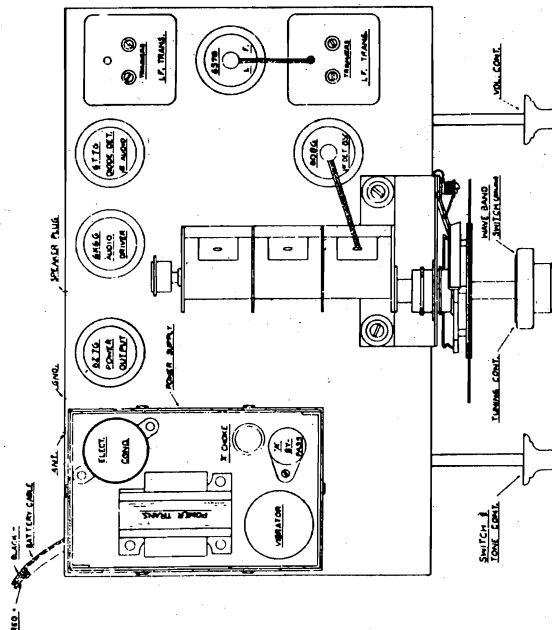
Turn band switch to "Foreign Programs" position, still using 400 ohm carbon resistor in antenna lead to signal generator.

Set signal generator and receiver dial both at 22.0 MC. Adjust SW OSC. trimmer until 22.0 MC signal is heard.

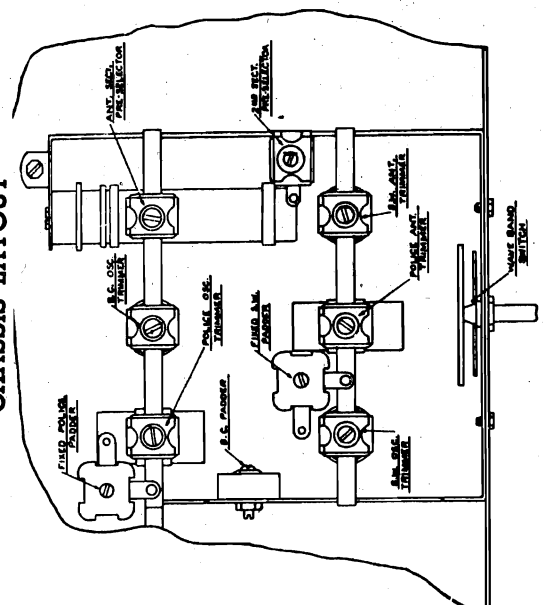
Set signal generator at 18.7 MC. and turn condenser gang to signal at 18.7 MC. Adjust SW ANT. trimmer to point giving greatest output reading, while slightly rocking condenser gang.

Padders on "Police" and "Foreign" bands are fixed (no adjustment necessary).

BAND COVERAGE
American Programs 540-1720 KC
Police and Aircraft 2200-7000 KC
Foreign Programs 7,000-22,000 KC



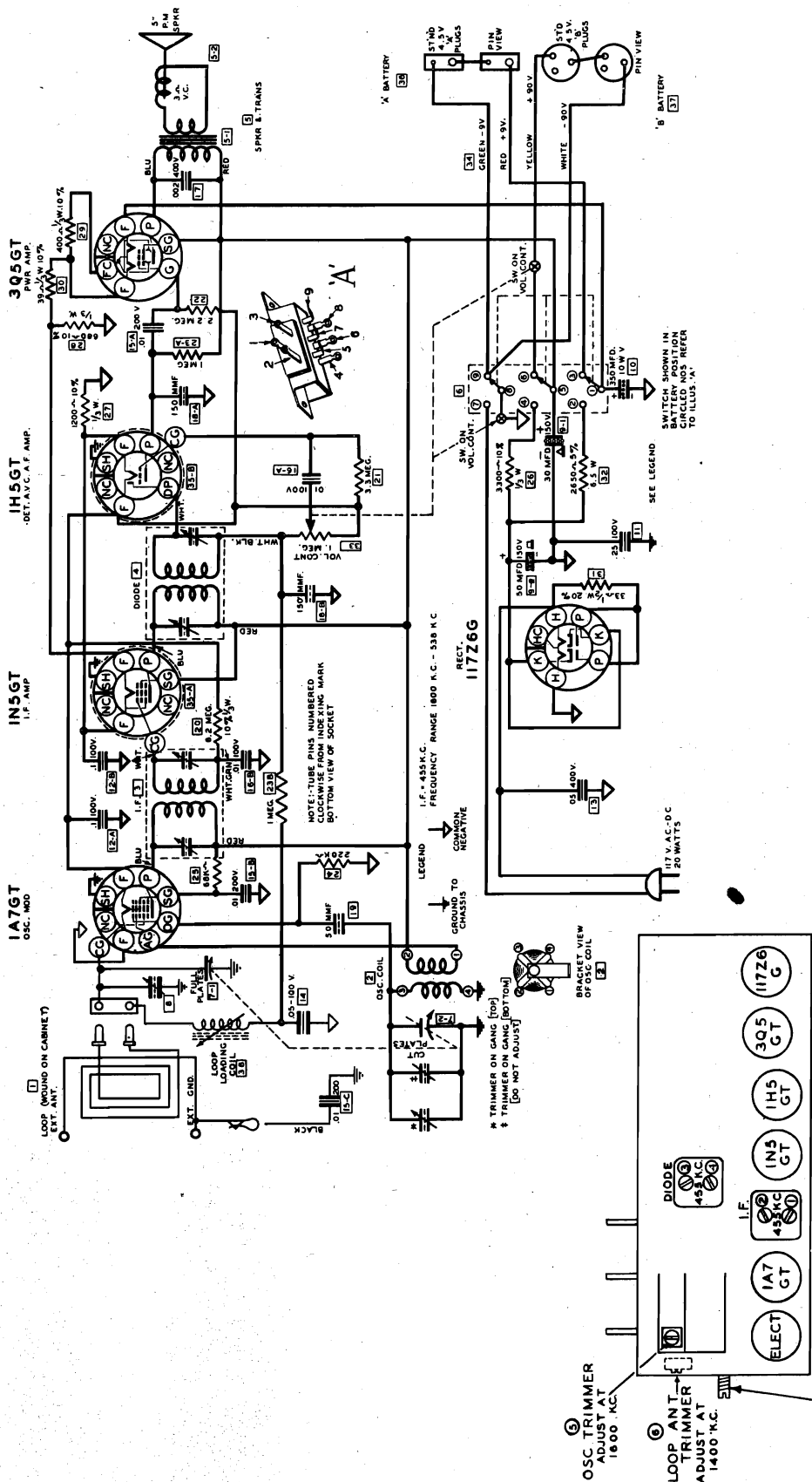
CHASSIS LAYOUT



TRIMMERS

MODELS 57BP1A, 57BP2A,
57BP3A, 57BP4A

GALVIN MFG. CORP.



DETAIL N2 69A26277

⑦ LOOP ANT. ADJUSTMENT
ADJUST AT 600 K.C.

ALIGNMENT CHART MODELS 57BP1A, 2A, 3A, and 4A

OPERATIONS IN ORDER	GANG CONDENSER SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMERS NO.	GENERATOR SET AT
1	Minimum 1600 K.C.	.1 Mfd.	Osc.-Mod. Grid	1-2-3-4	455 K.C.
2	Minimum 1600 K.C.	200 Mmf.	External Ant.	5	1600 K.C.
3	1400 K.C.	200 Mmf.	External Ant.	6	1400 K.C.
4	600 K.C.	200 Mmf.	External Ant.	7	600 K.C.

Volume Control Set at Maximum

POSITION	PLATE	SCREEN	BIAS
Osc.-Mod.	85	42	1.1
I.F.	85	85	5.7
Det.-AVC.-AF	15	-	2.3
Power	85	87	8.5
Rect.	-	123	-

Line Voltage - 117 Volts A.C.
All voltages measured from socket terminal to common
negative using 500 OHM per volt meter.

GALVIN MFG. CORP.

MODELS 57BP1A, 57BP2A,
57BP3A, 57BP4A

SENSITIVITY AND STAGE GAIN MEASUREMENTS MODELS 57BP1A, 2A, 3A, and 4A

Average Microvolt Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
4200	455	I.F. Grid	.1 Mfd.	.5 Meg	.38
85	455	Mod. Grid	.1 Mfd.	.5 Meg	.38
95	600	Mod. Grid	.1 Mfd.	.5 Meg	.38
26	600	Ant. Terminal	200 Mmf.	None	.38

Volume Control Set at Maximum
* .05 Watts = .38 Volts

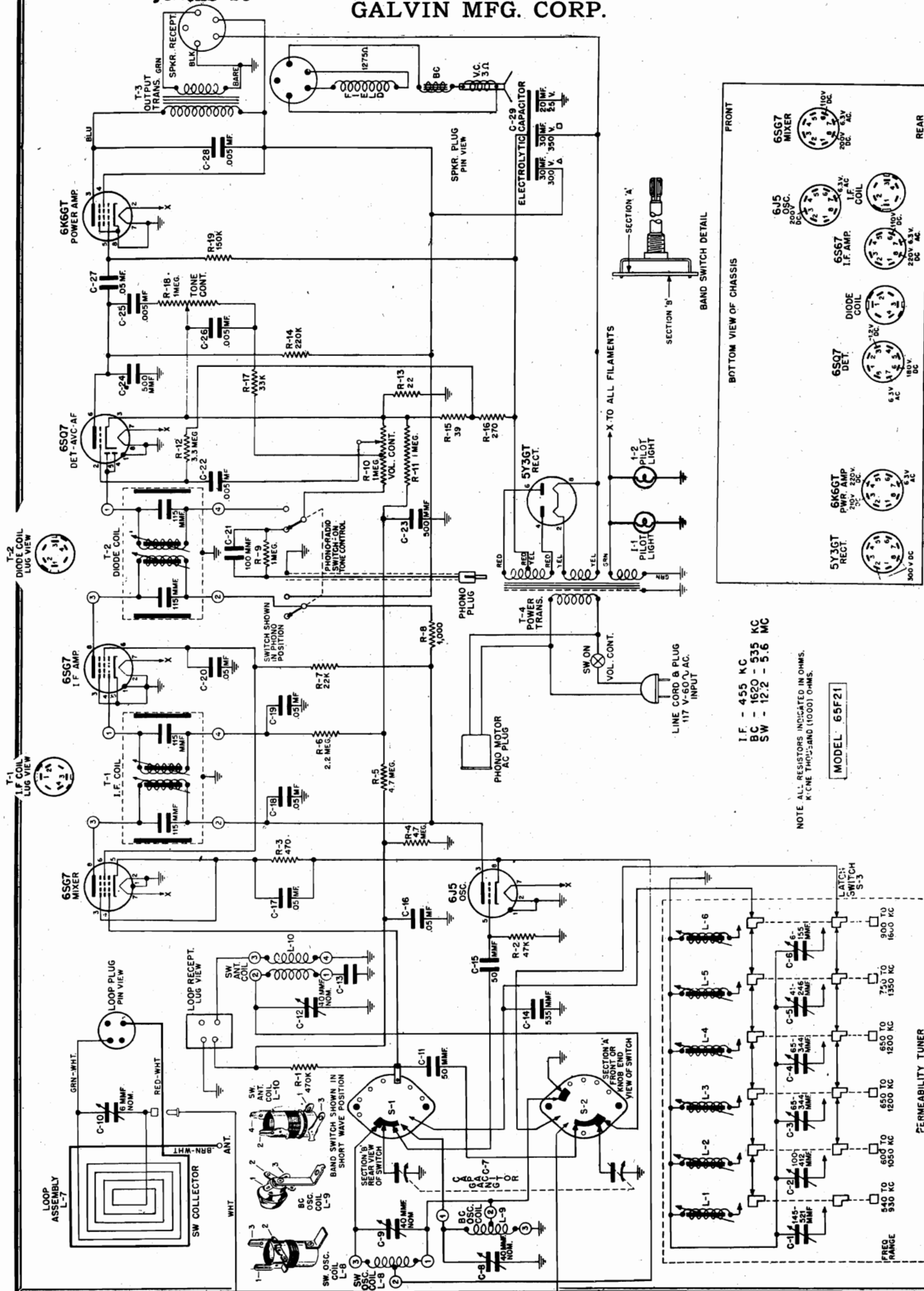
** Output meter connected
across voice coil.

MODELS 57BPA1, 2, 3, 4 PARTS PRICE LIST

DRWG. NO.	PART NO.	DESCRIPTION	LIST	DRWG. NO.	PART NO.	DESCRIPTION	LIST
MAJOR PARTS				CONDENSERS (Cont'd.)			
6	1X20289	Slider Switch & Bracket Assembly.	\$0.55	13	8S9816	Tubular Condenser .05-400v.	\$0.15
10	23A20318	Elect. Cond. & Strap 350-10v. . . . .	.50	17	8S9824	Tubular Condenser .002-400v. . . . .	.10
9	23A20324	Elect. Condenser FP . . . . .	.80	15	8S9825	Tubular Condenser .01-200v. . . . .	.10
33	18K20339	Vol. Control & Switch 1 meg . . . . .	.85		20A20321	I.F. Trimmer - Small. . . . .	.25
7	1X20506	Gang & Pulley Assembly.	1.85		20A20323	Diode Trimmer - Small . . . . .	.30
	19B20507	Variable Condenser - Subs. 1X20506	XXXX	8	20A22796	Trimmer & Bracket - 6 mmf . . . . .	.15
4	1X20586	Diode Coil & Shield Assembly.	1.35	RESISTORS			
3	1X20588	I.F. Coil & Shield Assembly	1.40	24	6B6003	Carbon Resistor 220,000-1/3-20 N.I. . . . .	.60
2	24A22746	Osc. Coil (Wht-Brn) Ceramic . . . . .	.35	29	6B6025	Carbon Resistor 400-1/3-10 N.I. . . . .	.60
38	1X22831	Coil Core & Bracket Assembly - Loop . . . . .	.50	22	6B6049	Carbon Resistor 2.2 meg-1/3-20 N.I. . . . .	.60
5	50B22836	Speaker & Output Transformer.	4.20	31	6B6067	Carbon Resistor 33-1/2-20 N.I. . . . .	.60
		Speaker Exchange.	2.45	23	6B6071	Carbon Resistor 1 meg-1/3-20 N.I. . . . .	.60
5-1	25K22838	Output Transformer. . . . .	.85	28	6B6073	Carbon Resistor 680-1/3-10 N.I. . . . .	.60
CABINET PARTS				25	6B6125	Carbon Resistor 68,000-1/3-20 N.I. . . . .	.60
	7A14345	Zee Bracket - Cab. Back . . . . .	.DOZ. .50	21	6B6179	Carbon Resistor 3.3 meg-1/3-20 N.I. . . . .	.60
	7A15254	Back Mounting Bracket . . . . .	.05	27	6B6198	Carbon Resistor 1200-1/3-10 N.I. . . . .	.60
	55K15738	Handle Clasp - Cop. Oxd . . . . .	.20	26	6B6242	Carbon Resistor 3300-1/3-10 N.I. . . . .	.60
	55K16551	Female Latch CO - #3,4A . . . . .	.15	30	6B6283	Carbon Resistor 39-1/3-10 . . . . .	.60
	55K16575	Male Latch - #3,4A. . . . .	.20	20	6B6297	Carbon Resistor 8.2 meg.-1/3-10 N.I. . . . .	.60
	37A16614	Rubber Foot . . . . .	.DOZ. .25	32	17A20578	W.W. Resistor 2650-8.5-5. . . . .	.45
	36A20315	Control Knob (Ivory) Plain - #4A. . . . .	.10	SCREWS, WASHERS etc.			
	7A20375	Battery Retainer Bracket - Long . . . . .	.05	4A1957	Cee Washer .093 CP - Tun. Shaft . . . . .	.DOZ. .15	
	32B20581	Speaker Baffle - Card Board . . . . .	.DOZ. .30	257003	Nut 8-32x11/32 Hex CP . . . . .	.PER C. .50	
	64B20582	Speaker Screen - Plain. . . . .	.15	257050	Nut 6-32 CP - Switch. . . . .	.PER C. .50	
	36K20609	Control Knob (Ivory) Marked - #4A . . . . .	.10	357155	Screw 6-32x3/16 CP - Gang Brkt. . . . .	.PER C. .35	
	36K20610	Control Knob (Walnut) Marked - #1,2,3A. . . . .	.10	357205	Screw 8-32x1/4 CP - Spkr. . . . .	.PER C. .95	
	36K20611	Control Knob (Walnut) Plain - #1,2,3A . . . . .	.10	357247	Lockscrew 6-32 CP - Gang Brkt. . . . .	.PER C. 1.00	
	55K20885	Strap Handle - Flat . . . . .	.25	357248	Screw 8-32 CP - Dial. . . . .	.PER C. .40	
	35B21021	Grill Cloth . . . . .	.15	357271	Screw 8-32 Brz. - Cab. Back . . . . .	.PER C. .75	
	16D22724	Cabinet (Portable) Cpt. - #3A	9.00	357437	Screw 5x3/8 RHWS CO . . . . .	.DOZ. .30	
	16K22728	Cabinet (Portable) Cpt. - #4A	9.00	357454	Screw 8x1/4 CP. . . . .	.DOZ. .20	
	1X22788	Back & Brackets Assembly - #1,3A. . . . .	.55	357457	Screw 8x7/8 CP - Chassis Mtg. . . . .	.DOZ. .25	
	1X22792	Back & Brackets Assembly - #2,4A. . . . .	.55	357475	Screw 8x1/4 CP - Cord Guard . . . . .	.PER C. .65	
	16X22820	Cabinet (Portable) Cpt. - #1A	6.50	357506	Screw 6x1/4 CP - Coil Mtg. . . . .	.PER C. .50	
	16K22823	Cabinet (Portable) Cpt. - #2A	6.50	357507	Screw 8x5/8 CP - Gang Mtg. . . . .	.PER C. .70	
	56X22855	Packing Carbon & Fillers - #3,4A. . . . .	.40	357528	Screw 8x3/8 CO - Bat. Brkt. . . . .	.PER C. .65	
	56X23002	Packing Carton & Fillers - #1,2A. . . . .	.30	457597	Washer 7/16 CP - Dial . . . . .	.PER C. .35	
DIAL & DRIVE				3K21134	Speaker Mtg. Screw 8-32x3/4 CP. . . . .	.PER C. .85	
	557805	Snap-In Eyelet CP - Dial. . . . .	.PER C. .70	MISCELLANEOUS			
	11M8944	Dial Cord 18# Black 18" . . . . .	.YARD .05	29B5207	Soldering Lug - Gang Mtg. . . . .	.PER C. .85	
	37A12691	Rubber Grommet - Gang Mtg. . . . .	.DOZ. .25	29B5209	Dumbell Lug - Cab . . . . .	.PER C. 1.00	
	41A14244	Dial Cord Tension Spring. . . . .	.DOZ. .40	29B5248	Soldering Lug - Bent - Cab. . . . .	.PER C. .75	
	7A14610	Tuning Shaft Bracket. . . . .	.05	42B5480	Grid Clip - Small - Collar Grip . . . . .	.DOZ. .15	
	49A14641	Cord Pulley 2" Cop. Pl. . . . .	.05	42B5526	Fahnestock Clip #15 Bronze - Cab. . . . .	.PER C. .60	
	7B18748	Gang Mtg. Bracket . . . . .	.10	9B6738	Tube Socket - Saddle Octal. . . . .	.15	
	5A19658	Eyelet Cop. Pl. - Gang Mtg. . . . .	.DOZ. .40	26X12250	Three Prong Battery Plug. . . . .	.05	
	47K20340	Tuning Shaft 1 & 11/64. . . . .	.10	42K13135	Cable Clamp . . . . .	.DOZ. .15	
	38A20612	"Off" Indicator Button. . . . .	.05	26X14760	Bantam Tube Shield. . . . .	.05	
	52K20667	Dial Pointer (Double) Molded. . . . .	.10	31A15433	Terminal Strip 1 Ins. #2 Mtg. . . . .	.05	
	61K22389	Dial Crystal. . . . .	.20	9A15642	Two Prong Receptacle. . . . .	.10	
	34B22758	Dial Scale. . . . .	.15	36X15757	Plug Button 19/64x25/64 CO. . . . .	.DOZ. .35	
	1X22917	Dial Plate & Bracket Assembly . . . . .	.10	42A17040	Line Cord Clamp . . . . .	.05	
CONDENSERS				7A20317	Switch Mounting Bracket - V.C. . . . .	.DOZ. .15	
19	21B6503	Molded Mica Condenser 50mmf-20% . . . . .	.15	30B20329	Line Cord & Small Plug - 6 Ft . . . . .	.35	
18	21B6506	Molded Mica Condenser 150mmf-20% . . . . .	.15	28A20361	Two-Pin Plug Base . . . . .	.DOZ. .30	
16	8S9801	Tubular Condenser .01-100v. . . . .	.10	14A20579	Slider Switch Insulator Strip . . . . .	.DOZ. .30	
14	8S9805	Tubular Condenser .05-100v. . . . .	.15	32B20583	Line Cord Guard - Fibre . . . . .	.10	
11	8S9810	Tubular Condenser .25-100v. . . . .	.20	1X20592	Battery Cable Assembly. . . . .	.20	
12	8S9814	Tubular Condenser .1-100v15	1X22787	Bottom Cover & Bracket Assembly30	

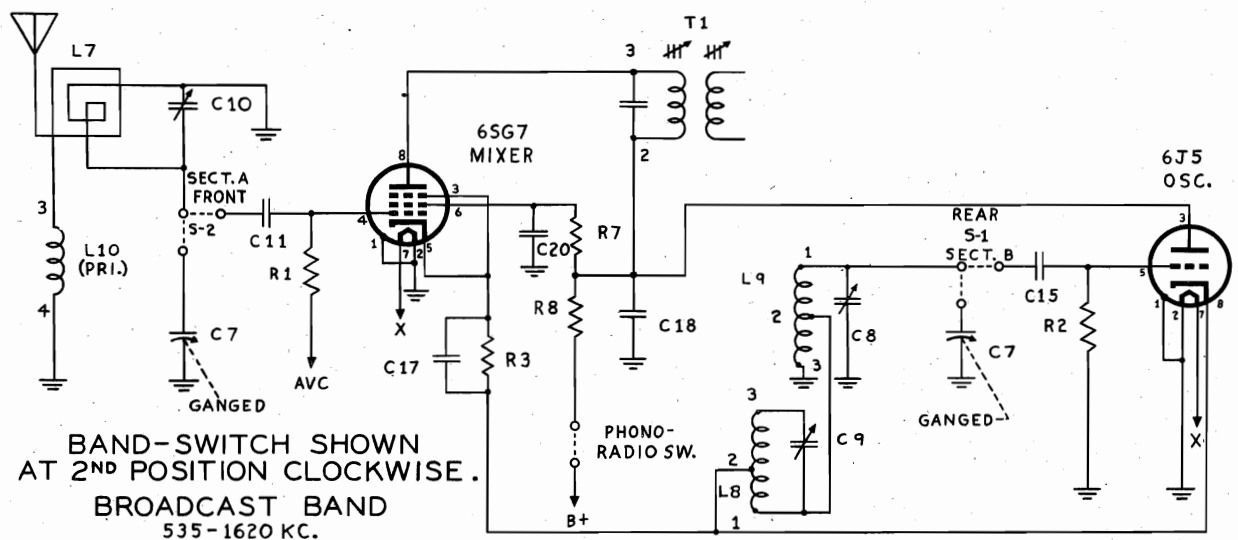
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GALVIN MFG. CORP.

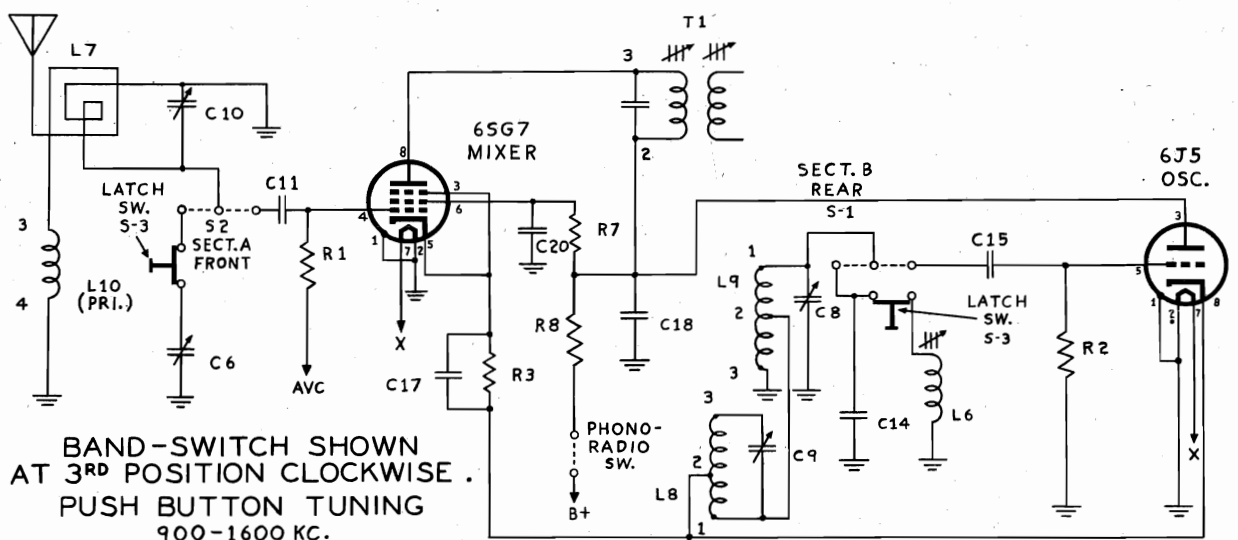


BAND-SWITCH SHOWN AT 1ST POSITION. SHORT WAVE BAND 5.6-12.2 MC

BAND-SWITCH SHOWN
AT 1ST POSITION.
SHORT WAVE BAND
5.6-12.2 MC

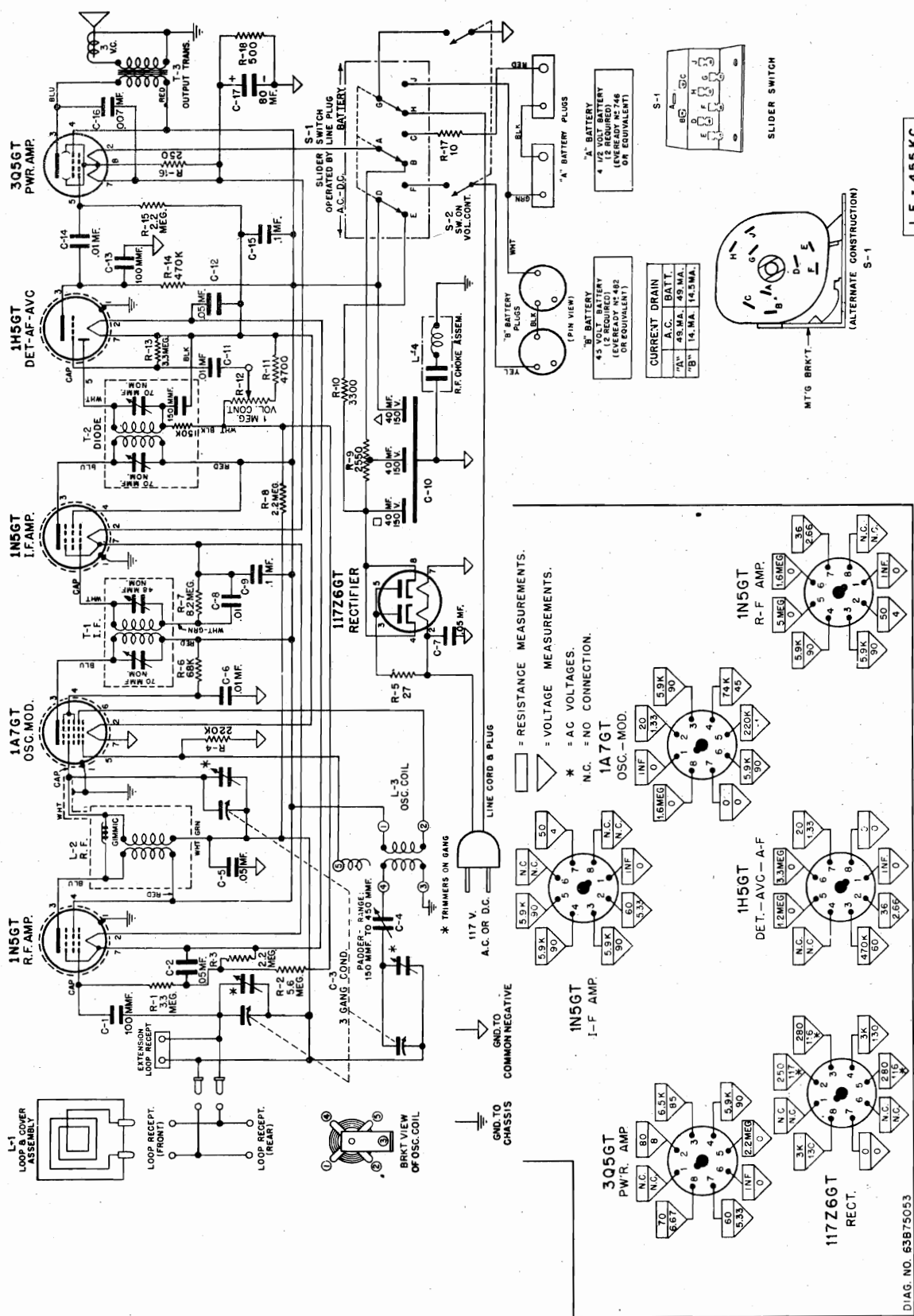


BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
BROADCAST BAND
535-1620 KC.



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE .
PUSH BUTTON TUNING
900-1600 KC.

GALVIN MFG. CORP.



FREQUENCY RANGE
535 KC TO 1600 KC

NOTE: ALL RESISTORS ARE INDICATED IN OHMS.
K=ONE THOUSAND(1,000) OHMS.

BOTTOM VIEW OF CHASSIS

A TOLERANCE OF $\pm 20\%$ IS PERMISSIBLE ON RESISTANCE MEASUREMENTS EXCEPT WHERE RESISTORS CODED WITH A SILVER BAND ARE USED. IN SUCH CIRCUITS, THE TOLERANCE IS $\pm 10\%$.

NOTE-VOLTAGES AND RESISTANCES WERE MEASURED FROM TUBE BASE PIN TERMINALS TO B-(∇) WITH A 20,000 OHM PER VOLT METER.

GALVIN MFG. CORP.

*Connect output of signal generator to a 5" diameter 3 turn loop. See Fig. 1. With volume control on full, bring loop close enough to receiver loop until an output of 50 milliwatts is obtained (.38V on output meter). The distance between loops should never be less than 12". Vary distance between generator and receiver loops or adjust generator output to maintain .38V output during alignment.

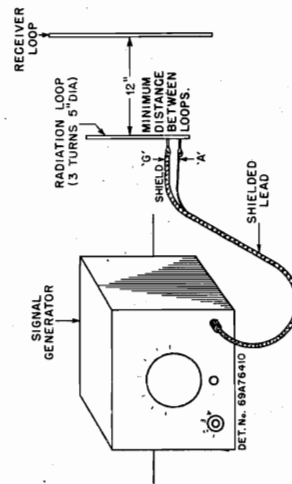


FIGURE 1. METHOD OF RADIATING SIGNAL INTO RECEIVER

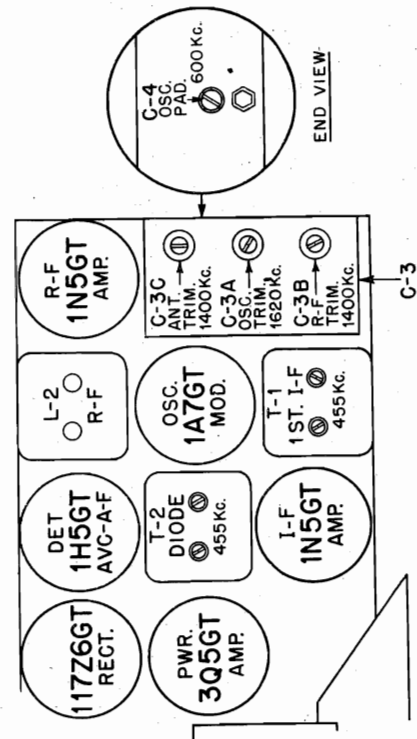
INSTRUCTIONS FOR REMOVING CHASSIS FROM CABINET

- Remove the line cord plug from 117 Volt outlet.
- Remove the batteries.
- Remove the dial plate hold-down screw in the upper left hand corner of the cabinet and the chassis retaining nut located beneath the front center of the chassis.
- Slide the chassis and shelf out of the cabinet.

ALIGNMENT PROCEDURE

Connect output meter across speaker voice coil (.38 V = .05 watts).
Volume control set at maximum for all operations.
The adjusting screwdriver or alignment tool should be of the insulated type, such as Motorola Part No. 66A71008.
Chassis bottom plate must be in position on bottom of chassis.

OPERATIONS IN ORDER	GANG CAPACITOR SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	GENERATOR SET AT (400~ 30% MODULATED)	ADJUST TRIMMER NO.	AVERAGE MICROVOLT INPUT FOR .38V OUTPUT
Align I.F.'s for maximum	Minimum Capacity	.1 mf.	Osc.-Mod. grid	455 Kc	T-1&T-2 (2 trim- mers on each)	3700 microvolts to I.F. grid. 120 microvolts to Osc.-Mod. grid.
Set Oscilla- tor trimmer	Minimum Capacity	None	Radiation Loop*	1620 Kc	C-3A	
Adjust R.F. trimmer for maximum	1400 Kc.	None	Radiation Loop*	1400 Kc	C-3B	135 microvolts to Osc.-Mod. Grid through .1 mf dummy.
Adjust Oscillator padder for maximum	600 Kc.	None	Radiation Loop*	600 Kc	C-4 (Rock gang capa- citor for greatest output)	
Adjust antenna trimmer for maximum with set in cabinet	Approx. 1400 Kc.	None	Use weak station	---	C-3C	12 microvolts to F.F. grid through .1 mf dummy.



MODELS 65L11, 65L12,
Ch.HS-7

GALVIN MFG. CORP.

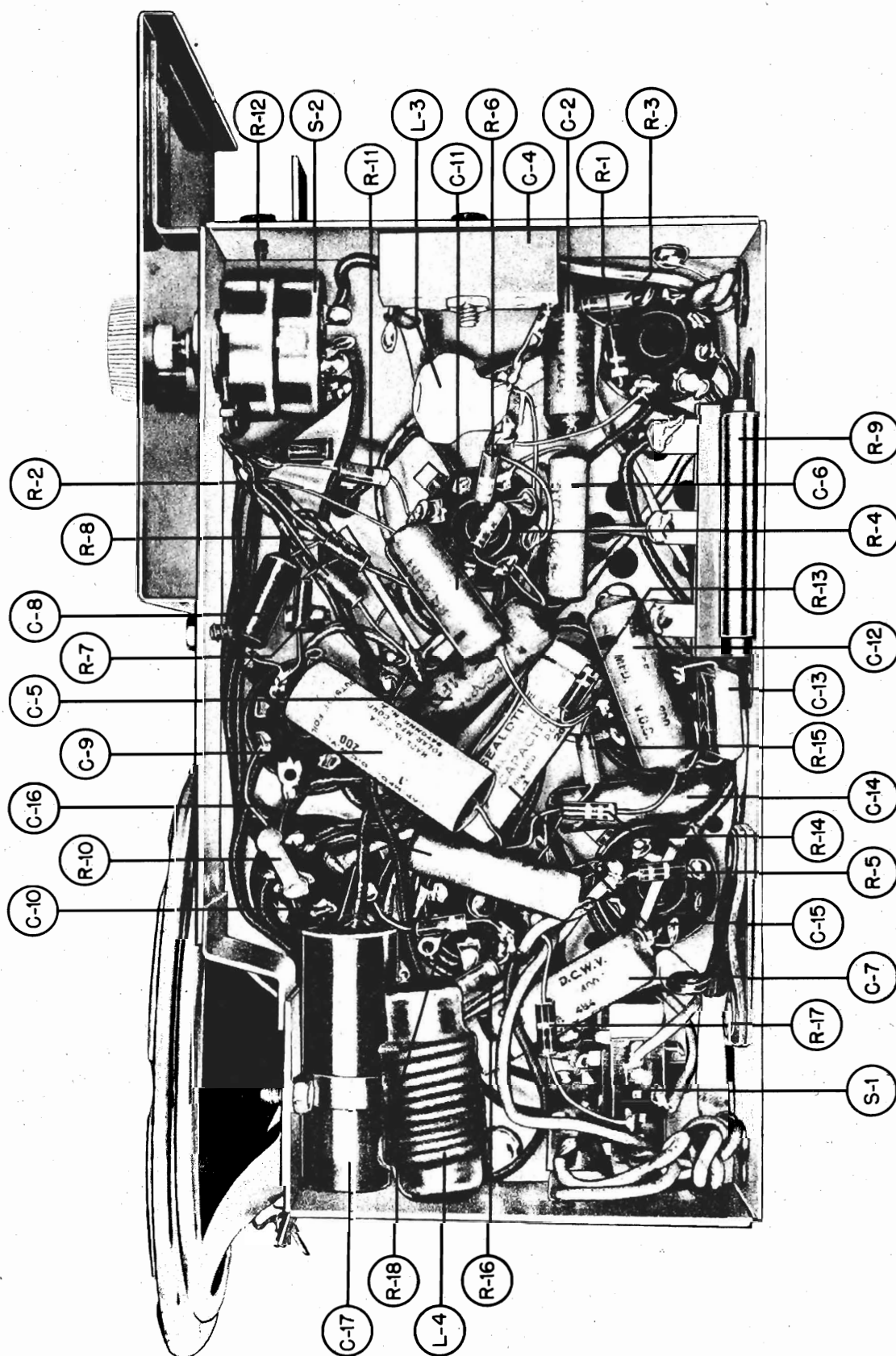


FIGURE 4. CHASSIS BOTTOM VIEW

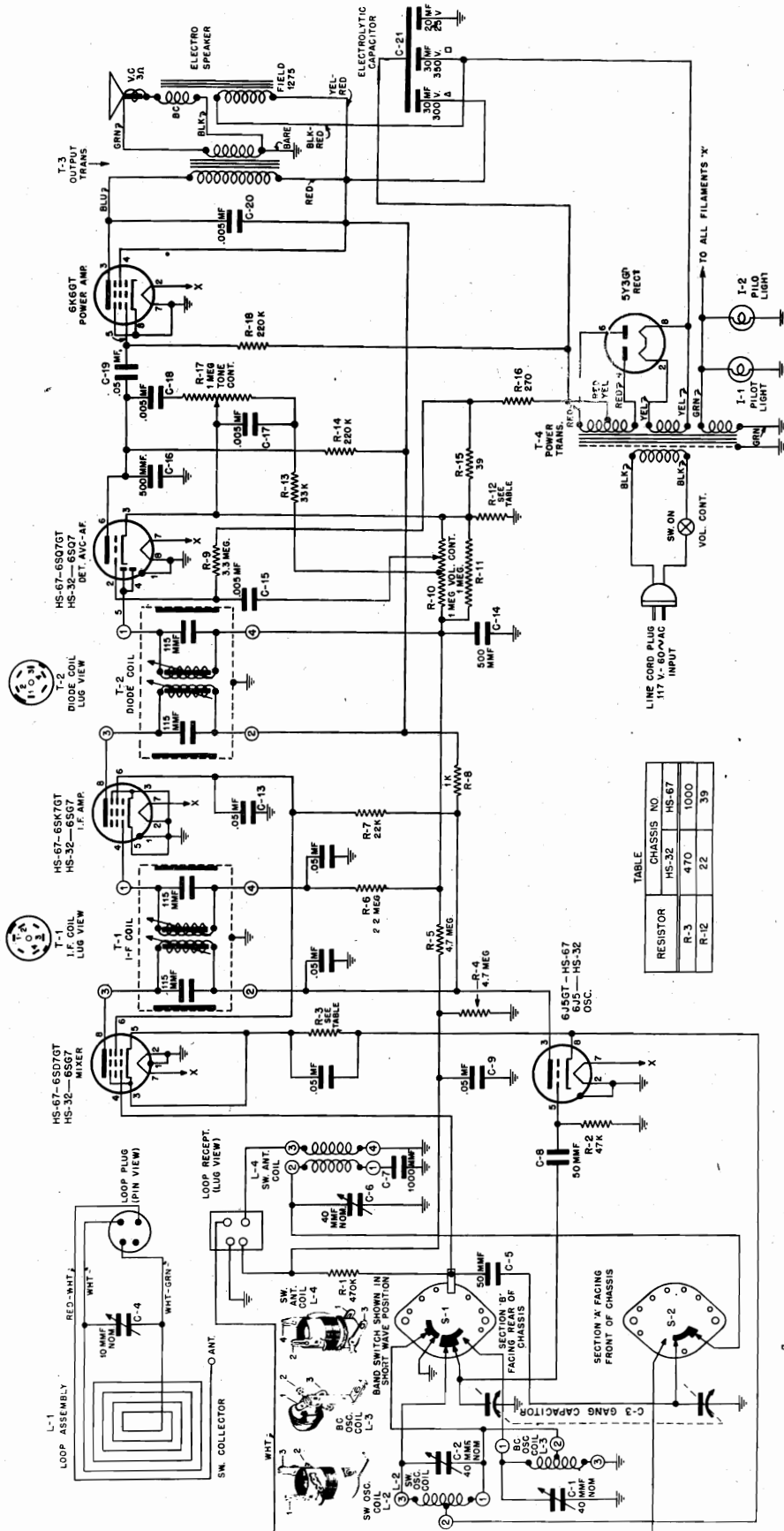
MODELS 65L11, 65L12,
Ch.HS-7

GALVIN MFG. CORP.

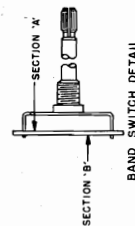
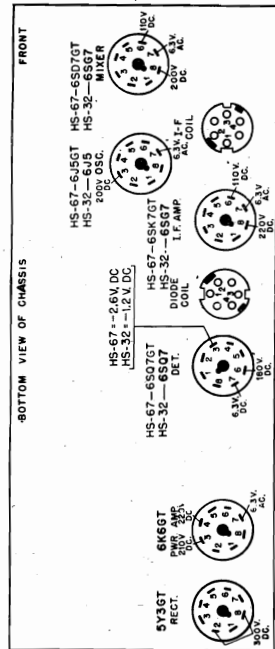
REF. NO.	PART NO.	DESCRIPTION	LIST	REF. NO.	PART NO.	DESCRIPTION	LIST
C-1	218641	Capacitor, fixed: mica; 100 mf 20% 500 VDC	.23	R-12	1942682	Resistor, variable: carbon; 1 meg with DDT switch	1.10
C-2	898905	Capacitor, fixed: paper; .05 mf 20% 100 VDC	.20	R-13	686001	Resistor, fixed: carbon; 3.3 meg; 20% 1/2 W ins.	dos. .60
C-3	1982623	Capacitor, variable; 3 gang; has planetary drive	3.20	R-14	686160	Resistor, fixed: carbon; 470,000 20% 1/2 W ins.	dos. .60
C-4	2042669	Capacitor, fixed: paper; .05 mf 20% 400 VDC	.40	R-15	686202	Resistor, fixed: carbon; 2.2 meg; 20% 1/2 W ins.	dos. .60
C-5	898916	Capacitor, fixed: paper; .01 mf 20% 400 VDC	.20	R-16	686088	Resistor, fixed: carbon; 250 10% 1/2 W ins.	dos. .60
C-6	898925	Capacitor, fixed: paper; .01 mf 20% 400 VDC	.20	R-17	686021	Resistor, fixed: carbon; 10 10% 1/2 W ins.	dos. .60
C-7	898916	Capacitor, fixed: paper; .05 mf 20% 400 VDC	.20	R-18	686461	Resistor, fixed: carbon; 500 10% 1/2 W ins.	dos. .75
C-8	8426329	Capacitor, fixed: paper; .01 mf 20% 100 VDC	.10	S-1	40427114	Switch, slider; triple pole, double throw	.75
C-9	898906	Capacitor, fixed: paper; .1 mf 20% 200 VDC	.15	or 40976386	Switch, rotary; triple pole, double throw		
C-10	2242669	Capacitor, electrolytic; 4C-40-40 mf 150 V	1.55	S-2	Part of R-12	Switch, double pole, single throw (part of R-12)	
C-11	898901	Capacitor, fixed: paper; .01 mf 20% 100 VDC	.15	T-1	1258904	I. F. Coil & Shield Assembly; 455 Kc; complete with trimmer	1.65
C-12	398905	Capacitor, fixed: paper; .05 mf 20% 100 VDC	.20	T-2	1258902	Diode coil & Shield Assembly; 455 Kc; complete with trimmer	2.20
C-13	318641	Capacitor, fixed: mica; 100 mf 20% 500 VDC	.23	T-3	3242684	Transformer, output (Purch. with 90070091)	
C-14	898901	Capacitor, fixed: paper; .01 mf 20% 100 VDC	.15		3710614	Baffle, speaker; cardboard, 5-1/2 x 4 x 3/32 thick	.05
C-15	898906	Capacitor, fixed: paper; .1 mf 20% 200 VDC	.15		3710614	Band, rubber; (used on tube shields)	01. .20
C-16	8451091	Capacitor, fixed: paper; .007 mf 20% 400 VDC	.20		1258916	Battery Lead Assembly, 1A; with 2 two pin plugs	.30
C-17	3426868	Capacitor, electrolytic; 80 mf 25 VDC; with mtg. strap	.85		176273	Battery Lead Assembly, 1B; with 2 three pin plugs	.45
	2042623	Capacitor, variable; mica; 70 mf nom. (diode coil tuning)	.40		3981579	Bracket, gang mounting	.15
	or 2042754				3981579	Button, plug for 3/8 hole; (csp. oxide finish; cover for antenna trimmer hole)	.25
	20426321	Capacitor, variable; mica; 50 mf nom. (diode coil tuning)	.30		174392	Cabinet Assembly; complete except for cabinet back and loop	13.75
	or 2042755				174392	Cabinet Assembly; complete except for cabinet back and loop	13.75
L-1	1525946	Loop & Front Cover Assembly; complete with hinges and bar knob (65L11)	2.10		125942	Front cover assemblies (65L12) with all hardware (65L11)	.65
L-2	1525946	Loop & Front Cover Assembly; complete with hinges and bar knob (65L12)	1.65		125944	Cabinet Back Assembly; complete with all hardware (65L12)	.65
L-3	2445896	Oscillator coil	2.75		4285400	Clip, grid; small; collar grip	dos. .15
L-4	176871	R. F. Choke assembly; .15 mf capacitor with 15 turn choke	.45		3642424	Cloth, grille	.10
R-1	486201	Resistor, fixed: carbon; 3.3 meg; 20% 1/2 W ins.	dos. .60		3026389	Cord, lins., & small plug; 6 ft. long	.40
R-2	686203	Resistor, fixed: carbon; 5.6 meg; 20% 1/2 W ins.	dos. .75		125918	Dial scale assembly; includes mounting bracket & crystal	.50
R-3	686202	Resistor, fixed: carbon; 2.2 meg; 20% 1/2 W ins.	dos. .60		5419668	Eyelet; steel; .284 x .212 (gang mtg.)	dos. .40
R-4	686249	Resistor, fixed: carbon; 220,000 10% 1/2 W ins.	dos. .75		3741061	Grommet, rubber (gang chafions)	dos. .35
R-5	686253	Resistor, fixed: carbon; 27 10% 1/2 W ins.	dos. .60		3242686	Guard, lins cord; fibre	.05
R-6	686256	Resistor, fixed: carbon; 66,000 20% 1/2 W ins.	dos. .60		6597400	Handle; molded	.35
R-7	686210	Resistor, fixed: carbon; 9.2 meg; 20% 1/2 W ins.	dos. .60		3242686	Knob, tuning; white plastic; with spring clip	.10
R-8	686202	Resistor, fixed: carbon; 2.2 meg; 20% 1/2 W ins.	dos. .60		3242684	Knob, volume control; white plastic	.10
R-9	1742697	Resistor, fixed: wire wound; 2500 5% 5 W	.75		32424415	Lock, lins cord (holds lins cord to chassis)	dos. .30
R-10	686204	Resistor, fixed: carbon; 3000 20% 1/2 W N. I.	dos. .60		459668	Lockwasher, steel; 40 external; Cad. Pl. (occ. coil mtg.)	per/c .25
R-11	686203	Resistor, fixed: carbon; 4700 20% 1/2 W ins.	dos. .60		2982601	Lugs, soldering; L shaped (used as washer, to hold top of dial scale to cabinet)	per/c .60
					297050	Nut, steel; 3/8 x 5/16 Hex	per/c .60
						Palnut (padder nut.)	per/c .60
						Prices Subject to Change Without Notice	

MODELS 65T21, Ch. HS-32;
65T21-B, Ch. HS-67

GALVIN MFG. CORP.



RESISTOR	CHASSIS NO.
R-3	HS-67
R-12	HS-32
	470
	22
	39

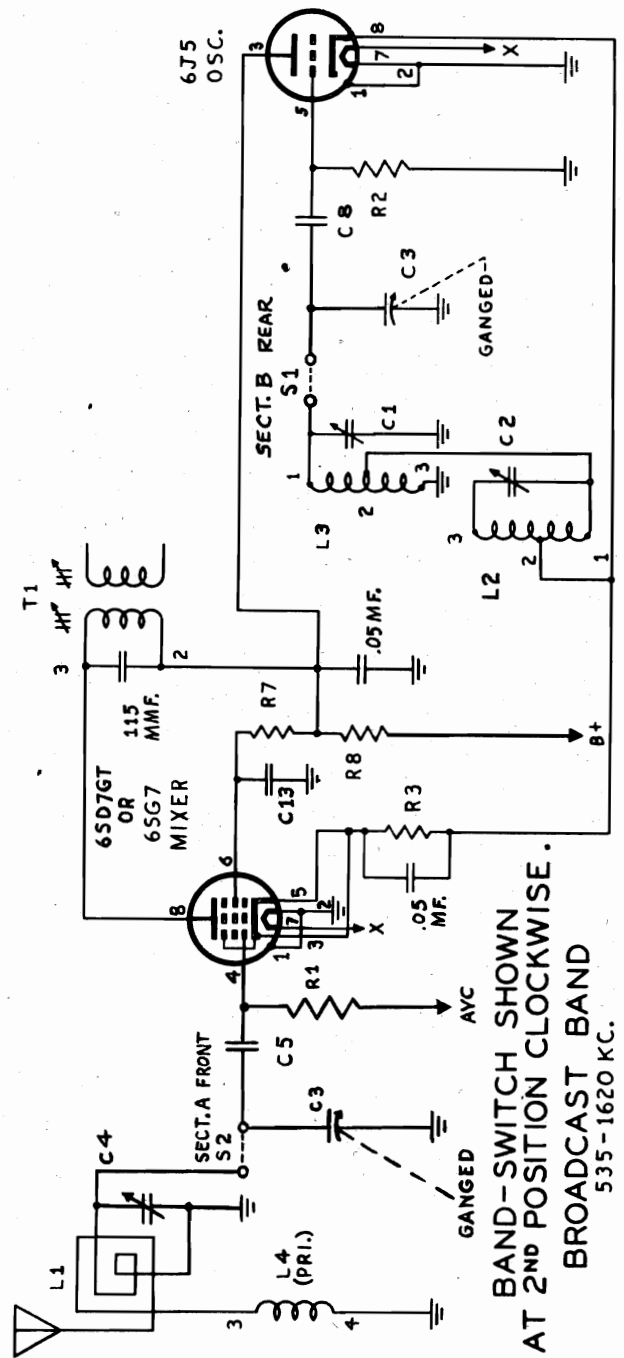
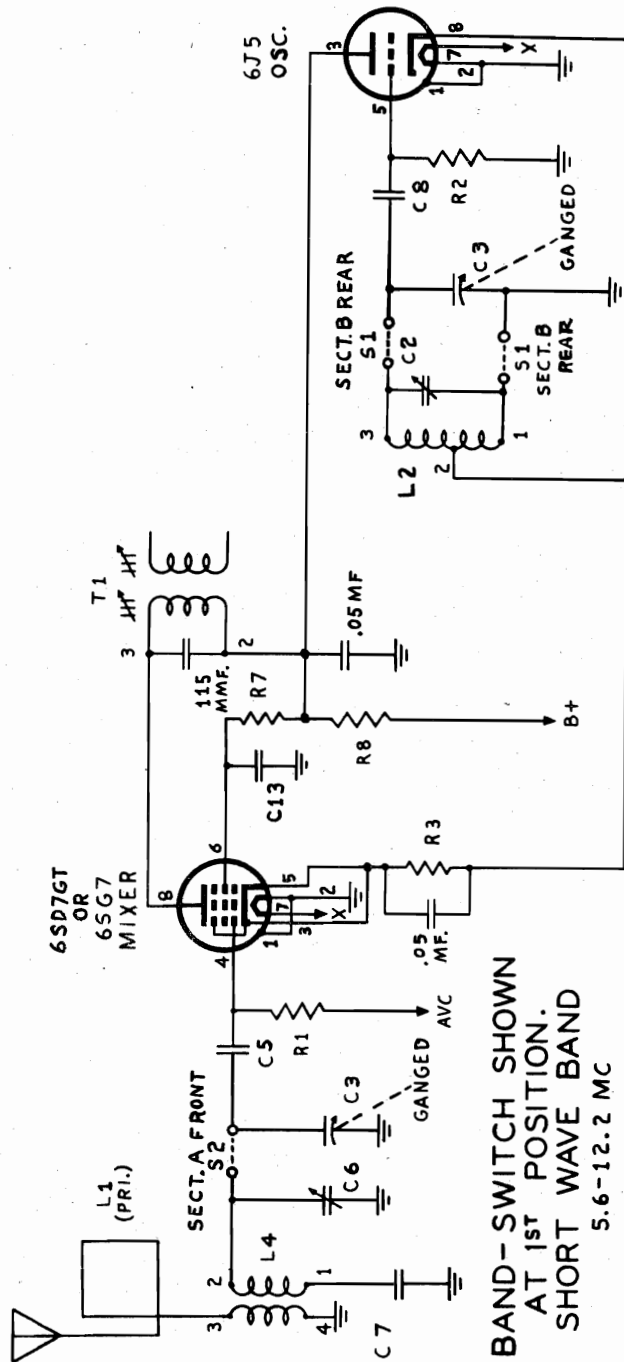


NOTE: ALL RESISTORS ARE INDICATED IN OHMS.
K = ONE THOUSAND OHMS, (1000 OHMS)

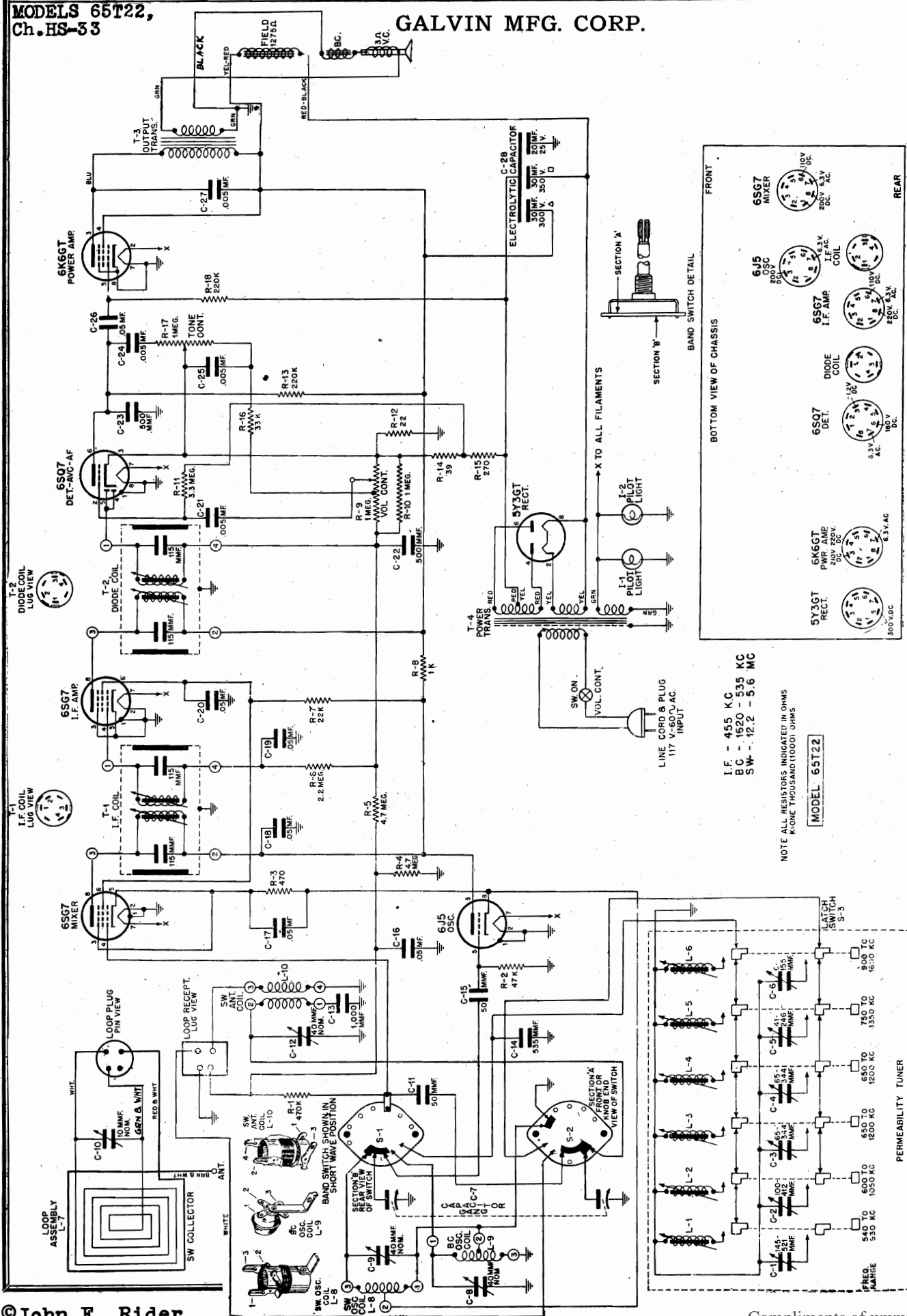
I-F-455 KC

BC-1620-535 KC
SW-12.2-5.6 MC

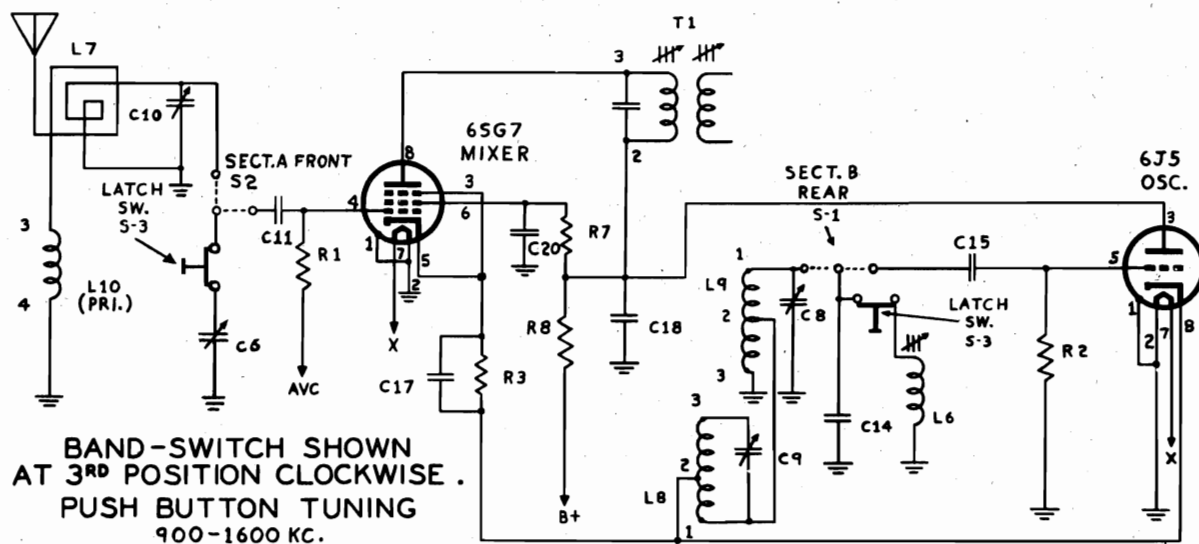
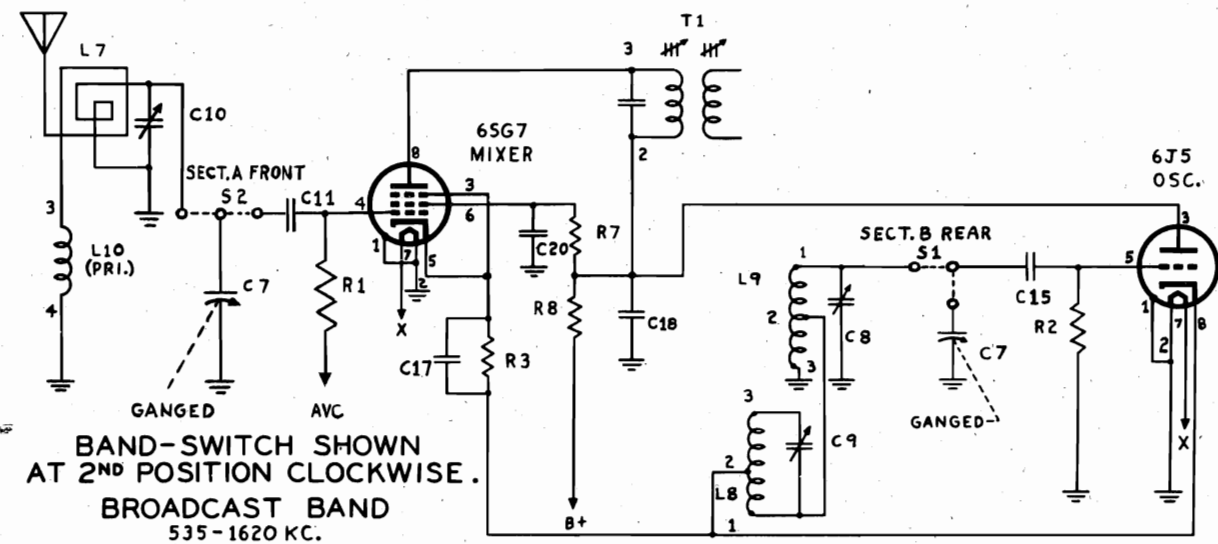
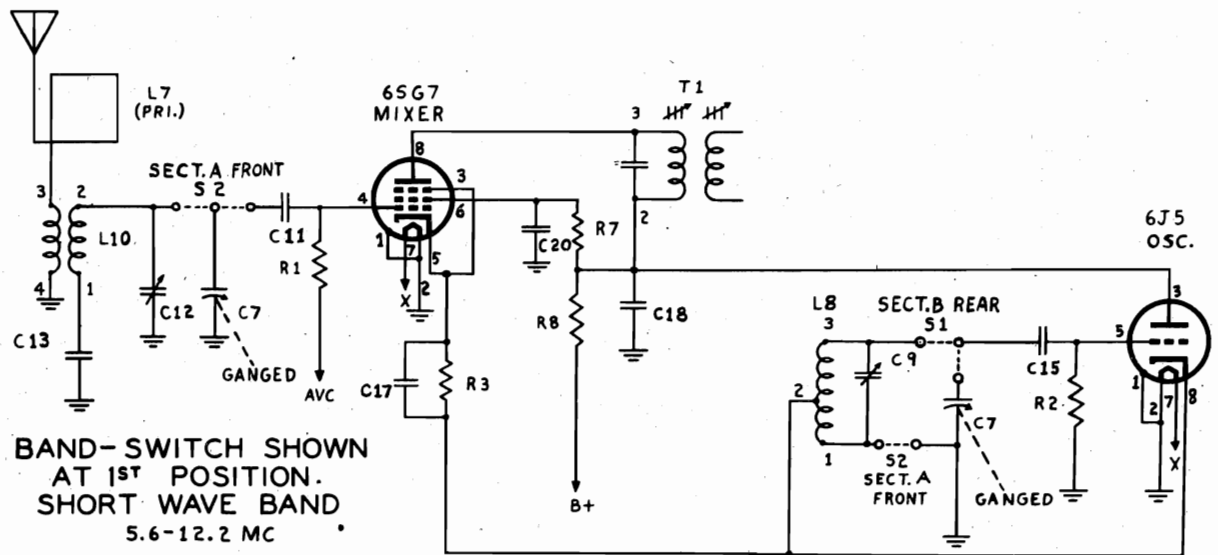
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FRONT

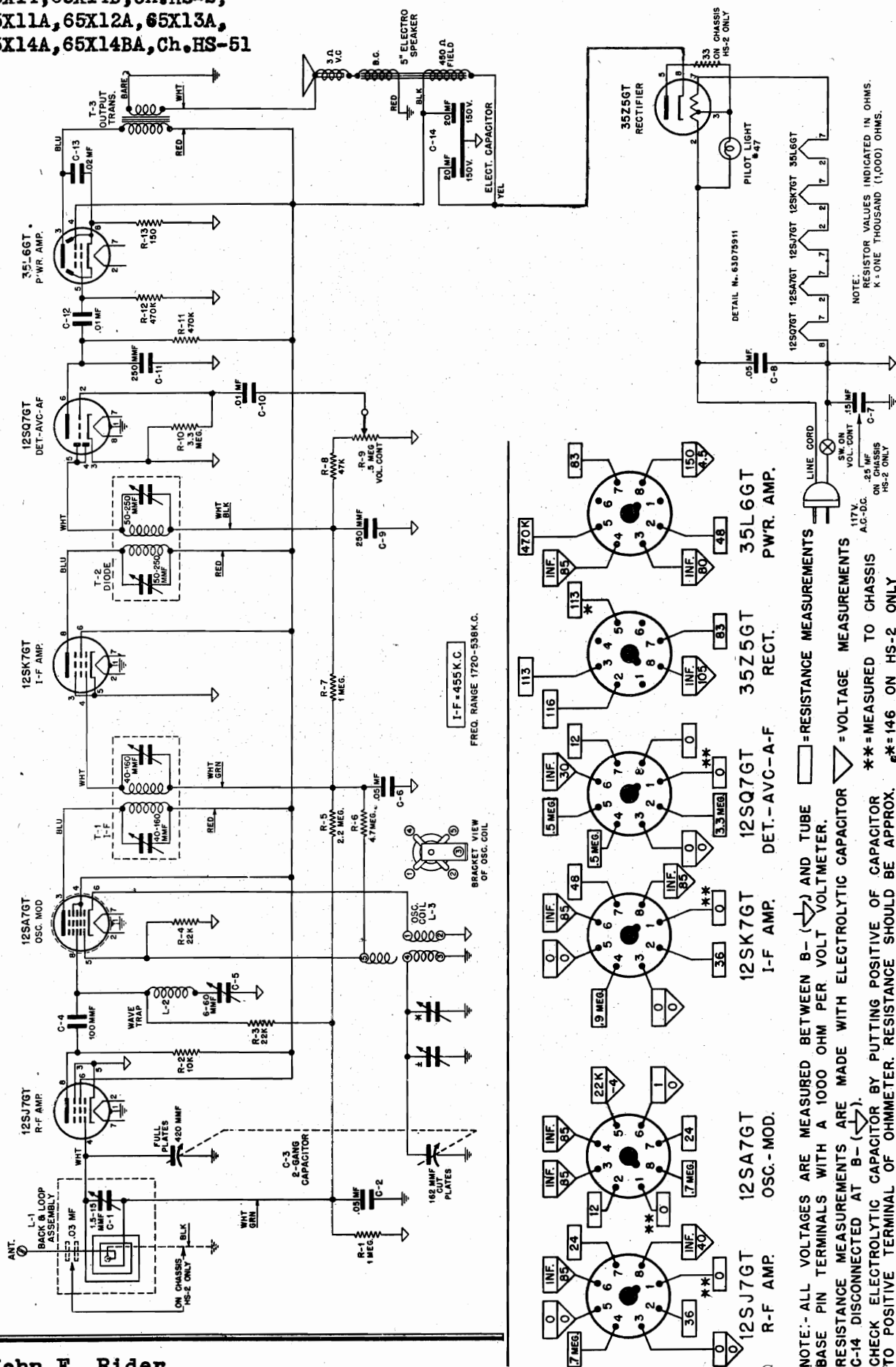


GALVIN MFG. CORP.



MODELS 65X11, 65X12, 65X13,
65X14, 65X14B, Ch. HS-2;
65X11A, 65X12A, 65X13A,
65X14A, 65X14BA, Ch. HS-51

GALVIN MFG. CORP.



BOTTOM VIEW OF CHASSIS

GALVIN MFG. CORP.

MODELS 65X11, 65X12, 65X13,
65X14, 65X14B, Ch. HS-2;
65X11A, 65X12A, 65X13A,
65X14A, 65X14BA, Ch. HS-51

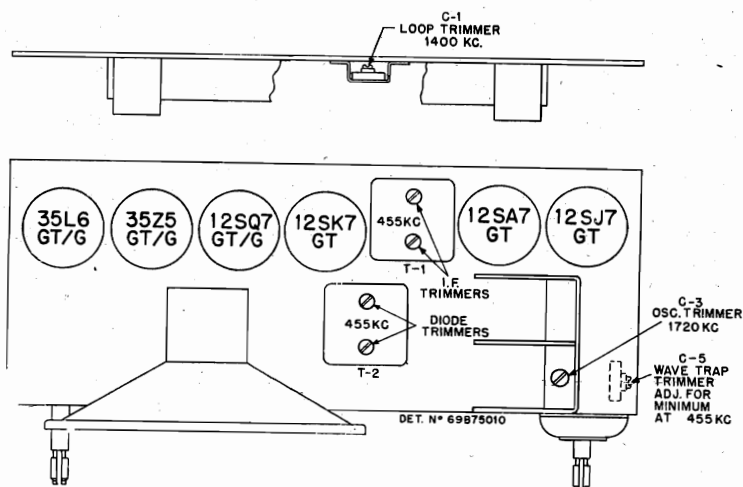
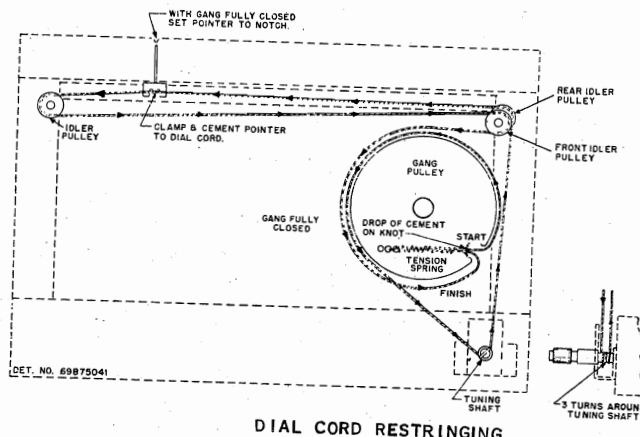
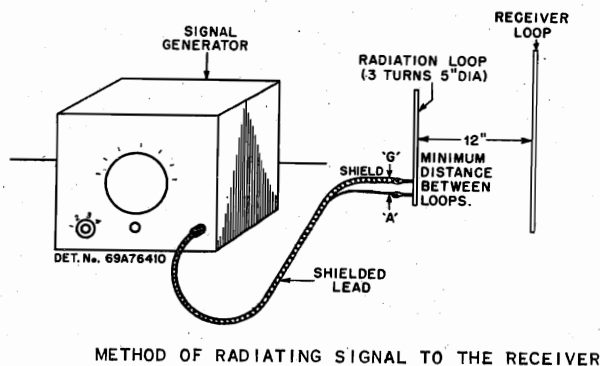
ALIGNMENT PROCEDURE

Connect output meter across speaker voice coil (.38V = .05 watt)
Volume control set at maximum for all operations.
The adjusting screwdriver or alignment tool should be of the
insulated type, such as Motorola Part No. 66A71008

OPERATION IN ORDER	GANG CAPACITOR SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMER NO.	GENERATOR AT (400 \sim 30% MODULATED)	SET AVERAGE MICRO- VOLT INPUT FOR .38V OUTPUT
1. Align I.F.'s for maximum	Minimum	.1 mf	Osc.-Mod. grid	T-1 & T-2 (2 trim- mers on each)	455 Kc	4000 Microvolts to I. F. Grid
2. Adj. wave- trap for minimum response	Minimum	.1 mf	R.F. Grid	C-5	455 Kc	- - - - -
3. Set Oscil- lator to dial scale	Minimum	None	Radiation Loop*	C-3	1720 Kc	- - - - -
4. Align R.F. for maximum	1400 Kc	None	Radiation Loop*	C-1 (on loop) Should be adjusted with set in cabinet	1400 Kc	60 microvolts to Osc.-Mod. grid through .1 mf. dummy. 5.5 mi- crovolts to R.F. grid through .1 mf dummy

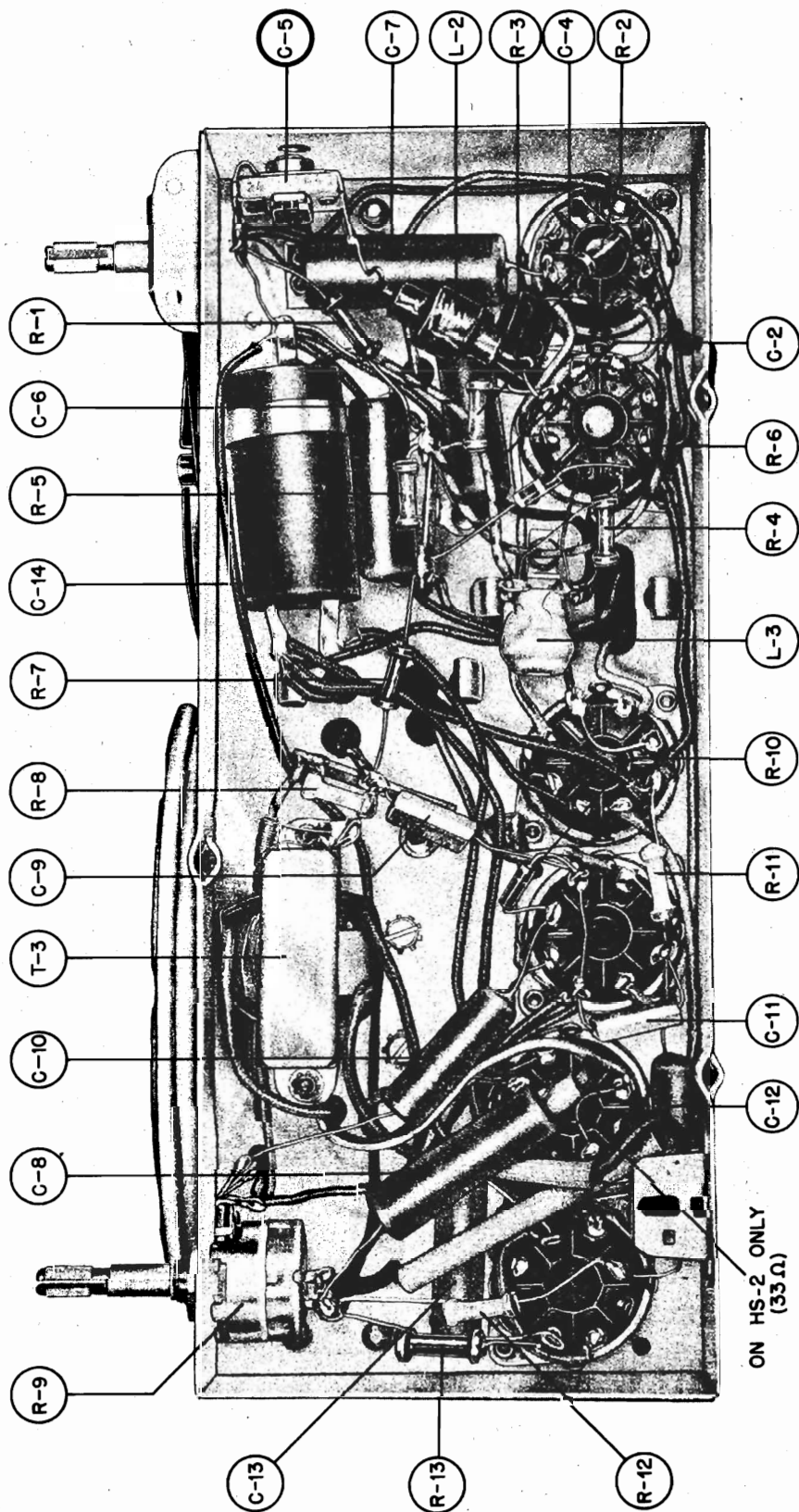
5. Repeat above steps for maximum accuracy.

* Connect output of signal generator to a 5" diameter 3 turn loop. See Fig. 2. With volume control on full, bring loop close enough to receiver loop until an output of 50 milliwatts is obtained (.38V on output meter). The distance between loops should never be less than 12". Vary distance between generator and receiver loops or adjust generator output to maintain .38V output during alignment.



MODELS 65X11, 65X12, 65X13,
65X14, 65X14B, Ch. HS-2;
65X11A, 65X12A, 65X13A,
65X14A, 65X14BA, Ch. HS-51

GALVIN MFG. CORP.



BOTTOM VIEW OF CHASSIS

This receiver is a 6 tube AC-DC superheterodyne, with a self contained loop antenna and a stage of R.F. amplification. The frequency range is 538 to 1720 kc and the I.F. frequency is 455 kc.

POWER INPUT: 117 V. AC-DC, 30 WATTS.

GALVIN MFG. CORP.

MODELS 65X11, 65X12, 65X13,
65X14, 65X14B, Ch. HS-2;
65X11A, 65X12A, 65X13A,
65X14A, 65X14BA, Ch. HS-51

REF. NO.	PART NO.	DESCRIPTION	LIST	REF. NO.	PART NO.	DESCRIPTION	LIST
C-1	20A18740	Capacitor, trimmer: 1.5-15 mmf; includes "U" mounting bracket	.30	L-1	1X70002	Cabinet back & Loop assembly (65X11)	2.40
C-2	889805	Capacitor, fixed: paper; .05 mf 20% 100 vdc	.20		1X70005	Cabinet back & Loop assembly (65X12)	2.75
C-3	1X26949	Capacitor, variable: 2 gang, cut oscillator plates: includes pulley	3.55		1X70014	Cabinet back & Loop assembly (65X13)	2.65
C-4	21R6641	Capacitor, fixed: mica; 100 mmf 20% 500 vdc	.25		1X71739	Cabinet back & Loop assembly (65X14)	2.85
C-5	20A26941	Capacitor, trimmer: 6-60 mmf; includes "L" mounting bracket	.30		1X71776	Cabinet back & Loop assembly (65X14B)	2.85
C-6	889805	Capacitor, fixed: paper; .05 mf 20% 100 vdc	.20		1X74455	Cabinet back & Loop assembly (65X11-A)	2.50
C-7	8A72688	Capacitor, fixed: paper; .15 mf 20% 200 vdc (HS-51)	.25		1X74458	Cabinet back & Loop assembly (65X12-A)	2.50
	or 8A75566	Capacitor, fixed: paper; .15 mf 20% 400 vdc (HS-51)	.25		1X74461	Cabinet back & Loop assembly (65X13-A)	2.45
	or 889810	Capacitor, fixed: paper; .25 mf 20% 100 vdc (HS-2)	.25		1X74464	Cabinet back & Loop assembly (65X14-A)	2.35
C-8	889816	Capacitor, fixed: paper; .05 mf 20% 400 vdc	.20		1X74467	Cabinet back & Loop assembly (65X14-BA)	2.45
C-9	21R6649	Capacitor, fixed: mica; 250 mmf 20% 500 vdc	.20	L-2	24A21858	Coil, wave trap	.40
C-10	889801	Capacitor, fixed: paper; .01 mf 20% 100 vdc	.15	L-3	24A26942	Coil, oscillator	.40
C-11	21R6648	Capacitor, fixed: mica; 250 mmf 20% 500 vdc	.20	R-1	6R6071	Resistor, fixed: carbon; 1 meg. 20% 1/3W N.I.	doz. .60
C-12	889825	Capacitor, fixed: paper; .01 mf 20% 200 vdc	.15	R-2	6R6113	Resistor, fixed: carbon; 10,000 20% 1/3W N.I.	doz. .60
C-13	889802	Capacitor, fixed: paper; .02 mf 20% 400 vdc	.20	R-3	6R6050	Resistor, fixed: carbon; 22,000 20% 1/3W N.I.	doz. .60
C-14	23A70008	Capacitor, electrolytic; 20-20 mf 150 WV; with mounting strap	1.40	R-4	6R6050	Resistor, fixed: carbon; 22,000 20% 1/3W N.I.	doz. .60
	20A14619	Capacitor, dual trimmer: 40-160 mmf each section (in IF can)	.35	R-5	6R6049	Resistor, fixed: carbon; 2.2 meg 20% 1/3W N.I.	doz. .60
	or 20A72757	Capacitor, dual trimmer: 40-160 mmf each section (in IF can)	.35	R-6	6R6446	Resistor, fixed: carbon; 4.7 meg 10% 1/2W Ins.	doz. .60
	20K20649	Capacitor, dual trimmer: 50-250 mmf each section (in diode can)	.40	R-7	6R6071	Resistor, fixed: carbon; 1 meg 20% 1/3W N.I.	doz. .60
	or 20A72756	Capacitor, dual trimmer: 50-250 mmf each section (in diode can)	.40	R-8	6R6020	Resistor, fixed: carbon; 47,000 20% 1/3W N.I.	doz. .60
	587707	Rivet, steel: 5/32 x .122, Pol. Nkl. (tube socket mtg.)	per/c .45	R-9	18A14629	Resistor, variable; carbon; .5 meg. with SPST switch	1.00
	587716	Rivet, steel: 5/32 x .122, antique cop. (loop mtg. clip and trimmer mtg.)	per/c .45		or 18A72888	Resistor, variable; carbon; .5 meg. with SPST switch	1.00
	587701	Rivet, steel: 3/16 x .122, Pol. Nkl. (tuning shaft brkt.mtg.)	per/c .45	R-10	6R2118	Resistor, fixed: carbon; 3.3 meg. 20% 1/2W Ins.	doz. .60
	5K74560	Rivet, shoulder: .312 shoulder; Pol.Nkl.(cord pulley mtg.)	.30	R-11	6R6011	Resistor, fixed: carbon; 470,000 20% 1/3W N.I.	doz. .60
	34B25759	Scale, dial: glass (65X11, 65X11-A, 65X12, 65X12-A, 65X14, 65X14-A, 65X14-B and 65X14-BA)	.45	R-12	6R6011	Resistor, fixed: carbon; 470,000 20% 1/3W N.I.	doz. .60
	34B29469	Scale, dial: glass (65X13 & 65X13-A)	.35	R-13	6R6392	Resistor, fixed: carbon; 150 10% 1/2W N.I.	doz. .60
	387431	Screw, steel: #2 x 1/4 Ph RH WS; Cop. Ox. (dial scale mtg.) (65X14, 65X14-A, 65X14B & 65X14-BA)	doz. .20	T-1	1X26946	Transformer, I.F.; 455 Kc; complete with shield and trimmers	1.80
	357526	Screw, steel: #8 x 1-1/8 PKZ S1 HH; plain (set mtg.- wood models)	doz. .30		387526	Screw, steel: #8 x 1-1/8 PKZ S1 HH; plain (set mtg.- wood models)	doz. .30
	47A14635	Shaft, tuning control	.15		47A14635	Shaft, tuning control	.15
	26A26283	Shield, tube	.05		26A26283	Shield, tube	.05
	60A25758	Socket, dial light: with mtg. clip and leads.	.20		60A25758	Socket, dial light: with mtg. clip and leads.	.20
	9A6738	Socket, tube; octal, saddle type	.15		9A6738	Socket, tube; octal, saddle type	.15
	50B23173	Speaker, electro: 5 inch	5.20		50B23173	Speaker, electro: 5 inch	5.20
	or 50B20653	Speaker, electro: 5 inch	5.20		or 50B20653	Speaker, electro: 5 inch	5.20
	287098	Speednut: for .180 round stud (mounts dial scale to escutcheon in 65X13 & 65X13-A)	doz. .20		287098	Speednut: for .180 round stud (mounts dial scale to escutcheon in 65X13 & 65X13-A)	doz. .20
	41A14111	Spring, tension coil (dial cord)	doz. .35		41A14111	Spring, tension coil (dial cord)	doz. .35
	42A70423	Strap, ground (used behind loop screw terminal)	doz. .25		42A70423	Strap, ground (used behind loop screw terminal)	doz. .25
	31A12847	Strip, terminal: 2 ins. lugs, #3 mtg.	.10		31A12847	Strip, terminal: 2 ins. lugs, #3 mtg.	.10
	31K15026	Strip, terminal: 2 ins. lugs, #2 mtg.	.05		31K15026	Strip, terminal: 2 ins. lugs, #2 mtg.	.05
	29A70422	Terminal, screw (external antenna term. on loop assem.) (Use with ground strap)	doz. .35		29A70422	Terminal, screw (external antenna term. on loop assem.) (Use with ground strap)	doz. .35
	4A70015	Washer, "C" (tuning shaft retain-er)	per/c .70		4A70015	Washer, "C" (tuning shaft retain-er)	per/c .70
	35K19943	Washer, paper: brown (used between knobs and cabinet on dark models)	per/c .60		35K19943	Washer, paper: brown (used between knobs and cabinet on dark models)	per/c .60
	35K22505	Washer, paper: ivory (used between knobs and cabinet)	per/c .60		35K22505	Washer, paper: ivory (used between knobs and cabinet)	per/c .60
	587707	Rivet, steel: 5/32 x .122, Pol. Nkl. (tube socket mtg.)	per/c .45		587707	Rivet, steel: 5/32 x .122, Pol. Nkl. (tube socket mtg.)	per/c .45
	587716	Rivet, steel: 5/32 x .122, antique cop. (loop mtg. clip and trimmer mtg.)	per/c .45		587716	Rivet, steel: 5/32 x .122, antique cop. (loop mtg. clip and trimmer mtg.)	per/c .45
	587701	Rivet, steel: 3/16 x .122, Pol. Nkl. (tuning shaft brkt.mtg.)	per/c .45		587701	Rivet, steel: 3/16 x .122, Pol. Nkl. (tuning shaft brkt.mtg.)	per/c .45
	5K74560	Rivet, shoulder: .312 shoulder; Pol.Nkl.(cord pulley mtg.)	.30		5K74560	Rivet, shoulder: .312 shoulder; Pol.Nkl.(cord pulley mtg.)	.30
	34B25759	Scale, dial: glass (65X11, 65X11-A, 65X12, 65X12-A, 65X14, 65X14-A, 65X14-B and 65X14-BA)	.45		34B25759	Scale, dial: glass (65X11, 65X11-A, 65X12, 65X12-A, 65X14, 65X14-A, 65X14-B and 65X14-BA)	.45
	34B29469	Scale, dial: glass (65X13 & 65X13-A)	.35		34B29469	Scale, dial: glass (65X13 & 65X13-A)	.35

Prices Subject To Change Without Notice



GALVIN MFG. CORP.

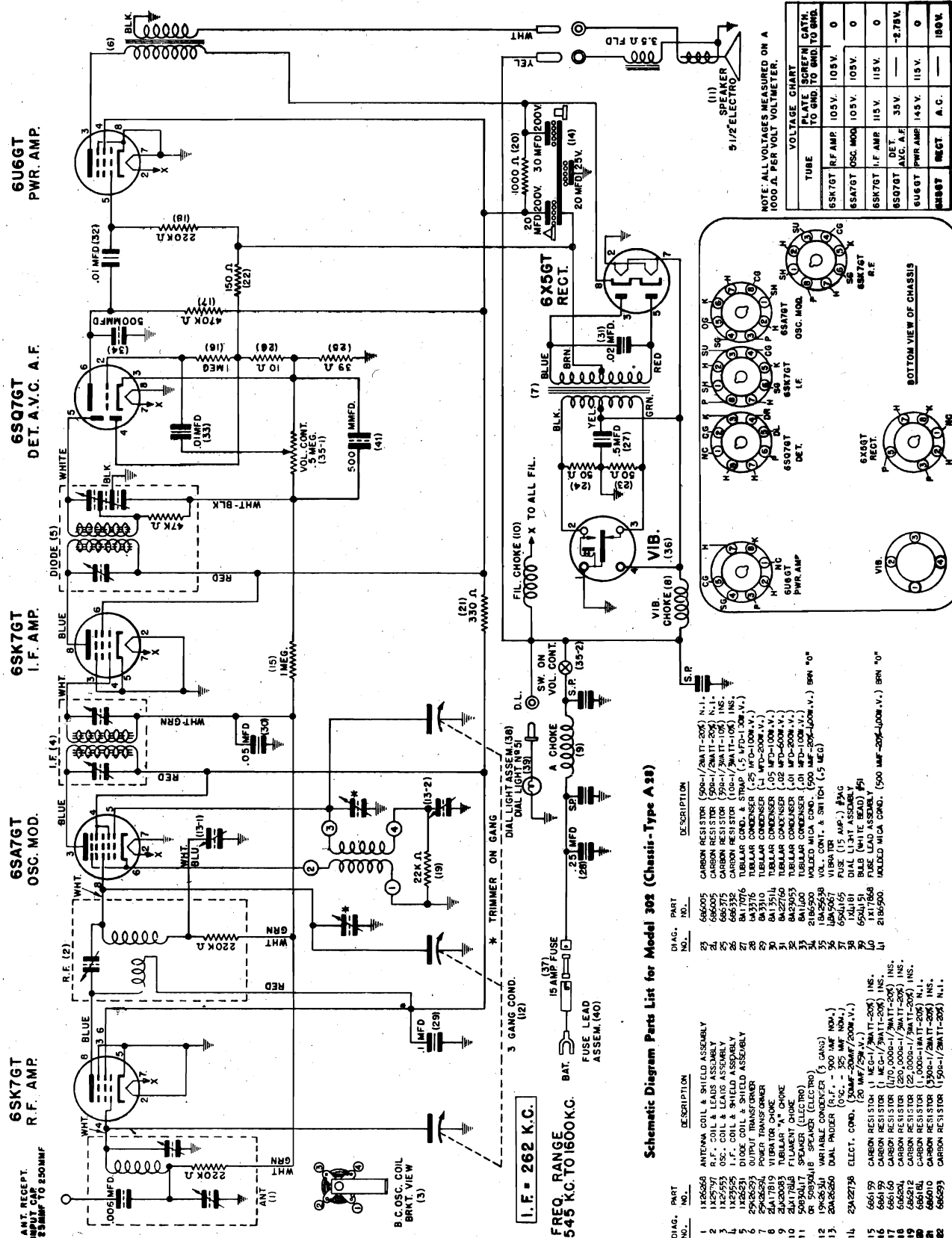
MODELS 65BP1A, 65BP2A,
65BP3A, 65BP4A

MODELS 65BP1, 2, 3, 4A

DRWG. NO.	PART NO.	DESCRIPTION	LIST	DRWG. NO.	PART NO.	DESCRIPTION	LIST
MAJOR PARTS				CONDENSERS (Cont'd.)			
8	25A15786	Output Transformer.	\$0.80	20	8S9814	Tubular Condenser .1-100v	\$0.15
7	1X20289	Slider Switch & Brkt. Assembly. . . . .	.55	19	8S9816	Tubular Condenser .05-400v. . . . .	.15
9	23A20318	Elect. Cond. & Strap 350-10v. . . . .	.50	18	8S9821	Tubular Condenser .05-200v. . . . .	.10
10	23A20324	Electrolytic Condenser FP . . . . .	.80	14	8S9824	Tubular Condenser .002-400v . . . . .	.10
6	18K20339	Volume Control & Switch 1 meg . . . . .	.85	16	8S9825	Tubular Condenser .01-200v. . . . .	.10
5	1X20342	Diode Coil & Shield Assembly	1.55	20A20321	I.F. Trimmer - Small. . . . .	.25	
4	1X20344	I.F. Coil & Shield Assembly	1.40	20A20323	Diode Trimmer - 3 Pl. 70 mmf. . . . .	.30	
39	50C20392	Speaker 6" P.M.	3.60	RESISTORS			
		Speaker Exchange.	2.10	28	6B6003	Carbon Resistor 220,000-1/3-20 N.I. . . . .	.60
	50C21172	Speaker 6" P.M.	3.60	27	6B6011	Carbon Resistor 470,000-1/3-20 N.I. . . . .	.60
		Speaker Exchange.	2.10	34	6B6025	Carbon Resistor 400-1/3-10 N.I. . . . .	.60
	19B22734	Variable Condenser - Subs. 1X22749.	XXXX	29	6B6030	Carbon Resistor 100,000-1/3-20 N.I. . . . .	.60
2	1X22740	R.F. Coil & Shield Assembly	1.40		6B6070	Carbon Resistor 150,000-1/3-20 N.I. . . . .	.60
3	24A22746	Osc. Coil - Wht.-Brn.-Ceramic . . . . .	.35	26	6B6071	Carbon Resistor 1 meg-1/3-20 N.I. . . . .	.60
11	1X22749	Gang & Pulley Assembly.	2.85	33	6B6086	Carbon Resistor 1,000-1/3-10 N.I. . . . .	.60
41	1X22831	Coil Core & Brkt. Assembly (Loading Coil) . . . . .	.50	30	6B6125	Carbon Resistor 68,000-1/3-20 N.I. . . . .	.60
13	23A22953	Tub. Elect. Cond.-20-25v. EP. . . . .	.25	37	6B6132	Carbon Resistor 10-1/2-10 N.I. . . . .	.60
CABINET PARTS				25	6B6179	Carbon Resistor 3.3 meg-1/3-20 N.I. . . . .	.60
	3S7431	Screw 2x1/4 CO - 65BP3,4A . . . . .	.20	35	6B6192	Carbon Resistor 720-1/3-10 N.I. . . . .	.60
	55K16573	Handle. . . . .	.25	36	6B6241	Carbon Resistor 27-1/2-10 N.I. . . . .	.60
	55K16576	Handle Mounting Post. . . . .	.20	31	6B6242	Carbon Resistor 3,300-1/3-10 N.I. . . . .	.60
	37A16614	Rubber Foot . . . . .	.25	32	6B6276	Carbon Resistor 2,700-1/3-20 N.I. . . . .	.60
	36A20315	Control Knob - Ivory - Plain. . . . .	.10	24	6B6297	Carbon Resistor 8.2 meg-1/3-10 N.I. . . . .	.60
	64B20372	Speaker Screen - Plain. . . . .	.20	38	17A20466	W.W. Resistor 2550-6.5-5. . . . .	.40
	36K20609	Control Knob - Ivory - Marked . . . . .	.10	SCREWS & WASHERS			
	35B21021	Grille Cloth. . . . .	.15	287000	Nut 8-32x11/32 Brass - Spkr . . . . .	.70	
	36K21049	Bar Knob & Brkt.-Frt. Cover - 65BP3,4A. . . . .	.20	287003	Nut 8-32x11/32 CP - Bot. Brkt. . . . .	.50	
	55A21099	Sliding Hinge- Frt. Cover - 65BP3,4A. . . . .	.15	387155	Screw 6-32x3/16 CP - Gang Brkt. . . . .	.35	
	61K22389	Dial Crystal - 65BP1,2A . . . . .	.20	387203	Screw 6-32x3/16 CP - Coil Core. . . . .	.60	
	16D22763	Cabinet (Portable) Cpt. - 65BP1A.	7.50	387248	Screw 8-32x1/8 CP - Dial. . . . .	.40	
	1X22771	Back & Brackets Assembly - 65BP1A . . . . .	.55	387271	Screw 8-32x7/16 CO - Loop . . . . .	.75	
	16K22774	Cabinet (Portable) Cpt. - 65BP2A.	7.50	387350	Lockscrew 6-32x1/4 CP - Gang Brkt. . . . .	.80	
	1X22776	Back & Bracket Assembly - 65BP2A. . . . .	.55	387454	Screw 8x1/4 PK Z PIHH CP. . . . .	.20	
	61B22798	Escutcheon & Crystal - 65BP3,4A	1.00	387462	Screw 6-32x3/16 CP - Osc. Coil. . . . .	.90	
	16D22802	Cabinet (Portable) Cpt. - 65BP3A.	12.50	387475	Screw 8x1/4 CP - Cord Guard . . . . .	.65	
	16K22805	Cabinet (Portable) Cpt. - 65BP4A.	12.50	387528	Screw 8x3/8 CO - Batt. Brkt. . . . .	.65	
	1X22814	Back & Bracket Assembly - 65BP3A. . . . .	.55	487597	Washer 7/16 CP - Bot. Brkt. . . . .	.35	
	1X22815	Back & Bracket Assembly - 65BP4A. . . . .	.55	387512	Screw 8x1/2 CP - Gang Brkt. . . . .	.70	
	56X22861	Packing Carton & Fillers - 65BP1,2A . . . . .	.30	487660	Lockscrew #8 Ext. Pho. Brz.-Spkr. . . . .	.60	
	56X22867	Packing Carton & Fillers - 65BP3,4A . . . . .	.35	MISCELLANEOUS			
DIAL & DRIVE				31A504	Terminal Strip 1 Ins. #1 Mtg. . . . .	.05	
	5S7805	Snap-In Eyelet 1/8x.141 CP. . . . .	.70	29B5207	Soldering Lug - Gang Brkt. . . . .	.85	
	11M8944	Dial Cord 18# Blk. - 18". . . . .	.05	42B5480	Grid Clip - Small - Collar Grip . . . . .	.15	
	37A12691	Rubber Grommet - Gang Mtg . . . . .	.25	9B6739	Tube Socket - Octal Waferette . . . . .	.15	
	41A14244	Dial Cord Tension Spring. . . . .	.40	28X12250	Three Prong Battery Plug. . . . .	.05	
	7A14610	Tuning Shaft Bracket. . . . .	.05	42K13135	Cable Clamp . . . . .	.15	
	7B18748	Gang Mounting Bracket . . . . .	.10	40	26X14760	Bantam Tube Shield. . . . .	.05
	5A19658	Eyelet .296 Cop. Pl. - Gang Mtg . . . . .	.40		7A15254	Back Mounting Bracket . . . . .	.05
	47K20340	Tuning Shaft 1 & 11/64. . . . .	.10		14A15324	Elect. Insulator Tube . . . . .	.05
	38A20612	"Off" Indicator Button. . . . .	.05		9A15642	Two Prong Receptacle. . . . .	.10
	52K20667	Dial Pointer - Double . . . . .	.10		38X15757	Plug Button 3/8x3/16 CO . . . . .	.35
	1X22755	Dial Plate & Bracket Assembly . . . . .	.10		42X17040	Line Cord Clamp . . . . .	.05
	34B22758	Dial Scale. . . . .	.15		31A20288	Term. Strip - 2 Lrg. Ins. #2 Mtg. . . . .	.40
CONDENSERS					7A20317	Mounting Bracket - Sw. & Shield . . . . .	.15
22	21B6503	Molded Mica Condenser 50 mmf-20%. . . . .	.15		30B20329	Line Cord & Small Plug - 6 Ft . . . . .	.35
	21B6506	Molded Mica Condenser 150 mmf-20% . . . . .	.15		32B20332	Line Cord Guard - Fibre . . . . .	.05
23	21B6511	Molded Mica Condenser 100 mmf-20% . . . . .	.15		28A20361	Two-Pin Plug Base . . . . .	.30
15	8S9801	Tubular Condenser .01-100v. . . . .	.10		7A20375	Battery Retainer Brkt. - Long . . . . .	.05
17	8S9805	Tubular Condenser .05-100v. . . . .	.15	12	1X20592	Battery Cable Assembly. . . . .	.20
21	8S9810	Tubular Condenser .25-100v. . . . .	.20		1X22769	Bottom Plate & Brkt. Assembly . . . . .	.30

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

GALVIN MFG. CORP.



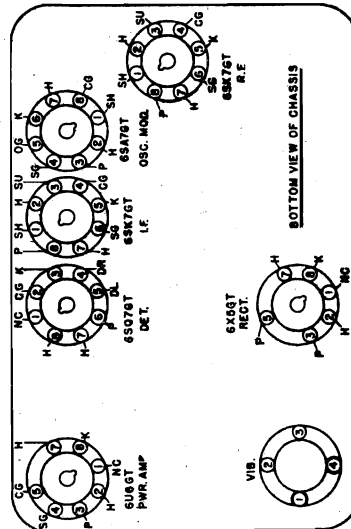
Schematic Diagram Parts List for Model 302 (Chassis - Type A28)

DIAG.	PART	DESCRIPTION
NO.	NO.	
1	11262668	ANTENNA COIL & SHIELD ASSEMBLY
2	11262797	R.F. COIL & LEADS ASSEMBLY
3	11262953	R.F. COIL & LEADS ASSEMBLY
4	11263055	R.F. COIL & SHIELD ASSEMBLY
5	11263060	IF COIL & SHIELD ASSEMBLY
6	12626293	OUTPUT TRANSFORMER
7	12626294	POWER TRANSFORMER
8	2117819	VIBRATOR CHORE
9	2117819	VIBRATOR CHORE
10	21182083	TUBULAR "A" CHORE
11	21182083	TUBULAR "A" CHORE
12	5043017	SPARKER (ELECTRO)
13	5043017	SPARKER (ELECTRO)
14	5043017	SPARKER (ELECTRO)
15	1926320	VARIABLE CONDENSER (3 GANG)
16	20126560	DUAL MODER (R.F. - 905 MF NOM.)
17	20126560	DUAL MODER (R.F. - 905 MF NOM.)
18	20126560	DUAL MODER (R.F. - 905 MF NOM.)
19	20126560	DUAL MODER (R.F. - 905 MF NOM.)
20	20126560	DUAL MODER (R.F. - 905 MF NOM.)
21	20126560	DUAL MODER (R.F. - 905 MF NOM.)
22	20126560	DUAL MODER (R.F. - 905 MF NOM.)
23	20126560	DUAL MODER (R.F. - 905 MF NOM.)
24	20126560	DUAL MODER (R.F. - 905 MF NOM.)
25	20126560	DUAL MODER (R.F. - 905 MF NOM.)
26	20126560	DUAL MODER (R.F. - 905 MF NOM.)
27	20126560	DUAL MODER (R.F. - 905 MF NOM.)
28	20126560	DUAL MODER (R.F. - 905 MF NOM.)
29	20126560	DUAL MODER (R.F. - 905 MF NOM.)
30	20126560	DUAL MODER (R.F. - 905 MF NOM.)
31	20126560	DUAL MODER (R.F. - 905 MF NOM.)
32	20126560	DUAL MODER (R.F. - 905 MF NOM.)
33	20126560	DUAL MODER (R.F. - 905 MF NOM.)
34	20126560	DUAL MODER (R.F. - 905 MF NOM.)
35	20126560	DUAL MODER (R.F. - 905 MF NOM.)
36	20126560	DUAL MODER (R.F. - 905 MF NOM.)
37	20126560	DUAL MODER (R.F. - 905 MF NOM.)
38	20126560	DUAL MODER (R.F. - 905 MF NOM.)
39	20126560	DUAL MODER (R.F. - 905 MF NOM.)
40	20126560	DUAL MODER (R.F. - 905 MF NOM.)
41	20126560	DUAL MODER (R.F. - 905 MF NOM.)
42	20126560	DUAL MODER (R.F. - 905 MF NOM.)
43	20126560	DUAL MODER (R.F. - 905 MF NOM.)
44	20126560	DUAL MODER (R.F. - 905 MF NOM.)
45	20126560	DUAL MODER (R.F. - 905 MF NOM.)
46	20126560	DUAL MODER (R.F. - 905 MF NOM.)
47	20126560	DUAL MODER (R.F. - 905 MF NOM.)
48	20126560	DUAL MODER (R.F. - 905 MF NOM.)
49	20126560	DUAL MODER (R.F. - 905 MF NOM.)
50	20126560	DUAL MODER (R.F. - 905 MF NOM.)
51	20126560	DUAL MODER (R.F. - 905 MF NOM.)
52	20126560	DUAL MODER (R.F. - 905 MF NOM.)
53	20126560	DUAL MODER (R.F. - 905 MF NOM.)
54	20126560	DUAL MODER (R.F. - 905 MF NOM.)
55	20126560	DUAL MODER (R.F. - 905 MF NOM.)
56	20126560	DUAL MODER (R.F. - 905 MF NOM.)
57	20126560	DUAL MODER (R.F. - 905 MF NOM.)
58	20126560	DUAL MODER (R.F. - 905 MF NOM.)
59	20126560	DUAL MODER (R.F. - 905 MF NOM.)
60	20126560	DUAL MODER (R.F. - 905 MF NOM.)
61	20126560	DUAL MODER (R.F. - 905 MF NOM.)
62	20126560	DUAL MODER (R.F. - 905 MF NOM.)
63	20126560	DUAL MODER (R.F. - 905 MF NOM.)
64	20126560	DUAL MODER (R.F. - 905 MF NOM.)
65	20126560	DUAL MODER (R.F. - 905 MF NOM.)
66	20126560	DUAL MODER (R.F. - 905 MF NOM.)
67	20126560	DUAL MODER (R.F. - 905 MF NOM.)
68	20126560	DUAL MODER (R.F. - 905 MF NOM.)
69	20126560	DUAL MODER (R.F. - 905 MF NOM.)
70	20126560	DUAL MODER (R.F. - 905 MF NOM.)
71	20126560	DUAL MODER (R.F. - 905 MF NOM.)
72	20126560	DUAL MODER (R.F. - 905 MF NOM.)
73	20126560	DUAL MODER (R.F. - 905 MF NOM.)
74	20126560	DUAL MODER (R.F. - 905 MF NOM.)
75	20126560	DUAL MODER (R.F. - 905 MF NOM.)
76	20126560	DUAL MODER (R.F. - 905 MF NOM.)
77	20126560	DUAL MODER (R.F. - 905 MF NOM.)
78	20126560	DUAL MODER (R.F. - 905 MF NOM.)
79	20126560	DUAL MODER (R.F. - 905 MF NOM.)
80	20126560	DUAL MODER (R.F. - 905 MF NOM.)
81	20126560	DUAL MODER (R.F. - 905 MF NOM.)
82	20126560	DUAL MODER (R.F. - 905 MF NOM.)
83	20126560	DUAL MODER (R.F. - 905 MF NOM.)

Q'AG.	PART	DESCRIPTION	S.P.
23	666205	CARBON RESISTOR (500-1/2WATT-200K) N.I.	
24	666205	CARBON RESISTOR (500-1/2WATT-200K) N.I.	
25	666375	CARBON RESISTOR (500-1/2WATT-100K) INC.	
26	666375	CARBON RESISTOR (500-1/2WATT-100K) INC.	
27	BA2076	TUBULAR CONDENSER (.25 WFD-100K V.)	
28	BA3375	TUBULAR CONDENSER (.25 WFD-100K V.)	
29	BA3310	TUBULAR CONDENSER (.1 WFD-100K V.)	
30	BA1314	TUBULAR CONDENSER (.05 WFD-100K V.)	
31	BA22760	TUBULAR CONDENSER (.02 WFD-600K V.)	
32	BA12905	TUBULAR CONDENSER (.02 WFD-100K V.)	
33	BA12905	TUBULAR CONDENSER (.02 WFD-100K V.)	
34	2186290	WALDED MICA COND. (500 MAF-200-1000K V.) 50M "0"	
35	2186290	VOL. CONT. 5 SWITCH (.5 MEG)	
36	1A8-5067	VIBRATOR	
37	65A4165	FUSE (15 AMP.) #3AG	
38	65A4165	FUSE (15 AMP.) #3AG	
39	1A8-5067	VIBRATOR	
40	1A8-5067	BULB (WHITE SEED #5)	
41	1A8-5067	BULB LEAD ASSEMBLY	
42	1A8-5067	WALDED MICA COND. (500 MAF-200-1000K V.) 50M "0"	
43	2186290	WALDED MICA COND. (500 MAF-200-1000K V.) 50M "0"	

VOLTAGE CHART			
TUBE	PLATE TO GND.	SCREEN TO GND.	CATH. TO GND.
6SR7GT	105V.	105V.	0
6SA7GT	OSC. MOD.	105V.	0
6SK7GT	I.F. AMP.	115V.	0
6SQ7GT	DET. AVC. A.F.	35V.	-2.75V.
6U6GT	POWER AMP.	145V.	0
6X6GT	RECT.	A.C.	150V.

NOTE: ALL VOLTAGES MEASURED ON A 1000 Ω PER VOLT VOLTMETER.



GALVIN MFG. CORP.

MODEL 302

MODEL 352

MODEL 452

MODEL 302

1X26268	Antenna Coil & Shield Assembly	1.55	6B6184	Carbon Res. (1,000-1 Watt 20% NI	.10
1X25797	R. F. Coil & Leads Assembly	.75	6B6010	Carbon Res. (330-1/2-20% Ins.	Doz. .60
1X26553	Osc. Coil & Leads Assembly	.60	6B6293	Carbon Res. (150-1/2-Watt -20%) NI	Doz. .60
1X23525	I. F. Coil & Shield Assembly	1.45	6B6005	Carbon Res. (500-1-1/2 Watt 20% NI	Doz. .60
1X26231	Diode Coil & Shield Assembly	1.60	6B6375	Carbon Res. (300-1/3 Watt 10% Ins.	Doz. .60
25K26293	Output Transformer	.80	6B6332	Carbon Res. (10-1/3 Watt 10% Ins.	Doz. .60
25K26294	Power Transformer	2.35	8A17076	Tubular Cond. & Strap .5 MFD 100 W. V.	.30
24A17819	Vibrator Choke	.35	8A3376	Tubular Cond. (.25 MFD 100WV)	.20
24K20083	Tubular "A" Choke	.20	8A3310	Tubular Cond. (.1 MFD 200 W. V.)	.15
24X17848	Filament Choke	.05	8A13514	Tubular Cond. (.05-MFD-100W.V.)	.15
24X30417	Speaker Electro	3.10	8A22760	Tubular Cond. (.02MFD 600 WV)	.15
19K26341	Variable Cond 3Gang	3.15	8A23053	Tubular Cond. (.01 MFD 200 WV)	.10
20A26260	Dual Padder(RF 900 MMF Nom)	.55	8A1400	Tubular Cond. (.01 MFD 100WV)	.15
	(Osc. 325 MMF Nom)		21B6500	Molded Mica Cond.(500 MMF 20%)	.15
23A22738	Elect Cond. (30MMF 20MMF/200W.V)	.75	18A25638	Vol. Cont. & Switch (.5 Meg)	.80
	(20MMF/25 W.V.)		48A5067	Vibrator	2.50
6B6159	Carbon Res.(1 Meg-1/3 Watt -20% Ins.	Doz. .60	65X4165	Fuse (15 Amp) 3AG	.05
6B6160	Carbon Res. (470,000-1/3 Watt 20% Ins.	Doz. .60	1X4181	Dial Light Assembly	.35
6B6204	Carbon Res. (220,000-1/3Watt 20% Ins.	Doz. .60	65X4151	Bulb (White Bead) #51	.15
6B6212	Carbon Res. (22,000-1/3-20% Ins.	Doz. .60	1X17868	Fuse Lead Assembly	.15

MODEL 352

1X26399	Antenna Coil & Shield Assembly	2.60	21B6500	Molded Mica Cond. (500 MMFD 20%)	.15
1X26379	R. F. Coil & Shield Assembly	1.80	21B6503	Molded Mica Cond. (50 MMFD 20%)	.15
24A23892	Oscillator Coil	.60	6B6159	Carbon Resistor (1.0 Meg 1/3-20) Ins.	Doz. .60
1X26385	I. F. Coil & Shield Assembly	1.45	6B6160	Carbon Resistor (470,000-1/3-20 Ins.	Doz. .60
1X26383	Diode Coil & Shield Assembly	1.60	6B6204	Carbon Resistor (220,000-1/3-20 Ins.	Doz. .60
25A26233	Output Transformer	.90	6B6012	Carbon Resistor (33,000-1/2-20 Ins.	Doz. .60
25K26296	Power Transformer	2.45	6B6212	Carbon Resistor (22,000-1/3-20 Ins.	Doz. .60
24A19108	Vibrator Choke	.30	6B6184	Carbon Resistor (1000-1-20 N.I.	.10
24K19109	"A" Choke	.30	6B6010	Carbon Resistor (330-1/2-20 Ins.	Doz. .60
19B26246	Variable Condenser 3 Gang	2.55	6B6330	Carbon Resistor (150-1-10) Ins.	.10
20A26238	Single Padder & Brkt.(325 MMFD Nom.)	.30	6B6005	Carbon Resistor (50-1/2-20 NI	Doz. .60
23A22738	Electrolytic Condenser(30-20/200V-20/25V)	.75	6B6331	Carbon Resistor (27-1/3-10 Ins.	Doz. .60
8A19133	Tubular Condenser (.05-100V)	.30	6B6332	Carbon Resistor (10-1/3-10 Ins.	Doz. .60
8A14095	Tubular Condenser (.4-100V)	.30	18K25639	Vol. Cont. & Switch (.5 Meg)	.90
8A3310	Tubular Condenser (.1-200V)	.15	40A26887	Tone Switch	.45
8A3302	Tubular Condenser (.1-100V)	.15	48K12793	Vibrator	2.50
8A23146	Tubular Condenser (.5-200V)	.10	26A14760	Bantam Shield	.05
8A13514	Tubular Condenser (.05-100V)	.15	65X4165	Fuse (15 Amp.)3AG	.05
8A22760	Tubular Condenser(.02-600V)	.15	1X4872	Battery Lead Assembly	.50
8A24053	Tubular Condenser (.02-200V)	.10	1X4181	Dial Light Assembly	.35
8A1697	Tubular Condenser (02-100V)	.15	65X4151	Bulb White Bead #51	.15
8A19134	Tubular Condenser (.005-600V)	.20	6B6284	Carbon Resistor (.5,000-1/3-20 Ins.	Doz. .60
8A2289	Tubular Condenser (.007-600V)	.20	21B6500	Molded Mica Cond. (500 MMFD 20%)	.15

MODEL 452

1X26583	Antenna Coil & Shield Assembly	2.50	21B6500	Molded Mica Cond. (500 MMF 20%)	.15
1X26557	R. F. Coil & Shield Assembly	1.75	21A23110	Ceramic Mica Cond. (300 MMF 5%)	.25
1X26556	Osc. Coil & Leads Assembly	.65	21B20877	Metal Mica Cond.(90MMF 10%)	.15
1X26558	I. F. Coil & Shield Assembly	1.20	6B6159	Carbon Res. (1 Meg. 1/3-20 Ins.	Doz. .60
1X26586	Diode Coil & Shield Assembly	1.55	6B6160	Carbon Res. (470,000-1/3-20 Ins.	Doz. .60
25K26487	Power Transformer	2.35	6B6165	Carbon Res. (100,000-1/3-20 Ins.	Doz. .60
25K26623	Output Transformer	1.00	6B6012	Carbon Res. (330,000-1/2-20 Ins.	Doz. .60
24A26555	Vibrator Choke	.35	6B6212	Carbon Res. (22,000-1/3-20 Ins.	Doz. .60
24A26554	"A" Choke & Bracket	.35	6B6184	Carbon Res. (1,000-1-20 NI	.10
19B26622	Variable Condenser (3Gang)	3.95	6B6010	Carbon Res. (330-1/2-20 Ins.	Doz. .60
20A23135	Osc. Padder & Brkt.(9-39 MMF)	.20	6B6330	Carbon Res. (150-1-10) Ins.	.10
20A17257	Osc. Trimmer & Brkt. 6 MMF Nom)	.20	6B6005	Carbon Res. (50-1/2-20 NI	Doz. .60
20A23927	Compensating Condenser	.25	6B6331	Carbon Res. (27-1/3-10 Ins.	Doz. .60
23A22738	Elect. Cond. (-30-20/200V-20/25V)	.75	6B6332	Carbon Res. (10-1/3-10 Ins.	Doz. .60
8A19133	Tubular Cond. (.5-100V)	.30	18A25638	Vol. Cont. & Switch .5 Meg.	.80
8A3376	Tubular Cond. (.25-100V)	.20	48K12793	Vibrator Short	2.50
8A3310	Tubular Cond. (.1-200V)	.15	65X4151	Bulb White Bead #51	.15
8A14095	Tubular Cond. (.4-100V)	.30	65X12712	Fuse 20 Amp 3AG	.05
8A23146	Tubular Cond. (.5-200V)	.15	1X4288	Battery Lead Assembly	.40
8A13514	Tubular Cond. (.05-100V)	.15	26X14760	Bantam Tube Shield	.05
8A22760	Tubular Cond. (.02-600V)	.15	26A26283	Bantam Tube Shield	.05
8A1697	Tubular Cond. (.02-100V)	.15	1X22875	Model E-24-T Tuner Assembly	9.50
8A2289	Tubular Condenser (.007-600V)	.20	1X26560	MR-6 Tone Control Relay	1.70
8A4529	Tubular Cond. (.006-100V)	.15	6B6256	Carbon Res. (68,000-1/3-20) Ins.	Doz. .60
21B6525	Molded Mica Cond.(800 MMF) 20%	.20	21B6500	Molded Mica Cond.(500 MMF) 20%	.15

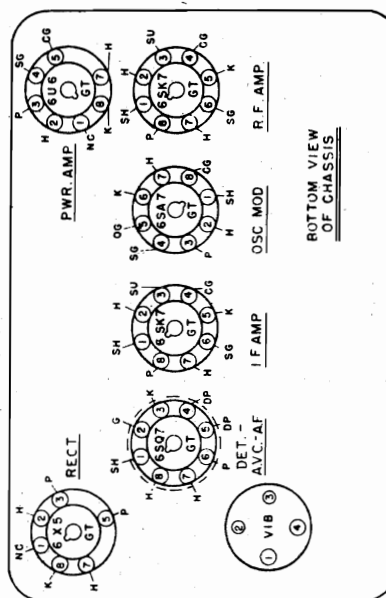
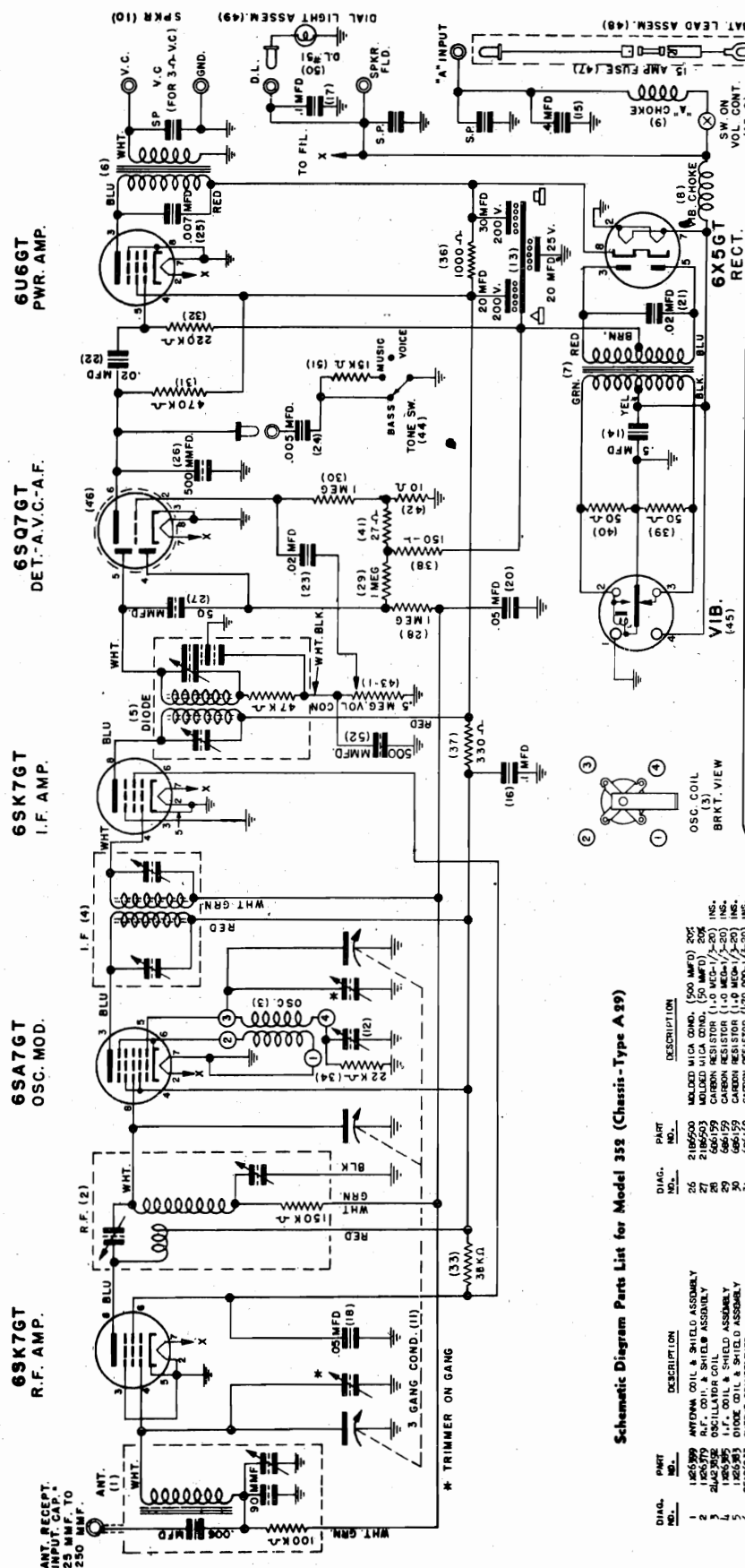
Prices subject to change without notice.

I.F. = 262 KC

FREQUENCY RANGE
545 KC TO 1600 KC

TUBE		VOLTAGE CHART		
		PLATE	SCREEN	CATH.
		TO GND	TO GND	TO GND
6X5KT6	RF AMP	110 V	90 V	0
6SA7	OSC MOD	110 V	110 V	0
6X5KT6	IF AMP	115 V	90 V	0
6SQ7GT	DET	40 V	—	0
6AU6GT	PR AMP	130 V	115 V	0
6X5GT	RECT.	AC	—	140

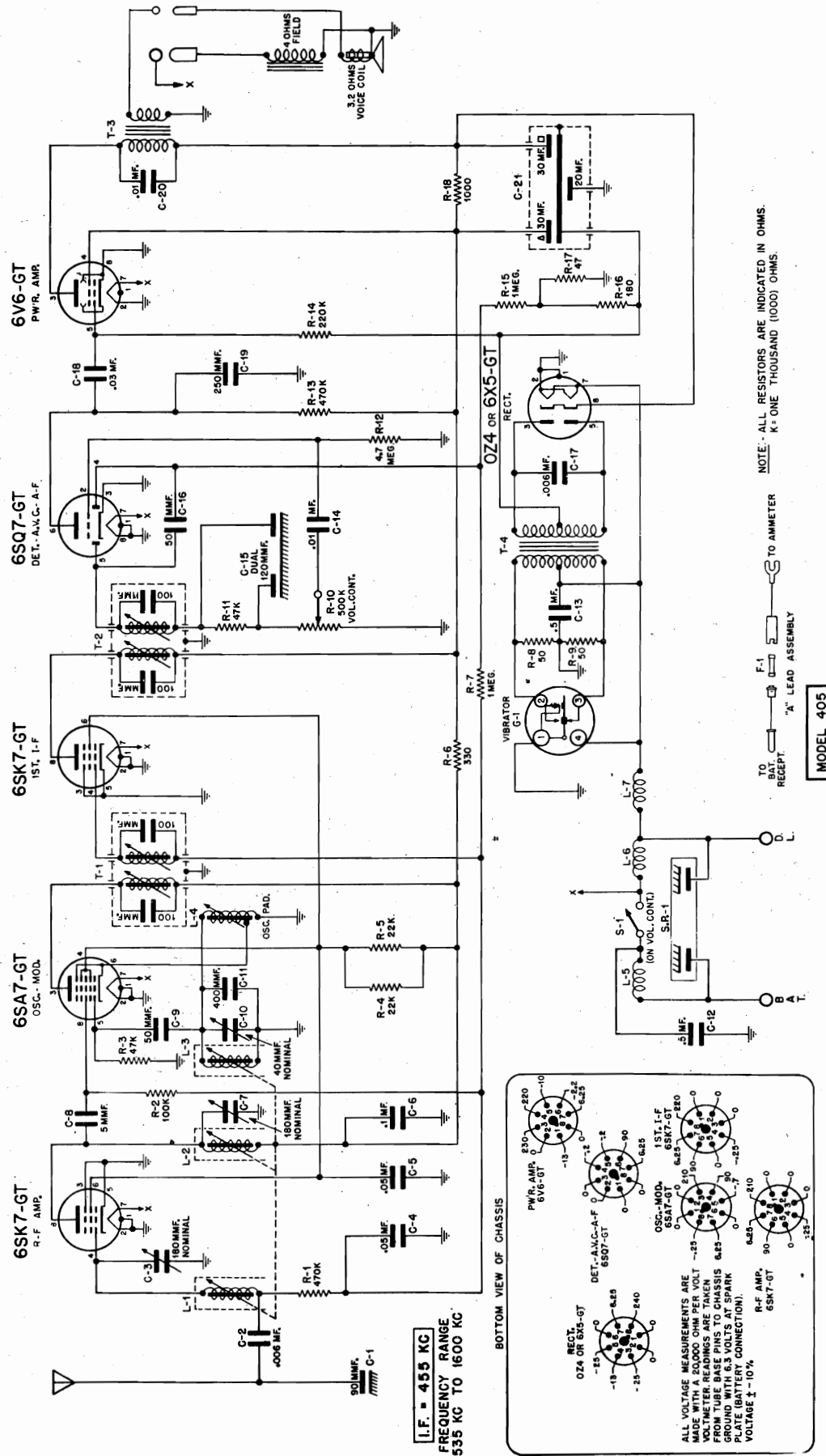
ALL MEASUREMENTS MADE WITH A
1000 OHM PER VOLT METER



Schematic Diagram Parts List for Model 352 (Chassis-Type A99)

PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.
1353799	REFORM COIL & SHIELD ASSEMBLY	26	2186500	MOLDED MICA COND. (500 MFD) 20K	20K
2	REFORM COIL & SHIELD ASSEMBLY	27	2186503	MOLDED MICA COND. (500 MFD) 20K	20K
3	OSCILLATOR COIL	28	6861599	CARBON RESISTOR (1.0 MEG./1/2-20) INS.	1/2-20
4	17.0 K. & SHIELD ASSEMBLY	29	6861599	CARBON RESISTOR (1.0 MEG./1/2-20) INS.	1/2-20
5	OSCILLATOR COIL	30	6861599	CARBON RESISTOR (1.0 MEG./1/2-20) INS.	1/2-20
6	OSCILLATOR COIL	31	6861610	CARBON RESISTOR (1.0 MEG./1/2-20) INS.	1/2-20
7	POTENTIAL TRANSFORMER	32	6865620	CARBON RESISTOR (250,000/1/2-20) INS.	1/2-20
8	POTENTIAL TRANSFORMER	33	6865620	CARBON RESISTOR (250,000/1/2-20) INS.	1/2-20
9	POTENTIAL TRANSFORMER	34	6865620	CARBON RESISTOR (250,000/1/2-20) INS.	1/2-20
10	POTENTIAL TRANSFORMER	35	6865620	CARBON RESISTOR (250,000/1/2-20) INS.	1/2-20
11	POTENTIAL TRANSFORMER	36	6865620	CARBON RESISTOR (250,000/1/2-20) INS.	1/2-20
12	POTENTIAL TRANSFORMER	37	6865620	CARBON RESISTOR (250,000/1/2-20) INS.	1/2-20
13	POTENTIAL TRANSFORMER	38	6865620	CARBON RESISTOR (250,000/1/2-20) INS.	1/2-20
14	POTENTIAL TRANSFORMER	39	6865620	CARBON RESISTOR (250,000/1/2-20) INS.	1/2-20
15	POTENTIAL TRANSFORMER	40	6865620	CARBON RESISTOR (250,000/1/2-20) INS.	1/2-20
16	POTENTIAL TRANSFORMER	41	6865620	CARBON RESISTOR (250,000/1/2-20) INS.	1/2-20
17	POTENTIAL TRANSFORMER	42	6865620	CARBON RESISTOR (250,000/1/2-20) INS.	1/2-20
18	POTENTIAL TRANSFORMER	43	6865620	CARBON RESISTOR (250,000/1/2-20) INS.	1/2-20
19	POTENTIAL TRANSFORMER	44	6865620	CARBON RESISTOR (250,000/1/2-20) INS.	1/2-20
20	POTENTIAL TRANSFORMER	45	6865620	CARBON RESISTOR (250,000/1/2-20) INS.	1/2-20
21	POTENTIAL TRANSFORMER	46	6865620	CARBON RESISTOR (250,000/1/2-20) INS.	1/2-20
22	POTENTIAL TRANSFORMER	47	6865620	CARBON RESISTOR (250,000/1/2-20) INS.	1/2-20
23	POTENTIAL TRANSFORMER	48	6865620	CARBON RESISTOR (250,000/1/2-20) INS.	1/2-20
24	POTENTIAL TRANSFORMER	49	6865620	CARBON RESISTOR (250,000/1/2-20) INS.	1/2-20
25	POTENTIAL TRANSFORMER	50	6865620	CARBON RESISTOR (250,000/1/2-20) INS.	1/2-20

GALVIN MFG. CORP.



IF PEAK 262 KC

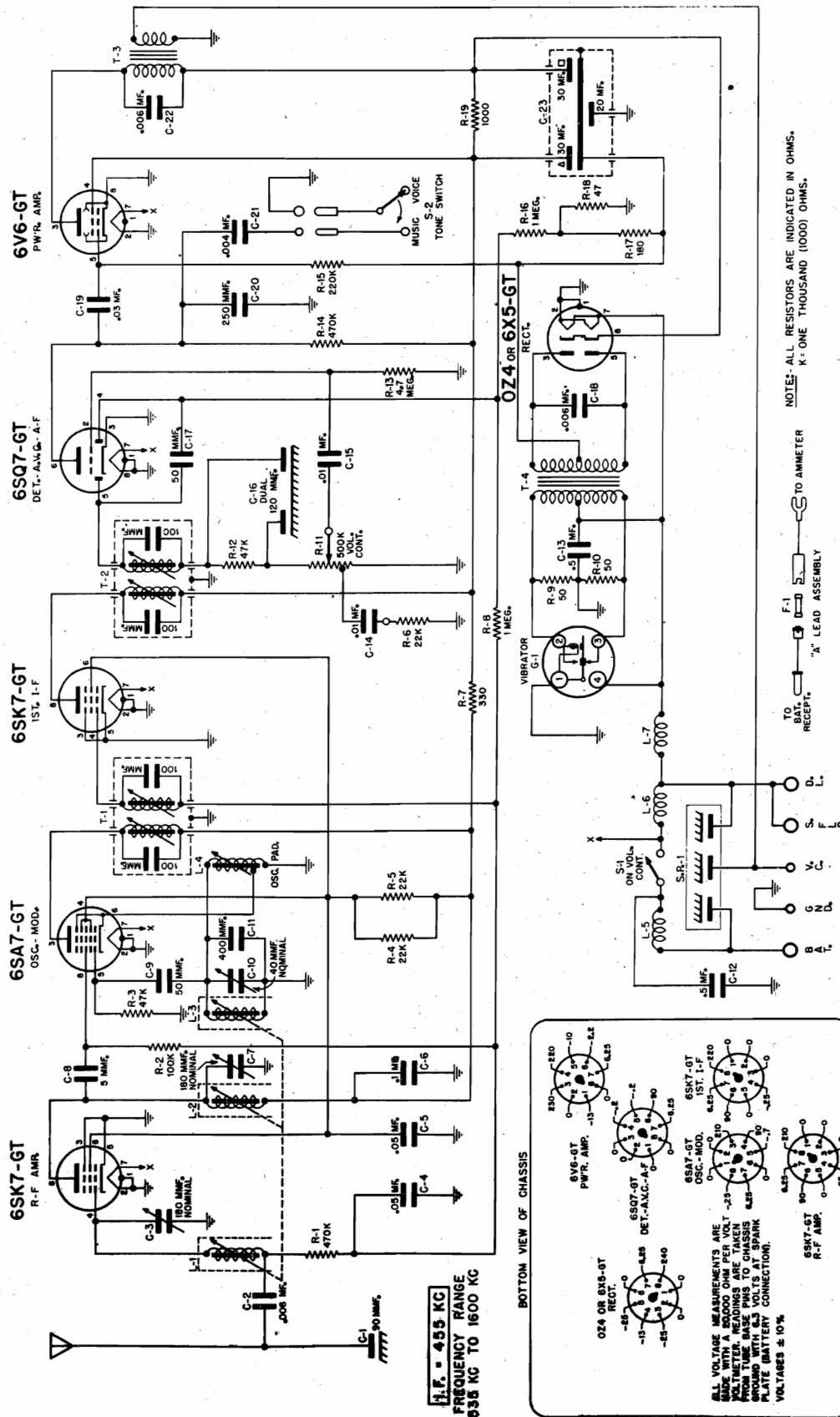


Schematic Diagram Parts List for Model 452 (Chassis-Type A31)

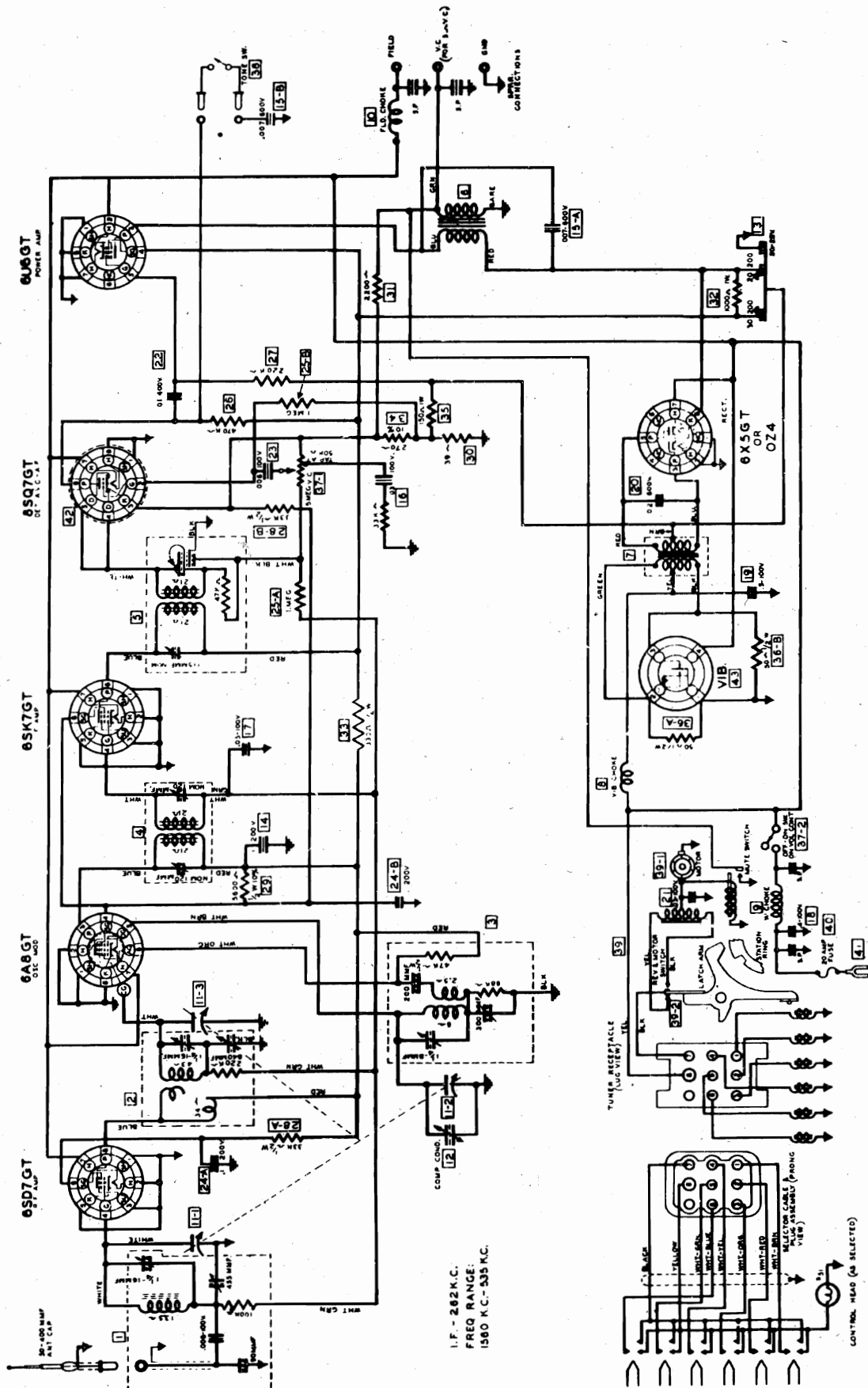
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NOTE - ALL VOLTAGES MEASURED ON
A 1000 OHM PER VOLT VOLTMETER

GALVIN MFG. CORP.



GALVIN MFG. CORP.



MODEL 550A

SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input *	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
12,000	262 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	1.74
300	262 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
350	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
12	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	1.74
6	600 K.C.	Antenna	***	None	1.74

Volume Control Set At Maximum
** 1 Watt = 1.74 Volts

Tone Control Set At Music

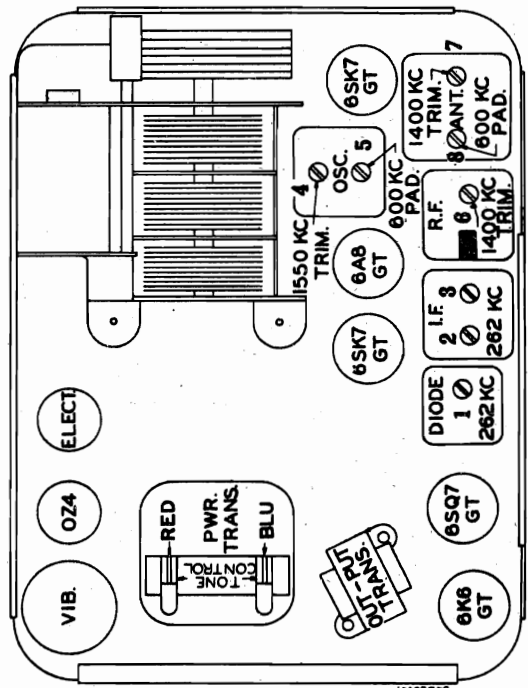
**** Output meter connected across voice coil.**

*** Use Special Dummy Part No. 1X18018.

ALIGNMENT CHART

Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum	.1 Mfd.	Osc.-Mod. Grid	1-2-3	262 K.C.
2	1550 K.C.	.1 Mfd.	Osc.-Mod. Grid	4	1550 K.C.
3	535 K.C.	.1 Mfd.	Osc.-Mod. Grid	5	535 K.C.
4	1400 K.C.	*	To Special Dummy	6	1400 K.C.
5	1400 K.C.	*	To Special Dummy	7	1400 K.C.
6	600 K.C.	*	To Special Dummy	8	600 K.C.

* Use Special Dummy Part No. 1X18018.



VOLTAGE CHART

POSITION	PLATE	SCREEN	CATHODE
R.F.	120	85	0
Osc.Mod.	120	75	0
I.F.	125	75	0
Det-AVC-AF	35	-----	1.5
Pwr.	140	125	0
Rect.	AC	-----	145

All measurements from chassis ground to socket terminal using 1000 ohms per volt meter.
Current Consumption—8.5 Amps.
Battery Vc¹age 6.3
Maximum power output 4 Watts

MODEL 550-A

GALVIN MFG. CORP.

MODEL 550A

Same As 550 Except:

8A2289	Tubular Condenser .007-600v	.20
20A4308	Trimmer & Padder - Osc.	.55
20A4399	Antenna Trimmer & Padder	.45
6B6029	Carbon Resistor 100,000-1/3-20 N.I.	.60
6B6154	Carbon Resistor 150-1-20 N.I.	.10
6B6184	Carbon Resistor 1,000-1-20 N.I.	.10
6B6200	Carbon Resistor 39-1/2-20 N.I.	.60
6B6321	Carbon Resistor 47,000-1/3-20 Ins.	.60
6B6322	Carbon Resistor 5,600-1/2-10 N.I.	.60
3S8126	Screw 8 x 1-1/4 CP - Pwr. Trans.	.20
26A13678	Antenna Coil Bottom Shield	.05
8K18320	Tub. Cond. & Strap .1-200v	\$0.20
23A22738	Electrolytic Condenser FP	.75
25B22739	Power Transformer - Shielded	2.35
1X22745	Diode Coil & Shield Assembly	1.55
25A22745	Output Transformer	1.00
20A22747	Trimmer Diode - Small	.40
20A22751	Double Trimmer - 120 mmf Nom. (I.F.)	.30
1X22752	I.F. Coil & Shield Assembly	1.40
8A22760	Tubular Condenser .02-600v	.15
1X22762	Front Housing Assembly	2.55

MODEL 550

MAJOR PARTS

10	24X4835	Dial Light Choke	.15
43	48A5067	Vibrator	2.50
43	48A5333	Vibrator (3333)	2.50
13	23A17738	Electrolytic Condenser FP	1.00
39	1K19819	EL4T Tuner Assembly	14.00
7	25B20011	Power Transformer - Shielded	2.45
38	1X20079	Push Switch Assembly	.35
9	24K20083	Tubular "A" Choke	.20
6	25K20396	Output Transformer	.95
3	1X20417	Osc. Coil & Shield Assembly	1.35
2	1X20419	R.F. Coil & Shield Assembly	1.80
1	1X20423	Ant. Coil & Shield Assembly	2.60
5	1X20426	Diode Coil & Shield Assembly	1.50
4	1X20428	I.F. Coil & Shield Assembly	1.35
37	1A20435	Volume Control & Shaft Assembly	1.00
	18A20439	Volume Control & Switch .5 Meg.	.75
	15K20441	Rear Housing	.55
	15C20444	Front Housing	.55

ACCESSORIES

	41A2157	Backing Coil Spring - Fuse	.PER C. .50
	14X2423	"A" Lead Insulator	.DOZ. .20
	9X4075	Fuse Receptacle	.DOZ. .20
	14X4076	Fuse Backing Washer - Bakelite	.DOZ. .10
	14X4077	Contact Bushing - Fuse	.DOZ. .20
	6X4141	Distributor Suppressor	.30
	9X4168	"A" Lead Male Ferrule	.DOZ. .25
	1X4171	Flexible Shaft & Housing Assembly	1.00
	8A4491	Generator Condenser	.40
40	65X4637	Fuse 20 AMP (3AG)	.05
	9B6734	Tube Socket - Saddle 4 Prong	.15
	9B6739	Tube Socket - Octal Waferette	.15
	65X12712	Fuse 20 AMP (SFE)	.05
	1X13698	Antenna Receptacle & Bracket Assembly	.10
	1X13699	Antenna Receptacle Assembly	.10
	1X16762	Fuse & Clamp Assembly	.10
41	1X17868	Fuse Lead Assembly 12"	.15
	1X19034	"A" Lead	.10
	1X20098	Accessories Kit Assembly	.90
	1X20160	Receiver Accessories Assembly	2.50
	13K20446	Button Medallion	.20
	1K20476	Spark Plate Assembly	.80

CONDENSERS

24	8A3310	Tubular Condenser .1-200V	.15
14	8A4092	Tubular Condenser & Strap .1-400V	.25
23	8A4529	Tubular Condenser .006-100V	.15
19	8A4588	Tubular Condenser .5-100V	.30
	21A4807	Molded Mica Condenser 90 MTF 10%	.20
21	8A4925	Dual Tubular Condenser .0008-.0008-1000V	.25
	21B6500	Molded Mica Condenser 500 MTF 20%	.15
	21B6501	Molded Mica Condenser 200 MTF 20%	.15
20	8A10432	Tubular Condenser .01-1600V	.35
17	8K13006	Tubular Condenser & Strap .05-100V. LH.	.20
16	8A13134	Condenser Resistor & Strap .03-100V-33K	.30
18	8A14095	Tubular Condenser .4-100V	.30

15	8A17077	Tubular Condenser & Strap .03-600V	.15
	20A18384	Compensating Condenser	.30
22	8A18799	Tubular Condenser .01-400V	.10

RESISTORS

	6B6000	Carbon Resistor 820,000-1/3-20	.DOZ. .60
	6B6002	Carbon Resistor 47,000-1/2-20	.DOZ. .60
	6B6003	Carbon Resistor 220,000-1/3-20 N.I.	.DOZ. .60
27	6B6005	Carbon Resistor 50-1/2-20	.DOZ. .60
36	6B6006	Carbon Resistor 2,200-1-20	.10
30	6B6010	Carbon Resistor 330-1/2-20 Ins.	.DOZ. .60
33	6B6011	Carbon Resistor 470,000-1/3-20	.DOZ. .60
26	6B6012	Carbon Resistor 33,000-1/2-20	.DOZ. .60
28	6B6071	Carbon Resistor 1 MEG-1/3-20 N.I.	.DOZ. .60
25	6B6072	Carbon Resistor 2,200-1/3-20 N.I.	.DOZ. .60
31	6B6103	Carbon Resistor 330-1-10 N.I.	\$0.10
32	6B6106	Carbon Resistor 10,000-1-20 N.I.	.10
29	6B6107	Carbon Resistor 68-1/3-10 N.I.	.DOZ. .60
35	6B6197	Carbon Resistor 270-1/3-10 N.I.	.DOZ. .60
34	6B6204	Carbon Resistor 220,000-1/3-20 Ins.	.DOZ. .60
	6B6256	Carbon Resistor 68,000-1/3-20 Ins.	.DOZ. .60

SCREWS, WASHERS, ETC.

	3A3134	"J" Bolt 5/16 X 3" CP	.DOZ. .75
	287003	Nut 8-32 X 11/32 HEX. CP	.PER C. .50
	287004	Nut 3/8-32 X 9/16 HEX. CP	.PER C. 1.00
	287035	Nut 3/16-18 x 5/8 Fits "J" Bolt	.DOZ. .20
	287050	Nut 6-32 X 5/16 PAL. CP	.PER C. .50
	387224	Screw 6-32 X 1/4 PLHMS Brass	.PER C. .50
	387239	Screw 8-32 X 1" PLHMS CP	.PER C. .50
	387257	Screw 8-32 X 5/8 SLHMS CP	.PER C. .65
	387454	Screw 8 X 1/4 PK Z PLH CP	.DOZ. .20
	387456	Housing Screw 8 X 1/4 ACHD PK A	.PER C. .65
	387457	Chassis Mounting Screw 8 x 7/8" PK-A-PLH CP	.DOZ. .25
	387481	Screw 8 X 3/4 PK Z SLH	.PER C. 1.00
	387509	Screw 6 X 5/8 PK A ACHD CO.	.DOZ. .10
	387515	Screw 8 X 3/8 PK A BH BLK. OXD.	.PER C. 1.00
	487614	Washer 11/16-.171-.037 CP	.PER C. .70
	487625	Washer 1/4-.125-.018 Plain	.PER C. .50
	487634	Washer 9/16-.390-.031 CO.	.DOZ. .65
	487639	Washer 5/8-.406-.125 CP	.DOZ. .30
	487650	Lockwasher No.6 Int. CP	.PER C. .50
	487651	Lockwasher No.8 Int. CP	.PER C. .50
	487653	Lockwasher 1-1/4 OD-5/16 I.D. CP	.DOZ. .45
	487655	Lockwasher 3/8 Split-Black	.PER C. .60
	487656	Lockwasher No.6 Spec.-Black	.PER C. .60
	487657	Lockwasher No.8 Ext. BO	.PER C. .50
	487665	Lockwasher-Special-Black No.6	.PER C. .75
	388104	Screw 8 X 1 1/2 PK A SLH CP	.PER C. 1.00

MISCELLANEOUS

	58A2581	Flexible Shaft Bushing-C.H. End	.DOZ. .30
	58A3180	Flexible Shaft Square Fitting-Set End	.DOZ. .30
	39X4205	Hood Wiper	.DOZ. .25
	42A4215	Vibrator Grounding Clip	.DOZ. .75
	9K4556	Large Pin Terminal Receptacle	.DOZ. .30
	29B5350	Spade Lug HT	.DOZ. .30
	42B5480	Grid Clip Small Collar Grip	.DOZ. .15
	587820	Eyelet .470-.129-.230 Brs. CSP	.PER C. .60
	38X10544	Plug Button 1/4" COP. OXD	.DOZ. .25
	9X10844	Electrolytic Ins. Wafer	.10
	31A11114	Terminal Strip 4 Ins. No.2 GND.	.05
	26B13671	Antenna Coil Shield	.35
	7A13680	Choke Support Bracket	.10
	37A13682	Tuner Mtg. Grommet-Small-Rubber	.DOZ. .30
	43A13730	Tuner Spacer Bushing-Long	.DOZ. .50
	43A13743	Tuner Spacer Bushing-Short	.DOZ. .40
8	24A13775	Vibrator Choke & Mtg. Screw	.50
	42X14564	Cable Clamp	.DOZ. .15
42	26X14760	Bantam Tube Shield	.05
	37K14841	Tuner Mounting Grommet-Red	.DOZ. .60
	41A15214	Volume Control Shaft Spring	.DOZ. .25
	1X16764	Hood Wiper & Screw Assembly	.05
	54X17887	Important P.B. Instr. Sheet	.DOZ. .20
	14A19067	Speaker Terminal Insulator	.DOZ. .20
	7A20008	Volume Control Mtg. Bracket	.05
	31A20397	Tone Control Terminal Strip	.10
	47A20436	Drive Shaft & Coupling	.15
	47A20438	Volume Control Coupling Shaft	.10
	38K20448	Plug Button & Wiper	.10
	54B20449	Drilling Template	.DOZ. .30
	54X20458	Instruction Booklet	.10
	56X20482	Packing Carton & Fillers	.30

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

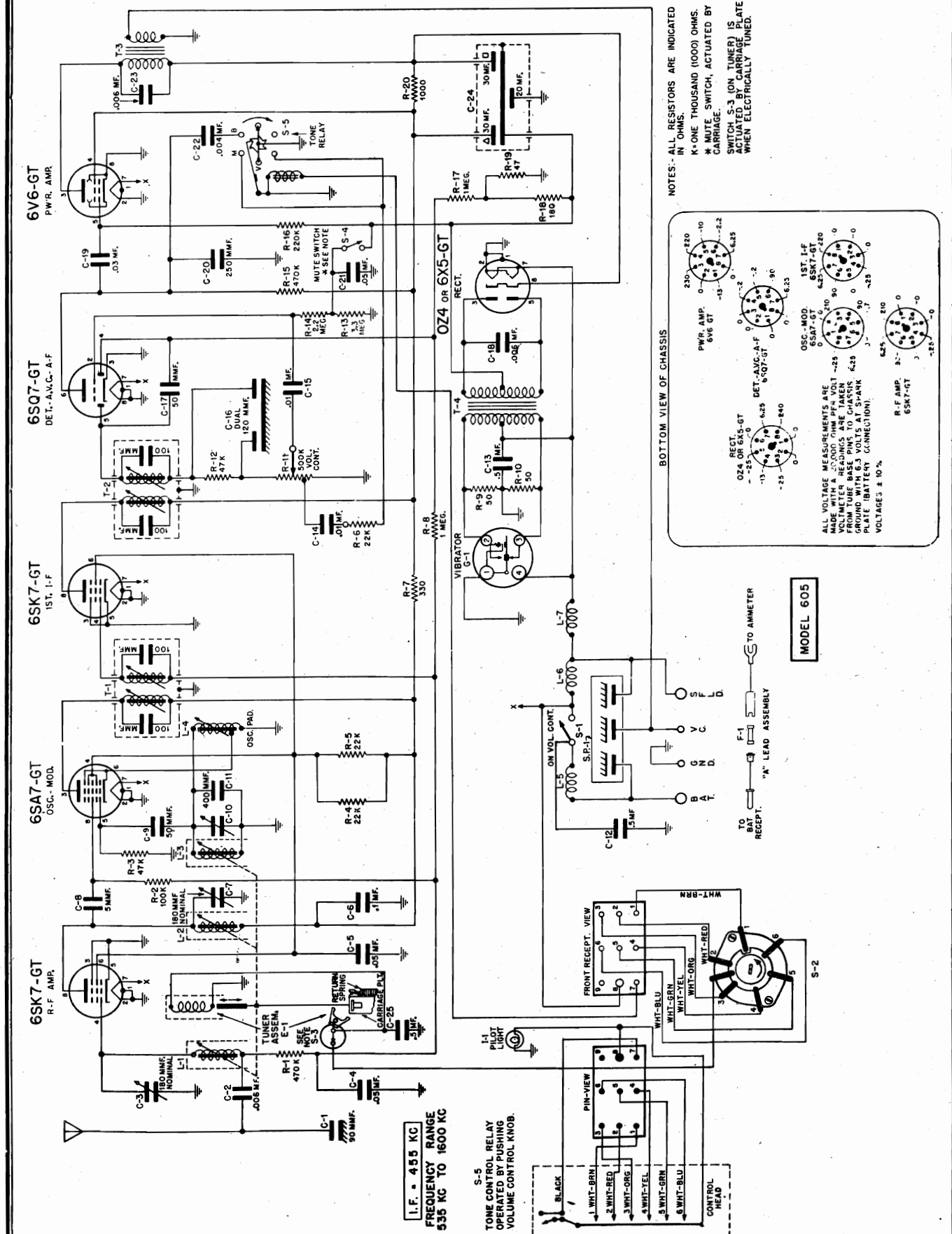


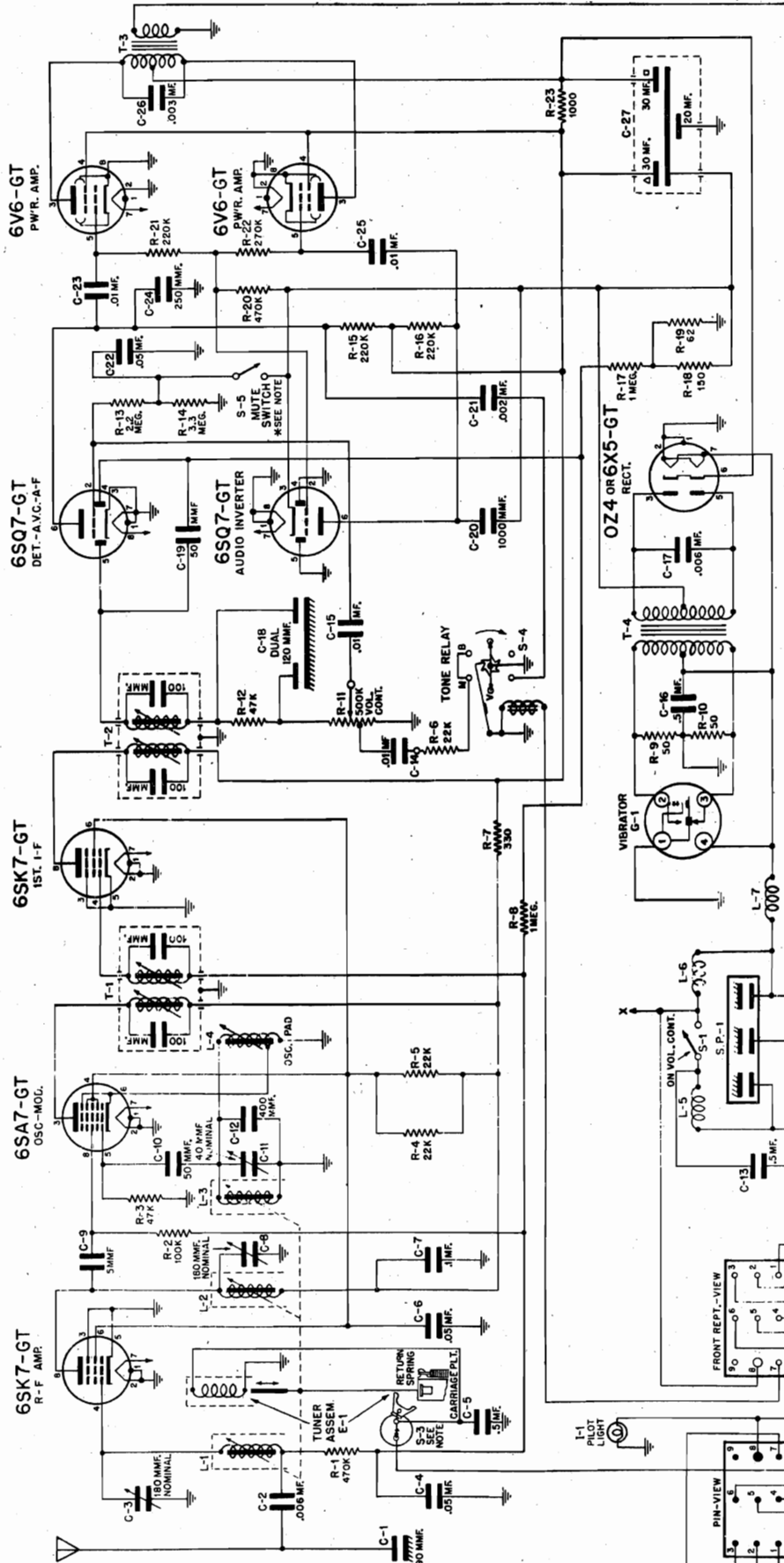
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MODEL 552 PARTS PRICE LIST					
MAJOR PARTS					
8H11026	Vibrator Bk.	2.50			
8K13166	Electrolytic Condenser	.85			
1K25619	Volume Control & Switch Assy.	.85			
9B26622	Variable Condenser 3 Gang	3.95			
9A5A26804	Output Transformer	1.25			
5B26810	Power Transformer	2.90			
4K26832	"A" Choke	.30			
4K26833	Vibrator Choke	.30			
1X26834	Filter Choke & Bracket Assy.	.75			
1X26840	Oscillator Coil & Leads Assy.	.70			
1X26842	Diode Coil & Shield Assy.	1.60			
1X26844	I.F. Coil & Shield Assy.	1.45			
1X26848	R. F. Coil & Shield Assy.	1.75			
1X26850	Antenna Coil & Shield Assy.	2.50			
1X26857	E-29-T Tuner Gang & Leads Assy	13.75			
1X26860	Type Mx-4 Tone Relay	1.75			
1X26870	E-29-T Electric Tuner Less Gang	9.50			
1X27130	Sensitizing Control Assy.	.75			
5K30709	Rear Housing	2.05			
1X31099	Front Housing Assy.	2.90			
ACCESSORIES					
4K24223	Fuse Insulator "A" Lead	Dos.			
6X4141	Distributor Suppressor	.30			
1X4288	Battery Lead Assy.	.40			
6A4491	Generator Condenser	.40			
1X4894	Fuse Lead Assy. 20"	.25			
1X4895	Short "A" Lead Assy 10"	.25			
65X12712	Fuse 20 AMP SFE	.05			
1X12820	Antenna Receptacle Assy.	.15			
1X20686	Mounting & Filter Parts Assy.	.80			
1B26812	Spark Plate Assy.	.55			
39X28036	Shirt Marker	.80			
1K29864	Flexible Shaft & Housing Assy.	1.00			
13B30660	Golden Voice Letters	.10			
13D20566	Motorola Overlay Molded	.40			
36K30675	Tone Control Knob	.10			
1X31103	Receiver Accessories Assy.	2.40			
CONDENSERS					
8A1697	Tubular Condenser .02-100V	.15			
8A3302	Tubular Condenser .1-100V	.15			
8A3314	Tubular Condenser .004-120V	.20			
8A4925	Dual Tubular Cons. .0008-.0008-1000V	.25			
21B5600	Molded Mica Condenser 50Mmf 20%	.15			
21B5603	Molded Mica Condenser 50Mmf 20%	.15			
SCREWS, WASHERS, ETC.					
257004	Nut 3/8x5/16 CP -Vol. Cont.	.25			
257007	Nut 8-32x1/4 Hex CP-Gang Mtg.	.15			
257035	Nut 5/16-15x5/8 CP-Set Mtg	.15			
257070	Nut 6-32x1/4 Inv. Pal CP-Colls	.15			
257084	Speednut 9/16x5/16 Blk. Overlay	.30			
357205	Lockwasher 8-32x1/4 CP Tone Relay	.35			
357215	Screw 8-32x3/16 CP -Trim Mtg.	.30			
357236	Screw 8-32x13/32 Brass Choke	.50			
357375	Screw 8-32x7/16 CP Gang Mtg.	.40			
357454	Screw 8x1/4 CP. O/P Trans.	.30			
357456	Housing Screw 8x1/4 ACHC Pk A CO	.55			
357457	Screw 8x7/8 PK A PLHH CP Misc.	.25			
357457	Screw 8x3/8 PK Z PLHH CP	.10			
357506	Screw 8x1/4 CP Osc. Mtg.	.25			
357507	Screw 8x5/8 CP Tun. Mtg.	.25			
457609	Washer 1-5/16x.218x.050 CP Choke	.25			
457634	Washer 9/16 .390-.031 CO	.65			
457651	Lockwasher #8 Int. CP Gang Mtg.	.50			
457653	Lockwasher 5/16 Int. Ext. Set Mtg. CP. Dos.	.10			
457655	Lockwasher 3/8 Split Black Sw.	.60			
457657	Lockwasher #8 Ext. BO Choke	.60			
457666	Lockwasher #6 Ext. Blk. Osc. Coll Per C	.60			
MISCELLANEOUS					
37A411	Rubber Grommet-Tun. Mtg.	.05			
37A4187	Rubber Grommet-Frim. Mtg.	.25			
42A4215	Vibrator Grounding Clip	.75			
95B734	Tube Socket-Saddle 4 Prong	.15			
9A6774	Tube Socket-Saddle Octal	.15			
557820	Eyelet .470-.129-.230 Brs. Tone Cont.	.60			
557830	Eyelet .406x.240 CP-Tun. Mtg.	.20			
3A13748	Locking Screw 8-32x1/32 CP Tun. Unit	.20			
7E26376	Tuner Mounting Bracket Long	.10			
43A26594	Spacer Bushing, Chamfered	.40			
1X26599	Receptacle & Brkt. Assy. 9 Prong	.30			
7A26741	Tuner Mounting Bracket	.10			
31A26803	Terminal Strip 10 Ins.	.10			
43A26886	Spacer Sleeve	.20			
35X26922	Plug Button 1/4"	.55			
31A27158	Terminal Strip	.30			
38A30708	Plug Button 3/8"	.40			
Prices subject to change without notice.					
343134	"J" Bolt 5/16x3" CP-Set Mtg.	.75			
237003	Nut 8-32x5/16 Hex C P-Choke	.50			

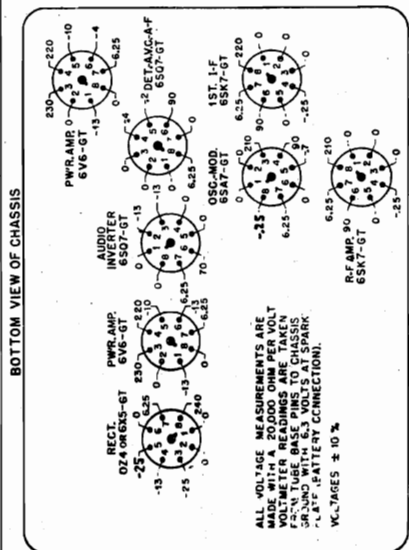
Prices subject to change without notice.

GALVIN MFG. CORP.





NOTES: ALL RESISTORS ARE INDICATED IN OHMS.
K-ONE THOUSAND (1000) OHMS.
* MUTE SWITCH, ACTUATED BY CARRIAGE.
SWITCH S-3 (ON TUNER) IS CARRIAGE RATE WHEN ELECTRICALLY TUNED.



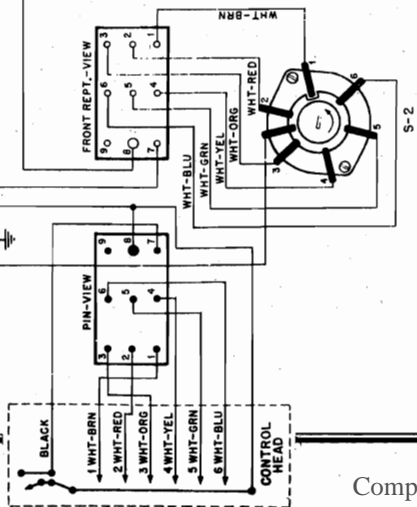
ALL VOLTAGE MEASUREMENTS ARE TAKEN WITH THE RADIO SET TO THE MIDDLE OF THE TUNING RANGE. VOLTAGE READINGS ARE TAKEN FROM TUBE BASE PINS TO CHASSIS GROUND. VOLTAGE MEASUREMENTS ARE TAKEN FROM TUBE BASE PINS TO CHASSIS GROUND. VOLTAGE MEASUREMENTS ARE TAKEN FROM TUBE BASE PINS TO CHASSIS GROUND.

BOTTOM VIEW OF CHASSIS

MODEL 705

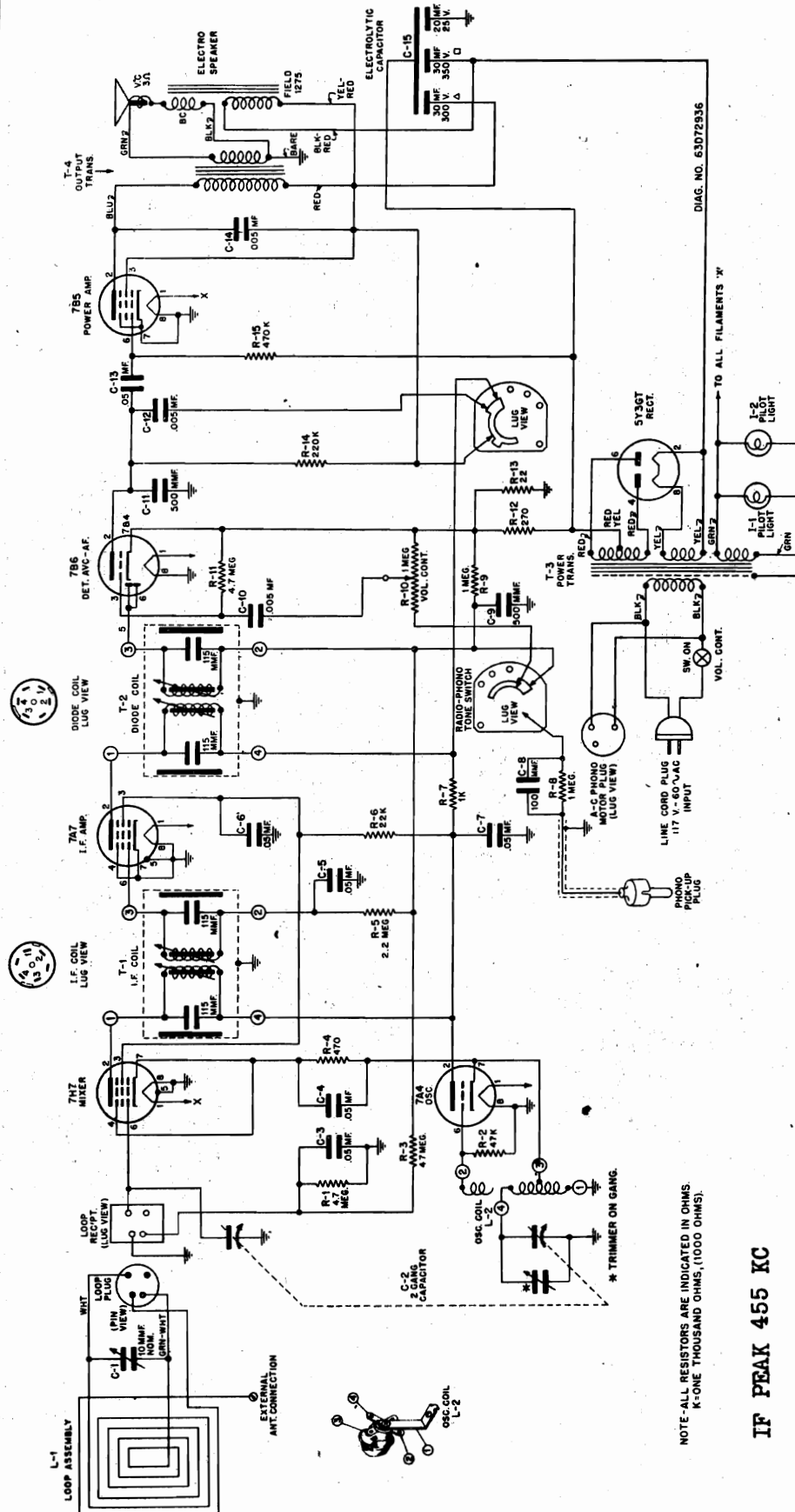
I.F. = 455 KC
FREQUENCY RANGE
535 KC TO 1600 KC

S-4
TONE CONTROL RELAY
OPERATED BY PUSHING
VOLUME CONTROL KNOB.



GALVIN MFG. CORP.

1946



NOTE-ALL RESISTORS ARE INDICATED IN OHMS.
K-ONE THOUSAND OHMS, (1000 OHMS).

IF PEAK 455 KC

TO REMOVE CHASSIS FROM CABINET:

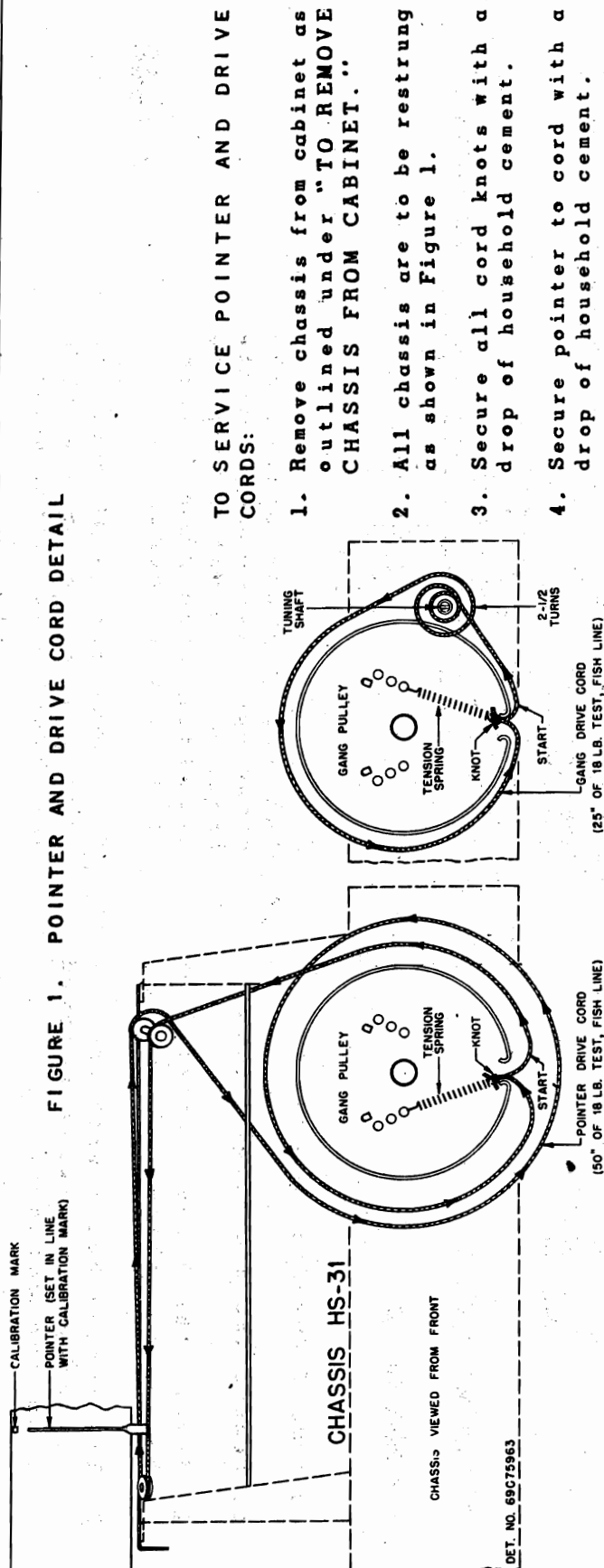
1. Remove the 3 control knobs.
2. Remove the 7 wood screws from bottom of cabinet.
3. The bottom board with chassis attached may now be removed from the cabinet.
4. The loop, phono pickup and phono motor cords all terminate in plugs. Do not attempt to unsolder them when freeing chassis from cabinet.
5. To expose bottom of chassis, remove the two screws that hold chassis to bottom board.

MODELS 65F11, 65F12

Chassis HS-31

GALVIN MFG. CORP.

FIGURE 1. POINTER AND DRIVE CORD DETAIL



TO SERVICE POINTER AND DRIVE CORDS:

1. Remove chassis from cabinet as outlined under "TO REMOVE CHASSIS FROM CABINET."
2. All chassis are to be restrung as shown in Figure 1.
3. Secure all cord knots with a drop of household cement.
4. Secure pointer to cord with a drop of household cement.

CHASSIS HS-31

NOTE: A VTVM WAS USED TO MAKE MEASUREMENTS. IF A 20,000 OHM PER VOLT METER IS USED ALL GRID & AVG VOLTAGES WILL READ LOWER.

MEASUREMENTS ARE MADE FROM TUBE BASE PIN TERMINALS TO CHASSIS.

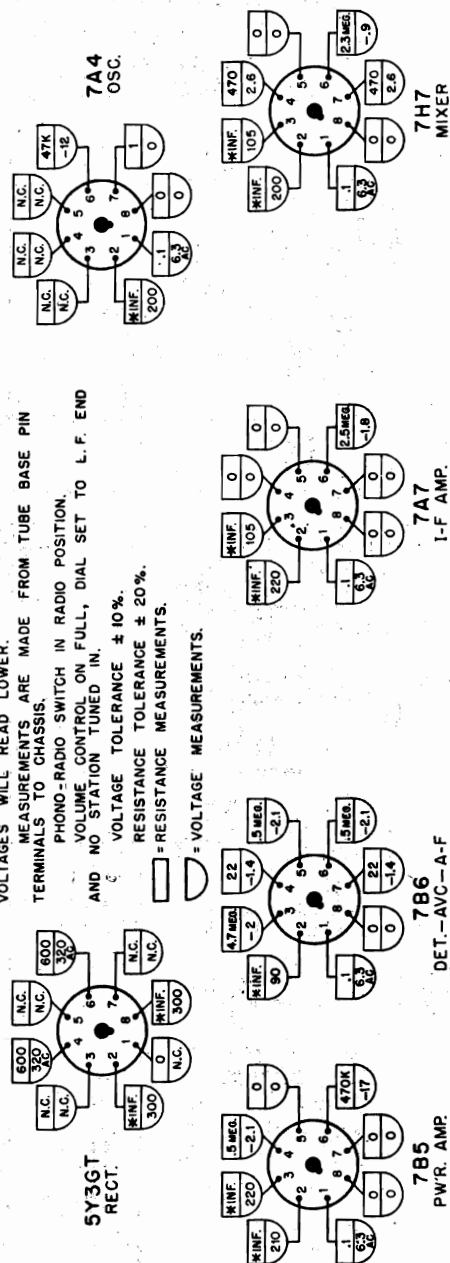
PHONO-RADIO SWITCH IN RADIO POSITION, VOLUME CONTROL ON FULL, DIAL SET TO L. F. END AND NO STATION TUNED IN.

VOLTAGE TOLERANCE $\pm 10\%$.

RESISTANCE TOLERANCE $\pm 20\%$.

□ = RESISTANCE MEASUREMENTS.

○ = VOLTAGE MEASUREMENTS.



* MAY VARY DUE TO ELECTROLYTIC CAPACITOR C-15 IN CIRCUIT.

DIAG. NO. 63C75063

BACK VIEW OF CHASSIS

GALVIN MFG. CORP.

MODELS 65F11, 65F12
Chassis HS-31

Refer to Figure 3 for location of adjustment trimmers and cores. Connect output meter across speaker voice coil. (.38V = .05 watt). Volume control set at maximum for all operations. The PHONO-RADIO-TONE switch should be set to RADIO treble position. The adjusting screwdriver or alignment tool should be of the insulated type, such as Motorola Part No. 68A71008.

OPERATIONS IN ORDER	GANG CAPACITOR SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	GENERATOR SET AT (400~30% MODULATED)	ADJUST TRIMMER OR CORE NO.	AVERAGE MICROVOLT INPUT FOR .38V OUTPUT
1. Align I-F & diode for maximum	Minimum	.1 mf.	Mixer Grid	455 Kc.	1, 2, 3 & 4	6 microvolts
2. Set Oscillator trimmer	Minimum	.1 mf.	Mixer Grid	1620 Kc.	5	
3. Peak loop antenna	1400 Kc.	None	Radiation loop*	1400 Kc.	6 (should be repeaked after loop & set are installed in cabinet.)	

* Connect output of signal generator to a 5" diameter 3 turn loop. See Figure 2. With volume control on full, bring loop close enough to receiver loop until an output of 50 milliwatts is obtained. (.38V on output meter). The distance between loops should never be less than 12". Vary distance between generator and receiver loops or adjust generator output to maintain .38V during alignment.

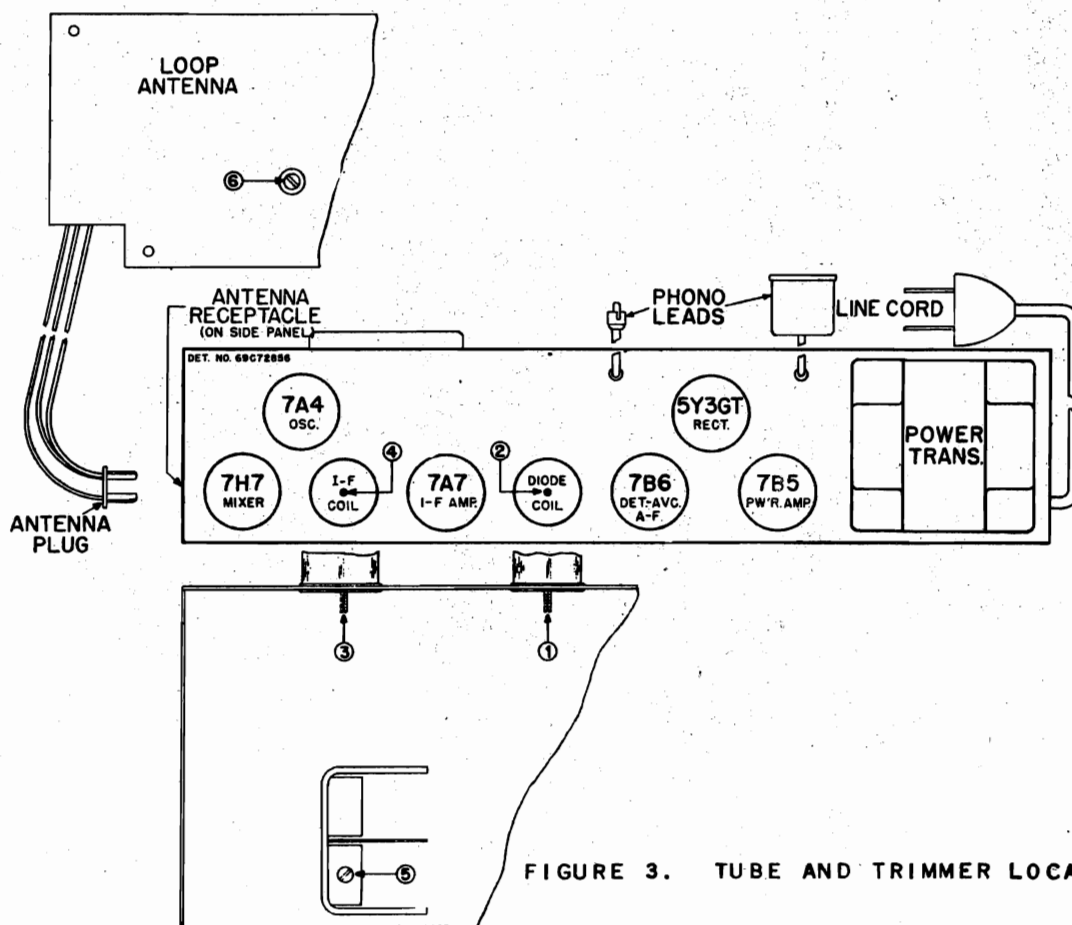


FIGURE 3. TUBE AND TRIMMER LOCATION DETAIL

MODELS 65F11, 65F12
Chassis HS-31

GALVIN MFG. CORP.

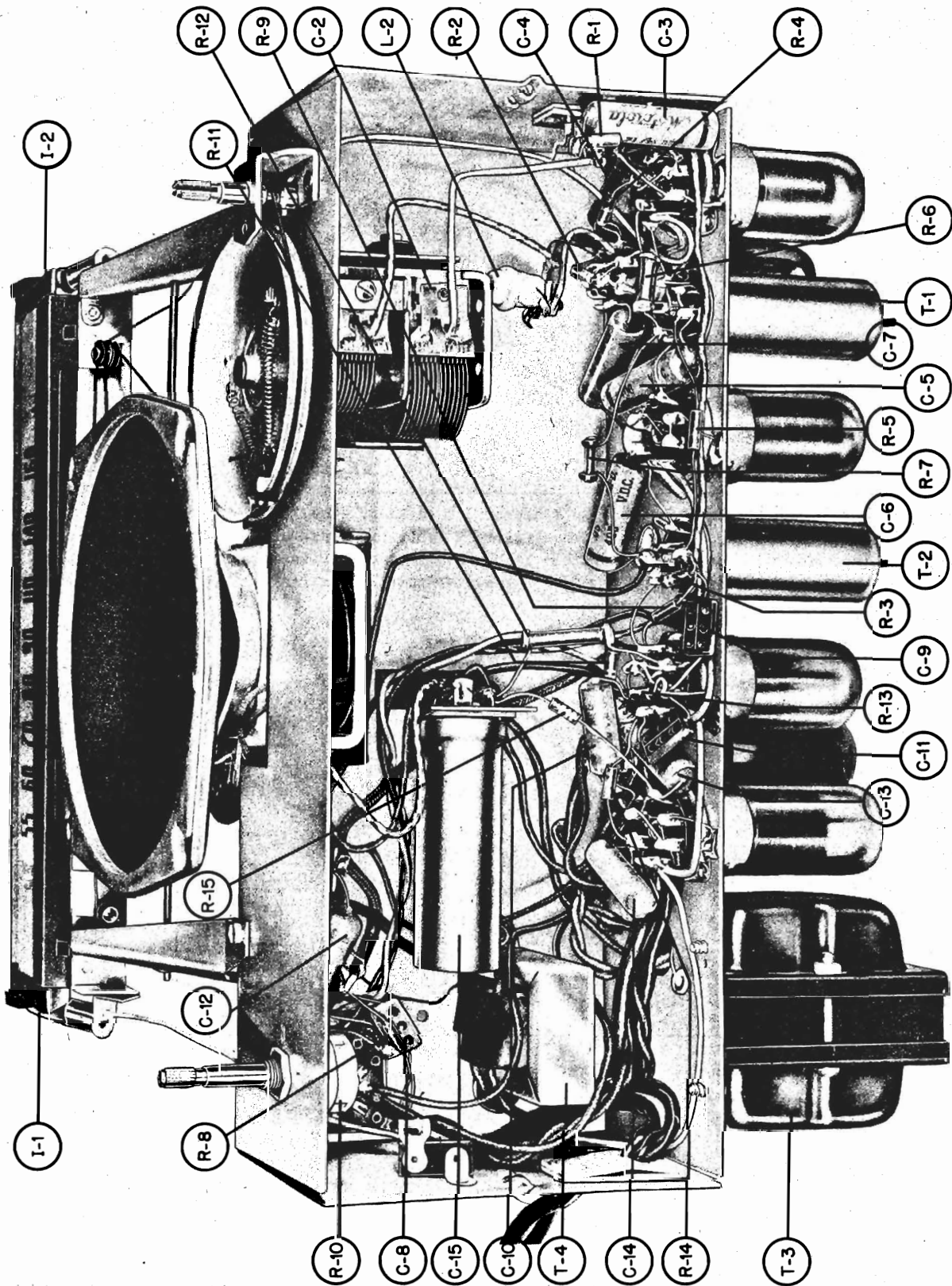


FIGURE 5. CHASSIS BOTTOM VIEW

MODELS 65F11, 65F12
Chassis HS-31

GALVIN MFG. CORP.

REF. NO.	PART NO.	DESCRIPTION	LIST PRICE	REF. NO.	PART NO.	DESCRIPTION	LIST PRICE
C-1	20A18740	Capacitor, trimmer: 1.5-15 mmf; includes "U" mounting bracket	.35	R-9	6R6004	Resistor, fixed: carbon; 1 meg 1/2W Ins.	doz. 1.00
C-2	1X72533	Capacitor, variable: 2 gang; cut oscillator plates; includes pulley	4.35	R-10	18A70032	Resistor, variable; 1 meg; with SPST switch	1.10
C-3	8S9816	Capacitor, fixed: paper; .05 mf. 400V	.20	R-11	6R2122	Resistor, fixed: carbon; 4.7 meg 1/2W Ins.	doz. 1.00
C-4	8S9816	Capacitor, fixed: paper; .05 mf. 400V	.20	R-12	6R6035	Resistor, fixed: carbon; 270 10% 1W N.I.	each .15 doz. 1.45
C-5	8S9816	Capacitor, fixed: paper; .05 mf. 400V	.20	R-13	6R6406	Resistor, fixed: carbon; 22 10% 1/2W Ins.	doz. 1.00
C-6	8S9816	Capacitor, fixed: paper; .05 mf. 400V	.20	R-14	6R6015	Resistor, fixed: carbon; 220,000 1/2W Ins.	doz. 1.00
C-7	8S9816	Capacitor, fixed: paper; .05 mf. 400V	.20	R-15	6R6032	Resistor, fixed: carbon; 470,000 1/2W Ins.	doz. 1.00
C-8	21R6641	Capacitor, fixed: mica; 100 mmf. 500V	.20	T-1	24B70545	Transformer, I.F.: 455 kc; complete but less shield and iron core sleeve	2.45
C-9	21R6639	Capacitor, fixed: mica; 500 mmf. 500V	.30	T-2	24B70537	Transformer, diode: 455 kc; complete but less shield and iron core sleeve	2.45
C-10	8S9813	Capacitor, fixed: paper; .005 mf. 600V	.20	T-3	25C21248	Transformer, power	7.55
C-11	21R6639	Capacitor, fixed: mica; 500 mmf. 500V	.30	T-4	25B21175	Transformer, output	2.85
C-12	8S9813	Capacitor, fixed: paper; .005 mf. 600V	.20		1X72531	Bracket & Mounting Plate Assem- bly: "L" shaped steel bracket and bakelite electrolytic mounting plate	.10
C-13	8S9816	Capacitor, fixed: paper; .05 mf. 400V	.20		7371727	Bracket, gang capacitor mounting	.25
C-14	8S9813	Capacitor, fixed: paper; .005 mf. 600V	.20		7A14684	Bracket, tuning shaft	.10
C-15	23A27718	Capacitor, electrolytic: 30-30-20 mf/350-300-25V	2.70		43A76441	Bushing, felt (used on control shafts, between knob and cabinet	.10
or	23K74827	Capacitor, electrolytic: 30-30-20 mf/350-300-25V			16F71015	Cabinet (65F11)	27.00
I-1 & I-2	65X10867	Bulb: 6.3V, .25A, tubular bayonet; #44	.15		16F76443	Cabinet (65F12)	30.00
L-1	24K72585	Loop and Panel Assembly: complete with trimmer, connecting leads and plug (65F11)	3.25		35K72561	Cloth, grille (65F11)	1.00
	24K76412	Loop and Panel Assembly: complete with trimmer, connecting leads and plug (65F12)	3.25		35K76444	Cloth, grille (65F12)	1.00
L-2	24A70547	Coil, B. C. oscillator	1.15		11M6944	Cord, dial: 18 lb; black	yd. .10
R-1	6R2122	Resistor, fixed: carbon; 4.7 meg 1/2W Ins.	doz. 1.00		30K75570	Cord, line: 6 ft. long; with plug	.75
R-2	6R6056	Resistor, fixed: carbon; 47,000 1/2W Ins.	doz. 1.00		1X72528	Cord, phono-pick-up; complete with single pin plug	.60
R-3	6R2122	Resistor, fixed: carbon; 4.7 meg 1/2W Ins.	doz. 1.00		1X71047	Core & Palmnut Assembly (I.F. & diode transformer top tuning iron core and nut)	.20
R-4	6R6090	Resistor, fixed: carbon; 470 10% 1/2W Ins.	doz. 1.00		1X71048	Core & Clip Assembly (I.F. & diode transformer bottom tuning iron core and clip)	.20
R-5	6R3927	Resistor, fixed: carbon; 2.2 meg 1/2W Ins.	doz. 1.00		1X72543	Dial Assembly: complete with 2 mounting brackets, dial plate (painted brown), pointer slider rail, 3 pointer cord pulleys and 2 dial light sockets. No glass dial scale or pointer included.	3.30
R-6	6R6347	Resistor, fixed: carbon; 22,000 10% 1/2W N.I.	doz. 1.20		13B72476	Escutcheon, dial: brown plastic	1.05
R-7	6R6053	Resistor, fixed: carbon; 1,000 1/3W N.I.	doz. 1.20		5A19658	Eyelet: 19/64 x .212 I.D. x 1/2 (gang mounting)	doz. .20
R-8	6R6004	Resistor, fixed: carbon; 1 meg 1/2W Ins.	doz. 1.00		5A70098	Eyelet: 23/64 x 7/32 I.D. x 1/2 (speaker mounting)	doz. .20
					37K15841	Foot, rubber (cabinet foot)	doz. .25
					13C76344	Grille, cabinet: metal, brass plated (65F12)	2.00
					5A70404	Grommet, rubber (gang capacitor and speaker cushions)	doz. .60

MODELS 65F11, 65F12

Chassis HS-31

GALVIN MFG. CORP.

REF. NO.	PART NO.	DESCRIPTION	LIST PRICE	REF. NO.	PART NO.	DESCRIPTION	LIST PRICE
	587708	Rivet, steel: .122 x 9/32 nickel plated (line cord lock mounting)	per/c .50		28K71775	Plug, 1 pin (used on phono-pick-up cord)	.10
	5A71246	Rivet, shoulder: .187 long (pointer cord guide pulley mounting)	doz. .15		28K19871	Plug, 4 pin (loop plug)	.10
	5A13896	Rivet, shoulder: .312 long (pointer cord guide pulley mounting)	doz. .15		52B71098	Pointer, dial	.20
	47A71724	Rod, dial cord guide: steel; 9-3/8 long x 3/32 diameter	.05		49A23960	Pulley, cord: bakelite; 1/4 groove (pointer cord guides)	doz. .50
	34B71097	Scale, dial: glass	1.10		9A30680	Receptacle, 3 prong; less shell (phono-motor power cord receptacle)	.10
	381317	Screw, steel: #2 x 3/8 Phillips oval head wood screw; bronze finish (dial escutcheon mounting)	doz. .20		9K28049	Receptacle, 4 prong (loop receptacle)	.10
	387508	Screw, steel: #8 x 1/4 PKZ plain hex head; cadmium plated (osc. coil mounting)	per/c .50		587707	Rivet, steel: .122 x 5/32; nickel plated (tube socket mounting; terminal strip mounting; output transformer mounting)	per/c .50
	387536	Screw, steel: #8 x 3/8 PKA slotted acorn head; antique copper finish (loop mounting)	per/c .50		587701	Rivet, steel: .122 x 3/16; nickel plated (elect. plate and insulator mounting; tuning shaft bracket mounting)	per/c .50
	382294	Screw, steel: 6-32 x 1/2 plain hex head locking type machine screw; cadmium plated (gang capacitor mounting)	doz. .15		587700	Rivet, steel: .122 x 1/4; nickel plated (loop receptacle mounting)	per/c .50
	387454	Screw, steel: #8 x 1/4 PKZ plain hex head; cadmium plated (gang capacitor bracket mounting)	per/c .50		15K74443	Shell, receptacle & plug (used with phono-motor power cord plug and receptacle)	.05
	387475	Screw, steel: #8 x 1/4 PKZ slotted acorn head; cadmium plated (power transformer mounting)	per/c .50		1A71049	Shield, & Iron Core Sleeve Assembly (I.F. & diode transformer shield with internal iron core sleeve)	.30
	387512	Screw, steel: #8 x 1/2 PKZ plain hex head; cadmium plated (speaker mounting)	doz. .15		9K72592	Socket, pilot light: with mounting bracket	.25
	387528	Screw, steel: #8 x 1-1/8 PKA slotted hex head; cadmium plated (chassis mounting)	doz. .15		9A6771	Socket, tube: octal; saddle type (for rectifier)	.20
	387396	Screw, steel: 10-32 x 2" slotted hex head machine screw; copper plated (record changer mounting)	doz. .25		9A72519	Socket, tube: loctal	.20
	47A71722	Shaft, tuning	.15		50B71731	Speaker: 6" electro; with mounting bracket	8.00
	55K72558	Hinge, cabinet	.15		287087	Speednut: for .093 diameter rods (dial cord guide rod retainer)	per/c .50
	55K72559	Hinge & lid support	.95		41A28190	Spring, cushion (top) (record changer mounting)	doz. .25
	56K74652	Knob, control: bakelite; with white dot (radio-phono-tone knob)	.10		41A21807	Spring, cushion (bottom) (record changer mounting)	per/c .65
	1X76610	Knob, control: clear plastic with gold inset (65F11)	.40		41A14244	Spring, tension coil (pointer and drive cord tension spring)	doz. .55
	1X76611	Knob, control: brown (65F11) (tuning & volume knobs)	.40		37K70556	Strip, channel; rubber (dial scale mounting)	doz. .15
	56K76373	Knob, control (tuning & volume knobs) (65F12)	.40		31K72404	Strip, terminal: 1 small insulated lug (used on loop)	doz. .50
	32A24815	Lock, line cord: fibre (holds line cord to chassis)	doz. .25		31A15433	Strip, terminal: 1 large insulated lug, #2 mounting	.05
	487650	Lockwasher: steel; #8 internal; cadmium plated (output transformer mounting)	per/c .50		31A7112C	Strip, terminal: 3 insulated lugs, #2 ground	.10
	287051	Nut, steel: 3/8-32 x 9/16; Palmnut; cadmium plated (phono-radio-tone switch & volume control mounting)	doz. .15		40A71721	Switch, phono-radio & tone	1.15
	9A12705	Plate, electrolytic mounting: bakelite	doz. .30		4A70015	Washer, "C" (tuning shaft retainer)	per/c .50
					481719	Washer, steel: 3/8 x .140 x .030 thick; cadmium plated (line cord lock mounting)	per/c .50
					488214	Washer, steel: 7/8 x .203 x .067 thick; cadmium plated (chassis mounting)	doz. .25
					488204	Washer, steel: 1" x .203 x .067 thick (record changer mounting)	doz. .25

Prices Subject To Change Without Notice

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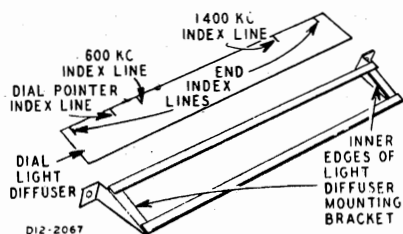
5 Tube Superheterodyne, including Rectifier Tube
Tuning Frequency Range.....540 to 1600 KC
Power Consumption.....30 watts (At 117 volts AC)
Power Output, 1.5 watt max., .9 watt (10% harmonics)

DIAL CALIBRATION

In order to align the receiver, the dial pointer must be positioned on the dial string correctly with reference to the dial. Index lines are provided on the dial light diffuser for this purpose.

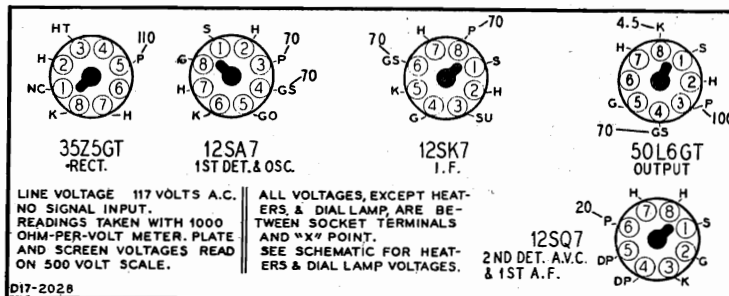
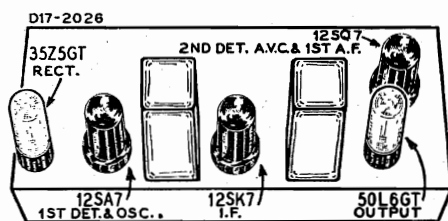
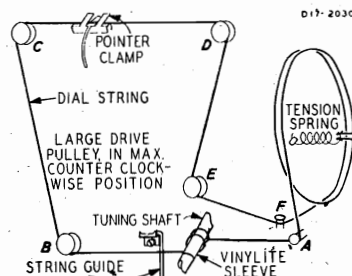
Before aligning the receiver (or when replacing the dial light diffuser) check the position of the diffuser strip, making certain that the two extreme index lines are aligned with the inner edges of the diffuser mounting bracket opening. The bracket should be crimped at one point to prevent movement of the diffuser strip. To position the dial pointer, turn the gang condenser to the fully closed position. The dial pointer should be directly over the dial pointer index line. (See illustration).

The 600 KC and 1400 KC index lines are for use when aligning the receiver.



DRIVE CORD REPLACEMENT

Turn gang condenser to fully open position. Use a new drive cord and fasten one end to the tension spring. Fasten the other end of the tension spring to the hook on the drive pulley. Pass the drive cord through the slot in the drive pulley rim and continue over top of pulley (counterclockwise) one-half turn. Pass cord around idler stud A and wind two turns clockwise around tuning shaft, turns must progress away from chassis. Pass cord in front of string guide, around pulley B, over pulleys C, D, E and around idler stud F. Wind cord counterclockwise one and one-half turns around drive pulley in back of previous one-half turn. Pass cord through slot in pulley rim, stretch the tension spring and fasten free end of cord to spring. Refer to the Replacement Parts List for the number of the drive cord assembly for use with this radio.



ALIGNMENT PROCEDURE

Check dial pointer position, see DIAL CALIBRATION paragraph.

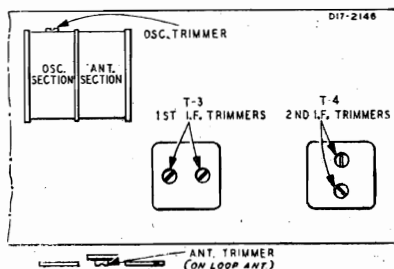
Volume Control—Maximum All Adjustments. Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter: Non-Metallic Screwdriver.

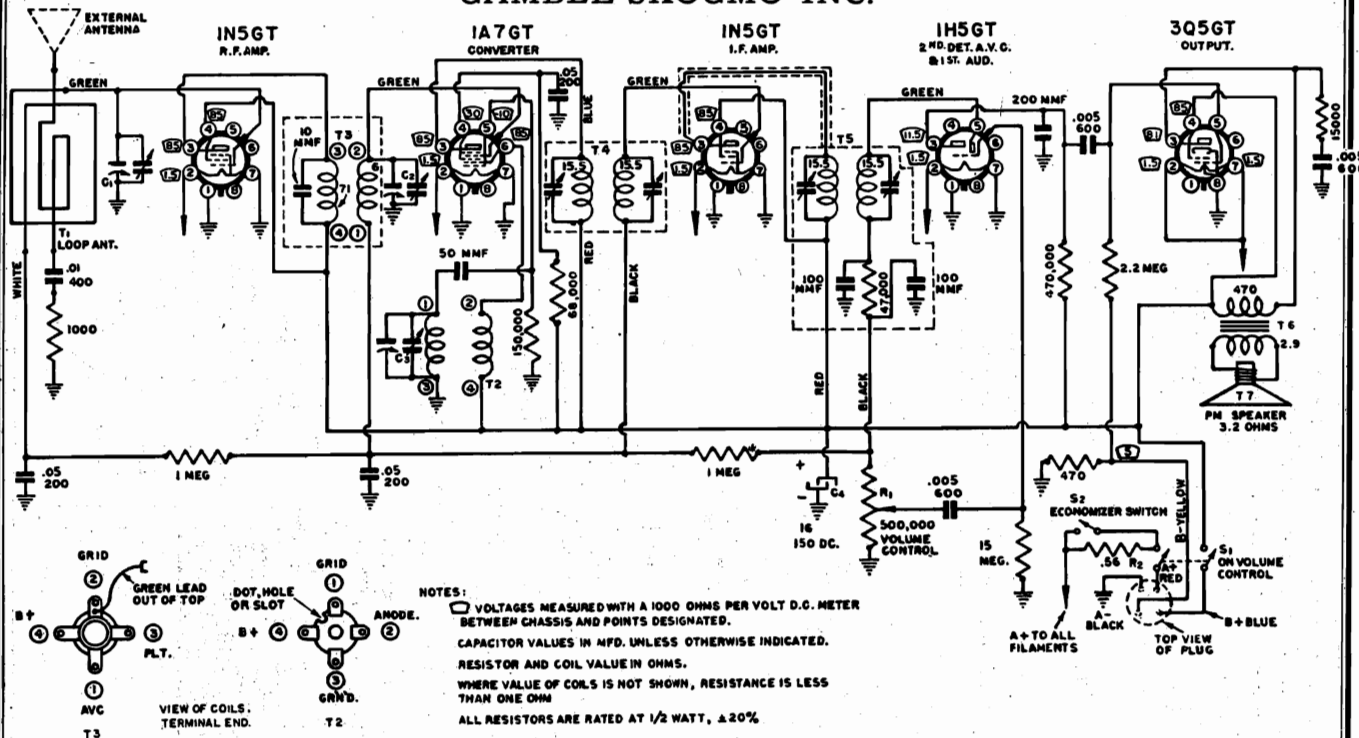
Dummy Antennas—.1mf., 50 mmf.



NOTE A—Use 1400 KC index line on dial light diffuser. See DIAL CALIBRATION paragraph.

SIGNAL GENERATOR				ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)	
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION	DUMMY ANTENNA	CONDENSER SETTING	
455 KC	Control Grid 12SK7—I. F. Prong No. 4	Point "X" 12SK7—I. F. Prong No. 3	.1 mf.	Turn Rotor to full open	2nd I. F. Trimmers
455 KC	Control Grid 12SA7—1st Det. Prong No. 8	Same As Above	.1 mf.	Turn Rotor to full open	1st I. F. Trimmers
1400 KC	Control Grid 12SA7—1st Det. Prong No. 8	Same As Above	.1 mf.	Turn Rotor to 1400 KC See Note A	Oscillator Trimmers
1400 KC	External Antenna Clip On Loop	Chassis	50 mmf.	Turn Rotor to 1400 KC See Note A	Antenna Trimmer

GAMBLE-SKOGMO INC.



SERVICE PARTS LIST MODEL 43-6451

IF PEAK 455 KC.

Order Parts by Model No. and Part No.

Part No.	Name
25296	Adaptor, for use with 2 volt storage battery.
25566	Bearing (for wood pulleys)
25561	Cabinet
25597	Coil, R. F. (T3)
25598	Coil, Oscillator (T2)
25600	Condenser, Electrolytic 16 Mfd, 150 V. (C4)
25592	Condenser—Tuning, 3 Gang, less Tuning Shaft (C1, C2, C3)
25367	Control, Volume, with On-Off Switch (R1)
25811	Cord, Dial, complete with Spring and Pointer Coupling
25696	Knob, Tuning or Volume
25609	Loop (T1)
25612	Plug, Battery Cable 4 Prong
	Pointer, Dial — See "Track-Pointer"
25336	Pulley—Wood
25616	Scale, Dial
25766	Shaft—Tuning with "spool" pulley
25620	Socket—Tube
25593	Speaker 5" P. M. Dynamic (T7) (less Transformer)
25319	Switch, Economizer (S2)
25808	Track, Pointer, complete with Brackets and Pointer
25621	Transformer I. F. Input (T4)
25622	Transformer I. F. Output (T5)
25594	Transformer—Speaker Output (T6)

Reference Numbers such as (C4) are shown on circuit diagram.

Parts not listed above, may be ordered by part number as shown in the picture and by complete description, send a sketch if possible. Order parts from your local Gamble Store.

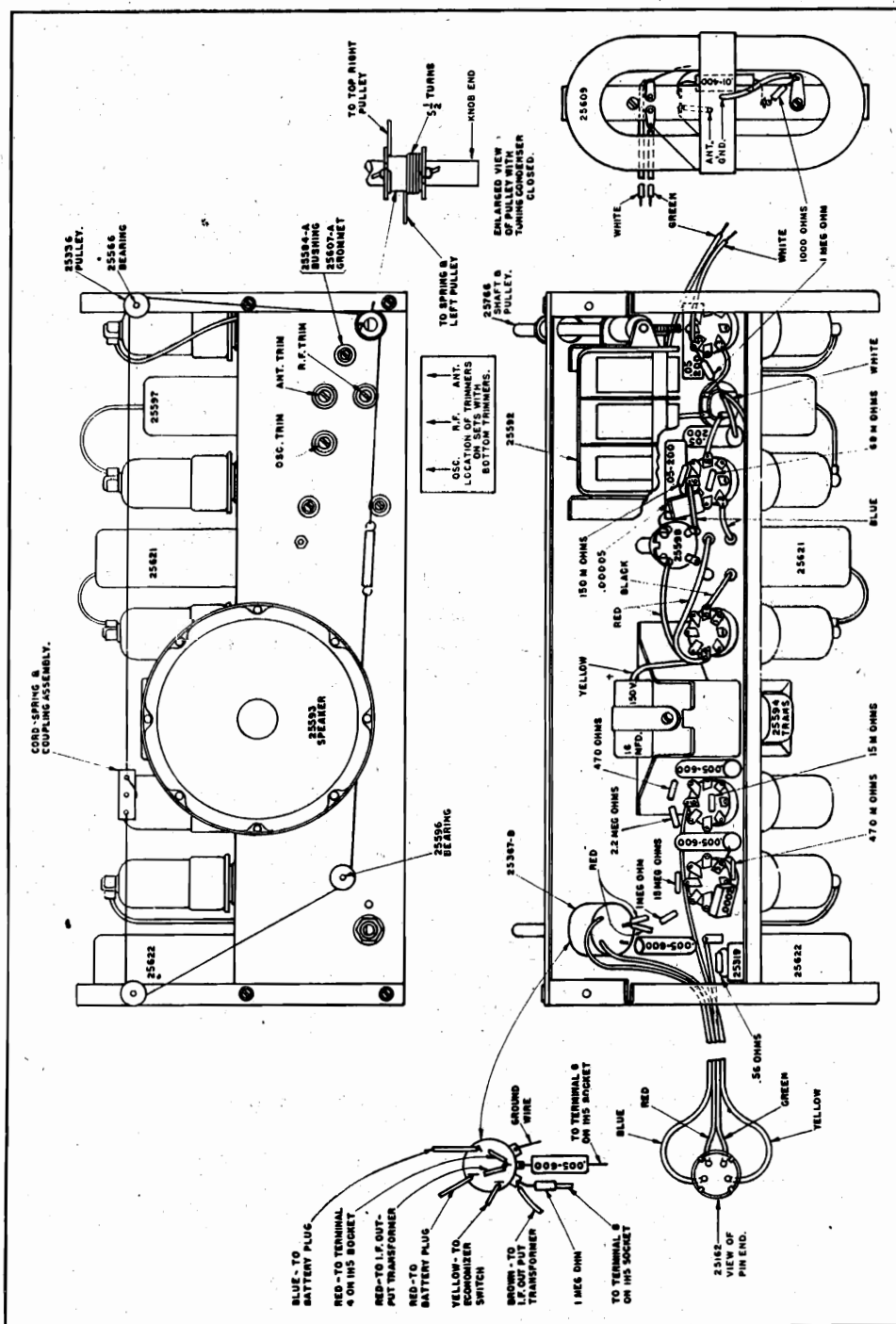
We cannot supply speaker cones. We can replace or repair a damaged speaker for a nominal price if it is returned to our factory, transportation charges prepaid.

GAMBLE-SKOGMO INC.

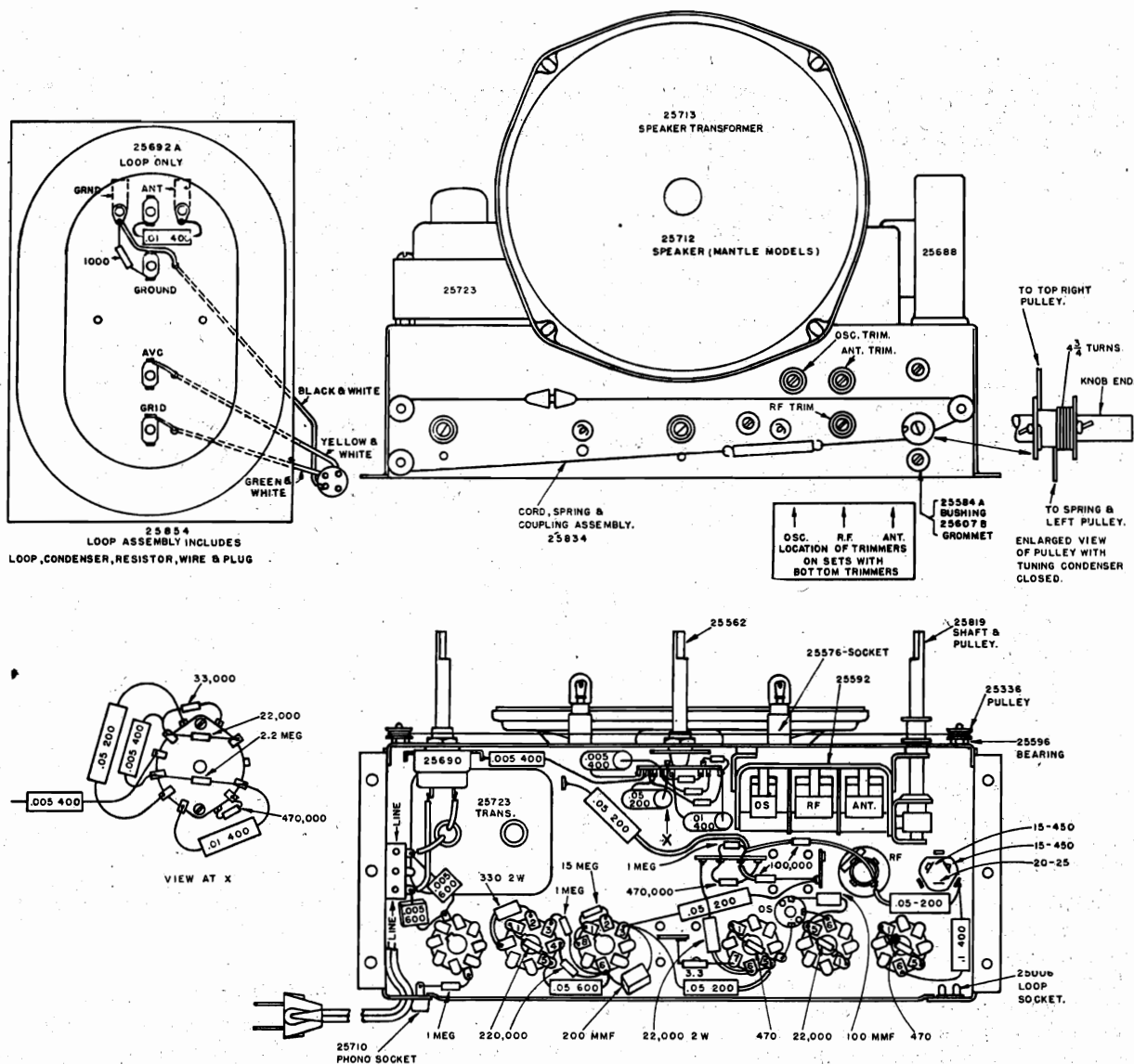
To Properly Align—Remove chassis from cabinet, and align I. F. Transformers in the conventional manner with a test oscillator adjusted to 455 KC, connected to the grid of the 1A7GT through a .1 Mfd condenser, with the tuning condenser set at minimum capacity. To align tuning condenser, connect test oscillator to antenna wire (green) through a .0001 Mfd. condenser. Adjust oscillator trimmer condenser (located on left top) to 1620 KC with tuning condenser at minimum capacity (completely out of mesh). The antenna and R. F. sections are trimmed at 1400 KC. Antenna trimmer is top right; R. F. trimmer is below at right. Dial pointer may be adjusted to scale by slipping bakelite pointer coupling on dial cord.

Battery Unit Voltages—Should be checked with receiver turned on—if B voltage is below 60 Volts, battery unit should be replaced.

Dial Cord Replacement—Is best accomplished by replacing complete cord assembly #27811, which is made up to correct length. In an emergency 30 lb. fish line may be used. See picture of chassis for correct installation.



GAMBLE-SKOGMO INC.



SERVICE PARTS LIST

MODEL 43-8685

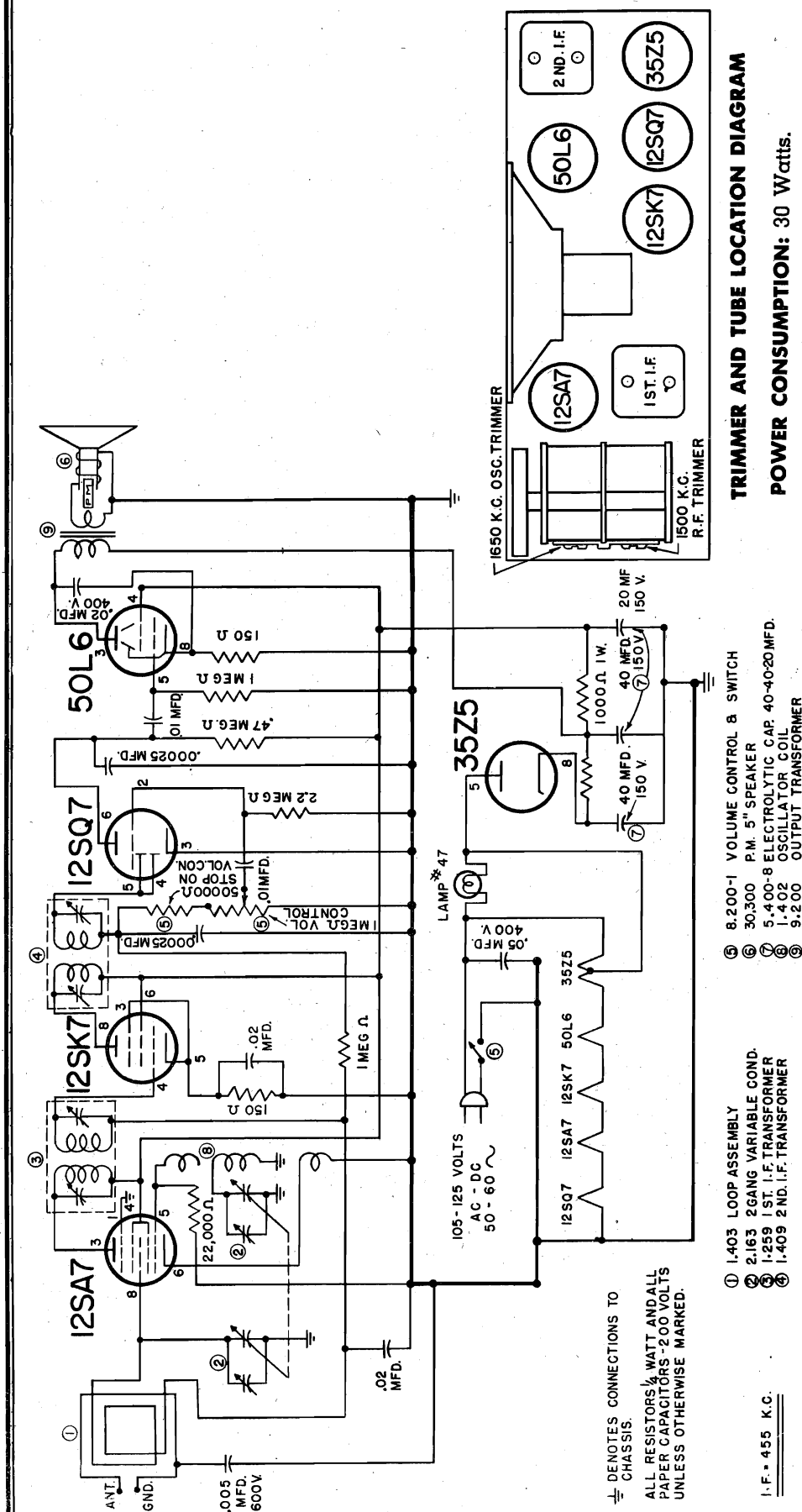
When ordering parts always mention complete factory model number, series and issue.

Part No.	Description	Part No.	Description
25692	Antenna—Loop	25336	Pulley—Wood—Small
25596	Bearings—For Wood Pulleys	25819	Pulley—Manual Drive With Shaft
25572	Bracket—Tuning Condenser—Front	25607	Rubber—Grommets
25573	Bracket—Tuning Condenser—Rear	25774	Screw—Set For Worm Gear (Tuning Condenser)
25574	Bracket—Speaker	25576	Socket—Dial Lamp
25765	Bracket—Pointer Track	25620	Socket—Octal
25660	Cabinet	25006	Socket—For Loop
25597	Coil—R. F.	25712	Speaker—With Transformer
25724	Coil—Oscillator	25562	Switch—Tone S-1,
25688	Condenser—Filter 15-450, 15-450, 20-25	25711	Track—Pointer
25592	Condenser—Tuning C-1, C-2, C-3	25715	Transformer—I. F. Input
25690	Control—Volume (with AC Switch S-2)	25714	Transformer—I. F. Output
25068	Cord—AC and Plug	25713	Transformer—Output—Speaker
25834	Cord—Dial (includes Spring and Pointer Coupling)	25723	Transformer—Power 60 Cycles
25751	Dial Scale—Glass		
25578	Dial Pointer		
25829	Knob—Tone		
25696	Knob—Volume and Tuning		
25710	Phono—Pick-Up Socket		
25693	Plug—For Loop		

Note: Resistors and condensers not listed will be supplied on order—specify value.
We cannot supply speaker cones. We can replace or repair a damaged speaker for a nominal price if it is returned to our factory, transportation charges prepaid.

In ordering any part not listed give complete description and a sketch, if possible.
Order parts from your local Gamble Store.

GAROD ELECTRONICS CORP.

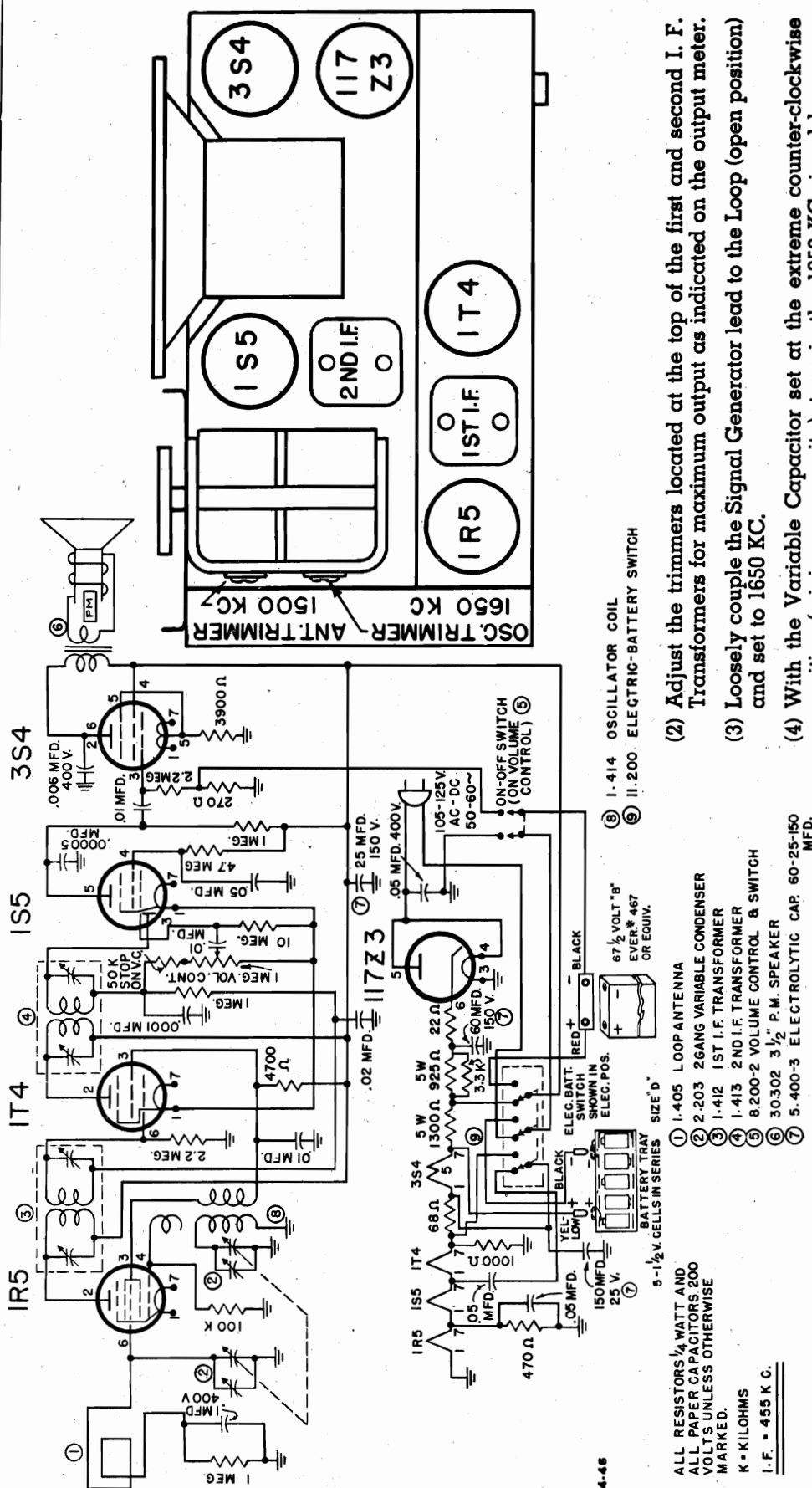


ALIGNMENT: Should it become necessary at any time to check the alignment of this receiver, proceed as follows:

- (1) Loosely couple the Signal Generator lead to the Loop and set to 1650 KC.
- (2) Loosely couple the Signal Generator lead to the Loop and set to 1650 KC.
- (3) Loosely couple the Signal Generator lead to the Loop and set to 1650 KC.

- (1) Set the Signal Generator to 455 KC and connect to the stator lug on the rear section of the Variable Capacitor. Connect the Signal Generator Ground lead to the chassis. Connect a suitable output meter across the Speaker Voice Coil Connections. Turn the Volume Control to the maximum position. Turn the Variable Capacitor to the extreme clockwise position.
- (2) Adjust the trimmers located at the top of the first and second I. F. Transformers for maximum output as indicated on the Output Meter.
- (4) With the Variable Capacitor set at the extreme clockwise position, tune in the 1650 KC signal by means of the Oscillator Trimmer on the Variable Capacitor (front section).
- (5) Set the Signal Generator to 1500 KC and turn the Tuning Control so that this frequency is indicated on the dial. Adjust the Antenna Trimmer on the Variable Capacitor (rear section) for maximum output. No other adjustments are necessary.

GAROD ELECTRONICS CORP.



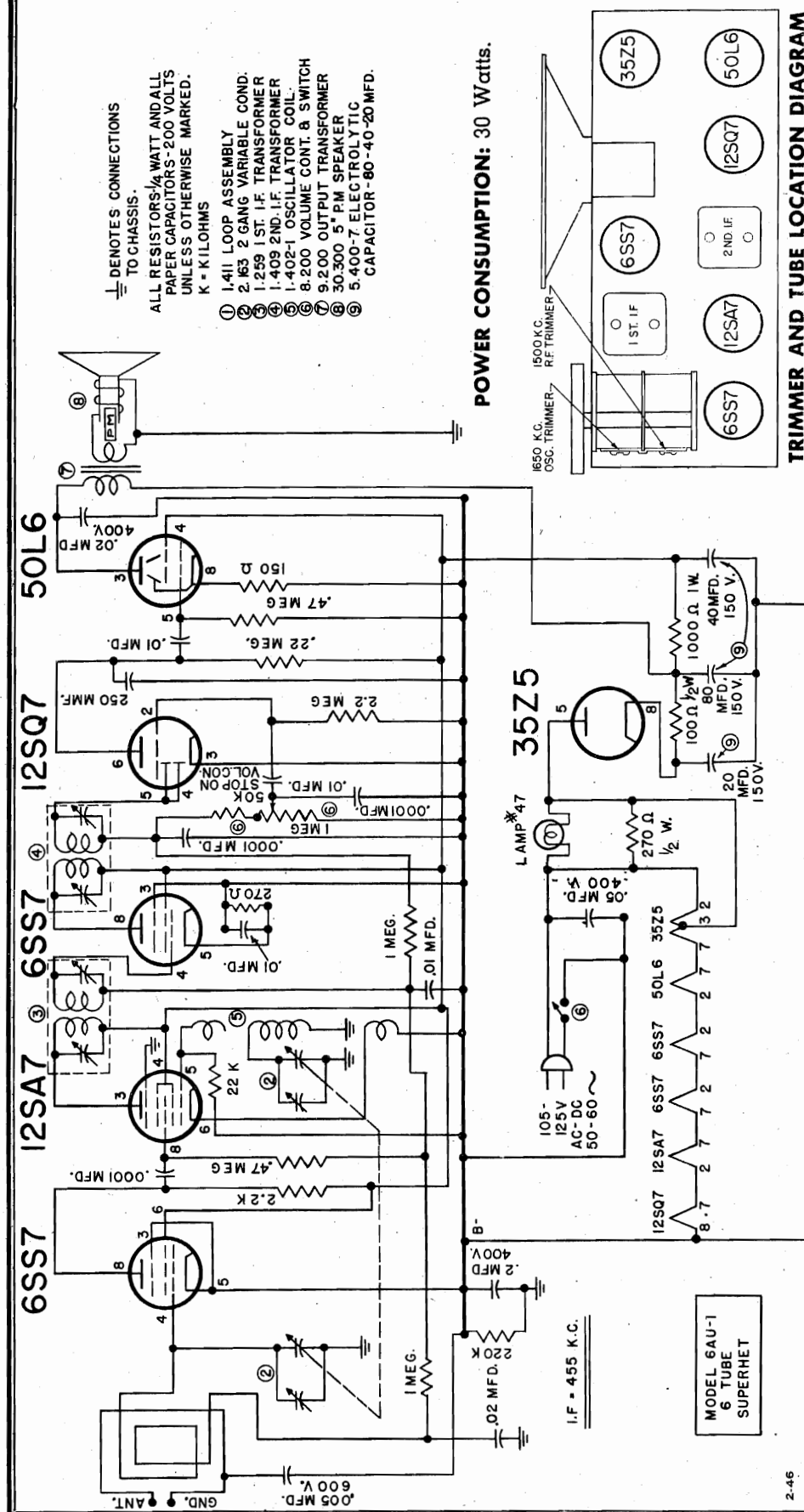
-4-46

ALIGNMENT (Electric Operation) Receiver removed from cabinet. Should it become necessary at any time to check the alignment of this receiver, proceed as follows:

- (1) Set the Signal Generator to 455 KC and connect to the stator lug (front section) of the Variable Capacitor. Extend Loop leads and connect to Loop contacts inside top of cabinet. Connect the Signal Generator ground lead to the chassis. Connect a suitable output meter across the Speaker Voice Coil Connections. Turn the Volume Control to the maximum position. Turn the Variable Capacitor to the extreme counter-clockwise position (minimum capacity).

- (2) Adjust the trimmers located at the top of the first and second I. F. Transformers for maximum output as indicated on the output meter.
- (3) Loosely couple the Signal Generator lead to the Loop (open position) and set to 1650 KC.
- (4) With the Variable Capacitor set at the extreme counter-clockwise position (minimum capacity), tune in the 1650 KC signal by means of the Oscillator Trimmer on the Variable Capacitor (rear section).
- (5) Set the Signal Generator to 1500 KC and turn the Tuning Control so that this frequency is indicated on the dial. Adjust the Antenna Trimmer on the Variable Capacitor (front section) for maximum output.
- (6) Install the chassis into the cabinet and check the dial calibration. If further adjustment is required, remove the two plug buttons on the side of the cabinet adjacent to the Variable Capacitor and adjust the Oscillator Trimmer as required for correct dial calibration. Readjust the Antenna Trimmer for maximum output and replace plug buttons.

GAROD ELECTRONICS CORP.



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ALIGNMENT: Should it become necessary at any time to check the alignment of this receiver, proceed as follows:

Set the Signal Generator to 455 KC and connect to the grid of the 6SS7 R. F. Amplifier, or to the Stator Lug on the rear section of the Variable Capacitor. Connect the Signal Generator Ground Lead to a "B" point underneath the chassis. Connect a suitable output meter across the Speaker Voice Coil Connections. First turn the Volume Control to the maximum position. Turn the Variable Capacitor to the extreme clockwise position.

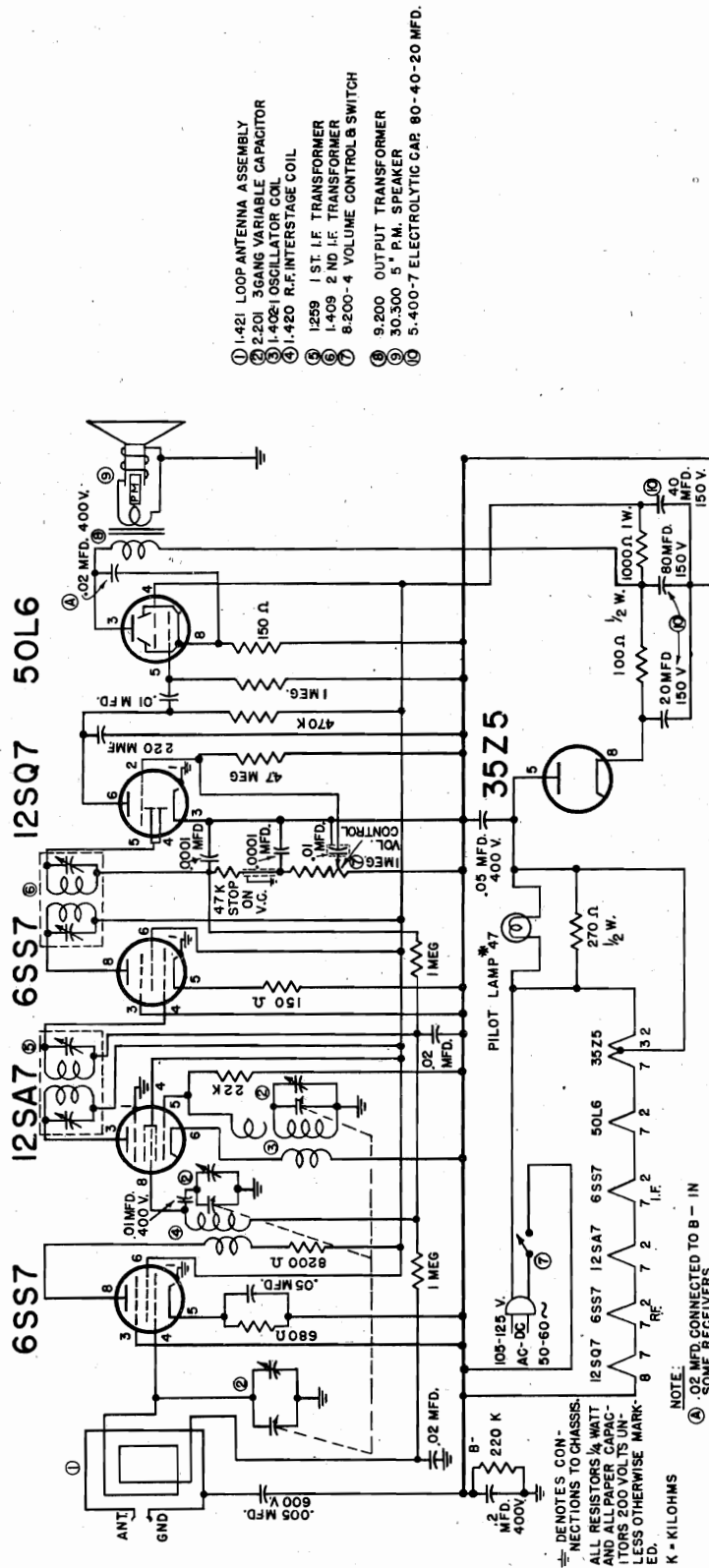
Adjust the trimmers located at the top of the first and second I. F. Transformers for maximum output as indicated on the Output Meter.

With the Variable Capacitor set at the extreme clockwise position, tune in the 1650 KC signal by means of the Oscillator Trimmer on the Variable Capacitor (front section).

Set the Signal Generator to 1500 KC and turn the Tuning Control so that this frequency is indicated on the dial. Adjust the Antenna Trimmer on the Variable Capacitor (rear section) for maximum output. No other adjustments are necessary.

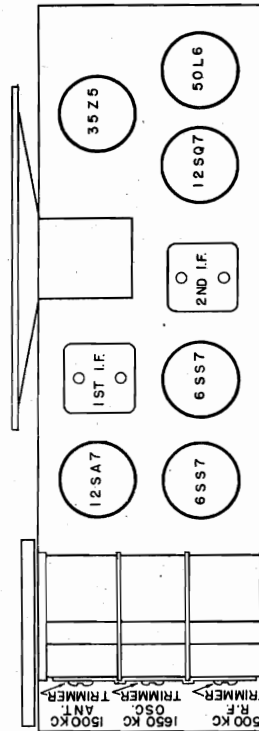
MODEL 6BU-1A

GAROD ELECTRONICS CORP.



POWER CONSUMPTION: 30 Watts.

8-46



TUNING RANGE: Broadcast: 540 to 1650 Kilocycles (180 to 555 meters).

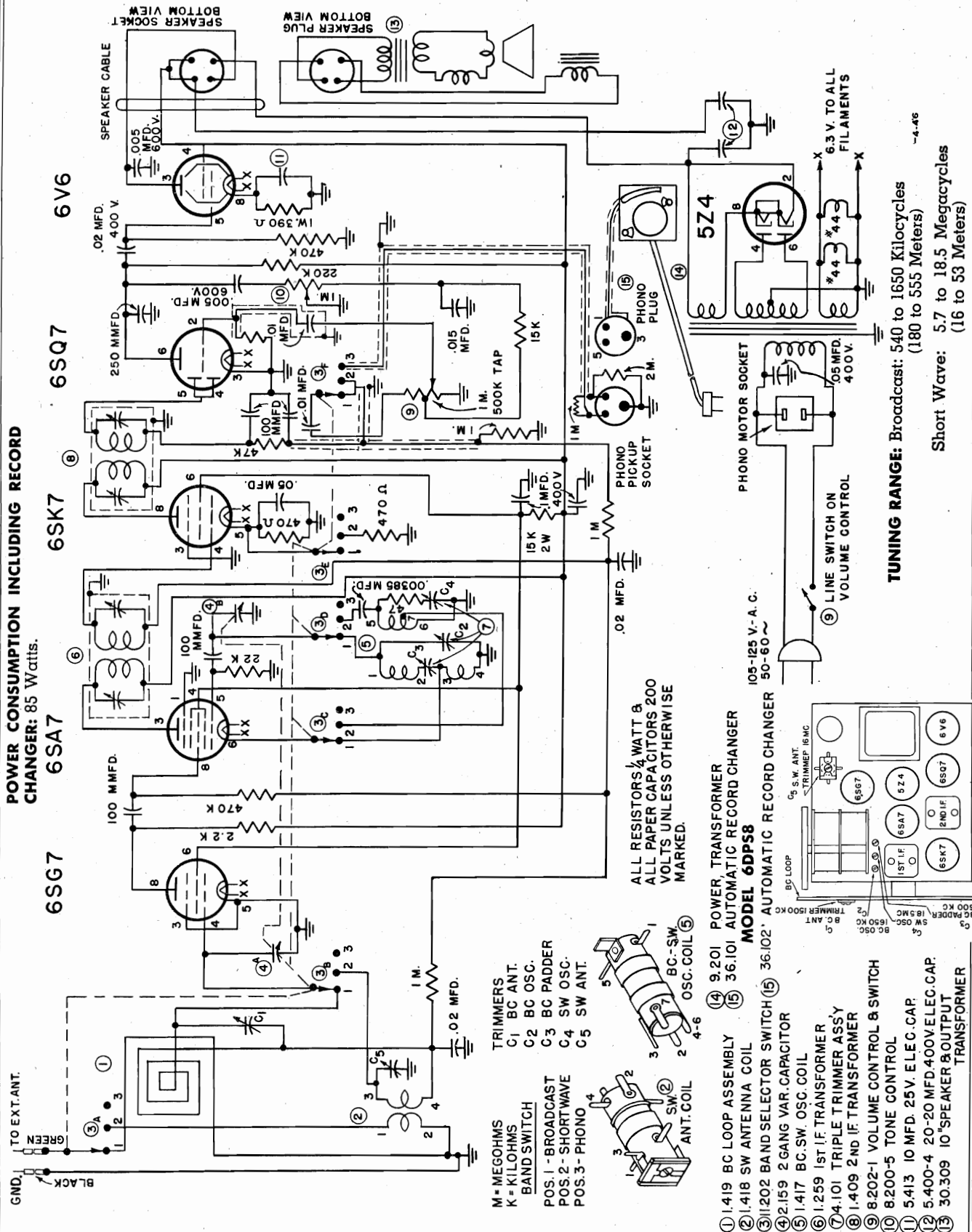
DIAL: The Dial Scale is calibrated in Kilocycles times 10.

TUBES: The tubes used, and their functions, are as follows:

- 6SS7 R. F. Amplifier
- 12SA7 Converter
- 6SS7 I. F. Amplifier
- 12SQ7 Detector, Avc and Audio Amp.
- 50L6GT Beam Power Amplifier
- 35Z5GT Rectifier

- (1) Set the Signal Generator to 455 KC and connect to the grid of the 6SS7 R. F. Amplifier, or to the Stator Lug on the rear section of the Variable Capacitor. Connect the Signal Generator Ground Lead to "B" point underneath the chassis. Connect a suitable output meter across the Speaker Voice Coil Connections. Turn the Volume Control to the maximum position. Turn the Variable Capacitor to the extreme clockwise position (minimum capacity).
- (2) Adjust the trimmers located at the top of the first and second I. F. Transformers for maximum output as indicated on the Output Meter.
- (3) Loosely couple the Signal Generator lead to the Loop and set to 1650 KC.
- (4) With the Variable Capacitor set at the extreme clockwise position, tune in the 1650 KC signal by means of the Oscillator Trimmer on the Variable Capacitor (middle section).
- (5) Adjust the R. F. Trimmer (rear section) and the Antenna Trimmer (front section) on the Variable Capacitor for maximum output. No other adjustments are necessary.

GAROD ELECTRONICS CORP.



Realignment of this receiver should not be attempted unless all other possible causes have been thoroughly investigated. An accurately calibrated signal generator, which will cover the necessary bands, and an output meter for indicating the effect of adjustments are required. During the alignment procedure, all adjustments should be made under the following conditions (refer to Trimmer and Tube Location Diagram below for trimmer location):

- Line voltage as indicated on instruction sheet.
- Volume Control at maximum position.
- Tone Control at extreme left position (brilliant).
- Minimum input from signal generator. This procedure should be adhered to, otherwise adjustments will be broad, due to the action of the automatic volume control.

BROADCAST (Band Switch in extreme left position)

I. F. Adjustment:

(1) Set the signal generator to 455 KC and connect to the lower side of the Loop Antenna Trimmer through a .1 MFD capacitor. Connect the signal generator ground lead to the chassis. Connect a suitable output meter across the speaker voice coil connections. Turn the Variable Capacitor to the extreme clockwise position (minimum capacity).

(2) Adjust the trimmers located at the top of the first and second I. F. Transformers for maximum output as indicated on the output meter.

BC. R. F. Adjustment: It is desirable to align this band on the loop. (1) Couple the signal generator to the receiver loop by means of a two or three turn loop.

(2) With the Variable Capacitor set at the extreme clockwise position (minimum capacity), tune in the 1650 KC signal by means of the broadcast oscillator trimmer (C2).

(3) Set the signal generator to 1500 KC and turn the Tuning Control so that this frequency is indicated on the dial. Adjust the Antenna Trimmer (C4) on the loop for maximum output.

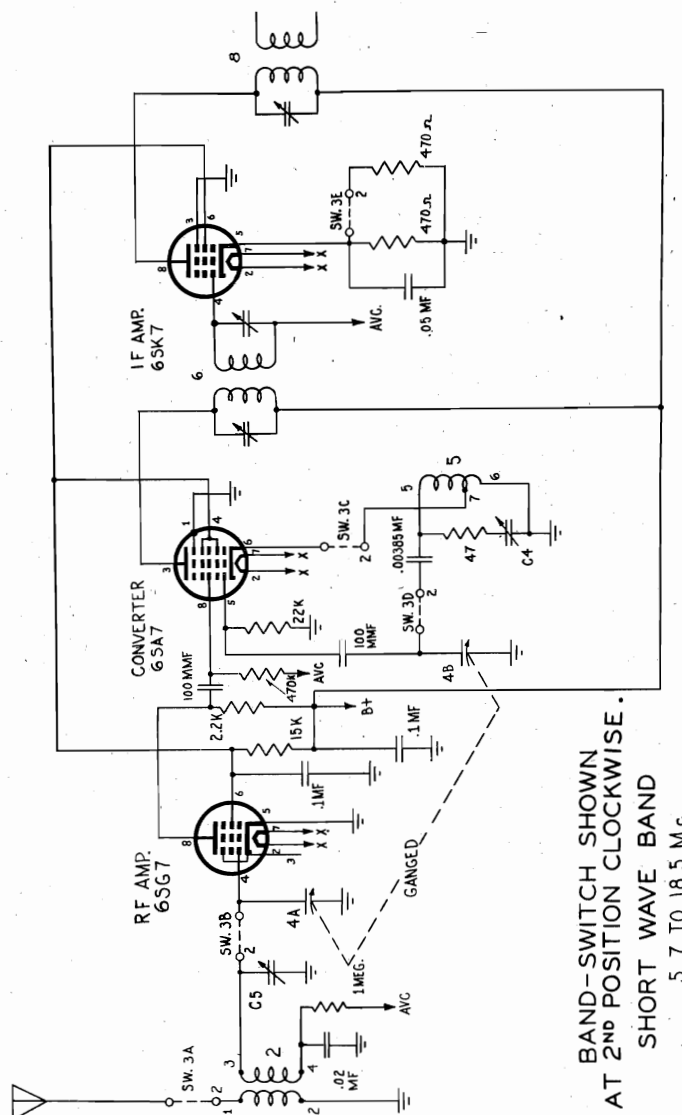
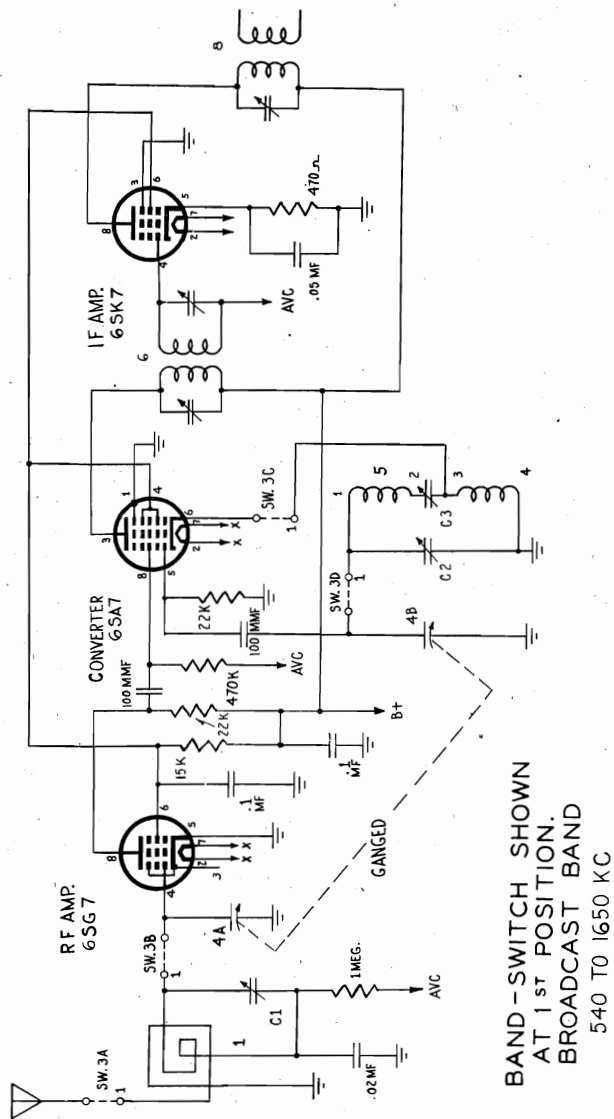
(4) Set the signal generator to 800 KC and turn the Tuning Control so that this frequency is indicated on the dial. Adjust the broadcast oscillator paddler capacitor (C3) for maximum response while "rocking" the Variable Capacitor. Recheck the 1500 KC high frequency adjustment trimmer (C1).

SHORT WAVE (Band Switch in the middle position)

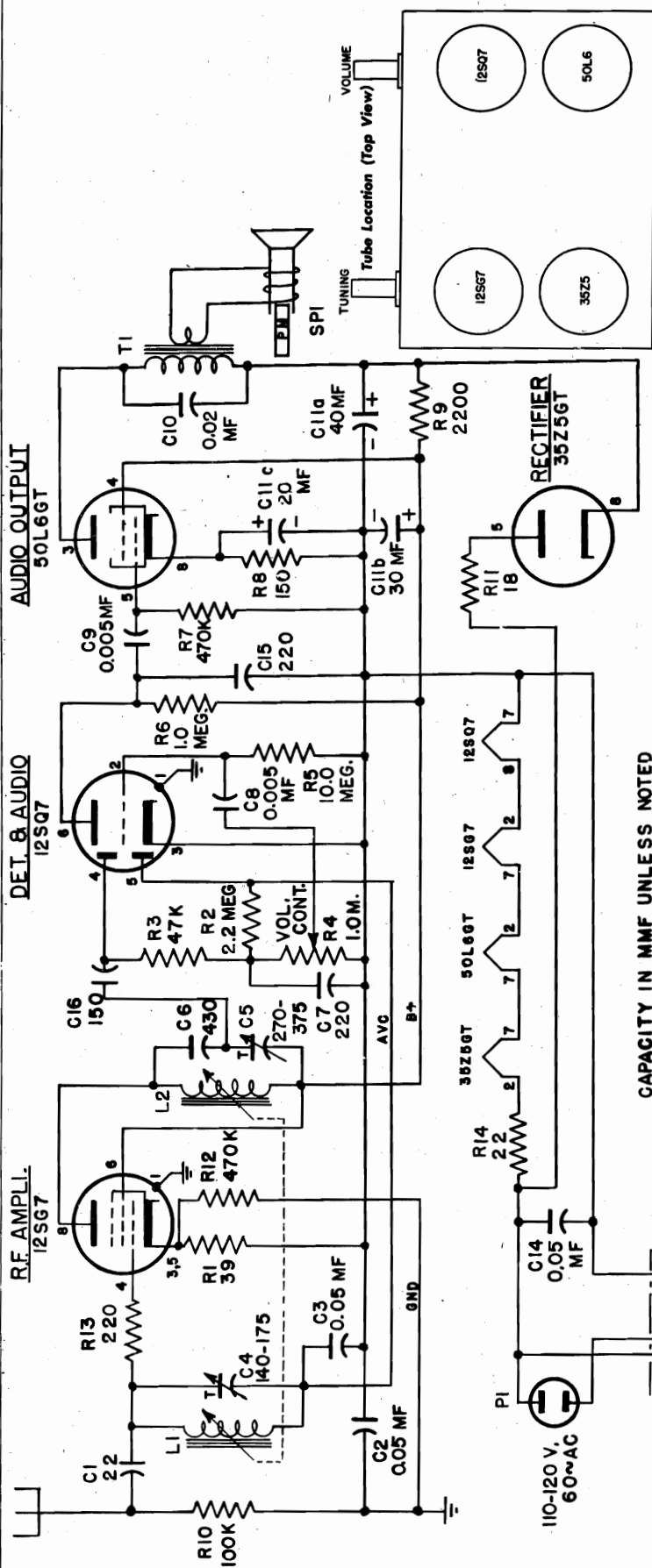
(1) Connect the signal generator through a standard short wave dummy antenna to the antenna (green wire) and the ground lead to the chassis of the receiver. Set the signal generator to 18.5 MC.

(2) With the Variable Capacitor set at the extreme clockwise position (minimum capacity), tune in the 18.5 MC signal by means of the S. W. oscillator trimmer (C4).

(3) Set the signal generator to 16 MC and turn the tuning control so that this frequency is indicated on the dial. Adjust the Antenna Trimmer (C5) on the short wave coil for maximum output while rocking the Variable Capacitor from left to right for maximum output. No other adjustments are necessary.



GENERAL ELECTRIC CO.



CAPACITY IN MMF UNLESS NOTED

RADIO CIRCUIT ALIGNMENT

EQUIPMENT REQUIRED

1. Test oscillator with audio tone modulation.
2. A-C output meter, 1 1/2 volts full scale.
3. 100 mmf. mica capacitor.
4. Insulated screwdriver.

PROCEDURE

1. Connect test oscillator through 100 mmf. to antenna lead; connect output meter across the loudspeaker voice coil leads.
2. Turn dial pointer as far clockwise as it will go.
3. Set test oscillator to 1620 kc with tone modulation. Keeping the radio volume control set for maximum and attenuating test oscillator so that the output meter reading never exceeds 1 1/2 volts, trim antenna (C4) and RF (C5) trimmers for maximum output.
4. Set test oscillator to 580 kc with tone modulation. While rocking tuning control in vicinity of this dial calibration, adjust tracking adjustment platform up or down to give maximum output meter reading.
5. Recheck 1620 calibration adjustment. If RF (C5) trimmer has to be changed appreciably for maximum output, recheck step 4.

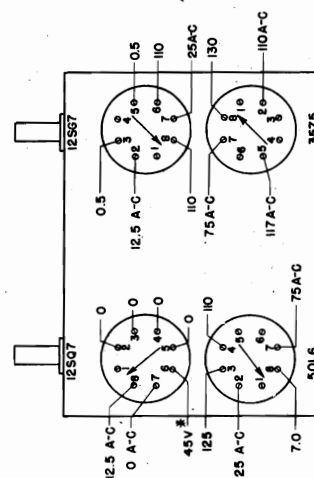


Fig. 4. Socket Voltages (Bottom View)

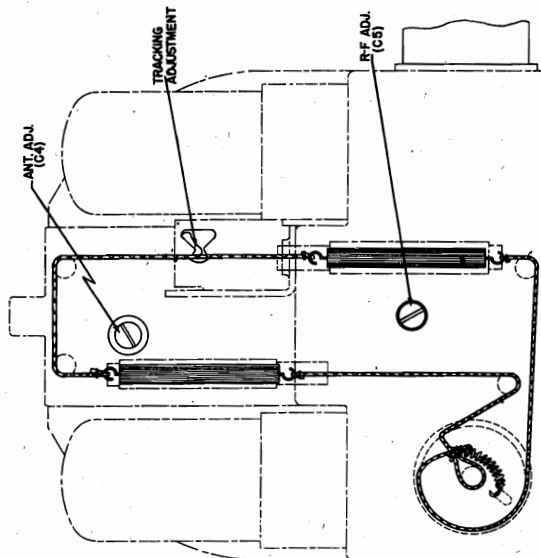


Fig. 1. Drive Stringing and Trimmer Location

MODEL 50

GENERAL ELECTRIC CO.

MODEL 50 ----- Mounting Screws.

To meet Underwriters requirements, the Model 50 chassis must be mounted in its cabinet with non-standard screws that cannot be removed with tools that are generally available to non-technical customers. We have been using spanner-head screws to meet this requirement.

Because our stock became exhausted due to the scarcity of these screws, we have temporarily used a standard Phillips-head screw to mount this radio in the cabinet, and then fill the screw head with solder. Radios mounted in this way may be easily removed from their cabinet by heating the screw head with a soldering iron until the solder becomes liquid enough to permit the insertion of a standard Phillips head screwdriver. CAUTION - Care should be exercised not to apply too much heat as it may damage the cabinet.

MODEL 50 ----- Rectifier 35W4 Substitution.

To overcome a shortage of 35Z5GT tubes, for a large portion of the Model 50 production we have had to substitute the miniature 35W4 rectifier tube. This tube has similar characteristics to the 35Z5GT, however it requires a miniature tube socket. This socket is adapted to the regular chassis hole by an adapter plate.

If it is desired to change a 35W4 for a 35Z5GT, it is only necessary to drill out the 35W4 socket adapter plate and substitute an octal base socket.

MODEL 50 ----- Time Set Incorrect.

Customer complaints of alarm set errors are usually brought about by their turning the Time Set shaft counterclockwise. This knob should only be turned clockwise. For alarm adjustment, refer to the Clock Service section

(Schematic Diagram):- The schematic diagram should be corrected to read:

1. Move the series resistor, R14, from its location between the power plug P1 and the 35Z5GT filament pin, to connect in series with the filament string between the 35Z5GT and 50L6GT filament pins.

2. The filament connections (pins 2 and 7) to the 35Z5GT tube are interchanged.

3. Remove R11 in series with the plate side of the 35Z5GT rectifier tube (pin 5) and connect it in series with the cathode side (pin 8) of the rectifier tube.

4. Late production receivers use a tapped primary on the output transformer, T1. The color code of the primary is: red - B+, white - tap; blue - plate. This tapped transformer replaces the early production transformer and is wired as follows:

(a) Break connection to filter resistor, R9, on the rectifier side of the resistor.

(b) Connect this broken side of R9 to the tap of the output transformer, T1.

The above connects the positive (+) side of C11a, the rectifier output and the red lead of the output transformer together; while the tap lead of T1 connects to R9.

5. In late production receivers, a miniature Type 35W4 tube is substituted in place of the 35Z5GT rectifier tube. This requires installation of a miniature socket and adapter plate in place of the octal socket. The corresponding pin connections are as follows:

	<u>35Z5GT</u>	<u>35W4</u>
Plate.....	Pin 5	Pin 5
Cathode.....	Pin 8	Pin 7
Filament.....	Pin 2	Pin 4
Filament.....	Pin 7	Pin 3

(Radio Replacement Parts List):- Add Part No. RTO-022, symbol T1, Transformer - output transformer. (This part is a direct replacement for late production radios and a replacement with modification for the early production transformer without tap.)

GENERAL ELECTRIC CO.

CLOCK SERVICE

Figure 6 shows clock parts referred to in the following paragraphs and the parts list.

CLOCK MOVEMENT DISASSEMBLY

1. Remove clock movement from case. When removing knobs, note that the Alarm-set knob is a left-hand thread, while Alarm-Radio is a pull-off knob.
2. Remove Bezel Window, Hands and Dial Face.
3. Remove two field screws (A) and break two soldered joints on Field. The Field and Rotor assembly (R) can now be removed. The Rotor is held by friction only to the Field.
4. Remove Switch Assembly (B) by removing two screws from base plate.
5. Remove Switch Shaft Assembly (C) and spacer.
6. Remove Alarm-set Shaft Assembly (D) and spacer.
7. Remove the three front plate assembly screws that are located under the Dial Face and then remove Front Plate.
8. Remove Alarm Gear Sleeve Assembly (E), Hour Gear Sleeve Assembly (F), Minute Gear Sleeve Assembly (G), and Sweep Second Gear Shaft Assembly (H).
9. Remove Alarm Cam Gear Assembly (I) and Spring Washer (J).
10. Remove Alarm-set Gear (K).
11. Remove Time-set Gear and Shaft Assembly (L).
12. Remove Switch Cam Lever (M).

CLOCK MOVEMENT REASSEMBLY

Reassemble in the reverse order of disassembly, observing the following precautions:

1. The spring washer (J) should curve upward when placed on the Alarm Cam Gear (I).
2. The Switch Cam Lever (M) fork must straddle the base plate post as shown in the illustration.
3. After reassembly of front plate, check the Sweep Second Gear (H) through hole in base plate to make sure it is free to turn.

4. Proceed with ALARM AND SWITCH ADJUSTMENTS as described below before installing hands.

ALARM AND SWITCH ADJUSTMENTS

1. Turn Alarm-Radio shaft to ALARM position.
2. Slowly rotate Time Set shaft clockwise until the contacts of the Switch Assembly (B) close.
3. Replace Dial Face, Alarm Dial, the Minute, Hour and Second Hands. Set all Hands and Dial so that they indicate 12 o'clock. Make sure all Hands and Alarm Dial are tight on their respective shafts.
4. With Alarm Set knob pulled out, continue to rotate Time Set shaft clockwise and note that the vibrator arm (N) drops against field core approximately 7-10 minutes later.
5. Set alarm at some other selected position and make sure mechanism actuates within limits (± 1 minute).
6. Check alarm tone of vibrator. This can be adjusted by either bending vibrator arm nearer or farther away from field core. Bend arm near anchor point.

CLEANING AND LUBRICATION

To clean, completely disassemble and clean all moving parts in carbon tetrachloride or some similar cleaner.

The inside of the sleeves and shaft surfaces may be cleaned of oxidized oil by rubbing with a fine grade of steel wool dampened in carbon tetrachloride.

Do not use too much oil and apply by means of a small wire (drop oiler). Too much oil collects dust and later oxidizes. Use only recommended clock oil, such as Nyes Celebrated Oil which may be purchased from Wm. F. Nye Co., Inc., New Bedford, or equivalent.

CLOCK TROUBLES

1. Clock will not operate—Defective field coil, defective rotor, binding of parts.
2. Clock loses time—Binding parts, too little friction on minute hand sleeve assembly, defective rotor. Clock time set shaft bent and rubs against hole in back cover. Radio pushed against wall so that knob (Q) rubs will cause loss of time.
3. Noisy Clock—Rotor defective, alarm armature improperly adjusted, loose parts, or binding of moving parts.

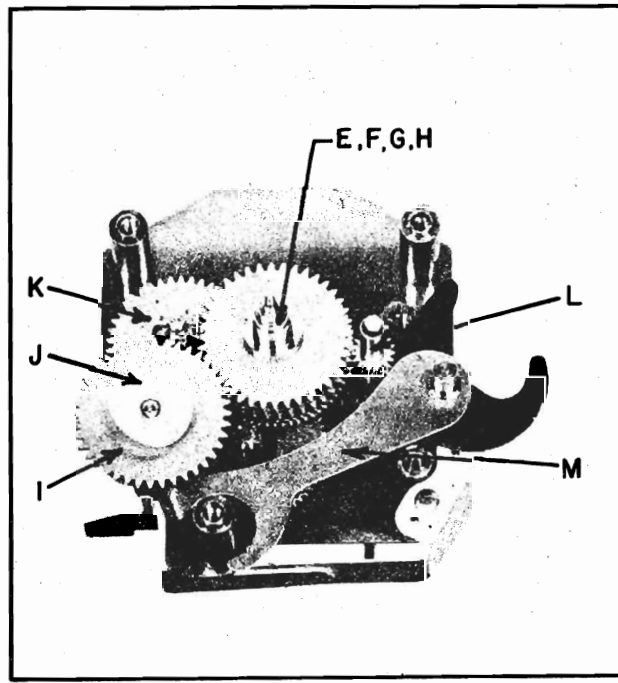
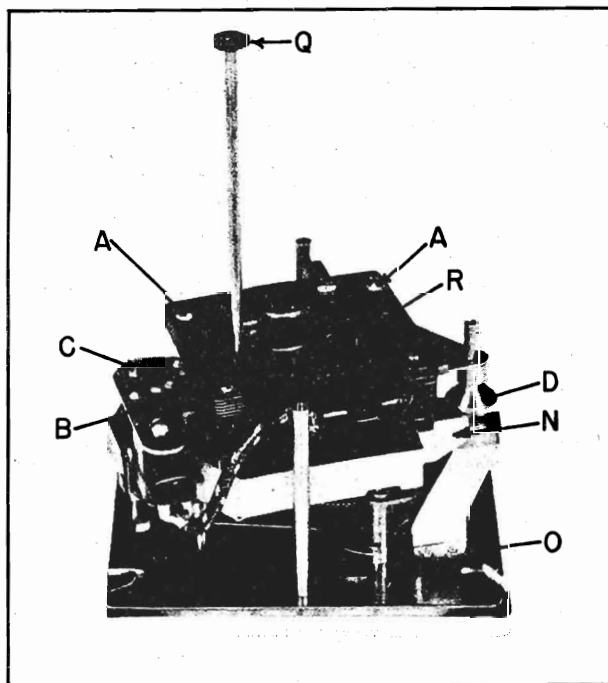


Fig. 6. Clock Part Identification

ELECTRICAL RATING (INPUT):

TUNING FREQUENCY (RADIO):

Broadcast Band 540-1600 kc

POWER OUTPUT (117 VOLTS LINE):

Undistorted.....	1.5 watts
Maximum.....	2.2 watts

LOUDSPEAKER:

Type.....Alnico P.M.
Outside Cone Diameter.....4 inch
Voice Coil Impedance (400 Cycles) 3.5 ohms

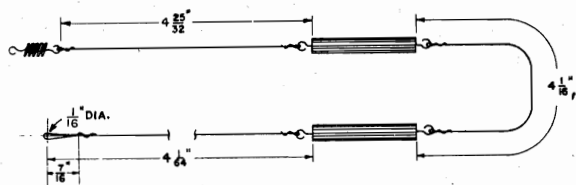


Fig. 2. Drive Cord Assembly

DRIVE CORD REPLACEMENT

When replacing the drive cord, it is essential that the measurements shown in Figure 2 be maintained very accurately, otherwise alignment and dial calibration difficulties will be experienced. Use a $\frac{1}{32}$ -inch diameter nylon jacketed cord, Part No. RDC-015, for replacement.

RADIO STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements by vacuum tube voltmeter or similar measuring devices may be used to check circuit performance and isolate trouble. The gain values listed may have tolerances of 20 per cent. Readings are taken with low signal input.

(1) R-F Stage Gains.

Antenna lead to 12SG7 grid..... 8 at 1000 kc
12SG7 grid to 12SQ7 diode plate..... 50 at 1000 kc

(2) **Audio Gain.**

0.06 volts at 400 cycles across volume control (R4) with control set at maximum will give approximately 1/2-watt output across speaker voice coil.

(3) Socket Pin Voltages.

Figure 4 shows voltages from all points to B—. Voltage readings much lower than those specified may help localize defective components or tubes.

RADIO REPLACEMENT PARTS LIST—MODEL 50

CAT. NO.	SYMBOL	DESCRIPTION
UNIVERSAL G-E RADIO REPLACEMENT PARTS		
UCC-039	C8	CAPACITOR - 0.005 mfd., 600 v., paper
UCG-045	C2, 3	CAPACITOR - 0.05 mfd., 600 v., paper
UCG-543	C6	CAPACITOR - 430 mmf., silver mica
UCU-512	C1	CAPACITOR - 22 mmf., mica
UCU-532	C16	CAPACITOR - 150 mmf., mica
UCU-536	C7, 15	CAPACITOR - 220 mmf., mica
UIC-001		CEMENT - Speaker cement
UOP-405	SP1	LOUDSPEAKER - 4-inch PM speaker
UOX-009		CONE - Speaker replacement cone
URD-015	R1	RESISTOR - 39 ohms, $\frac{1}{2}$ w., carbon
URD-029	R8	RESISTOR - 150 ohms, $\frac{1}{2}$ w., carbon
URD-033	R13	RESISTOR - 220 ohms, $\frac{1}{2}$ w., carbon
URD-080	R3	RESISTOR - 47,000 ohms, $\frac{1}{2}$ w., carbon
URD-097	R10	RESISTOR - 100,000 ohms, $\frac{1}{2}$ w., carbon
URD-113	R7, 12	RESISTOR - 470,000 ohms, $\frac{1}{2}$ w., carbon
URD-121	R6	RESISTOR - 1.0 megohm, $\frac{1}{2}$ w., carbon
URD-129	R2	RESISTOR - 2.2 megohms, $\frac{1}{2}$ w., carbon
URD-145	R5	RESISTOR - 10.0 megohms, $\frac{1}{2}$ w., carbon
URE-057	R9	RESISTOR - 2,200 ohms, 1 w., carbon
SPECIALIZED G-E REPLACEMENT PARTS		
RAB-016		COVER - Cabinet back cover

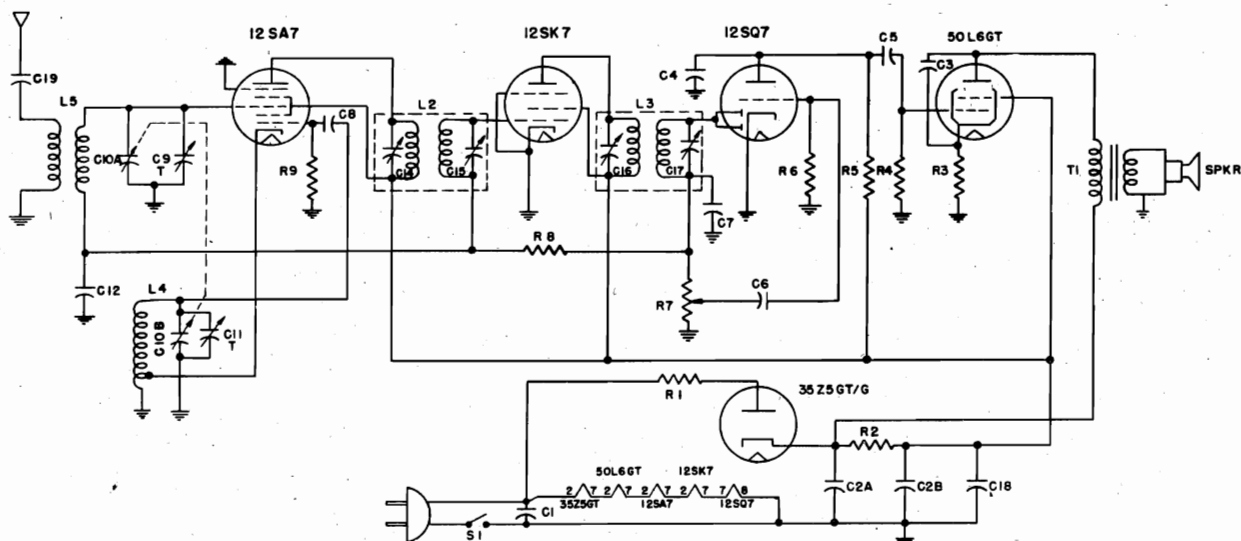
CAT. NO.	SYMBOL	DESCRIPTION
SPECIALIZED G-E REPLACEMENT PARTS		
RAU-009		CABINET - Plastic cabinet
RCC-039	C9	CAPACITOR - 0.005 mfd., 600 v., paper
RCC-041	C10	CAPACITOR - 0.02 mfd., 600 v., paper
RCC-045	C14	CAPACITOR - 0.05 mfd., 600 v., paper
RCE-031	C11A, B, C	CAPACITOR - 40 mfd., 150 v.; 30 mfd., 150 v.; 20 mfd., 25 v.; electrolytic
RCY-007	C4	TRIMMER - 140-175 mmf., antenna trimmer
RCY-008	C5	TRIMMER - 270-375 mmf., r-f trimmer
RDC-015		CORD - Tuning drive cord (bulk)
RDK-028		KNOB - Volume or tuning knob
REI-004		CORE - Powdered iron tuning core
RHJ-001		ASSEMBLY - Tuning shaft assembly and spacer
RIT-005		COVER - Electrolytic cardboard cover (inner and outer)
RJS-003		SOCKET - Tube socket
RLA-005	L1, 2	COIL - Antenna or R-F coil
RMB-003		BUSHING - Drive shaft bushing
RMS-034		SPRING - Drive cord tension spring
RMX-006		PULLEY - Drive pulley
RRW-003	R14	RESISTOR - 22 ohms, 1 w., wirewound
RRW-008	R11	RESISTOR - 18 ohms, 1 w., glassohm W.W.
RWL-009		CORD - Power cord
RZC-001		CLOCK - Clock assembly

CLOCK REPLACEMENT PARTS LIST—MODEL 50

CAT. NO.	SYMBOL	DESCRIPTION
MISCELLANEOUS		
XC34X110	O	Frontplate Assembly
XC11X8	D	Alarm Set Shaft Assembly
XC10X115	L	Time Set Gear and Shaft Assembly
XC40X73	C	Switch Shaft Assembly
XC53X83		Inner Bezel 2 1/4 in. Square - Lacquer
XC58X15		Crystal - 2 1/4 in. Square
XC60X707		Dial
XC32X129		Hands - Gold
XC55X3		Alarm Dial
XC3X49	Q	Time Set Shaft Knob - Bronze
XC4X5		Alarm Set Knob - Ivory
XC40X74		Switch Knob - Ivory
XC31X26		Sweep Second Hand - Gold
CLOCK MOVEMENT		
XC40X260		Spacer - Switch Shaft
XC44X38		Rotor Unit - 60 Cycle
XC45X69	R	Field Coil Assembly - 60 Cycle

CAT. NO.	SYMBOL	DESCRIPTION
CLOCK MOVEMENT		
XC64X1-2-3		Frontplate Screw
XC40X202		Spreader Post
XC40X252	J	Cam Gear Spring Washer
XC1X1	A	Field Screws, No. 4-40 x 1 1/8 in. R.H.
XC1X2		No. 1204 Lockwasher
XC1X6		Screw No. 4-40 x 3/8 in. R.H.
XC1X43		Hex Nut
XC40X261		Time Set Shaft Spacer
XC40X262		Time Set Shaft Spacer (at front plate)
XC35X39		Baseplate Assembly
XC14X15	G	Minute Gear Sleeve Assembly
XC13X11	F	Hour Gear Sleeve Assembly
XC15X3	E	Alarm Gear Sleeve Assembly
XC40X77	K	Alarm Set Gear Assembly
XC17X8		Alarm Gear Shaft Assembly
XC40X78	I	Switch Cam Lever Assembly
XC16X14	H	Sweep Second Gear Shaft Assembly
XC40X13		Rivet - Vibrator
XC40X263		Alarm Shut-off Spacer
XC40X76	B	Switch Assembly
XC40X79		Upper Contact Spring Assembly
XC40X80		Lower Contact Spring and Tip Assembly

GENERAL ELECTRIC CO.

MODELS YRB60-1
YRB60-2

Tuning Frequency Range: 540-1725 kc

Intermediate Frequency: 455 kc

LOUDSPEAKER "ALNICO V" MAGNET DYNAMICOutside Cone Diameter 4 in.
Voice Coil Impedance (400 cycles) 3.5 ohm**ALIGNMENT PROCEDURE****ALIGNMENT FREQUENCIES**

I.F. 455 kc

R.F. 1725 and 1500 kc

The location of all trimmers is shown in Fig. 1.

I.F. ALIGNMENT

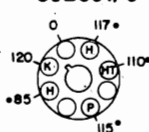
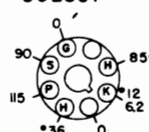
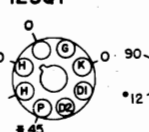
Connect an output meter across the voice coil. Turn the volume control to maximum. Set test oscillator to 455 kc and keep the oscillator output as low as a readable meter reading will permit. Apply signal to the converter grid through a .05 mfd capacitor and align progressively the trimmers in the 2nd and 1st I.F. transformer cans.

R.F. ALIGNMENT

Apply the R.F. alignment signals through a standard I.R.E. dummy antenna to the receiver antenna post. With the gang condenser wide open, align the oscillator trimmer (C11) to 1725 kc. Change the generator signal to 1500 kc, tune the receiver to the signal and peak antenna trimmer (C9) for maximum output.

PRECAUTION

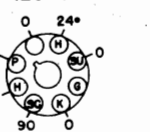
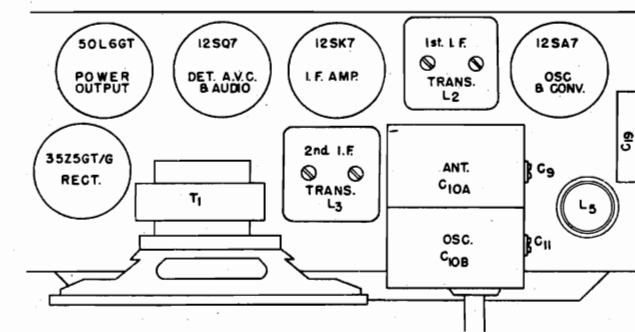
If the signal generator is a-c operated, use an isolating transformer between the power supply and the radio receiver power input. The use of an isolating capacitor is not recommended, as a-c through the capacitor will introduce hum modulation and/or create the possibility of a burned-out signal generator attenuator.

35Z5GT/G**50L6GT****12SQ7****VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS**

● INDICATES A.C. VOLTS
A.C. LINE 117 VOLTS
NO SIGNAL INPUT

ALL VOLTAGES MEASURED WITH
1000 OHM/VOLT METER

* MEASURED ON 300 V SCALE

12SK7**12SA7**

Cat. No.	Symbol	Description
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UNIVERSAL G-E REPLACEMENT PARTS

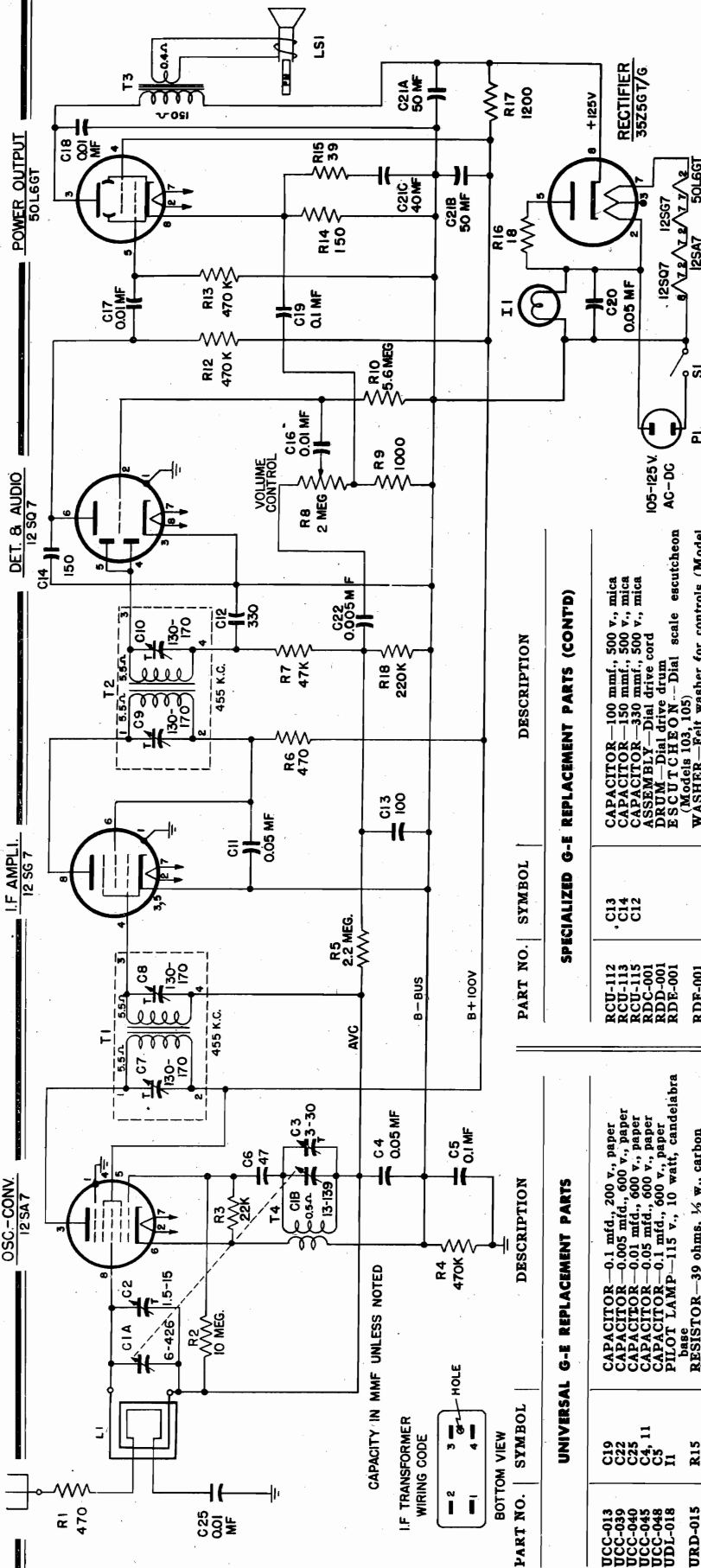
UCC-039	C6, C19	Capacitor—.005 mfd paper
UCC-040	C5, C13	Capacitor—.01 mfd paper
UCC-041	C3	Capacitor—.02 mfd paper
UCC-045	C1, C12, C18	Capacitor—.05 mfd paper
UCU-1020	C8	Capacitor—47 mmfd mica
UCU-1040	C4, C7	Capacitor—330 mmfd mica
URD-029	R3	Resistor—150 ohm 1/2 watt carbon
URD-041	R11	Resistor—470 ohm 1/2 watt carbon
URD-081	R9	Resistor—22,000 ohm 1/2 watt carbon
URD-105	R5	Resistor—220,000 ohm 1/2 watt carbon
URD-113	R4	Resistor—470,000 ohm 1/2 watt carbon
URD-129	R8	Resistor—2.2 megohm 1/2 watt carbon
URD-145	R6	Resistor—10 megohm 1/2 watt carbon
URE-007	R1	Resistor—18 ohm 1 watt carbon
URF-053	R3	Resistor—1500 ohm 2 watt carbon

SPECIALIZED G-E REPLACEMENT PARTS

SAB-009	Back cover for cabinet
SAU-011	Cabinet, Model YRB 60-1
SAU-012	Cabinet, Model YRB 60-2
SCE-003	Capacitor electrolytic filter, 40-40 mfd 150 volts
SCT-003	Capacitor—tuning
SDK-005	Knob—tuning, Model YRB 60-1
SDK-006	Knob—tuning, Model YRB 60-2
SDK-007	Knob—volume control, Model YRB 60-1
SDK-008	Knob—volume control, Model YRB 60-2
SDX-002	Grille and dial, Model YRB 60-1
SDX-003	Grille and dial, Model YRB 60-2
SJS-002	Socket, octal tube
SLA-001	Antenna coil
SLC-002	Oscillator coil
SMC-003	Fasteners, speed clip for fastening grille
SMF-003	Fasteners, for fastening cabinet back cover
SOP-001	Speaker, 4 in. PM dynamic
SRC-004	Volume control, 0.5 megohm, with power switch
STL-003	Transformer, 1st I.F.
SWL-001	Transformer, 2nd I.F.
	Power cord

MODELS 100,101,103,105
Under Serial No.5000

GENERAL ELECTRIC CO.



SPECIFICATIONS

CABINET:		ELECTRICAL RATING (INPUT)	
Model	100	Voltage	105-125 volts a-c or d-c
Material	Plastic	Frequency on a-c	25 to 60 cycles
Color	Brown	Wattage	.....40 watts
Height	7 1/2"	Operating Frequencies	Broadcast Band
Width	12"	I-F Amplifier	.....540-1600 kilocycles
Depth	7 1/2"	Power Output (117 Volts Line)	.....455 kilocycles
		Undistorted	.....1.25 watts
		Maximum	.....2.0 watts
		LOUDSPEAKER	
		Type	Alnico P.M.
		Outside Cone Diameter	.....5 1/4 in.
		Voice Coil Impedance (400 cycles)	.....3.5 ohms

SPECIALIZED G-E REPLACEMENT PARTS (CONTD)

PART NO.	SYMBOL	DESCRIPTION
RCU-112	C13	CAPACITOR—100 mmf., 500 v., mica
RCU-113	C14	CAPACITOR—150 mmf., 500 v., mica
RDC-001	C12	ASSEMBLY—Dial drive drum
RDE-001		ESCUTCHEON—Dial scale escutcheon (Models 103, 105)
RDF-001		WASHER—Felt washer for controls (Model 101)
RDF-003		WASHER—Felt washer for controls (Models 103, 105)
RDE-001		KNOB—Control knob (Model 101)
RDE-004		KNOB—Control knob (Models 103, 105)
RDE-006		KNOB—Control knob (Model 100)
RDS-001		POINTER—Dial scale pointer
RDS-002		SCALE—Dial scale (Models 100, 101)
RDX-001		ASSEMBLY—Dial scale back plate assembly (Models 103, 105)
RHG-001		GROMMET—Tuning capacitor mounting (Model 100)
RHM-001		Ring—Speaker shaft retainer ring
RHM-002		CLIP—Speaker mounting clip
RHM-004		CLIP—Dial scale mounting clip (Models 100, 101)
RHM-005		CLIP—Dial scale mounting clip (Models 103, 105)
RHU-001		SPACER—Scale back plate spacer
RHU-002		SPACER—Tuning capacitor mounting spacer
RLC-001	T4	COIL—Oscillator coil assembly
RMC-001	L1	SHIELD—A-S-C-O-P-E Loop antenna assembly
RMS-001		SPRING—Dial scale tension spring
RMU-001		SHAFT—Tuning control shaft
ROP-005	LS1	LOUDSPEAKER—5 1/4-inch permanent magnet (Model 100)
RRC-002	R8, S1	VOLUME CONTROL—2.0 megohm potentiometer (includes power switch)
RTL-001	T1	TRANSFORMER—1st I-F transformer
RTL-002	T2	TRANSFORMER—2nd I-F transformer
RTG-001	T3	TRANSFORMER—Output transformer
RTS-003		SOCKET—Ion amp socket
RTS-004		SOCKET—Electrolytic capacitor mounting socket
RWL-001	P1	CORD—Power cord and plug

UNIVERSAL G-E REPLACEMENT PARTS

PART NO.	SYMBOL	DESCRIPTION
UCC-013	C19	CAPACITOR—.01 mfd., 200 v., paper
UCC-039	C22	CAPACITOR—.005 mfd., 600 v., paper
UCC-040	C25	CAPACITOR—.01 mfd., 600 v., paper
UCC-045	C4, 11	CAPACITOR—.05 mfd., 600 v., paper
UCC-048	C5	CAPACITOR—.01 mfd., 600 v., paper
UDL-018	I1	PILOT LAMP—115 v., 10 watt, candelabra base
URD-015	R15	RESISTOR—39 ohms, 1/2 w., carbon
URD-019	R14	RESISTOR—150 ohms, 1/2 w., carbon
URD-020	R13	RESISTOR—10 ohms, 1/2 w., carbon
URD-040	R9	RESISTOR—22,000 ohms, 1/2 w., carbon
URD-081	R7	RESISTOR—22,000 ohms, 1/2 w., carbon
URD-089	R3	RESISTOR—22,000 ohms, 1/2 w., carbon
URD-105	R18	RESISTOR—220,000 ohms, 1/2 w., carbon
URD-113	R4, 12, 13	RESISTOR—470,000 ohms, 1/2 w., carbon
URD-129	R5	RESISTOR—2.2 megohms, 1/2 w., carbon
URD-139	R10	RESISTOR—5.6 megohms, 1/2 w., carbon
URD-145	R2	RESISTOR—10 megohms, 1/2 w., carbon
URD-037	R16	RESISTOR—18 ohms, 1 w., carbon
URE-051	R17	RESISTOR—1280 ohms, 2 w., carbon

SPECIALIZED G-E REPLACEMENT PARTS

PART NO.	SYMBOL	DESCRIPTION
RAB-001		BACK—Cabinet Back Cover (Models 103, 105)
RAB-002		BACK—Cabinet Back Cover, white (Model 100)
RAB-003		BACK—Cabinet Back Cover, brown (Model 100)
RAD-001		BRACKET—Antenna Bracket, right rear
RAD-002		BRACKET—Antenna Bracket, left rear
RAU-002		CABINET—Brown Plastic, with grille assembly (Model 100)
RAU-003		CABINET—Ivory Plastic, with grille assembly (Model 101)
RAC-001		ASSEMBLY—Idle pulley assembly
RAC-002	C16, 17, 18	CAPACITOR—.01 mfd., 600 v., paper
RCC-045	C20	CAPACITOR—.05 mfd., 600 v., paper
RCE-001	21C, 21B, 21A	CAPACITOR—50 mfd., 150 v., electrolytic
RCT-001	C1A, C1B	40 mfd. 25 v. dry electrolytic
RCU-110	C2, C3	CAPACITOR—Tuning capacitor assembly

GENERAL ELECTRIC CO.

MODELS 100, 101, 103, 105
Above Serial No. 5000

PRODUCTION CHANGES WERE MADE ON ALL MODELS 100, 101, 103, AND 105, HAVING SERIAL NUMBERS 5000 AND OVER. THE SERVICING DATA ON THE PRECEDING PAGES APPLY TO THE REVISED MODELS WITH THE FOLLOWING EXCEPTIONS:

(ELECTRICAL CIRCUIT ALIGNMENT)—Under the paragraph PROCEDURE—GENERAL the third sentence should read "If it doesn't, remove chassis and slip pointer on shaft until the pointer is under reference mark when chassis is bolted in place."

For receivers equipped with the Beam-A-Scope which forms a part of the back cover (Part Nos. RLL-009 and RLL-010), paragraph 4 should be changed to read, "Chassis must be removed from cabinet during i-f alignment. For r-f alignment, bolt chassis in cabinet securely; r-f and oscillator trimmers are then available through the hole in the back cover assembly."

(SCHEMATIC DIAGRAM)—A corrected schematic is printed below. Changes were made as follows:

- (1) C18 connects between the output plate and screen instead of between plate and ground.
- (2) The plate and screen filter (C11, R6) is moved

from the IF amplifier circuit to the converter plate and screen circuit.

- (3) The filament connections (Pins 2 and 7) to the 12SA7 converter tube are interchanged.

- (4) The 10-megohm resistor, R2, is removed.

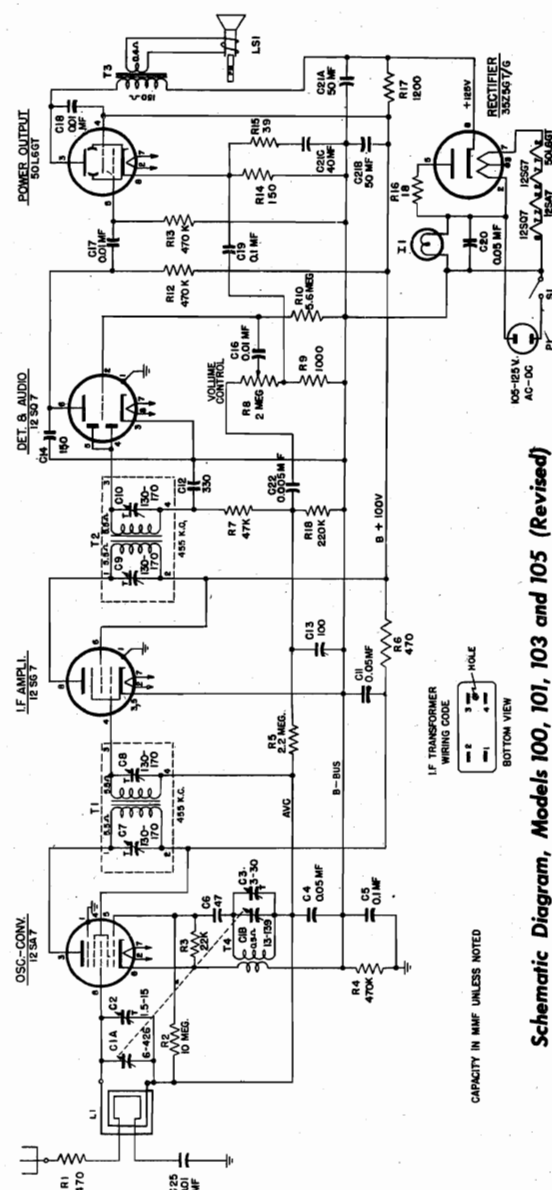
(Fig. 4, Socket Voltages) At 12SA7 socket, pins 3 and 4 should be changed to read +92. At 12SG7 socket, pins 6 and 8 should be changed to read +97 volts.

(REPLACEMENT PARTS LIST)—Part Number UCC-013, Symbol C19, becomes Part Number RCC-013. Stock numbers RTS-001, RTS-003, and RTS-004 should be changed to read: RJS-001, RJS-003, and RJS-004, respectively.

(Parts List). Part No. RCE-001 changed to RCE-027. Delete Part Nos. RDP-001, RDP-003, RDX-001, and RMM-001. Part No. RWL-001 changed to RWL-004. Add Part No. RIT-006, Electrolytic cardboard cover. Add Part No. RLL-009, Beam-A-Scope loop ant. and back cover assembly, Models 103, 105. Add Part No. RLL-010, Beam-A-Scope loop ant. and back cover assembly, Models 100, 101. Change Part No. ROP-005 to read Part No. UOP-525.

Beam-A-Scope Change. Two different type loop antenna assemblies were used until Beam-A-Scope Change. Two different type loop antenna assemblies were used during production. Part No. RLL-001 is secured to the chassis by two metal brackets and needs a separate cabinet back cover. The other type Beam-A-Scope is identified as it is a part of the back cover assembly. This new assembly is stocked as Part No. RLL-009 for Models 103 and 105, and as Part No. RLL-010 for Models 100 and 101. The Beam-A-Scope are electrically interchangeable. The loop (RLL-009, RLL-010), which is a part of the back cover can be used without alteration to replace Part No. RLL-001. Part No. RLL-001 may replace Part No. RLL-009 or RLL-010, provided that brackets (Part No. RAD-001 and RAD-002) are added to the chassis to mount the new loop. When connecting the Beam-A-Scope into the circuit, the inner turn of Part Nos. RLL-009 and RLL-010 must be connected to the converter grid (pin 8); while on Part No. RLL-001 loop, the turn nearest the back cover connects to the converter grid (pin 8).

REMOVAL OF PILOT LIGHT: In some cases, the glyptal cement used between the pilot light base and socket prevents removal of the light. Repeated applications of acetone or nail-polish remover between the lamp and socket will soften cement sufficiently to permit removal.



Schematic Diagram, Models 100, 101, 103 and 105 (Revised)

MODELS 100,101,103,105

GENERAL ELECTRIC CO.

TUBE COMPLEMENT*

Oscillator-Converter.....Type 12SA7
 I. F. Amplifier.....Type 12SG7
 Detector-Audio.....Type 12SQ7
 Power Output.....Type 50L6GT
 Rectifier.....Type 35Z5GT/G
 Pilot Lamp.....G-E, Type C7, 115-volt, 10-watt, clear,
 candelabra screw base

ELECTRICAL CIRCUIT ALIGNMENT**ALIGNMENT FREQUENCIES**

R-F.....1500 kilocycles
 I-F.....455 kilocycles

EQUIPMENT REQUIRED

1. Test oscillator with audio tone modulation
2. A-C output meter, 1 1/2 volts full scale
3. 0.05 mf. paper capacitor
4. 50 mmf. mica capacitor
5. Insulated screwdriver

PROCEDURE—GENERAL 1. Turn dial scale pointer as far counter-clockwise as possible. The pointer should coincide with the first marking at the left of the scale. If it doesn't, remove chassis and slip pointer drum on cord until pointer is under reference mark when chassis is bolted in place.

2. For i-f and r-f alignments, the output meter is connected across the loudspeaker voice coil terminals.

3. Keep radio volume control at maximum and attenuate test oscillator signal output so that the output meter reading never exceeds 1 1/4 volts.

4. The chassis must be removed from the cabinet during I-F alignment. For R-F alignment bolt the chassis in the cabinet securely, the rf and osc. trimmers are then available through the hole in the Beam-a-scope assembly when the back cover is removed.

5. Connect the capacitor as listed in column 2, between the output "High Side" of test oscillator and the point of input specified.

ALIGNMENT CHART

Step	Connect test oscillator to	Test osc. setting	Pointer setting on radio	Adjustment for maximum output
1	12SG7 grid in series with 0.05 mf. cap.	455 kc	1,500 kc	2nd I-F Trans. Trimmers
2	12SA7 grid in series with 0.05 mf. cap.	455 kc	1,500 kc	1st and 2nd I-F Trans. Trimmers
3	Ant. Post in series with 50 mmf.	1,500 kc	1,500 kc	C3 (Osc.)
4	Ant. Post in series with 50 mmf.	1,500 kc	1,500 kc	C2 (R-F)

STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements by vacuum tube voltmeter or similar measuring devices may be used to check circuit performance and isolate trouble. The gain values listed may have tolerances of 20%. Readings taken with low signal input so that AVC is not effective.

- (1) R-F Stage Gains.
 Antenna post to 12SA7 grid..... 4 @ 1000 kc
 12SA7 grid to 12SG7 grid..... 30 @ 455 kc
 12SG7 grid to 12SQ7 diode plate..... 150 @ 455 kc
- (2) Audio Gain.
 0.06 volt at 400 cycles across volume control (R8) with control set at maximum will give approximately 1/2-watt output across speaker voice coil.
- (3) Oscillator Grid Bias.
 D-C voltage developed across the oscillator grid leak (R3). Averages 7.7 volts at 1000 kc.
- (4) Socket Pin Voltages.
 Figure 4 shows voltages from all tube pins to B- unless otherwise specified. Voltage readings much lower than those specified may help localize defective components or tubes

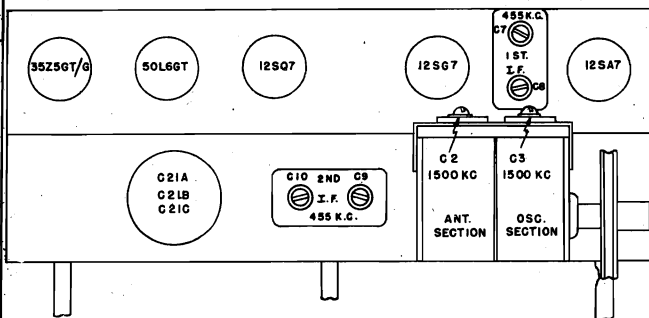


Fig. 1. Tube and Trimmer Location

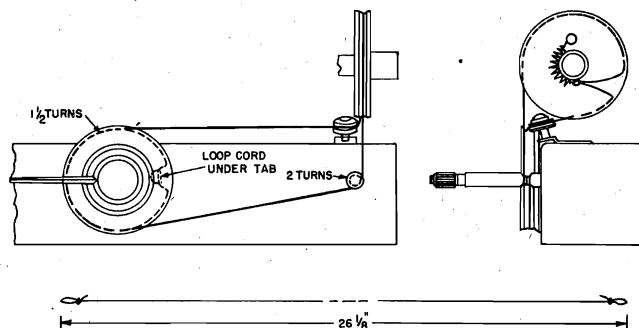


Fig. 2. Dial Stringing Diagram

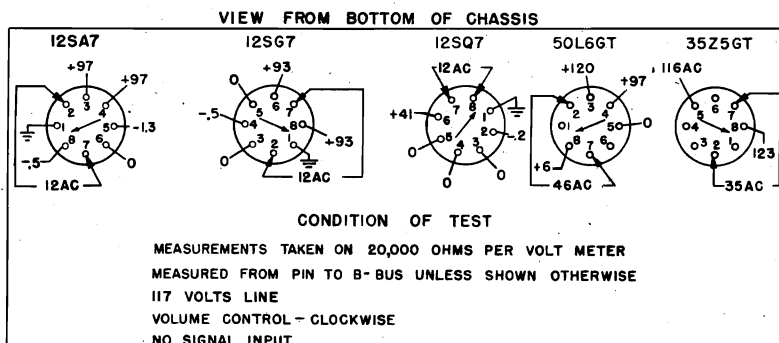


Fig. 4. Socket Voltages

STAGE GAIN AND VOLTAGE CHECKS

(1) R-f Stage Gains.

Antenna post to 1SA7 grid.....	4	@ 1000 kc
1SA7 grid to 1SG7 grid.....	30	@ 455 kc
1SG7 grid to 12SQ7 diode plate.....	150	@ 455 kc

(2) Audio Gain.

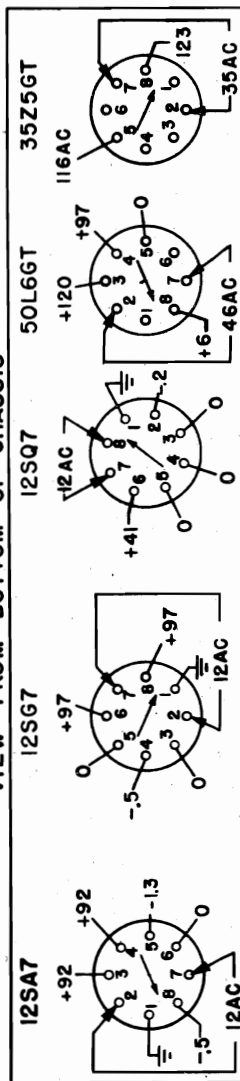
(3) **Oscillator Grid Bias.** D-c voltage developed across the oscillator grid leak (R3) averages 7.7 volts at 1000 kc.

(4) Socket Pin Voltages. Fig. 4 shows voltages from all tube pins to B—unless otherwise specified. Voltage readings much lower than those specified may help localize defective components or tubes.

OPERATING FREQUENCIES

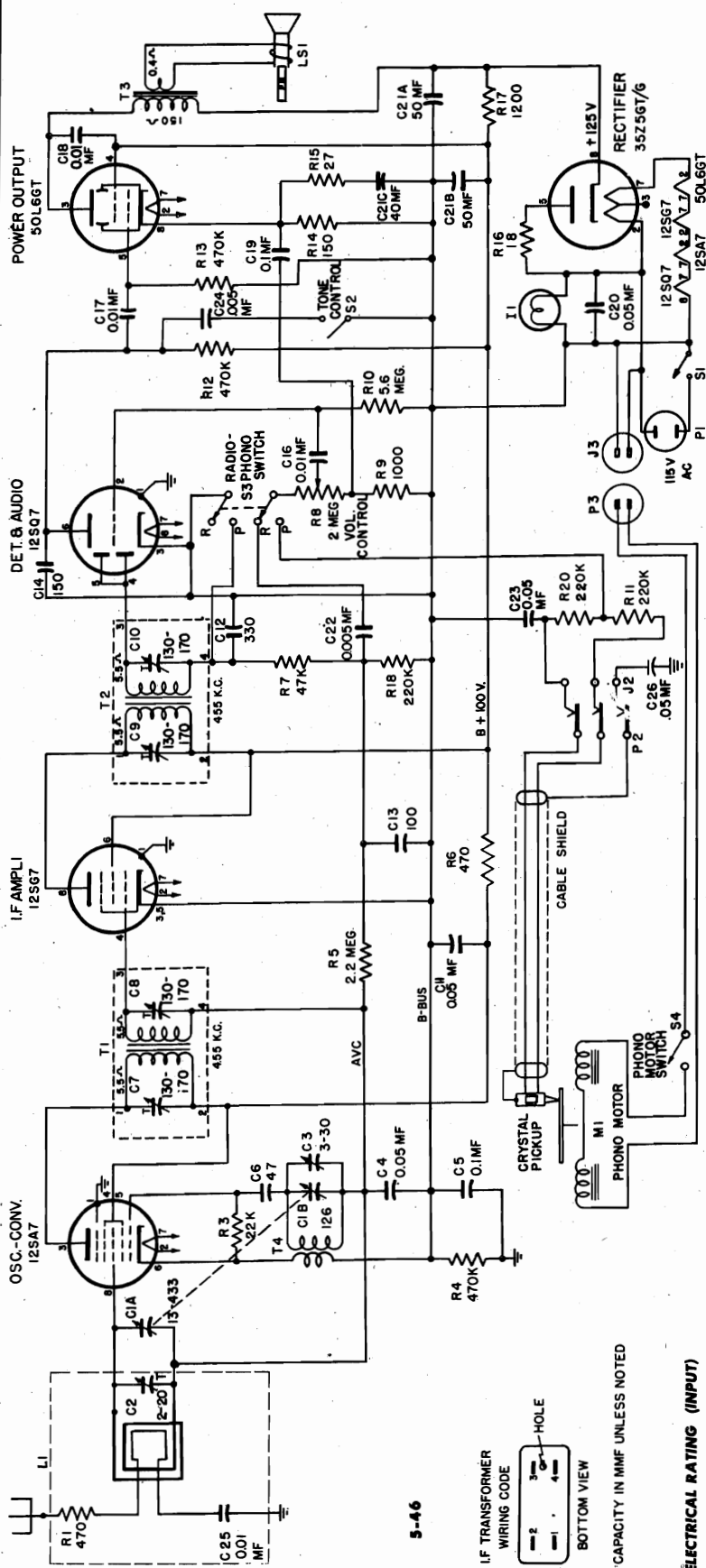
Broadcast Band.....	540-1600 kilocycles
I-F Amplifier.....	455 kilocycles

VIEW FROM BOTTOM OF CHASSIS



CONDITION OF TEST

MEASUREMENTS TAKEN ON 20,000 OHMS PER VOLT · METER
MEASURED FROM PIN TO B-BUS UNLESS SHOWN OTHERWISE



ELECTRICAL RATING (INPUT)

Voltage.....	105-125 volts a-c
Frequency.....	60 cycles
Wattage (Including Phonograph).....	55 watts

CAPACITY IN MMF UNLESS NOTED

I.F. TRANSFORMER
WIRING CODE

Bottom view of the part. It shows a rectangular shape with dimensions 2, 3, and 4. A hole is located in the upper right corner, with a leader line pointing to it labeled "HOLE".

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SPECIALIZED G-E REPLACEMENT PARTS (CONT'D)

RDF-002	WASHER—Felt Washer for Control Knob	
RDK-001	KNOB—Radio-phono Control Knob	
RDK-003	KNOB—Volume Control Knob	
RDE-005	KNOB—Tone Switch Water Knob	
RDE-006	KNOB—Tuning Knob	
RDP-001	POINTER—Dial Scale Pointer	
RDS-003	SCALE—Dial Scale	
RDX-025	ASSEMBLY—Back Plate Weld Assembly	
RDX-026	FIN—Harpin Cotter (Fan)	
RHC-003	FIN—Harpin Cotter (Spindle)	
RHG-001	GROMMET—Tuning Capacitor Mounting Grommet	
RHM-001	RING—Pointer Shaft Retaining Ring	
RHM-006	CLIP—Speed Clip (Motor Board)	
RHQ-001	TIRE—Rubber Tire (Phono-motor Idler)	
RHU-001	SPACER—Scale Back Plate Spacer	
RHU-002	SPACER—Tuning Capacitor Mounting Spacer	
RIT-001	COVER—Electrolytic Capacitor Cover	P3
RJP-003	PLUG—Phono Power Socket	
RJS-002	SOCKET—Pilot Light Socket	
RJS-003	SOCKET—Octal Tube Socket	
RJS-004	SOCKET—Electrolytic Capacitor Mounting Socket	
RJS-049	SOCKET—Phono Power Socket	J3
RJC-005	PLUG AND SOCKET—Phono Plug and Socket	P2
RJC-018	COIL—Oscillator Coil Assembly	T4
RLI-002	ARM—A-SOPE—Loudspeaker Assembly	L1
RNM-008	SHIELD—Pilot Lamp Shield	
RMS-006	SPRING—Idle Wheel Spring	
RMT-001	TURNTABLE—9-inch diameter Turntable	
RMU-002	SHAFT—Tuning Shaft	
RMU-007	SPINDLE—Turntable Spindle	
RMW-005	WHEEL—Phono Idler Wheel (with Rubber Gasket)	
ROP-006	LSPK—SPEAKER—6½-inch Permanent Magnet	LS1
RPC-014	PICK UP—Crystal Cartridge Pick-up	
RPP-012	ARM—Tone Arm Assembly with Pick-up	
RRX-001	VOLUME CONTROL—2.0 megohm Potentiometer (includes power switch)	R8, S1
RSS-001	SWITCH—Phono Motor Switch	S4
RSM-001	ASSEMBLY—Phono-motor Switch Assembly	
RSX-002	ASSEMBLY—Phono-switch Arm Assembly	S2
RSW-001	SWITCH—Phono Radio Switch	S3
RSW-002	SWITCH—Phono Radio Switch	S2
RTI-001	TRANSFORMER—1st I-f Transformer	T1
RTI-002	TRANSFORMER—2nd I-f Transformer	T2
RTO-001	TRANSFORMER—Output Transformer	T3
RWL-004	CORD—Power Cord and Plug	

UNIVERSAL G-E REPLACEMENT PARTS

C22	UCC-039	CAPACITOR—0.005 mfd., 600 v., paper
C25	UCC-040	CAPACITOR—0.01 mfd., 600 v., paper
C25	UCC-041	CAPACITOR—0.05 mfd., 600 v., paper
C25	UCC-042	CAPACITOR—0.1 mfd., 600 v., paper
C25	UCC-043	PLATE LAMP—115 v., 10 watt, candelabra base
C25	UCC-044	CEMENT—Thermoplastic Cement
C25	UCC-045	LOUDSPEAKER— $6\frac{1}{2}$ " PM Speaker
C25	UCC-046	RESISTOR—27 ohms, $\frac{1}{2}$ w., carbon
C25	UCC-047	RESISTOR—150 ohms, $\frac{1}{2}$ w., carbon
C25	UCC-048	RESISTOR—470 ohms, $\frac{1}{2}$ w., carbon
C25	UCC-049	RESISTOR—1000 ohms, $\frac{1}{2}$ w., carbon
C25	UCC-050	RESISTOR—22,000 ohms, $\frac{1}{2}$ w., carbon
C25	UCC-051	RESISTOR—47,000 ohms, $\frac{1}{2}$ w., carbon
C25	UCC-052	RESISTOR—220,000 ohms, $\frac{1}{2}$ w., carbon
C25	UCC-053	RESISTOR—470,000 ohms, $\frac{1}{2}$ w., carbon
C25	UCC-054	RESISTOR—2 megohms, $\frac{1}{2}$ w., carbon
C25	UCC-055	RESISTOR—18 ohms, 1 w., carbon
C25	UCC-056	RESISTOR—1200 ohms, 2 w., carbon
C25	UCC-057	
C25	UCC-058	
C25	UCC-059	
C25	UCC-060	
C25	UCC-061	
C25	UCC-062	
C25	UCC-063	
C25	UCC-064	
C25	UCC-065	
C25	UCC-066	
C25	UCC-067	
C25	UCC-068	
C25	UCC-069	
C25	UCC-070	
C25	UCC-071	
C25	UCC-072	
C25	UCC-073	
C25	UCC-074	
C25	UCC-075	
C25	UCC-076	
C25	UCC-077	
C25	UCC-078	
C25	UCC-079	
C25	UCC-080	
C25	UCC-081	
C25	UCC-082	
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C25	UCC-190	
C25	UCC-191	
C25	UCC-192	
C25	UCC-193	
C25	UCC-194	
C25	UCC-195	
C25	UCC-196	
C25	UCC-197	
C25	UCC-198	
C25	UCC-199	
C25	UCC-200	

SPECIALIZED G-E REPLACEMENT PARTS

RAA-002	ARM—Switch Arm
RAB-003	ARM—Tone Control Switch Arm
RAD-003	BRACKET—Top Bracket Support for Back Plate
RAD-004	BRACKET—Bottom Bracket Support for Back Plate
RAX-002	ASSEMBLY—Idle Pulley Assembly
RAX-003	BRACKET ASSEMBLY—Dial Drum Support
RBH-001	ASSEMBLY—Phono-motor Assembly
RBK-004	ARMATURE—Motor Armature
REX-001	ASSEMBLY—Phono-motor, Drive Wheel, and Mounting Plate Assembly
RCC-013	CAPACITOR—0.005 mfd., 200 v., paper
RCC-039	CAPACITOR—0.005 mfd., 500 v., paper
RCC-040	CAPACITOR—01 mfd., 600 v., paper
RCC-045	CAPACITOR—05 mfd., 600 v., paper
RCE-001	CAPACITOR—50 mfd., 150 v., 50 mfd., 150 v., 40 mfd., 25 v., dry electrolytic
RCT-002	CAPACITOR—Tuning Capacitor
RCT-110	CAPACITOR—47 mmt., 500 v., mica
RCU-112	CAPACITOR—100 mmt., 500 v., mica
RCU-113	CAPACITOR—300 mmt., 500 v., mica
RCU-115	CAPACITOR—3 mmt., 500 v., mica
RCC-005	CAPACITOR—7-20 mmt. trimmer
RDD-002	CORD—Dial Drive Cord and Spring Drum
RDD-003	CORD—Dial Drive Drum
RDE-002	ESCUTCHEON—Dial Scale Escutcheon

Part No. RJX-005 should be changed to read RJX-007. Delete Part No. ROP-006. Add Part No. UOX-001, CONE-Replacement speaker cone.

POWER OUTPUT

Undistorted.....	1.25 watts
Maximum.....	2.0 watts

LOUDSPEAKER

Type.....	Alnico P.M.
Outside Cone Diameter.....	6 1/2 in.
Voice Coil Impedance (400 cycles).....	3.5 ohms

PHONOGRAPH MECHANISM

Type.....	Manual
Pick-up.....	Crystal
Needle.....	Permanent Type
Turntable Speed.....	78 rpm

Fig. 2. Dial Stringing Diagram

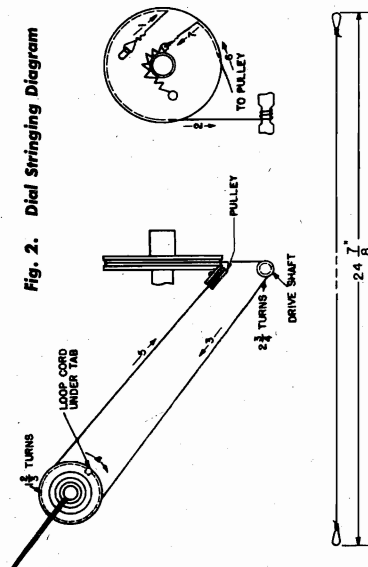


Fig. 1. Tube and Trimmer Location

ELECTRICAL CIRCUIT ALIGNMENT

EQUIPMENT REQUIRED

1. Test oscillator with audio tone modulation
2. A-c output meter, 1½ volts, full scale
3. 0.05 mf paper capacitor
4. 50 mmf mica capacitor
5. Insulated screwdriver

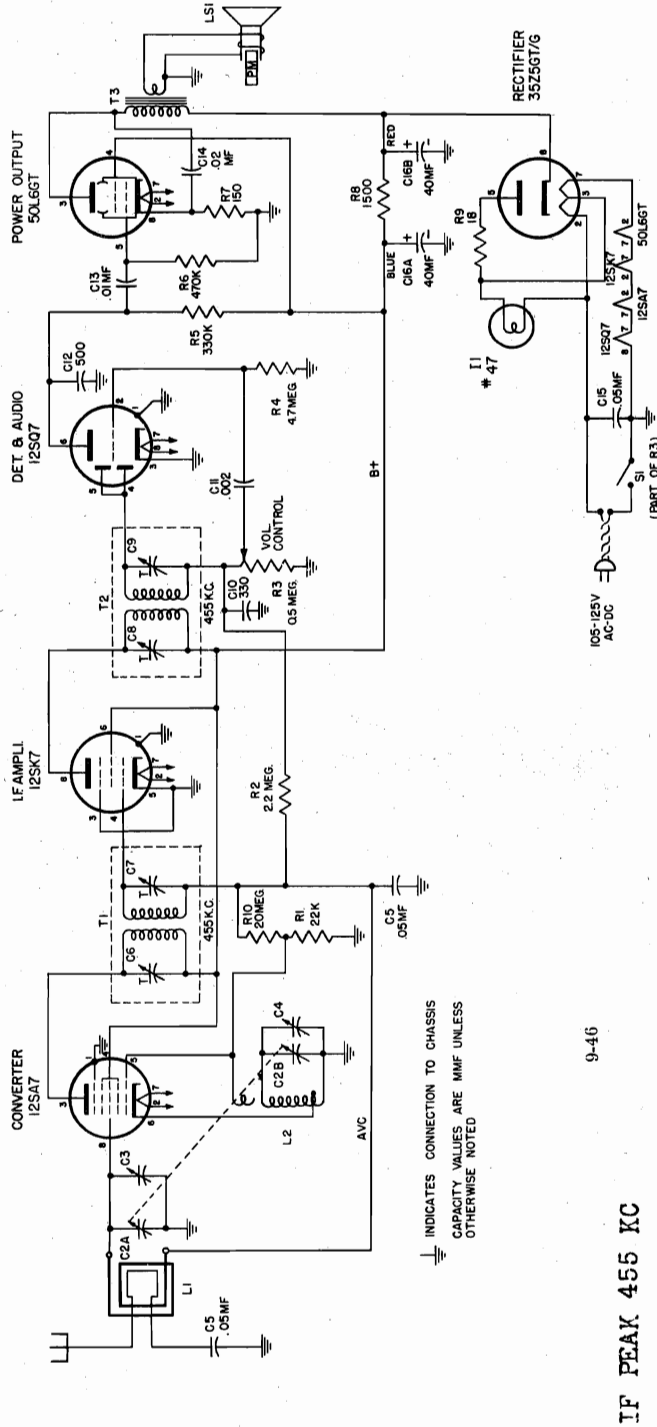
PROCEDURE—GENERAL 1. Turn dial scale pointer as far counterclockwise as possible. The pointer should coincide with the first marking at the left of the scale. If it doesn't, remove chassis and slip pointer on drum until pointer is under reference mark when chassis is bolted in place.

2. For i-f and r-f alignments, the output meter is connected across the loudspeaker voice coil terminals.
3. Keep radio volume control at maximum and attenuate test oscillator signal output so that the output meter reading never exceeds 1 1/4 volts.
4. The chassis must be removed from the cabinet during r-f alignment. For r-f alignment, bolt the chassis in the cabinet securely. The r-f trimmer is then available through the hole in the Beam-a-Scope assembly (back cover). The Osc. Trimmer can be reached when the back cover is tilted back.
5. Connect the capacitor as listed in column 2 between the output "High Side" of test oscillator and the point of input specified.

ALIGNMENT CHART

Step	Connect test oscillator to	Test osc. setting	Pointer setting on radio	Adjustment for maximum output
1	12SG7 grid in series with 0.05 mf. cap.	455 kc	1500 kc	2nd I-F Trans. Trimmers
2	12SA7 grid in series with 0.05 mf. cap.	455 kc	1500 kc	1st and 2nd I-F Trans. Trimmers
3	Ant. Post in series with 50 mmf.	1500 kc	1500 kc	C3 (Osc.)
4	Ant. Post in series with 50 mmf	1500 kc	1500 kc	C2 (R-F)

GENERAL ELECTRIC CO.



REPLACEMENT PARTS LIST

CAT. NO.	SYMBOL	DESCRIPTION
UNIVERSAL REPLACEMENT PARTS		
UCC-019	C1, 11	CAPACITOR—0.002 mfd., 400 v., paper
UCC-025	C13	CAPACITOR—0.01 mfd., 400 v., paper
UCC-026	C14	CAPACITOR—0.02 mfd., 400 v., paper
UCC-028	C5, 15	CAPACITOR—0.05 mfd., 400 v., paper
UCU-1040	C10	CAPACITOR—330 mmf., mica
UCU-2045	C12	CAPACITOR—510 mmf., mica
UOP-407	LS1	LOUDSPEAKER—4-in. P.M. speaker
VOX-009	R7	RESISTOR—150 ohms, 1/2 w., carbon
URD-029	R1	RESISTOR—22,000 ohms, 1/2 w., carbon
URD-081	R5	RESISTOR—330,000 ohms, 1/2 w., carbon
URD-109	R2	RESISTOR—2.2 meg., 1/2 w., carbon
URD-129	R4	RESISTOR—4.7 meg., 1/2 w., carbon
URD-137	R10	RESISTOR—20 meg., 1 w., carbon
URD-153	R9	RESISTOR—18 ohms, 1 w., carbon
URE-007	R8	RESISTOR—1500 ohms, 2 w., carbon
URF-053		
SPECIALIZED REPLACEMENT PARTS		
RAB-043	L1	BEAM-A-SCOPE—Back cover and beam-a-scope assembly
RAU-014		CABINET—Walnut cabinet (Model 110)
SPECIALIZED REPLACEMENT PARTS (CONT'D)		
RAU-015	C16a, b	CABINET—Ivory cabinet (Model 111)
RCE-040		CAPACITOR—40 mfd., 40 mfd., 150 v., electrolytic
RCT-017	C2a, 2b	CONDENSER—Variable tuning condenser
RDC-022		CORD—Drive cord and spring
RDK-015		KNOB—Control knob (ivory)
RDK-077		KNOB—Control knob (walnut)
RDP-024		POINTER—Dial pointer
RDS-035		SCALE—Dial scale assembly
RDX-002		WINDOW—Celluloid dial window hardware
RHX-005		HARDWARE—Tuning condenser mounting hardware
RIF-002		CLIP—Beam-a-scope and back cover clip
RJS-006		SOCKET—Octal base socket
RJS-061		SOCKET—Pilot lamp socket assembly
RLC-031	L2	COIL—Oscillator coil
RMS-054		SPRING—Drive cord spring
RMX-054		SHAFT—Drive shaft assembly
RRC-037	R3, S1	VOLUME CONTROL—0.5 meg. potentiometer and switch
RTL-035	T1	TRANSFORMER—1st IF transformer
RTL-036	T2	TRANSFORMER—2nd IF transformer
RTO-023	T3	TRANSFORMER—Output transformer
RWL-004		CORD—Power cord assembly

MODELS 110,111

GENERAL ELECTRIC CO.

ELECTRICAL RATING:

Voltage.....105-125 v. a-c or d-c
 Frequency on a-c.....50/60 cycles
 Wattage.....30 watts

OPERATING FREQUENCIES:

Broadcast Band.....540-1600 kc
 I-F Amplifier.....455 kc

POWER OUTPUT (120 VOLTS LINE):

Undistorted.....0.8 watts
 Maximum.....1.6 watts

LOUDSPEAKER:

Type.....Alnico P.M.
 Outside Cone Diameter.....4 inches
 Voice Coil Impedance (400 cycles).....3.5 ohms

TUBE COMPLEMENT:

Oscillator-Converter.....Type 12SA7
 I-F Amplifier.....Type 12SK7
 Detector-Audio.....Type 12SQ7
 Power Output.....Type 50L6GT
 Rectifier.....Type 35Z5GT/G
 Pilot Lamp.....GE No. 47

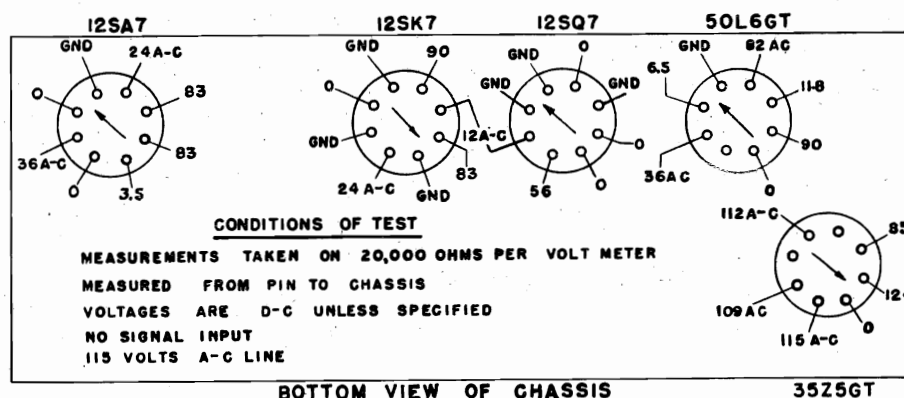
ELECTRICAL CIRCUIT ALIGNMENT**ALIGNMENT FREQUENCIES:**

R-F.....1500 kilocycles
 I-F.....455 kilocycles

EQUIPMENT REQUIRED:

1. Line isolation transformer.
2. A-c output meter, 1 1/2 volts full scale.
3. Test oscillator with tone modulation.
4. 0.05 mf. paper capacitor.
5. 50 mmf. mica capacitor.
6. Insulated screwdriver.

PROCEDURE—GENERAL. 1. Remove chassis from cabinet. Turn pointer as far counterclockwise as possible. The pointer should set horizontal. If it doesn't, remove the dial window and slip the pointer on its shaft until it is horizontal.



BOTTOM VIEW OF CHASSIS

Fig. 1. Socket Voltages

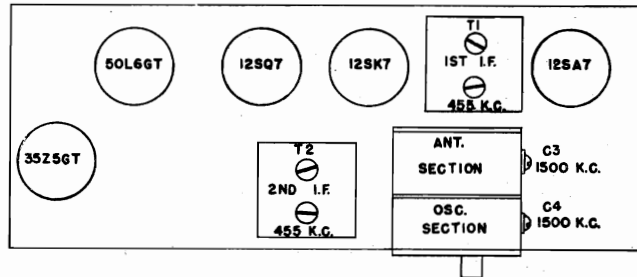


Fig. 2. Tube and Trimmer Location

2. Connect the line cord to the line through an isolation 1:1 ratio transformer.
3. Connect output meter across loudspeaker voice coil terminals.
4. Keep radio volume control at maximum and attenuate the test oscillator signal output so that the output meter reading never exceeds 1 volt.
5. For R-F alignment, the Beam-a-scope assembly should be connected and dressed in exactly the same location it would occupy if installed in the cabinet.
6. Connect the capacitor as listed in column 2, between the output "high side" of the test oscillator and the point of input specified.

ALIGNMENT CHART

Step	Connect Test Oscillator to	Test Oscillator Setting	Pointer Setting on Radio	Adjustment for Maximum Output
1	12SG7 grid in series with 0.05 mf. cap.	455 kc	1500 kc	2nd I-F trans. trimmers
2	12SA7 grid in series with 0.05 mf. cap.	455 kc	1500 kc	1st and 2nd I-F trans. trimmers
3	Ant. post in series with 50 mmf.	1500 kc	1500 kc	C4 (osc.)
4	Ant. post in series with 50 mmf.	1500 kc	1500 kc	C3 (R-F)

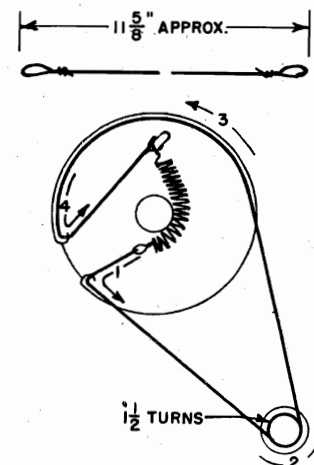
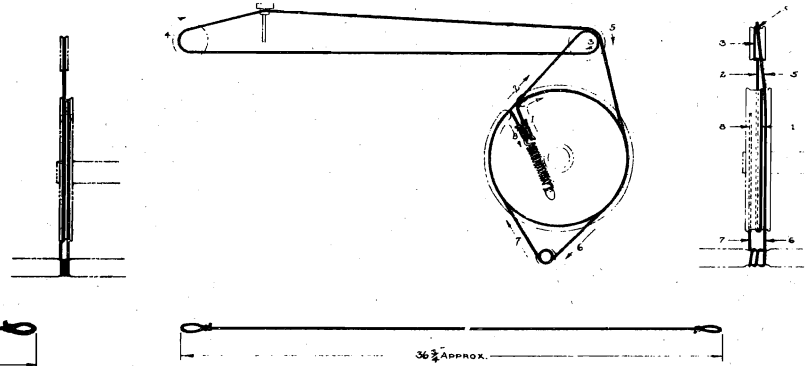
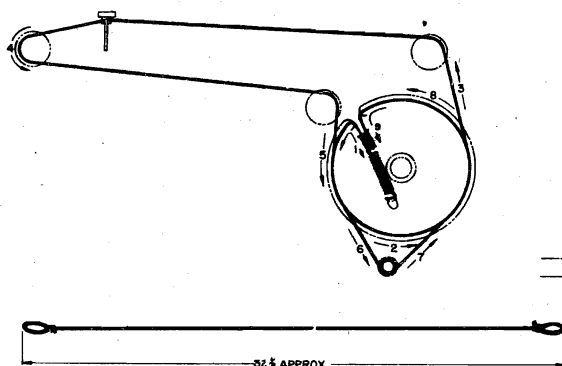
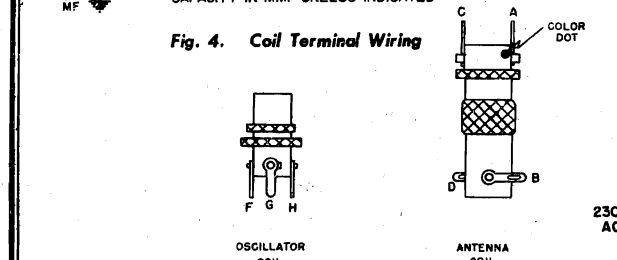
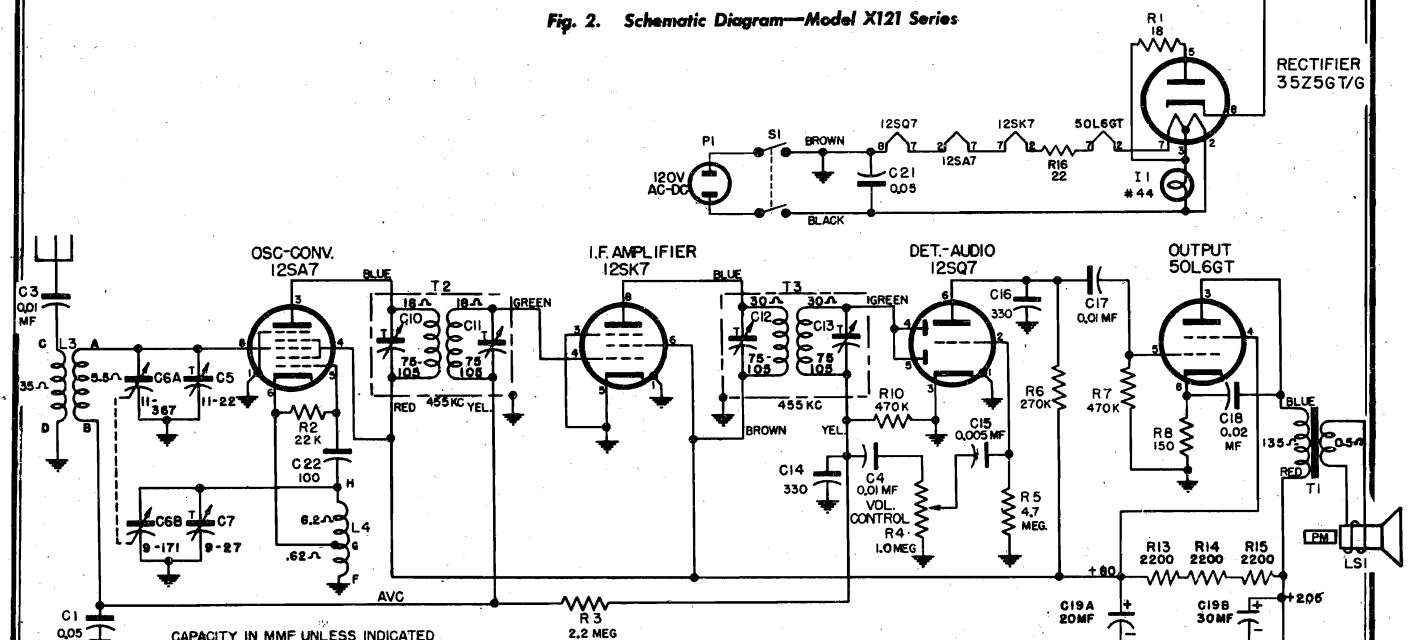
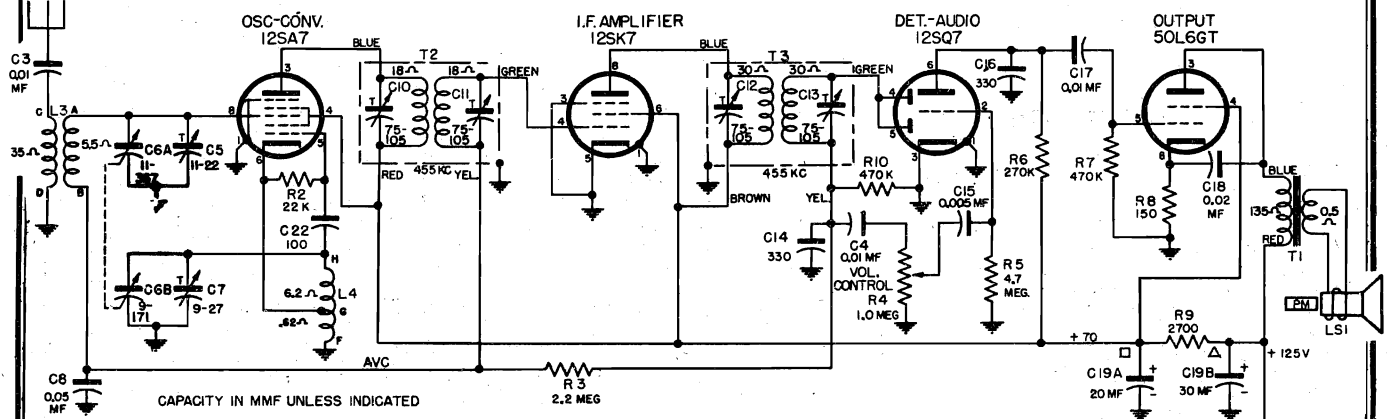


Fig. 3. Drive Stringing

GENERAL ELECTRIC CO.

MODELS XB-121, XM-121,
XR-121, XB-221, XM-221,
XR-221



MODELS XB-121, XM-121,
XR-121, XB-221, XM-221,
XR-221

GENERAL ELECTRIC CO.

SPECIFICATIONS

CABINET:

Model	Material	Color	Height	Width	Depth
XB121	Wood	Walnut	6 $\frac{3}{4}$	10 $\frac{3}{8}$	6 $\frac{3}{4}$
XM121	Plastic	Mahogany	6	9 $\frac{1}{4}$	5 $\frac{7}{16}$
XR121	Plastic	Maroon	6	9 $\frac{1}{4}$	5 $\frac{7}{16}$
XB221	Wood	Walnut	6 $\frac{3}{4}$	10 $\frac{3}{8}$	6 $\frac{3}{4}$
XM221	Plastic	Mahogany	6	9 $\frac{1}{4}$	5 $\frac{7}{16}$
XR221	Plastic	Maroon	6	9 $\frac{1}{4}$	5 $\frac{7}{16}$

ELECTRICAL RATING (INPUT):

D1 Voltage Rating (X121 series).....105-135 v. a-c or d-c
D2 Voltage Rating (X221 series).....210-250 v. a-c or d-c
Frequency on a-c.....40-60 cycles
Watts (X121 series).....30 watts
Watts (X221 series).....60 watts

OPERATING FREQUENCIES:

Broadcast Band.....550-1700 kc
I-F Amplifier.....455 kc

POWER OUTPUT:

(X121 Series—At 120 Volts Line)
Undistorted.....0.9 watts
Maximum.....1.4 watts
(X221 Series—At 230 Volts Line)
Undistorted.....1.6 watts
Maximum.....2.5 watts

LOUDSPEAKER:

Type.....Alnico P.M.
Outside Cone Diameter.....4 inches
Voice Coil Impedance (400 cycles).....3.5 ohms

TUBE COMPLEMENT:

Oscillator-Converter.....Type 12SA7
I-F Amplifier.....Type 12SK7
Detector-Audio Amplifier.....Type 12SQ7
Power Output.....Type 50L6GT
Rectifier.....Type 35Z5GT/G
Pilot Lamp.....GE No. 44, 6-8 volt

ELECTRICAL CIRCUIT ALIGNMENT

CAUTION—ONE SIDE OF THE POWER LINE IS CONNECTED TO THE CHASSIS. AVOID ANY GROUND CONNECTIONS TO THE RADIO UNLESS AN ISOLATING TRANSFORMER IS USED IN THE POWER LINE.

ALIGNMENT FREQUENCIES:

R-F.....1500 kc
I-F.....455 kc

EQUIPMENT REQUIRED:

1. Test oscillator with audio tone modulation.
2. A-C output meter, 1 $\frac{1}{2}$ volts full scale.
3. 0.05 mf. paper capacitor.
4. 200 mmf. mica capacitor.
5. Insulated screwdriver.

PROCEDURE—GENERAL: 1. Turn the tuning knob to its extreme counterclockwise position. If the pointer does not coincide with the first marking at the left of the scale, slide it along the dial cord until it does.

2. Remove chassis from cabinet and connect output meter across speaker voice coil terminals. **NOTE:** For Models XB121 and XB221, use alignment strip in back of dial plate for pointer setting.

3. Keep radio volume control set at maximum and attenu-

ate test oscillator signal output so that the output meter reading never exceeds 1 $\frac{1}{4}$ volts.

4. Connect the capacitor, listed in column 2 of Alignment Chart, between the "high side" of the test oscillator and the point of input specified. The ground terminal of the test oscillator may be connected to the chassis, providing an isolating transformer is used between the radio and the line input.

ALIGNMENT CHART

Step	Connect test oscillator to	Test oscillator setting	Pointer setting on radio	Adjustment for maximum output
1.	12SK7 grid (pin 4) in series with 0.05 mf.	455 kc	1500 kc	C12 and C13 (2nd i-f trans. trimmers)
2.	12SA7 grid (pin 8) in series with 0.05 mf.	455 kc	1500 kc	C10 and C11 (1st i-f trans. trimmers)
3.	Ant. post in series with 200 mmf.	1500 kc	1500 kc	C7 (osc.) on gang condens. er.
4.	Ant. post in series with 200 mmf.	1500 kc	1500 kc	C5 (ant.) on gang condens. er.

STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements by vacuum tube voltmeter or similar measuring devices may be used to check circuit performance and isolate trouble. The gain values listed may have tolerances of 20%. Readings taken with low signal input so that AVC is not effective.

(1) R-F Stage Gains.

Antenna Post to 12SA7 Grid.....4.0 @ 1000 kc
12SA7 Grid to 12SK7 Grid......55 @ 455 kc
12SA7 Grid to 12SK7 Grid......45 @ 1000 kc
12SK7 Grid to 12SQ7 Diode Plate.....50 @ 455 kc

(2) Audio Gain.

0.12 volts at 400 cycles across volume control (R4) with control set at maximum will give approximately $\frac{1}{2}$ -watt output across the speaker voice coil

(3) Oscillator Grid Bias.

D-C voltage developed across the oscillator grid leak (R3) averages 6.0 volts at 1000 kc.

(4) Socket Pin Voltages.

Figures 7 and 8 show voltages from all tube pins to B—unless otherwise specified. Voltage readings much lower than those specified may help localize defective components or tubes.

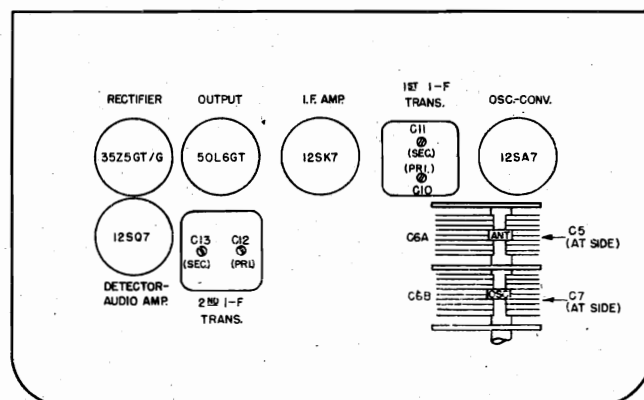
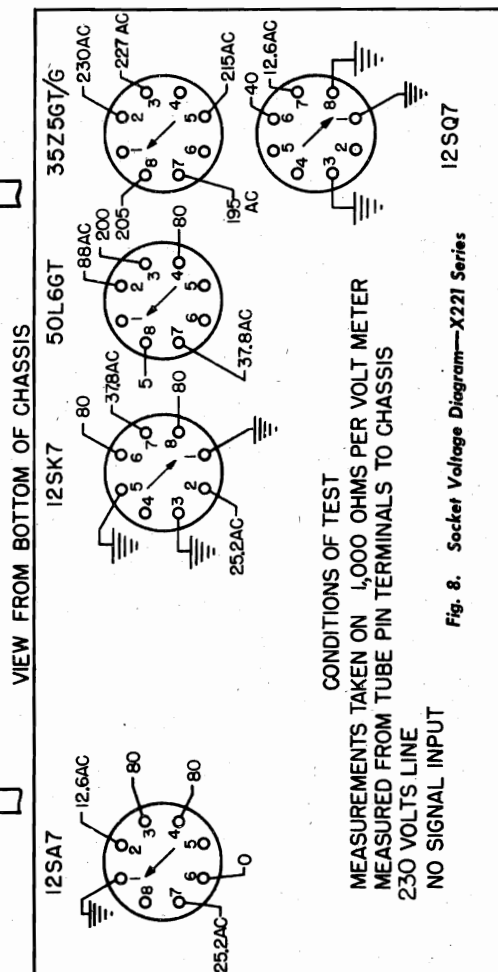


Fig. 1. Tube and Trimmer Location

SPECIALIZED G-E REPLACEMENT PARTS

RAB-008	BACK—Cabinet back (XB121)	
RAB-009	BACK—Cabinet back (XB221)	
RAB-010	BACK—Cabinet back (Plastic X121 series)	
RAB-011	BACK—Cabinet back (Plastic X221 series)	
RAB-009	BRACKET—Scale mounting bracket	
RAU-006	CABINET—Mahogany plastic (XM121, XM221)	
RAU-008	CABINET—Maroon plastic (XR121, XR221)	
RAU-003	CABINET—Wood (XB121, XB221)	
RRC-040	CAPACITOR—0.01 mfd., 600 v., paper	C3, 4, 17
RRC-041	CAPACITOR—0.02 mfd., 600 v., paper	C18
RRC-045	CAPACITOR—0.05 mfd., 600 v., paper	C1, 21
RCE-004	CAPACITOR—20 mfd., 30 mfd., dry electrolytic	C19a, b
RCT-006	CONDENSER—Variable tuning condenser	
RDC-005	ASSEMBLY—Drive cord assembly (32 1/2"—early production)	C6a, b
RDC-012	ASSEMBLY—Drive cord assembly (36 3/4"—late production)	
RDF-005	WASHER—Felt knob washer	
RDK-012	KNOB—Control knob (Tomato Red)	
RDK-013	KNOB—Control knob (Oak)	
RDK-014	KNOB—Control knob (Mahogany)	
RDK-016	KNOB—Control knob (Grey)	
RDP-006	POINTER—Dial scale pointer	
RDS-007	SCALE—Dial scale assembly (XR121, XR221)	
RDS-007	SCALE—Dial scale (XB121, XB221)	
RDS-009	SCALE—Dial scale (XM121, XM221)	
RDW-001	WINDOW—Dial scale window (plastic cabinets)	
RDX-010	ASSEMBLY—Scale back plate assembly (XB121, XB221)	
RHH-001	FASTENER—Snap fastener (wood cabinets)	
RHH-003	FASTENER—Snap fastener (plastic cabinets)	
RJS-013	SOCKET—Octal tube socket	
RJS-016	SOCKET—Pilot lamp socket	
RLA-001	SOCKET—Antenna coil	L3
RLC-006	COIL—Oscillator coil	L4
RMS-004	SPRING—Drive cord spring	
RMU-005	SHAFT—Drive shaft and cotter	
RMW-003	PULLEY—Drive cord pulley	
RMW-006	VOLUME CONTROL—1.0 megohm control and switch	R4, S1
RRL-001	CORD—Power cord, includes R12 (X221 series)	R12
RRW-001	RESISTOR—250 ohms, 10 w., wirewound	R11
RRW-003	RESISTOR—220 ohms, 1 w., wirewound	R16
RTL-007	TRANSFORMER—1st i-f transformer	T2
RTL-008	TRANSFORMER—2nd i-f transformer	T3
RTU-005	TRANSFORMER—Output transformer	T1
RWL-009	CORD—Power Cord	



Note that Part No. UCC-045 and RCC-045 appear to be the same condenser; however, the RCC-type is made with a higher melting point wax and is used in sections of the receiver where more heat is dissipated. The condensers are identical in size, but the RCC type is marked in red instead of black.

MODELS X-150, X-150C,
X-150V

GENERAL ELECTRIC CO.

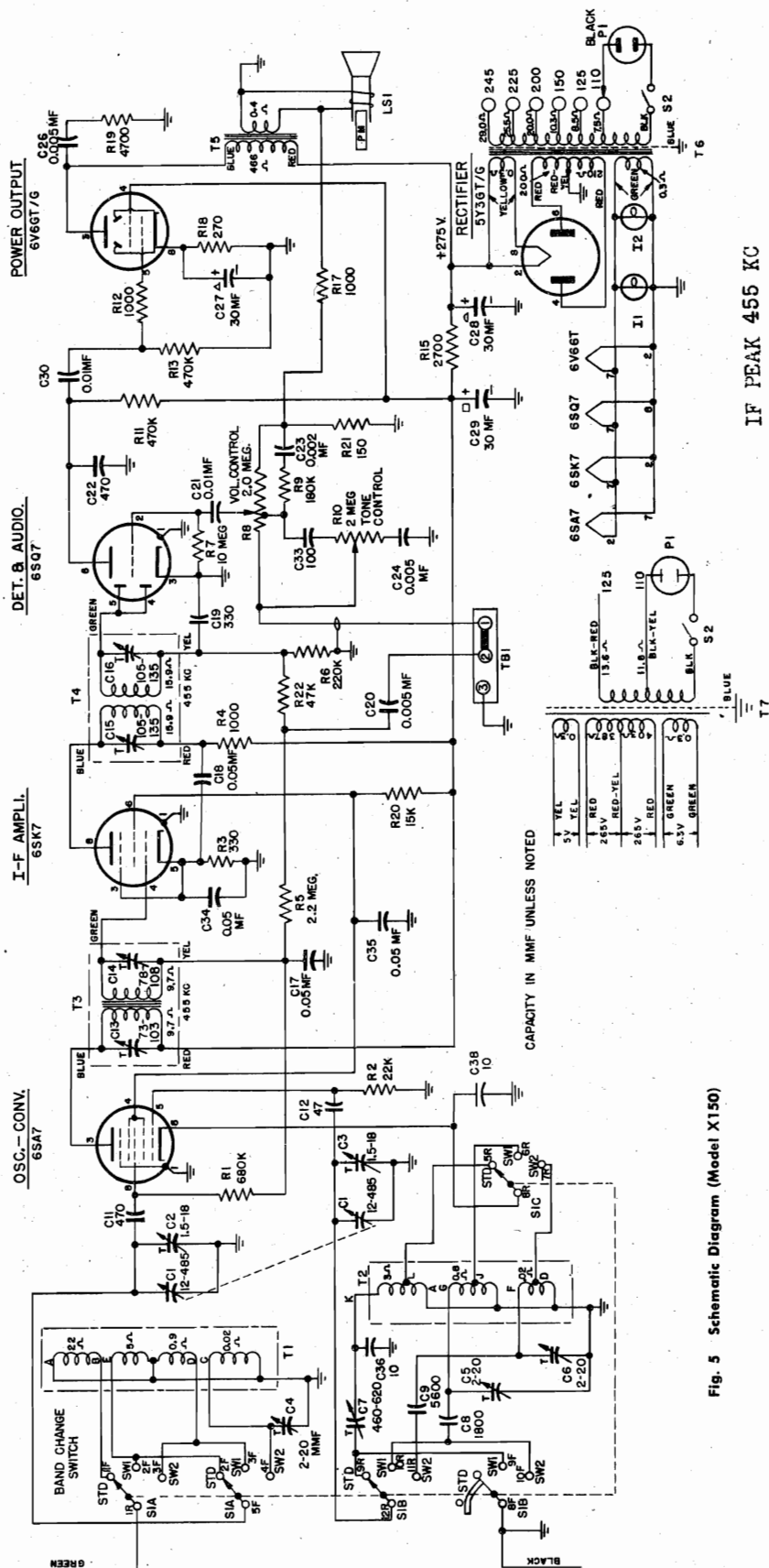


Fig. 5 Schematic Diagram (Model X150)

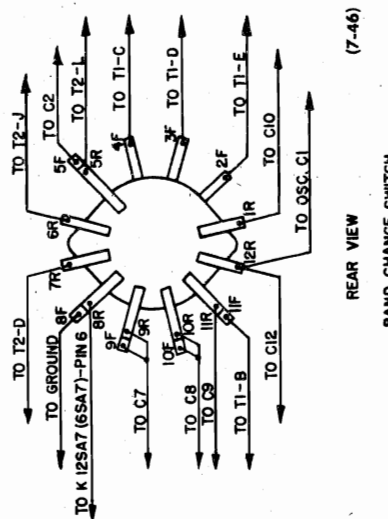


Fig. 7 Switch Terminal Wiring

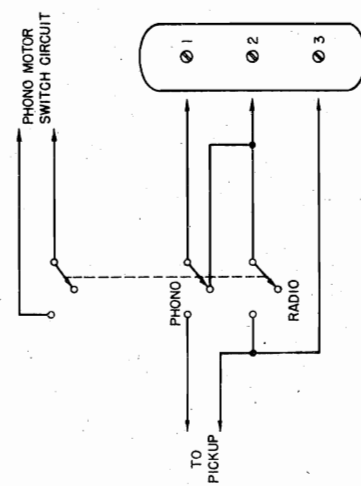


Fig. 4 Phone Connection

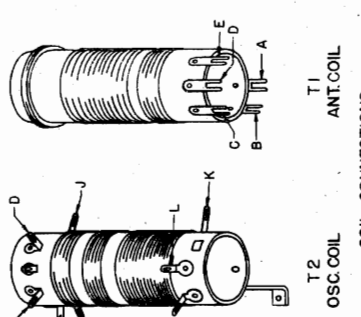
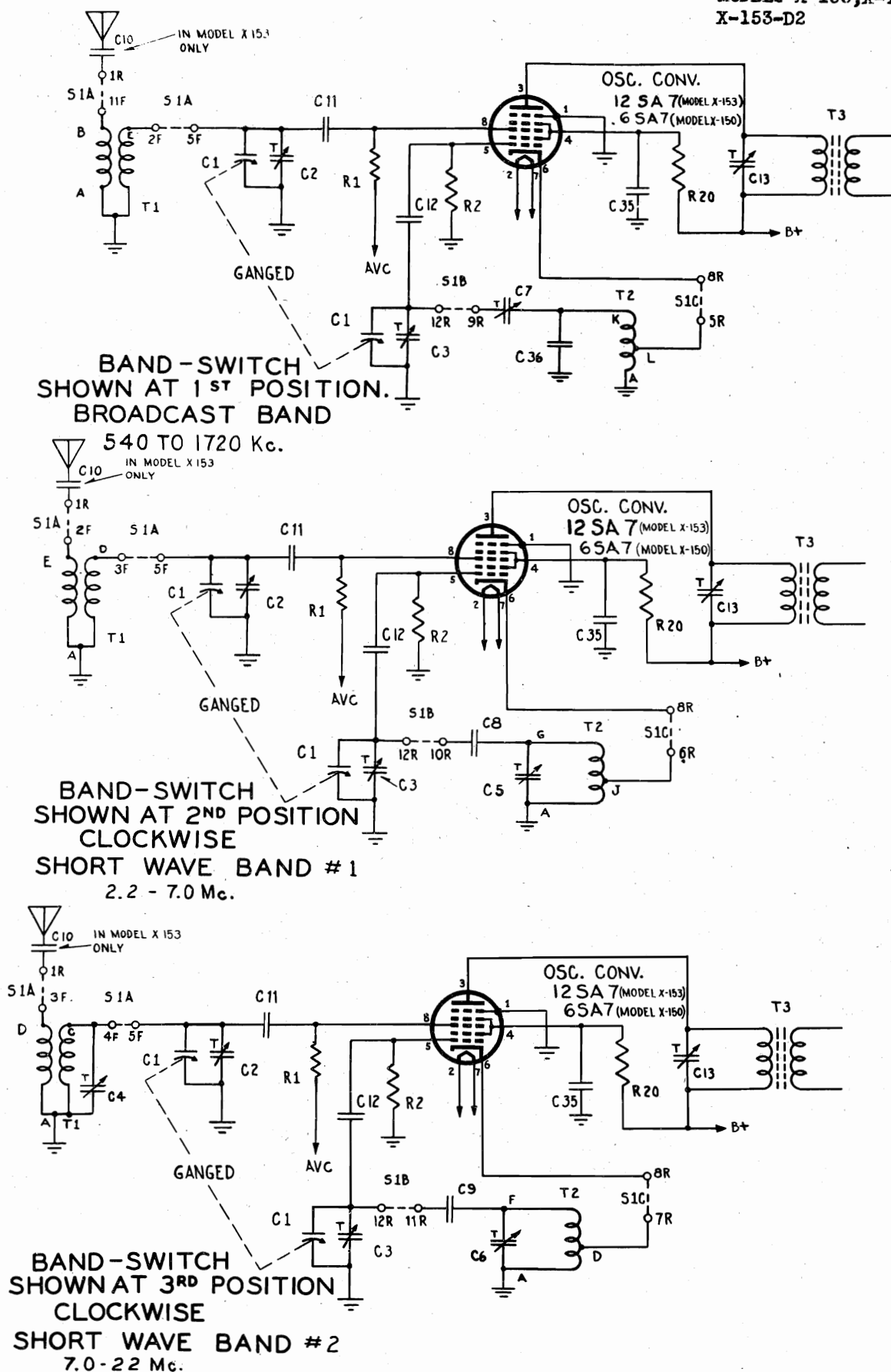


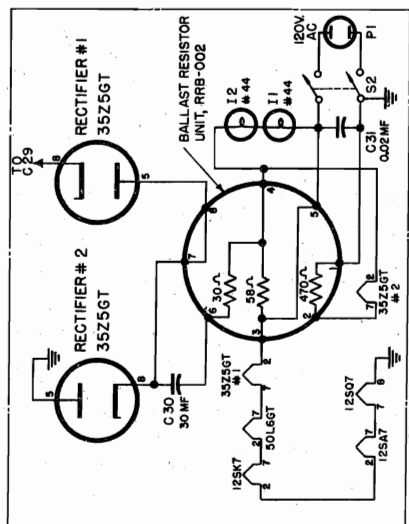
Fig. 6 Coil Terminal Wiring

GENERAL ELECTRIC CO.

MODELS X-150, X-150C,
X-150V
MODELS X-153, X-153-A1,
X-153-D2



Standard Wave.....	540-1720 kc
Short Wave—1.....	2.2-7.0 mc
Short Wave—2.....	7.0-22 mc
I-F Amplifier.....	.455 kc



POWER OUTPUT	
Undistorted.....	2.5 watts
Maximum.....	4.3 watts

LOUDSPEAKER:

Type	Alnico PM
Outside Cone Diameter	5¼ inches
Voice Coil Impedance (400 cycles)	3.5 ohms

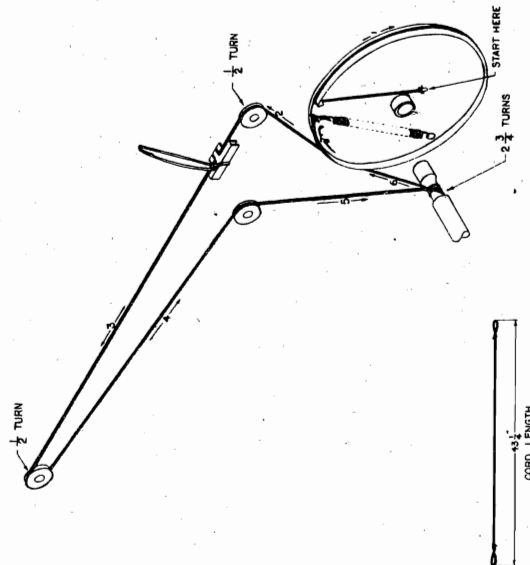


Fig. 3 Drive Stringing

GENERAL ELECTRIC CO.

MODELS X-150, X-150C,
X-150V
MODELS X-153, X-153-A1,
X-153-D2

ELECTRICAL CIRCUIT ALIGNMENT

ALIGNMENT FREQUENCIES:

R-F (Standard Wave)	580 and 1500 kc
R-F (Short Wave 1)	6 mc
R-F (Short Wave 2)	18 mc
I-F	455 kc

EQUIPMENT REQUIRED:

1. Test oscillator with audio tone modulation.
2. A-C output meter, $1\frac{1}{2}$ volts full-scale.
3. 0.05 mf. paper capacitor.
4. 200 mmf mica capacitor.
5. Insulated screwdriver.

PROCEDURE—GENERAL:

1. The alignment procedure shown in table form should be followed with the chassis removed from the cabinet. Since the dial scale is not a part of the main chassis, it is necessary to use the special alignment scale fastened to the rear of the scale back plate assembly. With the gang condenser fully closed, set the left edge of the pointer to zero on the alignment scale. Then 147 on the alignment scale will correspond to 1500 kc (Standard Wave), approximately 149 to 6 mc (SW 1 band), and 141 to 18 mc (SW 2 band).
2. Connect output meter across speaker voice coil terminals. During alignment keep volume control set at maximum and attenuate test oscillator signal output so that the output meter reading never exceeds $1\frac{1}{4}$ volts.
3. Connect the capacitor listed in the chart between the "high side" of the test oscillator and the point of input specified. For Model X153, the ground terminal of the test-oscillator may be connected to the chassis, providing an isolating transformer is used between the radio and the line input.
4. After the chassis has been aligned and replaced into the cabinet, it may be necessary to reset the pointer. It should point to zero on the logging scale when the gang condenser is fully closed (pointer at extreme left of scale).

ALIGNMENT CHART

Step	Test-osc. Connection to	Test-osc. Setting	Pointer Setting	Adjust Trimmers for Max. Output
1	12SK7 or 6SK7 IF grid in series with .05 mfd.	455 kc	"STD" Band 550 kc	C15 and C16 (2nd IF trans. capacitors)
2	12SA7 or 6SA7 Conv. grid in series with .05 mfd.	455 kc	"STD" Band 550 kc	C13 and C14 (1st IF trans. capacitors)
3**	Ant. post in series with 200 mmf.	1500 kc	"STD" Band 1500 kc	C3 (osc.); C2 (ant.)
4	Ant. post in series with 200 mmf.	580 kc	"STD" Band 580 kc	C7**
5	Repeat Step No. 3			
6	Ant. post in series with 200 mmf.	6.0 mc	"SW1" Band 6.0 mc	C5 (osc.)**
7	Ant. post in series with 200 mmf.	18.0 mc	"SW2" Band 18 mc	C6 (osc.)* C4 (ant.)**

* Use minimum capacity peak.

** Rock gang condenser for optimum peak.

*** Note: C2 trimmer is not incorporated on some receivers. This requires that C3 be aligned while rocking the gang condenser.

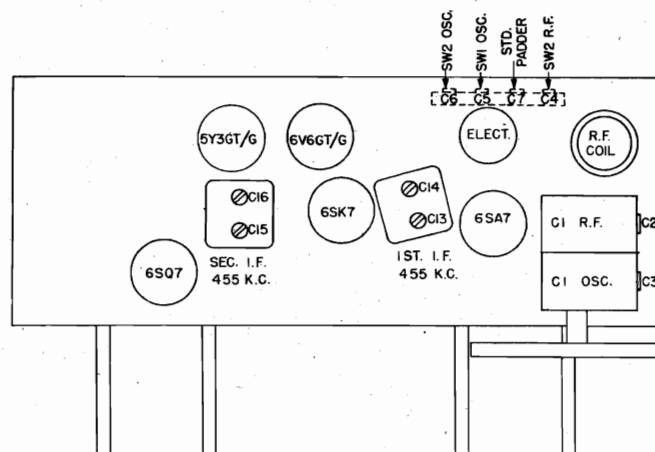


Fig. 1 Tube and Trimmer location (Model X150)

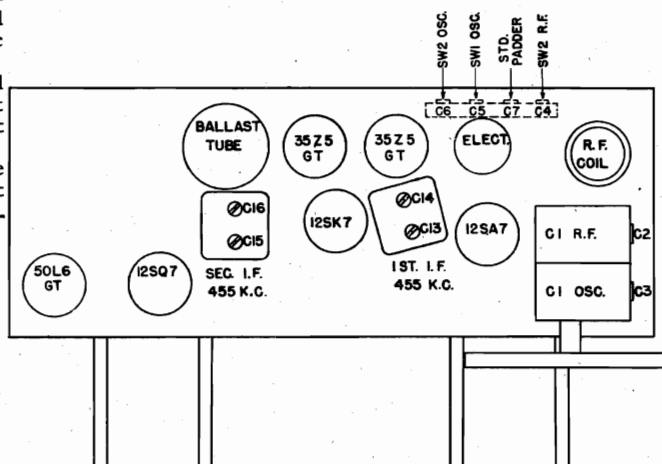


Fig. 2 Tube and Trimmer location (Model X153)

STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements by vacuum tube voltmeter or similar measuring devices may be used to check circuit performance and isolate trouble. The gain values listed may have tolerances of 20%. Readings taken with low signal input so that AVC is not effective.

(1) R-F Stage Gains.

Antenna Post to 12SA7 Grid	5.5 @ 1000 kc
Antenna Post to 12SA7 Grid	3.3 @ 4000 kc
Antenna Post to 12SA7 Grid	2.0 @ 12000 kc
12SA7 Converter Grid to 12SK7 Grid	.65 @ 1000 kc
12SA7 Converter Grid to 12SK7 Grid	.81 @ 455 kc
12SK7 Grid to 12SQ7 Diode Plate	.62 @ 455 kc

(2) Audio Gain.

0.06 volts for Model X150, or 0.03 volts for Model X153, at 400 cycles across volume control (R10) with control set at maximum will give approximately $\frac{1}{2}$ -watt output across the speaker voice coil.

(3) Oscillator Grid Bias.

D-C voltage developed across the oscillator grid leak (R2) averages 7.3 volts at 1000 kc, 9.9 volts at 4000 kc, and 6.8 volts at 12,000 kc.

(4) Socket Pin Voltages.

Figures 9, 10 and 11 show voltages from all tube pins to B—unless otherwise specified. Voltage readings much lower than those specified may help localize defective components or tubes.

MODELS X-150,X-150C,
X-150V

GENERAL ELECTRIC CO.

MODELS X-153,X-153-A1,
X-153-D?

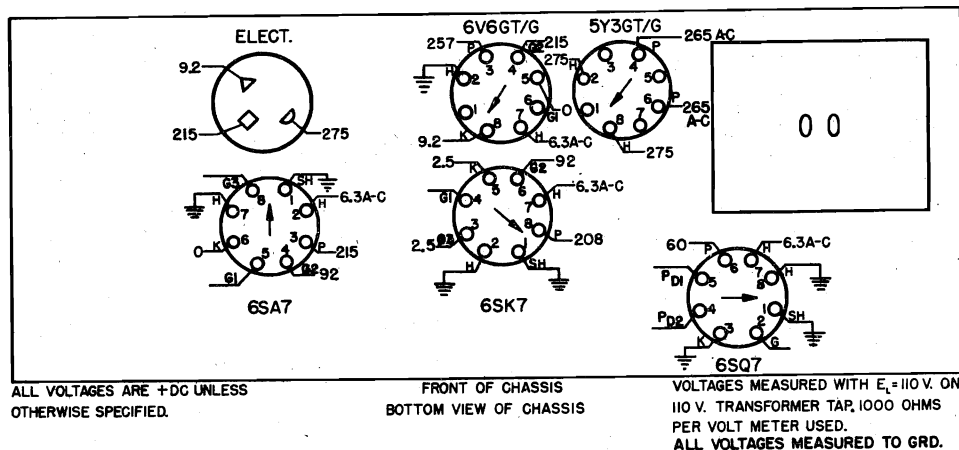


Fig. 9 Socket Voltages (Model X150)

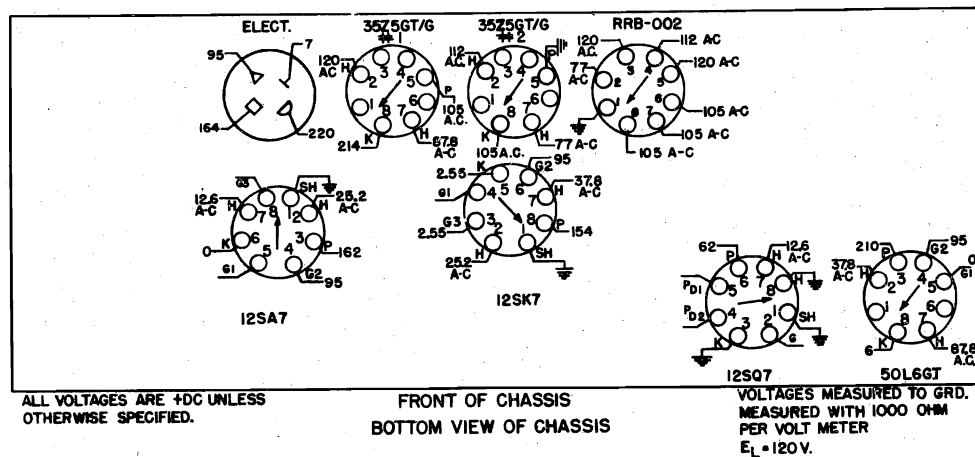


Fig. 10 Socket Voltages (Model X153 A1)

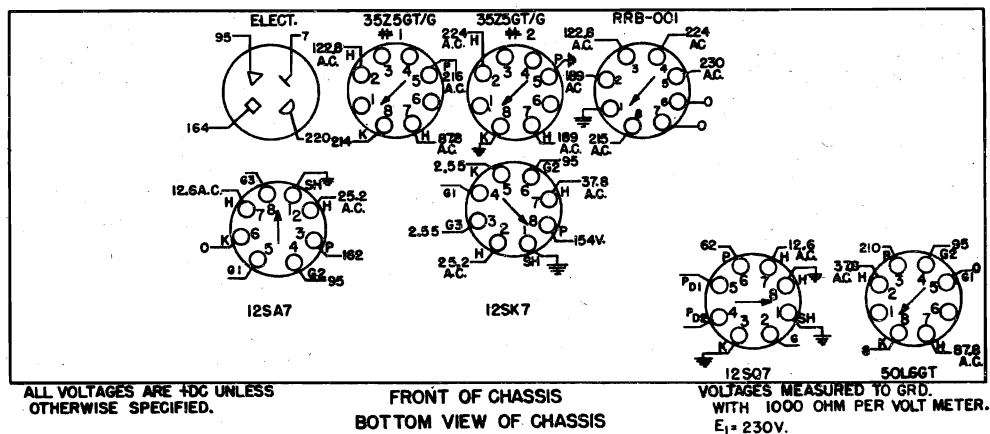


Fig. 11 Socket Voltages (Model X153 D2)

GENERAL ELECTRIC CO.

MODELS X-150, X-150C,
X-150V
MODELS X-153, X-153-A1,
X-153-D2

ELECTRICAL RATING

Model	Rating	Power Supply			Power Consumption
		Nominal Voltage	Voltage Range	Frequency Cycles A-c	
X150	V	110	103-117	50-60	55
		125	117-133		
		150	140-160		
		200	185-213		
		225	213-234		
		245	234-260		
X150	C	110	103-117	25-60	55
		125	117-133		
X153	D2	230 Ac-Dc	210-250	40-60	60
X153	A1	120 Ac	105-130	40-60	60

CAUTION:

On the Model X153, one side of the power line is connected to the chassis. Use extreme caution when servicing this receiver unless an isolating transformer is used in the power line. Do not place a ground on the chassis unless an isolating transformer is used.

GENERAL INFORMATION

Power Supply Conversion—Model X150:

The Model X150 "V" rating receiver is equipped with a universal power transformer which permits practically instantaneous conversion for operation on any one of the six voltage ranges shown on the label. Merely loosen the set screw on the control at the top of the power transformer and turn the knob until the correct nominal voltage rating appears in the window. Tighten the set screw.

The Model X150 "C" rating makes use of a tapped transformer. To change voltage rating reconnect transformer primary to proper input color coded leads as shown on schematic.

Power Supply Conversion—Model X153:

The X153 Models with "D2" and "A1" ratings are identical except for the ballast tube that is used. The substitution of the appropriate ballast tube takes care of all the wiring changes necessary to convert from one line voltage range to the other. The "A1" rating may be converted for operation on a line of 230 volts a-c or d-c by removing the ballast resistor unit, Part No. RRB-002, and substituting the ballast resistance unit, Part No. RRB-001, in the same socket. When this is done the label should be changed so that it reads "D2" rating. The "D2" rating may be changed to "A1" rating in like manner—by substitution of Part No. RRB-002 ballast resistor for Part No. RRB-001.

Phonograph or FM Sound Connection:

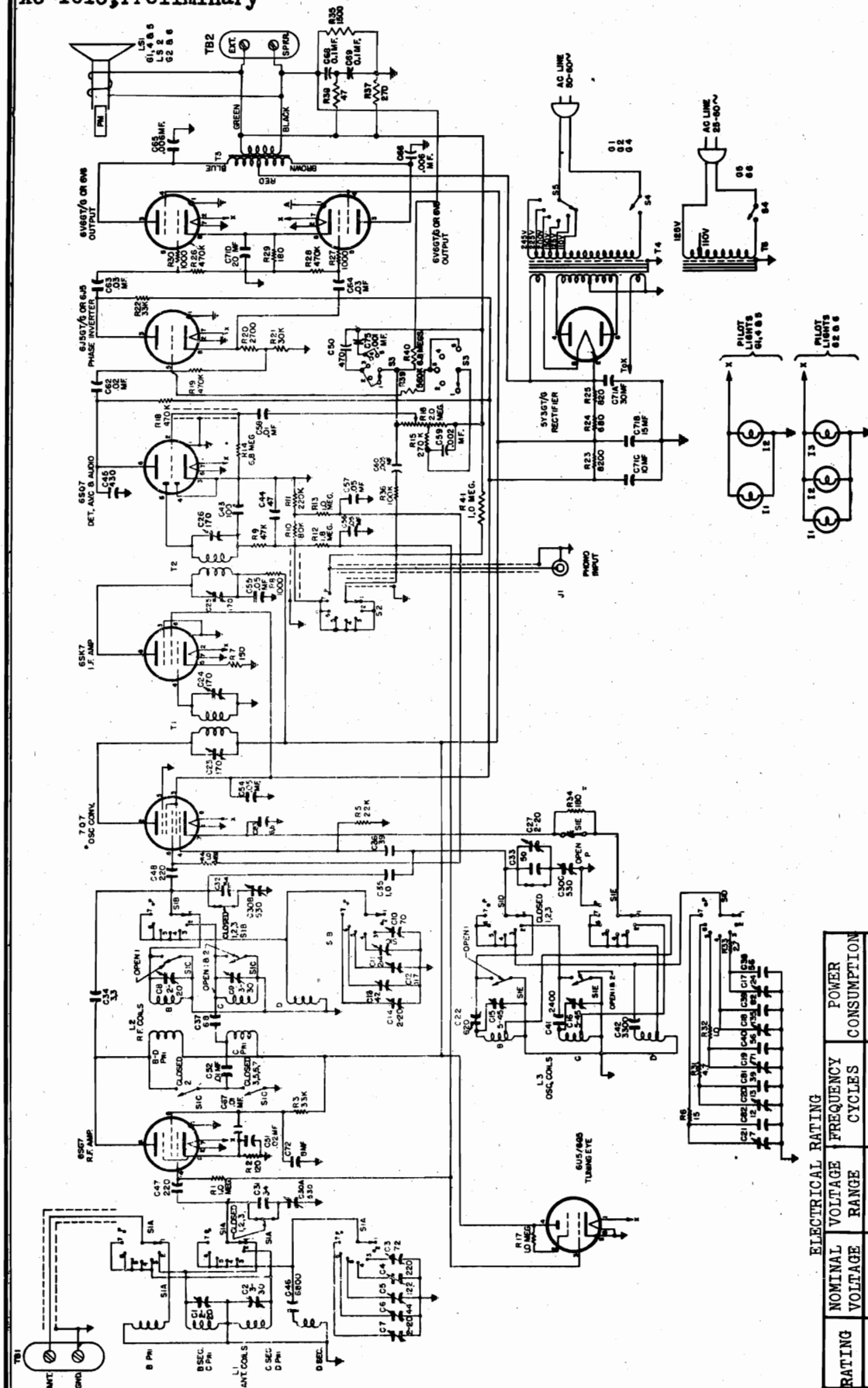
Figure 4 shows a simple method for connecting a crystal or high impedance magnetic phono pick-up into the circuit of the Models X150 and X153. A double-pole, double-throw type phono switch with a phono motor power switch attached is recommended. This should be mounted close to the rear chassis terminal board on the radio. It is important that if the lead from the record player is shielded that the shield braid be connected to terminal 3, *not to chassis ground*. As a precaution when operating the Model X153, add spaghetti insulation to the full length of the shield braid so that the braid cannot accidentally touch the chassis. This will also avoid the possibility of the operator receiving a shock under certain conditions.

When making this phono connection as a permanent installation, the link between terminals 1 and 2 must be removed.

An FM Translator may be connected in the same manner as for the record player. This permits the FM sound to be reproduced through the radio.

Cat. No.	Symbol	Description	Cat. No.	Symbol	Description
UNIVERSAL G-E REPLACEMENT PARTS			SPECIALIZED G-E REPLACEMENT PARTS		
UCC-036	C23	CAPACITOR—0.002 mf., 600 v., paper	RCE-034	C27, 28, 29	CAPACITOR—30 mf., 350 v.; 30 mf., 350 v.; 30 mf., 25 v., dry electrolytic (Model X150)
UCC-039	C20, 24	CAPACITOR—0.005 mf., 600 v., paper	RCE-009	C30	CAPACITOR—30 mf., 250 v., dry electrolytic (Model X153)
UCC-040	C10, 21, 25	CAPACITOR—0.01 mf., 600 v., paper	RCE-035	C27, 28, 29, 37	CAPACITOR—20 mf., 25 v.; 30 mf., 250 v., 40 mf., 250 v.; 10 mf., 250 v., dry electrolytic (Model X153)
UCC-045	C17, 18, 34, 35	CAPACITOR—0.05 mf., 600 v., paper	RCS-002	C31	CAPACITOR—0.02 mf., 600 v., paper (Model X153)
UCC-050	C32	CAPACITOR—0.25 mf., 600 v., paper (Model X153)	RCT-009	C1, 2, 3	CONDENSER—Tuning condenser, includes trimmers
UCC-061	C26	CAPACITOR—0.008 mf., 1000 v., paper (Model X153)	RDF-005		WASHER—Felt washer for knobs
UCU-028	C33	CAPACITOR—100 mmf., mica	RDK-022		KNOB—Control knob with pointer (painted)
UCU-044	C11	CAPACITOR—470 mmf., mica	RDK-053		KNOB—Control knob with pointer (plain)
UCU-1004	C36, 38	CAPACITOR—10 mmf., mica	RDM-001		CUSHION—Rubber cushions for dial scale
UCU-1040	C19	CAPACITOR—330 mmf., mica	RDP-009		POINTER—Dial scale pointer assembly
UCU-1044	C22	CAPACITOR—470 mmf., mica	RDS-014		SCALE—Dial scale
UCU-1520	C12	CAPACITOR—47 mmf., mica	RDX-012		SCALE PLATE—Scale plate assembly
UCU-2557	C8	CAPACITOR—1800 mmf., mica	RDX-014		CORD—Drive cord assembly
UCU-2570	C9	CAPACITOR—5600 mmf., mica	RIT-002		Cover—Inner and outer cardboard cover for electrolytic capacitor
UIC-001		CEMENT—Cone cement	RIT-003		SOCKET—Octal base tube socket
UOP-520	LS1	LOUDSPEAKER—5 1/4 inch PM speaker	RJS-003		PLATE—Electrolytic mounting plate (4 mtg. lugs)
UOX-008		CONE—Loudspeaker replacement cone assembly	RJS-012		SOCKET—Pilot light socket (Model X150)
URD-029	R14, 21	RESISTOR—150 ohms, 1/2 w., carbon	RJS-022		SOCKET—Pilot light socket (Model X153)
URD-037	R3	RESISTOR—330 ohms, 1/2 w., carbon	RJS-023		PLATE—Electrolytic mounting plate (3 mtg. lugs) (Model X153)
URD-049	R4, 12, 17	RESISTOR—1000 ohms, 1/2 w., carbon	RLA-003	T1	COIL—Antenna coil
URD-061	R19	RESISTOR—3300 ohms, 1/2 w., carbon (Model X153)	RLC-009	T2	COIL—Oscillator coil
URD-065	R19	RESISTOR—4700 ohms, 1/2 w., carbon (Model X150)	RMM-005		SHIELD—Pilot lamp shield
URD-081	R2	RESISTOR—22,000 ohms, 1/2 w., carbon	RMS-007		SPRING—Drive cord tension spring
URD-089	R22	RESISTOR—47,000 ohms, 1/2 w., carbon	RMU-009		SHAFT—Tuning shaft and cotter
URD-097	R16	RESISTOR—100,000 ohms, 1/2 w., carbon (Model X153)	RMW-008		PULLEY—Drive cord idler pulley and stud
URD-103	R9	RESISTOR—180,000 ohms, 1/2 w., carbon	RRB-001		BALLAST—230 volt ballast resistance unit (Model X153)
URD-105	R6	RESISTOR—220,000 ohms, 1/2 w., carbon	RRB-002		BALLAST—120 volt ballast resistance unit (Model X153)
URD-113	R11, 13	RESISTOR—470,000 ohms, 1/2 w., carbon	RRC-009	R8	VOLUME CONTROL—2 meg., potentiometer
URD-117	R1	RESISTOR—680,000 ohms, 1/2 w., carbon	RRC-010	R10, S2	TONE CONTROL—2 meg., potentiometer includes power switch (Model X150)
URD-129	R5	RESISTOR—2.2 meg., 1/2 w., carbon	RRC-011	R10, S2	TONE CONTROL—2 meg., potentiometer, includes power switch (Model X153)
URD-145	R7	RESISTOR—10 meg., 1/2 w., carbon	RSW-011	S1	SWITCH—Band change switch
URE-035	R18	RESISTOR—270 ohms, 1 w., carbon (Model X150)	RTL-013	T3	TRANSFORMER—1st I-F transformer
URF-057	R15	RESISTOR—2200 ohms, 2 w., carbon (Model X153)	RTL-014	T4	TRANSFORMER—2nd I-F transformer
URF-059	R15	RESISTOR—2700 ohms, 2 w., carbon (Model X150)	RTO-008	T5	TRANSFORMER—Output transformer (Model X150)
URF-069	R20	RESISTOR—6800 ohms, 2 w., carbon (Model X153)	RTO-009	T5	TRANSFORMER—Output transformer (Model X153)
URF-077	R20	RESISTOR—15,000 ohms, 2 w., carbon (Model X150)	RTP-014	T6	TRANSFORMER—Power transformer, 60 cycle (Model X150)
			RTP-015	T6	TRANSFORMER—Power transformer, 25-60 cycles (Model X150)
			RWL-004		CORD—Power cord
SPECIALIZED G-E REPLACEMENT PARTS					
RAB-013		BACK—Cabinet back cover (Model X150)			
RAB-014		BACK—Cabinet back cover (Model X153)			
RAV-006		CABINET—Wood cabinet			
RCC-040	C30	CAPACITOR—0.01 mf., 600 v., paper			
RCC-059	C26	CAPACITOR—0.005 mf., 1000 v., paper (Model X150)			

(1)	X181V	50°/60	cycle	(2)	X181V	50/60	cycle	(3)	X181V	50/60	cycle
(4)	X182V	50/60	cycle	(5)	X181C	25/60	cycle	(6)	X181C	25/60	cycle



RATING	ELECTRICAL RATING			POWER CONSUMPTION
	NOMINAL VOLTAGE	VOLTAGE RANGE	FREQUENCY CYCLES	
V	110	103-117	50-60	85
	125	117-133		
	150	140-160		
	200	185-213		
	225	213-234		
	245	234-260		
C	110	103-117	25-60	85
	125	117-133		

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MODELS X-181V,XC-181V,
XP-181V,X-181C,XC-181C
X-182V,Preliminary

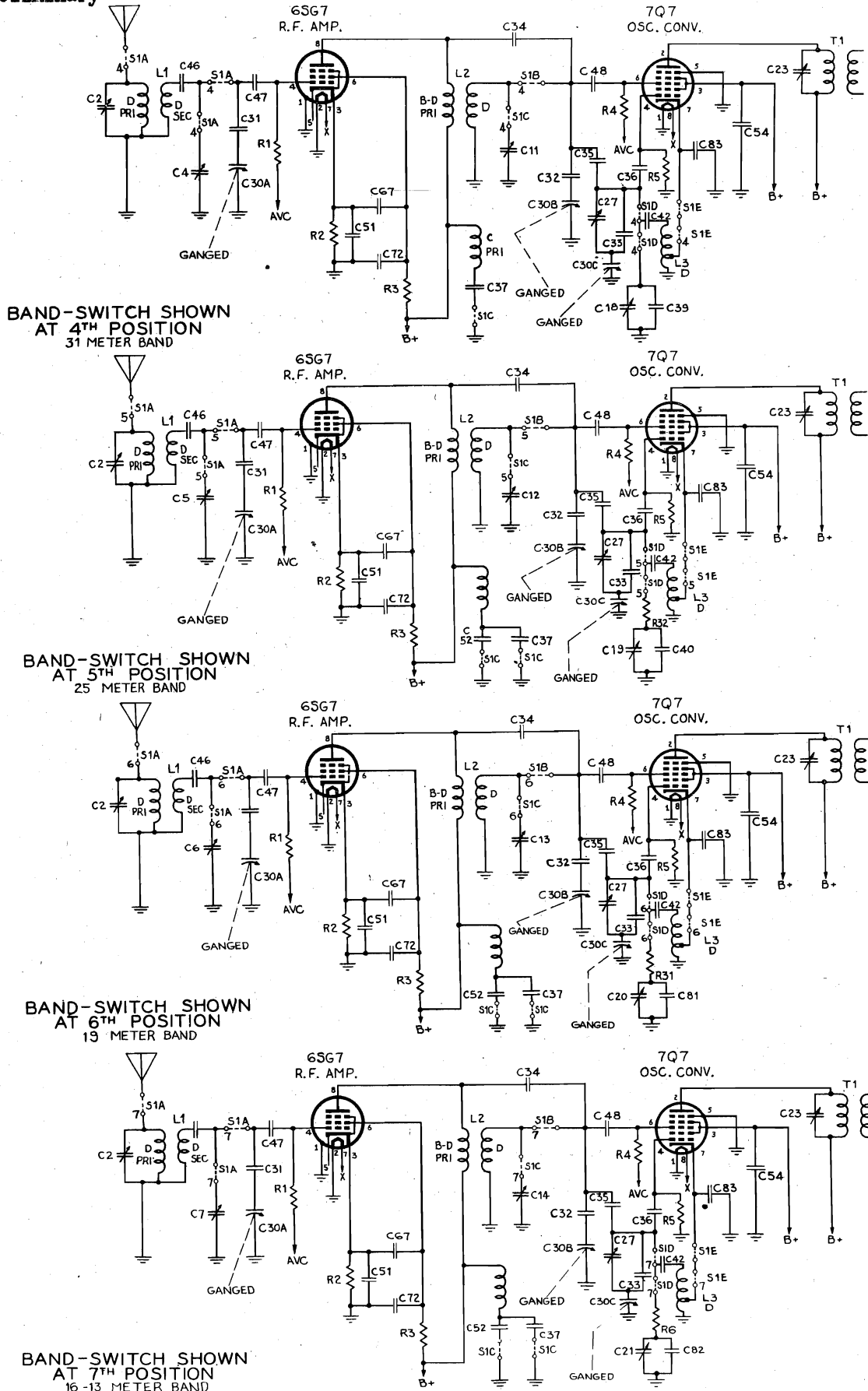


"clarified schematics"

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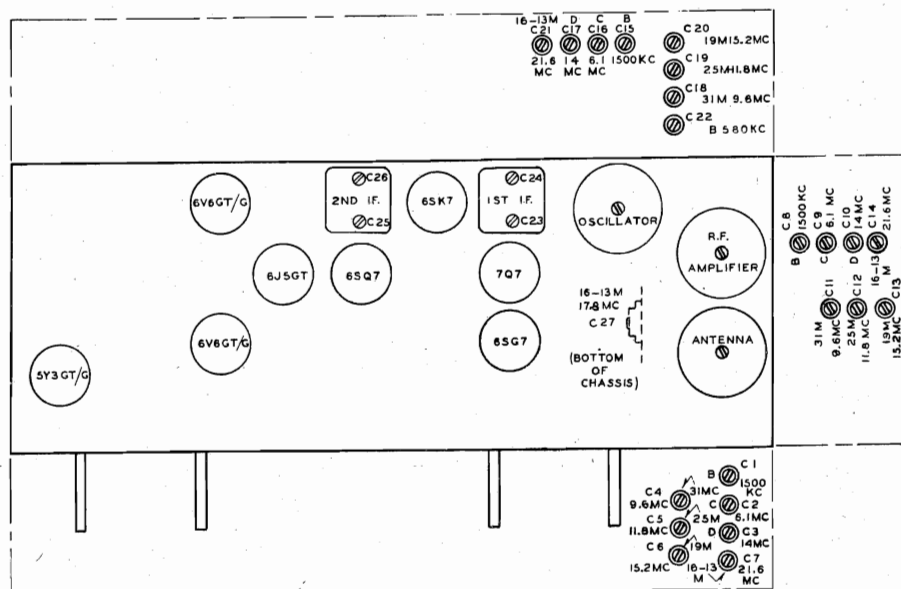
MODELS X-181V, XC-181V,
XP-181V, X-181C, XC-181C,
X-182V, Preliminary

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MODELS X-181V, XC-181V,
XP-181V, X-181C, XC-181C
X-182V, Preliminary



ELECTRICAL CIRCUIT ALIGNMENT

PROCEDURE: (1) Remove chassis during r-f alignment.

(2) Connect output meter across loudspeaker voice coil leads.

(3) Set radio volume control to its maximum position and attenuate the test oscillator signal

output so that the output meter reading never exceeds 1 1/4 volts.

(4) Connect capacitor or capacitor and resistor listed in column 2 between the output "High Side" of test oscillator and the point of input specified.

ALIGNMENT CHART

Step	Test Osc. Connected To -	Test Osc. Setting	Band & Pointer Setting	Tune Trimmer for Max. Output
1	6SK7 grid in series with .05 mf.	455 KC	"B" BAND 550KC	C25 & C26
2	7Q7 grid in series with .05 mf.	455 KC	"B" BAND 550KC	C23 & C24 Retrim C25 & C26
3	ANT. POST in series with 200 mmf. and 400 ohms	1500 KC	"B" BAND 1500KC	C15, C1, C8
4	ANT. POST in series with 200 mmf. and 400 ohms	580 KC	"B" BAND 580KC	C22*
5	R E P E A T S T E P 3			
6	ANT. POST in series with 200 mmf. and 400 ohms	6.1 MC	SW1, 6.1MC	C16, C2, C9
7	ANT. POST in series with 200 mmf. and 400 ohms	14 MC	SW2, 14MC	C17, C3, C10
8	ANT. POST in series with 200 mmf. and 400 ohms	17.8 MC	16-13M, 17.8MC	C27*
9	ANT. POST in series with 200 mmf. and 400 ohms	21.6 MC	16-13M, 21.6MC	C21**C7, C14***
10	R E P E A T S T E P S 8 A N D 9			
11	ANT. POST in series with 200 mmf. and 400 ohms	9.6 MC	31M, 9.6MC	C18**, C4, C11
12	ANT. POST in series with 200 mmf. and 400 ohms	11.8 MC	25M, 11.8MC	C19**, C5, C12
13	ANT. POST in series with 200 mmf. and 400 ohms	15.2 MC	19M, 15.2MC	C20**, C6, C13

*Rock gang condenser for optimum peak.

**Use minimum capacity setting if two are obtainable.

***Use maximum capacity peak if two are obtainable.

SOCKET VOLTAGES

CONDITIONS OF TEST: 1000 ohm/volt meter used. All measurements made to chassis.

Values are d-c unless noted. Measurements made using tap voltage shown on schematic.

PIN NO.	1	2	3	4	5	6	7	8
6SQ7	0	0	1.2	0	1.2	110	6.3 AC	209
7Q7	0	207	95	0	0	0	0	6.3 AC
6SK7	0	6.3 AC	0	0	1.9	95	0	197
6SQ7	0	0	0	0	0	31	6.3 AC	0
6J5GT	0	0	68	-	-2.1	-	6.3 AC	24
6V6GT/G	0	6.3 AC	264	209	0	-	0	11.2
5Y3GT/G	-	270	-	274 AC	-	274 AC	-	270
6U5/6G5	6.3 AC	-	-	209	-	0	-	-

MODELS X-181V, XC-181V,
XP-181V, X-181C, XC-181C,
X-182V, Preliminary

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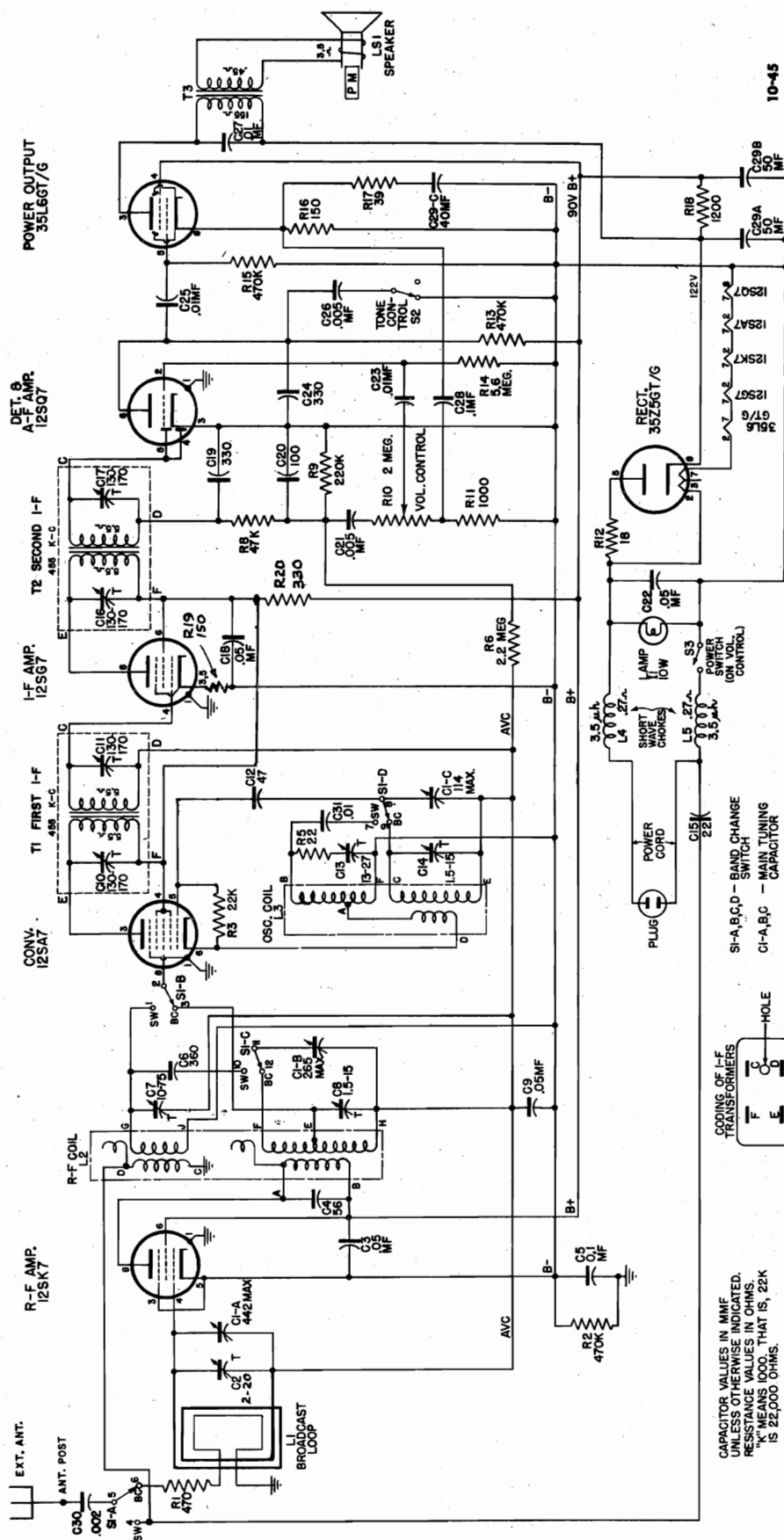
Cat.No.	Description	Model	Qty. Per Set	Symbol
RAB-015	Cabinet back	1-4-5	1	
RAB-026	" "	3	1	
RAG-004	Grille	1-4-5	1	
RAG-007	" (metal)	3	1	
RAV-013	Cabinet	1-5	1	
RAV-014	"	4	1	
RAV-015	"	2-6	1	
RAV-016	"	3	1	
RCC-036	Capacitor (paper) .1 mfd. 600 V.	All	2	C68,69
RCC-060	" " .006 mfd. 1000 V.	"	2	C65,66
RCE-002	" electrolytic - 15-15 - 350 V.	3	1	C88 A & B
RCE-011	" " - 8 mfd. 250 V.	All	1	C72
RCE-012	(" " - 30-350V,			
	15-300,10-150,20-25	All	1	C71 A,B,C,D
RCT-010	Capacitor (Tuning)	"	1	C30 A,B,C
RCW-010	" (Mica) 56 mmf.	"	1	C38
RCW-011	" (") 56 "	"	1	C40
RCW-012	" (") 39 "	"	1	C81
RCW-058	" (") 54 "	"	2	C31,32
RCW-059	" (") 50 "	"	1	C33
RCX-007	Trimmer strip assembly	"	1	C18,19,20,22
RCX-008	" " "	"	1	C15,16,17,21
RCX-009	" " "	"	2	C1,2,3,7,8,9, 10,14
RCX-010	" " "	"	2	C13,12,11,6, 5,4 C27
RCY-006	Capacitor (trimmer)	"	1	
RDC-008	Drive cord assembly (tuning)	1-4-5	1	
RDC-009	" " " "	1-4-5	1	
RDC-010	" " " (Band)	1-4-5	1	
RDD-005	Drum assembly	All	1	
RDE-012	Escutcheon	2-3-6	1	
RDF-005	Knob felt washer	All	4	
RDG-001	Back plate (background)	1-4-5	1	
RDK-026	Knob (plain)	1-4-5	2	
RDK-027	" (pointer)	1-4-5	2	
RDK-034	"	3	2	
RDK-056	"	3	2	
RDP-011	Pointer & slider assembly	1-4-5	1	
RDP-012	" " "	All	1	
RDP-019	" " "	2-3-6	1	
RDS-017	Dial scale	1-4-5	1	
RDS-027	" "	2-3-6	1	
RDX-023	Background plate assembly	2-6	1	
RDX-024	" " "	3	1	
RHG-001	Cushion (capacitor)	All	3	
RHG-005	Grommet (power cord)	"	1	
RHM-023	Stud (pulley)	"	2	
RJP-003	Plug (phono motor)	3	1	
RJP-004	" (phono)	All	1	
RJP-010	Phono jack	"	1	
RJS-012	Mtg. Plate (electrolytic)	"	1	
RJS-016	Socket (dial light)	1-4-5	2	
RJS-017	" (tube)	All	7	
RJS-018	" "	"	1	
RJS-028	Tuning indicator tube connector	"	1	
RJS-037	Mtg. plate (electrolytic)	3	1	
RJS-045	Socket (dial light)	3	1	
RJS-046	" " "	3	1	
RJS-047	" " "	2-3-6	1	
RJS-048	Tuning indicator tube connector	3	1	
RLA-004	Antenna coil	All	1	L-1
RLB-003	R.F. Amplifier coil	"	1	L-2
RLC-010	Oscillator coil	"	1	L-3
RMC-006	Clamp (tuning indicator)	"	1	
RMS-019	Spring (LINK)(Band)	"	1	
RMW-008	Pulley	"	2 or 5	(1) X181V 50/60 cycle
RMW-013	Flywheel	"	1	(2) XC181V 50/60 cycle
RMW-014	Pulley	2-3-6	3	(3) XP181V 50/60 cycle
RMX-007	Lever & link (Phono Sw.)	All	1	(4) X182V 50/60 cycle
RPX-010	Phono pick-up	3	1	(5) X181C 25/60 cycle
RRC-012	Volume control	All	1	(6) XC181C 25/60 cycle

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MODELS X-181V, XC-181V,
XP-181V, X-181C, XC-181C,
X-182V, Preliminary

Cat.No.	Description	Model	Qty. Per Set	Symbol
RRN-001	Resistor (carbon) 10 ohm. 1/2 W.	"	1	R-32
RRN-002	" " 2.7 ohm. 1/2 W.	"	1	R-33
RRN-003	" " 4.7 " "	"	1	R-31
RRW-006	" " 70 " 25 W.	3	1	R-52
RSW-012	Switch (band)	All	1	S-1
RSW-014	" (radio phono)	"	1	S-2
RSW-015	" (tone & power)	"	1	S-3,4
RTL-015	I.F. Transformer (2nd)	"	1	T-2
RTL-016	" " (1st)	"	1	T-1
RTO-010	Output transformer	"	1	T-3
RTP-016	Power transformer	1-2-4	1	T-4
RTP-017	" "	3	1	T-5
RTP-025	" "	5-6	1	T-6
RWL-004	Power cord	2-3-6	1	
RWL-009	" "	1-4-5	1	
UCC-036	Capacitor (paper) .002 mfd. 600 V.	All	1	C-59
UCC-039	" " .005 " "	"	1	C-60
UCC-040	" " .01 " "	"	3 or 5	C-52, 58, 67, 89, 90
UCC-041	" " .02 " "	"	2 or 3	C-51, 62, 91
UCC-042	" " .03 " "	"	2	C-63, 64
UCC-045	" " .05 " "	"	4 or 5	C-54, 55, 56, 57, 87
UCN-501	Capacitor (Ceramic) 1 mmf.	"	1	C-35
UCN-1052	" (mica) .001 mfd.	"	1	C-75
UCN-1504	" (Ceramic) 3.3 mmf.	"	1	C-34
UCN-1506	" " 6.8 "	"	2	C-37, 83
UCU-036	" (mica) 220 mmf.	"	2	C-47, 48
UCU-1020	" " 47 "	"	1	C-44
UCU-1044	" " 470 "	"	1	C-50
UCU-1572	" " 6800 "	"	1	C-46
UCU-2043	Capacitor (mica) 430 mmf.	All	1	C-45
UCU-2561	" " 2400 "	"	1	C-41
UCU-2564	" " 3300 "	"	1	C-42
UCW-1018	" (ceramic) 39 mmf.	"	1	C-36
UCW-2006	" " 12 "	"	1	C-82
UCW-2026	" " 82 "	"	1	C-39
UIC-001	Cement for speaker	"		
UOP-802	Speaker 8" PM.	1-4-5	1	LS-1
UOP-1207	" 12" "	2-3-6	1	LS-2
UOX-004	Cone & voice coil assembly 8"	1-4-5	1	
UOX-005	" " " 12" "	2-3-6	1	
URD-005	Resistor (carbon) 150 ohm. 1/2 W.	All	1	R-6
URD-027	" " 120 " "	"	1	R-2
URD-029	" " 150 " "	"	1	R-7
URD-031	" " 180 " "	"	1	R-34
URD-049	" " 1000 " "	"	3	R-8, 27, 30
URD-053	" " 1500 " "	"	1 & 2	R-35, 43
URD-059	" " 2700 " "	"	1	R-20
URD-081	" " 22000 " "	"	1	R-5
URD-083	" " 27000 " "	3	1	R-46
URD-085	" " 33000 " "	All	1	R-22, R-50
URD-089	" " 47000 " "	"	1	R-9
URD-093	" " 68000 " "	3	2	R-48, 51
URD-097	" " 100000 " "	All	1 & 2	R-36, 49
URD-103	" " 180000 " "	"	1	R-10
URD-105	" " 220000 " "	"	1	R-11
URD-107	" " 270000 " "	"	1	R-15
URD-113	" " 470000 " "	"	4	R-18, 19, 26, 28
URD-115	" " 560000 " "	"	1	R-39
URD-121	" " 1 Meg. 1/2 W.	"	5 & 4	R-1, 4, 13, 17, 41
URD-127	" " 1.8 Meg. 1/2 W.	"	1	R-12
URD-133	" " 3.3 " "	3	2	R-44, 45
URD-141	" " 6.8 " "	All	2	R-14, 40
URD-1017	" " 47 ohms. "	"	1	R-38
URD-1035	" " 270 " "	"	1	R-37
URD-1084	" " 30000 " "	"	1	R-21 (1) X181V 50/60 cycle
URD-1104	" " 200000 ohms. "	3	1	R-47 (2) XC181V 50/60 cycle
URE-085	" " 33000 " 1 W.	All	1	R-3 (3) XP181V 50/60 cycle
URF-031	" " 180 " 2 W.	"	1	R-29 (4) X182V 50/60 cycle
URF-045	" " 680 " "	"	1	R-24 (5) X181C 25/60 cycle
URF-047	" " 820 " "	"	1	R-25 (6) XC181C 25/60 cycle
URF-071	" " 8200 " "	"	1	R-23

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CAPACITOR VALUES IN MMF
UNLESS OTHERWISE INDICATED.
RESISTANCE VALUES IN OHMS.
"K" MEANS 1000. THAT IS, 22K
IS 22,000 OHMS.

ELECTRICAL RATING (INPUT).

Voltage.....	105-125 volts, a-c or d-c
Frequency (a-c).....	25-60 cps
Wattage.....	45 watts

ELECTRICAL POWER OUTPUT (120 LINE VOLTS).

Undistorted.....	1.25 watts
Maximum.....	2 watts

LOUDSPEAKER.

Type.....	"Alnico" permanent magnet
Outside cone diameter.....	5 1/4"
Voice Coil Impedance (400 cycles).....	3.5 ohms

TUNING BAND.

Standard Broadcast..... 540 KC-1600 KC
Shortwave..... 6 MC-10 MC

INTERMEDIATE FREQUENCY..... 455 KC

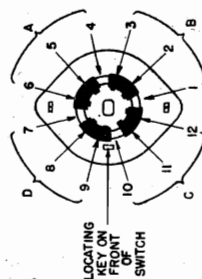


Fig. 7. Identification of Terminals on Band Change Switch S1

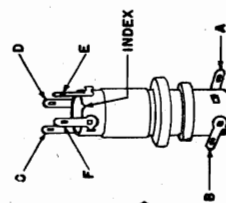


Fig. 6. Identification

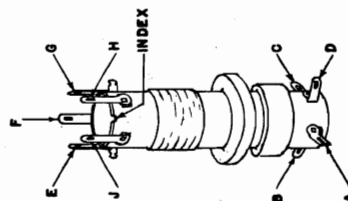
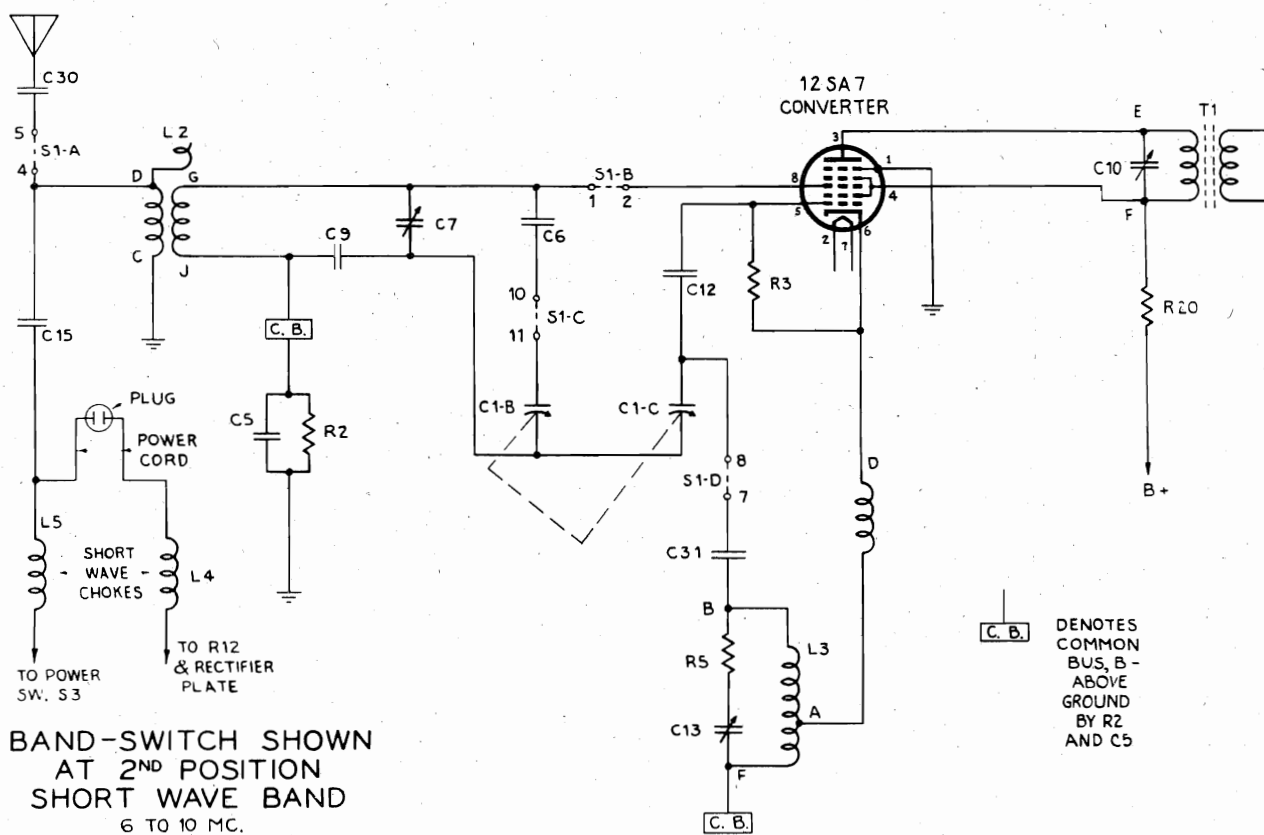
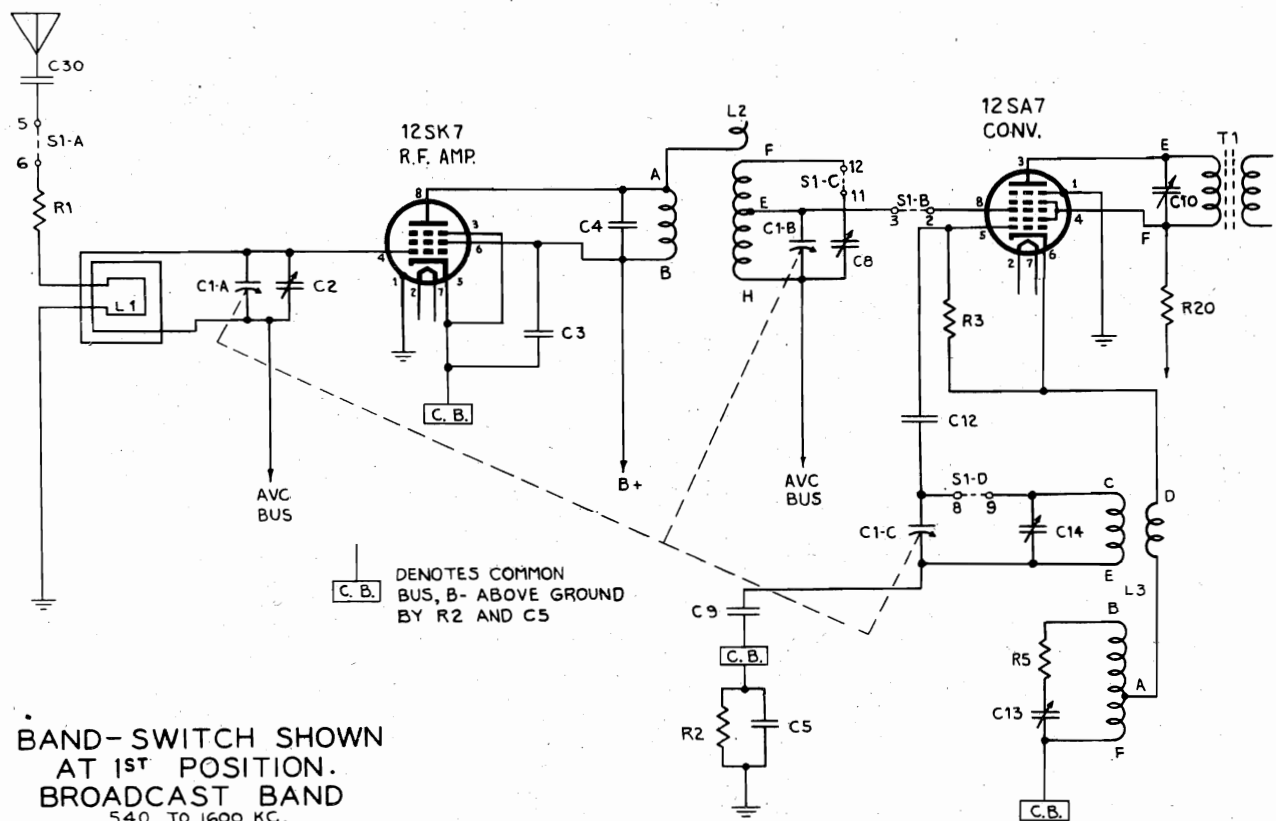


Fig. 5. Identification of Terminals on R-F Coil L2

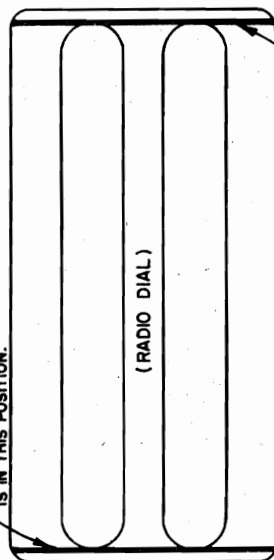
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ANTENNA.

Broadcast Reception—Built in "Beam-a-Scope" loop antenna.
Shortwave Reception—Power cord used as antenna. An external antenna is recommended for improvement of long-distance reception.

WITH TUNING CAPACITOR PLATES COMPLETELY CLOSED (TUNING CONTROL MAXIMUM COUNTER CLOCKWISE), DIAL POINTER SHOULD BE ADJUSTED ON STRING SO THAT IT IS IN THIS POSITION.



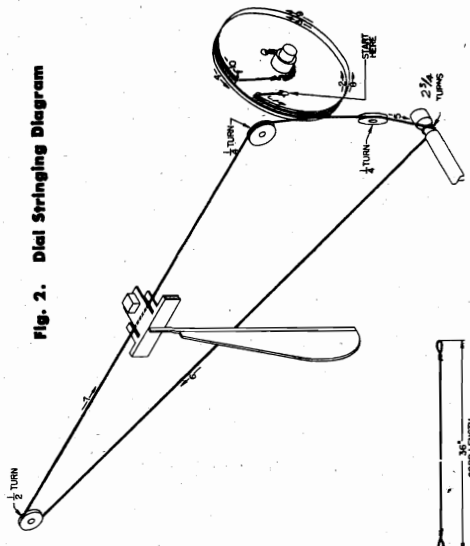
WITH TUNING CAPACITOR PLATES COMPLETELY OPEN (TUNING CONTROL MAXIMUM CLOCKWISE), DIAL POINTER SHOULD BE ADJUSTED ON STRING SO THAT IT IS IN THIS POSITION.

Fig. 1. Alignment of Dial Pointer on String

Alignment of Dial Pointer and String.

The extreme left and right positions of the dial pointer should be in accordance with Fig. 1. This adjustment should be checked before proceeding with the r-f alignment.

Fig. 2. Dial Stringing Diagram



C13 S.W. TRIMMER (ON UNDERSIDE OF CHASSIS)

T2 2ND I-F

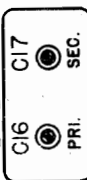


Fig. 3. Trimmer and Tube Identification



9. Disconnect signal generator from 12SG7 and connect (through .05 mf. capacitor) to pin eight of the 12SA7 converter.
10. Keeping output below 1 1/4 volts as before, peak the first i-f trimmers, C10 and C11, for maximum output.
11. Check second and first i-f trimmer adjustments.

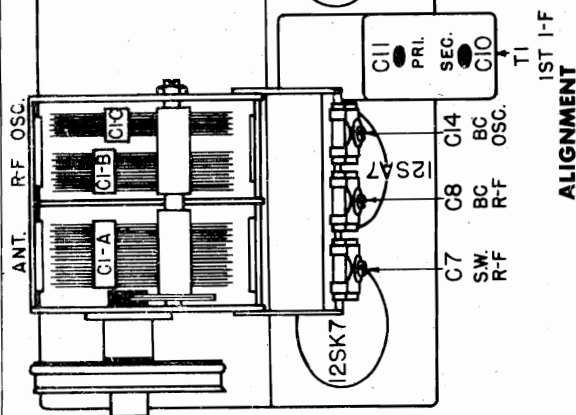
Broadcast R-F Alignment.

When making the following alignment, the Beam-a-Scope (loop antenna) must be mounted to the chassis, and the chassis must be installed in the cabinet. All trimmer adjusting screws are available through the hole in the loop antenna frame.

1. Connect the output of the signal generator through a 60 mmf. capacitor, to the radio antenna post.
2. Set the signal generator and dial pointer to 1500 kc.
3. Adjust C14, C8, and C2 for maximum output. If two peaks are obtained when adjusting C14, the correct point is the one with the trimmer plates the furthest apart.

Shortwave R-F Alignment.

1. Set Band Change switch to SW position.
2. Set dial pointer and signal generator to 9.5 mc.
3. Remove chassis carefully, so as not to disturb the setting of the dial pointer.
4. Connect the output of the signal generator through a .05 mf. capacitor to pin eight of the 12SA7 converter tube.
5. Adjust C13 (under the chassis) for maximum output. Two points of maximum output may be obtained. The correct point is the one with the trimmer plates closest together.
6. Remove the signal generator connection, and connect its output through a 400-ohm resistor to the radio antenna post. Peak C7 for maximum output while rocking-in the main tuning condenser.
7. Replace the chassis in the cabinet, and check the setting of C7.



Equipment Needed.

- Signal Generator, modulated 30% with 400 cycles.
- One—60 mmf. capacitor
- One—.05 mf. capacitor
- One—400-ohm resistor
- One—output meter
- One—insulated screw driver.

General.

For a complete alignment, the i-f should be aligned before the r-f.
The i-f sections may be aligned with the chassis removed from the cabinet, but for the final r-f alignment the chassis should be in place, in the cabinet.

Fig. 3 identifies and locates all trimmers.
Be sure the radio has been "on" for at least 10 minutes before making any alignment adjustments.

In order to be sure of frequency stability in the signal generator, follow the manufacturer's recommended procedure for use.

When making connections to the signal generator, avoid any ground connections to the radio unless an isolation transformer is used in the power line.

I-F Alignment.

1. Remove chassis from cabinet.
2. Connect output meter across the speaker voice coil.
3. Set volume control for maximum.
4. Connect output terminal of signal generator through a .05 mf. capacitor to pin 4 of the 12SG7 (i-f amplifier) tube.
5. Set signal generator frequency to 455 kc.
6. Set dial pointer on radio to approximately 1500 kc.
7. Peak second i-f trimmers, C16 and C17, for maximum output.
8. It is important to keep the output reading under 1 1/4 volts by reducing the input or gain control so as to avoid spurious results due to a.v.c. action.

GENERAL ELECTRIC CO.

STAGE GAINS AND VOLTAGE CHECKS

The following information will be useful to servicemen equipped with vacuum tube voltmeters or similar voltage measuring instruments. The stage gain values listed may have a tolerance of 20%.

Stage Gains.

- (1) Antenna terminal* to pin 4 of 12SK7 . . . 4 @ 1000 kc
- (2) Pin 4 of 12SK7† to pin 8 of 12SA7 . . . 10 @ 1000 kc
- (3) Pin 8 of 12SA7† to pin 4 of 12SG7 . . . 35 @ 455 kc
- (4) Pin 4 of 12SG7† to pins 4 or 5 of 12SQ7 . . . 100 @ 455 kc

* Connect to signal generator output through a 60 mmf. capacitor.

† Connect to signal generator output through a .05 mf. capacitor.

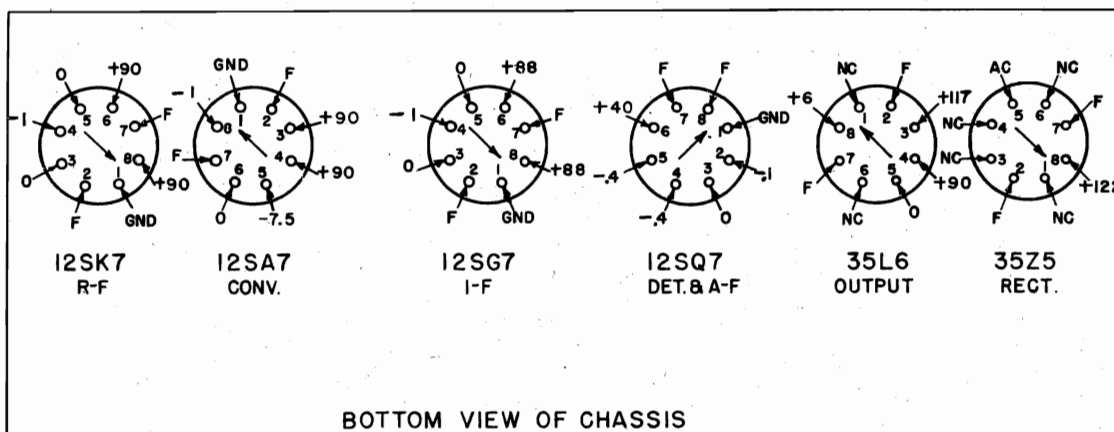
In all measurements, the readings should be kept as low as possible by reducing the signal generator gain control so as to avoid a.v.c. action.

Audio Gain.

0.06 volt at 400 cycles across the volume control (R10), with the control set at maximum, will give approximately 0.5 watt output (1.32 volts) across the speaker voice coil.

Oscillator Grid Voltage.

The d-c voltage developed across the grid leak R3 (22,000 ohms) averages 7.7 volts at 1000 kc. This should be measured with a vacuum tube voltmeter. (The grid current, measured with an ammeter in series with pin 6 of the 12SA7 tube, should be in the order of 350 microamps.)



BOTTOM VIEW OF CHASSIS

CONDITIONS OF TEST

ALL MEASUREMENTS D-C
MEASUREMENTS MADE TO B-BUS
MEASUREMENTS MADE WITH
20,000 OHM/VOLT METER

LINE VOLTAGE 117 VOLTS
VOL. CONTROL MAX. CLOCKWISE
NC - NOT CONNECTED
F - FILAMENT

PART NO.	SYMBOL	DESCRIPTION	PART NO.	SYMBOL	DESCRIPTION
UNIVERSAL G-E REPLACEMENT PARTS			SPECIALIZED G-E REPLACEMENT PARTS (Cont'd)		
UCC-036	C30	Capacitor—.002 mf, 600 V., paper	RCU-053	C4	Capacitor—56 mmf, mica
UCC-039	C21	Capacitor—.005 mf, 600 V., paper	RCU-108	C15	Capacitor—22 mmf, mica
UCC-040	C23, C25, C27, C31	Capacitor—.01 mf, 600 V., paper	RCU-110	C12	Capacitor—47 mmf, mica
UCC-045	C3, C9, C18, C22	Capacitor—.05 mf, 600 V., paper	RCU-112	C20	Capacitor—100 mmf, mica
UDL-018	I1	Lamp—110-125 V., 10 W.	RCU-115	C19, C24	Capacitor—330 mmf, mica
URD-009	R5	Resistor—22 ohm, 1/2 watt, carbon	RCU-164	C6	Capacitor—360 mmf, mica
URD-015	R17	Resistor—39 ohm, 1/2 watt, carbon	RCY-002	C2	Capacitor—trimmer—1.5-15 mmf
URD-029	R16, R19	Resistor—150 ohm, 1/2 watt, carbon	RCY-003	C13	Capacitor—trimmer—13-27 mmf
URD-041	R1, R7	Resistor—470 ohm, 1/2 watt, carbon	RDE-004	—	Escutcheon—model 221
URD-049	R11	Resistor—1000 ohm, 1/2 watt, carbon	RDF-002	—	Felt washer, smaller, under round knobs—models 220, 221
URD-081	R3	Resistor—22,000 ohm, 1/2 watt, carbon	RDF-004	—	Felt washer, larger, under flipper knobs—models 220, 221
URD-089	R8	Resistor—47,000 ohm, 1/2 watt, carbon	RDK-003	—	Knob, round—model 220
URD-105	R9	Resistor—220,000 ohm, 1/2 watt, carbon	RDK-005	—	Knob, flipper—model 220
URD-113	R2, R13, R15	Resistor—470,000 ohm, 1/2 watt, carbon	RDK-008	—	Knob, round—model 219
URD-129	R6	Resistor—2.2 meg., 1/2 watt, carbon	RDK-009	—	Knob, round—model 221
URD-139	R14	Resistor—5.6 meg., 1/2 watt, carbon	RDK-010	—	Knob, flipper—model 221
URE-007	R12	Resistor—18 ohm, 1 watt, carbon	RDK-011	—	Knob, flipper—model 219
URF-051	R18	Resistor—1200 ohm, 2 watt, carbon	RDP-004	—	Pointer assembly
SPECIALIZED G-E REPLACEMENT PARTS			RDS-005	—	Dial scale assembly
RAA-003	—	Switch arm, with set screw, for Band Change and Tone Control switches—switch half	RDX-005	—	Dial parts—back plate and bracket assembly
RAA-004	—	Switch arm, with set screw, for Band Change and Tone Control switches—flipper half	RDX-006	—	Shaft, hair pin cotter, and drive shaft bracket
RAB-005	—	Cabinet back, for Model 220	RDX-007	—	Cord—for dial pointer
RAB-006	—	Cabinet back, for Model 221	RHG-001	—	Grommet—cushion used for mounting tuning capacitor
RAB-007	—	Cabinet back, for Model 219	RHU-002	—	Spacer—for RHG-001
RAD-006	—	Antenna bracket, left side	RHX-001	—	Chassis mounting bolt and washer
RAD-007	—	Antenna bracket, right side	RJS-003	—	Cover for electrolytic capacitor
RAD-008	—	Baffle bracket—models 219, 220	RJS-004	—	Tube socket—octal
RAE-001	—	Baffle shield	RJS-010	—	Socket for electrolytic capacitor
RAG-001	—	Grille—models 219, 220	RLB-001	L2	Socket—dial light
RAU-004	—	Cabinet—model 219	RLC-003	L3	Coil—RF
RAU-005	—	Cabinet—model 220	RLI-001	L4, L5	Coil—oscillator
RAV-002	—	Cabinet—model 221	RLL-003	L1	Coil—power cord choke
RCC-040	C26	Capacitor—.005 mf, 600 V., paper	RMS-001	—	Loop Assembly
RCC-040	C23, C25, C27	Capacitor—.01 mf, 600 V., paper	ROP-005	LS1	Spring—on dial string drum
RCC-045	C2	Capacitor—.05 mf, 600 V., paper	RRC-004	R10	Speaker—5 1/4 in. PM
RCC-046	C5, C28	Capacitor—.01 mf, 600 V., paper	RSW-004	—	Volume Control—2 meg.
RCE-001	C29-A, -B, -C	Capacitor—50-50-40 mf, 150-150-25 V., electrolytic	RTL-001	S2	Switch—Tone Control
RCT-004	C1, C7, C8, C14	Capacitor—main tuning capacitor assembly	RTL-002	S1	Switch—Band Change
URD-037	R20	RESISTOR—330 ohms 1/2 w., carbon	RTO-003	T1	I-F Transformer assembly
			RWL-003	T2	I-F Transformer assembly
				T3	Transformer—output
					Power cord

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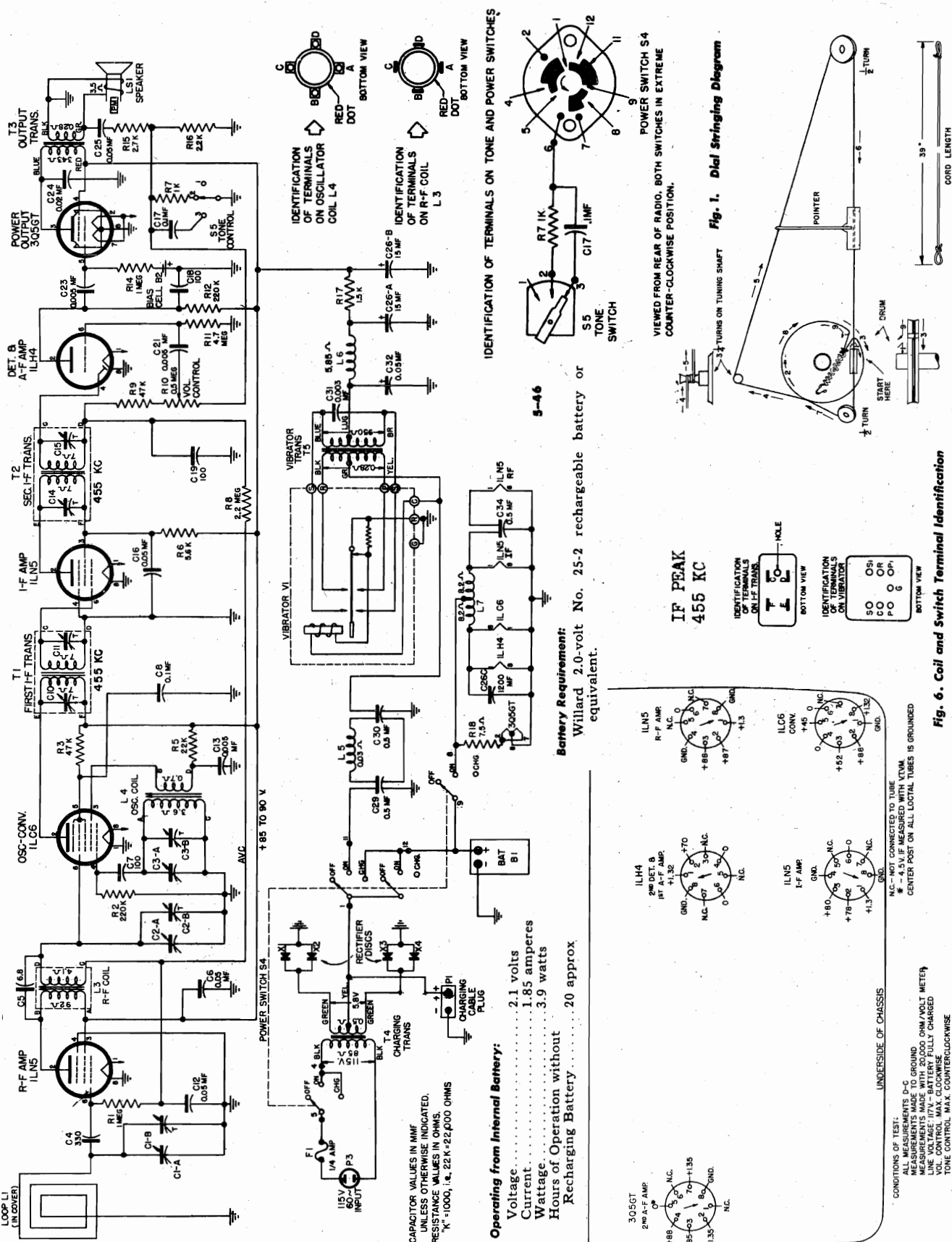


Fig. 6. Coil and Switch Terminal Identification

Compliments of www.nucow.com

GENERAL ELECTRIC CO.

MODEL 250 ----- Battery Filler Cap.

It is important that the battery filler cap be sufficiently tight so that the washer is compressed, otherwise battery acid will leak out and damage the radio. Make sure the washer is replaced when the cap is removed and that possible thread burrs do not prevent the cap from being tightened completely. Use a screwdriver to tighten the cap.

A quantity of Model 250 radios was shipped with the oscillator adjustment plug not locked after alignment. This causes the low frequency calibration to be considerably in error and reduces sensitivity at this end of the band.

Realign the oscillator adjustment (adjacent to 1st IF transformer), I4, then tighten down the lock nut.

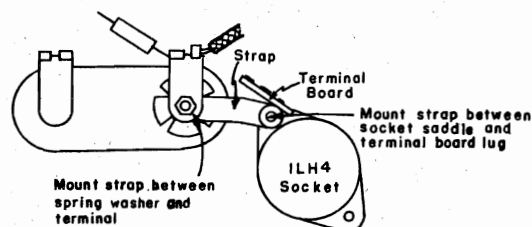
Failure of the vibrator unit REU-001 may be treated in the following manner:

1. The vibrator should be removed from the receiver and a resistance check made with an ohmmeter across terminals C and R.
2. If the resistance checks approximately six ohms and the vibrator will not start, it should be replaced with a new one.
3. If the resistance checks an infinite or high value, the vibrator should be opened up by unsoldering the base from the can. A resistance check should then be made across the terminals of the operating coil, and across the 220 ohm resistor. The operating coil should check approximately six ohms. If the coil is open, the vibrator must be replaced with a new one. If the resistor is open, the resistor should be replaced.
4. If the resistance across terminals C and R checks approximately 220 ohms, the starting contacts that short out the 220 ohm resistor do not make contact. This condition may be corrected by opening the vibrator and turning the small adjustment screw on the resistor side of the vibrator very slowly in the clockwise direction until the resistance across terminals C and R reads approximately six ohms. Care should be taken to see that this adjustment screw is not turned beyond the point where contact is made, and the 220 ohm resistor is shorted out.

A few radios were shipped that did not have the IF transformers peaked for maximum sensitivity. For sets with low sensitivity, realign the IF amplifier

When hum is experienced, the following checks should be made in the order of their listing:

1. Check the battery electrolyte level. It should be maintained at the recommended level.
2. A battery which is nearly discharged caused an excessive hum level.
3. A dirty or loose negative battery terminal contact causes excessive hum. Remove the battery and clean the terminals. Also, clean the negative prong located in the battery compartment, with fine emery; spread the battery spring contacts; and install a rubber insert, V61J551, up through the center of the split spring contacts. Early production radios did not have the rubber insert so that the normal handling causes these spring contacts to be compressed resulting in a high resistance connection. For those receivers not equipped, write your requirements to the Technical Service Section in Bridgeport and they will be forwarded immediately. When reinstalling the battery, spread a thin layer of petroleum jelly on the contacts.
4. Where the previous checks do not remedy the trouble, check the spring washer on the opposite end of the negative prong for a good chassis bond. This requires that the front part of receiver case be removed and then install a bonding strap as shown in the illustration. The factory is now installing an auxiliary copper strap made of 3/8" x .010" soft copper strip, fastened between the spring washer and the 1LH4 socket saddle hole as shown in the illustration. Drill out the rivet at the socket saddle and install a bolt and nut to hold it and the socket and terminal board.



In a few remote cases it has been found that the storage battery (25-2) terminals have loosened internally where they are swaged to the plate holder of the battery. This causes low voltage when under load and results in a "dead" or intermittent set. To remedy replace the battery.

MODEL 250

GENERAL ELECTRIC CO.

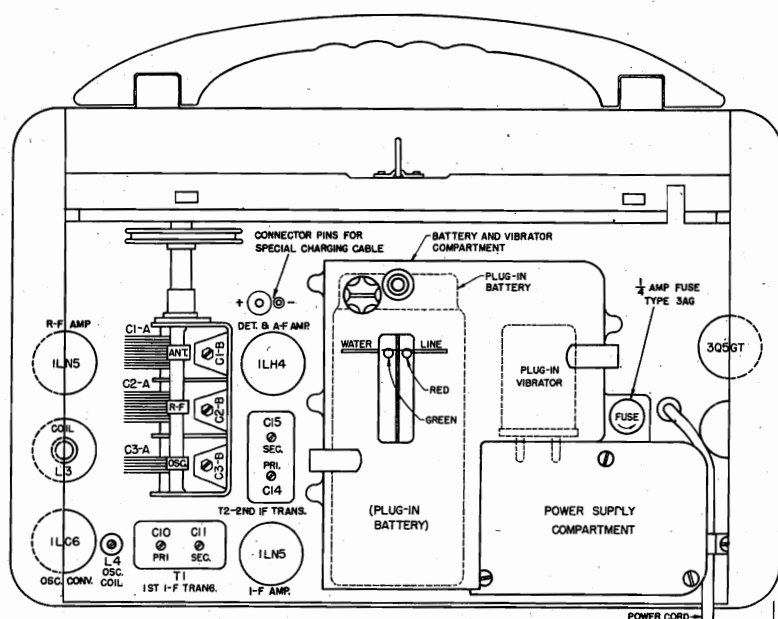


Fig. 3. Tube and Trimmer Location

ELECTRICAL CIRCUIT ALIGNMENT

1. EQUIPMENT REQUIRED.

1. Signal generator with audio tone modulation.
2. A-c output meter, 1 or 1½ volts full scale, 1000 ohms - volt.
3. Insulated screwdriver.

2. ALIGNMENT PROCEDURE.

1. **General.**—The alignment procedure is given in table form for convenience. Reference is made to Fig. 3 for the trimmer locations. The low side of the signal generator should be connected to the chassis of the receiver for i-f alignment; the high side should be connected as indicated in the Alignment Chart. A meter or some other suitable indicating device must be connected to the output of the receiver. Two methods for connecting an output meter are given in later paragraphs.

When aligning the receiver, the Volume Control on the receiver should be turned to its maximum position (clockwise), and the Tone Control should be turned to the position of maximum treble (extreme counterclockwise). The output signal of the signal generator should be kept as low as possible at all times; the reading of a meter connected across the voice coil leads of the receiver should be kept below ½ volt by changing the signal generator output. If the signal level is too high, the AVC becomes effective and alignment errors may result.

The following paragraphs give greater details regarding the connection of the output meter and the signal generator to the receiver during alignment.

2. **Connecting the Output Meter.**—In aligning the receiver, some means for indicating differences in the output voltage will be required. Either of the following methods is satisfactory. The first requires more disassembly of the receiver case than the second, but the second requires additional test equipment.

Method 1.—A satisfactory method for indicating differences in output is to connect a rectifier-type a-c meter of 1 or 1½ volts full scale deflection across the speaker voice coil terminals. To gain access to the speaker, remove the front panel from the radio as previously described. A short green lead will be found connected to one terminal of the speaker. This may be pushed through one of the holes in the chassis so that it will be accessible from the back of the radio. The front panel is reinstalled in place so that the stray capacities in the set will be the same as when the set is operating normally. Connect the meter between this lead and ground. A convenient ground connection is to remove the tone control knob and use a clip lead to the shaft.

Method 2.—The following is an alternate method which eliminates the necessity of removing the front panel of the set, but which requires additional test equipment. Make an indicating device by connecting a 4- to 6-inch diameter magnetic speaker or the high-impedance leads from the

ELECTRICAL RATING:

Charging from A-c Line:

Voltage.....105-125 volts, a-c only
Frequency.....50/60 cps
Wattage.....10 watts

Fuse:

G-E No. 2548, ¼-ampere rating.

OPERATING FREQUENCIES:

Broadcast Band.....540-1600 kc
I-F Amplifier.....455 kc

POWER OUTPUT:

Undistorted.....248 milliwatts
Maximum.....365 milliwatts

LOUDSPEAKER:

Type.....Alnico PM
Outside Cone Diameter.....5¼ inches
Voice Coil Impedance (400 cps).....3.2 ohms

ALIGNMENT CHART

Turn Tone Control CCW (Treble)

Turn Volume Control CW (Maximum)

Step	Connect Signal Generator to	Signal Generator Setting	Dial Setting	Adjust
1	Stator of C2-A in series with 0.05 mf.	455 kc	Reference Point Below 550 kc (Gang Closed)	2nd i-f (T-2) Trimmers for Max.
2	Stator of C2-A in series with 0.05 mf.	455 kc	Reference Point Below 550 kc (Gang Closed)	1st i-f (T-1) Trimmers for Max.
3	Inductively Coupled	580 kc	580 kc	*L3 and L4 for Maximum.
4	Inductively Coupled	1500 kc	1500 kc	**C3-B, C2-B, and C1-B for maximum in sequence given.

† Use loop on output of signal generator.

* Adjust L3 and L4 alternately several times to obtain peak.

** Make all adjustments of C1B, C2B, and C3B with rear cover closed, through the three ports provided on cover. Remove snap buttons for access.

output transformer of a good p m dynamic speaker to the terminals of a rectifier-type microammeter with a full scale deflection of 100 microamperes or less. For convenience, the meter and speaker may be mounted in a small box in such a way that the meter will be visible when the speaker is placed in front of the speaker on the receiver being aligned.

To use this device, place its speaker in front of and about an inch away from the speaker of the receiver being aligned. The meter will then deflect in proportion to the intensity of the sound produced by the speaker, and therefore may be used as an output meter. The meter must not be moved during alignment.

3. **Connecting the Signal Generator.**—For aligning the i-f transformers, the output of the signal generator should be coupled through a 0.05 mf. capacitor to the grid (pin 6) of the 1LC6 oscillator-converter tube. This may be accomplished easily by connecting the capacitor to the stator of C2-A, the middle section of the tuning gang, as this stator is connected directly to the converter grid. The low side of the signal generator output should be connected to the chassis ground to complete the circuit.

For aligning the oscillator and r-f coils, the r-f signal should be inductively coupled by connecting a three- or four-turn, 6-inch diameter, loop of bell wire across the signal generator output terminals and then locate the loop about one foot from the radio cover, with cover open. To prevent possible errors in peak readings, the position of the loop with respect to the receiver should not be changed during any one set of adjustments.

GENERAL ELECTRIC CO.

1. POWER SUPPLY

All power necessary for the operation of the receiver is supplied by the 2-volt built-in rechargeable battery. Power to the 1.4-volt tube filaments is supplied by the battery through suitable voltage dropping resistors. The high voltage for the screens and plates of the tubes is furnished by a synchronous vibrator used in conjunction with a step-up power transformer and its associated filter circuit. The synchronous vibrator operates directly from the battery voltage.

The receiver power is obtained from the battery at all times in the manner just described, whether the power cord is connected to a power source or not. When the power cord is connected to a receptacle supplying from 105 to 125 volts, 50 or 60 cps, a-c, and the power selector is in either the CHARGE or ON position, the power supplied from the line will be used to charge the battery. The CHARGE position on the three-position power selector switch allows the battery to be charged from the house current when the receiver is not operating. The ON position of the switch permits the radio to be operated at the same time that the battery is being charged. Under this condition, the battery floats in the circuit to keep the voltage at its proper voltage and, with high line voltage, the battery may be charged slowly while the radio is operating.

The battery-charging unit consists of a step-down transformer which converts the house current to approximately 5.8 volts center-tapped at 117 volts line, and a full-wave copper-oxide rectifier circuit which supplies the battery with d-c charging current.

A charging cable is available, which provides a convenient means of charging the radio battery from an automobile or 6-volt storage battery. The cable plug is inserted over the two pins provided, see Fig. 3, and the plug and socket on the other end of the cable are connected to a 6-volt supply. Complete installation instructions are provided with each cable.

2. CHARGER CHARACTERISTICS

Testing the operation of the rectifier unit.—A $\frac{1}{4}$ -ampere fuse is used in series with the primary of the charger transformer. If the battery does not show any signs of becoming charged after a reasonable length of time, check the fuse. If it is necessary to replace the fuse, use a $\frac{1}{4}$ -ampere, Type 3AG fuse.

If one or more of the copper-oxide discs of the rectifier unit are defective, the charger will not operate properly. To test the rectifier unit operation, remove the battery from the unit and reconnect it in series with a d-c ammeter capable of reading at least two amperes. Plug the power cord into a 105-125 volt, 50 or 60 cps, a-c supply, and turn the power selector switch to the CHARGE position. With the a-c line voltage at 117 volts, the average charging current should read about 1.8 amperes at 2.1 volts battery. Care must be exercised in making this test as the charging circuit is of extremely low resistance. *Very heavy* leads must be used, and the use of an ammeter having only 0.05 ohms resistance will introduce considerable error. If the line voltage is greater than 117, or the battery voltage is lower than 2.1 volts, the charging current will be greater. If the current is much less than 1.8 amperes at the rated line voltage of 117 volts, one or more of the copper-oxide discs may be defective.

Testing the individual rectifier discs.—Two rectifier assemblies are used in the receiver, each assembly consisting of two rectifier discs held together by an eyelet. A cross section of a rectifier assembly is shown in Fig. 2. The center plate of the assembly is positive and is provided with a soldering tab. A copper-oxide rectifier disc is located on each side of the center plate. The rectifier disc conducts when the positive potential is applied to the copper-oxide surface. The copper oxide is a dark purple coating which has been plated with nickel to afford a good surface contact to the copper oxide. If either or both of the rectifier discs in an assembly become defective, the entire assembly should be replaced.

To check the rectifier assembly, the following tests are recommended. In the conducting direction, the rectifier assembly should pass 0.5 ampere or more when $\frac{1}{2}$ volt is impressed across it. If a d-c ammeter is not available for measuring currents as high as 0.65 ampere, the circuit shown in Fig. 2 can be used for this check. The 2.00-ohm resistance should be fairly accurate. The voltage across the rectifier assembly should read 0.7 volt or less; if this voltage exceeds 0.7 volt, the assembly is defective and should be replaced.

The reverse current flow is as important as the above test and is made as follows: Reverse the battery polarity in the test circuit described for current check, disconnect the voltmeter, and place a milliammeter that will read 10 ma. in series with a lead to one of the battery terminals. A suitable meter fuse should be used in series with the milliammeter to prevent damage to the meter in case the assembly under test

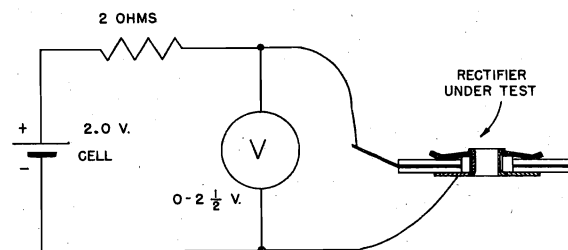


Fig. 2. Rectifier Test Circuit

is shorted. The reverse current should not exceed 10 ma. If the current is considerably above this value, the rectifier assembly should be discarded.

If a milliammeter is not available, a rough check may be made by measuring the resistance of the assembly in the nonconducting direction on the low-resistance range of an ohmmeter. The resistance should measure at least 300 ohms.

3. DISASSEMBLY OF THE RECEIVER

The following outlines should be of assistance in gaining access to the various compartments of the receiver and in dismantling it for replacement of panels.

To Gain Access to Power Supply Compartment.

1. Open the back cover and unsnap the battery compartment cover. Remove the cover by prying gently with a screwdriver.
2. Remove the three flat-head screws on the power supply compartment cover (see Fig. 3).
3. Pry the lid from the power supply compartment and lift it straight outward. All of the power supply components are attached to the lid and will come out with it as far as the connecting leads will permit. In replacing this cover, be careful not to short circuit the B+ lead.

To Gain Access to Underside of Radio Chassis.

1. Open the top cover and remove the four Phillips-head screws from the front edge of the escutcheon.
2. Unscrew the three flat-head screws from the bottom of the case, and remove the single sheet of metal which forms the front and bottom of the case. Disconnect the speaker plugs from the speaker to free the front panel from the chassis.

To Remove the Right End Panel.

1. Open the top cover and pull off the four knobs.
2. Remove the two cover stay-arms by unscrewing the screw which holds each to the cover. This allows the loop to fall to its extreme position. Care should be taken to see that the loop connection springs are not broken while the stay-arms are off.
3. Remove the eight Phillips-head screws which hold the escutcheon in place.
4. Bend the ends of the escutcheon inward slightly to free them from the end panels, and remove the escutcheon and dial assembly.
5. Remove the three speed-nuts which hold the end in place. Two of these are located in the top part of the case; the third one is in the bottom rear.
6. Pull off the end panel.

To Remove the Left End Panel.

1. Remove the escutcheon and dial assembly as outlined in steps one through four in the preceding paragraph.
2. Unscrew the three flat-head screws from the bottom of the case, and remove the single sheet of metal which forms the front and bottom of the case. Disconnect the speaker plugs from the speaker to free the front panel from the chassis.
3. Remove the three speed-nuts which hold the end in place. Two of these are located in the top part of the case; the third is in the bottom front.

To Remove Top and Rear Cover Assembly.

1. Open the back cover and unsolder the two antenna loop leads. To facilitate replacement, mark each of the metal strips with the color code of the wire which was unsoldered from it.
2. Remove the escutcheon and dial assembly as outlined in steps one through four of the preceding paragraph, "To Remove the Right End Panel."
3. Unscrew the three flat-head screws located near the ends of the hinge on the top of the chassis, and remove the entire top and rear cover assembly.
4. Pull out the hinge pin to separate the top and rear covers.

GENERAL ELECTRIC CO.

STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements may be made with a vacuum-tube voltmeter to check circuit performance and to locate stages which are not operating properly. The gain values listed may have a tolerance of 20%.

1. R-F Stage Gains.

- R-F Amplifier grid (1LN5, pin 6) to Osc.-Conv. grid (1LC6, pin 6).....25.0 at 1000 kc
Osc.-Conv. grid (1LC6, pin 6) to I-F Amp. grid (1LN5, pin 6).....33 at 1000 kc

2. Audio Gain.

The power output across the speaker voice coil should be approximately 50 milliwatts with a 400 cps signal of 0.07 volts applied across C19 (Volume Control max.—Tone Control CCW).

3. Oscillator Grid Bias.

The d-c voltage developed across the oscillator grid leak (R2) averages 8.1 volts at 1000 kc.

4. Socket Pin Voltages.

Fig. 4 shows typical tube pin voltages. All readings should be made from the pins to ground unless otherwise indicated.

BATTERY INFORMATION

The receiver uses a 2-volt Willard Radio Battery No. 25-2 or equivalent. It has a 25 ampere-hour capacity and should be cared for in the same manner as any other storage battery.

Charge Indicator

The degree of charge of the battery can be determined by raising the back cover of the radio and referring to the charge ball indicators visible through the hole in the metal battery case.

If the battery is fully charged, two indicator balls will be visible at the surface of the liquid in the battery. When the battery discharges, these ball indicators will sink and disappear in the following order:

1. Green indicator sinks when approximately 20 per cent of battery capacity has been discharged.
2. The red ball sinks when battery is 80 per cent discharged.

On charge, the balls rise or float in the reverse order and the charge is complete and may be stopped when both balls appear in the opening.

To Charge Battery

The battery is charged by merely plugging the receiver power cord in the rated a-c power outlet and turning the

selector switch to CHARGE. Frequent check should be taken of the charge indicator and when both indicator balls are visible, the battery is fully charged. Charging the battery after all indicator balls are visible will not harm the battery except that it will evaporate the water faster. A completely discharged battery will be restored usually within 20 to 30 hours.

When operating the receiver from the a-c house current, the battery floats or is being charged at a slow rate. Thus, if you wish to operate the receiver at the same time that you are charging even a fully discharged battery, plug the power cord in the a-c receptacle and turn the power selector switch to the ON position. Prolonged and repeated operation on this position will assure that the battery is always maintained in a nearly fully charged condition.

Battery Operating Instructions

1. Add distilled or tap water in the filler cap at sufficiently frequent intervals to keep liquid level at indicator mark as viewed through opening in battery case. DO NOT OVER-FILL as this impairs nonspill feature.

2. A fully charged battery will operate the radio in the ON position without being connected to a-c outlet for about 20 hours before recharging is required. Whenever possible, it is best not to allow the battery to become discharged to the extent that both indicators disappear.

However, if both indicators have sunk, the battery should be recharged immediately or within 24 hours.

3. A battery will continually discharge at a slow rate even when not in use. For this reason, monthly checks should be made of the charge condition and the battery placed on charge when necessary. This will prevent damage to the battery such as freezing during cold weather.

BATTERY INSTALLATION

The following instructions should be carefully followed in installing a battery:

1. Remove battery from packing carton.
2. If needed, add water to bring liquid level to indicator mark on battery container. *Do not overfill.*
3. Raise back cover on radio, remove battery case cover. The latter is removed by unclipping the two catches. Pry off cover.
4. Unplug battery and replace with new battery.
5. Place battery on charge, if necessary, as described in a previous paragraph, until both indicators are showing in the opening in the case cover.

CAT. NO.	SYMBOL	DESCRIPTION
UNIVERSAL G-E REPLACEMENT PARTS LIST		
UCC-030	C8, 17	CAPACITOR—0.1 mf., 400 v., paper
UCC-039	C13, 21, 23	CAPACITOR—0.005 mf., 600 v., paper
UCC-041	C24	CAPACITOR—0.02 mf., 600 v., paper
UCN-506	C5	CAPACITOR—6.8 mmf., ceramic
UCU-028	C7, 18, 19	CAPACITOR—100 mmf., mica
UCU-040	C4	CAPACITOR—330 mmf., mica
UOP-009	LS1	LOUDSPEAKER—5 $\frac{1}{4}$ -inch PM speaker
URD-049	R7	RESISTOR—1,000 ohms, $\frac{1}{2}$ w., carbon
URD-057	R16	RESISTOR—2,200 ohms, $\frac{1}{2}$ w., carbon
URD-059	R15	RESISTOR—2,700 ohms, $\frac{1}{2}$ w., carbon
URD-067	R6	RESISTOR—5,600 ohms, $\frac{1}{2}$ w., carbon
URD-081	R5	RESISTOR—22,000 ohms, $\frac{1}{2}$ w., carbon
URD-089	R3, 9	RESISTOR—47,000 ohms, $\frac{1}{2}$ w., carbon
URD-105	R2, 12	RESISTOR—220,000 ohms, $\frac{1}{2}$ w., carbon
URD-121	R1, 14	RESISTOR—1 meg., $\frac{1}{2}$ w., carbon
URD-129	R8	RESISTOR—2.2 meg., $\frac{1}{2}$ w., carbon
URD-137	R11	RESISTOR—4.7 meg., $\frac{1}{2}$ w., carbon
URE-053	R17	RESISTOR—1,500 ohms, 1 w., carbon

SPECIALIZED G-E REPLACEMENT PARTS

RAC-002		COVER—Battery compartment cover
RAC-003		COVER—Power supply compartment cover
RAC-006		COVER—Case back cover (brown)
RAC-007		COVER—Case back cover (gray)
RAC-010		COVER—Case left end cover (brown)
RAC-011		COVER—Case left end cover (gray)
RAC-012		COVER—Case right end cover (brown)
RAC-013		COVER—Case right end cover (gray)
RAG-002		COVER—Case front and grille (brown)
RAG-003		COVER—Case front and grille (gray)
RAI-001		BRACE—Case cover brace assembly (brown)
RAI-002		BRACE—Case cover brace assembly (gray)
RAX-004		COVER—Case cover assembly (brown)
RAX-005		ASSEMBLY—Cover stay arm assembly
RAX-006		COVER—Case cover assembly (gray)
RBC-001		CELL—Bias cell
RCC-028	B6	CAPACITOR—0.05 mf., 400 v., paper
	C2, 12, 16, 25, 32	
RCC-069	C34	CAPACITOR—0.5 mf., 120 v., paper
RCC-070	C29, 30	CAPACITOR—0.5 mf., 120 v., paper
RCC-073	C31	CAPACITOR—0.003 mf., 1500 v., paper

CAT. NO.	SYMBOL	DESCRIPTION
SPECIALIZED G-E REPLACEMENT PARTS		
RCE-007	C26A, B, C	CAPACITOR—15 mf., 150 v.; 15 mf., 150 v.; 1200 mf., 1.5 v. electrolytic
RCT-008	C1A, B, 2A, B, 3A, B	CONDENSER—Tuning condenser and trimmers
RDC-007		CORD—Drive cord and tension spring
RDE-006		ESCUTCHEON—Dial scale escutcheon
RDK-020		KNOB—Control knob (plain)
RDK-021		KNOB—Control knob (pointer)
RDP-008		POINTER—Dial pointer assembly
RDS-013		SCALE—Dial scale
REF-001	F1	FUSE— $\frac{1}{4}$ -amp. fuse, Type 3AG
REU-001	V1	VIBRATOR—Vibrator unit
REX-001	X1, 2, 3, 4	RECTIFIER—Copper-oxide rectifier assembly
RHF-001		FOOT—Cabinet foot
RHK-001		KNOB—Cover lock knob
RHO-002		TUBE—Battery vent tube
RHX-003		HARDWARE—Tuning condenser mtg. hardware
RIG-001		GASKET—Dial scale gasket
RJS-019		SOCKET—Vibrator socket
RJS-020		SOCKET—Loktal tube socket
RJS-021		PLATE—Electrolytic capacitor mounting plate
RJS-026		SOCKET—Octal base tube socket
RJW-001		HOLDER—Fuse holder
RLB-002	L3	COIL—R-f coil
RLC-008	L4	COIL—Oscillator coil
RLF-001	L5, 6	CHOKE—Vibrator and B+ choke
RLF-002	L7	CHOKE—Filament choke
RLL-008	L1	BEAM-A-SCOPE—Loop antenna assembly (in cover)
RMC-008		CAM—Cover lock mechanism cam
RMC-009		CATCH—Cover lock mechanism catch
RMU-010		SHAFT—Tuning shaft
RMW-004		PULLEY—Pulley and stud (small pulley)
RMW-009		PULLEY—Pulley and stud (large pulley)
RMX-013		CATCH—Battery case catch
RRC-008	R10	VOLUME CONTROL—0.5 meg., potentiometer
RRG-001	R18	RESISTOR—7.5 ohms, $\frac{1}{2}$ w., carbon
RSW-009	S4	SWITCH—Power selector switch
RSW-010	S5	SWITCH—Tone selector switch
RTC-001	T4	TRANSFORMER—Rectifier transformer
RTL-011	T1	TRANSFORMER—1st i-f transformer
RTL-012	T2	TRANSFORMER—2nd i-f transformer
RTO-007	T3	TRANSFORMER—Output transformer
RTV-001	T5	TRANSFORMER—Vibrator transformer
RWL-005	P3	PLUG—Power cord and plug

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MODEL 303

GENERAL ELECTRIC CO.

ELECTRICAL CIRCUIT ALIGNMENT

ALIGNMENT FREQUENCIES

R-F—1620, 1500, 1000 KC

I-F—455 KC

EQUIPMENT REQUIRED

1. Test Oscillator with Tone Modulation.
2. A-C Output Meter, 1½ volts full scale.
3. .05 Paper Condenser.
4. Insulated Screwdriver.
5. 200 μf. Mica Condenser.

ALIGNMENT PROCEDURE—GENERAL

The alignment procedure is given in table form. All i-f and r-f alignments may be made with the chassis removed from the cabinet. All i-f and r-f adjustments are accessible from the bottom of the cabinet when the chassis is installed. The location of the i-f and r-f adjustments is shown in Figure 4. Adjustment of inductances L₂ and T₁ is accomplished by loosening the adjustment screws and sliding the inductance to the correct position using the chassis hole as a fulcrum. Retighten the adjustment screw after alignment.

For accurate calibration, the position of the pointer should be established prior to r-f alignment as follows. If no dial scale is available or if the chassis is removed from the cabinet, turn the tuning control knob fully counterclockwise (slugs fully in the coils) and secure the pointer to the dial string at some arbitrary position near the left end of the dial scale or pointer travel. Mark the pointer position on the backplate or note its position with reference to the number scale stamped on the backplate. Proceed with the alignment as indicated in the alignment chart and mark the pointer position for 1500 kc. The distance between the original reference mark and the 1500 kc mark should be 5.25 inches for accurate dial calibration. After installation of the chassis in the cabinet, the tuning control is turned extreme counterclockwise and the pointer slid and secured to the string at the extreme left rectangular dial calibration mark on the scale. The pointer is accessible through the hole in the backplate.

The output meter should be connected across the loud-speaker voice coil terminal. A voice coil terminal is accessible at an insulated rivet in the bottom of the chassis. The low side of the test oscillator output should be connected to the chassis ground; the high side of the test oscillator output should be connected as indicated in the alignment chart. During the entire alignment procedure, the volume control should be at its maximum position. The test oscillator output should be attenuated so that the output meter reading doesn't exceed 1¼ volts.

ALIGNMENT CHART

Step	Connect Test-Osc. To:	Test-Osc. Setting	Pointer Setting on Radio	Adj. for Max. Output
1	6SK7 pin No. 4 in series with .05 mf. paper capacitor	455 kc	1600 kc	2nd I-F Trans Trimmers C9-C10
2	6SB7Y pin No. 8 in series with .05 mf. paper capacitor	455 kc	1600 kc	1st and 2nd I-F Trans. C6, C7, C9, and C10
3	Antenna post in series with 200 mmf. capacitor. Shorting link removed.	1620 kc	Extreme Right	Osc. Trimmer C5
4	Antenna post in series with 200 mmf. capacitor. Shorting link removed.	1620 kc	Extreme Right	Ant. Trimmer C2
5	Antenna post in series with 200 mmf. capacitor. Shorting link removed.	1500 kc	*1500 kc	Oscillator Inductance L2
6	Antenna post in series with 200 mmf. capacitor. Shorting link removed.	1000 kc	1000 kc	Antenna Inductance T1
7	Recheck Steps 3, 4, 5, and 6.			
8	Replace shorting link unless installing for antenna operation.			

* 1500 kc is 5.25 inches from extreme low frequency pointer position. (See alignment procedure.)

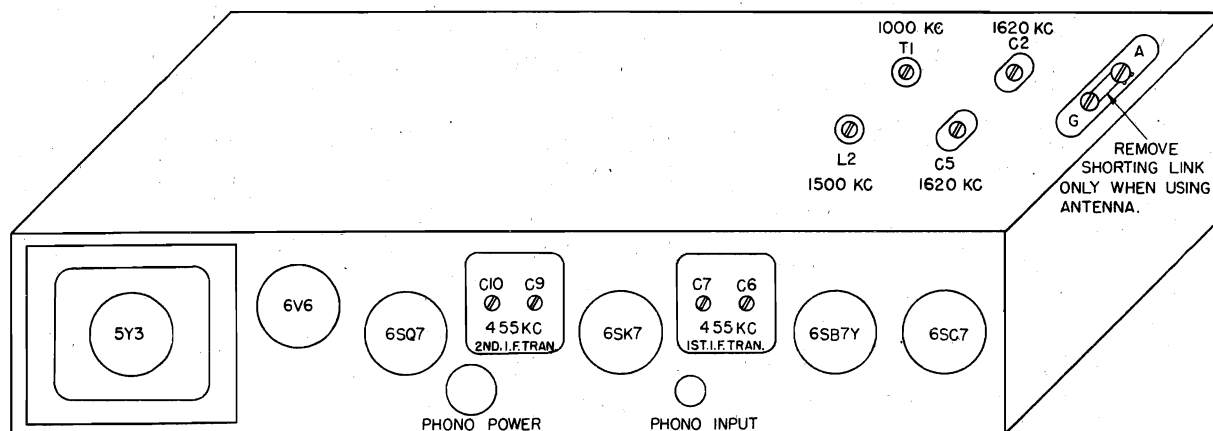
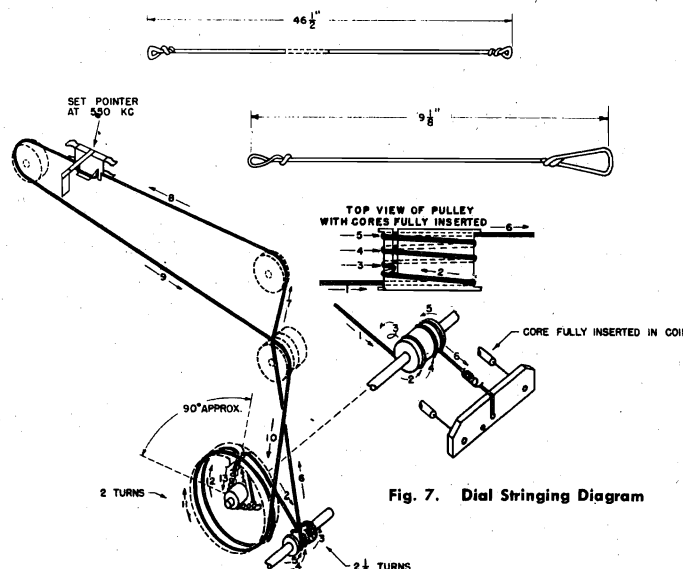


Fig. 4. Tube and Trimmer Location

GENERAL ELECTRIC CO.



STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements may be made with a vacuum tube voltmeter to check circuit performance and to locate stages which are not operating properly. The gain values listed may have a tolerance of 20%.

1. R-F Stage Gain.

Antenna post to 6SB7Y grid 1.3 at 1000 kc
6SB7Y grid to 6SK7 grid 70 at 455 kc
6SK7 grid to 6SQ7 diode plate 70 at 455 kc

2. Audio Gain.

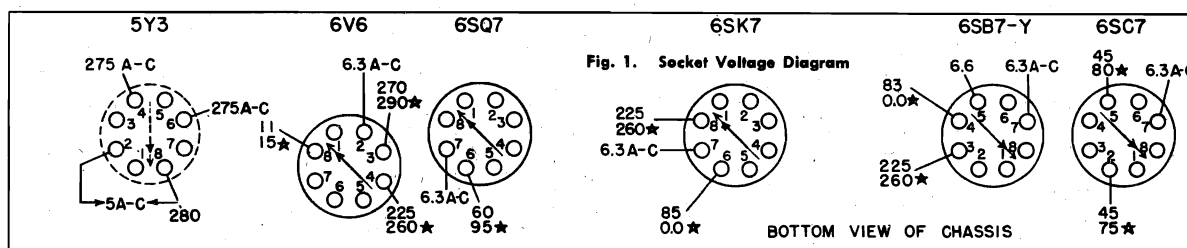
The power output across the speaker voice coil should be approximately 1/2 watt with .05 volts at 400 cps applied between the high side of the volume control and ground. Approximately .008 volts at 400 cps should be applied to the phonograph input for 1/2 watt output across the speaker voice coil.

3. Oscillator Grid Bias.

The d-c voltage developed across the oscillator grid leak R2 should be approximately 6.6 volts at 1000 kc.

4. Socket Pin Voltages.

Socket pin voltages greatly different than those shown in Figure 1 indicate defective components or tubes. It should be noted that a considerable difference in voltage exists at some voltage check points depending on the position of the radio-phonograph switch. (See Fig. 1).



CONDITIONS OF TEST

VALUES OBTAINED WITH 20000 OHMS PER VOLT METER

READINGS ARE BETWEEN PIN AND CHASSIS WITH A LINE VOLTAGE OF 117 VOLTS

VOLUME CONTROL MINIMUM

NO SIGNAL INPUT

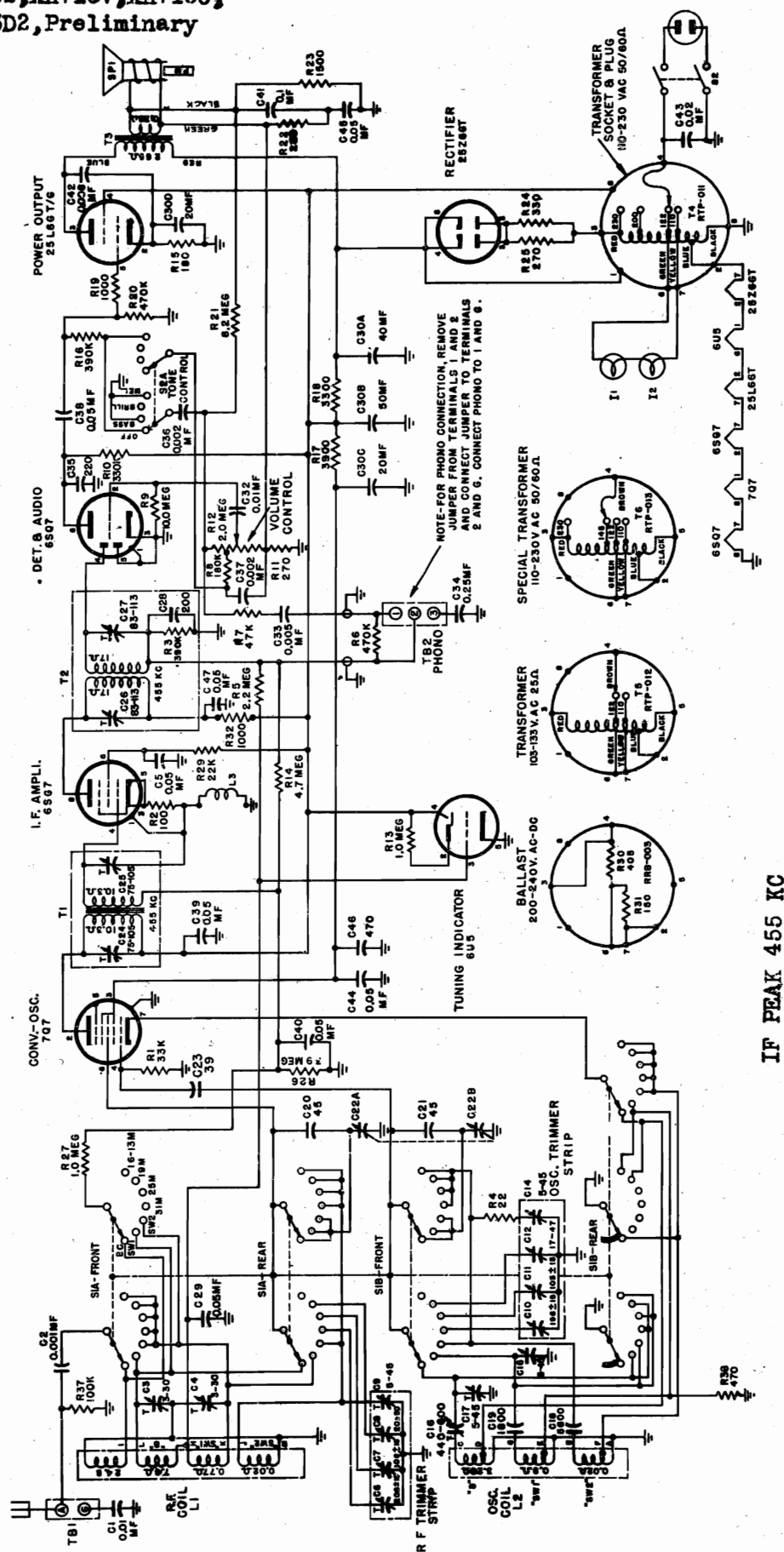
★ VALUES OBTAINED WITH RADIO-PHONO SWITCH IN PHONO POSITION

ALL READINGS TAKEN WITH RADIO-PHONO SWITCH IN RADIO POSITION UNLESS OTHERWISE INDICATED

PART NO.	SYMBOL	DESCRIPTION	PART NO.	SYMBOL	DESCRIPTION
UNIVERSAL G-E REPLACEMENT PARTS			SPECIALIZED G-E REPLACEMENT PARTS (Cont'd)		
UCC-035	C15, 16	CAPACITOR—.001 mfd., 600 v., paper	RCE-033	C21A	CAPACITOR—30 mf., 350 v., dry electrolytic
UCC-039	C14	CAPACITOR—.005 mfd., 600 v., paper		C21B	CAPACITOR—30 mf., 350 v., dry electrolytic
UCC-040	C11, 18, 22, 23	CAPACITOR—.01 mfd., 600 v., paper		C21C	CAPACITOR—15 mf., 250 v., dry electrolytic
UCC-041	C8, 19	CAPACITOR—.02 mfd., 600 v., paper		C21D	CAPACITOR—20 mf., 25 v., dry electrolytic
UCC-045	C3, 24	CAPACITOR—.05 mfd., 600 v., paper	RCY-013	C2	CAPACITOR—Antenna trimmer, 20-75 mmf.
UCC-057	C20	CAPACITOR—.003 mfd., 1000 v., paper	RDC-013	C5	CAPACITOR—Oscillator trimmer, 220-275 mmf.
UCN-506	C1	CAPACITOR—6.8 mmf., 500 v., ceramic	RDC-014		CORD—Tuning mechanism drive cord 9 1/2 in.
UCU-020	C4	CAPACITOR—47 mmf., 500 v., mica	RDF-005		WASHER—Felt washers for control knobs
UCU-044	C13	CAPACITOR—470 mmf., 500 v., mica	RDK-002		KNOB—Phono-radio and tone control (pointer)
UIC-001		CEMENT—Speaker cone replacement cement	RDK-006		KNOB—Tuning and volume control (plain)
UOP-628	SPKR	SPEAKER—6 inch permanent magnet	RDP-014		POINTER—Dial pointer and slide
UOX-001		CONE—Speaker cone and dust cap	RDS-020		SCALE—Dial scale and cushion
URD-025	R11	RESISTOR—100 ohms, 1/2 w., carbon	REI-005		CORE—Iron core for tuning antenna and oscillator coils
URD-041	R28	RESISTOR—180,000 ohms, 1/2 w., carbon	RHG-003		GROMMET—Mounting grommet for 6SC7 socket
URD-053	R14	RESISTOR—1500 ohms, 1/2 w., carbon	RHH-004		FASTENER—Holds bottom plate on
URD-057	R4, 27	RESISTOR—2200 ohms, 1/2 w., carbon	RJA-001		ADAPTER—Connects control knobs to control shaft
URD-067	R17	RESISTOR—5600 ohms, 1/2 w., carbon	RJC-001		PLUG—Connects to speaker
URD-081	R2	RESISTOR—22,000 ohms, 1/2 w., carbon	RJP-010	J2	SOCKET—Phono input socket on chassis
URD-083	R24	RESISTOR—27,000 ohms, 1/2 w., carbon	RJS-003		SOCKET—6SB7-Y socket
URD-093	R22	RESISTOR—68,000 ohms, 1/2 w., carbon	RJS-006		SOCKET—Octal socket
URD-097	R8, 20, 21, 10	RESISTOR—100,000 ohms, 1/2 w., carbon	RJS-031		SOCKET—6SC7 socket
URD-103	R28	RESISTOR—180,000 ohms, 1/2 w., carbon	RJS-033		SOCKET—Pilot light socket
URD-106	R7	RESISTOR—220,000 ohms, 1/2 w., carbon	RJS-049	J1	SOCKET—Phono power socket
URD-109	R25	RESISTOR—330,000 ohms, 1/2 w., carbon	RLA-010	T1	COIL—Antenna coil assembly (less iron core)
URD-113	R13, 15	RESISTOR—470,000 ohms, 1/2 w., carbon	RLC-019	L2	COIL—Oscillator coil assembly (less iron core)
URD-121	R1	RESISTOR—1.0 meg., 1/2 w., carbon	RLC-020	L3	COIL—Oscillator padder
URD-129	R6	RESISTOR—2.2 meg., 1/2 w., carbon	RLL-011	L1	BEAM-A-SCOPE—Loop antenna assembly
URD-133	R23, 26	RESISTOR—3.3 meg., 1/2 w., carbon	RMS-004		SPRING—Tuning Drive Cord Tension Spring
URD-145	R12	RESISTOR—10.0 meg., 1/2 w., carbon	RMS-056		SPRING—Main Drive Cord Tension Spring
URE-037	R16	RESISTOR—330 ohms, 1 w., carbon	RMW-003		PULLEY—Idle pulley for dial string
URF-057	R18	RESISTOR—2200 ohms, 2 w., carbon	RMX-013		SHAFT—Shaft assembly for driving tuning mechanism
URF-075	R19	RESISTOR—12,000 ohms, 2 w., carbon	RMX-014		SHAFT—Tuning control shaft assembly
SPECIALIZED G-E REPLACEMENT PARTS			RPX-010	PU	PICK-UP—Magnetic pick-up cartridge
RAC-015		COVER—Cabinet bottom	RRC-029	R9	VOLUME CONTROL AND POWER SWITCH—2 meg. tapped at 1 meg.
RAD-016		BRACKET—For pilot light	RSW-018	S3	SWITCH—Radio phone
RCC-001	C17	CAPACITOR—.007 mfd., 600 v., paper	RSL-020	G1	SWITCH—Tone control
RCD-001		SHAFT—Tuner assembly consisting of slide shaft and bracket (less iron cores)	RTL-020	T4	TRANSFORMER—2nd IF Transformer
			RTL-021	T3	TRANSFORMER—1st IF Transformer
			RTO-013	T5	TRANSFORMER—Output transformer
			RTP-021	T6	TRANSFORMER—Power transformer
			RWL-009		CORD—Power cord and plug

MODELS X-317V, X317C,
X-317D2, XH713V, XH713C,
XH-713D2, Preliminary

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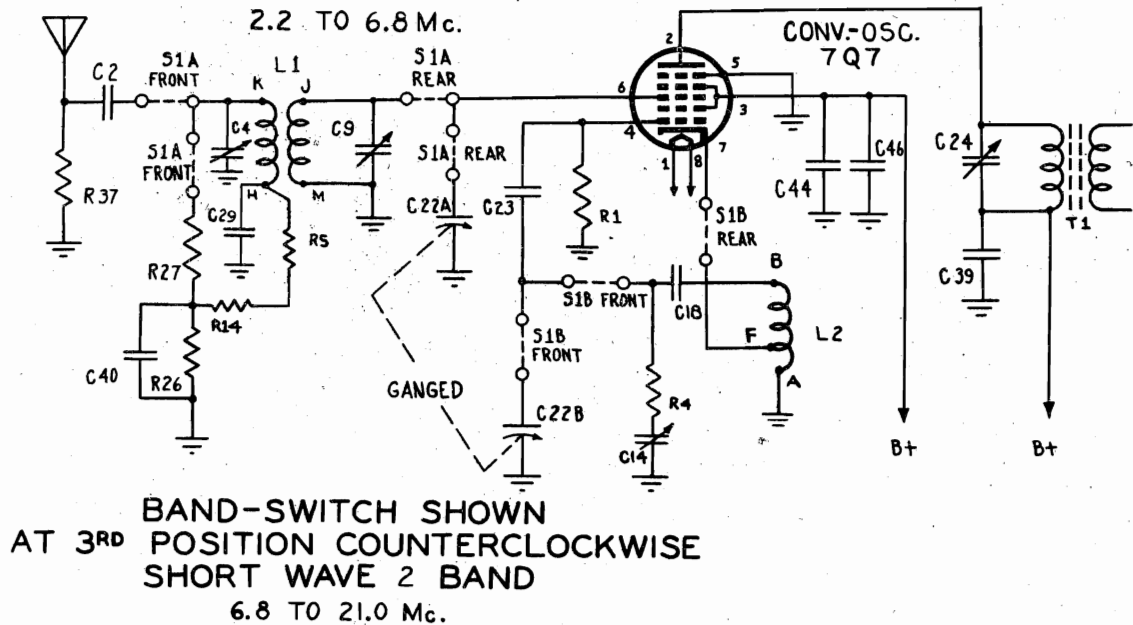
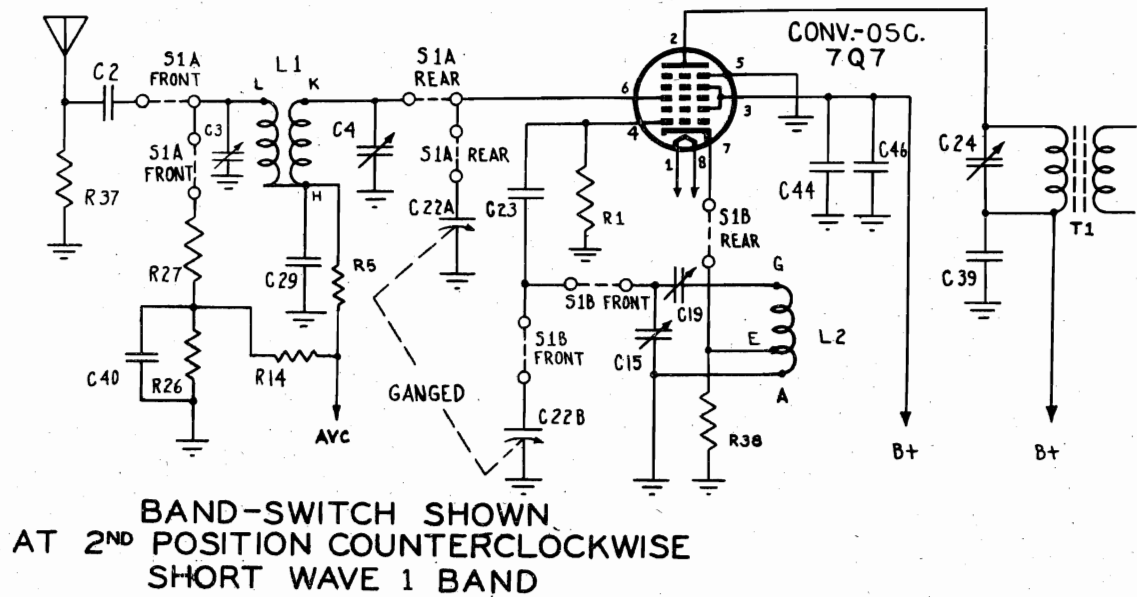
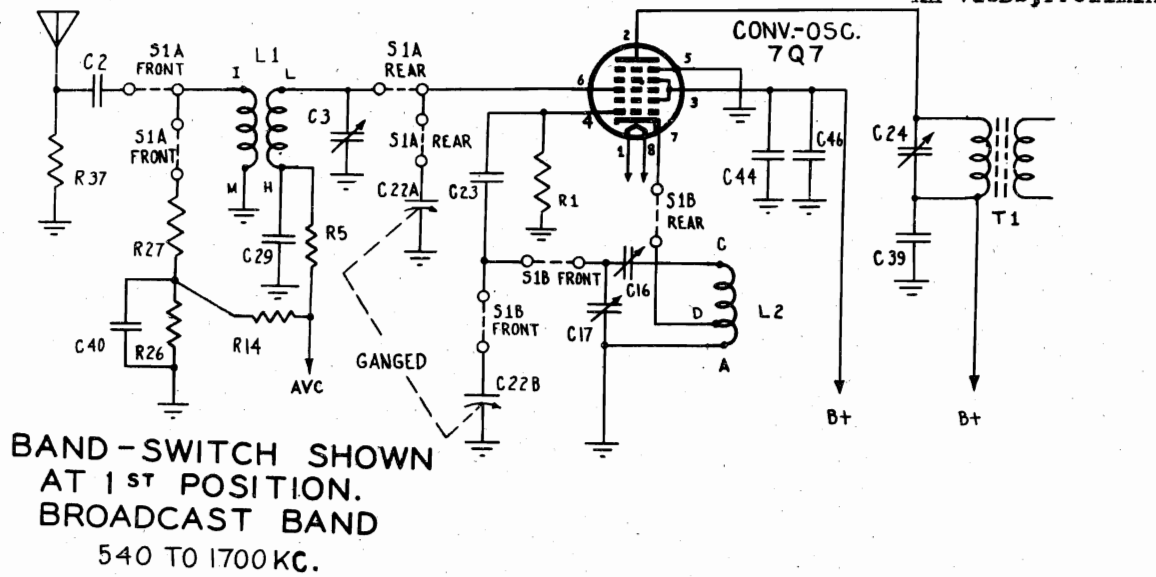


IF PEAK 455 KC

- | | | |
|-----------------|---------------------|--------------------------|
| (1) X317V Univ. | (2) X317C 25 cycle | (3) X317D2 230 V. AC-DC |
| (4) XH713V " | (5) XH713C 25 cycle | (6) XH713D2 230 V. AC-DC |

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MODELS X-317V, X-317C,
X-317D2, XH-713V, XH-713C,
XH-713D2, Preliminary

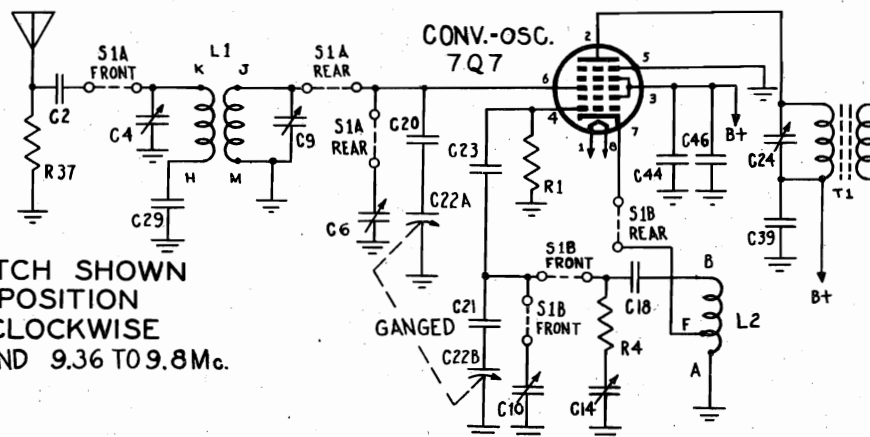


"clarified schematics"

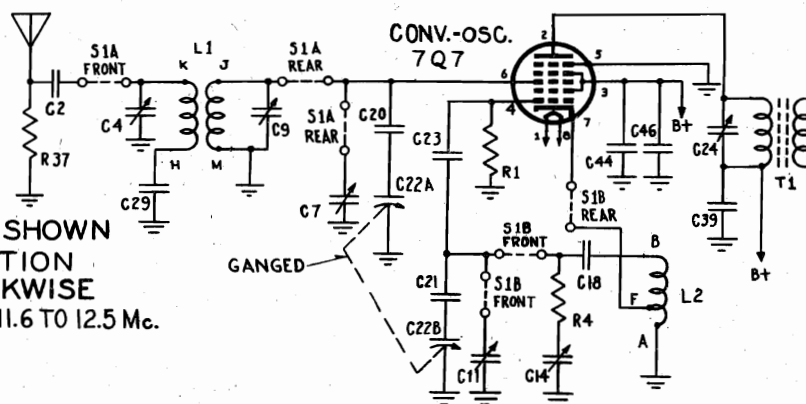
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X-317D2, XH-713V,
XH-713C, XH-713D2
Preliminary

GENERAL ELECTRIC CO.

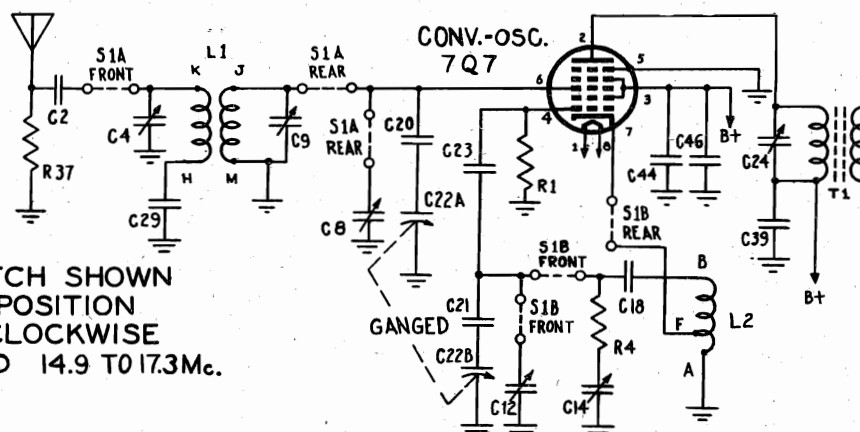
BAND-SWITCH SHOWN
AT 4TH POSITION
COUNTERCLOCKWISE
31 METER BAND 9.36 TO 9.8 Mc.



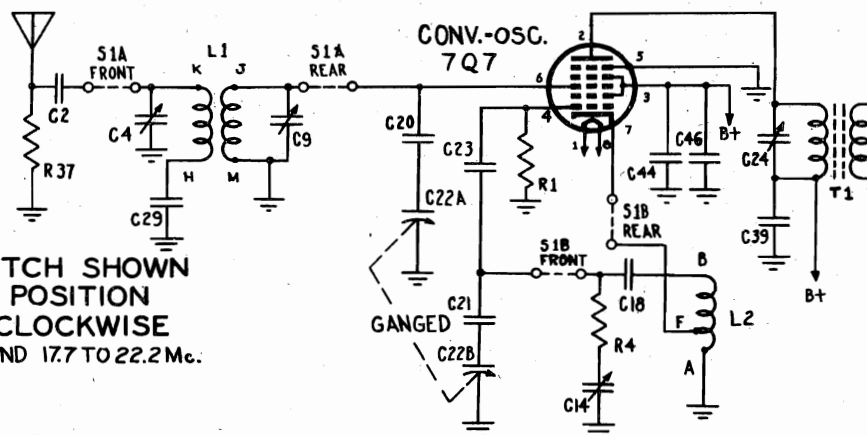
BAND-SWITCH SHOWN
AT 5TH POSITION
COUNTERCLOCKWISE
25 METER BAND 11.6 TO 12.5 Mc.



BAND-SWITCH SHOWN
AT 6TH POSITION
COUNTERCLOCKWISE
19 METER BAND 14.9 TO 17.3 Mc.



BAND-SWITCH SHOWN
AT 7TH POSITION
COUNTERCLOCKWISE
16-13 METER BAND 17.7 TO 22.2 Mc.



GENERAL ELECTRIC CO.

MODELS X-317V, X-317C
X-317D2, XH-713V,
XH-713C, XH-713D2,
Preliminary

CAUTION

ONE SIDE OF THE POWER LINE IS CONNECTED TO THE CHASSIS. AVOID ANY GROUND CONNECTIONS TO THE RADIO UNLESS AN ISOLATING TRANSFORMER IS USED IN THE POWER LINE.

ELECTRICAL CIRCUIT ALIGNMENT

The following equipment is required: (1) test oscillator with tone modulation, (2) a-c output meter, 1 1/2 volts full scale, (3) 0.05 mf. paper capacitor, (4) 200 mmf. mica capacitor, (5) insulated screwdriver.

PROCEDURE:

- (1) For i-f alignment, the chassis must be removed from the cabinet. For r-f alignment, the chassis should be firmly bolted in place in the cabinet.
- (2) Connect output meter across loudspeaker voice coil leads.
- (3) Set radio volume control to its maximum position and attenuate test oscillator signal output so that the output meter reading never exceeds 1 1/4 volts.
- (4) Connect the capacitor as listed in column 2, between the output "High Side" of test oscillator and the point of input specified.

TUBE COMPLEMENT:

Converter-Oscillator..... Type 7Q7
I-F Amplifier..... Type 6SG7
Detector-Audio..... Type 6SQ7
Power Output..... Type 25L6GT/G
Rectifier..... Type 25Z6GT
Tuning Indicator..... Type 6U5
Pilot Lamp..... (2) GE #44

ELECTRICAL RATING:

"C" Voltage Rating
(Transformer RTP-012)... 103-133 v., 25-60 cycles
"D2" Voltage Rating
(Ballast RRB-003)..... 210-240 v., a-c or d-c
"V" Voltage Rating
(Transformer RTP-011)... 103-250 v., 50-60 cycles
Wattage ("C" and "V" Ratings)..... 60 watts
Wattage (D2 Rating)..... 100 watts

OPERATING FREQUENCIES:

Broadcast..... 540-1700 kc
Shortwave 1..... 2.2-6.8 mc
Shortwave 2..... 6.8-21.0 mc
31 Meters..... 9.36-9.8 mc
25 Meters..... 11.6-12.5 mc
19 Meters..... 14.9-17.3 mc
16-13 Meters..... 17.7-22.2 mc
I-F Amplifier..... 455 kc

ALIGNMENT CHART

Step	Test Osc. Connected to	Test-Osc. Setting	Band & Pointer Setting	Tune Trimmer for Max. Output
1	6SG7 I-F grid in series with .05 mfd. cap.	455 KC	"BC" BAND 550KC	C26 and C27
2	7Q7 CONV. grid in series with .05 mfd. cap.	455 KC	"BC" BAND 550KC	C24 and C25
3	ANT. POST in series with 200 mmf.	580 KC	"BC" BAND 580KC	C16**
4	ANT. POST in series with 200 mmf.	1500 KC	"BC" BAND 1500KC	C17 (osc.) C3 (ant.)
5	R E P E A T S T E P 3			
6	ANT. POST in series with 200 mmf.	6.1 MC	"SW-1" BAND 6.1 MC	C15 (osc.) C4 (ant.)
7	ANT. POST in series with 200 mmf.	17.8 MC	16 METER 17.8MC	C14* (osc.)
8	ANT. POST in series with 200 mmf.	21.6 MC	16 METER 21.6MC	C9*** (ant.)
9	ANT. POST in series with 200 mmf.	15.22 MC	19 METER 15.22MC	C12* (osc.) C8*** (ant.) *
10	ANT. POST in series with 200 mmf.	11.8 MC	25 METER 11.8MC	C11* (osc.) C7*** (ant.)
11	ANT. POST in series with 200 mmf.	9.6 MC	31 METER 9.6MC	C10* (osc.) C6*** (ant.)

*Use minimum capacity peak if two are obtainable. ***Use maximum capacity peak if two are obtainable.
**Rock gang condenser for optimum peak.

SOCKET VOLTAGES

CONDITIONS OF TEST: 100 ohm/volt meter used. All measurements made to chassis.
Values are +d-c unless otherwise noted.
"C" and "V" Rating - 110 volts on 110 v. tap. "D2" Rating - 220 volts a-c:

Pin Number	1	2	3	4	5	6	7	8
7Q7	12.6 AC	131	98	...	GND	...	0	6.3 AC
6SG7	0	12.6 AC	1.0	...	1.0	82	18.9 AC	131
6SQ7	0	.....	0	0	.....	60	6.3 AC	0
25L6GT/G	.....	43.9 AC	201	131	.....	...	18.9 AC	10
25Z6GT	.....	.....	210 AC	216	210 AC	...	.....	216

MODELS X-317V, X-317C,
X-317D2, XH-713V,
XH-713C, XH-713D2,
Preliminary

GENERAL ELECTRIC CO.

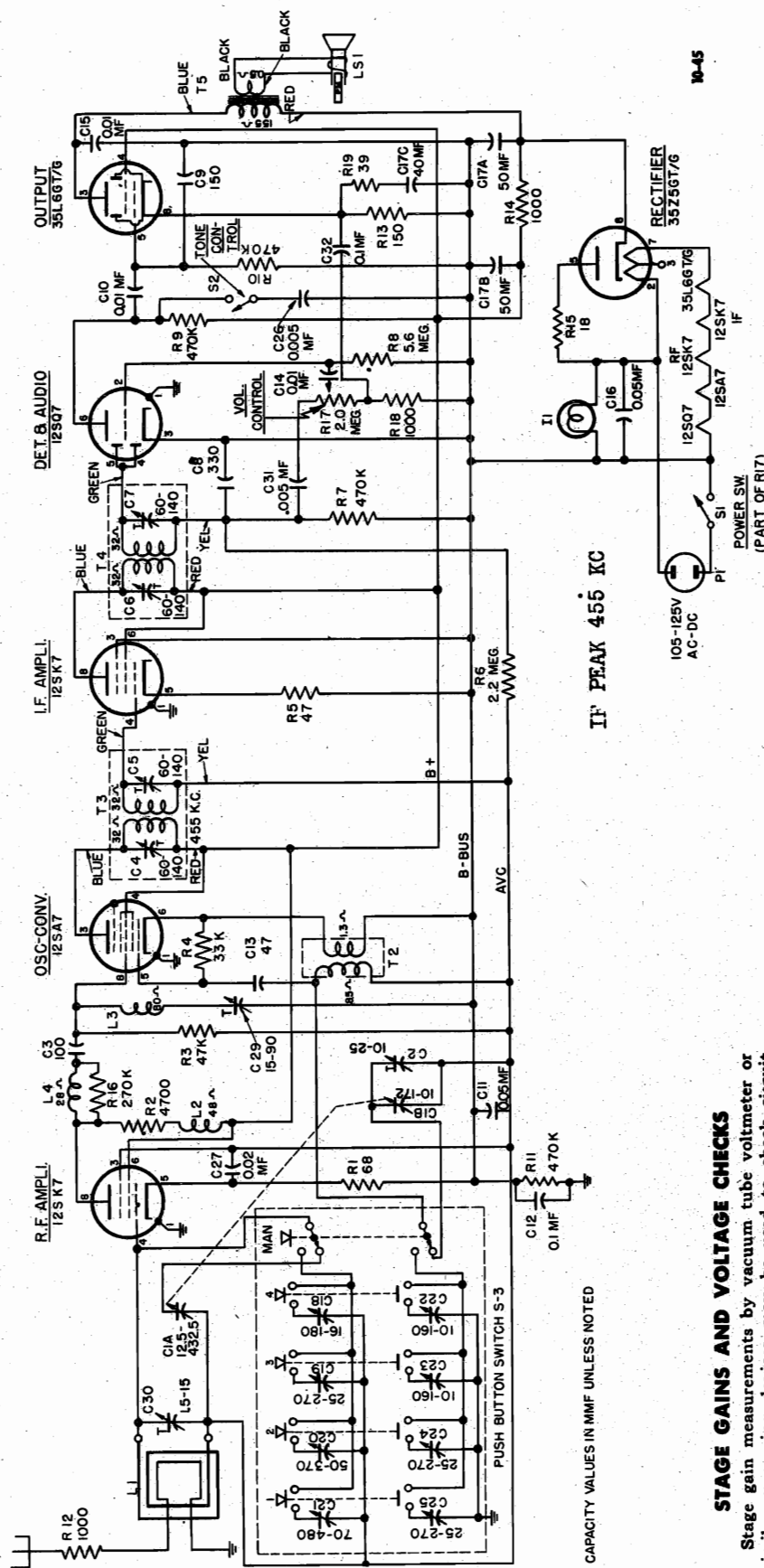
Cat. No.	Description	Model	Quan. Used Per Set	Symbol	Cat. No.	Description	Model	Quan. Used Per Set	Symbol
RAB-012	Cabinet back	All	1		RTP-012	Power transformer	2-5	1	T-5
RAV-004	Cabinet	1-2-3	1		RWL-009	Power cord	All	1	
RAV-005	"	4-5-6	1		RWX-001	Cable (tuning eye)	"	1	R-13
RCE-026	Dry Electrolytic 40-300, 50420-250 20-25	All	1	C-30 a-b-c-d.	UCG-036	Capacitor (paper)	"	2	C-36, 37
					UCG-039	"	"	1	C-33
					UCG-040	"	"	2	C-1, 32
					UCG-045	"	"	7	C-5, 29, 38, 39, 40, 44, 45
RCS-001	Line capacitor .02 mfd. 600 V.	All	1	C-43				1	C-41
RCT-007	Tuning capacitor	"	2	C-22 a & b	UCG-048	"	"	1	C-2
RCT-030	Compensating capacitor 45 mmf.	"	1	C-20, 21	UCG-049	"	"	1	C-34
RCX-004	Trimmer Strip (spread antenna)	"	1	C-6, 7, 8, 9	UCG-050	"	"	1	C-42
RCX-005	" " (B-C ant.)	"	1	C-3, 4	UCG-061	"	"	1	C-35
RCX-006	" " (oscillator)	"	1	C-10, 11, 12, 14, 15, 16, 17	UCU-036	Capacitor (mica) 220 mfd.	"	1	C-46
RDC-006	Drive cord assembly	"	1		UCU-044	"	"	1	C-18
RDF-005	Felt washer	"	4		UCU-2557	"	"	1	C-23
RDK-017	Knob & spring	4-5-6	2		UCU-2570	"	"	1	
RDK-018	"	4-5-6	2		UCM-1018	"	"	1	
RDK-019	"	1-2-3	2		UIC-001	Cement for speaker	"	1	
RDK-024	"	1-2-3	2		UJP-802	Speaker 8" H	"	1	
RDP-007	Pointer assembly	All	1		UCX-004	Cone and voice coil assembly	"	1	
RDS-010	Scale	1-2-3	1		URD-009	Resistor (carbon) 22 ohm. 1/2 W.	"	1	
RDS-011	"	4-5-6	1		URD-025	"	"	1	
RDX-011	Pilot light socket assembly	All	1		URD-033	"	"	1	
RDX-016	Drum assembly	"	1		URD-035	"	"	1	
RHC-001	Hairpin cotter	"	2		URD-041	"	"	1	
RHJ-002	Tuning shaft spacer	"	1		URD-049	"	"	1	
RHM-019	Tuning eye thumb screw	"	1		URD-053	"	"	1	
RHX-004	Mounting plate & bearing assembly	"	1		URD-081	"	"	1	
RJC-003	Contact (female)	"	5		URD-085	"	"	1	
RJS-012	Mtg. plate	"	1		URD-089	"	"	1	
RJS-017	Tube socket	"	5		URD-097	"	"	1	
RJS-018	"	"	1		URD-103	"	"	1	
RLA-002	Antenna coil	"	1	L-1	URD-109	"	"	1	
RLC-007	Oscillator coil	"	1	L-2	URD-111	"	"	1	
RLN-002	I.F. Neutralizing coil	"	1	L-3	URD-113	"	"	2	
RMG-005	Clamp (scale)	"	2		URD-121	"	"	1	
RMG-006	Clamp (tuning eye)	"	2		URD-129	"	"	1	
RMH-006	Pilot light shield	"	1		URD-135	"	"	1	
RMS-005	Spring (dial cord)	"	1		URD-137	"	"	1	
RMU-006	Tuning shaft	"	1		URD-143	"	"	1	
RMV-006	Pulley and pin	"	2		URD-145	"	"	1	
RRB-003	Ballast tube	"	1		URE-031	"	"	1	
RRC-007	Volume control	3-6	1		URE-031	"	"	1	
RSI-008	Band change switch	All	1	R-12	URE-063	"	"	1	
RSX-004	Tone control and AC switch	"	1	S-1	URF-035	"	"	1	
RTL-009	1st I.F. transformer	"	1	S-2 a & b	URF-037	"	"	1	
RTL-010	2nd " "	"	1	T-1	URF-061	"	"	1	
RTQ-006	Output " "	"	1	T-2				1	
RTP-011	Power transformer	1-4	1	T-3				1	
				T-4				1	

(3) X317D2 230 V. AC-DC
(6) XH713D2 230 V. AC-DC

(1) X317V Univ.
(4) XH713V "

(2) X317C 25 cycle
(5) XH713C 25 cycle

GENERAL ELECTRIC CO.



STAGE GAINS AND VOLTAGE CHECKS

Stage gain measurements by vacuum tube voltmeter or similar measuring devices may be used to check circuit performance and isolate trouble. The gain values listed may have tolerances of 20%. Readings taken with low signal input so that AVC is not effective.

- (1) R-F Stage Gains.
 - Antenna Post to 12SK7 r-f grid..... 3 at 1000 kc
 - 12SK7 r-f grid to 12SA7 grid..... 13 at 1000 kc
 - 12SA7 grid to 12SK7 i-f grid..... 30 at 455 kc
 - 12SK7 i-f grid to 12SQ7 diode plate.. 60 at 455 kc
- (2) Audio Gain.
 - 0.10 volts at 400 cycles across volume control (R17) with control set at maximum, will give approximately 1/2 watt speaker output.
- (3) Oscillator Grid Bias.
 - D-c voltage developed across the oscillator grid leak (R4) averages 7.5 volts at 1000 kc.
- (4) Socket Pin Voltages.
 - Fig. 5 shows voltages from all tube pins to B - unless otherwise specified. Voltage readings much lower than those specified may help localize defective components or tubes.

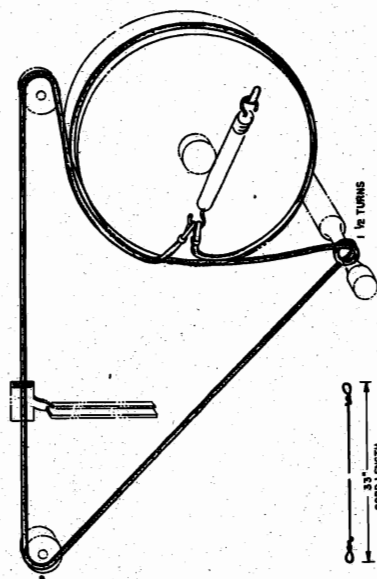


Fig. 1. Dial Cord Stringing

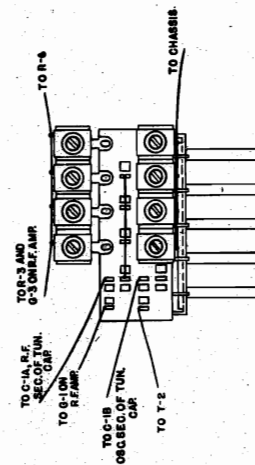
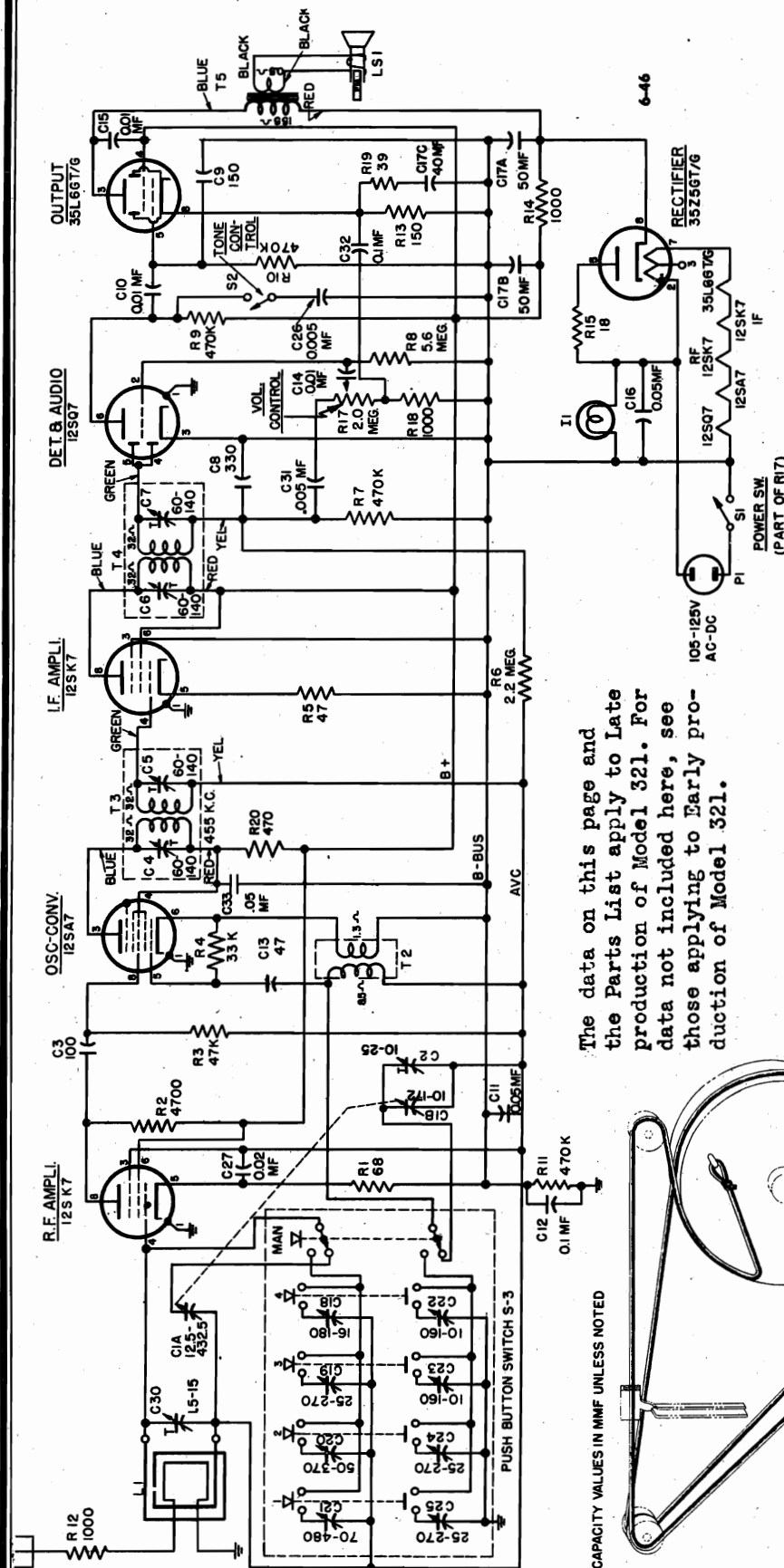


Fig. 3. Selector Switch Wiring Diagram

MODEL 321 Late

GENERAL ELECTRIC CO.



The data on this page and the Parts List apply to Late production of Model 321. For data not included here, see those applying to Early production of Model 321.

CAPACITY VALUES IN MMF UNLESS NOTED

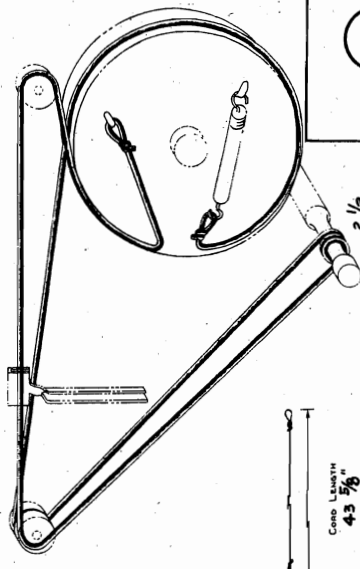
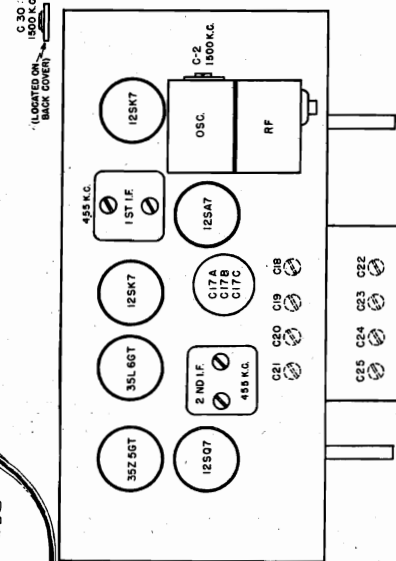


Fig. 1. Dial Cord Stringing

ALIGNMENT CHART

Step	Connect Test Oscillator To	Test Osc. Setting	Pointer Setting on Radio	Adjustment For Maximum Output
1	12SK7 i-f grid in series with 0.05 mf. capacitor.	455 kc	1500 kc	2nd i-f trans. trimmers
2	12SA7 grid in series with 0.05 mf. capacitor.	455 kc	1500 kc	1st and 2nd i-f trans. trimmers
3	Ant. post in series with 50 mmf.	1500 kc	1500 kc	C2 (Osc.)
4	Ant. post in series with 50 mmf.	1500 kc	1500 kc	C30 (r-f)



GENERAL ELECTRIC CO.

MODEL 321 Early

ALIGNMENT PROCEDURE

ALIGNMENT FREQUENCIES

R-F.....1500 kilocycles
I-F.....455 kilocycles

EQUIPMENT REQUIRED

1. Test oscillator with audio tone modulation
2. A-C output meter, 1½ volts full scale
3. 0.05 mf. paper capacitor
4. 50 mmf. mica capacitor
5. Insulated screwdriver

PROCEDURE—GENERAL

1. Turn dial control until pointer is as far to the left as it will go. The pointer should coincide with the first marking at the left of the scale. If it doesn't, remove chassis and slip pointer along drive cord until pointer is under reference mark when chassis is bolted in place.

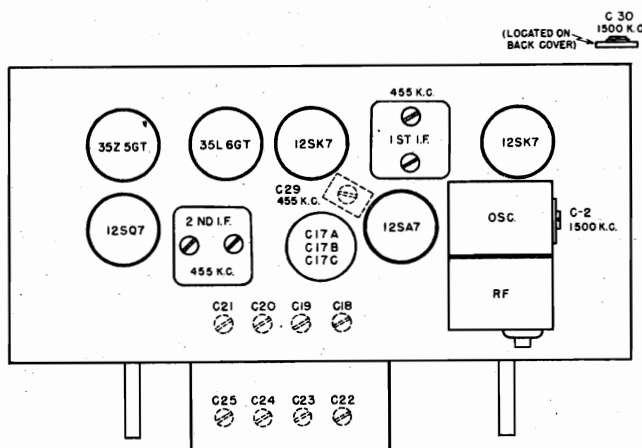


Fig. 4. Tube and Trimmer Location

ALIGNMENT CHART

Step	Connect Test Oscillator To	Test Osc. Setting	Pointer Setting on Radio	Adjustment For Maximum Output
*1	12SK7 i-f grid in series with 0.05 mf. capacitor.	455 kc	1500 kc	2nd i-f trans. trimmers
*2	12SA7 grid in series with 0.05 mf. capacitor.	455 kc	1500 kc	1st and 2nd i-f trans. trimmers
3	Ant. post in series with 50 mmf.	455 kc	1500 kc	C-29 (wave-trap) adjust for minimum output
4	Ant. post in series with 50 mmf.	1500 kc	1500 kc	C2 (Osc.)
5	Ant. post in series with 50 mmf.	1500 kc	1500 kc	C30 (r-f)

*Disconnect wavetrap (L3, C29) from circuit before making these alignments.

2. For i-f and r-f alignments, the output meter is connected across the loudspeaker voice coil terminals.

3. Keep radio volume control set at maximum and attenuate test oscillator signal output so that the output meter reading never exceeds 1¼ volts.

4. For i-f alignment, remove chassis from cabinet. For r-f alignment, the chassis should be bolted in the cabinet. Since the oscillator trimmer (C-2) is not accessible when the chassis is bolted in the cabinet, before C-2 adjustment, set pointer and test oscillator to 1500 kc and then remove chassis carefully from cabinet, so as not to disturb the setting of the dial pointer. Adjust oscillator trimmer (C-2) for maximum output and replace chassis in cabinet, then proceed with r-f trimmer (C-30) alignment.

5. Connect the capacitor as listed in column 2 between the "high side" of the test oscillator and the point of input specified. The ground terminal of the test oscillator may be connected to B— in the chassis providing an isolating transformer is used between the radio and the line input, otherwise use a suitable capacitor.

ELECTRICAL RATING (INPUT)

Voltage.....105-125 volts a-c or d-c
Frequency (on a-c).....25 to 60 cycles
Wattage.....40 watts

OPERATING FREQUENCIES:

Broadcast Band.....540-1600 kilocycles
I-F Amplifier.....455 kilocycles

POWER OUTPUT (117 volts line)

Undistorted.....1.2 watts
Maximum.....1.5 watts

LOUDSPEAKER:

Type.....Alnico P.M.
Outside Cone Diameter.....5¼ inches
Voice Coil Impedance (400 cycles)...3.5 ohms

STATION KEY ADJUSTMENTS—The station key adjustments are located on the bottom of the cabinet through the slots designated as "Osc." and "R-F." The extreme left trimmers in rows "Osc." and "R-F" are corresponding adjustments for the first or extreme left station key. The second set of adjustment trimmers is for the No. 2 or second key from the left; correspondingly the remaining sets of trimmers are for the station keys No. 3 and No. 4. Turn power ON and allow radio to operate 15 minutes before making the following adjustments.

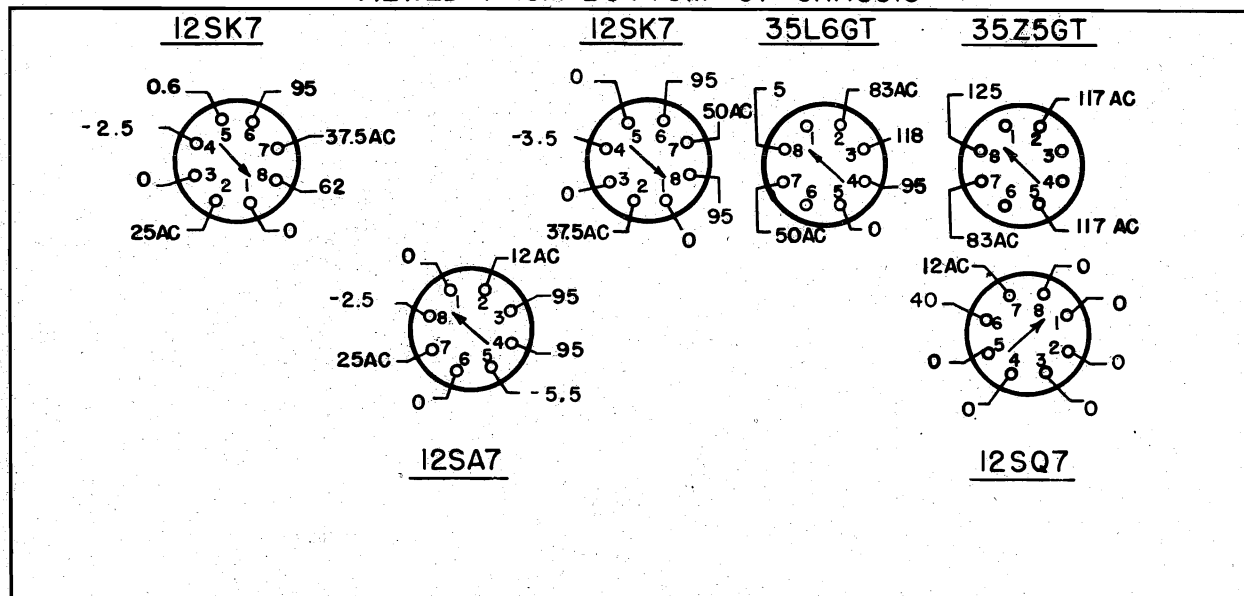
1. List the desired station on key, then depress the "Manual" key. Tune in the station desired for the key.
2. Push in station key to be set up, to its depressed position.
3. Adjust its corresponding "Osc." adjustment for the station signal which you tuned in step 1 and which is listed for the key. Peak the adjustment for the clearest program reception.
4. Adjust corresponding "R-F" adjustment for maximum signal strength.
5. Proceed in like manner for adjustment of the remaining keys.

Note: Clockwise rotation of adjustment screws lowers the frequency.

MODEL 321 Early

GENERAL ELECTRIC CO.

VIEWED FROM BOTTOM OF CHASSIS



CONDITIONS OF TEST

MEASURED AT 117 VOLTS LINE ON A 20,000
OHMS PER VOLT METER
READINGS TAKEN BETWEEN TUBE PIN TERMINALS
AND B-BUS.
NO SIGNAL INPUT

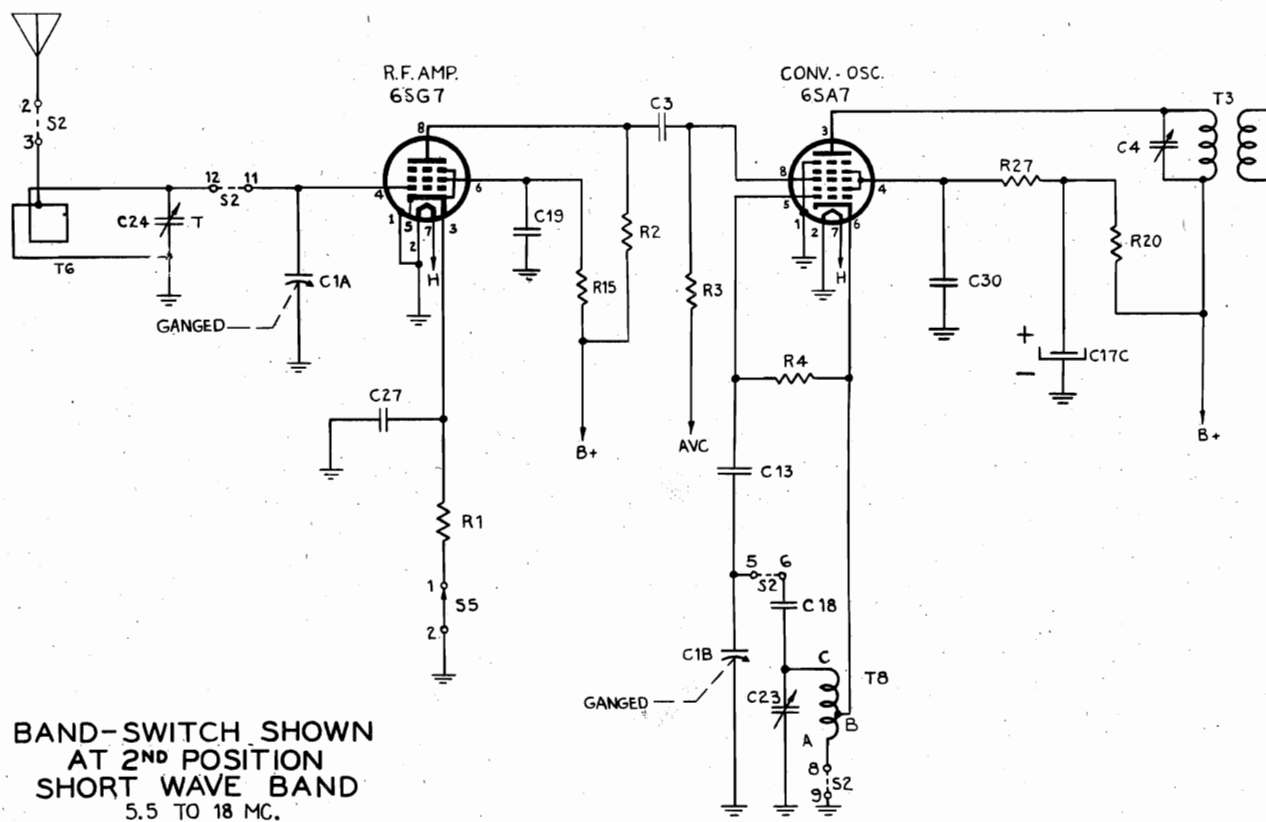
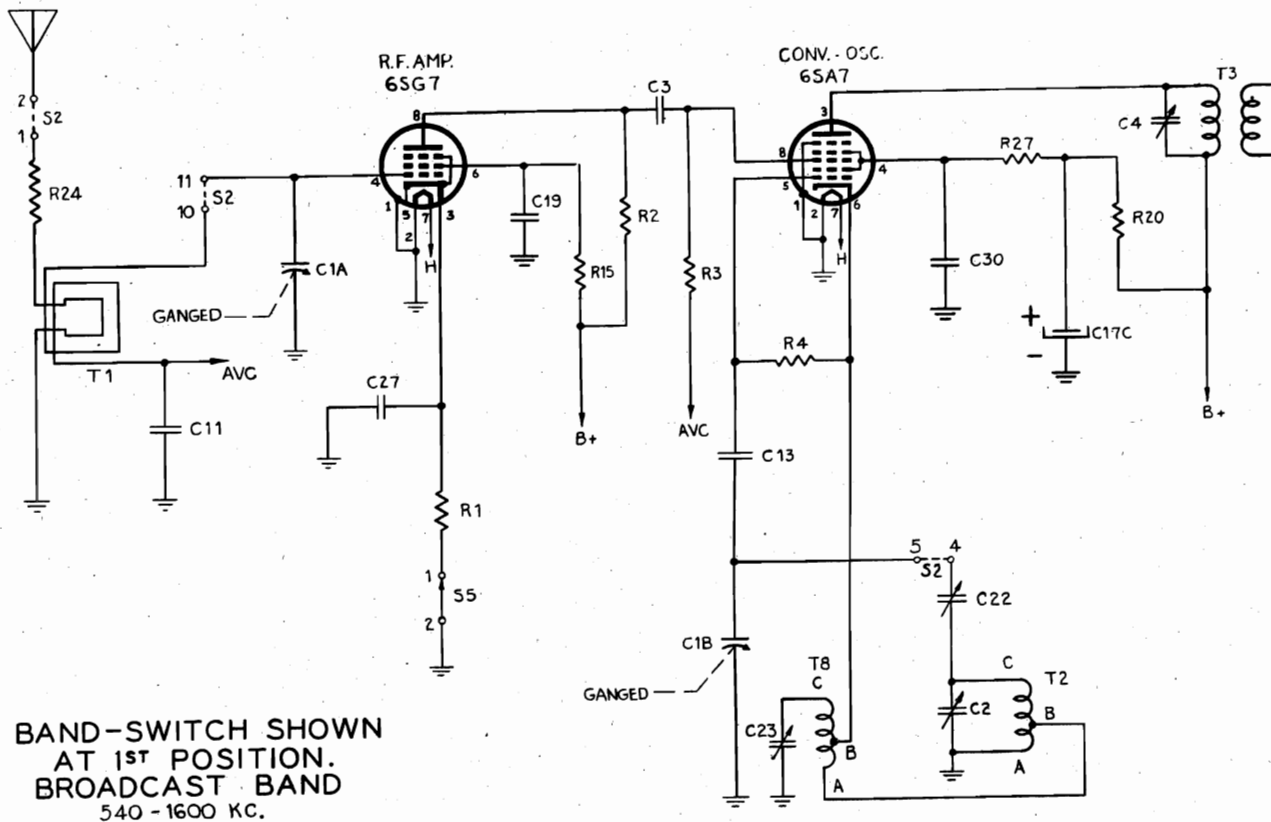
Cat. No.	Symbol	Description	Cat. No.	Symbol	Description
UNIVERSAL G-E REPLACEMENT PARTS			SPECIALIZED G-E REPLACEMENT PARTS (Cont'd)		
UCC-009	C27	Capacitor—0.02 mfd., 200 V., paper	RDK-007		Key—Station selector key
UCC-013	C32	Capacitor—0.1 mfd., 200 V., paper	RDK-009		Knob—Control knob (volume)
UCC-025	C10, 14	Capacitor—0.01 mfd., 400 V., paper	RDK-010		Knob—Tone control wafer knob
UCC-030	C12	Capacitor—0.1 mfd., 400 V., paper	RDP-003		Pointer—Dial scale pointer
UCC-039	C26, 31	Capacitor—0.005 mfd., 600 V., paper	RDS-004		Scale—Dial scale
UCC-040	C15	Capacitor—0.01 mfd., 600 V., paper	RDX-003		Assembly—Dial scale back plate assembly
UCC-045	C11, 16	Capacitor—0.05 mfd., 600 V., paper	RDX-004		Assembly—Drive cord assembly
UDL-018	I1	Pilot Lamp—115 V., 10 watt candelabra base	RHC-001		Cotter—Hairpin shaft retaining cotter
URD-015	R19	Resistor—39 ohms, $\frac{1}{2}$ W., carbon	RHG-001		Grommet—Tuning capacitor mtg. grommet
URD-017	R5	Resistor—47 ohms, $\frac{1}{2}$ W., carbon	RHM-007		Stud—Idler pulley stud
URD-021	R1	Resistor—68 ohms, $\frac{1}{2}$ W., carbon	RHM-008		Cam—Tone switch cam
URD-029	R13	Resistor—150 ohms, $\frac{1}{2}$ W., carbon	RHM-009		Link—Tone switch cam link
URD-049	R12, 18	Resistor—1000 ohms, $\frac{1}{2}$ W., carbon	RHM-010		Clip—Tone control shaft clip
URD-065	R2	Resistor—4700 ohms, $\frac{1}{2}$ W., carbon	RHM-011		Bushing—Tuning shaft bushing
URD-085	R4	Resistor—33,000 ohms, $\frac{1}{2}$ W., carbon	RHX-001		Assembly—Chassis mounting assembly
URD-089	R3	Resistor—47,000 ohms, $\frac{1}{2}$ W., carbon	RIT-001		Cover—Electrolytic capacitor cardboard cover
URD-113	R7, 9, 10, 11	Resistor—470,000 ohms, $\frac{1}{2}$ W., carbon	RJC-003		Terminal—Loudspeaker lead terminals
URD-129	R6	Resistor—2.2 megohms, $\frac{1}{2}$ W., carbon	RJS-007		Socket—Pilot lamp socket
URD-139	R8	Resistor—5.6 megohms, $\frac{1}{2}$ W., carbon	RJS-008		Socket—Octal base tube socket
URE-007	R15	Resistor—18 ohms, 1 W., carbon	RJS-009		Socket—Mtg. socket for electrolytic capacitor
URF-049	R14	Resistor—1000 ohms, 2 W., carbon	RLC-002		Coil—Oscillator coil
SPECIALIZED G-E REPLACEMENT PARTS			RLL-004		Beam-a-scope—Cabinet back and antenna assembly
RAV-001		Cabinet—Cabinet, less escutcheon and back	RLP-001		Coil—Plate choke
RCE-001	C17A, 17B, 17C	Capacitor—50 mfd., 150 V.; 50 mfd., 150 V., 40 mfd., 25 V., dry electrolytic	RLP-002		Coil—Series peaking coil and resistor assembly
RCT-003	C1A, 1B, 2	Capacitor—Tuning capacitor assembly	RLW-001		Coil—Wave trap coil
RCU-110	C13	Capacitor—47 mmf., 500 V., mica	RMM-001		Shield—Tube shield and clip
RCU-112	C3	Capacitor—100 mmf., 500 V., mica	RMM-002		Shield—Light shield
RCU-113	C9	Capacitor—150 mmf., 500 V., mica	RMS-001		Spring—Drive cord spring
RCU-115	C8	Capacitor—330 mmf., 500 V., mica	RMS-003		Spring—Station selector button spring
RCX-001	C18, 19, 20, 21	Trimmer Strip—Station selector adjustments (r-f)	RMU-003		Shaft—Tuning shaft and cotter pin
RCX-002	C22, 23, 24, 25	Trimmer Strip—Station selector adjustments (osc.)	RMW-001		Pulley—Drive cord idler pulley
RCY-001	C29	Capacitor—Wave trap trimmer	ROP-005		Speaker—5 $\frac{1}{4}$ in. permanent magnet loud-speaker
RCY-002	C30	Capacitor—1.5-15 mmf. antenna trimmer	RRC-003		Volume Control—2 meg. potentiometer
RDF-002		Washer—Felt washer, $\frac{1}{8}$ in. O.D.	RSP-001		Switch—Station selector push button switch
RDF-003		Washer—Felt washer, $\frac{1}{8}$ in. O.D.	RSW-003		Switch—Tone control switch
RDF-004		Washer—Felt washer, $\frac{1}{8}$ in. O.D.	RTL-003		Transformer—1st I-F transformer
RDK-004		Knob—Control knob (tuning)	RTL-004		Transformer—2nd I-F transformer
			RTO-002		Transformer—Output transformer
			RWL-002		Cord—Power cord and plug
			RYC-001		Card—Station letter cards

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MODELS 326, 327

GENERAL ELECTRIC CO.



GENERAL ELECTRIC CO.

ELECTRICAL CIRCUIT ALIGNMENT

EQUIPMENT REQUIRED

1. Test oscillator with audio tone modulation.
2. A-C output meter, 1½ volts full scale.
3. Insulated screwdriver.

ALIGNMENT PROCEDURE

The alignment procedure is given in table form. All i-f alignments may be made with the chassis removed from the cabinet. However, the r-f alignments should be made with the chassis and loop antennas securely fastened in the cabinet, as the relative position of the loop antenna with respect to the chassis materially affects the alignment. All oscillator and r-f trimmers are accessible from the rear of the cabinet when the chassis is installed; the location of these trimmers is shown in Fig. 1.

The r-f signal should be capacity coupled by placing a two-foot wire on the output post (high side) of the test oscillator to act as an antenna. This antenna should be kept two feet or more away from the receiver loop to insure freedom from too much coupling. Metal objects such as meters and tools should not be placed on top of the receiver cabinet.

The output meter should be connected across the loud-speaker voice coil terminals. The low side of the test oscillator output should be connected to the chassis ground; the high side of the test oscillator output should be connected as indicated in the alignment chart. During the entire alignment procedure, the radio volume control should be in its maximum position. The test oscillator output signal should be attenuated so that the output meter reading never exceeds 1¼ volts.

ALIGNMENT CHART

Step	Connect Test Oscillator to	Test Oscillator Setting	Dial Settings	Adjust Trimmers
1	6SK7, pin 4, in series with 0.05 mf	455 kc	"BC" Band 550 kc	C6 and C7 for maximum
2	6SA7, pin 8, in series with 0.05 mf	455 kc	"BC" Band 550 kc	C4 and C5 for maximum
3	†Capacity Coupled	1500 kc	"BC" Band 1500 kc	*C2 (Osc.) for maximum
4	†Capacity Coupled	580 kc	"BC" Band 580 kc	*C22 (Osc.) for maximum
5	†Capacity Coupled	1500 kc	"BC" Band 1500 kc	*C2 (Osc.) for maximum
6	†Capacity Coupled	18 mc	"SW" Band 18 mc	**C23 (Osc.) to signal
7	†Capacity Coupled	18 mc	"SW" Band 18 mc	*C24 (Ant.) for maximum

† Use two-foot antenna on output of test oscillator.

* Rock gang condenser when making alignment.

** Use minimum capacity peak.

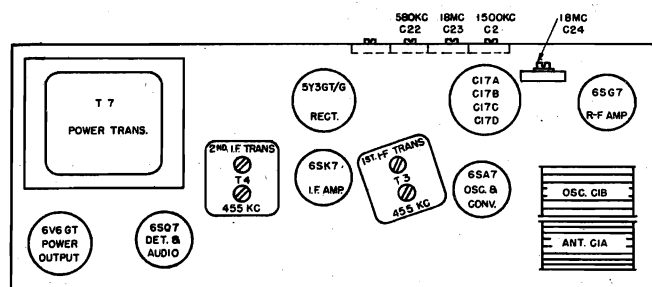


Fig. 1—Tube and Trimmer Location

STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements may be made with a vacuum tube voltmeter to check circuit performance and to locate stages which are not operating properly. The gain values listed may have a tolerance of 20%. Readings should be taken with the AVC shorted out. This may be done conveniently by connecting the yellow Beam-a-Scope lead to ground.

1. R-F Stage Gains.

- Antenna to 6SG7 grid..... 4 at 1000 kc
6SG7 grid to 6SA7 grid..... 14 at 1000 kc
6SA7 grid to 6SK7 grid..... 74 at 455 kc

Audio Gain.

The power output across the speaker voice coil should be approximately ½ watt with 0.06 volts at 400 cps applied between the high side of the volume control and ground.

3. Oscillator Grid Bias.

The d-c voltage developed across the oscillator grid leak (R4) averages 5.7 volts at 1000 kc.

4. Socket Pin Voltages.

Fig. 4 shows typical tube pin voltages. All readings should be made from the pins to ground unless otherwise indicated.

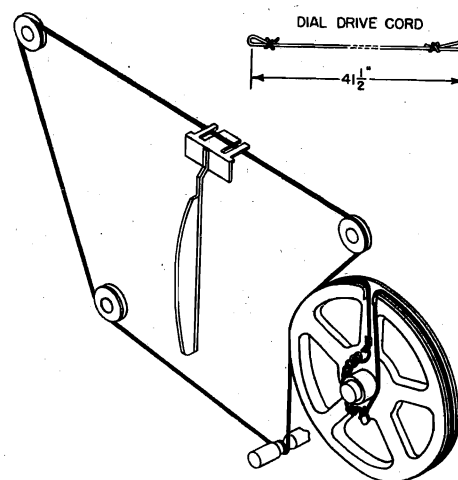


Fig. 3—Dial Stringing Diagram

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GENERAL ELECTRIC CO.

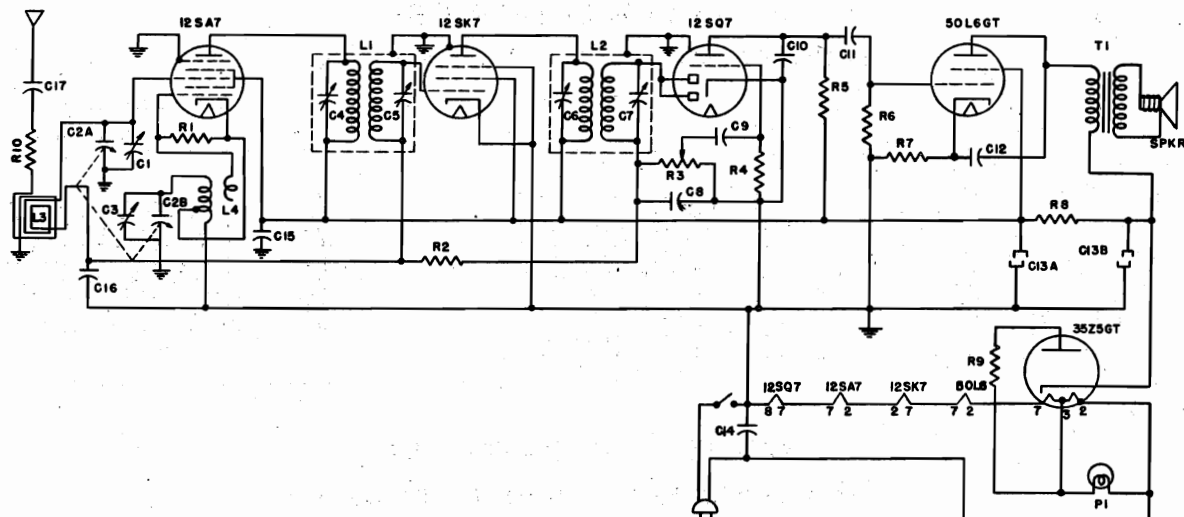
MODEL 321 (LATE)

Cat. No.	Symbol	Description	Cat. No.	Symbol	Description
UNIVERSAL G-E REPLACEMENT PARTS			SPECIALIZED G-E REPLACEMENT PARTS (Cont'd)		
UCC-009	C27	Capacitor—0.02 mfd., 200 V., paper	RDK-004		Knob—Control Knob (tuning)
UCC-013	C32	Capacitor—0.1 mfd., 200 V., paper	RDK-007		Key—Station selector key
UCC-025	C10, 14	Capacitor—0.01 mfd., 400 V., paper	RDK-009		Knob—Control knob (volume)
UCC-030	C12	Capacitor—0.1 mfd., 400 V., paper	RDK-023		Knob—Tone control wafer knob
UCC-039	C26, 31	Capacitor—0.005 mfd., 600 V., paper	RDP-003		Pointer—Dial scale pointer
UCC-040	C15	Capacitor—0.01 mfd., 600 V., paper	RDS-004		Scale—Dial scale
UCC-045	C11, 16, 33	Capacitor—0.05 mfd., 600 V., paper	RDX-003		Assembly—Dial scale back plate assembly
UDL-018	11	Pilot Lamp—115 V., 10 watt candelabra base	RDX-004		Assembly—Drive cord assembly
UOP-325	LS1	Speaker— $\frac{5}{8}$ in. permanent magnet loud-speaker	RHC-001		Cotter—Hairpin shaft retaining cotter
URD-015	R19	Resistor—39 ohms, $\frac{1}{2}$ W., carbon	RHG-001		Grommet—Tuning capacitor mtg. grommet
URD-017	R5	Resistor—47 ohms, $\frac{1}{2}$ W., carbon	RHM-007		Stud—Idler pulley stud
URD-021	R1	Resistor—68 ohms, $\frac{1}{2}$ W., carbon	RHM-008		Cam—Tone switch cam
URD-029	R13	Resistor—150 ohms, $\frac{1}{2}$ W., carbon	RHM-009		Link—Tone switch cam link
URD-041	R20	Resistor—470 ohms, $\frac{1}{2}$ W., carbon	RHM-010		Clip—Tone control shaft clip
URD-049	R12, 18	Resistor—1000 ohms, $\frac{1}{2}$ W., carbon	RHM-011		Bushing—Tuning shaft bushing
URD-065	R2	Resistor—4700 ohms, $\frac{1}{2}$ W., carbon	RHX-001		Assembly—Chassis mounting assembly
URD-085	R4	Resistor—33,000 ohms, $\frac{1}{2}$ W., carbon	RJC-006		Cover—Electrolytic capacitor cardboard cover
URD-089	R3	Resistor—47,000 ohms, $\frac{1}{2}$ W., carbon	RJS-007		Terminal—Loudspeaker lead terminals
URD-113	R7, 9, 10, 11	Resistor—470,000 ohms, $\frac{1}{2}$ W., carbon	RJS-008		Socket—Pilot lamp socket
URD-129	R6	Resistor—2.2 megohms, $\frac{1}{2}$ W., carbon	RJS-008		Socket—Octal base tube socket
URD-139	R8	Resistor—5.6 megohms, $\frac{1}{2}$ W., carbon	RJS-004		Socket—Mtg. socket for electrolytic capacitor
URE-007	R15	Resistor—18 ohms, 1 W., carbon	RLC-002	T2	Coil—Oscillator coil
URF-049	R14	Resistor—1000 ohms, 2 W., carbon	RLI-004	L1	Beam-a-scope—Cabinet back and antenna assembly
RAV-001		Cabinet—Cabinet, less escutcheon and back	RLP-001	L2	Coil—Plate choke
RCE-001	C17A, 17B, 17C	Capacitor—50 mfd., 150 V., 50 mfd., 150 V., 40 mfd., 25 V., dry electrolytic	RLP-002	L4, R16	Coil—Series peaking coil and resistor assembly
RCT-003	C1A, 1B, 2	Capacitor—Tuning capacitor assembly	RLW-001	L3	Coil—Wavetrap coil
RCU-110	C13	Capacitor—47 mmf., 500 V., mica	RMM-001		Shield—Tube shield and clip
RCU-112	C3	Capacitor—100 mmf., 500 V., mica	RMM-002		Shield—Light shield
RCU-113	C9	Capacitor—150 mmf., 500 V., mica	RMS-001		Spring—Drive cord spring
RCU-115	C8	Capacitor—330 mmf., 500 V., mica	RMS-003		Spring—Station selector button spring
RCX-001	C18, 19, 20, 21	Trimmer Strip—Station selector adjustments (r-f)	RMU-003		Shaft—Tuning shaft and cotter pin
RCX-002	C22, 23, 24, 25	Trimmer Strip—Station selector adjustments (osc.)	RMW-001		Pulley—Drive cord idler pulley
RCY-002	C30	Capacitor—1.5-15 mmf. antenna trimmer	RRC-003	R17	Volume Control—2 meg. potentiometer
			RSP-001	S3	Switch—Station selector push button switch
			RSW-003	S2	Switch—Tone control switch
			RTL-003	T3	Transformer—1st I-F transformer
			RTL-004	T4	Transformer—2nd I-F transformer
			RTO-002	T5	Transformer—Output transformer
			RWL-009	P1	Cord—Power cord and plug
			RYC-001		Card—Station letter cards

MODELS 326, 327

UNIVERSAL G-E REPLACEMENT PARTS			SPECIALIZED G-E REPLACEMENT PARTS		
UCC-037	C15	CAPACITOR—0.003 mf., 600 v., paper	RDK-041		KNOB—Oak knob (pointer)
UCC-039	C14	CAPACITOR—0.005 mf., 600 v., paper	RDP-005		POINTER—Dial scale pointer
UCC-040	C19, 26, 27, 28, 30, 103	CAPACITOR—0.01 mf., 600 v., paper	RDS-016		SCALE—Dial scale
UCC-041	C10, 104	CAPACITOR—0.02 mf., 600 v., paper	RDX-008		BACKPLATE—Dial backplate assembly
UCC-045	C11, 101, 102	CAPACITOR—0.05 mf., 600 v., paper	RHG-001		GROMMET—Tuning capacitor mounting grommet
UDL-005	I1, 2, 3, 4	PILOT LAMP—G.E. No. 44, 6-8 v., 0.25 amp.	RHG-003		GROMMET—Rubber grommet, $\frac{1}{4}$ in. I.D. for $\frac{1}{8}$ in. hole
UIC-001		CEMENT—Speaker cone replacement cement	RHG-004		GROMMET—Rubber grommet, $\frac{1}{8}$ in. I.D. for $\frac{1}{4}$ in. hole
UOP-1206	LS	SPEAKER—12 inch PM speaker	RHM-012		CUSHIONS—Rubber dial scale cushions
UOX-005		CONE—Replacement speaker cone kit	RHM-014		STUD—Shaft for upper pulleys on backplate
URD-025	R11	RESISTOR—100 ohms, $\frac{1}{2}$ W., carbon	RHM-015		BUSHING—Tuning shaft bushing, washer, and nut
URD-029	R5	RESISTOR—150 ohms, $\frac{1}{2}$ W., carbon	RHU-002		SPACER—Tuning capacitor mounting spacer
URD-035	R1	RESISTOR—270 ohms, $\frac{1}{2}$ W., carbon	RJB-001		RECEPTACLE—Two-pin speaker receptacle
URD-037	R13	RESISTOR—330 ohms, $\frac{1}{2}$ W., carbon	RJB-002		TERMINAL STRIP—Terminal strip for phono pre-amplifier, 2 terminals
URD-041	R24, 27	RESISTOR—470 ohms, $\frac{1}{2}$ W., carbon	RJC-001		PLUG—Tip plug for speaker leads
URD-049	R17, 19	RESISTOR—1000 ohms, $\frac{1}{2}$ W., carbon	RJC-002		CONNECTOR—Clip for antenna loop connections
URD-053	R12	RESISTOR—1500 ohms, $\frac{1}{2}$ W., carbon	RJP-002	P5	PLUG—4-prong plug for pre-amplifier
URD-065	R2	RESISTOR—4700 ohms, $\frac{1}{2}$ W., carbon	RJP-004	P2	PLUG—Phono pre-amplifier output plug
URD-067	R14	RESISTOR—5600 ohms, $\frac{1}{2}$ W., carbon	RJS-003		SOCKET—Octal socket for receiver chassis
URD-077	R101	RESISTOR—6800 ohms, $\frac{1}{2}$ W., carbon	RJS-011		SOCKET—Pilot light socket for cabinet jewel
URD-081	R4	RESISTOR—22,000 ohms, $\frac{1}{2}$ W., carbon	RJS-012		PLATE—Mounting plate for capacitor C17A, B, C, D
URD-083	R104	RESISTOR—27,000 ohms, $\frac{1}{2}$ W., carbon	RJS-013		SOCKET—Pilot light socket for chassis lights
URD-085	R107, 109	RESISTOR—33,000 ohms, $\frac{1}{2}$ W., carbon	RJS-014	J5	RECEPTACLE—Four prong receptacle (Power to pre-amp.)
URD-089	R3, 15	RESISTOR—47,000 ohms, $\frac{1}{2}$ W., carbon	RJS-015		SOCKET—Octal socket for pre-amplifier (shock mounted)
URD-093	R106, 108	RESISTOR—68,000 ohms, $\frac{1}{2}$ W., carbon	RJX-001	J2	RECEPTACLE—Phono input receptacle on receiver chassis
URD-097	R22, 23	RESISTOR—100,000 ohms, $\frac{1}{2}$ W., carbon	RJS-049	J4	RECEPTACLE—Phono motor connector (female)
URD-105	R21	RESISTOR—220,000 ohms, $\frac{1}{2}$ W., carbon	RJX-003	J1	RECEPTACLE—Phono input receptacle on pre-amplifier
URD-113	R9, 10, 26	RESISTOR—470,000 ohms, $\frac{1}{2}$ W., carbon	RLC-004	T2	COIL—BC Band oscillator coil
URD-129	R6	RESISTOR—2.2 meg., $\frac{1}{2}$ W., carbon	RLC-005	T2	COIL—SW Band oscillator coil
URD-133	R102, 103	RESISTOR—3.3 meg., $\frac{1}{2}$ W., carbon	RLI-005	T6	LOOP—SW Band antenna loop
URD-145	R8	RESISTOR—10 meg., $\frac{1}{2}$ W., carbon	RLI-006	T1	LOOP—Beam-a-scope BC Band loop
URF-055	R16	RESISTOR—1800 ohms, 2 W., carbon	RMC-001		CLAMP—Mounts BC Band oscillator coil
URF-073	R20	RESISTOR—10,000 ohms, 2 W., carbon	RMC-002		CLAMP—Mounts SW Band oscillator coil
			RMM-003		SHIELD—Bottom shield for 2nd I-F transformer
			RMS-001		SPRING—Drive cord tension spring
			RMU-004		SHAFT—Tuning shaft with cotter pin and "C" clip
			RMW-001		PULLEY—Upper back plate pulley
			RMW-002		PULLEY—Chassis idler pulley
			ROC-001		CONE—Speaker cone and dust cap
			RPX-010	PU	PICKUP—Magnetic pickup cartridge
			RRC-005	R7	POTENTIOMETER—Volume control, 2 meg. tapped at 1 meg.
			RRD-089	R18	RESISTOR—47,000 ohms, $\frac{1}{2}$ W., carbon
			RRD-104	R105	RESISTOR—200,000 ohms, $\frac{1}{2}$ W., carbon
			RSW-006	S5	SWITCH—Phono-Radio switch
			RSW-007	S2	SWITCH—Band switch
			RSX-003	S1	SWITCH—Power switch
			RTL-005	S3	SWITCH—Tone control switch
			RTL-006	T3	TRANSFORMER—1st I-F transformer
			RTO-004	T4	TRANSFORMER—2nd I-F transformer
			RTP-010	T5	TRANSFORMER—Output transformer
			RWL-004	T7	TRANSFORMER—Power transformer
				P6	CORD—Power cord and plug
RAC-001		COVER—Beam-a-scope Cover			
RAL-001		JEWEL—Pilot light jewel			
RCC-001	C29	CAPACITOR—0.007 mfd., 600 v., paper			
RCC-035	C12, 25	CAPACITOR—0.001 mf., 600 v., paper			
	C105A	CAPACITOR—15 mf., 350 v., dry electrolytic			
	C105B	CAPACITOR—15 mf., 350 v., dry electrolytic			
	C17A	CAPACITOR—15 mf., 350 v., dry electrolytic			
	C17B	CAPACITOR—30 mf., 350 v., dry electrolytic			
	C17C	CAPACITOR—10 mf., 250 v., dry electrolytic			
	C17D	CAPACITOR—20 mf., 25 v., dry electrolytic			
RCT-005	C1A, 1B	CAPACITOR—2 gang tuning capacitor			
RCU-064	C9	CAPACITOR—470 mmf., mica			
RCU-110	C13	CAPACITOR—47 mmf., mica			
RCU-112	C3, 21	CAPACITOR—100 mmf., mica			
RCU-189	C18	CAPACITOR—3900 mmf., mica			
	C2	CAPACITOR—Trimmer, 5-45 mmf.			
	C16	CAPACITOR—Trimmer, 15-90 mmf.			
	C22	CAPACITOR—Trimmer, 590-80 mmf.			
	C23	CAPACITOR—Trimmer, 5-45 mmf.			
	C24	CAPACITOR—Trimmer, 1.8-20 mmf.			
RCX-020		CORD—Dial drive cord, 41 $\frac{1}{2}$ in. long			
		DRUM—Dial drum assembly			
		ESCUTCHEON—Dial escutcheon			
		WASHER—Felt washer for knobs			
		KNOB—Mahogany knob (plain)			
		KNOB—Oak knob (plain)			
		KNOB—Mahogany knob (pointer)			

GENERAL ELECTRIC CO.

MODELS YRB67-1, YRB67-2,
YRB82-1

ALIGNMENT PROCEDURE

ALIGNMENT FREQUENCIES

I.F.	455 KC
R.F.	1720 and 1500 KC

The location of all trimmers is shown in Fig. 1.

I. F. ALIGNMENT

Connect an output meter across the voice coil. Turn the volume control to maximum. Set test oscillator to 455 KC and keep the oscillator output as low as a readable meter reading will permit. Apply signal to the converter grid through a .05 mfd capacitor and align progressively the trimmers in the 2nd and 1st I.F. transformer cans.

R. F. ALIGNMENT

Apply the R.F. alignment signals through a standard I.R.E. dummy antenna to the receiver antenna post. With the gang condenser wide open, align the oscillator trimmer (C17B) to 1720 KC. Change the generator signal to 1500 KC, tune the receiver to the signal and peak the antenna trimmer (C17A) for maximum output.

PRECAUTION

If the signal generator is A-C operated, use an isolating transformer between the power supply and the radio receiver power input. The use of an isolating capacitor is not recommended, as A-C through the capacitor will introduce hum modulation and/or create the possibility of a burned-out signal generator attenuator.

OVERALL DIMENSIONS—YRB 82-1

Height	8 1/8"
Width	12 1/2"
Depth	7"

YRB 67-1, 2

Height	8 1/2"
Width	13"
Depth	6 1/8"

Rating: 105-125 volts DC
105-125 volts 40-60 cycles AC
28 watts at 117 volts

Tuning Frequency Range: 540-1720 KC

Intermediate Frequency: 455 KC

LOUDSPEAKER "ALNICO V" MAGNET DYNAMIC •

Outside Cone Diameter	5 1/4"
Voice Coil Impedance (400 cyc)	3.2 ohms

TUBES

Converter and Oscillator	12SA7
I.F. Amplifier	12SK7
Det. Audio, AVC	12SQ7
Power Output	50L6GT
Rectifier	35Z5GT
Pilot Lamp	GE 51

GENERAL INFORMATION

Models YRB 67-1 and 67-2 are 5 tube (including rectifier) superheterodyne receivers in distinctively styled wood cabinets; Model YRB 82-1 is a rich brown plastic cabinet. These receivers incorporate built-in antenna, automatic volume control, oversize permanent magnet speaker and beam power output.

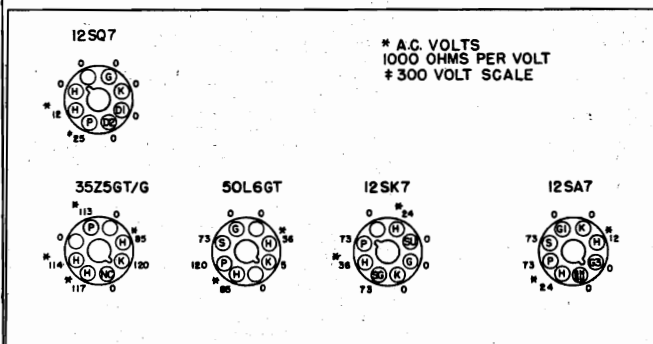


Fig. 2. Socket Voltage Diagram

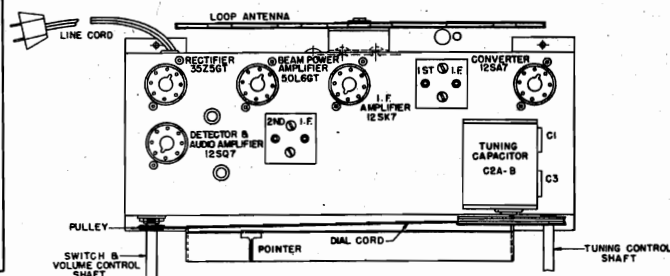


Fig. 1. Tube and Trimmer Location

MODELS YRB67-1, YRB67-2,
YRB82-1
MODELS 200, 203, 205

GENERAL ELECTRIC CO. PARTS DESCRIPTION LIST

MODELS YRB 82-1, YRB 67-1, YRB 67-2

Symbol	Description	Symbol	Description	Symbol	Description
C1	Ant. trimmer condenser	C14	.05 mfd paper capacitor	R2	2.2 megohm carbon resistor
C2A	Tuning condenser, ant. section	C15	.05 mfd paper capacitor	R3	Volume control .5 megohm
C2B	Tuning condenser, osc. section	C16	.05 mfd paper capacitor	R4	4.7 megohm carbon resistor
C3	Osc. trimmer condenser	C17	.01 mfd paper capacitor	R5	470,000 ohm carbon resistor
C8	220 mmfd mica capacitor	L1	1st I.F. transformer	R6	470,000 ohm carbon resistor
C9	.005 mfd paper capacitor	L2	2nd I.F. transformer	R7	150 ohm carbon resistor
C10	220 mmfd mica capacitor	L3	Loop assembly	R8	2700 ohm carbon resistor
C11	.01 mfd paper capacitor	L4	Oscillator coil	R9	18 ohm carbon resistor
C12	.02 mfd paper capacitor	P1	Pilot lamp	R10	470 ohm carbon resistor
C13A	30 mfd electrolytic capacitor	T1	Output transformer		
C13B	30 mfd electrolytic capacitor	R1	22,000 ohm carbon resistor		

REPLACEMENT PARTS LIST

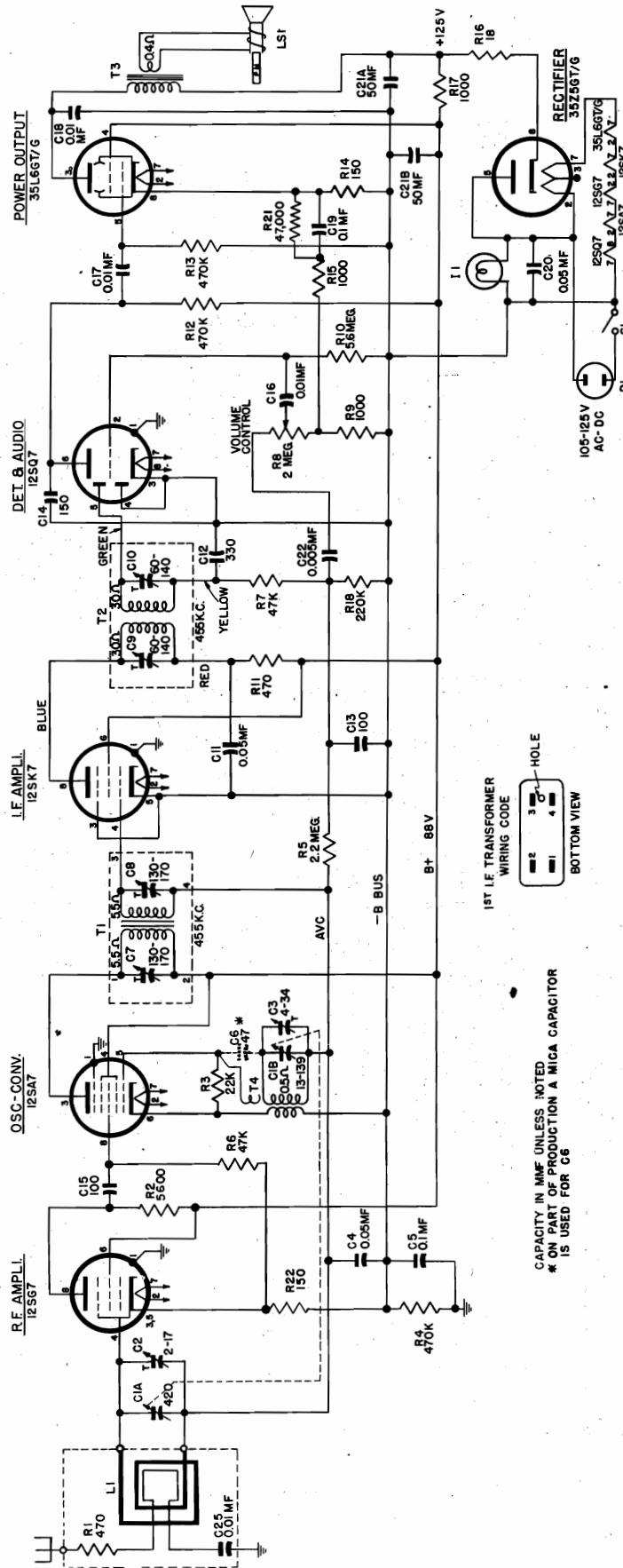
MODELS YRB 82-1, YRB 67-1, YRB 67-2

Stock No.	Description	Stock No.	Description
SPECIALIZED G-E REPLACEMENT PARTS		SPECIALIZED G-E REPLACEMENT PARTS (Cont.)	
SAB 004	Back cover, Models YRB 67-1 and 67-2	STL 001	Transformer, 1st I.F.
SAB 006	Back cover, Model YRB 82-1	STL 002	Transformer, 2nd I.F.
SAU 001	Cabinet, Model YRB 82-1	STO 001	Transformer, output
SAV 003	Cabinet, Model YRB 67-1	SWL 001	Power cord
SAV 015	Cabinet, Model YRB 67-2		
SCE 002	Capacitor, filter electrolytic, 30-30 mfd 150 volt, C13A, C13B	UNIVERSAL G-E REPLACEMENT PARTS	
SCT 002	Capacitor, tuning, C2A, C2B	UCC 039	Capacitor, .005 mfd paper, C9
SDC 001	Cord, dial drive cord	UCC 040	Capacitor, .01 mfd paper, C17
SDK 002	Knob, Models YRB 67-1 and 67-2	UCC 041	Capacitor, .02 mfd paper, C12
SDK 010	Knob, Model YRB 82-1	UCC 045	Capacitor, .05 mfd paper, C14, C15, C16
SDP 001	Pointer, dial scale	UCU 1036	Capacitor, 220 mmfd mica, C8, C10
SDS 004	Dial scale, Models YRB 67-1 and 67-2	UDL 013	Pilot lamp, Mazda 51
SDS 006	Dial scale, Model YRB 82-1	UOP 526	Speaker, 5 1/4 inch PM dynamic
SHC 001	Hair pin cotter for dial drive	URD 007	Resistor, 18 ohm 1/2 watt carbon, R9
SJP 002	Connector, female to speaker	URD 029	Resistor, 150 ohm 1/2 watt carbon, R7
SJS 001	Pilot lamp socket	URD 041	Resistor, 470 ohm 1/2 watt carbon, R10
SJS 003	Socket, octal tube	URD 081	Resistor, 22,000 ohm 1/2 watt carbon, R1
SLC 001	Coil, oscillator	URD 113	Resistor, 470,000 ohm 1/2 watt carbon, R5, R6
SLL 001	Loop, antenna	URD 129	Resistor, 2.2 megohm 1/2 watt carbon, R2
SMF 002	Snap button	URD 137	Resistor, 4.7 megohm 1/2 watt carbon, R4
SMF 003	Fastener, back cover to cabinet	URE 059	Resistor, 2700 ohm 1 watt carbon, R8
SMS 001	Spring, dial drive drum		
SMU 001	Shaft, dial drive		
SMW 001	Pulley, dial drive		
SRC 003	Volume control, 0.5 megohm with power switch		

REPLACEMENT PARTS LIST—MODELS 200, 203, & 205

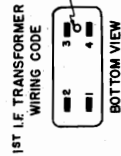
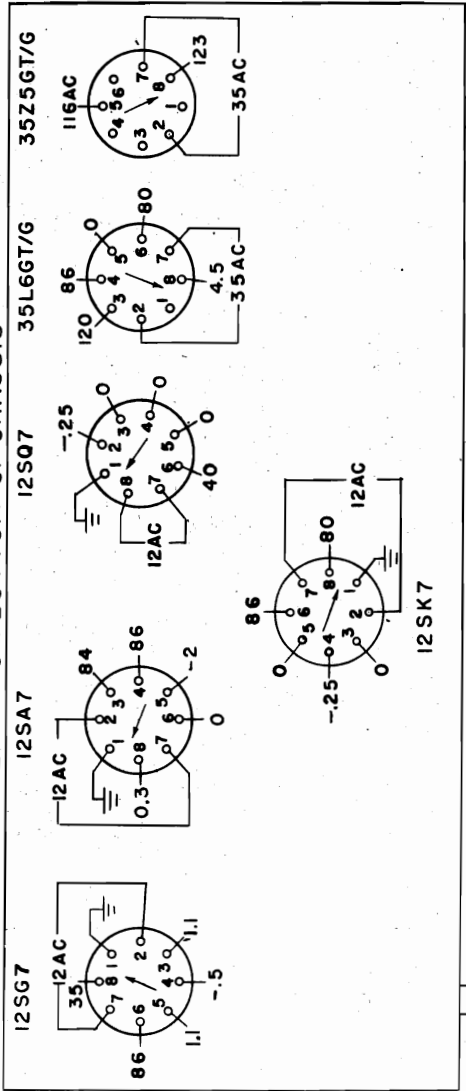
PART NO.	SYMBOL	DESCRIPTION	PART NO.	SYMBOL	DESCRIPTION
UNIVERSAL REPLACEMENT PARTS			SPECIALIZED REPLACEMENT PARTS (Cont'd)		
UCC-039	C22	CAPACITOR—.005 mfd, 600 v, paper	RAX-001		PULLEY—Idle pulley assembly
UCC-040	C25	CAPACITOR—.01 mfd, 600 v, paper	RCC-013	C19	CAPACITOR—.01 mfd, 200 v, paper
UCC-048	C5	CAPACITOR—.01 mfd, 600 v, paper	RCC-040	C16, 17, 18	CAPACITOR—.01 mfd, 600 v, paper
UCU-020	C6	CAPACITOR—.47 mmf, 500 v, mica	RCC-045	C4, 11, 20	CAPACITOR—.05 mfd, 600 v, paper
UCU-028	C13, 15	CAPACITOR—100 mmf, 500 v, mica	RCE-037	C21A, 21B	CAPACITOR—50-50 mfd, 150 v, dry electrolytic
UCU-032	C14	CAPACITOR—150 mmf, 500 v, mica	RCT-015	C1A, 1B	CONDENSER—Tuning condenser (includes C2 and C3)
UCU-040	C12	CAPACITOR—330 mmf, 500 v, mica	RDC-001		CORD—Drive cord assembly
UIC-001		CEMENT—Loudspeaker cone cement	RDD-001		DRUM—Drive drum and shaft assembly
UIC-002		THINNER—Cone cement thinner	RDE-001		ESCUTCHEON—Dial escutcheon (Models 203, 205)
UOP-528	LS1	SPEAKER—5 1/4 in. PM	RDG-002		PLATE—Dial back plate assembly
UOX-001		CONE—Replacement cone kit	RDK-006		KNOB—Control knob
URD-029	R14, 22	RESISTOR—150 ohms, 1/2 w, carbon	RDS-030		SCALE—Dial scale (Models 203, 205)
URD-041	R1, 11	RESISTOR—470 ohms, 1/2 w, carbon	RDS-031		SCALE—Dial scale (Models 200, 201)
URD-057	R9, 15	RESISTOR—1000 ohms, 1/2 w, carbon	RHM-004		CLIP—Speed clip for dial scale (Model 200)
URD-067	R2	RESISTOR—5600 ohms, 1/2 w, carbon	RHM-005		CLIP—Speed clip for dial scale (Models 203, 205)
URD-081	R3	RESISTOR—22,000 ohms, 1/2 w, carbon	RHM-016		CLIP—Osc. coil mtg. clip
URD-089	R6, 7, 21	RESISTOR—47,000 ohms, 1/2 w, carbon	RJS-003		TUBE SOCKET—Octal base tube socket (12SA7)
URD-105	R18	RESISTOR—220,000 ohms, 1/2 w, carbon	RJS-006		TUBE SOCKET—Octal base tube socket
URD-113	R4, 12, 13	RESISTOR—470,000 ohms, 1/2 w, carbon	RJS-053		SOCKET—Pilot lamp socket
URD-129	R5	RESISTOR—2.2 meg, 1/2 w, carbon	RLC-021	T4	COIL—Oscillator coil
URD-139	R10	RESISTOR—5.6 meg, 1/2 w, carbon	RRC-002	R8, S1	VOLUME CONTROL—2.0 meg potentiometer includes power switch
URF-049	R17	RESISTOR—1000 ohms, 2 w, carbon	RRW-008	R16	RESISTOR—18 ohms, 1 w, wirewound
SPECIALIZED REPLACEMENT PARTS			RTL-001	T1	TRANSFORMER—1st I.F. transformer
RAB-001		BEAM-A-SCOPE—Cabinet back and loop assembly (Models 203, 205)	RTL-029	T2	TRANSFORMER—2nd I.F. transformer
RAB-003		BEAM-A-SCOPE—Cabinet back and loop assembly (Model 200)	RTO-003	T3	TRANSFORMER—Output transformer
RAU-002		CABINET—Brown plastic (Model 200)	RWL-009	P1	CORD—Power cord and plug
RAV-025		CABINET—Walnut wood (Model 203)			
RAV-026		CABINET—Blonde wood (Model 205)			
RAV-027		CABINET—Maple wood (Model 205)			

GENERAL ELECTRIC CO.



CONDITION OF TEST
MEASUREMENTS TAKEN ON 20,000 OHMS-
PER-VOLT METER
MEASURED FROM PIN TO B-BUS UNLESS
SHOWN OTHERWISE.
117 VOLTS LINE
VOLUME CONTROL-CLOCKWISE
NO SIGNAL INPUT

VIEW FROM BOTTOM OF CHASSIS



CAPACITY IN MMF UNLESS NOTED
* ON PART OF PRODUCTION A MICA CAPACITOR
IS USED FOR C6

MODELS 200, 203, 205

GENERAL ELECTRIC CO.

SPECIFICATIONS

CABINET:

Model	200	203	205
Material	Plastic	Wood	Wood
Color	Brown	Mahogany	Maple
Height	7 $\frac{1}{2}$ in.	8 $\frac{1}{4}$ in.	8 $\frac{1}{4}$ in.
Width	12 in.	13 in.	13 in.
Depth	7 $\frac{1}{2}$ in.	7 $\frac{1}{8}$ in.	7 $\frac{1}{8}$ in.

ELECTRICAL RATING (INPUT)

Voltage	105-125 volts a-c or d-c
Frequency on a-c	25 to 60 cycles
Wattage	45 watts

OPERATING FREQUENCIES

Broadcast Band	540-1600 kilocycles
I-F Amplifier	455 kilocycles

POWER OUTPUT (117 VOLTS LINE)

Undistorted	1.2 watts
Maximum	1.5 watts

LOUDSPEAKER

Type	Alnico P.M.
Outside Cone Diameter	5 $\frac{1}{4}$ in.
Voice Coil Impedance (400 cycles)	3.5 ohms

TUBE COMPLEMENT

R.F. Amplifier	Type 12SG7
Oscillator-Converter	Type 12SA7
I.F. Amplifier	Type 12SK7
Detector-Audio	Type 12SQ7
Power Output	Type 35L6GT
Rectifier	Type 35Z5GT/G
Pilot Lamp	G-E, Type C7, 115-volt, 10-watt, clear, candelabra screw base

ELECTRICAL CIRCUIT ALIGNMENT

ALIGNMENT FREQUENCIES

R-F	1500 kilocycles
I-F	455 kilocycles

EQUIPMENT REQUIRED

1. Test oscillator with audio tone modulation
2. A.C. output meter, 1 $\frac{1}{2}$ volts full scale
3. 0.05 mf paper capacitor
4. 50 mmf mica capacitor
5. Insulated screwdriver

PROCEDURE—GENERAL

1. Turn dial scale pointer as far counterclockwise as possible. The pointer should coincide with the first marking at the left of the scale. If it doesn't, remove chassis and slip pointer on shaft until the pointer is under reference mark when chassis is bolted in place.
2. For i-f and r-f alignments, the output meter is connected across the loudspeaker voice coil terminals.

3. Keep radio volume control at maximum and attenuate test oscillator signal output so that the output meter reading never exceeds 1 $\frac{1}{4}$ volts.

4. The chassis must be removed from the cabinet during I-F alignment. For R-F alignment bolt the chassis in the cabinet securely.

5. Connect the capacitor as listed in column 2, between the output "High Side" of test oscillator and the point of input specified.

ALIGNMENT CHART

Step	Connect Test Oscillator to	Test Osc. Setting	Pointer Setting on Radio	Adjustment for Maximum Output
1	12SK7 grid in series with 0.05 mf cap.	455 kc	1500 kc	2nd I-F Trans. Trimmers
2	12SA7 grid in series with 0.05 mf cap.	455 kc	1500 kc	1st and 2nd I-F Trans. Trimmers
3	Ant. Post in series with 50 mmf	1500 kc	1500 kc	C3 (Osc.)
4	Ant. Post in series with 50 mmf	1500 kc	1500 kc	C2 (R-F)

STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements by vacuum tube voltmeter or similar measuring devices may be used to check circuit performance and isolate trouble. The gain values listed may have tolerances of 20 per cent. Readings taken with low signal input so that AVC is not effective.

(1) R-F Stage Gains.

Antenna post to 12SG7 grid	4 at 1000 kc
12SG7 grid to 12SA7 grid	8 at 1000 kc
12SA7 grid to 12SK7 grid	30 at 455 kc
12SK7 grid to 12SQ7 diode plate	57 at 455 kc

(2) Audio Gain.

0.12 volt at 400 cycles across volume control (R8) with control set at maximum will give approximately $\frac{1}{2}$ -watt output across speaker voice coil.

(3) Oscillator Grid Bias.

D-C voltage developed across the oscillator grid leak (R3). Averages 7.7 volts at 1000 kc.

(4) Socket Pin Voltages.

Figure 4 shows voltages from all tube pins to B- unless otherwise specified. Voltage readings much lower than those specified may help localize defective components or tubes.

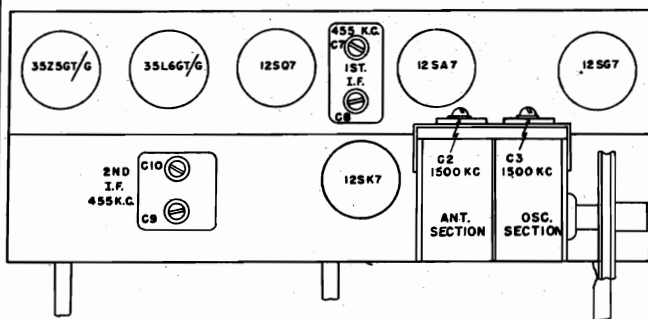


Fig. 1. Tube and Trimmer Location

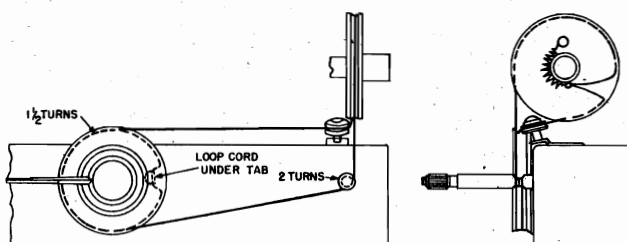
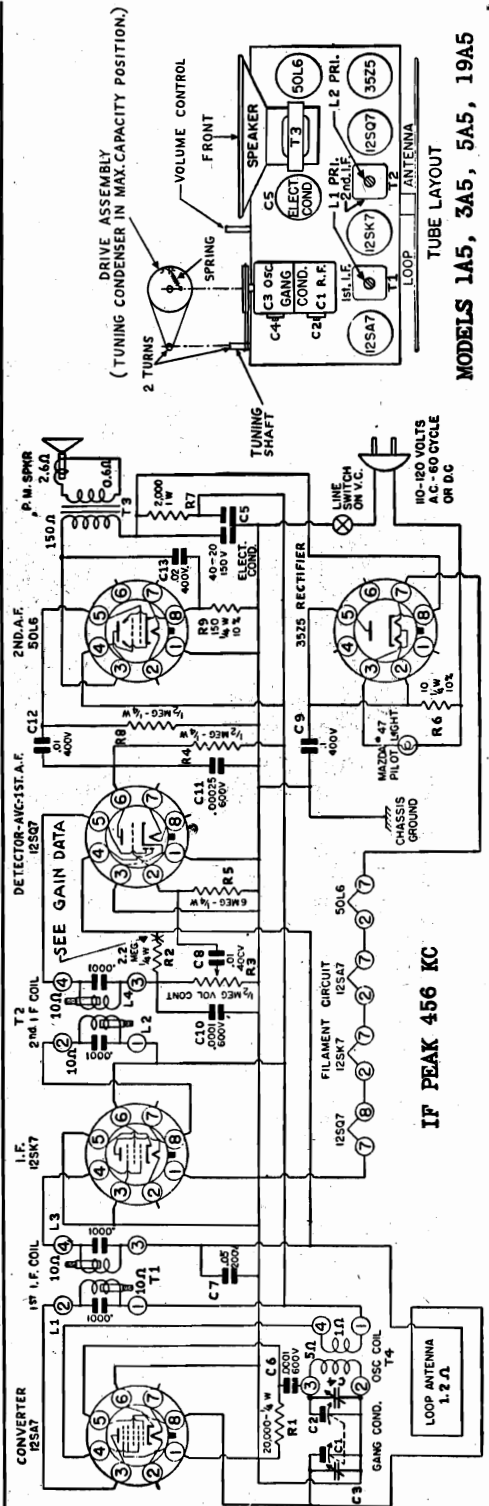
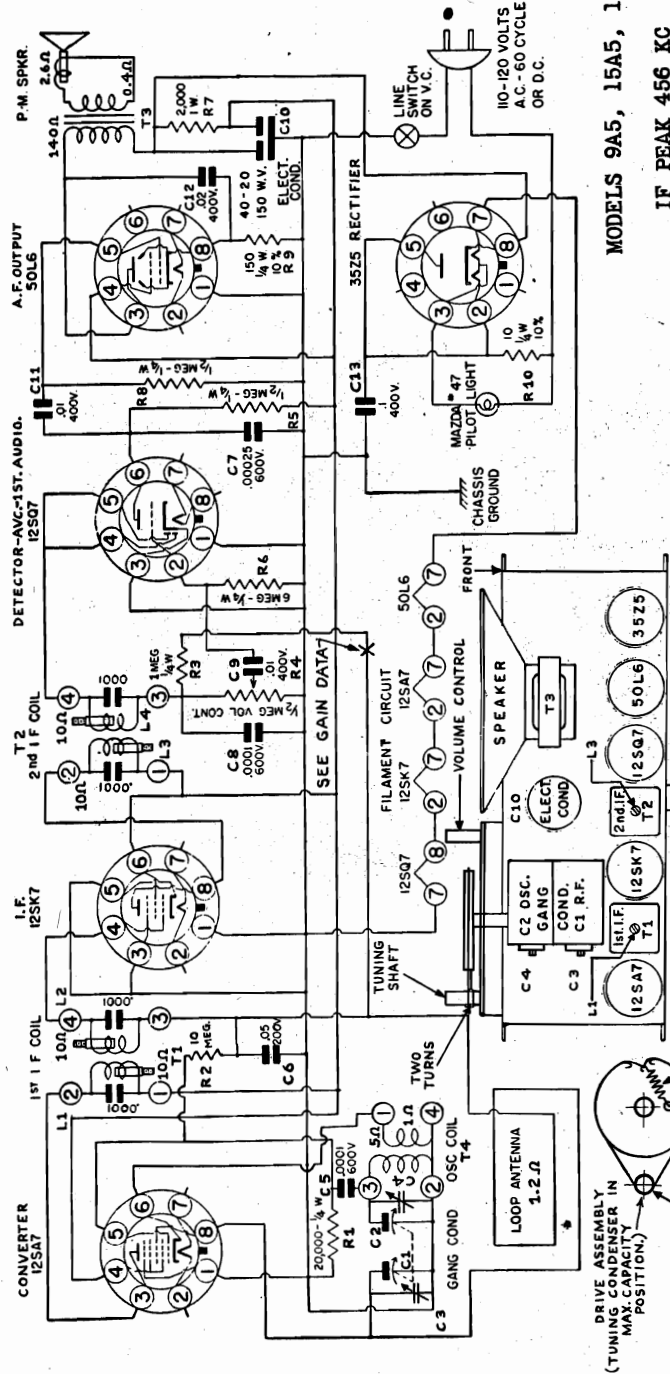
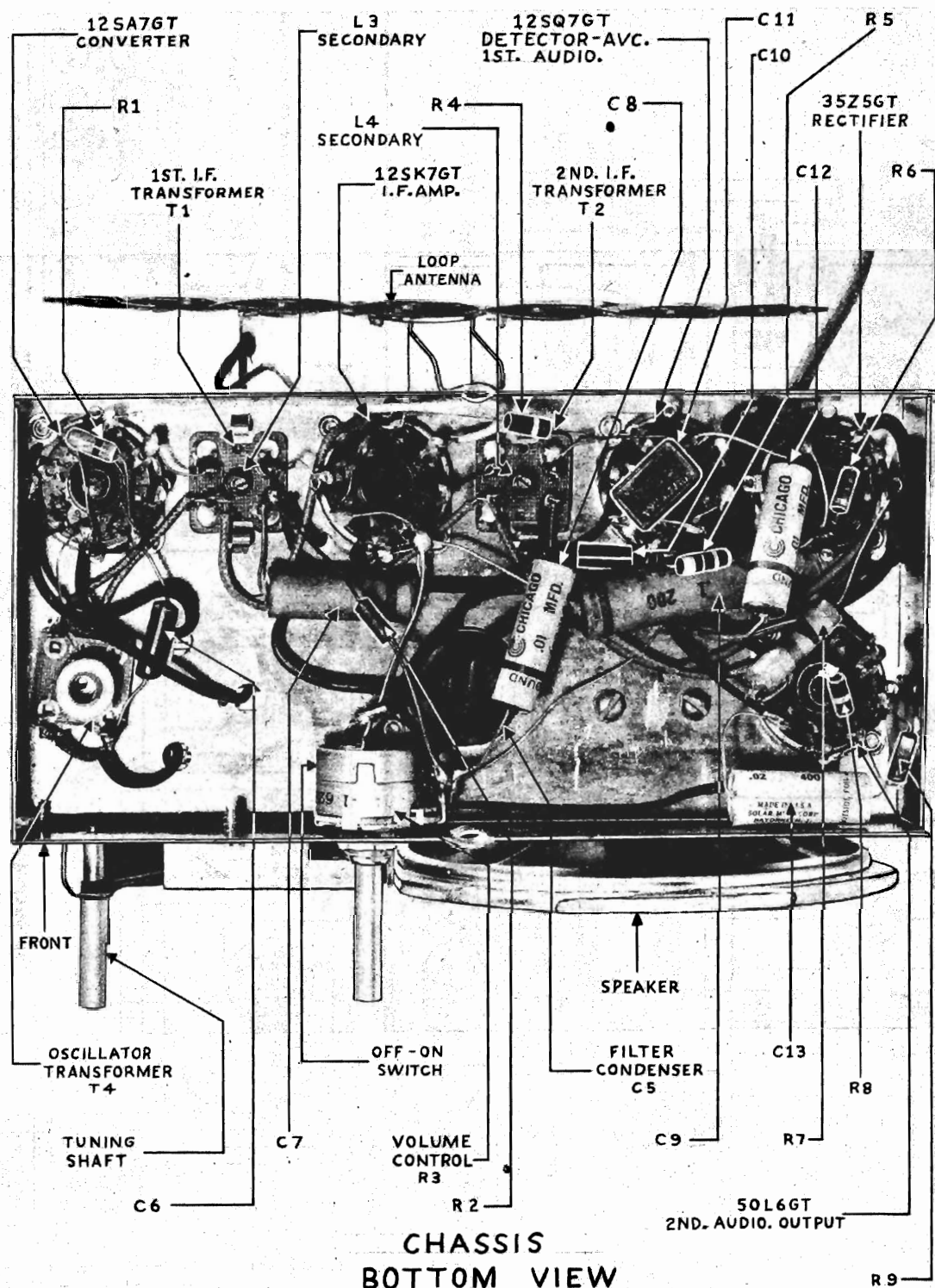


Fig. 2. Dial Stringing Diagram

GENERAL TELEV. & RADIO CORP. MODELS 1A5, 3A5, 5A5
19A5
MODELS 9A5, 15A5, 17A5



GENERAL TELEV. & RADIO CORP.



**MODELS 9A5, 15A5, 17A5
MODEL 14A4F**

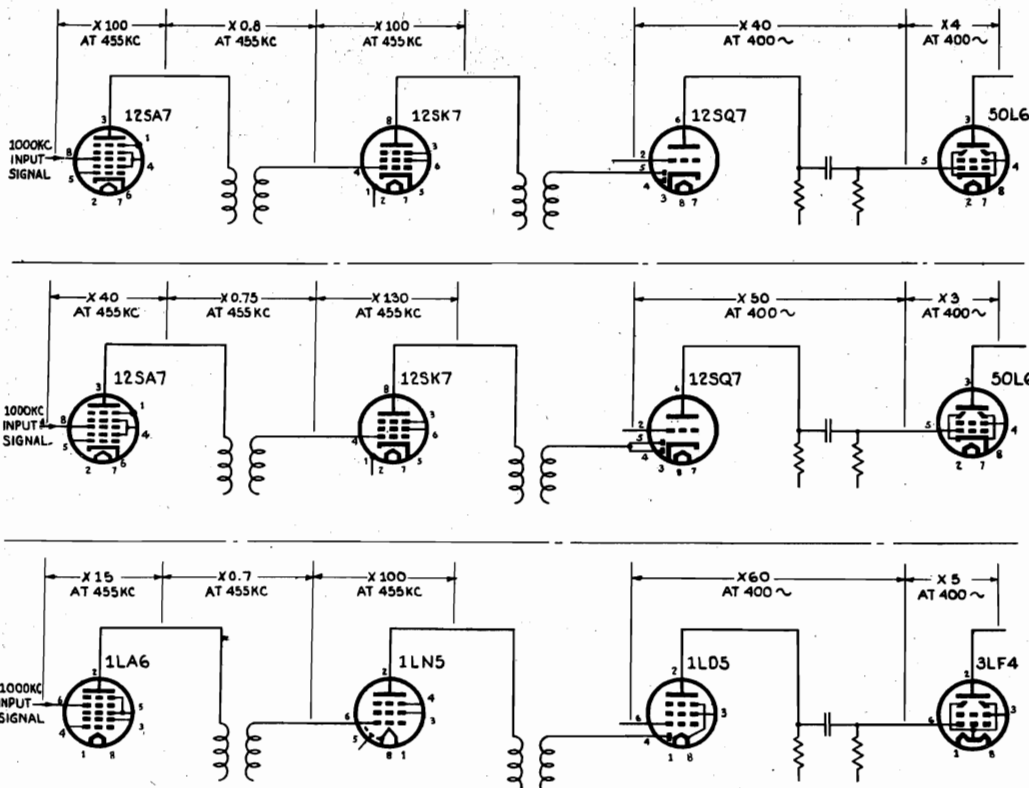
GENERAL TELEV. & RADIO CORP.

**MODELS 1A5, 3A5, 5A5,
19A5**

MODELS 1A5, 3A5, 5A5, 19A5

MODELS 9A5, 15A5, 17A5

D-C VOLTAGE					RESISTANCE					D-C VOLTAGE					RESISTANCE					
TUBE	PIN	VTVM	20,000 OHMS PER VOLT	1000 OHMS PER VOLT	TUBE	PIN	VTVM	20,000 OHMS PER VOLT	1000 OHMS PER VOLT	TUBE	PIN	VTVM	20,000 OHMS PER VOLT	1000 OHMS PER VOLT	TUBE	PIN	VTVM	20,000 OHMS PER VOLT	1000 OHMS PER VOLT	
12SA7	1	0	0	0	0	12SA7	1	0	0	0	12SA7	1	0	0	0	12SA7	1	0	0	0
	2	0	0	0	25		2	0	0	0		24								
	3	+80	+80	+80	5,000,000		3	+80	+80	+78		INFINITE								
	4	+80	+80	+80	5,000,000		4	+80	+80	+78		INFINITE								
	5	-6	-5.6	-2.6	19,000		5	-9.5	-9.5	-4.8		20,000								
	6	0	0	0	0		6	0	0	0		1								
	7	0	0	0	40		7	0	0	0		40								
	8	-1	-0.4	-0.4	5,000,000		8	-1.5	-0.8	-0.2		1,200,000								
12SK7	1	0	0	0	0	12SK7	1	0	0	0	12SK7	1	0	0	0	12SK7	1	0	0	0
	2	0	0	0	16		2	0	0	0		12								
	3	0	0	0	0		3	0	0	0		0								
	4	-1	-0.4	-0.4	5,000,000		4	-1.5	-0.6	-0.2		1,200,000								
	5	0	0	0	0		5	0	0	0		0								
	6	+80	+80	+78	5,000,000		6	+80	+80	+78		INFINITE								
	7	0	0	0	26		7	0	0	0		26								
	8	+80	+80	+78	5,000,000		8	+80	+80	+78		INFINITE								
12SQ7	1	0	0	0	0	12SQ7	1	0	0	0	12SQ7	1	0	0	0	12SQ7	1	0	0	0
	2	-1.2	-0.8	-0.5	10,000,000		2	-0.5	-0.4	-0.2		6,000,000								
	3	0	0	0	0		3	0	0	0		0								
	4	-1	-0.45	-0.4	5,000,000		4	-0.5	-0.4	-0.2		400,000								
	5	-0.7	-0.5	-0.2	500,000		5	-0.5	-0.4	-0.2		400,000								
	6	+54	+48	+42	5,000,000		6	+46	+42	+40		INFINITE								
	7	0	0	0	15		7	0	0	0		14								
	8	0	0	0	0		8	0	0	0		0								
50L6	1	0	0	0	0	50L6	1	0	0	0	50L6	1	0	0	0	50L6	1	0	0	0
	2	0	0	0	40		2	0	0	0		40								
	3	+125	+120	+120	5,000,000		3	+120	+120	+120		INFINITE								
	4	+80	+80	+80	5,000,000		4	+80	+80	+78		INFINITE								
	5	0	0	0	450,000		5	0	0	0		460,000								
	6	0	0	0	INFINITE		6	0	0	0		INFINITE								
	7	0	0	0	90		7	0	0	0		90								
	8	+5.2	+5	+5	140		8	+4.5	+4.5	+4.5		150								
35Z5	1	0	0	0	INFINITE	35Z5	1	0	0	0	35Z5	1	0	0	0	35Z5	1	0	0	INFINITE
	2	0	0	0	120		2	0	0	0		120								
	3	0	0	0	120		3	0	0	0		120								
	4	0	0	0	INFINITE		4	0	0	0		INFINITE								
	5	0	0	0	120		5	0	0	0		120								
	6	0	0	0	120		6	0	0	0		120								
	7	0	0	0	90		7	0	0	0		90								
	8	130	125	125	5,000,000		8	+120	+120	+120		INFINITE								



**MODELS
1A5, 3A5,
5A5, 19A5**

APPROXIMATE
GAIN PER STAGE
DATA

IN MAKING GAIN PER STAGE
MEASUREMENTS, CIRCUIT
WAS OPENED AT POINT X TO STOP
AVC ACTION, AND A 3-VOLT
BATTERY CONNECTED
BETWEEN THIS POINT AND
GROUND.

**MODELS
9A5, 15A5,
17A5**

APPROXIMATE
GAIN PER STAGE
DATA

IN MAKING GAIN PER STAGE
MEASUREMENTS, CIRCUIT WAS
OPENED AT POINT X TO STOP
AVC ACTION, AND A 3-VOLT
BATTERY CONNECTED
BETWEEN THIS POINT AND
GROUND.

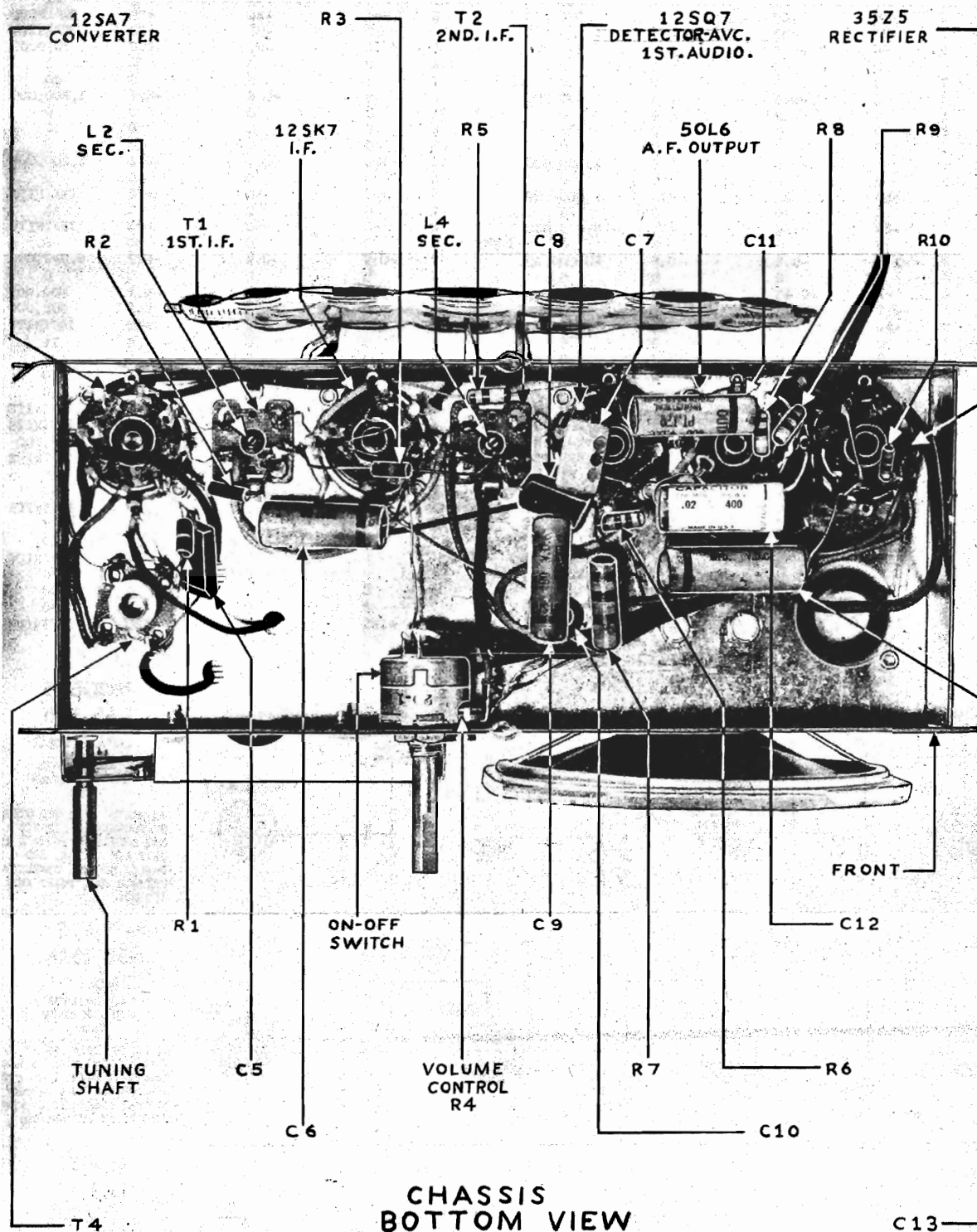
**MODEL
14A4F**

APPROXIMATE
GAIN PER STAGE
DATA

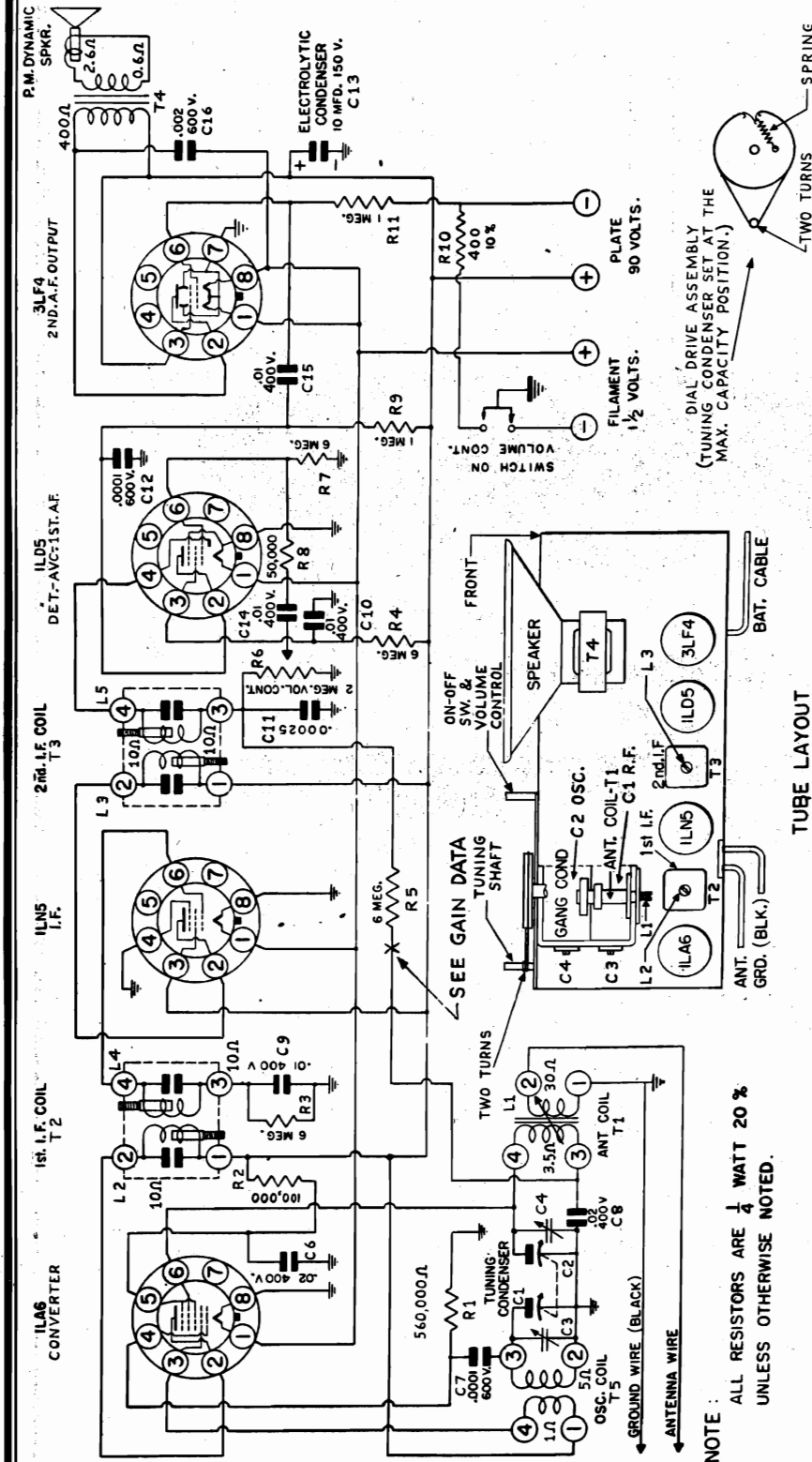
IN MAKING GAIN PER STAGE
MEASUREMENTS, CIRCUIT WAS
OPENED AT POINT X TO STOP
AVC ACTION, AND A 1-1/2
VOLT BATTERY CONNECTED
BETWEEN THIS POINT AND
GROUND.

MODEL 17A5

GENERAL TELEV. & RADIO CORP.



GENERAL TELEV. & RADIO CORP.



TUBE LAYOUT

D-C VOLTAGE RESISTANCE

TUBE	PIN	20,000 OHMS PER VOLT	1000 OHMS PER VOLT	D-C VOLTAGE
1LA6	1	+1.4	+1.4	4
	2	+90	+20	INFINITE
	3	+90	+16	INFINITE
	4	-3.5	-0.2	2,000,000
	5	+34	0	INFINITE
	6	-0.3	0	7,500,000
	7	0	0	7,700,000
	8	0	0	0
1LN5	1	+1.4	+1.4	4
	2	+90	+86	INFINITE
	3	+90	+90	INFINITE
	4	0	0	0
	5	0	-5	450
	6	-0.1	-1	1,700,000
	7	-0.1	0	0
	8	0	+1.4	4

D-C VOLTAGE RESISTANCE

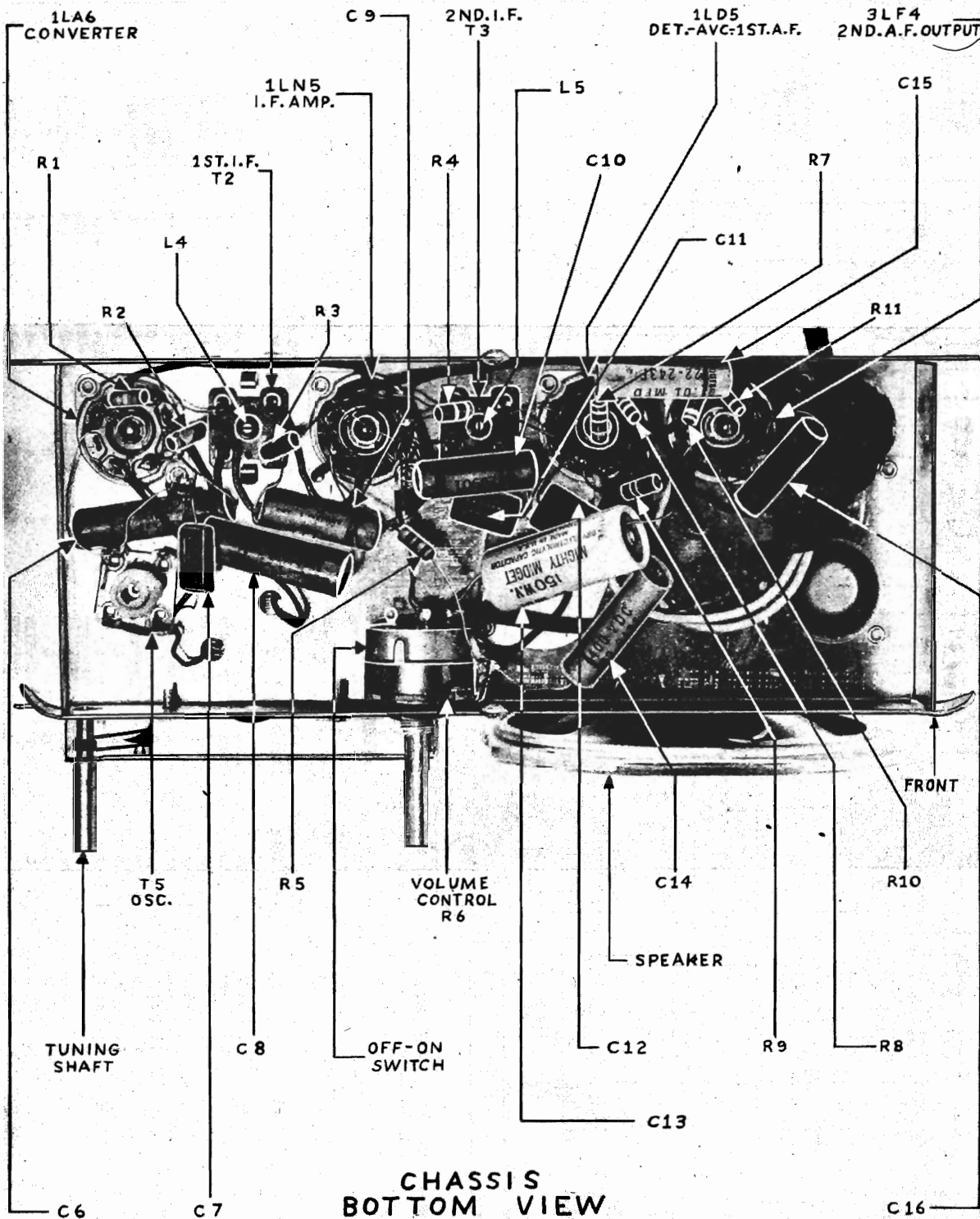
TUBE	PIN	20,000 OHMS PER VOLT	1000 OHMS PER VOLT	D-C VOLTAGE
1LD5	1	+1.4	+1.4	4
	2	+26	+20	INFINITE
	3	+21	+16	INFINITE
	4	-0.4	-0.2	600,000
	5	0	0	INFINITE
	6	-0.2	0	7,000,000
	7	-0.2	0	INFINITE
	8	0	0	0
3LF4	1	+1.4	+1.4	4
	2	+86	+86	INFINITE
	3	+90	+90	INFINITE
	4	0	0	0
	5	0	-5	INFINITE
	6	0	-1	1,700,000
	7	0	0	0
	8	+1.5	+1.4	4

IF PEAK 456 KC

NOTE: ALL RESISTORS ARE 1/4 WATT 20% UNLESS OTHERWISE NOTED.

MODEL 14A4F

GENERAL TELEV. & RADIO CORP.



GENERAL TELEV. & RADIO CORP.

MODELS 1A5, 3A5, 5A5, 19A5
 MODELS 9A5, 15A5, 17A5
 MODEL 14A4F

ALIGNMENT

MODELS 1A5, 3A5, 5A5, 19A5

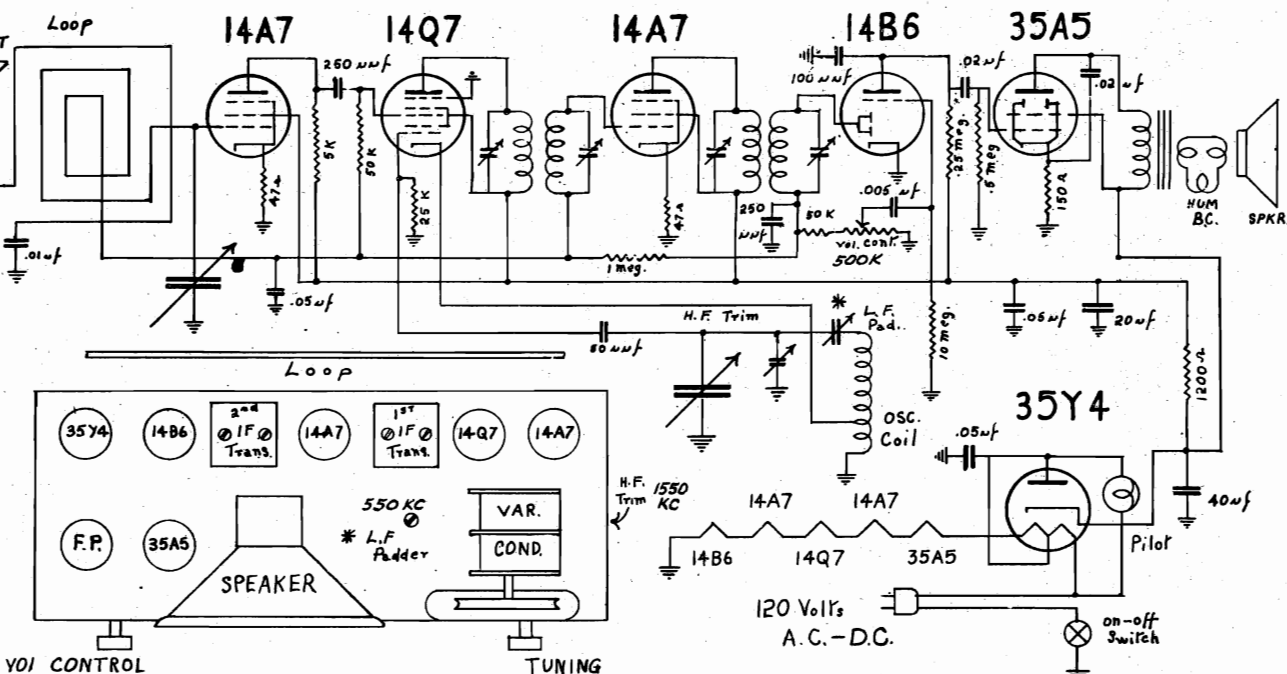
The chassis must be removed from the cabinet in order to align this receiver. Connect the output meter across the voice coil. Connect the signal generator to the Standard Hazeltine Model 1150 loop, and couple loosely to the receiver loop. Set the receiver volume control at maximum. The tuning condenser plates should be fully meshed when the dial pointer is at the index mark at the low frequency end of the dial. The signal generator output should at all times be just sufficient to obtain a minimum deflection on the output meter. Set the signal generator to 456 Kc. Adjust the i-f trimmers for maximum meter deflection in the following sequence: L4, L2, L3, L1. Set the generator and receiver to 1600 Kc and adjust oscillator trimmer C4 for maximum output. Set the generator and receiver to 1400 Kc and adjust loop trimmer C3 for maximum output.

MODELS 9A5, 15A5, 17A5

The chassis must be removed from the cabinet in order to align this receiver. Connect the output meter across the voice coil. Connect the signal generator to the standard Hazeltine Loop Model 1150, and couple loosely to the receiver loop. Set the receiver volume control at maximum. The tuning condenser plates should be fully meshed when the dial pointer is at the index mark at the low frequency end of the dial. The signal generator output should at all times be just sufficient to obtain a minimum deflection on the output meter. Set the signal generator to 456 Kc and adjust the i-f trimmers for maximum meter deflection in the following sequence: L4, L3, L2, L1. Set the generator and receiver to 1600 Kc and adjust the oscillator trimmer C4 for maximum output. Set the generator and receiver to 1400 Kc and adjust the loop trimmer C3 for maximum output.

MODEL 14A4F

Alignment may be accomplished with the chassis in the cabinet if a small alignment screwdriver is used. Connect the output meter across the voice coil. Connect the high side of the signal generator to the antenna lead through a .01 mf condenser and the low side to the black ground wire. Set the receiver volume control at maximum. The tuning condenser plates should be fully meshed when the dial pointer is at the index mark at the low frequency end of the dial. The signal generator output should at all times be just sufficient to obtain a minimum deflection on the output meter. Set the signal generator to 455 Kc and adjust the i-f trimmers for maximum output in the following sequence: L5, L3, L4, L2. Set the generator and receiver to 1500 Kc and adjust the oscillator shunt trimmer C4 for maximum output. Set the generator and receiver to 1400 Kc and adjust the antenna trimmer C3 for maximum output. Set the generator and receiver to 600 Kc and adjust the antenna coil tuning slug L1 for maximum output. Repeat the high frequency adjustment of the antenna trimmer C3 at 1400 Kc.



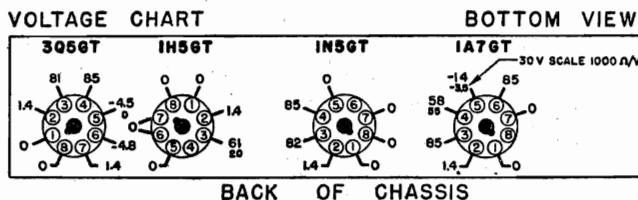
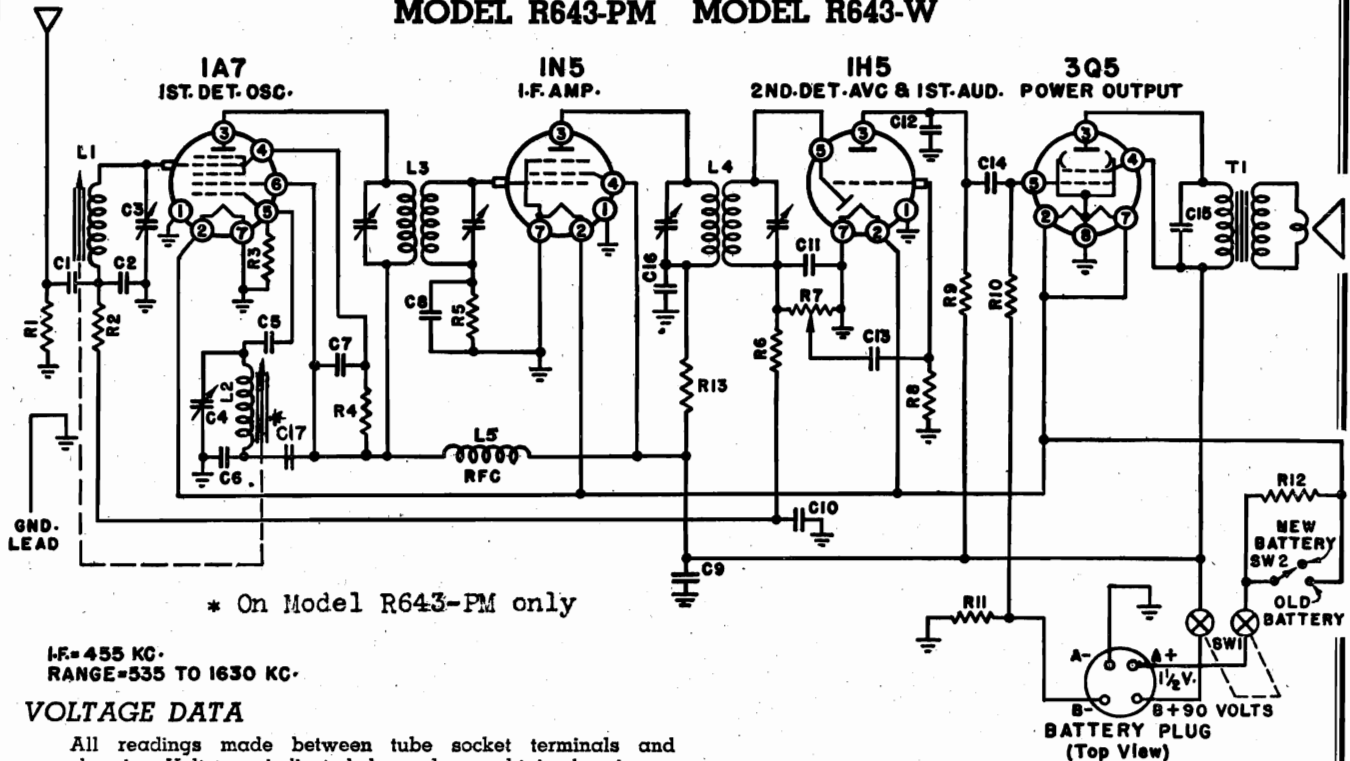
NOTE: MODEL 6U1 is the same as MODEL 601 except that the frequency range is from 550 to 1700 KC and a cut-plate variable condenser replaces the L.F. padder.

B.W. 9-25 46

B. F. GOODRICH CO.

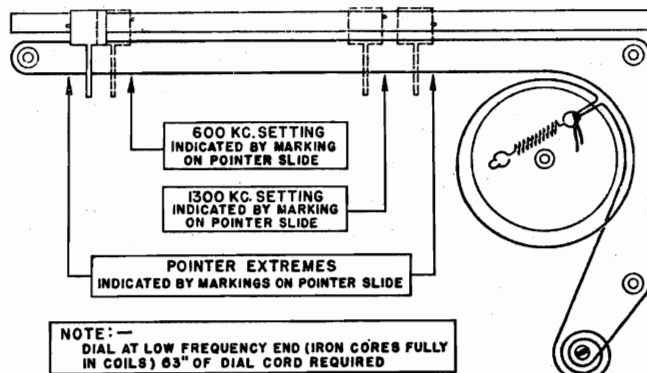
MODELS R643-PM, R643-W

MODEL R643-PM MODEL R643-W



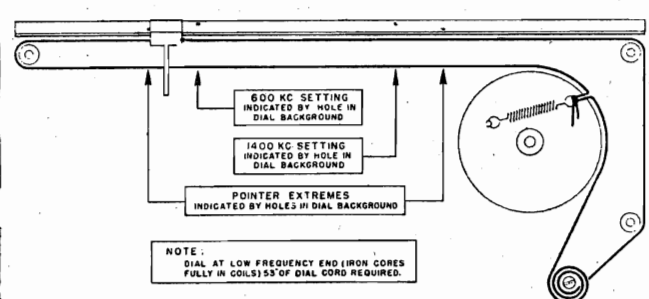
MODEL R643-PM

POINTER SETTINGS AND DIAL CORD STRINGING



MODEL R643-W

POINTER SETTINGS AND DIAL CORD STRINGING



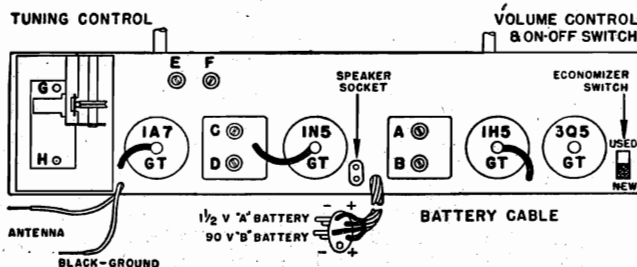
MODEL R643-PM

B. F. GOODRICH CO.

MODEL R643-PM

ALIGNMENT PROCEDURE

- **IMPORTANT**—Check to see that dial pointer reaches each end of dial scale when Station Selector Control is turned from one end to the other.
- Volume control—Maximum for all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead, when needed (see below).
- Connect output meter across voice coil of speaker.
- Allow chassis and signal generator to warm up for several minutes.



- Use lowest Output setting of Signal Generator capable of producing adequate Output Meter indication and then proceed as indicated in the chart below.

Band	Signal Generator Frequency	Dummy Antenna	Connection to Radio	Receiver Dial Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Type of Adjustment
I. F.	455 KC.	.1 MFD.	Grid of 1A7 (Cap)	High frequency end of dial	C-D—2nd I.F.	Output I.F.	Adjust to maximum output
	455 KC.	.1 MFD.	Grid of 1A7 (Cap)	High frequency end of dial	A-B—1st I.F.	Input I.F.	Adjust to maximum output
BROAD-CAST	1630 KC.	.0002 MFD.	Antenna Lead	High frequency end of dial	E—(See note below) F—(See note below)	Oscillator Antenna	Adjust to maximum output
	1300 KC.	.0002 MFD.	Antenna Lead	1300 KC.	G H	Oscillator Antenna	Adjust to maximum output

NOTE: Before adjusting trimmers "E" and "F", make sure that each iron core is 1 3/8" or more outside of its coil form. If necessary, turn adjustments "G" and "H" to accomplish this.

CONDENSERS

Symbol	Description	Part No.
C1	Paper, .01 mfd., 400 V.	64B1-25
C2	Mica, .0008 mfd. $\pm 10\%$	65B5-31
C3	Trimmer, Antenna	66A21-1
C4	Trimmer, Oscillator	
C5	Mica, .0001 mfd. $\pm 20\%$	65B7-17
C6	Mica, .0008 mfd. $\pm 10\%$	65B5-31
C7	Paper, .01 mfd., 400 V.	64B1-25
C8	Paper, .002 mfd., 600 V.	64B1-14
C9	Elect., 4 mfd., 150 V.	67A4-2
C10	Paper, .05 mfd., 200 V.	64B1-32
C11	Mica, .00025 mfd. $\pm 20\%$	65B7-22
C12	Mica, .00025 mfd. $\pm 20\%$	65B7-22
C13	Paper, .01 mfd., 400 V.	64B1-25
C14	Paper, .01 mfd., 400 V.	64B1-25
C15	Paper, .005 mfd., 600 V.	64B1-12
C16	Paper, .01 mfd., 400 V.	64B1-25
C17	Paper, .01 mfd., 400 V.	64B1-25

RESISTORS

R1	15,000 ohm $\pm 10\%$, 1/2W.	60B8-153
R2	470,000 ohm $\pm 10\%$, 1/4W.	60B2-474
R3	220,000 ohm $\pm 10\%$, 1/2W.	60B8-224
R4	33,000 ohm $\pm 10\%$, 1/2W.	60B8-333
R5	4,700,000 ohm $\pm 10\%$, 1/4W.	60B2-475
R6	2,200,000 ohm $\pm 10\%$, 1/4W.	60B2-225
R7	1 megohm Volume Control & Switch	75B1-1
R8	4,700,000 ohm $\pm 10\%$, 1/4W.	60B2-475
R9	1,000,000 ohm $\pm 10\%$, 1/4W.	60B2-105
R10	1,000,000 ohm $\pm 10\%$, 1/4W.	60B2-105
R11	390 ohm $\pm 10\%$, 1/4W.	60B2-391
R12	0.75 ohm $\pm 10\%$, 1/4W. (Wire)	61A2-1
R13	2200 ohm $\pm 10\%$, 1/4W.	60B2-222

TRANSFORMERS AND COILS

L1	Antenna Coil	AC105-1
L2	Oscillator Coil	A1020
L3	1st I.F. Transformer	72B5
L4	2nd I.F. Transformer	72B6
L5	Choke Coil (RF)	AB103-1
T1	Output Transformer	98A5

MISCELLANEOUS

Description	Part No.
Background, Dial	X22C5-1
Cabinet, R643-PM (Plastic)	34D10
Cable, Battery (complete with plug)	A1026
Cap, Grid	90A1-2
Clip, Dial Glass	18A2
Cord, Dial (5" on tuner and 63" on dial drive)	50A1-3
Dial Scale, glass	21B25
Drum and Hub, Tuning	A1035
Grille Cloth	36B3-1
Iron Slug, with wire (Oscillator)	71B1-3
Iron Slug, with wire (Antenna)	71B1-4
Knob	33A7-2
Plug, Battery, 5 Prong	88A4-4
Pointer, Dial	25A9-1
Pulley, Fibre Dial	17A1-3
Screw Studs (for iron cores)	27A4
Shaft, Tuning	28A1-1
Shaft and Pulley (Tuner)	A1040
Shield, Tube	87A8
Socket, Octal Tube	87A5-1
Socket, Speaker	87A4-3
Speaker and Output Transformer	78B15-2
Speaker Guard	36A5-2
Spring, Dial Drum Cord Tension	19B1-10
Spring, Hairpin (To hold Ant. or Osc. coil)	19A3-1
Spring, Tuner Slide Cord Tension	19A1-4
Spring, Tuner, back bearing takeup	19A6
Spring, Tuner, front bearing takeup	19A5
Spring, Tuner Slide Pressure	18A9
Switch, SPST (Economizer) SW2	77B1-6
Washer, C	4A4-1
Washer, spring (coils)	4A6-12-0
Washer, spring (shaft)	4A6-3-0

B. F. GOODRICH CO.

MODEL R643-W

MODEL R643-W

ALIGNMENT PROCEDURE

Be sure Radio Receiver and Signal Generator are thoroughly warmed up before starting alignment procedure.

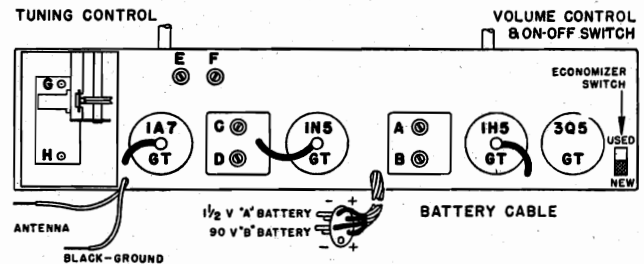
Check setting of Pointer Extremes and note correct 600 K.C. and 1400 K.C. positions on Dial Background. (See Dial Diagram on reverse side.)

Connect Output Meter across Voice Coil.

Turn Receiver Volume Control—full on.

Use lowest Output setting of Signal Generator capable of producing adequate Output Meter indication and then proceed in the following sequence.

Repeat adjustments to insure final overall maximum results.



Connect Signal Generator to—	Dummy Antenna Between Radio and Generator	Set Generator Frequency to—	Set Receiver Dial Frequency to—	Adjust Following Trimmers or Slugs	Type of Adjustment
Grid of 1A7 (Cap)	.1 mfd. Condenser	455 Kc.	High frequency End of dial	A-B—1st I.F. C-D—2nd I.F.	Adjust to maximum Output
Antenna Lead	.0002 mfd. Condenser	1630 Kc.	High frequency End of dial	E—Osc. (Trimmer) F—Ant. (Trimmer)	Adjust to maximum Output
Antenna Lead	.0002 mfd. Condenser	1400 Kc.	Tune in Generator Signal	G—Osc. (iron core) H—Ant. (iron core)	Adjust to maximum Output

PAPER CONDENSERS

Part No.	Symbol No.	Description
64B1-14	C8	.002 mfd. 600 Volt
64B1-12	C15	.005 mfd. 600 Volt
64B1-25	C1, C7, C13, C14, C16	.01 mfd. 400 Volt
64B1-32	C10	.05 mfd. 200 Volt

MICA CONDENSERS

Part No.	Symbol	Description
65B7-17	C5	.0001 mfd.
65B7-22	C11, C12	.00025 mfd.
64B5-31	C2, C6	.0008 mfd.

ELECTROLYTIC CONDENSER

Part No.	Symbol	Description
67A4-2	C9	4. mfd. 150 Volt

TRIMMER CONDENSERS

Part No.	Symbol No.	Description
66A9-1	C3, C4	Dual trimmer

RESISTORS

Part No.	Symbol	Description
61A2-1	R12	.75 ohm 1/4 w (wire)
60B2-391	R11	390. ohm 1/4 w
60B2-222	R13	2200 ohm 1/4 w
60B8-153	R1	15,000 ohm 1/2 w

Part No.	Symbol No.	Description
60B8-333	R4	33,000 ohm 1/2 w
60B8-224	R3	220,000 ohm 1/2 w
60B2-474	R2	470,000 ohm 1/4 w
60B2-105	R9, R10	1,000,000 ohm 1/4 w
60B2-225	R6	2,200,000 ohm 1/4 w
60B2-475	R5, R8	4,700,000 ohm 1/4 w

VOLUME CONTROL

Part No.	Symbol No.	Description
75B1-1	R7	1 megohm Vol. Control and switch

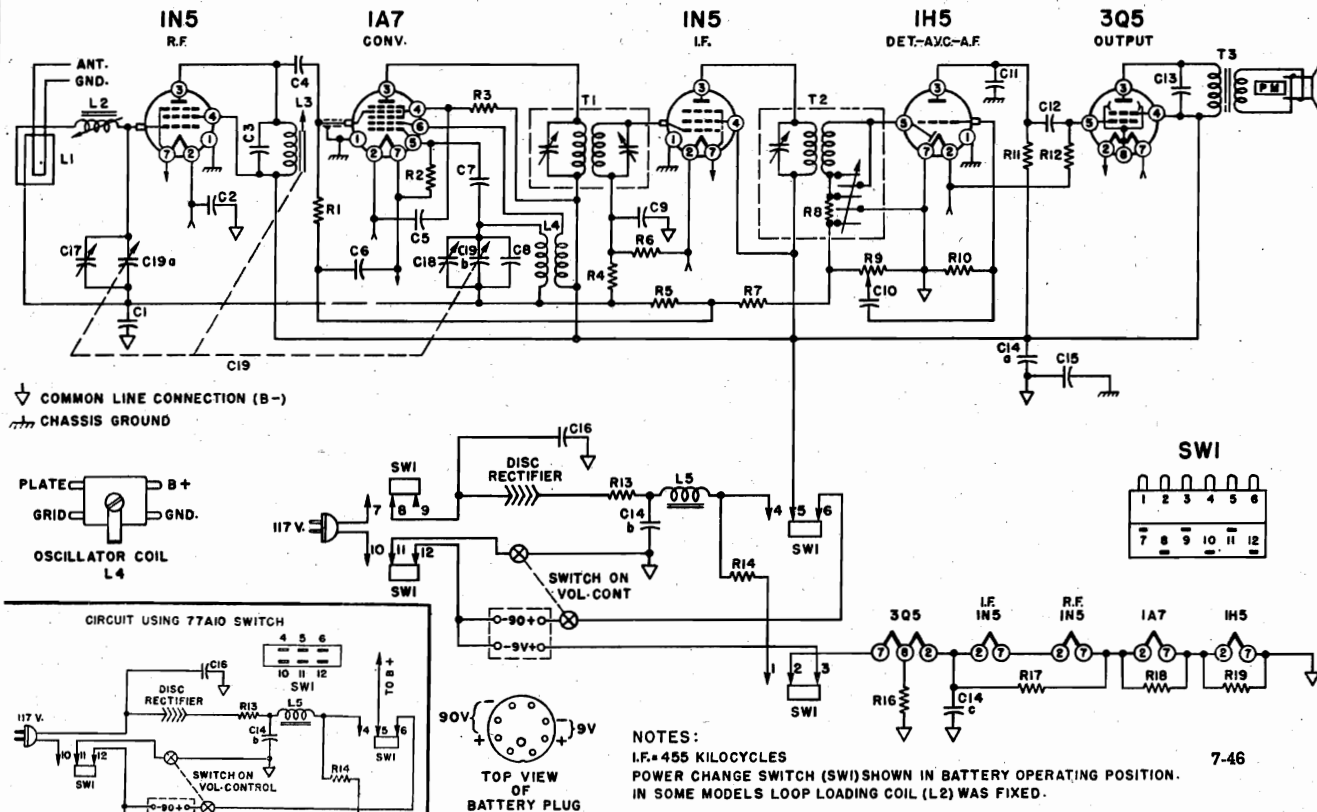
TRANSFORMERS AND COILS

Part No.	Symbol No.	Description
AC105-1	L1	Antenna coil
AB104-4	L2	Oscillator coil
72B5	L3	1st I.F. Transformer
72B6	L4	2nd I.F. Transformer
AB103-1	L5	Choke coil (RF)
	T1	Output Transformer (specify full speaker part no. including mfg. code when ordering)

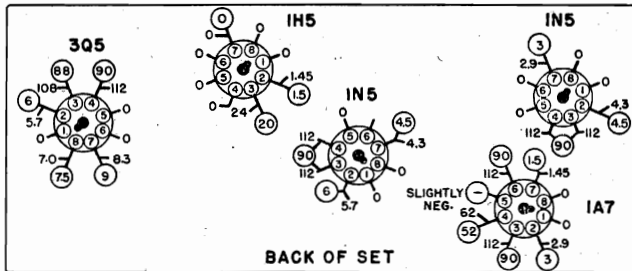
MISCELLANEOUS

Part No.	Symbol No.	Description
22C5-1		Background, Dial
35C25		Cabinet, R643-W
A1025		Cable, Battery (complete with plug)
90A1-4		Cap, Grid
50A1-1		Cord, Dial (5" on tuner) (53" on dial drive)

Part No.	Symbol No.	Description
A1035		Drum and Hub, Tuning
23A8-1		Escutcheon
71B1-3		Iron Core, with wire (Osc.)
71B1-4		Iron Core, with wire (Ant.)
33A7-2		Knob
A1028		Permeability Tuner Assembly, complete
88A4-4		Plug, Battery 5 Prong
25A9-1		Pointer, Dial
17A1-3		Pulley, Fibre Dial
21B13		Scale, Glass Dial
27A4		Screw studs (for iron cores)
87A8		Shield, Tube
28A11-1		Shaft, Tuning
A1040		Shaft and pulley (Tuner)
87A10-2		Socket, octal tube
78B5		Speaker and output Transformer (specify complete part number including mfg. code, when ordering)
19A1-3		Spring, Dial Drum Cord Tension
19A1-4		Spring, Tuner slide cord tension
18A1		Spring, Tuner slide pressure
19A5		Spring, Tuner, front bearing takeup
19A6		Spring, Tuner, back bearing takeup
19A3-1		Spring, Hairpin (To hold Ant.-Osc. coils)
95A9-1		Sprashield (3")
77A1-6		Switch, SPST (Economizer)
9A8-1		Terminal, Tuner slide cord
4A4-1		Washer, C
4A6-3-0		Washer, spring (shaft)
4A6-5-0		Washer, spring (coils)



VOLTAGE CHART



VOLTAGE DATA

1. Voltage readings circled (O) are for Battery Operation.
2. All readings made between Tube Socket Terminals and Pin No. 7 on the IH5.
3. A.C. Voltages measured on a 117 Volt A.C. line.
4. Battery Voltages measured with a fresh battery.
5. Dial turned to low frequency end, no signal.
6. All Voltages measured with a 1000 ohm-per-volt meter.

CONDENSERS

Symbol	Description	Part No.
C1	.05 Mfd., 200 Volt, Paper	64B1-32
C2	.25 Mfd., 200 Volt, Paper	64B1-28
C3	.00042 Mfd., Mica	65B1-13
C4, C11	.00025 Mfd., Mica	65B5-22
C5, C6, C9, C10, C12	.01 Mfd., 400 Volt, Paper	64B1-25
C7	.00005 Mfd., Mica	65B5-11
C8	.000015 Mfd., Mica	65B5-3
C13	.002 Mfd., 600 Volt, Paper	64B1-14
C14a	50 Mfd., 150 Volt	67C7-42
C14b	30 Mfd., 150 Volt	
C14c	100 Mfd., 25 Volt	
C15	.2 Mfd., 400 Volt, Paper	64A2-1
C16	.05 Mfd., 400 Volt, Paper	64B1-22
C17	Antenna Trimmer	66A12-5
C18	Oscillator Trimmer (Part of Gang)	
C19 {C19a, C19b}	Condenser, Gang	68B4

RESISTORS

R1	100,000 Ohms, 1/2 Watt, Carbon	60B8-104
R2	220,000 Ohms, 1/2 Watt, Carbon	60B8-224
R3	47,000 Ohms, 1/2 Watt, Carbon	60B8-473
R4, R5	4.7 Megohms, 1/4 Watt, Carbon	60B2-475

RESISTORS

Symbol	Description	Part No.
R6	4.7 Megohms, 1/4 Watt, Carbon	60B2-475
R7	3.3 Megohms, 1/4 Watt, Carbon	60B2-335
R8	47,000 Ohms, 1/2 Watt, Carbon	60B8-473
R9	1 Megohm Volume Control	75B1-10C
R10	15 Megohms, 1/4 Watt, Carbon	60B2-156
R11	1 Megohm, 1/4 Watt, Carbon	60B2-105
R12	2.2 Megohms, 1/4 Watt, Carbon	60B2-225
R13	68 Ohms, Wire Wound, 1 Watt	60B28-4
R14	2,275 Ohms, Wire Wound, 5 Watt	61A3-6
R16	1,500 Ohms, 1/2 Watt, Carbon	60B8-152
R17	560 Ohms, 1/2 Watt, Carbon	60B8-561
R18	220 Ohms, 1/2 Watt, Carbon	60B8-221
R19	120 Ohms, 1/2 Watt, Carbon	60B8-121

COILS & TRANSFORMERS

L2	Coil, Loop Loading, (fixed)	AA114
L3	Coil, Loop Loading, (variable)	AA115
	Iron Slug for plate coil	71B1-3
	Coil, Plate	AB100-5
	Oscillator Coil	69A7
	Choke Filter	74A5
	1st I.F. Transformer	72B9-2

COILS & TRANSFORMERS

Symbol	Description	Part No.
T2	2nd I.F. Transformer	72B10-2
T3	Transformer, Output	*

* When ordering, specify all numbers on the speaker and transformer.

SW1	Switch, Power Change (R652)	77A6
	Switch, Power Change (R652N)	77A10

MISCELLANEOUS

Description	Part No.
Dial Background	21A18-2
Dial Cord, 12"	50A1-3
Dial Cord Tension Spring	19A1-2
Escutcheon and Dial Scale	23C14
Knob, Tuning	33A14-6
Knob, Volume	33A14-5
Plug, Battery (3 prong)	88A3-3
Pointer, Cream Tenite	25A15-1
Rectifier, Selenium	93A1-2
Speaker & Output Transformer	78B8
Tube Shields	87A8

ALIGNMENT PROCEDURE

1. Be sure both set and signal generator are thoroughly warmed up before starting alignment.
2. Make alignment, using a battery whenever possible.
3. Disconnect Loop Antenna leads from clips on set and remove chassis from cabinet.
4. Connect a 50,000 ohm carbon resistor across the two clips from which the Loop Antenna was removed.
5. Connect Output Meter across the Voice Coil.
6. Connect a fresh battery to the set.
7. Turn receiver Volume Control full on.

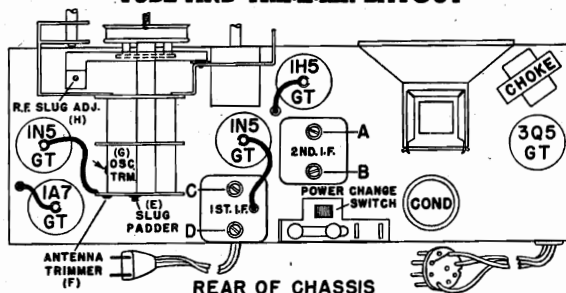
Step	Dummy Antenna Used in Series with Signal Generator	Connect High Side Signal Generator to	Signal Generator Frequency	Gang Condenser Setting	Trimmer Description and Designation	Type of Adjustment
1	.00025 Mfd. when using A.C. .1 Mfd. when using Battery	Grid Cap 1A7	455 K.C.	Any point where it does not affect Signal	2nd I.F. (A), (B). 1st I.F. (C), (D).	Maximum Deflection. Then repeat
2	.00025 Mfd. when using A.C. .1 Mfd. when using Battery	Grid Cap 1N5	1620 K.C.	Rotor full open (Plates out of mesh)	Oscillator Trimmer (G)	Maximum Deflection
3	.00025 Mfd. when using A.C. .1 Mfd. when using Battery	Grid Cap 1N5	1400 K.C.	Tune in Generator Signal	R.F. Slug (H)	Maximum Deflection
4	Replace Set in Cabinet					
5	.00025 Mfd.	Antenna and Ground Leads	1400 K.C.	Tune in Generator Signal	Antenna Trimmer (F)	Maximum Deflection
6	Disregard the next two steps if the set being aligned is a model with a fixed loop loading coil (L2).					
7	.00025 Mfd.	Antenna and Ground Leads	600 K.C.	Tune in Generator Signal	Loop Loading Coil Slug (E)	Maximum Deflection
8	.00025 Mfd.	Antenna and Ground Leads	1400 K.C.	Tune in Generator Signal	Reset Antenna Trimmer (F)	Maximum Deflection

Seal adjusting screw on the loop loading coil with any quick drying cement.

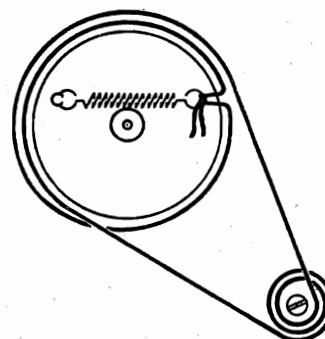
REPLACING R.F. TUNING SLUG

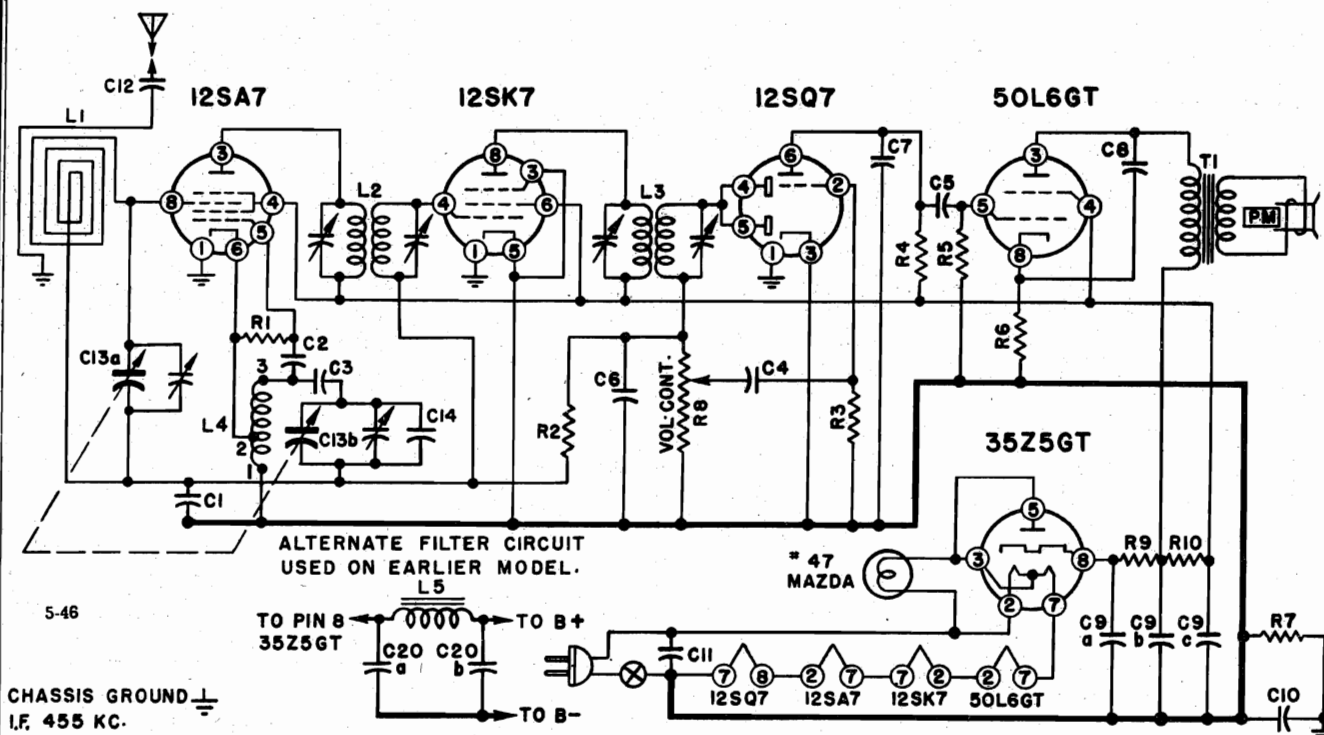
If the R.F. Tuning Slug has to be changed, use the following procedure. Set the gang condenser to the point where the plates are fully meshed. Screw the slug adjusting screw about halfway down. Place the slug in the coil in such a position that the top of the slug is flush with the top of the coil. Solder the slug wire to the adjusting screw. Be sure that the position of the slug does not change during the soldering and that the slug wire is straight. Proceed to re-align the set as shown in the chart.

TUBE AND TRIMMER LAYOUT



DIAL CORD STRINGING





NOTE: 1. In later production R9 and C9a are disconnected from pin No. 8 of the 35Z5 and a 33-ohm 1-watt resistor (R11) is connected between pin No. 8 and the junction of R9 and C9a.

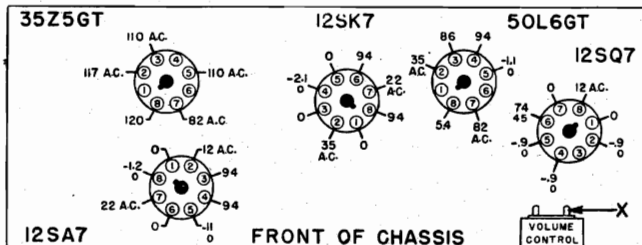
2. The jumper between pins 4 and 5 on the 12SQ7 is removed and one pin is connected to the secondary of the second I.F. (L3) and the other pin is connected directly to the junction point of R2 and the secondary of the 1st I.F. (2).

VOLTAGE DATA

All readings made between Tube Socket Terminals and Switch Lug on volume control (Point "X" on drawing).

Voltages indicated obtained on Vacuum Tube voltmeter.

A second voltage reading is shown made with a 1000 ohm-per-volt meter when use of this instrument would result in appreciably lower readings.



Bottom View

Measured on a 117 Volt A.C. line; volume control full on; dial tuned to low frequency end, no signal.

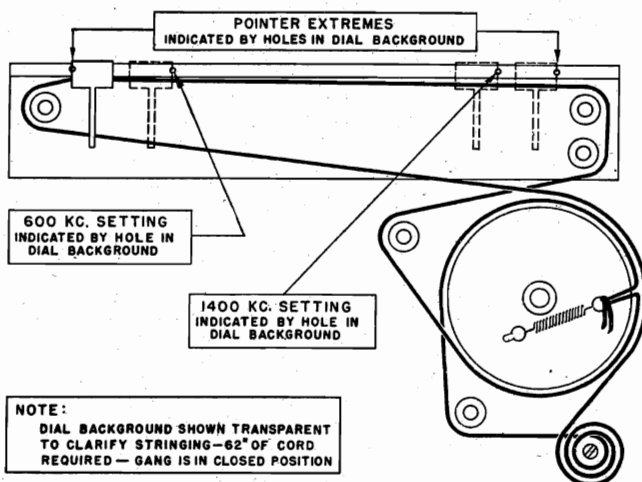
Frequency Range 540-1630 Kc.

POWER SUPPLY

This receiver is designed to operate from any AC (Alternating Current) power supply main of 110-120 volts, 50-60 cycles or DC (Direct Current) power supply main of 110-120 volts. If the receiver fails to operate on DC (Direct Current), reverse the power main plug.

On AC only the line plug should be tried both ways and left in the position that give minimum hum.

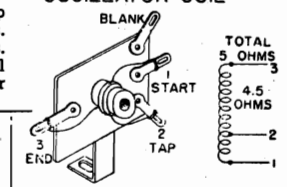
DIAL STRINGING AND POINTER SETTINGS



COILS

Symbol	Description
L1 (Sec. 2.3 ohms)	Loop
L2	1st I.F. Trans.
L3	2nd I.F. Trans.
L4	Osc. Coil
L5 (325 ohms)	Choke, Filter

OSCILLATOR COIL



B. F. GOODRICH CO.

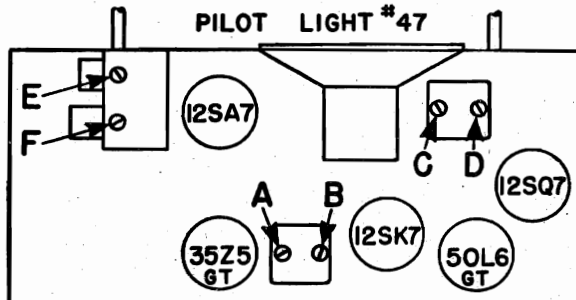
MODELS R654-PM, R654-PV
MODEL R655-W

ALIGNMENT PROCEDURE

- Be sure Radio Receiver and Signal Generator are thoroughly warmed up before starting alignment procedure.
- Check setting of Pointer Extremes and note correct 600 K.C. and 1400 K.C. positions on Dial Background. (See Dial Diagram on reverse side.)
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect Output Meter across Voice Coil of Speaker.
- Turn Receiver Volume Control full on.
- Use lowest Output setting of Signal Generator capable of producing adequate Output Meter indication and then proceed as outlined in chart below.
- Repeat adjustments to insure final overall maximum results.

TOP VIEW

TUBE & TRIMMER LOCATION



BACK OF CHASSIS

Step	Dummy Antenna between Radio and Signal Generator	Connect Signal Generator to	Signal Generator Frequency	Gang Condenser Setting	Trimmers Adjusted for Maximum Output
1	250 mmfd. Capacitor	Gang Condenser Antenna Stator	455 KC.	Rotor full open (Plates out of mesh)	C and D—2nd. I.F.
2	250 mmfd. Capacitor	Gang Condenser Antenna Stator	455 KC.	Rotor full open (Plates out of mesh)	A and B—1st I.F.
3	250 mmfd. Capacitor	Gang Condenser Antenna Stator	1630 KC.	Rotor full open (Plates out of mesh)	E—Oscillator
4	No actual connection between set and generator.	Loop radiator (or place pickup lead from generator close to loop of set to obtain adequate signal).	1400 KC.	Set Gang to tune in Generator Signal	F—Antenna (See Note)

NOTE: Antenna trimmer "F" must be aligned after chassis and loop are mounted in the cabinet. This adjustment can be made by lifting up the top cover and removing the plug button which is directly above trimmer "F".

MODEL R655-W

REPLACEMENT PARTS

CONDENSERS			RESISTORS			MISCELLANEOUS	
Symbol	Description	Part No.	Symbol	Description	Part No.	Description	Part No.
C1	.1 mfd., 200 Volts, Paper	64B1-30	R8	1/2 megohm, Volume Control and Switch. Tapped at approx. 100,000 and 200,000 ohms from start.	75B3-2	Background, Dial.....	X22C3-1
C2	50 mmfd., Mica	65B7-11				Dial Scale, Glass.....	21B27-2
C3	.02 mfd., 400 Volts, Paper	64B1-24	R9	47,000 ohms, 1/2 Watt	60B8-473	Drum and Hub Assembly.....	A1012
C4	.01 mfd., 400 Volts, Paper	65A3-10	R10	27,000 ohms, 1/2 Watt	60B8-273	Grommet, Rubber Insulating.....	12A1-1
C5	.01 mfd., 400 Volts, Paper	65A3-10	R11	150 ohms, 1 Watt	60B28-1	Grommet, Rubber for Drum.....	12A1-2
C6	250 mmfd., Mica	65B7-22	R12	1,000 ohms, 1 Watt	60B28-2	Knob, Tuning or Volume Control.....	33A16-2
C7	500 mmfd. Mica	65B7-27	R13	33 ohms, 1 Watt	60B28-3	Knob, Radio-Phono Switch.....	33A11-5
C8	.02 mfd., 400 Volts, Paper	64B1-24	R14	10 megohms, 1/2 Watt	60B9-106	Pilot Light, Mazda No. 47.....	81A1-8
C9a	30 mfd., 150 V. }	Electrolytic 67A8	TRANSFORMERS and COILS			Pilot Light Socket and Leads.....	82A2-3
C9b	30 mfd., 150 V. }		L1	Antenna, Loop	69B6	Plug, Button.....	13A2-1-57
C9c	20 mfd., 150 V. }		L2	Transformer, 1st I. F.	72B3	Plug, Alden (Motor Leads).....	88A8-1
C10	.1 mfd., 400 Volts, Paper	64B1-20	L3	Transformer, 2nd I. F.	72B4	Pointer.....	25A4-1
C11	.05 mfd., 400 Volts, Paper	64B1-22	L4	Oscillator Coil	69A5	Pulley, Fibre Dial.....	17A1-3
C12	.005 mfd., 600 Volts, Paper	64B1-12	L5	Choke Coil (Filter)	74A1	Shaft, Tuning.....	28A1-1
C13a	.00042 mfd., Gang }	68A2	T1	Transformer, Output	98A4	Socket and Leads (Alden).....	89A6-2
C13b	.00018 mfd., Gang }		L1	Antenna, Loop	69B6	Socket, Octal Tube.....	87A5-1
C14	15 mmfd., Mica		65B5-3	L2	Transformer, 1st I. F.	72B3	Speaker (5" PM) & Output Transformer.....	78B13-1
C15	.01 mfd., 400 Volts, Paper	65A3-10	L3	Transformer, 2nd I. F.	72B4	Spring, Dial Cord Tension.....	19B1-7
C16	.01 mfd., 400 Volts, Paper	65A3-10	L4	Oscillator Coil	69A5	Switch, Rotary Radio-Phono.....	{ 77A8 or 77A11
C17	.05 mfd., 400 Volts, Paper	64B1-22	L5	Choke Coil (Filter)	74A1	Washer, Flat Insulating.....	5A1-6
C20a	30 mfd., 150 V. }	Electrolytic 67A3	T1	Transformer, Output	98A4	Washer, Offset Insulating.....	5A2-5
C20b	50 mfd., 150 V. }		L1	Antenna, Loop	69B6	Washer, C.....	4A4-1
RESISTORS			PHONOGRAPH PARTS			Washer, Spring.....	4A6-3-0
R1	22,000 ohms, 1/2 Watt	60B8-223	Description	Part No.			
R2	1 megohm, 1/2 Watt	60B8-105	Centorpost	G400A12-1			
R3	10 megohms, 1/2 Watt	60B8-106	Crystal Cartridge	409A1			
R4	220,000 ohms, 1/2 Watt	60B8-224	Idler Wheel (407B3 Motor)	G400A23			
R5	470,000 ohms, 1/2 Watt	60B8-474	Idler Wheel (407B2 Motor)	G400A59			
R6	150 ohms, 1/2 Watt	60B8-151	Idler Wheel (407B1 Motor)	G400A57			
R7	150,000 ohms, 1/2 Watt	60B8-154	Motor, 60 cycle 115 volt, A. C. (Types 407B1 & 407B2 also used)	407B3			

PARTS FOR MODELS R654-PM, R654-PV THE SAME AS ABOVE EXCEPT FOR THE PHONOGRAPH PARTS AND THE FOLLOWING EXCEPTIONS:

MISCELLANEOUS			MISCELLANEOUS		
Part No.	Symbol	Description	Part No.	Description	
64B1-25	C4, C5	.01 mfd. 400 V.	22C3-1	Background, Dial	82A2-3
64A2-1	C10	.2 mfd. 900 V.	15A14	Bracket, Loop Retainer	25A4-1
MICA CONDENSERS			34D5-1	Cabinet (Ivory)	17A1-3
65B5-5	C14	Mica 20 mmf. ±10%	34D5-2	Cabinet (Mahogany)	21B8-1
60B28-3	R11	33 ohm 1 W. ±10%	43B9	Cover, Back	28A1-1
60B28-1	R9	150 ohm 1 W. ±10%	18A2	Clip, Dial Glass Mtg.	13A1-4-47
60B28-2	R10	1,000 ohm 1 W. ±10%	89A1	Cord, Line	87A1C-2
75B1-6	R8	1 meg Control and Switch	50A1-3	Cord, Dial (62")	78B4-1
			A1012	Drum and Hub Assy., Dial	19A1-3
			12A1-2	Grommets, Rubber	5A1-6
			33A7-1	Knob, Ivory	5A2-5
			33A7-2	Knob, Mahogany	4A4-1
			1A67-27-2	Mounting Bolts, 8-32 x 1/2" lg.	4A6-3-0
			81A1-8	Pilot Light No. 47	4B1-55-2
					3B1-26-2

B. F. GOODRICH CO.

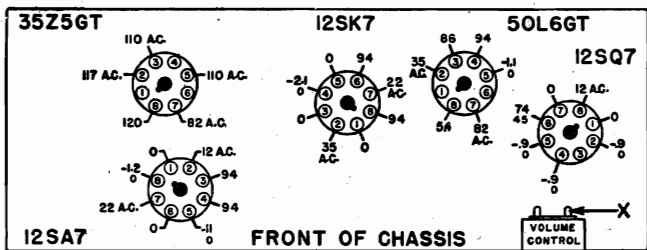


TUBES USED

12SA7—1st Det. Osc.	50L6GT—Beam Power Output
12SK7—I. F. Amplifier	35Z5GT—Rectifier
12SQ7—2nd Det.—A. V. C.—1st Audio	

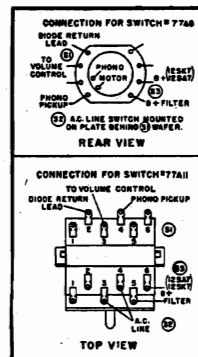
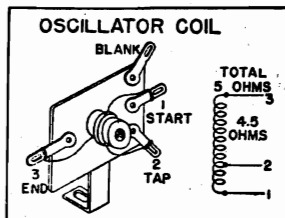
Frequency Range 540-1630 Kilocycles

VOLTAGE DATA

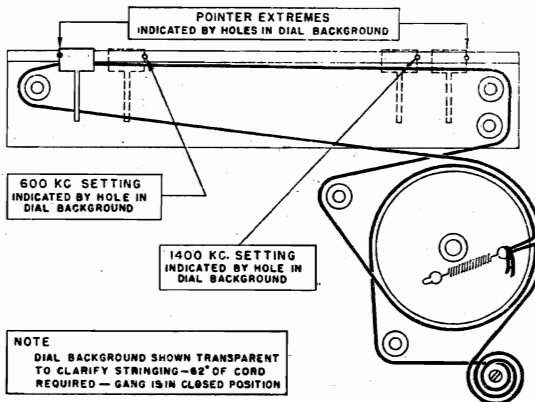


Bottom View of Chassis, Showing Voltages

- All readings made between Tube Socket Terminals and Switch Lug on Volume Control (Point "X" on drawing).
- Measured on a 117 Volt A.C. line.
- Volume control full on.
- Dial tuned to low frequency end, no signal.
- Voltages obtained on Vacuum Tube voltmeter.
- A second voltage reading is shown made with a 1000 ohm-per-volt meter when use of this instrument would result in appreciably lower readings.



DIAL STRINGING AND POINTER SETTINGS



NOTE
DIAL BACKGROUND SHOWN TRANSPARENT
TO CLARIFY STRINGING—82" OF CORD
REQUIRED — GANG IS IN CLOSED POSITION

117Z6 RECTIFIER

3Q5 OUTPUT

IH5 DET.-AFC.-A.F.

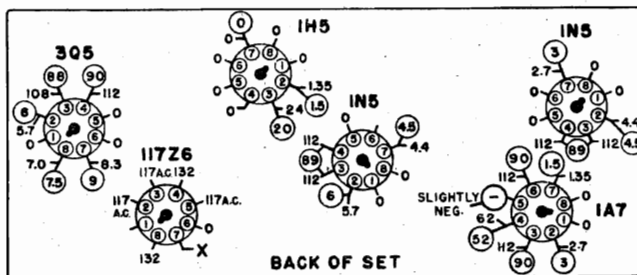
IN5 IF

SW1

1	2	3	4	5	6
7	8	9	10	11	12

NOTES: I.F.=455 Kilocycles
Power change switch (SW1) shown in battery operation position.
In some models, loop loading coil (L2) was fixed.

1. Voltage readings circled (O) are for Battery Operation.
2. All readings made between Tube Socket Terminals and Terminal No. 7 on the 117Z6 (Point "X" on Voltage Chart).
3. A.C. Voltages measured on a 117 Volt A.C. line.
4. Battery Voltages measured with a fresh battery.
5. Dial turned to low frequency end, no signal.
6. All Voltages measured with a 1000 ohm-per-volt meter.



CONDENSERS		
Symbol	Description	Part No.
C1	.05 Mfd., 200 Volt, Paper	64B1-32
C2	.25 Mfd., 200 Volt, Paper	64B1-28
C3	.00042 Mfd., Mica	65B1-9
C4, C11	.00025 Mfd., Mica	65B5-22
C5, C6, C9,		
C10, C12	.01 Mfd., 400 Volt, Paper	64B1-25
C7	.00005 Mfd., Mica	65B5-11
C8	.000015 Mfd., Mica	65B5-3
C13	.002 Mfd., 600 Volt, Paper	64B1-14
C14a	50 Mfd., 150 Volt	} Elect. Cond. 67C7-42
C14b	30 Mfd., 150 Volt	
C14c	100 Mfd., 25 Volt	
C15	.2 Mfd., 400 Volt, Paper	64A2-1
C16	.05 Mfd., 400 Volt, Paper	64B1-22
C17	Antenna Trimmer	66A12-5
C18	Oscillator Trimmer (Part of Gang)	
C19	{ C19a } Condenser, Gang	68B4
	{ C19b }	

RESISTORS

Symbol	Description
R6	4.7 Megohms, 1/2 Watt, Carbon
R7	3.3 Megohms, 1/2 Watt, Carbon
R8	50,000 Ohms, 1/2 Watt, Carbon
R9	1 Megohm Volume Control
R10	15 Megohms, 1/2 Watt, Carbon
R11	1 Megohm, 1/2 Watt, Carbon
R12	2.2 Megohms, 1/2 Watt, Carbon
R13	22 Ohms, Wire Wound, 1/2 Watt
R14	2,450 Ohms, Wire Wound, 5 Watt
R16	1,500 Ohms, 1/2 Watt, Carbon
R17	560 Ohms, 1/2 Watt, Carbon
R18	220 Ohms, 1/2 Watt, Carbon
R19	120 Ohms, 1/2 Watt, Carbon

COILS & TRANSFORMERS			
Part No.	Symbol	Description	Part No.
60B2-475	T2	2nd I.F. Transformer	72B10-2
60B2-335	T3	Transformer, Output	*
60B8-803		*When ordering, specify all numbers on the speaker and transformer.	
75B1-100			
60B2-156			
60B2-105		{ Switch, Power Change (R662)	77A6
60B2-225	SW1	{ Switch, Power Change (R662N)	77A10
61A2-2			

MISCELLANEOUS	
Description	Part No.
Dial Background	21A18-2
Dial Cord, 12"	50A1-3
Dial Cord Tension Spring	19A1-2
Escutcheon and Dial Scale	23C14
Knob, Tuning	33A14-6
Knob, Volume	33A14-5
Plug, Battery (9 prong)	88A3-3
Pointer, Cream Tenite	25A15-1
Speaker & Output Transformer	78B8
Tube Shields	37A8

RESISTORS

R1	100,000 Ohms, 1/2 Watt, Carbon	60B8-104
R2	220,000 Ohms, 1/2 Watt, Carbon	60B8-224
R3	47,000 Ohms, 1/2 Watt, Carbon	60B8-473
R4, R5	4.7 Megohms, 1/2 Watt, Carbon	60B2-475

COILS & TRANSFORMERS

L2	{ Coil, Loop Loading, (fixed)	AA
	{ Coil, Loop Loading, (variable)	AA
L3	{ Iron Slug for plate coil	71E
	{ Coil, Plate	70A
L4	Oscillator Coil	69A
L5	Choke Filter	74A
T1	1st I.F. Transformer	72E

ALIGNMENT PROCEDURE

1. Be sure both set and signal generator are thoroughly warmed up before starting alignment.
2. Make alignment, using a battery whenever possible.
3. Disconnect Loop Antenna leads from clips on set and remove chassis from cabinet.
4. Connect a 50,000 ohm carbon resistor across the two clips from which the Loop Antenna was removed.
5. Connect Output Meter across the Voice Coil.
6. Connect a fresh battery to the set.
7. Turn receiver Volume Control full on.

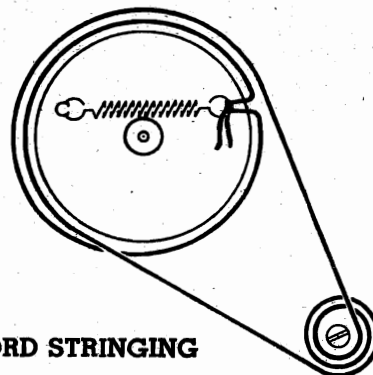
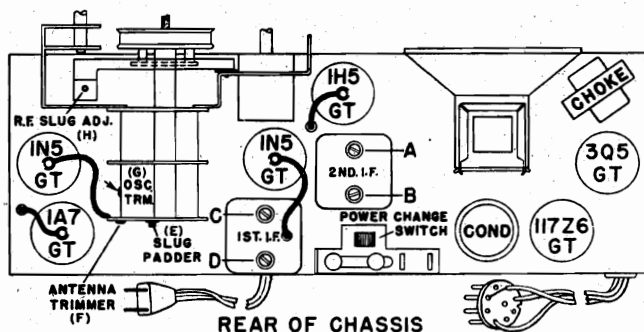
Step	Dummy Antenna Used in Series with Signal Generator	Connect High Side Signal Generator to	Signal Generator Frequency	Gang Condenser Setting	Trimmer Description and Designation	Type of Adjustment
1	.00025 Mfd. when using A.C. .1 Mfd. when using Battery	Grid Cap 1A7	455 K.C.	Any point where it does not affect Signal	2nd I.F. (A), (B). 1st I.F. (C), (D).	Maximum Deflection. Then repeat
2	.00025 Mfd. when using A.C. .1 Mfd. when using Battery	Grid Cap 1N5	1620 K.C.	Rotor full open (Plates out of mesh)	Oscillator Trimmer (G)	Maximum Deflection
3	.00025 Mfd. when using A.C. .1 Mfd. when using Battery	Grid Cap 1N5	1400 K.C.	Tune in Generator Signal	R.F. Slug (H)	Maximum Deflection
4	Replace Set in Cabinet					
5	.00025 Mfd.	Antenna and Ground Leads	1400 K.C.	Tune in Generator Signal	Antenna Trimmer (F)	Maximum Deflection
6	Disregard the next two steps if the set being aligned is a model with a fixed loop loading coil (L2).					
7	.00025 Mfd.	Antenna and Ground Leads	600 K.C.	Tune in Generator Signal	Loop Loading Coil Slug (E)	Maximum Deflection
8	.00025 Mfd.	Antenna and Ground Leads	1400 K.C.	Tune in Generator Signal	Reset Antenna Trimmer (F)	Maximum Deflection

Seal adjusting screw on the loop loading coil with any quick drying cement.

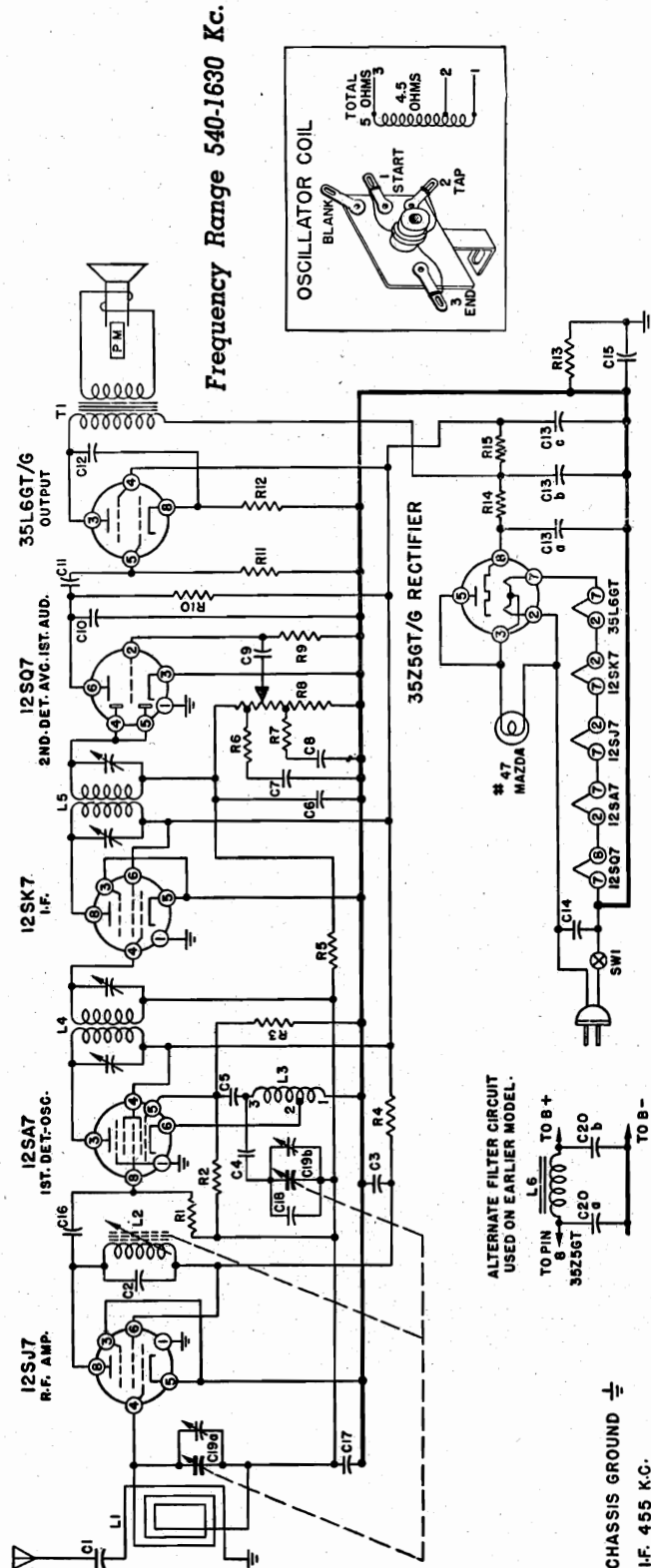
REPLACING R.F. TUNING SLUG

If the R.F. Tuning Slug has to be changed, use the following procedure. Set the gang condenser to the point where the plates are fully meshed. Screw the slug adjusting screw about halfway down. Place the slug in the coil in such a position that the top of the slug is flush with the top of the coil. Solder the slug wire to the adjusting screw. Be sure that the position of the slug does not change during the soldering and that the slug wire is straight. Proceed to re-align the set as shown in the chart.

TUBE AND TRIMMER LAYOUT



B. F. GOODRICH CO.

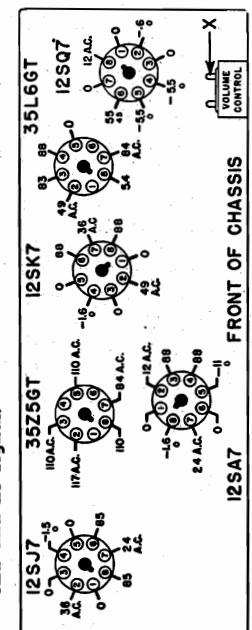
MODELS R664-PM, R664-PV,
R664-W

NOTE: 1. In later production R14 and C13a are disconnected from pin #8 of the 35Z5 and a 33-ohm 1W resistor (R16) is connected from pin #8 to the junction of R14 and C13a.

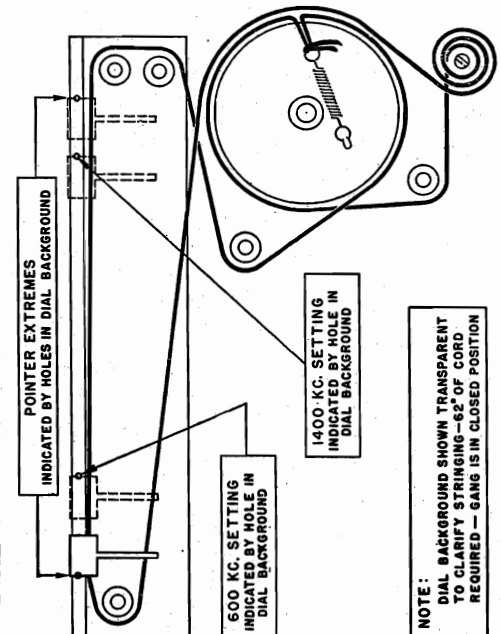
2. The jumper between pins 4 and 5 on the 12SQ7 is removed and one pin is connected to the secondary of the second I.F. (L5) and the other pin is connected directly to the junction point of R5 and the secondary of the 1st I.F. (L4).

VOLTAGE DATA

All readings made between Tube Socket Terminals and Switch Lug on volume control (Point "X" on drawing). Voltages indicated were obtained with a vacuum tube voltmeter. However, when use of a 1000 ohm-per-volt meter results in an appreciably different reading, this reading is shown below that of the vacuum tube voltmeter reading. Voltages are measured using a 117 volt A.C. line with the volume control full on, the dial tuned to the low-frequency end and no signal.



DIAL STRINGING AND POINTER SETTINGS



COILS

Symbol	Description
L1 (Sec. 2.3 ohms)	Loop
L2 (2.5 ohms)	R. F. Coil
L3	Osc. Coil
L4	1st I. F. Trans.
L5	2nd I. F. Trans.
L6 (325 ohms)	Choke, Filter

MODELS R664-PM, R664-PV,
R664-W

B. F. GOODRICH CO.

DIAL DRUM POSITION

If the dial drum position is disturbed, it should be carefully re-positioned to insure correct tuning of the permeability tuned coil. With the gang fully meshed, the drum will be properly positioned if the center of the condenser shaft and the dial cable hole on the drum are in a straight line parallel to the chassis base. Note that the dial cable hole should be on the right side (looking at front) of the chassis.

TUNED SLUG POSITION.

If the tuned coil slug needs replacing or re-positioning, first see that the dial drum is in its proper position. Then with the gang condenser fully meshed and the threaded stud half-way through the bakelite, note that the top of the slug is flush with the top of coil form. Then re-align.

ALIGNMENT PROCEDURE

Be sure Radio Receiver and Signal Generator are thoroughly warmed up before starting alignment procedure.

Check setting of Pointer Extremes and note correct 600 K.C. and 1400 K.C. positions on Dial Background. (See Dial Diagram on reverse side.)

Connect Output Meter across Voice Coil.

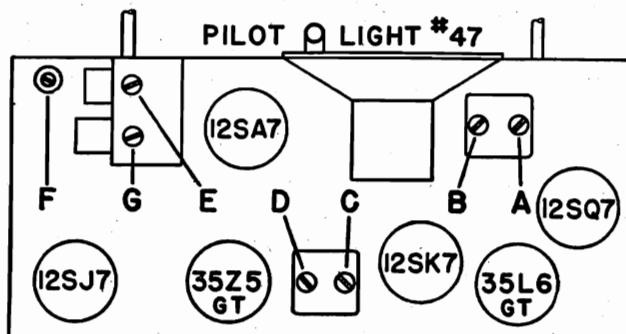
Turn Receiver Volume Control full on.

Use lowest Output setting of Signal Generator capable of producing adequate Output Meter indication and then proceed as outlined in chart below.

Repeat adjustments to insure final overall maximum results.

TOP VIEW

TUBE & TRIMMER LOCATION



BACK OF CHASSIS

Connect Signal Generator To—	Dummy Antenna Between Radio and Generator	Set Generator Frequency To—	Set Receiver Dial Frequency To—	Adjust Following Trimmers	Type of Adjustment
12SA7 Control Grid	250 mmfd. Mica Condenser	455 KC.	High frequency end of Dial	A and B 2nd I. F. C and D 1st I. F.	Adjust to maximum Output
External Antenna Wire on Loop	250 mmfd. Mica Condenser	1630 KC.	High frequency end of Dial	E—Osc.	Adjust to maximum Output
External Antenna Wire on Loop	250 mmfd. Mica Condenser	1400 KC.	• Tune in Generator signal	F—R. F. (Iron Core)	See Note Below
Loop radiator or place pickup lead from gen. close to set loop to obtain adequate signal.	No actual connection between set and generator.	1400 KC.	Tune in Generator signal	G—Ant.	Adjust to maximum Output

NOTE: Adjustment F is the threaded stud at the top end of the slug wire. Screw stud up or down in the bakelite for maximum output. Alignment is correct if the output is reduced

when the position of the lever arm is changed slightly in either direction (up or down).

PAPER CONDENSERS

Part No.	Symbol	Description
64B1-12	C-1	.005 mfd 600 V.....
64B1-22	C-3, C-14	.35 mfd 400 V.....
64B1-24	C-4, C-12	.02 mfd 400 V.....
64B1-25	{C-7, C-8, C-9, C-11}	.01 mfd 400 V.....
64B1-30	C-17	.1 mfd 200 V.....
64A2-1	C-15	.2 mfd. 400 V.....

CERAMIC or MICA CONDENSERS

65B5-5	C-18	20 mmfd. ±10%.....
65B7-11	C-5	50 mmfd. ±20%.....
65B7-22	C-6, C-16	250 mmfd. ±20%.....
65B7-27	C-10	500 mmfd ±20%.....
65B1-8	C-2	785 mmfd. ±5% (silver)

VARIABLE RESISTORS

75B3-2	R-8	Volume Control (½ meg ohm) and Switch (Tapped).....
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TRANSFORMERS and COILS

69B4	L1	Aeroscope (Loop).....
A1052	L2	R. F. Coil and Mounting
69A5	L3	Oscillator Coil.....
72B3	L4	1st I. F. Transformer.....
72B4	L5	2nd I. F. Transformer.....
74A1	L6	Choke, Filter.....
*	T1	Transformer, Output.....

*When ordering, specify all numbers on speaker and transformer.

ELECTROLYTIC CONDENSERS

Part No.	Symbol	Description
67A3	{C20a, C20b}	30 mfd. 150 V.....
or	{C13a, C13b}	30 mfd 150 V.....
67A8	{C13c}	20 mfd 150 V.....

VARIABLE CONDENSERS

68A2	C19a, b	Condenser, Gang.....
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RESISTORS

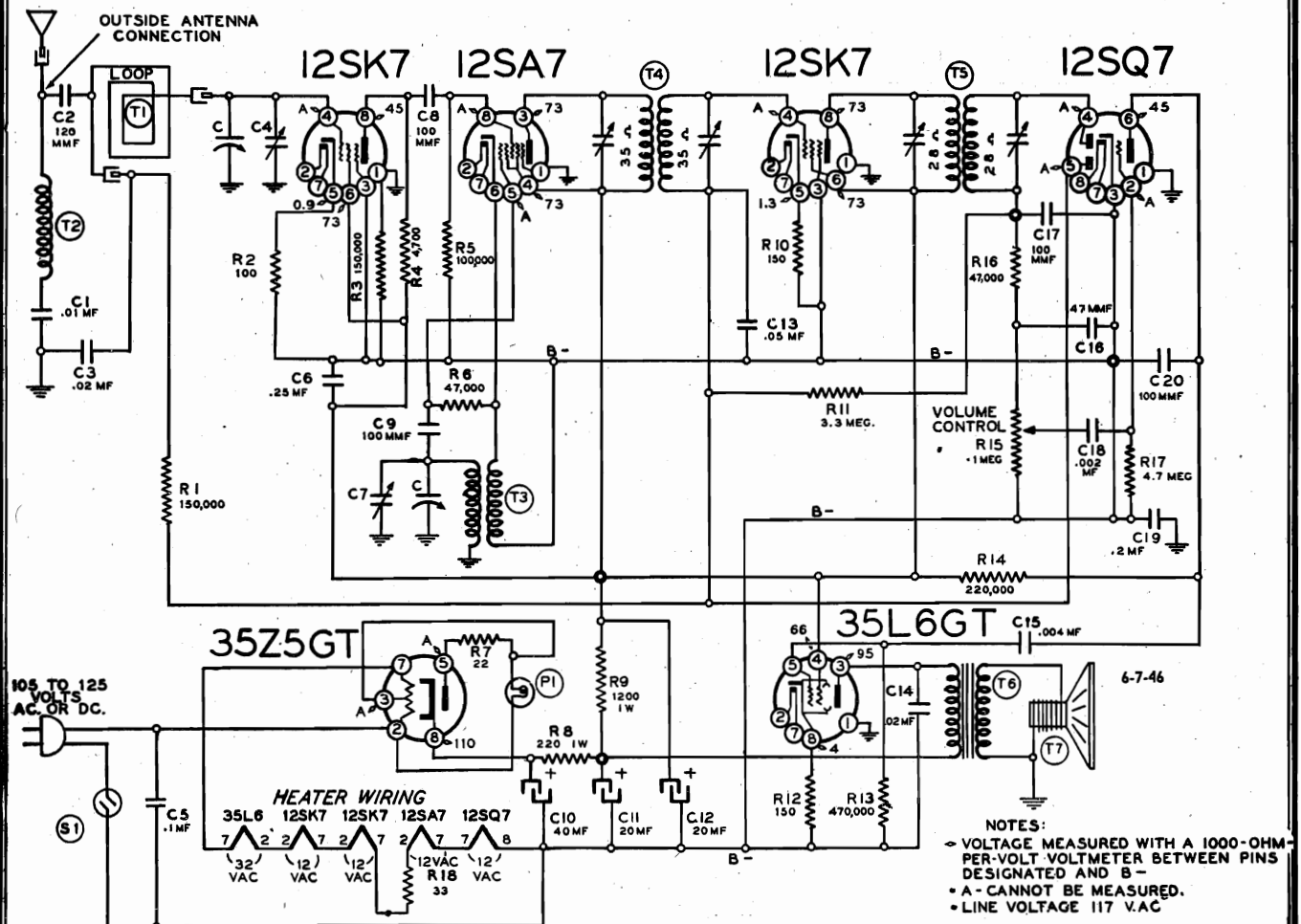
60B28-3	R-16	33 ohm 1 W. ±10%.....
60B8-101	R-4	100 ohm ½ W. ±10%.....
60B8-151	R-12	150 ohm ½ W. ±10%.....
60B14-151	R-14	150 ohm 1 W. ±10%.....
60B14-102	R-15	1,000 ohm 1 W. ±10%.....
60B8-103	R-1	10,000 ohm ½ W. ±10%.....
60B8-223	R-3	22,000 ohm ½ W. ±10%.....
60B8-273	R-7	27,000 ohm ½ W. ±10%.....
60B8-473	R-6	47,000 ohm ½ W. ±10%.....
60B8-154	R-13	150,000 ohm ½ W. ±10%.....
60B8-274	R-10	270,000 ohm ½ W. ±10%.....
60B8-474	R-11	470,000 ohm ½ W. ±10%.....
60B8-105	R-5	1 meg ohm ½ W. ±10%.....
60B8-475	R-9	4.7 meg ohm ½ W. ±10%.....
60B8-106	R-2	10 meg ohm ½ W. ±10%.....

MISCELLANEOUS

Part No.	Description
22C3-1	Background, Dial (specify blue for plastic, brown for wood cabinets)
15A69	Bracket, Dial glass mtg. (wood Cab.)
13A1-4-47	Buttons, Snap (For cabinet back and R. F. Coil).....

Part No.	Description
15A14	Bracket Plate, Loop Retainer.....
34D8-1	Cabinet, Plastic Ivory.....
34D8-2	Cabinet, Plastic Mahogany.....
18A2	Clip, Dial glass (Plastic Cab.).....
43B10	Cover, Chipboard back (Plastic Cab.)
43B18	Cover, Chipboard back (wood Cab.)
50A1-3	Cord, Dial (62").....
A1049	Drum and Cam Assembly.....
12A1-2	Grommet, Rubber.....
33A7-1	Knob (For Ivory Plastic only).....
33A7-2	Knob (For Mahog. Plastic only).....
33A7-5	Knob (For wood cabinet).....
A1050	Lever arm assembly (R.F.).....
81A1-8	Pilot light, No. 47.....
82A2-3	Pilot light socket and leads.....
25A13-1	Pointer.....
17A1-3	Pulley, Fibre ½ x ½ OD.....
21B10-1	Scale, Glass dial.....
1A5-14	Screw, Set 8-32x½ (Dial Drum).....
1A67-27-2	Screw, Mtg., 8-32x½" lg. (For Plastic only).....
1A67-29-2	Screw, Mtg., 8-32x¾" lg. (For Wood only).....
28A1-1	Shaft, Tuning.....
78B4-2	Speaker and Trans. 5" PM.....
19A1-3	Spring, Tension (Dial).....
19A4	Spring, Lever Arm (R.F.).....
29A2-3-21	Spacer, T (R.F.).....
71R1-2	Slug, R. F. Iron Core (with wire).....
87A10-2	Socket, Octal Tube.....
27A4	Stud, slug adj. (R.F.).....
4A4-1	Washer, C (Tuning shaft).....
4A6-3-C	Washer, Spring (Tuning Shaft).....

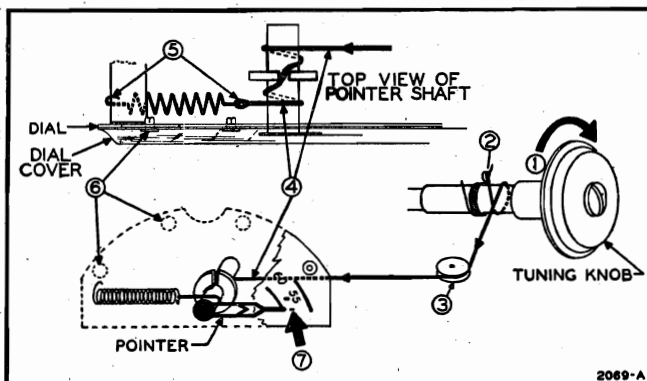
W. T. GRANT CO.

MODELS 605, 606
Series A

REPLACING DIAL POINTER DRIVE CORD

Six inches of cord are required. Numbers below correspond to circled numbers in diagram.

1. Rotate tuning knob to extreme clockwise position.
2. Tie cord to loop in spring as shown.
3. Pass cord over idler pulley.
4. Pass cord OVER pointer shaft; wind it one turn around shaft; pass it through key washer, then once more around shaft.
5. Hook spring over end of dial support. Tie cord to spring. IMPORTANT: Full contraction of spring must rotate pointer shaft at least one half turn.
6. Remove dial crystal by removing snap-in rivets.
7. Make sure tuning knob is in extreme clockwise position. Then rotate pointer clockwise, against friction of shaft, until it is in a horizontal position, as shown.



POWER SUPPLY.....105 to 125 volts, DC or 50-
60 cycle AC, 35 watts.
Also made for 25 cycles.

FREQUENCY RANGE.....530 to 1650 kc.

INTERMEDIATE FREQ.....455 kc.

TUNING.....Two-gang capacitor.

ANTENNA.....Built-in loop. Also, pro-
visions for external an-
tenna. No ground re-
quired.

SPEAKER.....5-inch; P.M.; voice coil im-
pedance 3.2 ohms.

POWER OUTPUT.....1 watt undistorted.
1.5 watts maximum.

SENSITIVITY.....10 microvolts average for
50-milliwatt output.

SELECTIVITY.....55 kc. broad at 1000 times
signal at 1000 kc.

TUBE COMPLEMENT.....12SK7, R. F. amplifier
12SA7, converter
12SK7, I. F. amplifier
12SQ7, 2nd detector, AVC,
1st audio
35L6GT, output amplifier
35Z5GT, rectifier

MODELS 605,606

Series A

W. T. GRANT CO.

DIAL LIGHT—If the dial lamp burns out the set should not be operated until a new lamp has been installed. Failure to heed this caution may result in a burned-out 35Z5GT tube. To replace the lamp, first remove the four buttons which hold the back to the cabinet. On the inside of the back unclip the green, black, and white wires clipped to the back. The Chassis View illustration shows the location of the dial lamp. Pull the lamp bracket toward the rear of the radio. The lamp can now be removed and replaced. Use a 6- to 8-volt lamp, type T-47. When replacing the back on the cabinet, connect the green wire to the green-painted clip, the black wire to the black-painted clip, and the white wire to the unpainted clip.

REMOVAL OF CHASSIS—If for any reason you wish to remove the radio chassis from the cabinet, proceed as follows: First be sure the line cord

is disconnected from the house power receptacle. Then take off the back as described under "Dial Light" above. Pull the volume control knob off its shaft. Unscrew the locking screw in the center of the tuning knob and pull the knob off its shaft. Remove the four chassis mounting screws from the bottom of the cabinet. The chassis can now be slipped out.

After the chassis is replaced the automatic pushbuttons will probably have to be reset.

SETTING THE PUSHBUTTONS—The pushbuttons may be used, after proper adjustment, for the automatic tuning of any six stations on the standard broadcast band. They can be set up in any order.

1. Turn on the radio.

2. Push out the call letters of the six stations from the call-letter sheets supplied with this manual.

3. Insert one call-letter tab in the rectangular opening in the front of each pushbutton, in any order. Press an acetate tab (supplied in small envelope) into each of the pushbuttons.

4. With the screwdriver supplied, check to see that the locking screw in the center of the tuning knob (see front view) is loose. If it is not, turn it several turns to the left (counterclockwise).

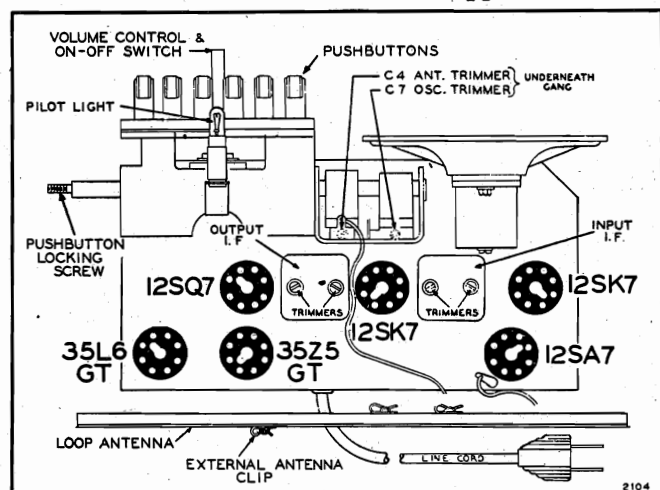
5. Press the first pushbutton down *all the way*. With one hand hold the button down firmly and with the other carefully tune in the desired station. Release the pushbutton.

6. Follow this procedure for each of the five other buttons, setting each one for a different station.

7. Rotate the tuning knob on the side of the cabinet as far to the right as it will go. Tighten the locking screw in the center of the knob. **IT IS IMPORTANT THAT THIS SCREW BE TIGHTENED VERY FIRMLY.**

8. The pushbuttons are now properly set for automatic tuning.

Any of the six stations may be tuned in simply by pressing the proper button down as far as it will go. If you wish to reset any of the buttons for a new station, loosen the locking screw, set the pushbutton as described above, and re-tighten the locking screw.



ALIGNMENT PROCEDURE

(Refer to Chassis View for location of trimmers)

Output meter across 3.2-ohm output load. Align for maximum output. Reduce input as needed to keep output near 0.4 volts. Volume control at maximum for all adjustments. Connect ground post of signal generator to B— of radio.

- Chassis must be removed from cabinet for proper alignment. Slight adjustments of the oscillator and antenna circuits can be made, without removing the chassis, through two holes provided on the bottom of the cabinet. The screws can be reached with a long screwdriver.

SIGNAL GENERATOR			TUNER SETTING	ADJUST FOR MAXIMUM OUTPUT (in order shown)
Frequency	Dummy Antenna	Connection to Radio		
455 kc	.1 mf	Grid (pin 8) of 12SA7	Plates out of mesh	Trimmers on output and input I.F. cans
1650 kc	.1 mf	Grid (pin 8) of 12SA7	Plates out of mesh	Oscillator trimmer C7 on bottom of gang
1400 kc	200 mmf	See note below	Set dial at 1400 kc	Antenna trimmer C4 on bottom of gang

Lay output lead of generator in back of loop antenna. Turn up generator output. Loop will pick up energy.

W. T. GRANT CO.

MODELS 605,606
Series A**NOTE ON TUBE REPLACEMENT**

Replace a defective metal 12SK7 tube with another metal tube. Replace a glass 12SK7 tube with a metal tube or with an exact duplicate of the tube now in the set.

Ref. No.	Part. No.	Description
TUNER MECHANICAL PARTS		
	115146	Cams (6 used on cam shaft)
	115143	Key washers (12 used)
	117528	Spacer (1 used on shaft)
	117602	Spacer (4 used on shaft)
	117604	Locking collar
	131181	Spring washer for collar
	A-3N-11086	Spacer on shaft for drive cord
	A-49A-11087	Spring on shaft for drive cord
	115361	Cam lever with roller
	120283	Return spring for lever
	112785	Pointer
	A-53A-10989	Drive cord (6 inches)
	120143	Tension spring for drive cord
	B-6D-10241	Dial scale
	112659	Crystal for dial scale
	B-2M-7758	Snap-in rivets (4) for crystal
MISCELLANEOUS		
T7	114191B	Speaker, 5-inch, P.M.
	121171	Socket for tube (6 used)
	10798D	Line cord and plug
P1	107249	Dial lamp, 6-8 volts, T-47
	107271	Socket assembly for dial lamp
	A-2H-11271	Tube shield for bakelite-base 12SA7GT
	A-2H-10715	Tube shield for metal-base 12SA7GT
	128334B-18	Cabinet, walnut
	128334B-9	Cabinet, ivory
	A-5B-11249-17	Knob, volume, walnut
	A-5B-11249-8	Knob, volume, ivory
	B-5B-10994-18	Knob, tuning, walnut
	B-5B-10994-9	Knob, tuning, ivory
	120388	Locking spring for tuning knob
	A-3F-10995	Locking screw in tuning knob
	128292B-17	Pushbutton, walnut
	128292B-8	Pushbutton, ivory
	134123	Rubber bumper for bottom of cabinet
	131193	Snap-in rivets (4) for mounting back
	112784	Station call letters, 1 set
	112606	Acetate tabs for call letters

Pre-standardized value—200,000 ohms, 20%, 1/3 watt
RMA value—220,000 ohms, 20%, 1/2 watt
Pre-standardized value—50 mmf, 500 volts, 20%
RMA value—47 mmf, 500 volts, 20%

Ref. No.	Part. No.	Description
CAPACITORS*		
C,C4,C7	B-8A-10211	Two-gang, including antenna and oscillator trimmers
C1	C-8D-10761	.01 mf, 400 volts, 20%
C2	C-8F3-114	120 mmf, 500 volts, 10%, mica
C3,C14	C-8D-10774	.02 mf, 400 volts, 20%
C5	C-8D-10760	.1 mf, 400 volts, +20%—10%
C6	C-8D-10775	.25 mf, 200 volts, +20%—10%
C8,C9	C-8F3-8	100 mmf, 500 volts, 20%, mica
C17,C20		Electrolytic for 60 cycles; 40 mf, 20
C10,C11, C12	11994 or 11995	mf, 20 mf x 150 volts
		Electrolytic for 25 cycles; 60 mf, 40
		mf, 40 mf x 150 volts
C13	C-8D-10770	.05 mf, 200 volts, 20%
C15	C-8D-10788	.004 mf, 600 volts, 20%
C16	C-8F3-6	47 mmf, 500 volts, 20%, mica
C18	C-8D-10778	.002 mf, 600 volts, +40%—15%
C19	C-8D-10942	.2 mf, 400 volts, +30%—10%
RESISTORS*		
R1,R3	C-9B1-26	150,000 ohms, 1/2 watt, 20%
R2	C-9B1-50	100 ohms, 1/2 watt, 10%
R4	C-9B1-70	4700 ohms, 1/2 watt, 10%
R5	C-9B1-25	100,000 ohms, 1/2 watt, 20%
R6	C-9B1-82	47,000 ohms, 1/2 watt, 10%
R7	C-9B1-42	22 ohms, 1/2 watt, 10%
R8	C-9B2-54	220 ohms, 1 watt, 10%
R9	C-9B2-63	1200 ohms, 1 watt, 10%
R10,R12	C-9B1-52	150 ohms, 1/2 watt, 10%
R11	C-9B1-34	3.3 megohms, 1/2 watt, 20%
R13	C-9B1-29	470,000 ohms, 1/2 watt, 20%
R14	C-9B1-27	220,000 ohms, 1/2 watt, 20%
R15,S1	101193	Volume control (1 megohm) and on-off switch
R16	C-9B1-23	47,000 ohms, 1/2 watt, 20%
R17	C-9B1-35	4.7 megohms, 1/2 watt, 20%
R18	C-9B2-44	33 ohms, 1 watt, 10%
COILS AND TRANSFORMERS		
T1,T2	B-212-11062	Loop antenna assembly, including capacitors C1 and C2, coil T2, and cardboard back. Specify brown or ivory back.
T3	A-13D-10215	Oscillator coil
T4	108140G	Input I.F. coil complete in can. Range of trimmers: 56-104 mmf
T5	108145C	Output I.F. coil complete in can. Range of trimmers: 56-104 mmf
T6	10595B	Output transformer

*The values of the resistors and mica capacitors listed above are based on RMA standards. Due to conditions beyond our control, some receivers have been shipped with components of pre-standardized values. This receiver will operate equally well with components of either group. An illustration of the differences follows:

MODEL CN-1

Converter

THE HALLICRAFTERS CO.

CONVERTER R-F ADJUSTMENTS

NOTE - Signal generator remains connected the same as for oscillator adjustments. Use audio output meter for proper r-f alignment. The r-f alignment of the converter is performed only with the frequency range selector in positions 1 and 3.

- With the frequency range selector in position 1-
1. Set the receiver at 48 MC on the FM dial scale.
 2. Set the signal generator at 90 MC (Signal should be heard.)
 3. Peak secondary trimmer C-2 for maximum output on output meter.

With the converter frequency range selector at position 3-

1. Set the receiver at 42 MC on FM dial scale.
2. Set signal generator at 102 MC. (Signal should be heard.)
3. Peak aerial trimmer C-1 for maximum output on output meter.

NOTE - It may be necessary to readjust the converter on position 1 to insure maximum output.

A switch is provided on the converter for selecting three frequency ranges (84mc to 93mc, 93mc to 102mc, and 102mc to 111mc) and also for turning off the power to the converter and restoring the receiver for normal operation.

CONVERTER OSCILLATOR ADJUSTMENT

NOTE - A signal generator with a range of 84 MC to 111 MC will be necessary for oscillator and r-f adjustments.

HOW TO CONNECT SIGNAL GENERATOR TO CONVERTER

1. Connect signal generator "hot" lead to converter aerial. (green wire)
2. Connect signal generator ground lead to converter ground lead. (black wire)

WHERE TO SET RECEIVER TUNING DIAL

Set receiver tuning dial at 45 MC on FM dial scale for all of the three oscillator adjustments and use the following:

ADJUSTMENT PROCEDURE

NOTE - Always begin adjustments with converter range selector set at position 3.

Set converter frequency selector at position	Set sig. gen. at	Adjust following trimmer until signal is heard
3	105 MC	C - 5
2	96 MC	C - 4
1	87 MC	C - 3

Refer to photograph on schematic diagram for location of trimmers.

THE HALLICRAFTERS CO.

MODEL CN-1
Converter

HOW TO INSTALL THE CONVERTER

The converter should be mounted inside of the receiver in such a way that the range selector switch will be easily accessible.

1. Determine suitable location for the converter inside of receiver cabinet on either side of receiver chassis.
2. Remove knob from converter shaft.
3. Place converter in a position such that the switch shaft will rest against inside front of cabinet in such a way as will permit the short side of mounting bracket to rest against inside surface of cabinet.
4. Mark spot on inside front of cabinet where hole is to be drilled and then remove the converter.
5. Drill small pilot hole and enlarge it from the front of the cabinet using a 3/8 inch carpenter's drill.
6. Put extension shaft on converter switch shaft and tighten coupling.
7. Replace converter so that shaft extends out through front of cabinet and converter is located where desired.
8. Mark shaft, so when cut, it will extend at least 3/8 inches from front of cabinet and then remove converter from cabinet.
9. Saw off shaft where marked and file off any rough edges on end of shaft.
10. Replace converter in cabinet at desired position and fasten short end of bracket to mounting surface by means of the two wood screws supplied with kit.
11. Fasten frequency conversion chart label to front of receiver cabinet, put knob on shaft and fasten securely by tightening set screw.
12. Remove audio output tube from the receiver. (This will be either a 6V6, 6F6, 6K6 or 6L6 type tube.) In cases where there are two of the type, remove only one.

13. Insert the adapter plug into the audio output tube socket and insert the audio output tube, previously removed, into the adapter socket.
14. Disconnect the aerial from the receiver and connect it to the converter aerial lead. (green wire)
15. Connect inner conductor of shielded lead from the converter output to the aerial terminal on the receiver.
16. Connect shield of converter output lead from the converter to the ground terminal on the receiver.
17. Connect black lead of converter to a ground. (Water or radiator pipe or an external ground)

HOW TO USE THE CONVERTER

Consult frequency label chart for frequency conversions.

Turn converter frequency range switch to position 2. The range of reception on the receiver will now be 84 to 93 MC (megacycles).

Turn converter frequency range switch to position 3. The range of reception will now be 93 to 102 MC. (megacycles). Or

Turn converter frequency range switch to position 4. The range of reception on the receiver will now be 102 to 111 MC. (megacycles).

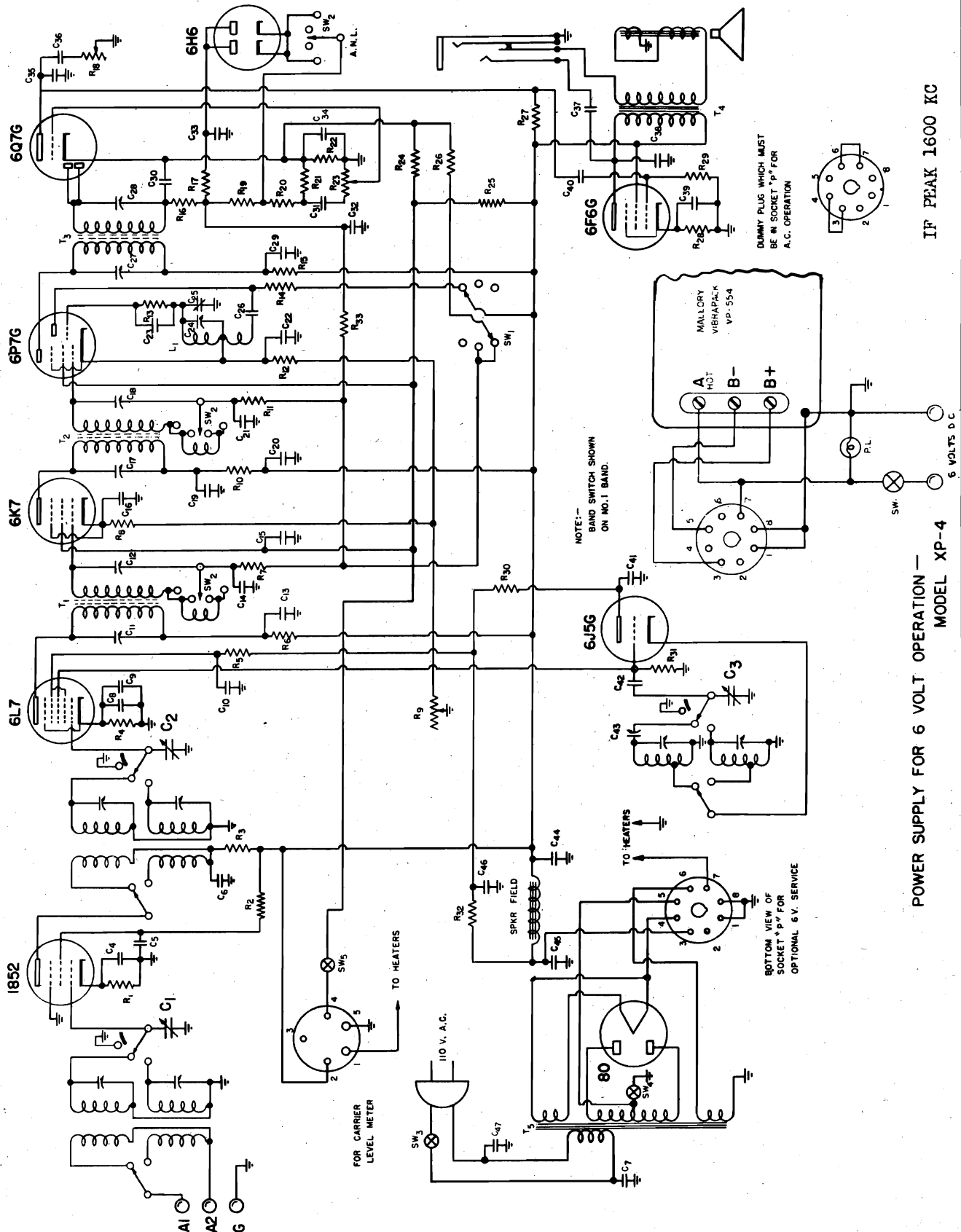
Turn converter frequency range switch to position 1 to restore receiver for normal operation.

A universal bracket is included for mounting the converter. Power is supplied to the converter tube through an adapter cable from the receiver with which the converter is to be used.

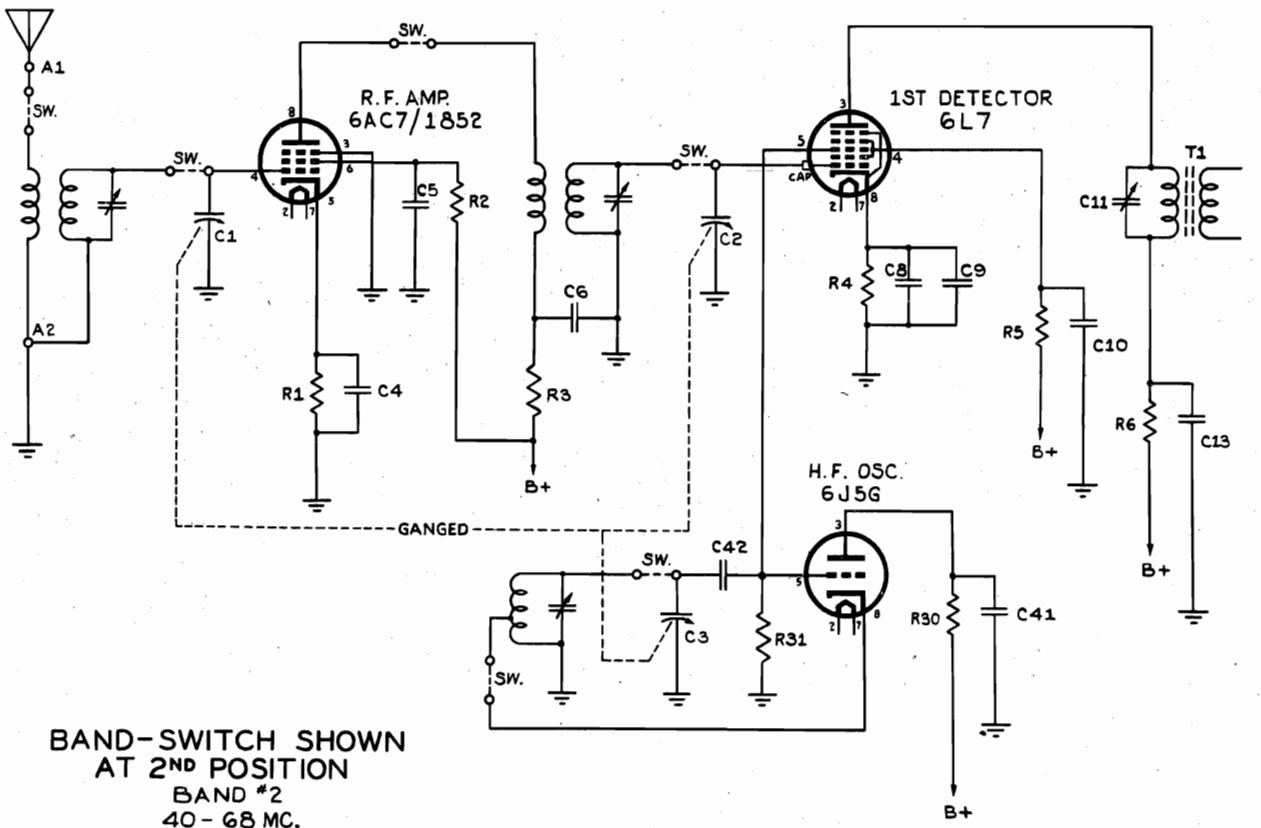
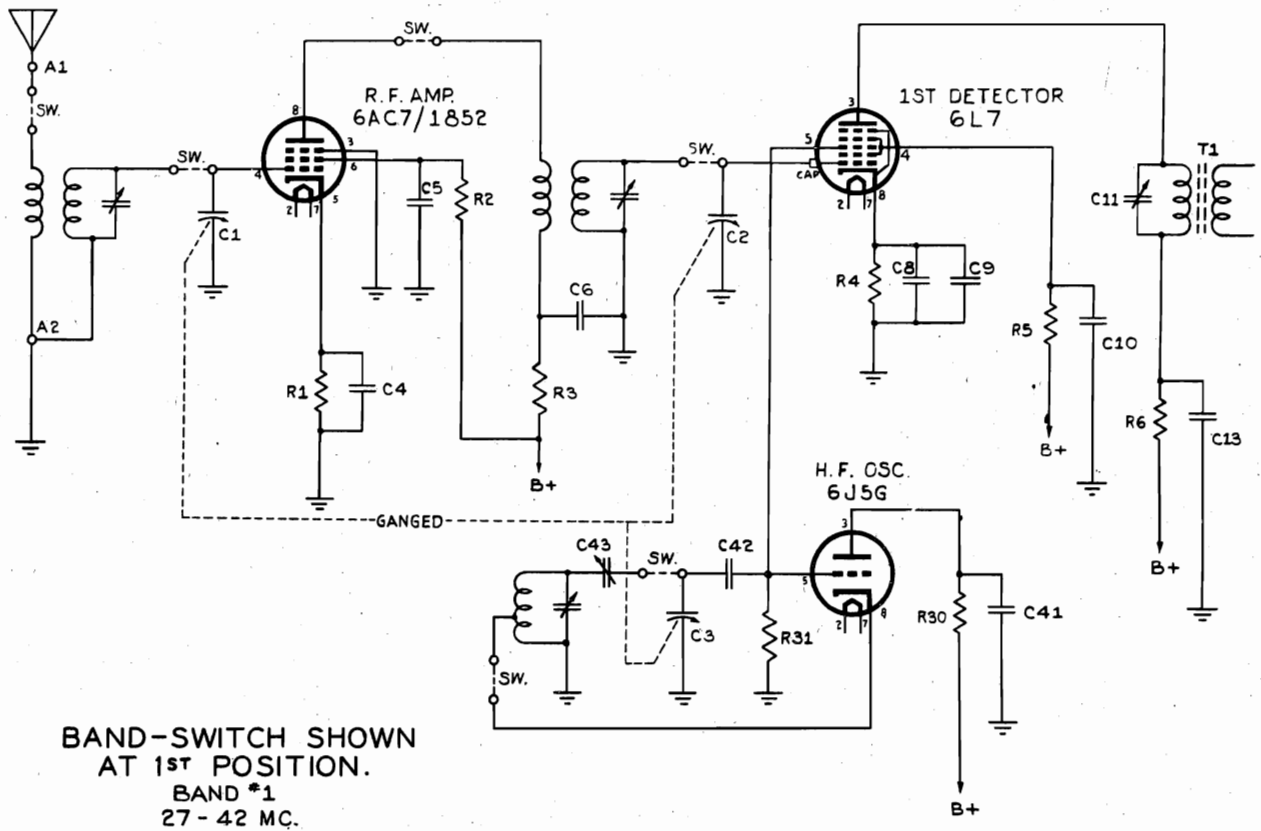
The converter will in no way interfere with the normal operation of the receiver. All tuning is accomplished by the main tuning dial on the receiver.

MODEL Skyrider 5-10
S21

THE HALLICRAFTERS CO.



THE HALLICRAFTERS CO.

 MODEL Skyrider 5-10
S21


Band 1 - 27 MC to 42 MC
Band 2 - 40 MC to 68 MC

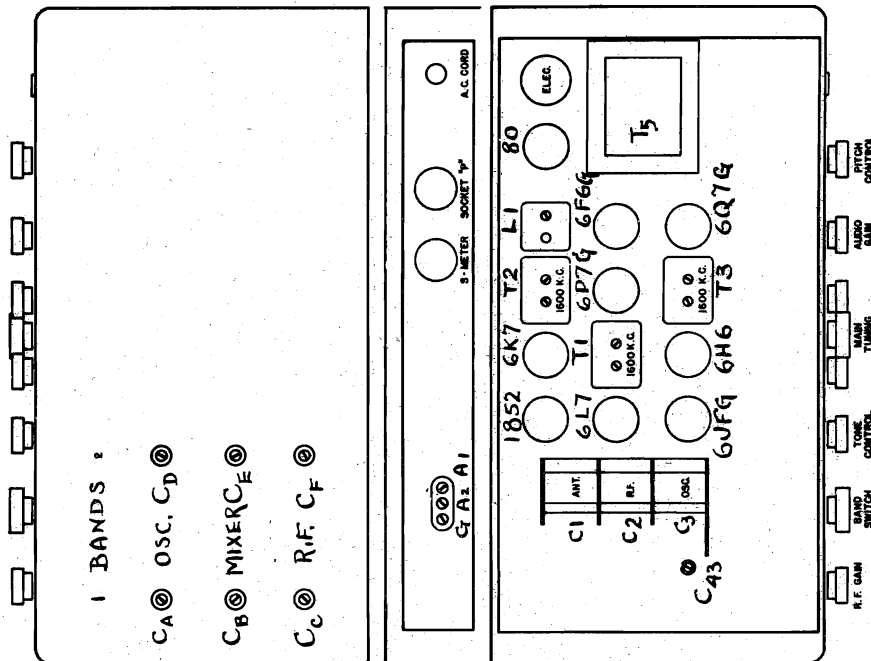
1852 - R. F. Amplifier
6L7 - First Detector
6J5 - High Frequency Oscillator
6K7 - 1st I. F. Amplifier
6P7G - 2nd I. F. Amplifier, B.F.O.
6Q7G - 2nd Detector, A.V.C., 1st Stage of Audio
6F6G - Audio Output tube
80 - Rectifier

1 BANDS :

C_A ⊗ OSC. C_D ⊗

C_B ⊗ MIXER C_E ⊗

C_C ⊗ R.F. C_F ⊗



ALIGNMENT PROCEDURE FOR SKYRIDER "5-10" Model S21

Intermediate Frequency Alignment

Have the controls set as follows:

Broad-sharp switch to sharp position.
A.V.C. - B.F.O. switch in "Off" position.
Set R. F. and A. F. gain controls at maximum.
Set band switch on Band #1.
Adjust main dial to minimum capacity or #24 on the Vernier scale.
Remove the 6L7 grid cap - connect the signal generator to this tube, through an .01 mfd condenser.

Now set the signal generator for 1600 KC output.
Adjust trimmers on T₁, T₂, T₃ transformer for exact resonance which will be indicated by maximum output.

For adjustment of the Beat Frequency Oscillator turn the knob on the "pitch control" unit until the dot is straight up. Remove modulation from the 1600 KC signal being fed into the I. F. amplifier and then adjust T₄ for zero beat.

R. F. Alignment

Replace the 0.1 mfd condenser in series with the generator to the receiver with a 400 ohm resistor. Connect the generator to the A1 terminal on the antenna terminal strip to be found on the rear apron of the chassis. Leave the jumper connected between A2 and G. There is only one pad adjustment on the "5-10" receiver and that is for the low frequency end of Band #1. This pad is adjusted from the top of the chassis.

Band #1

Place the band switch on Band #1. Set the generator and tuning dial to 28 mc and adjust pad C₄₃ for maximum signal. Reset tuning dial and generator to 40 mc and set oscillator trimmer C_A. Now recheck pad C₄₃ and trimmer C_A until no change in frequency calibration is noted. When this is accomplished adjust trimmers C_B, C_C for maximum gain. When making these latter adjustments it is advisable to "rock" the tuning control slightly until the point of exact resonance and maximum output is obtained.

Band #2

Set signal generator and tuning dial to 60 mc and adjust oscillator trimmer C_D to signal. Then adjust C_E, C_F for maximum gain, slightly rocking the tuning gang while making the adjustment.

There is no pad on Band #2.

NOTE: Should the noise picked up by the receiver interfere seriously with the alignment, increase the signal generator output and reduce the R. F. gain. The noise limiter may also be left on during alignment.

The SKYRIDER "5-10" draws 74 watts at 117 volts 60 cycle A.C.

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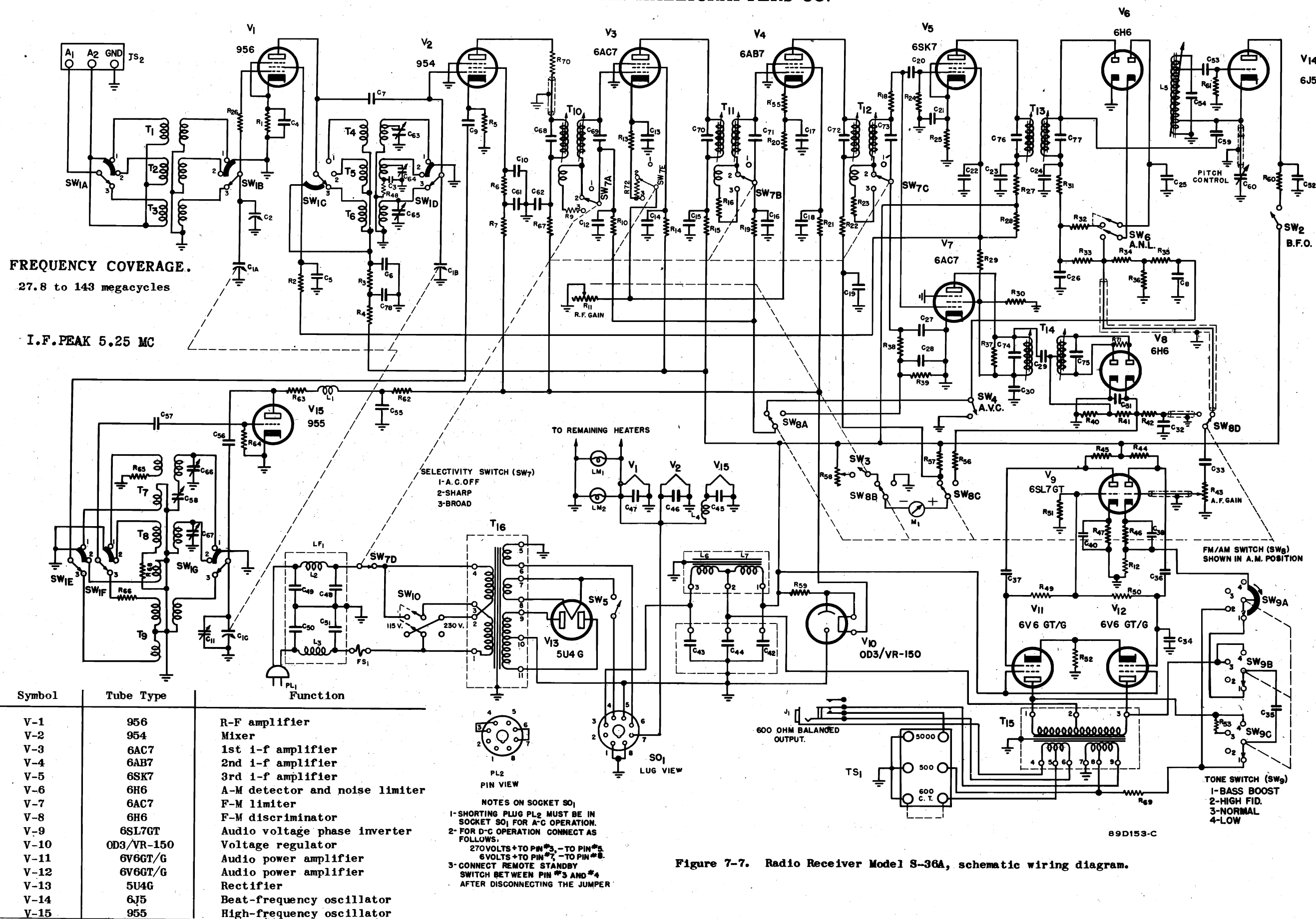
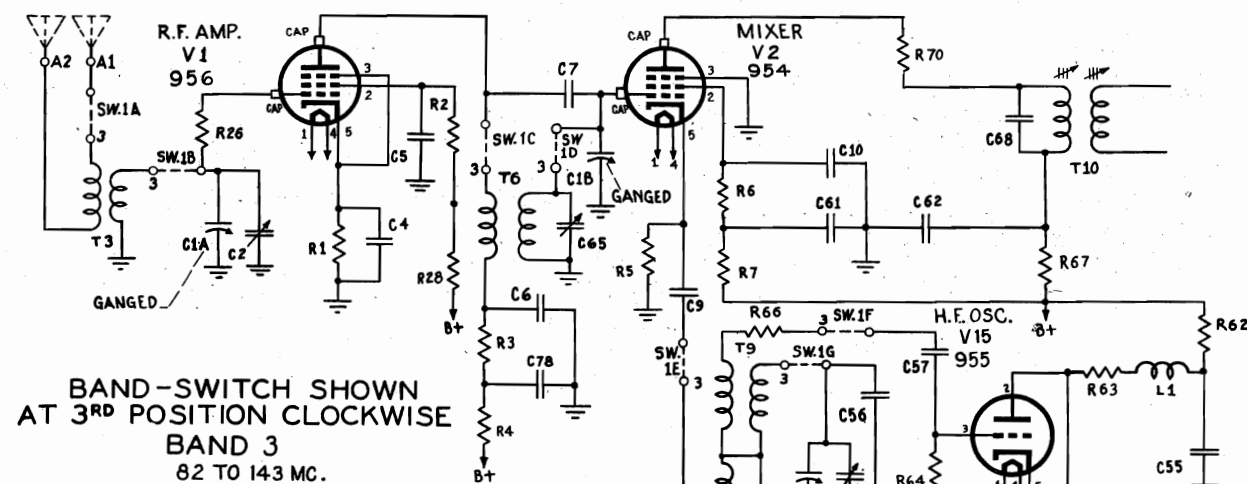
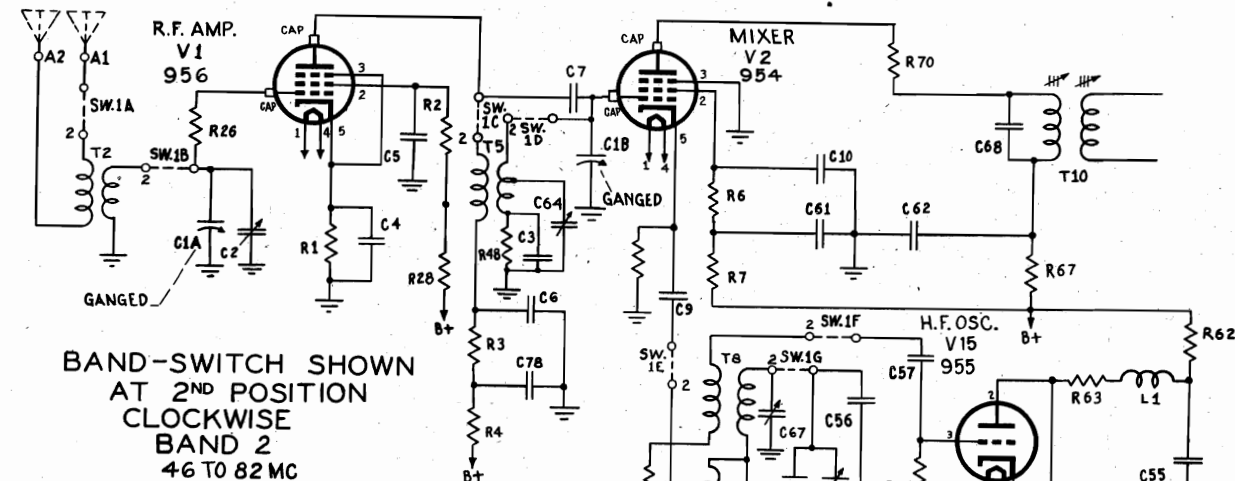
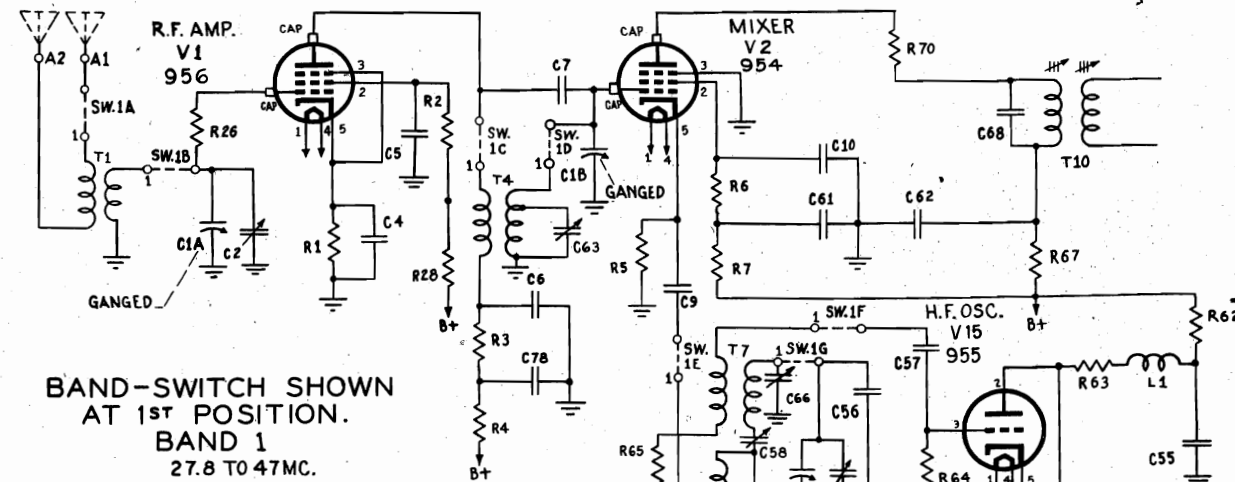


Figure 7-7. Radio Receiver Model S-36A, schematic wiring diagram.



POWER REQUIREMENTS.

The receiver is designed to operate from either a 115-volt or 230-volt 50/60 cycle, single phase, a-c source or from a 6-volt storage battery and 270-volt "B" battery. The "B" batteries may be replaced by a suitable vibrator type power supply if it meets the following current requirements.

A-C Operation	* D-C Operation
Line voltage . . . 115 volts, 230 volts	Filament voltage 6.3 volts
Line current . . . 1.0 amp., 0.5 amp.	Filament current 4.5 amps.
Power consumption 115 watts	"B" voltage 270 volts
	"B" current 145 ma.

* The 6-volt battery drain using a vibrator type supply for "B" voltage will run approximately 20 to 22 amperes.

Audio Output Connections.—A headset or loudspeaker may be used with the receiver.

(1) The headset jack marked PHONES, located on the front panel, provides a 600-ohm balanced output for headset reception. The center tap of the 600-ohm headset winding is grounded externally at the speaker output terminal board TS-1 by a jumper wire across the terminals marked 600 C.T. If it is desirable to operate with one side of the headset line grounded, disconnect the jumper on terminal board TS-1.

(2) The two sets of speaker terminals located on the rear chassis apron provide output impedances of 500 and 5000 ohms for loudspeaker reception. One side of each of the 500 and 5000-ohm output connections is grounded. This should be kept in mind if this receiver is to work in conjunction with other equipment. A speaker capable of handling 5 watts of audio power should be used with this equipment.

Remote Operation Facilities.—The receiver may be disabled remotely by disconnecting the jumper wire between pins #3 and #4 in the shorting plug PL-2, which is normally plugged into socket SO-1 during a-c operation, and connecting a remote switch or relay across these pins. The stand-by switch is connected in the "B" lead, hence, the remote stand-by switch must be insulated for approximately 270 volts to protect the operator. When using the remote control disabling switch, the SEND/REC switch on the receiver must be set at SEND.

CAUTION - The external stand-by switch and its connections will be approximately 270 volts above ground hence must be well insulated throughout.

PREPARATION FOR USE.

A-C Operation.—The receiver may be operated from either a 115-volt or 230-volt, 50/60 cycle, single phase, a-c source of power. To change over from one line voltage to the other, it is merely necessary to throw the line voltage switch (SW-10) located on the top of the chassis near the power transformer. See Fig. 7-1. for location of the line voltage switch.

CAUTION - Check the line voltage and position of the line voltage switch before connecting the receiver to a source of power. A receiver set for 230-volt operation will not be damaged when connected to a 115-volt line, but a receiver set for 115-volt operation will, in most cases, be damaged when plugged into a 230-volt outlet. When in doubt, set the line voltage switch for 230-volt operation. If the dial lamps light up dimly, indicating a 115-volt line voltage, switch over to the 115-volt position.

D-C Operation.—The receiver may be operated from a 6-volt d-c source, generally a storage battery, and a 270-volt d-c supply in the form of dry batteries or vibrator type power pack. Consult the chart on power requirements for d-c operation in Section I. and provide battery facilities capable of supplying these demands. The receiver is connected to the d-c supply as follows:

(1) Remove the octal "jumper plug" (PL-2) used for a-c operation from socket SO-1. Use No. 18 (AWG) wire leads for the 270-volt "B" supply connections to pins #3 and #5 and No. 12 (AWG) wire leads for the 6-volt "A" battery connections to pins #1, #8 and #7.

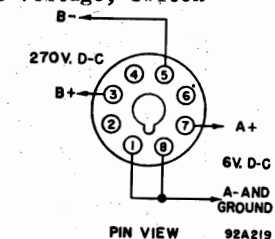


Fig. 2-1. Radio Receiver Model S-36A, wiring diagram for d-c power plug.

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R.F. GAIN Control. - The radio frequency gain control regulates the sensitivity of the receiver. Turning the control to the right increases the sensitivity of the receiver. Ganged to this control is the "S" meter switch which connects the tuning meter into the circuit when the control is advanced all the way to the right.

SELECTIVITY Switch. - The selectivity switch serves a dual purpose. In position #1 it turns the receiver off when operating from an a-c source of power. (When operating from a d-c supply the power switch is part of the external supply, hence, the SELECTIVITY switch does not function in position #1). In positions #2 and #3 the selectivity switch controls the bandwidth of the i-f amplifier thereby affecting the selectivity of the receiver. In general, the switch is set at SHARP for amplitude modulated signals and at BROAD for frequency modulated signals.

"S" Meter or Tuning Meter. - The tuning meter serves two functions in the receiver depending on the type of reception as follows:

(1) **A.M. Reception.** - When the receiver is adjusted to receive amplitude modulated signals, the tuning meter indicates the relative carrier strength of the received signal. To put the meter in operation, turn the R.F. GAIN control to the right until the switch connected to its shaft clicks, and set the A.V.C. switch at ON.

(2) **F.M. Reception.** - When the receiver is adjusted to receive frequency modulated signals, the tuning meter is used to indicate resonance with the station carrier. As the receiver is tuned through the f-m carrier the indicator will deflect to one side of zero, return to zero and deflect an equal distance to the opposite side of zero, and finally return to zero as the carrier is completely passed. The zero center position in the middle of the swing represents the correct setting of the receiver tuning dial and indicates resonance with the station carrier.

2. OPERATION.

Listed below are the receiver controls and their settings for the three types of reception provided by this receiver, namely, amplitude and frequency modulated telephone and c-w code reception.

a. A.M. (Amplitude Modulation) Telephone Reception - To receive amplitude modulated telephone signals set the front panel controls as follows:

SELECTIVITY switch	- Set at A.C. OFF when the receiver is not in use. Set at SHARP for reception of amplitude modulated phone signals.
SEND/REC. switch	- Set at REC. (Set at SEND to disable receiver for short stand-by periods.)
BAND SWITCH	- Set at range number corresponding to band covering desired frequency.
A.M./F.M. switch	- Set at A.M.
A.V.C.	- Set at ON.
R.F. GAIN control	- Turn to the right until tuning meter switch ganged to the control snaps on.
B.F.O. switch	- Set at OFF.
PITCH CONTROL	- Not used.
TUNING wheel	- Set calibrated dial to frequency of desired signal, adjust for maximum tuning meter deflection.
ANTENNA trimmer	- Adjust for maximum tuning meter deflection.
A.F. GAIN control	- Adjust for desired volume at headset or loudspeaker.
TONE control	- Set to please the listener. Generally set at HIGH FID. or BASS BOOST when signal to noise ratio is high or at NORMAL or LOW when signal to noise ratio is low.
A.N.L. switch	- Normally set at OFF except when background noise is excessive.

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b. F.M. (Frequency Modulation) Telephone Reception. - To receive frequency modulated telephone signals set the front panel controls as follows:

- SELECTIVITY switch** - Set at A.C. OFF when the receiver is not in use. Set at BROAD for reception of frequency modulated phone signals.
- SEND/REC. switch** - Set at REC. (Set at SEND to disable receiver for short stand-by periods.)
- BAND SWITCH** - Set at range number corresponding to band covering desired frequency.
- A.M./F.M. switch** - Set at F.M.
- R.F. GAIN control** - Turn all the way to the right. (The switch ganged to this control does not operate during f-m reception).
- A.V.C. switch** - Set at OFF.
- B.F.O. switch** - Set at OFF.
- PITCH CONTROL** - Not used.
- A.N.L. switch** - Set at OFF
- TUNING wheel** - Set calibrated dial to frequency of desired signal, adjust for "0" position of tuning meter marked for F-M tuning.
- ANTENNA trimmer** - Adjust for minimum background noise (Control will only be effective on very weak signals.)
- A.F. GAIN control** - Adjust for desired volume at headset or loudspeaker.
- TONE control** - Set at BASS BOOST or HIGH FID.

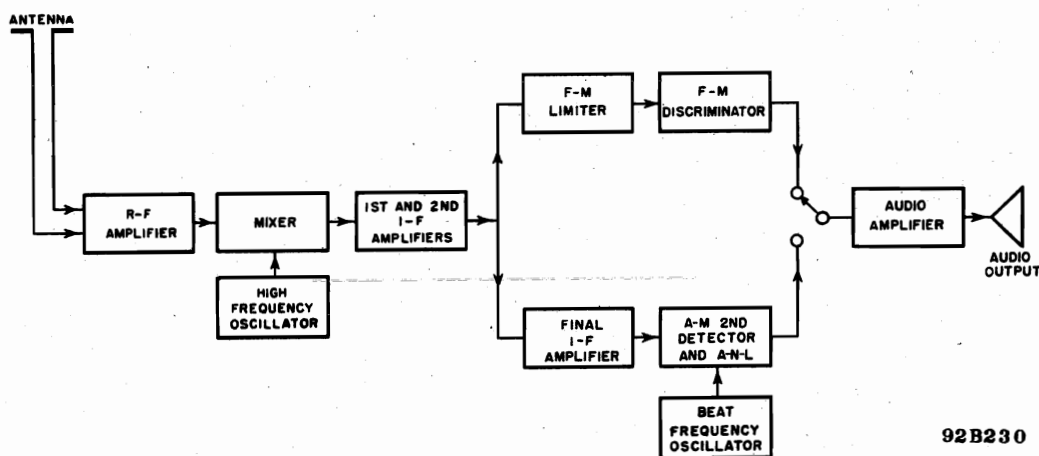
c. C-W Code Reception. - To receive continuous wave (c-w) code signals set the front panel controls as follows:

- SELECTIVITY switch** - Set at A.C. OFF when the receiver is not in use. Set at SHARP for reception of c-w code signals.
- SEND/REC. switch** - Set at REC. (Set at SEND to disable receiver for short stand-by periods.)
- BAND SWITCH** - Set at range number corresponding to band covering desired frequency.
- A.M./F.M. switch** - Set at A.M.
- A.V.C. switch** - Set at OFF.
- B.F.O. switch** - Set at ON.
- PITCH CONTROL** - Adjust to produce a 500 to 1000 cycle code signal.
- TUNING wheel** - Set calibrated dial to frequency of desired signal. Tune for maximum signal level at headset or loudspeaker.
- R.F. GAIN control** - Turn up as high as the signal strength of the code signal will allow. Too much gain will result in distortion of the signal.
- ANTENNA trimmer** - Adjust for maximum signal level at the headset or loudspeaker.
- TONE control** - Set at LOW or NORMAL.
- A.N.L. switch** - Set at OFF.
- A.F. GAIN control** - Adjust for desired volume at headset or speaker.

FUNCTIONING OF PARTS

1. GENERAL.

Figure 4-1. shows, in a very simple block form, the plan of the circuit of the Model S-36A receiver. Note that the circuit is that of the conventional superheterodyne receiver up to the second i-f amplifier stage. The output of the 2nd i-f amplifier is fed to two channels, namely, the F-M signal channel and the A-M signal channel. The F-M channel consists of the f-m limiter and discriminator and the A-M channel consists of an additional i-f amplifier stage and second detector stage. The demodulated signal from both channels then feeds the same audio amplifier, being selected by the A.M./F.M. switch.



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Fig. 4-1. Radio Receiver Model S-36A, block diagram.

2. DETAILED FUNCTIONING BY STAGES. (Refer to Fig. 7-7.)

Since the circuit functions of bands 1, 2 and 3 are essentially identical, this discussion will describe the circuit with BAND SWITCH (SW_{1A} to SW_{1G}) set at band 3 as shown in the schematic diagram.

a. R-F Amplifier. - The r-f amplifier stage employs a type 956 acorn type pentode tube in a conventional class A amplifier circuit. Signals present at the antenna are fed to the primary of transformer T-3 through terminals A₁ and A₂ of the antenna terminal strip TS-2. The secondary is tuned by the ganged tuning capacitor section C-1A and trimmer C-2. Trimmer capacitor C-2 is controlled from the front panel by the control marked ANTENNA to provide accurate alignment of the r-f stage with varying antenna load impedances. R-F signals selected by the parallel resonant circuit are applied to the grid of tube V-1 and appear in greater amplitude across the primary of transformer T-6. Parasitic resistor R-26 prevents unwanted oscillations in this stage and tends to stabilize the amplifier. Resistor R-1 by-passed by capacitor C-4 provides self-bias for the stage. Resistor R-2 and capacitor C-5 act as decoupling network for the screen of tube V-1 and resistor R-3 and R-4 and capacitors C-6 and C-78 act as decoupling networks for the plate circuit. The signal across the primary of transformer T-6 is coupled to the grid of tube V-2 inductively by transformer T-6 and capacitively by capacitor C-7. Capacitor C-7 provides a small amount of coupling to improve the response at the high frequency end of the band, thus equalizing the r-f signal amplitude over the tunable frequency range. The signal developed at the grid of tube V-2 then feeds the mixer stage of the receiver.

b. Mixer. - The mixer stage employs a type 954 acorn type pentode in a cathode coupled mixer circuit. The secondary of transformer T-6 is tuned by section C-1B of the ganged tuning capacitor and trimmer C-65. R-F signals selected by the parallel resonant circuit are applied to the grid of the mixer tube, V-2. A signal from the local oscillator 5.25 mc higher in frequency than the received signal on band #1 and 5.25 mc. lower in frequency than the received signal on bands #2 and #3 is fed to the mixer tube through the cathode and provides the difference frequency of 5.25 mc for the i-f amplifier stages.

c. Oscillator. - The oscillator circuit consists of a type 955 acorn type triode in a tuned-plate untuned grid type of oscillator circuit. The frequency of oscillation is determined by a resonant circuit consisting of the secondary of transformer T-9 and section C-1C of the main tuning capacitor connected in parallel. Capacitor C-11 is used to trim transformer T-9 (Band #3) only, although it remains in the circuit on bands #1 and #2. The r-f energy is fed from the plate of tube V-15 to the tuned circuit by the d-c blocking capacitor C-56. The decoupling network in the plate circuit of the oscillator tube consists of R-63, L-1, C-55 and R-62. Resistor R-66 (in band #3 only) and capacitor C-57 (in all bands) in series with the feed-back winding of transformer T-9 provide grid voltage across resistor R-64 for the oscillator tube. The oscillator voltage is supplied for the mixer stage by a third winding on transformer T-9 which is fed to the mixer tube (V-2) through capacitor C-9.

d. First and 2nd I-F Amplifier. - The 1st and 2nd i-f amplifier stages employ type 6AC7 and 6AB7 pentodes respectively. The i-f amplifier coupling transformers T-10, T-11, and T-12 for these two stages are tuned to 5.25 mc. by adjusting the powdered iron core slugs in both primary and secondary windings. The gain of the 1st and 2nd i-f amplifier stages is varied by the R.F. GAIN control (R-11), connected in series with the cathodes of both tubes, to provide sensitivity control for the receiver instead of the usual practice of varying the gain of the r-f amplifier stages. This method of control permits the r-f amplifier stages to operate at maximum gain, thereby providing a high signal to noise ratio at all sensitivity settings. The a-v-c grid voltage is applied to this section of the receiver through the decoupling networks C-12, R-10, C-16, and R-19. The a-v-c voltage is supplied by the 2nd detector tube (V-6) during a-m reception and a small amount of voltage is also supplied for a similar purpose, from the limiter tube (V-7) during f-m reception. Since the 1st and 2nd i-f amplifier stages are used for both a-m and f-m reception, the band width of the i-f amplifier channel is varied to provide a relatively sharp frequency response for a-m reception (SELECTIVITY switch set at SHARP) and a relatively broad frequency response for f-m reception. (SELECTIVITY switch set at BROAD). The selectivity of the i-f amplifier is controlled by switching in a third winding which varies the coupling between the primary and secondary windings. In SHARP position, the coupling winding is disconnected and only the coupling between primary and secondary windings determines the band width of the i-f amplifier. In BROAD position, the coupling winding is introduced to increase the coefficient of coupling between primary and secondary winding. The increase in coupling broadens the i-f amplifier frequency response to accept f-m signals. The signal voltage supplied by the 2nd i-f amplifier is fed to the limiter and discriminator for f-m reception and to the 3rd i-f amplifier stage and 2nd detector for a-m reception.

e. Final I-F Amplifier. - The last i-f amplifier stage, used for a-m reception, employs a type 6SK7 pentode connected in a conventional class A amplifier circuit. The stage is coupled by transformers T-12 and T-13 which are tuned by adjustable powdered iron core slugs. Resistor R-25 by-passed by capacitor C-21 provides self-bias for the stage. The gain of this stage is not varied as was the case for the 1st and 2nd i-f amplifier stages. The amplified signal voltage developed across the secondary of transformer T-13 is then fed to the 2nd detector for demodulation of a-m signals.

f. A-M 2nd Detector and A-N-L. - Both the second detector and automatic noise limiter stages employ a single type 6H6 duo-diode. One diode section of tube V-6 serves as detector for amplitude modulated signals by rectifying the modulated carrier. The r-f filter for this type of detection consists of resistor R-31 and capacitors C-24 and C-26 connected in a pi-section. Automatic volume control voltage and audio frequency voltage is obtained from the load and voltage divider resistors R-33, R-34, and R-36. Resistor R-35 and capacitor C-8 serve as a-v-c decoupling. The remaining diode section of tube V-6 serves as automatic noise limiter as follows: Capacitor C-25 becomes charged by the rectified carrier voltage and the time constant of this capacitor and the filter network associated with it is such that the audio frequency voltage variations do not alter this charge. During a severe noise pulse, however, the cathode of the diode plate connected to capacitor C-25 becomes more negatively charged than the charge held by capacitor C-25, hence, current flows shorting the audio voltage to ground through capacitor C-25 until the cathode voltage of the a-n-l diode again reaches a less negative potential than its plate and capacitor C-25 acquires its normal charge again. By shorting the audio voltage to ground during a noise pulse, the a-n-l circuit prevents the objectional noise pulses from reaching the audio amplifier stages.

g. Beat Frequency Oscillator. - The beat frequency oscillator employs a type 6J5 triode tube in a modified Hartley oscillator circuit. The oscillator frequency is adjusted by a moveable powdered iron core within the field of coil L-5. This iron core adjustment sets the oscillator's frequency at 5.25 mc. and is adjusted by a screw driver during alignment. The fine adjustment of the oscillator frequency re-

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quired to provide control of the beat note frequency is controlled by variable capacitor C-60 (PITCH CONTROL) which tunes a small portion of the total oscillator coil (L-5). The B.F.O. switch controls the use of the oscillator by breaking the plate voltage lead to the tube. The decoupling network R-60 and C-52 prevents the oscillator signal from reaching the other stages through the "B" voltage supply.

h. F-M Limiter and Discriminator. - The frequency modulation detector consists of a limiter stage and a discriminator stage. The 6AC7 limiter tube (V-7) is fed by the second i-f transformer secondary winding along with the third i-f amplifier tube V-5 for a-m reception. The limiter stage operates as a saturated amplifier in which the output voltage remains constant over a large range of input voltage levels, thus eliminating variations in the amplitude of the carrier signal to be demodulated by the discriminator. When operating as an f-m receiver, automatic volume control action is obtained by applying a part of the voltage developed across resistor R-39 in the grid return of the limiter tube (V-7), to the control grids of the 1st and 2nd i-f amplifier tubes (V-3 and V-4) through section SW-8A of the A.M./F.M. switch. The constant level signal voltage from the limiter tube (V-7) is fed to the type 6H6 discriminator tube (V-8) through the discriminator transformer (T-14) and coupling capacitor C-29. The discriminator circuit, consisting of transformer T-14, tube V-9 and load resistors R-40 and R-41, converts the frequency variations of the f-m signal into amplitude variations or the audio signal. The de-emphasis network, consisting of resistor R-42 and capacitor C-32, attenuates the high frequency end of the audio range since these frequencies are emphasized as the f-m transmitter. From the de-emphasis network the audio signal is fed to the A.F. GAIN control (R-43) in the same way as the audio signal from the amplitude modulation detector tube (V-6).

i. Audio Amplifier. - The audio amplifier stages consists of a class A phase inverter amplifier employing a type 6SL7GT twin-triode driving a pair of 6V6GT/G pentodes in push-pull class A. The audio signal from either the a-m detector or the f-m discriminator is fed to the grid of the first triode section of the phase inverter tube (V-9) through the A.F. GAIN control (R-43). The amplified audio signal voltage from the first triode section of tube V-9 is fed to the grid of power amplifier tube V-12 and to the grid of the second triode section of tube V-9 through the voltage divider network consisting of resistors R-50 and R-51 which also serve as grid return for the power amplifier tube (V-12). The audio signal voltage developed across the plate load resistor (R-45) of the second triode section of tube V-9, which is now 180 degrees out of phase, is then fed to the remaining power amplifier tube (V-11) grid. The output of the power amplifier tubes is coupled to the load through transformer T-15, the secondary of which provides output impedances of 500 ohms and 5000 ohms to ground and 600 ohms balanced to ground. The network consisting of R-69, R-53 and C-35 supplies inverse feedback in various amounts to provide tone control ranging from bass boost to high frequency cutoff. The TONE switch SW-9 selects the required network combination.

j. Tuning Meter. - The tuning meter serves two circuits in the receiver depending upon the type of signals being received. It is switched from one circuit to the other by the A.M./F.M. switch (SW-8 sections B and C).

(1) **A-M Reception.** - When metering the reception of a-m signals, the tuning meter measures the plate current of the 2nd i-f amplifier tube (V-4) which varies with the strength of the signal carrier. Resistor R-58 sets the zero (no signal) position of the tuning meter by controlling that part of the plate current of tube V-4 flowing through the meter. The intermediate frequency signal voltage then drives the plate current of tube V-4 to a lower value depending upon the signal strength. The screen grid voltage of tube V-4 is regulated by the voltage regulator tube (V-10) to provide an accurate control over the zero signal plate current so that the meter adjustment resistor (R-58) need not be continually re-set for variations of the a-c line voltage.

(2) **F-M Reception.** - When metering reception of f-m signals the tuning meter measures the unbalanced current in resistors R-40 and R-41 obtained when the receiver is tuned to one side of the f-m carrier. When the receiver is tuned to the exact center of the f-m carrier the meter rests at zero indicating that the currents in the discriminator load resistors are equal. Resistor R-56 functions to limit the maximum current in the meter circuit to a safe value.

k. Power Supply. - The receiver has provisions for operation from either an a-c or d-c source.

(1) **A-C Operation.** - The receiver's power supply provides for operation from 115 or 230-volt a-c mains. The a-c current is fed through the line filter which is a low pass pi-section network connected in each side of the line. The network consists

of inductances L-2 and L-3 and capacitors C-48, C-49, C-50 and C-51. The line filter attenuates all the objectionable noise components coming into the receiver circuit through the a-c power source. The line voltage at which the receiver will operate is determined by the setting of the line voltage switch SW-10. This switch simply connects the two 115-volt primary windings of transformer T-16 in parallel for 115-volt operation or series for 230-volt operation. A type 5U4G (tube V-13) full wave rectifier is employed in a conventional full wave rectifier circuit. The high voltage from this rectifier is fed to the filter network through the "Shorting Plug" on the rear apron of the receiver chassis as is the filament current for the heaters of the tubes. The SEND/REC. switch is connected in series with the high voltage lead from the rectifier filament to the shorting plug socket to break the high voltage circuit to the receiver's filter sections, thereby, disabling the receiver but at the same time keeping the tube heaters hot, ready for instant use. The filter circuit consists of two low pass pi-section networks made up of inductances L-6 and L-7 and capacitors C-42, C-43, and C-44. In order to provide a constant "B" voltage for the oscillator, mixer, and screen grid of the 2nd i-f amplifier stages a voltage regulator tube type OD3/VR-150 is used. The voltage supplied to the screen of tube V-4 is regulated to provide accurate current control for the tuning meter connected in the plate circuit of this tube.

(2) D-C Operation. - External 6-volt storage battery and 270-volts of "B" batteries or storage battery and vibrator type supply provide for d-c operation. When operating from an external d-c supply the "Shorting Plug" on the rear apron of the receiver chassis is removed and a similar plug is wired to supply filament and plate current to the receiver circuits. The "B" voltage is fed to the input side of the filter sections used for a-c operation thereby insuring adequate filtering for vibrator type power supplies.

MAINTENANCE

CAUTION - Voltages at various points in this equipment are of sufficiently high potential to produce a severe shock. Locate the high-potential points on the VOLTAGE CHART before attempting to service circuits that are "hot". IT IS A GOOD RULE TO DISCONNECT THE POWER SOURCE BEFORE MAKING ADJUSTMENTS WHEN POSSIBLE. BE CAREFUL.

1. PREVENTIVE MAINTENANCE.

All components of the receiver should be given a thorough inspection at regular intervals. The time interval between inspections will be determined by the operating conditions of the individual installation. In general, keep the components clean and dry. Moisture, even in a completely tropicalized set may cause serious deterioration and produce general unsatisfactory operation. Dust and dirt materially effect both electrical and mechanical operation. Keep the various parts clean especially the tuning capacitors and associated gear drive. Dust should be blown out with dry air or brushed out carefully. Do not oil the gear teeth or the condenser wipers, as noisy reception will result from intermittent electrical contact at these points. Noisy reception may also be caused by dirty condenser wipers, faulty gain controls and switches, frayed cable connections, faulty tubes, etc. in the installation. Check accessible connections, switch contacts, etc. regularly, making sure that all are clean and tight and the tubes and cable connectors are held securely in their sockets.

2. REPLACING TUBES, LAMPS, and FUSES.

a. **Replacing Tubes.** - All tubes with exception of the three acorn types are accessible at the top of the chassis through the hinged cover of the cabinet. The three acorn type tubes are made accessible by removing the top cover of the r-f section which is held down by anchor clips. The acorn type tubes are inserted with the short end of the body in the socket. Acorn tubes are more fragile than the rest and must be handled accordingly. If the grid and plate clips on the connections to these tubes become loose replace or bend them to fit firmly. DO NOT ATTEMPT TO SOLDER DIRECTLY TO THE TUBE PIN as the heat generated by the soldering iron will crack the glass envelope. When replacing tubes, check the tube type carefully and replace with the correct tube type. Refer to the top view of the chassis to determine the location of the tubes and to the PARTS LIST for the type number and description of each.

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b. Replacing Lamps. The receiver employs two lamps with bayonet type sockets to illuminate the calibrated tuning dial and the vernier dial. The lamps are to be replaced with a 6/8-volt, 250 ma. (blue bead) G.E. #44 or equivalent. The color code referred to is the color of the glass bead above the glass stem inside the envelope of the lamp.

3. PERIODIC ADJUSTMENTS.

a. Tuning Meter Adjustment. -

(1) The tuning meter zero setting control is located behind its front panel button type cover, marked METER ADJ. Remove the button with a knife or screw driver blade.

(2) Disconnect the antenna and connect a jumper across terminals A₁, A₂, and GND. on terminal board TS-2.

(3) Set the front panel controls for amplitude modulation reception as follows:

(a) Set A.M./F.M. switch at A.M.

(b) Set A.V.C. switch at ON.

(c) Turn R.F. GAIN control to right until the switch on the control clicks.

(d) Set A.F. GAIN control for minimum gain. (All the way to the left.)

(e) Set A.N.L. switch at OFF.

(f) Set B.F.O. switch at OFF.

(g) Set SEND/REC. switch at REC.

(h) Set SELECTIVITY switch at SHARP.

(4) With a screw driver set the METER ADJ. control for the zero reading on the S-meter scale of the tuning meter.

(5) Remove the antenna terminal jumper and replace antenna leads and meter adjustment cover button, the adjustment is completed.

b. Receiver Alignment. - The receiver has been carefully aligned at the factory and should not require realignment until the receiver requires new tubes in the r-f and i-f amplifier stages, or shows signs of loss of sensitivity, off frequency calibration or requires service work on one or more of its r-f and i-f amplifier stages. Alignment should not be attempted by inexperienced personnel as maximum performance is obtained only by careful and intelligent alignment.

(1) Aligning Tools. -

(a) Signal generator capable of providing a 400-cycle modulated signal at 5.25 mc. and 27 to 145 mc. range. Recommended generators are the Ferris Instrument Corp. Model 18D or 18FS and the Measurements Corp. Model 75.

(b) A 50-ohm non-inductive dummy antenna resistor.

(c) Non-metallic screw driver. A bakelite screw driver with a short metal blade is very good.

(d) Audio output meter capable of handling 10 watts of audio power for either 500 or 5000-ohm loads.

(2) I-F Amplifier Alignment. -

(a) Disconnect the grid lead of the type 954 mixer tube (V-2) and connect the "hot" lead of the signal generator to the grid of the mixer tube using a small clip or flexible piece of wire to make the connection. Connect the ground wire of the generator to the receiver chassis.

CAUTION - Do not attempt to solder to the tube terminal as the heat of the soldering iron is certain to crack the glass envelope.

(b) Connect the output meter across the speaker terminals. Set the range of the output meter for its highest range to prevent overloading the meter accidentally.

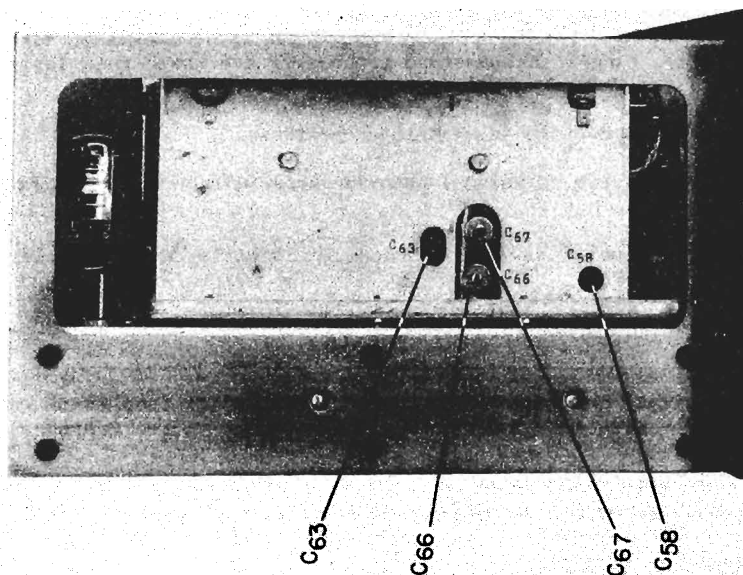
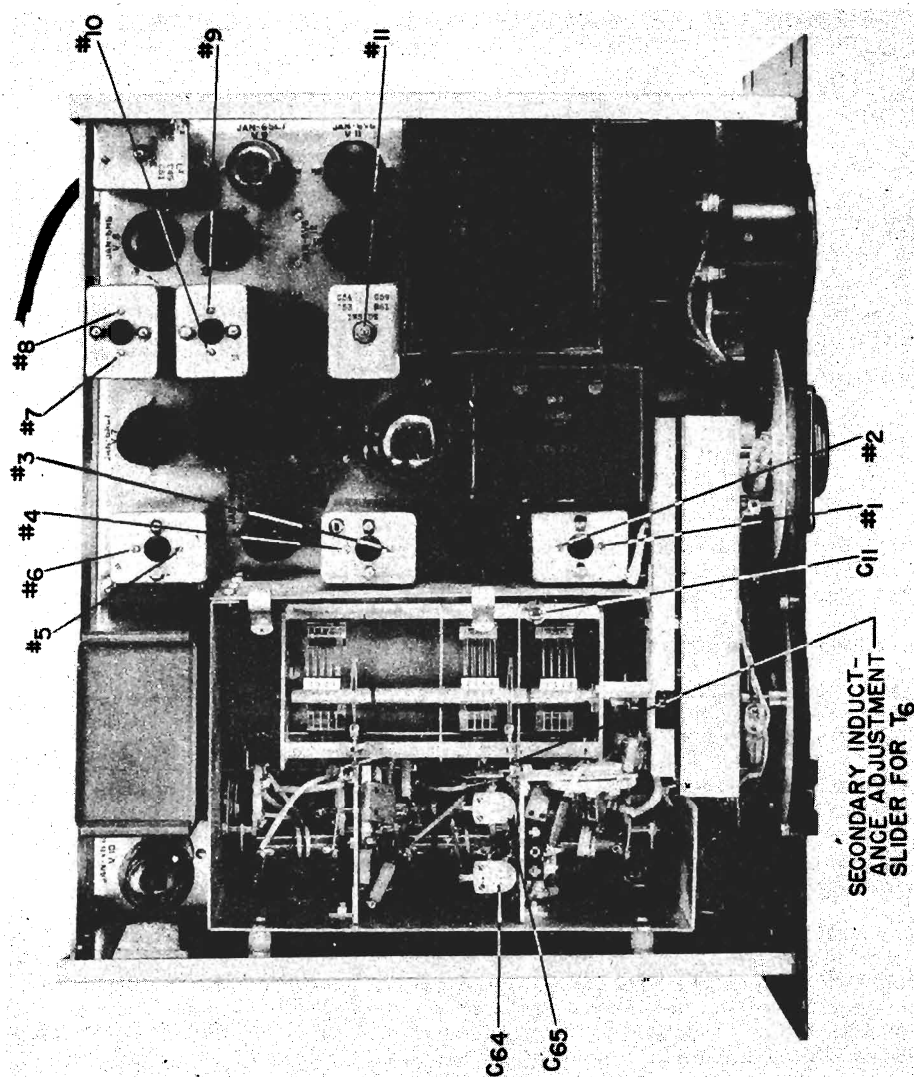


Figure 5-1. Radio Receiver Model S-36A, view showing alignment points.

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(c) Let the receiver warm up for approximately half an hour, then set the receiver controls as follows:

R.F. GAIN control at maximum gain.

A.F. GAIN control at maximum gain. Work in a shielded room if possible.

SELECTIVITY switch at SHARP.

A.M./F.M. switch at A.M.

BAND SWITCH at band #2.

A.V.C. switch at OFF.

SEND/REC. switch at REC.

A.N.L. switch at OFF.

B.F.O. switch at OFF.

TONE control at HIGH FID.

(d) Set the signal generator frequency at 5.25 mc. and turn on the 400-cycle modulation.

(d) Adjust transformers T-10, T-11, T-12 and T-13 for maximum output meter reading using just enough signal generator output to provide a good resonant swing on the output meter. The signal level at the generator should not be more than 70 microvolts for a 500 milliwatt audio output level. Repeat the alignment procedure until assured of accurate alignment. Refer to figure 5-1. for the location of i-f transformer adjustment screws #1 through #8 inclusive on i-f transformers T-10, T-11, T-12, and T-13.

(3) Discriminator Transformer Alignment. -

(a) Set the A.M./F.M. switch at F.M. and the SELECTIVITY switch at BROAD.

(b) Leave the signal generator set at 5.25 mc. with 400-cycle modulation.

(c) Adjust the secondary slug (#10) of the discriminator transformer (T-14) for zero signal level at the output meter. Note that this adjustment is critical, therefore turn the adjustment screw slowly. Use sufficient signal generator output to provide a good null indication.

(d) Detune the adjustment made in par. (c) slightly so that the output meter gives a readable indication.

(e) Adjust the primary slug adjustment (#9) of the discriminator transformer for maximum response.

(f) Retune the secondary (slug #10) of the discriminator transformer for the null point as in par. (c).

(g) Detune the signal generator to a frequency lower than the i-f frequency until the maximum output point is reached. Note the output meter reading and the frequency deviation from the i-f frequency (5.25 mc.).

(h) Repeat the procedure for the frequency above the i-f frequency. The frequency deviation and maximum output should be the same for good balance. If they are not, then tune the signal generator to the lower of the two peaks and adjust the primary slug adjustment (#9) until the output rises an amount equal to about half the difference of the two peaks previously noted.

(i) Retest for balance as above readjusting the primary slug adjustment until both maximum readings are alike when the signal generator is detuned approximately the same amount on either side of resonance (5.25 mc.). If a balance cannot be obtained, it is an indication that the discriminator transformer secondary slug adjustment (#10) has been misadjusted and will require a very slight correction in either direction. The direction of adjustment that will cause the off-tune peaks to assume the same values is the correct one. Care must be taken in adjusting the discriminator secondary control as even a very slight misadjustment will result in distortion of frequency modulated signals.

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(4) **B.F.O. Adjustment.** - Set up the receiver and signal generator as for i-f amplifier alignment and proceed as follows:

- (a) Shut off the 400-cycle modulation of the signal generator.
- (b) Set the PITCH CONTROL at "0" and set the B.F.O. switch at ON.
- (c) Back off the A.F. GAIN control slightly and use just enough signal generator output to provide a clean beat note.
- (d) Plug a headset into the PHONES jack.
- (e) Adjust the slug screw (#11) of coil L-5 for zero beat.
- (f) Check the adjustment by turning the PITCH CONTROL to the right and left of "0". A change in the pitch of the beat note should result. The frequency of the beat note will vary from zero at the "0" setting to a very high pitch at the #5 setting of the control.
- (g) Disconnect the signal generator and reconnect the grid lead to the mixer tube, the alignment of the i-f amplifier stages is completed.

(5) **R-F Amplifier Alignment.** - The following sequence must be followed to properly align the r-f amplifier stages. Band 3 is aligned first since the adjustment of trimmer C-11 is made for band 3 alignment only and will slightly effect the alignment of bands 1 and 2 if band 3 is not aligned first.

(a) Connect the "hot" lead of the signal generator to terminal "A₁" of the antenna terminal board through a 50-ohm non-inductive resistor (carbon). Connect the ground lead of the generator to the receiver chassis. Leave the jumper connected between terminals "A₂" and "GND". Turn on the 400-cycle modulation.

(b) Let the receiver warm up for approximately half an hour, then set the receiver controls as follows:

R.F. GAIN control at maximum gain.

A.F. GAIN control at maximum gain.

SELECTIVITY switch at SHARP during alignment of band 1. and at BROAD during alignment of bands 2 and 3.

A.M./F.M. switch at A.M.

A.V.C. switch at OFF.

SEND/REC. switch at REC.

A.N.L. switch at OFF.

B.F.O. switch at OFF.

TONE control at HIGH FID.

NOTE For all alignment adjustments the signal generator output attenuator must be adjusted to provide a 500 milliwatt audio signal output at the speaker terminals of the receiver.

NOTE - During each of the following adjustments the ANTENNA control should be touched up to keep the antenna stage in alignment.

(c) **Band 3. Alignment.** - (BAND SWITCH at 3.)

1. Set the signal generator at 135 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 135 mc. no adjustment of capacitor C-11 is necessary if not, adjust C-11 for maximum output with the receiver dial set at 135 mc.

2. Set the signal generator at 90 mc. and tune in its signal on the receiver. If the receiver dial reads 90 mc. no adjustment of the plate winding inductance of transformer T-9 is necessary - if not, loosen the setscrew at the frame of the main tuning condenser (C-1), holding the end of the plate coil, and adjust the inductance. Increase the inductance if the generator signal falls lower than the 90 mc. calibration point on the receiver dial and reduce the inductance if the signal

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falls above the 90 mc. calibration point. Tighten down the set screw each time before checking the adjustment.

NOTE - If the plate coil inductance was altered it will be necessary to repeat step 1. again. Several adjustments of capacitor C-11 in step 1. and the plate coil inductance in step 2. may be required in cases of where a new transformer (T-9) had to be installed.

3. Set the signal generator and receiver at 135 mc. and adjust trimmer capacitor C-65 for maximum output. Rock the tuning control back and forth slightly to determine the best adjustment.

4. Ordinarily no adjustment of the secondary winding inductance of transformers T-3 and T-6 is necessary at 90 mc., however, if the sensitivity of the receiver falls off at this end of the range or if new transformers have just been installed it will be necessary to adjust the secondary winding inductance for maximum response at 90 mc. Transformer T-6 is provided with a soldered slider adjustment at the gang condenser frame, however, the ground side of the secondary of transformer T-3 must be unsoldered to be adjusted. The value of inductance that provides maximum audio signal at the output meter is the correct adjustment.

NOTE - If the secondary inductance was altered it will be necessary to repeat step 3. again. Several adjustments of capacitor C-65 in step 3. and inductance in step 4. may be necessary depending upon the condition of the coils.

(d) Band 2. Alignment. - (BAND SWITCH at 2.)

1. Set the signal generator at 80 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 80 mc. no adjustment of capacitor C-67 is necessary - if not, adjust capacitor C-67 for maximum output with the receiver dial set at 80 mc.

2. Set the signal generator at 50 mc. and tune in its signal on the receiver. If the receiver dial reads 50 mc. no adjustment of the plate winding inductance of transformer T-8 is necessary - if not, it will be necessary to loosen the winding from the form with lacquer thinner and shift the individual turns until the signal peaks with the receiver dial set at 50 mc. Repeat step 1. above and recheck step 2. again before cementing the coil in place with Amphenol 912 cement.

NOTE - The presence of lacquer thinner may effect the winding inductance, hence, it is well to allow a few minutes for the lacquer thinner to evaporate before making inductance adjustments.

3. Set the signal generator and receiver at 80 mc. and adjust trimmer capacitor C-64 for maximum output. Rock the tuning control back and forth slightly to determine the best adjustment.

4. Ordinarily no adjustment of the secondary winding inductance of transformers T-2 and T-5 is necessary at 50 mc., however, if the sensitivity of the receiver falls off at this end of the range or if new transformers have just been installed it will be necessary to adjust the secondary winding inductance for maximum response at 50 mc. To adjust the secondary inductance it will be necessary to use lacquer thinner as in step 2. to loosen and shift turns until the signal peaks with the receiver dial set at 50 mc. Repeat step 3. above and recheck step 4. again before cementing the coils in place with Amphenol 912 cement.

(e) Band 1. Alignment. - (BAND SWITCH at 1.)

1. Set the signal generator at 45 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 45 mc. no adjustment of capacitor C-66 is necessary - if not, adjust capacitor C-66 for maximum response with the receiver dial set at 45 mc.

2. Set the signal generator at 30 mc. and tune in its signal on the receiver. If the receiver dial reads 30 mc. no adjustment of the padder capacitor C-58 is necessary - if not, adjust capacitor C-58 for maximum output with the receiver dial set at 30 mc.

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3. Set the signal generator and receiver at 45 mc. and adjust trimmer capacitor C-63 for maximum response. Rock the tuning control back and forth slightly to obtain the best adjustment.

4. Ordinarily no adjustment of the secondary winding inductance of transformers T-1 and T-4 is necessary at 30 mc., however, if the sensitivity of the receiver falls off at this end of the range or if new transformers have just been installed it will be necessary to adjust the secondary winding inductance for maximum response at 30 mc. To adjust the secondary inductance it will be necessary to use lacquer thinner as before to loosen and shift turns until the signal peaks with the receiver dial set at 30 mc. Repeat step 3. above and recheck step 4. again before cementing the coils in place with Amphenol 912 cement.

NOTE - After completing the above alignment procedure check the image frequency to determine whether the oscillator frequency is higher than the signal frequency on band 1. and lower than the signal frequency on bands 2 and 3. For example: Set the receiver dial at 100 mc., set the signal generator frequency at twice the i-f frequency lower than 100 mc. or 89.5 mc. and turn up the signal generator output to about 5000 times the normal alignment output. An image signal should be heard. If not, tune the signal generator to twice the i-f frequency higher than the signal frequency or 110.5 mc. and look for the image there. If the image shows up at 110.5 mc., the receiver's oscillator is operating above the signal frequency on this band and must be readjusted so that it falls below the signal frequency. Due to the construction of this receiver it is considered impossible to adjust the oscillator frequency so that it will fall on the wrong side of the signal frequency on any of the three bands, however, it is always well to check for the image after making any extensive alignment adjustments.

(f) When completely aligned the overall receiver sensitivity will usually run from 2 microvolts at 30 mc. to 10 microvolts at 130 mc. for 50 milliwatts audio output. If your receiver falls reasonably close to this sensitivity, consider your job finished.

4. LOCATING FAULTS WITH A VOLT-OHM METER.

a. **Voltage Chart.** - Refer to Fig. 5-2. for the tube socket terminal voltages. Voltages shown are those between the terminal and ground (chassis) unless otherwise specified. To identify the tube socket connections, refer to Fig. 7-6. The readings were taken with an RCA Volt-Ohmmist Junior analyzer using 20,000 ohm per volt sensitivity. To prepare the receiver for measurement, disconnect the antenna, connect a jumper between the antenna terminals A₁, A₂ and GND, disconnect the speaker and replace with a 5000-ohm 10-watt resistor across the 5000-ohm output terminals or a 500-ohm 10-watt resistor across the 500-ohm terminals, and set the controls as follows:

SELECTIVITY switch at SHARP

SEND/REC. switch at REC.

A.M./F.M. switch at A.M.

A.V.C., A.N.L., and B.F.O. switches at ON.

R.F. GAIN and A.F. GAIN controls at maximum gain position.

ANTENNA, TONE, TUNING, and PITCH CONTROL adjustments do not effect the readings.

b. **Resistance Chart.** - Refer to Fig. 5-3. for the tube socket terminal to ground (chassis) resistance measurements.

The readings were taken with an RCA Volt Ohmmist Junior analyzer. To prepare the receiver for measurement, disconnect the a-c line cord and set the controls as follows:

SELECTIVITY switch at SHARP.

SEND/REC. switch at REC.

A.M./F.M. switch at A.M.

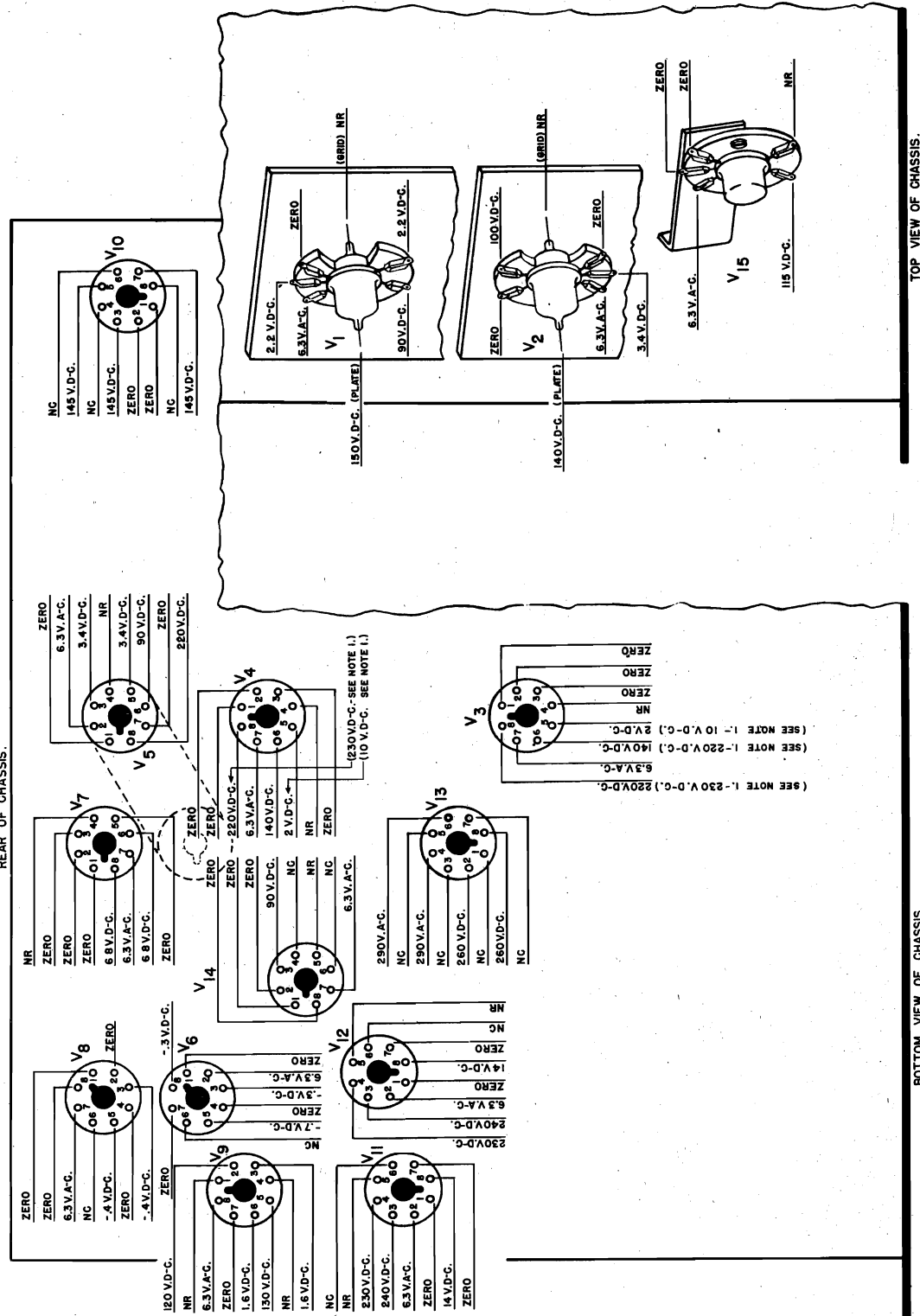
A.V.C., A.N.L., and B.F.O. switches at ON.

R.F. GAIN and A.F. GAIN controls at maximum gain position.

TONE control set at BASS BOOST.

ANTENNA, TUNING and PITCH CONTROL adjustments do not effect the readings.

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NOTE: 1. VOLTAGE READING WITH R.F. GAIN CONTROL SET AT MINIMUM GAIN POSITION.

2. NC = NO CONNECTION.

3. NR = NOT READABLE ON A 20,000 OHM PER VOLT METER.

92D251



NOTE: 1. R.F. GAIN CONTROL SET AT MINIMUM GAIN POSITION.
2. A.F. GAIN CONTROL SET AT MINIMUM GAIN POSITION.
3. NC = NO CONNECTION.

Figure 5-3. Radio Receiver Model S-36A, resistance chart.

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c. Checking Transformer and Inductor Windings With an Ohm-meter. -

NOTE - One terminal of each winding measured must be disconnected from the circuit to avoid measuring circuit resistance instead of winding resistance alone as indicated in the chart.

Circuit Symbol	Name of Part	Winding	Winding Terminals	D-C Resistance (ohms)
T-15	TRANSFORMER, audio.	Primary	1 to 3	560
		$\frac{1}{2}$ primary	1 to 2/2 to 3	280
		600-ohm secondary	4 to 6	25
		$\frac{1}{2}$ 600-ohm secondary	4 to 5/5 to 6	12.5
		5000-ohm secondary	7 to 9	33
		500-ohm secondary	7 to 8	3
T-16	TRANSFORMER, power.	Primary #1	1 to 3	3.5
		Primary #2	2 to 4	3.5
		H.V. secondary	9 to 11	90
		$\frac{1}{2}$ H.V. secondary	8 to 10/10 to 11	45
		5.0-volt secondary	7 to 8	Zero
		6.3-volt secondary	5 to 6	Zero
L-6/L-7	Reactor, filter.	12-henry coil	1 to 2	215
		3-henry coil	2 to 3	85

SUPPLEMENTARY DATA

FREQUENCY RANGE.

27.8 mc. - 143 mc. (Covered in three bands).

AUDIO POWER OUTPUT.

Speaker operation - 3 watts with less than 5% distortion (500 or 5000 ohms).

Headset operation - 3 watts with less than 5% distortion (600 ohms).

SENSITIVITY.

At 30 mc. - 2.0 microvolts (For 50 milliwatt audio output).

At 135 mc. - 10.0 microvolts (For 50 milliwatt audio output).

(Signal generator modulated 30% at 400 cycles.)

AUDIO FIDELITY.

Audio response is flat within ± 3 db. from 40 to 10,000 cycles per second.

IMAGE RATIO.

Image ratio exceed 1000:1 at 30 mc., 300:1 at 58 mc.; 100:1 at 80 mc. and 60:1 at 100 mc.

SELECTIVITY.

I-F selectivity measured at the grid of the mixer tube is not less than 10kc. or more than 25 kc. with the SELECTIVITY switch at SHARP and not less than 65 kc. or more than 80 kc. with the SELECTIVITY switch at BROAD. at 6 db. down from resonance.

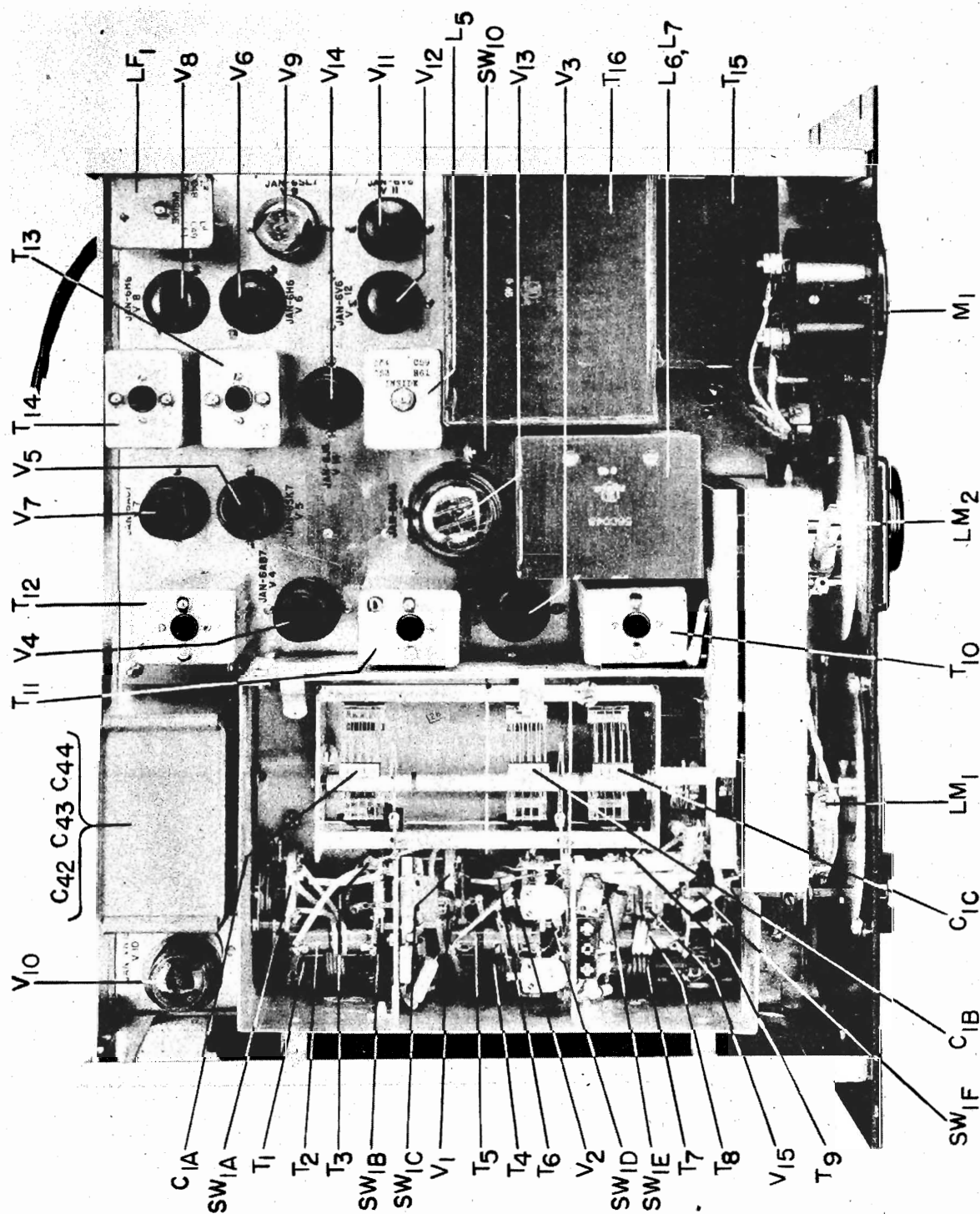


Figure 7-1. Radio Receiver Model S-36A, top view.

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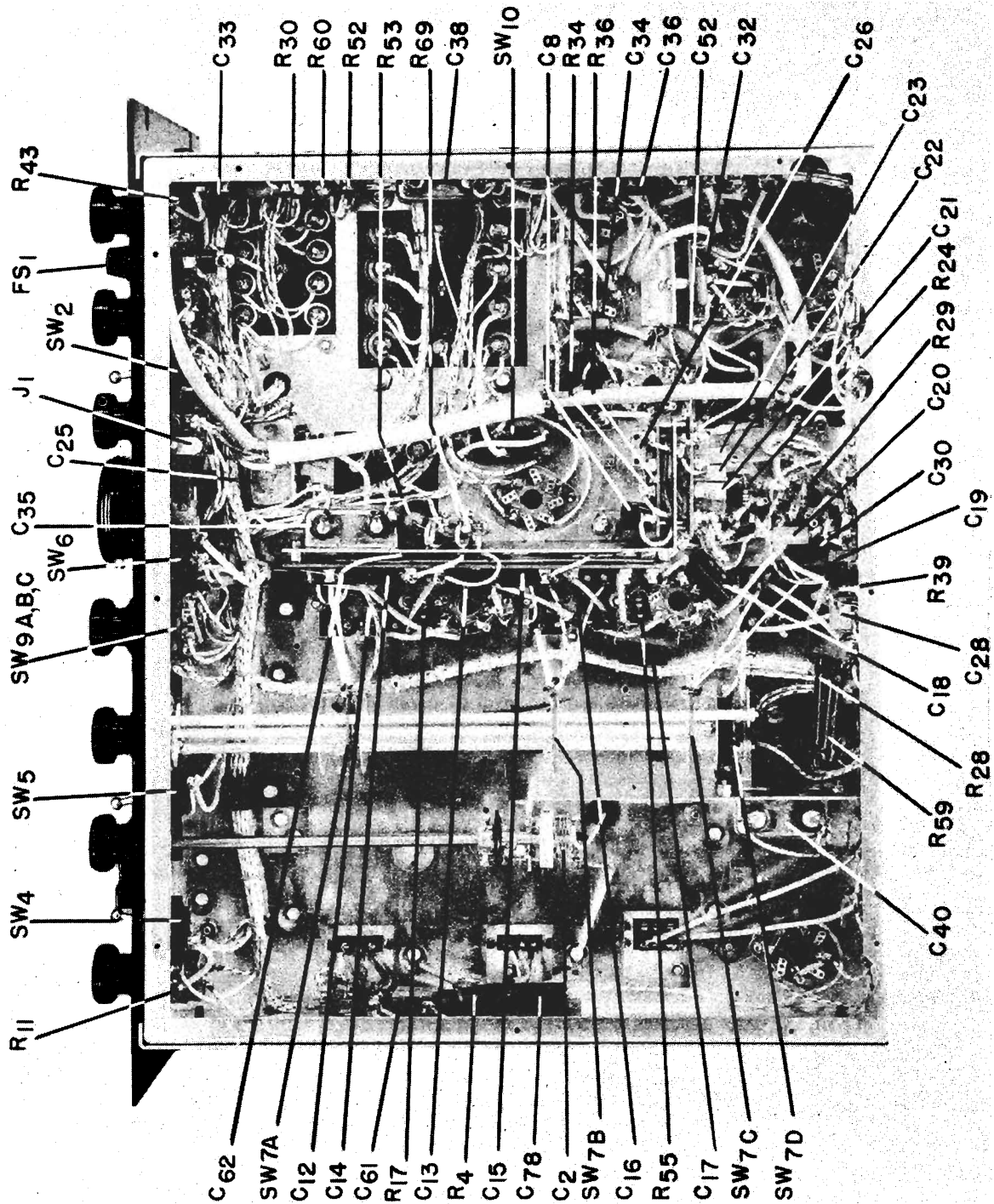


Figure 7-2. Radio Receiver Model S-36A, bottom view.

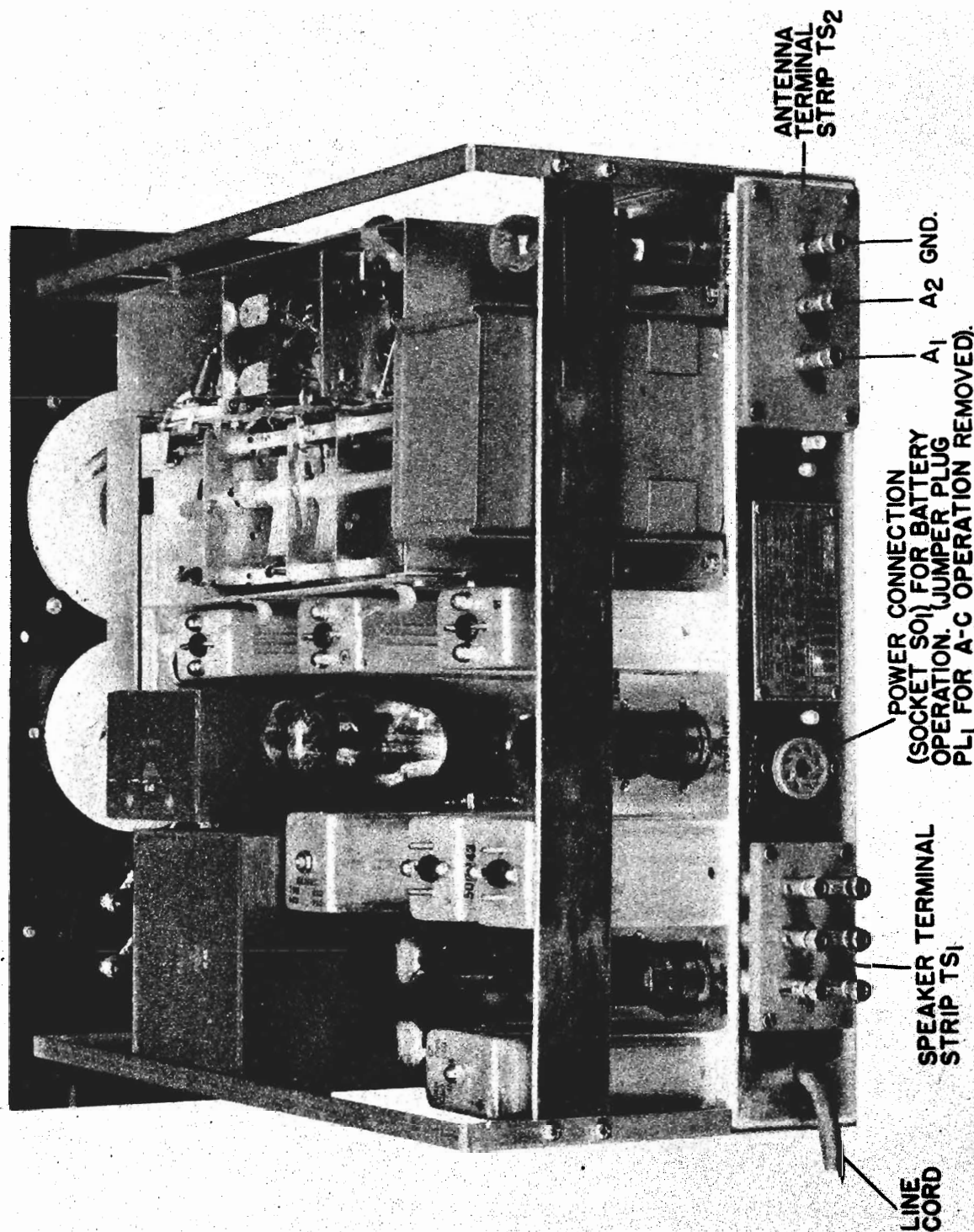


Figure 7-3. Radio Receiver Model S-36A, rear view.

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Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters Part No.
C ₂₂	Same as C ₉	-	-
C ₂₃	Same as C ₉	-	-
C ₂₄	Capacitor, fixed: mica dielectric; 55 mfd. $\pm 10\%$; 500 V. D-C working; case 51/64" long x 15/32" wide x 7/32" thick same as C ₂₆	ASA	CNE0A560K
C ₂₅	Capacitor, fixed: paper dielectric; 0.05 mfd. - 6 + 14%; 600 V. D-C working; metal case 1-35/32" long x 1-1/32" deep x 19/16" high, with 2 mtg. feet with 2-1/8" mtg. centers; 2 solder lug terminals insulated from case by neoprene seals and phenolic washers; same as C ₃₅	IC type 7678	48A005
C ₂₆	Same as C ₂₄	-	-
C ₂₇	Capacitor, fixed: mica dielectric; 100 mfd. $\pm 10\%$; 500 V. D-C working; case 51/64" lg x 15/32" wd x 7/32" thick.	ASA	CNE0A101K
C ₂₈	Capacitor, fixed: mica dielectric; 550 mfd. $\pm 10\%$; 500 V. D-C working; case 53/64" long x 53/64" wide x 9/32" thick.	ASA	CNE0A551K
C ₂₉	Capacitor, fixed: ceramic dielectric; 25 mfd. $\pm 10\%$; 500 V. D-C working; negative 0 temp. coeff; body 9/8" lg x 3/16" dia.	IRC special	47A143
C ₃₀	Same as C ₉	-	-
C ₃₁	Same as C ₉	-	-
C ₃₂	Capacitor, fixed: mica dielectric; 550 mfd. $\pm 10\%$; 500 V. D-C working; case 1-1/16" long x 15/32" wide x 7/32" thick.	ASA	CNE0A551K
C ₃₃	Same as C ₉	-	-
C ₃₄	Capacitor, fixed: mica dielectric; 1000 mfd. $\pm 10\%$; 500 V. D-C working; case 53/64" square x 9/32" thick.	ASA	CNE0A102K
C ₃₅	Same as C ₂₅	-	-
C ₃₆	Same as C ₉	-	-
C ₃₇	Same as C ₉	-	-
C ₃₈	Capacitor, fixed: paper dielectric; 20 mfd. - 10 + 75%; 25 V. D-C working; case hermetically sealed metal 2-1/8" long x 1" deep x 13/16" high; 2 mtg. feet with 2-1/8" mtg. centers; 2 solder lug terminals insulated from the case; same as C ₄₀	IC type 1B113	46A011
C ₃₉	Capacitor, fixed: mica dielectric; 150 mfd. $\pm 10\%$; 500 V. D-C working; case 51/64" lg x 15/32" wd x 7/32" thk	ASA	CNE0A151K
C ₄₀	Same as C ₃₈	-	-
C ₄₁	Not used	-	-
C ₄₂	Capacitor, fixed: paper dielectric; triple unit; unit #1 is 4 mfd. 600 V. D-C working (C ₄₂), unit #2 is 8 mfd. 600 V. D-C working (C ₄₃), unit #3 is 8 mfd. 600 V. D-C working (C ₄₄); hermetically sealed metal case 4-3/4" long x 2-3/4" deep x 5-7/16" high; 2 mtg. feet with 4-3/4" x 2" mtg. centers; 4 solder lug terminals (one common to all units) insulated from the case by bakelite and neoprene washers; terminals marked "9", "4", "8".	IC type 7332E	43B043
C ₄₃	Same as C ₃₈	-	-
C ₄₄	Same as C ₃₈	-	-
C ₄₅	Same as C ₃₈	-	-
C ₄₆	Same as C ₃₈	-	-
C ₄₇	Same as C ₃₈	-	-

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters Part No.
CAPACITORS			
C ₁	Capacitor, variable: air dielectric; 3 sections; 9 plates with double spacing between plates; min. cap. 0 mfd., max. cap. 54.7 mfd.; plates are aluminum shaft silver plated brass 3/4" long x 0.375" dia., with x 2B insulation on stators; front rotor section grounded to frame, other two sections insulated from frame; spade lug mtg.; solder lug terminals.	OM special	48C147
C ₂	Capacitor, variable: air dielectric; single section; 7 plates; min. cap. 3 mfd., max. cap. 25 mfd.; aluminum shaft; ceramic insulation; brass shaft 3/4" long x 3/4" dia., mtg. base 3/4" thick x 1-7/32" dia., mtg. centers 21/32"; total depth of unit 7/8"; solder lug terminals	IC type 22-7	48A009
C ₃	Capacitor, fixed: mica dielectric; 320 mfd. $\pm 10\%$; 500 V. D-C working; case 51/64" lg x 15/32" wd x 7/32" thk; same as C ₉ , C ₁₀ , C ₃₅ , C ₄₆ , C ₄₇ , C ₅₅ .	ASA	CNE0A321K
C ₄	Capacitor, fixed: mica dielectric; 2200 mfd. $\pm 10\%$; 500 V. D-C working; case 53/64" long x 53/64" wide x 9/32" thick; same as C ₉ , C ₃₂ , C ₃₁ .	ASA	CNE0A222K
C ₅	Same as C ₉	-	-
C ₆	Same as C ₄	-	-
C ₇	Capacitor, fixed: ceramic dielectric; 10 mfd. $\pm 10\%$; 500 V. D-C working; temp. coeff. -0.0005 mfd./mfd./deg. Cent.; case 0.625" long x 0.225" dia.	CHL type 811-077	47A106
C ₈	Capacitor, fixed: mica dielectric; 8200 mfd. $\pm 10\%$; 500 V. D-C working; case 1-1/32" long x 41/64" wide x 11/32" thick; same as C ₉ , C ₁₄ , C ₁₅ , C ₁₇ , C ₁₈ , C ₁₉ , C ₂₁ , C ₂₂ , C ₂₃ , C ₃₀ , C ₃₃ , C ₃₆ , C ₃₇ , C ₆₅ , C ₇₈ .	ASA	CNE0A822K
C ₉	Same as C ₉	-	-
C ₁₀	Same as C ₉	-	-
C ₁₁	Capacitor, variable: air dielectric; small variable capacity formed between a 6-32 metal screw and a CUS plate 5/8" wd x 13/16" lg, rolled to 3/16" ID, at one end, with a 7/32" dia mtg hole 3/16" center from other end x 7/32" center from top side; cadmium plated plate.	H 48A140	48A140
C ₁₂	Capacitor, fixed: paper dielectric; 1000 mfd. $\pm 100-20\%$; 600 V. D-C working; case 3/4" lg x 3/4" wd x 7/32" thk.	CE	47A121
C ₁₃	Same as C ₉	-	-
C ₁₄	Same as C ₉	-	-
C ₁₅	Same as C ₉	-	-
C ₁₆	Same as C ₉	-	-
C ₁₇	Same as C ₉	-	-
C ₁₈	Same as C ₉	-	-
C ₁₉	Same as C ₉	-	-
C ₂₀	Capacitor, fixed: mica dielectric; 47 mfd. $\pm 10\%$; 500 V. D-C working; case 51/64" long x 15/32" wide x 7/32" thick; same as C ₃₁ .	ASA	CNE0A470K
C ₂₁	Same as C ₉	-	-

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Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters Part No.
C ₆₉	Same as C ₆₈	-	-
C ₇₀	Same as C ₆₈	-	-
C ₇₁	Same as C ₆₈	-	-
C ₇₂	Same as C ₆₈	-	-
C ₇₃	Same as C ₆₈	-	-
C ₇₄	Capacitor, fixed: ceramic dielectric; 50 mmfd $\pm 10\%$; 500 V. D-C working; zero temp. coeff; body 3/4" lg x 1/4" dia.; same as C ₇₅ .	ER Special	47A008
C ₇₅	Same as C ₇₄	-	-
C ₇₆	Same as C ₇₄	-	-
C ₇₇	Same as C ₇₄	-	-
C ₇₈	Same as C ₇₄	-	-
FUSES			
FS ₁	Fuse: 3 amperes 9250 V.; 40G; glass enclosed; 1-3/4" long x 9/32" dia.; core nickel plated copper alloy; carries 110% of rated current; vibration factor is 200.	LF type 1099	31M31A
JACKS			
J ₁	Jack, phone; switching-one make, one break; steel frame; silver contacts; rubber and bakelite insulation; mounted by 3/8-32 brass bushing 3/4" long; frame dimensions 1-19/32" x 27/32" x 3/4"; solder lug contacts; 1" from front of bushing to tip contact.	U type ST-687 modified	36B006
INDUCTORS			
L ₁	Inductor, R-F; 75 turns of #28SCE single layer winding; inductance 15.5 microhenries $\pm 10\%$; d-c resistance 4.10 ohms $\pm 3\%$; wound on molded bakelite coil form 15/16" long x 5/32" dia., coated with Chinese red lacquer; air core.	SWI type 651	53A006
L ₂	Inductor, line filter: 57 turns of #22SCE universal winding; 46 microhenries inductance; winding 3/4" ID x 1-1/16" OD x 9/32" lg; air core; coil form 1" lg x 3/4" dia., tapered 6-32 at each end for mtg.	H 53A062	53A082
L ₃	Same as L ₂	-	-
L ₄	Inductor, R-F; 42 turns of #28SCE single layer winding; inductance 4.20 microhenries $\pm 10\%$; d-c resistance 0.25 ohms $\pm 70\%$; wound on molded bakelite coil form 7/8" long x 9/32" dia., coated with Chinese blue lacquer; air core.	SWI type 662	53A009
L ₅	Inductor, beat frequency oscillator; 15-7/8 turns of #15/44 D cel. 11/2 single layer winding tapped 3-1/8" turns and 10-7/8 turns from start of winding; coil wound on xx bakelite tube 1-5/8" long x 3/4" O.D. x 0.408" I.D.; tuned by adjustable iron core; unit shielded; assembly includes resistor R ₉₁ and capacitors C ₅₃ , C ₅₄ , and C ₅₉ .	SWI type 3491	54C024

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters Part No.
C ₄₈	Capacitor, fixed: mica dielectric; 8500 mmfd $\pm 20\%$; 500 V. D-C working; case 53/64" square x 11/32" thick; same as C ₄₉ , C ₅₀ , C ₅₁ .	ASA	CN35A822N
C ₄₉	Same as C ₄₈	-	-
C ₅₀	Same as C ₄₈	-	-
C ₅₁	Same as C ₄₈	-	-
C ₅₂	Same as C ₄₈	-	-
C ₅₃	Capacitor, fixed: mica dielectric; 100 mmfd $\pm 20\%$; 500 V. D-C working; case 51/64" lg x 15/32" wd x 7/32" thk.	ASA	CN20A101K
C ₅₄	Capacitor, fixed: ceramic dielectric; 300 mmfd $\pm 10\%$; 500 V. D-C working; zero temp. coeff; body 1.875" lg x 0.295" dia.	ER	47A026
C ₅₅	Same as C ₅₃	-	-
C ₅₆	Capacitor, fixed: ceramic dielectric; 30 mmfd ± 2.5 mmfd; 500 V. D-C working; neg. 0.00075 mmfd/deg. Cent.; body 7/16" lg x 7/32" dia.	ER type N750K	47A109
C ₅₇	Capacitor, fixed: ceramic dielectric; 1000 mmfd $\pm 20\%$; 500 V. D-C working; body 11/16" lg x 3/16" dia.	MF type 20K1200	47A132
C ₅₈	Capacitor, adjustable: mica dielectric; 450 mmfd $\pm 10\%$; bakelite mfg. insulation; 2 solder lug terminals to which are attached #18AWG tinned copper leads 1" long, both leads insulated from the frame; special L shaped mtg. frame 1" x 7/8" x 1"; octagon condenser frame 3/4" diam.	UE type SB1A	44A050
C ₅₉	Capacitor, fixed: twisted pair of leads to form 1 mmfd capacity.	-	-
C ₆₀	Capacitor, variable: air dielectric; min. cap. 3-5 mmfd, max. cap. 25 mmfd; ceramic insulation; 2 mtg. holes with 21/32" mtr. centers; one solder lug terminal (rotor plates); wire slot on stator plates mtg. posts; shaft 29/32" long x 3/4" dia.; base 1-7/32" long x 15/16" wide; overall depth 2-3/8".	RC type 22-7	48A064
C ₆₁	Same as C ₄	-	-
C ₆₂	Same as C ₈	-	-
C ₆₃	Capacitor, adjustable: mica dielectric; min. cap. 3 mmfd, max. cap. 50 mmfd; ceramic insulation; compression type adjustment; unit is 3/4" long x 5/8" wide x 11/16" deep including 2 solder lug terminals.	UE Special	44A049
C ₆₄	Capacitor, adjustable: ceramic dielectric; 4 to 20 mmfd; 500 V. D-C working; screw driver adjustment; vertically mounted by a CRS special mtg bracket; same as C ₆₅ .	H Special	44A101
C ₆₅	Same as C ₆₄	-	-
C ₆₆	Capacitor, adjustable: air dielectric; 1 to 12 mmfd; bakelite insulation; screw driver adjustment; 1-11/64" lg x 0.555" dia. overall excluding solder lug terminals; same as C ₆₇ .	WN type 22-5230 modified	44A140
C ₆₇	Same as C ₆₆	-	-
C ₆₈	Capacitor, fixed: ceramic dielectric; 100 mmfd $\pm 3\%$; 500 V. D-C working; neg. 0.00005 mmfd temp. coeff.; body 3/4" lg x 3/4" dia.; same as C ₆₉ , C ₇₀ , C ₇₁ , C ₇₂ , C ₇₃ , C ₇₆ , C ₇₇ .	ER Special	47A117

THE HALLICRAFTERS CO.

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Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
R ₆	Same as R ₂	-	-
R ₇	Resistor, fixed: 100,000 ohms \pm 10%; $\frac{1}{2}$ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R ₃₃ , R ₄₀ , R ₄₁ , R ₅₁ .	ASA	RC21AE104K
R ₈	Not used	-	-
R ₉	Resistor, fixed: 10 ohms \pm 10%; $\frac{1}{2}$ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R ₁₆ , R ₂₃ , R ₃₆ .	ASA	RC21AE100K
R ₁₀	Resistor, fixed: 100,000 ohms \pm 10%; $\frac{1}{2}$ watt; carbon; insulated; 0.170" diam x 0.406" long.	ASA	RC10AE104K
R ₁₁	Resistor, variable: 10,000 ohm \pm 20%; $\frac{1}{2}$ watt; carbon; shaft 1" long x $\frac{1}{4}$ " dia.; 3 solder lug terminals with the variable contact located in the center and the fixed contacts 1-7/16" apart; no tape; includes a toggle action switch (SW ₁) on rear which closes the circuit when the control is turned to the extreme right (clockwise).	CT type 135	25C0586
R ₁₂	Resistor, fixed: 120 ohms \pm 10%; $\frac{1}{2}$ watt; carbon; insulated; 0.249" O.D. x 0.468" long.	ASA	RC20AE121K
R ₁₃	Resistor, fixed: 120 ohms \pm 10%; $\frac{1}{2}$ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R ₂₀ .	ASA	RC21AE121K
R ₁₄	Resistor, fixed: 39,000 ohms \pm 10%; $\frac{1}{2}$ watt; carbon; insulated; 0.249" O.D. x 0.655" long.	ASA	RC21AE393K
R ₁₅	Resistor, fixed: 330 ohms \pm 10%; $\frac{1}{2}$ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R ₂₂ , R ₂₉ , R ₃₂ .	ASA	RC21AE331K
R ₁₆	Same as R ₉	-	-
R ₁₇	Not used.	-	-
R ₁₈	Resistor, fixed: 33 ohms \pm 10%; $\frac{1}{2}$ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R ₃₅ , R ₃₇ , R ₅₅ .	ASA	RC21AE330K
R ₁₉	Same as R ₁₀	-	-
R ₂₀	Same as R ₁₃	-	-
R ₂₁	Same as R ₂	-	-
R ₂₂	Same as R ₁₅	-	-
R ₂₃	Same as R ₉	-	-
R ₂₄	Resistor, fixed: 470,000 ohms \pm 10%; $\frac{1}{2}$ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R ₃₅ , R ₃₇ , R ₅₅ .	ASA	RC21AE474K
R ₂₅	Same as R ₁₅	-	-
R ₂₆	Same as R ₉	-	-
R ₂₇	Same as R ₂	-	-
R ₂₈	Resistor, fixed: 7500 ohms \pm 5%; 10 watt; wire wound; coated with baked vitreous enamel; 3.8" O.D. x 1-1/4" long.	10C type AH	24B6752D
R ₂₉	Same as R ₉	-	-
R ₃₀	Resistor, fixed: 22,000 ohms \pm 10%; $\frac{1}{2}$ watt; carbon; insulated; 0.342" O.D. x 1.76" long; same as R ₆₀ .	ASA	RC41AE223K
R ₃₁	Resistor, fixed: 47,000 ohms \pm 10%; $\frac{1}{2}$ watt; carbon; insulated; 0.249" O.D. x 0.655" long.	ASA	RC21AE473K

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
L ₆	Inductor assembly, filter: 2 section unit; section #1 inductance 2 henries - 10 + 30% @ 150 milliamperes; d-c resistance 85 ohms ± 10%; connected to solder lug terminals #2 and #3 (L ₆); section #2 inductance 12 henries - 10 + 20%, @ 90 milliamperes; d-c resistance 215 ohms ± 10%; connected to solder lug terminals #1 and #2 (L ₇); each section has a separate iron core; coils and cores located so no mutual coupling exists; hermetically sealed case 3- $\frac{1}{4}$ " long x 2- $\frac{3}{16}$ " deep x 5- $\frac{3}{8}$ " high; unit mounts by 4 threaded lugs with 2- $\frac{5}{8}$ " x 1- $\frac{9}{16}$ " mfg. centers; breakdown between core and windings 2000 V. RMS; heat rise under rated load 40 deg. Cent. or less	ST type 10C123	56C048
L ₇			
LINE FILTERS			
LF ₁	Line filter assembly: consists of inductors L ₆ and L ₇ and capacitors C ₄₈ , C ₄₉ , C ₅₀ and C ₅₁ , mounted in drawn aluminum can 4-15/32" high, x 1-3/8" wide x 1-13/16" deep with solder lug terminals and mounted by 4 spade lugs.	SWI type 3492	59A056
LAMPS			
LM ₁	Lamp: bayonet base 6 to 8 volts @ 250 milliamperes; glass bulb; same as LM ₂	GE type 44	39A003
LM ₂	Same as LM ₁	-	-
METERS			
M ₁	Meter, "S" meter: calibrated in "S" units; 100-0-40 microamperes movement; body 2.92" dia. x 1.90" deep; round flush type mg. plate 3.5 O.D., with 3 mg. holes 120 degrees apart; Includes 2 terminals ± 24-NF2 which project 0.09" from rear of meter.	B Special	52A097
PLUGS			
PL ₁	Plug and line cord assembly: 2 conductor #18 type S-J all rubber covered cord 6 feet long with a spring type (aluminum type 271) molded on plug at one end and stripped and tinned for 5/8" at the other end.	B type 1750	87A125
PL ₂	Plug, octal: male, bakelite body 1- $\frac{3}{4}$ " O.D. x 7/16" thick; metal contact wings 7/16" long; supplied with insulated jumpers between contacts 3 and 4, and contacts 6 and 7.	AP type CP-8	35A002
RESISTORS			
R ₁	Resistor, fixed: 270 ohms ± 10%; $\frac{1}{2}$ watt; carbon; insulated; 0.249" O.D. x 0.655" long.	ASA	RC21AE271K
R ₂	Resistor, fixed: 1000 ohms ± 10%; $\frac{1}{2}$ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R ₃ , R ₆ , R ₂₁ , R ₂₇ , R ₃₇ .	ASA	RC21AE102K
R ₃	Same as R ₂	-	-
R ₄	Resistor, fixed: 10,000 ohms ± 20%; $\frac{1}{2}$ watt; carbon; insulated; 0.342" O.D. x 1.76" long.	ASA	RC41AE103W
R ₅	Resistor, fixed: 2200 ohms ± 10%; $\frac{1}{2}$ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R ₂₉ , R ₃₂ .	ASA	RC21AE222K

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Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
R ₃₃	Resistor, fixed: 4700 ohms $\pm 10\%$; $\frac{1}{2}$ watt; carbon; insulated; 0.249" diam x 0.655" long.	ASA	RC21AE472K
R ₃₄	Resistor, fixed: 22,000 ohms $\pm 10\%$; $\frac{1}{2}$ watt; carbon; insulated; 0.249" O.D. x 0.655" long.	ASA	RC21AE223K
R ₃₅	Same as R ₃₄	-	-
R ₃₆	Resistor, fixed: 6 ohms $\pm 10\%$; $\frac{1}{2}$ watt; carbon; insulated; 0.215" O.D. x 7/16" long.	ER type 504	23A011
R ₃₇	Same as R ₃₆	-	-
R ₃₈	Resistor, fixed: 8 ohms $\pm 10\%$; $\frac{1}{2}$ watt; carbon; insulated; 0.215" O.D. x 7/16" long.	ER type 504	23A019
R ₃₉	Resistor, fixed: 15,000 ohms $\pm 20\%$; $\frac{1}{2}$ watt; insulated; 0.249" diam x 0.408" long.	ASA	RC20AE150W
R ₄₀	Same as R ₃₉	-	-
R ₄₁	Same as R ₃₇	-	-
R ₄₂	Same as R ₃₇	-	-
R ₄₃	Resistor, variable: 1 megohm $\pm 20\%$; carbon; $\frac{1}{2}$ inch long x $\frac{1}{8}$ inch dia.; 3 solder lug terminals with the variable contact located in the center and the fixed contacts 1-7/16" apart; no taps.	CT type 125	23C059
R ₄₄	Same as R ₃₄	-	-
R ₄₅	Resistor, fixed: 3300 ohms $\pm 10\%$; $\frac{1}{2}$ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R ₄₇ .	ASA	RC21AE332K
R ₄₆	Same as R ₄₅	-	-
R ₄₇	Resistor, fixed: 100,000 ohms $\pm 20\%$; $\frac{1}{2}$ watt; carbon; insulated; 0.249" diam x 0.655" long.	ASA	RC21AE104W
R ₄₈	Same as R ₄₅	-	-
R ₄₉	Same as R ₄₅	-	-
R ₅₀	Same as R ₄₅	-	-
R ₅₁	Resistor, fixed: 220 ohms $\pm 10\%$; 2 watt; carbon; insulated; 0.342" O.D. x 1.775" long.	ASA	RC41AE221K
R ₅₂	Resistor, fixed: 3900 ohms $\pm 10\%$; 2 watt; carbon; insulated; 0.408" diam x 1.41" long.	ASA	RC40AE392K
R ₅₃	Not used	-	-
R ₅₄	Same as R ₄₇	-	-
R ₅₅	Same as R ₄₇	-	-
R ₅₆	Same as R ₄₇	-	-
R ₅₇	Resistor, variable: 1500 ohms $\pm 20\%$; wire wound; st. line taper; shaft 3/8" long x $\frac{1}{8}$ inch dia. slotted 1/16" x 1/16"; 3 solder lug terminals with the variable contact located in the center and the fixed contacts 1-7/16" apart; no taps.	CT type 125	25C000
R ₅₈	Resistor, fixed: 3300 ohms $\pm 10\%$; 10 watt; wire wound; coated with baked vitreous enamel; 3/8" O.D. x 1-3/4" long.	IRC type AD	24BC032D
R ₅₉	Same as R ₅₀	-	-
R ₆₀	Resistor, fixed: 47,000 ohms $\pm 10\%$; $\frac{1}{2}$ watt; carbon; insulated; 0.249" diam x 0.408" long.	ASA	RC20AE473K
R ₆₁	Same as R ₅₀	-	-
R ₆₂	Same as R ₅₀	-	-

SOCKETS

S₆₁ Socket, octal: female; high dielectric mica filled beryllia body 1-7/16" dia. x 31/64" thick; silver plated phosphor bronze solder lugs; soldered on steel mtg. plate 1-6/32" wide x 0.031" thick having 2 mtg. holes of 5/32" dia. x 1-8" mtg. centers; pins are numbered on back of socket clockwise from locating pin.

SWITCHES

S_{W1} Switch, rotary selector: 3 position single pole, 7 sections; non-shorting type contacts; ceramic wafers oval shaped 1-7/8" x 1-5/8" x 5/32" thick; 2 holes 0.144" dia. x 1-8/16" mtg. centers mount wafers individually; entire shaft 11-3/4" long x 0.249" dia. squared on opposite sides to 0.188" dia., with index plate 1-7/8" x 1-3/8" x 0.038" thick and having two 0.1875" stainless steel balls; 3 stops, each 60 degrees apart and position 1 symmetrical to mtg. holes; minimum torque not less than 70 inch ounces.

S_{W2} Switch, toggle: SPST; rated 3 amperes @ 250 V.; case 1" long threaded 15/32-32; solder lug contacts; same as S_{W4}, S_{W5}.

S_{W3} Switch, toggle action; SPST; part of resistor R₅₈
S_{W4} Same as S_{W2}
S_{W5} Same as S_{W2}
S_{W6} Switch, toggle: DPST; rated 3 amperes @ 250 V.; case 1-3/32" long x 17/32" wide x 9/16" deep; mounted by bushing 15/32" long threaded 15/32-32; solder lug contacts

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Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
T ₅	Transformer, R-F: 46 to 82 megacycles; one primary and one secondary winding; primary 11-3 turns of #34BCE single layer winding (round counter-clockwise), secondary: 2-3 turns of #22 D cel. braid single layer winding (round clockwise); air cores; coils wound on a bakelite tube 1-5/8" long x 3/8" O.D. x 3/8" I.D.; solder lug terminals.	SWI type 655	51B704
T ₆	Transformer, R-F: 82 to 143 megacycles; one secondary winding; primary 2-3/4 turns of #36BCE single layer winding; secondary 3/4 turns of #14 solid copper single layer winding; air cores; coils are wound on a solid bakelite from 7/8" long x 3/8" dia.; extended coil winding leads for terminals.	SWI type 658	51A776
T ₇	Transformer, R-F: 27.8 to 47 megacycles; one primary and two secondary windings; primary 1-3/4 turns of #34BCE; first secondary 4-1/4 turns of #22 D cel. braid; second secondary 2-3 turns of #30BCE; air cores; coils are wound on a bakelite tube 1-5/8" long x 3/8" O.D.; solder lug terminals.	SWI type 653	51A267
T ₈	Transformer, R-F: 46 to 82 megacycles; one primary and two secondary windings; primary 3/4 turn of #30B cel. braid; first secondary 2-3 turns of #18D cel. braid; second secondary 1/2 turn of #22D cel. braid; air cores; coils are wound on a bakelite tube 1-5/8" long x 3/8" O.D.; solder lug terminals.	SWI type 656	51A270
T ₉	Transformer, R-F: 82 to 143 megacycles; one primary and two secondary windings; primary 1 turn of #28 plate enamel; first secondary 1 turn of #14 bare copper wire; second secondary 1-1/2 turns of #28 cel. braid; air cores; coils are wound on a bakelite tube 1-5/8" long x 3/8" dia.; one solder lug and extended coil winding leads provide terminals.	SWI type 659	51B774
T ₁₀	Transformer, Intermediate-Frequency: 5.25 megacycles; one primary and three secondary windings; primary 1 1/2 turns single layer winding on adjustable polyiron core assembly; first secondary 1 1/2 turns single layer winding on same form as primary; second secondary 2 1/2 turns single layer winding on adjustable polyiron core assembly; third secondary 2 1/2 turns wound on same form as second secondary; fixed trimmer capacitors (C ₁₀) and (C ₁₁); a fixed resistor (R ₁₀) and a fixed capacitor (C ₁₂) complete the assembly; aluminum shield can 4" high x 1-7/8" long x 1-7/8" wide with 4 spade lugs centered one on each side of shield; solder lug terminals at base numbered 1 thru 8 and a 7" insulated stranded wire lead brought out through a hole in the side of the shield provide connections.	RN Special	50C140
T ₁₁	Transformer, Intermediate-Frequency: 5.25 megacycles; one primary and three secondary windings; primary 1 1/2 turns single layer winding on adjustable polyiron core assembly; first secondary 1 1/2 turns single layer winding on same form as primary; second secondary 20 turns single layer winding on adjustable polyiron core assembly; third secondary 2 1/2 turns wound on same form as second secondary; fixed trimmer capacitors (C ₁₀) and (C ₁₁); a fixed resistor (R ₁₀) and a fixed capacitor (C ₁₂) complete the assembly; aluminum shield can 4" high x 1-7/8" long x 1-7/8" wide with 4 spade lugs centered one on each side of shield mounted 9/32" from base; solder lug terminals at the base numbered 1 thru 8 provide connections.	RN Special	50C141

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
SW _{7A}	Switch, rotary selector: 3 section 3 position; 2 shields separate section #1 from rest of the assembly; a single pole A-C power switch is included at rear and is open at position #1, and closed in positions #2 and #3; all metal parts silver plated brass except for stainless steel index spring and ball; vacuum wax impregnated phenolic wafer; shorting type rotor contacts; frame 11" long including special mfg. bracket at rear of assembly; front of assembly mounts by 3/8-32 bushing 3/4" long, shaft 1" long x 3/8" dia.	OM type R	608176
SW _{7B}	Switch, rotary selector: single section 2 position; all metal parts silver plated brass except for stainless steel index spring and ball; vacuum wax impregnated phenolic wafer; non shorting teeth at contacts 5 and 6; frame 5/16" long, mounts by 3/8-32 bushing 3/4" long; shaft 1" long x 3/8" dia.	OM type QH	60A177
SW ₈	Switch, rotary selector: 3 circuit; single section 4 position; metal parts brass, fungicide treated bakelite wafer; shorting type contacts; 1-3/8" lg x 1-7/8" wd x 1-8/9" h overall; shaft 3/8" lg x 3/8" dia.; mfg by 3/8-32 x 3/8" lg brass bushing.	OM Special	608212
SW ₁₀	Switch, toggle, DPDT, rated 3 amperes @ 250 V., 1-3/4" long x 2 1/2" wide x 5/8" deep, mounted by bushing 13/32" long threaded 15/32-32, solder lug contacts.	HH	60A090

TRANSFORMERS			
T ₁	Transformer, R-F: 27.8 to 47 megacycles; one primary and one secondary winding; primary 1-3 turns of #30BCE single layer winding with a Q of 65 at 44 megacycles with 98.8 micro-microfarads; secondary 5 turns of #22 D cel. single layer winding with a Q of 103 at 26 megacycles with 181.5 micro-microfarads; air cores; coils wound on a bakelite tube 1-5/8" long x 3/8" O.D. x 3/8" I.D.; solder lug terminals.	SWI type 651	51A265
T ₂	Transformer, R-F: 46 to 82 megacycles; one primary and one secondary winding; primary 1-1/2 turns of #34BCE single layer winding with a Q of 67 at 40 megacycles with 106 micro-microfarads; secondary 1-7/8 turns of #18 D cel. braid single layer winding with a Q of 158 at 45 megacycles with 39 micro-microfarads; air cores; coils wound on a bakelite tube 1-5/8" long x 3/8" O.D. x 3/8" I.D.; solder lug terminals.	SWI type 654	51A268
T ₃	Transformer, R-F: 82 to 143 megacycles; one primary and one secondary winding; primary 2-3 turns of #28 braided cel. single layer winding; secondary 1-3 turns of #14 solid copper single layer winding; air cores; coils wound on a solid form 3 1/4" long x 3/8" dia.; extended coil winding leads for terminals.	SWI type 657	51A782
T ₄	Transformer, R-F: 27.8 to 47 megacycles; one primary and one secondary winding; primary 2 1/2 turns of #34BCE single layer winding; secondary 6 turns of #22 D cel. braid; air cores; coils wound on a bakelite tube 1-5/8" long x 3/8" O.D. x 3/8" I.D.; solder lug terminals.	SWI type 652	51B783

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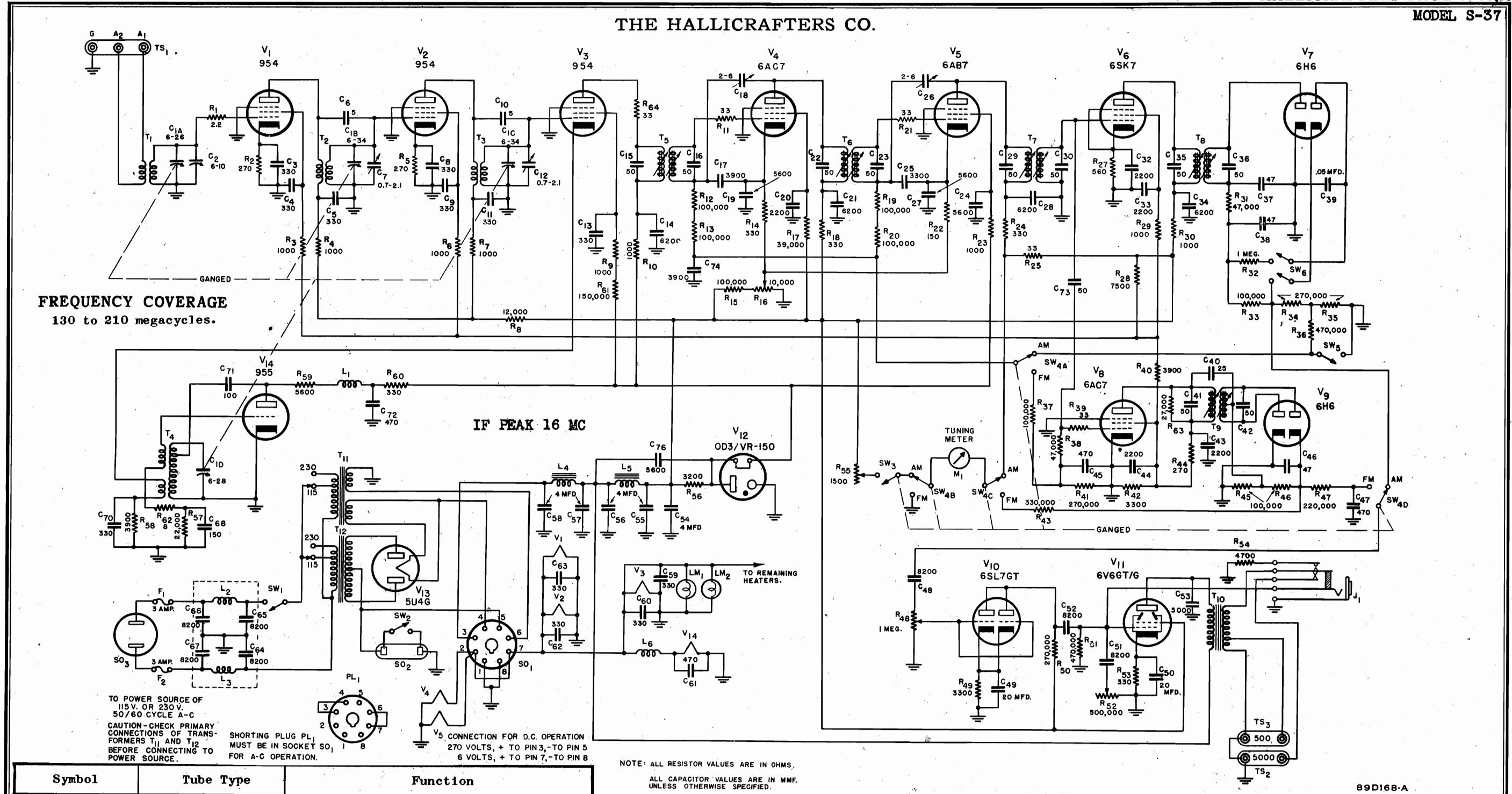
Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
TERMINAL BOARDS			
TS ₁	Board, terminal; output; consists of vacuum impregnated natural linen bakelite mfg. board 3 1/2" long x 2" wide x 1/8" thick with 4 mfg. holes 0.144" dia. and having 2-7/8" x 1-5/8" mfg. centers, marked "6000 OHM CENTER TAP - GND. and 5000 OHM, 5000 OHM-GND", six brass knurled thumb screw binding posts provide electrical connection.	H Special	41X5306
TS ₂	Board, terminal; antenna input; consists of natural paper bakelite mfg. board 4-5/16" long x 2-1/4" wide x 3/16" thick with 4 mfg. holes 0.144" dia. and having 3-13/16" x 2" mfg. centers; marked A ₁ , A ₂ , GND; 3 brass knurled thumb screw binding posts provide electrical connections.	H Special	41X5308

INDEX TO PARTS MANUFACTURERS

Symbol	Manufacturer	Symbol	Manufacturer
AP	American Phenolic Corp. Chicago, Illinois	IC	Industrial Condenser Chicago, Illinois
ASA	Any manufacturer meeting the applicable American Standards Association specifications.	IRC	International Resistance Co. Philadelphia, Pa.
B	Belden Mfg. Co. Chicago, Illinois	IF	Littlefuse, Inc. Chicago, Illinois
BC	Brenner Chemical Co. Chicago, Illinois	MCN	McClintock Meter Co. Minneapolis, Minn.
CE	Coronet Electric Co. Chicago, Illinois	MN	Meissner Manufacturing Co. Mt. Carmel, Illinois
CH	Cutler-Hammer Milwaukee, Wis.	MT	The Muter Co. Chicago, Illinois
CRL	Centralab Milwaukee, Wis.	OM	Oak Manufacturing Co. Chicago, Illinois
CT	Chicago Telephone & Supply Co. Elkhart, Indiana	RC	Radio Condenser Corp. Chicago, Illinois
ER	Erie Resistor Erie, Pa.	RCA	RCA Manufacturing Co., Inc., Camden, N. J.
EW	Electronic Winding Corp. Chicago, Illinois	ST	Standard Transformer Corp. Chicago, Illinois
GE	General Electric Co. Schenectady, N. Y.	SWI	S.W. Inductor Co. Chicago, Illinois
H	The Hallcrafters Co. Chicago, Illinois	U	Utah Products Company Chicago, Illinois
HH	Hart & Hegeman Electric Co. Hartford, Conn.	UE	Underwood Electric Co. Chicago, Illinois

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
T ₁₂	Transformer, intermediate-frequency: 5.25 megacycles; one primary and three secondary windings; primary 11 1/2 turns single layer winding on adjustable polytron core assembly; first secondary 1 1/2 turns winding on same form as primary; second secondary 20 1/2 turns single layer winding on adjustable polytron core assembly; third secondary 2 1/2 turns winding on same form as second secondary; fixed trimmer capacitors (C ₇₂) and (C ₇₃), complete the assembly; aluminum shield can 4" high x 1-7/8" long x 1-7/16" wide with 4 spade lugs centered one on each side of shield mounted 9/32" from base; solder lug terminals at base numbered 1 thru 8 provide connections.	EW Special	50C142
T ₁₃	Transformer, intermediate-frequency: 5.25 megacycles; one primary and one secondary winding; primary 31 1/2 turns single layer winding on adjustable polytron core assembly; secondary 31 1/2 turns single layer winding on adjustable polytron core assembly; fixed trimmer capacitors (C ₇₄ and C ₇₅), and a fixed coupling capacitor (C ₇₆) complete the assembly; aluminum shield can 4" high x 1-7/8" long x 1-7/16" wide with 4 spade lugs centered one on each side of shield mounted 9/32" from base; solder lug terminals at base numbered 1 thru 8 provide connections.	EW Special	50C143
T ₁₄	Transformer, discriminator: 5.25 megacycles; one primary and one secondary winding; primary 33 turns single layer winding on adjustable polytron core assembly; secondary 35 turns center tapped single layer winding on polytron core assembly; fixed trimmer capacitors (C ₇₄ and C ₇₅), and a fixed coupling capacitor (C ₇₆) complete the assembly; aluminum shield can 4" high x 1-7/8" long x 1-7/16" wide with 4 spade lugs centered one on each side of shield mounted 9/32" from base; solder lug terminals at base numbered 1 thru 8 provide connections.	EW Special	50C144
T ₁₅	Transformer, A-F: one primary and 2 secondary windings; primary to match a 12,000-ohm push-pull load @ 35 ma. for each tube; first secondary to match a load of 600 ohms, center tapped; second secondary to match a load of 5000 ohms; iron core; case hermetically sealed; vacuum impregnated; coil and core assemblies bolted to brackets spot welded to case, solder lug terminals marked 1 through 8 at base of transformer, 4 mfg. lugs at base with 3-1/16" x 1-11/16" mfg. centers; breakdown between windings and core 1000 R.M.S. volts.	ST type 10440	55C062
T ₁₆	Transformer, power: primary, 2 section winding connected in parallel for 115 V. A-C and connected in series for 230 V. A-C operation, 50/60 cycles, single phase, first secondary center tapped to provide 270 V. D-C @ 150 milliamperes across 10 mfd. capacitor and a 2 heavy .85 8.4 V. A-C # 4 ampere; third secondary 5 V. A-C @ 3 amperes; hermetically sealed case 4-15/16" long x 3-3/4" deep x 5-5/16" high spot welded at all joints; coil and core assemblies bolted to brackets spot welded to case; vacuum impregnated; mounted by 4 lugs at base with 3-5/8" x 2-3/16" mfg. centers; 4 terminals threaded 8-32 NC-2 connected to primary as follows: 1 and 3 to one section of primary, 2 and 4 to other section of primary; 7 solder lug terminals connected as follows: 5 and 6 connect to secondary #2 (6.4 V. A-C), 7 and 8 connect to secondary #3 (5 V. A-C), 9 and 11 connect to secondary #1 (540 V. A-C), 10 is center tap for secondary #1 and ground for transformer case and core, iron core; breakdown voltages as follows between windings and core and case; primary 3000 V. RMS, secondary #1-2500 V. RMS, secondary #2-1500 V. RMS, secondary #3-2500 V. RMS.	ST type 10P51	52C094

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Symbol	Tube Type	Function
V-1	954	1st r-f amplifier
V-2	954	2nd r-f amplifier
V-3	954	Mixer
V-4	6AC7	1st i-f amplifier
V-5	6AB7	2nd i-f amplifier
V-6	6SK7	3rd i-f amplifier
V-7	6H6	A-M detector and noise limiter
V-8	6AC7	F-M limiter
V-9	6H6	F-M discriminator
V-10	6SL7GT	Audio voltage amplifier
V-11	6V6GT/G	Audio power amplifier
V-12	OD3/VR-150	Voltage regulator
V-13	5U4G	Rectifier
V-14	955	High-frequency oscillator

NOTE: ALL RESISTOR VALUES ARE IN OHMS.
ALL CAPACITOR VALUES ARE IN MMF.
UNLESS OTHERWISE SPECIFIED.

Figure 7-7. Radio Receiver Model S-37, schematic wiring diagram.

A-C Operation	* D-C Operation
Line Voltage.....117 volts, 230 volts. Line Current.....1.0 amp, 0.5 amp. Power Consumption...110 watts.	Filament voltage..... 6.3 volts. Filament current..... 3.6 amps. "B" voltage..... 270 volts. "B" current..... 125 ma.

* The 6-volt battery drain using a vibrator type supply
for "B" voltage will run approximately 18-20 amperes.

1. GENERAL

Figure 4-1. shows, in very simple block form, the plan of the circuit of the Model S-37 receiver. Note that the circuit is that of the conventional superheterodyne receiver up to the second-i-f amplifier stage. The output of the 2nd i-f amplifier is fed to two channels, namely, the F-M signal channel and the A-M signal channel. The F-M channel consists of the f-m limiter and discriminator and the A-M channel consists of an additional i-f amplifier stage and second detector stage. The demodulated signal from both channels then feeds the same audio amplifier being selected by the AM/FM switch.

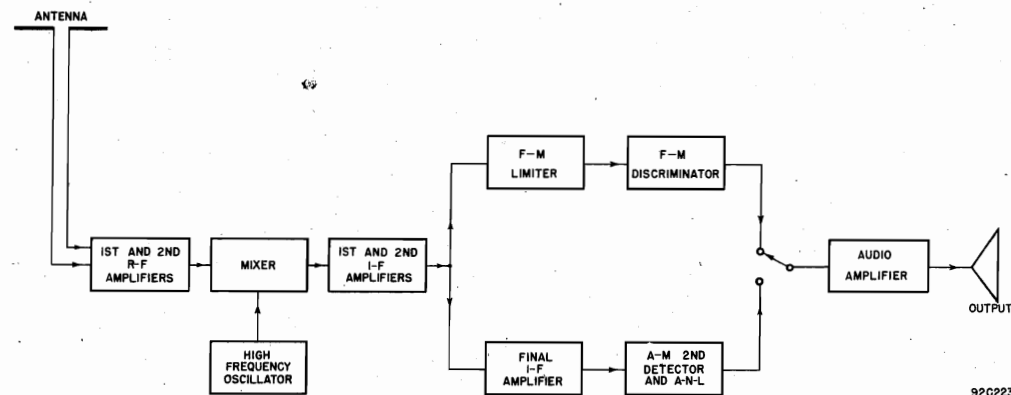


Fig. 4-1. Radio Receiver Model S-37, block diagram

2. DETAILED FUNCTIONING BY STAGES. . (Refer to Fig. 7-7.)

a. R-F Amplifier. - The two r-f amplifier stages employ type 954 acorn pentode tubes in a conventional two stage amplifier circuit. Signals present at the antenna are fed to the primary of transformer T-1 through terminals A₁ and A₂ of antenna terminal strip TS-1. The secondary is tuned by the ganged tuning capacitor section C-1A and trimmer C-2. Trimmer capacitor C-2 is controlled from the front panel by the control marked ANTENNA to provide accurate alignment of the r-f stage with varying antenna load impedances. R-F signals selected by the parallel resonant circuit are applied to the grid of tube V-1 and appear in greater amplitude across the primary of transformer T-2. Parasitic resistor R-1 prevents unwanted oscillations in this stage and tends to stabilize the amplifier. Resistor R-2 by-passed by capacitor C-3, provides self-bias for the stage. Resistors R-3 and R-4 and capacitors C-4 and C-5 act as decoupling networks for the screen and plate circuit of tube V-1. The signal across the primary of transformer T-2 is coupled to the grid of tube V-2 inductively by transformer T-2 and capacitively by capacitor C-6. Capacitor C-6 provides a small amount of coupling to improve response at the high-frequency end of the band, thus equalizing the r-f signal amplitude over the tunable frequency range. The secondary of transformer T-2 is tuned by section C-1B of the ganged tuning capacitor and trimmer C-7. R-F signals applied to the grid of tube V-2 by the secondary winding of transformer T-2, appear at the primary of transformer T-3 in greater amplitude as a result of the amplifying action of tube V-2. Resistor R-5 by-passed by capacitor C-8 provides self-bias for the stage. Resistors R-6 and R-7 and capacitors C-9 and C-11 act as decoupling networks for the screen and plate circuit of tube V-2. The signal developed at the primary winding of transformer T-3 then feeds the mixer stage of the receiver.

b. Mixer. - The mixer stage employs a type 954 acorn pentode in a cathode coupled mixer circuit. The signal across the primary of transformer T-3 is coupled to the grid of tube V-3 inductively by transformer T-3 and capacitively by capacitor C-10. Capacitor C-10 provides a small amount of coupling to improve response at the high-frequency end of the band, thus equalizing the r-f signal amplitude over the tunable frequency range. The secondary of transformer T-3 is tuned by section T-10 of the ganged tuning capacitor and trimmer C-12. R-F signals selected by the parallel resonant circuit are applied to the grid of the mixer tube V-3. A signal from the local oscillator 16 megacycles lower in frequency than the receiver tuning frequency, is fed to the mixer tube through the cathode and provides the difference frequency of 16 mc. for the i-f stages.

c. Oscillator. - The oscillator circuit consists of a type 955 acorn triode in a tuned-plate untuned-grid type of oscillator circuit. The frequency of oscillation is determined by a resonant circuit which consists of the secondary of transformer T-4 and section C-1D of the main tuning gang connected in parallel. The r-f energy is

fed from the plate of tube V-14 to the tuned circuit by the d-c blocking capacitor C-71. The decoupling network in the plate circuit of the oscillator tube consists of R-59, L-1, C-72, and R-60. Resistor R-62 and R-57 by-passed by capacitor C-68 are connected in series with the feedback winding of transformer T-4 to provide equal oscillator voltage to the mixer stage over the entire tuning range. The mixer voltage is further compensated by the network R-58 and C-70, connected in series with the winding feeding the cathode of the mixer tube.

d. First and 2nd I-F Amplifier. - The 1st and 2nd i-f amplifier stages employ type 6AC7 and 6AB7 pentodes respectively. The i-f amplifier coupling transformers T-5, T-6 and T-7 for these two stages are tuned to 16 mc. by adjusting the powdered iron core slugs in both primary and secondary windings. Each stage is neutralized by capacitors C-18 for tube V-4 and C-26 for tube V-5, to provide stable amplification at this relatively high intermediate frequency. The gain of the 1st and 2nd i-f amplifier stages is varied by the R.F. GAIN control (R-16), connected in series with the cathodes of both tubes, to provide sensitivity control for the receiver instead of the usual practice of varying the gain of the r-f amplifier stages. This method of control permits the r-f amplifier stages to operate at maximum gain, thereby providing a high signal to noise ratio at all sensitivity settings. The a-v-c grid voltage is applied to this section of the receiver through the decoupling networks C-17, R-12, R-13, C-74, and R-19, R-20 and C-25. The a-v-c voltage is supplied by the 2nd detector during a-m reception and a small amount of voltage is also supplied, for a similar purpose, from the limiter tube (V-8) during f-m reception.

e. Final I-F Amplifier. - The last i-f amplifier, used for a-m reception, employs a type 6SK7 pentode connected in a conventional circuit. The stage is coupled by transformers T-7 and T-8 which are tuned by adjustable iron core slugs. Resistor R-27 by-passed by capacitor C-32 provides self-bias for the stage. The gain of this stage is not varied as was the case for the 1st and 2nd i-f amplifier stages. The amplified voltage developed across the secondary of transformer T-8 is then fed to the 2nd detector for demodulation of a-m signals.

f. A-M 2nd. Detector and A-N-L. - Both the second detector and automatic noise limiter stages employ a single type 6H6 duo-diode. One diode section of tube V-7 serves as detector for amplitude modulated signals by rectifying the modulated carrier. The r-f filter for this type of detection consists of resistor R-31, and capacitors C-37 and C-38 connected in a pi-section. Automatic volume control voltage and audio frequency voltage is obtained from the load and voltage divider resistors R-33, R-34, R-35. Resistor R-36 serves as a-v-c decoupling. The remaining diode section of tube V-7 serves as automatic noise limiter as follows: Capacitor C-39 becomes charged by the rectified carrier voltage and the time constant of this capacitor and the filter network associated with it is such, that the audio frequency voltage variations do not alter this charge. During a severe noise pulse, however, the cathode of the diode plate connected to capacitor C-39 becomes more negative than the charge held by C-39, hence, current flows shorting the audio voltage to ground through capacitor C-39 until the cathode voltage of the a-n-l diode again reaches a less negative potential than its plate and capacitor C-39 acquires its normal charge again. By shorting the audio voltage to ground during a noise pulse, the a-n-l circuit prevents the objectional noise pulses from reaching the audio amplifier stages.

g. F-M Limiter and Discriminator. - The frequency modulation detector consists of a limiter stage and a discriminator stage. The type 6AC7 limiter tube (V-8) is fed by the second i-f transformer secondary winding along with the third i-f amplifier tube V-6 for a-m reception. The limiter stage operates as a saturated amplifier in which the output remains constant over a large range of input voltage levels, thus eliminating variations in the amplitude of the carrier signal to be demodulated by the discriminator. When operating as an f-m receiver, automatic volume control action is obtained by applying a part of the voltage developed across resistor R-41 in the grid return of the limiter tube (V-8), to the control grids of the 1st and 2nd i-f amplifier tubes (V-4 and V-5) through section SW-4A of the F.M./A.M. switch. The constant level signal out of the limiter tube (V-8) is fed to the discriminator tube (V-9) through the discriminator transformer (T-14) and coupling capacitor C-40. The discriminator circuit, consisting of transformer T-9, tube V-9 and load resistors R-45 and R-46, converts the frequency variations of the f-m signal into amplitude variations or the audio signals. The de-emphasis network, consisting of resistor R-47 and capacitor C-47, attenuates the high frequency end of the audio range since these frequencies are emphasized at the f-m transmitter. From the de-emphasis network the audio signal is fed to the A.F. GAIN control (R-48) in the same way as the signal from the amplitude modulation detector tube (V-7).

h. Audio Amplifier. - The audio amplifier consists of a conventional high- μ triode class A voltage amplifier driving a single beam power amplifier also operating class A.

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(1) **Voltage Amplifier.** - The voltage amplifier stage employs a type 6SL7GT twin-triode tube with its elements connected in parallel. Self bias voltage obtained from resistor R-49 by-passed by capacitor C-49 provides grid bias voltage for class A operation. The stage operates into its plate load resistor R-50 from which grid voltage for the beam power stage is obtained as well as audio voltage for headset operation. Capacitor C-52 isolates the d-c plate voltage from the headset and beam power amplifier grid.

(2) **Power Amplifier.** - The power amplifier employs a type 6V6GT/G beam-power amplifier in a resistance capacity coupled single ended class A amplifier circuit. Grid bias is obtained from cathode resistor R-53 which is by-passed by capacitor C-50. The output of tube V-11 is coupled to the speaker load by transformer T-10 which provides proper matching for 5000 and 500 ohm loads. When the headset is plugged into the circuit, resistor R-54 is automatically connected across the 5000 - ohm winding to maintain proper load impedance for the beam power stage. If a speaker is connected to the 5000 ohm outlet, it will be automatically disabled when the headset is plugged in. The frequency response of the power amplifier stage is controlled by variable resistor R-52 and capacitor C-51 connected in series from the grid of tube V-11 to ground. As the resistance of R-52 is lowered, the higher audio frequencies are attenuated producing a bass boost effect in the output.

1. **Tuning Meter.** - The tuning meter is switched between two circuits depending upon the type of reception:

(1) **A-M Reception.** - When metering reception of a-m signals the tuning meter measures the plate current of the 2nd i-f amplifier stage which varies as the strength of the signal carrier. Resistor R-55 sets the zero (no signal) position by adjusting the plate current of tube V-5. A carrier then drives the plate current of tube V-5 to a lower value depending upon the signal strength. The screen grid voltage of tube V-5 is regulated by the voltage regulator tube to provide accurate control over the plate current.

(2) **F-M Reception.** - When metering reception of f-m signals the tuning meter measures the unbalanced current in resistors R-45 and R-46 obtained when the receiver is tuned to one side of the f-m carrier. When the receiver is tuned to the exact center of the f-m carrier the meter rests at zero indicating that the currents in the discriminator load resistors are equal. Resistor R-43 functions to limit the maximum current in the meter circuit to a safe value.

j. **Power Supply.** - The receiver has provisions for operation from either an a-c or d-c source.

(1) **A-C Operation.** - The internal power supply provides for operation from 115 or 230-volt a-c mains. The a-c current is fed through a line filter which is a low pass pi-section network connected in each side of the line. The networks consist of inductances L-2 and L-3 and capacitors C-64, C-65, C-66 and C-67. The line filter attenuates all the objectionable noise components coming into the receiver circuit through the a-c power source. The filament and high voltage supply transformers are separate units, each provided with a tapped primary for 115- or 230-volts operation. The taps must be wired accordingly each time the line potential is changed. A type 5U4G (tube V-13) full-wave rectifier is employed in a conventional rectifier circuit. The high voltage from this rectifier is fed to the filter network through the "Shorting Plug" on the rear apron of the receiver chassis as is the filament current for the heaters of the tubes. The SEND-REC. switch is connected in series with the center tap of the high voltage secondary of transformer T-12 and ground to break the high voltage circuit in order to disable the receiver and yet keep the tube heaters hot ready for instant use. The filter circuit consists of two low pass pi-section networks made up of inductances L-4 and L-5 and capacitors C-58, C-57, C-56, C-55 and C-54. In order to provide a constant plate voltage to the oscillator, mixer and screen of the second i-f stages a voltage regulator tube type 003/VR-150 is used. The voltage supplied to the screen of tube V-5 is regulated to provide accurate current control for the tuning meter connected in the plate circuit of this tube.

(2) **D-C Operation.** - External storage battery and "B" batteries or storage battery and vibrator type supply provide for d-c operation. When operating from an external d-c supply the "Shorting Plug" on the rear apron of the receiver chassis is removed and a similar plug is wired to supply filament and plate current to the receiver circuits. The "B" voltage is supplied to the input side of the filter section used for a-c operation there by insuring adequate filtering for vibrator type supplies when used.

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ANTENNA Control. - This control is used to compensate for misalignment of the receiver's antenna stage due to antenna impedance variations. Once set for a given antenna, its setting will hold for a wide range of frequencies.

R. F. GAIN Control. - The radio frequency gain control regulates the sensitivity of the receiver. Turning the control to the right increases the sensitivity of the receiver. Ganged to this control is the "S" meter switch which connects the tuning meter into the circuit when the control is advanced all the way to the right during automatic volume control operation.

S-METER ADJ. - This adjustment sets the signal level meter to its zero signal level position when the receiver is set for A.M. (amplitude modulation) reception. The adjustment is made with a screw driver and once set, it is seldom necessary to make further adjustments.

POWER Switch. - The power switch connects the a-c power to the receiver when operating from a-c mains only. When operating the receiver from a battery supply this control function must be handled by a power switch in the battery supply circuit.

CAUTION - When operating the receiver from a d-c supply set the receiver's POWER switch at OFF and do not plug the a-c line cord into an a-c outlet.

"S" Meter or Tuning Meter. - The tuning meter serves two functions in the receiver depending on the type of reception as follows:

A.M. Reception. - When the receiver is adjusted to receive amplitude modulated signals, the tuning meter indicates the relative carrier strength of the received signal. To put the meter in operation, turn the R.F. GAIN control to the right until the switch connected to its shaft clicks, and set the A.V.C. switch at ON.

F.M. Reception. - When the receiver is adjusted to receive frequency modulated signals, the tuning meter is used to indicate resonance with the station carrier. As the receiver is tuned through the f-m carrier the meter pointer will first deflect to one side of zero, return to zero and deflect an equal distance on the opposite side of zero, and finally return to zero as the carrier is completely passed. The zero center position in the middle of the swing represents the current setting of the receiver tuning dial and indicates resonance with the station carrier.

OPERATION.

Listed below are the receiver controls and their settings for the two types of reception provided by this receiver, namely, amplitude modulation reception and frequency modulation reception.

A. A.M. (Amplitude Modulation) Reception. - To receive an amplitude modulated signal, set the panel controls as follows:

POWER switch	-	Set at ON when operating receiver on alternating current. To turn off receiver set switch at off.
SEND/REC. switch	-	CAUTION - Leave switch set at OFF when operating receiver from external batteries.
A.V./F.M. switch	-	Set at REC. (Set at SEND to disable receiver when desired.)
		Set at A.M.

A.V.C. switch	-	Set at ON.
R.F. GAIN control	-	Turn to right until switch on control clicks.
TUNING control	-	Set dial that is calibrated in megacycles to frequency of signal; adjust for maximum tuning meter reading.
ANTENNA control	-	Adjust for maximum tuning meter reading.
A.F. GAIN control	-	Adjust for desired signal level at headset or speaker.
TO NE control	-	Set to please the listener.
A.N.L. switch	-	Normally set at OFF. Use only when background noise is excessive.

NOTE - The control settings listed above are those necessary for reception using automatic volume control and meter tuning. Should the operator wish to use manual control of the receiver's sensitivity set the A.V.C. switch at OFF and adjust the R.F. GAIN control for maximum required sensitivity. The tuning meter will not function when manual control of the receiver's sensitivity is employed.

F.M. (Frequency Modulation) Reception. - To receive a frequency modulated signal, set the panel controls as follows:

POWER switch	-	Set at ON when operating receiver on alternating current. To turn off receiver set switch at OFF.
SEND/REC. switch	-	CAUTION - Leave switch set at OFF when operating receiver from external batteries.
		Set at REC. (Set at SEND to disable receiver when desired.)
A.M./F.M. switch	-	Set at F.M.
A.V.C. switch	-	Set at OFF.
R.F. GAIN control	-	Turn all the way to the right. (It is not necessary to actuate the switch.)
TUNING control	-	Set dial that is calibrated in megacycles to frequency of signal; adjust for zero setting of tuning meter.
ANTENNA control	-	Adjust for maximum signal level in headset or speaker if control is effective. (Adjustment is generally needed only on very weak signals.)
A.F. GAIN control	-	Adjust for desired signal level at headset or speaker.
TO NE control	-	Set to please the listener.
A.N.L. switch	-	Set at OFF. (not used)

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CAUTION - Voltages at various points in this equipment are of sufficiently high potential to produce a severe shock. Locate the high potential points on the VOLTAGE-RESISTANCE DIAGRAM before attempting to service circuits that are "hot". IT'S A GOOD RULE TO DISCONNECT THE POWER SOURCE BEFORE MAKING ADJUSTMENTS WHEN POSSIBLE. BE CAREFUL.

1. PREVENTIVE MAINTENANCE

All components of the receiver should be given a thorough inspection at regular intervals. Keep the components clean and dry. Moisture, even in a completely tropicalized set may cause serious deterioration and produce general unsatisfactory operation. Dust and dirt materially effect both electrical and mechanical operation. Keep the various parts clean especially the tuning capacitor and associated gear drive. Dust should be blown out with dry air or brushed out carefully. Do not oil the gear teeth or the condenser wipers as noisy reception will result from intermittent electrical contact at these points. Noisy reception may also be caused by dirty condenser wipers, faulty gain controls, and switches, frayed cable connections, faulty tubes, etc. in the installation. Check accessible connections, switch contacts, etc. regularly making sure that all are clean and tight and the tubes and cable connectors are held securely in their sockets.

2. REPLACING TUBES, LAMPS, AND FUSES

a. Replacing Tubes. - All tubes with the exception of the four acorn types are accessible at the top of the chassis through the hinged cover of the cabinet. The four acorn type tubes are made accessible by removing the top cover of the r-f section which is held down by thumb screws. The acorn tubes should be inserted with the short end of the body in the socket. Acorn tubes are more fragile than the rest and should be handled accordingly. If the grid and plate clips on the connections to these tubes become loose replace or bend to fit. **DO NOT ATTEMPT TO SOLDER DIRECTLY TO THE TUBE PIN** as the heat generated by the soldering iron will crack the glass envelope. When replacing tubes, check the tube type carefully and replace with the correct tube type. Refer to the top view of the chassis to determine the location of the tubes and to the PARTS LIST for the type number and description of each.

b. Replacing Lamps. - The receiver employs two lamps with bayonet type sockets to illuminate the vernier dial and the tuning meter. The lamps illuminating the vernier dial scale and tuning meter are to be replaced by a 6/8-volt, 150 ma. (Brown bead) G.E. 47 or equivalent. The color code referred to, is the color of the glass bead above the glass stem inside the envelope of the lamp. The lamp illuminating the meter scale is removed by pulling the lamp socket from the rubber grommet in the meter case. When reinserting the lamp, do not push the socket assembly too far into the meter case as a hot spot of light will appear on the meter scale instead of even area of illumination.

c. Replacing Fuses. - Two fuses are used, one in each side of the a-c line. The fuse holders are located on the rear apron of the chassis and require a screw driver to remove the fuse. Replace burned out fuses with 3-ampere 250-volt, Little Fuse type 3AG or equivalent.

CAUTION - The fuses protect your equipment, don't take chances using fuses rated for a heavier current drain than 3 amperes.

3. PERIODIC ADJUSTMENTS

a. Tuning Meter Adjustment.

(1) The tuning meter zero setting control is located behind its front panel button type cover marked S-METER ADJ. Remove the button with a knife or screw driver blade.

(2) Disconnect the antenna and connect a jumper across terminals A₁, A₂, and GND.

(3) Set the front panel controls for amplitude modulation reception as follows:

(a) Set A.M./F.M. switch at A.M.

(b) Set A.V.C. switch at ON.

- (c) Turn R.F. GAIN control to right until the switch on the control clicks.
- (d) Set A.F. GAIN control for minimum gain. (All the way to the left).
- (e) Set A.N.L. switch at OFF.
- (f) Set SEND-REC. switch at REC.

(4) With a screw driver set the S-METER ADJ. control for the zero reading on the S-meter scale of the tuning meter.

(5) Remove the antenna terminal jumper and replace antenna leads and meter adjustment cover button, the adjustment is completed.

b. Receiver Alignment. - The receiver has been carefully aligned at the factory and should not require realignment until the receiver requires new tubes in the r-f and i-f stages or shows signs of loss of sensitivity, off frequency calibration or requires service work on one or more of its r-f and i-f stages. Alignment should not be attempted by inexperienced personnel as maximum performance is obtained only by careful and intelligent alignment.

(1) Aligning Tools. -

(a) Signal generator capable of providing a 400-cycle modulated signal at 16 mc. and 130 to 210 mc. range. Recommended generators are the Ferris Instrument Corp. Model 18D or 18FS and the Measurements Corp. Model 75.

(b) A 50-ohm non-inductive dummy antenna resistor.

(c) Non-metallic screw driver. A bakelite screw driver with a short metal blade is very good.

(d) Audio output meter capable of handling 5 watts of audio power for either 500 or 5000-ohm loads.

(2) I-F Amplifier Alignment.

(a) Disconnect the grid lead of the type 954 mixer tube (V-3) and connect the signal generator to the grid of the mixer tube, using a small clip or flexible piece of wire to make the connection. Connect the ground wire of the generator to the receiver chassis.

CAUTION - Do not attempt to solder to the tube terminal as the heat of the soldering iron is certain to crack the glass envelope.

(b) Connect the output meter across the speaker terminals. Set the range of the output meter for its highest range to prevent overloading the meter accidentally.

(c) Let the receiver warm up for approximately half an hour then set the receiver controls as follows:

R.F. GAIN control at maximum gain.

A.F. GAIN control at maximum gain permitted by local noise level. Work in a shielded room if possible.

A.M./F.M. switch at A.M.

A.V.C. switch at OFF.

A.N.L. switch at OFF.

SEND/REC. switch at REC.

(d) Set the signal generator frequency at 16 megacycles and turn on the 400-cycle modulation.

(e) Adjust i-f transformers T-5, T-6, T-7, and T-8 for maximum response by tuning for maximum signal level at the output meter using just enough signal generator output to provide a good resonant swing on the output meter. The signal level at the generator should run not more than 70 microvolts for a 500 milliwatt audio output level. Repeat the alignment procedure until assured of accurate alignment. Refer to

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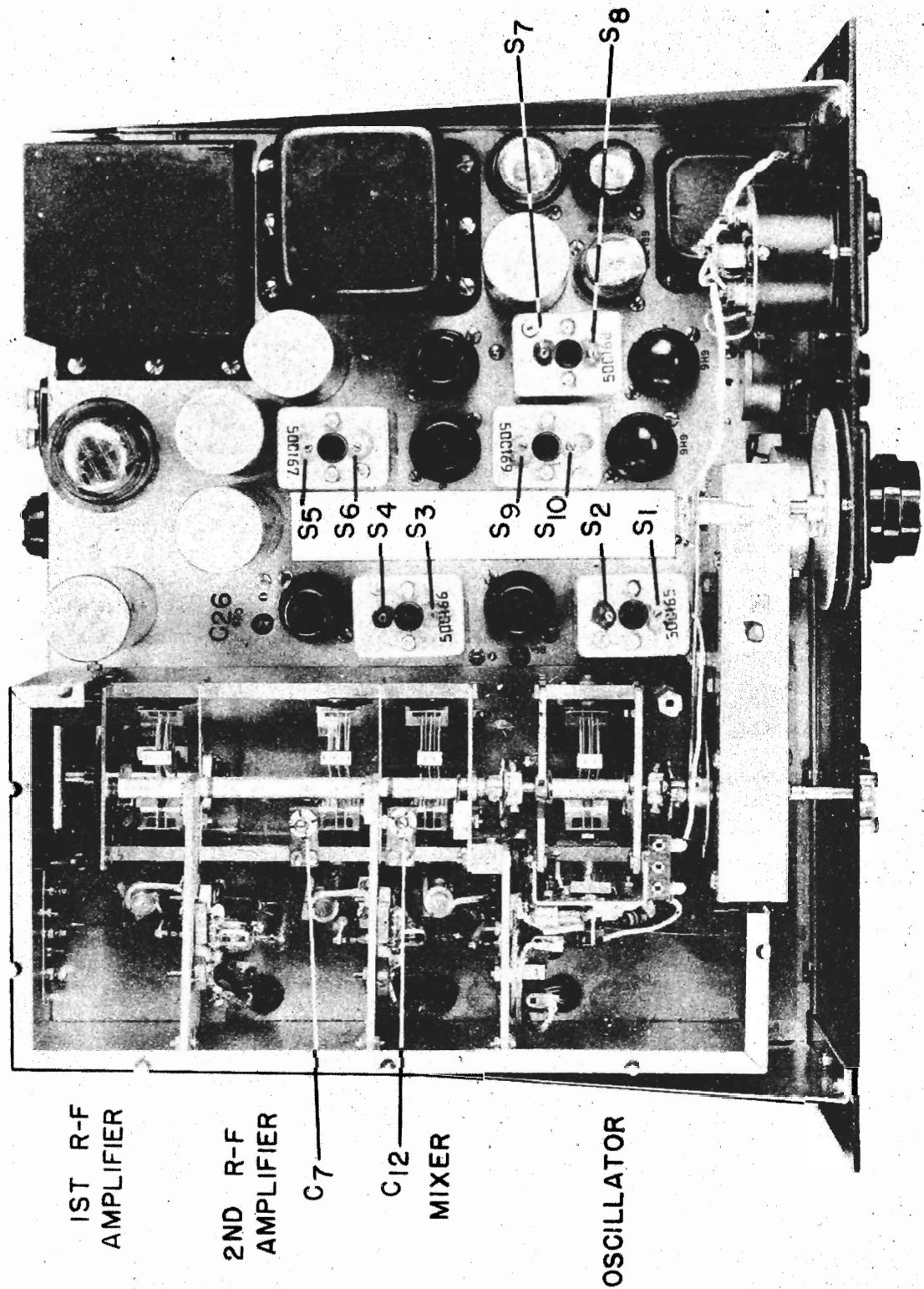


Figure 5-1. Radio Receiver Model S-37, top view showing alignment points.

figure 5-1 for the location of i-f transformer adjustment screws S_1 through S_8 inclusive on i-f transformers T-5, T-6, T-7, and T-8.

(f) Disconnect the filament lead of the 1st i-f amplifier tube (V-4) at pin #2 of the d-c power input socket (S0-1) on the rear apron of the chassis. Refer to Fig. 7-7. Allow the filament of tube V-4 about one minute to cool off before proceeding.

(g) Increase the output of the signal generator until a readable signal level is indicated by the output meter and adjust neutralizing capacitor C-18 for minimum output. While adjusting capacitor C-18, adjust slug adjustment S_3 on transformer T-6 for maximum output to compensate for detuning caused by adjusting C-18. Repeat the procedure until satisfied that the best possible settings have been obtained.

(h) Reconnect the filament lead of tube V-4 and disconnect the filament lead of the 2nd i-f amplifier tube V-5 at the d-c power input socket. Allow a minute for the tube to cool as before.

(i) Adjust neutralizing capacitor C-26 and slug adjustment S_5 on transformer T-7 for their optimum settings as for the 1st i-f amplifier stage. Reconnect the filament lead again before proceeding.

(j) Detune transformers T-6 (Slugs S_3 and S_4) and T-8 (Slugs S_7 and S_8) until a fairly high signal generator output is required to produce a readable output meter reading. First adjust transformers T-5 and T-7 for maximum output, then adjust transformer T-8 and finally transformer T-6. Do not readjust transformers T-5 and T-7 when adjusting T-8 and T-6. Reduce the signal generator output as required while bringing these last two i-f transformers into alignment.

(3) Discriminator Transformer Alignment. -

(a) Set the A.M./F.M. switch at F.M.

(b) Leave the signal generator set at 16 mc. with 400 cycle modulation.

(c) Adjust the secondary slug (S_{10}) of the discriminator transformer (T_9) for zero signal level at the output meter. Note that this adjustment is critical, therefore turn the screw slowly.

(d) Detune the signal generator from the 16 mc i-f frequency until a readable indication is obtained at the output meter and adjust the primary slug (S_9) for maximum output meter reading.

(e) Balance up the discriminator stage as follows:

1. Detune the signal generator to either side of the 16 mc resonant point and note the maximum output meter readings obtained. If they are equal, the discriminator stage is functioning properly, if not, proceed with the balancing adjustment that follows.

2. To balance up an unbalanced condition, tune the signal generator to the resonant point of the weaker peak and tune the primary slug (S_9) until the output rises about one-half the difference of the unbalanced readings obtained in step 1. Recheck for balance and repeat the balancing procedure if necessary.

NOTE - If a balance cannot be obtained by adjusting the primary slug (S_9), the discriminator's secondary slug (S_{10}) has been misadjusted slightly and will require a very slight readjustment in either direction. The direction of adjustment that will cause the off-tune peaks to assume the same values is the correct one. Note that the quality of the f-m signal will depend materially upon the degree of balance obtained, hence, a little care will be well repaid in performance.

(f) Disconnect the signal generator and reconnect the grid lead to the mixer tube, the alignment of the i-f amplifier stages is completed.

(4) R-F Amplifier Alignment. -

(a) Connect the signal generator to the "A₁" antenna terminal through a 50-ohm resistor and connect the ground wire of the signal generator to terminal "A₂". Disconnect the jumper wire between "A₂" and "GND" as the generator should not be grounded to the receiver's chassis for the following adjustments.

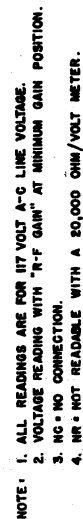


Figure 5-2. Radio Receiver Model S-37, voltage chart.

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(b) Set the receiver controls as for i-f amplifier alignment. Refer to paragraph 3. b. (2) (c) this section.

(c) Set the signal generator at 210 mc. and turn on 400 cycle modulation.

Note - if your signal generator will not reach 210 mc. use the harmonic of the generator signal.

(d) Set the receiver's TUNING dial at 210 mc. and set the ANTENNA control for maximum output, then adjust capacitors C-7 and C-12 for maximum output while "rocking" the TUNING dial control back and forth across the generator signal. Use just enough signal generator output to provide a readable resonance point at the output meter.

NOTE - Should it be necessary to adjust the frequency of the oscillator to make the receiver's dial reading fall on 210 mc exactly, loosen and shift the heavy wire primary winding (oscillator transformer T-4 primary) nearest to the front panel and the heavy wire coupling loop on the opposite side of the heavy tubing secondary winding. Take care that the coupling between the primary winding and the secondary is not reduced below that necessary to maintain adequate feed back for the oscillator over the entire band. Having obtained proper adjustment recement the winding in place with Amphenol "912" or an equivalent low loss cement. After adjusting the oscillator frequency realign capacitors C-7 and C-12 as described above.

(e) Set the signal generator at 130 mc, tune in the signal on the receiver and check to see that the receiver's main tuning dial reads 130 mc. If not, the secondary (heavy tubular winding) inductance of transformers T-1, T-2, T-3, and T-4 must be adjusted by loosening the clamps and set screws which hold them in place and sliding the transformers back and forth. Tighten all set screws after adjustment.

NOTE - If it is necessary to adjust the inductance of the windings at 130 mc. the adjustments in paragraph (d) must be repeated at 210 mc to bring the high frequency end of the range into alignment again.

(f) Repeat steps (d) and (e) until the receiver alignment and calibration are satisfactory then make the following check to see that the oscillator frequency falls below the signal frequency as it should. For example: Set the receiver dial at 165 mc., turn up the signal generator output to about 5000 times normal, and set the signal generator frequency at twice the i-f frequency lower than 165 mc. or 133 mc. An image signal should be heard. If not, tune the signal generator to twice the i-f frequency higher than the signal frequency or 197 mc. and look for the image there. If the image shows up at the 197 mc. the receiver's oscillator is operating above the signal frequency and must be readjusted so that it falls below the signal frequency. Due to the construction of this receiver it is considered impossible to adjust the oscillator frequency so that it will fall above the signal frequency, however, it is always well to check for the image after making any extensive alignment adjustments.

(g) When completely aligned the overall receiver sensitivity will usually run between 10 to 15 microvolts for 500 milliwatts audio output. If your receiver falls reasonably close to this sensitivity, consider your alignment adjustments satisfactory.

4. LOCATING FAULTS WITH A VOLT-OHM METER

a. Voltage Chart. - Refer to Fig. 5-2. for the tube socket terminal voltages. Voltages shown are those between the terminal and ground (chassis) unless otherwise specified. To identify the tube socket connections, refer to Fig. 7-6. The readings were taken with an RCA Volt Ohmyst Junior analyzer using 20,000 ohm per volt sensitivity. To prepare the receiver for measurement, disconnect the antenna, connect a jumper between the antenna terminals A₁, A₂, and GND., disconnect the speaker and replace with a 5000-ohm 10-watt resistor across the 5000-ohm output terminals or a 500-ohm 10-watt resistor across the 500-ohm terminals, and set the controls as follows:

POWER, A.V.C. and A.N.L. switches at ON.

SEND/REC. switch at REC.

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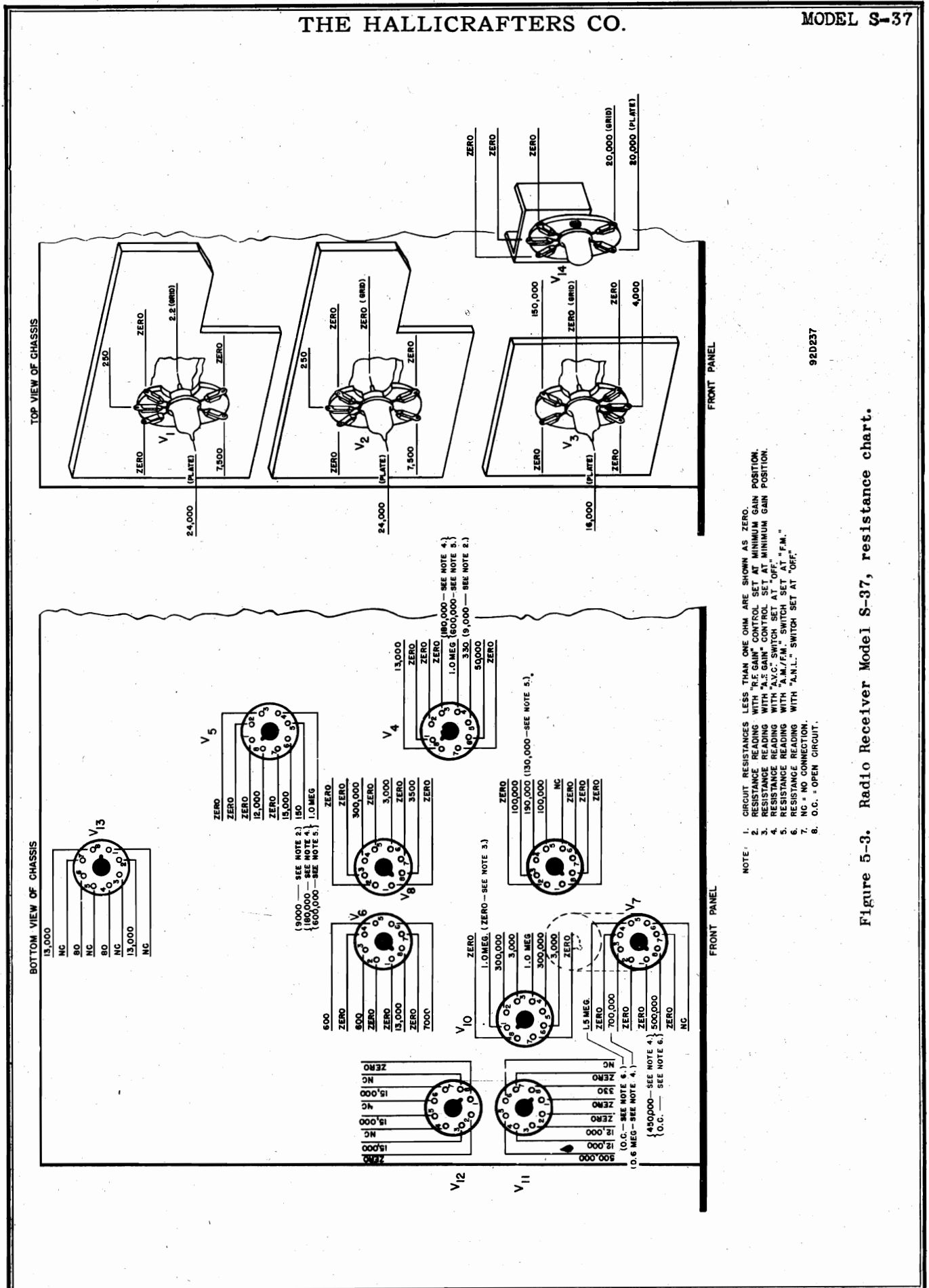


Figure 5-3. Radio Receiver Model S-37, resistance chart.

A.M./F.M. switch at A.M.

R.F. GAIN and A.F. GAIN controls at maximum gain position.

ANTENNA TUNING and TONE controls do not effect readings.

b. Resistance Chart. - Refer to Fig. 5-3. for the tube socket terminal to ground (chassis) resistance measurements. To identify tube socket connections, refer to Fig. 7-6. The readings were taken with an RCA Volt Ohmyst Junior analyzer. To prepare the receiver for measurement, disconnect the a-c line cord and set the controls as follows:

POWER, A.V.C. and A.N.L. switches at ON.

SEND/REC. switch at REC.

A.M./F.M. switch at A.M.

R.F. GAIN and A.F. GAIN controls at maximum gain position.

TONE control at maximum clock-wise position.

ANTENNA and TUNING controls do not effect readings.

CAUTION - The receiver's line cord, if operating from an a-c outlet, or the battery supply cord, if operating from a d-c supply, must be disconnected before making resistance measurements.

c. Checking Transformer and Inductor Windings With an Ohm-meter. -

NOTE - One terminal of each winding measured must be disconnected from the circuit to avoid measuring circuit resistances instead of winding resistance alone as indicated in the chart.

Circuit symbol	Name of part	Winding	Winding terminals	D-C resistance (ohms)
T-10	TRANSFORMER, audio.	Primary.	1 to 2	300
		5000-ohm secondary.	3 to 6	250
		500-ohm secondary.	3 to 5	22
T-11	TRANSFORMER, filament power.	115-volt primary.	\pm to 115 V.	12
		230-volt primary.	\pm to 230 V.	40
		6.3-volt secondary.	-	Less than one ohm.
		5.0-volt secondary.	-	Less than one ohm.
T-12	TRANSFORMER, plate power	115-volt primary.	\pm to 115 V.	7
		230-volt primary.	\pm to 230 V.	20
		$\frac{1}{2}$ secondary.	CT to 288 V.	75
		Secondary	288 V. to 288 V.	150
L-4	REACTOR, filter.	-	1 to 2	85
L-5	REACTOR, filter.	-	-	300

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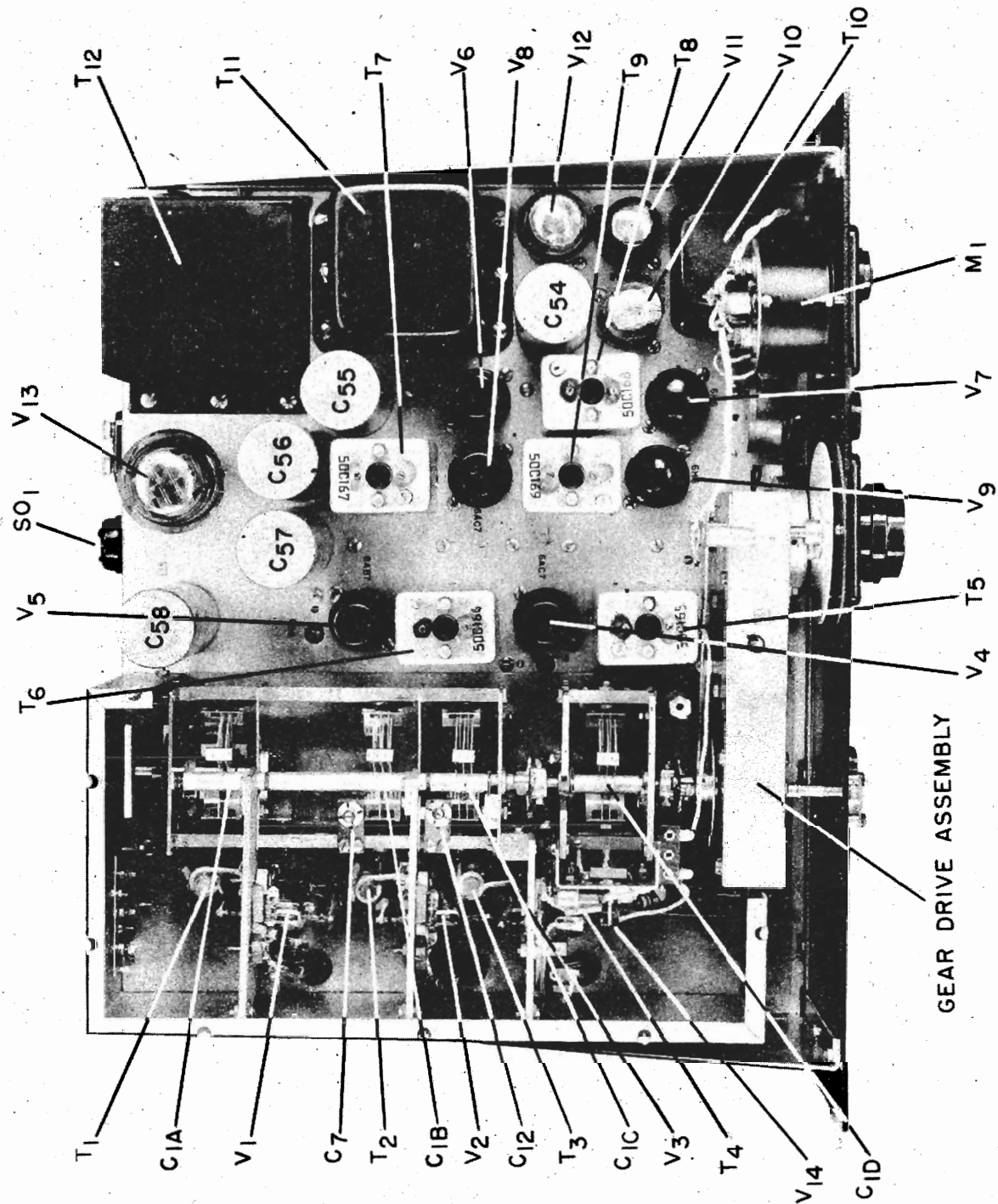


Figure 7-1. Radio Receiver Model S-37, top view.

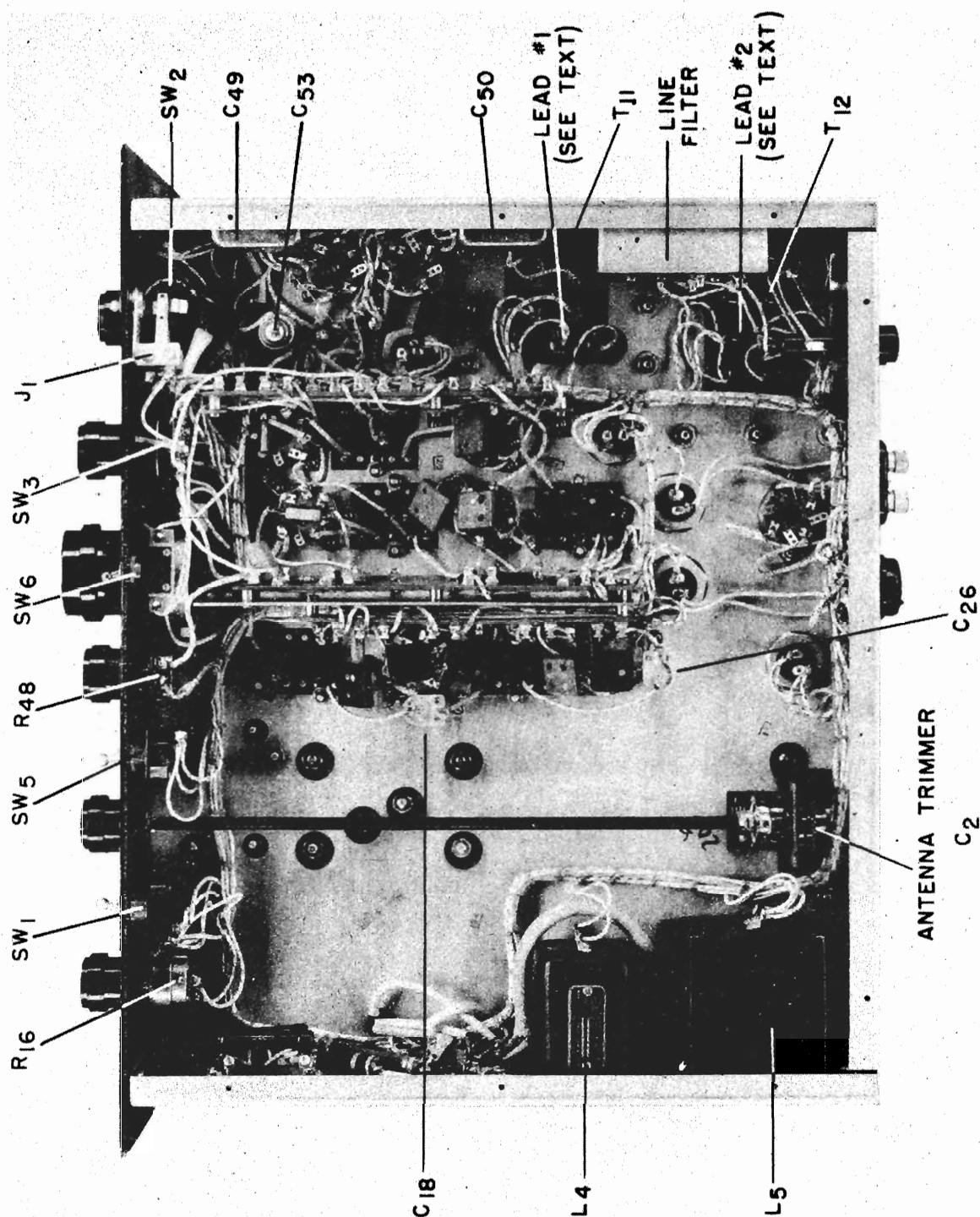


Figure 7-2. Radio Receiver Model S-37, bottom view.



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Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
C ₁₇	Capacitor, fixed; mica dielectric; 3900 mmf $\pm 10\%$; 500 vdc; case 53/64" x 53/64" x 11/32"; humidity resistant; two #18 AWG wire leads 1-1/8" lg; same as C ₁₄ .	ASA	CM5A592X
C ₁₈	Capacitor, variable; ceramic dielectric; 2-6 mmf.; solder lug terminals; same as C ₂₆ .	CRL type 820-A	44A079
C ₁₉	Capacitor, fixed; mica dielectric; 9600 mmf. $\pm 10\%$; 500 vdc; case 53/64" x 53/64" x 11/32"; humidity resistant; two #18 AWG wire leads 1-1/8" lg; same as C ₂₄ , C ₂₇ , C ₇₆ .	ASA	CM5A592X
C ₂₀	Capacitor, fixed; mica dielectric; 2200 mmf $\pm 20\%$; 500 vdc; case 53/64" x 53/64" x 9/32"; humidity resistant; two #18 AWG wire leads 1-1/8" lg.	ASA	CM5A592X
C ₂₁	Same as C ₁₄ .	-	-
C ₂₂	Same as C ₁₅ ; part of transformer T ₆ .	-	-
C ₂₃	Same as C ₁₅ ; part of transformer T ₆ .	-	-
C ₂₄	Same as C ₁₉ .	-	-
C ₂₅	Capacitor, fixed; mica dielectric; 3900 mmf $\pm 10\%$; 500 vdc; case 53/64" x 53/64" x 9/32"; humidity resistant; two #18 AWG wire leads 1-1/8" lg.	ASA	CM5A592X
C ₂₆	Same as C ₁₈ .	-	-
C ₂₇	Same as C ₁₈ .	-	-
C ₂₈	Same as C ₁₄ .	-	-
C ₂₉	Same as C ₁₅ ; part of transformer T ₇ .	-	-
C ₃₀	Same as C ₁₅ ; part of transformer T ₇ .	-	-
C ₃₁	Not used.	-	-
C ₃₂	Capacitor, fixed; mica dielectric; 2200 mmf $\pm 10\%$; 500 vdc; case 53/64" x 53/64" x 9/32"; humidity resistant; two #18 AWG wire leads 1-1/8" lg; same as C ₃₃ , C ₄₃ , C ₄₄ .	ASA	CM5A592X
C ₃₃	Same as C ₃₂ .	-	-
C ₃₄	Capacitor, fixed; mica dielectric; 6200 mmf $\pm 5\%$; 500 vdc; case 53/64" square x 11/32" thick; humidity resistant; two #18 AWG wire leads 1-1/8" lg.	ASA	CM5A592J
C ₃₅	Same as C ₁₅ ; part of transformer T ₈ .	-	-
C ₃₆	Same as C ₁₅ ; part of transformer T ₈ .	-	-
C ₃₇	Capacitor, fixed; mica dielectric; 47 mmf $\pm 10\%$; 500 vdc; case 51/64" x 51/64" x 9/32"; humidity resistant; two #20 AWG wire leads 1-1/8" lg; same as C ₃₈ , C ₄₆ .	ASA	CM5A470X
C ₃₈	Same as C ₃₇ .	-	-
C ₃₉	Capacitor, fixed; paper dielectric; 0.05 mfd $\pm 20\%$; 400 vdc; molded bakelite case 1-7/16" lg x 3/4" wd x 3/8" thk; two #20 AWG wire leads 1-3/4" lg.	WTC type 345	48AL503H
C ₄₀	Capacitor, fixed; ceramic dielectric; 25 mmf $\pm 10\%$; 500 vdc; T.C. 0.00075 mmf/mf/degree C; body 0.625" lg x 0.225" dia; two #22 AWG wire leads 1-3/4" lg; part of discriminator transformer T ₉ .	ER type K	47A103

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
C _{1A}	Capacitor, variable; air dielectric; 4 sections, section 1 (C _{1A}) approx. 6 mmf min to 26 mmf max; sections 2 & 3 (C _{1B} and C _{1C}) capacity approx. 6 mmf min to 34 mmf max; section 4 (C _{1D}) capacity approx. 6 mmf min. to 10.5 mmf max; 9-4" lg excluding shaft, shaft 3" lg x 0.376/0.373" diam. for sections 1, 2 and 3, shaft for section 4 is 21/32" lg x 3" diam; section 1 has 4 plates, sections 2 & 3 have 5 plates each, section 4 has 6 plates, common stator plates for sections 1 and 4; X2B bakelite insulation; spade lug mfg bolts not supplied with unit; each section has rotor shaft insulated from other sections; section 4 is separate rotor assembly bolted to main unit so that the plates mesh with section 1 stator plates and has its own drive shaft; assembly consisting of a 1 to 1 ratio brass and fibre gear drive assembly.	OM Special	48C007
C _{1D}	Capacitor, variable, single section, effective capacity 28 mmf., air dielectric, unit is ganged to C ₁ .	H Special	48B006
C ₂	Section 4 of Hallcrafters variable capacitor assembly 48C007; refer to description of C _{1A} , C _{1B} , C _{1C} for details.	-	-
C ₃	Capacitor, fixed; mica dielectric; 330 mmf. $\pm 20\%$; 500 vdc; case 51/64" lg x 15/32" wd x 7/32" thk; two #20 AWG wire leads 1-1/8" lg; humidity resistant; same as C ₄ , C ₅ , C ₆ , C ₉ , C ₁₁ , C ₁₃ , C ₅₆ , C ₆₁ , C ₆₂ , C ₆₃ , C ₇₀ , C ₇₂ .	ASA	CM5A531H
C ₄	Same as C ₃ .	-	-
C ₅	Same as C ₃ .	-	-
C ₆	Capacitor, fixed; ceramic dielectric; 5-66 mmf; 500 vdc; TC-0.00075 mmf/mf/°C; case 0.625" lg x 0.225" dia; two #22 AWG tinned copper or brass wire leads 1-3/4" lg; same as C ₁₀ .	CRL type 807004, NTC	47A005
C ₇	Capacitor, variable; polystyrene dielectric; 2 mmf; same as C ₁₂ .	H Special	44A081
C ₈	Same as C ₃ .	-	-
C ₉	Same as C ₃ .	-	-
C ₁₀	Same as C ₆ .	-	-
C ₁₁	Same as C ₃ .	-	-
C ₁₂	Same as C ₇ .	-	-
C ₁₃	Same as C ₃ .	-	-
C ₁₄	Capacitor, fixed; mica dielectric; 6200 mmf. $\pm 10\%$; 500 vdc; case 53/64" square x 11/32" thk; humidity resistant; two #18 AWG wire leads 1-1/8" lg; same as C ₂₁ , C ₂₈ .	ASA	CM5A592J
C ₁₅	Capacitor, fixed; ceramic dielectric; 80 mmf. $\pm 10\%$; 500 vdc; T.C. 0.00075 mmf/mf/degree C; body 7/16" lg x 7/32" diam; two #22 AWG wire leads 1-3/4" lg; part of transformer T ₅ .	ER type K	47A081
C ₁₆	Same as C ₁₅ ; part of transformer T ₅ .	-	-

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Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters Part No.
C ₆₆	Same as C ₆₅ .	-	-
C ₆₇	Same as C ₆₆ .	-	-
C ₆₈	Capacitor, fixed: silver mica dielectric; 150 mfd \pm 20%; 500 vdc; button type; 13/32" x 29/64" diam; 2 solder lug terminals; mtg hole tapped #3-48 x 11/64" d.	ER type 370-A	47A135
C ₆₉	Not used.	-	-
C ₇₀	Same as C ₆₉ .	-	-
C ₇₁	Capacitor, fixed: ceramic dielectric; 100 mfd \pm 5 mfd; 500 vdc; T.C. positive 0.0007 mfd/mf/degree C; body 11/16" lg x 7/32" diam; vacuum wax impregnated; two #20 AWG wire leads 1-3/4" lg; part of oscillator transformer T ₄ .	ER type N-750L	47A108
C ₇₂	Same as C ₆₅ .	-	-
C ₇₃	Same as C ₁₅ ; part of transformer T ₂ .	-	-
C ₇₄	Same as C ₁₇ .	-	-
C ₇₅	Not used.	-	-
C ₇₆	Same as C ₁₈ .	-	-
F ₁	Fuse, cartridge; 3 amp 250-volt; 3 AG; glass enclosed; ferrule caps; same as F ₂ .	IF type 1043	39A301
F ₂	Same as F ₁ .	-	-
J ₁	Jack, telephone; headphones; short; takes standard tip and sleeve; mounts by bushing 3/8"-32x3/8"; furnished with one brass hex nut and one brass nl pl 5/8" OD washer; solder lug terminals.	U type ST-827	38B011
L ₁	Coil, r-f; 15.5 ohm \pm 10%; distributed capacity 1 mfd \pm 20%; d-c resistance 4.10 ohm \pm 5%; "q" with 100 mfd capacity 65 \pm 15%; 70 turns #38 SCC wire on molded natural bakelite rod 15/16" lg x 5/32" diam; two wire leads 1-3/4" lg; Chinese red laquer coating.	SWI Special	53A008
L ₂	Coil, filter; 1 line; 48 ohm; 57 turns #22 SCE wire, universal winding; wound on glazed ceramic form 1" lg x 3/4" diam, tapped #6-32 x 7/16" d; winding is 1" lg x 1-1/16" diam; two extended leads with spaghetti covering; tape over spaghetti and leads to prevent leads breaking; same as L ₃ .	SWI Special	53A065
L ₃	Same as L ₂ .	-	-
L ₄	Coil, filter; input; 2 henries \pm 10%; rated d-c current 150 ma; d-c resistance 85 ohm \pm 10%; iron core; 1850 turns of #31 enameled copper wire; metal case 2-5/8" h x 2-3/16" wd x 2-11/16" lg; mtg flange has six mtg holes 3 on each side, of 3/16" diam, spaced 3/4" apart, on 2-3/8" mtg centers; two lug terminals on top of case, each terminal 3/16" diam, spaced 5/8" apart; coil is vacuum wax impregnated; voltage breakdown 2400 volts A.M.S. between coil and core or coil and case.	CTC type 7488	58B011
L ₅	Coil, filter; output; 12 henries; rated d-c current 90 ma; d-c resistance 288 ohm \pm 75%; test voltage 2400 volt r.m.s. between coil and core or coil and case; hermetically sealed in metal case 3-1/16" h x 2-3/8" wd x 2-3/4" lg; four #8-32 NC thread mtg studs on 1-3/4" x 1-3/4" mtg centers; hardware included; two lug terminals on top, spaced 23-32" apart.	CTC type 7845	58B012

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters Part No.
C ₄₁	Same as C ₁₅ ; part of discriminator transformer T ₃ .	-	-
C ₄₂	Same as C ₁₅ ; part of discriminator transformer T ₃ .	-	-
C ₄₃	Same as C ₃₂ .	-	-
C ₄₄	Same as C ₃₂ .	-	-
C ₄₅	Capacitor, fixed: mica dielectric; 470 mfd \pm 10%; 500 vdc; case 51/64" x 15/32" wd x 7/32" thk; humidity resistant; two #20 AWG wire leads 1-1/8" lg; same as C ₄₇ .	ASA	CM20A71K
C ₄₆	Same as C ₃₇ .	-	-
C ₄₇	Same as C ₄₅ .	-	-
C ₄₈	Capacitor, fixed: mica dielectric; 8000 mfd \pm 10%; 500 vdc; case 53/64" x 53/64" x 11/32"; humidity resistant; two #18 AWG wire leads 1-1/8" lg; same as C ₅₁ , C ₅₂ , C ₅₄ , C ₅₅ , C ₅₆ , C ₅₇ .	ASA	CM3A622K
C ₄₉	Capacitor, fixed: electrolytic; 20 mfd -20 \pm 80%; 100 vdc; bathtub metal case 1-3/4" lg x 1" wd x 13/16" h, excluding lugs; two mtg lugs with 2-1/8" mtg/c; two solder lug terminals; same as C ₅₀ .	IC type 100B20	45B033
C ₅₀	Same as C ₄₉ .	-	-
C ₅₁	Same as C ₄₉ .	-	-
C ₅₂	Same as C ₄₉ .	-	-
C ₅₃	Capacitor, fixed: paper dielectric; 0.005 mfd \pm 20%; 1000 vdc; round metal case 2-3/4" h x 11/16" diam; oil filled; one mtg hole 9/16" from center of unit on mtg base; mtg hole .178/.189" diam.; base is one terminal, solder lug on top is other terminal.	IC	46A007
C ₅₄	Capacitor, fixed: paper dielectric; 4 mfd \pm 10%; 500 vdc; tubular metal case 4-1/2" lg x 1-1/2" diam, over-all; mtg by bushing having 3/4"-16 NF-2 thd, nut and lock washer included; solder lug is one terminal, can is other terminal; same as C ₅₅ , C ₅₆ , C ₅₇ , C ₅₈ .	CD type TL0040	46A018
C ₅₅	Same as C ₅₄ .	-	-
C ₅₆	Same as C ₅₄ .	-	-
C ₅₇	Same as C ₅₄ .	-	-
C ₅₈	Same as C ₅₄ .	-	-
C ₅₉	Same as C ₅₄ .	-	-
C ₆₀	Capacitor, fixed: mica dielectric; 330 mfd \pm 10%; 500 vdc; case 51/64" lg x 15/32" wd x 7/32" thk; humidity resistant; two #20 AWG wire leads 1-1/8" lg.	ASA	CM20A331K
C ₆₁	Same as C ₄₅ .	-	-
C ₆₂	Same as C ₄₅ .	-	-
C ₆₃	Same as C ₄₅ .	-	-
C ₆₄	Same as C ₄₅ .	-	-
C ₆₅	Same as C ₄₅ .	-	-

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Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
L ₆	Coil, r-f: 4.2 ohm \pm 10%; distributed capacity 1 mmf \pm 20%; d-c resistance 0.25 ohm \pm 10%; "Q" with 100 mmf capacitor 100 \pm 20%; 48 turns #28 EBC copper wire on molded natural bakelite form 7/8" lg x 9/32" diam; Chinese blue lacquer coated; two copper wire leads 1-3/4" lg.	SVI Special	53A009
LM ₁	Lamp, incandescent; pilot; 6-8 volt, 0.15 amp; bayonet type base.	GE type 47	39A004
LM ₂	Same as LM ₁ .	-	-
PT ₁	Connector, male contact; octal; molded bakelite body, 1" lg x 1-3/4" diam overall; prongs are numbered from 1 to 8 on both sides; includes insulated jumper between 3 and 4 and one between 6 and 7.	AP type CP-8	35A003
M ₁	Meter, micro ammeter; range 100-0-40 microamperes; accuracy \pm 20% of full scale length 1.63" covered in 90° of pointer swing; approx resistance 1250 ohm d-c; damping factor 8 (full scale length); metal case 1-3/16" d x 2-3/4" diam; mtd by metal flange 3-3/4" diam having 3 mtg holes 1/8" diam spaced 120° apart on 1-3/16" radius; two stud terminals at rear 3/4" long x #10-32 thread; flange is part of case.	B Special	62A006
R ₁	Resistor, fixed: 2.2 ohm \pm 10%; 1/2 watt; composition; insulated; 7/16" lg x 0.218" diam; two #18 AWG leads 1-3/4" lg; part of transformer T ₁ .	ER type 504	23A016
R ₂	Resistor, fixed: 270 ohm \pm 10%; 1/2 watt; composition; humidity resistant; insulated; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-3/4" lg; same as R ₃ , R ₄₄ .	ASA	RC21AE271K
R ₃	Resistor, fixed: 1000 ohm \pm 20%; 1/2 watt; composition; humidity resistant; insulated; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-3/4" lg; same as R ₄ , R ₆ , R ₇ , R ₉ , R ₁₀ , R ₂₀ .	ASA	RC21AE100V
R ₄	Same as R ₃ .	-	-
R ₅	Same as R ₂ .	-	-
R ₆	Same as R ₃ .	-	-
R ₇	Same as R ₃ .	-	-
R ₈	Resistor, fixed: 12,000 ohm \pm 10%; 2 watt; composition; insulated; humidity resistant; 1.76" lg x 0.342" diam; two #18 AWG wire leads 1-1/2" lg.	ASA	RC41AE120K
R ₉	Same as R ₃ .	-	-
R ₁₀	Same as R ₃ .	-	-
R ₁₁	Resistor, fixed: 33 ohm \pm 10%; 1/2 watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-3/4" lg; same as R ₂₁ , R ₂₅ , R ₃₉ , R ₆₄ .	ASA	RC21AE330K
R ₁₂	Resistor, fixed: 100,000 ohm \pm 10%; 1/2 watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-3/4" lg; part of transformer T ₅ . Same as R ₁₉ , R ₄₅ , R ₄₆ .	ASA	RC20AE104K
R ₁₃	Resistor, fixed: 100,000 ohm \pm 10%; 1/2 watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-3/4" lg; same as R ₁₆ , R ₃₃ .	ASA	RC21AE104K
R ₁₄	Resistor, fixed: 330 ohm \pm 10%; 1/2 watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-3/4" lg; same as R ₂₄ , R ₃₀ , R ₆₀ .	ASA	RC21AE331K
R ₁₅	Same as R ₁₃ .	-	-
R ₁₆	Resistor, variable: 10,000 ohm \pm 20%; carbon; #8 reversed taper; shaft 1" long x 3/4" diam; 3 solder lug terminals; center lug is variable contact; includes switch SW ₃ .	CT type 135	26C008
R ₁₇	Resistor, fixed: 35,000 ohm \pm 10%; 1/2 watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-3/4" lg.	ASA	RC21AE350K
R ₁₈	Resistor, variable: 330 ohm \pm 20%; 1/2 watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-3/4" lg.	ASA	RC21AE331M
R ₁₉	Same as R ₁₂ ; part of transformer T ₆ .	-	-
R ₂₀	Resistor, fixed: 100,000 ohm \pm 20%; 1/2 watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-3/4" lg; same as R ₃₇ , R ₄₅ , R ₄₆ .	ASA	RC21AE104M
R ₂₁	Same as R ₁₁ .	-	-
R ₂₂	Resistor, fixed: 150 ohm \pm 10%; 1/2 watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-3/4" lg.	ASA	RC21AE151K
R ₂₃	Same as R ₃ .	-	-
R ₂₄	Same as R ₁₄ .	-	-
R ₂₅	Same as R ₁₁ .	-	-
R ₂₆	Not used.	-	-
R ₂₇	Resistor, fixed: 560 ohm \pm 10%; 1/2 watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-3/4" lg.	ASA	RC21AE561K
R ₂₈	Resistor, fixed: 7500 ohm \pm 10%; 10 watt; wire wound; vitreous baked enameled coated; 1-3/4" lg x 3/8" max diam; two #18 AWG wire leads 1-3/8" lg.	U type OC	24B0752E
R ₂₉	Same as R ₃ .	-	-
R ₃₀	Resistor, fixed: 1000 ohm \pm 10%; 1/2 watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-3/4" lg.	ASA	RC21AE102K
R ₃₁	Resistor, fixed: 47,000 ohm \pm 10%; 1/2 watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-3/4" lg; same as R ₃₈ .	ASA	RC21AE470K
R ₃₂	Resistor, fixed: 1 megohm \pm 20%; 1/2 watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-3/4" lg.	ASA	RC21AE106M
R ₃₃	Same as R ₁₃ .	-	-

THE HALLICRAFTERS CO.

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Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters Part No.
R ₅₅	Resistor, variable: 1500 ohm \pm 20%; wire wound; st line taper; shaft 3/8" long \times 1/16" \times 1/16"; 3 solder lug terminals with variable contact located in the center and fixed contacts 1-7/16" apart; no tape.	CT type 125	25C060
R ₅₆	Resistor, fixed: 3,200 ohm \pm 10%; 10 watt; wire wound; vitreous enamel coated; 1-3/4" lg \times 3/8" max diam; two #18 AWG wire leads 1-3/8" long.	U type CC	24B5322E
R ₅₇	Resistor, fixed: 22,000 ohm \pm 20%; 1/2 watt; composition; insulated; humidity resistant; 0.655" lg \times 0.249" diam; two #21 AWG wire leads 1-3/4" lg.	ASA	RC21AE220M
R ₅₈	Resistor, fixed: 3900 ohm \pm 10%; 1/2 watt; composition; insulated; humidity resistant; 0.655" lg \times 0.249" diam; two #21 AWG wire leads 1-3/4" lg.	ASA	RC21AE392K
R ₅₉	Resistor, fixed: 5,600 ohm \pm 10%; 1/2 watt; composition; insulated; humidity resistant; 0.655" lg \times 0.249" diam; two #21 AWG wire leads 1-3/4" lg.	ASA	RC21AE562K
R ₆₀	Same as R ₁₄ .	-	-
R ₆₁	Resistor, fixed: 150,000 ohm \pm 20%; 1/2 watt; composition; insulated; humidity resistant; 0.655" lg \times 0.249" diam; two #21 AWG wire leads 1-3/4" lg.	ASA	RC21AE154M
R ₆₂	Resistor, fixed: 8 ohm \pm 10%; 1/2 watt; composition; insulated; humidity resistant; 7/16" lg \times 0.215" diam; two #21 AWG wire leads.	ER type 504	23A019
R ₆₃	Resistor, fixed: 27,000 ohm \pm 10%; 1/2 watt; composition; insulated; humidity resistant; 0.468" lg \times 0.249" diam; two #21 AWG leads 1-3/4" lg. Part of transformer T ₉ .	ASA	RC20AE273K
R ₆₄	Same as R ₁₁ .	-	-
S ₀₁	Connector, female contact: octal; high dielectric mica filled bakelite body, 1-7/64" diam \times 31/64" thick; silver plated phosphor bronze solder lugs; molded on steel mtg plate 1-9/32" wd \times 0.081" thk having 2 mtg holes of 5/32" diam \times 1-3/8" mtg centers; pins are numbered on back of socket clockwise from locating pin.	AP type MIPMTN	64200
S ₀₂	Connector, female contact: two terminal; bakelite body, 11/16" wd \times 3/8" h \times 23/32" d + thickness of mtg plate; mounted by cad plated steel plate having 2 mtg holes with 1-1/8" mtg centers; 2 solder lug terminals 5/16" lg \times 3/4" wd, rated 10 amp at 250 volts, 15 amp at 125 volts.	AL type 4002-T	10A015
S ₀₃	Connector, male contact: recessed; two brass prongs; screw type terminals; 1-3/4" \times 1-5/8" \times 1-3/4" overall; molded bakelite body recessed in metal cup 1-3/8" diam with flange type mtg having 1-3/4" mtg centers, mtg holes 0.144" diam.	AP type 60M-10	10A047
SW ₁	Switch, toggle; SPSST; power; rated 3 amp at 250-volt; black enamel steel case 13/16" h \times 15/32" d \times 3/4" wd; 2 solder lug terminals; mounts by brass bushing 15/32" - 32 to fit a 3/8" hole; mechanism is brass; lugs separated by fibre piece; same as SW ₂ .	HR type 20094	60A116
SW ₂	Same as SW ₁ .	-	-

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters Part No.
R ₃₄	Resistor, fixed: 270,000 ohm \pm 10%; 1/2 watt; composition; insulated; humidity resistant; 0.655" lg \times 0.249" diam; two #21 AWG wire leads 1-3/4" lg; same as R ₃₅ , R ₄₁ , R ₅₀ .	ASA	RC21AE274K
R ₃₅	Same as R ₃₄ .	-	-
R ₃₆	Resistor, fixed: 470,000 ohm \pm 20%; 1/2 watt; composition; insulated; humidity resistant; 0.655" lg \times 0.249" diam; two #21 AWG wire leads 1-3/4" lg.	ASA	RC21AE474M
R ₃₇	Same as R ₃₀ .	-	-
R ₃₈	Same as R ₃₁ .	-	-
R ₃₉	Same as R ₁₁ .	-	-
R ₄₀	Resistor, fixed: 3,900 ohm \pm 10%; 2 watt; composition; insulated; humidity resistant; 1.78" lg \times 0.242" diam; two #19 AWG wire leads 1-3/4" lg.	ASA	RC41AE392K
R ₄₁	Same as R ₃₄ .	-	-
R ₄₂	Resistor, fixed: 3300 ohm \pm 10%; 1 watt; composition; insulated; humidity resistant; 1.28" lg \times 0.310" diam; two #20 AWG wire leads 1-3/4" lg.	ASA	RC31AE332K
R ₄₃	Resistor, fixed: 330,000 ohm \pm 10%; 1/2 watt; composition; insulated; humidity resistant; 0.655" lg \times 0.249" diam; two #21 AWG wire leads.	ASA	RC21AE334K
R ₄₄	Same as R ₁₂ .	-	-
R ₄₅	Same as R ₁₂₁ , part of transformer T ₉ .	-	-
R ₄₆	Same as R ₁₂ , part of transformer T ₉ .	-	-
R ₄₇	Resistor, fixed: 220,000 ohm \pm 20%; 1/2 watt; composition; insulated; humidity resistant; 0.655" lg \times 0.249" diam; two #21 AWG wire leads 1-3/4" lg.	ASA	RC21AE224V
R ₄₈	Resistor, variable: 1 megohm \pm 20%; carbon; #6 taper; shaft 1" long \times 1/2" diam; 3 solder lug terminals with variable contact located in the center and fixed contacts 1-7/16" apart; no tape.	CHL type 1-010	25C059
R ₄₉	Resistor, fixed: 3300 ohm \pm 10%; 1/2 watt; composition; insulated; humidity resistant; 0.655" lg \times 0.249" diam; two #21 AWG wire leads 1-3/4" long.	ASA	RC21AE332K
R ₅₀	Same as R ₃₄ .	-	-
R ₅₁	Resistor, fixed: 470,000 ohm \pm 10%; 1/2 watt; composition; insulated; humidity resistant; 0.655" lg \times 0.249" diam; two #21 AWG wire leads 1-3/4" lg.	ASA	RC21AE474K
R ₅₂	Resistor, variable: 500,000 ohm \pm 20%; carbon; #6 taper; shaft 1" lg \times 1/2" diam; 3 solder lug terminals with variable contact between the outer lug terminals; terminals 1-7/16" apart; no tape.	CT type 31	25C065
R ₅₃	Same as R ₁₄ .	-	-
R ₅₄	Resistor, fixed: 4700 ohm \pm 20%; 1 watt; composition; insulated; humidity resistant; 1.28" lg \times 0.310" diam; two #20 AWG wire leads 1-3/4" lg.	ASA	RC31AE472M

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THE HALLICRAFTERS CO.

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
T ₄	wd x 3/4" h x 5/32" thick mounted on coil form by a 1/2" nickel plated brass screw; grid lead is insulated by 3 amphenol #912* beads #73-1. Transformer, T-1: pri, 1-3 turns of #10 tinned copper wire; sec, 1-3 turns of silver plated copper tubing 1/8" O.D. x 1/16" I.D.; sec winding spaced 1/32"; sec leads are 1-3/4" and 1-3/32" lg respectively; pri leads are 1-3/4" and 1-3/32" lg respectively and extending from the coil at a 90 degree angle; capacitor C ₇₁ is soldered 1 turn from longest lead of sec; coils are wound on polystyrene from 1-1/4" lg x 3/8" diam; pri is slightly sealed to coil form for shipping, seal may easily be broken for adjustment.	EW Special	51A353
T ₅	Transformer, T-1: 10 megacycles; input stage; shielded; shield can 1-7/8" lg x 1-7/16" wd x 4" h; powdered iron core; tuned primary and secondary; adjustable from core tuning; spade lug mtg on 1-7/8" x 1-7/16" mtg centers; 8 solder lug terminals at base; includes capacitors C ₁₅ and C ₁₆ and resistor R ₁₂ .	EW Special	50C165
T ₆	Transformer, T-1: 10 megacycles; interstage; shielded; shield can 1-7/8" lg x 1-7/16" wd x 4" h; powdered iron core; tuned primary and secondary; adjustable from core tuning; spade lug mtg on 1-7/8" x 1-7/16" mtg centers; 8 solder lug terminals at base; includes capacitors C ₂₃ and C ₂₅ , and resistor R ₁₉ .	EW Special	50C166
T ₇	Transformer, T-1: 16 megacycles; interstage; shielded; shield can 1-7/8" lg x 1-7/16" wd x 4" h; powdered iron core; tuned primary and secondary; adjustable from core tuning; spade lug mtg on 1-7/8" x 1-7/16" mtg centers; 8 solder lug terminals at base; includes capacitors C ₂₉ , C ₃₀ , and C ₃₃ .	EW Special	50C167
T ₈	Transformer, T-1: 16 megacycles; diode; shielded; shield can 1-7/8" lg x 1-7/16" wd x 4" h; powdered iron core; tuned primary and secondary; adjustable from core tuning; spade lug mtg on 1-7/8" x 1-7/16" mtg centers; 8 solder lug terminals at base; includes capacitors C ₃₅ and C ₃₆ .	EW Special	50C168
T ₉	Transformer, T-1: 16 megacycles; discriminator; shielded; shield can 1-7/8" lg x 1-7/16" wd x 4" h; powdered iron core; tuned primary and secondary; adjustable from core tuning; spade lug mtg on 1-7/8" x 1-7/16" mtg centers; 8 solder lug terminals at base; includes capacitors C ₄₀ , C ₄₁ and C ₄₂ , and resistors R ₄₅ , R ₄₆ and R ₅₃ .	EW Special	50C169
T ₁₀	Transformer, T-1: audio output; two windings; primary to match output of tube V ₁₁ (6V6GT), secondary to match 5000 ohm load; tapped to match 500 ohm load; enclosed in metal case.	H Special	50B012
T ₁₁	Transformer, power; filament; primary for 230 volts, 50 cycles with tap for 115-volts; #1 secondary 3 amp 5 volts; #2 secondary 4 amp 6.3 volts; coil and core potted and sealed in metal case 3-15/16" x 3-1/4" x 4" overall, 2 mg flanges each having 3 mg holes 7/32" diam spaced 1-1/8" apart, 2 sets of mg holes have 3-3/4" x 2-1/2" mtg centers.	H Special	52A044

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallcrafters' Part No.
S ₃	Switch, toggle; SMT; mounts on back of R.F. GAIN control and closes when the R.F. GAIN control is turned all the way to the right (clockwise); part of R.F. GAIN control.	OM type OH	60A177
S _{4A} S _{4B} S _{4C} S _{4D}	Switch, rotary; single section; 2 positions; all metal parts silver plated brass except for stainless steel index spring and ball; vacuum was impregnated phenolic wafer; non shorting teeth of contacts 5 and 6; frame 5/16" lg; mts by 3/8-32 bushing 3/8" lg, shaft 1" lg x 3/8" diam.	EW Special	51A350
S ₅ S ₆	Same as S ₄ . Switch, toggle; DMT; rated 1 amp at 250-volts, 3 amp at 125-volts; metal case, 1-9/16" x 19/32" overall diam; includes fibre separators in assembly; 4 brass lug terminals; mts by brass bushing 15/32-32 x 13/32".	EW Special	51A351
T ₁	Transformer, T-1: sec, 2 turns of 1/8" O.D. x 1/16" I.D. copper tubing; silver plated; pri, 1-3 turns of #28 tinned & single braided celanese wire strung thru hollow sec; grid lead, stranded voice coil wire 3/41 lg; spacing between sec turns not less than 1/32"; coil wound on polystyrene form 1-13/16" lg x 3/8" diam; includes resistor R ₁ , mounted thru center of form 3/8" from top end; one lead of resistor soldered to sec about 1-3/4" turns from winding start; the other lead is cut short and the grid lead with acorn tube clip is attached; the start end of the sec extends 27/32" from the center of the coil form and is flattened 3/16" from the end; the finish end of the secondary extends 13/16" from the center of the coil form; the primary terminal are two solder lug terminals which are mounted on a ceramic terminal 5/8" x 3/4" h x 5/32" thick which is mid near the bottom of the coil form by a 3" nickel plated brass screw; start and finish leads of sec extend from coil at a 90 degree angle.	EW Special	51A352
T ₂	Transformer, T-1: pri, 2-3 turns of #22 enameled single silk covered wire; spaced one wire diam; sec, 2 turns of silver plated copper tubing 1/8" O.D. x 1/16" I.D.; grid lead is voice coil wire 1-3/4" lg with acorn tube clip and soldered on sec 2 turns from winding start; spacing between sec turns not less than 1/32"; the start end of the sec extends 3/4" from center of coil form and the sec extends 3/16" from end; the finish end extends 15/16" from center of coil form; coils are wound on polystyrene from 1-7/16" lg x 3/8" diam at one end and 5/16" diam at other end; secondary leads terminate as two solder lug terminals which are mid on a ceramic terminal 5/8" x 3/4" h x 5/32" thick which mounts to coil form by a 3" nickel plated brass screw; grid lead insulated by 2 amphenol #912* beads #73-1; start and finish leads of sec extend from coil at a 90 degree angle.	EW Special	51A353
T ₃	Transformer, T-1: pri, 3-3/4" turns of #22 enameled single silk covered wire spaced not less than 1/32" between turns; sec, 1-3 turns of silver plated copper tubing, 1/8" O.D. x 1/16" I.D.; grid lead is voice coil wire 1-3/4" lg with acorn tube clip at one end, other end soldered to sec 1 turn from start end; start end of sec extends 1-1/32" from center of coil and is flattened 3/16" from end; finish end of sec extends 13/16" from center of coil; start and finish end of coil extend at a 90 degree angle; pri leads terminate at two solder lug terminals which are mounted on a ceramic terminal 5/8" x 3/4" h x 5/32" thick which mounts to coil form by a 3" nickel plated brass screw; grid lead insulated by 2 amphenol #912* beads #73-1; start and finish leads of sec extend from coil at a 90 degree angle.	EW Special	51A354

THE HALLICRAFTERS CO.

MODEL S-37

SUPPLEMENTARY DATA

AUDIO POWER OUTPUT.

Speaker operation - 2 watts with less than 5% distortion
Headset operation - High impedance.

SENSITIVITY.

At 130 mc. - 15 microvolts. (For 500 milliwatt audio output.)
At 200 mc. - 7 microvolts. (For 500 milliwatt audio output.)

SIGNAL TO NOISE RATIO.

Not less than 5 to 1 when measured with a 3.5 microvolt, 400-cycle 30% modulated signal.

AUDIO FIDELITY.

Audio response is flat within ± 4 db. from 100 to 10,000 cycles per second.

IMAGE RATIO.

Not less than 60 db. between 130 mc. and 210 mc.

SELECTIVITY.

I-F selectivity measured at the grid of the mixer tube is not less than 140 kc. or more than 180 kc. at 6 db down from resonance. The receiver will be more selective when measured from the antenna terminals.

INDEX TO PARTS MANUFACTURERS

Symbol	Manufacturer	Symbol	Manufacturer
AL	Alden Manufacturing Co. Brookton, Mass.	IC	Industrial Condenser Corp. Chicago, Illinois
AP	American Phenolic Corp. Chicago, Illinois	IRC	International Resistance Co. Philadelphia, Pennsylvania
CD	Cornell-Dubilier Corp. South Plainfield, N.J.	IF	Littlefuse Inc. Chicago, Illinois
CRL	Centralab Milwaukee, Wis.	0	Ohmite Manufacturing Co. Chicago, Illinois
CT	Chicago Telephone Supply Elkhart, Indiana	OM	Oak Manufacturing Co. Chicago, Illinois
ER	Erie Resistor Co. Erie, Pennsylvania	RCA	RCA Mfg. Co. Chicago, Illinois
GE	General Electric Co. Schenectady, N.Y.	SI	F. W. Sickles Co. Springfield, Mass.
H	The Hallcrafters Co. Chicago, Illinois	U	Utah Products Co. Chicago, Illinois
HH	Hart & Hegeman Hartford, Conn.		

Ref. Symbol	Name of Part and Description	Mfr. Code and Type No.	Hallcrafters' Part No.
T ₁₂	Transformer, power; primary 230 volts, 50 cycles with tap for 115 volts; secondary 280 volts each side of center tap, 150 ma using 5U4G full wave rectifier and 10 mfd filter capacity; coil and core potted and sealed in metal case, 4-3/8" h x 3-21/32" wd x 3-21/32" d; 2 mtg flanges each having 3 mtg holes 7/32" diam spaced 1-3/8" apart, mtg centers 3-7/8" x 2-3/4".	H Special	52A043
TS ₁	Board, terminal: mounts three brass, cadmium plated binding posts and nuts, and has two brass cadmium plated mtg inserts; base of black BM120 or 262 high impact bakelite; base 2-3/8" lg x 7/8" wd x 3/16" thk; mtg inserts centered on 3/4" x 1/2" mtg centers, have 0.144" clearance ID.	H Special	11B163
TS ₂	Board, terminal: mounts two brass, cadmium plated binding posts and nuts, and has two brass cadmium plated mtg inserts; base of black BM120 or 262 high impact bakelite; base 1-5/8" lg x 7/8" wd x 3/16" thk; mtg inserts centered on 1/2" mtg centers have 0.144" clearance ID, same as TS ₃ .	H Special	11B162
TS ₃	Same as TS ₂ .	-	-
V ₁	Tube, detector amplifier pentode (acorn type); same as V ₂ , V ₃ .	RCA type 954	90X954
V ₂	Same as V ₁ .	-	-
V ₃	Same as V ₁ .	-	-
V ₄	Tube, television amplifier pentode, same as V ₅ .	RCA type 6AC7	90X6AC7
V ₅	Tube, television amplifier pentode.	RCA type 6AB7	90X6AB7
V ₆	Tube, triple-grid super-control amplifier.	RCA type 6SK7	90X6SK7
V ₇	Tube, twin diode; same as V ₈ .	RCA type 6H6	90X6H6
V ₈	Same as V ₄ .	-	-
V ₉	Same as V ₇ .	-	-
V ₁₀	Tube, twin-triode amplifier.	RCA type 6SL7GT	90X6SL7GT
V ₁₁	Tube, beam power amplifier.	RCA type 6V6 GT/G	90X6V6GT/G
V ₁₂	Tube, voltage regulator (Glow discharge type).	RCA type 003/VR-150	90XVR150
V ₁₃	Tube, full-wave high-vacuum rectifier.	RCA type 5U4G	90X5U4G
V ₁₄	Tube, detector, amplifier, oscillator (acorn type).	RCA type 955	90X955

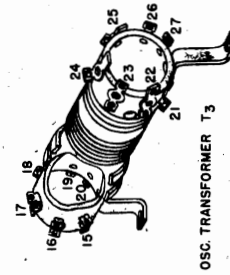
MODEL Skyrider 5-10
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THE HALLICRAFTERS CO.

NO.	OHMS	WATTAGE	PARTS NO.	NO.	CAPACITY	TYPE	VOLTAGE	PARTS NO.
R1	160	1/3	22-011	C8	.002 mfd.	mica		40-013
2	100,000	1/3	20-093	9	.05 "		200	41-004
3	1,000	1/3	20-033	10	.05 "		400	41-005
4	600	1/3	22-125	11	Tuning Condenser in I.F. Transformer			
5	30,000	1	22-075	12	"	"		
6	2,500	1/3	22-044	13	.01 mfd.		400	41-001
7	100,000	1/3	20-093	14	.01 "		200	41-000
8	500	1/3	22-026	15	.05 "		400	41-005
9	10,000	R.F. Gain Control	25-029	16	.01 "		400	41-001
10	2,500	1/3	22-044	17	Tuning Condenser in I.F. Transformer			
11	100,000	1/3	20-093	18	"	"		
12	500	1/3	24-040	19	.01 mfd.		400	41-001
13	50,000	1/3	20-084	20	.25 "		400	
14	50,000	1/2	22-082	21	.01 "		200	41-000
15	1,000	1/3	20-033	22	.01 "		400	41-001
16	20,000	1/3	22-071	23	.00025 "	mica		40-024
17	1,000,000	1/3	20-018	24	Pad			
18	500,000	Tone Control	25-018	25	.00025 "	air		48-021
19	100,000	1/3	20-093	26	.01 "		400	41-001
20	100,000	1/3	20-093	27	Tuning Condenser in I.F. Transformer			
21	250,000	1/3	20-099	28	"	"		
22	300	1/3	20-021	29	.02 mfd.		400	41-002
23	500,000	A.F. Gain Control	25-031	30	.0001 "	mica		40-003
24	25,000	1	20-073	31	.02 "		400	41-002
25	20,000	1	20-070	32	.0001 "	mica		40-003
26	150	1/3	22-011	33	.05 "		200	41-004
27	100,000	1/3	20-093	34	.1 "		200	41-006
28	500	1/3	24-040	35	.0001 "	mica		40-003
29	500,000	1/3	22-101	36	.01 "		400	41-001
30	10,000	1	20-061	37	.01 "		600	45-002
31	50,000	1/3	20-084	38	.01 "		600	45-002
32	5,000	2		39	20. "		25	42-025
				40	.05 "		400	41-005
				41	.002 "	mica		40-013
				42	.0001 "	"		40-003
				43	.400 mmfd.	Pad		44-037
				44	10. "		450	
				45	10. "		450	42-024
				46	10. "		450	
				47	.01 "		600	45-002
				51	A.V.C. - B.F.O. On-Off Switch			
				52	Automatic Noise Limiter and I.F. Expander Switch			
				53	A.C. On-Off Switch on Tone Control			
				54	Stand By SPST			
				55	Meter Switch on R.F. Gain Control			

CONDENSER PARTS LIST - SKYRIDER 5-10 Model S21

NO.	CAPACITY	TYPE	VOLTAGE	PARTS NO.
C1	80 mmfd per section	main		
2		tuning		48-033
3		gang		
4	.005 mfd.	mica		40-013
5	.002 "	"	400	41-001
6	.01 "	"	600	45-002
7	.01 "	"		



POWER SUPPLY DATA: 105 to 125 volts AC/DC line voltage. Power drain is 30 watts.

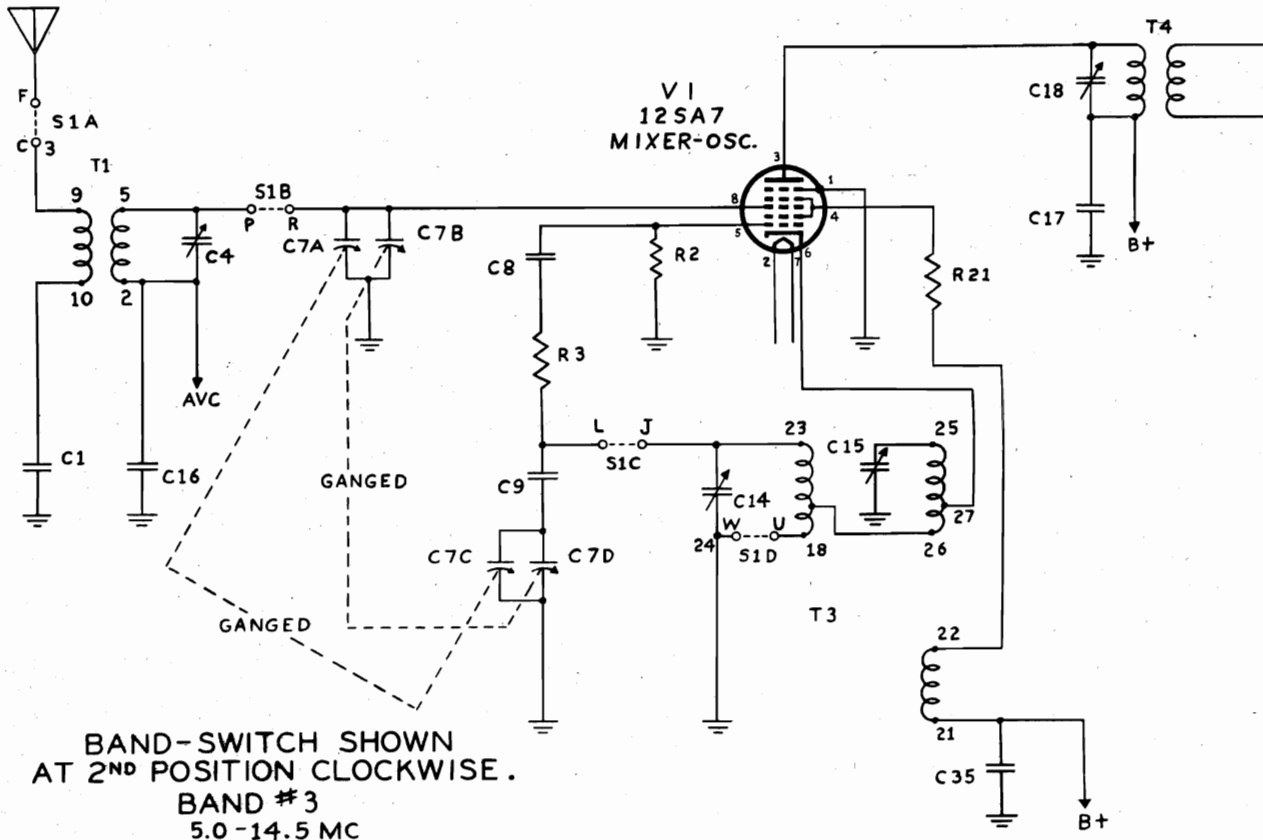
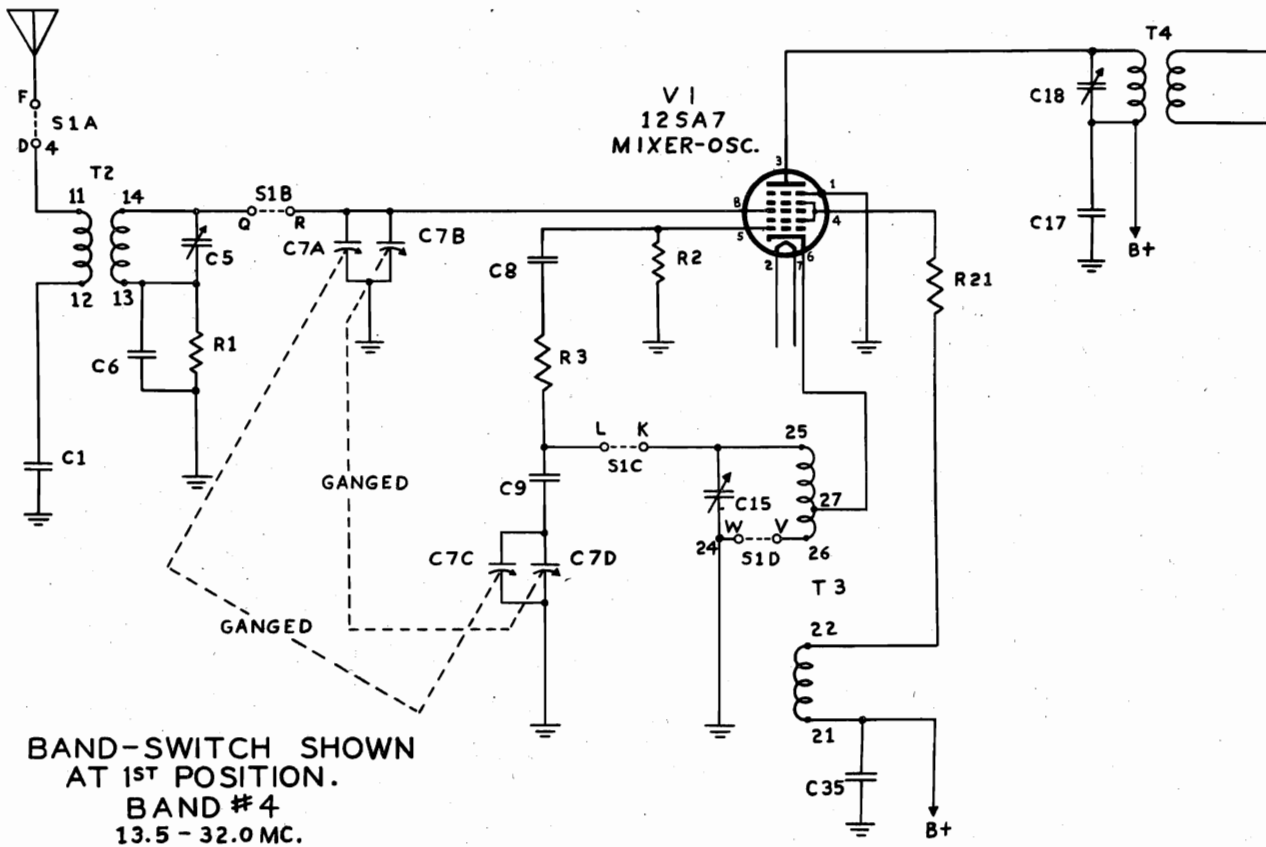
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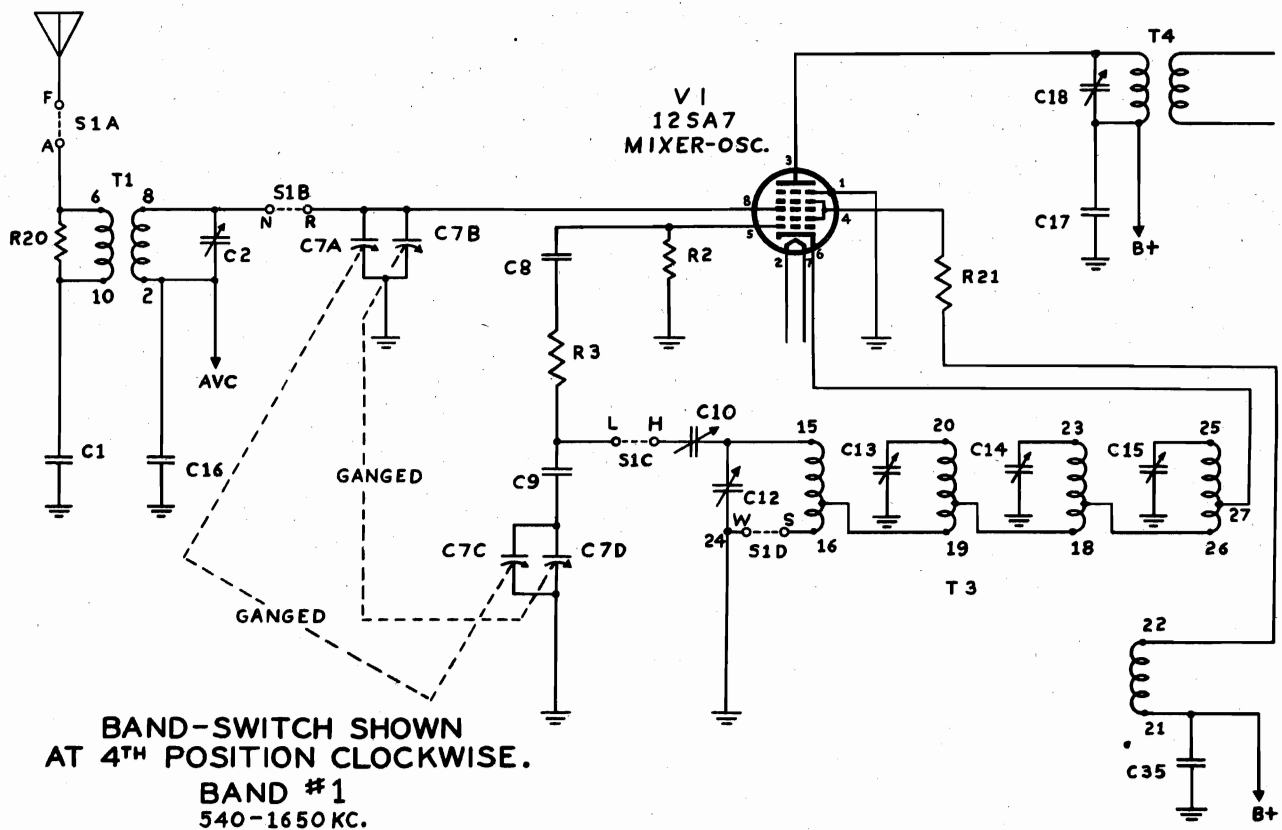
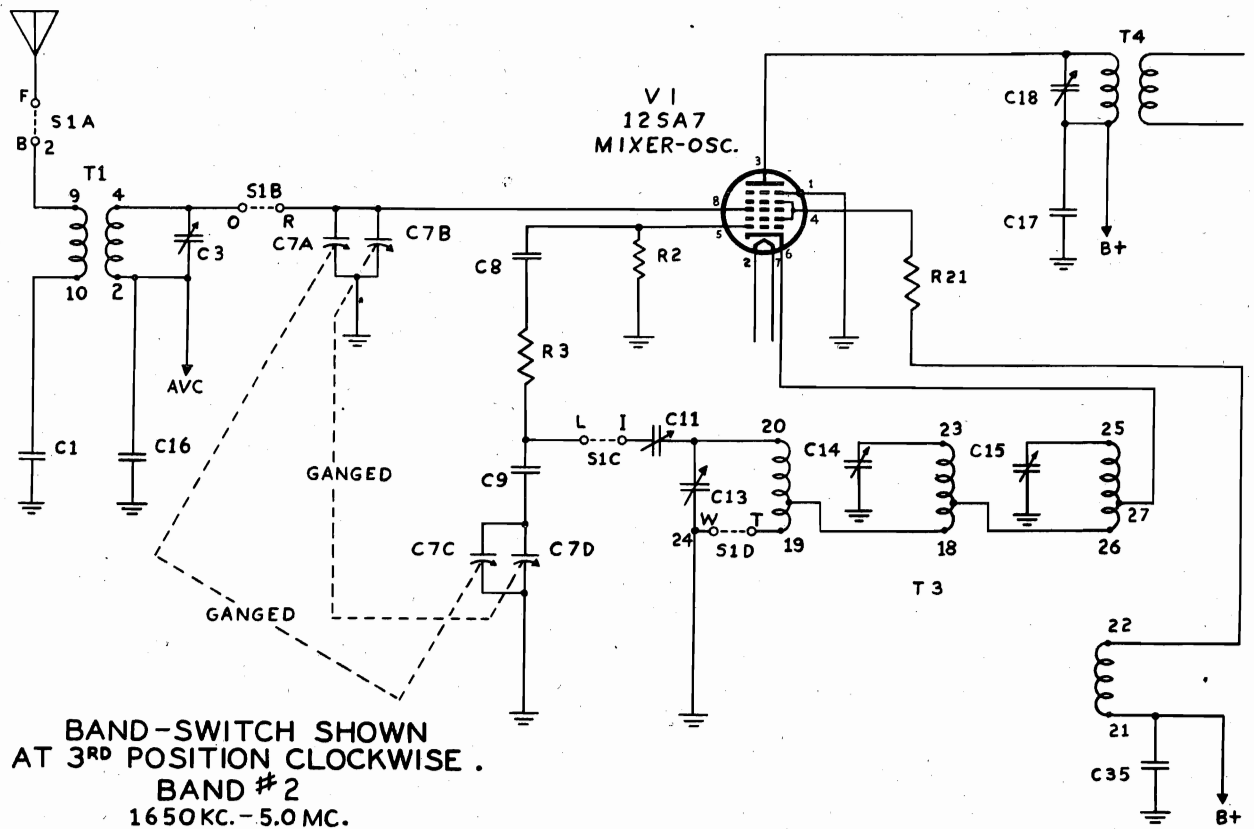
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MODEL S-38, Early
and Revised

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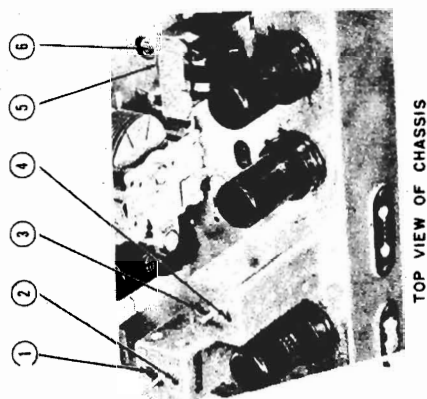


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TOP VIEW OF CHASSIS

IF FREQUENCY	IF SELECTIVITY	IMAGE RATIO	SENSITIVITY	AUDIO OUTPUT
455 kc	7 kc wide at 6 db down 65 kc wide at 60 db down (for 50 milliwatt output)	2.7:1 at 30 mc 6:1 at 14 mc 10:1 at 5 mc 35:1 at 1500 kc	12 microvolt at 600 kc 12 microvolt at 5 mc 11 microvolt at 14 mc 23 microvolt at 30 mc (for 50 milliwatt output)	675 milliwatt with less than 10% distortion at 400 cycles

EQUIPMENT:

1. Signal Generator capable of the ranges indicated in the Alignment Chart, including a 400 cycle audio modulator.
 2. Output meter capable of handling 1 watt of audio power.
 3. Standard RMA dummy consisting of a 200 mmf condenser in series with a 20uh r-f choke which is shunted by a 400 mmf condenser in series with a 400 ohm carbon resistor.
 4. Non-metallic screw driver.
- CONNECTIONS: Connect the Sig. Gen. "cold" lead to "G" on the antenna strip; the "hot" lead is connected as indicated in the Chart.

Connect the output meter across the terminals of socket SO-1 and remove the speaker plug from the socket and adjust the meter for 3 ohms impedance.

Caution: Set the meter at a sufficiently high range to prevent possible damage from overload.

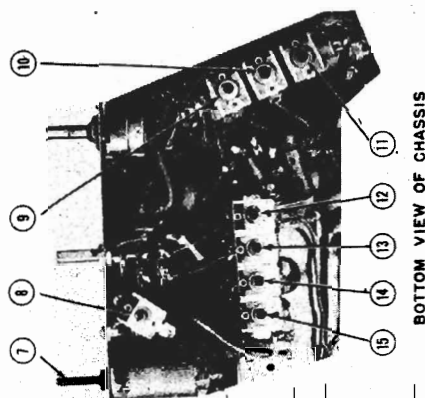
CONTROL SETTINGS: After allowing about a ten minute warm up period, set the receiver's control as follows:

- SPEAKER/PHONES switch at "SPEAKER."
- VOLUME control at full clockwise (maximum).
- CW/AM switch at "AM" (except for BFO adjustment).
- NOISE LIMITER switch at "OFF."
- BANDSPREAD TUNING control at "0," (min. cap.).
- STANDBY/RECEIVE switch at "RECEIVE."

Fig. 5. Top and bottom views of the receiver locating slugs, padders and trimmers for STEP NO. alignment purposes.

DUMMY ANT. IN SERIES WITH SIG. GENERATOR	CONNECTION OF SIG. GENER. FREQUENCY OUTPUT TO RECEIVER	BAND SWITCH SETTING	RECEIVER DIAL SETTING	ADJUST. SLUG, PADDER, OR TRIMMER NO.	DESCRIPTION	TYPE OF ADJUSTMENT — MAKE ADJUSTMENT FOR:
*IF ADJUSTMENT						
None	Stator plates of rear sect. of tuning gang	455 kc	"1"	1000 kc	3 and 4 1 and 2	2nd IF 1st IF Maximum output Maximum output Repeat steps 1 and 2
None	Stator plates of rear sect. of tuning gang	455 kc	"1"	1000 kc	7	BFO slug Zero beat
BFO ADJUSTMENT—NOTE: Turn off Sig. Gen. 400 cycle modulation; set CW/AM switch at "CW"; remove Pitch Control knob and adjust slotted screw shaft.						
BAND #4 ADJUSTMENT—NOTE: Make sure 400 cycle audio modulator is turned on; AM/CW switch should be at "AM."						
STANDARD RMA Dummy	"A1" on antenna strip	30 mc 30 mc	"4"	30 mc 30 mc	12 + 8	Osc. Trimmer Mix. Trimmer Maximum output Maximum output
BAND #3 ADJUSTMENT						
STANDARD RMA Dummy	"A1" on antenna strip	14 mc 14 mc	"3"	14 mc 14 mc	13 + 9	Osc. Trimmer Mix. Trimmer Maximum output Maximum output
*BAND #2 ADJUSTMENT						
STANDARD RMA Dummy	"A1" on antenna strip	5 mc 1.8 mc	"2"	5 mc 1.8 mc	14 6	Osc. Trimmer Osc. Padder Maximum output Maximum output and repeat step 8
		5 mc		5 mc	+10	Mix. Trimmer Maximum output
*BAND #1 ADJUSTMENT						
STANDARD RMA Dummy	"A1" on antenna strip	1500 kc 600 kc 1500 kc	"1"	1500 kc 600 kc	15 5	Osc. Trimmer Osc. Padder Maximum output Maximum output and repeat step 11
				1500 kc	11	Mix. Trimmer Maximum output

*It may be necessary to repeat the indicated adjustments several times.
†Rock the main tuning capacitor slightly (turn back and forth) when making these adjustments.



BOTTOM VIEW OF CHASSIS

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MODEL 8-38, Early
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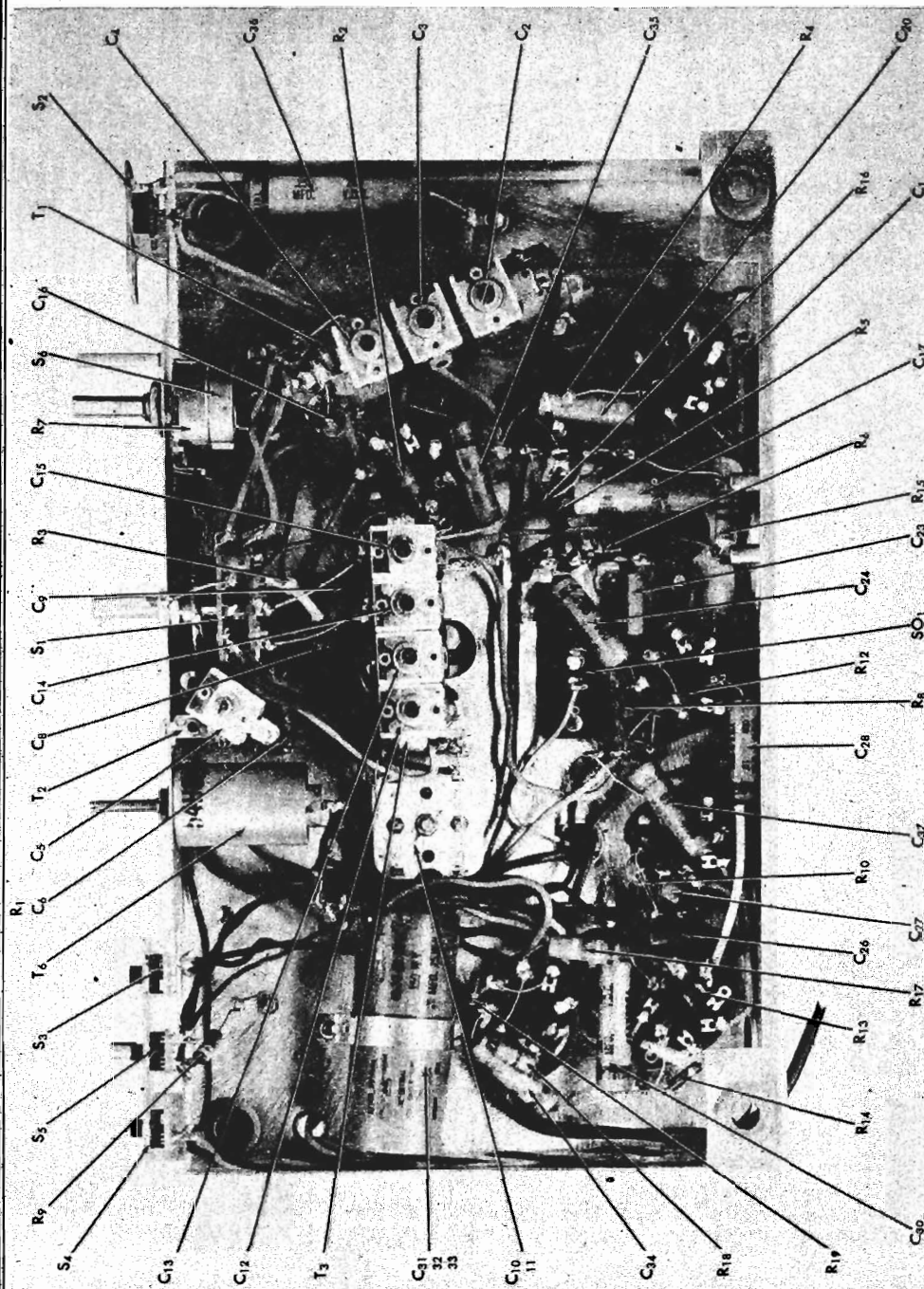


Fig. 4. Bottom view of the receiver showing components location.

CONTROL SETTINGS FOR PRELIMINARY TEST OPERATION (Broadcast Band)

NAME	FUNCTION	SETTING	NAME	FUNCTION	SETTING
STANDBY/ RECEIVE	Receiver temporary standby	At "RECEIVE"	SPEAKER/ PHONES	Output selector switch	At "SPEAKER"
VOLUME	Audio gain control and receiver on/off switch	Half clockwise; adj. as necessary	CW/AM	BFO on/off switch AVC on/off switch	At "AM" (AVC on)
BAND SELECTOR	Operating band selector	Clockwise to "1"	NOISE LIMITER	Noise peak limiting	At "OFF"
PITCH CONTROL	CW beat note pitch selector	Any position (not in use)	TUNING	Main tuning control	To local station freq. on main dial scale
			BAND SPREAD	Short wave band spreading	To "0" on small dial scale

MODEL S-38, Early
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BANDSPREAD TUNING

MAIN TUNING

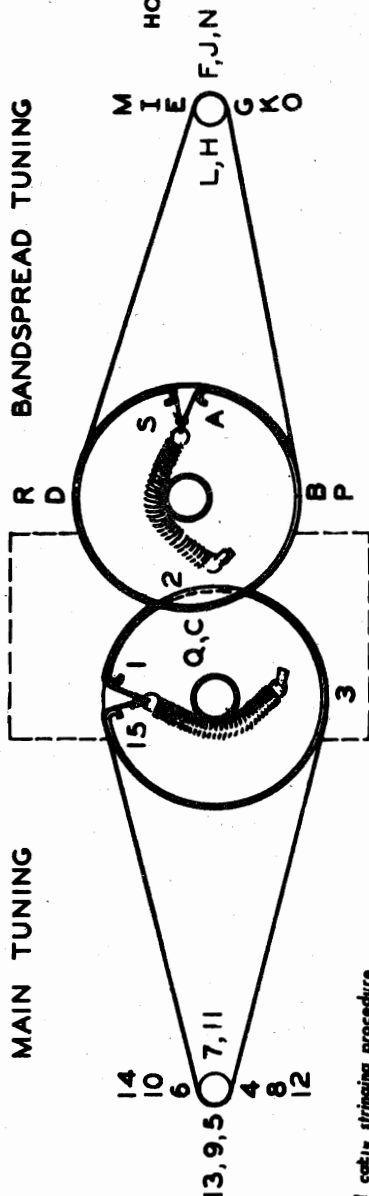


Fig. 2. Dial cable stringing procedure.

TUNING CAPACITOR FULLY CLOSED (BOTH SECTIONS).

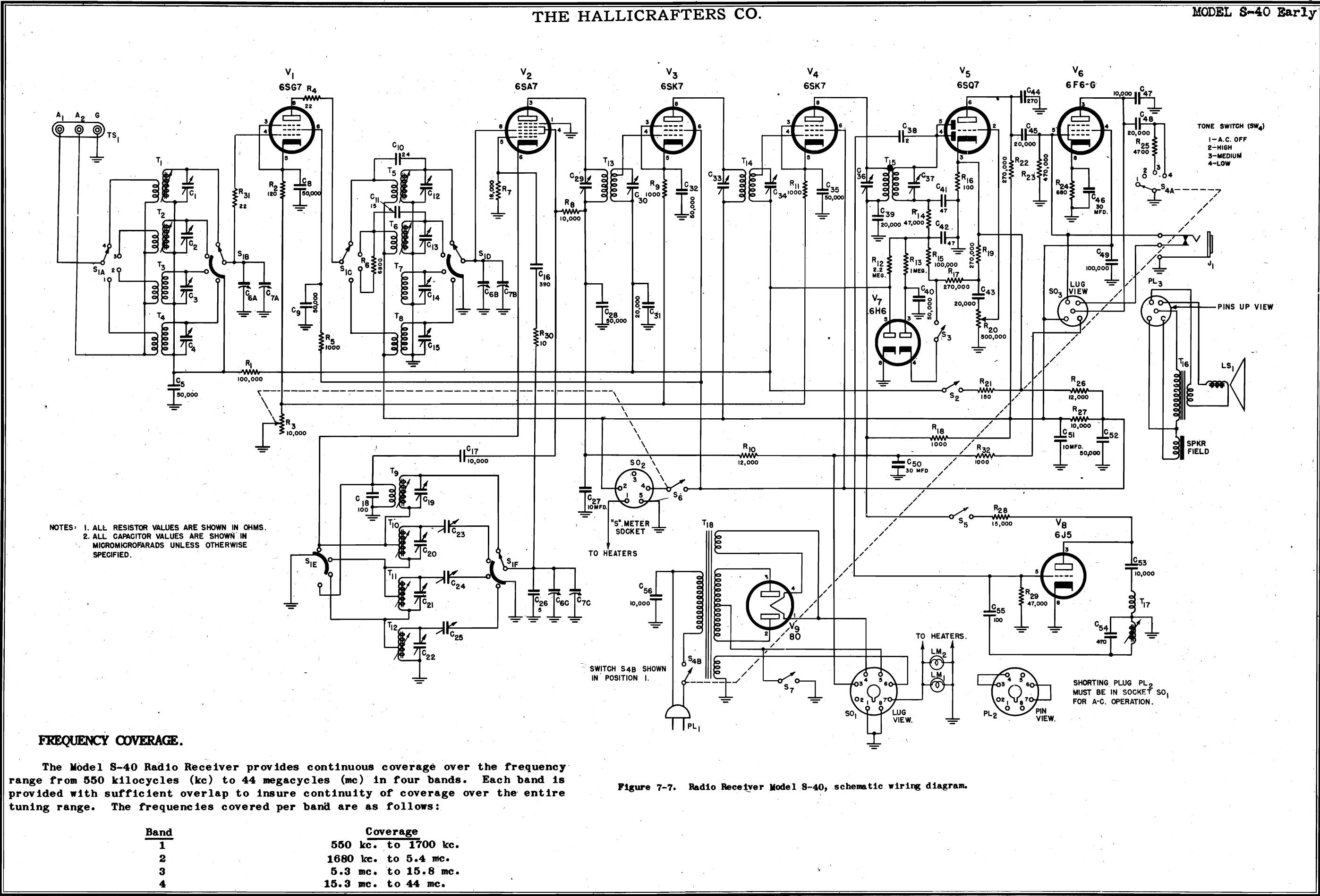
FRONT VIEW

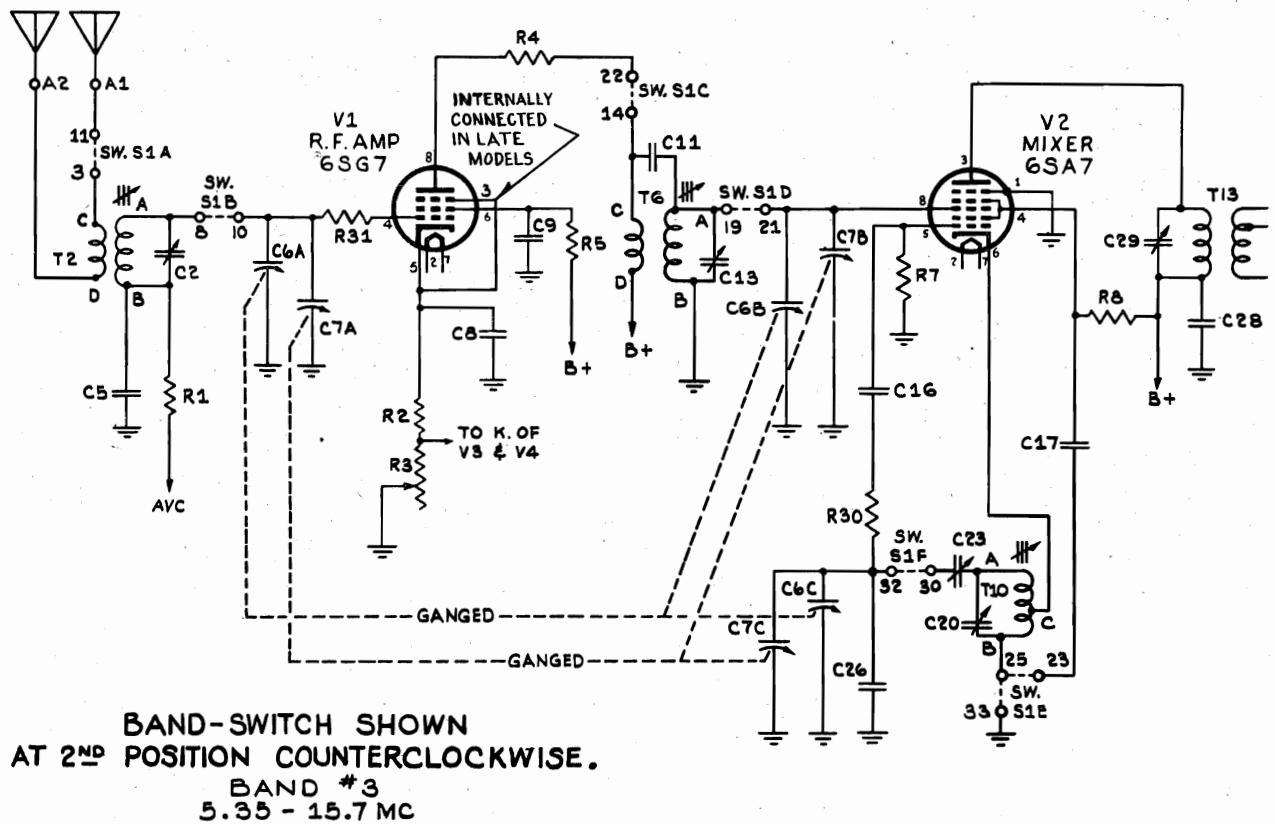
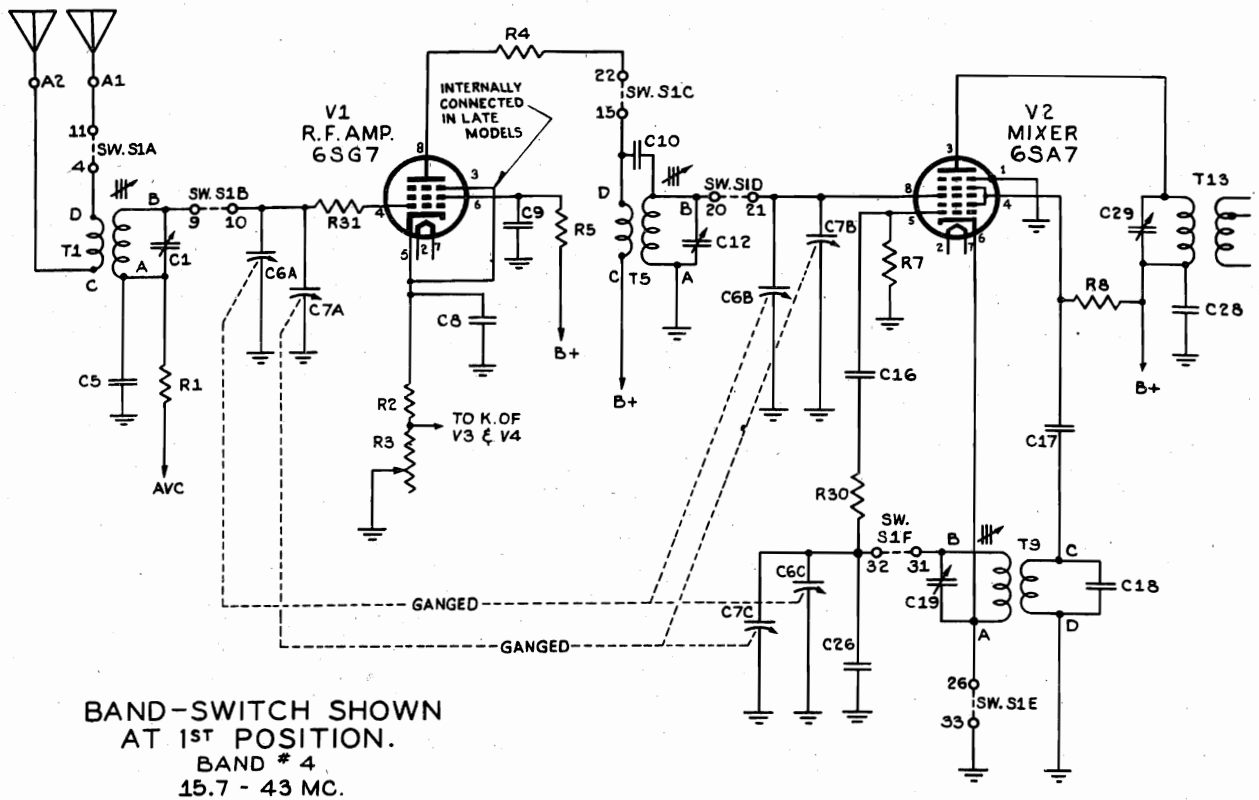
REF. NO.	DESCRIPTION	HALLICRAFTER'S PART NUMBER	LIST PRICE PER COMPONENT
C-1	0.01 mfd; 600 vdcw; paper	46AY103J	\$.40
C-2, 3 & 4	Trimmer Unit for antenna transformer T-1	44B129	.10
C-5	Trimmer Unit for antenna transformer T-2	44A039	.10
C-6	2700 mmf; $\pm 5\%$; 500 vdcw; mica	CM30A272J	.30
C-7	Tuning capacitor; air; 2 sections ganged	48C162	2.90
C-8, 23, 27 & 38	220 mmf; 500 vdcw; mica	CM20A221K	.15
C-9	3000 mmf; $\pm 5\%$; 500 vdcw; mica	CM30A302J	.65
C-10 & 11	Dual padder for oscillator transformer T-3	44A152	.50
C-12, 13, 14 & 15	Trimmer Unit for oscillator transformer T-3	44B159	.10
C-16 & 34	0.02 mfd; 400 vdcw; paper	46AW203J	.10
C-17 & 36	0.25 mmf; 200 vdcw; paper	46AT254J	.15
C-18, 19, 21 & 22	Trimmers for IF transformers T-4 and T-5	44A097	.25
C-20 & 35	0.05 mfd; 200 vdcw; paper	46AU503J	.10
C-24	0.005 mfd; 400 vdcw; paper	46AV502J	.10
C-25	2 mmf; twisted insulated wire leads; NOT AVAILABLE AS A SPARE PART.	CM20A471K	.20
C-26 & 39	470 mmf; 500 vdcw; mica	CM20A471K	.10
C-28 & 37	0.01 mfd; 400 vdcw; paper	46AW102J	.10
C-29, 31, 32 & 33	Electrolytic; four section unit; color coded leads; sect. 1 (C-29) 20 mfd, 25 vdcw; sect. 2 & 3 (C-31 & 32) 30 mfd, 150 vdcw; sect. 4 (C-33) 40 mfd, 150 vdcw	45B091	.80
C-30	0.02 mfd; 600 vdcw; paper	46AY203J	.10
LM-1	6/8 v @ 150ma; brown bead; G. E. type 47	39A004	.10
LS-1	5" P.M. speaker; 3.2 ohm voice coil	85C035	2.50
PL-1	AC line cord with two prong plug at one end	87A078	.35
PL-2	Speaker voice coil connector plug	88A072	.10
R-1 & 13	470,000 ohm; $\frac{1}{2}$ watt; carbon	RC20AE474M	.10
R-2	22,000 ohm; $\frac{1}{2}$ watt; carbon	RC20AE223M	.10
R-3	470 ohm; $\frac{1}{2}$ watt; carbon	RC20AE470M	.10
R-4	390 ohm; $\frac{1}{2}$ watt; carbon	RC20AE391K	.10
R-5	2.2 megohm; $\frac{1}{2}$ watt; carbon	RC20AE225M	.10
R-6 & 10	47,000 ohm; $\frac{1}{2}$ watt; carbon	RC20AE473M	.10
R-7 & S-6	Volume Control; includes SPST toggle action switch assembly on rear	25B094	.50
R-8	10 megohm; $\frac{1}{2}$ watt; carbon	RC20AE106M	.10
R-9 & 11	470,000 ohm; $\frac{1}{2}$ watt; carbon	RC20AE471K	.10
R-12	220,000 ohm; $\frac{1}{2}$ watt; carbon	RC20AE224M	.10
R-14	150 ohm; $\frac{1}{2}$ watt; carbon	RC20AE151K	.10
R-15	15 ohm; $\frac{1}{2}$ watt; carbon	RC20AE150M	.10
R-16	1,000 ohm; $\frac{1}{2}$ watt; carbon	RC20AE102M	.10
R-17	680 ohm; $\frac{1}{2}$ watt; carbon	RC20AE681M	.10
R-18 & 21	330 ohm; $\frac{1}{2}$ watt; carbon	RC20AE331M	.10
R-19	10,000 ohm; $\frac{1}{2}$ watt; carbon	RC20AE103M	.10
R-20	10,000 ohm; $\frac{1}{2}$ watt; carbon	RC20AE103M	.10
S-1a, b, c & d	Bandswitch; two sections ganged; rotary "RECEIVE-STANDBY" and "NOISE LIMITER" switches; slide action; SPST	60A240	.95
S-2 & 3	"SPEAKER-PHONES" switch; slide action; SPST	60A244	.20
S-4	"A.M.-C.W." switch; slide action; DPST	60A243	.25
S-5	Antenna coil for bands 1, 2 and 3	51C821	2.35
T-1	Oscillator coil for band 4	51C818	.65
T-2	Oscillator coil for bands 1, 2, 3 and 4	51C822	2.45
T-3	Input IF transformer; 455 kc.	50C183	1.20
T-4	Diode IF transformer; 455 kc.	50B184	1.20
T-5	Beat frequency oscillator coil; 455 kc.	54B031	1.25
T-6	Audio output transformer; 3,000 ohm primary	55A075	.95
T-7	-15 ohm secondary tapped at 3 ohms	88A032	.10
TS-1	Antenna and ground connector strip	88A071	.10
TS-2	Headset plug connector strip; bakelite		
QUANT. IN EQUIPMENT	DESCRIPTION	HALLICRAFTER'S PART NUMBER	LIST PRICE PER COMPONENT
2	Knob; for Volume Control and Band Selector switches	15A049	.15
1	Knob; for C. W. PITCH Control	15A058	.15
2	Knob; for main TUNING and BANDSPREAD tuning controls	15A047	.25
1	Pointer; for main tuning dial	82A102	.15
1	Pointer; for bandspread tuning dial	82A103	.15
1	Calibrated dial assembly, complete	83B057	.15
6	Dial window; glass	22B157	.30
1	Octal tube socket; Amphenol type MIP-8	6A035	.10
1	Dial lamp socket; bayonet	28A011	.15
2	Tuning capacitor dial drive pulley	28A012	.10
1	Tuning capacitor rear mounting bracket	67A556	.10
1	Left hand switch mounting bracket	67A558	.10
1	Right hand switch mounting bracket	67B560	.10
4	Rubber mounting feet for cabinet	67B561	.10
2	Spring washers for grounding tuning capacitor	16A007	.10
4	"C" washers; (hair-pin type)	44A043	.10
1	Rear cover plate; cardboard	75A052	.10
1	Bottom cover plate; painted steel	32C331	.45

NOTE: ALL PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

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MODEL S-40 Early



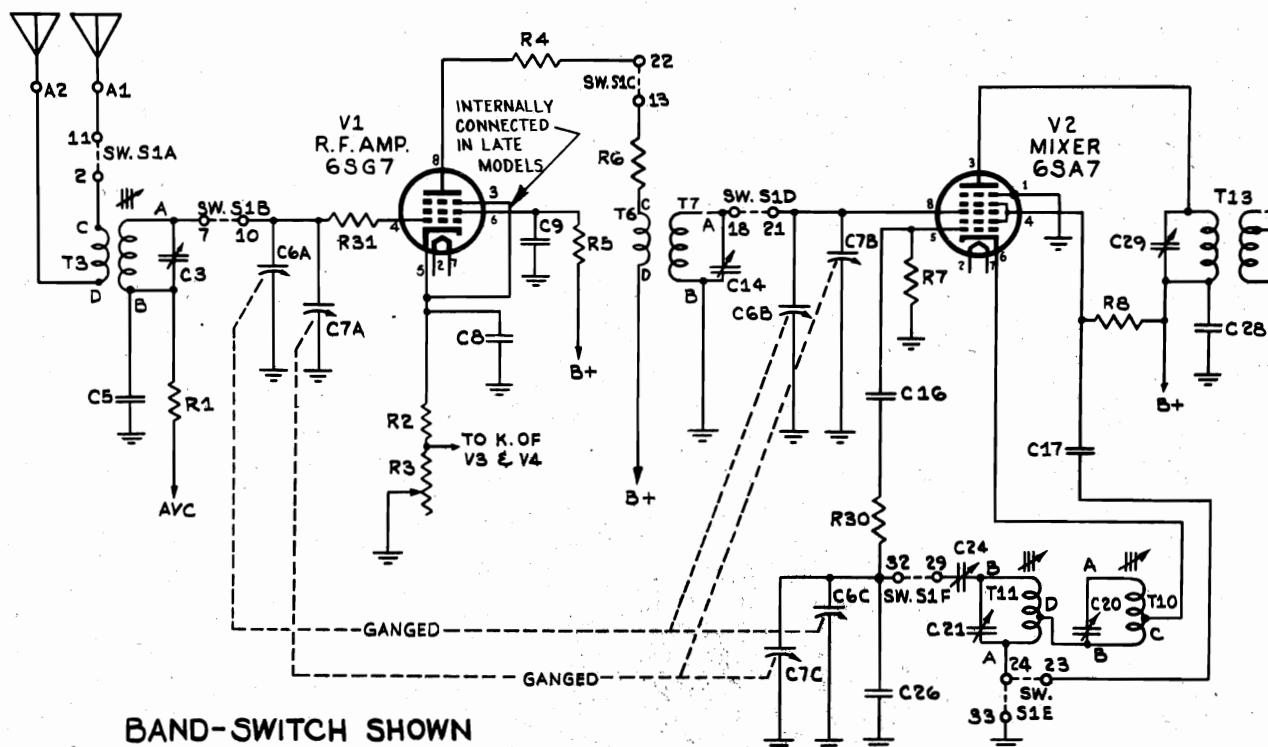


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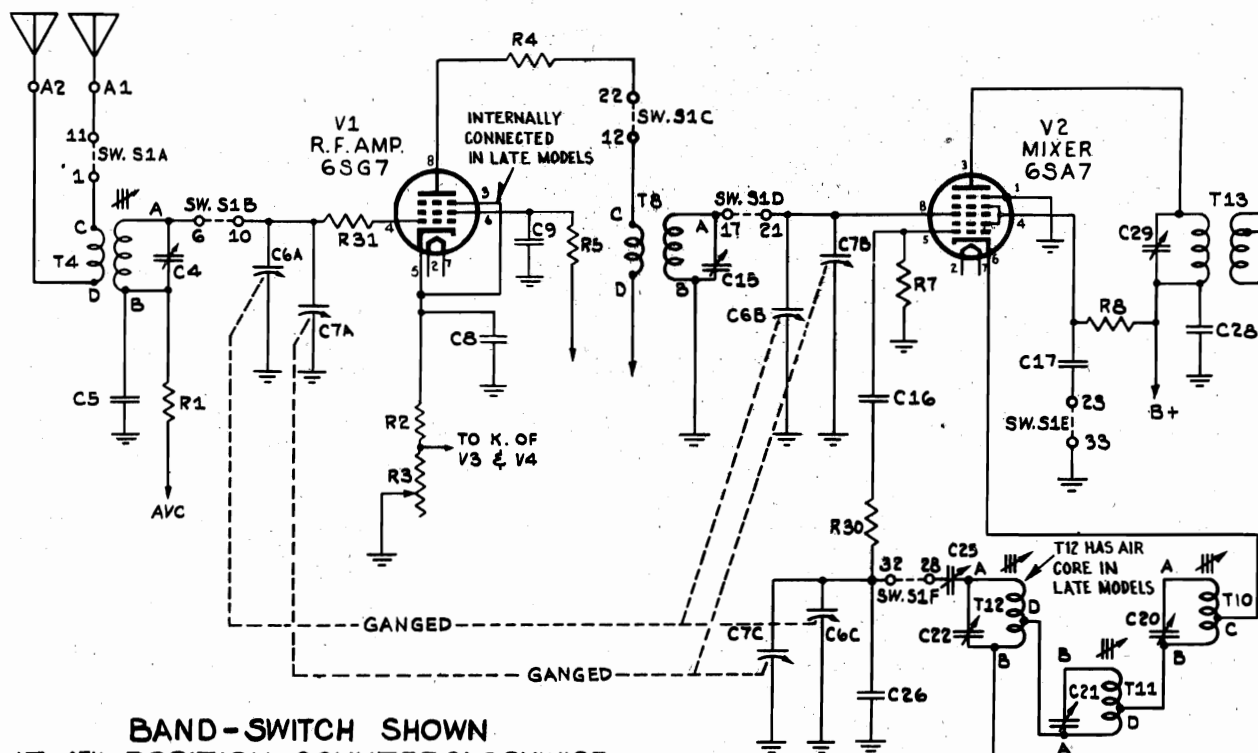
MODEL S-40

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BAND-SWITCH SHOWN
AT 3RD POSITION COUNTERCLOCKWISE.

BAND #2
1.7-5.35 MC.



BAND-SWITCH SHOWN
AT 4TH POSITION COUNTERCLOCKWISE.

BAND #1
540-1700 KC.

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MODEL S-40

POWER REQUIREMENTS.

The receiver is designed to operate from a 117-volt, 50/60 cycle single phase, (25/60 cycle if receiver has universal power transformer) a-c source or from a 6-volt storage battery and 260-volts of "B" battery. The "B" batteries may be replaced by a suitable vibrator type power supply if it meets the following current requirements:

A-C Operation	* D-C Operation
Line voltage 117 volts	Filament voltage. 6.3 volts
Line current 0.76 amp.	Filament current. 5 amps.
Power consumption. 75 watts	"B" voltage 260 volts
	"B" current 70 ma.

* The 6-volt battery drain using a vibrator type supply for "B" voltage will run approximately 10 amperes.

Audio Output Connections. - The headset jack marked PHONES, located on the front panel, provides output for headset reception. The circuit is such, that the speaker circuit is opened when the headset cord plug is inserted into the PHONE jack. The output of the first audio stage is then capacitively coupled to the PHONE jack.

Remote Operation Facilities. - The receiver may be disabled remotely by disconnecting the jumper wire between pins #3 and #4 on the shorting plug (PL-2), which is normally plugged into socket S0-1 during a-c operation, and connecting a remote switch or relay across these pins. The stand-by switch is connected in the "B" lead. When using the remote control disabling switch, the STANDBY/RECEIVE switch on the receiver must be set at STANDBY.

PREPARATION FOR USE.

A-C Operation. - The receiver may be operated from a 117-volt, 50/60 cycle, (25/60 cycle if universal power transformer is used) single phase a-c source of power. In the event that the receiver has a universal power transformer, check the line voltage and set the line voltage switch, located on top of the transformer, before connecting the receiver to a source of power. If the receiver power transformer is set for a higher line voltage than the source, it will not be damaged when connected to a line of lower voltage, but a receiver set for a lower line voltage will, in most cases, be damaged when plugged into an outlet having a higher line voltage.

D-C Operation. - The receiver may be operated from a 6-volt d-c source, generally a storage battery, and a 260-volt d-c supply in the form of dry batteries or vibrator type power pack. Consult the chart on power requirements for d-c operation in Section I, and provide battery facilities capable of supplying these demands. The receiver is connected to the d-c supply as follows:

(1) Remove the octal "jumper plug" (PL-2) used for a-c operation from socket S0-1. Use #18 (AWG) wire leads for the 260-volt "B" supply connections to pins #3 and #5, and #12 (AWG) wire leads for the 6-volt "A" battery connections to pins #1, #8 and #7.

CAUTION - Check your wiring carefully before connecting up to the battery supply.

OPERATION.

Listed below are the receiver controls and their settings for the two types of reception provided by this receiver, namely, phone and c-w code reception. Refer to Figure 1-1 or the front panel of the receiver.

a. PHONE RECEPTION. - To receive phone signals set the front panel controls as follows:

STANDBY/RECEIVE switch	- Set at RECEIVE. (Set at STANDBY to disable receiver for short standby periods.
BAND SELECTOR switch	- Set at range number corresponding to band covering desired frequency.
AM-CW switch	- Set at AM.
A.V.C. switch	- Set at ON.
NOISE LIMITER switch	- Normally set at OFF.

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- SENSITIVITY control** - Turn the control all the way clockwise to maximum.
- VOLUME control** - Adjust for desired volume at headset or loudspeaker.
- PITCH CONTROL** - Not used.
- TONE control** - Set to please listener. Set at HIGH for normal reception. Generally set at LOW or MED. when noise level is high.
- TUNING control** - Set calibrated dial to frequency of desired signal and adjust for maximum tuning meter deflection (if a tuning meter is used.) Dial frequency calibrations are true only with BANDSPREAD tuning dial set at zero.
- BANDSPREAD Tuning control** - Use this control in conjunction with the TUNING control as described in the paragraph on bandspread tuning in this section. This control is used for finer tuning.

b. C-W Code Reception. - To receive continuous wave (c-w) code signals, set the front panel controls as follows:

- BAND SELECTOR switch** - Set at range number corresponding to band covering desired frequency.
- A.V.C. switch** - Set at OFF.
- AM-CW switch** - Set at CW.
- NOISE LIMITER switch** - Set at OFF.
- TUNING control** - Set calibrated dial at frequency of desired signal. Tune for maximum signal level at headset or loudspeaker. Dial frequency calibrations are true only with the BANDSPREAD tuning dial set at zero.
- SENSITIVITY control** - Turn up as high as the signal strength of the code signal will permit. Too much gain will result in distortion of the signal.
- TONE control** - Set at LOW or MED.
- VOLUME control** - Turn up to full clockwise.
- BANDSPREAD tuning control** - Use this control in conjunction with the MAIN tuning control as described in the paragraph in bandspread tuning in this section. This control is used for finer tuning.
- PITCH CONTROL** - Set at desired pitch of code signal by turning to the right or left.
- STANDBY-RECEIVE** - Set at RECEIVE (Set at STANDBY to disable receiver for short standby periods.

GENERAL: Model S-40 is a 9 tube commercial superheterodyne table model, radio receiver, incorporating 4 bands of AM/CW reception, as follows: band #1, 540 kc to 1700 kc; band #2, 1.7 mc to 5.35 mc; band #3, 5.35 mc to 15.7 mc; band #4, 15.7 mc to 43 mc. Provision for variable sensitivity control; optional AVC, noise limiting, BFO pitch, tone, headset reception, and use of an external "S" meter; standby operation; and bandspreading are provided.

REAR PANEL CONNECTIONS: Consist of AC line cord with plug, antenna and ground connector strip, dc power input socket and external "S" meter connector socket.

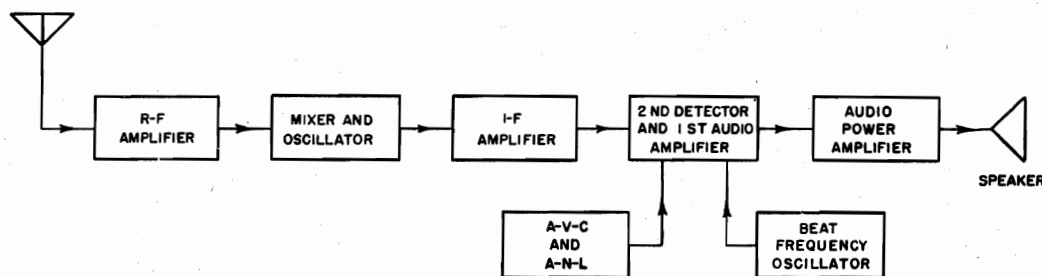
POWER SUPPLY DATA: AC operation—117 volt, 50/60 single phase source. (Also, 110/130/150/220/250 volt, 25 cycles single phase source with special power transformer available, Hallicrafter's part #52CO27.) Power drain is 75 watts.

DC operation—filament 6.3 volt @ 3.5 amp; "B" supply 260 volt @ 70 ma. (The 6 volt battery drain for vibrator type supply for "B" voltage will run about 10 amp.)

FUNCTIONING OF PARTS

1. GENERAL.

Figure 4-1. shows, in a very simple block form, the plan of the circuit of the Model S-40 radio receiver. Note that the circuit is that of the conventional super-heterodyne receiver. A signal received at the antenna is fed through an r-f amplifier stage to a combined mixer-oscillator stage where a local signal is generated and mixed with the incoming signal. An intermediate frequency signal selected at the output of the mixer stage is fed through two i-f amplifier stages to a combined detector audio amplifier stage where it is demodulated, amplified and fed through an audio power amplifier stage to a loud speaker. Provision is made for headset reception. A combined a-v-c and a-n-l stage is also included to provide improved reception. A beat frequency oscillator is incorporated for the reception of continuous wave (c-w) signals. Provision is also made for bandsread operation. An external tuning meter may be used with the receiver, provision being made at the rear of the receiver for connections.



928252

Figure 4-1. Radio Receiver Model S-40, block diagram.

2. DETAILED FUNCTIONING BY STAGES. (Refer to Fig. 7-7.)

Since the circuit functions of bands 1, 2, 3 and 4 are essentially identical, this discussion will describe the circuit with BAND SELECTOR switch (S-1A through S-1F) set at band 4 as shown in the schematic diagram.

a. **R.F. Amplifier.** - The r-f amplifier stage employs a type 6SG7 pentode tube in a conventional class A amplifier circuit. Signals present at the antenna are fed to the primary of transformer T-1 through terminals A-1 and A-2 of the antenna terminal strip TS-1. The secondary of transformer T-1 is tuned by the ganged tuning capacitor section C-6A and trimmer C-1. Ganged tuning capacitor section C-7A acts as a bandspread for the secondary of transformer T-1. R-f signals selected by the parallel resonant circuit are applied to the grid of tube V-1 and appear in greater amplitude across the primary of transformer T-5. Resistor R-1 and capacitor C-5 provide decoupling for the a-v-c voltage applied to the control grid. Parasitic resistors R-4 and R-31 prevents unwanted oscillations in this stage and tends to stabilize the amplifier. Resistor R-2, by-passed by capacitor C-8, provides self-bias for the stage. Resistor R-3 (SENSITIVITY control) regulates the bias to the grid. Resistor R-5 and capacitor C-9 act as a decoupling network for the screen of tube V-1. The signal voltage developed across the primary of transformer T-5 is then coupled to the grid of tube V-2 inductively through transformer T-5 and capacitively through capacitor C-10. Capacitor C-10 provides a small amount of coupling to improve the response at the high frequency end of the band, thus equalizing the r-f signal amplitude over the tunable frequency range.

b. Mixer-Oscillator. - The mixer-oscillator stage employs a type 6SA7 converter tube. The tube functions both as oscillator and mixer. The secondary of r-f transformer T-5 is tuned by section C-6B of the ganged tuning capacitor and trimmer C-12. Ganged tuning capacitor section C-7B acts as bandspread tuning for the secondary of transformer T-5. Ganged tuning capacitor section C-6C, trimmed by capacitor C-19, tunes the secondary of transformer T-9 which is part of the oscillator circuit. Ganged tuning capacitor section C-7C acts as bandspread tuning for the secondary of transformer T-9. A signal generated by the local oscillator, 455 kc. higher in frequency than the received signal on bands #1, #2, #3 and 455 kc. lower in frequency than the received signal on band #4, is mixed electronically in the mixer tube since the oscillator tube elements are included as part of the mixer tube V-2 in the same tube envelope. The frequency of oscillation is determined by a resonant circuit consisting of the secondary of transformer T-9 and section C-6C of the main tuning capacitor and trimmer capacitor C-19 connected in parallel. Section C-7C of the variable ganged bandspread capacitor is connected in parallel with section C-6C of the main tuning capacitor for the purpose of effectively spreading or broadening the frequency range. Capacitor C-26 is an additional fixed trimmer across the resonant circuit. Capacitor C-18 provides increased gain for the oscillator on this band. Variable capacitors C-23, C-24, and C-25 are padders for bands #3, #2, and #1 respectively. Resistor R-7 is a grid return for the oscillator grid in tube V-2. Capacitor C-16 is the oscillator grid coupling capacitor while capacitor C-17 provides coupling and d-c blocking for the oscillator plate circuit. Resistor R-30 suppresses parasitic oscillations. Plate voltage for the screen grid of tube V-2, which also acts as oscillator plate, is applied through resistor R-8. The difference frequency of the oscillator and incoming signal frequencies is applied to the first i-f transformer T-13 primary which is tuned by capacitor C-29. Capacitor C-29 is a by-pass for the mixer plate.

c. First and 2nd I-F Amplifier. - The first and 2nd i-f amplifier stages employ type 6SK7 pentode tubes. I-f amplifier coupling transformer T-13, T-14, and T-15 for these two stages are tuned to 455 kc by adjusting the trimmer capacitors across each transformer primary and secondary. The gain of the 1st and 2nd i-f amplifier stages is varied by the SENSITIVITY control (R-3), connected in series with the cathodes of both tubes, to provide sensitivity control for the receiver. The a-v-c grid voltage is applied to this section of the receiver through resistor R-12 when A.V.C. switch S-2 is at OFF or in the open position. C-31 is an a-v-c by-pass for the control grid of 1st i-f amplifier tube V-3. Resistor R-9, by-passed by capacitor C-32, provides fixed bias for tube V-3. Resistor R-11 by-passed by capacitor C-35 provides fixed bias for 2nd i-f amplifier tube V-4. Capacitor C-39 is a plate by-pass for tube V-4. The signal voltage developed across the transformer T-15 primary is fed inductively to the 2nd detector.

d. 2nd Detector and 1st Audio. - Both the second detector and first audio amplifier stages employ a single type 6SQ7 duo diode-triode. The diode section of tube V-5 serves as a detector by rectifying the modulated carrier. The r-f filter for this type of detection consists of resistor R-14 and capacitors C-41 and C-42 connected in a pi-section. Automatic volume control and audio frequency voltage is obtained from a voltage divider consisting of resistors R-19, R-17 and R-15. Capacitor C-43 couples the 2nd detector to the VOLUME control, resistor (R-20). Resistor R-16 is bias for the first audio stage, part of tube V-5. Resistor R-22 is the plate load for the triode part of tube V-5. Capacitor C-44 acts as r-f filter at the plate. The audio frequency voltage is then fed through coupling capacitor C-45 to the grid of the output audio amplifier tube V-6.

e. Power Audio Amplifier. - The power audio amplifier stage is a class A amplifier employing a type 6F6-G pentode. Resistor R-23 is a grid return for the control grid of tube V-6. Resistor R-24, by-passed by capacitor C-46, supplies bias to the control grid. Resistor R-25 and capacitors C-47 and C-48 serve as a tone control circuit. Capacitor C-49 serves as by-pass for the screen grid. The audio signal is then fed through socket SO-3 and plug PL-3 to the primary of output transformer T-16 whence it is coupled inductively to the secondary and fed to the speaker LS-1 voice coil. An audio frequency signal is also fed from the grid of tube V-6 to PHONE jack J-1. Voltage is fed to the plate of tube V-6 through the primary of transformer T-16.

f. A.V.C. and NOISE LIMITER. - Both the automatic volume control and automatic noise limiter stages employ a single type 6H6 duo-diode. One diode of tube V-7 serves as the automatic volume control rectifier. The remaining diode section of tube V-7 serves as an automatic limiter as follows: Capacitor C-40 becomes charged by the rectified carrier voltage and the time constant of this capacitor and filter network associated with it is such that the audio frequency voltage variations do not alter this charge. During a severe noise pulse, however, the cathode of the diode plate connected to capacitor C-40 becomes more negatively charged than the charge held by capacitor

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C-40 until the cathode voltage of the a-n-1 diode again reaches a less negative potential than its plate and capacitor C-40 acquires its normal charge. By shorting the audio voltage to ground during a noise pulse, the a-n-1 circuit prevents the objectionable noise pulses from reaching the audio amplifier stages.

g. Beat Frequency Oscillator. - The beat frequency oscillator employs a type 6J5 triode tube in a tuned-grid, untuned plate oscillator circuit. The oscillator frequency is adjusted by a moveable powdered iron core in the field of transformer T-17. This iron core adjustment sets the oscillator frequency at 455 kc. and is adjusted by a screw driver during alignment. The fine adjustment of the oscillator frequency required to provide control of the beat note frequency is controlled by a knob (PITCH CONTROL) from the front panel. The AM-CW switch controls the use of the oscillator by opening or closing the plate voltage lead to the tube. Resistor R-28 provides a load for the plate of tube V-8. Resistor R-29 is the oscillator tube V-8 grid return while capacitor C-55 provides grid coupling from the oscillator tank circuit. Capacitor C-54, across part of transformer T-17, resonates the tank circuit. Capacitor C-53 forms part of a series impedance circuit with part of transformer T-17. The beat frequency signal is coupled to the 2nd detector through capacitor C-38.

h. Power Supply. - The receiver has provisions for operation from either an a-c or d-c source.

(1) **A-C Operation.** - The receiver's power supply provides for operation from a 117-volt source. The a-c current is fed to the primary of power transformer T-18 through the line cord. A type 80 (tube V-9) full wave rectifier is employed in a conventional full wave rectifier circuit. The high voltage from this rectifier is fed to a filter network through the "Shorting Plug" on the rear apron of the receiver chassis as is the filament current for the heaters of the tubes. The STANDBY/RECEIVE switch is connected in series with the transformer T-18 center tap lead to ground (chassis), thereby disabling the receiver but at the same time keeping the tube heaters hot and ready for instant use. The filter circuit consists of a pi network made up of the speaker field coil and capacitors C-50 and C-51. Resistors R-26 and R-27 are part of a voltage divider and capacitor C-52 is a by-pass.

(2) **D-C Operation.** - External 6-volt storage battery and 260-volts of "B" batteries or storage battery and vibrator type supply provide for d-c operation. When operating from an external d-c supply the "Shorting Plug" on the rear apron of the receiver chassis is removed and a similar plug is wired to supply filament and plate current to the receiver circuits. The "B" voltage is fed to the input side of the filter sections used for a-c operation thereby insuring adequate filtering for vibrator type power supplies.

1. Tuning Meter. - The tuning meter "S METER" is not supplied with the receiver, but can be purchased on request from the company. Provision has been made on the rear apron of the receiver for the external connection of the "S" meter. A five prong plug is wired to the meter as indicated in figure 4-2 and should be plugged into socket S0-2. When metering reception, the meter measures a voltage drop across resistor R-27 e.i. a change in screen current of first and second i-f amplifier tubes V-4 and V-3.

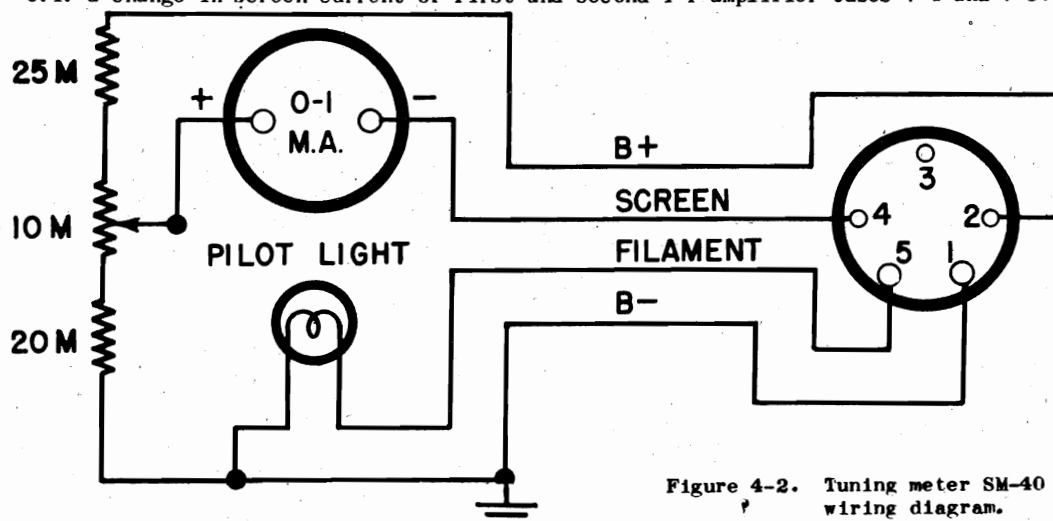


Figure 4-2. Tuning meter SM-40 and schematic wiring diagram.

MAINTENANCE

CAUTION. - Voltages at various points in this equipment are of sufficiently high potential to produce a severe shock. Locate the high - potential points on the VOLTAGE CHART before attempting to service circuits that are "hot". IT IS A GOOD RULE TO DISCONNECT THE POWER SOURCE BEFORE MAKING ADJUSTMENTS WHEN POSSIBLE. BE CAREFUL.

1. PREVENTIVE MAINTENANCE.

All components of the receiver should be given a thorough inspection at regular intervals. The time interval between inspections will be determined by the operating conditions of the individual installation. In general, keep the components clean and dry. Moisture, even in a completely tropicalized set may cause serious deterioration and produce general unsatisfactory operation. Dust and dirt materially effect both electrical and mechanical operation. Keep the various parts clean, especially the tuning capacitors. Dust should be blown out with dry air or brushed out carefully without bending the gang plates in the slightest. Noisy reception may also be caused by dirty condenser wipers, faulty gain controls and switches, frayed cable connections, faulty tubes, etc. in the installation. Check accessible connections, switch contacts, etc. regularly, making sure that all are clean and tight and the tubes and cable connectors are held securely in their sockets.

2. REPLACING TUBES, LAMPS, and FUSES.

a. **Replacing Tubes.** - All tubes are accessible at the top of the chassis through the hinged cover of the cabinet. When replacing tubes, check the tube type carefully and replace with the correct type. Refer to the top view of the chassis to determine the location of the tubes and to the PARTS LIST for the type number and description of each.

b. **Replacing Lamps.** - The receiver employs two lamps with bayonet type sockets to illuminate the calibrated tuning dial and the bandspread tuning dial. The lamps are to be replaced with a 6/8-volt, 250 ma. (blue bead) G.E. #44 or equivalent. The color code referred to, is the color of the glass bead above the glass stem inside the envelope of the lamps.

3. PERIODIC ADJUSTMENTS.

a. **Receiver Alignment.** - The receiver has been carefully aligned at the factory and should not require realignment until the receiver requires new tubes in the r-f and i-f amplifier stages, or shows signs of loss of sensitivity, off frequency calibration or requires service work on one or more of its r-f and i-f amplifier stages. Alignment should not be attempted by inexperienced persons as maximum performance is obtained only by careful and intelligent alignment.

(1) Aligning Tools. -

(a) Signal generator capable of providing a 400 cycle modulated signal at 455 kc, and 550 kc. to 44 mc. range.

(b) A $390 \pm 20\%$ ohm non-inductive carbon dummy antenna resistor.

(c) Non-metallic screw driver. A bakelite screw driver with a short metal blade is very good.

(d) Audio output meter capable of handling 1.5 watts of audio power for speaker load.

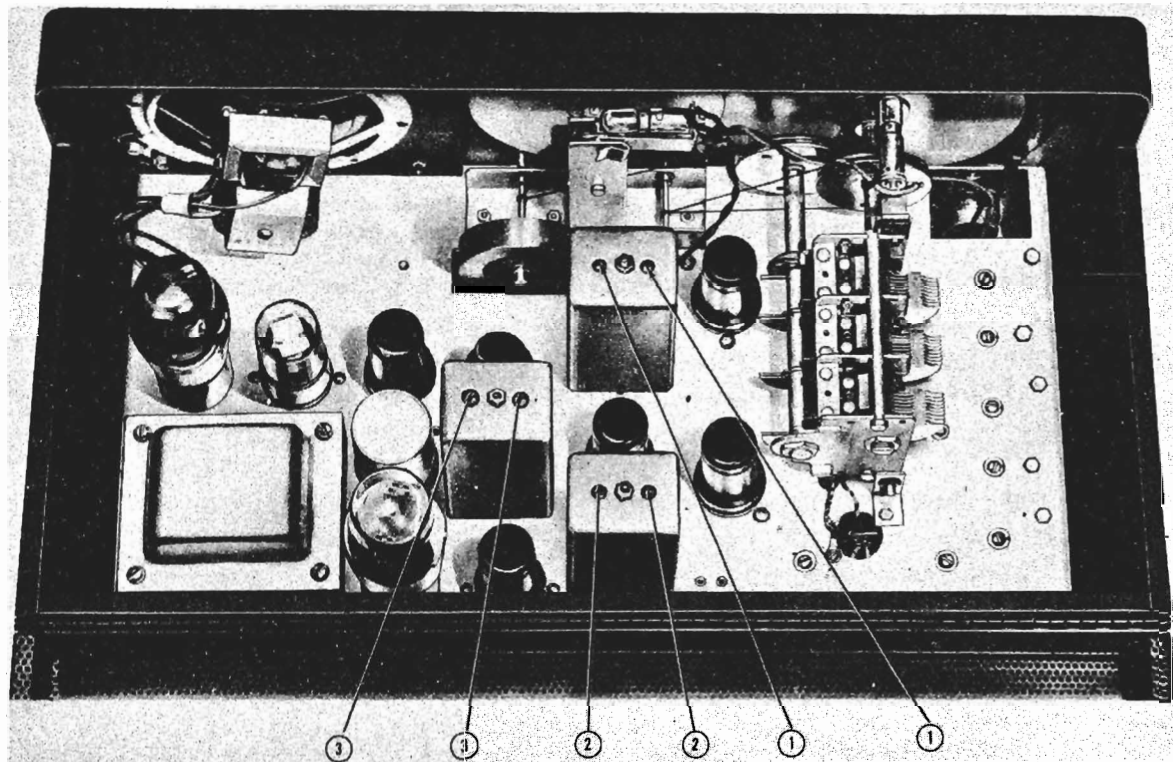
(2) I-F Amplifier Alignment. - (See Fig. 5-1)

(a) Connect the "hot" lead of the generator directly to the stator plates of the center section of the main tuning capacitor gang (the solder lug on top of that section). Connect the ground wire of the generator to the receiver chassis. Set main tuning capacitor at minimum capacity (open).

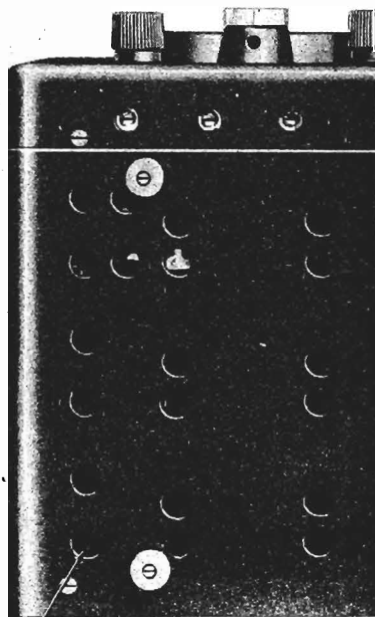
(b) Connect the output meter across the speaker voice coil and set the meter range switch for its highest range to prevent overloading the meter accidentally.

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- ① I-F Adjustments for 1st I-F Transformer T-13
- ② I-F Adjustments for 2nd I-F Transformer T-14
- ③ I-F Adjustments for 3rd I-F Transformer T-15



R-F and oscillator
adjustment holes

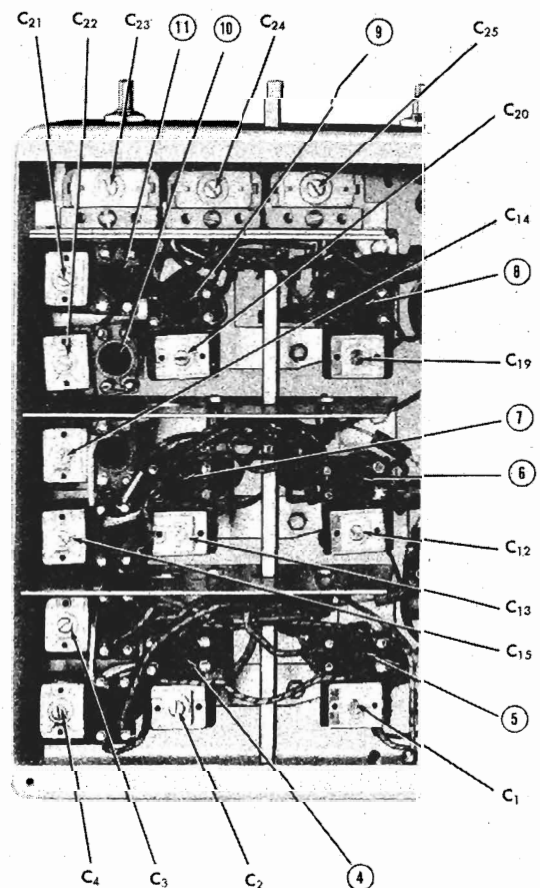


Figure 5-1. Radio Receiver Model S-40, view showing aligning points.

(c) Let the receiver warm up for approximately ten minutes, then set the receiver controls as follows:

SENSITIVITY control at maximum sensitivity (full clockwise).
 VOLUME control at maximum volume (full clockwise).
 A.V.C. switch at OFF.
 NOISE LIMITER switch at OFF.
 CW-AM switch at AM.
 TONE control at HIGH.
 STANDBY/RECEIVE switch at RECEIVE.

(d) Set the signal generator frequency at 455 kc, and turn on the 400-cycle modulation.

(e) Adjust transformers T-13, T-14, and T-15 for maximum output meter reading using just enough signal generator output to provide a good resonant swing on the output meter. The signal level at the generator should be approximately 52 microvolts for a 500 milliwatt audio output level. Repeat the alignment procedure until assured of accurate alignment. Refer to figure 5-1 for the location of i-f transformer adjustment screws #1 through #3 inclusive on transformers T-13, T-14, and T-15.

(3) Beat Frequency Oscillator Adjustment. -

Connect signal generator as in paragraph (2). Turn 400-cycle modulation off. Remove PITCH CONTROL knob with an Allen wrench and adjust the slotted screw shaft for zero beat. Replace knob so that red mark is on top.

(4) R-F Amplifier Alignment. -

†See note at end of this section.

(a) Connect the "hot" lead of the signal generator to terminal "A1" of the antenna terminal board through a $390 \pm 20\%$ ohm non-inductive carbon resistor. Connect the ground lead of the generator to the receiver chassis. Leave the jumper connected between terminals "A2" and "GND". Turn on the 400-cycle modulation.

(b) Let the receiver warm up for approximately ten minutes, then set the receiver controls as follows:

SENSITIVITY control at maximum sensitivity (full clockwise).
 VOLUME control at maximum volume (full clockwise).
 A.V.C. switch at OFF.
 NOISE LIMITER switch at OFF.
 CW-AM switch at AM.
 TONE control at HIGH.
 STANDBY/RECEIVE switch at RECEIVE.

NOTE - For all alignment adjustments, the signal generator output attenuator must be adjusted to provide a 500 milliwatt audio signal output at the speaker socket of the receiver on the output meter.

NOTE - Refer to figure 5-1 for all r-f alignment points.

(c) Band 4. Alignment. -

(1) Set the signal generator at 36 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 36 mc. no adjustment is necessary - if not, adjust oscillator trimmer capacitor C-19 for maximum output with the receiver dial set at 36 mc.

(2) Set the signal generator at 18 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 18 mc. no adjustment is necessary - if not, adjust slug #8 on transformer T-9 for maximum output with the receiver dial set at 18 mc.

NOTE - If slug #8 has been adjusted it will be necessary to repeat step (1) again. Several adjustments of capacitor C-19 in step (1) and slug #8 in step (2) may be required in cases where the transformer has been greatly detuned or a new transformer has been installed.

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(3) Set signal generator and receiver at 36 mc. and adjust trimmers C-1 and C-12 for maximum output.

(4) Set signal generator and receiver at 18 mc. and adjust slugs #5 and #6 for maximum output.

NOTE - If slugs #5 and #6 have been adjusted, it will be necessary to repeat step (3) again. Several adjustments of capacitors C-1 and C-12 and slugs #5 and #6 may be required in cases where the transformer has been greatly detuned or a new transformer has been installed.

(d) Band 3. Alignment. -

(1) Set the signal generator at 14 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 14 mc. no adjustment is necessary - if not, adjust oscillator trimmer capacitor C-20 for maximum output with the receiver dial set at 14 mc.

(2) Set the signal generator at 7 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 7 mc. no adjustment is necessary - if not, adjust oscillator padder capacitor C-23 for maximum output with the receiver dial set at 7 mc.

NOTE - If capacitor C-20 has been adjusted, it will be necessary to repeat step (1) again. Several adjustments of capacitor C-20 in step (1) and capacitor C-23 in step (2) may be required in cases where the transformer has been greatly detuned or a new transformer has been installed.

(3) Set the signal generator at 10 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 10 mc. no adjustment is necessary - if not, adjust slug #9 on transformer T-10 for maximum output with the receiver dial set at 10 mc.

(4). If slug #9 has been adjusted, repeat steps (1) and (2).

(5) Set the signal generator and receiver at 14 mc. and adjust trimmers C-2 and C-13 for maximum output.

(6) Set signal generator and receiver at 7 mc. and adjust slugs #4 and #7 for maximum output.

NOTE - If slugs #4 and #7 have been adjusted, it will be necessary to repeat step (3) again. Several adjustments of capacitors C-2 and C-13 and slugs #4 and #7 may be required in cases where the transformer has been greatly detuned or a new transformer has been installed.

(e) Band 2. Alignment. -

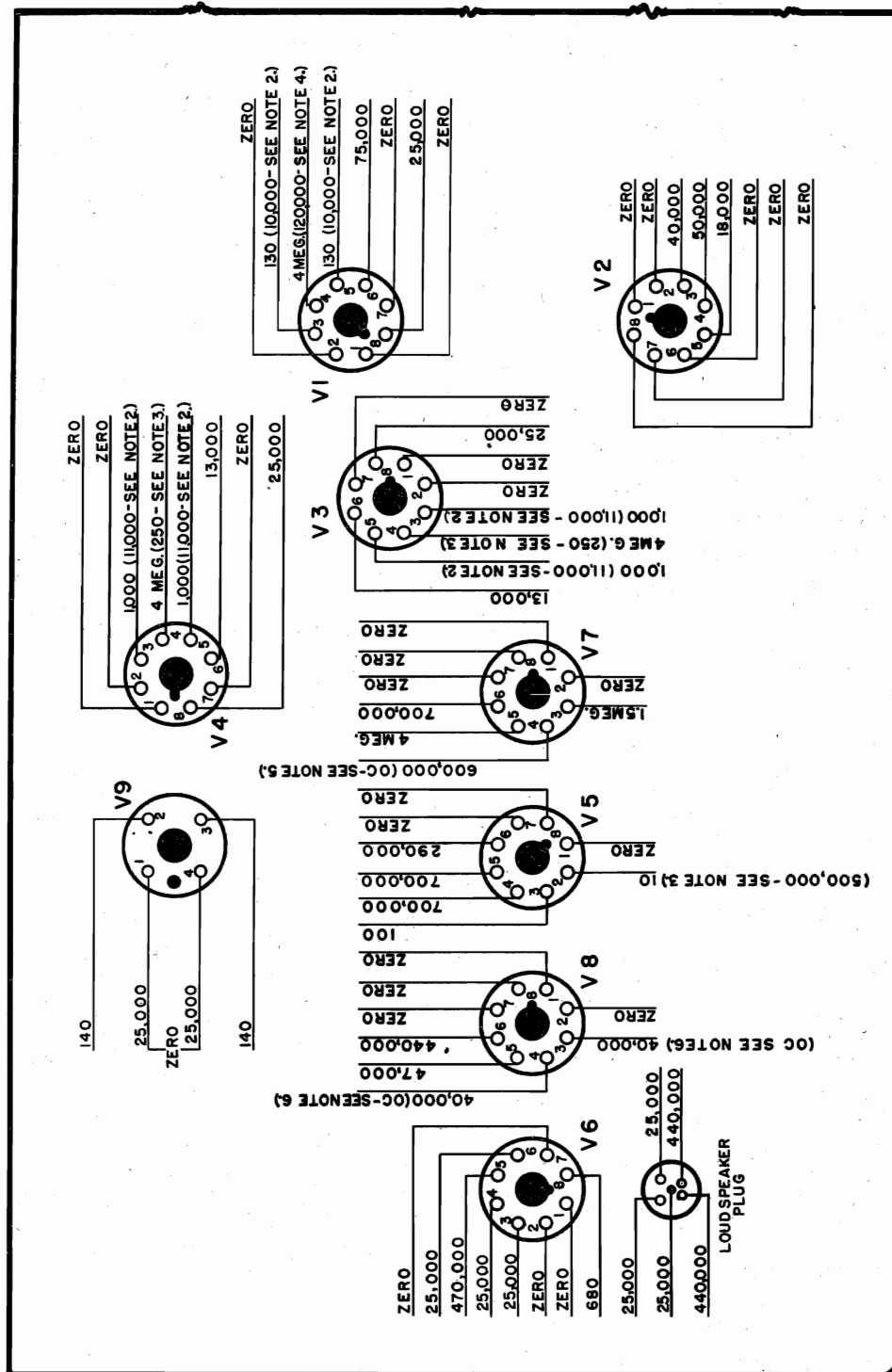
(1) Set the signal generator at 5 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 5 mc. no adjustment is necessary - if not, adjust oscillator trimmer capacitor C-21 for maximum output.

(2) Set the signal generator at 1.8 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 1.8 mc. no adjustment is necessary - if not, adjust oscillator padder capacitor C-24 for maximum output with the receiver dial set at 1.8 mc.

NOTE - If capacitor C-21 has been adjusted it will be necessary to repeat step (1) again. Several adjustments of capacitor C-21 in step (1) and capacitor C-24 in step (2) may be required in cases where the transformer has been greatly detuned or a new transformer has been installed.

(3) Set the signal generator at 3 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 3 mc. no adjustment is necessary - if not, adjust slug #11 on transformer T-11 for maximum output with the receiver dial set at 3 mc.

BOTTOM VIEW OF CHASSIS



FRONT PANEL

- NOTES:
1. CIRCUIT RESISTANCES LESS THAN ONE OHM ARE SHOWN AS "ZERO".
 2. RESISTANCE READING WITH "SENSITIVITY" CONTROL SET AT MINIMUM SENSITIVITY.
 3. RESISTANCE READING WITH "VOLUME" CONTROL SET AT MINIMUM VOLUME.
 4. RESISTANCE READING WITH "A.V.C." SWITCH SET AT "OFF".
 5. RESISTANCE READING WITH "NOISE LIMITER" SWITCH SET AT "OFF".
 6. RESISTANCE READING WITH "CW-AM" SWITCH SET AT "AM".
 7. OC = OPEN CIRCUIT.

Figure 5-3. Radio Receiver Model S-40, resistance chart.

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(4) If slug #11 has been adjusted repeat steps (1) and (2).

(5) Set the signal generator and receiver at 5 mc. and adjust trimmers C-3 and C-14 for maximum output.

(f) Band 1. Alignment. -

(1) Set the signal generator at 1500 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 1500 kc. no adjustment is necessary - if not, adjust oscillator trimmer capacitor C-22 for maximum output with the receiver dial set at 1500 kc.

(2) Set the signal generator at 600 kc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 600 kc. no adjustment is necessary - if not, adjust oscillator padder capacitor C-25 for maximum output with the receiver dial set at 600 kc.

NOTE - If capacitor C-22 has been adjusted it will be necessary to repeat step (1) again. Several adjustments of capacitor C-22 in step (1) and capacitor C-25 in step (2) may be required in cases where the transformer has been greatly detuned or a new transformer has been installed.

(3) Set the signal generator and receiver at 1000 kc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 1000 kc. no adjustment is necessary - if not, adjust slug #10 on transformer T-12 for maximum output with the receiver dial set at 1000 kc.

(4) If slug #10 has been adjusted repeat steps (1) and (2).

(5) Set the signal generator and receiver at 1500 kc. and adjust trimmers C-4 and C-15 for maximum output.

NOTE - After completing the above r-f alignment procedure check the image frequency to determine whether the oscillator frequency is higher than the signal frequency on bands 1, 2 and 3, and lower than the signal frequency on band 4.

(g) When completely aligned the overall receiver sensitivity will usually run from 7.2 microvolts at 600 kc. to 5 microvolts at 36 mc. for 500 milliwatts audio output. If your receiver falls reasonably close to this sensitivity, consider your job finished.

4. LOCATING FAULTS WITH A VOLT-OHM METER.

a. Voltage Chart. Refer to schematic for the tube socket terminal voltages. Voltages shown are those between the terminal and ground (chassis) unless otherwise specified. The readings were taken with a Weston Model 772 Analyzer using 20,000 ohm per volt sensitivity. To prepare the receiver for measurement, disconnect the antenna, connect a jumper between the antenna terminals A1, A2, and G, and set the controls as follows:

STANDBY/RECEIVE switch at RECEIVE.
A.V.C., NOISE LIMITER at ON and AM-CW switch at CW.
SENSITIVITY and VOLUME controls full clockwise.
TUNING, and PITCH CONTROL adjustments do not effect the reading.
TONE control at any one of the three tone positions.

b. Resistance Chart. - Refer to Fig. 5-3. for the tube socket terminal to ground (chassis) resistance measurements. To identify tube socket connections, refer to Fig. 7-6. The readings were taken with a Weston Model 772 Analyzer. To prepare the receiver for measurement, disconnect the a-c line cord and set the controls as follows:

STANDBY/RECEIVE switch at RECEIVE.
A.V.C., NOISE LIMITER at ON and AM-CW switch at CW.
SENSITIVITY and VOLUME controls full clockwise position.
TONE control at any one of the three tone positions.
TUNING and PITCH control adjustments do not effect the readings.

c. Checking Transformer and Inductor Windings With an Ohm-meter. -

NOTE - One terminal of each winding measured must be disconnected from the circuit to avoid measuring circuit resistance instead of winding resistance alone as indicated in the chart.

Circuit Symbol	Name of Part	Winding	Winding Terminals	D-C Resistance (Ohms)
T-16	TRANSFORMER, audio	Primary	Primary	400
		Secondary	Secondary	* 5
SPKR FIELD	Speaker field	-	-	1500
T-18	TRANSFORMER, power	Primary	1 to 3	6
		H.V. secondary	6 to 10	280
		$\frac{1}{2}$ H.V. second-	6 to 8	140
		ary	8 to 10	140
		6.3-volt sec-	2 to 4	ZERO
		ondary		
		5.0-volt sec-	7 to 9	ZERO
		ondary		

* With speaker plug in socket.

†Note Rock main tuning gang capacitor when making r-f adjustments on bands 3 and 4.

TUBE COMPLEMENT.

Symbol	Tube Type	Function
V-1	6SG7	R-F amplifier
V-2	6SA7	Mixer and local oscillator.
V-3	6SK7	1st i-f amplifier
V-4	6SK7	2nd i-f amplifier
V-5	6SQ7	Detector, 1st audio amplifier
V-6	6F6-G	Audio power amplifier
V-7	6H6	A-V-C and noise limiter
V-8	6J5	Beat frequency oscillator
V-9	80	Rectifier

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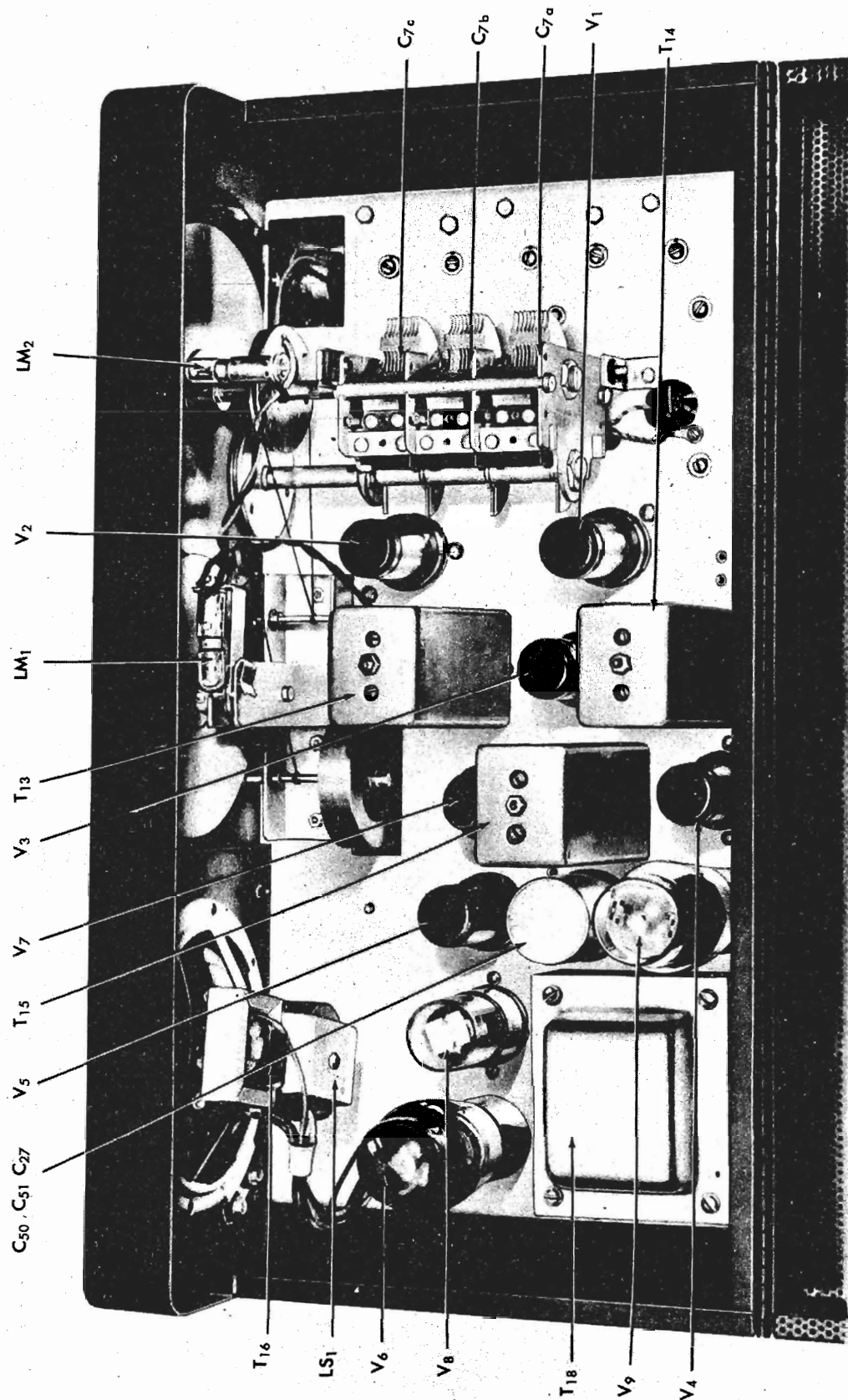


Figure 7-1. Radio Receiver Model S-40, top view.

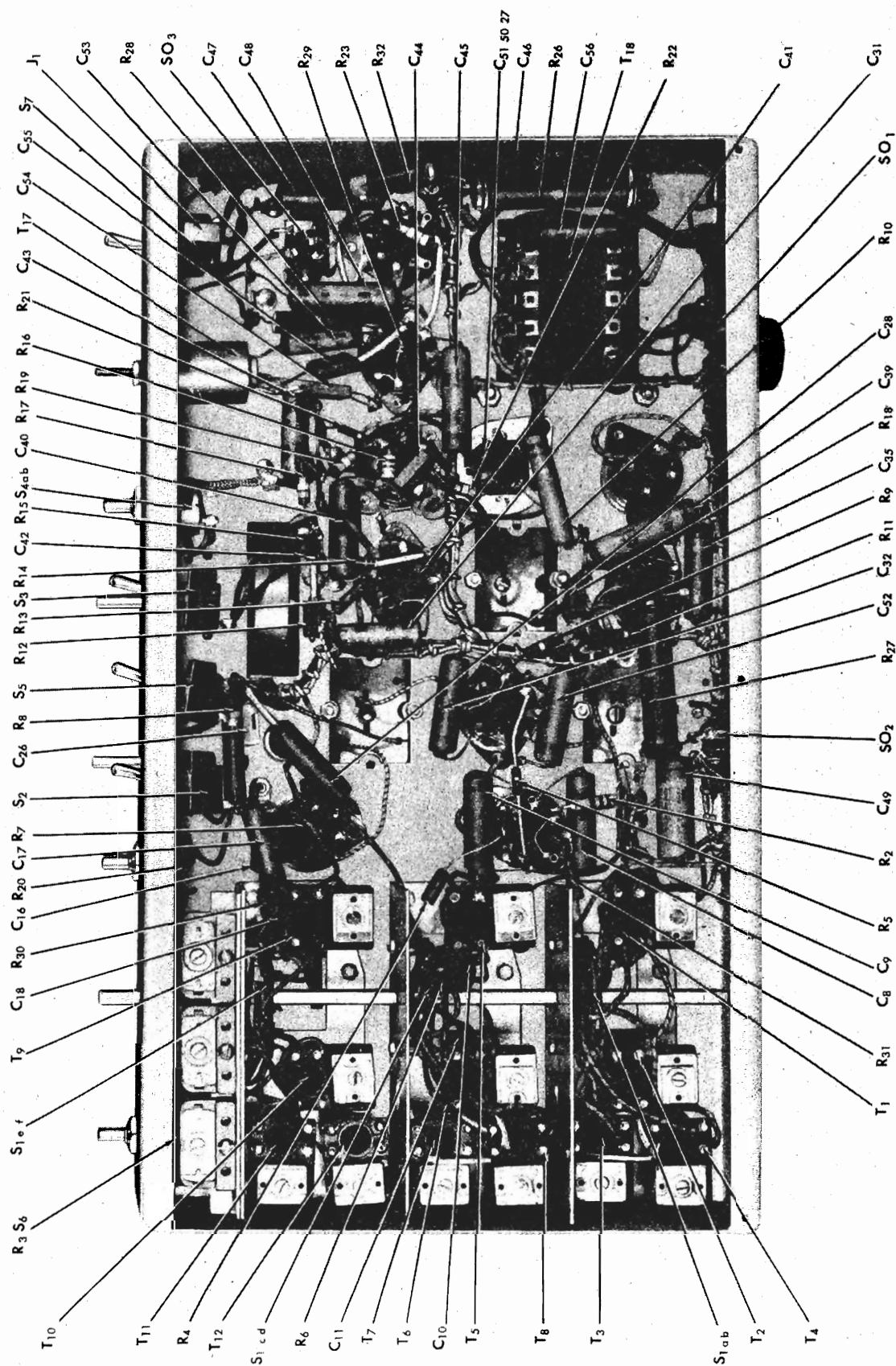


Figure 7-2. Radio Receiver Model S-40, bottom view.

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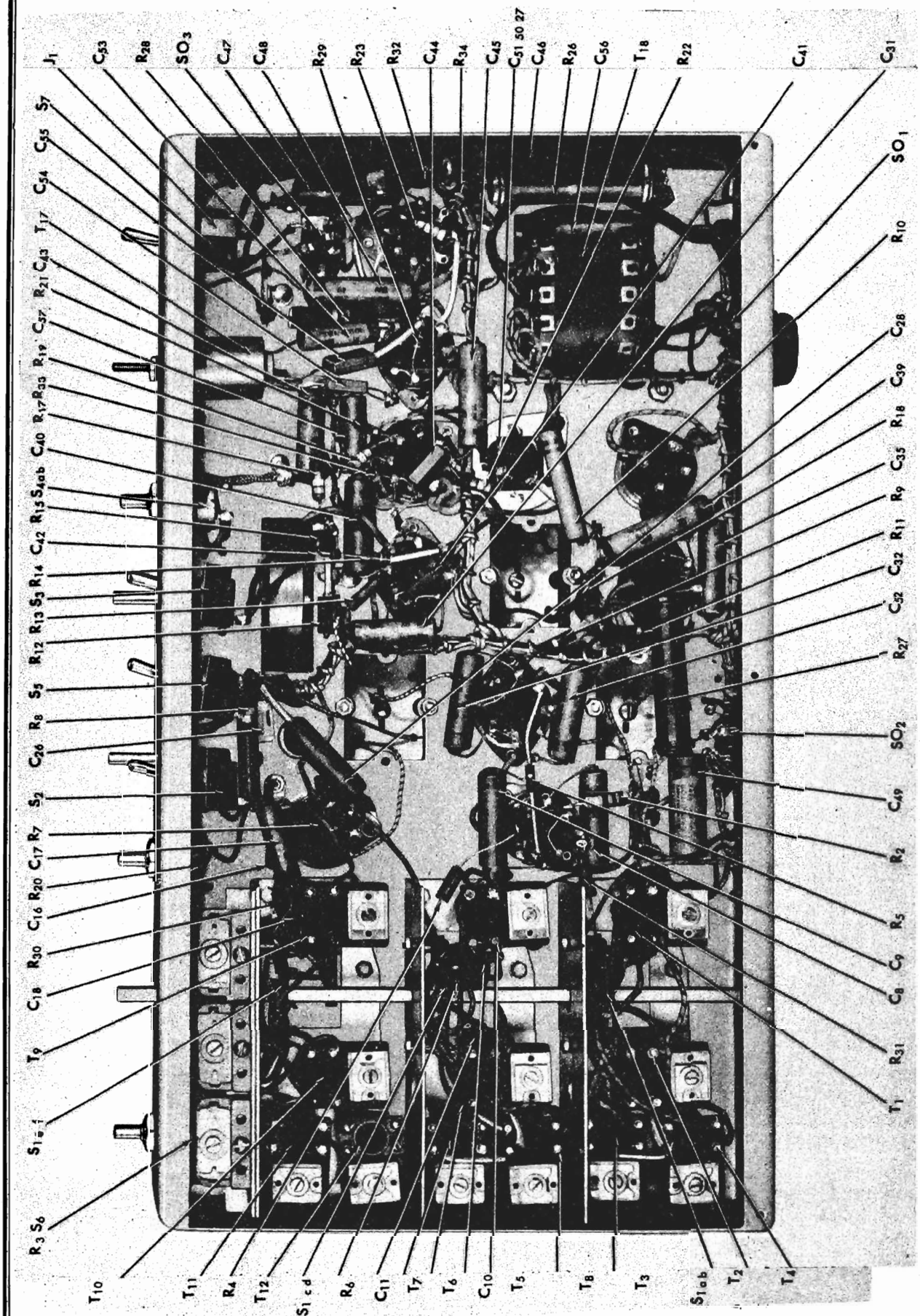


Fig. 3. Bottom view of the receiver showing components location.

IF FREQUENCY	IF SELECTIVITY	IMAGE RATIO	SENSITIVITY	AUDIO OUTPUT
455 kc	6.8 kc wide at 6 db down 40.7 kc wide at 60 db down (for 500 milliwatt output)	6:1 at 30 mc 15:1 at 14 mc 37:1 at 5 mc 1000:1 at 1500 kc	15 microvolt for 500 milliwatt output at 550 kc 8 microvolt for 500 milliwatt output at 40 mc	1 watt with less than 10% distortion

CONTROL SETTINGS FOR PRELIMINARY TEST OPERATION (Broadcast Band)

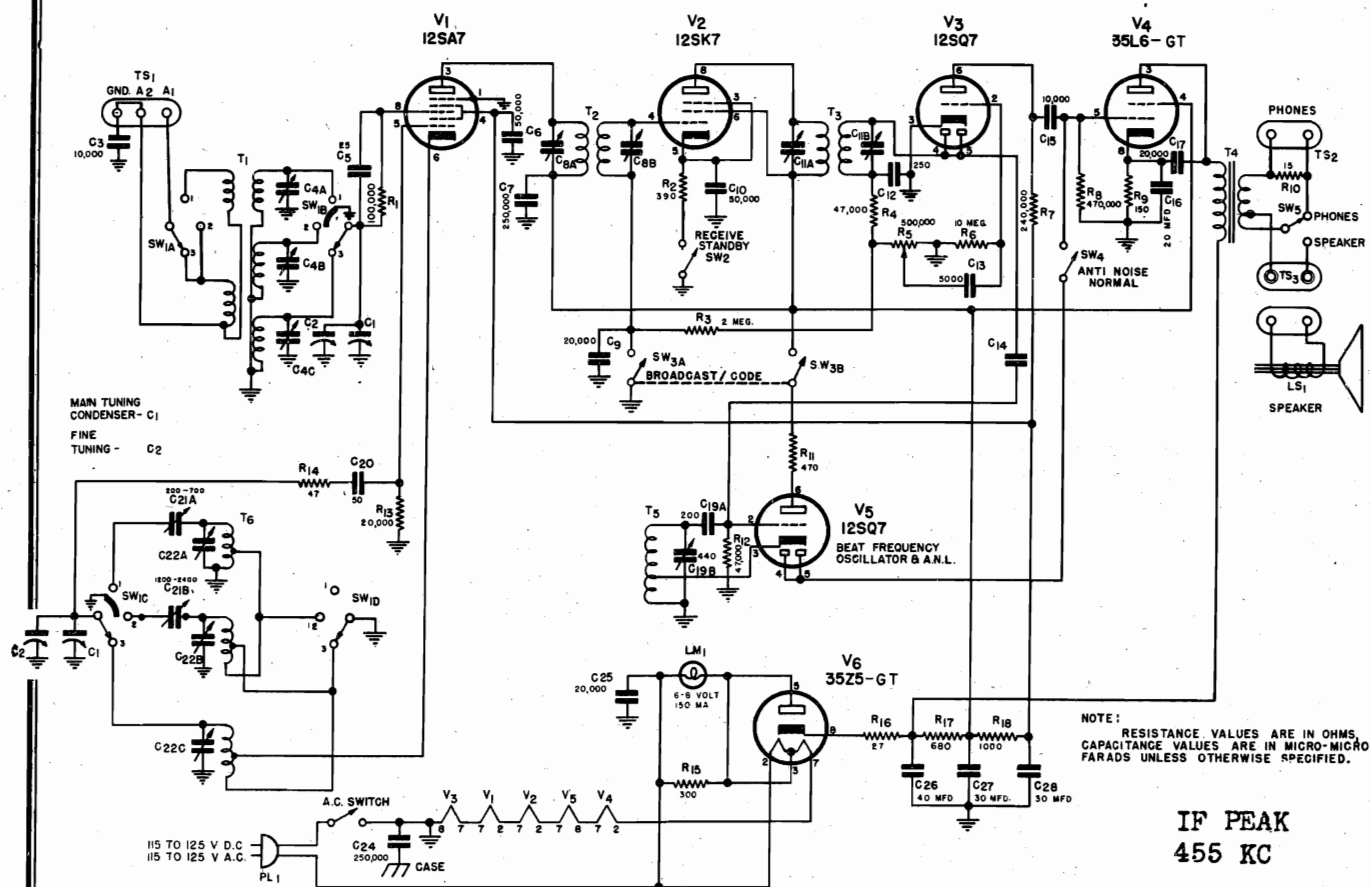
REF. NO. (in Fig. 1)	NAME	FUNCTION	SETTING	REF. NO. (in Fig. 1)	NAME	FUNCTION	SETTING
1	SENSITIVITY	RF gain control	Maximum clockwise	7	NOISE LIMITER	Noise peak limiting	At "OFF"
2	BAND SELECTOR	Operating band selector	Counter clockwise to "1"	8	BAND SPREAD	Short wave band spreading	To "O" on small dial scale
3	VOLUME	Audio gain control	Half clockwise; adj. as necessary	9	TO NE	Receiver on/off switch and tone control	Clockwise to "MED"
4	AVC	Automatic volume control	AT "ON"	10	PITCH CONTROL	CW beat note pitch selector	Any position (not in use)
5	TUNING	Main tuning control	To local station freq. on main dial scale	11	PHONES jack	Headset connection	Not used
6	CW/AM	BFO on/off switch	At "AM"	12	STANDBY RECEIVE	Receiver temporary standby	At "RECEIVE"

REF. NO.	DESCRIPTION	HALLICRAFTER'S PART NUMBER	COMPONENT LIST PRICE	REF. NO.	DESCRIPTION	HALLICRAFTER'S PART NUMBER	LIST PRICE PER COMPONENT
CAPACITORS				SWITCHES			
C-1, 2, 12, 13 and 19	4 to 80 mmf trimmer for transformers T-1, T-2, T-5, T-6 and T-9.	44A149	\$.10	S-1	BAND SELECTOR; 3 sections ganged; 4 position; each wafer is individually mounted in chassis, ganged by indexing shaft.	62B039	\$.25
C-3, 4, 14, 15, 20 and 21	1.5 to 15 mmf trimmer for transformers T-3, T-4, T-7, T-8, T-10, T-11 and T-12.	44A147	.10		2 bakelite wafers (S-1A through D)	62B044	.25
C-5	0.05 mfd; $\pm 20\%$; 300 vdcw; paper.	46A091	.20		1 bakelite wafer (S-1E and F)	74C172	.65
C-6 and 7	Tuning capacitor; 3 sections ganged.	48C138	3.75	S-2, 3, 5 and 7	A.V.C. ON/OFF; SPST; toggle; 3 amp @ 250 volts	60A138	.25
C-8, 32, 35 and 40	0.05 mfd; $\pm 40\%$; 200 vdcw; paper.	46AU503J	.10	S-4	TONE and AC line switch; 2 sections ganged; 1 sect. (S-4A) Single Pole 4 Position; 2 sect. (S-4B) SPST; rotary action; sect. 2 rated 3 amp @ 125 volts or 1 amp @ 250 volts, AC; bushing mfg.	60A225	.45
C-9, 28 and 52	0.05 mfd; $\pm 40\%$; 400 vdcw; paper.	46AW503J	.10	S-6	"5" meter; SPST; refer to R-3; NOT AVAILABLE AS A SEPARATE REPLACEMENT PART.		
C-10	24 mmf; $\pm 20\%$; 500 vdcw; neg. temp. coeff.	CC21UK240M	.15	SOCKETS			
C-11	750 mmf; $\pm 20\%$; 500 vdcw; neg. temp. coeff.	CC21UK150M	.15	SO-1	DC power source input socket; octal, female, Amphenol type MIP-8	6A035	.10
C-16	390 mmf; $\pm 20\%$; 500 vdcw; mica	CM20A391K	.15	SO-2	Connection for external "5" meter; 5 contacts, female, Amphenol type MIP-5	6A186	.10
C-17, 53 and 56	100 mmf; $\pm 10\%$; 500 vdcw; neg. temp. coeff.	46AW103J	.10	SO-3	Speaker plug connection; 5 contacts, female, Cinch type 2649-B	6A246	.10
C-18	0.00075 mmf/mm; deg. C; ceramic.	CC25UK101K	.15	TRANSFORMERS			
C-23	2645 mmf nominal; padder for transformer T-10	44B141	.50	T-1	Antenna coil for Band 4; variable iron core	51B783	
C-24	1300 mmf nominal; padder for transformer T-11	44A024	.35	T-2	Antenna coil for Band 3; variable iron core	51B782	
C-25	490 mmf nominal; padder for transformer T-12	44A142	.25	T-3	Antenna coil for Band 2; air core	51B781	
C-26	3 mmf ± 0.2 mmf at 25 deg. C; temp. compensating for oscillator stage	44A158		T-4	Antenna coil for Band 1; air core	51B780	
C-27, C-50 and C-51	Electrolytic; 3 section unit; coded lug terminals; sect. 1 (C-50) 30 mfd, $\pm 40\%$; sect. 2 (C-27) and sect. 3 (C-51) each 10 mfd, $\pm 40\%$; all sections 450 vdcw.	45A062	1.60	T-5	Mixer coil for Band 4; variable iron core	51B787	
C-29 and 30, 33 and 34	Dual trimmer unit for IF transformers T-13 and T-14	44A095	.25	T-6	Mixer coil for Band 3; variable iron core	51B786	
C-31 and 43	0.02 mfd; $\pm 40\%$; 200 vdcw; paper	46AU203J	.10	T-7	Mixer coil for Band 2; air core	51B785	
C-36 and 37	Dual trimmer unit for IF transformer T-15	44A098	.25	T-8	Mixer coil for Band 1; air core	51B784	
C-38	2 mmf gimmick; formed by twisting two insulated wire leads; NOT AVAILABLE AS A REPLACEMENT PART, SHOWN FOR REFERENCE ONLY.			T-9	Oscillator coil for Band 4; variable iron core	51B791	
C-39, 45 and 48	0.02 mfd; $\pm 40\%$; 600 vdcw; paper	46AY203J	\$.10	T-10	Oscillator coil for Band 3; variable iron core	51B790	
C-41 and 42	47 mmf; $\pm 20\%$; 500 vdcw; mica	CM20A47M	.10	T-11	Oscillator coil for Band 2; variable iron core	51B789	
C-44	270 mmf; $\pm 10\%$; 500 vdcw; mica	CM20A271K	.15	T-12	Oscillator coil for Band 1; variable iron core	51B788	
C-46	Electrolytic; 30 mfd; $\pm 250\%$; 25 vdcw; axial stranded wire leads	45A034	.35	T-13	1st IF transformer; 455 kc; shielded	50C185	
C-47	0.002 mfd; $\pm 40\%$; 800 vdcw; paper	46A104	.10	T-14	2nd IF transformer; 455 kc; shielded	50C186	
C-49	0.1 mfd; $\pm 40\%$; 400 vdcw; paper	46AV104J	.15	T-15	Diode IF transformer; 455 kc; shielded	50C192	
C-54	560 mmf; $\pm 5\%$; 500 vdcw; mica	CM25A6 J	.15	T-16	Audio output transformer; part of loudspeaker LS-1 assembly but is available as a separate replacement part.	54B028	
C-55	100 mmf; $\pm 20\%$; 500 vdcw; mica	CM20A101M	.10	T-17	BFO coil; 455 kc; shielded		
C-57	1000 mmf	46A2302J	.10	T-18	Power transformer; primary—117 volt AC, 50/60 cycle; high voltage secondary 342 volts each side of center tap (no load); filament secondary 6.3 volts @ 3.5 amp; rectifier filament secondary 5 volt @ 2 amp; solder lug terminals at base	52C026	3.30
JACKS				T-18*	Power transformer; same as T-18 above, except primary—110/130/150/220/250 volt AC, 25 cycles.	52C027	8.35
J-1	PHONES jack; closed circuit; short body; accepts standard headset plug	36A002	.30	*This transformer is available on special order only, and is not standard equipment for this model			
LAMPS				TERMINAL STRIPS			
LM-1 and 2	6.8 v for 250 ma; blue bead; G.E. type 44	39A003	.10	TS-1	Antenna and ground connector strip; marked "A1", "A2" and "G" on face; Cinch type 1738	88A032	.10
LOUDSPEAKER				MISCELLANEOUS MECHANICAL COMPONENTS			
LS-1	5" P.M. speaker; 3.2 ohm voice coil				Octal tube sockets	6A035	.10
PLUGS					4 prong tube sockets; for rectifier	6A025	.10
PL-1	AC line cord and standard 2 prong plug	87A078	.35		Pilot lamp socket; main tuning dial; bayonet base	86A033	.10
PL-2	AC operating shorting plug; Amphenol octal, male, type CP-8; includes jumpers wired between pins 3, 4 and 6, 7	35A003	.10		Pilot lamp socket; bandspread dial light; bayonet base	86A034	.10
PL-3	Speaker connecting plug; Cinch type 2749; part of speaker LS-1 assembly	10A197	.10		Bandspread knob drive shaft	74A170	.10
RESISTORS					Main tuning knob drive shaft	74A171	.10
R-1 and 15	100,000 ohm; $\pm 20\%$; $\frac{1}{2}$ watt; carbon	RC20AE104M	\$.10		Bandspread dial drive shaft	28A012	.40
R-2	120 ohm; $\pm 10\%$; $\frac{1}{2}$ watt; carbon	RC20AE121K	.10		Bandspread dial drive pulley	28A012	.40
R-3 and S-6	SENSITIVITY control; 10,000 ohm; includes SPST toggle action switch (S-6) on rear	25A533	.50		Bracket; main tuning and bandspread dial drive	67B503	.30
R-4	22 ohm; $\pm 20\%$; $\frac{1}{2}$ watt; carbon	RC20AE220M	.10		Flywheel; bandspread tuning	71A169	.50
R-5, 18 and 32	1,000 ohm; $\pm 20\%$; $\frac{1}{2}$ watt; carbon	RC20AE102M	.10		Pulley; 2" O.D.; capacitor drive; main tuning	28A002	.10
R-6	6,800 ohm; $\pm 10\%$; 1 watt; carbon	RC20AE682K	.10		Pulley; 2" O.D.; capacitor drive; bandspread tuning	28A019	.10
R-7	10,000 ohm; $\pm 10\%$; $\frac{1}{2}$ watt; carbon	RC41AE103K	.10		Calibrated scale; bandspread tuning	83C240	.85
R-8	10,000 ohm; $\pm 10\%$; $\frac{1}{2}$ watt; carbon	RC20AE102K	.10		Escutcheon; main tuning dial; includes window	83B254	.75
R-9 and 11	1,000 ohm; $\pm 10\%$; $\frac{1}{2}$ watt; carbon	RC6S0E123K	.10		Escutcheon; bandspread tuning dial; includes window	78B017	.75
R-10	12,000 ohm; $\pm 10\%$; $\frac{1}{2}$ watt; carbon	RC20AE225M	.10		Tension springs; dial cabling	70C04	1.85
R-12	1.2 megohm; $\pm 20\%$; 1 watt; carbon	RC20AE105M	.10		Cabinet mounting feet; rubber	75A012	.10
R-13	1 megohm; $\pm 20\%$; $\frac{1}{2}$ watt; carbon	RC20AE473M	.10		Knobs; main tuning and bandspread controls	16A007	.10
R-14 and 29	47,000 ohm; $\pm 20\%$; $\frac{1}{2}$ watt; carbon	25A534	.35		Knobs; SENSITIVITY, VOLUME and TONE controls	15A049	.10
R-17, 19 and 22	270,000 ohm; $\pm 10\%$; $\frac{1}{2}$ watt; carbon	RC20AE151M	.10		Knob; BANDSWITCH control; aluminum	15B053	.40
R-20	AUDIO GAIN control; 500,000 ohm	RC20AE474M	.10		Knob; PITCH CONTROL	15A058	.10
R-21	150 ohm; $\pm 20\%$; $\frac{1}{2}$ watt; carbon	RC31AE681K	.10		Top cover for receiver cabinet	66C284	2.50
R-22	470,000 ohm; $\pm 20\%$; $\frac{1}{2}$ watt; carbon	RC31AE133M	.10		Receiver cabinet		2.85
R-23	680 ohm; $\pm 10\%$; 1 watt; carbon	RC41AE123K	.10				
R-24	15,000 ohm; $\pm 20\%$; 1 watt; carbon	RC6S0E103K	.10				
R-25	12,000 ohm; $\pm 10\%$; 2 watt; carbon	RC41AE153M	.10				
R-26	10,000 ohm; $\pm 10\%$; 4 watt; carbon	RC20AE100M	.10				
R-27	15,000 ohm; $\pm 20\%$; 2 watt; carbon	24B012E	.30				
R-28	10 ohm; $\pm 20\%$; $\frac{1}{2}$ watt; carbon	RC10AE156M	.10				
R-30	1,500 ohm; $\pm 10\%$; 10 watt; wire wound	RC20AE103M	.10				
R-32	15 megohm; $\pm 20\%$; $\frac{1}{2}$ watt; carbon						
R-33	10,000 ohm; $\pm 20\%$; $\frac{1}{2}$ watt; carbon						

Note: All prices are subject to change without notice.

THE HALLICRAFTERS CO.

MODELS S-41G, S-41W



December 1945

Foreign and Domestic Broadcast Reception. - To receive broadcast stations set the controls as follows:

VOLUME control

- Set at OFF when the receiver is not in use. Turn to the right until desired volume is obtained after tuning in the station.

BAND SELECTOR switch

- Set at band number corresponding to the range covering desired frequency of reception.

BROADCAST-CODE switch

- Set at Broadcast. This switch may be set at CODE to help tune in weak phone signals by tuning for zero beat and then switching back to BROADCAST.

PHONES/SPEAKER switch

- Set at PHONES for headset reception; set at SPEAKER for loud-speaker reception.

RECEIVE-STANDBY switch

- Set at RECEIVE when listening, set at STANDBY during short standby periods.

FINE TUNING control

- Set at zero when tuning in stations with the MAIN TUNING control. Tuning dial calibrations are true only when the FINE TUNING pointer is set at zero. Use the FINE TUNING control for amateur band reception or for vernier tuning in the short wave bands.

MAIN TUNING control

- Set main tuning pointer at frequency of desired station. FINE TUNING pointer must be set at zero for true calibration.

ANTI NOISE-NORMAL switch - Set at NORMAL unless background noise is excessive.

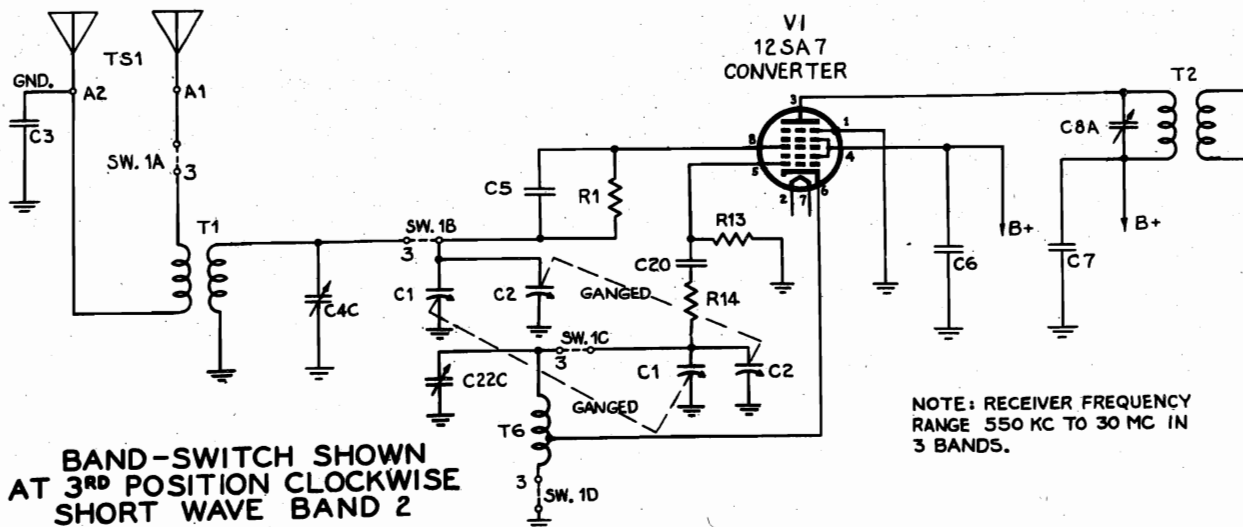
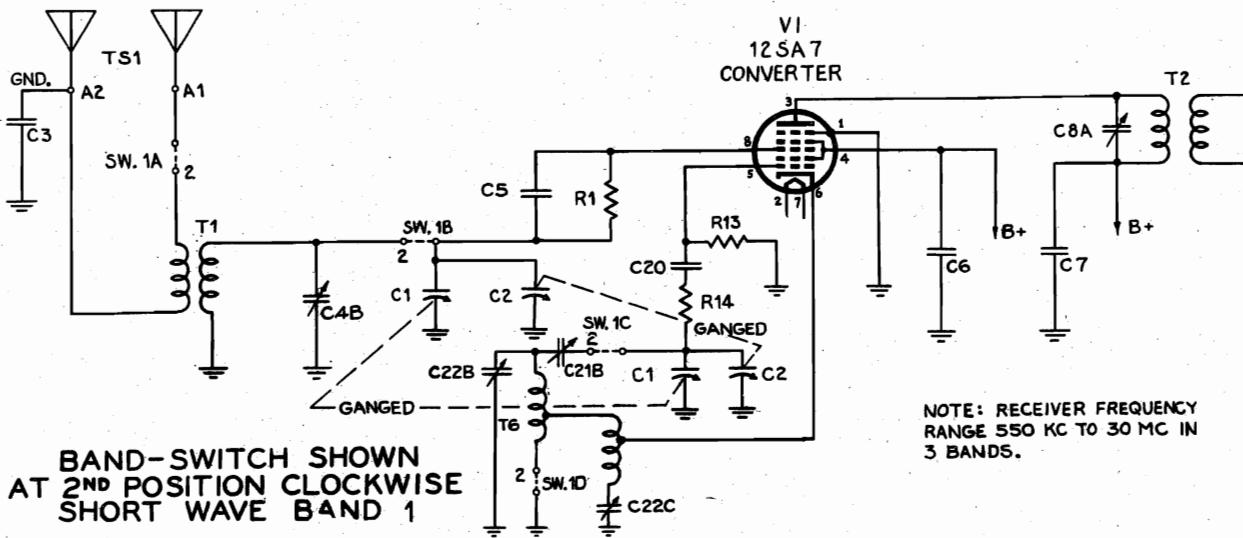
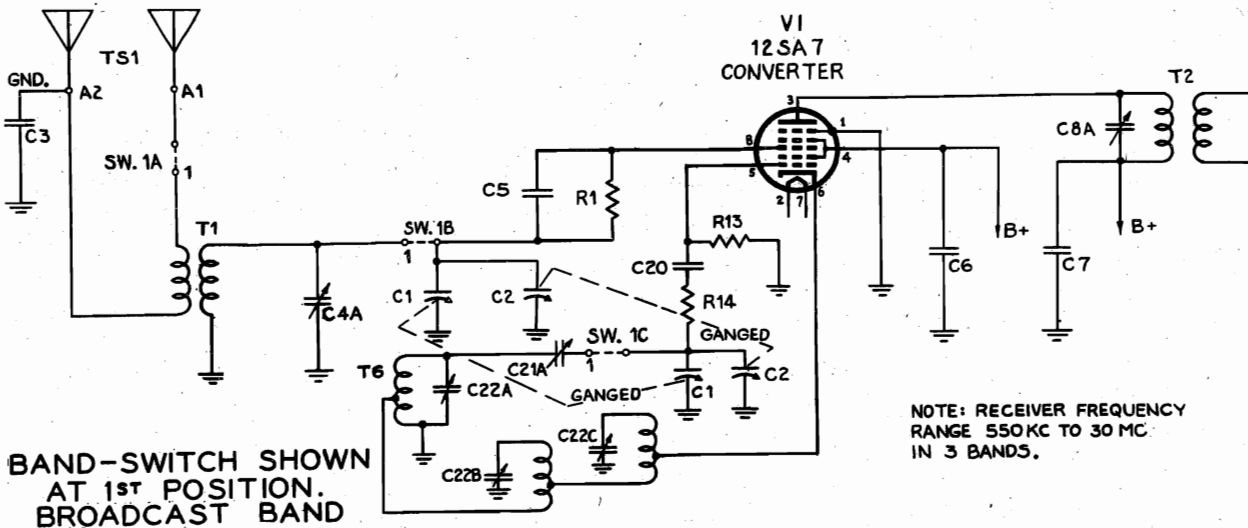
Foreign and Domestic Code Reception. - To receive code stations set the BROADCAST-CODE switch at CODE. All other controls are to be handled as for foreign and domestic broadcast.

"clarified schematics"

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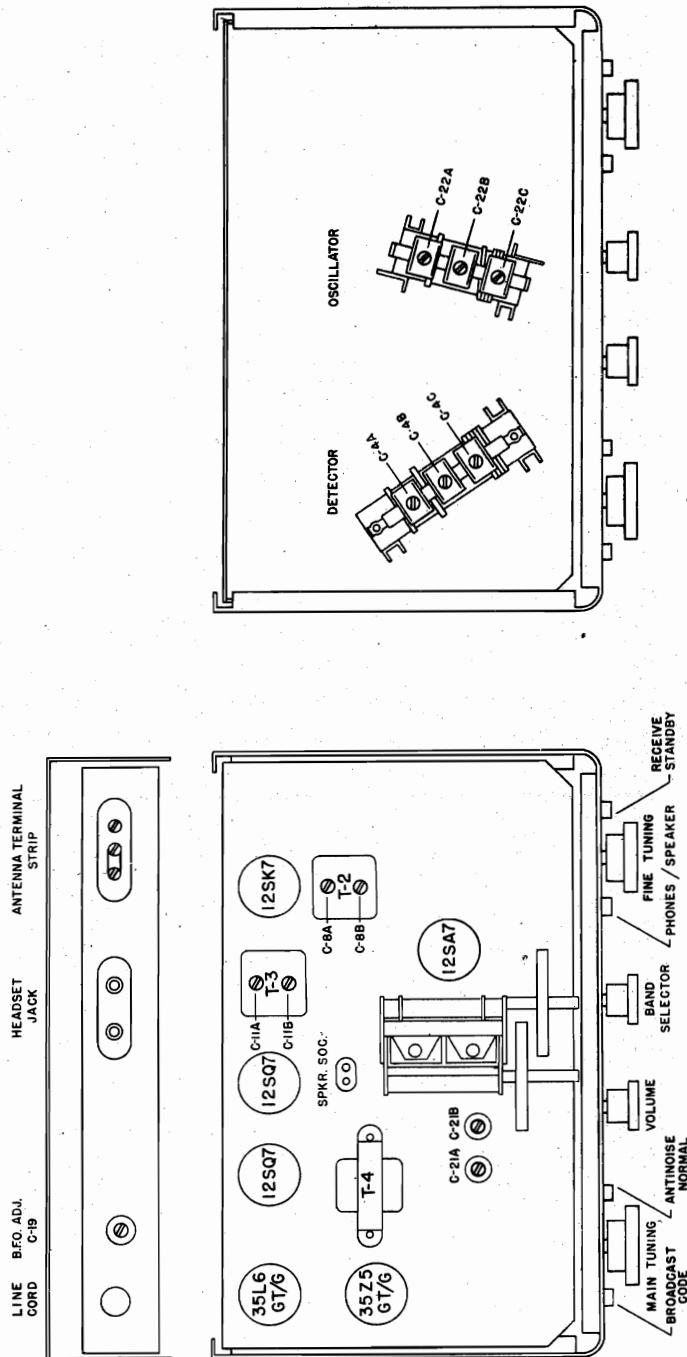
MODELS S-41G, S-41W

THE HALLICRAFTERS CO.



THE HALLICRAFTERS CO.

MODELS S-41G, S-41W

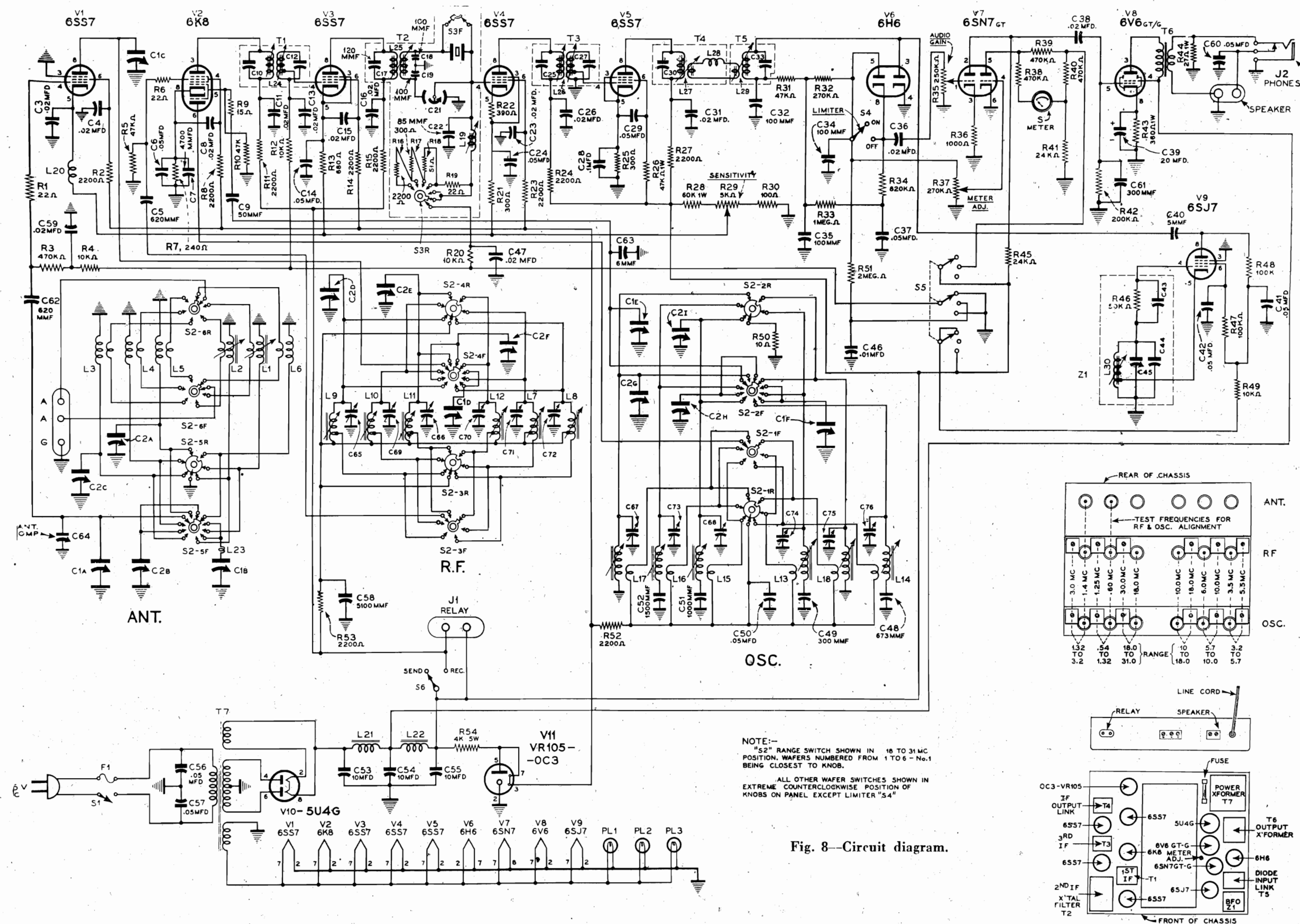


Listed below in table form, are the alignment frequencies and adjustments necessary to align the receiver. CAUTION - Do not connect signal generator ground directly to the chassis, connect it to the "G" terminal of the antenna terminal strip.

ALIGNMENT DATA

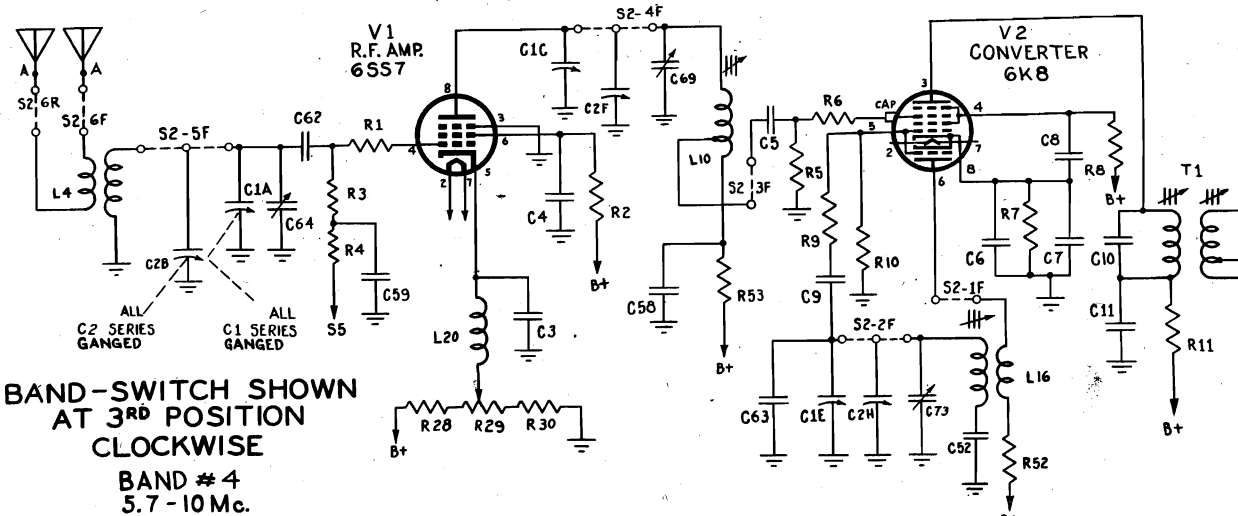
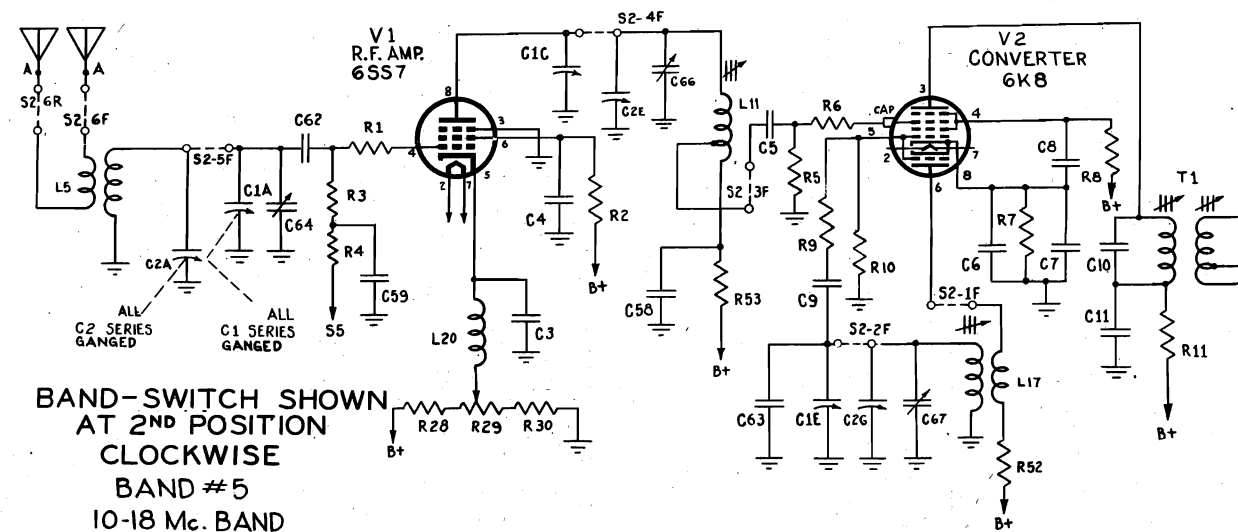
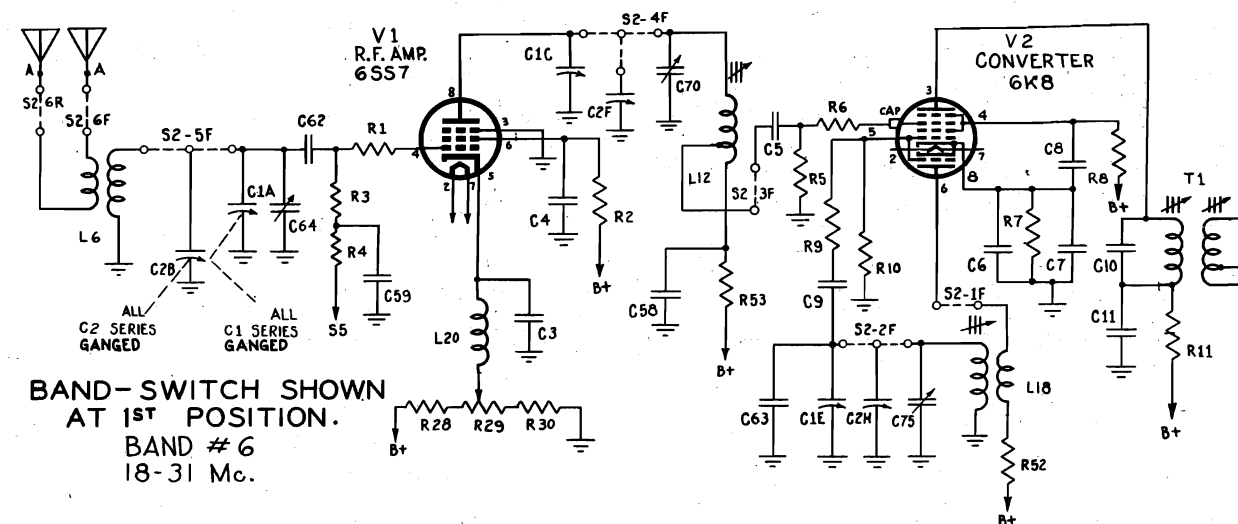
Band	Signal Generator Frequency	Dummy Antenna	Adjust Pads	Adjust Trimmers
I-F	455 kc.	None	None	C-8A, C-8B, C-11A, C-11B
RF0	455 kc.	None	Adjust capacitor C-19 for zero beat.	
1	600 kc. 1800 kc.	330 ohm 330 ohm	C-21A None	None C-22A
2	2.4 mc. 7.0 mc.	330 ohm 330 ohm	C-21B None	None C-22B
3	No low frequency adjustment on this band. 28 mc.	330 ohm	None	C-22C

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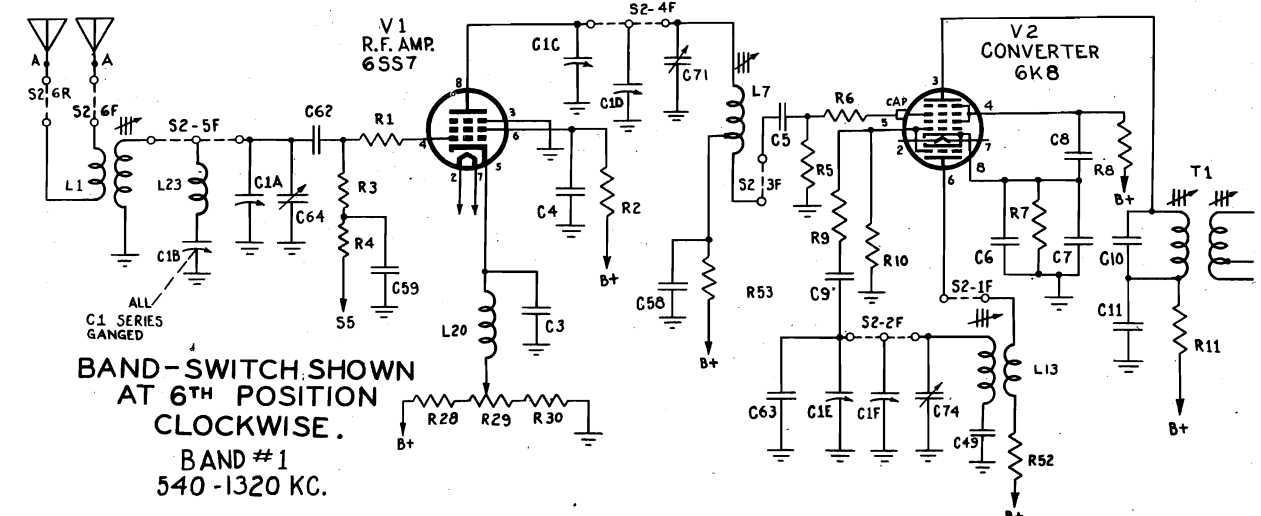
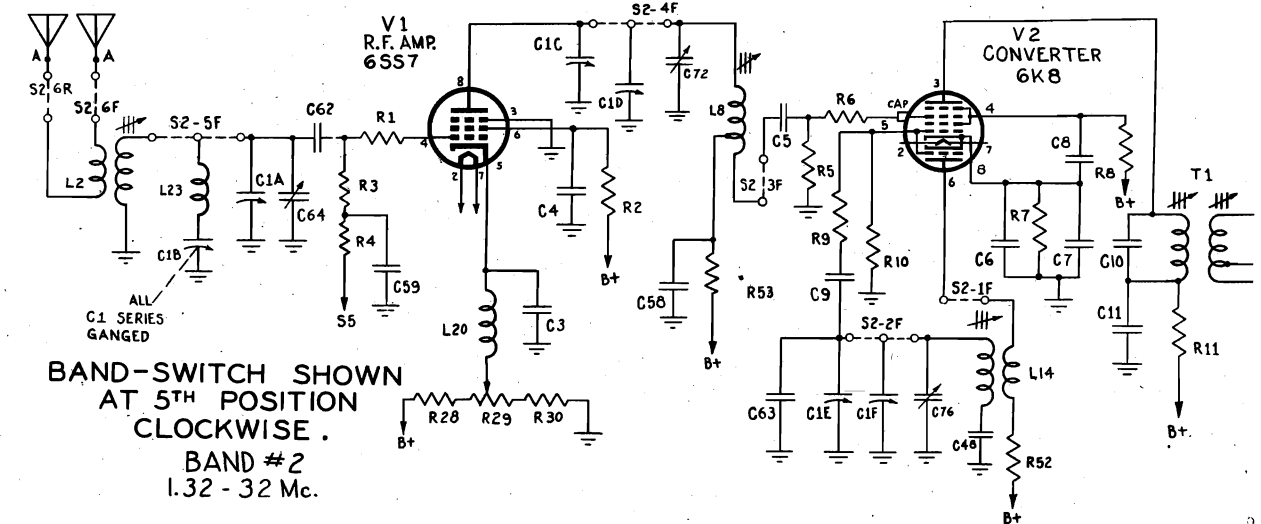
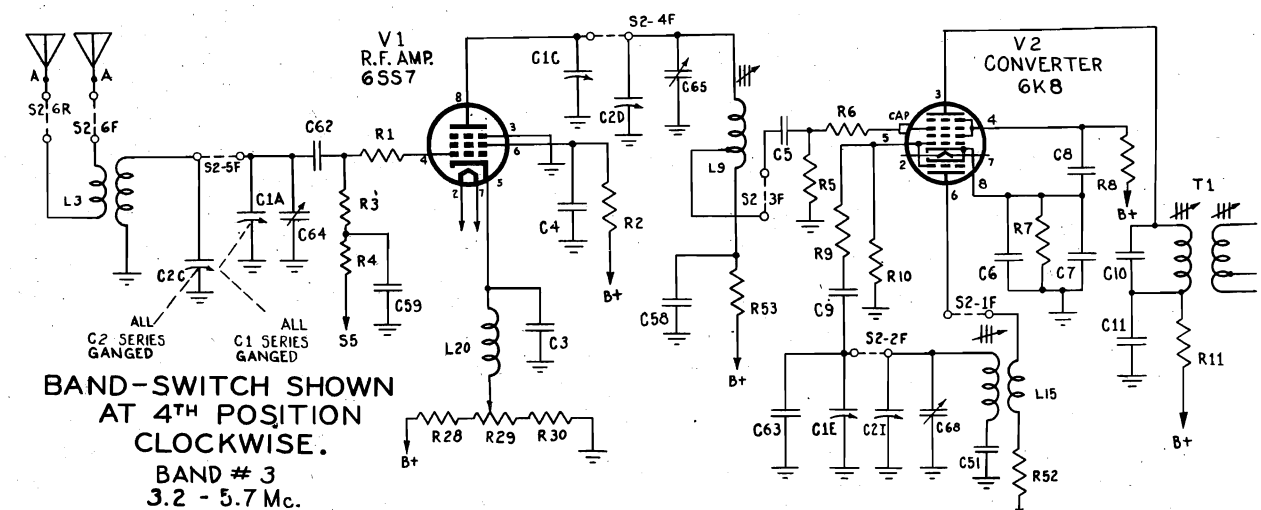
HAMMARLUND MFG. CO. INC.

MODEL HQ-129-X



MODEL HQ-129-X

HAMMARLUND MFG. CO. INC.



HAMMARLUND MFG. CO. INC.

MODEL HQ-129-X

TECHNICAL DESCRIPTION

This receiver is sensitive enough to pick up extremely weak signals and has the selectivity to separate signals in the more crowded bands. It covers a continuous range of frequencies from 540 KC. to 31 MC., or from 555 meters to 9.7 meters, in six bands. Band spread tuning is supplied on the four higher frequency bands, with actual calibration in the 80, 40, 20 and 10 meter amateur bands.

DESIGN

PRE-SELECTION

The pre-selection or tuned R.F. stage for each band of this receiver is designed for high performance. Entirely individual tuning coils are used for each band. These along with the multi-section variable condenser permit the proper LC ratio for best performance to be used with each band. Both grid and plate circuits are tuned. A compensating condenser, adjustable from the front of the panel, provides perfectly aligned input circuits with any given antenna system.

These features of design provide high selectivity and high gain and afford maximum signal-to-noise ratio and maximum image signal rejection.

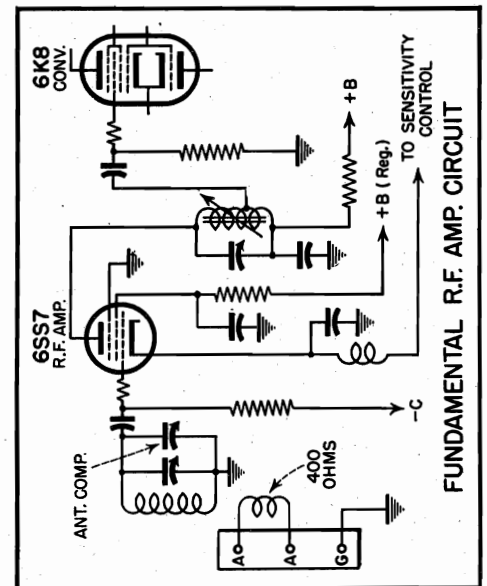


Fig. 2—Tuned R.F. amplifier and converter. Careful circuit design improves signal-to-noise ratio.

TUNING RANGES

Band	Frequency	Meters
1	540—1320 KC	Wave Length
2	1.32—3.2 MC	555—227
3	3.2—5.7 MC	227—93.7
4	5.7—10 MC	93.7—52.6
5	10—18 MC	52.6—30.0
6	18—31 MC	30—16.7
		16.7—9.7

TUBE LINE-UP

Symbol	Type	Function
V-1	6SS7 Triple-Grid Super Control Amplifier, Single Ended	R.F. Amplifier
V-2	6K8 Triode-Hexode Converter	Converter or 1st Detector and Oscillator
V-3	6SS7	1st I.F. Amplifier
V-4	6SS7	2nd I.F. Amplifier
V-5	6SS7	3rd I.F. Amplifier
V-6	6H6 Twin Diode	Detector and Noise Limiter
V-7	6SN7GT/G Twin Triode Amplifier	1st Audio Amplifier and "S" Meter Tube
V-8	6V6GT/G Beam Power Amplifier	Audio Power Amplifier and output Tube
V-9	6SJ7 Triple Grid Tube	Beat Frequency Oscillator
V-10 V11	5U4G OC3/VR105 Full Wave Rectifier Voltage Regulator	Rectifier Voltage Regulator

BAND SPREAD

An exceptionally wide band spread of 310 degrees supplied by a special 9 section condenser, is provided on the 4 higher frequency ranges. The band spread dial has 5 scales. Four of these are directly calibrated for the 80, 40, 20 and 10 meter amateur bands. The fifth

scale is an arbitrary 0-200 division scale, provided for making up calibration charts for other bands, such as the short wave international broadcast bands. It is also of use in logging stations.

The following table shows the approximate frequency range that can be covered by the band spread dial at different points on each of the 4 higher frequency bands.

Band	Low End	Middle	High End
3.2 MC— 5.7 MC	.4 MC	.7 MC	1.25 MC
5.7 MC— 10 MC	.2 MC	.5 MC	.9 MC
10 MC— 18 MC	.2 MC	.5 MC	.9 MC
18 MC— 31 MC	.6 MC	1.2 MC	2.2 MC

It should be noted that the Main Tuning dial has been calibrated with the Band Spread dial set at 200 which corresponds to minimum band spread capacity included in the circuit. To use band spread tuning, the Main Tuning dial should be set at the high frequency end of the desired band with the Band Spread dial set at 200. Lower frequencies such as those in the above table will then be obtained as the Band Spread dial setting is decreased.

CONVERTER STAGE

This converter stage uses the triode-hexode 6K8 tube which becomes more efficient as the frequency increases. The design of this converter stage is such that the over-all RF gain is relatively constant and uniform over the whole range of the receiver. This provides uniform operation and provides a true indication of signal strength, as shown on the "S" meter, over all the bands.

The stability of the oscillator is insured by a drift compensator, by low loss tube sockets, and by a ceramic oscillator switch section. It is further insured by its operation from a controlled voltage circuit which uses the OC3/VR-105 Voltage Regulator tube to keep the voltages constant regardless of line voltage fluctuation.

All these factors aid in maintaining the accuracy of the calibration of the receiver.

CRYSTAL FILTER AND PHASING CIRCUIT

The patented crystal filter included in the HQ-129-X Receiver is an outstanding Hammarlund development. Five degrees of selectivity,

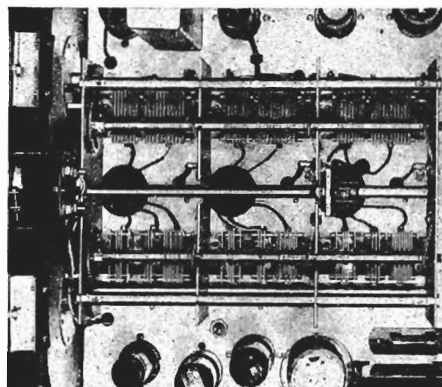


Fig. 3—Precision H.F. tuning assembly.

selected by a six-position panel control, are provided for reducing interference. Steps 1, 2, and 3, varying from broad to fairly sharp, may normally be used for phone reception, depending upon the degree of fidelity desired. Steps 4 and 5, giving sharper selectivity, may be used for CW code reception. The "OFF" position of the control cuts out the crystal filter when broadest selectivity or highest fidelity is desired. The curves of Fig. 5, indicate the degrees of broadness or sharpness that may be obtained.

Along with the crystal filter, a phasing control is provided to eliminate interfering heterodynes, within limits. Fig. 5, is a schematic diagram of the filter and phasing circuit. The complete unit is shown in Fig. 4.

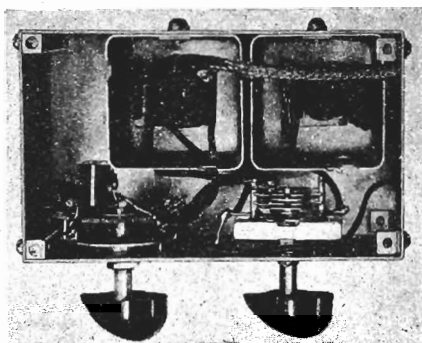


Fig. 4—Crystal Filter unit.

The over-all gain of the receiver is not noticeably affected by the changes in selectivity of the filter nor is the reading of the "S" Meter appreciably affected.

affect the intelligibility of the received signals, and it may be switched off when so desired.

"S" METER

The signal strength "S" meter which is operated from one section of the 6SN7 Tube shows the relative signal strength of the received signal. The dial is calibrated in units of 1 to 9. Each division represents a doubled signal strength over the previous division. For example, if division 6 corresponds to approximately 6.25 microvolts at the antenna terminals, division 7 represents approximately 12.5 microvolts, 8 represents 25 microvolts, and 9 represents 50. Each division therefore represents a 6 DB step. This relative sensitivity of the meter can be adjusted. In production it is arbitrarily adjusted to a reading

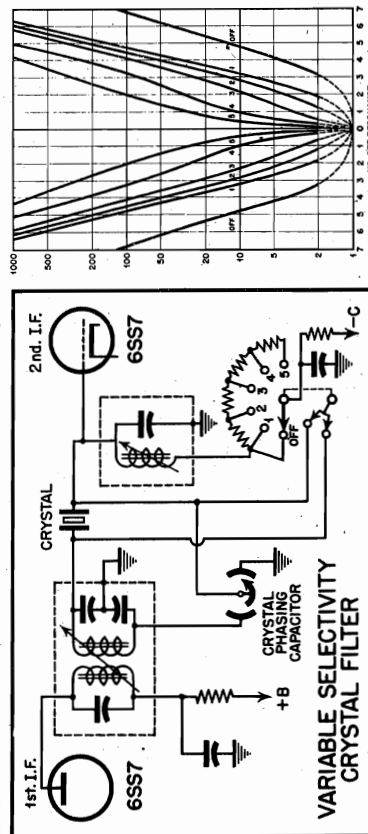


Fig. 5—Selectivity curve and crystal filter circuit.

I. F. AMPLIFIER

Three stages of I.F. amplification are provided. The gain per stage is purposely made low, in order to maintain stability. Iron core permeability-tuned transformers are used for improved performance and for ease of adjusting. Silvered mica condensers are used in each transformer circuit to improve its stability. The intermediate frequency is 455 KC—the R.M.A. standard frequency.

Over-all selectivity curves for this amplifier and the crystal filter are shown in Fig. 5.

A.V.C. SYSTEM

The automatic volume control system in the HQ-129-X gives remarkably smooth operation. The RF stage and the first two I.F. stages are automatically controlled. A switch is provided for shifting from AVC to manual control, when so desired.

SECOND DETECTOR

One section of a 6H6 tube is used for the second detector and for the A.V.C. system. This system is well designed and produces a minimum of distortion.

NOISE LIMITER

The other section of the 6H6 tube is employed as a noise limiter. It is designed to reduce automobile ignition interferences and other similar disturbances to a negligible amount. Its operation does not

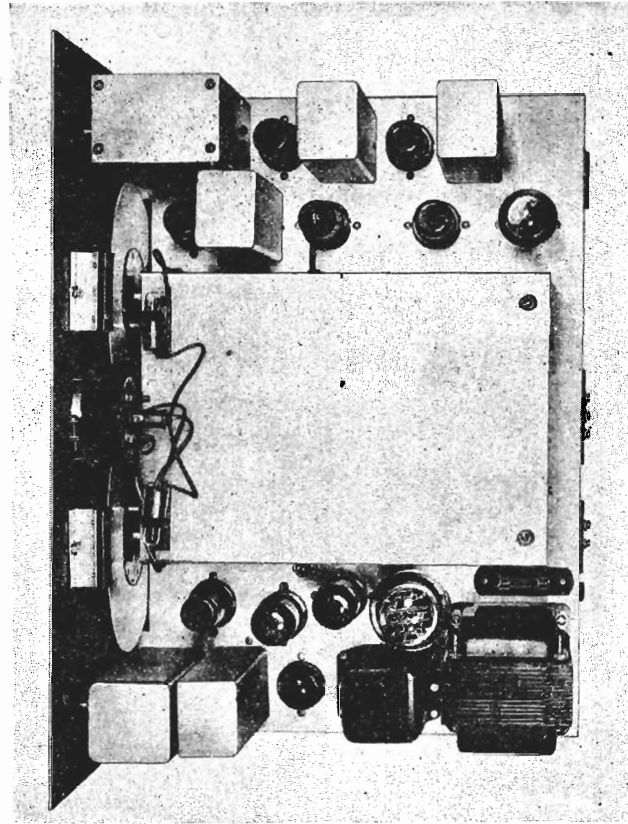


Fig. 6—Top view showing chassis layout.

of 9 for an input of approximately 50 microvolts. Should this not correspond with your previous experience with a strength 9 signal, readjust the slotted shaft, located near the 6V6 and the 6SN7 tubes, as shown on the chart in Fig. 8.

MODEL HQ-129-X

HAMMARLUND MFG. CO. INC.

BEAT FREQUENCY OSCILLATOR

The Beat Frequency Oscillator is designed for the reception of CW or unmodulated code signals. The control on the front panel provides a wide selection of beat frequencies for the best tone to cut through any interfering signals. The oscillator is of the electron coupled type, has excellent stability, and is designed to have no material affect on the operation of the I.F. Amplifier. A switch is provided for turning this oscillator on or off at will.

AUDIO AMPLIFIER

The first stage of the audio amplifier is a resistance coupled triode voltage amplifier using one section of the twin triode 6SN7 tube. The final stage uses a 6V6 Beam Power amplifier Tube and supplies an undistorted power output of approximately 3 watts. An output transformer with an output impedance of 6 ohms is used to connect directly to the voice coil of a suitable permanent magnet type dynamic

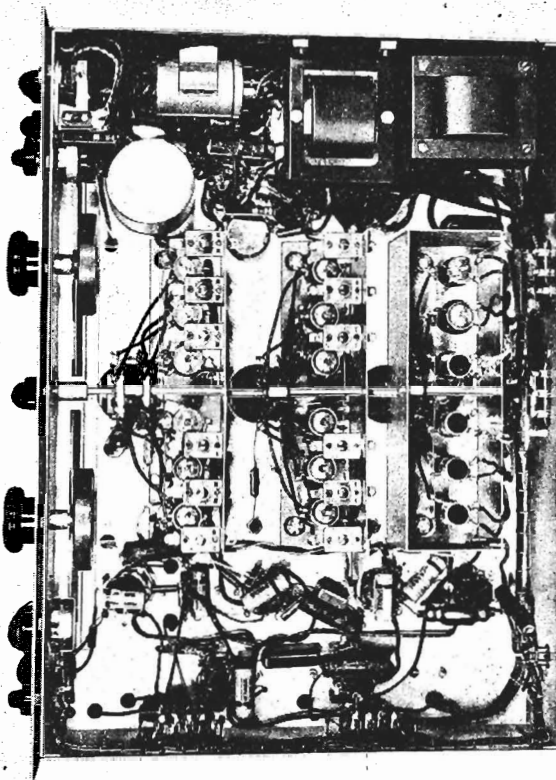


Fig. 7—Bottom view showing placement of parts.

speaker. A phone jack is connected across the same output and disconnects the speaker when headphones are plugged in. A manual gain control is provided.

POWER SUPPLY

All components of the power supply have a very large safety factor in order to insure satisfactory operation over a long period of time. A two-section filter is employed with a total inductance of 40 henries and a total capacitance of 30 microfarads. This heavy duty filter provides humless operation.

ANTENNA SUGGESTIONS

Because of the high sensitivity of the HQ-129-X receiver, the antenna is usually not critical. Often an indoor wire 20 to 50 feet long, strung along the base board or along the ceiling molding of a room will give surprisingly good reception. A long single wire outdoor antenna, such as shown in Fig. 9, will generally give entirely satisfactory reception. This wire may be 50 to 75 feet long. The more isolated this antenna is from neighboring objects the better the reception will be.

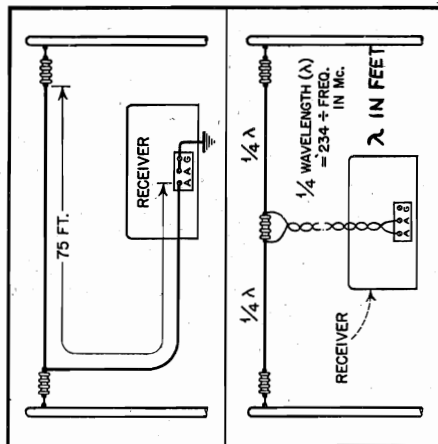


Fig. 9—Antenna suggestions.

REALIGNMENT PROCEDURE—I.F. AMPLIFIER

Tuning of the intermediate-frequency transformers is accomplished by the use of iron-core permeability-tuned coils together with fixed silvered-mica capacitors, resulting in a very high degree of stability. This, together with the mechanical arrangement provided, precludes the possibility of any appreciable drift or change of setting. Therefore, re-alignment should not be necessary, except when parts are re-

HAMMARLUND MFG. CO. INC.

MODEL HQ-129-X

placed which would affect tuning of the I.F. circuits (like I.F. transformer or crystal).

Alignment of the I.F. channel should not be attempted unless suitable equipment is on hand. Proper alignment is accomplished by the visual method employing a cathode-ray oscilloscope used in conjunction with a frequency-modulated (swept) signal generator, having a fairly constant output. The oscilloscope should be externally synchronized by the signal generator.

The transformers must be tuned for symmetry and proper coincidence of the visible curves, as well as for amplitude. This requires a stage-by-stage alignment, starting with the Diode Input Link Transformer (T5) and continuing back through the First I.F. Transformer (T1). The procedure is as follows:

- 1) Set the Main Tuning capacitor to .54 M.C. and the band-switch to .54-1.32 M.C., the Send-Receive switch to Receive, the Limiter "off", the MAN-AVC-BFO switch to MAN position and the Crystal Selectivity switch to "off" position.

- 2) Now, with the generator set at 455 K.C. and applying the signal to the grid (pin #4) of the Third I.F. tube (V5), adjust the plate inductor (L27) of the I.F. Output Link (T4) and the Diode Input inductor (L29) of the Diode Input Link (T5), alternately, to obtain maximum amplitude, symmetry and pattern coincidence on the oscilloscope.

- 3) Apply the signal input lead to the grid (pin #4) of the 2nd I.F. tube (V4). Turn the two adjustment screws of the 3rd I.F. Transformer to obtain symmetrical, coinciding curve with as much amplitude as possible without disturbing the pattern.

- 4) Switch the signal input lead to the grid (pin #4) of the 1st I.F. tube (V3), and adjust the lower (plate) inductor (L25) of the Crystal Filter (T2) for maximum amplitude at center of curve.

- 5) Apply the signal input to the grid cap of 6K8 mixer tube (V2). Adjust screws of 1st I.F. Transformer (T1) as in (3). This should result in a tall selectivity curve with a slightly flattened peak.

- 6) Turn Crystal Selectivity switch to position #1, set Crystal Phasing pointer on arrow, and adjust the upper (grid) inductor (L19) of the Crystal Filter (T2) for maximum amplitude and

symmetry. Adjust signal input or receiver Sensitivity control to prevent overloading.

- 7) Switch Crystal Selectivity to position #2 and adjust Phasing control slightly from the arrow position, if necessary, to obtain identical images.

Adjust the signal generator frequency to obtain coincidence of the images, and if complete coincidence is not obtained, alternately make slight adjustments of the phasing control and the signal generator frequency, until images coincide.

These last steps have determined the exact frequency of the quartz crystal and the frequency setting of the signal generator should be left undisturbed.

- 8) Repeat carefully the complete I.F. alignment procedure (steps 1 through 7) for the crystal frequency.

R.F. AND H.F. OSCILLATOR

As in the case of the I.F. amplifier, the R.F. stage and the H.F. oscillator were accurately aligned at the factory with the aid of calibrated oscillators that are frequently compared with standard frequency crystals. These circuits are designed to insure permanence of adjustment and should not be disturbed unless it is positive that readjustment is necessary.

The front row of adjustments, shown on the chart (Fig. 8), control the H.F. Oscillator circuits and consequently the dial calibration. To check these adjustments the band spread dial must be at 200, since that is the setting at which the main dial was calibrated. An accurate test oscillator is necessary. Connect the test oscillator to the antenna terminals and set it and the MAIN TUNING dial at the frequency indicated on the chart. The inductance is adjusted at a low frequency and the trimmer at a high frequency in each band, each being adjusted for maximum response. Generally a small fraction of a turn will suffice. These adjustments mutually affect each other. Therefore, if much damage is made at one end of a band, the other end of the same band must be readjusted. This procedure must be repeated until further readjustment at either end is unnecessary.

The adjustments in the middle row control the mixer input cir-

MODEL HQ-129-X

HAMMARLUND MFG. CO. INC.

PARTS LIST HQ-129X

SCHEMATIC DESIGNATION	DESCRIPTION	HML'D. PART NO.
C1, AF	Capacitors	
C2, A1	Main tuning, variable (Part of SA-610)	23912-1
C3, 4	Band-spread, variable (Part of SA-610)	23005-86B
C5	Paper tubular, .02 uf 500 W.V.D.C.	23912-2
C6	Mica, 620 uf 500 W.V.D.C.	23015-5B
C7	Paper tubular, .05 uf 500 W.V.D.C.	23912-1
C8	Mica, 4700 uf 500 W.V.D.C.	23002-11D
C9	Paper tubular, .02 uf 500 W.V.D.C.	
C10	Silver mica, 50 uf 500 W.V.D.C.	23912-1
C11	Silver mica (Part of T1, I.F. Transformer #6335)	
C12	Paper tubular, .02 uf 500 W.V.D.C.	23912-1
C13	Silver mica (Part of T1, I.F. Transformer #6335)	
C14	Paper tubular, .02 uf 500 W.V.D.C.	23912-2
C15, 16	Paper tubular, .05 uf 500 W.V.D.C.	23912-1
C17	Paper tubular, .02 uf 500 W.V.D.C.	23003-96D
C18, 19	Silver mica, 120 uf 500 W.V.D.C.	23001-48B
C21	Mica, 100 uf 500 W.V.D.C.	SA-604
C22	Crystal phasing, variable	6180
C23	Silver mica, 85 uf 500 W.V.D.C.	23912-1
C24	Paper tubular, .02 uf 500 W.V.D.C.	23912-2
C25	Paper tubular, .05 uf 500 W.V.D.C.	
C26	Silver mica (Part of T3, I.F. Transformer #6335)	23912-1
C27	Paper tubular, .02 uf 500 W.V.D.C.	
C28	Silver mica (Part of T3, I.F. Transformer #6335)	23912-3
C29	Paper tubular, .01 uf 500 W.V.D.C.	23912-2
C30	Paper tubular, .05 uf 500 W.V.D.C.	6195
C31	Paper tubular, .05 uf 500 W.V.D.C.	23912-1
C32	Silver mica, 95 uf 500 W.V.D.C.	23001-48B
C33	Paper tubular, .02 uf 500 W.V.D.C.	6195
C34, 35	Mica, 100 uf 500 W.V.D.C.	23001-48B
C36	Paper tubular, .02 uf 500 W.V.D.C.	23912-1
C37	Paper tubular, .05 uf 500 W.V.D.C.	23912-2
C38	Paper tubular, .02 uf 500 W.V.D.C.	23912-1
C39	Electrolytic, 20 uf 25 W.V.D.C. (Part of 23840-1)	
C40	Silver mica, 5 uf 500 W.V.D.C.	23002-1D
C41, 42	Paper tubular, .05 uf 500 W.V.D.C.	23912-2
C43	Silver mica (Part of Z1, B.F.O. Assy. #26021-G1)	
C44	Silver mica (Part of Z1, B.F.O. Assy. #26021-G1)	SA-681
C45	B.F.O., variable (Part of Z1, B.F.O. Assy. #26021-G1)	23912-4
C46	Paper tubular, .01 uf 200 W.V.D.C.	23912-1
C47	Paper tubular, .02 uf 500 W.V.D.C.	6061
C48	Silver mica 673 uf 500 W.V.D.C.	23003-105D
C49	Silver mica 300 uf 500 W.V.D.C.	23912-2
C50	Paper tubular, .05 uf 500 W.V.D.C.	23015-40B
C51	Mica, 1000 uf 500 W.V.D.C.	23015-20B
C52	Mica, 1500 uf 500 W.V.D.C.	
C53, 54, 55	Electrolytic 10/10/10 uf 450 W.V.D.C. (Part of 23840-1)	23912-2
C56, 57	Paper tubular, .05 uf 500 W.V.D.C.	23015-16B
C58	Mica, 5100 uf 500 W.V.D.C.	23912-1
C59	Paper tubular, .02 uf 500 W.V.D.C.	23912-2
C60	Paper tubular, .05 uf 500 W.V.D.C.	

cuits. To adjust these, set the oscillator to the frequency indicated on the chart and tune it in on the receiver. Employing an output meter, make the adjustments for peak meter readings. At 30 mc. there is a certain amount of interlocking between the detector and H.F. oscillator making it necessary to rock the tuning capacitor back and forth while adjusting the trimmer capacitor, in order to avoid a false setting.

The chart below, Fig. 10, gives the values of the voltages between the tube socket terminals and ground or B- negative side of the circuit. The meter scale that should be used for making the check is shown in parenthesis below the voltage. A meter having a resistance of 1000 ohms per volt should be used. Small variations in voltages do not indicate trouble. With the aid of this chart and the circuit diagram (Fig. 8) the ailing capacitor or resistor can be found.

TUBE	LINE VOLTAGE 115V. A.C.										SWITCH ON AVC	SWITCH ON BFO
	RF 6SS7	Conv. 6K8	1-IF 6SS7	2-IF 6SS7	3-IF 6SS7	Detector Limiter 6H6	Out-put 6V6	Rectifier 5U4G	Reg. Point 105	1st Audio 6SN7-GT/G		
Pin 1 to ground.....	...	...	...	...	...	...	...	Tie Point 212 (300)	Tie Point 83 (150)	...	...	...
Pin 2 to ground.....	...	...	...	...	...	6.2 A.C.	...	300 (750)	...	113 (150)	...	...
Pin 3 to ground.....	...	210 (300)	6.3 (15)	4.3 (15)	3.5 (15)	-0.4 (15)	254 (300)	Tie Point 212 (300)	Tie Point 108 (150)	3.6 (15)	...	...
Pin 4 to ground.....	...	91 (150)	...	...	...	...	268 (300)	Tie Point 280 A.C.	Tie Point 108 (150)	-0.3 (15)	...	...
Pin 5 to ground.....	3.2 (15)	...	6.3 (15)	6.3 (15)	3.5 (15)	-0.2 (15)	...	...	108 (150)	5.6 (15)	...	...
Pin 6 to ground.....	102 (150)	98 (150)	105 (150)	105 (150)	97 (150)	Tie Point	Tie Point 210 (300)	280 A.C.	2.8 (15)	...	58 (150)	...
Pin 7 to ground.....	6.2 A.C.	6.2 A.C.	6.2 A.C.	6.2 A.C.	6.2 A.C.	...	6.2 A.C.	Tie Point 212 (300)	Tie Point 108 (150)	6.2 A.C.	6.2 A.C.	...
Pin 8 to ground.....	106 (300)	3.2 (15)	206 (300)	204 (300)	193 (300)	-0.2 (15)	14 (30)	300 (750)	Tie Point 108 (150)	...	34.5 (150)	...

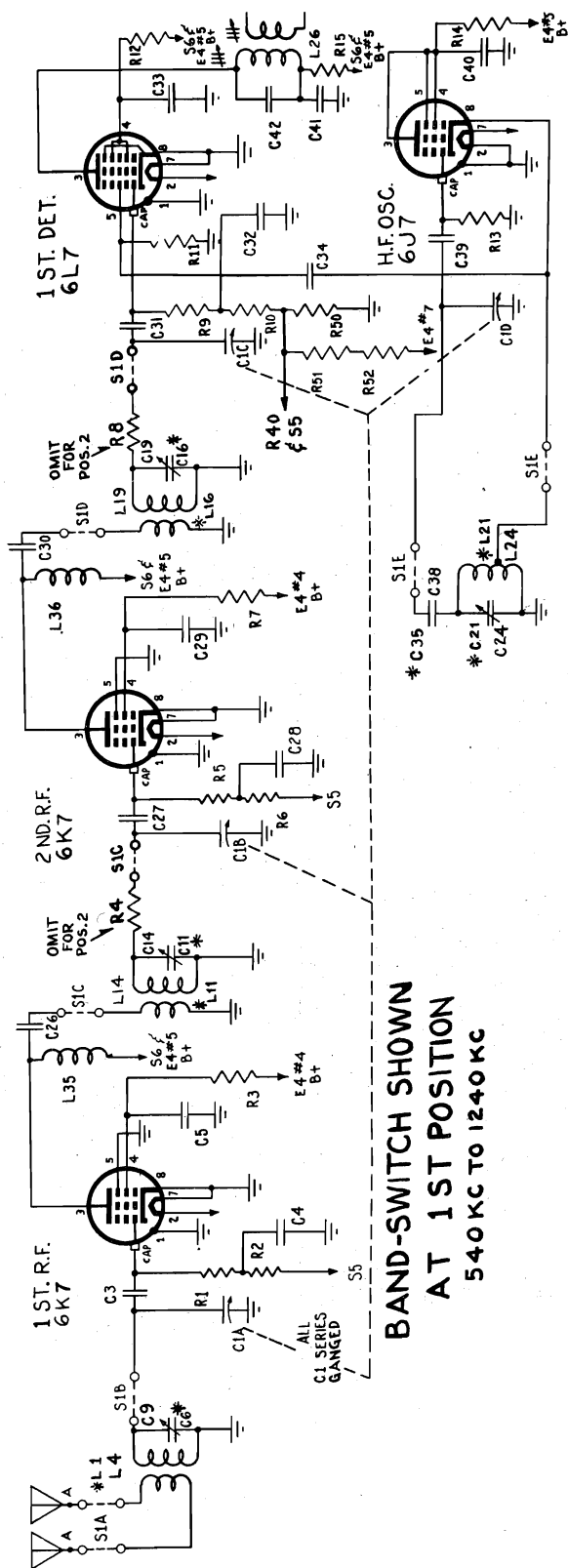
Fig. 10

HAMMARLUND MFG. CO. INC

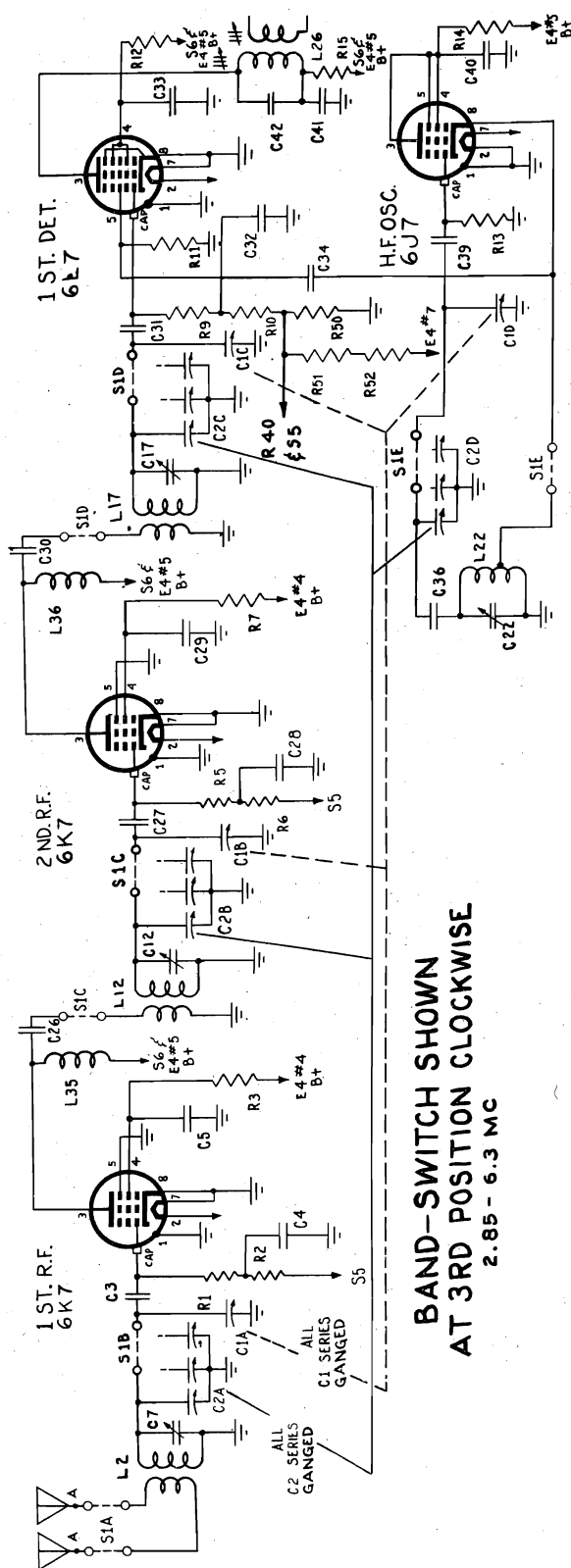
MODEL HQ-129-X

PARTS LIST HQ-129X—Cont.

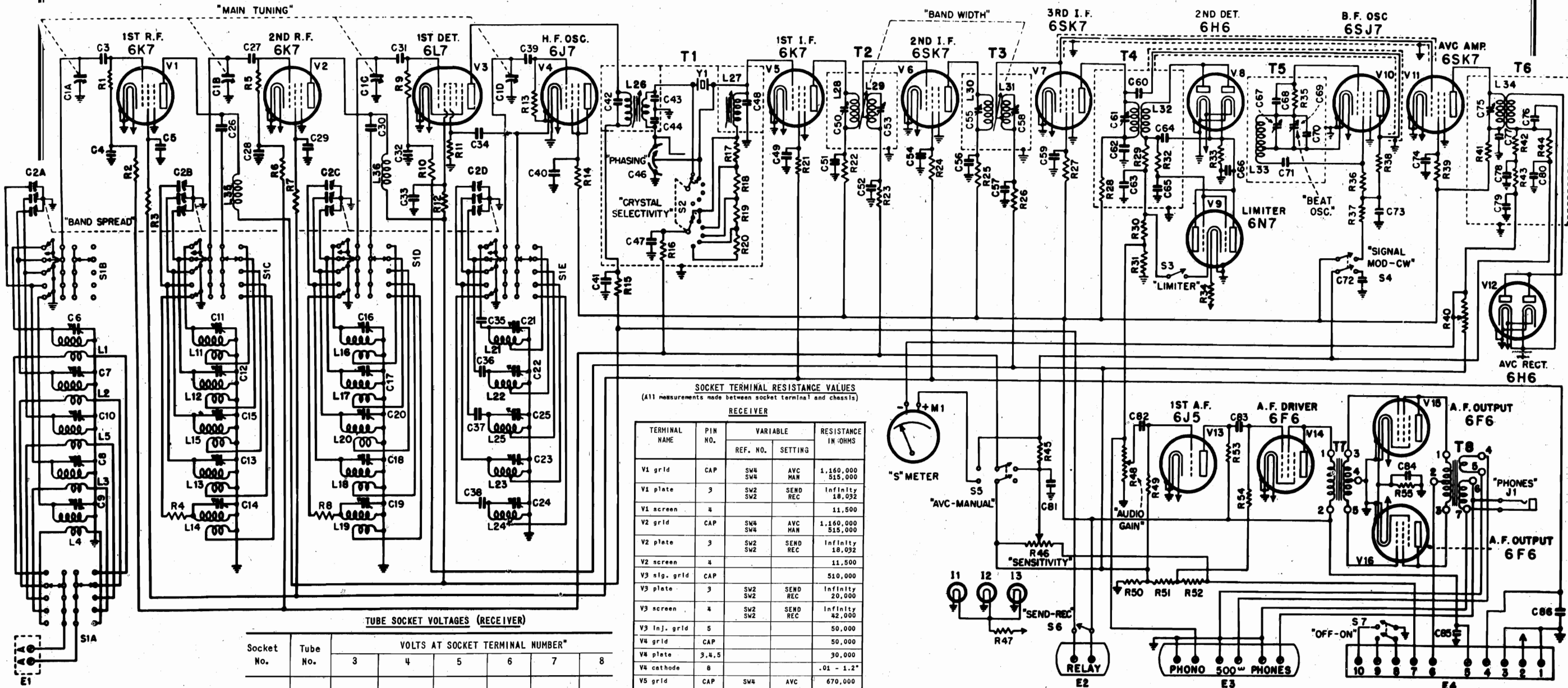
SCHEMATIC DESIGNATION	DESCRIPTION	HML'D. PART NO.
CAPACITORS—Continued		
C61	Mica 300 uuf 500 W.V.D.C.	23001-75B
C62	Mica 620 uuf 500 W.V.D.C.	23005-86B
C63	Ceramic N750K 6uuf 500 W.V.D.C.	23023-34
C64	Antenna Comp., variable. (Part of SA-610)	SA-617
C65-68	Trimmer, mica, 1.5 - 9 uuf	6189-G2
C-69-76	Trimmer, mica, 3-35 uuf	6055-G1
F1	Fuse, 2 amp. type 3AG	15928-7
J1	Relay jack	6142
J2	Phone jack	6087
INDUCTORS		
L1	Antenna coil assembly 54-1.32 mc range	26051-G1
L2	Antenna coil assembly 132-3.2 mc range	26051-G2
L3	Antenna coil 3.2-5.7 mc range	6013
L4	Antenna coil 5.7-10 mc range	6016
L5	Antenna coil 10-18 mc range	6019
L6	Antenna coil 18-31 mc range	6022
L7	R.F. coil assembly 54-1.32 mc range	26047-G2
L8	R.F. coil assembly 132-3.2 mc range	26047-G1
L9	R.F. coil assembly 3.2-5.7 mc range	26047-G6
L10	R.F. coil assembly 5.7-10 mc range	26047-G5
L11	R.F. coil assembly 10-18 mc range	26047-G4
L12	R.F. coil assembly 18-31 mc range	26047-G3
L13	H.F. osc. coil assembly 54-1.32 mc range	26030-G2
L14	H.F. osc. coil assembly 132-3.2 mc range	26030-G1
L15	H.F. osc. coil assembly 3.2-5.7 mc range	26030-G6
L16	H.F. osc. coil assembly 5.7-10 mc range	26030-G5
L17	H.F. osc. coil assembly 10-18 mc range	26030-G4
L18	H.F. osc. coil assembly 18-31 mc range	26030-G3
L19	Crystal filter grid coil (Part of Assy. #SA788)	
L20	R.F. choke (CHX)	6181
L21	Filter choke	6084
L22	Filter choke	26054-1
L23	R.F. choke	
L24	1st I.F. coil (Part of T1, #6335)	
L25	Crystal filter plate coil (Part of Assy. #SA787)	
L26	3rd I.F. coil (Part of T3, #6335)	
L27	I.F. output coil (Part of T4, #SA797)	
L28	Series coupling coil (Part of T4, #SA797)	
L29	Diode input coil (Part of T5, #SA799)	
L30	B.F.O. coil (Part of ZL, #26021-G1)	
M1	"S" meter	4903
PL1, 2, 3	Pilot lamp #47 6.3 V., .15 amp.	16004
RESISTORS		
R1	22 ohms, 1/2 W.	19302-9
R2	2200 ohms, 1/2 W.	19301-40
R3	470,000 ohms, 1/2 W.	19301-96
R4	10,000 ohms, 1/2 W.	19301-56
R5	47,000 ohms, 1/2 W.	19301-72
R6	22 ohms, 1/2 W.	19302-9
R7	240 ohms, 1/2 W.	19302-34
R8	2200 ohms, 1/2 W.	19301-40
R9	15 ohms, 1/2 W.	19302-5
R10	47,000 ohms, 1/2 W.	19301-72
R11	2200 ohms, 1/2 W.	19301-40
R12	10,000 ohms, 1/2 W.	19301-56
R13	680 ohms, 1/2 W.	19301-28
RESISTORS—Continued		
R14, 15, 16	2200 ohms, 1/2 W.	19301-40
R17	300 ohms, 1/2 W.	19301-196
R18	51 ohms, 1/2 W.	19301-187
R19	22 ohms, 1/2 W.	19302-9
R20	10,000 ohms, 1/2 W.	19301-56
R21	300 ohms, 1/2 W.	19301-196
R22	390 ohms, 1/2 W.	19301-22
R23, 24	2200 ohms, 1/2 W.	19301-40
R25	300 ohms, 1/2 W.	19301-196
R26	47,000 ohms, 1 W.	19303-61
R27	2200 ohms, 1/2 W.	19301-40
R28	60,000 ohms, 1 W.	19310-231
R29	Potentiometer, 5,000 ohms	15305-4
R30	100 ohms, 1/2 W.	19301-8
R31	47,000 ohms, 1/2 W.	19301-72
R32	270,000 ohms, 1/2 W.	19301-90
R33	1 Meg ohms, 1/2 W.	19301-104
R34	820,000 ohms, 1/2 W.	19301-102
R35	Potentiometer, 250,000 ohms (Switch Attached)	15356-1
R36	1,000 ohms, 1/2 W.	19301-32
R37	Potentiometer, 270,000 ohms	15357-1
R38, 39, 40	470,000 ohms, 1/2 W.	19301-96
R41	24,000 ohms, 1/2 W.	19301-213
R42	200,000 ohms, 1/2 W.	19301-220
R43	360 ohms, 1 W.	19305-38
R44	27 ohms, 1 W.	19305-11
R45	24,000 ohms, 1 W.	19310-187
R46	50,000 ohms (Part of ZL, B.F.O. Assy. #26021-G1)	19301-80
R47, 48	100,000 ohms, 1/2 W.	19301-56
R49	10,000 ohms, 1/2 W.	19302-1
R50	10 ohms, 1/2 W.	19301-169
R51	2 meg. ohms, 1/2 W.	19301-40
R52, 53	2200 ohms, 1/2 W.	19380-47
R54	4,000 ohms, 5 W., wire wound	
SWITCHES		
S1	H.F. Osc. Plate (Part of R29, potentiometer #15305-4)	6331
S2-1 F.R.	H.F. Osc. Grid	6332
S2-2 F.R.	Det. Grid Tap	6064
S2-3 F.R.	Det. Grid Tap	6063
S2-4 F.R.	R.F. Plate	6063
S2-5 F.R.	R.F. Grid	6062
S2-6 F.R.	Antenna	26035-G1
S3 F.R.	Crystal filter assy.	6333
S4	Limiter	6097
S5	MAN-AVC-BFO	6333
S6	Send-Rec.	
TRANSFORMERS		
T1	1st I.F.	6335
T2	Crystal filter assy. (2nd I.F.)	SA785
T3	3rd I.F.	6335
T4	I.F. output coil assy. (Link)	SA797
T5	Diode input coil assy. (Link)	SA799
T6	Audio output transformer	6086
T7	Power transformer	26012
X1	Quartz crystal	6338
Z1	B.F.O. assembly	26021-G1



BAND-SWITCH SHOWN AT 2nd POSITION CLOCKWISE
1.24 MC - 2.88 MC



BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE
2.85 - 6.3 MC



SOCKET TERMINAL RESISTANCE VALUES				
(All measurements made between socket terminal and chassis)				
RECEIVER				
TERMINAL NAME	PIN NO.	VARIABLE	RESISTANCE IN OHMS	
V1 grid	CAP	SW4	AVC	1,160,000
V1 plate	3	SW2	SEND REC	Infinity
V1 screen	4			11,500
V2 grid	CAP	SW4	AVC	1,160,000
V2 plate	3	SW2	SEND REC	Infinity
V2 screen	4			11,500
V3 sig. grid	CAP			510,000
V3 plate	3	SW2	SEND REC	Infinity
V3 screen	4	SW2	SEND REC	Infinity
V3 inj. grid	5			50,000
V4 grid	CAP			50,000
V4 plate	3,4,5			30,000
V4 cathode	8			.01 - 1.2"
V5 grid	CAP	SW4	AVC	670,000
V5 plate	3	SW4	MAN	14,600
V5 screen	4	SW4	MAN	10,300
V6 grid	4	SW4	AVC	670,000
V6 plate	3	SW4	MAN	14,600
V6 screen	4	SW4	MAN	10,300
V6 screen	4			11,500
V6 plate	8			20,000
V7 grid	4			10,300
V7 screen	6			68,000
V7 plate	8			20,000
V8 plates	3,5			217,000
V8 cathodes	4,8			250,000
V9 plates	3,6			250,000
V9 grids	4,5			1,220,000
V9 heater	7			4"
V9 cathode	8	SW5	ON OFF	117,000
V10 grid	4			100,000

TUBE SOCKET VOLTAGES (RECEIVER)							
Socket No.	Tube No.	VOLTS AT SOCKET TERMINAL NUMBER*					
		3	4	5	6	7	8
X1	V1	+250	+135		+135	6.3AC	0
X2	V2	+250	+135		+135	6.3AC	0
X3	V3	+250	+115			6.3AC	0
X4	V4	+150**	+150**	+150**		6.3AC	0
X5	V5	+250	+135	0		6.3AC	0
X6	V6	0	-43	0	+135	6.3AC	+250
X7	V7	0	-1.5	0	+100	6.3AC	+240
X8	V8	-.2	+4	-.2		6.3AC	+4
X9	V9	+4	0	0	+4	4.0AC	-.2
X10	V10	0		0	+40	6.3AC	+155
X11	V11	0	-1.5	0	+110	6.3AC	+240
X12	V12	-3.2	0	-3.2		6.3AC	0
X13	V13	+110			-3.2	6.3AC	0
X14	V14	+240	+240		-20	6.3AC	0
X15	V15	+380	+380	0		6.3AC	+38
X16	V16	+380	+380	0		6.3AC	+38

SENSITIVITY and AUDIO GAIN should be set at a 0

SIGNAL-MOD-CW switch should be on CW.

AVC-MANUAL switch should be on MANUAL.

SEND-REC switch should be on REC.

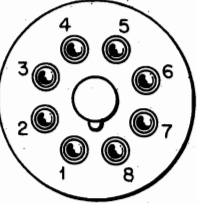
LIMITER switch should be ON.

*Terminals 1 and 2 of all sockets are at zero potential with respect to chassis.

**Varies widely with different tubes; also with dial setting.

SOCKET TERMINAL RESISTANCE VALUES				
(All measurements made between socket terminal and chassis)				
TERMINAL NAME	PIN NO.	VARIABLE	RESISTANCE IN OHMS	
V10 screen	6	SW3	CW MOD	523,000
V10 plate	8	SW3	CW MOD	73,000
V11 grid	4			10,300
V11 screen	6			68,000
V11 plate	8			20,000
V12 plates	3,5			34,300
V13 plate	3			69,000
V13 grid	5			510,000
V14 plate	3,4			18,600
V14 grid	5			510,000
V15 plate	3,4			19,400
V15 grid	5			320
V15 cathode	8			750
V16 plate	3,4			19,400
V16 grid	5			320
V16 cathode	8			750

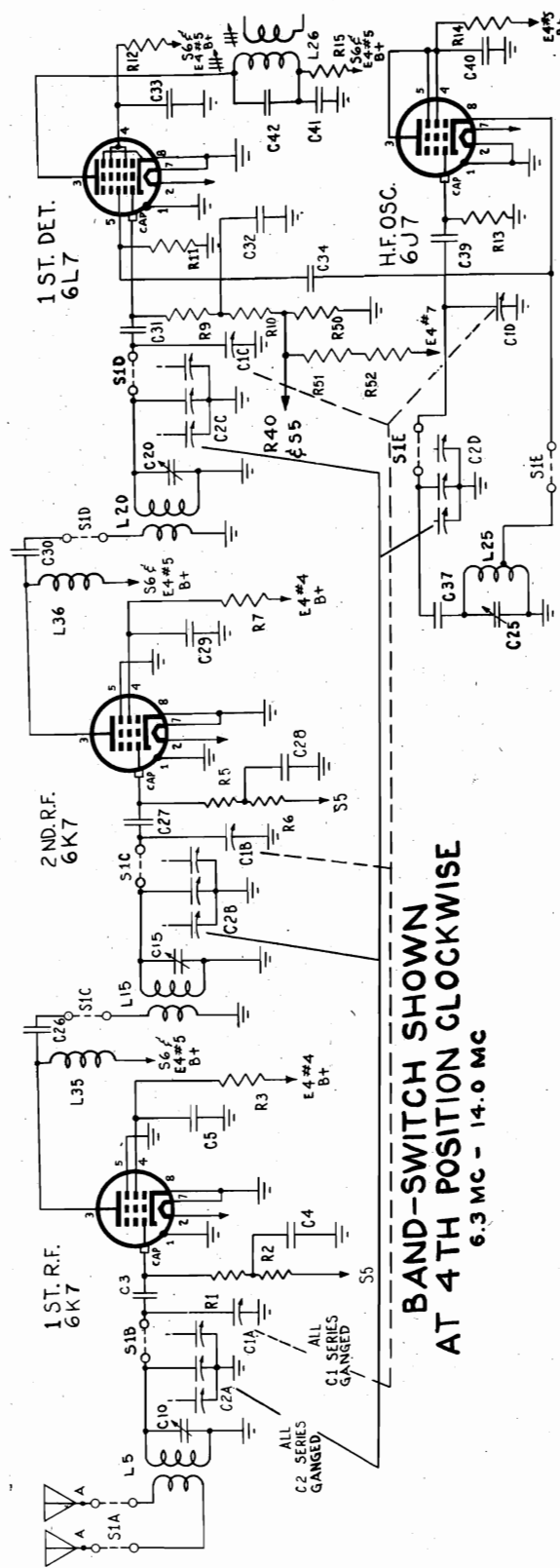
POWER SUPPLY		
TERMINAL NAME	PIN NO.	RESISTANCE IN OHMS
V1 plate	4	40
V1 plate	6	40
V1 filament	2, 8	19,500
V2 plates	4, 6	28,500
V2 filament	2, 8	22



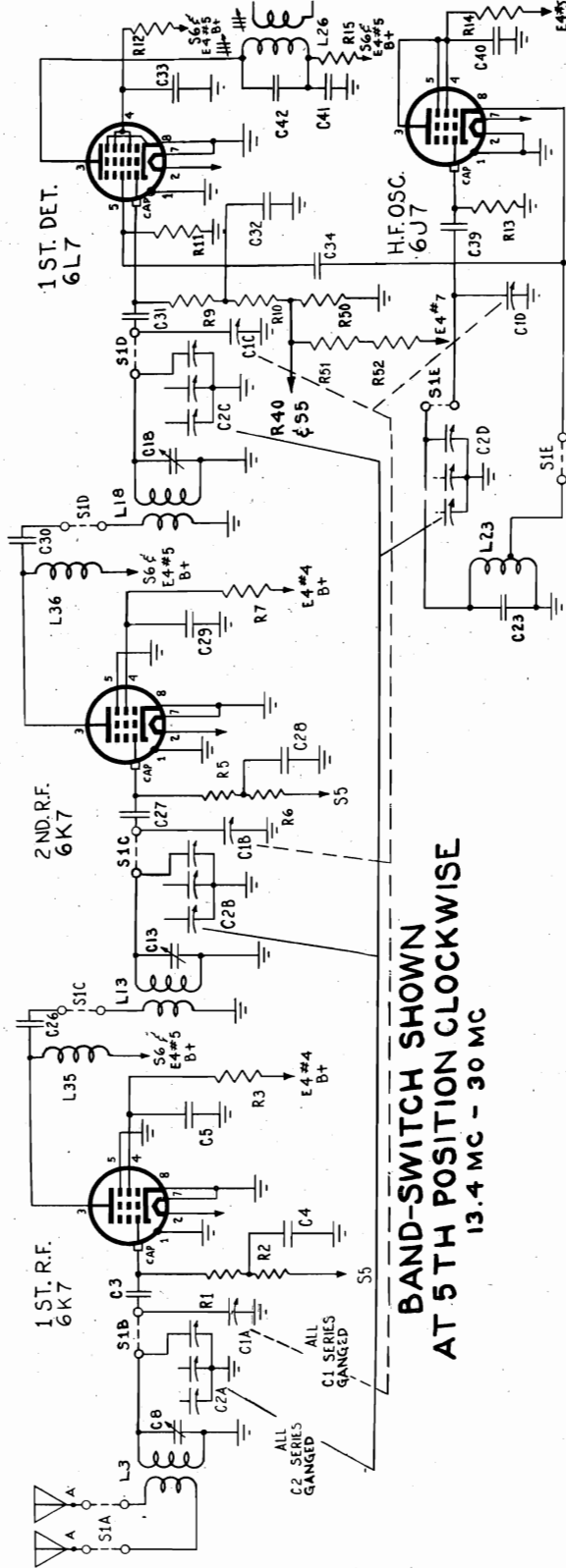
Tube socket terminals.

voltage readings are based on an a-c line voltage exactly equal to the primary tap on the power transformer - higher or lower line voltage should result in corresponding variations in these readings.

All d-c readings are based on the use of a meter having a resistance of 1000 ohms per volt, and are taken between socket terminals and chassis.



BAND-SWITCH SHOWN
AT 4TH POSITION CLOCKWISE
6.3 MC - 14.0 MC



BAND-SWITCH SHOWN
AT 5TH POSITION CLOCKWISE
13.4 MC - 30 MC

INSTALLATION

Connection to Power Supply—Connect Receiver to Power Supply as follows:

(1) Remove the sheet-metal covers from terminal strip (E4, Fig. 3) on rear of Receiver and from terminal strip (E1, Fig. 3) on Power Supply. See that all ten screws on each strip are unscrewed at least three turns. Then attach one end of the connector cable to each terminal strip *exactly* as shown in Fig. 3 and tighten all screws securely. Make certain that each slotted spade lug on the cable strips makes contact with its respective screw terminal *only*, since a lug jammed between *two* screws could cause considerable trouble. Immediately replace both metal covers and do not remove them while the Power Supply is connected to the a-c power line.

(2) The spacing of spade lugs on cable terminal strips is exactly the same as the spacing of screws on Receiver and Power Supply. If the two fail to go together easily, DON'T USE FORCE. Be sure *all* screws are unscrewed far enough. If a spade lug has been bent or pushed out of place by rough handling, straighten it and try again. Spade lugs should slip under screws from the top.

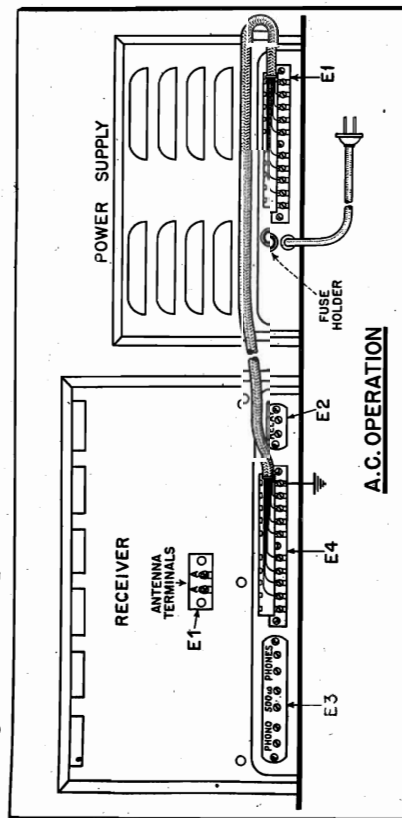


FIG. 3—Connections for power cable—A.C. operation.

Connection for Battery Operation—A cable for use in battery operation is available on special order. This cable (W2 in Parts List) has only one terminal strip. The other end of the cable is made up of eight loose wires. Connect this cable according to Fig. 4 (note the color code for the eight loose wires), or make up connections to serve the purpose. Connect the battery cable to the Receiver *first* and re-

place the terminal cover *before* making connections to the batteries. When discontinuing battery operation, disconnect the battery cable from the receiver. All operations of the Receiver are the same with either the Power Supply or the battery set-up.

Chassis Ground: It is not usually necessary to ground the Receiver chassis, but this can be done by connecting the ground lead to the left-hand PHONO or to the left-hand PHONES terminal (located on terminal strip E3, Fig. 3). These two terminals are grounded to the inside of the chassis.

Earphones: Plug a headset into the PHONES jack (J1, Fig. 2), or connect it to screw terminals marked PHONES on rear of chassis. No matching transformer is necessary.

Loudspeaker: The permanent magnet dynamic loudspeaker supplied with the Receiver has a transformer mounted on its housing. This transformer matches the voice coil of the loudspeaker to the 500-ohm output terminals (on terminal strip E3, Fig. 3) located at the rear of the chassis (marked 500 ohms). For loudspeaker operation, connect the two-wire lead attached to the terminals of the loudspeaker transformer to the 500-ohm terminals on the Receiver. Disconnecting the loudspeaker will not impair the operation of the Receiver.

Power Transformer Primary Tap: Before plugging the power cord into the a-c line, remove bottom plate from Power Supply to see that power cord is properly connected for the a-c voltage of the power line being used. One wire of the power cord is permanently connected to the fuse-holder (E3, Fig. 5); the other wire is connected at the factory to one of the screw terminals on terminal strip E2 (Fig. 5). These screw terminals are marked 105, 115 and 125, and are connected to primary taps on the power transformer. See that the power cord wire is connected to the screw terminal most closely agreeing with the available a-c line voltage and replace the bottom cover plate.

POWER SOURCES

A-C Operation . . .

105-125 Volts, 50-60 cps
180 watts average power consumption

Battery Operation . . .

6-volt storage battery, drain
6.25 amperes for heaters.
Five 45-volt "B" batteries, drain
117 milliamperes at 225 v. 3s;
4.5 milliamperes at 90 volts.
One 45-volt "C" battery, drain
10 milliamperes.

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MODEL SP-400-SX**OPERATION**

a. *Radiophone Reception:* Set the front panel controls (Fig. 2) as follows:

CONTROL	POSITION
CRYSTAL SELECTIVITY	OFF
PHASING	on arrow
BAND WIDTH	3
LIMITER	OFF
AVC-MANUAL	AVC
SENSITIVITY	10
BAND SPREAD	100
SIGNAL-MOD-CW	MOD
AUDIO GAIN	6
SEND-REC	REC
BEAT OSCILLATOR	0

(1) Throw OFF-ON power switch in center of panel to ON. This puts Receiver in operation.

(2) Adjust band switch (S1, Fig. 2) to a band which is likely to be very active. This will facilitate the process of getting familiar with the various adjustments. If interference is not serious, BAND WIDTH control can be adjusted to a wider band width (higher number), depending upon the degree of fidelity desired. In general, adjust this control to band width giving best tone with least interference.

(3) Do all tuning, with or without the meter with BAND WIDTH control set at 3. Other settings give wider bands, making exact tuning difficult. Make band width adjustments *after* signal is tuned properly.

(4) LIMITER-OFF-ON control turns noise limiter on and off. The noise limiter will be most valuable on the higher frequencies, where interference from automobile ignition system is most bothersome.

b. *Code Reception:* Flip AVC-MANUAL switch to MANUAL and turn down SENSITIVITY control to provide proper sensitivity.

(1) On strong signals, do not turn SENSITIVITY control all the way on, because it will cause overloading. If the AUDIO GAIN control is set at about 7, it is possible to regulate volume by using only the sensitivity control.

(2) To turn on the beat oscillator, set SIGNAL-MOD-CW switch at CW. The BEAT OSCILLATOR control varies the pitch of the beat

between oscillator and incoming signal. Use beat oscillator for code reception and for locating weak modulated signals.

(3) Fading signals can be improved by returning AVC-MANUAL switch to AVC.

c. *Crystal Filter:* First three positions of CRYSTAL SELECTIVITY control are generally used for radiophone reception and will serve for code reception where interference is not serious. Last two positions are intended for code reception *only* since they provide so narrow a band that "phone" signals are usually unintelligible. After adjusting CRYSTAL SELECTIVITY control for desired degree of selectivity, use PHASING control to eliminate or reduce any heterodyne interference or "whistle" which may be present.

d. *Receiver Silencing:* Receiver can be silenced by flipping the SEND-REC switch (S6, Fig. 2) to SEND. This operation opens the "B" supply to the R-F and 1st detector tubes (V1, V2 and V3). The Receiver then remains ready for instant service during transmission periods. Note also that instead of using the SEND-REC switch, a relay may be connected to the RELAY terminals (E2, Fig. 3) at rear of Receiver and silencing controlled by relay action, actuated, for example, by the associated transmitter. When using a relay for silencing, flip SEND-REC switch to SEND (open) and *leave* it there. While the transmitter is operating, the relay should remain *open*; when the transmitter is "off the air," the relay contacts should *close* to restore Receiver operation.

e. *Phono Operation:* Leads from a phonograph pickup may be connected to the PHONO terminals (on terminal strip E3, Fig. 3) at the rear of the Receiver. (Note that the left-hand terminal of this pair is grounded to chassis.) Use the SEND-REC switch (S6) as a "phono-radio" switch by flipping it to the SEND position, thus eliminating radio interference and making it unnecessary to hunt for a "dead spot" on the tuning dial.

f. *Tuning:* All tuning can be done with the MAIN TUNING control. In this case, leave the band spread dial at 100. BAND SPREAD control spreads out a narrow band of frequencies *below* the frequency to which the main dial is set. This control operates continuously throughout the entire tuning range of the Receiver, and signals can be spread out in any one of the five bands.

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FIG. 5—Bottom view of power supply.

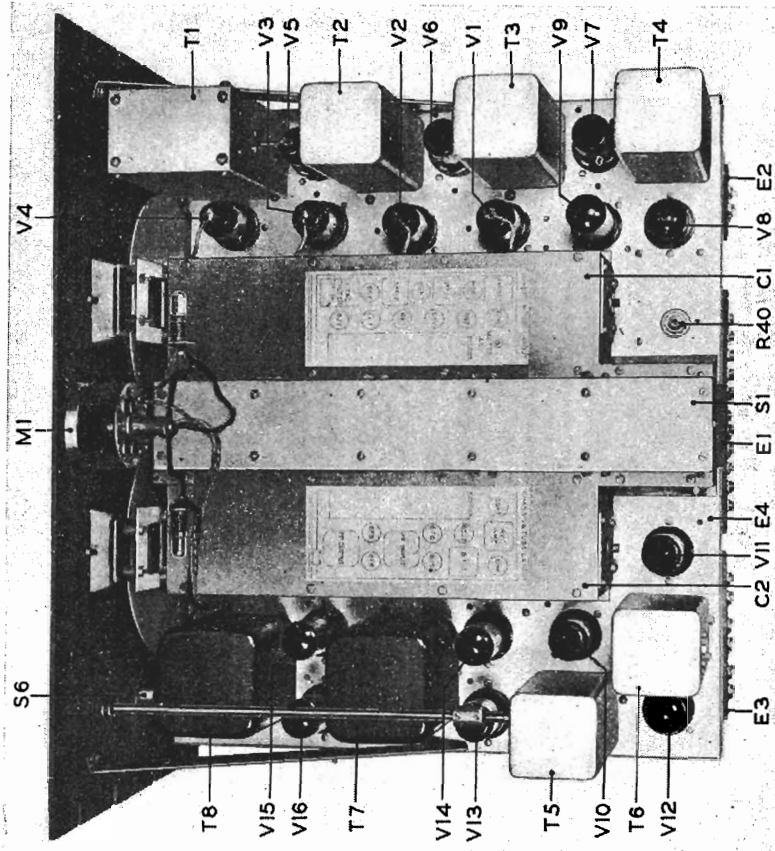
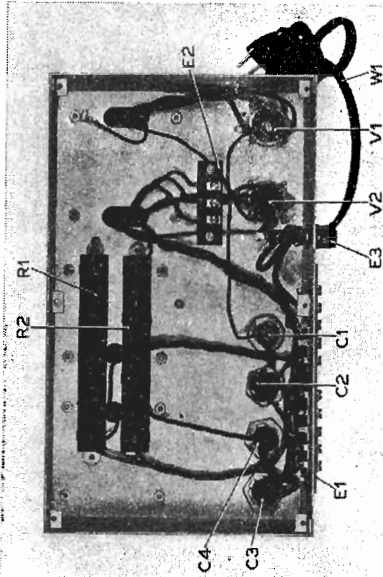


FIG. 7—Top chassis view showing arrangement of components.

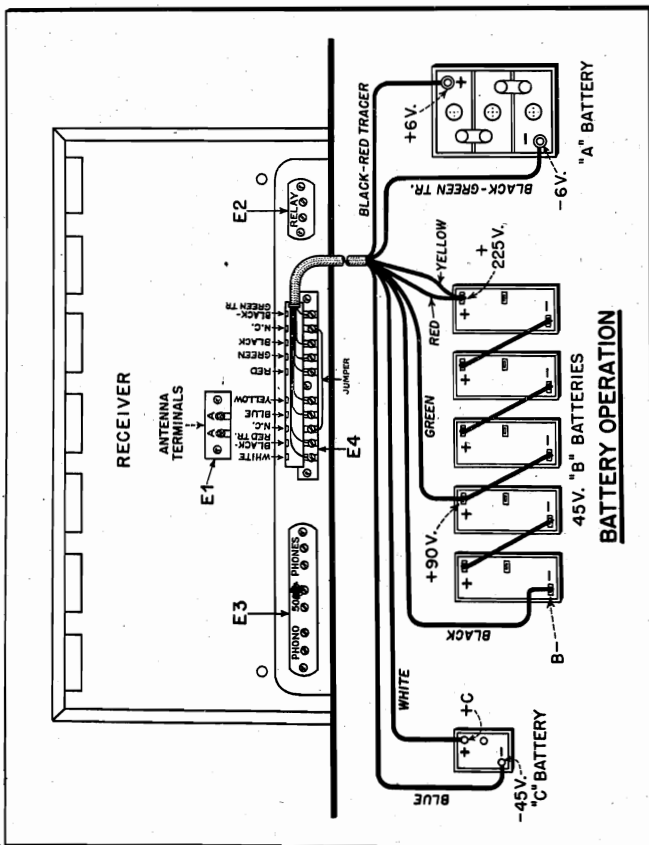


FIG. 4—Connections for power cable—battery operation.

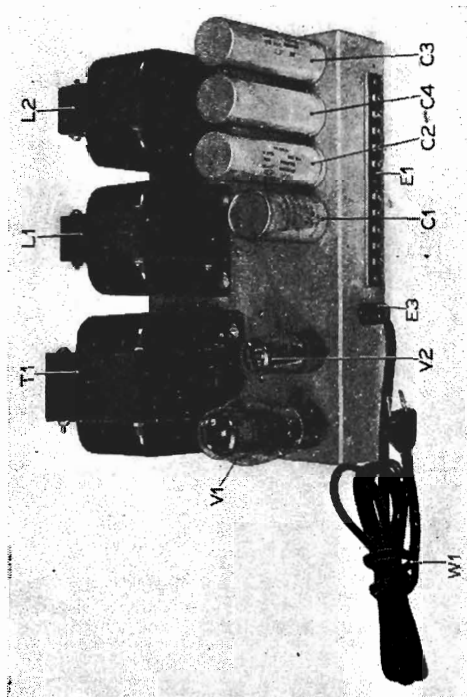


FIG. 6—Top view of power supply.

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540-1240 kc band, normally provide more selectivity than is desirable for the reception of high-fidelity programs. To prevent loss of audio quality resulting from RF side-band cutting, resistors (R4, R8) have been placed in series with the secondaries of RF transformers L14, L19, to broaden their pass band.

CRYSTAL FILTER

a. *Controls:* The Quartz Crystal Filter (T1) couples the 1st detector (V3) to the 1st IF amplifier (V5). Its selectivity can be varied in definite steps by the CRYSTAL SELECTIVITY switch (S2) controlled from the front panel by knob and pointer. In addition, its selectivity characteristic can be greatly sharpened *on one side* or the other (to avoid heterodyne "whistle") by adjusting the PHASING capacitor (C46), also controlled by a knob on the front panel.

b. Variable Selectivity:

Curves A and B, Fig. 8, show Receiver selectivity curves which indicate certain effects of the Crystal Filter. When the CRYSTAL SELECTIVITY switch is set at OFF, the quartz crystal is short-circuited and signal voltages present in the secondary of the 1st detector plate coil (L26) are impressed directly on the control grid of the first IF amplifier tube (V5). At any other setting (1 to 5), the quartz crystal is in use and acts as an extremely high "Q," high impedance, series tuned circuit interposed between the secondary of plate coil L26 and the 1st IF grid circuit (L27, C48), which constitutes the load into which the crystal works. Selectivity is varied by altering the impedance of this parallel tuned circuit (L27, C48), which is accomplished by adding resistance. (R17, R18, R19, R20) in series with coil L27 and capacitor C48.

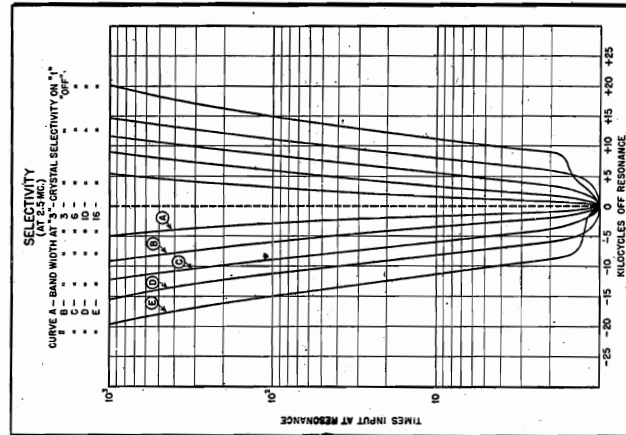


Fig. 8—Selectivity curves.

g. *Earphone Operation:* For earphone operation, plug earphones into the PHONES jack (J1, Fig. 2) provided for them on the front panel, or connect them to the PHONES terminals on the rear of the Receiver chassis. These terminals are connected in parallel with the jack on the front panel.

h. *S-Meter Tuning:* The S-meter (M1, Fig. 2), a tuning guide, operates only when the Receiver is set for AVC. Its reading increases as the Receiver approaches resonance with the incoming signal. Exact resonance is shown by the greatest reading of the meter. BANDWIDTH control must be set at 3 for accurate tuning by means of the meter. A screwdriver adjustment (R40, Fig. 7) at the rear of the chassis varies the resistance in shunt with the meter. By means of this adjustment, an "S9" reading may be obtained on any input between approximately 10 and 10,000 microvolts. The normal factory adjustment is made on an input of 50 microvolts, and when so adjusted each "S" number represents a change in signal input of approximately 6 decibels, or a ratio of two-to-one.

CIRCUIT ARRANGEMENT

RF AMPLIFIER

a. *Antenna Circuit:* The antenna is coupled to the grid of the 1st RF amplifier (V1) through an input transformer having an untuned primary and tuned secondary. The terminals of the primary coils are ungrounded, and are connected through a double-pole section (S1A) of the band switch to the "A," "A" terminals (E1) on the rear of the tuning unit. This symmetrical arrangement of the antenna primary coils permits full advantage to be taken of the noise-reducing properties of a balanced transmission line lead-in. The impedance of the input circuit averages approximately 100 ohms throughout the tuning range of the Receiver.

b. *Amplifier Stages:* There are two stages of RF amplification preceding the first detector or mixer. These stages are coupled by means of RF transformers having tuned secondaries and low inductance untuned primaries. The plates of the two RF amplifier tubes (V1, V2) are shunt fed through RF chokes L35, L36 and are coupled to their respective tuned circuits through fixed capacitors C26, C30. This shunt feed keeps plate voltage off the tuned RF amplifier circuits. Two stages of RF amplification, in the frequency range covered by the

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the secondary and ground, and is made up of R29, R30 and R31. Resistor R29 and two small capacitors (C64, C63) constitute a filter to prevent IF voltages from reaching resistor R31 and the AUDIO GAIN control (R48).

NOISE LIMITER

The noise limiter tube (V9) is a 6N7 class B twin triode with its two grids and its two plates connected in parallel in order to secure the lowest possible impedance. The circuit is designed to limit interferences of very short pulse duration such as caused by auto ignition and other similar disturbances. It is designed to work with or without the AVC system and will automatically follow widely different signal levels. Some distortion results at higher modulation percentages but this is unavoidable if effective noise limiting is to be obtained. An "on-off" switch is provided.

"S" METER

The "S" or Signal Strength Meter (M1) is connected for use when the AVC-MANUAL switch (S5) is thrown to AV. This meter shows the relative strength of the received signal. The centrally located dial is calibrated in units of 1 to 9. A variable control (R40) on the rear of the chassis allows the meter to be adjusted to read "S-9" on any signal from 10 to 10,000 microvolts.

The normal factory adjustment for "S-9" is approximately 50 microvolts. Each division represents a ratio of approximately 2 to 1 over the previous division. Thus each division represents a 6db step. The sensitivity control (R46) must be set at maximum (position 10) for maximum "S" meter accuracy. This "S" meter can also be used as a tuning meter since it will show maximum reading at resonance. In this case, to obtain a relatively sharp resonance indication, the BAND WIDTH control should be set at position 3.

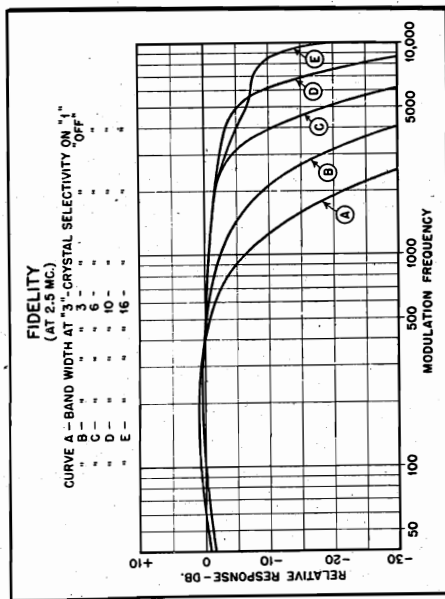


Fig. 9—Audio fidelity curves.

HF OSCILLATOR

The HF oscillator operates at a frequency 455 kc. (the frequency for which the IF amplifier is adjusted) higher than that of the incoming signal. The oscillator section of the variable tuning capacitor (C1D) has the same capacitance and plate shape as the RF sections (C1A, C1B, C1C). The constant 455 kc. frequency difference is maintained by means of a padding capacitor in series with the variable, together with appropriate values of oscillator inductance and parallel trimmer capacitance.

FIRST DETECTOR

The 1st detector employs a 6L7 pentagrid mixer (V3). Its injection grid (grid No. 3) is coupled to the HF oscillator cathode, and its signal grid (grid cap) is coupled to the plate of the second RF amplifier tube (V2) by means of the second RF transformer.

IF AMPLIFIER

The intermediate-frequency amplifier has three stages consisting of three coupling transformers (T2, T3 and T4) and three pentode amplifier tubes (V5, V6 and V7) of the remote cutoff or super-control type. The first two transformers (T2, T3) are identical, and have tuned primaries as well as tuned secondaries. The secondary coils are fixed in position, while the primary coils are mounted on slide rods permitting them to move back and forth with respect to the secondaries, thus changing the degree of inductive coupling between them. When the coils are farthest apart the coupling is at its lowest value and the transformers exhibit their maximum selectivity or minimum band width. Conversely, when the coils are pushed close together the coupling is greatly increased and minimum selectivity or maximum band width results. At any adjustment between these two extremes, an intermediate degree of selectivity is obtained.

SECOND DETECTOR

The 2nd detector (V8) is a twin diode operated with both plates and both cathodes connected in parallel. Its IF input is obtained from the untuned secondary of coil L32 in transformer T4 in the plate circuit of the 3rd IF amplifier (V7). To facilitate operation of the limiter tube (V9) the diode load resistance is divided into two approximately equal parts. One part, R33, is placed between the paralleled cathodes and ground and is by-passed (for IF) by a small capacitor (C66). The other part is between the low-potential end of

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AVC AMPLIFIER AND RECTIFIER

Special amplifier and rectifier stages are employed in order to give most satisfactory AVC action. AVC voltages are applied to the two RF stages and to the first two IF stages and compensate for variations in signal strength due to fading. A different rate of compensation is required for voice modulated signals than for code signals. This is automatically adjusted when the beat frequency oscillator is turned on or off.

BEAT OSCILLATOR

The beat oscillator tube (V10) and associated oscillator circuit (T5) provide a voltage at approximately the intermediate frequency. This voltage, when introduced into the input circuit of the 2nd detector (V8) by means of a small coupling capacitor (C60), mixes with the I-F signal being delivered to the detector by the 3rd I-F amplifier (V7). The mixture of these two similar frequencies results in a "beat" or difference frequency in the output of the 2nd detector. The beat oscillator frequency is adjusted so that the pitch of this difference frequency falls within the audio-frequency range. Fine adjustment of the beat frequency pitch is accomplished by means of the BEAT OSCILLATOR control on the front panel which turns a small variable capacitor (C69) in transformer T5. The beat oscillator is turned on by throwing the SIGNAL-MOD-CW switch (S4) to CW. In addition to being necessary for proper reception of CW signals, the beat oscillator is useful for locating weak signals of any kind.

AF AMPLIFIER

a. *Circuits:* The AF amplifier has three stages, using one 6J5 triode (V13) and three 6F6 pentodes (V14, V15, V16). The grid of the first tube (V13) is connected to the moving arm of the AUDIO GAIN control (R48) through a blocking capacitor (C82). Its plate is coupled to the grid of the second AF amplifier by means of capacitor C83, plate resistor R53 and grid leak R54. The second amplifier tube (V14), while a pentode, is operated as a triode by connecting its plate and screen together. It drives the output tubes (V15, V16) through a push-pull input transformer (T7). The output tubes (V15, V16) are also triode-connected pentodes and are operated as class AB₂ amplifiers.

b. *Output Transformer:* The output transformer (T8) has two secondary windings; a 500-ohm secondary (4-5) for power output, and a secondary for earphones (6-7) designed to deliver about 3% of the output power into an 8000-ohm resistive load when the 500-ohm sec-

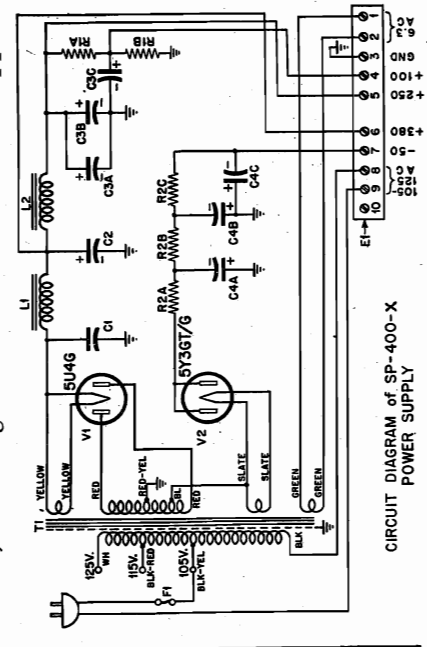
ondary is connected to a matching load such as the loudspeaker

The turns ratio and resistance of the earphone winding are such that the power delivered to any load between 8000 ohms and 80 ohms varies less than 6 db, and the power input to a 250-ohm load is but 2 db greater than that to a 4000-ohm load. Fig. 16 shows curves of overall audio fidelity with different settings of the CRYSTAL SELECTIVITY and BAND WIDTH controls.

POWER SUPPLY

The Power Supply furnishes "A," "B" and "C" voltages for the Receiver. The "A," or heater voltage, is 6.3 volts AC obtained from a separate secondary winding (1-2) on the power transformer (T1, Fig. 10). "B" voltage is obtained from the center-tapped high-voltage secondary (7-8-10) connected to the plates of the "B" rectifier tube (V1). After this voltage is rectified, it is filtered by the combined action of the first filter choke (L1) and the two filter capacitors C1 and C2. This provides 380 volts DC for the plates of the power output tubes in the Receiver. Further filtering by the second filter choke (L2) and the first two sections of capacitor C3 provides 250 volts DC for the plates of the remaining tubes in the Receiver. Approximately 100 volts DC for the screen grids of the Receiver tubes is obtained from the tap on the bleeder resistor (R1), which is by-passed by the remaining section of capacitor C3. Negative "C" voltage is obtained from a tap (9) on the high-voltage secondary connected to the filament of the "C" rectifier tube (V2). The rectified output from the plates of tube V2 is filtered by the three sections of resistor R2 and the three sections of filter capacitor C4. When connected to the Receiver, the voltage at the end of this filter is approximately minus 50.

Fig. 10—
Power supply
diagram.



CIRCUIT DIAGRAM OF SP-400-X
POWER SUPPLY

CONTINUITY TESTS

If the Receiver is inoperative, it may have a shorted filter or by-pass capacitor or an open resistor. Remove the cabinet or bottom cover plate to get at all parts. Measure socket voltages and compare them with TABLE 2. (Consult Fig. 11 and TABLE 1 for key to tube base pin connections.) If this measurement does not reveal the trouble, start checking socket terminal resistance values against TABLE 3 (Receiver) or TABLE 4 (Power Supply). Obtain values of resistors and capacitors by locating the reference number on the proper circuit diagram and looking it up in the Table of Parts, Section V. In checking these resistance values be sure to set the "variable" controls to the positions specified in the table.

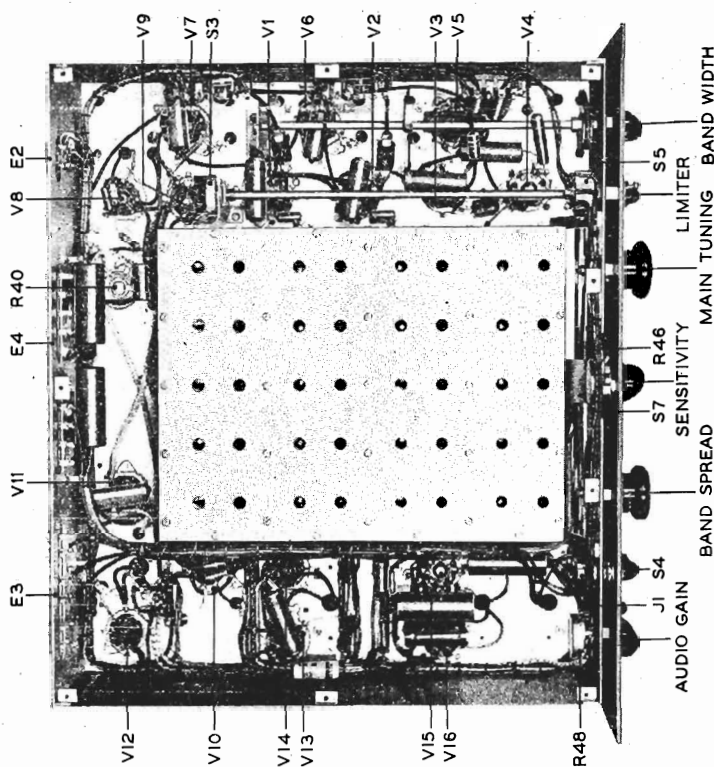


Fig. 12—Bottom view of chassis.

ALIGNMENT—GENERAL

When either selectivity or sensitivity or both appear to be below normal and all tubes have been tested, check the alignment. Remove the dust cover or cabinet and bottom cover plate of the Receiver to get at all parts for making adjustments. CAUTION: ANY CHANGES FROM ORIGINAL SETTINGS WILL BE SMALL SO USE GREAT CARE WHEN CHECKING ADJUSTMENTS. This is especially true of the HF oscillator

circuits, which should NOT be disturbed unless the MAIN TUNING dial is definitely known to be off calibration.

a. **Signal Generator:** This should be an accurately calibrated instrument producing amplitude-modulated radio-frequency signals. In addition to 455 kc. (the IF), the frequency range required of the signal generator depends on the tuning range of the receiver to be aligned. The RF alignment frequencies required for the Series 400-X Super-Pro are shown in Fig. 13. The second harmonic can generally be used when the fundamental frequency is not available. For example, a signal generator covering all frequencies from 455 kc to 15 mc could be used to check the highest frequency band by using the second harmonic of 15 mc to provide the 30 mc called for in Fig. 13. The signal generator should have an output of approximately 100 microvolts and an output impedance of approximately 100 ohms for best results when aligning the RF and HF Oscillator circuits. For IF alignment these values are not critical. The frequency calibration of the signal generator is extremely important if the Receiver dial calibration is to be correct.

b. **Output Meter:** The output meter should respond to the modulation frequency of the signal generator, preferably 400 cps, and should provide at least half-scale deflection for 10 volts. Its resistance should be greater than 500 ohms.

c. **Tools:** An insulated screwdriver 9/64" wide and .025" thick at the bit, is required for alignment of the Receiver.

d. **Preliminary Procedure:** Throw the OFF-ON switch to ON and permit the Receiver to warm up for about an hour before beginning adjustments. Connect the output meter to the 500-ohm terminals located at the rear of the Receiver chassis

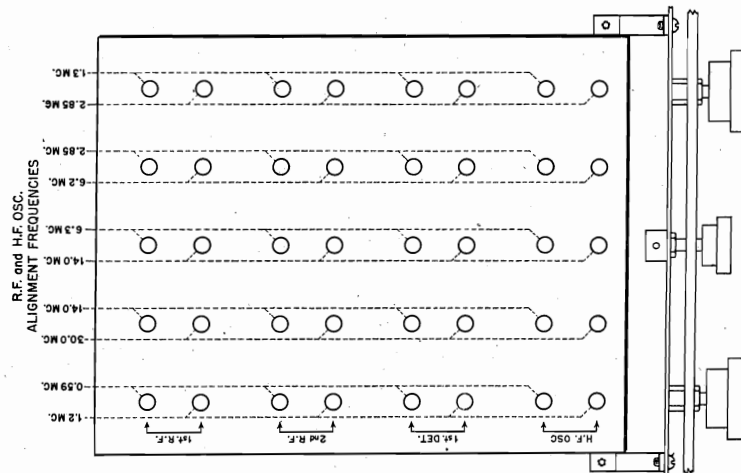


Fig. 13—R.F. and H.F. osc. alignment frequencies and location of adjustments.

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generator and cathode-ray oscilloscope. If this equipment is available, proceed as follows:

(3) Connect the input of the vertical amplifier of the oscilloscope to the PHONO connections on Terminal strip E3 (Fig. 7) on the rear skirt of the Receiver chassis. The "high" terminal is the second one from the edge of the strip; the first screw is connected to the chassis. Set the frequency-modulated signal generator to approximately 455 kc and connect its output to the control grid cap of the 1st detector (V3) through a fixed capacitor (100 mmf or larger). With the CRYSTAL SELECTIVITY switch at OFF, readjust the signal generator frequency to produce the conventional single-peaked resonance curve on the screen of the oscilloscope. Then turn the CRYSTAL SELECTIVITY switch to position 1. If the grid coil (L27) is correctly tuned the image on the oscilloscope screen will remain symmetrical but will be only about two-thirds as wide as before, indicating an increase in selectivity. The oscilloscope image is also affected by the PHASING control, maximum symmetry occurring at or very near the arrow on its scale. Therefore, when tuning L27, rock the PHASING control back and forth at the same time to secure the best adjustment.

c. *AVC Alignment Check:* Leaving all other controls as in PAR. 26a, and without changing the signal generator frequency, reduce AUDIO GAIN to 0, switch to AVC and increase SENSITIVITY to 10. Increase AUDIO GAIN to restore half-scale reading on the output meter and adjust the single trimmer capacitor in T6 for *minimum* output meter reading. The "S" meter reading should "peak" at the same time the output meter reading "dips."

d. *Beat Oscillator Alignment Check:* Continuing with controls as above, switch off the output meter and plug in a pair of earphones, or replace the meter with a suitable loudspeaker. Turn the SIGNAL-MOD-CW switch to CW and see that the BEAT OSCILLATOR control is exactly on 0 (zero). If tone in earphones or speaker is not very low in pitch, readjust the trimmer capacitor near the bottom of T5 until it is. If the beat oscillator is in perfect alignment when this test is made, no sound will be heard since the signal generator and the beat oscillator will be oscillating at the same frequency and there will be no audible difference or "beat." Check this by turning the BEAT OSCILLATOR control knob slightly off 0 (zero) toward one side or the other. If this results in a tone rising in pitch as the pointer is turned away from 0 (zero) to either side, the beat frequency oscillator is perfectly aligned. If no audible tone can be obtained within the range of the BEAT OSCILLATOR control, adjust the trimmer capacitor near the bottom of T5 until an approximate "zero beat" occurs at 0 (zero) setting of the BEAT OSCILLATOR control.

ALIGNMENT PROCEDURE

a. *Preliminary Setup:* Adjust the signal generator to approximately 455 kc and connect its output to the control grid cap of the 1st detector tube (V3) through a fixed capacitor (anything larger than 100 mmf will do). Set the front panel controls as follows:

SENSITIVITY	0
AVC-MANUAL	MANUAL
SIGNAL-MOD-CW	MOD
SEND-REC	REC
BAND SWITCH	2.85-6.3 mc
AUDIO GAIN	10
CRYSTAL SELECTIVITY	OFF
PHASING	on arrow
BAND WIDTH	3
BAND SPREAD DIAL	100

b. *IF Alignment Check:*

(1) Set the MAIN TUNING dial near 2.85 mc, but be careful not to tune in a powerful local signal. Set the CRYSTAL SELECTIVITY switch on 3, the AVC-MANUAL switch on AVC, and advance the SENSITIVITY to 10. Turn off the modulation of the signal generator and adjust its frequency slightly to produce maximum deflection of the "S" meter. The adjustment of the signal generator in this manner is necessary in order to get exact agreement with the natural period of the particular quartz crystal in the Receiver being checked. After reducing SENSITIVITY to 0, the modulation may be switched on, but the tuning adjustment of the signal generator must not be altered until the alignment check has been completed. Return the CRYSTAL SELECTIVITY and AVC-MANUAL controls to their original settings of OFF and MANUAL and advance the SENSITIVITY control until a suitable output meter reading is obtained. A half-scale reading in the region of 5 to 10 volts will be satisfactory.

(2) Now check the alignment of both upper (grid) and lower (plate) air trimmer capacitors in IF transformers T2 and T3 and the single trimmer in T4 for peak reading of the output meter. If one or more of these adjustments results in a sizeable increase in output, reduce the SENSITIVITY control enough to bring the meter reading back to half-scale. Alignment of the plate circuit of the crystal filter (T1) can be tested in the same way by means of the lower adjusting screw on the side of the unit. This screw varies the position of the powdered iron core in coil L26. Do not change the setting of the upper adjusting screw which tunes grid coil L27, as this circuit cannot be adjusted properly with the output meter. It can, however, be aligned by the "visual" method using a frequency-modulated signal.

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as a separate operation. Efficient weak-signal reception, with low receiver noise level and high image rejection ratios, depends on the relative alignment of these three circuits with respect to the HF oscillator and without regard to calibration accuracy.

(1) Accurate calibration of the signal generator is not required to check these adjustments. Modulation of the signal generator, while convenient, is not strictly necessary. Input to antenna terminals should be through 100 ohms (approximate) including output resistance of signal generator. If signal generator is modulated, Receiver controls should be set as for IF alignment; if unmodulated, set BEAT OSCILLATOR to 2 (either side) and SIGNAL-MOD-CW to CW. Adjust SENSITIVITY for half-scale reading on output meter when signals are exactly in tune.

(2) Starting with 2.85-6.3 mc band, set main dial at 6.3 mc (BAND SPREAD at 100) and adjust frequency of signal generator for peak deflection of output meter. Then check setting of trimmer marked 1st DET 6.3 mc (Fig. 13). Repeat this procedure on trimmers designated as 2nd RF and 1st RF in same row. If readjustments on one of these settings greatly increases output meter reading, alter SENSITIVITY slightly to reduce reading to half-scale. After each adjustment check tuning of Receiver to make sure test signal is still accurately tuned. BAND SPREAD may be used as a vernier for this purpose.

CAUTION: THIS TUNING CHECK IS EXTREMELY IMPORTANT AT HIGH END OF 6.3-14.0 MC AND 13.4-30.0 MC BANDS WHERE THERE IS SOME SLIGHT INTERACTION BETWEEN 1st DET AND HF OSC CIRCUITS. After checking the three trimmers at high end of this band, turn main dial to 2.85 mc and retune signal generator to suit. Then check the three inductance adjuster settings marked 2.85 mc (Fig. 13) in the same row. Since adjustments at one end of a band also affect the other end of the band (as described under HF OSC alignment), repeat above procedure until no further improvement can be secured. The number of repetitions necessary depends on how much mistuning existed initially. Other bands may be checked in the same manner.

(3) For best possible efficiency with a particular antenna arrangement, the 1st RF circuits may be adjusted with the antenna connected. This can be done by loosely coupling output of signal generator to antenna system instead of directly to antenna terminals through a 100-ohm resistor. Make sure that signal from signal generator actually reaches Receiver by way of antenna rather than by some form of direct coupling.

(4) In all the foregoing tests using output meter readings for circuit adjustment it is recommended that earphones (or speaker) be used to monitor the signal. This will avoid false adjustments caused by overloading or 'freakish' responses.

e. *HF Oscillator Calibration Check:* The accuracy of the MAIN DIAL calibration depends solely on the HF oscillator frequency, which in this Receiver is 455 kc. (the IF) higher than the signal frequency. Although the frequency of the HF oscillator can be measured directly if accurate frequency-measuring equipment is on hand, it is far simpler to check it by tuning in signals of known frequency and noting the MAIN DIAL readings. CAUTION: BE SURE THE BAND SPREAD DIAL IS SET AT 100 WHEN MAKING THIS TEST.

(1) To correct dial calibration, refer to alignment chart (Fig. 13) for location of HF oscillator adjustments as well as signal frequencies at which settings should be made. The output of the signal generator should be unmodulated and SIGNAL-MOD-CW switch on Receiver turned to CW. Set BEAT OSCILLATOR at 0, AUDIO GAIN at 10, AVC-MANUAL on MANUAL, BAND WIDTH at 16. Disconnect output meter and use earphones or loudspeaker to make necessary adjustments by "zero beat" method. Connect signal generator to antenna terminals for this test.

(2) If the 2.85-6.3 mc band is to be corrected, tune signal generator accurately to 6.3 mc. Tune in signal generator signal at 6.3 mc end of Receiver dial to zero beat. Notice approximate dial error. Turn main dial slightly toward 6.3 mc calibration line until beat note rises to a high pitch. Do not turn dial far enough to raise beat so high it cannot be heard. With alignment screwdriver adjust trimmer capacitor marked HF OSC 6.3 mc (Fig. 13) until beat is again zero. Turn main dial still farther toward 6.3 mc line and make a further adjustment of trimmer capacitor to return to zero beat. Repeat this process as often as necessary to bring dial to exactly 6.3 mc. (The main dial could be set at once on exactly 6.3 mc and trimmer turned enough at one time to produce zero beat, but the step-by-step method is recommended.) Now retune signal generator to exactly 2.85 mc and tune in signal-generator signal at low-frequency end of main dial and correct the calibration step-by-step as before, using inductance trimming adjuster HF OSC 2.85 mc (Fig. 13). When 6.3 mc signal from signal generator is again tuned in at other end of dial, it will be found that inductance adjustment at 2.85 mc has changed correction previously made at 6.3 mc. This is normal. Go back and forth several times from 2.85 to 6.3 mc in order to bring both ends of dial scale into exact agreement with the signal frequency. CAUTION: DURING THIS ADJUSTMENT BE VERY CAREFUL TO ADJUST THE SENSITIVITY CONTROL TO AVOID OVERLOADING.

f. *RF and 1st Detector Alignment Check:* Although alignment of these three circuits (1st and 2nd RF and 1st Det) can be checked at the same time as the HF oscillator, it is simpler to consider each check

HAMMARLUND MFG. CO. INC.

MODEL SP-400-X

TABLE OF PARTS—Cont.

TABLE OF PARTS

CIRCUIT REF. No.	D E S C R I P T I O N	PART No.
CAPACITORS		
C1	Main Tuning	
C2	Band Spread	
C3	620 mmf, Mica	23005-86
C4	.02 mf, Paper	23912-1
C5	.05 mf, Paper	23912-2
C6	Trimmer, Mica, 3-30 mmf	Part of 29529-G1
C7	Trimmer, Mica, 3-30 mmf	Part of 29532-G1
C8	Trimmer, Mica, 3-30 mmf	Part of 29538-G1
C9	Trimmer, Mica, 3-30 mmf	Part of 29520-G1
C10	Trimmer, Mica, 3-30 mmf	Part of 29535-G1
C11	Trimmer, Mica, 3-30 mmf	Part of 29530-G1
C12	Trimmer, Mica, 3-30 mmf	Part of 29533-G1
C13	Trimmer, Mica, 3-30 mmf	Part of 29539-G1
C14	Trimmer, Mica, 3-30 mmf	Part of 29521-G1
C15	Trimmer, Mica, 3-30 mmf	Part of 29536-G1
C16	Trimmer, Mica, 3-30 mmf	Part of 29530-G1
C17	Trimmer, Mica, 3-30 mmf	Part of 29533-G1
C18	Trimmer, Mica, 3-30 mmf	Part of 29539-G1
C19	Trimmer, Mica, 3-30 mmf	Part of 29521-G1
C20	Trimmer, Mica, 3-30 mmf	Part of 29536-G1
C21	Trimmer, Air, 425 mmf	Part of 29531-G1
C22	Trimmer, Air, 425 mmf	Part of 29534-G1
C23	Trimmer, Air, 425 mmf	Part of 29540-G1
C24	Trimmer, Air, 425 mmf	Part of 29528-G1
C25	Trimmer, Air, 425 mmf	Part of 29537-G1
C26	300 mmf, Silver Mica	
C27	620 mmf, Mica	23003-105D
C28	.02 mf, Paper	23912-1
C29	.05 mf, Paper	23912-2
C30	300 mmf, Silver Mica	23003-105D
C31	620 mmf, Mica	23005-86
C32	.02 mf, Paper	23912-1
C33	.05 mf, Paper	23912-2
C34	95 mmf, Silver Mica	6195
C35	673 mmf, Silver Mica	Part of 29531-G1
C36	1500 mmf, Silver Mica	Part of 29534-G1
C37	3300 mmf, Silver Mica	Part of 29537-G1
C38	300 mmf, Silver Mica	Part of 29528-G1
C39	51 mmf, Silver Mica	
C40	.05 mf, Paper	23003-50
C41	.05 mf, Paper	23912-2
C42	120 mmf, Silver Mica	23912-2
C43	100 mmf, Mica	23003-96
C44	100 mmf, Mica	23001-48
C45	NOT USED	
C46	Phasing, Air, 2-6 mmf (ea.)	SA-179
C47	.02 mf, Paper	23912-1
C48	85 mmf, Silver Mica, 2%	6180
C49	.05 mf, Paper	23912-2
C50	Variable, Air, 100 mmf	SA-1
C51	.05 mf, Paper	23912-2
C52	.05 mf, Paper	23912-2
C53	Variable, Air, 100 mmf	SA-1
C54	.05 mf, Paper	23912-2
C55	Variable, Air, 100 mmf	SA-1
C56	.05 mf, Paper	23912-2
C57	.05 mf, Paper	23912-2
C58	Variable, Air, 100 mmf	SA-1
CAPACITORS—Continued		
C59	.05 mf, Paper	23912-2
C60	5 mmf, Silver Mica	23003-75
C61	Variable, Air, 100 mmf	SA-1
C62	.05 mf, Paper	23912-2
C63	51 mmf, Mica	23001-59
C64	51 mmf, Mica	23001-59
C65	.05 mf, Paper	23912-2
C66	51 mmf, Mica	23001-59
C67	Variable, Air, 100 mmf	SA-197
C68	100 mmf, Mica	23001-48
C69	Variable, Air, 9 mmf	SA-170
C70	95 mmf, Silver Mica	6195
C71	620 mmf, Mica	23005-86
C72	.25 mf, Paper	23912-38
C73	.05 mf, Paper	23912-2
C74	.05 mf, Paper	23912-2
C75	Variable, Air, 100 mmf	SA-1
C76	5100 mmf, Mica	23015-16
C77	.05 mf, Paper	23912-2
C78	.05 mf, Paper	23912-2
C79	.05 mf, Paper	23912-2
C80	.05 mf, Paper	23912-2
C81	.05 mf, Paper	23912-2
C82	.02 mf, Paper	23912-1
C83	.05 mf, Paper	23912-2
C84	40 mf, Electrolytic, Dry	6171
C85	.25 mf, Paper	23912-38
C86	.25 mf, Paper	23912-38
COILS		
L1	Assembly, Antenna transformer, 1.24-2.86 mc	29529-G1
L2	Assembly, Antenna transformer, 2.85-6.3 mc	29532-G1
L3	Assembly, Antenna transformer, 13.4-30.0 mc	29538-G1
L4	Assembly, Antenna transformer, 540-1240 kc	29520-G1
L5	Assembly, Antenna transformer, 6.3-14.0 mc	29535-G1
L6	Not Used	
L7	Not Used	
L8	Not Used	
L9	Not Used	
L10	Not Used	
L11	Assembly, R.F. transformer, 1.24-2.86 mc	29530-G1
L12	Assembly, R.F. transformer, 2.85-6.3 mc	29533-G1
L13	Assembly, R.F. transformer, 13.4-30.0 mc	29539-G1
L14	Assembly, R.F. transformer, 540-1240 kc	29521-G1
L15	Assembly, R.F. transformer, 6.3-14.0 mc	29536-G1
L16	Assembly, Same as L11	29530-G1
L17	Assembly, Same as L12	29533-G1
L18	Assembly, Same as L13	29539-G1
L19	Assembly, Same as L14	29521-G1
L20	Assembly, Same as L15	29536-G1
L21	Assembly, Oscillator Coil, 1.24-2.86 mc	29531-G1
L22	Assembly, Oscillator Coil, 2.85-6.3 mc	29534-G1
L23	Assembly, Oscillator Coil, 13.4-30.0 mc	29540-G1
L24	Assembly, Oscillator Coil, 540-1240 kc	29528-G1
L25	Assembly, Oscillator Coil, 6.3-14.0 mc	29537-G1
L26	Universal, 7/41 Litz., iron dust core	6146
L27	Universal, 7/41 Litz., iron dust core	6147
L28	3 pie universal 7/41 Litz., ceramic core	2903-A

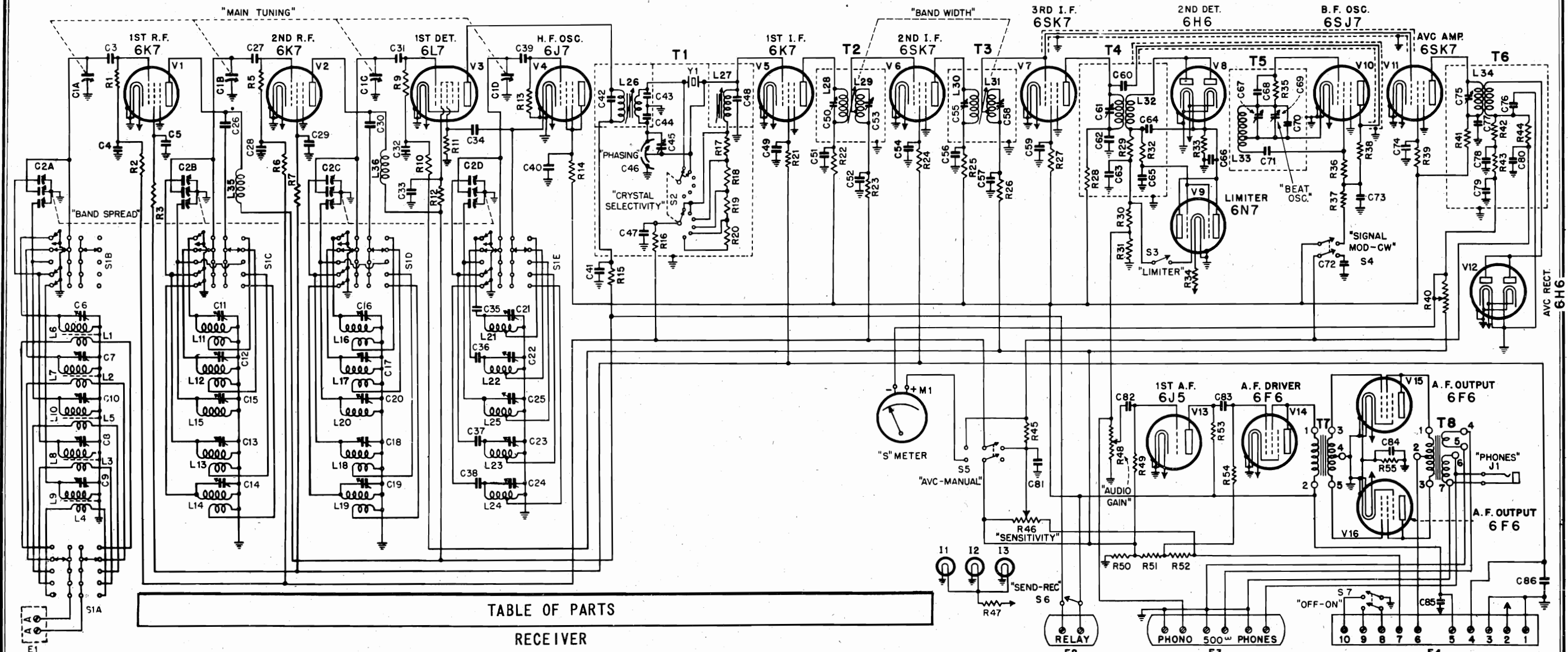
MODEL SP-400-X

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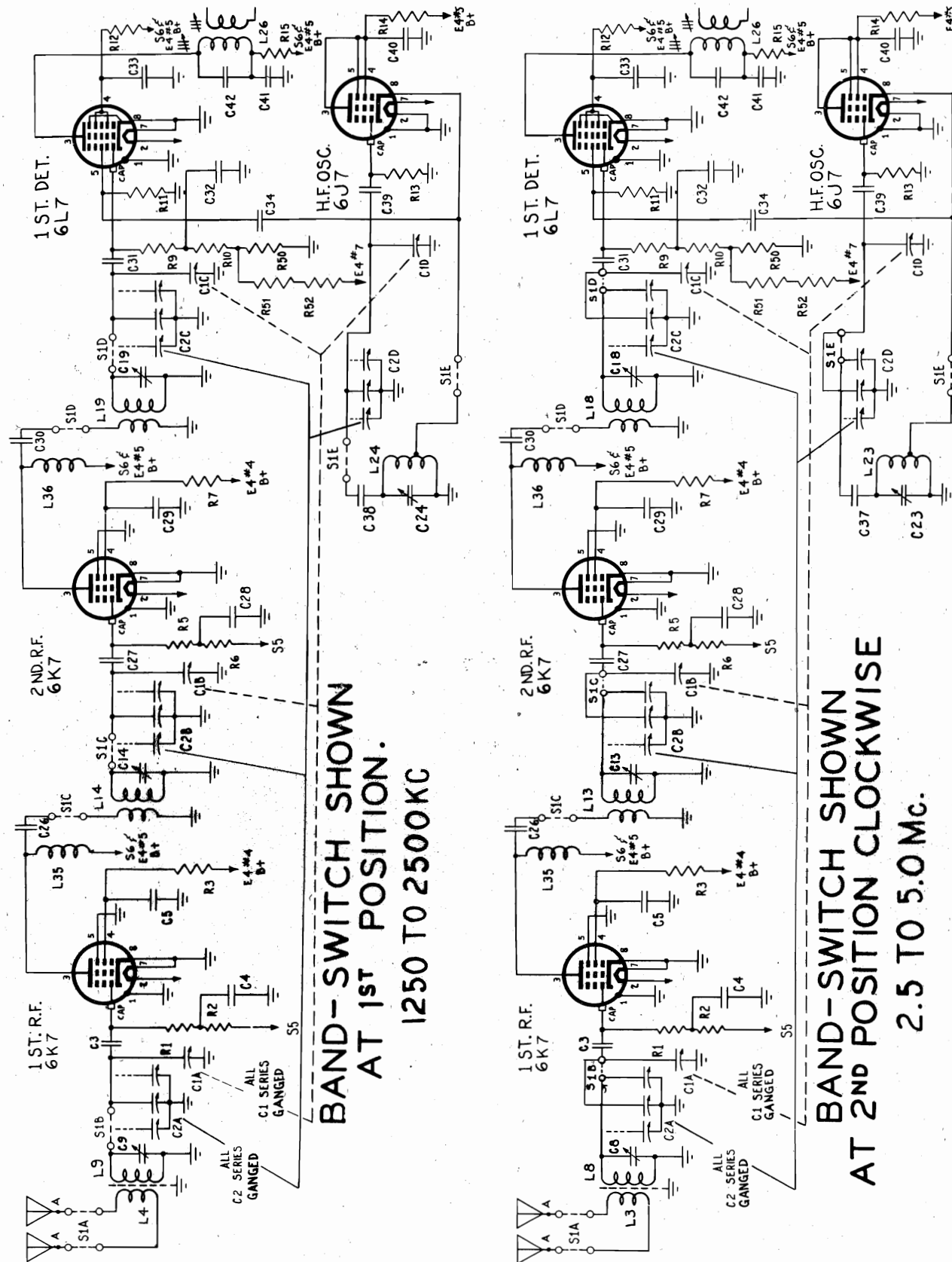
TABLE OF PARTS—Cont.

CIRCUIT REF. No.	D E S C R I P T I O N	PART No.	CIRCUIT REF. No.	D E S C R I P T I O N	PART No.
L29	COILS—Continued		R46	RESISTORS—Continued	
L30	3 pie universal, 7/41 Litz., ceramic coil	3990	R47	50,000 ohms, Potentiometer	5023
L31	Same as L28	2903-A	R48	4 ohms, 5 W	19431-1
L32	Same as L29	3990	R49	250,000 ohms, Potentiometer	4919
L33	Universal, 7/41 Litz., ceramic core	4907	R50	510,000 ohms, 1/2 W	19309-159
L34	3 pie universal, 7/41 Litz., ceramic core	2931	R51	300 ohms, 1/2 W	19301-196
L35	Universal, 7/41 Litz., ceramic core	4906	R52	1,800 ohms, 1 W	19301-38
	Choke Coil, 5 pie universal R.F. choke, ceramic core, wire leads	609-1	R53	3,000 ohms, 1 W	19303-169
L36	Choke Coil, Same as L35	609-1	R54	51,000 ohms, 1 W	19303-182
J1	JACK, JK-34-A, Phone Jack (headset)	5066	R55	510,000 ohms, 1/2 W	19309-159
M1	Meter, 0-200 micro-ampere movement	4903		750 ohms, 10 W	19430-30
R1	RESISTORS			SWITCHES	
R2	500,000 ohms, 1/2 W	4959	S1	10 pole, 5 position, 5 section	
R3	10,000 ohms, 1/2 W	19309-73	S2	Wafer type, 6 position	4911
R4	2,000 ohms, 1/2 W	19301-206	S3	SPST rotary snap	4916
R5	20 ohms, 1/2 W	19301-183	S4	DPST rotary snap	5733
R6	500,000 ohms, 1/2 W	4959	S5	DPST toggle	2990
R7	10,000 ohms, 1/2 W	19309-73	S6	SPST rotary snap	5729
R8	2,000 ohms, 1/2 W	19301-183	S7	DPST toggle	2983-1
R9	20 ohms, 1/2 W	4959		TRANSFORMERS	
R10	500,000 ohms, 1/2 W	19309-73	T1	Filter Assembly, Variable selectivity quartz crystal filter	29555-G1
R11	10,000 ohms, 1/2 W	19301-206	T2	Variable selectivity I.F. transformer	SA-166A
R12	2,000 ohms, 1/2 W	19301-183	T3	Same as T2	SA-166A
R13	20 ohms, 1/2 W	4959	T4	Fixed selectivity, I.F. transformer	SA-167A
R14	500,000 ohms, 1/2 W	19309-73	T5	455 kc oscillator assembly	SA-169A
R15	10,000 ohms, 1/2 W	4960	T6	Fixed selectivity, I.F. transformer	SA-168A
R16	24,000 ohms, 2 W	19304-202	T7	A.F. transformer, push-pull input	4887
R17	50,000 ohms, 1/2 W	4960	T8	A.F. transformer, push-pull output	4888
R18	12,000 ohms, 2 W	19304-44	W1	Connector Cable, Nine wire, with two 10 terminal connector strips	SA-35
R19	2,000 ohms, 1/2 W	19301-206	W2	Connector Cable, Eight wire, with one 10 terminal connector strip (special order only)	SA-67
R20	10,000 ohms, 1/2 W	19309-73	X1-X4	Tube Socket, Molded octal, low-loss bakelite	16082-1
R21	24 ohms, 1/2 W	19301-178	X5-X16	Tube Socket, Molded octal, black bakelite	16083-1
R22	51 ohms, 1/2 W	19301-187	Y1	Quartz Crystal, Resonator type, ground for 455 kc	6338
R23	300 ohms, 1/2 W	19301-196		POWER SUPPLY	
R24	2,000 ohms, 1/2 W	19301-206		CAPACITORS	
R25	2,000 ohms, 1/2 W	19301-206	C1	Paper 1 mf, 1000 VDCW	23843-4
R26	10,000 ohms, 1/2 W	19309-73	C2	16 mf, 600 VDCW Dry Electrolytic	23842-13
R27	2,000 ohms, 1/2 W	19303-182	C3-A-B-C	8-88 mf, 450 VDCW Dry Electrolytic	23842-28
R28	51,000 ohms, 1 W	19301-206	C4-A-B-C	8-88 mf, 450 VDCW Dry Electrolytic	23842-28
R29	100,000 ohms, 1/2 W	19301-80	E3	Fuse Holder	15923-1
R30	75,000 ohms, 1/2 W	19301-215	F1	Fuse, 2 amp, 250V, glass enclosed	15928-7
R31	51,000 ohms, 1/2 W	19301-171	L1	Filter Choke, 160 ohms, 25h at 160 ma.	2981
R32	1 Megohm, 1/2 W	19301-104	L2	Filter Choke, 1150 ohms, 50h at 110 ma.	4819
R33	240,000 ohms, 1/2 W	19301-155		RESISTORS	
R34	4 ohms, 5 W	19431-1	R1	18,000 ohms tapped at 9500, 10 watt	4946
R35	100,000 ohms, 1/2 W	19301-80	R1A	8500 ohms	Part of R1
R36	510,000 ohms, 1/2 W	19309-159	R1B	9500 ohms	Part of R1
R37	5,100 ohms, 1/2 W	19301-210	R2	18,000 ohms tapped at 6500, 6500, 10 watt	3997
R38	51,000 ohms, 1/2 W	19301-171	R2A	5000 ohms	Part of R2
R39	51,000 ohms, 1 W	19303-182	R2B	6500 ohms	Part of R2
R40	1,000 ohms, Potentiometer	4932	R2C	6500 ohms	Part of R2
R41	2,000 ohms, 1/2 W	19301-206		TRANSFORMER	
R42	24,000 ohms, 1/2 W	19301-213	T1	50-60 cycle, primary tapped at 105, 115, 125V	4801
R43	10,000 ohms, 1/2 W	19309-73			
R44	1 Megohm, 1/2 W	19301-104			
R45	2 Megohm, 1/2 W	19301-169			

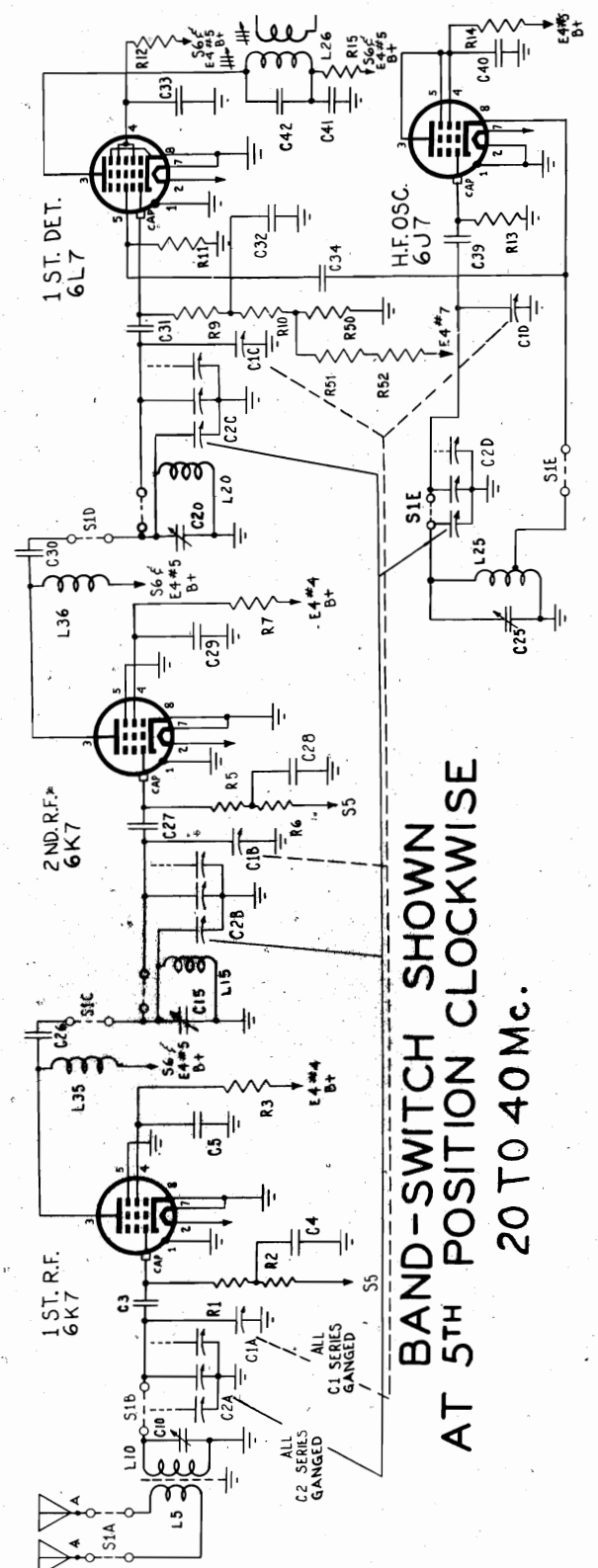
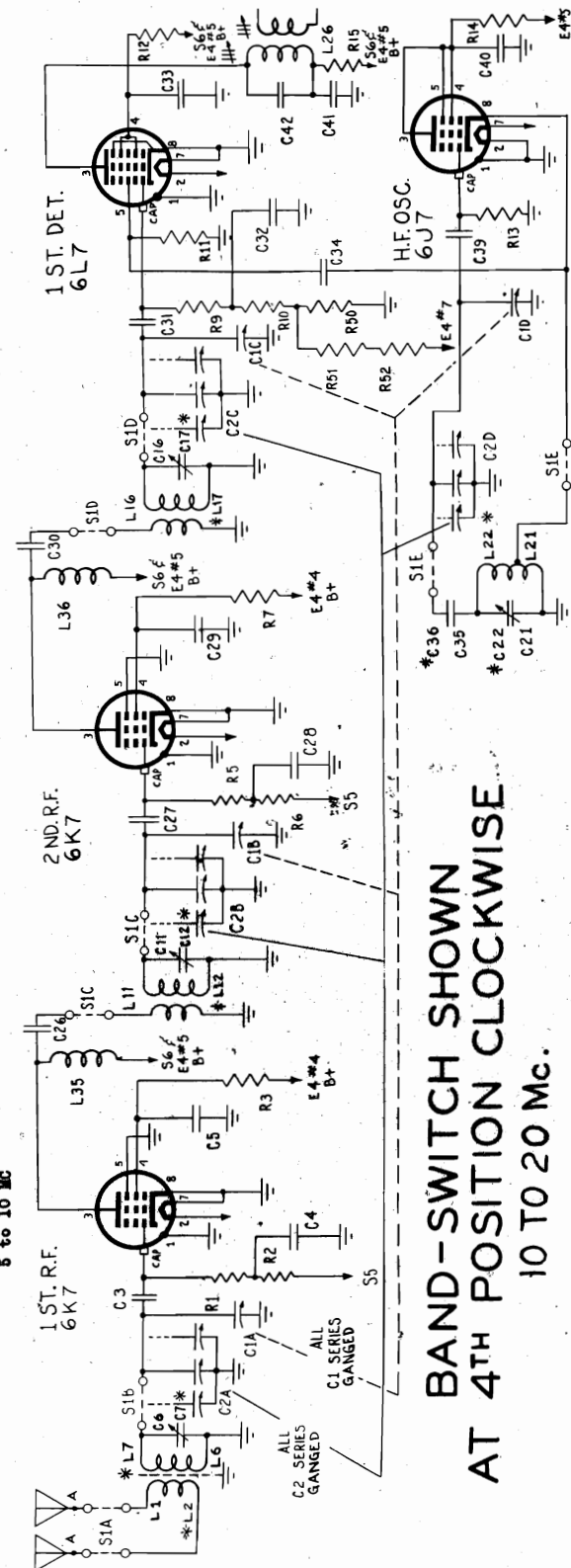
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CIRCUIT REF. NO.	DESCRIPTION	PART NO.	C17	Trimmer, Mica, 3-30 mmf	Part of SA-114	C37	1220 mmf, "Toothpick"	Part of SA 118	C56	.05 mf, Paper	23912-2
C1	Main Tuning		C18	Trimmer, Mica, 3-30 mmf	Part of SA-117	C38	522 mmf, Silver Mica	Part of SA 138	C57	.05 mf, Paper	23912-2
C2	Band Spread		C19	Trimmer, Mica, 3-30 mmf	Part of SA-137	C39	51 mmf, Silver Mica	23003-50	C58	Variable, Air, 100 mmf	SA-1
C3	620 mmf, Mica	23005-86	C20	Trimmer, Air, 4-16 mmf	Part of SA-131	C40	.05 mf, Paper	23912-2	C59	.05 mf, Paper	23912-2
C4	.02 mf, Paper	23912-1	C21	Trimmer, Air, 4-28 mmf	Part of SA-112	C41	.05 mf, Paper	23912-2	C60	5 mmf, Silver Mica	23003-75
C5	.05 mf, Paper	23912-2	C22	Trimmer, Air, 4-28 mmf	Part of SA-115	C42	120 mmf, Silver Mica	23003-96	C61	Variable, Air, 100 mmf	SA-1
C6	Trimmer, Mica, 3-30 mmf	Part of SA-110	C23	Trimmer, Air, 4-28 mmf	Part of SA-118	C43	100 mmf, Mica	23001-48	C62	.05 mf, Paper	23912-2
C7	Trimmer, Mica, 3-30 mmf	Part of SA-113	C24	Trimmer, Air, 4-28 mmf	Part of SA-138	C44	100 mmf, Mica	23001-48	C63	51 mmf, Mica	23001-59
C8	Trimmer, Mica, 3-30 mmf	Part of SA-116	C25	Trimmer, Air, 4-25 mmf	Part of SA-132	C45	Trimmer, Mica, 1.5-5 mmf	6189	C64	51 mmf, Mica	23001-59
C9	Trimmer, Mica, 3-30 mmf	Part of SA-136	C26	300 mmf, Silver Mica	23003-105D	C46	Phasing, Air, 2-6 mmf (ea.)	SA-179	C65	.05 mf, Paper	23912-2
C10	Trimmer, Air, 4-36 mmf	Part of SA-130	C27	620 mmf, Mica	23005-86	C47	.02 mf, Paper	23912-1	C66	51 mmf, Mica	23001-59
C11	Trimmer, Mica, 3-30 mmf	Part of SA-111	C28	.02 mf, Paper	23912-1	C48	85 mmf, Silver Mica $\pm 2\%$	6180	C67	Variable, Air, 100 mmf	SA-197
C12	Trimmer, Mica, 3-30 mmf	Part of SA-114	C29	.05 mf, Paper	23912-2	C49	.05 mf, Paper	23912-2	C68	100 mmf, Mica	23001-48
C13	Trimmer, Mica, 3-30 mmf	Part of SA-117	C30	300 mmf, Silver Mica	23003-105D	C50	Variable, Air, 100 mmf	SA-1	C69	Variable, Air, 9 mmf	SA-170
C14	Trimmer, Mica, 3-30 mmf	Part of SA-137	C31	620 mmf, Mica	23005-86	C51	.05 mf, Paper	23912-2	C70	95 mmf, Silver Mica	6195
C15	Trimmer, Air, 4-16 mmf	Part of SA-131	C32	.02 mf, Paper	23912-1	C52	.05 mf, Paper	23912-2	C71	620 mmf, Mica	23005-86
C16	Trimmer, Mica, 3-30 mmf	Part of SA-111	C33	.05 mf, Paper	23912-2	C53	Variable, Air, 100 mmf	SA-1	C72	.25 mf, Paper	23912-38
			C34	95 mmf, Silver Mica	6195	C54	.05 mf, Paper	23912-2	C73	.05 mf, Paper	23912-2
			C35	4800 mmf, "Toothpick"	Part of SA 112	C55	Variable, Air, 100 mmf	SA-1	C74	.05 mf, Paper	23912-2
			C36	2400 mmf, "Toothpick"	Part of SA 115				C75	Variable, Air, 100 mmf	SA-1



BAND-SWITCH SHOWN AT 3rd POSITION CLOCKWISE 5 to 10 Mc. * STARS SHOW CHANGES IN PARTS DESIGNATIONS FOR 3rd POSITION - OTHERWISE SCHEMATIC REMAINS THE SAME AS 4th POSITION.



HAMMARLUND MFG. CO. INC.

MODEL SP-400-SX

ALIGNMENT - GENERAL

When either selectivity or sensitivity or both appear to be below normal and all tubes have been tested, check the alignment. Remove the cabinet or dust cover and bottom cover plate of the Receiver to get at all parts for making adjustments. CAUTION: ANY CHANGES FROM ORIGINAL SETTINGS WILL BE SMALL SO USE GREAT CARE WHEN CHECKING ADJUSTMENTS. This is especially true of the H-F oscillator circuits, which should NOT be disturbed unless the MAIN TUNING dial is definitely known to be off calibration.

a. *Signal Generator* - This should be an accurately calibrated instrument producing amplitude-modulated radio-frequency signals. In addition to 465 kc (the I.F.), the frequency range required of the signal generator depends on the tuning range of the receiver to be aligned. The H-F alignment frequencies required for the Series 400-SX Super-Pro are shown in Fig. 13. The second harmonic frequency is not available. For example: a signal generator covering all frequencies from 465 kc to 20 mc could be used to check the highest frequency band by using the second harmonic of 20 mc to provide the 40 mc called for in Fig. 13. The signal generator should have an output of approximately 100 microvolts and an output impedance of approximately 100 ohms for best results when aligning the R-F and H-F Oscillator circuits. For I-F alignment these values are not critical. The frequency calibration of the signal generator is extremely important if the Receiver dial calibration is to be correct.

b. *Output Meter* - The output meter should respond to the modulation frequency of the signal generator, preferably 400 cps, and should provide at least half-scale deflection for 10 volts. Its resistance should be greater than 500 ohms.

c. *Tools* - An insulated screwdriver 9/64" wide and .025" thick at the bit, is required for alignment of the Receiver.

d. *Preliminary Procedure* - Throw the OFF-ON switch to ON and let the Receiver warm up for about an hour before beginning adjustments. Connect the output meter to the 500-ohm terminals located at the rear of the Receiver chassis.

ALIGNMENT PROCEDURE

a. *Preliminary Setup* - Adjust the signal generator to approximately 465 kc and connect its output to the control grid cap of the 1st detector tube (V3) through a fixed capacitor (anything larger than 100 mmf will do). Set the front panel controls as follows:

SENSITIVITY.....0
 AVC-MANUAL.....MANUAL
 SIGNAL-MOD-CW.....MOD
 SEND-REC.....REC
 BAND SWITCH.....2.5-5.0 mc
 AUDIO GAIN.....10
 CRYSTAL SELECTIVITY.....OFF
 PHASING.....on arrow
 BAND WIDTH.....3
 BAND SPREAD DIAL.....100

b. *I-F Alignment Check* -

(1) Set the MAIN TUNING dial near 2.5 mc, but be careful not to tune in a powerful local signal. Set the CRYSTAL SELECTIVITY switch on 3, the AVC-MANUAL switch on AVC, and advance the SENSITIVITY to 10. Turn off the modulation of the signal generator and adjust its frequency slightly to produce maximum deflection of the "S" meter. The adjustment of the signal generator in this manner is necessary in order to get exact agreement with the natural period of the particular quartz crystal in the Receiver being checked. After reducing SENSITIVITY to 0, the modulation may be switched on, but the tuning adjustment of the signal generator must not be altered until the alignment check has been completed. Return the CRYSTAL SELECTIVITY and AVC-MANUAL controls to their original settings of OFF and advance the SENSITIVITY control until a suitable output meter reading is obtained. A half-scale reading in the region of 5 to 10 volts will be satisfactory.

(2) Now check the alignment of both upper (grid) and lower (plate) air trimmer capacitors in I-F transformers T2 and T3 and the single trimmer in T4 for peak reading of the output meter. If one or more of these adjustments results in a sizeable increase in output, reduce the SENSITIVITY control enough to bring the meter reading back to half-scale. Alignment of the plate circuit of the crystal filter (T1) can be tested in the same way by means of the lower adjusting screw on the side of the unit. This screw varies the

position of the powdered iron core in coil L26. Do not change the setting of the upper adjusting screw which tunes grid coil L27, as this circuit cannot be adjusted properly with the output meter. It can, however, be aligned by the "visual" method using a frequency-modulated signal generator and cathode-ray oscilloscope. If this equipment is available, proceed as follows:

(3) Connect the input of the vertical amplifier of the oscilloscope to the PHONO connections on terminal strip E3 (Fig. 6) on the rear skirt of the Receiver chassis. The "high" terminal is the second one from the edge of the strip; the first screw is connected to the chassis. Set the frequency-modulated signal generator to approximately 465 kc and connect its output to the control grid cap of the 1st detector (V3) through a fixed capacitor (100 mmf or larger). With the CRYSTAL SELECTIVITY switch at OFF, readjust the signal generator frequency to produce the conventional single-peaked resonance curve on the screen of the oscilloscope. Then turn the CRYSTAL SELECTIVITY switch to position 1. If the grid coil (L27) is correctly tuned the image on the oscilloscope screen will remain symmetrical but will be only about two-thirds as wide as before, indicating an increase in selectivity. The oscilloscope image is also affected by the PHASING control, maximum symmetry occurring at or very near the arrow on its scale. Therefore, when tuning L27, rock the PHASING control back and forth at the same time to secure the best adjustment.

c. *AVC Alignment Check* - Leaving all other controls as in PAR. 26a, and without changing the signal generator frequency, reduce AUDIO GAIN to 0, switch to AVC and increase SENSITIVITY to 10. Increase AUDIO GAIN to restore half-scale reading on the output meter and adjust the single trimmer capacitor in T6 for minimum output meter reading. The "S" meter reading should "peak" at the same time the output meter reading "dips".

d. *Beat Oscillator Alignment Check* - Continuing with controls as above (PAR. 26c), switch off the output meter and plug in a pair of earphones, or replace the meter with a suitable loudspeaker. Turn the SIGNAL-MOD-CW switch to CW and see that the BEAT OSCILLATOR control is exactly on 0 (zero). If tone in earphones or speaker is not

very low in pitch, readjust the trimmer capacitor near the bottom of T5 until it is. If the beat oscillator is in perfect alignment when this test is made, no sound will be heard since the signal generator and the beat oscillator will be oscillating at the same frequency and there will be no audible difference of "beat". Check this by turning the BEAT OSCILLATOR control knob slightly off 0 (zero) toward one side or the other. If this results in a tone rising in pitch as the pointer is turned away from 0 (zero) to either side, the beat frequency oscillator is perfectly aligned. If no audible tone can be obtained within the range of the BEAT OSCILLATOR control, adjust the trimmer capacitor near the bottom of T5 until an approximate "zero beat" occurs at 0 (zero) setting of the BEAT OSCILLATOR control.

e. *H-F Oscillator Calibration Check* - The accuracy of the MAIN DIAL calibration depends solely on the H-F oscillator frequency, which in this Receiver is 465 kc (the IF) higher than the signal frequency except in the 20-40 mc band, where the H-F oscillator is 465 kc lower than the signal frequency. Although the frequency of the H-F oscillator can be measured directly if accurate frequency-measuring equipment is on hand, it is far simpler to check it by tuning in signals of known frequency and noting the MAIN DIAL readings. CAUTION: BE SURE THE BAND SPREAD DIAL IS SET AT 100 WHEN MAKING THIS TEST.

(1) To correct dial calibration, refer to alignment chart (Fig. 13) for location of H-F oscillator adjustments as well as signal frequencies at which settings should be made. If the 2.5-5.0 mc band is to be corrected, the signal generator may be set accurately to 2.5 mc and its second harmonic (if strong enough) used for the 5.0 mc end of the band. The output of the signal generator should be unmodulated and SIGNAL-MOD-CW switch on Receiver turned to CW. Set BEAT OSCILLATOR at 0, AUDIO GAIN at 10, AVC-MANUAL on MANUAL, BAND WIDTH at 16. Disconnect output meter and use earphones or loudspeaker to make necessary adjustments by "zero beat" method. Connect signal generator to antenna terminals for this test.

(2) Tune in second harmonic at 5.0 mc end of dial to zero beat. Notice approximate dial error. Turn main dial slightly toward 5.0 mc calibration line until beat note rises to a high pitch. Do not turn dial far enough to

MODEL SP-400-SX

HAMMARLUND MFG. CO. INC.

system instead of directly to antenna terminals through a 100-ohm resistor. Make sure that signal from signal generator actually reaches Receiver by way of antenna rather than by some form of direct coupling.

(4) In all the foregoing tests using output meter readings for circuit adjustment it is recommended that earphones (or speaker) be used to monitor the signal. This will avoid false adjustments caused by overloading or freakish responses.

put resistance of signal generator. If signal generator is modulated, Receiver controls should be set as for I-F alignment; if unmodulated, set BEAT OSCILLATOR to 2 (either side) and SIGNAL-MOD-CW to CW. Adjust SENSITIVITY for half-scale reading on output meter when signals are exactly in tune.

(2) Starting with 2.5-5.0 mc band, set main dial at 5.0 mc (BAND SPREAD at 100) and adjust frequency of signal generator for peak deflection of output meter. Then check setting of trimmer marked 1st DET 5.0 mc (Fig. 13). Repeat this procedure on trimmers designated as 2nd RF and 1st RF in same row. If readjustments on one of these settings greatly increases output meter reading, alter SENSITIVITY slightly to reduce reading to half-scale. After each adjustment check tuning of Receiver to make sure test signal is still accurately tuned. BAND SPREAD may be used as a vernier for this purpose. CAUTION: THIS TUNING CHECK IS EXTREMELY IMPORTANT AT HIGH END OF 10-20 MC AND 20-40 MC BANDS WHERE THERE IS SOME SLIGHT INTERACTION BETWEEN 1ST DET AND H-F OSC CIRCUITS. After checking the three trimmers at high end of this band, turn main dial to 2.5 mc and retune signal generator to suit. Then check the three inductance adjuster settings marked 2.5 mc (Fig. 13) in the same row. Since adjustments at one end of a band also affect the other end of the band (as described under H-F OSC alignment), repeat above procedure until no further improvement can be secured. The number of repetitions necessary depends on how much mistuning existed initially. Other bands may be checked in the same manner.

(3) For best possible efficiency with a particular antenna arrangement, the 1st RF circuits may be adjusted with the antenna connected. This can be done by loosely coupling output of signal generator to antenna

raise beat so high it cannot be heard. With alignment screwdriver adjust trimmer capacitor marked HF OSC 5.0 mc (Fig. 13) until beat is again zero. Turn main dial still farther toward 5.0 mc line and make a further adjustment of trimmer capacitor to return to zero beat. Repeat this process as often as necessary to bring dial to exactly 5.0 mc. (The main dial could be set at once on exactly 5.0 mc and trimmer turned enough at one time to produce zero beat, but the step-by-step method is recommended.) Now tune in 2.5 mc fundamental at low-frequency end of main dial and correct the calibration step-by-step as before, using inductance trimming adjustment HF OSC 2.5 mc (Fig. 13). When second harmonic is again tuned in at other end of dial, it will be found that inductance adjustment at 2.5 mc has changed correction previously made at 5.0 mc. This is normal. Go back and forth several times from 2.5 to 5.0 mc in order to bring both ends of dial scale into exact agreement with the signal frequency. CAUTION: DURING THIS ADJUSTMENT BE VERY CAREFUL TO ADJUST THE SENSITIVITY CONTROL TO AVOID OVERLOADING.

f. R-F and 1st Detector Alignment Check - Although alignment of these three circuits (1st and 2nd RF and 1st Det) can be checked at the same time as the H-F oscillator, it is simpler to consider each check as a separate operation. Efficient weak-signal reception, with low receiver noise level and high image rejection ratios, depends on the relative alignment of these three circuits with respect to the H-F oscillator and without regard to calibration accuracy.

(1) Accurate calibration of the signal generator is not required to check these adjustments. Modulation of the signal generator, while convenient, is not strictly necessary. Input to antenna terminals should be through 100 ohms (approximate) including out-

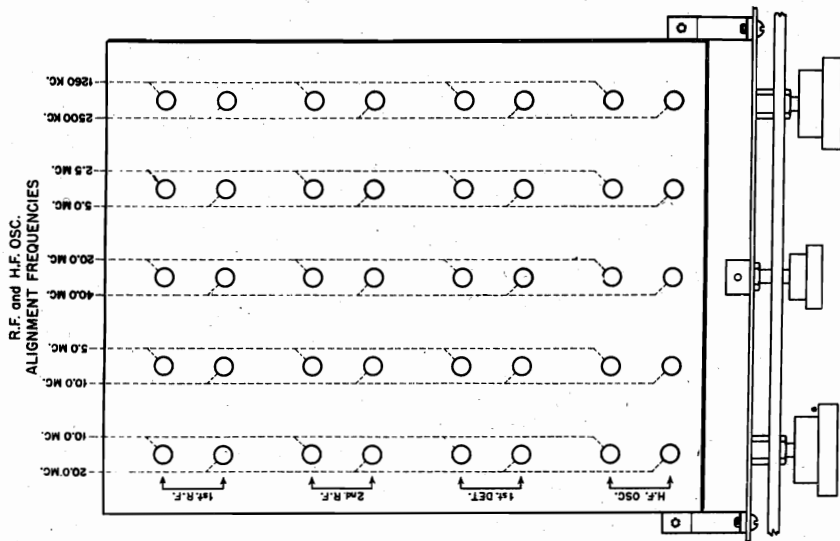


Fig. 13. ALIGNMENT CHART. Shows location of screwdriver adjustments and corresponding test frequencies.

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HOFFMAN RADIO CORP.

No alignment adjustments should be attempted without first thoroughly checking over all other possible causes of trouble such as defective tubes, resistors, and condensers. In order to align the receiver properly, remove the chassis from the cabinet and proceed as follows.

EQUIPMENT REQUIRED:

1. Signal Generator.
2. Output Meter with 2.5 Volt Scale.
3. 1 Mfd. Condenser.

I.F. ALIGNMENT:

1. Connect output meter across speaker voice coil; set meter on 2.5 volt scale.
2. Connect output of signal generator directly to antenna post on loop; connect ground side of generator to chassis of receiver through .1 Mfd. condenser. Set signal generator on 455 Kc (modulated).
3. Adjust I.F. trimmers (first T4 and then T3) for maximum reading on output meter.

Note: Keep signal level low, just enough to keep maximum reading on lower half of meter scale. Tuning condenser plates should be all the way out; volume control should be on full.

R.F. ALIGNMENT:

1. Set tuning condenser with plates completely out.
2. Set signal generator at 1650 Kc (modulated) and feed its output into a loop of wire about 6" in diameter. Place this loop about one foot away from and parallel to the receiver loop antenna.
3. Tune in signal by adjusting oscillator trimmer (C4).
4. Adjust output of signal generator to obtain deflection on lower half of meter scale.
5. Adjust oscillator trimmer for maximum output.
6. Set signal generator at 1400 Kc and tune in signal with tuning condenser.
7. Adjust antenna trimmer (C3) while rocking gang condenser for maximum reading on output meter. Feed only enough signal from generator to keep maximum reading on lower half of meter scale.

DIAL ADJUSTMENT:

To set the dial on calibration, pick up a station of known frequency near the center of the dial and move the pointer by hand as required.

Power Consumption 26 Watts
Undistorted Audio Output 1.0 Watt
Maximum Audio Output 1.5 Watts
Loudspeaker 5-inch round P.M.

MAY, 1946

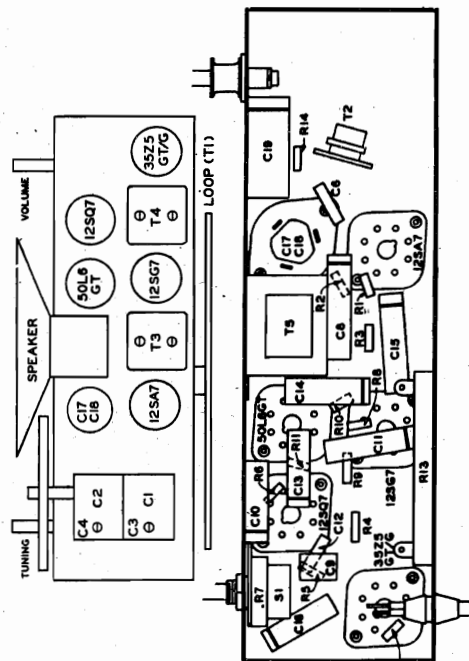
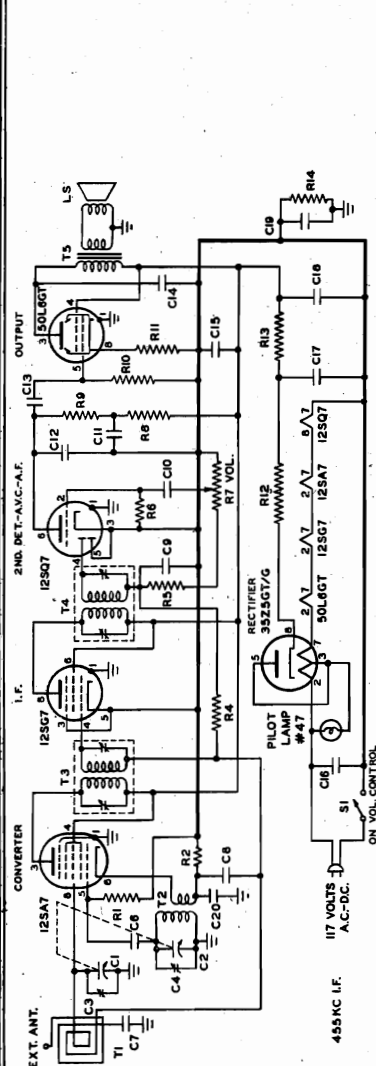


Fig. 2 Bottom of Chassis

NORMAL OPERATING CURRENTS
Cathode Current
Cathode Current

57 Ma.
33 Ma.

35Z5
50L6

NORMAL OPERATING VOLTAGES

The following table lists the normal operating voltages to be expected at the various tube socket terminals.

PIN NO.	1	2	3	4	5	6	7	8
12SA7		24.5AC	+87	+87	-7	0	12AC	-9
12SQ7		36AC	0	-9	0	+87	24AC	+87
12SQ7		-5	0	0	0	+62	0	12AC
50L6GT/G		87AC	+85	+87	0	+77 *	36AC	+5.3
35Z5GT/G		117AC	112AC	-	112AC	-	87AC	+117

* Means tie point
NOTE: The above readings are obtained with no signal input to receiver.

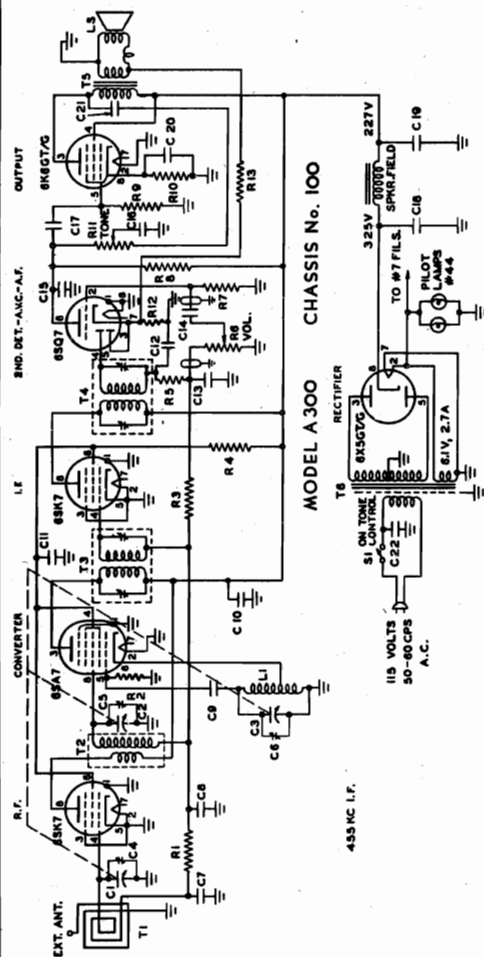
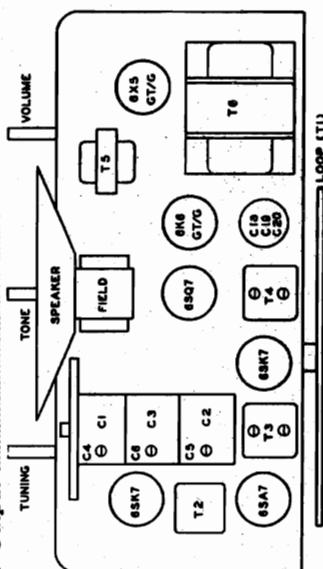
D.C. voltages measured with 20,000 ohm/volt meter
A.C. voltages measured with 1,000 ohm/volt meter
All voltages measured with reference to B-Line voltage 117.5

SYMBOL	DESCRIPTION	HOFFMAN No.
C1-C2-C3	Three-Section Variable (388-388-180 Mm.f.)	4400
C4, C5, C6	Trimmers: Part of Variable Condenser	4100
C7, C8	.05 Mfd, 200 Volt, Tubular Paper	4000
C9, C12	100 Mmf ±20%, Mica	4101
C13, C15	.05 Mfd, 400 Volt, Tubular Paper	4102
C10, C11	.005 Mfd, 600 Volt, Tubular Paper	4103
C14, C16	.01 Mfd, 600 Volt, Tubular Paper	4200
C17	Dry Electrolytic Condenser	4104
C18-C19-C20	(20-20-20 Mfd, 450-450-25 Volt)	5200
C21	.001 Mfd, 600 Volt, Tubular Paper	9003
C22	.01 Mfd, 600 Volt, Tubular Paper (Metal Can)	4500
L1	Oscillator Coil	4501
L5	5" PA Loudspeaker	4502
R1, R8	22 Megohm ±20%, ½ Watt	4503
R2	22,000 Ohm ±20%, ½ Watt	4504
R3	2.2 Megohm ±20%, ½ Watt	4505
R4	10,000 Ohm ±10%, 2 Watt	4800
R5	47,000 Ohm ±20%, ½ Watt	4506
R6	.5 Megohm Potentiometer (Volume)	4507
R7	10 Megohm ±20%, ½ Watt	4801
R9	.47 Megohm ±20%, ½ Watt	4508
R10	560 Ohm ±10%, ½ Watt	4509
R11	.25 Megohm Potentiometer With Switch (Tune)	4702
R12	47 Ohm ±20%, ½ Watt	5201
R13	330 Ohm ±20%, ½ Watt	5202
R14	1500 Ohm ±10%, 10 Watt, W.W.	5203
S1	On-Off Switch (On Tone Control)	5204
T1	Antenna Loop	5100
T2	R.F. Coil (Shielded)	5000
T3	Input I.F. Transformer (455 K.C.)	
T4	Output I.F. Transformer (455 K.C.)	
T5	Audio Output Transformer	
T6	Power Transformer	

Hoffman Model A300 is a 6-tube broadcast band AC operated superheterodyne table model receiver incorporating such features as built-in loop antenna, a stage of r-f amplification preceding the converter tube, and a variable tone control. An additional feature, usually not found in receivers of this type, is an inverse feedback network to reduce audio distortion.

SPECIFICATIONS

Tuning Range 535 Kc to 1640 Kc
Intermediate Frequency 455 Kc
Power Supply 115 V A.C., 50-60 C.P.S.
Power Consumption 55 Watts
Audio Output 1.25 Watts



Hoffman Model A300 with Chassis number 1003 is electrically identical with Chassis number 100 except for the following:

1. Five-inch P.M. speaker, part number 9003, has been substituted for 4 x 6 inch oval dynamic speaker, part number 9000.
2. A 1500-ohm resistor, part number 4701, has been connected in the filter circuit in place of the 1500-ohm speaker field.

These changes have been incorporated in the schematic diagram shown below.

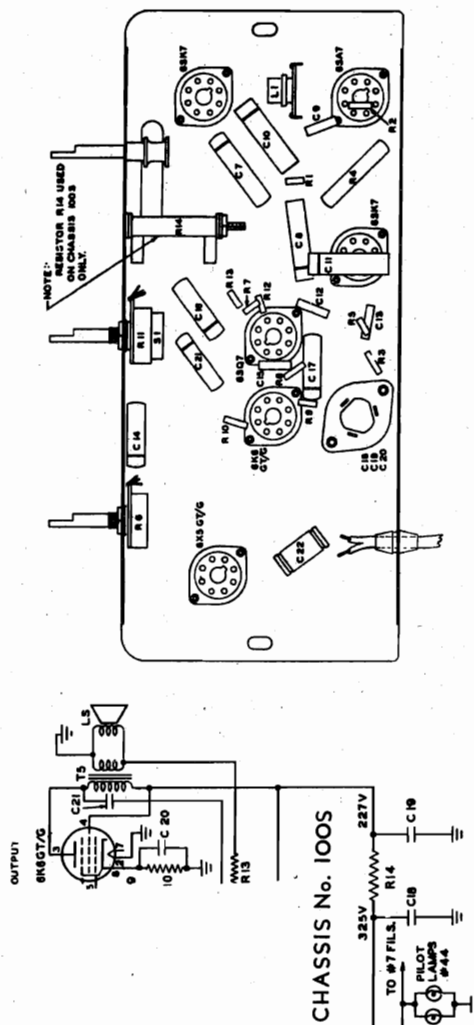


Fig. 3. Bottom of Chassis

HOFFMAN RADIO CORP.

MODEL A300
MODEL A301
MODEL A401
MODEL A500

MODEL A300, Chassis 100, 100S
MODEL A301, Chassis 101, 101S

DIAL ADJUSTMENTS:

To set the dial on calibration, tune in a station of known frequency near the center of the dial and move the pointer by hand as required.

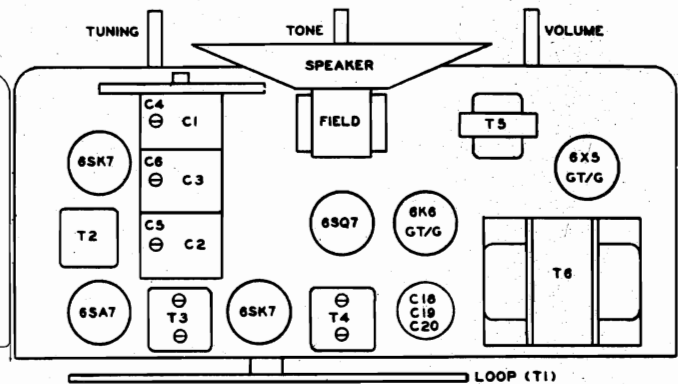
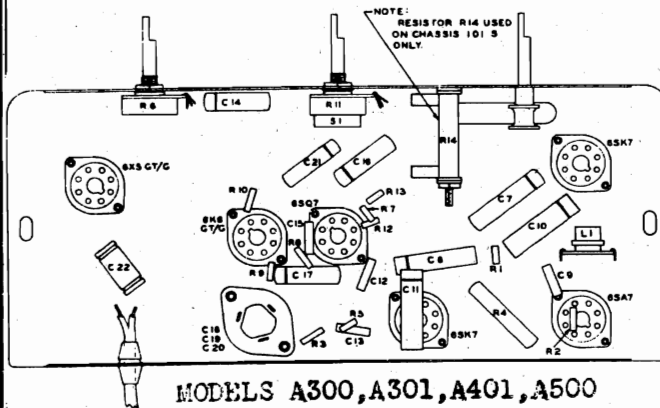


Fig. 1 Top of Chassis

NORMAL OPERATING VOLTAGES

The following table lists the normal operating voltages to be expected at the various tube socket terminals.

PIN NO.	1	2	3	4	5	6	7	8
6SK7 (R.F.)	0	0	0	-.5	0	+85	6.1A.C.	+227
6SA7	0	0	+227	+85	-7	0	6.1A.C.	-.7
6SK7 (I.F.)	0	0	0	-.7	0	+85	6.1A.C.	+227
6SQ7	0	-.5	0	-.25	0	+95	6.1A.C.	0
6K6GT/G	0	0	+217	+227	0	+325 *	6.1A.C.	+15
6X5GT/G	0	6.1A.C.	290A.C.	—	290A.C.	—	0	+325

D.C. voltages measured with 20,000 ohm/volt meter.

A.C. voltages measured with 1,000 ohm/volt meter.

All voltages measured with reference to chassis.

Line voltage 117.5.

* Means tie point.

NOTE: The above readings are obtained with no signal input to the receiver.

MODELS A300, A301, A401, A500

NORMAL OPERATING CURRENTS

6X5GT/G	Cathode Current	65 Ma
6K6GT/G	Cathode Current	24.5 Ma

ALIGNMENT PROCEDURE

CAUTION:

No alignment adjustments should be attempted without first thoroughly checking over all other possible causes of trouble such as defective tubes, resistors, and condensers. In order to align the receiver properly, remove the chassis from the cabinet and proceed as follows:

EQUIPMENT REQUIRED:

1. Signal Generator
2. Output Meter with 2.5 Volt Scale.
3. .1 Mfd. Condenser

I.F. ALIGNMENT:

1. Connect output meter across speaker voice coil; set meter on 2.5 Volt Scale.
2. Connect output of signal generator to stator of C2 (see schematic) through a .1 Mfd. condenser; connect ground side of generator directly to chassis of receiver. Set signal generator on 455 Kc (modulated).
3. Adjust I.F. trimmers (first T4 and then T3) for maximum reading on output meter. (Note: Keep signal level low, just enough to keep maximum reading on lower half of meter scale.) The tuning condenser plates should be all

the way out; volume and tone controls should be in extreme clockwise position.

R.F. ALIGNMENT:

1. Set tuning condenser with plates completely out.
2. Set signal generator at 1650 Kc (modulated) and feed its output into a loop of wire about 6 inches in diameter. Place this loop about one foot away from and parallel to the receiver loop antenna.
3. Tune in signal by adjusting oscillator trimmer (C6).
4. Adjust output of signal generator to obtain deflection on lower half of meter scale.
5. Adjust oscillator trimmer for maximum output.
6. Set signal generator at 1400 Kc and tune in signal with tuning condenser.
7. Adjust antenna and RF trimmers (C4 and C5) while rocking gang condenser for maximum reading on output meter. Feed only enough signal from generator to keep maximum reading on lower half of meter scale.

MODEL A301, Chas. 101,
101S
MODEL A500
MODEL A501

HOFFMAN RADIO CORP.

SYMBOL	DESCRIPTION	HOFFMAN No.
C1-C2-C3	Three-Section Variable (388-388-180 Mmfl.)	4400
C4, C5, C6	Trimmers Part of Variable Condenser	4100
C7, C8	.05 Mfd, 200 Volt, Tubular Paper	4000
C9, C10	100 Mmf ± 20%, Mica	4101
C11, C12	.05 Mfd, 400 Volt, Tubular Paper	4102
C13, C14	.005 Mfd, 600 Volt, Tubular Paper	4103
C15, C16	.01 Mfd, 600 Volt, Tubular Paper	4200
C17	Dry Electrolytic Condenser	4104
C18-C19-C20	(20-20-20 Mfd 450-450-35 Volt)	4004
C21	.001 Mfd, 600 Volt, Tubular Paper	5200
C22	.01 Mfd, 600 Volt, Tubular Paper (Metal Can)	9003
C23	500 Mmf ± 5%, Silver Mica	4501
L1	Oscillator Coil	4502
L2	Loadspeaker, 5" P.M.	4503
R1, R2	22 Megohm ± 20%, 1/2 Watt	4504
R3	22,000 Ohm ± 20%, 1/2 Watt	4505
R4	2.2 Megohm ± 20%, 1/2 Watt	4506
R5	10,000 Ohm ± 10%, 2 Watt	4507
R6	47,000 Ohm ± 20%, 1/2 Watt	4804
R7	.5 Megohm Potentiometer (Volume)	4508
R8	.47 Megohm ± 20%, 1/2 Watt	4509
R9	.560 Ohm ± 10%, 1/2 Watt	4701
R10	.47 Ohm ± 20%, 1/2 Watt	6000
R11	.25 Megohm Potentiometer With Switch (Tone)	5201
R12	47 Ohm ± 20%, 1/2 Watt	5212
R13	330 Ohm ± 20%, 1/2 Watt	5203
R14	150 Ohm ± 5%, 6 1/2 Watt	5204
S1	On-Off Switch (On Tone Control)	5100
S2	Pushbutton Switch Assembly	52500
T1	Antenna Loop	
T2	R.F. Coil (Shielded)	
T3	Input I.F. Transformer (455 K.C.)	
T4	Output I.F. Transformer (455 K.C.)	
T5	Audio Output Transformer	
T6	Power Transformer	
Z1	Pushbutton Tuning Assembly	

Tuning Range 535 Kc to 1640 Kc
Intermediate Frequency 455 Kc
Power Supply 115 V A.C., 50-60 C.P.S.
Power Consumption 55 Watts
Audio Output 1.25 Watts

MAY, 1946

MODELS A301, A500, A501

SPECIFICATIONS

MODEL A 301 CHASSIS No. 101

Hoffman Model A301 with Chassis 101S is electrically identical with Chassis 101 except for the following:

1. Five-inch P.M. speaker, part number 9003, has been substituted for 4 x 6-inch oval dynamic speaker, part number 9000.
2. A 1500-ohm resistor, part number 4701, has been connected in the filter circuit in place of the 1500-ohm speaker field.

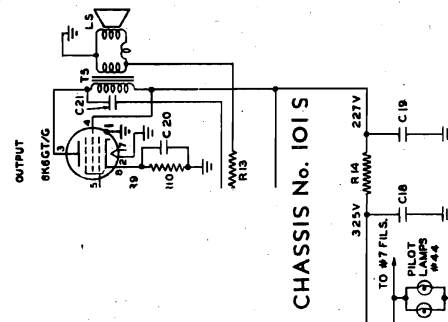
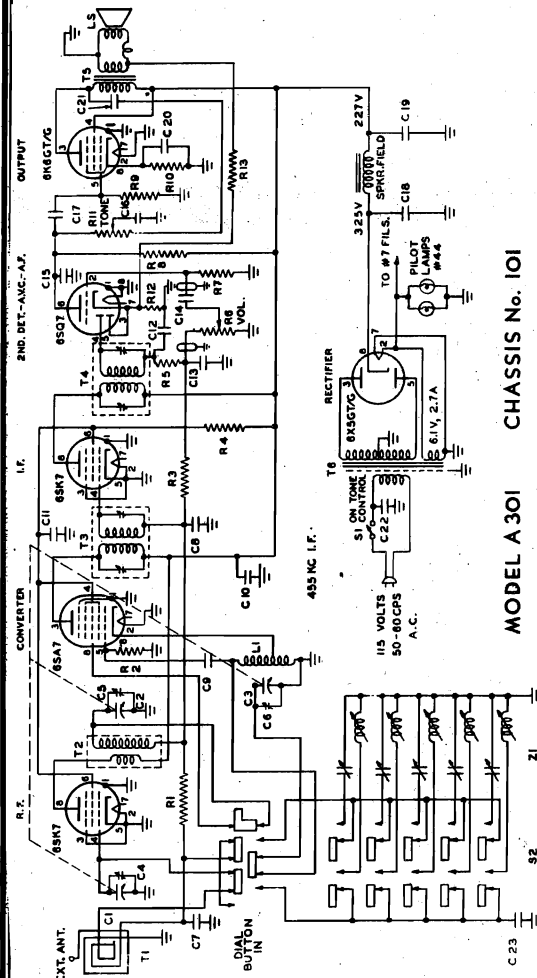
These changes have been incorporated in the schematic diagram shown below.

PUSHBUTTON ADJUSTMENTS

The frequency ranges for the pushbuttons are given in figure 3. A layout of the pushbutton adjustments is shown in figure 4. Note that in this figure pushbutton number 1 is now to the extreme right, since the pushbutton assembly is being viewed from the rear. To make pushbutton adjustments, proceed as follows:

1. Turn the receiver on and let it warm up for fifteen minutes or longer in order to minimize drift effects.
2. Depress the DIAL pushbutton and tune in the station which is to be set on pushbutton number 1.
3. Now depress pushbutton number 1 and adjust tuning slug 1a and trimmer 1b (figure 4) until the station is accurately tuned in again.
4. Repeat the above procedure for the remaining pushbuttons.

NOTE: When making oscillator coil pushbutton adjustments, it is desirable that this adjustment be made from the high-frequency end (slug all the way out). The proper oscillator coil slug setting will then be reached before there is any possibility of tuning the oscillator to the low-frequency side of the carrier.



PUSHBUTTON NO.	1	2	3	4	5
FREQUENCY RANGE IN KILOCYCLES	550-600	550-600	720-1200	720-1200	900-1500

Fig. 3 Pushbuttons

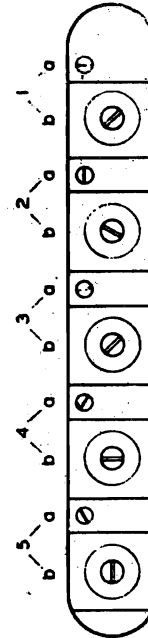
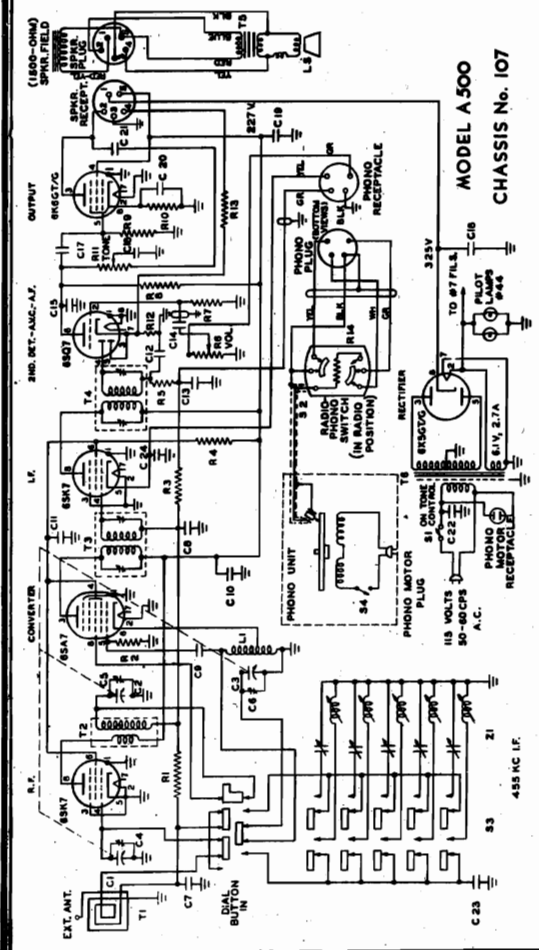


Fig. 4 Adjustment Screws

HOFFMAN RADIO CORP.

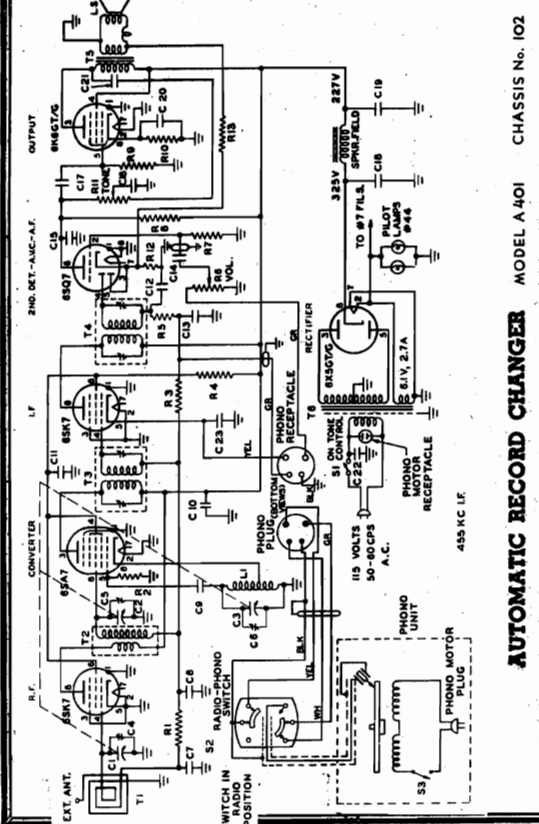
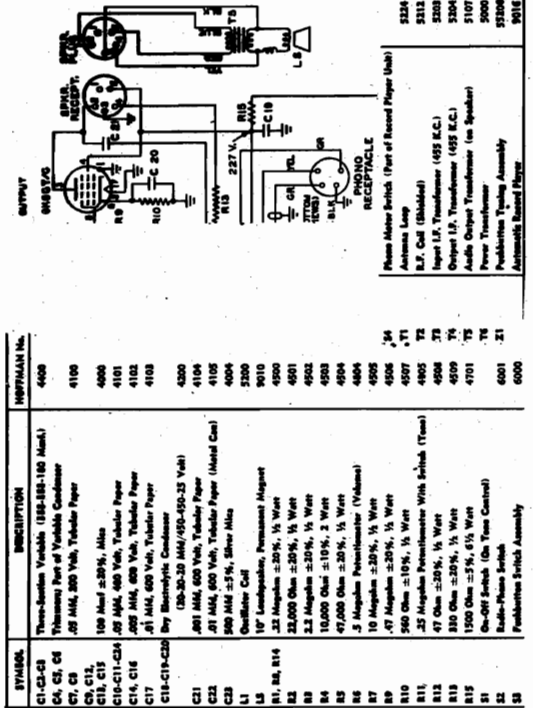
MODEL A401, Ch. 102
MODEL A500, Ch. 107,
107S



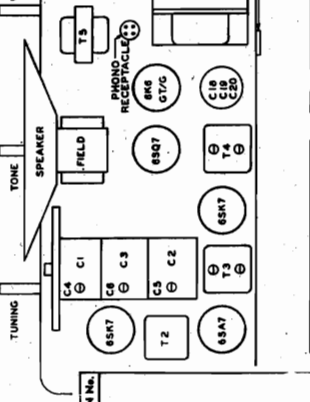
Hoffman Model A500 with Chassis 107S is electrically identical with Chassis 107 except for the following:

1. Ten-inch P.M. speaker, part number 9010, has been substituted for ten-inch electrodynamic speaker, part number 9012.
2. A 1500-ohm resistor, part number 4701, has been connected in the filter circuit in place of the 1500-ohm speaker field.

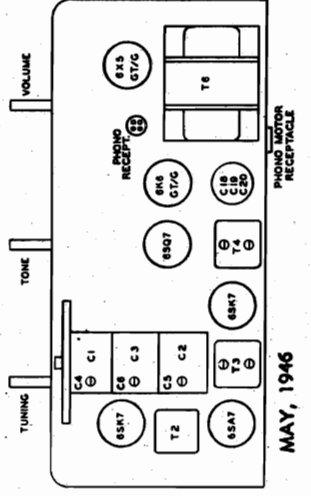
These changes have been incorporated in the schematic diagram shown below.



The automatic record changer used with this receiver is a General Instrument, Model 205.



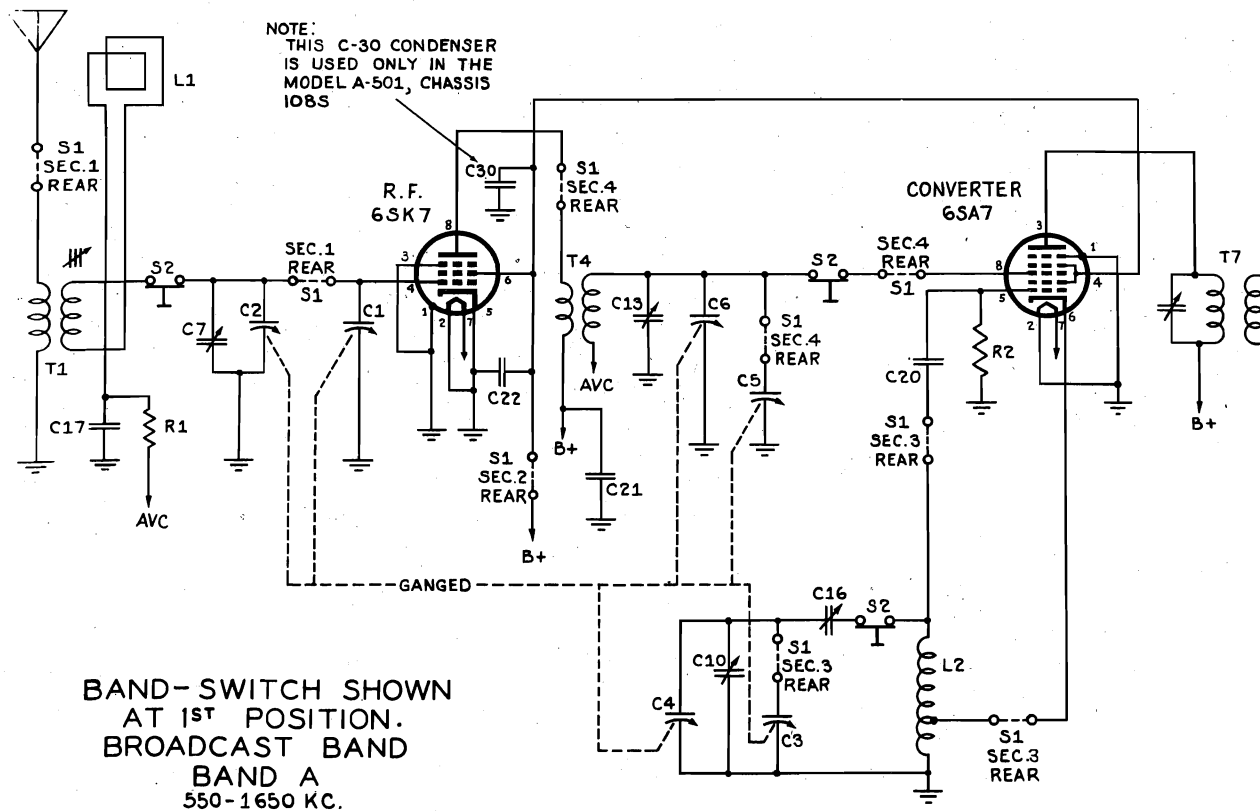
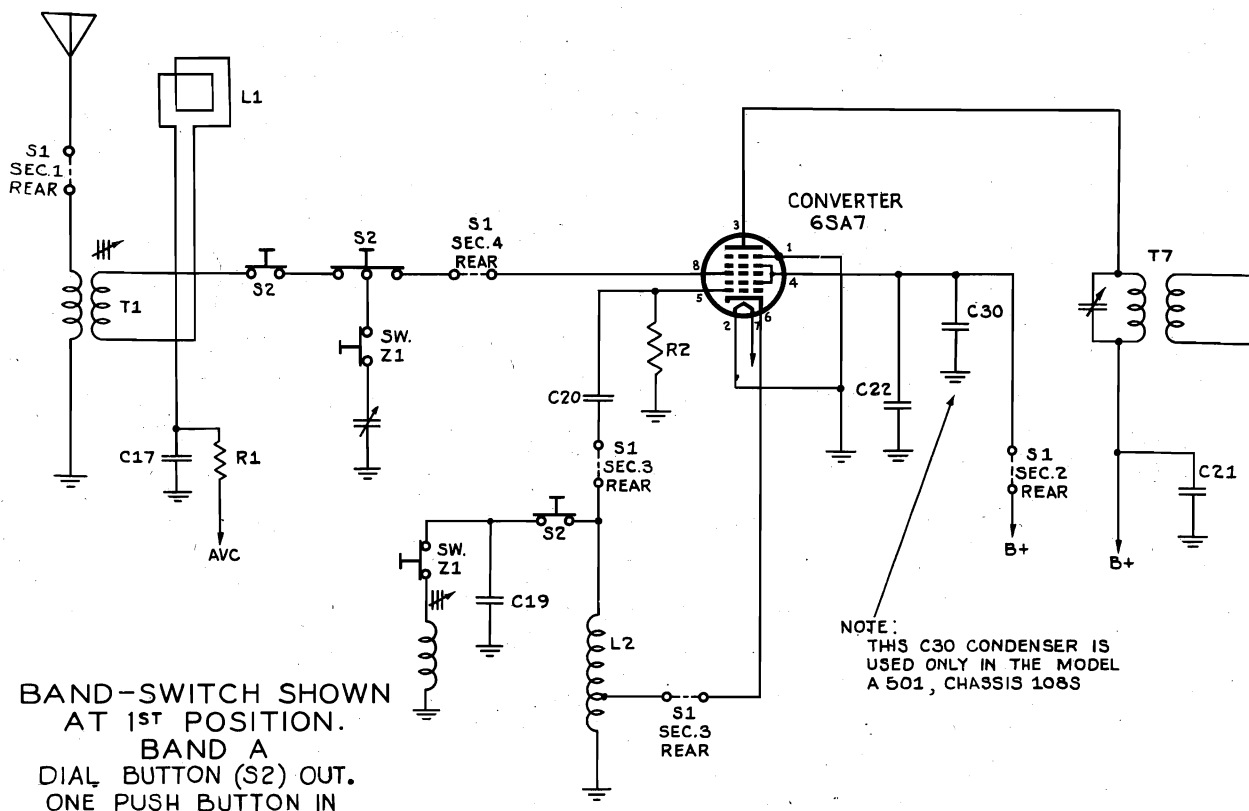
AUTOMATIC RECORD CHANGER
The automatic record changer used with this receiver is a Seeburg Model K.



SYMBOL	DESCRIPTION	HOFFMAN No.
C1-C2-C3	Three-Section Variable (388-388-180 Mmf.)	4400
C4, C5, C6	Trimmer: Part of Variable Condenser	4100
C7, C8	.05 Mfd., 200 Volt, Tubular Paper	4000
C9, C10	100 Mmf. ±20%, Mica	4101
C11, C12	.05 Mfd., 400 Volt, Tubular Paper	4102
C13, C14	.05 Mfd., 600 Volt, Tubular Paper	4103
C15, C16	.01 Mfd., 200 Volt, Tubular Paper	4200
C17	Dry Electrolytic Condenser (30-30-30 Mfd. 450-450-25 Volt)	4104
C18-C19-C20	.01 Mfd., 600 Volt, Tubular Paper (Metal Can)	4105
C21	500 Mfd. ±5%, Silver Mica	4000
C22	100 Mfd. ±20%, Mica	4101
C23	22,000 Ohm ±20%, 1/2 Watt	4102
L1	Oscillator Coil	4103
L2	22,000 Ohm ±20%, 1/2 Watt	4200
L3	10,000 Ohm ±20%, 1/2 Watt	4104
L4	2.2 Megohm ±20%, 1/2 Watt	4105
L5	47,000 Ohm ±20%, 1/2 Watt	4000
L6	.5 Megohm Potentiometer (Volume)	4101
L7	10 Megohm ±20%, 1/2 Watt	4102
L8	47 Megohm ±20%, 1/2 Watt	4103
L9	500 Ohm ±10%, 1/2 Watt	4200
L10	.25 Megohm Potentiometer With Switch (Tune)	4104
L11	47 Ohm ±20%, 1/2 Watt	4105
L12	330 Ohm ±20%, 1/2 Watt	4000
L13	On-Off Switch (On Tone Control)	4101
L14	Radio-Phono Switch	4102
L15	Phono Motor Switch (Part of Phono Unit)	4103
L16	Antenna Loop	4200
L17	I.F. Coil (Shielded)	4101
L18	Input I.F. Transformer (455 K.C.)	4102
L19	Output I.F. Transformer (455 K.C.)	4103
L20	Audio Output Transformer (See Speaker)	4200
L21	Power Transformer	5000
L22	Phono Unit—Automatic Record Player	9011



HOFFMAN RADIO CORP.

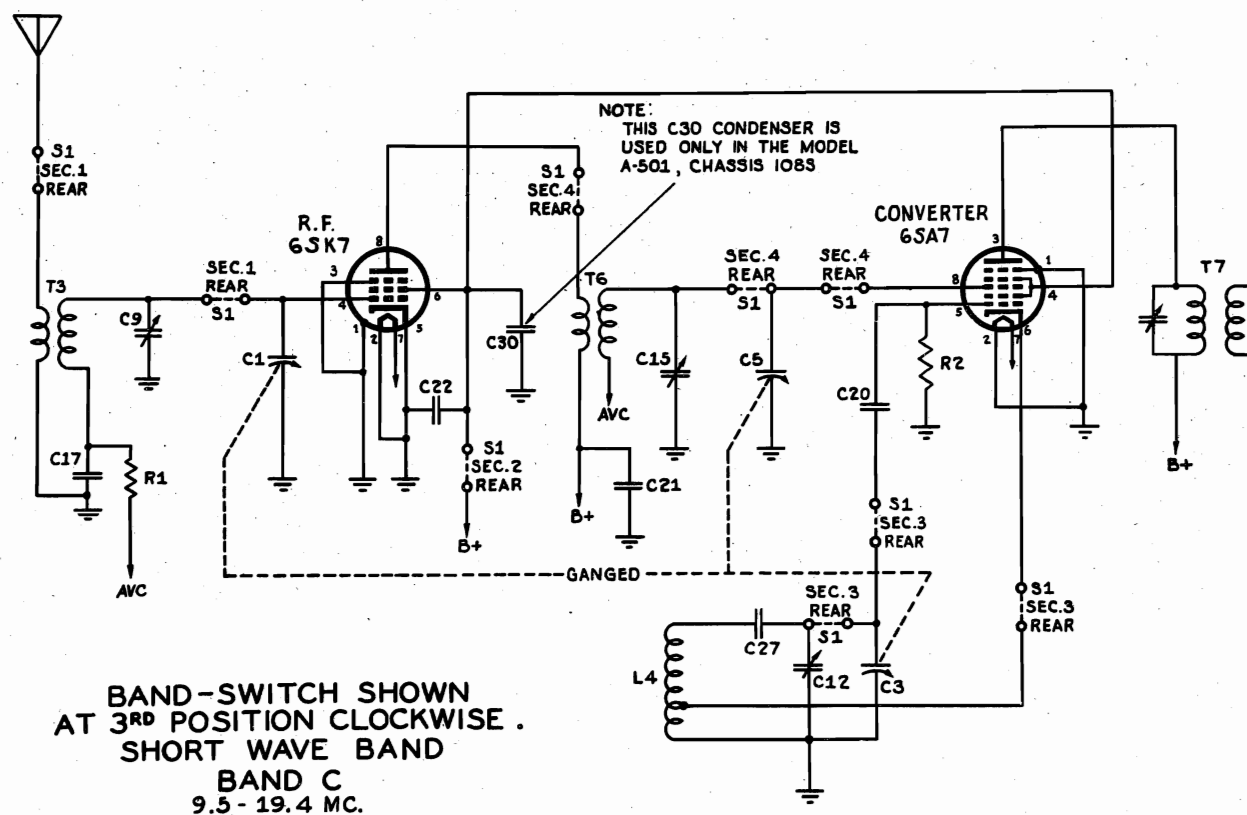
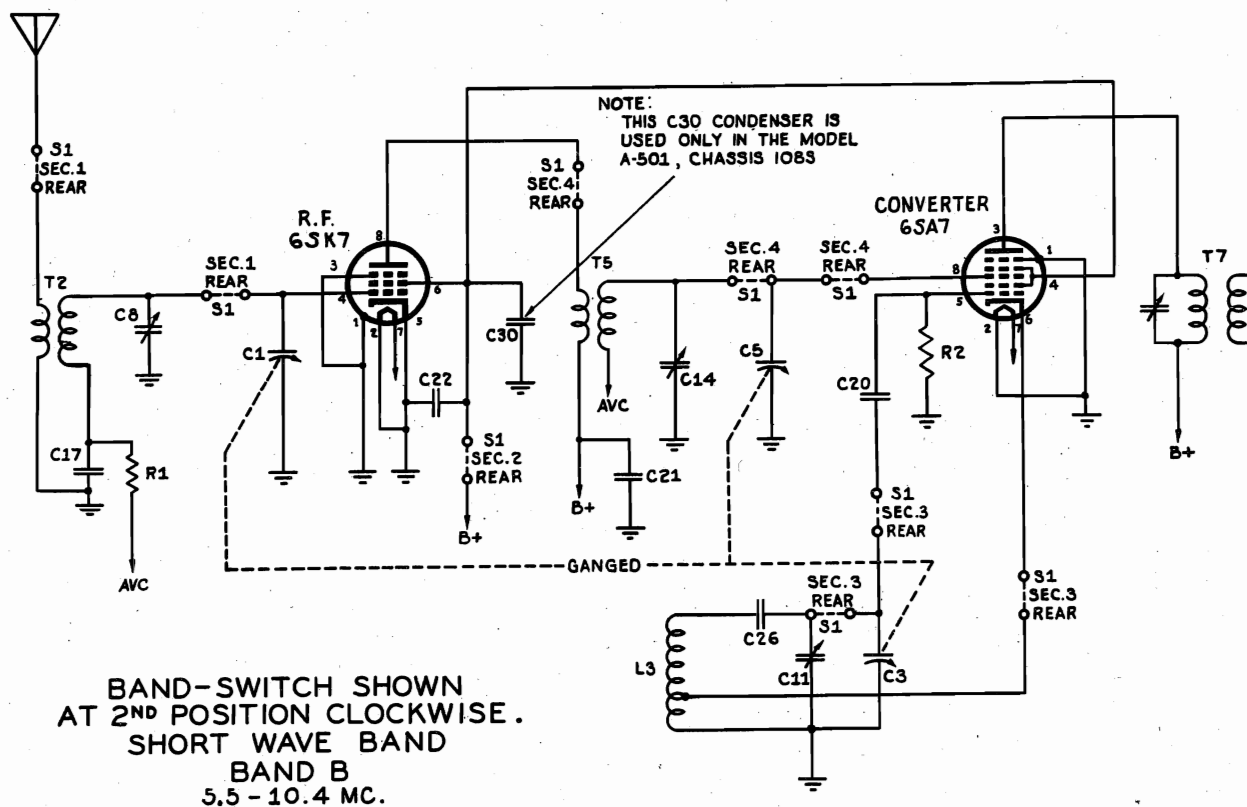


"clarified schematics"

PAGE 15-8 HOFFMAN

MODEL A501, Ch. 108S,
108ST

HOFFMAN RADIO CORP.



HOFFMAN RADIO CORP.

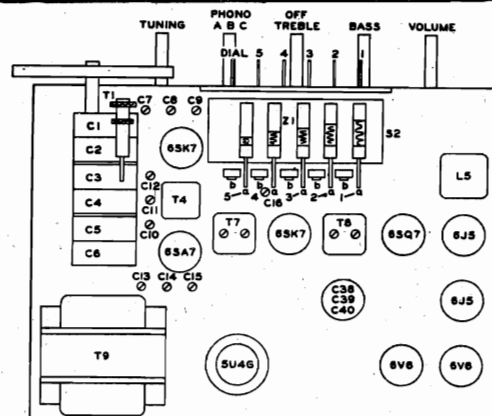
MODEL A501, Ch. 108S
108ST

OPERATIONS IN ORDER	SIGNAL GENERATOR		RECEIVER		TRIMMER ADJ. IN ORDER
	CONNECTIONS TO REC.	FREQUENCY	CONTROL SETTINGS	DIAL SETTING	
1	To stator of C-6 through .1 mfd. cond.	455 Kc	Vol. Max. Range Sw. on "A" Band	Minimum Capacity	T-8 and T-7
2	To Ant. Term. through a 400-ohm resistor.	18 Mc	Vol. Max. Range Sw. on "C" Band	18 Mc	C-12, C-15, C-9
3	To Ant. Term. through a 400-ohm resistor	10 Mc	Vol. Max. Range Sw. on "B" Band	10 Mc	C-11, C-13, C-8
4	To Ant. Term. through 200 mmf. condenser	1400 Kc	Vol. Max. Range Sw. on "A" Band	1400 Kc	C-10, C-13, C-7
5	To Ant. Term. through 200 mmf. condenser	600 Kc	Vol. Max. Range Sw. on "A" Band	600 Kc	C-16, T-1 tuning slug
6	To Ant. Term. through 200 mmf. condenser	1400 Kc	Vol. Max. Range Sw. on "A" Band	1400 Kc	C-10, C-13, C-7

NOTE: Rocking the condenser gang on the higher frequencies (bands "B" and "C") is necessary in order to avoid a false point of alignment due to "pulling action" between r-f and oscillator circuits.

NOTE: Be sure that the image frequency is not picked up during this adjustment. Note that the signal may be readily heard at two points as C-11 is adjusted. The correct setting for C-11 is with the trimmer in its looser position (adjusting screw further out).

NOTE: It is necessary to align the "C" band first so that "B" band and broadcast band alignment will not be adversely affected by subsequent "C" band adjustment.
Alignment of "C" Band:



NORMAL OPERATING VOLTAGES

The following table lists the normal operating voltages to be expected at the various tube socket terminals.

5U4G
6V6

NORMAL OPERATING CURRENTS

Cathode Current. 115 Ma.
Cathode Current (both tubes) 70 Ma.

PIN NO.	1	2	3	4	5	6	7	8
6SK7 (R.F.)	0	0	0	-.1	0	+95	6.2 AC	+290
6SA7 (Conv.)	0	0	+290	+95	-5 to -10	0	6.2 AC	-.15
6SK7 (I.F.)	0	0	0	-.15	0	+95	6.2 AC	+290
6SQ7	0	-.2	0	-.25	0	+75	6.2 AC	0
6J5 (Tone)	0	0	+130	0	+20 □	0	6.2 AC	+22
6J5 (Inverter)	0	0	+105	0	+50 #	0	6.2 AC	+43
6V6	0	0	+290	+290	0	0	6.2 AC	+17
6V6	0	0	+290	+290	0	0	6.2 AC	+17
5U4G	0	+350 5.2 AC*	0	335 AC	0	335 AC	0	+350 5.2 AC*

D.C. voltages measured with 20,000 ohm/volt meter.
A.C. voltages measured with 1,000 ohm/volt meter.
Line voltage 117.

measured at junction of R13 and R16.

□ measured at junction of R15 and R17.

All voltages measured with reference to chassis except as follows:

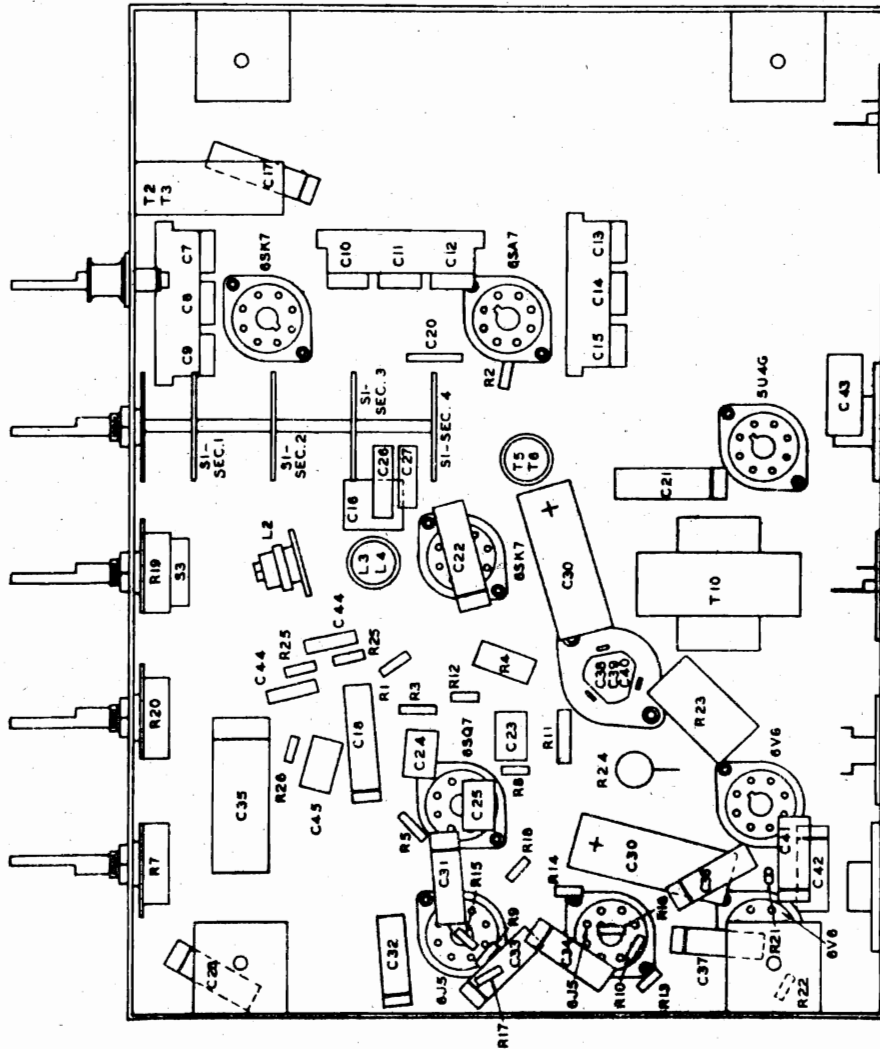
* measured between pins 2 and 8; not to chassis.

NOTE The above readings are obtained with no signal input to receiver and band switch in position "A".

MODEL A501, Ch. 108S,
108ST

HOFFMAN RADIO CORP.

HOFFMAN No.	SYMBOL	DESCRIPTION
4403	C1-C2, C3-C4, C5-C6	Three-section Variable with Split Stator, (160-260, 160-260, 160-260 Mmf.)
4300	C7, C8, C9	Three-section Trimmer Assembly
4300	C10, C11, C12	Three-section Trimmer Assembly
4300	C13, C14, C15	Three-section Trimmer Assembly
4301	C16	110-560 Mmf. Padder, Band "A"
4100	C17, C18	.05 Mfd., 200 Volt, Tubular Paper
4004	C19	500 Mmf. $\pm 5\%$, Silver Mica
4007	C20	47 Mmf. $\pm 10\%$, Mica
4101	C21, C22	.05 Mfd., 400 Volt, Tubular Paper
4000	C23, C24, C25	100 Mmf. $\pm 20\%$, Mica
4005	C26	1050 Mmf. $\pm 5\%$, Mica
4006	C27	2300 Mmf. $\pm 5\%$, Mica
4102	C28, C29	.005 Mfd., 600 Volt, Tubular Paper
4203	C30	10 Mfd., 450 Volt, Tubular Electrolytic
4112	C31, C32, C33, C34	.01 Mfd., 400 Volt, Tubular Paper
4110	C35	.5 Mfd., 200 Volt, Tubular Paper
4106	C36, C37	.02 Mfd., 400 Volt, Tubular Paper
4200	C38-C39-C40	20-20-20 Mfd./450-450-25 V. Electrolytic
4103	C41, C42	.01 Mfd., 600 Volt, Tubular Paper
4105	C43	.01 Mfd., 600 Volt, Tubular Paper (Metal Can)
4010	C44	330 Mmf., 5%, Mica
4011	C45	650 Mmf., 5%, Mica
4011	L1	Loop Antenna
5221	L2	Oscillator Coil (Band "A")
5215	L3-L4	Oscillator Coil (Bands "B" and "C")
5218	L5	5 Hy Choke (Bass Boost)
5103	R1	12-inch Loudspeaker, Permanent Magnet
4511	R2	.1 Megohm $\pm 20\%$, $\frac{1}{2}$ Watt
4501	R3	22,000 Ohm $\pm 20\%$, $\frac{1}{2}$ Watt
4502	R4	2.2 Megohm $\pm 20\%$, $\frac{1}{2}$ Watt
4520	R5	10,000 Ohm $\pm 20\%$, 3 Watt
4505	R6	10 Megohm $\pm 20\%$, $\frac{1}{2}$ Watt
4521	R7	15,000 Ohm $\pm 20\%$, $\frac{1}{2}$ Watt
4804	R8	.5 Megohm Potentiometer (Volume Control)
4500	R9, R10	.22 Megohm $\pm 20\%$, $\frac{1}{2}$ Watt
4513	R11	1 Megohm $\pm 20\%$, $\frac{1}{2}$ Watt
4516	R12, R13, R14	47,000 Ohm $\pm 20\%$, 1 Watt
4504	R15, R16	47,000 Ohm $\pm 20\%$, $\frac{1}{2}$ Watt
4512	R17, R18	2200 Ohm $\pm 20\%$, $\frac{1}{2}$ Watt
4515	R19	10,000 Ohm $\pm 20\%$, $\frac{1}{2}$ Watt
4805	R20	.25 Meg. Pot. with Switch (Treble Control)
4806	R21, R22	50,000 Ohm Potentiometer (Bass Control)
4506	R23	.47 Megohm $\pm 20\%$, $\frac{1}{2}$ Watt
4519	R24	220 Ohm $\pm 20\%$, 3 Watt
4702	R25	500 Ohm $\pm 10\%$, 20 Watt
4537	R26	47,000 Ohm $\pm 10\%$, $\frac{1}{2}$ Watt
4538	S1	22,000 Ohm $\pm 10\%$, $\frac{1}{2}$ Watt
6004	S2	Band Change Switch
5220	S3	Pushbutton Switch Assembly
5217	T1	On-Off Switch (On Treble Control)
5216	T2-T3	Antenna Coil (Band "A")
5219	T4	Antenna Coil (Bands "B" and "C")
5213	T5-T6	R.F. Coil, Shielded (Band "A")
5001	T7	R.F. Coil (Bands "B" and "C")
5107	T8	Input I.F. Transformer
55200	T9	Output I.F. Transformer
	T10	Audio Output Transformer (On Speaker)
	Z1	Pushbutton Tuning Assembly



These are electrically identical.

A 10-mf, 450-volt electrolytic condenser, Part No. 4203, has been added from screen to ground on the 6SK7 r-f and i-f tubes to eliminate a hum modulation. It is suggested that this condenser be added on all Model A501 receivers not having it.

TUNING RANGES:

Band "A" 540 Kc to 1600 Kc.

Band "B" 5.6 Mc to 10.4 Mc

Band "C" 9.4 Mc to 19.4 Mc

Intermediate Frequency 455 Kc

Power Supply 115V A.C., 50-60 C.P.S.

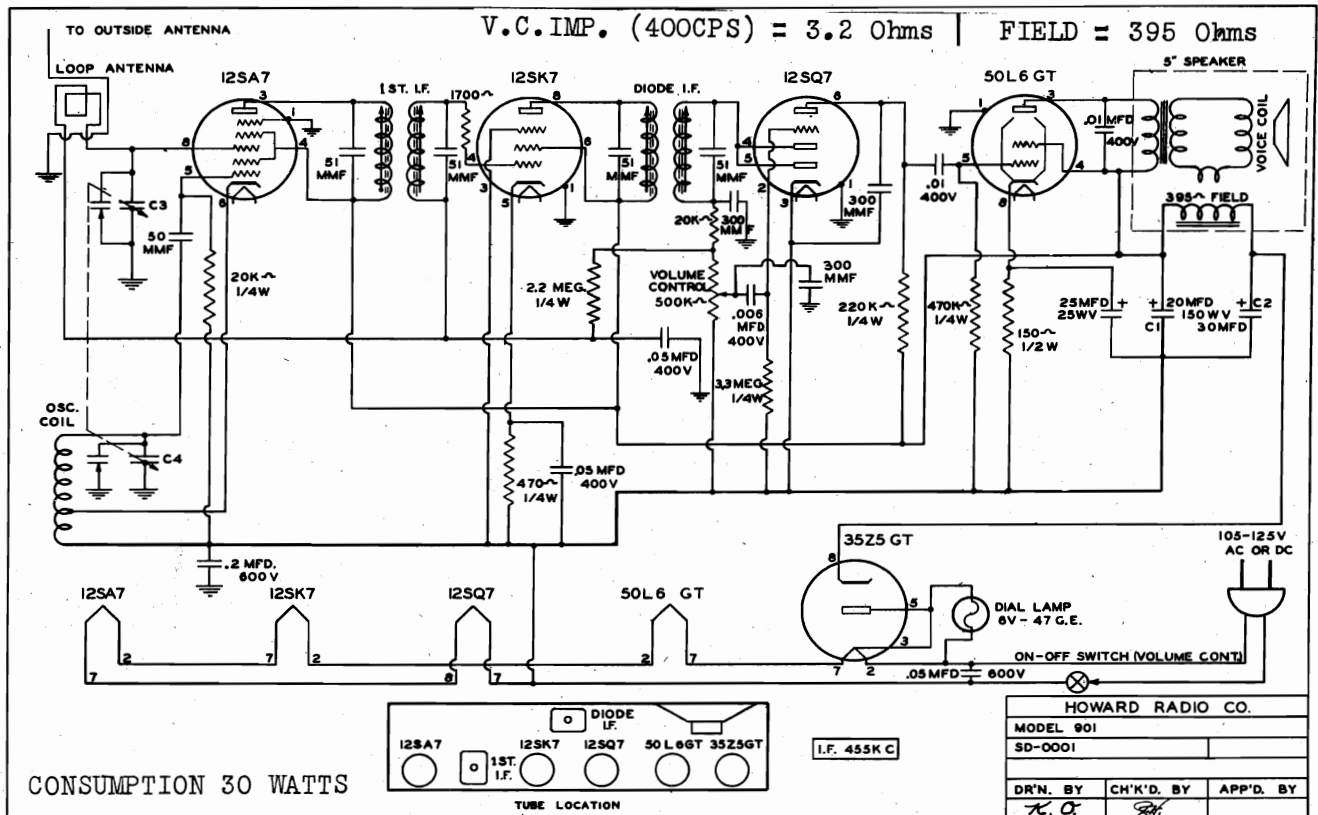
Power Consumption (incl. phono) 125 Watts

Undistorted Audio Output 12 Watts

Model A501 with Chassis 108S is electrically identical with Chassis 108ST, except for:

Output transformer, Part No. 5110 substituted for Part No. 5107.

HOWARD RADIO CO.

MODELS 901, 901AE, 901AH,
901AI, 901AM, 901AW

All voltages taken from the back of the AC switch to the socket contacts with a 20,000 ohm per volt D.C. meter and the line voltage fixed at 117 volts A.C.

ALIGNMENT INFORMATION

Each 455 KC I. F. coil has an Iron Core adjustment protruding from the top and the bottom of the I. F. can.

Look beneath the chassis to reach the lower I. F. adjustments.

Repeat the I. F. alignment operation several times to insure accuracy of adjustment.

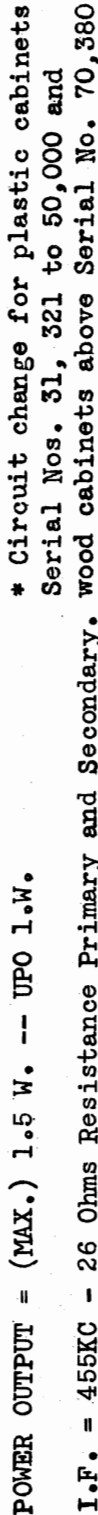
Add or remove resistance in the cathode circuit of the 12SK7 tube as the I. F. gain indicates.

The wire lead running from the loop aerial between the I. F. coils and the condenser gang is important in its placement. Dress this wire tightly to the chassis.

Set dial at 1400 KC. and adjust oscillator trimmer which is located on back section of variable condenser, then peak antenna stage trimmer on front section of variable condenser to 1400 KC. No adjustment is required at the low frequency end of the dial.

The filter condenser has a common negative, but note it does not return to ground and is insulated from the chassis.

For Alignment, see P.15-1;for Parts list,see P.15-4



CONSUMPTION -- 30 Watts --- See label on back of chassis.

ANTENNA SYSTEM = Built-in Loop. Available connections for aerial and ground.

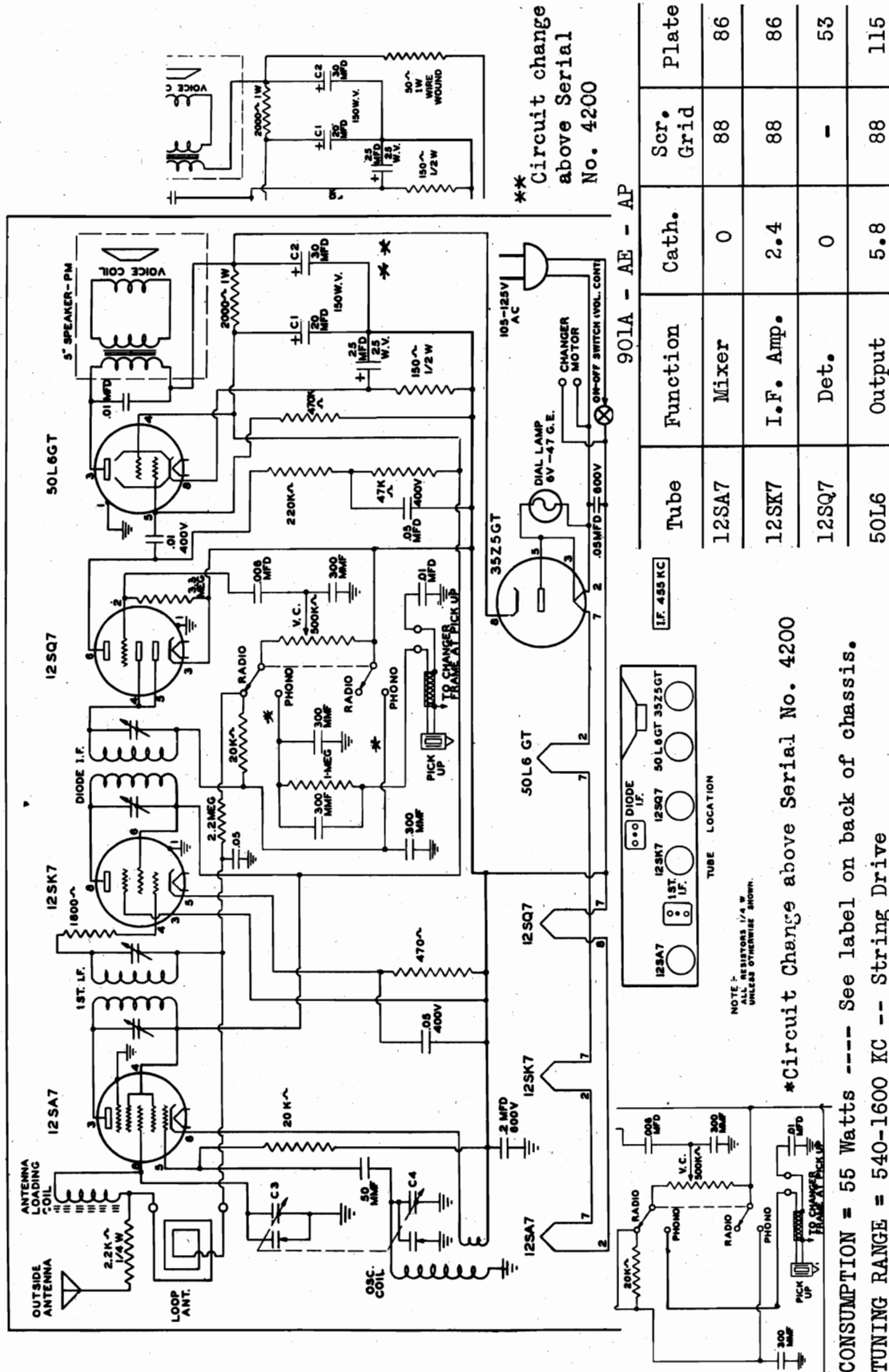
TUNING RANGE = 540-1600 KC -- String Drive -- Full Vision Airplane Dial.

SPEAKER = Permo Mag. Dynamic -- **SIZE** = 5" -- **V.C. IMP.** (400CPS) 3.2 Ohms.

POWER OUTPUT = (MAX.) 1.5 W. -- UPO 1.0 W.

I.F. = 455KC - 26 Ohms Resistance Primary and Secondary. wood cabinets above Serial No. 70,380

HOWARD RADIO CO.



*Circuit Change above Serial No. 4200

CONSUMPTION = 55 Watts --- See label on back of chassis.

TUNING RANGE = 540-1600 KC -- String Drive

ANTENNA SYSTEM = Built in low impedance loop. Ant. connection only.

SPEAKER = Permo Mag. Dynamic -- SIZE 5" -- V.C.I.M.P. (400CPS) 3.2 Ohms.

POWER OUTPUT = (MAX.) 1.5 W.--UPO 1. W.

I.F. = 455 KC -- 26 Ohms Resistance Primary and Secondary.

VOLTAGES + OR - 20% ARE MEASURED TO B MINUS AT REAR OF AC SWITCH.

MODELS 901, 901AE, 901AH,
901AI, 901AM, 901AW
MODEL 901A
MODEL 901AP

HOWARD RADIO CO.

MODEL 901 SERIES

Part No.	DESCRIPTION	Part No.	DESCRIPTION
VC-0001	CONTROLS Volume and on-off switch	LS-0001	Dial Lamp-Bayonet Type #47
CV-0008	CONDENSERS	WG-0001	Dial Window (for Plastic Cabinet)
CE-0001	Tuning	WG-0002	Dial Window (for Wood Cabinets)
CE-0003 or	Filter, 30-30-30-MFD, 200 Volt	SP-0005	Tension Spring for Dial Drive Cord
CE-0004 or	Filter, 30-20-MFD, 150 Volt	HD-0001	Dial Indicator Hand (Plastic Cabinet)
CE-0005	Filter, 30-30-MFD, 150 Volt	HD-0002	Dial Indicator Hand (Wood Cabinet)
	Filter, 25-MFD, 25 Volt this used with CE-0003 or CE-0004	SM-0074	Shaft-Tuning
	COIL ASSEMBLIES	GR-0006	Grommet-Dial Drive Cord-Ser. #0 to #6500.
AN-0002	Ant. Loop (for Plastic Cabinet)		KNOBS
LA-0001	Ant. Loop (for Wood Cabinet)	KB-0003	Moulded, Ivory (Plastic Cabinet)
LO-0014	Osc. coil	KB-0004	Moulded, Walnut (Plastic Cabinet)
LI-0006	1st I.F. Assembly complete	KB-0005	Moulded, Brown (Wood Cabinet)
LI-0007	Diode I.F. Assembly complete		LINE CORDS
	CABINETS	CA-0038	Standard 110 Volt
CB-0001	Plastic, Ivory		SOCKETS
CB-0003	Plastic, Walnut	SO-0009	Tube Sockets (Octal Wafer)
CW-0003	Wood, Phono Model	SL-0001	Dial Lamp Socket-Bayonet Type
CW-0004	Wood, Wraparound Model		SPEAKERS
	DIAL AND CONTROL PARTS	SK-0001	5" Dynamic (Serial #1 to 7250)
AR-0002	Calibrated Dial Plate (Plastic)	TO-0001	Transformer for Above
AR-0003	Calibrated Dial Plate (Wood)	SK-0002	5" Dynamic (Above Serial #7250)
DC-0001	Dial Drive Cord	TO-0002	Transformer for Above
MODEL - 901-A*		MODEL - 901-AP*	
Part No.	DESCRIPTION	Part No.	DESCRIPTION
SK-0003	Speaker P.M. with trans.	SK-0005	Speaker P.M. with trans.
LI-0008	1st I.F. Assembly Complete	LI-0010	1st I.F. Assembly Complete
AN-0004	Loop Antenna Wood Cabinet	LA-0004	Antenna Loading Coil
LO-0017	Oscillator Coil	AN-0003	Loop Antenna works only with models having antenna load coil
LI-0009	Diode I.F. Assembly Complete	LO-0017	Oscillator Coil
KB-0009	Knob with set screw	LI-0011	Diode I.F. Assembly Complete
*REMAINDER OF PARTS LIST SAME AS MODEL 901		SW-0005	Radio Phono Switch

OUTSIDE ANTENNA

OUTSIDE GROUND

ANTENNA COIL

1R5 (90V)

75 MMF

1ST. I.F.

75 MMF

1U4 (90V)

75 MMF

DIODE I.F.

75 MMF

IS5 (18V)

20V

10 MEG.

100MMF

47K

100MMF

500K VOL. CONT.

0.05 400V

0.005 400V

3.3 MEG.

10MFD 150V

50MMF

400V

MEG.

0.1 400V

0.05 400V

3Q4 (8V)

0.002 400V

5" SPEAKER-P.M.

VOICE COIL

80V

470K

0.1 400V

0.01 400V

100K

50MMF

68K

OSC. COIL

6.5 TO 12.0V

D.C. VOLTAGES MEASURED WITH AN ELECTRONIC VOLTMETER.
-3.7 TO -5.0V

REAR VIEW OF SWITCH SHOWN IN EXTREME COUNTER CLOCKWISE POSITION.

HOWARD RADIO CO.
MODEL 920
SD-0006

DR'N. BY
K.C.

CHK'D. BY
SW.

APPD. BY
H.D.

OSC. ANT.

DIODE I.F.

1R5

1U4

IS5

3Q4

1ST. I.F.

TUBE LOCATION AND ALIGNMENT POINTS
POINTS 2 AND 4 BENEATH CHASSIS

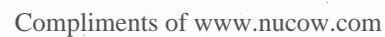
1F. 455 KC

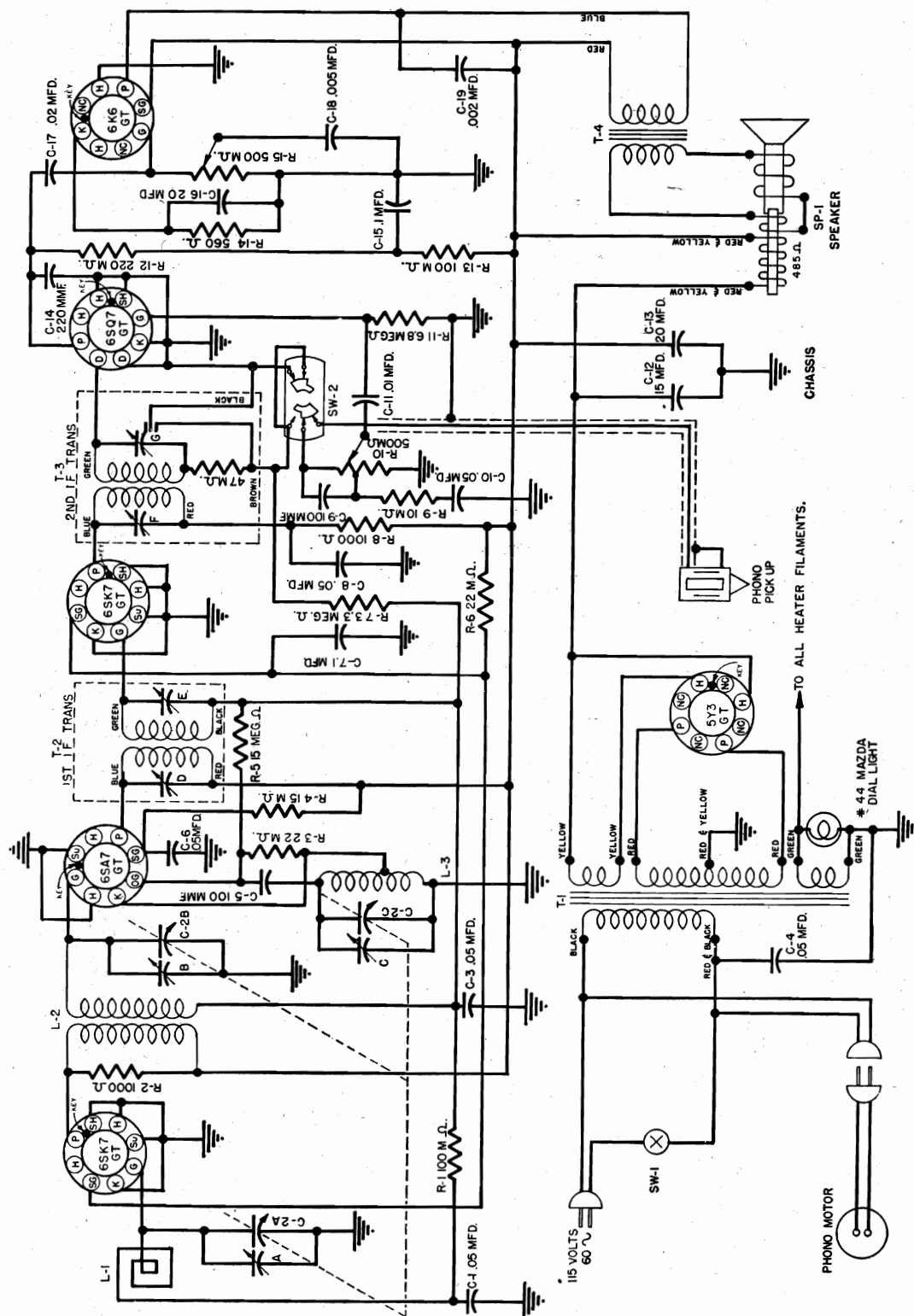
ANTENNA SYSTEM - Iron core high impedance antenna coil.
TUNING RANGE - 540 - 1600 K.C.
SPEAKER - Permo. Mag. Dynamic -- Size 5" -- V.C. IMP. (400CPS) 3.2 Ohms.
POWER OUTPUT - Max. 250MW U.P.O. 100MW.
I.F. - 455 KC - Iron core tuned.

Part No.	Description	Part No.	Description
	CONTROLS	DC-0001	Dial Drive Cord
VC-0003	Volume 1/2 Meg. R Taper	SP-0005	Tension Spring - Dial Drive Cord
SW-0008	Switch - On-Off - Batt. Saver	WG-0001	Dial Window (Plastic)
	CONDENSERS	HD-0001	Dial Indicator Hand
CV-0008	Tuning - 2 Gang cut Osc. Sec.	SM-0092	Drive Shaft Tuning
CE-0008	Filter - 10 MFD-150 V. Tubular		KNOB
	COIL ASSEMBLIES	KB-0009	Moulded, Walnut (with set screw)
LO-0017	Osc. Coil		CABLE
LA-0003	Ant. Coil	CA-0040	Battery Cable - 3 ft.
LI-0012	1st I.F. Assem. Complete		SOCKETS
LI-0013	Diode I.F. Assem. Complete	SO-0013	Miniature Tube Socket. 7 Pin.
	CABINET		SPEAKERS
CB-0004	Plastic Mottled	SK-0006	P.M. Dynamic Speaker 5"
AR-0011	Back Panel & Clip Assem.	TO-0004	Transformer (speaker)
	DIAL AND CONTROL PARTS	GR-0004	Grommet - Mounting Spk. & Gang
AR-0002	Calibrated Dial Plate (Plastic)	WD-0001	Wood Spacer Spk. Mounting
MP-0179	Battery Saver Red Flag	RB-0001	Sponge Rubber Spk. Support

The following batteries
are some well known makes
that can be used with
this instrument;

Burgess No.17GD60
Eveready No.758
General No.60DL-11L
Ray-O-Vac No.AB-82





455 KC IF

ALL TUBE SOCKETS SHOWN FROM PIN END VIEW.

ALL SWITCHES SHOWN IN COUNTERCLOCKWISE POSITION, SHAFT END VIEW

INTERNATIONAL DETROLA CORP

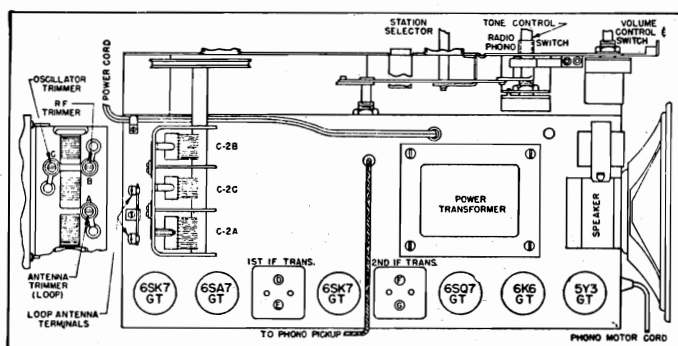
MODEL 554

ALIGNMENT PROCEDURE

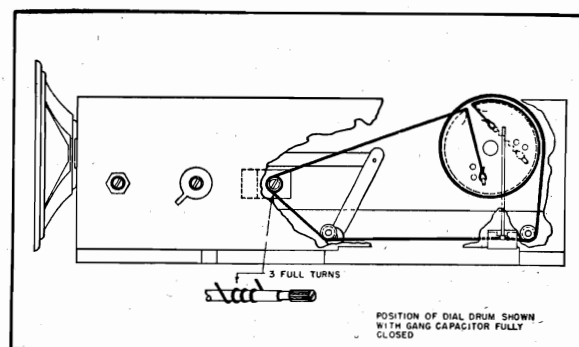
The following equipment is necessary to properly align this chassis:

1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Dummy antenna: — .1 mfd. — RMA loop.

CONNECT GEN- ERATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL AT	TRIMMERS	PURPOSE
6SA7GT grid	.1 mfd	455 kc.	Broadcast	HF end	D E F G	Align IF
6SK7GT RF grid	.1 mfd	1620 kc.	Broadcast	HF end	C	Set limit of band
6SK7GT RF grid	.1 mfd	1400 kc.	Broadcast	1400 kc.	B	Align RF
RMA loop	Through loop	1400 kc.	Broadcast	1400 kc.	A	Align antenna



Tube Layout



Dial Mechanism

TUBE COMPLEMENT

- | | |
|--------------------------------|--|
| 1—6SK7GT.....RF Amplifier tube | 1—6SQ7GT.....Detector—AVC—1st Audio tube |
| 1—6SA7GT.....Converter tube | 1—6K6GT.....Power Output tube |
| 1—6SK7GT.....IF Amplifier tube | 1—5Y3GT.....Rectifier tube |

NOTE: The above glass tubes are interchangeable with their metal equivalent.

Electrical and Mechanical Specifications

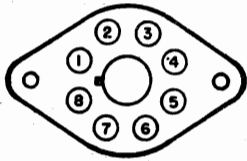
Frequency Range.....	540-1600 kc.	V.C. Impedance.....	3.5 ohms at 400 cycles
Intermediate Frequency.....	455 kc.	Power Output (Undistorted).....	1 watt
Power Supply.....	105-125 volts, 60 cycle A.C.	Power Output (Maximum).....	4 watts
Loudspeaker	Electrodynamic	Tuning Drive Ratio.....	4¾ to 1

MODEL 554

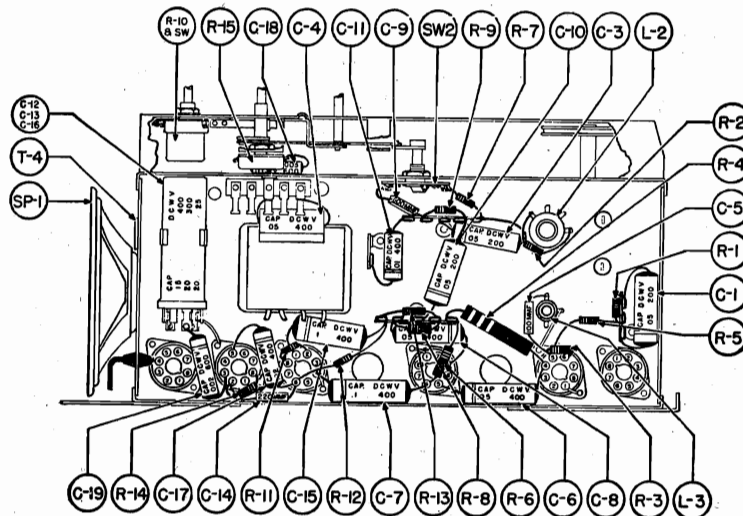
INTERNATIONAL DETROLA CORP.

SOCKET VOLTAGES

TUBE	POSITION	1	2	3	4	5	6	7	8
6SK7GT	RF Amplifier	0	0	0	0	0	93	6.3 AC	270
6SA7GT	Converter	0	6.3 AC	270	113	-7.5	0	0	0
6SK7GT	IF Amplifier	0	0	0	0	0	93	6.3 AC	260
6SQ7GT	Detector—AVC—1st Audio	0	0	0	0	0	88	6.3 AC	0
6K6GT	Power Output	0	0	250	270	0	175	6.3 AC	19
5Y3GT	Rectifier	0	310	0	290 AC	0	290 AC	0	310



NOTE: All voltages measured from chassis to socket contact indicated.
 DC voltages measured with a 1000 ohm-per-volt meter.
 All voltages are positive DC unless otherwise marked.
 Volume control full on. No signal.
 Tone Control in clockwise position.
 Line Voltage 117 volts AC.



Parts Layout
Chassis Model 554

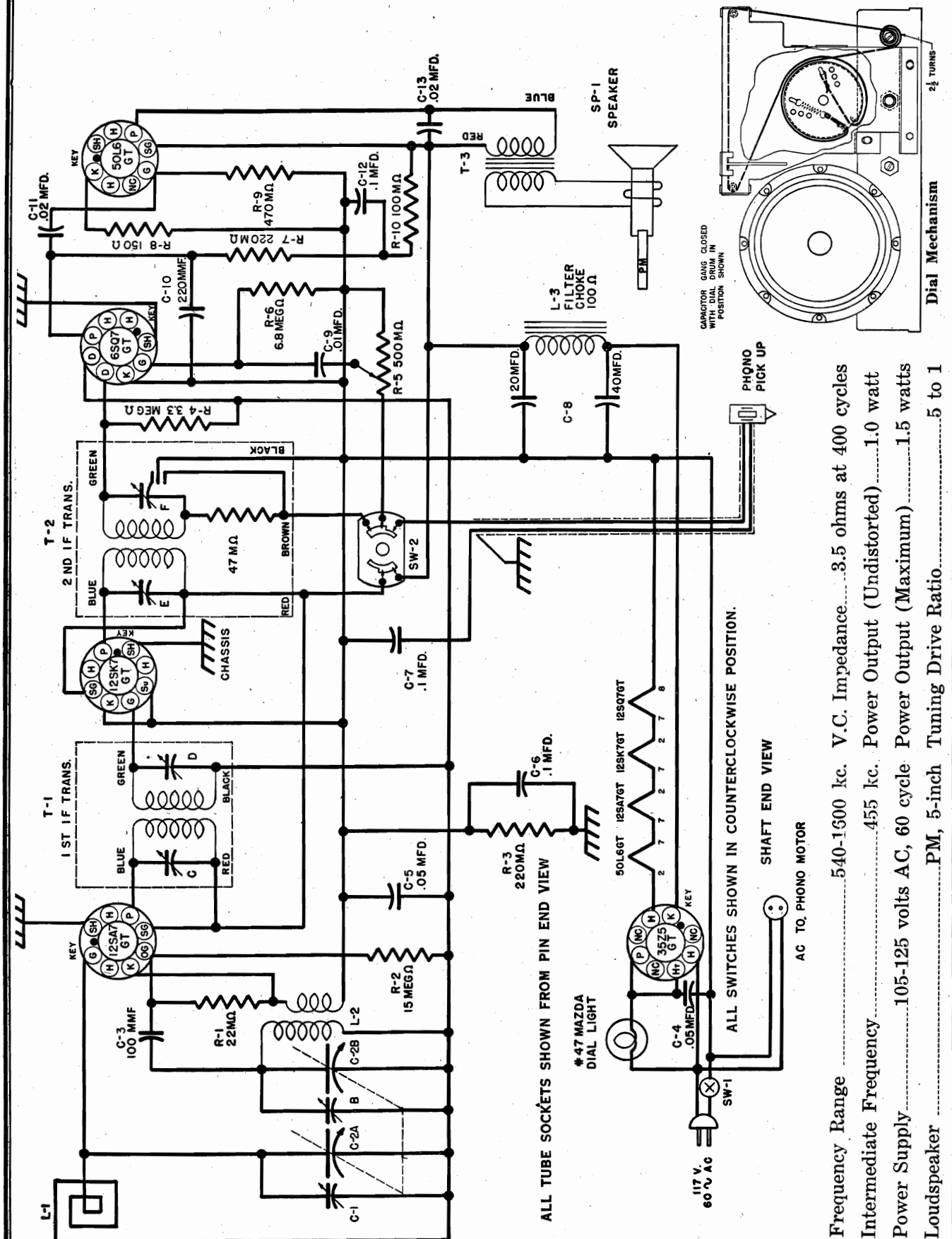
SERVICE PARTS LIST

Symbol	Part No.	Description	Symbol	Part No.	Description
C-4	BC31B503	Cap., Molded, .05 mfd., 400 v.	A-2163	Cable, Dial	
C-1, 3, 10	BD210503	Cap., Paper, .05 mfd., 200 v.	A-3123	Clamp, Cable	
C-11	BD410103	Cap., Paper, .01 mfd., 400 v.	A-9285	Lamp, Pilot, Mazda No. 44	
C-7, 15	BD410104	Cap., Paper, .1 mfd., 400 v.	A-51160-3	Cord, Power, 6 ft.	
C-17	BD410203	Cap., Paper, .02 mfd., 400 v.	A-51163	Clip, Spring	
C-6, 8	BD410503	Cap., Paper, .05 mfd., 400 v.	C-12, 13, 16	A-51356	Cap., Electro., 15-20-20 mfd.
C-19	BD610202	Cap., Paper, .002 mfd., 600 v.	C-2	C-51501-1	Capacitor, Variable, 3-section
C-18	BD610502	Cap., Paper, .005 mfd., 600 v.	T-1	C-51502	Transformer, Power
C-5, 9	BM78A101	Cap., Mica, 100 mmf.	L-2	B-51511	Coil, Assembly, RF
C-14	BM78A221	Cap., Mica, 220 mmf.	SP-1	C-51512	Speaker, 5" Dynamic, 485 ohm
R-14	BR16E561	Resistor, 560 ohm, 1 w.	L-3	B-51522	Coil Assembly, Osc.
R-2, 8	BR17B102	Resistor, 1000 ohm, 1/2 w.	A-51531	Shaft, Drive	
R-9	BR17B103	Resistor, 10M ohm, 1/2 w.	B-51416-2	Trans. Assembly, 1st IF	
R-1, 13	BR17B104	Resistor, 100M ohm, 1/2 w.	T-3	B-51417-2	Trans. Assembly, 2nd IF
R-5	BR17B156	Resistor, 15 meg., 1/2 w.	B-51591	Spring, Dial Bracket	
R-3	BR17B223	Resistor, 22M ohm, 1/2 w.	A-51787	Spring, Cable	
R-12	BR17B224	Resistor, 220M ohm, 1/2 w.	A-51801	Rivet, Pronged, 3/32 x 1/8	
R-7	BR17B335	Resistor, 3.3 meg., 1/2 w.	B-55300-1	Channel, Rubber	
R-11	BR17B685	Resistor, 6.8 meg., 1/2 w.	SW-2	B-55500-1	Switch (Radio-Phono)
R-6	BR17E223	Resistor, 22M ohm, 1 w.	R-15	B-55550-1	Potentiometer, 500M ohm
R-4	BR17G153	Resistor, 15M ohm, 2 w.	R-10	B-55575-1	Potentiometer & Switch, 500M ohm

Order parts not listed by specifying (1) Part Name and (2) Model Number (include number following dash).

INTERNATIONAL DETROLA CORP.

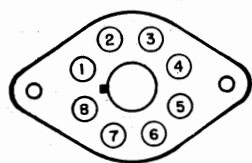
MODEL 558



MODEL 558

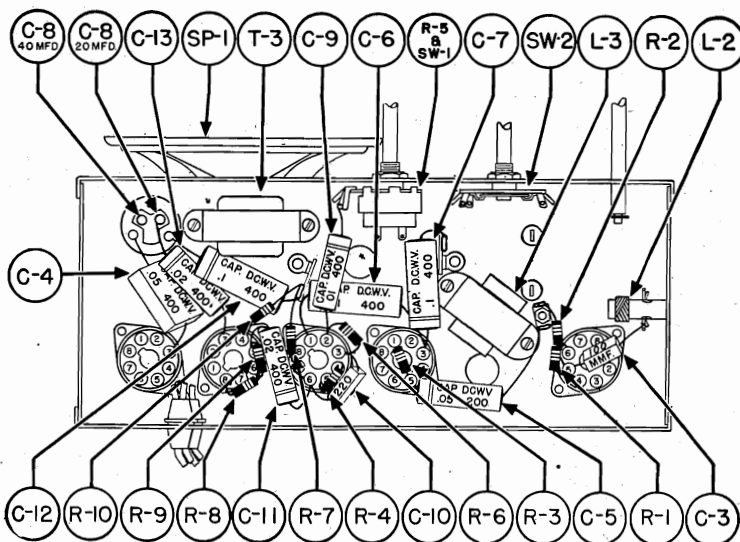
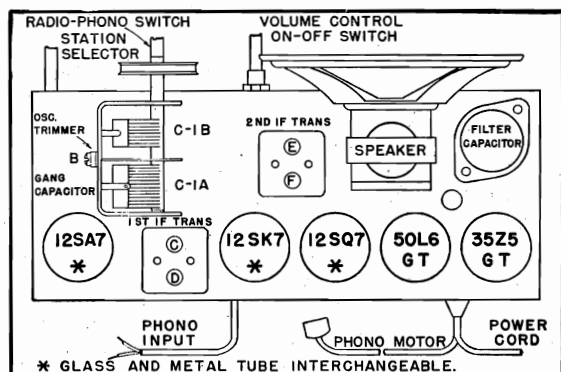
INTERNATIONAL DETROLA CORP.

TUBE	POSITION	1	2	3	4	5	6	7	8
12SA7GT	Converter	0	36.3 AC	108	108	-5.6	0	23.8 AC	0
12SK7GT	IF Amplifier	0	11.4 AC	0	0	0	108	23.8 AC	108
12SQ7GT	Detector—1st Audio	0	0	0	0	0	43	11.4 AC	0
50L6GT	Power Output	0	85 AC	100	108	0	0	36.3 AC	7.3
35Z5GT	Rectifier	0	117 AC	112 AC	0	112 AC	0	85 AC	117



NOTE: All DC voltages measured with a 1000 ohm-per-volt meter from ON-OFF switch (—B) to socket contact indicated. All AC voltages are measured from ON-OFF switch (—B) to socket contact indicated. All voltages are positive DC unless otherwise marked. Volume Control full on. No signal. Line voltage 117 volts AC.

Parts Layout
Chassis Model 558



The following equipment is necessary to properly align this chassis:

A signal generator which will provide an accurately calibrated signal at the frequencies listed.

An output meter.

A non-metallic screwdriver.

Dummy antenna: — .1 mfd. — RMA loop.

NOTE: Intermediate Frequency and Oscillator adjustments may be made with the loop disconnected provided a resistor of 10,000 to 50,000 ohms is substituted to close the 12SA7GT grid circuit. The loop alignment must be done with the loop and chassis mounted in operating position in the cabinet. A single turn loosely coupled to loop may be substituted for RMA loop.

GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TO TUNE TRIMMERS	REMARKS
1F 455 kc.	12SA7GT grid	.1 mfd.	HF end	IF trimmers C D E F	Tune to max.
1620 kc.	12SA7GT grid	RMA loop	HF end	Osc. trimmer B	Set limit of band
1400 kc.	Through loop*	RMA loop	1400 kc.	Ant. trimmer A	Tune to max.

* Loop trimmer accessible through bottom of cabinet.

INTERNATIONAL DETROLA CORP.

MODEL 558

MODEL 572

MODEL 576

MODEL 579

Chassis Model 558

Symbol	Part No.	Description	Symbol	Part No.	Description
C-4	BC31B503	Cap., Molded, .05 mfd., 400 v.	C-1	B-8296-1	Trimmer
C-5	BD210503	Cap., Paper, .05 mfd., 200 v.	C-8	A-8948	Capacitor, Electro., 40-20 mfd.
C-9	BD410103	Cap., Paper, .01 mfd., 400 v.	R-5	B-9051-3	Control, Pot.&Sw.(V.C.) 500M ohm.
C-6, 7, 12	BD410104	Cap., Paper, .1 mfd., 400 v.	T-1	B-51010-1	Transformer Assembly, 1st IF
C-11, 13	BD410203	Cap., Paper, .02 mfd., 400 v.	T-2	B-51011-1	Transformer Assembly, 2nd IF
C-3	BM78A101	Cap., Mica, 100 mmf.	L-2	B-51159	Coil Assembly, Oscillator
C-10	BM78A221	Cap., Mica, 220 mmf.	A-51160-1		Cord, AC Power, 6 ft.
R-8	BR16C151	Resistor, 150 ohm, ½ w.	A-51163		Clip, Spring
R-10	BR17B104	Resistor, 100,000 ohm, ¼ w.	C-2	C-51573-1	Cap., Variable
R-2	BR17B156	Resistor, 15 megohm, ¼ w.	SW-2	B-51576-1	Switch, Radio-Phono
R-1	BR17B223	Resistor, 22,000 ohm, ¼ w.	SP-1	C-51577	Speaker, 5-inch PM
R-3, 7	BR17B224	Resistor, 220,000 ohm, ¼ w.	T-3	B-51578-1	Transformer, Output
R-4	BR17B335	Resistor, 3.3 megohm, ¼ w.	B-51585-1		Cord (AC to Phono.)
R-9	BR17B474	Resistor, 470,000 ohm, ¼ w.	B-51591		Spring, Dial Bracket
R-6	BR17B685	Resistor, 6.8 megohm, ¼ w.	L-1	B-51599	Coil, Loop
A-2163		Cable, Drive	L-3	A-51726-2	Choke, Filter, 80 ma.
A-6158		Lamp, Pilot, No. 47 Mazda, 6.3 v.	A-51787		Spring, Cable

Chassis Model 572

Symbol	Part No.	Description	Symbol	Part No.	Description
C-5	BC31B503	Cap., .05 mfd., 400 v. paper	A-9285		Lamp, pilot, Mazda No. 44
C-2, 8, 21	BD210503	Cap., .05 mfd., 200 v. paper	A-51160-1		Cord, power, 6 ft.
C-22	BD410103	Cap., .01 mfd., 400 v. paper	B-51162-3		Shaft, drive
C-7, 24	BD410104	Cap., .1 mfd., 400 v. paper	A-51163		Clip, spring
C-25	BD410203	Cap., .02 mfd., 400 v. paper	A-51260		Shield, tube
C-16, 28	BD410503	Cap., .05 mfd., 400 v. paper	C-18, 19, 26	A-51356	Cap., electro., 15-20-20 mfd.
C-1, 27	BD610202	Cap., .002 mfd., 600 v. paper	C-6	C-51401-1	Capacitor, variable
C-12	BM58D512	Cap., 5100 mmf., mica	SP-1	C-51413	Speaker assembly, 5-inch
C-11, 20	BM78A101	Cap., 100 mmf., mica	T-2	B-51416-1	Trans. assembly, 1st IF
C-23	BM78A221	Cap., 220 mmf., mica	T-3	B-51417-1	Trans. assembly, 2nd IF
R-15	BR16E561	Resistor, 560 ohm, 1 w.	C-17	A-51419	Cap., electro., 10 mfd., 250 v.
R-2, 9	BR17B102	Resistor, 1000 ohm, ¼ w.	L-5	B-51420	Coil assembly, oscillator
R-10	BR17B103	Resistor, 10M ohm, ¼ w.	T-1	C-51421	Transformer, power
R-1, 14	BR17B104	Resistor, 100M ohm, ¼ w.	L-3	B-51422	Coil assembly, antenna loading
R-4	BR17B150	Resistor, 15 ohm, ¼ w.	L-4	B-51425	Coil assembly, RF
R-5	BR17B156	Resistor, 15 meg., ¼ w.	C-13	B-51428-5	Capacitor, padder
R-3	BR17B223	Resistor, 22M ohm, ¼ w.	L-2	B-51430	Coil assembly, SW antenna
R-13	BR17B224	Resistor, 220M ohm, ¼ w.	SW-2	B-51435-1	Switch assembly, 2-band
R-8	BR17B335	Resistor, 3.3 meg., ¼ w.	R-11	B-51445-1	Control, Pot. & switch 500,000 ohm.
R-16	BR17B474	Resistor, 470M ohm, ¼ w.	C-9, 10, 14, 15	A-51656	Cap. assembly, trimmer (4)
R-12	BR17B685	Resistor, 6.8 meg., ¼ w.	C-3	A-51657	Cap. assembly, trimmer (spec.)
R-7	BR17E223	Resistor, 22M ohm, 1 w.	A-51787		Spring, cable
R-6	BR17G153	Resistor, 15M ohm, 2 w.	C-4	B-51859-1	Cap. assembly, Ant.—BC
A-2163		Cable, drive			

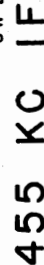
Chassis Model 576

Symbol	Part No.	Description	Symbol	Part No.	Description
C-4	BC31B503	Cap., Molded, .05 mfd., 400 v.	R-7	BR17B685	Resistor, 6.8 meg., ¼ w.
C-8	BD210303	Cap., Paper, .03 mfd., 200 v.	A-2163		Cable Drive
C-2	BD210503	Cap., Paper, .05 mfd., 200 v.	A-6158		Lamp, Pilot No. 47 mazda, 6.3 v.
C-10	BD410103	Cap., Paper, .01 mfd., 400 v.	A-8948		Cap., Electrolytic, 40-20 mfd., 150 v.
C-6, 13	BD410104	Cap., Paper, .1 mfd., 400 v.	T-1	B-51010-1	Transformer Assembly, 1st IF
C-14	BD410203	Cap., Paper, .02 mfd., 400 v.	T-2	B-51011-1	Transformer Assembly, 2nd IF
C-16	BD610202	Cap., Paper, .002 mfd., 600 v.	A-51160-1		Cord, AC-DC Line, 6 ft.
C-15	BD610502	Cap., Paper, .005 mfd., 600 v.	A-51163		Clip, Spring
C-7	BM78A101	Cap., Mica, 100 mmf., 500 v.	C-1	C-51251	Cap., Variable, 3-section
C-3	BM78A151	Cap., Mica, 150 mmf., 500 v.	L-3	B-51256	Coil Assembly, Oscillator
C-12	BM78A221	Cap., Mica, 220 mmf., 500 v.	L-2	B-51257	Coil Assembly, RF
C-5	BM78A470	Cap., Mica, 47 mmf., 500 v.	A-51260		Shield, Tube
R-11	BR16C151	Resistor, 150 ohm, ½ w.	SP-1	C-51722	Speaker, 6-inch, PM
R-9	BR17B104	Resistor, 100,000 ohm, ¼ w.	R-10	B-51724-1	Control, Pot. & Sw. (Tone) 500M ohm.
R-4	BR17B153	Resistor, 15,000 ohm, ¼ w.	R-5	B-51725-2	Control, Pot. (Volume) 500M ohm.
R-3	BR17B156	Resistor, 15 meg., ¼ w.	L-4	B-51726-1	Choke, Filter, 80 ma.
R-1	BR17B223	Resistor, 22,000 ohm, ¼ w.	A-51728		Shaft, Drive
R-2, 8	BR17B224	Resistor, 220,000 ohm, ¼ w.	B-51730		Socket and Cable Assembly
R-6	BR17B335	Resistor, 3.3 meg., ¼ w.	C-51735		Bracket Assembly, Welded
	BR17B473	Resistor, 47,000 ohm, ¼ w.	A-51787		Spring, Cable
			A-51986		Clip, Indicator

Chassis Model 579

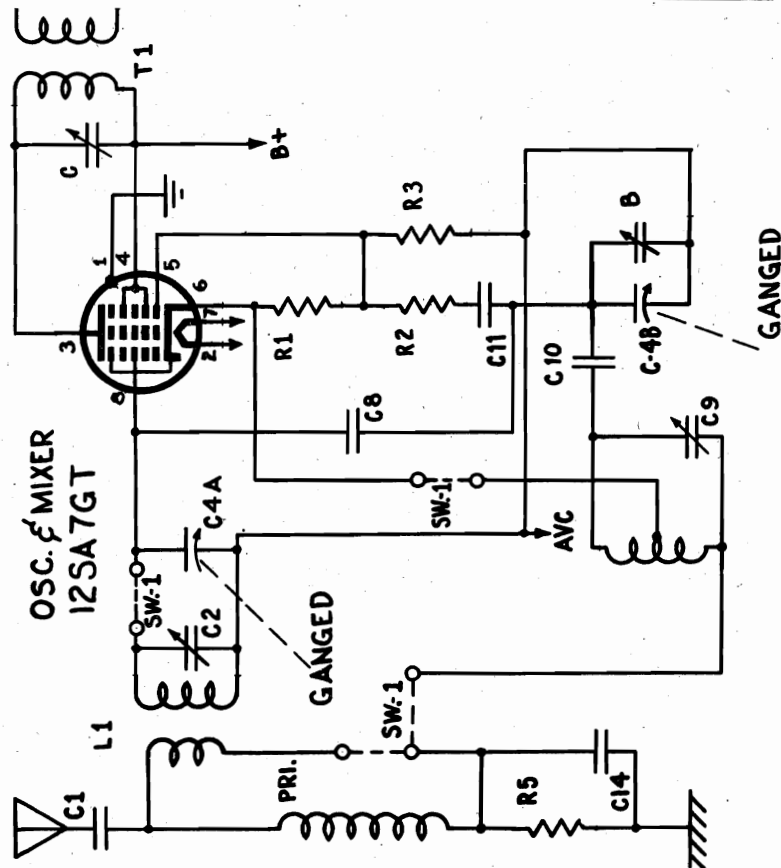
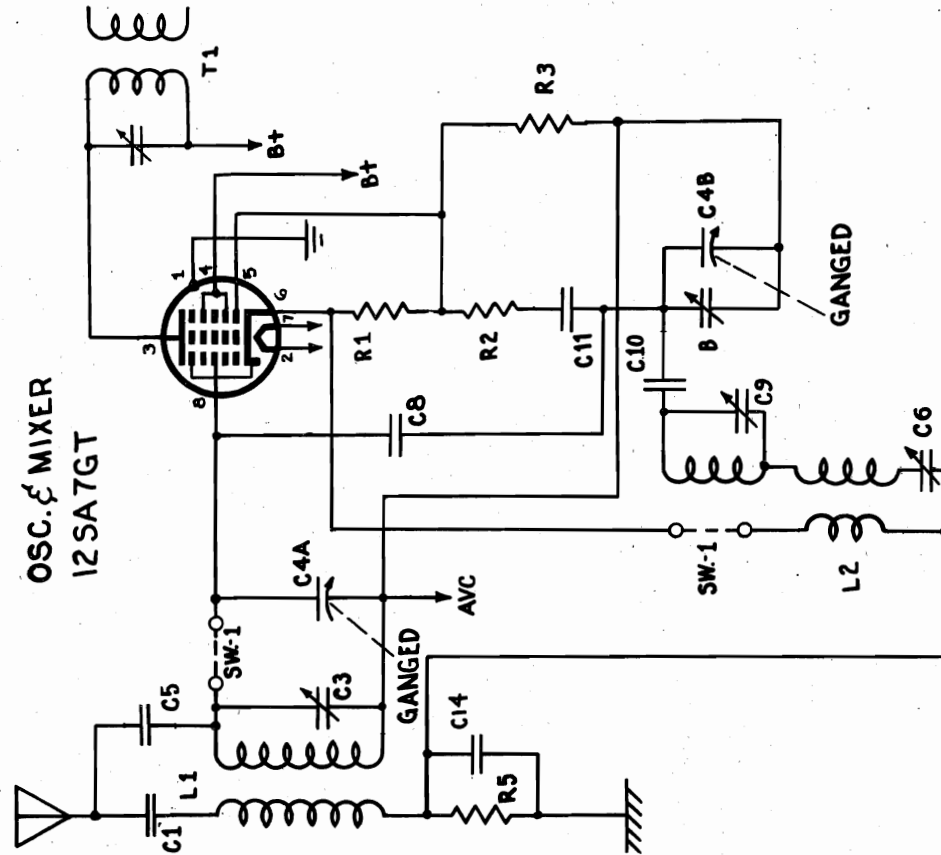
Symbol	Part No.	Description	Symbol	Part No.	Description
C-4	BC31B503	Cap., paper, .05 mfd., 400 v.	C-7	A-8948	Cap., electro., 40-20 mfd.
C-2	BD210503	Cap., paper, .05 mfd., 200 v.	R-4	A-9051-2	Potentiometer and switch
C-8	BD410103	Cap., paper, .01 mfd., 400 v.	T-1	B-51010-1	Transformer assembly, 1st IF
C-6	BD410104	Cap., paper, .01 mfd., 400 v.	T-2	B-51011-1	Transformer assembly, 2nd IF
C-10, 11	BD410203	Cap., paper, .02 mfd., 400 v.	SP-1	C-51058	Speaker, 5-inch
C-3	BM78A151	Cap., mica, 150 mmf.	A-51160-1		Cord, AC line, 6 ft.
C-9	BM78A221	Cap., mica, 220 mmf.	B-51162-2		Shaft, drive
C-5	BM78A470	Cap., mica, 47 mmf.	A-51163		Clip, spring
R-9	BR16C151	Resistor, 150 ohm, ½ w.	C-1	C-51251	Capacitor, variable
R-3	BR17B156	Resistor, 15 megohm, ¼ w.	L-3	B-51256	Coil, oscillator assembly
R-1	BR17B223	Resistor, 22M ohm, ¼ w.	L-2	B-51257	Coil, RF assembly
R-2	BR17B224	Resistor, 220M ohm, ¼ w.	A-51260		Shield, tube
R-5	BR17B335	Resistor, 3.3 megohm, ¼ w.	A-51787		Spring, cable, music wire
R-7, 8	BR17B474	Resistor, 470M ohm, ¼ w.	C-51921		Dial assembly, welded
R-6	BR17B685	Resistor, 6.8 megohm, ¼ w.	A-51936		Clip, indicator
A-2163		Cable, drive			
A-6158		Lamp, pilot, No. 47 Mazda 6.3 v.			

Order parts not listed by specifying (1) Part Name and (2) Model Number (Including number following dash).



ALL TUBE SOCKETS SHOWN FROM PIN END VIEW.

SWITCH (SW-1) SHOWN IN COUNTERCLOCKWISE POSITION (SHORT WAVE POSITION),
SHAFT END VIEW.



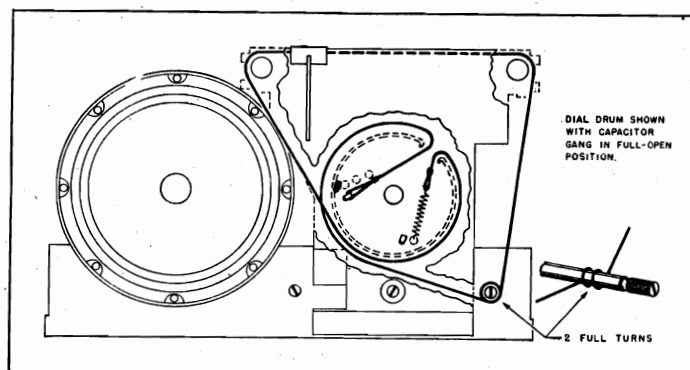
ALIGNMENT PROCEDURE

The following equipment is necessary to properly align this chassis:

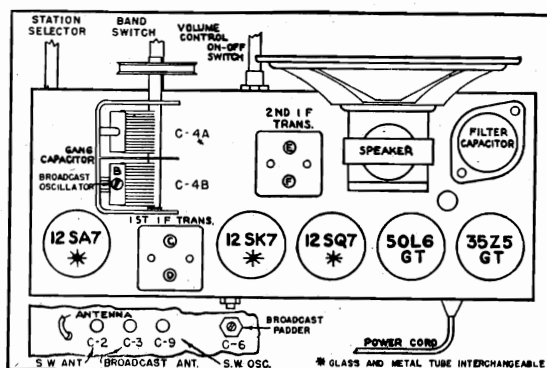
1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Dummy antenna: — .1 mfd. — 200 mmf. — 400 ohms

CONNECT TEST OSCILLATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL AT	TRIMMERS	PURPOSE
12SA7GT grid	.1 mfd.	455 kc.	Broadcast	HF end	C D E F	Align IF
12SA7GT grid	.1 mfd.	1620 kc.	Broadcast	HF end	B	Set limit of band
Ant. terminal	400 ohms	18.3 mc.	Short Wave	HF end	C-9	Set limit of band
Ant. terminal	400 ohms	18.0 mc.	Short Wave	18 mc.	C-2	Align antenna
Ant. terminal	200 mmf.	1400 kc.	Broadcast	1400 kc.	C-3	Align antenna
Ant. terminal	200 mmf.	600 kc.	Broadcast	600 kc.	C-6	Rock gang and adjust to max.

NOTE: Recheck alignment of trimmers B and C-3 after adjusting C-6.



Dial Mechanism



Tube Layout

TUBE COMPLEMENT

- | | |
|--|----------------------------|
| 1—12SA7GT Oscillator and Mixer tube | 1—50L6GT Power Output tube |
| 1—12SK7GT IF Amplifier tube | 1—35Z5GT Rectifier tube |
| 1—12SQ7GT Second Detector and First Audio tube | |

NOTE: The above glass tubes are interchangeable with their metal equivalent.

Electrical and Mechanical Specifications

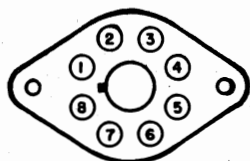
Frequency Range.....540-1600 kc., 6-18 mc. V.C. Impedance.....3.5 ohms at 400 cycles
 Intermediate Frequency455 kc. Power Output (Undistorted)......75 watt
 Power Supply.....105-125 volts, 50-60 cycle AC or DC Power Output (Maximum).....1.5 watts
 LoudspeakerDynamic Tuning Drive Ratio5-1

INTERNATIONAL DETROLA CORP.

MODEL 568

SOCKET VOLTAGES

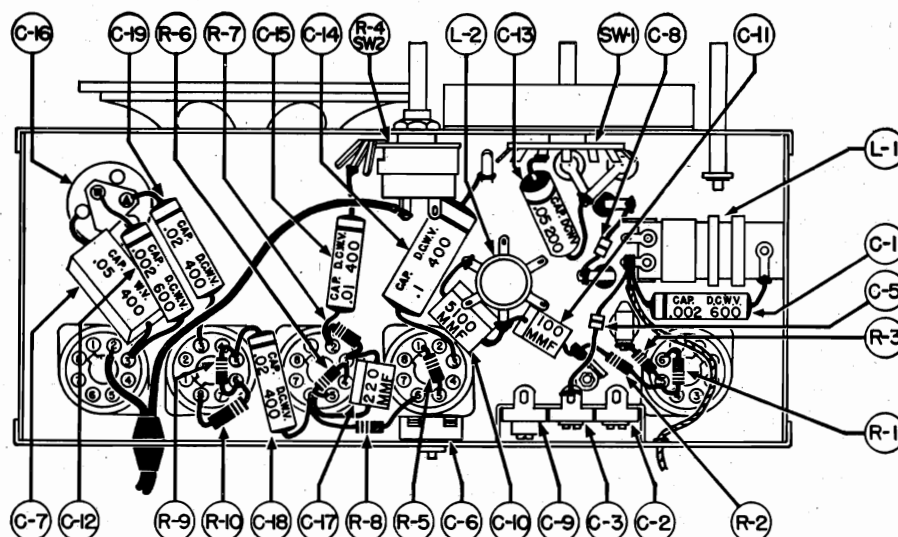
TUBE	POSITION	1	2	3	4	5	6	7	8
12SA7GT	Oscillator and Mixer	0	37.5 AC	99	99	-4.2	0	24.5 AC	0
12SK7GT	IF Amplifier	0	24.5 AC	0	0	0	99	12.5 AC	99
12SQ7GT	2nd Det.—1st Audio	0	0	0	0	0	16	12.5 AC	0
50L6GT	Power Output	0	85 AC	91.5	99	0	0	37.5 AC	5.9
35Z5GT	Rectifier	0	117 AC	112 AC	0	112 AC	0	85 AC	112



NOTE: All DC voltages measured with a 1000 ohm-per-volt meter from ON-OFF switch (—B) to socket contact indicated. All voltages are positive DC unless otherwise marked.

Volume control full on. No signal.

Line Voltage 117 volts AC.



Parts Layout
Chassis Model 568

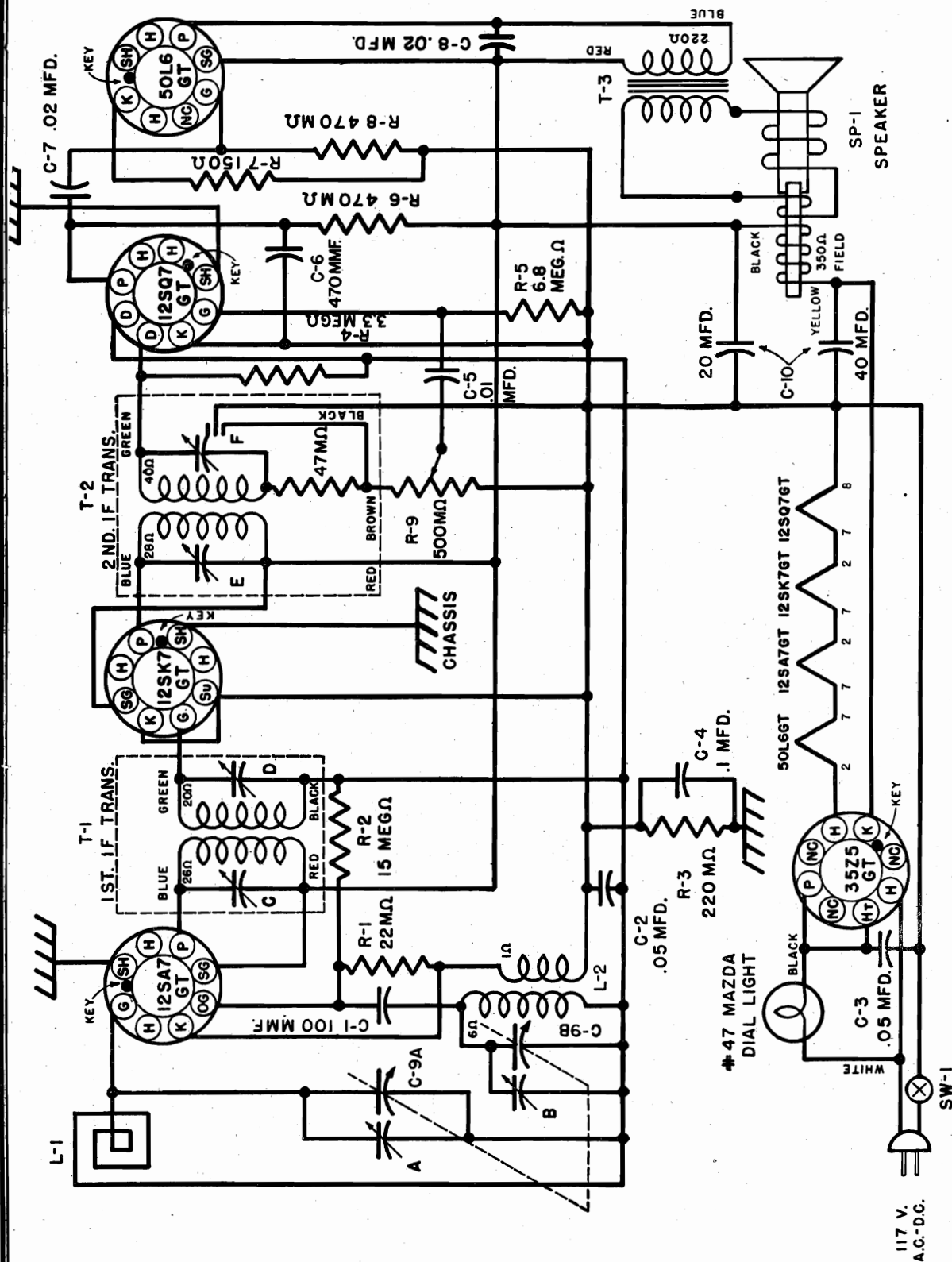
SERVICE PARTS LIST

Symbol	Part No.	Description	Symbol	Part No.	Description
C-7	BC31B503	Cap., Molded Paper, .05 mfd.	C-16	A-8948	Cap., Electrolytic, 40-20 mfd.
C-13	BD210503	Cap., Paper, .05 mfd., 200 v.	R-4	B-9051-5	Control, Vol & Sw. 500,000 ohm
C-15	BD410103	Cap., Paper, .01 mfd., 400 v.	T-1	B-51010-1	Transformer Assembly, 1st IF
C-14	BD410104	Cap., Paper, .1 mfd., 400 v.	T-2	B-51011-1	Transformer Assembly, 2nd IF
C-18, 19	BD410203	Cap., Paper, .02 mfd., 400 v.	C-51014		Speaker, 5-inch Dynamic
C-1, 12	BD610202	Cap., Paper, .002 mfd., 600 v.	A-51160-1		Cord, Power, 6 ft.
C-10	BM58D512	Cap., Mica, 5100 mmf.	A-51163		Clip, Spring
C-11	BM78A101	Cap., Mica, 100 mmf.	C-6	B-51428-5	Capacitor, Padder
C-17	BM78A221	Cap., Mica, 220 mmf.	B-51591		Spring, Dial Bracket
R-10	BR16C151	Resistor, 150 ohm, 1/2 w.	SW-1	B-51764-1	Switch, Band
R-2	BR17B151	Resistor, 150 ohm, 1/2 w.	A-51787		Spring, Cable, Music Wire
R-3	BR17B156	Resistor, 15 meg., 1/2 w.	L-1	B-51828	Coil Assembly, BC & SW Ant.
R-1	BR17B223	Resistor, 22,000 ohm, 1/2 w.	C-2, 3, 9	A-51834	Capacitor, Trimmer, 3-section
R-5	BR17B224	Resistor, 220,000 ohm, 1/2 w.	L-2	B-51836	Coil Assembly, Osc.
R-6	BR17B335	Resistor, 3.3 meg., 1/2 w.	C-4	C-51837-1	Capacitor, Variable
R-8, 9	BR17B474	Resistor, 470,000 ohm, 1/2 w.	C-8	B-51839-2	Capacitor, 1 mmf.
R-7	BR17B685	Resistor, 6.8 meg., 1/2 w.	C-5	B-51839-4	Capacitor, 2.2 mmf.
	A-2163	Cable, Drive		A-51869	Antenna Reel Assembly
	A-6158	Lamp, Pilot, No. 47, Mazda, 6.3 v.			

Order parts not listed by specifying (1) Part Name and (2) Model Number (include number following dash)

MODELS 571A,
571B

INTERNATIONAL DETROLA CORP.



455 KC IF

ALL TUBE SOCKETS SHOWN FROM PIN END VIEW.

INTERNATIONAL DETROLA CORP.

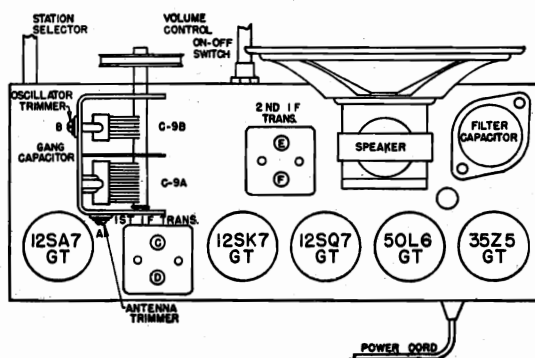
MODELS 571A,
571B**ALIGNMENT PROCEDURE**

The following equipment is necessary to properly align this chassis:

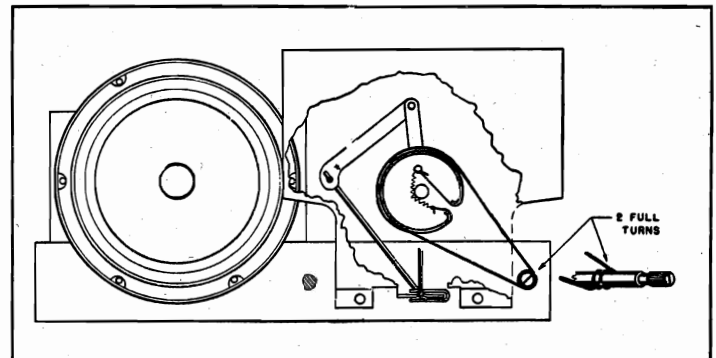
1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Dummy antenna: — .1 mfd., — RMA loop.

NOTE: Intermediate Frequency and Oscillator adjustments may be made with the loop disconnected provided a resistor of 10,000 to 50,000 ohms is substituted to close the 12SA7GT grid circuit. The loop alignment must be done with the loop and chassis mounted in operating position in the cabinet. A single turn loosely coupled to loop may be substituted for RMA loop.

GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TO TUNE TRIMMERS	REMARKS
IF 455 kc.	12SA7GT grid	.1 mfd.	HF end	IF trimmers C D E F	Tune to max.
1620 kc.	Through loop	RMA loop	HF end	Osc. trimmer B	Set limit of band
1400 kc.	Through loop	RMA loop	1400 kc.	Ant. trimmer A	Tune to max.



Tube Layout



Dial Mechanism

TUBE COMPLEMENT

1—12SA7GT Oscillator and Mixer tube

1—12SK7GT IF Amplifier tube

1—50L6GT Power Output tube

1—35Z5GT Rectifier tube

1—12SQ7GT Second Detector and First Audio tube

NOTE: The above glass tubes are interchangeable with their metal equivalent.

Electrical and Mechanical Specifications

Frequency Range540-1600 kc.

Power Output (Undistorted)75 watts

Intermediate Frequency455 kc.

Power Output (Maximum)..... 1.5 watts

Power Supply.....105-125 volts AC-DC

Tuning Drive Ratio.....3 to 1

LoudspeakerDynamic

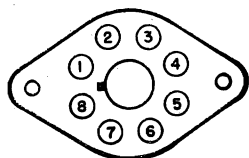
V.C. Impedance.....3.5 ohms at 400 cycles

MODELS 571A,
571B

INTERNATIONAL DETROLA CORP.

SOCKET VOLTAGES

TUBE	POSITION	1	2	3	4	5	6	7	8
12SA7GT	Osc. and Mixer	0	37.5 AC	99	99	-4.2	0	24.5 AC	0
12SK7GT	IF Amplifier	0	24.5 AC	0	0	0	99	12.5 AC	99
12SQ7GT	2nd Det.—1st Audio	0	0	0	0	0	16	12.5 AC	0
50L6GT	Power Output	0	85 AC	91.5	99	0	0	37.5 AC	5.9
35Z5GT	Rectifier	0	117 AC	112 AC	0	112 AC	0	85 AC	112

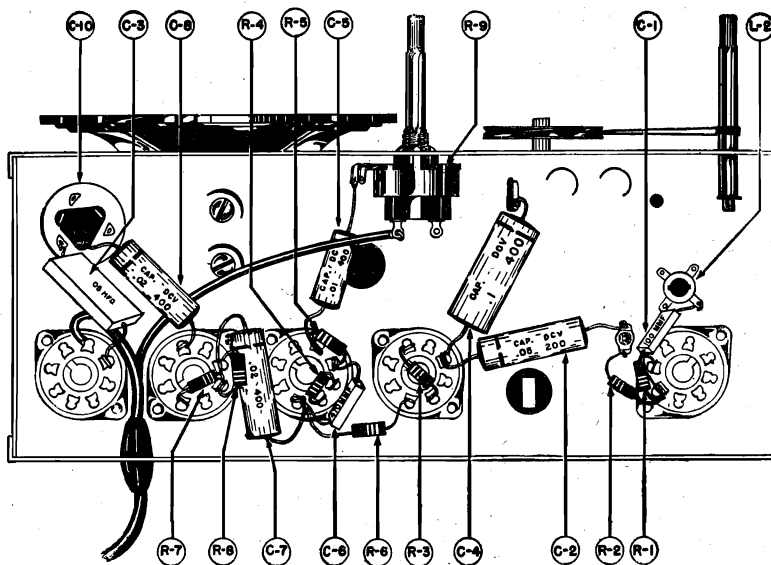


NOTE: All DC voltages measured with a 1000 ohm per volt meter from ON-OFF switch (—B) to socket contact indicated. All AC voltages are measured from ON-OFF switch (—B) to socket contact indicated.

All voltages are positive DC unless otherwise marked.

Volume control full on.

Line voltage 117 volts AC.



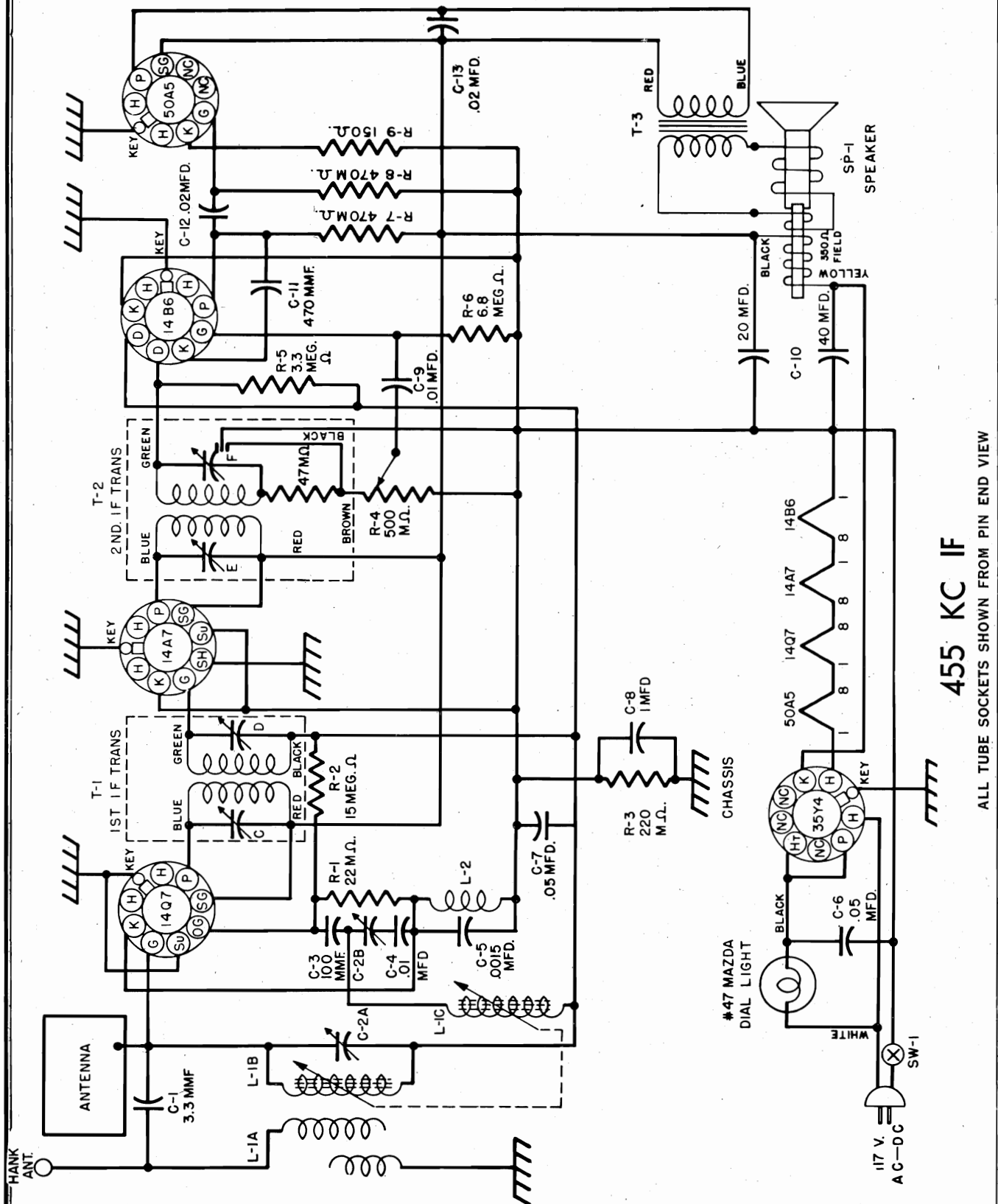
Parts Layout
Chassis Models 571A
and 571B

SERVICE PARTS LIST

Symbol	Part No.	Description	Symbol	Part No.	Description
C-1	BM78A101	Cap., Mica, 100 mmf.	T-2	B-51011	Trans., Assembly, 2nd IF
C-2	BD210503	Cap., Paper, .05 mfd., 200 v.	SP-1	C-51014	Speaker, 5" Dynamic, 350 ohm.
C-3	BC31B503	Cap., Mold., Paper, .05 mfd.		A-2163	Cable, Drive
C-4	BD410104	Cap., Paper, .1 mfd., 400 v.		A-6158	Lamp, Pilot No. 47 Mazda 6.3 v.
C-5	BD410103	Cap., Paper, .01 mfd., 400 v.		A-51160-1	Cord, AC-DC Line, 6 ft.
C-6	BM78A471	Cap., Mica, 470 mmf.		B-51162-1	Shaft, Drive
C-7, 8	BD410203	Cap., Paper, .02 mfd., 400 v.		A-51163	Clip, Spring
C-9	C-51155-1	Cap., Variable, 2 Section		B-51177	Bracket Assembly, Dial
C-10	A-8948	Cap., Electro., 40-20 mfd., 150 v.		A-51202	Link, Insulating
L-1	B-51243	Loop, Antenna		B-51204-1	Pointer
L-2	B-51159	Coil, Osc. Assembly*		A-51206	Arm, Dial Drive
R-1	BR17B223	Resistor, 22M ohm 1/3 w.		A-51237-1	Paper Back, Dial
R-2	BR17B156	Resistor, 15 meg. 1/3 w.		D-51240-1	Cabinet (571-1)
R-3	BR17B224	Resistor, 220M ohm 1/3 w.		A-51241-2	Knob
R-4	BR17B335	Resistor, 3.3 meg. 1/3 w.		C-51242-1	Dial, Glass Indicator
R-5	BR17B685	Resistor, 6.8 meg. 1/3 w.		C-51247	Back, Cabinet
R-6, 8	BR17B474	Resistor, 470M ohm 1/3 w.		A-51249	Strip, Sponge Rubber
R-7	BR16C151	Resistor, 150 ohm. 1/2 w.		A-51331	Spring, Dial Bracket
R-9	B-9051-1	Control, Vol. & Sw. 500M ohm.		A-51787	Spring, Cable
T-1	B-51010	Trans., Assembly, 1st IF		B-54000	Carton Assembly

INTERNATIONAL DETROLA CORP.

MODEL 571X



MODEL 571X

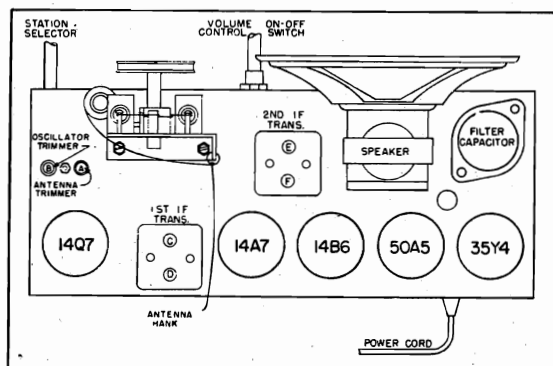
INTERNATIONAL DETROLA CORP.

ALIGNMENT PROCEDURE

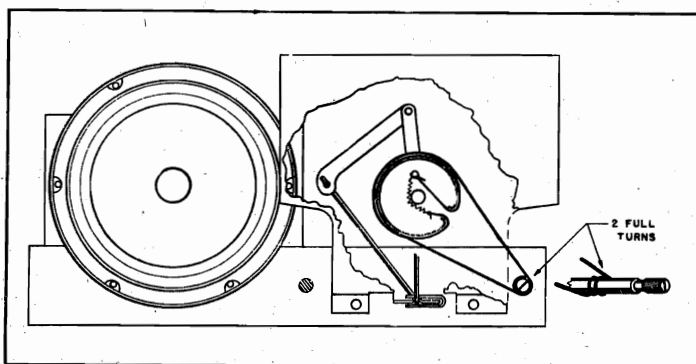
The following equipment is necessary to properly align this chassis:

1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Dummy antenna: — .1 mfd., — 10 mmf.

GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TO TUNE TRIMMERS	REMARKS
IF 455 kc.	14Q7 grid	.1 mfd.	HF end	IF trimmers C D E F	Tune to max.
535 kc.	14Q7 grid	10 mmf.	LF end	Osc. trimmer B	Set limit of band
1400 kc.	14Q7 grid	10 mmf.	1400 kc.	Ant. trimmer A	Tune to max.



Tube Layout



Dial Mechanism

TUBE COMPLEMENT

- | | |
|---|--------------------------|
| 1—14Q7 Oscillator and Mixer tube | 1—14A7 IF Amplifier tube |
| 1—50A5 Power Output tube | 1—35Y4 Rectifier tube |
| 1—14B6 Second Detector and First Audio tube | |

Electrical and Mechanical Specifications

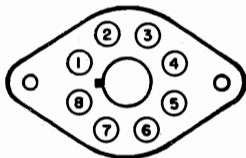
Frequency Range.....	540-1700 kc.	Power Output (Undistorted)...	.75 watts
Intermediate Frequency.....	455 kc.	Power Output (Maximum).....	1.5 watts
Power Supply.....	105-125 volts AC-DC	Tuning Drive Ratio.....	3 to 1
Loudspeaker	5-inch Dynamic	Rated Power Input.....	32 watts
V.C. Impedance.....	3.5 ohms at 400 cycles		

INTERNATIONAL DETROLA CORP.

MODEL 571X

SOCKET VOLTAGES

TUBE	POSITION	1	2	3	4	5	6	7	8
14Q7	Osc. and Mixer	37.5 AC	99	99	-4.2	0	0	0	24.5 AC
14A7	IF Amplifier	12.5 AC	99	99	0	0	0	0	24.5 AC
14B6	2nd Det.—1st Audio	0	16	0	0	0	0	0	12.5 AC
50A5	Power Output	85 AC	91.5	99	0	0	0	5.9	37.5 AC
35Y4	Rectifier	117 AC	112 AC	0	112 AC	0	0	112	85 AC



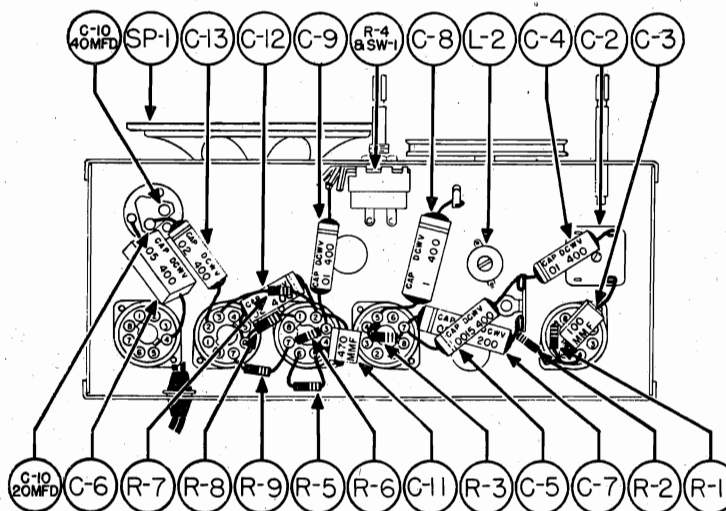
NOTE: All DC voltages measured with a 1000 ohm-per-volt meter from ON-OFF switch (—B) to socket contact indicated. All AC voltages are measured from ON-OFF switch (—B) to socket contact indicated.

All voltages are positive DC unless otherwise marked.

Volume control full on.

Line voltage 117 volts AC.

Parts Layout
Chassis Model 571X with
Loctal Tubes

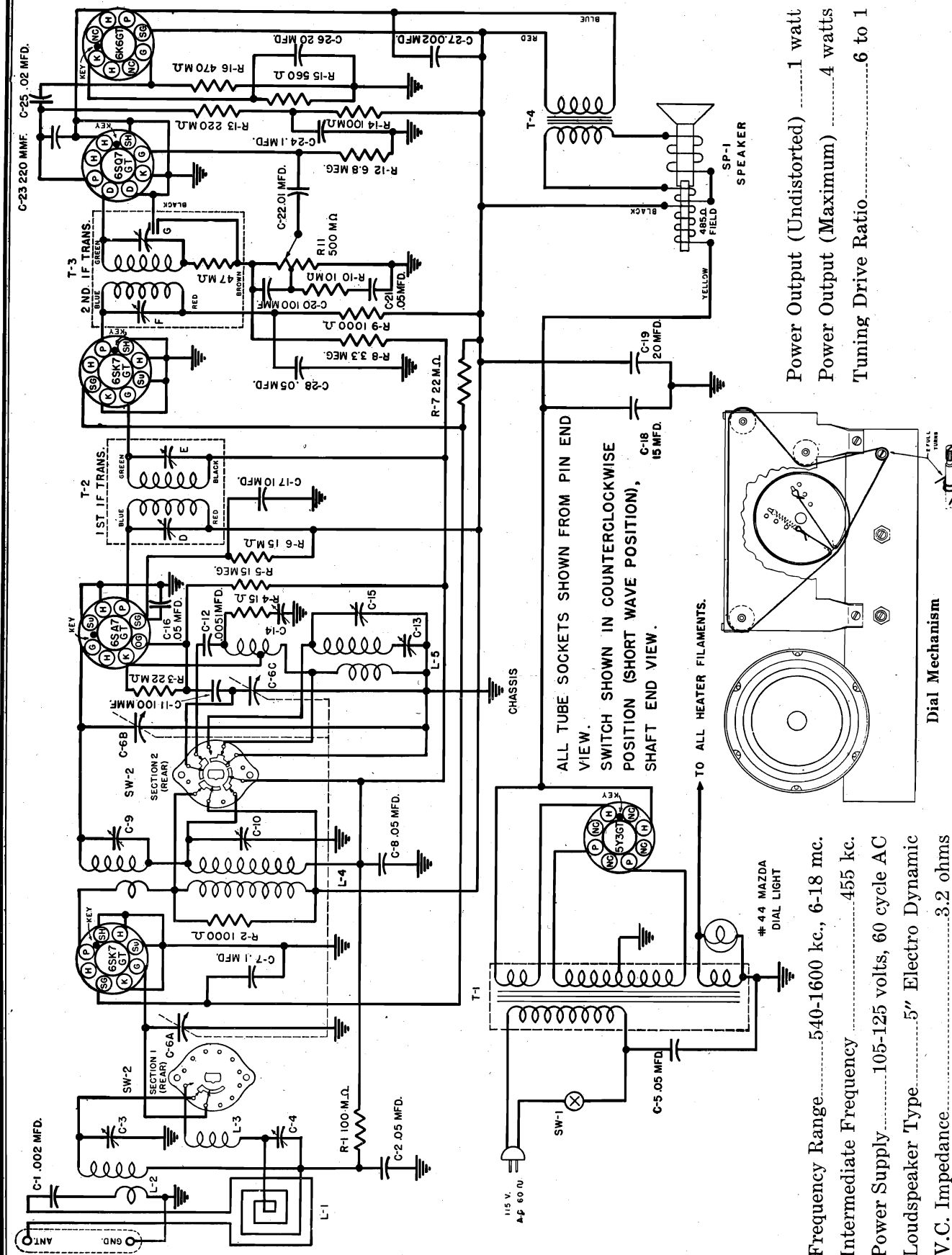


SERVICE PARTS LIST

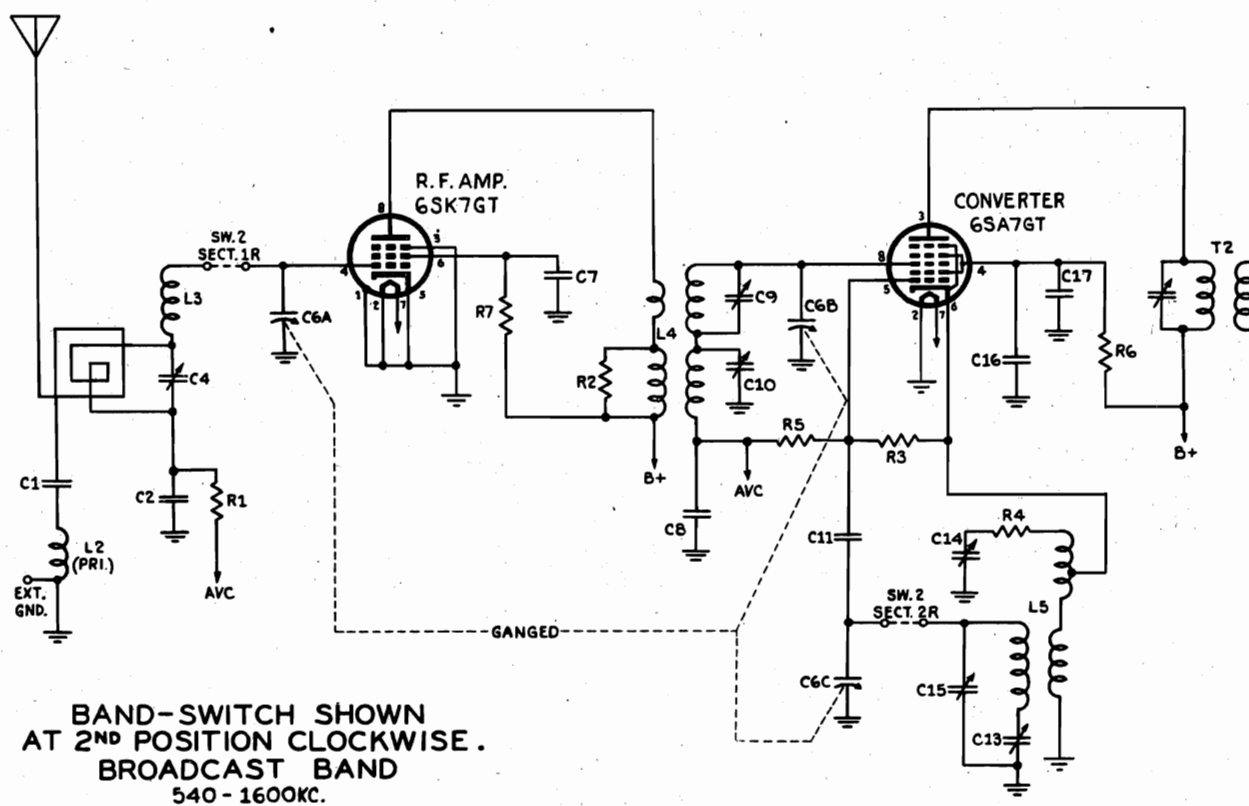
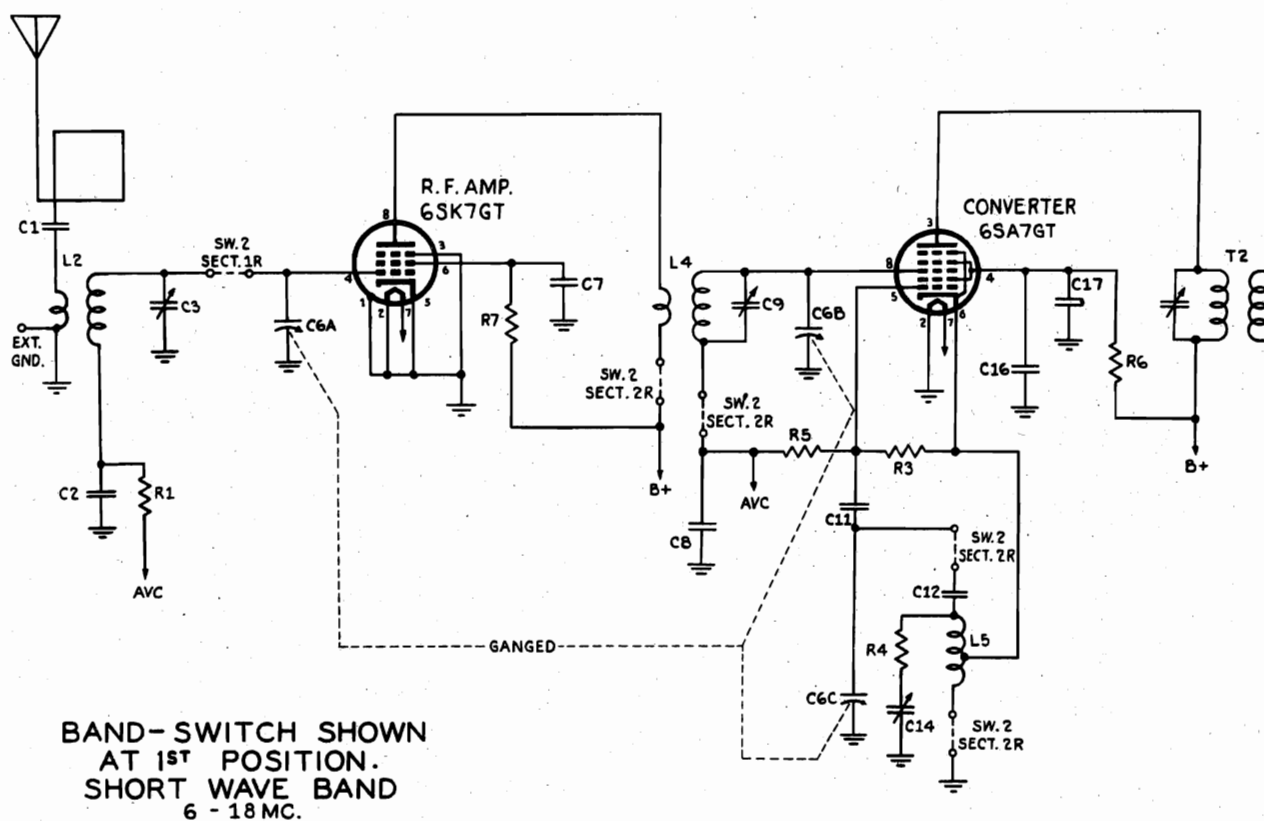
Symbol	Part No.	Description	Symbol	Part No.	Description
C-6	BC31B503	Cap., Mold. Paper, .05 mfd., 400 v.	T-1	B-51010-1	Transformer Assy., 1st IF
C-7	BD210503	Cap., Paper, .05 mfd., 200 v.	T-2	B-51011-1	Transformer Assy., 2nd IF
C-4, 9	BD410103	Cap., Paper, .01 mfd., 400 v.	SP-1	C-51014	Speaker, 5-inch Dynamic, 350 ohm.
C-8	BD410104	Cap., Paper, .1 mfd., 400 v.		A-51160-1	Cord, Power, 6 ft.
C-12, 13	BD410203	Cap., Paper, .02 mfd., 400 v.		B-51162-1	Shaft, Dial Drive
C-3	BM78A101	Cap., Mica, 100 mmf.		A-51163	Spring Clip for Dial Drive Shaft
C-11	BM78A471	Cap., Mica, 470 mmf.		A-51202	Link, Dial Drive
R-9	BR16C151	Resistor, 150 ohm, 1/2 w.		B-51330-1	Rubber Channel
R-2	BR17B156	Resistor, 15 megohm, 1/3 w.		A-51331	Spring, Dial Bracket
R-1	BR17B223	Resistor, 22,000 ohm, 1/3 w.		A-51778	Service Sheet
R-3	BR17B224	Resistor, 220,000 ohm, 1/3 w.		A-51787	Spring, Cable
R-5	BR17B335	Resistor, 3.3 megohm, 1/3 w.		A-51869	Antenna Reel Assembly
R-7, 8	BR17B474	Resistor, 470,000 ohm, 1/3 w.			
R-6	BR17B685	Resistor, 6.8 megohm, 1/3 w.			
	A-2163	Cable, Dial Drive	L-1A, L-1B,		
	A-6158	Lamp, Pilot, No. 47 Mazda, 6.3 v.	L-1C	D-54902	Permeability Tuner Assembly
C-10	A-8948	Cap., Elec., 40-20 mfd., 150 v.	L-2	B-54903	Coil Assembly, Cathode
R-4	B-9051-1	Control, Vol. & Sw., 500,000 ohm.	C-2A;		
C-5	A-9672	Cap., Paper, .0015 mfd., 400 v.	C-2B	B-54904-1	Capacitor, Trimmer
				B-55120-1	Stud, for Dial Drive Link

Order parts not listed by specifying (1) Part Name, (2) Model Number (include number following dash), (3) Run Number

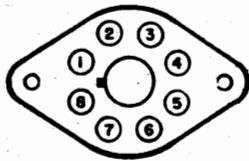
Power Output (Undistorted)	1 watt
Power Output (Maximum)	4 watts
Tuning Drive Ratio.....	6 to 1



Frequency Range.....	540-1600 kc., 6-18 mc.
Intermediate Frequency	455 kc.
Power Supply.....	105-125 volts, 60 cycle AC
Loudspeaker Type.....	5" Electro Dynamic
V.C. Impedance.....	3.2 ohms

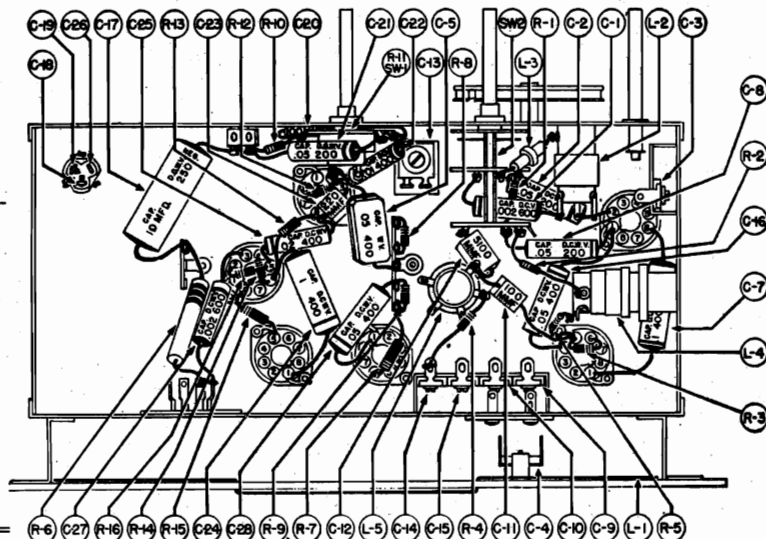
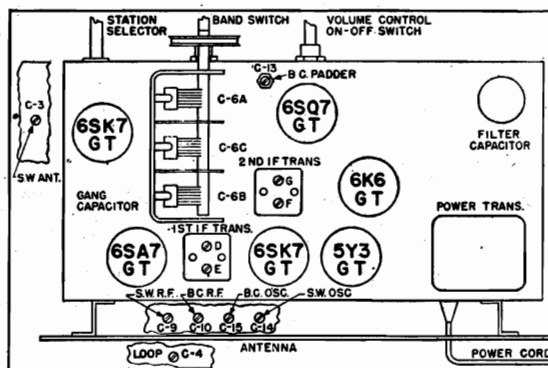


TUBE	POSITION	1	2	3	4	5	6	7	8
6SK7GT	RF Amplifier	0	0	0	0	0	107	6 AC	255
6SA7GT	Converter	0	6 AC	250	103	0	0	0	0
6SK7GT	IF Amplifier	0	0	0	0	0	105	6 AC	237
6SQ7GT	Det.—AVC—Audio	0	0	0	0	0	34	6 AC	0
6K6GT	Power Output	0	0	230	240	0	0	6 AC	18
5Y3GT	Rectifier	0	310	0	300 AC	0	300 AC	0	310



NOTE: All voltages measured from chassis to socket contact indicated. DC voltages measured with a 1000 ohm-per-volt meter.
All voltages are positive DC unless otherwise marked.
Volume control full on. Receiver not tuned to station.
Line voltage 117 volts AC.

Parts Layout
Model 572

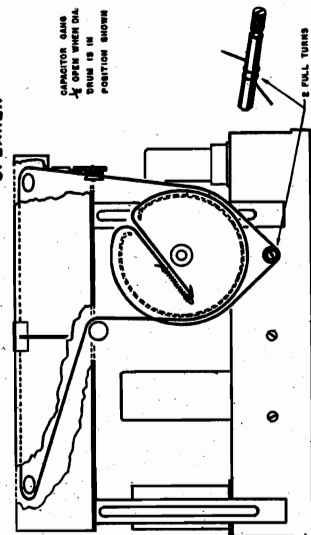


The following equipment is necessary to properly align this chassis:

1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. A non-metallic screwdriver.
3. A dummy antenna: .1 mfd. — 400 ohm resistor—RMA loop.
4. An output meter.

CONNECT TEST OSCILLATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL AT	TRIMMERS	PURPOSE
6SA7GT grid	.1 mfd.	455 kc.	Broadcast	HF end	D E F G	Align IF
6SK7GT RF grid	.1 mfd.	18.3 mc.	Short wave	HF end	C-14	Set limit of band
6SK7GT RF grid	.1 mfd.	16 mc.	Short wave	16 mc.	C-9	Align RF
Antenna post	400 ohms	16 mc.	Short wave	16 mc.	C-3	Align antenna
6SK7GT RF grid	.1 mfd.	1620 kc.	Broadcast	HF end	C-15	Set limit of band
6SK7GT RF grid	.1 mfd.	1400 kc.	Broadcast	1400 kc.	C-10	Align RF
6SK7GT RF grid	.1 mfd.	600 kc.	Broadcast	600 kc.	C-13	Rock gang and adjust to max.
RMA loop	Through loop	1400 kc.	Broadcast	1400 kc.	C-4	Align antenna

INTERNATIONAL DETROLA CORP.

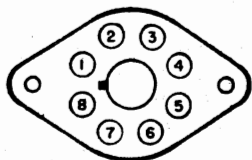


455 KC 1 F

ALL TUBE SOCKETS SHOWN FROM PIN END VIEW

V.C. Impedance.....	3.5 ohms at 400 cycles	Power Supply.....	105-125 volts AC-DC
Power Output (Undistorted).....	.9 watts	Loudspeaker	PM, 6-inch
Power Output (Maximum).....	1.25 watts	Frequency Range	540-1600 kc.
Tuning Drive Ratio.....	6-1		

TUBE	POSITION	1	2	3	4	5	6	7	8
12SK7GT	RF Amplifier	0	49.5 AC	0	0	0	105	36.5 AC	105
12SA7GT	Converter	0	24.7 AC	105	105	-6.8	0	36.5 AC	0
12SK7GT	IF Amplifier	0	24.7 AC	0	0	0	105	12.5 AC	105
12SQ7GT	2nd Det.—1st Audio	0	0	0	0	0	43	12.5 AC	0
35L6GT	Power Output	0	85.0 AC	97	105	0	0	49.5 AC	7.2
35Z5GT	Rectifier	0	117 AC	112 AC	0	112 AC	0	85 AC	114



NOTE: All DC voltages measured with a 1000 ohm-per-volt meter from ON-OFF switch (—B) to socket contact indicated.

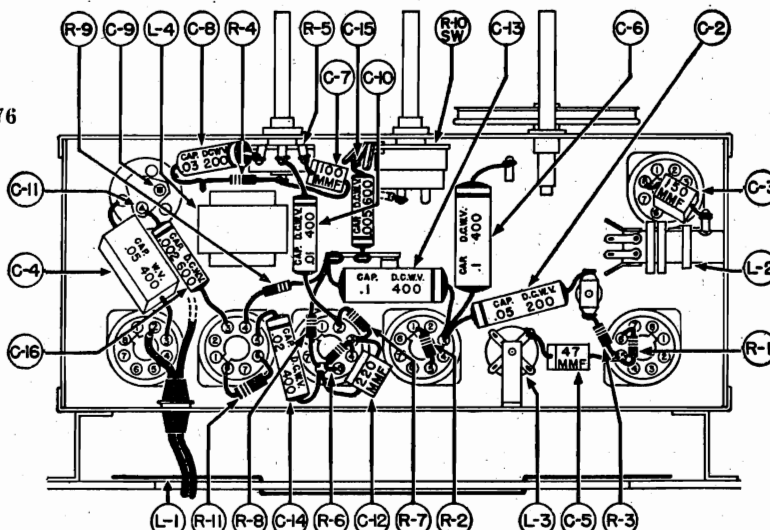
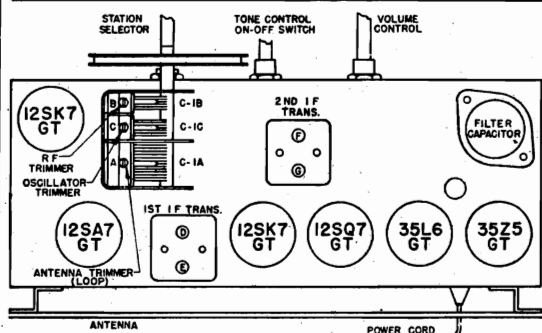
All voltages are positive DC unless otherwise marked.

Volume Control full on. No signal.

Tone Control in clockwise position.

Line voltage 117 volts AC.

Parts Layout
Chassis Model 576



The following equipment is necessary to properly align this chassis:

A signal generator which will provide an accurately calibrated signal at the frequencies listed.

An output meter.

A non-metallic screwdriver.

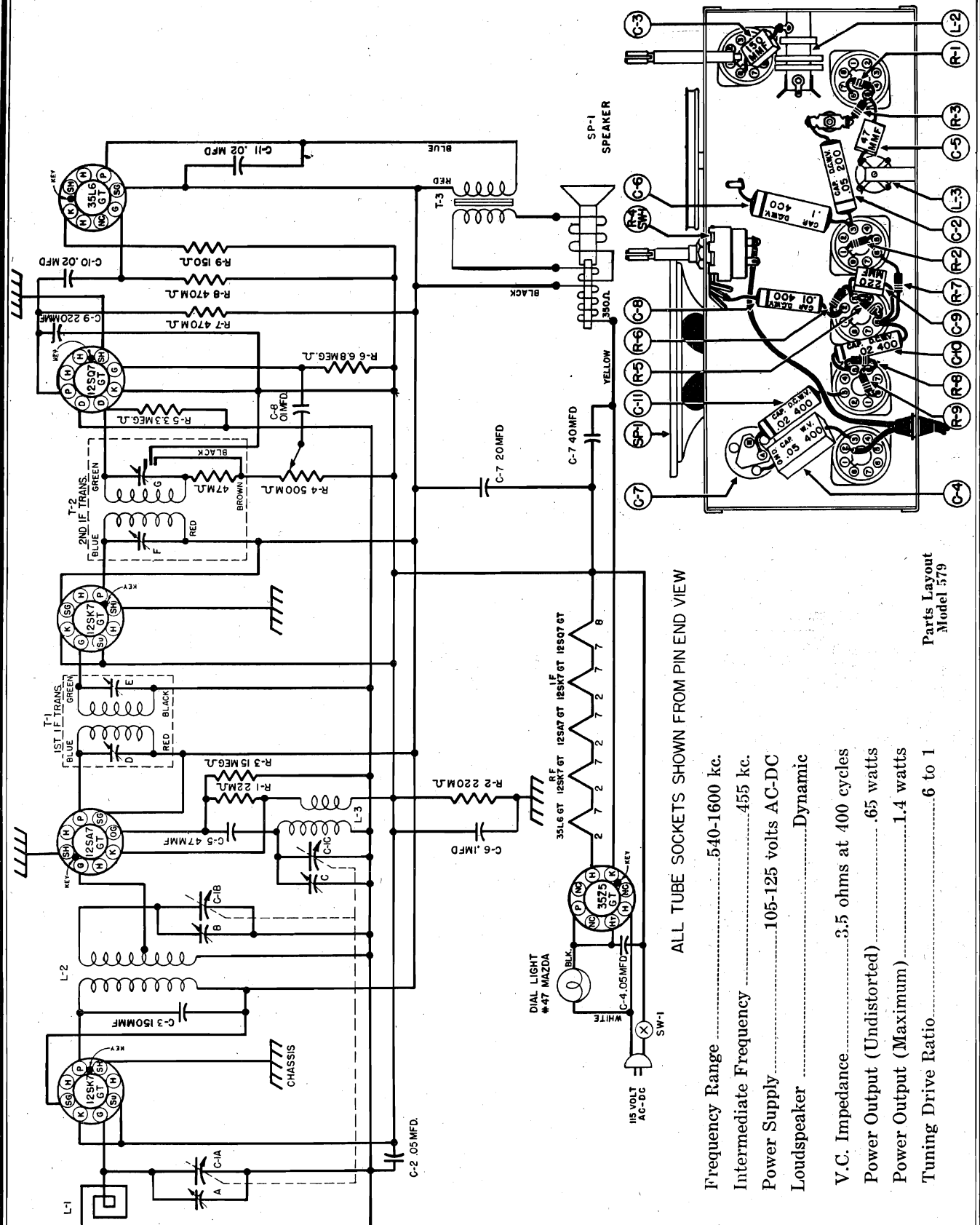
Dummy antenna: — .1 mfd., — RMA loop.

Intermediate Frequency and Oscillator adjustments may be made with the loop disconnected provided a resistor of 10,000 to 50,000 ohms is substituted to close the 12SA7GT grid circuit. The loop alignment must be done with the loop and chassis mounted in operating position in the cabinet. A single turn loosely coupled to loop may be substituted for RMA loop.

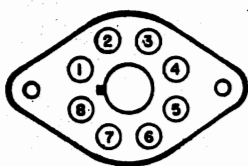
GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TO TUNE TRIMMERS	REMARKS
IF 455 kc.	12SA7GT grid	.1 mfd.	HF end	IF trimmers D E F G	Tune to max.
1620 kc.	Through loop	RMA loop	HF end	Osc. trimmer C	Set limit of band.
1400 kc.	Through loop	RMA loop	1400 kc.	RF trimmer B	Tune to max.
1400 kc.	Through loop	RMA loop	1400 kc.	Ant. Trimmer A	Tune to max.

INTERNATIONAL DETROLA CORP.

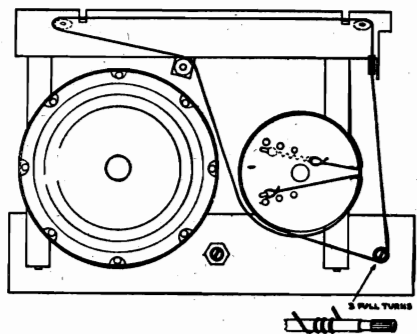
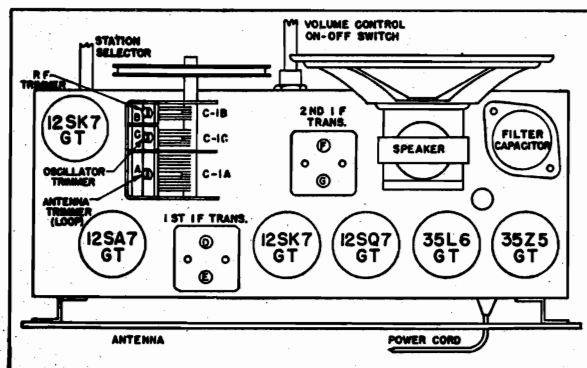
MODEL 579

Parts Layout
Model 579

TUBE	POSITION	1	2	3	4	5	6	7	8
12SK7GT	RF Amplifier	0	50 AC	0	0	0	97	38 AC	97
12SA7GT	Converter	0	25 AC	97	97	-6	0	38 AC	0
12SK7GT	IF Amplifier	0	25 AC	0	0	0	97	12 AC	97
12SQ7GT	Detector, 1st Audio	0	0	0	0	0	30	12 AC	0
35L6GT	Output	0	85 AC	92	97	0	0	50 AC	5.7
35Z5GT	Rectifier	0	117 AC	112 AC	0	112 AC	0	86 AC	125



NOTE: All DC voltages measured with a 1000 ohm-per-volt meter from ON-OFF switch (—B) to socket contact indicated. All AC voltages are measured from ON-OFF switch (—B) to socket contact indicated. All voltages are positive DC unless otherwise marked. Volume Control full on. No signal. Line voltage 117 volts AC.



Dial Mechanism

The following equipment is necessary to properly align this chassis:

A signal generator which will provide an accurately calibrated signal at the frequencies listed.

An output meter.

A non-metallic screwdriver.

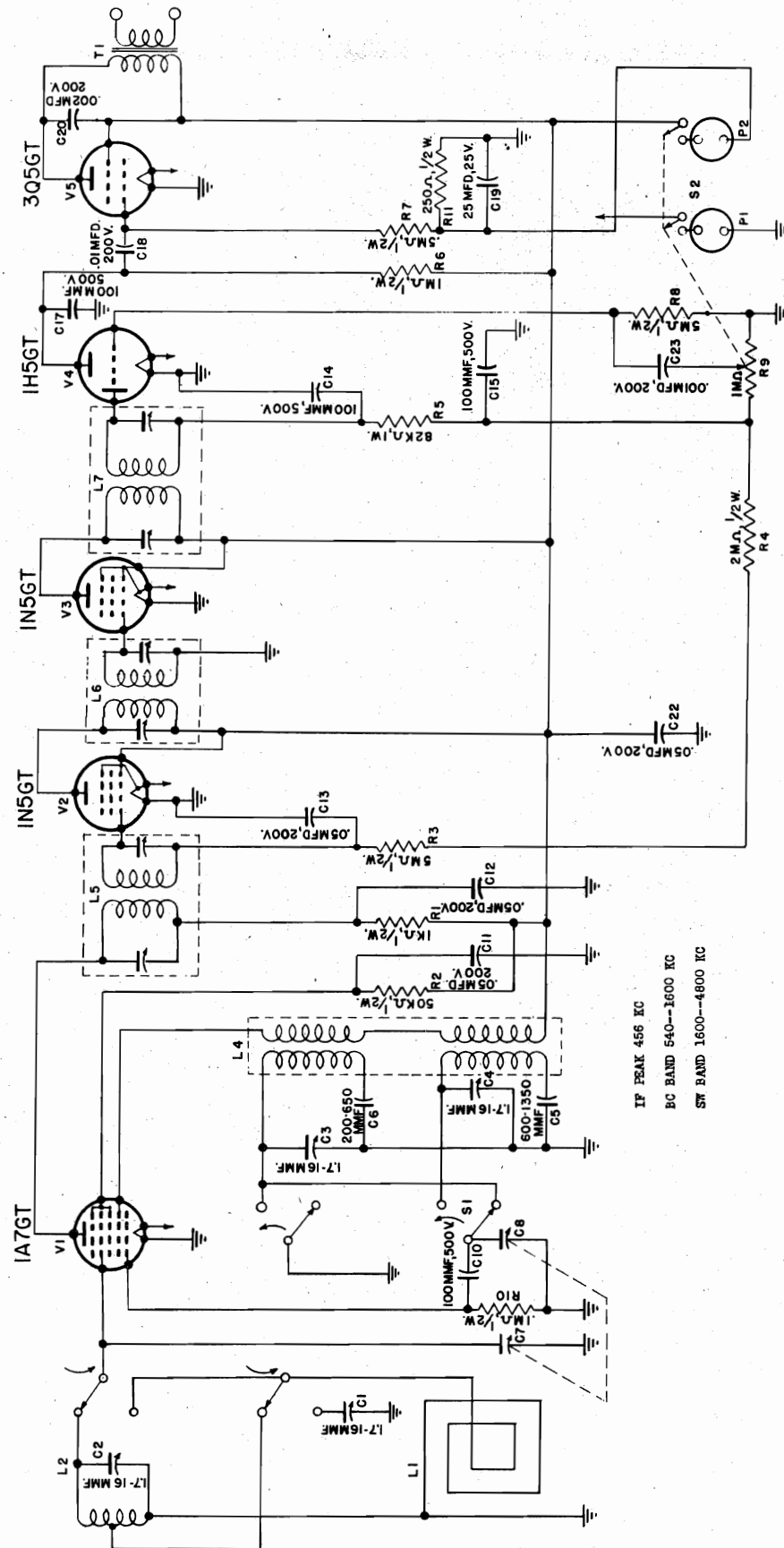
Dummy antenna: .1 mfd. — RMA loop.

Intermediate Frequency and Oscillator adjustments may be made with the loop disconnected provided a resistor of 10,000 to 50,000 ohms is substituted to close the 12SK7GT grid circuit. The loop alignment must be done with the loop and chassis mounted in operating position in the cabinet. A single turn loosely coupled to loop may be substituted for RMA loop.

CONNECT TEST OSCILLATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	SET DIAL AT	TRIMMERS	PURPOSE
12SA7GT grid	.1 mfd.	455 kc.	HF end	D E F G	Align IF
12SK7GT RF grid	.1 mfd.	1620 kc.	HF end	C	Set limit of band
12SK7GT RF grid	.1 mfd.	1400 kc.	1400 kc.	B	Align RF
RMA loop	Through loop	1400 kc.	1400 kc.	A	Align antenna

JEFFERSON-TRAVIS CORP.

MODEL MR2B

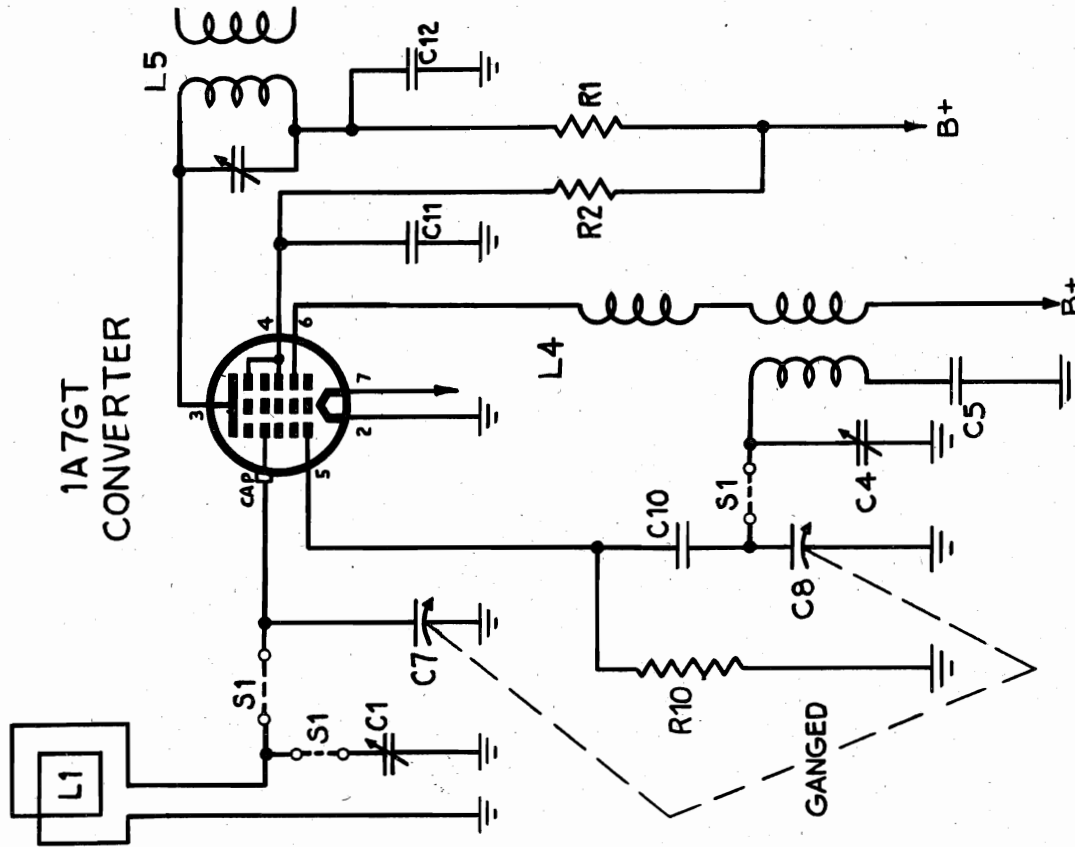


"clarified schematics"

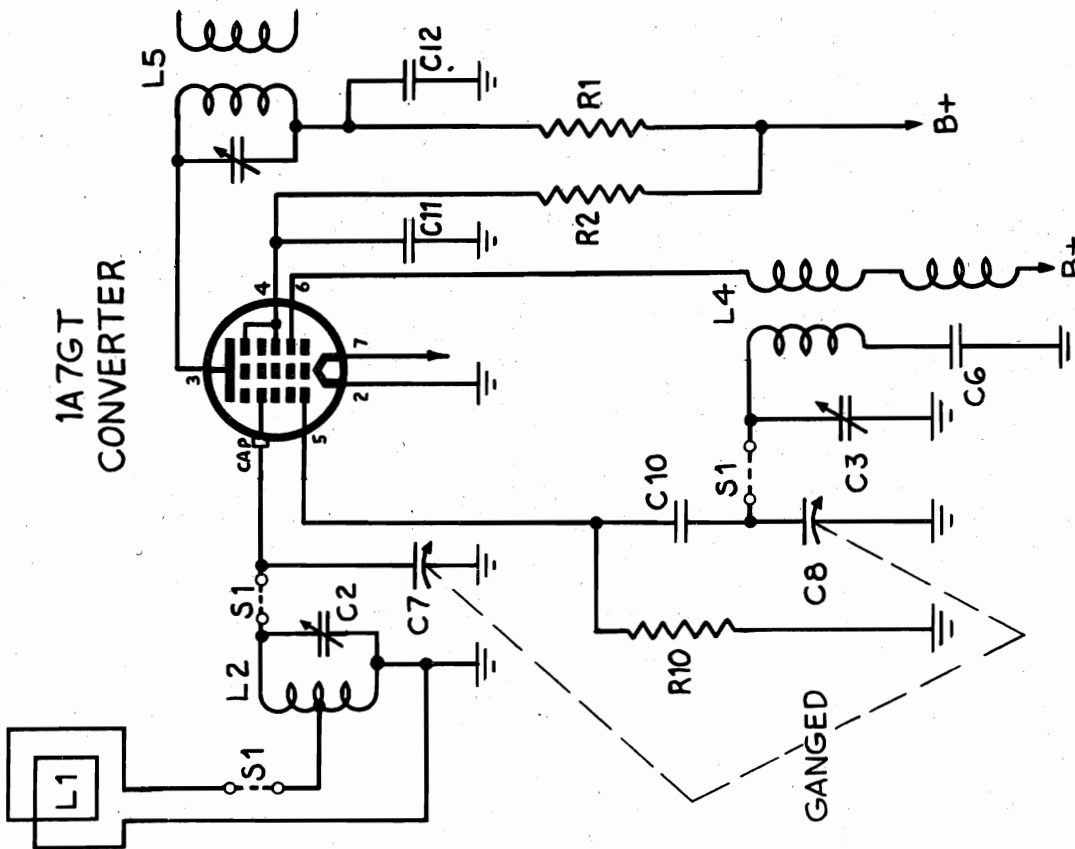
PAGE 15-2 JEFFTRAVIS

MODEL MR2B

JEFFERSON-TRAVIS CORP.



BAND-SWITCH SHOWN
AT 2ND POSITION
SHORT WAVE BAND
1600 TO 4800 KC



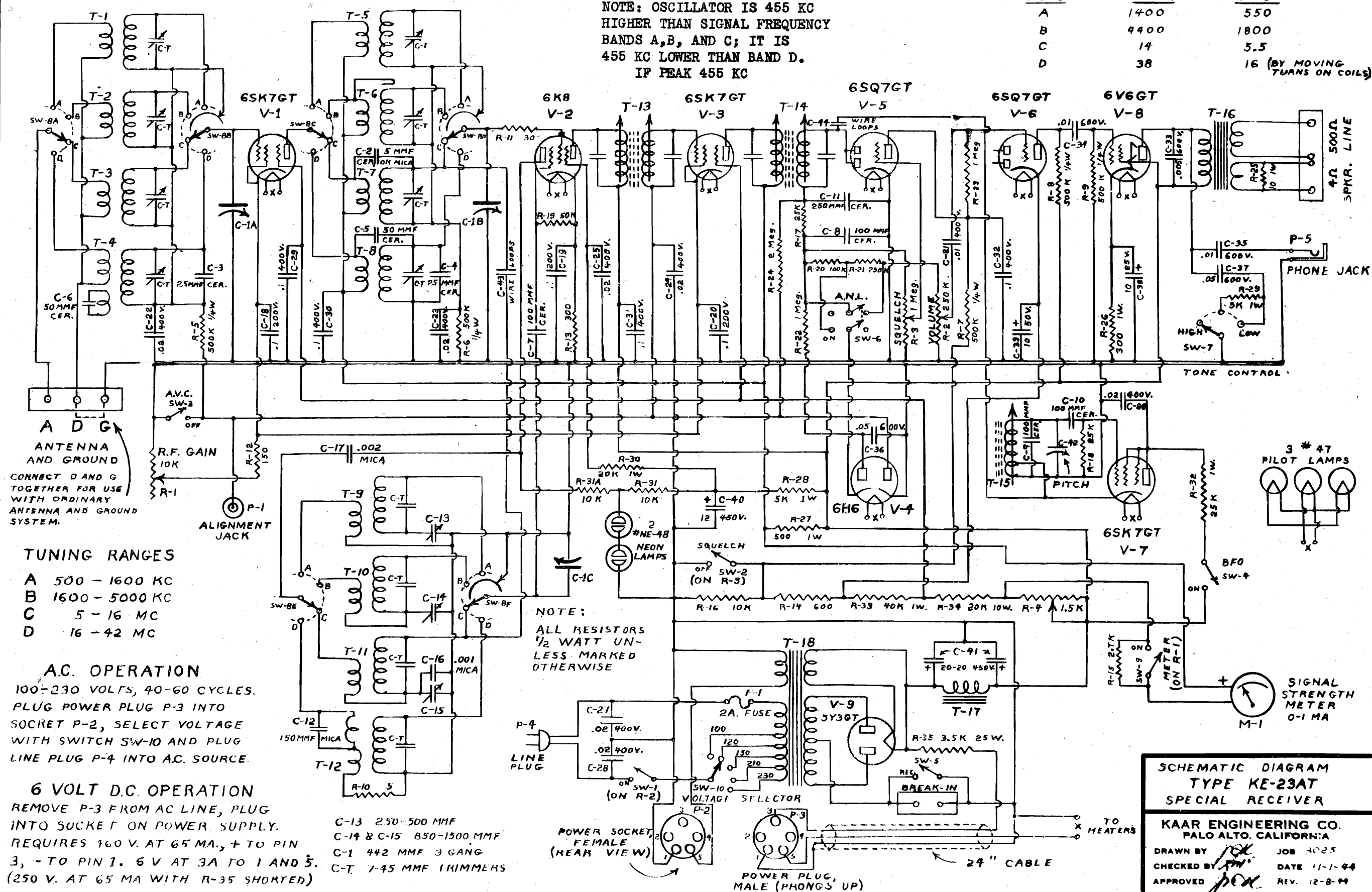
BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540 TO 1600 KC

KAAR ENGINEERING CO.

NOTE: OSCILLATOR IS 455 KC
HIGHER THAN SIGNAL FREQUENCY
BANDS A, B, AND C; IT IS
455 KC LOWER THAN BAND D.
IF PEAK 455 KC

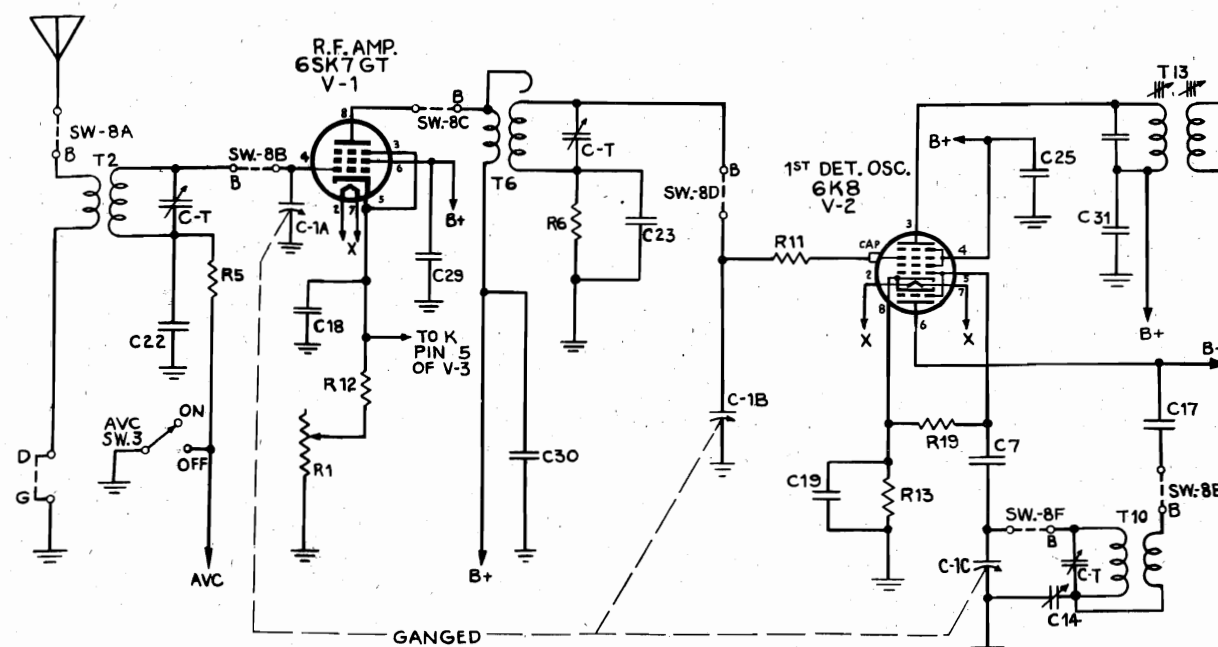
ALIGNMENT DATA

BAND	TRIM	PAD
A	1400	550
B	4400	1800
C	14	5.5
D	38	16 (BY MOVING TURNS ON COILS)



KAAR PAGE 15-3
MODEL KE-23AT

BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND A
500 TO 1600 KC.

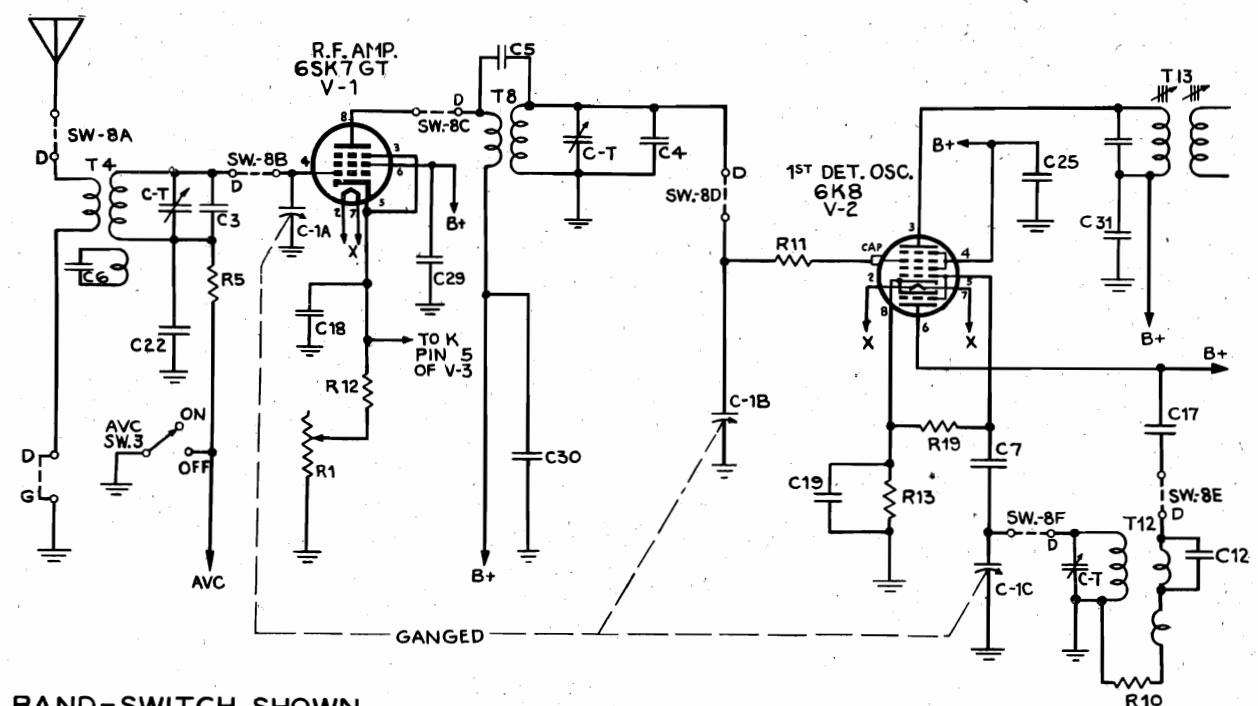


BAND-SWITCH SHOWN
AT 2ND POSITION
BAND B
1600 - 5000 KC.

PAGE 15-4 KAAR
MODEL KE-23AT

[illegible]

BAND-SWITCH SHOWN
AT 3RD POSITION
BAND C
5-16 MC.



BAND-SWITCH SHOWN
AT 4TH POSITION
BAND D
16-42 MC.

KAAR ENGINEERING CO.

1. DESCRIPTION

1.1 GENERAL: The Kaar Engineering Company Model KE-23AT is a nine-tube general purpose communications receiver covering a frequency range from 500 KC to 42 MC. The most commonly used radio communications bands. This receiver provides a high degree of selectivity and sensitivity which should provide reception under the most difficult conditions.

1.2 POWER SUPPLY: The KE-23AT receiver is designed for operation from AC power from its built-in AC power supply. An auxiliary 24" power cable terminating in a miniature 5 prong plug provides operation from a 6 volt battery through an external power pack.

1.21 The built-in power supply provides operation from 40 - 60 cycle AC power at 100, 120, 150, 210 and 230 volts. A switch is provided for selecting any one of these voltages as necessary. The receiver will also operate satisfactorily under substantial overvoltage or undervoltage conditions, and satisfactory operation can be expected on any voltage between 90 and 250 volts.

1.22 Operation from a 6 volt battery is provided by removing the power plug from its socket and inserting it into an external power supply capable of furnishing 460 volts at 65 mA and 6 V. DC for the heaters. By making a minor circuit change underneath the chassis, the high voltage power requirement can be reduced to 230 - 250 volts at 65 mA.

1.3 SPEAKER: The 8" PK model 23ST loud speaker as furnished with this receiver is recommended for general use. Much larger speakers to provide better tone quality or very small speakers for monitoring purposes may be used satisfactorily. A 4 ohm output is provided for direct loud speaker operation. EOC chms is also provided for feeding the output into a 500 ohm line.

1.4 DIMENSIONS: The KE-23AT receiver is mounted on a 8 3/4" x 19", 16 gage steel panel of relay rack mounting dimensions. It is housed in an 18 gage steel cabinet, with hinged lid in the top, 19" long, 9" high and 11" deep.

The model 23ST speaker cabinet is 9" high (excluding handle), 10" wide and 6" deep.

Both the receiver and speaker are finished in gray, baked enamel wrinkle with black trim and knobs.

1.5 FREQUENCY COVERSAGES: The tuning range of the receiver is covered in four bands:

Band A	500 KC to 1800 KC
Band B	1600 KC to 5000 KC
Band C	5 MC to 16 MC
Band D	16 MC to 42 MC

The frequencies are calibrated directly on the main dial. The VERNIER dial in the center provides a means for fine tuning adjustments and accurate logging. One complete rotation of this dial covers one division on the 0 - 50 logging scale on the main dial. The tuning ratio is approximately 100 to 1.

1.6 TUBE COMPONENTS:

V-1	6SK7GT	Tuned R.F. Amplifier.
V-2	6X5	First Det. Osc.
V-3	6SK7GT	455 KC I.F. Amplifier
V-4	6X5	Automatic Noise Limiter.
V-5	6SQ7GT	Second Det. and Squelch Control.
V-6	6SQ7GT	First Audio Amplifier.
V-7	6SK7GT	Beat F-frequency Oscillator.
V-8	6V6GT	Power Output Tube.
V-9	5Y3GT	Rectifier.

Glass "GT" tubes or even "G" tubes can be used if the metal tubes indicated above are not available. Metal tubes can be substituted in all cases where glass tubes are indicated. However, if such substitutions are made for V-1, V-2 or V-3, it is quite probable that the receiver would have to be re-aligned, particularly on the higher frequency bands.

2. CIRCUIT

1.71 The circuit is a standard superheterodyne with a high degree of stability. Permanently tuned intermediate frequency transformers and ceramic trimming condensers across the R.F. coils are incorporated to assure permanency of adjustment.

1.72 A special feature of the KE-23AT is the NO-SIGNAL SQUELCH CIRCUIT. This SQUELCH (or "Q") CIRCUIT may be used in two-way communication work where "standby" operation is desirable and where the background noise with the station off would be objectionable. The SQUELCH CIRCUIT automatically silences the receiver except when a station is actually being received. This feature can also be used as a between-station quieting device preventing the rear of static between stations when tuning from one to another.

1.73 There is also provided an AUTOMATIC NOISE SILENCER which limits the noise produced by gasoline engine ignition systems or other electrical equipment, including ordinary static, that may exceed the level of the signal being received.

1.74 A HEAT FREQUENCY OSCILLATOR is provided for receiving CW (code) signals.

1.8 PERFORMANCE: For a receiver built as simply as the KE-23AT with as few tubes and component parts, the general performance is excellent.

1.81 SENSITIVITY: When measured with a standard dummy antenna input, the sensitivity of the receiver will be approximately between 1 and 5 microvolts over the range 500 KC to 16 MC, and between 3 and 15 microvolts in the 16 to 42 MC range.

1.82 SELECTIVITY: The average selectivity is approximately as follows:

Ratio: Input Voltage off Resonance to Voltage at Resonance	Kilocycles off Resonance
10 (20 DB)	7 KC
100 (40 DB)	14 KC
1000 (60 DB)	25 KC

1.83 AUDIO RESPONSE: The audio frequency response is essentially flat between 100 and 3500 cycles. The power output is approximately 2 watts with a total harmonic distortion of not over 10%.

2. INSTALLATION

2.1 A radio receiver is only as good as its installation. Reception obviously will not be as good with a poor, fluctuating or noisy power source; or a make-shift antenna; as it would be under proper conditions. Generally speaking the KE-23AT receiver should be installed according to good and acceptable practices. A filter is provided in the AC line to help minimize noise from that source. The automatic noise limiter will help reduce noise entering by way of the antenna. Two voltage regulating neon lamps are in the oscillator voltage supply circuit to minimize the effect of voltage fluctuations. The receiver has been moisture-proofed and the parts on the under side of the chassis have been sprayed with fungus resisting lacquer as an aid to operation in damp and humid climates.

KAAR ENGINEERING CO.

be exercised in operating the receiver with this estimated setting, and at the first opportunity it should be checked with a voltmeter. Also, at the correct setting when the receiver is turned off and then on again, the two neon lamps located just in front of the 6X8, 1-2, should ignite.

2.4 BATTERY OPERATION: The KE-23AT may be operated from a 6 volt storage battery with a proper vibrator power supply. It can be operated from other battery sources if the proper voltages are applied to the correct prongs of the power plug, P-3.

To set up and operate the receiver from the vibrator power supply, proceed as follows:

2.41 Proceed as directed in Paragraphs 2.31 - 2.35. Be sure the AC line cord is not plugged into an AC outlet, (in case AC power should accidentally be applied).

2.42 Remove the power plug, P-3, in the end of the 24" power cable from the power socket, P-2, at the rear of the chassis. If operation is to be from a type of vibrator power supply furnishing approximately 460 volts at 65 mA from the same type of 5 prong power socket with the correct connections, simply plug P-3 into the socket.

Although the high voltage required for the receiver is only 250 volts, a dropping resistor, R-35 (3500 ohms, 25 watts), is installed in the receiver in order to drop the 460 volts to the correct value.

2.43 If operation is to be from other power supplies, make sure that the proper voltages are applied to the proper pins on P-3 as shown in the schematic diagram. The easiest way to do this is to connect the output terminals or leads from the power supply unit used to a 5 prong female cable socket such as an Amphenol Type HP55L. If the output is approximately 240 - 250 volts at 65 mA, such as would be obtained from the Kaar Type 6474 Vibrator Power Supply, then the resistor, R-35, should be shorted out by soldering a piece of wire around its terminals. (This resistor is located under the chassis at the rear near the fuse extractor post.) For power supplies furnishing voltages between 250 and 460 volts, a 10 watt resistor of the proper resistance value as calculated, or determined by experiment, may be connected across the terminals of R-35. The correct value should provide approximately 250 volts at the low potential end of the resistor when the receiver is operating.

2.44 Connect the heavy battery leads from the power supply to the 6 volt battery, the **RED** lead to the positive (+) and the **BLACK** lead to the negative (-) terminal.

2.45 When operating from a battery power source, the operation of the receiver is the same as before except that the switch, S-1, on the Volume Control does not now turn the receiver off and on. To turn the receiver off, it will be necessary to remove one of the battery leads from the storage battery. A special high current, low resistance switch may be installed in one of the battery leads if desired.

2.5 BREAK-IN CONNECTION: The KE-23AT may be used with a transmitter to form a two-way radio communication system. When the transmitter has break-in facilities, it is only necessary to run wires to the two BREAK-IN terminals on the rear of the chassis. When the STANDBY-RECEIVE switch is in the "STANDBY" position, every time the transmitter is turned off the receiver will automatically be turned on, and the receiver will be silenced while transmitting. This system will only work when the receiver is operated from its internal AC power supply. When operating from batteries with an external power supply, these BREAK-IN CONNECTIONS can not be used, and if break-in operation is desired, it will be necessary to provide for breaking the high voltage supply lead by other means, such as by a special relay operated by the transmitter.

2.2 ANTENNA AND GROUND: The importance of a good antenna cannot be over stressed. It is essential for satisfactory reception of weak signals.

2.21 The antenna input circuit of the KE-23AT provides for the use of a Harconi or doublet antenna. The Harconi type is usually recommended for ordinary reception and should prove satisfactory in most instances. It consists of an ordinary antenna wire of approximately #12 or 14 B&S gage strung between insulators as high as possible. The over-all length is not critical, and may be some 50 to 100 feet long including the lead-in to the set. When using this type of antenna, the terminals on the rear of the set, "H" and "G", must be connected together and the antenna lead-in connected to "A".

2.22 The receiver will usually work fairly satisfactorily without a ground connection but a good ground connection is to be highly recommended. In many instances it will increase the signal strength and reduce noise. A six-foot rod driven in moist earth will make a satisfactory ground, or as an alternate, a cold water pipe. The lead-in from the ground should be of heavy wire, at least #12 or 14, and should be connected to "G" at the rear of the receiver.

2.23 Under special conditions when a doublet antenna may be used, the 400 ohm transmission line will then be connected between "A" and "H" with the ground connected to "G". In this case "H" and "G" are not connected together. The doublet antenna performs excellently in a direction at right angles to its length but only on the rather narrow group of frequencies for which it was designed.

2.3 SETTING UP THE RECEIVER FOR AC OPERATION

2.31 Unpack the KE-23AT receiver and loud speaker from the shipping case and examine for possible damage. There are no loose accessories other than the instruction book.

2.32 Make sure that the tubes are firmly seated in their sockets and the grid cap is in place on the 6X8 tube.

2.33 Make sure that the power plug, P-3, on the end of the 24" power cable is firmly inserted in the power socket, P-2, at the rear of the chassis for AC operation.

2.34 Attach the 23ST speaker to the two terminals marked "4, 1" at the rear of the receiver.

Ordinarily the loud speaker will be placed at the side of the receiver. It is not desirable to place it on top of the cabinet since vibration from it might possibly introduce microphonic noises which would not otherwise be noticeable.

2.35 Connect the antenna lead-in or antenna transmission line in accordance with instructions in Paragraph 2.2.

2.36 Determine the voltage of the AC source which is to operate the receiver by measurement with a voltmeter. Then set the voltage selector switch, SW-1, to the nearest voltage indicated. This switch is located just behind the tuning meter, K-1. It will be necessary to loosen the set screw with a small screw driver in order to turn the switch.

CAUTION: Never turn the voltage selector switch with the receiver turned "ON". An accidental wrong setting may damage the receiver and accidental contact with the terminals at the rear of the tuning meter may cause shock.

If no voltmeter is available to test the line voltage, in cases of emergency the voltage selector switch can be turned first to the 230 volt position, the brilliancy of the pilot lamps observed, and then the switch tried in the consecutively lower positions until the brilliancy of the pilot lamps appears to be about normal. Care should

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3. OPERATING INSTRUCTIONS

3.1 The various controls for operating the KE-23AT receiver are located across the bottom of the panel and are appropriately marked. The main tuning knob is located in the center of the panel just underneath the Vernier dial. To put the KE-23AT receiver into operation, proceed as follows:

3.1.1 Plug the line cord into a source of AC power as outlined in Paragraph 2.3 or connect for battery operation with an external power supply as per Paragraph 2.4.

3.1.2 If operating from an AC source, the receiver is turned on by rotating the VOLUME control from its "OFF" position to the right. A click will be felt and heard. As the switch connected to this control closes, the dials should light up. It will take 30 seconds or so for the tubes to heat up. If operating from a 6 volt storage battery, the receiver is turned off and on by disconnecting one of the battery leads as described in Paragraph 2.45.

3.1.3 Set the SELECTOR switch on position "A" for receiving broadcast stations, as they are usually the easiest to receive initially and will enable one to become accustomed to the operation of the set. In remote locations it may be that there are no near-by stations on Band A, in which case the SELECTOR switch should be set on position "Q" and short wave broadcast stations tuned in instead.

3.1.4 The R.F. GAIN control should be turned completely to the right (clockwise) as far as it will go to position "10".

3.1.5 The SQUELCH control should be turned off by rotating it as far as it will go to the right (clockwise) until the switch snaps in the "OFF" position.

3.1.6 The AUTOMATIC NOISE LIMITER, A.N.L., and BEAT FREQUENCY OSCILLATOR, B.F.O. should be "OFF"; and the AUTOMATIC VOLUME CONTROL, A.V.C., switch "ON". Put the STANDBY-RECEIVE switch in the "RECEIVE" position.

3.1.7 Advance the VOLUME control to the right to a point where background noise is heard. In quiet locations it may be desirable to turn the VOLUME control full on, and when a station is turned to too loudly, reduce it to the desired volume level.

3.1.8 Rotate the main tuning knob until a fairly strong station is heard. The operator should then familiarize himself with the operation of each of the various controls in turn. Tune for maximum reading on Tuning Meter.

3.2 The function of each of the controls is herewith explained.

3.2.1 R.F. GAIN CONTROL: This control adjusts the sensitivity of the receiver and is used when the signal strength of a powerful nearby station is too great and reception is distorted. Normally, however, with the AUTOMATIC VOLUME CONTROL (A.V.C.) "ON", there will be very little use for this control when receiving voice and it is usually left turned completely to the right to position "10". The A.V.C. switch should be turned "OFF" when listening to code with the BEAT FREQUENCY OSCILLATOR (B.F.O.) "ON". With the A.V.C. "OFF", even medium powerful stations will overload the receiver and it will be necessary to reduce the sensitivity with the R.F. GAIN CONTROL for best results. The Tuning Meter operates only when the A.V.C. is turned on.

3.2.2 SELECTOR SWITCH: The SELECTOR switch, or "BAND CHANGER" switch as it is sometimes called, allows selection of the various frequency ranges, "A", "B", "Q" or "P", as desired. Simply turn the pointer knob to the desired range.

3.2.3 SQUELCH CONTROL: The SQUELCH CONTROL (or "Q" control) can be used to silence the receiver except when a signal is actually being received. Its use is particularly adapted to two-way communication work where the KE-23AT may be standing by and where a considerable amount of background noise would be present when no station is being received. The squelch circuit allows the receiver to be actually inoperative until the station to which it is tuned comes on the air, when it is automatically turned on. By adjusting the SQUELCH knob, the receiver can be made to operate only on signals of a definite minimum volume. As the control is turned to the left (counterclockwise) it takes a stronger and stronger signal to trip the squelch circuit. For instance, in position "8" a reasonably strong signal will operate the receiver. While in position "2" it would take a powerful transmitter located just a few blocks away to operate it and any weaker station on the same frequency would not then come in.

To properly set the SQUELCH for a given condition, tune in the station it is desired to receive in the ordinary manner while it is transmitting. When it goes off the air, turn the SQUELCH control knob to the left until the background and static noises just disappear. Then check and see if, when the transmitter again comes on the air, it can be heard.

Another way would be to turn the control knob to the left when the transmitter is on the air until it just disappears; then advance the knob slightly to the right until the station just sounds normal, but no further. This latter method is satisfactory for close-by stations, but for more distant stations which are subject to fading, it is possible that at some other time of day the signal would become weaker than it was when the control was set and then might not trip the SQUELCH circuit.

To use the SQUELCH control for a between-station quieting device, it is only necessary to set the knob at the position where average static noise just disappears when not tuned to a station. Then, when the set is tuned across the dial, only the stations stronger than the static noises will come in. This use of the control does not work too satisfactorily on the short wave bands, as the short wave stations are usually subject to so much fading that it is possible to tune right by them as they are fading and consequently miss them altogether.

3.2.4 VOLUME CONTROL: The main receiver "On-Off" switch is combined with the VOLUME control. To turn the receiver "On", turn the control to the right, and to turn it "Off", turn it to the left until the switch clicks and the dial lights go out. The VOLUME control is used to adjust the volume level of the received signals. When operating the receiver with the A.V.C. "OFF", best results will be obtained by advancing the VOLUME control a little further than normal and then reducing the volume to the desired level by turning the R.F. GAIN control to the left.

3.2.5 TONE CONTROL: The TONE control serves to reduce the intensity of the higher audio-frequencies which some listeners find desirable in assisting to reduce static or to make the tone quality "bassy". In the "HIGH" position, the receiver operates normally as there is no attenuation of the high frequencies and music, and especially voices, will be most natural. For the greatest

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intelligibility of the speaking voice, this control should always be in the "HIGH" position. When in the "LOW" position, most of the treble tones are lost. Since electrical and atmospheric noises are more or less of a high pitch, there will be a marked reduction in background noise when the TONE control is in the "LOW" position, but often this advantage is lost as the excessive "drummy" or "boomy" tone of the voice is not clear and crisp. The center point provides a position half way between the high and low settings.

3.26. PITCH CONTROL AND BEAT FREQUENCY OSCILLATOR: The BEAT FREQUENCY OSCILLATOR (B.F.O.) is turned on by snapping the "B.F.O." switch to "ON". The Beat Frequency Oscillator is a miniature radio transmitter built into the receiver for producing a signal which will "beat" with the received carrier to create an audible tone or whistle. CW (code) signals are produced by virtually turning a transmitter off and on to make the dots and dashes. If it were not for the Beat Frequency Oscillator, nothing could be heard but some thumping sounds as the transmitter went off and on. By beating this oscillator with the transmitter, a tone is produced which can be read as code. The pitch of the beat note should be adjusted by the PITCH CONTROL. Ordinarily the receiver is properly tuned when, with the PITCH CONTROL in the center "0" position, the tone is so low that it is inaudible. Then the control may be turned to the right or left until a tone of the desired pitch results. The pitch selected will depend upon the listener's preference, the background noises present, etc.

When listening to code signals with the B.F.O. on, the A.V.C. switch should be "OFF" and the volume controlled by turning the R.F. GAIN control to the left. The regular volume control can be left set at a comfortable listening level.

3.27. AUTOMATIC NOISE LIMITER: The AUTOMATIC NOISE LIMITER (A.N.L.) is a device for short-circuiting noises and interference which are stronger than the signal being received. It works best on noises of short duration such as spark discharge noises and the like. It is operative when the A.N.L. switch is "ON". Since the device removes a portion of the sounds coming through the receiver, there will be a certain amount of distortion, which is of much less consequence than heavy background noise when receiving a weak signal. However, when listening to stronger stations not requiring this feature, the A.N.L. should be turned "OFF" as the speech and music will then tend to be clearer.

3.28. STANDBY-RECEIVE SWITCH: Located at the center of the designation plate is the STANDBY-RECEIVE switch. This switch must always be in the "RECEIVE" position in order for the receiver to operate. When the receiver is used in conjunction with a transmitter, it is desirable to turn the receiver off while transmitting, leaving the tubes still lit in order that it can be instantly turned on without the usual delay in waiting for the tubes to warm up. This switch is used for that purpose.

At the rear of the receiver is a BREAK-IN connection which parallels this front panel switch. In using a transmitter with break-in facilities, it is only necessary to run wires from these two BREAK-IN terminals to the proper terminals on the transmitter. Then the STANDBY-RECEIVE switch should be left in the "STANDBY" position, and every time the transmitter is turned off the receiver will automatically be turned on. Complete Two-Way Radiotelephone communication can be carried on in this fashion very easily.

3.29. PHONES: A phone jack is located on the front panel for using headphones when desired. Ordinary high impedance crystal or magnetic phones can be used.

3.210. OUTPUT TERMINALS: There are two output circuits in the KE-23AT receiver, 4 Ohms and 500 Ohms. When using the Model 23ST speaker, connections should be made to the "4Ω" terminals. For 500 Ohm output, connections should be made to the "500Ω" terminals.

4. MAINTENANCE

4.1 The parts used in the KE-23AT Receiver are of more than adequate rating and the maintenance required ordinarily will be limited to the occasional cleaning of the tubes.

4.2 If the receiver is used in extremely dirty and dusty locations, it will be advisable to blow out the dust, preferably with compressed air, every few weeks. If compressed air is not available, a soft paint brush may be used although care should be exercised in dusting around the various adjusting screws in order that their settings will not be altered.

4.3 It may be desirable every few months to oil the gear train mechanism. A drop of light machine oil on the end of a tooth pick may be applied to the various bearings.

CAUTION: Do not use too much oil. One small drop only should be applied at each point.

It also may be desirable to apply vaseline or other light grease to the gears themselves. However, in very dirty locations this may not be desirable as the grease would collect abrasive dust and cause premature wear.

4.4 Should the failure of some part occur, regular servicing technique by one familiar with this work is suggested. If parts replacement be required, standard parts of any reputable manufacturer, of the same value and voltage rating as the originals, may be used without adversely affecting the performance of the equipment.

5. ALIGNMENT PROCEDURE

5.1. GENERAL: Due to continual temperature changes, ageing of the parts and tubes, etc., it may be necessary to align the KE-23AT from time to time. Even under severe operating conditions this should seldom be necessary more than once a year. It is suggested that only someone entirely familiar with the theory of alignment of super-hetrodyne receivers be permitted to make these adjustments.

Ordinarily the alignment will need only to be "touched up", and no more than a very small fraction of a turn of any of the adjusting screws should be required. This procedure is not particularly difficult. However, if certain coils and condensers are replaced, or through tampering the receiver should get badly out of alignment; trouble may be experienced in getting it correctly aligned again unless one is very thoroughly familiar with the correct procedure, as a number of apparent settings, images and the like may prove to be confusing, particularly on the higher frequency bands "B" and "D".

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NOTE: Since individual receivers may vary slightly one from the other, the dial calibration may not be exact in all cases, and alignment should not be attempted merely for making the dial calibration exact as performance may be sacrificed. Under no conditions bend the plates of the tuning condenser C-1.

To properly align the KE-23AT Receiver, certain apparatus will be required.

A very accurately calibrated source of RF signals is necessary. This may be an ordinary Test Oscillator for aligning the I.F. Amplifier, provided that 455 KC has been accurately calibrated by recent comparison with a secondary frequency standard. For properly aligning the R.F. section on the various bands, a regular laboratory type Standard Signal Generator is recommended. The frequencies that will be required will be: 455, 550, 1,400, 1,800 and 4,400 KC; and 515, 14, 16 and 38 MC. It is also desirable, but not essential, to have a series of frequencies lying near the mid-point of each band, such as 900 and 3,000 KC and 9 and 28 MC. It is also desirable to have provision for modulating the signal with a 400 or 1,000 cycle tone.

In order to visually observe the correct alignment, an Electronic Voltmeter or a regular rectifier type AC Voltmeter is used. If neither of these is available, then the regular tuning meter, M-1, may be used, but the small scale will make accurate adjustment difficult.

If the Electronic Voltmeter is used, connect the positive (+) lead to the chassis and insert the negative (-) lead-prong in the "ALIGNMENT JACK", the red tip-jack on the rear of the chassis. If the AC Voltmeter is used, it is connected as an output meter across the "SIGNAL" terminals at the rear of the receiver. When aligning the receiver, the "A.V.C." switch should be On when using the Electronic Voltmeter or the Tuning Meter of the receiver, and Off when using the AC Voltmeter as an output meter.

It is preferable to use an insulated screw driver for adjusting the various trimmers. The receiver may be left in or removed from the cabinet when aligning the R. F. section, but it must be removed when aligning the I. F. Amplifier.

5.2 ALIGNMENT OF THE I. F. AMPLIFIER: Correct alignment of the Intermediate Frequency Amplifier is perhaps most important, as all signals being received are converted to the 455 KC I.F. frequency. If the Amplifier is incorrectly aligned, it may cause the dial calibration to be excessively off or cause mis-tracking.

To align the I. F. Amplifier, proceed as follows:

5.21 To gain access to the adjusting screws, it will be necessary to remove the receiver from the cabinet. This is done by removing the four screws in the panel and then pulling the receiver forward out of the cabinet.

5.22 Connect the loud speaker. If the Electronic Voltmeter is used, turn the A.V.C. switch On. If the AC Voltmeter is used, turn the A.V.C. switch Off. The R.F. GAIN control should be turned completely On to the right, the A.N.L. switch Off, and the STANDBY-RECEIVE switch in the "RECEIVE" position. The VOLUME control may be turned about 1 1/2 way on just so the signal can be comfortably heard in order to give an aural indication, partly for convenience and also so that one can get the "feel" of the receiver. The B.F.O. switch should be turned off.

5.23 Remove the grid cap of the 6X8 mixer tube, V-2, and connect the Test Oscillator output to the 6X8 grid and the chassis. It may be most convenient to clip the grounded side to the variable condenser frame.

5.24 Turn on the receiver and the Test Oscillator and allow several minutes for the equipment to warm up and become stable. Since it is best to align the receiver at its normal operating temperatures, in extremely cold climates it is recommended to let it run for an hour or two before proceeding with the alignment.

5.25 Apply the 455 KC signal to the 6X8 tube. If the I.F. Amplifier is considerably out of alignment, such as might be the case if a new transformer had been installed, then a fairly strong signal will have to be used in order to force it through the system. Otherwise, set the level of the Test Oscillator until some two or three volts are read on the Electronic Voltmeter, or five volts with the Volume Control turned full On on the AC Voltmeter.

5.26 Then, with a screw driver, adjust the four screws on the rear side of the I.F. transformers, T-13 and T-14, one at a time, until maximum reading on the meter is obtained. If the alignment is occasioned by the replacement of one of the transformers, then adjust the two screws on this one first and follow up with the minor adjustment of the transformer that was not replaced.

After the adjustment appears to be completed and the meter reading is at a maximum, then go back over the adjusting screws in reverse order trying for a slightly higher reading. As the meter reading increases appreciably, reduce the output of the Test Oscillator as necessary.

5.3 ALIGNMENT OF THE BEAT FREQUENCY OSCILLATOR: The Beat Frequency Oscillator oscillates at the same frequency to which the I.F. Amplifier is tuned. Its adjustment is correct if, when a station is accurately tuned in, "zero beat" occurs when the B.F.O. pitch control is at zero or mid-point. Should it be required to adjust for this condition, proceed as follows:

5.31 If the I.F. Amplifier has just been aligned, leave the setup intact. Otherwise, set up in the same manner as described above, and apply the 455 KC signal. It is preferable that the modulation be removed from the signal.

5.32 With the B.F.O. PITCH control set at the mid-point, "0", with a screw driver turn the adjusting screw of T-15 until the beat-note between the Beat Frequency Oscillator and the Test Oscillator becomes lower and lower in pitch and finally zero beats.

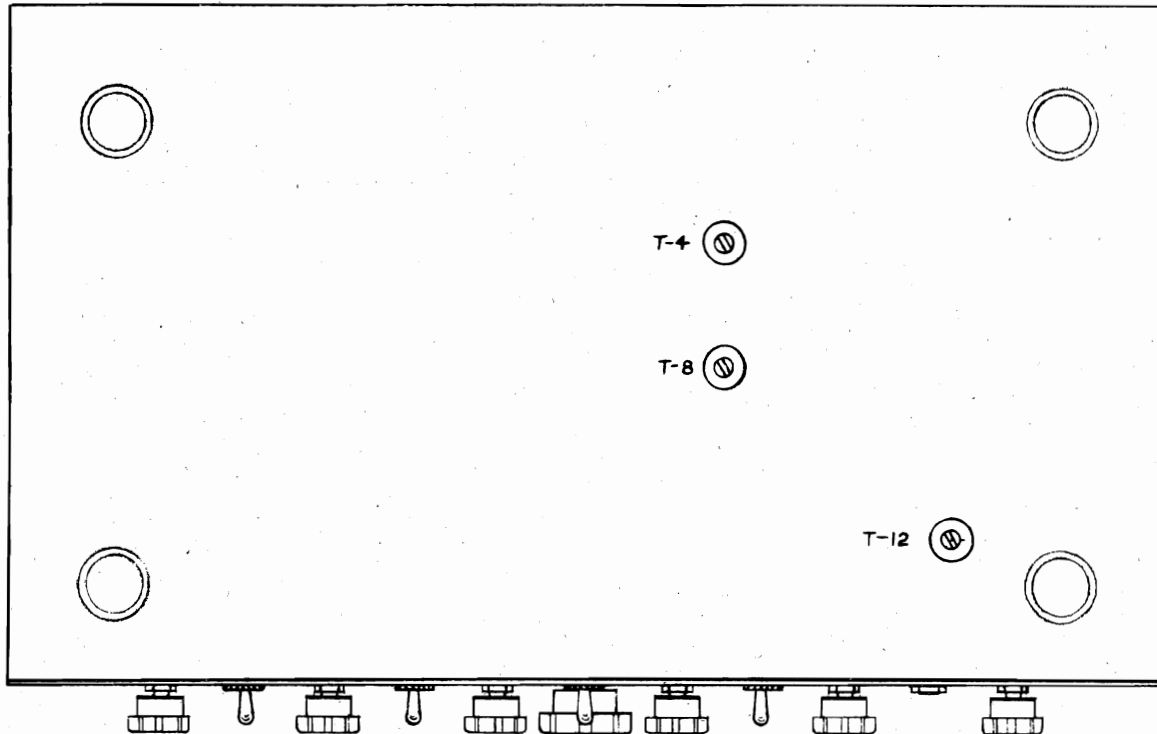
5.33 Check the adjustment by turning the B.F.O. pitch control to the right or left and see that the pitch increases as the control is turned either way.

5.34 Remove the leads and replace the grid cap on the 6X8 tube.

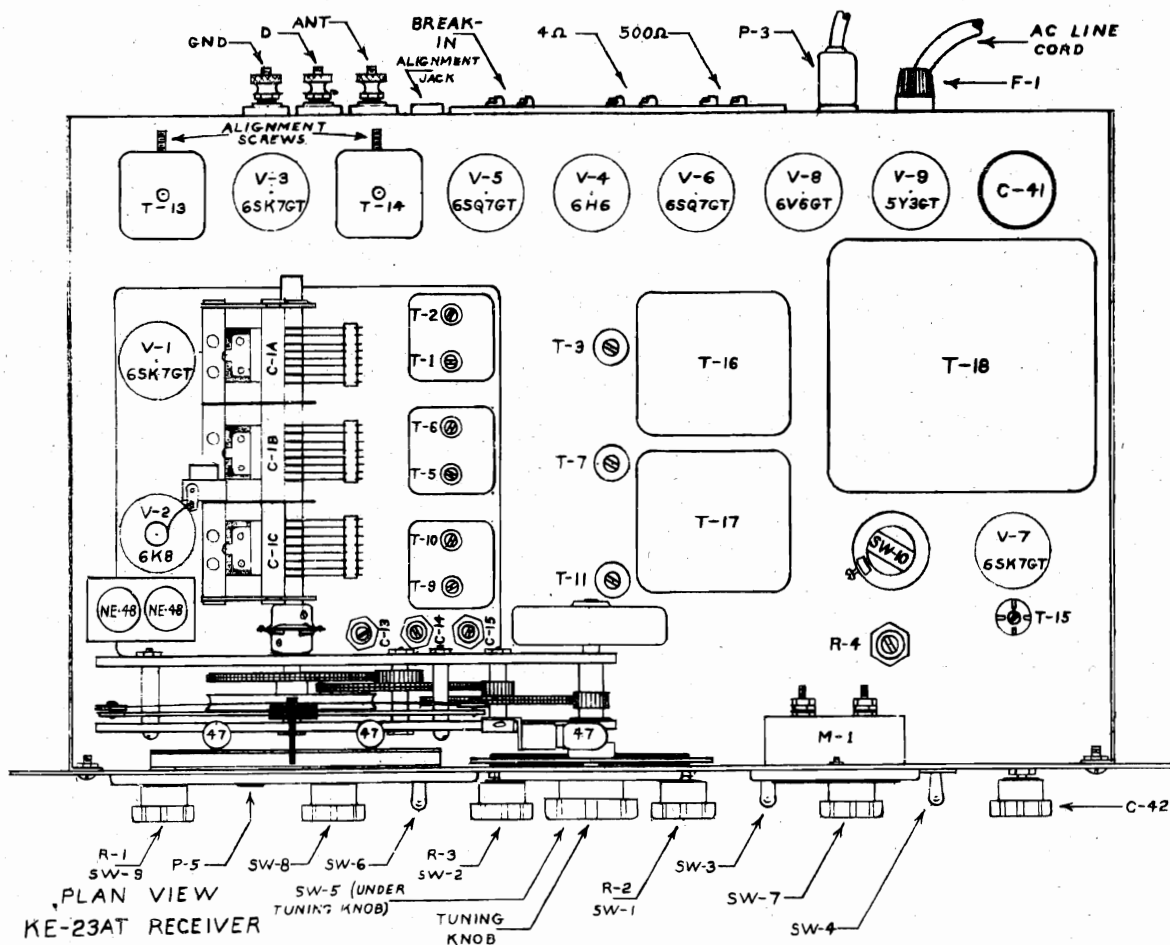
5.4 ALIGNMENT OF THE RADIO FREQUENCY SECTION: This procedure is much more difficult than that of aligning the I.F. Amplifier. It is suggested that care be exercised if only "touching up" the trimmers not to get the receiver too far out of alignment, as difficulty may be experienced in getting it realigned correctly, particularly on Bands "0" and "1". The positions of the various trimming and padding adjusting screws are shown in the Plan View and Bottom View diagrams.

5.41 Connect the Signal Generator through a standard dummy antenna to the input terminals, A and B, (be sure D and G are connected together). If a dummy antenna is not available, a 400 Ohm resistor can be connected between the hot side of the output of the Signal Generator and the antenna terminal, A.

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BOTTOM VIEW
KE-23AT RECEIVER



PLAN VIEW
KE-23AT RECEIVER

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5.42 Set the various switches and controls in the same position as outlined in Paragraph No. 5.22.

5.43 To align the A Band, 500 - 1,600 KC, proceed in the following order:

- (1) Turn the SELECTOR switch to "A".
- (2) Apply the 1,400 KC signal and tune the dial to approximately 1,400 KC. In other words, tune in the signal to be sure it is getting through. If the set is badly out of alignment, then a very strong signal may have to be used and T-9 turned to locate it.
- (3) If the dial does not read exactly 1,400, then turn it so that it does. VERY CAREFULLY "trim" by turning the trimmer T-9 until the signal is again heard. Do not attempt to too accurately tune by means of the trimmer alone. Instead slightly rotate the tuning dial for the maximum reading on the meter after T-9 has been approximately set. This movement should be so slight that the pointer will still point to 1,400.
- (4) Trim further by adjusting T-5 and T-1 for maximum reading on the output meter, reducing the output from the Signal Generator if necessary.
- (5) Apply a signal of 550 KC and tune it in on the dial.
- (6) Proceed to "pad" by adjusting the padding condenser, C-13, and the dial in connection with each other. There is somewhat of a "trick" to doing this properly and one who is inexperienced in padding a superheterodyne may find it difficult.

To properly pad, VERY CAREFULLY turn the adjusting screw of the padding condenser, C-13, to the right, clockwise, $1/8$ or $1/4$ turn. This should detune the receiver slightly. Then return with the dial and observe the reading on the output meter.

If the meter reading is higher, it shows the procedure is in the right direction. Then give C-13 another $1/8$ or $1/4$ turn and observe the reading again. Continue until the meter ceases to read higher. If one too many fractional turns is made and the meter starts to read lower, then go back $1/8$ or $1/4$ turn as necessary.

If, instead of the output meter reading higher when C-13 is turned $1/8$ or $1/4$ of a turn it reads lower, then, instead, turn it $1/8$ or $1/4$ turn to the left, counter-clockwise, and proceed as above until the maximum meter reading is reached.

- (7) The receiver is now correctly padded on Band A and if the intention was to "touch up" the adjustments only, no further alignment on Band A will be necessary.

However, if the receiver was considerably out of line, then it may be that the dial will not read 550 when a 550 KC signal is applied.

If such is the case the pointer may be bent slightly until it reads correctly. This may make the pointer read incorrectly at 1,400 KC, and if so, it will be necessary to trim over again as outlined in (3) and (4) above.

- (8) If Band A has required more adjustment than merely a "touch up" of the trimmers, then, regardless of whether the dial reads 550 at 550 KC or not, the padding procedure may have been enough to throw the trimmers out of alignment. This can be checked by returning to 1,400 KC, and see if the dial still reads 1,400. If it does not, repeat (3). Even if it does, check the adjustments T-5 and T-1 again. If T-9 requires further adjustment then repeat the entire trimming procedure, then repad again, retrim again and repad as necessary until the result of further adjustment in both cases is indiscernable.

- (9) In cases of extreme misalignment it is possible to inadvertently turn T-9 an excessive amount to such a position that would cause the oscillator to oscillate at a frequency 455 KC lower than the signal frequency, 1,400 KC, instead of higher. If this happens, the apparent performance of the receiver at and around 1,400 KC will seem to be the same as with the oscillator adjusted correctly, and the receiver will pad just as it should. However, if this mistake is made, the set will not perform satisfactorily in the middle of the band, appearing insensitive or dead, and it may even whistle when tuning in stations.

A quick check for this is to attach a fairly long outside antenna to the antenna terminal, A, instead of the Signal Generator, and tune the dial from 1,400 to 550 KC. The noise in the center of the band around 900 KC should be somewhat higher than at 550 KC and possibly a little lower than at 1,400 KC, but the set should sound definitely alive in the center of the band. This can also be checked with the Signal Generator, and the output should read as good as or better at 900 KC as at 550.

Should it be found that the set is dead in the middle of a band, then apply 1,400 KC to the input as before and tune in the signal, then turn the trimmer of T-9 approximately $1/4$ to $3/4$ turn in either direction until the signal is tuned in again with a new adjustment. Then trim and pad several times as described above and again check the performance at the center of the band.

5.44 To align the B Band, 1,600 - 5,000 KC.

- (1) Turn the SELECTOR switch to position "B". The Signal Generator and output meter are left connected as before.
- (2) Proceed in the same manner as outlined in Paragraph 5.43 (3) to (9) above, but trimming at 4,400 KC and padding at 1,800.

On this higher frequency range it will be found that the trimming of T-10 is somewhat more critical than T-9 was on Band A, but the padding with C-14 is less-critical.

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(4) After T-12, T-8 and T-4 are adjusted, then check to see if the oscillator frequency is lower than the signal frequency. To do this, find the image by tuning the dial to approximately 39 MC where the signal should again be heard a little weaker than before. If the signal is heard on 39 MC, the adjustment of T-12 is correct. However, if it should be heard on 37 MC and not on 39, the adjustment is incorrect and T-12 should be completely reset.

(5) It must be pointed out that in trimming the D Band it is possible to get false settings. At a false setting all of the adjustments seem to proceed normally except that the receiver lacks sensitivity generally and the performance is very poor. If this condition is suspected, the 38 MC signal should again be applied only possibly stronger, and T-12 and T-8 and T-4 arbitrarily readjusted until the 38 MC signal can be located with an entirely different set of adjustments. Then proceed to carry through the trimming procedure from the beginning.

(6) There is no padding adjustment for the D Band. Instead, the turns on the oscillator coil are moved back and forth to change the inductance, which accomplishes the same result.

It is suggested that no attempt be made to pad the D Band under a touch-up procedure. Only if one of the D Band coils has been replaced should this adjustment be attempted. The results of padding will vary from set to set but, in general, if one of the coils has been replaced it is suggested that an attempt be made to move the turns on it only, leaving the other two alone.

(7) The general padding procedure is much the same as that used with a padding condenser. A 16 MC signal is applied, the output meter reading observed as before, and one of the turns of heavy wire on T-12 moved backwards or forwards by pushing with a screw driver. Follow the signal by retuning the dial and observing if the output has gone up or gone down, repeating or reversing the procedure as necessary. After the correct point has been found, it will be necessary to retrim, much more so in this case than when aligning Bands A, B or C. Then, repad and retrim, repad and retrim as many times as necessary until the performance seems satisfactory. It is not uncommon to have to repeat as many as ten times before satisfactory performance is achieved.

(8) When the best padding seems to have been obtained, then heavy wire of the secondary of T-4 may be moved back and forth to try and better the results. It will seldom be necessary to adjust T-8.

The final check may be made at 25 MC in the center of the band. Ordinarily the sensitivity of the set at 25 MC will be greater than at 38 or 16 MC.

(9) Apply a little Duco Cement, or equivalent, to the turns of wire that have been moved in order to secure them in place.

5.47 Remove the meter and Signal Generator and replace the set in the cabinet.

(3) It will be noted that by properly trimming T-10, the dial can be made to read correctly at 4,400 KC, and T-6 and T-2 can be easily adjusted. However, the dial reading at 1,800 KC is dependent upon the coils which are not adjustable, and it is possible that when the receiver is correctly padded on Band B that the dial will not read exactly 1,800. If such should be the case the pointer may be bent slightly to "split the difference" so to speak, between the 550 KC reading of Band A and the 1,800 KC reading of Band B. Sometimes one may wish to "split the difference" between the correct padding position and the correct dial reading, in which case the receiver may be purposely mis-padded slightly in order that the dial may read more correctly. If this is done, some performance will naturally be sacrificed.

5.45 To align the C Band, 5 - 14 MC.

(1) Turn the SELECTOR switch to "C" and proceed as before, using 14 Megacycles for trimming and 5.5 Megacycles for padding.

(2) On this higher frequency band it is extremely easy to incorrectly adjust the trimming condenser of T-11 in such a manner that the oscillator is lower in frequency than the signal, as the two settings of the trimmers fall so close together, and sometimes in merely "touching up" the adjustments, the wrong oscillator frequency may result. Therefore, it is most important when aligning the C Band to check the performance in the center of the band, around 8 - 9 MC.

NOTE: Because of an inherent characteristic of the receiver the sensitivity between 9.5 and 10 MC is somewhat less than over the rest of the range. This slightly "dead" spot is rather sharply defined and should not be confused with a general lack of sensitivity over the middle portion of the band which would be due to the trimmers being incorrectly set.

It will be found that the padding adjustment of O-15 will not be critical.

5.46 To align the D Band, 16 - 42 MC.

(1) Turn the SELECTOR switch to "D".

(2) It is to be noted that on the D Band only, the oscillator frequency is 455 KC lower than the signal frequency, and the method of determining the correct setting is different from that used on the other bands.

(3) Apply a 38 MC signal to the receiver, adjust the trimming condenser of T-12 and obtain the correct dial reading as before. Adjust T-8 and T-4 for maximum reading on the meter. It will be noted in this case that all the adjustments are very, very critical. In adjusting T-12 it may be necessary to turn the trimmer a very small amount to an estimated setting, and then find the signal by tuning the dial, this adjustment is so critical.

KAAR ENGINEERING CO.

PARTS LIST

KAAR TYPE KE-23AR COMMUNICATIONS RECEIVER

Circuit Symbol	Function	Description	Type	Mfr.	Circuit Symbol	Function	Description	Type	Mfr.
C-1	Trimming condensers, 12 units mounted across secondaries of T-1 to T-12.	7-45 mmf. variable ceramic.	CMS-2	TEL	C-14	B Band oscillator padding condenser.	850 - 1500 mmf., mica compression.	HC-71	SI
C-1A	Antenna coil secondary tuning.	Rear section, 3 gang variable air condenser. 442 mmf. (Effective capacity.)	23	EC	C-15	C Band oscillator padding condenser.	Same as C-14.		
4-1B	R.F. coil secondary tuning.	Center section, 3 gang variable air condenser. 442 mmf. (Effective capacity.)			C-16	C Band oscillator padding condenser. Fixed portion.	.001 mfd. mica, 500 V. DC.	1-W5D1	CD
C-10	Oscillator grid coil tuning.	Front section, 3 gang variable air condenser. 442 mmf. (Effective capacity.)			4-17	V-2 oscillator plate coupling.	.002 mfd. mica, 500 V. DC.	1-W5D2	CD
C-2	High frequency coupling for T-7.	5 mmf. ceramic, 400 V. DC, or Two 10 mmf. mica in series.	N-750E-5 5B5Q1	E CD	4-18	V-1 cathode by-pass.	.1 mfd. 200 V. DC., moulded paper.	MPW-5157	SOL
C-3	Compensating capacitance for secondary of T-4.	25 mmf. ceramic, 400V. DC.	N-750E-25	E	4-19	V-2 cathode by-pass.	Same as C-18.		
C-4	Compensating capacitance for secondary of T-6.	Same as C-3.			4-20	V-3 cathode by-pass.	Same as C-18.		
C-5	High frequency coupling for T-8.	50 mmf. ceramic, 400 V. DC.	N-750E-50	E	C-21	Coupling volume control to V-6 grid.	.01 mfd., 400 V. DC., moulded paper.	340-21	MO
C-6	Tuning condenser for compensating coil of T-4.	Same as C-5.			C-22	V-1 grid return by-pass.	.02 mfd., 400 V. DC., moulded paper.	342-12	MO
C-7	V-2 oscillator grid.	100 mmf. ceramic, 400 V. DC.	N-750L-100	E	C-23	V-2 mixer grid return by-pass.	Same as C-22.		
C-8	V-5 diode, R.F. filter.	Same as C-7.			C-24	V-3 grid return by-pass.	Same as C-22.		
C-9	Tuning condenser for T-15.	Same as C-7.			C-25	V-2 screen by-pass.	.02 mfd., 400 V. DC., moulded paper.	MPW-5143	SOL
C-10	V-7 grid.	Same as C-7.			C-26	V-7 plate by-pass.	Same as C-25.		
C-11	V-5 diode, R.F. by-pass.	250 mmf. ceramic, 400 V. DC.	N-750M-250	E	C-27	Power line filter	Same as C-25.		
C-12	Low frequency tickler tuning of T-12.	150 mmf. mica, 500 V. DC.	FN	MO	C-28	Power line filter.	Same as C-25.		
C-13	A Band oscillator padding condenser.	250 - 525 mmf., mica compression.	HC-41	SI	C-29	V-1 and V-3 screen by-pass.	.1 mfd., 400 V. DC., moulded paper.	MPW-5147A	SOL
					C-30	V-1 and V-3 plate return by-pass.	Same as C-29.		
					C-31	V-2 plate return by-pass.	Same as C-29.		
					C-32	V-6 grid return by-pass.	Same as C-29.		
					C-33	V-8 plate filter.	.005 mfd., 600 V. DC., moulded paper.	340-25	MO
					C-34	Coupling V-6 plate to V-8 grid.	.01 mfd., 600 V. DC., moulded paper.	342-17	MO

KAAR ENGINEERING CO.

Circuit Symbol	Function	Description	Type	Mfr. Symbol	Circuit Symbol	Function	Description	Type	Mfr.
C-35	Coupling V-8 plate to phones.	Same as C-34.			R-8	V-6 plate.	Same as R-5.		
C-36	V-4 plate by-pass.	.05 mfd., 600 V. DC., moulded paper.	345-22	MC	R-9	V-8 grid leak.	Same as R-5.		
C-37	Tone control.	.05 mfd., 600 V. DC., moulded paper.	MPW-5639	SOL	R-10	Stabilizing resistance for T-12 oscillator coil.	5 Ohm, 1/2 W., insulated carbon.	504	E
C-38	V-8 cathode by-pass.	10 mfd., 25 V. DC., tubular electrolytic.	BR-102A	CD	R-11	Suppressor for Control Grid, V-2.	30 Ohm, 1/2 W., insulated carbon.	504	E
C-39	V-6 cathode by-pass.	10 mfd., 50 V. DC., tubular electrolytic.	BR-105	CD	R-12	V-1 and V-3 cathode.	150 Ohm, 1/2 W., insulated carbon.	504	E
C-40	Filter for V-2 plate and screen supply voltage.	12 mfd., 450 V. DC., tubular electrolytic.	BR-1245	CD	R-13	V-2 cathode.	300 Ohm, 1/2 W., insulated carbon.	504	E
C-41	Plate supply filter condensers. One section at input of filter, other section at output.	20-20 mfd., 450 V. DC., dual section aluminum can type electrolytic.	UP-6B-738	CD	R-14	Voltage divider.	600 Ohm, 1/2 W., insulated carbon.	504	E
C-42	B.F.O. pitch control. Across T-15.	13 mmf. variable air trimmer.	KE-1390	ASP	R-15	Meter compensating.	27,000 Ohm, 1/2 W., insulated carbon.	GM-1	ST
C-43	Phase correction capacitance for C Band.	Two loops of wire around grid bus of T-7.			R-16	Voltage divider.	10,000 Ohm, 1/2 W., insulated carbon.	504	E
C-44	B.F.O. coupling, V-7 to V-5.	1 1/2 loops of wire around diode plate lead of T-14.			R-17	R.F. filter from diode detector, V-5.	25,000 Ohm, 1/2 W., insulated carbon.	504	E
R-1	R.F. Gain Control.	1,000 Ohm wire wound variable resistor. Combined with meter switch SW-9.	X-2015	OTT	R-18	V-7 grid leak.	Same as R-17.		
R-2	Volume Control.	250,000 Ohm potentiometer. Combined with power switch SW-1.	WC-8586	ST	R-19	V-2 oscillator grid leak.	50,000 Ohm, 1/2 W., insulated carbon.	504	E
R-3	Squelch Control.	1 Megohm potentiometer. Combined with SW-2.	WC-8585	ST	R-20	Audio dropping for A.N.I. tube, V-4.	100,000 Ohm, 1/2 W., insulated carbon.	504	E
R-4	Meter Zero-Set Control.	1500 Ohm potentiometer.	WC-8975	ST	R-21	Audio dropping for A.N.I. tube, V-4.	250,000 Ohm, 1/2 W., insulated carbon.	504	E
R-5	A.V.C. filter, V-1 grid return.	500,000 Ohm, 1/4 W., insulated carbon.	GM-1/2	ST	R-22	V-4 plate filter.	1 Megohm, 1/2 W., insulated carbon.	504	E
R-6	V-2 grid return isolation.	Same as R-5.			R-23	V-6 grid leak.	Same as R-22.		
R-7	Squelch dropping.	Same as R-5.			R-24	A.V.C. filter.	2 Megohm, 1/2 W., insulated carbon.	504	E
					R-25	Protective load across 4 Ohm winding of T-16.	10 Ohm, 1 W., insulated carbon.	518	E

KAAR ENGINEERING CO.

Circuit Symbol	Function	Description	Type	Mfr.	Circuit Symbol	Function	Description	Type	Mfr.
R-26	V-8 cathode.	300 Ohm, 1 W., insulated carbon.	518	E	T-1	A Band. Antenna to V-1 grid.	Antenna coil in common shield with T-2.	AB-23AT	ML
R-27	Meter dropping, in plate supply for V-1 and V-3.	500 Ohm, 1 W., insulated carbon.	518	E	T-2	B Band. Antenna to V-1 grid.	Antenna coil in shield.	C-23AT	ML
R-28	V-2 plate and screen dropping.	5,000 Ohm, 1 W., insulated carbon.	518	E	T-3	C Band. Antenna to V-1 grid.	Unshielded antenna coil.	D-23AT	YE
R-29	Tone Control dropping.	Same as R-28.			T-4	D Band. Antenna to V-1 grid.	R.F. coil in common shield with T-5.	AB-23RFT	ML
R-30	V-2 screen dropping.	20,000 Ohm, 1 W., insulated carbon.	518	E	T-5	V-1 plate to V-2 grid, A Band.			
R-31	Voltage regulator dropping in plate circuit of V-2.	10,000 Ohm, 1 W., insulated carbon.	CM-1	ST	T-6	V-1 plate to V-2 grid, B Band.			
R-31A	V-2 plate.	Same as R-31.			T-7	V-1 plate to V-2 grid, C Band.	R.F. coil mounted in shield.	C-23RFT	ML
R-32	V-7 plate.	25,000 Ohm, 1 W., insulated carbon.	518	E	T-8	V-1 plate to V-2 grid, D Band.	Unshielded R.F. Coil.	D-23RFT	YE
R-33	Voltage divider.	40,000 Ohm, 1 W., insulated carbon.	518	E	T-9	Oscillator coil, A Band.	Oscillator coil in common shield with T-10.	AB-23SCT	ML
R-34	Voltage divider.	20,000 Ohm, 10 W., wire wound.	10F	ML	T-10	Oscillator coil, B Band.			
R-35	High voltage supply dropping from external power supply.	3,500 Ohm, 25 W., wire wound.	25F	ML	T-11	Oscillator coil, C Band.	Oscillator coil mounted in shield.	C-23SCT	ML
SW-1	Power Switch.	SPST on R-2.			T-12	Oscillator coil, D Band.	Unshielded oscillator coil.	D-23SCT	YE
SW-2	Squelch ON-OFF Switch.	SPST on R-3.			T-13	V-2 plate to V-3 grid.	455 KC. permeability tuned I.F. transformer.	912CT	ML
SW-3	A.V.C. ON-OFF Switch.	SPST toggle.	20994	EH	T-14	V-3 plate to V-5 diode plates.	Same as T-13.		
SW-4	R.F.O. Switch.	Same as SW-3.			T-15	Beat frequency oscillator coil.	455 KC permeability tuned oscillator coil.	E-23-RFOT	ML
SW-5	Stand-By Switch.	Same as SW-3.			T-16	V-8 plate to 4 Ohm and 500 Ohm output terminals.	Output transformer, 8,000 Ohm plate to 500 Ohm line and 4 Ohm speaker voice coil.	4259Q	P
SW-6	A.M.L. Switch.	DPDT toggle.	20905BJ	EH	T-17	Smoothing choke.	15 Henry, iron core choke.	K-3C3Q	F
SW-7	Tone Control Switch.	Single Pole, 3 Position.	1461	CE	T-18	Power transformer.	Primary 100, 120, 150, 210 and 230 Volts, to 5 V. at 2 A., 6.3 V. at 3.5 A., and 520 V. CT at 75 Ma.	5351Q	P
SW-8A to SW-8F	Band Selector Switch.	6 Pole, 4 Position, 3 gang, Isolantite.	K-23SWT	CE					
SW-9	Meter Switch.	SPST on R-1.							
SW-10	Line Voltage Selector.	Single Pole, 5 Position.	36	AMF					

KAAR ENGINEERING CO.

Circuit Symbol	Function	Description	Type	Mfg.
V-1	R.F. Amplifier.	Vacuum tube.	6SK7GT	TS
V-2	Oscillator and First Detector-Mixer.	Vacuum tube.	6X8	RCA
V-3	I.F. Amplifier.	Vacuum tube.	6SK7GT	TS
V-4	Automatic Noise Limiter.	Vacuum tube.	6H6	RCA
V-5	Diode Second Detector and Squelch Control.	Vacuum tube.	6SQ7GT	HY
V-6	First Audio Amplifier.	Vacuum tube.	6SQ7GT	HY
V-7	Beat Frequency Oscillator.	Vacuum tube.	6SK7GT	TS
V-8	Audio Output Amplifier.	Vacuum tube.	6V6GT	RCA
V-9	Rectifier.	Vacuum tube.	5Y3GT	TS
#2E-48	Voltage regulator for V-2.	Two neon lamps in series.	NE-48	GE
3 #47	Illumination of dials.	Three bayonet base miniature pilot lamps.	47	GE
M-1	Signal strength meter.	0 - 1 Ma 3-1/2 inch milliammeter.	DM-51	GE
F-1	Fuse.	2 amp. small glass.	3AG	ES
P-1	External connection to A.V.C. for receiver alignment.	Single contact tip jack.	889R	ICA
P-2	AC supply for heaters.	5 prong miniature socket.	SSS	AMP
P-3	Plate and heater input for DC operation.	5 prong miniature cable plug.	MPMS	AMP
P-4	Input from AC line.	Rubber AC, spring action line plug.	102	ALL
P-5	Output connection for phones.	Open circuit phone jack.	Li-101	U

OTHER PARTS AND ACCESSORIES

Description of Part	Type	Mfg.
Ceramic octal tube sockets for V-1 to V-9.	25-8437	UC
Miniature bayonet pilot lamp sockets.	3171	CI
2 contact neon lamp sockets.	1012	GO
Fuse extractor post for 3AG fuse.	(Sockets ONLY)	ES
Ceramic thru panel insulators for antenna and ground connections, A, D, and G.	HOM	EEJ

Terminal strip for 500 Ohm and 4 Ohm output connections and break-in, 6 terminals.

Small pointer knobs.

Large tuning knob.

Round Vernier dial assembly.

Main tuning dial scale.

Gear-train tuning mechanism.

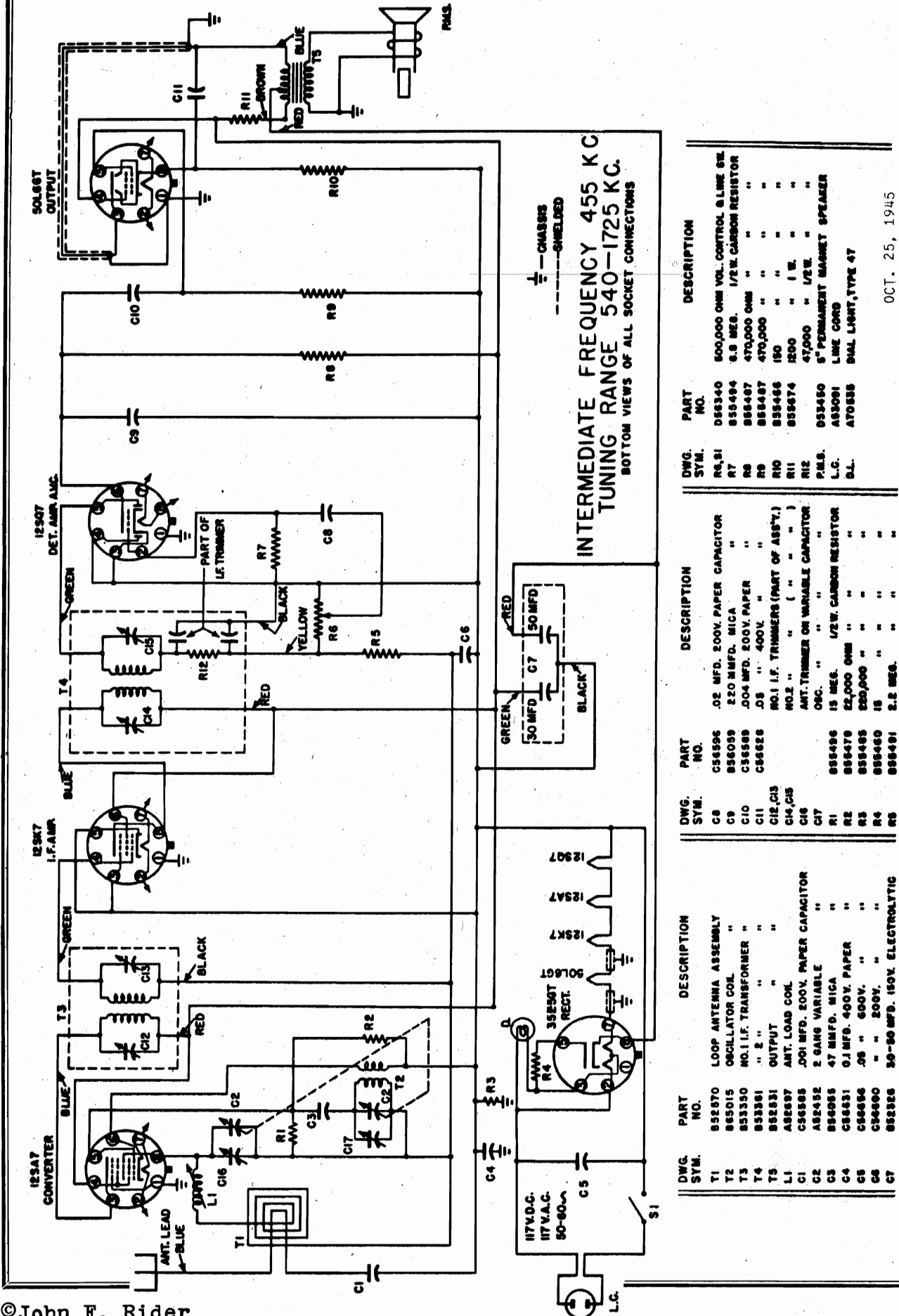
The KAAR ENGINEERING COMPANY reserves the right to make parts substitutions as necessary, changes or improvements on its products from time to time without incurring obligation to install the same on equipment previously sold.

LIST OF PARTS MANUFACTURERS AND ADDRESSES

Mfg. Symbol	Manufacturer	Address
ALL	Allied Electric Products, Inc.	82 Coit St., Irvington, N. J.
AMP	American Phenolic Corp.	1832 So. 54th Ave., Chicago, Ill.
ASP	American Steel Package Co.	Defiance, Ohio
BS	Bussman Mfg. Co.	University at Jefferson, St. Louis, Mo.
CE	Centralab	900 E. Keefe Ave., Milwaukee, Wis.
CI	Chicago Telephone Supply Co.	Elkhart, Indiana
CD	Cinch Mfg. Corp.	2335 W. Van Buren St., Chicago, Ill.
CR	Cornell-Dubilier Electric Corp.	So. Plainfield, New Jersey
E	Crowe Name Plate and Mfg. Co.	3701 Ravenswood Ave., Chicago, Ill.
GE	Erie Resistor Corp.	644 W. 13th St., Erie, Pennsylvania
GO	General Electric Company	Bridgeport, Connecticut
GO	Gothard Mfg. Co.	Springfield, Illinois
HH	Hart & Hegeman Division (The Arrow-Hart & Hegeman Co.)	Hartford, Connecticut
EEJ	E. F. Johnson Co.	Waseca, Minnesota
HI	Hytron Corporation	76 Lafayette St., Salem, Mass.
ICA	Insuline Corp. of America	35-02 36th Ave., Long Island City, N. Y.
J	Howard B. Jones	2300 Wabensia Ave., Chicago, Ill.
KE	Kear Engineering Company	619 Emerson St., Falo Alto, Calif.
KR	Kear-Red Tube & Lamp Corp.	Owensboro, Kentucky
KK	Kurtz Kasch, Inc.	1415 So. Broadway, Dayton, Ohio
MC	Micamold Radio Corp.	1097 Flushing, Brooklyn, New York
ML	J. W. Miller Co.	5917 So. Main St., Los Angeles, Calif.
RC	Pearless Electrical Products Co.	6320 McKinley St., Los Angeles, Calif.
RG	Radio Condenser Co.	Camden New Jersey.
RCA	R.C.A. Mfg. Co., Inc.	Camden, New Jersey.
SI	F. W. Sickles Co.	Springfield, Mass.
SOL	Solar Mfg. Corp.	Bayonne, New Jersey
ST	Stackpole Carbon Company	St. Marys, Pennsylvania
TEL	Teleradio Engineering Co.	Wilkes-Barre, Pennsylvania
TS	Tung-Sol Lamp Works	95 8th Avenue, Newark, New Jersey
UC	United Carr Fastener Co.	31 Ames St., Cambridge, Mass.
U	Utah Radio Products Co.	812 Orleans St., Chicago, Ill.
WL	Ward Leonard Co.	Mt. Vernon, New York

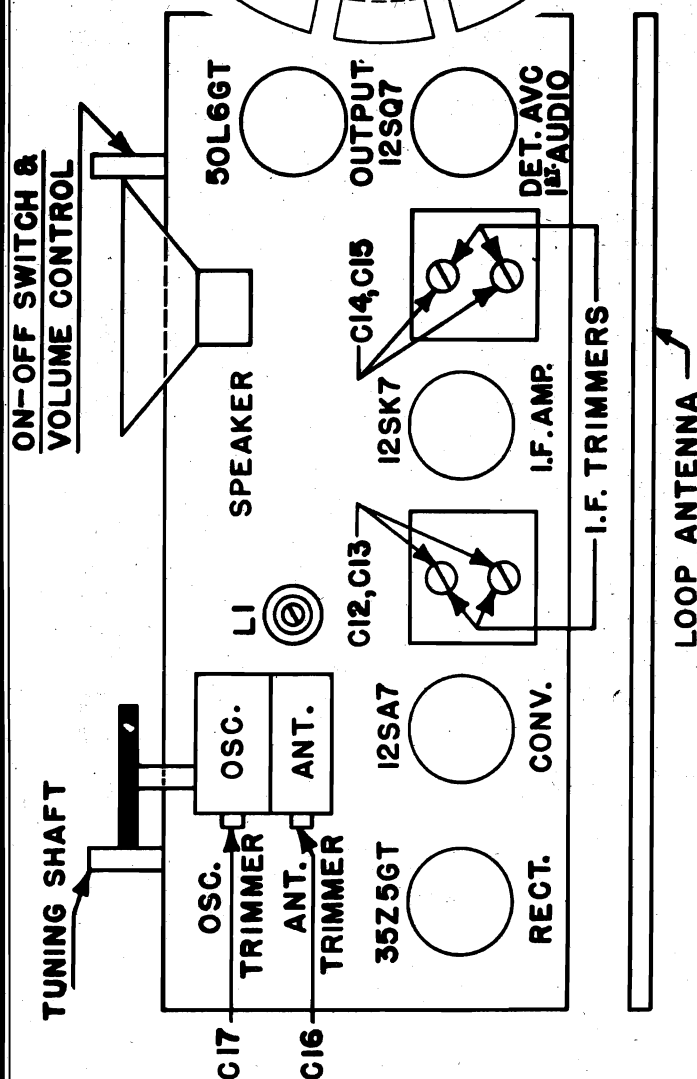
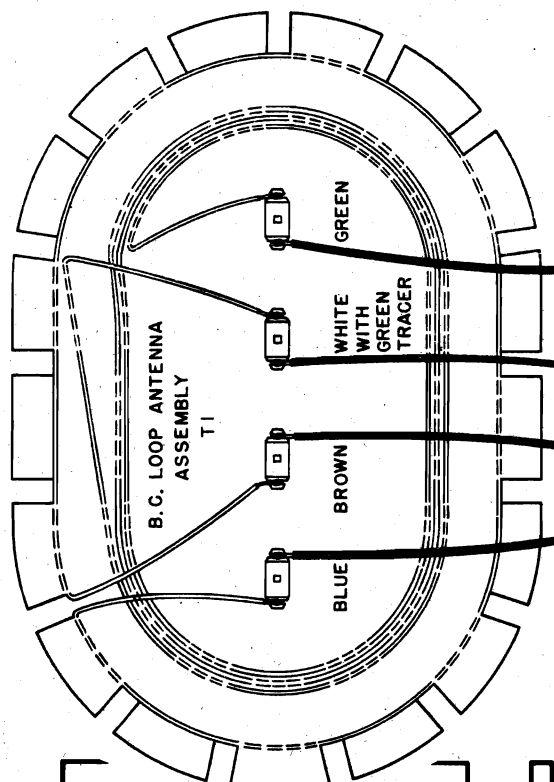
LEAR INC.

MODELS 561, 562, 563



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LOOP WIRING DIAGRAM

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TUBE	FUNCTION	Voltage of each socket prong to B- (Prong No. 3 of 12SK7)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	
12SA7	Oscillator - Converter	0	-	90	90	0	0	-	0	
12SK7	I-F Amplifier	0	-	0	0	0	90	-	90	
12SQ7	Detector - AVC - 1st. Audio	0	0	0	0	0	28	-	-	
50L6	Beam Power Amplifier	0	-	115	90	0	0	-	6	
35Z5	Rectifier	-	-	-	-	110 AC	-	-	117	

Notes: Voltage readings are for schematic diagram in this bulletin. Allow 10% \pm on all measurements.

Always use meter scale which will give greatest deflection within scale limits

All DC measurements made with 1000 ohms per volt voltmeter. Position of volume control: On full (with no signal). Voltages are DC unless otherwise specified.

Line voltage: 117 volts, 60 cycles (AC)
 Voltages are DC unless otherwise specified.
 All voltages measured from prong No. 3 of 12SK7 tube socket, or B-.

OCT. 12, 1945



BAND SWITCH IN B. C. POSITION
INTERMEDIATE FREQUENCY 455 KC.
B.C. BAND 535-1730 KC.
1st S.W. BAND 1.68-5.65 MC.
2nd S.W. BAND 5.45-18.3 MC.
-----SHIELDED
T-----CHASSIS

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS

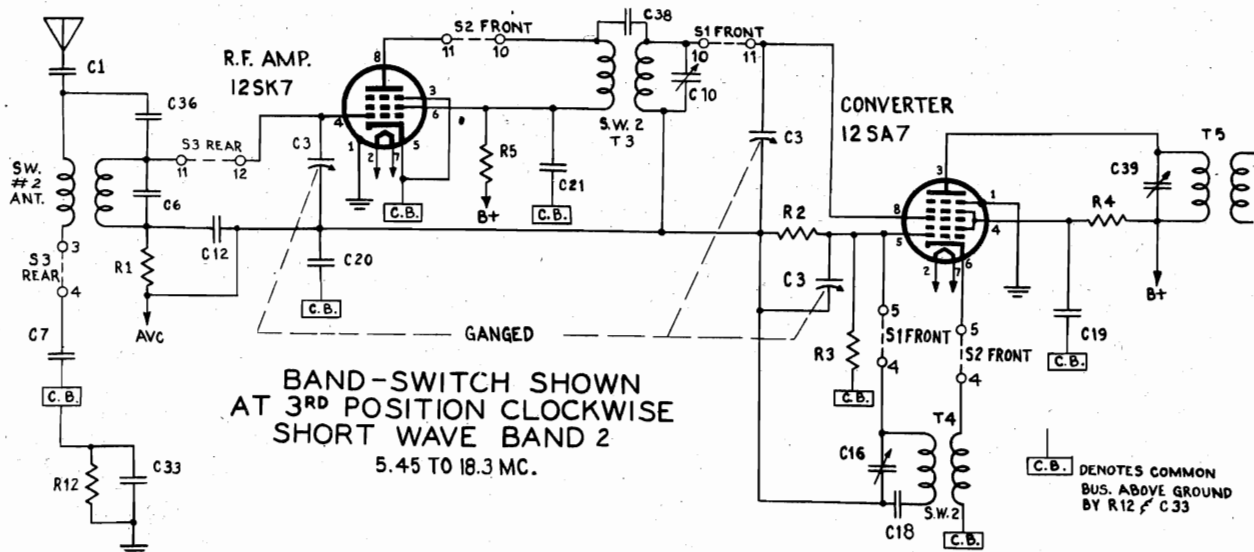
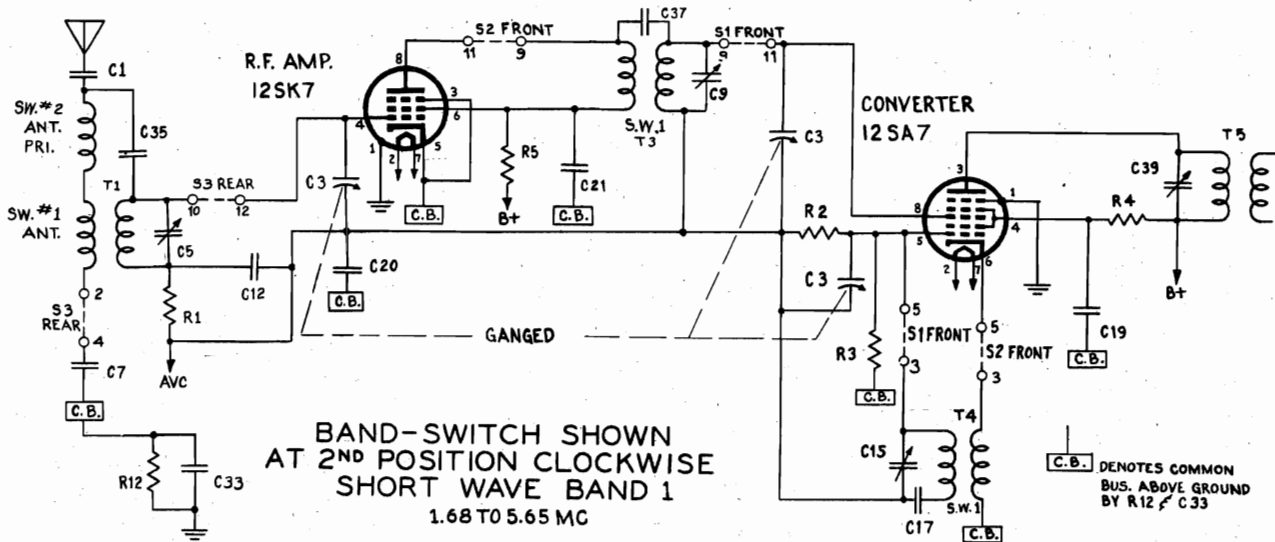
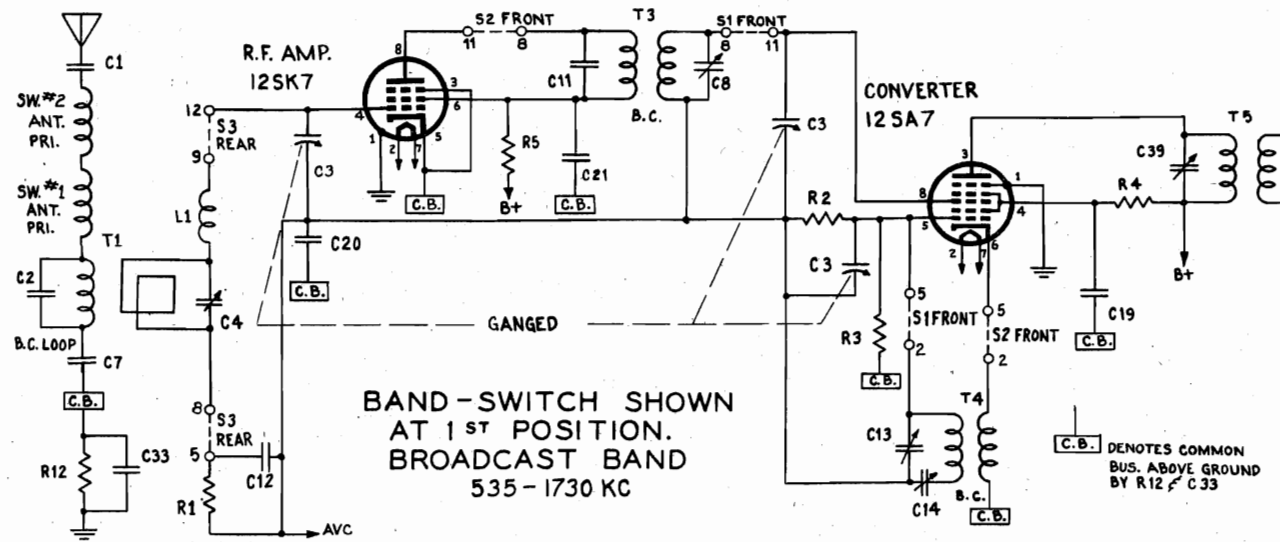
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"clarified schematics"

PAGE 15-4 LEAR

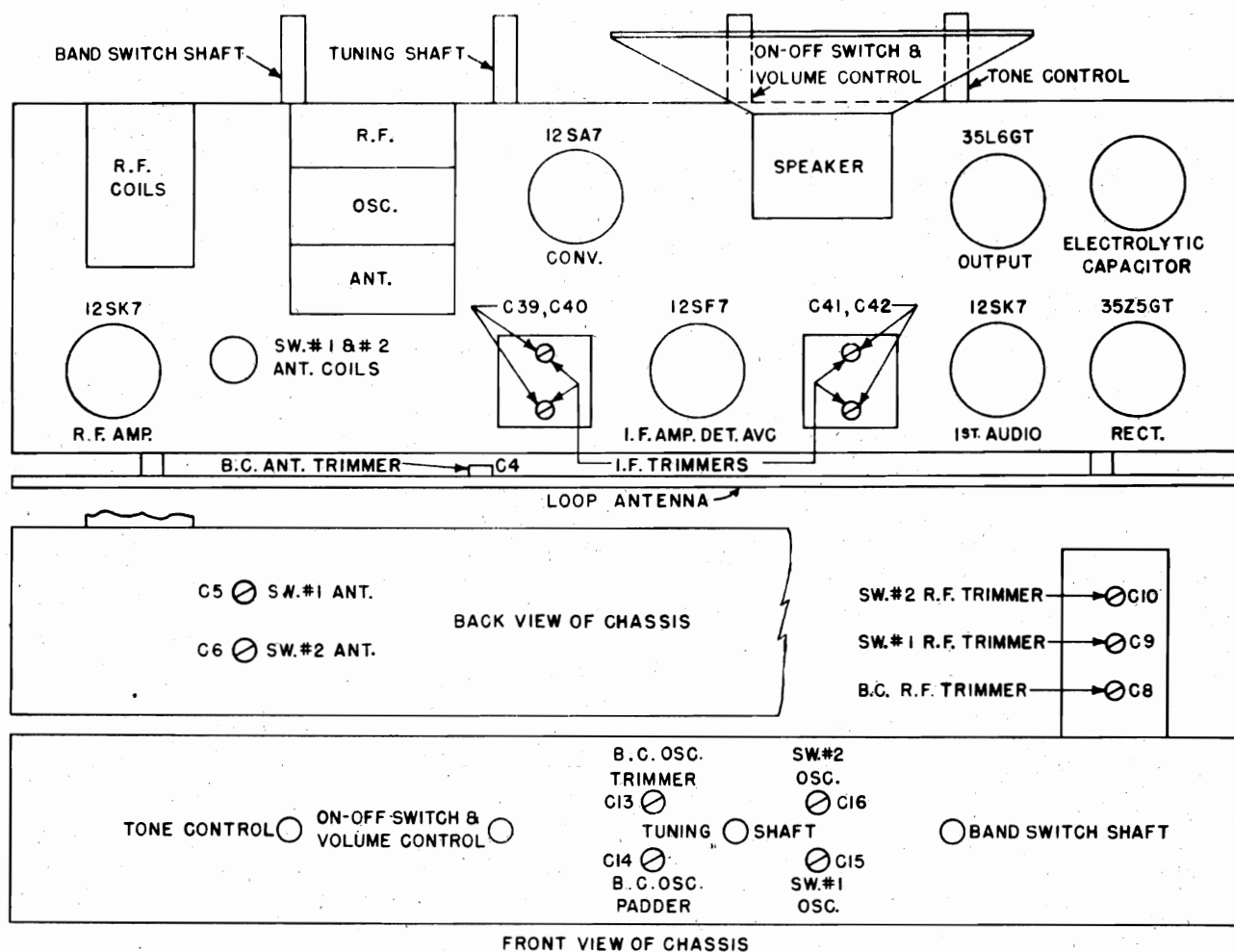
MODEL 651

LEAR INC.



LEAR INC.

MODEL 661



ALIGNMENT CHART

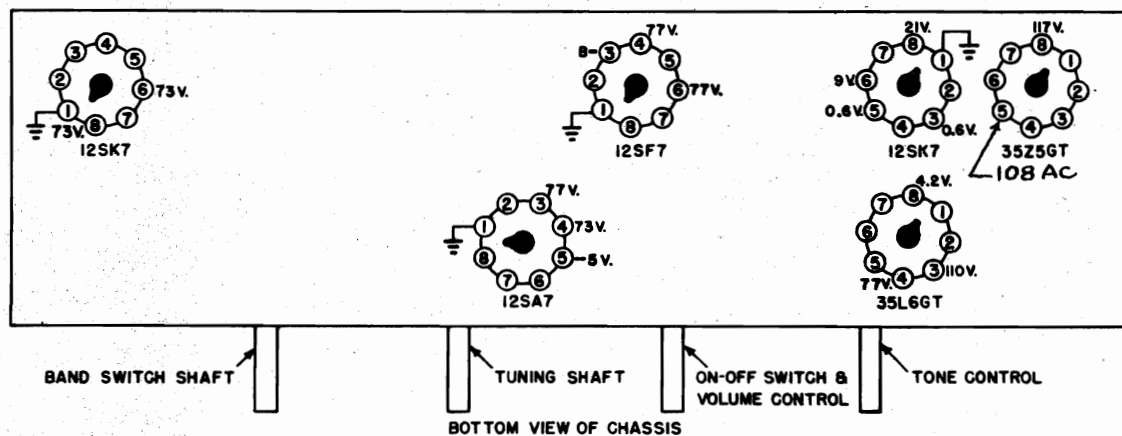
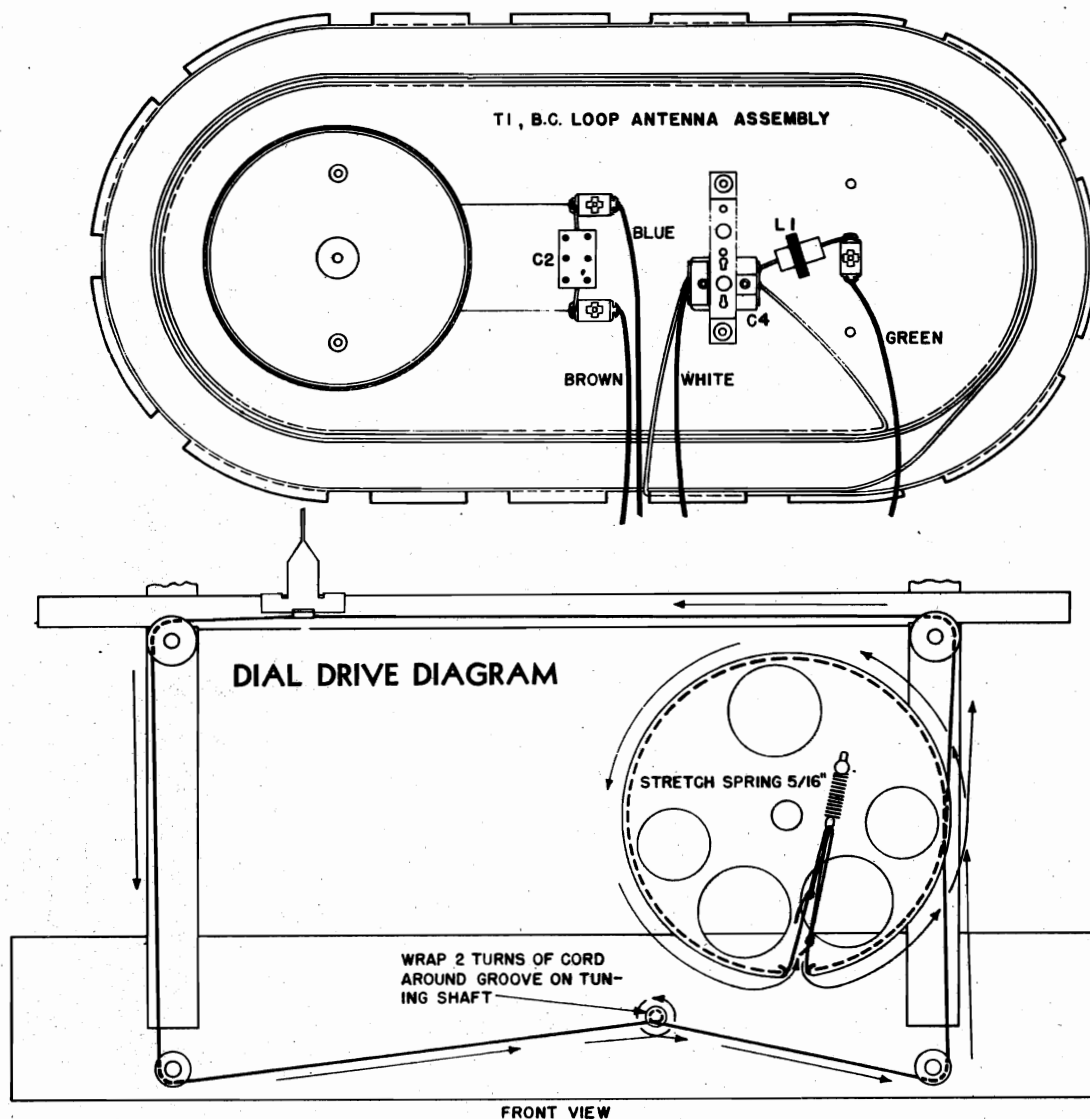
OPER-ALIGNMENT ATION OF		GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	DIAL AND CONDENSER SETTING	TRIMMER	REMARKS
1. Set dial pointer to last mark at low frequency end of dial with gang condenser closed.								
2.	2nd. IF	12SA7	.05 mf	455 KC	BC	open	C41 & C42	Max. Output
3.	1st. IF	Grid & B-					C39 & C40	Max. Output
4.	BC	Ant. lead	200 mmf.	1500 KC	BC	1500 KC	C13,C8,C4	Max. Output
5.		and B-		600 KC		600 KC	C14	Osc. Padder
6. Repeat operations 4 and 5 until alignment frequencies fall on correct calibration points.								
7.	SW 1	Ant. lead	400 ohms	5 MC	1	5 MC	C15,C9,C5	Max. Output
8.		and B-	(res.)	1800 KC		1800 KC		**
9.	SW 2	Ant. lead	400 ohms	16 MC	2	16 MC	C16*,C10,C6	Max. Output
10.		and B-	(res.)	6 MC		6 MC		**

* Rock dial while trimming C16 at 16 MC

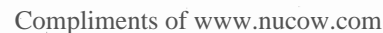
** Check sensitivity and dial calibration

LEAR INC.

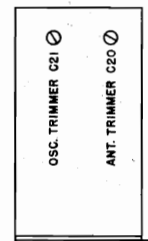
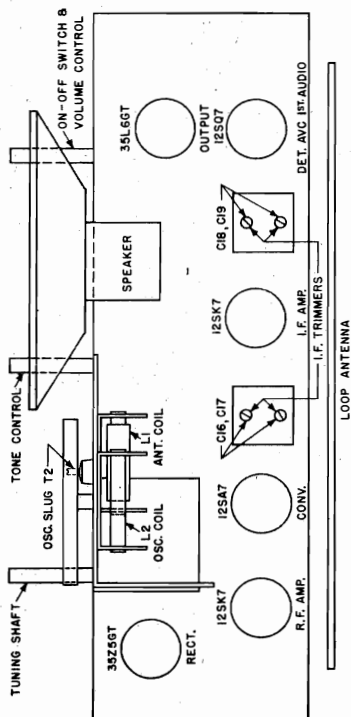
LOOP WIRING DIAGRAM



Notes: Voltage readings are for schematic diagram in this bulletin, Allow 10% \pm on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. Voltages are DC unless otherwise specified. All voltages measured from prong No. 3 of 12SF7 tube socket, or 8-.

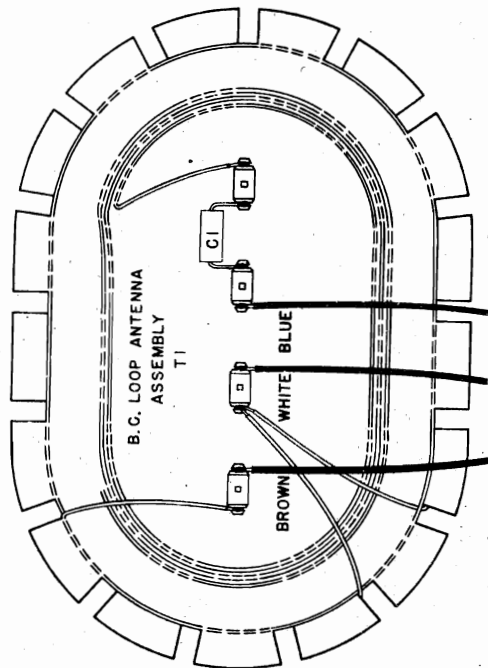


DIAL DRIVE DIAGRAM



BACK VIEW OF CHASSIS
 C4
 WAVE TRAP TRIMMER

FRONT VIEW
 LOOP WIRING DIAGRAM



ALIGNMENT CHART

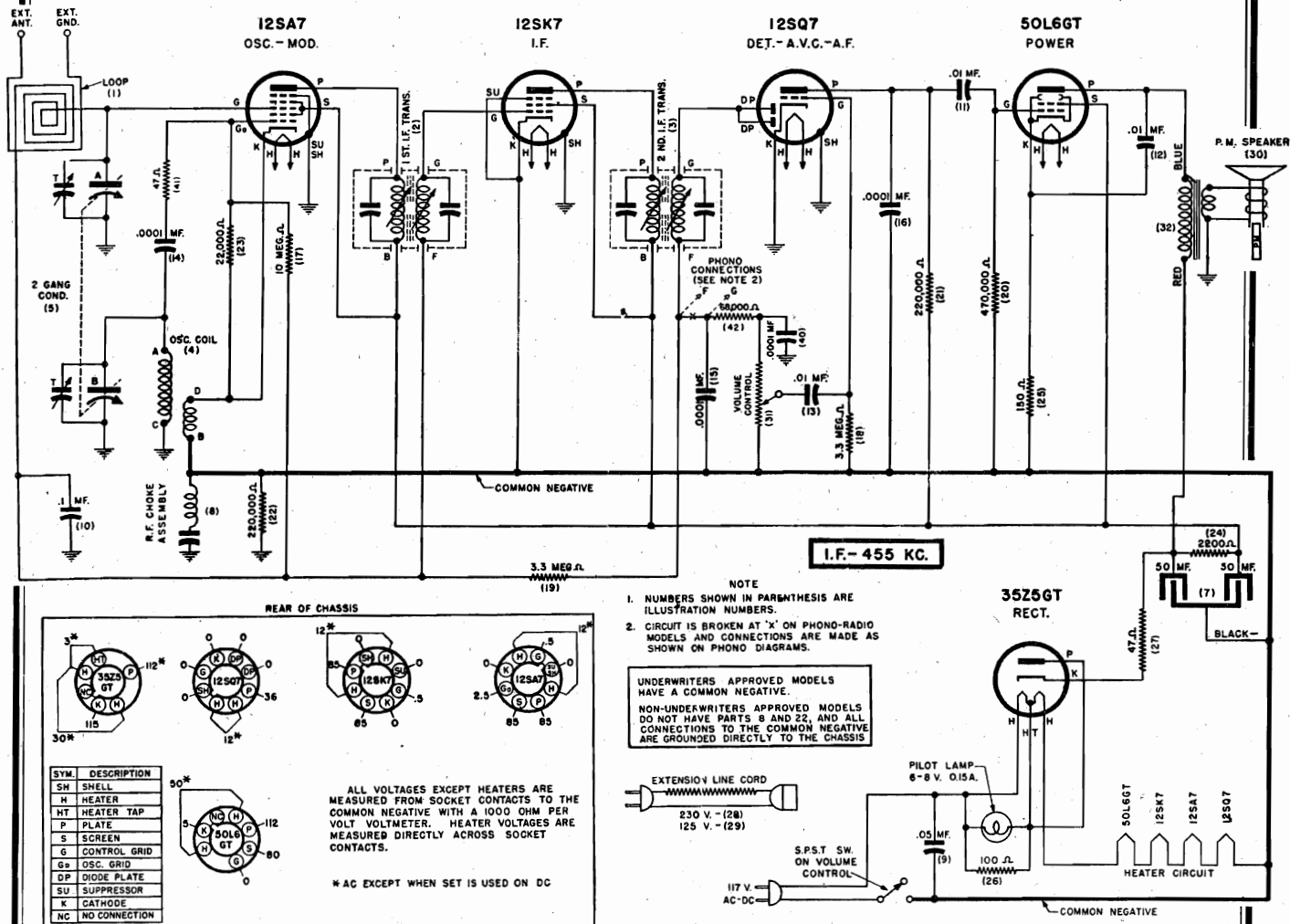
OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	DIAL SETTING	TRIMMER	REMARKS
1	Set dial pointer at 1620 KC with tuning unit drive turned fully clockwise against stop.						
2	2nd IF	Pin No. 8 of 12SA7 and B-	.05 mf.	455 KC	1620 KC	C18, C19	Max. Output
3	1st IF					C16, C17	Max. Output
4	Wave Trap			455 KC	1620 KC	C4	Min. Output
5	Osc. Trim	Antenna lead (blue wire) and B-	200 mmf.	1620 KC	1620 KC	C21	Max. Output
6	Ant. Trim			1500 KC	1500 KC	C22	Max. Output
7	Osc. Slug			600 KC	600 KC	T2	Max. Output*
8	Repeat adjustments in operations 5 and 6 until no further increase in output is obtained.						

* Rock dial tuner slightly while adjusting T2.

Notes: Connect output meter to voice coil circuit.
 Volume control on full for all adjustments.
 Signal generator gain control at minimum for satisfactory output meter reading.

LINCOLN RADIO & TELEV. CORP.

MODEL 5A-110

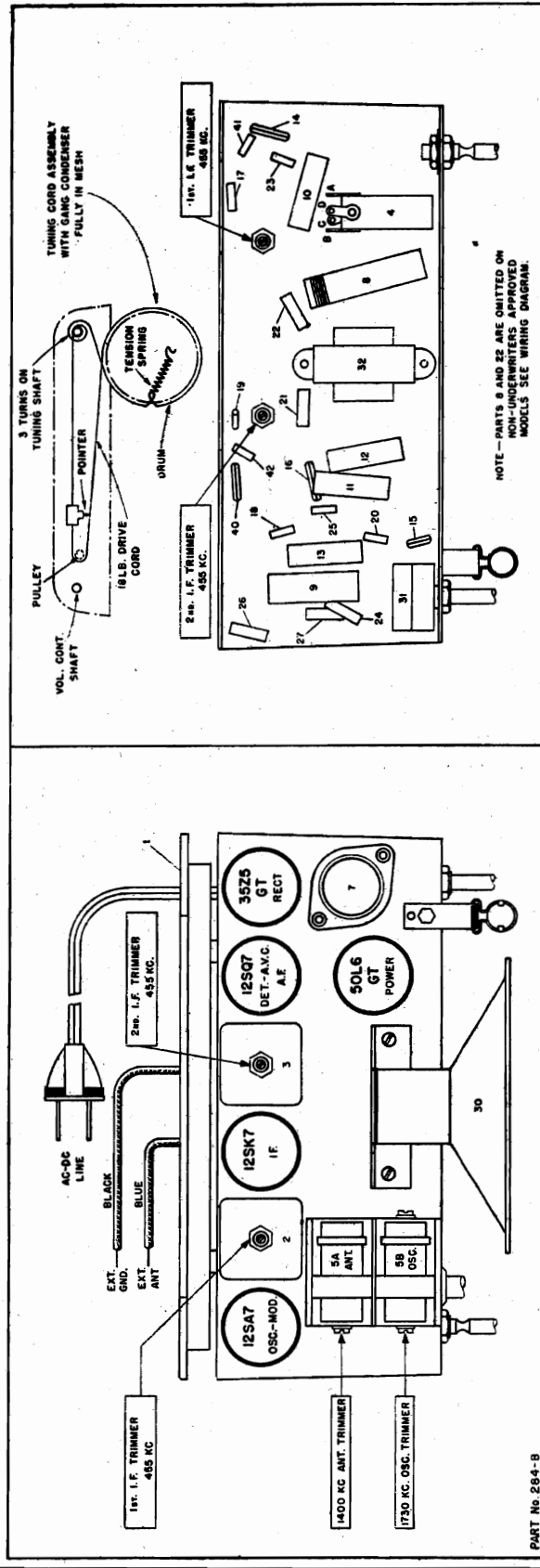


For alignment procedure read tabulations from left to right, and make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment:

- (a) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.
- (b) Use an accurately calibrated test oscillator with some type of output measuring device.
- (c) PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET.

Steps	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
	Set receiver dial to:	Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	
1	Any point where no interfering signal is received.	455 K. C.	.02 MFD. condenser	Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output.
2	Exactly 1730 K. C.	Exactly 1730 K. C.	.00025 MFD. condenser	Adjust 1730 K. C. oscillator trimmer for maximum output.
3	Approx. 1400 K. C.	Exactly 1400 K. C.	.00025 MFD. condenser	While rocking gang condenser adjust 1400 K. C. antenna trimmer for maximum output.



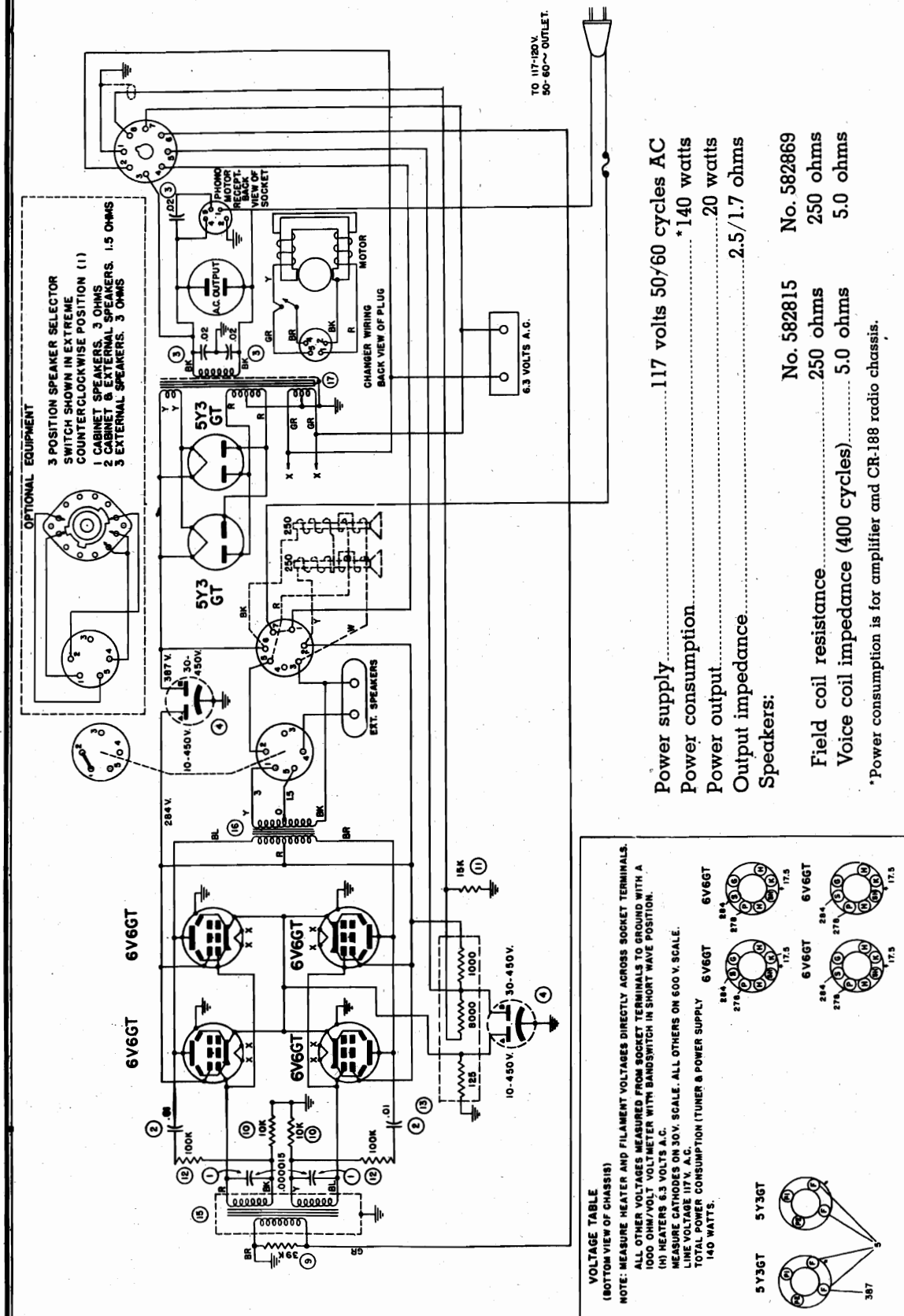
METHOD FOR REMOVING CHASSIS FROM CABINET

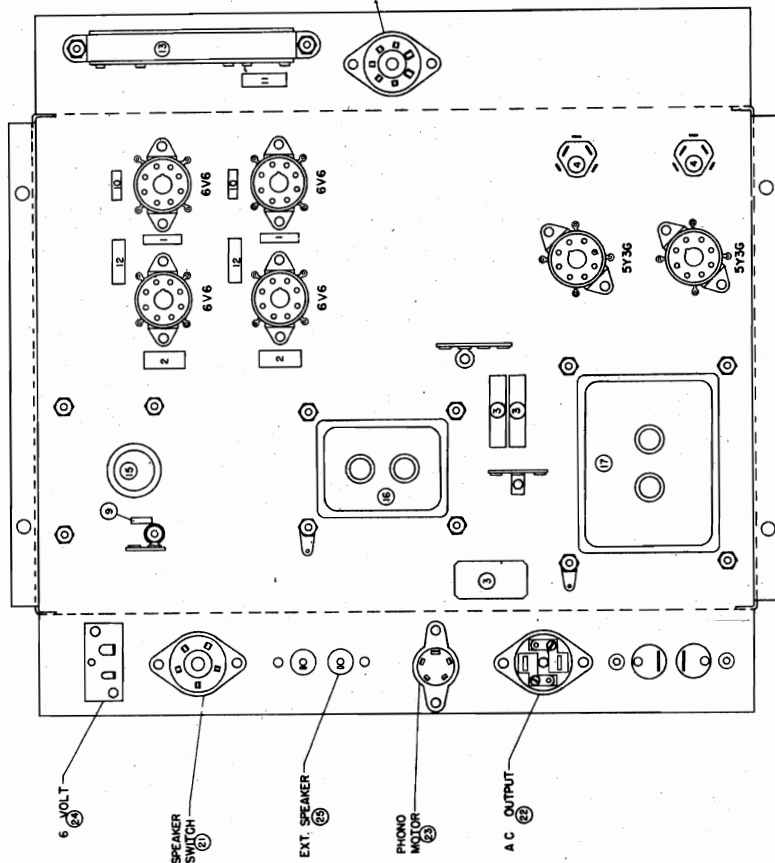
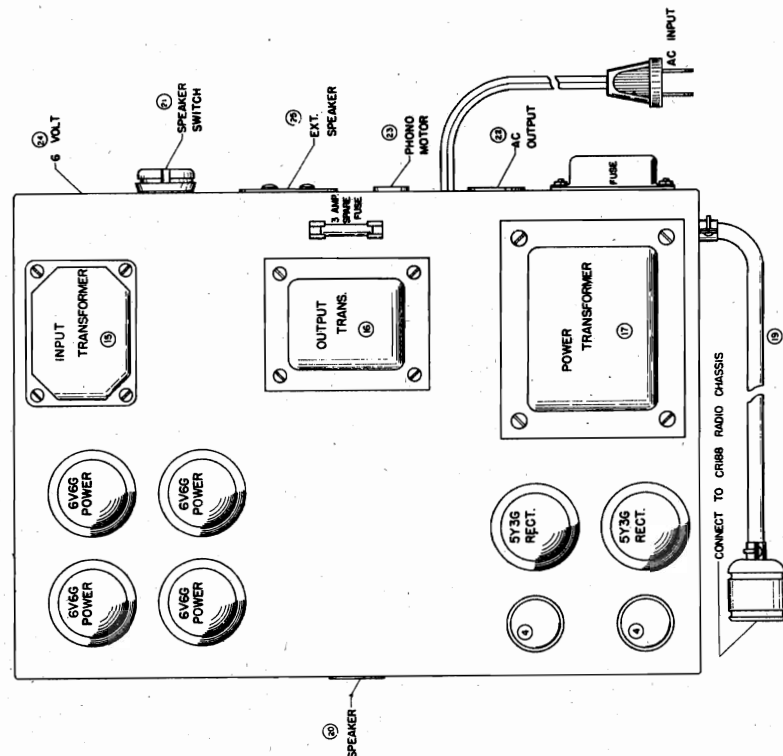
is mounted to the cabinet shelf with four screws and nuts; after they have been removed, the amplifier may be lifted from the cabinet.

To remove the chassis, first remove all plugs and cables from the receptacles and the connector from the rear of the radio chassis. The amplifier chassis

JUNE, 1946

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ACCESSORIES

SPEAKER SELECTOR SWITCH—Provision is made in this amplifier for connecting extension speakers and a speaker selector switch. By means of this switch, the cabinet and extension speakers may be operated separately or together while maintaining the proper load on the amplifier. This is accomplished by means of a rotary switch with a connecting plug that may be purchased from any authorized Magnavox dealer. When shipped from the factory, a shorting plug is inserted in the am-

plifier receptacle stamped **SPEAKER SWITCH**. This plug must not be removed unless the speaker selector switch is added. Then the shorting plug is replaced with a plug that is supplied as a part of the selector switch assembly.

EXTENSION SPEAKER—Two screw terminals are provided on the rear of the amplifier chassis for the connection of an extension speaker line. High-fidelity permanent-magnet extension speakers are available through all authorized Magnavox dealers.

THE MAGNAVOX CO.

MODEL AMP 101A
MODEL CR-189

CR-189

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil assembly, antenna, two band	360265G1
2	Coil assembly, r-f, 42.9-48.7 mc. band	360262G1
3	Coil assembly, r-f, 87.2-108.7 mc. band	360261G2
4	Coil assembly, oscillator, two band	360263G1
5	Transformer, i-f	360258G1
6	Transformer, discriminator	360259G1
7	Transformer, power, 117 volt 50/60 cycle	300030G1
8	Choke, r-f, filament	360264G1
9	Choke, a-f, filter	350032G1
10	Capacitor, variable, three-gang tuning	260058G1
11	Capacitor, trimmer 1.5-7 mmf.	*260067G1
12	Capacitor, trimmer 4.5-25 mmf.	260042G3
13	Capacitor, two-gang trimmer, 4-70 mmf. each section	260066G1
14	Capacitor, two-gang trimmer, 4-70 mmf. each section	260065G1
15	Capacitor, ceramic, 4 mmf.	250088G28
16	Capacitor, ceramic, 35 mmf.	250088G26
17	Capacitor, molded mica, 47 mmf.	250159G96
18	Capacitor, molded mica, 100 mmf.	250159G98
19	Capacitor, molded mica, 470 mmf. +10%	250159G90
20	Capacitor, molded mica, 470 mmf. +20%	250159G102
21	Capacitor, ceramic, 500 mmf.	250088G31
22	Capacitor, paper, .01 mfd. 600V.	250129G2
23	Capacitor, paper, .05 mfd. 600V.	250129G5
24	Capacitor, electrolytic, 10 mfd. 450V.	270026G3
25	Capacitor, electrolytic, 30-10 mfd. 475V.	270023G2
30	Resistor, composition, 100 ohm $\frac{1}{2}$ W.	230063G7
31	Resistor, composition, 220 ohm $\frac{1}{2}$ W.	230084G9
32	Resistor, composition, 680 ohm $\frac{1}{2}$ W.	230084G12
33	Resistor, composition, 1000 ohm $\frac{1}{2}$ W.	230084G13
34	Resistor, composition, 3300 ohm $\frac{1}{2}$ W.	230084G16
35	Resistor, composition, 4700 ohm $\frac{1}{2}$ W.	230084G17
36	Resistor, composition, 4700 ohm 1 W.	230085G17
37	Resistor, composition, 6800 ohm 2 W.	230061G18
38	Resistor, composition, 22,000 ohm $\frac{1}{2}$ W.	230084G21
39	Resistor, composition, 47,000 ohm $\frac{1}{2}$ W.	230084G23
40	Resistor, composition, 100,000 ohm $\frac{1}{2}$ W.	230084G25
41	Resistor, composition, 120,000 ohm $\frac{1}{2}$ W. $\pm 10\%$	230084G87
42	Resistor, composition, 100,000 ohm $\frac{1}{2}$ W. $\pm 10\%$	230084G86
43	Resistor, composition, 220,000 ohm $\frac{1}{2}$ W.	230084G27
44	Resistor, composition, 470,000 ohm $\frac{1}{2}$ W.	230084G29
45	Resistor, composition, 1 megohm $\frac{1}{2}$ W.	230084G31
46	Resistor, composition, 1.5 megohm $\frac{1}{2}$ W.	230084G32
47	Resistor, wire wound, 5000 ohm, 5 W.	240035G4
55	Switch, rotary, band selector and power	160163G1
56	Socket, output	180060G1
	Calibrated glass dial—CR-189A	150272G1
	Calibrated glass dial—CR-189B	150272G2

*Electrically replaces 260027G1 used in early production.

AMP-101A

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Capacitor, molded mica, 15 mmf.	250107G93
2	Capacitor, paper, .01 mfd. 600 V.	250129G2
3	Capacitor, paper, .02 mfd. 600 V.	250129G3
4	Capacitor, electrolytic, 30-10 mfd. 450 V.	270023G2
9	Resistor, composition, 39,000 ohm $\frac{1}{2}$ W.	230084G81
10	Resistor, composition, 10,000 ohm $\frac{1}{2}$ W.	230084G19
11	Resistor, composition, 15,000 ohm 2 W.	230086G20
12	Resistor, composition, 100,000 ohm 1 W.	230085G25
13	Resistor, wire wound, 125-8000-1000 ohm	240037G1
15	Transformer, input	320017G1
16	Transformer, output	330024G1
17	Transformer, power, 117 V. 50-60 cycle	300026G1
19	Cable and plug assembly	460557G1
20	Socket, speaker connection	180393G3
21	Socket, speaker switch	180393G5
22	Socket, power connection	180422G1
23	Socket, phonograph motor connection	180501G5
24	Socket, 6-volt	189788G1
	Socket, octal	180194G4
	Terminal board—external speaker connection	209601G2
	Fuse mounting	182467G1
	Fuse cover	182467G2
	Fuse, 3 amp. 250 V., cartridge	180157G10
	Fuse clip for spare fuse (2 required)	180236G1

**PIN LOCATION BY NUMBER
BOTTOM VIEW OF SOCKETS**

ALL SOCKET VOLTAGES EXCEPT THOSE OF CATHODES ARE MEASURED FROM THIS POINT USING THE 600 VOLT SCALE OF A 1000 OHMS PER VOLT VOLTMETER. LINE 115.V.

2525

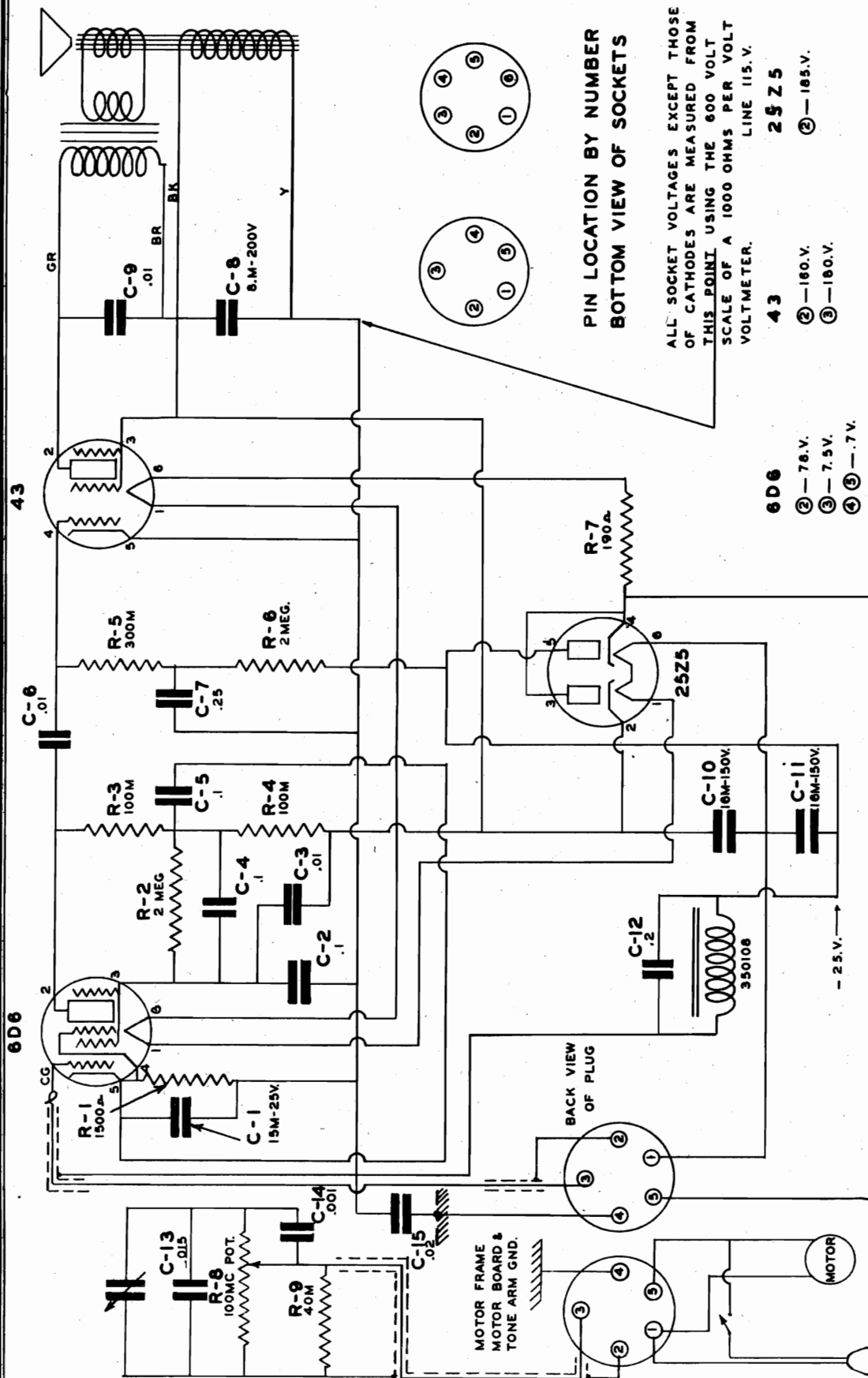
34

②—185.V.

②—160.V.

* DC resistance.

**** Primary impedance.**



Primary voltage	117 V. 60 cycle AC;
Power consumption	65 watts;
Power output	3 watts;
Vacuum tubes	1 - 6D6, 1 - 43, 1 - 25Z5;
Speaker: Field Coil	*6000 ohms;
Transformer	**5000 ohms;

THE MAGNAVOX CO.

MODEL A-101P
MODEL A-106P
MODEL A-205C
MODELS A-206, A-206A

A-101P

Ref. No.	Description	Magnevox Part No.
C1	Capacitor, electrolytic, 15 mfd. 25V., 8 mfd. 200V.	274201
C2	Capacitor, tubular, .1 mfd. 200 V.	254152
C3	Capacitor, tubular, .01 mfd. 600 V.	254153
C4	Capacitor, tubular, .1 mfd. 200 V.	254152
C5	Capacitor, tubular, .1 mfd. 200 V.	254153
C6	Capacitor, tubular, .01 mfd. 600 V.	254152
C7	Capacitor, tubular, .25 mfd. 120 V.	254149
C8	Capacitor, electrolytic, 15 mfd. 25V., 8 mfd. 200V.	274201
C9	Capacitor, tubular, .01 mfd. 600 V.	254153
C10	Capacitor, electrolytic, 16 mfd. 250 V.	274212
C11	Capacitor, electrolytic, 16 mfd. 250 V.	274212
C12	Capacitor, tubular, .2 mfd. 200 V.	254182
C13	Capacitor, tubular, .015 mfd. 600 V.	254131
C14	Capacitor, tubular, .01 mfd. 600 V.	254142
C15	Capacitor, tubular, .02 mfd. 600 V.	254127
R1	Resistor, carbon, 1500 ohm 1/2 W.	234425
R2	Resistor, carbon, 2 megohm 1/2 W.	234451
R3	Resistor, carbon, 100,000 ohm 1/2 W.	234445
R4	Resistor, carbon, 100,000 ohm 1/2 W.	234445
R5	Resistor, carbon, 300,000 ohm 1/2 W.	234448
R6	Resistor, carbon, 2 megohm 1/2 W.	234451
R7	Resistor, wire wound, 190 ohm	247808
R8	Control, volume, 100,000 ohm with switch	224354
R9	Resistor, carbon, 40,000 ohm 1/2 W.	234438
L1	Choke, filter	350108

A-106P

Ref. No.	Description	Magnevox Part No.
C1	Capacitor, tubular, .015 mfd. 600 V.	254131
C2	Capacitor, tubular, .001 mfd. 600 V.	254142
C3	Capacitor, electrolytic, 25 mfd. 25 V.	274236
C4	Capacitor, tubular, .1 mfd. 200 V.	254152
C5	Capacitor, tubular, .015 mfd. 600 V.	254131
C6	Capacitor, tubular, .25 mfd. 120 V.	254149
C7	Capacitor, tubular, .01 mfd. 600 V.	254153
C8	Capacitor, tubular, .01 mfd. 600 V.	254153
C9	Capacitor, tubular, .02 mfd. 600 V.	254127
C10	Capacitor, electrolytic, 16 mfd. 150 V.	274212
C11	Capacitor, electrolytic, 16 mfd. 150 V.	274212
C12	Capacitor, tubular, .05 mfd. 600 V.	254159
R1	Control, volume, 100,000 ohm	224354
R2	Resistor, carbon, 40,000 ohm 1/2 W.	234438
R3	Resistor, carbon, 5,000 ohm 1/2 W.	234430
R4	Resistor, carbon, 2 megohm 1/2 W.	234451
R5	Resistor, carbon, 150,000 ohm 1/2 W.	234446
R6	Resistor, carbon, 300,000 ohm 1/2 W.	234448
R7	Resistor, carbon, 2 megohm 1/2 W.	234451
R8	Resistor, wire wound, 190 ohm	247808

Choke, filter 350102
Socket, 6 prong marked 6D6 187328
Socket, 6 prong marked 43 187333
Socket, 6 prong marked 25Z5 187330
Knob, control 144101

A-205C

Ref. No.	Description	Magnevox Part No.
1	Capacitor, molded paper, .02 mfd. 600 V.	250056
2	Capacitor, molded paper, .01 mfd. 400 V.	250054
3	Capacitor, molded paper, .01 mfd. 400 V.	250054
4	Capacitor, electrolytic, 100-20 mfd. 150 V., 20 mfd. 25 V.	270008
5	Capacitor, electrolytic, 20 mfd. 150 V.	270005
6	Resistor, carbon, 250,000 ohm 1/3 W.	230010
7	Resistor, carbon, 3000 ohm 1/3 W.	230032
8	Resistor, carbon, 175 ohm 1/2 W.	230037
9	Resistor, carbon, 100 ohm 1/3 W.	239744
10	Resistor, carbon, 30 ohm 1/3 W.	230023
11	Control, volume with power switch, 2 megohm	220014

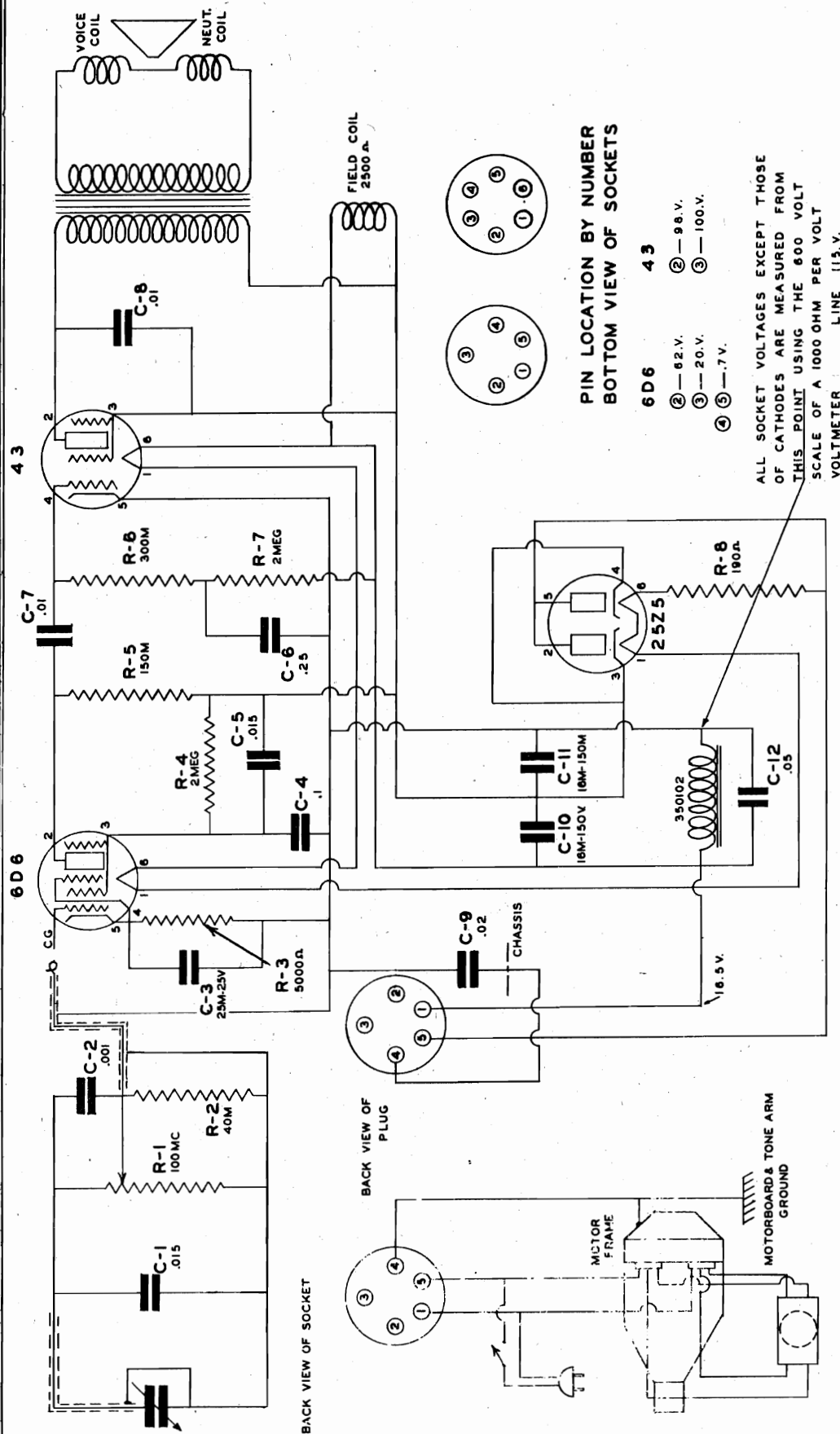
Socket, octal marked 50L6GT 180130
Socket, octal marked 35Z5GT 180131
Knob, control 144100

A-206, A-206A

Ref. No.	Description	Magnevox Part No.
1	Capacitor, electrolytic, 40-40 mfd. 150 V.	270013
2	Capacitor, moulded paper, .02 mfd. 600 V.	250056
3	Capacitor, moulded paper, .02 mfd. 600 V.	250056
4	Resistor, carbon, 500,000 ohm 1/3 W.	239755
5	Resistor, carbon, 500,000 ohm 1/3 W.	239755
6	Resistor, carbon, 1000 ohm 1/3 W.	239745
7	Resistor, carbon, 88 ohm 1 W.	230047
8	Resistor, wire wound, 166 ohm	240013
9	Control, volume, 1 megohm	222518
10	Control, tone, 20,000 ohm, with power switch	220021

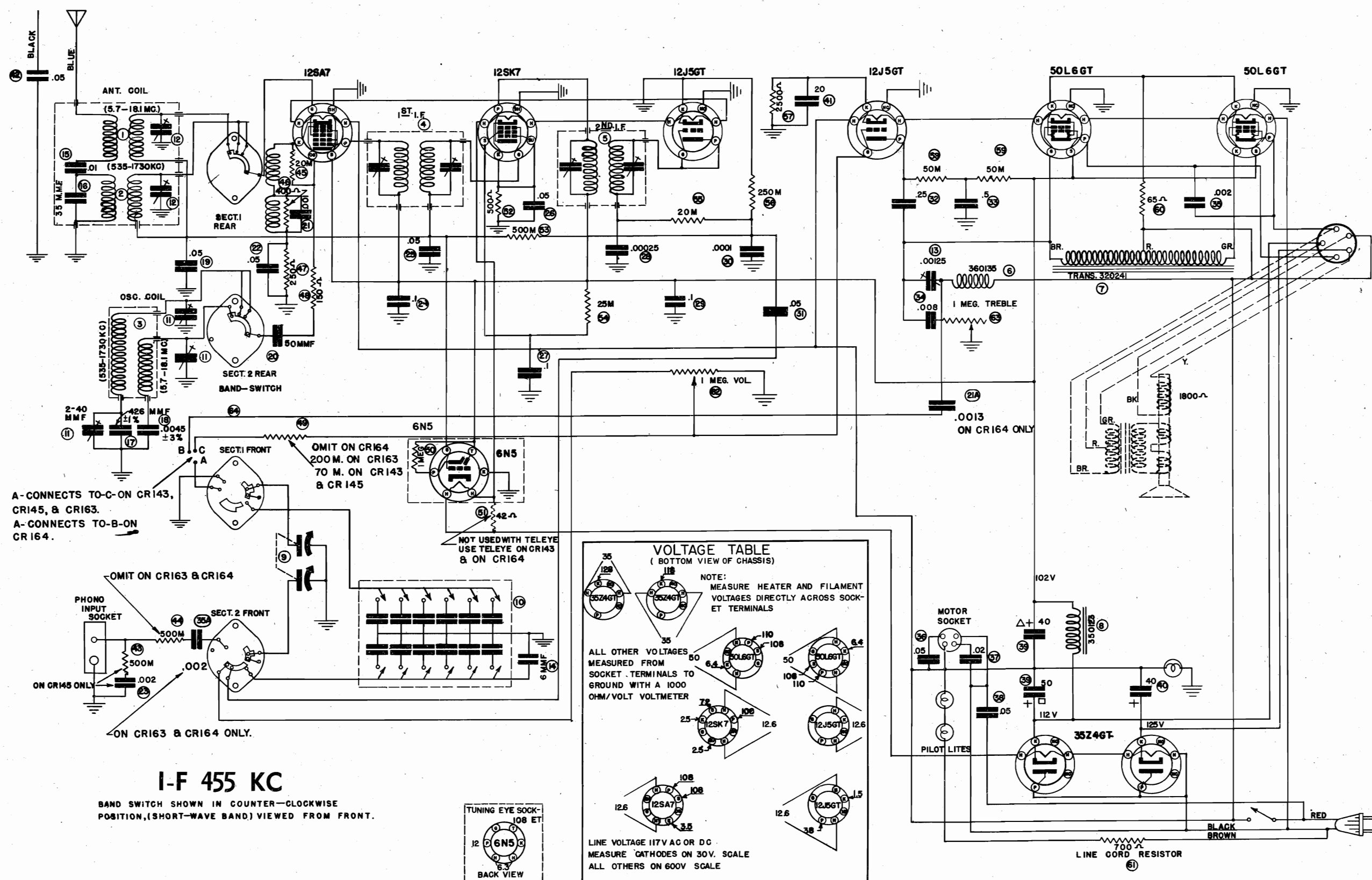
Socket, octal marked 70L7GT 180050
Switch, SPST toggle, (motor) 167402
Escutcheon, OFF-ON 150074
Knob, control marked VOLUME 140035
Knob, control marked OFF-ON-TONE 140036

THE MAGNAVOX CO.

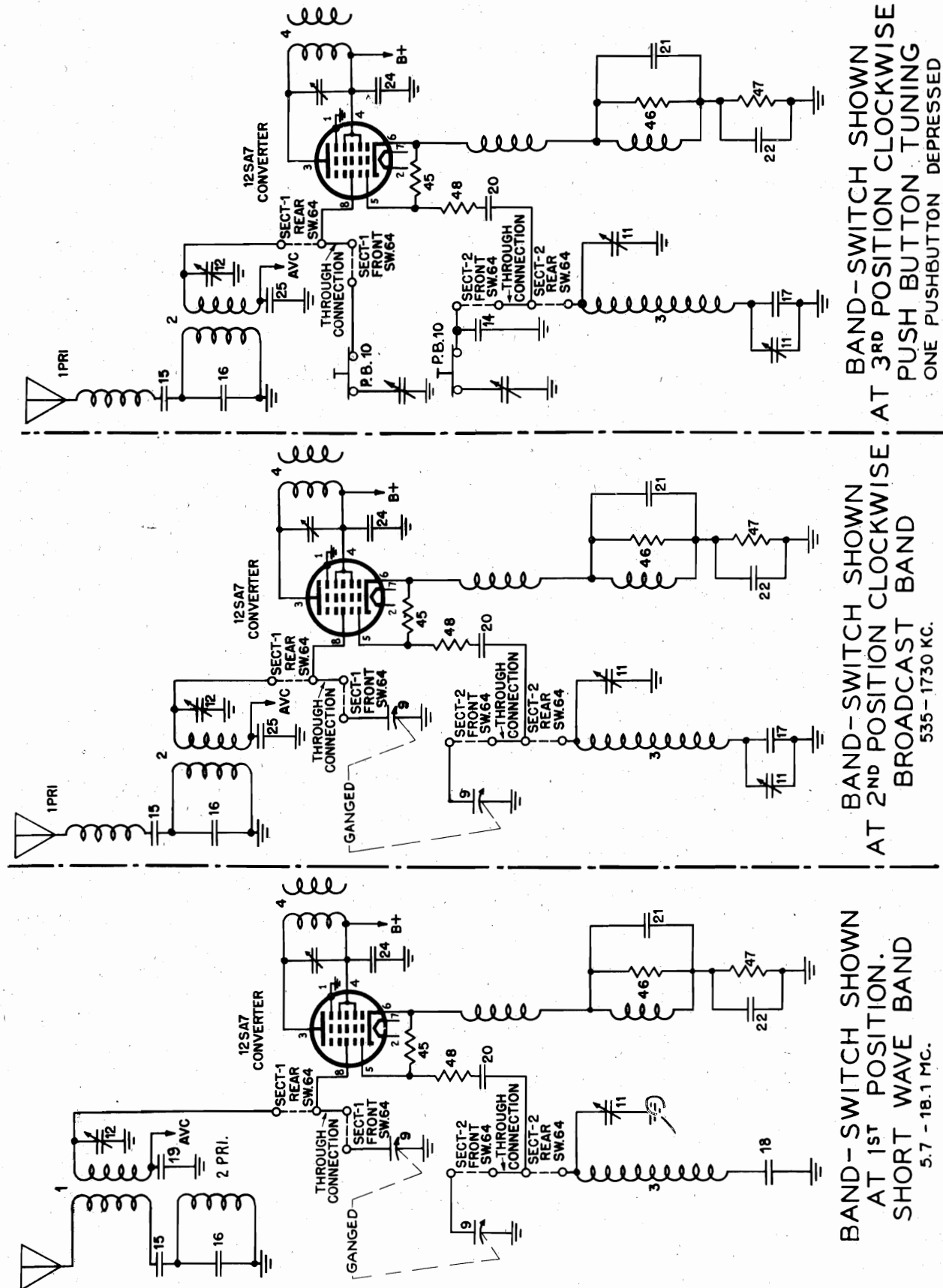


Primary voltage	117 V. AC-DC;
Power consumption	60 watts;
Power output	2 watts;
Vacuum tubes	1 - 6D6, 1 - 43, 1 - 25Z5;
Speaker:	
Field Coil	*2500 ohms;
Transformer	**4000 ohms; *DC resistance **Primary impedance

THE MAGNAVOX CO.



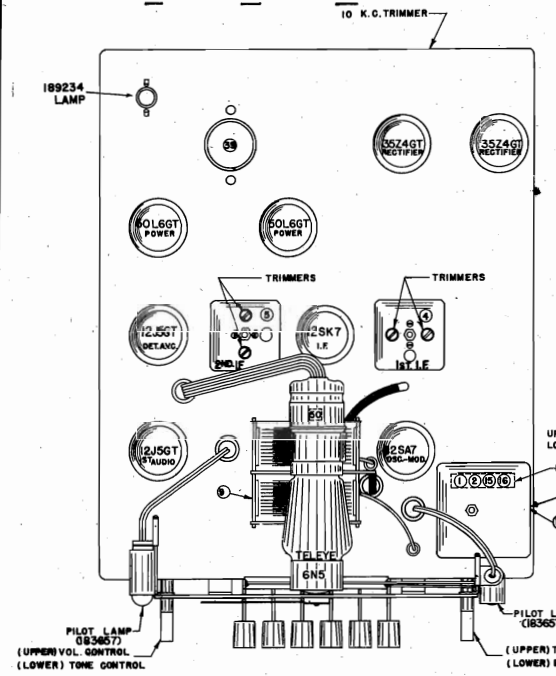
Schematic Diagram, Models CR-143, CR-145, CR-163, CR-164



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE
PUSH BUTTON TUNING
ONE PUSHBUTTON DEPRESSED

BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
BROADCAST BAND
535-1730 KC.

BAND-SWITCH SHOWN
AT 1ST POSITION.
SHORT WAVE BAND
5.7-18.1 MC.



ALIGNING THE 5.7-18.1 MC BAND

1. Substitute a 400 ohm resistor for the .00025 mfd. condenser in series with the signal generator output feeding the antenna lead.
 2. Adjust the band selector switch to the 5.7-18.1 megacycle short wave band, tune the receiver and signal oscillator frequency to EXACTLY 15 megacycles and adjust the short wave oscillator trimmer and antenna trimmer for maximum output as indicated on the output meter.
- While adjusting the oscillator trimmer, two peaks may be noticed, in which case, care must be taken so that the proper peak is used for aligning the receiver at 15 megacycles. Always screw in the trimmer to maximum capacity, then back off the trimmer until the second peak (if more than one is noticed), which is the correct one, is tuned in.
- NOTE: To assure most accurate trimmer setting, repeat all of the above adjustments several times, always using the lowest possible test oscillator output consistent with readable output meter scale deflection.

10 KC FILTER ADJUSTMENT

With the tone control set for maximum treble response, tune the receiver to a point between two stations of about the same signal strength on adjacent channels. If a 10,000 cycle heterodyne is heard as the beat note between the two carriers, it may be eliminated by tuning the 10 kc output filter by means of the 10 kc trimmer condenser, located at the rear of the chassis.

Instructions for removing the CR-143 or CR-163 chassis from the Sheraton Console, American Modern, Chippendale, Hepplewhite and Berkeley cabinets.

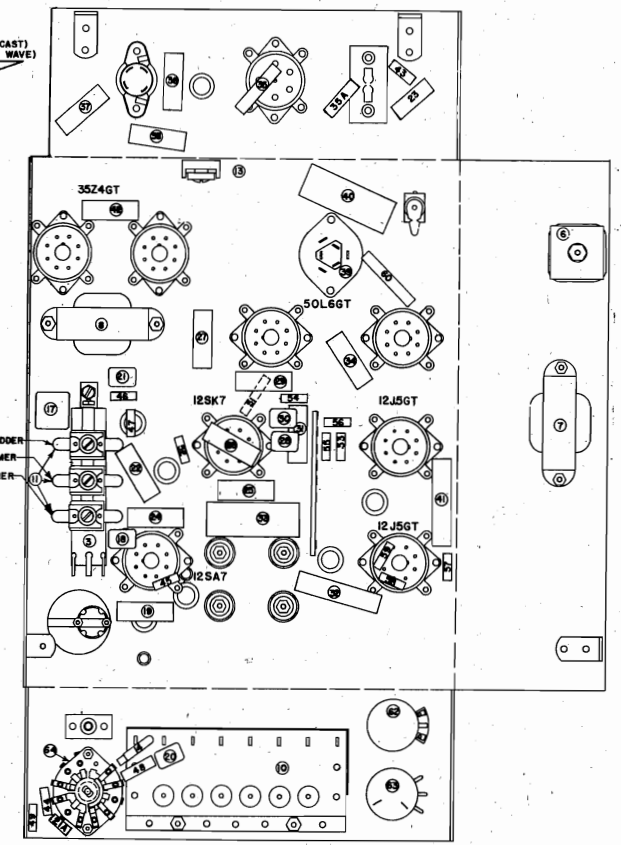
1. Remove the plugs from the bottom of the chassis.
2. Remove the antenna-ground terminal strip from the side of the cabinet.
3. Pull the control knobs and the push button knobs from their shafts.
4. Remove the four machine screws that secure the two chassis brackets to the cabinet, and lower the chassis from the cabinet.

ALIGNMENT PROCEDURE
ALIGNING THE I-F AT 455 KILOCYCLES

1. Connect the ground lead of the signal generator to the chassis or radio ground lead. Connect the other lead of the signal generator to the oscillator grid of the 12SA7 tube through a .00025 mfd. series condenser.
 2. Set the signal generator to EXACTLY 455 kilocycles and turn the receiver volume to maximum setting.
 3. Peak each of the second i-f transformer trimmer condensers.
 4. Peak each of the first i-f transformer trimmer condensers.
- To insure most accurate trimmer setting, repeat the above adjustment several times, always using the lowest possible signal generator output consistent with readable output meter scale deflection.

ALIGNING THE 535-1730 KILOCYCLE BAND

1. Remove the signal generator lead from the grid of the 12SA7 tube. Connect it to the receiver antenna lead (blue) through a .00025 mfd. series condenser.
2. Check the tuning dial adjustment by turning the gang condenser until the plates are completely meshed, at which point the dial pointer must be exactly even with the last line at the low frequency end of the dial calibration.
3. Adjust the band selector switch for operation on the 545-1730 kilocycle BROADCAST band.
4. Set the signal generator frequency and receiver dial to EXACTLY 1400 kilocycles. Adjust the BROADCAST oscillator trimmer and the antenna trimmer to bring in the 1400 kilocycle signal generator signal to maximum output.
5. Set the signal generator and receiver frequency to 600 kilocycles. While rocking the gang condenser slightly to the right and to the left, adjust the 600 kilocycle oscillator padder to maximum output.



THE MAGNAVOX CO.

Ref. No.	Description	Magnevox Part No.
1	Coil, antenna, short wave	360016
2	Coil, antenna, broadcast	360015
3	Coil, oscillator	360029
4	Coil, I-F transformer, first	363700
5	Coil, I-F transformer, second	363700
6	Coil, 10 kc filter choke	360135
7	Transformer, input	320241
8	Coil, filter choke	350123
9	Capacitor, two-gang tuning	260002
10	Capacitor, push button tuner assembly	160009
11	Capacitor, three-gang trimmer	260010
12	Capacitor, two-gang trimmer	260009
13	Capacitor, 10 kc filter, .00125 mfd.	259610
14	Capacitor, temperature compensator	290002
15	Capacitor, moulded paper, .01 mfd. 400 V.	250054
16	Capacitor, moulded mica, 35 mmf.	250050
17	Capacitor, silver mica, 426 mmf. $\pm 1\%$	250038
18	Capacitor, moulded mica, .0045 mfd. $\pm 3\%$	259779
19	Capacitor, tubular, .05 mfd. 200 V.	254123
20	Capacitor, silver mica, 50 mmf. $\pm 10\%$	250037
21	Capacitor, moulded mica, .001 mfd. $\pm 3\%$	259776
21A	Capacitor, moulded mica, .0013 mfd. $\pm 3\%$, CR-164 only	259777
22	Capacitor, tubular, .05 mfd. 200 V.	254123
23	Capacitor, tubular, .002 mfd. 600 V., CR-145 only	254161
24	Capacitor, tubular, .1 mfd. 200 V.	254123
25	Capacitor, tubular, .05 mfd. 200 V.	254123
26	Capacitor, tubular, .05 mfd. 200 V.	254123
27	Capacitor, tubular, .1 mfd. 200 V.	254152
28	Capacitor, moulded mica, .00025 mfd.	259772
29	Capacitor, tubular, .1 mfd. 200 V.	254152
30	Capacitor, moulded mica, .0001 mfd.	259769
31	Capacitor, tubular, .05 mfd. 200 V.	254135
32	Capacitor, tubular, .25 mfd. 200 V.	254123
33	Capacitor, tubular, .5 mfd. 200 V.	254134
34	Capacitor, tubular, .008 mfd. 600 V.	250014
35	Capacitor, tubular, .002 mfd. 600 V.	254161
35A	Capacitor, tubular, .002 mfd. 600 V., CR-163, 164 only	254161
36	Capacitor, tubular, .05 mfd. 400 V.	254146
37	Capacitor, tubular, .02 mfd. 600 V.	254127
38	Capacitor, tubular, .05 mfd. 400 V.	254146
39	Capacitor, molar, 50 .40 mfd. 150 V.	270004
40	Capacitor, molar, 40 mfd. 150 V.	270010
41	Capacitor, molar, 20 mfd. 25 V.	273611
42	Capacitor, tubular, .05 mfd. 200 V.	254123
43	Resistor, carbon, 500,000 ohm $\frac{1}{2}$ W., CR-145 only	239755
44	Resistor, carbon, 500,000 ohm $\frac{1}{2}$ W.	239755
45	Resistor, carbon, 20,000 ohm $\frac{1}{2}$ W.	239750
46	Resistor, carbon, 400 ohm $\frac{1}{2}$ W.	230005
47	Resistor, carbon, 250 ohm $\frac{1}{2}$ W.	230001
48	Resistor, carbon, 150 ohm $\frac{1}{2}$ W.	230033
49	Resistor, carbon, 70,000 ohm $\frac{1}{2}$ W.	230042
50	Resistor, carbon, 1 megohm $\frac{1}{2}$ W.	239756
51	Resistor, carbon, 42 ohm, 2 W., CR-145 only	230040
52	Resistor, carbon, 500 ohm $\frac{1}{2}$ W.	230043
53	Resistor, carbon, 500,000 ohm $\frac{1}{2}$ W.	239755
54	Resistor, carbon, 25,000 ohm $\frac{1}{2}$ W.	230002
55	Resistor, carbon, 20,000 ohm $\frac{1}{2}$ W.	239750
56	Resistor, carbon, 250,000 ohm $\frac{1}{2}$ W.	230010
57	Resistor, carbon, 2500 ohm $\frac{1}{2}$ W.	239746
58	Resistor, carbon, 50,000 ohm $\frac{1}{2}$ W.	239751
59	Resistor, carbon, 50,000 ohm $\frac{1}{2}$ W.	230020
60	Resistor, carbon, 65 ohm 1 W.	460004
61	Power cord, 700 ohm line cord resistance	220008
62	Control, volume, 1 megohm	220015
63	Control, treble, with switch — 1 megohm	160010
64	Switch, band selector	

SPECIFICATIONS

Primary voltage . . . 117 V. 50-60 cycle AC or DC; Intermediate frequency . . . 455 kc;
 Power consumption . . . 85 watts; Tuning frequency range . . . 535-1730 kc;
 Power output . . . 6 watts; 5.7-18.1 mc;
 Speaker: Field Coil . . . *1800 ohms;
 Transformer . . . **3000 ohms;

Circuit: Superheterodyne with two-gang tuning condenser, six-station condenser-type push button tuner, two tuning ranges, treble control, automatic volume control, bass compensation in volume control for phonograph pickup, teletune tuning indicator (CR-143 and CR-163 only).

* DC resistance. ** Primary impedance.

Models CR-143, CR-145, CR-163 and CR-164 are basically alike. Minor circuit differences are indicated on Figure 36.

The phonograph input circuit in CR-143 and CR-145 is designed for use with a 3 oz. pressure crystal pickup; CR-163 and CR-164 phonograph input circuit accommodates the 1 oz. pressure crystal pickup.

Instructions for removing the CR-145 or CR-164 chassis from the Concerto Combination, Sheraton Table and Modern Table cabinets.

1. Remove the back from the cabinet.
2. Pull the control knobs and push button knobs from their shafts.
3. Remove the plugs from the rear of the chassis and disconnect the antenna and ground connections.
4. Completely mesh the tuning condenser plates by turning the station selector knob until the dial pointer is in the lowest frequency setting on the dial.
5. Remove the four machine screws, located on the bottom of the cabinet, that secure the chassis.
6. Slide to the rear of the cabinet, lifting the rear of the chassis to permit the dial assembly to clear the rear opening.

Instructions for removing the CR-143 or CR-163 chassis from the Chairside cabinet.

1. Set the cabinet on end so that the speaker is facing upward.
2. Remove the plugs from the rear of the chassis.
3. Remove the antenna-ground terminal strip from the side of the cabinet.
4. Pull the control knobs and the push button knobs from their shafts.
5. Remove the four Phillips-head wood screws securing the radio panel, and lift the panel from the cabinet.
6. Remove the four machine screws that secure the chassis to the cabinet. Two of these screws are accessible in the phonograph compartment and the other two are beneath the motorboard.
7. Slide the chassis out the top opening of the cabinet.

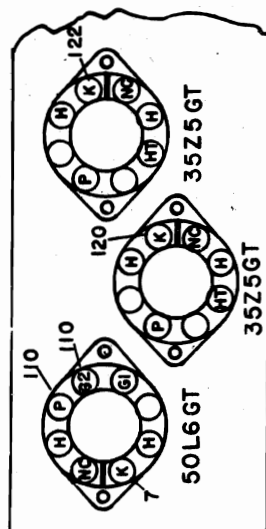
NOTE: If it is necessary to remove the speaker, the four mounting nuts on the speaker should be removed and the speaker taken through the bottom opening of the cabinet.

THE MAGNAVOX CO.



FILTER COND.

VOLTAGE TABLE
MEASURE ALL DC VOLTAGES
DIRECT TO CIRCUIT GROUND
WITH A 1000 OHM PER VOLT
VOLTMETER
LINE VOLTAGE 117 VOLTS AC
 Primary voltage . . .
 Power consumption . . .
 Power output . . .
 Vacuum tubes . . .
 Speaker: Field Coil . . .
 Transformer . . .

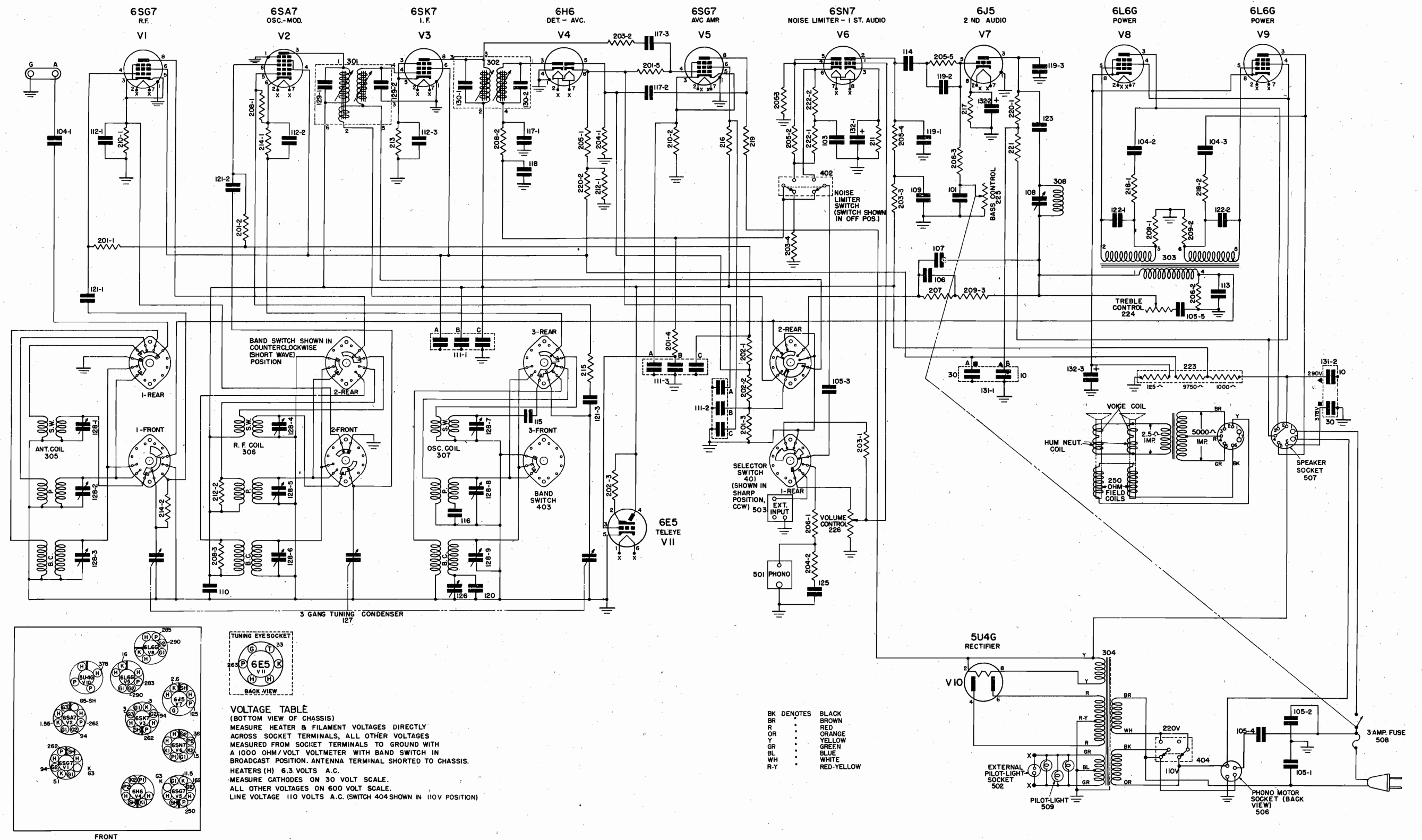


BOTTOM VIEW OF CHASSIS

*** DC resistance.**

**** Primary impedance.**

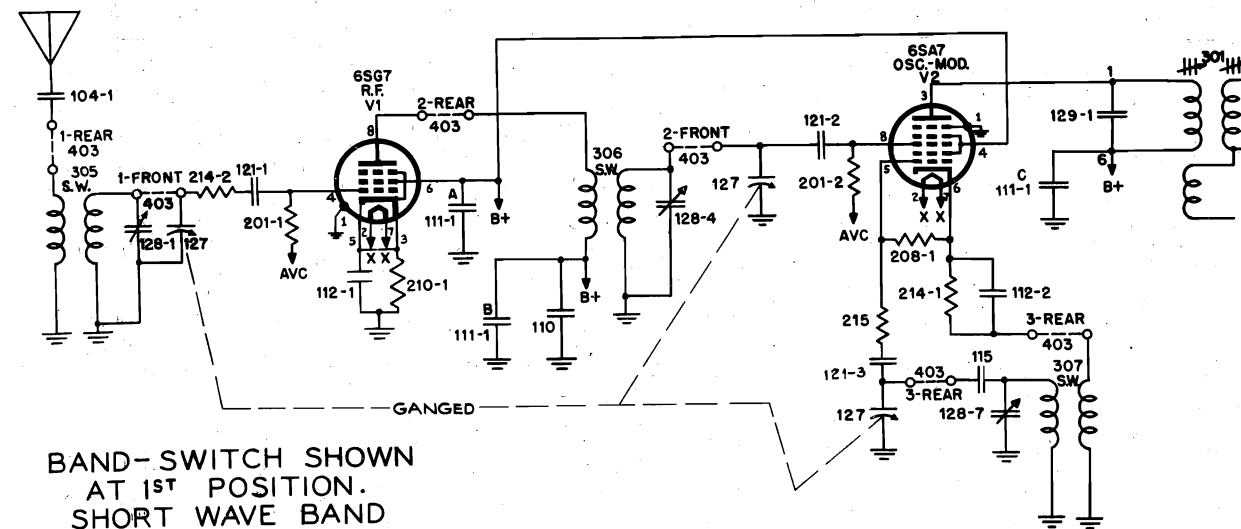
THE MAGNAVOX CO.



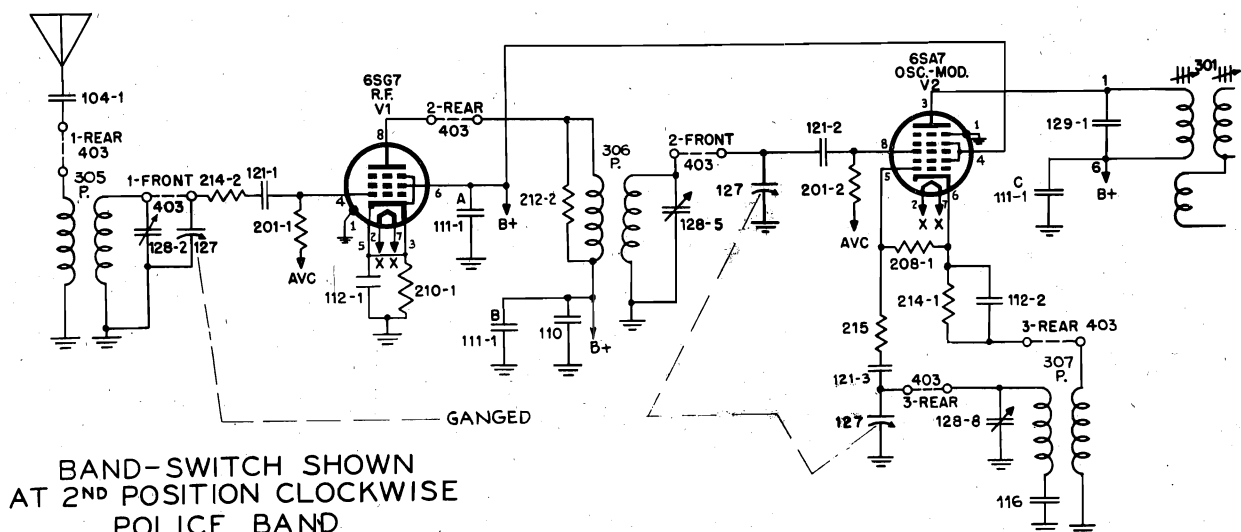
Model CR-183 and CR-185 radio chassis built by Magnavox for the U. S. Navy Department, were incorporated in Navy Radio-Phonograph combinations. The CR-183 chassis was used in instruments identified Models RCT, RCU and RCU-1. In combinations designated Model RCU-2, a CR-185 chassis was incorporated.

The differences between the CR-183 and the CR-185 are not extensive and the alignment procedure that follows applies to both receivers, although separate schematic diagrams are shown. Electrical values are not shown on the schematics; the reference number shown next to each part identifies the items shown in the parts list where electrical values and ratings are given.

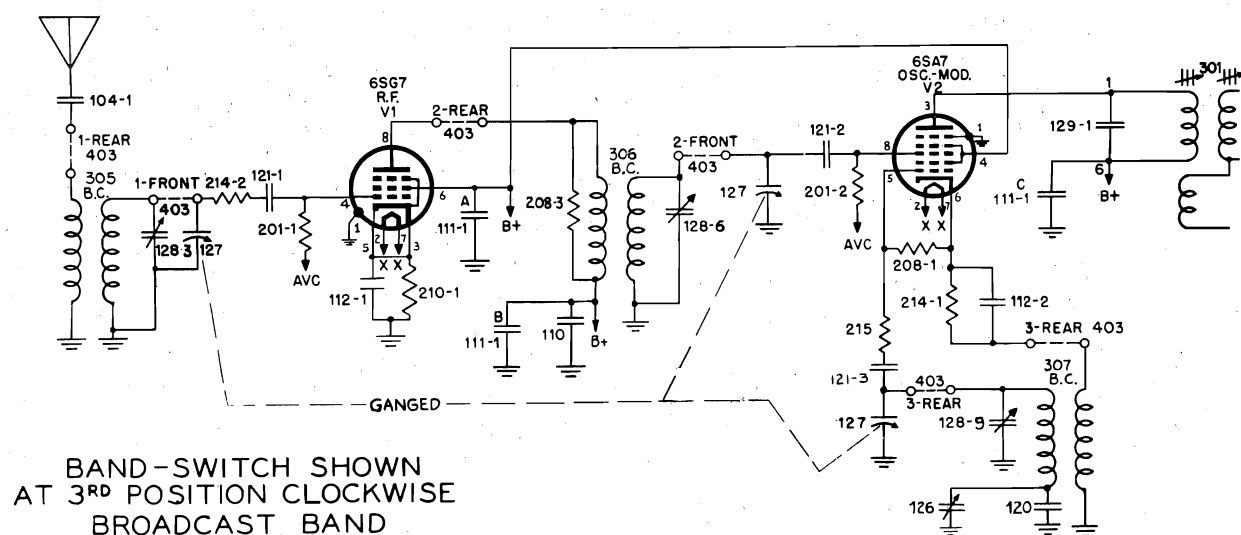
THE MAGNAVOX CO.



BAND-SWITCH SHOWN
AT 1ST POSITION.
SHORT WAVE BAND



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
POLICE BAND



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE
BROADCAST BAND

THE MAGNAVOX CO.
CR-183, CR-185

SHORT WAVE BAND ALIGNMENT

1. With the 400 ohm resistor in series with the test oscillator lead to the antenna of the radio receiver, set the band selector switch to SHORT WAVE.
2. Set the test oscillator frequency and receiver dial to EXACTLY 15 megacycles. Adjust the short wave oscillator trimmer, r-f trimmer and antenna trimmer for maximum deflection on the output meter.

While adjusting the oscillator trimmer, two peaks may be noticed, in which case care must be taken so that the proper peak is used for aligning the receiver at 15 megacycles. Always turn the trimmer screw clockwise to maximum capacity; then back off the trimmer until the second peak (if more than one is noticed) is reached.

NOTE: To assure most accurate trimmer setting, repeat all of the above adjustments several times, always using the lowest possible test oscillator signal, consistent with readable output meter scale deflection.

10 KC FILTER ADJUSTMENT

1. Turn the tone control to the right as far as possible for maximum treble response and the selectivity switch to the BROAD position.
2. Tune the receiver to a point between two station of about the same signal strength, located on adjacent channels 10 kc apart.
3. If a 10,000 cycle heterodyne is heard as a beat note between the two carriers, adjust the 10 kc trimmer until this beat note can no longer be heard. The 10 kc trimmer is located on the top of the radio chassis between the two 6L6G output tubes.
4. The preferred method for making this adjustment is to connect the output of an audio oscillator set at EXACTLY 10,000 cycles, to the phonograph input socket and set the 10 kc trimmer for minimum signal.

ALIGNMENT PROCEDURE

An accurate calibrated r-f test oscillator, an output indicator and a screw driver are required to align the radio receiver. The output meter should be connected across the voice coil terminals, and the test oscillator output should be kept to such a value that the reading on the output meter does not exceed one volt. Be sure that the selectivity switch is set in the SHARP position when aligning the set. This is important.

INTERMEDIATE-FREQUENCY STAGE ALIGNMENT

1. Connect the ground lead of the test oscillator to the chassis or to the ground terminal on the rear of the chassis. Connect the "high" side of the oscillator to the control grid of the oscillator section of the 6SA7 tube (pin #5), through a .00025 mfd. series capacitor.
2. Set the test oscillator to EXACTLY 455 kc and turn the receiver volume control to its maximum setting.
3. Adjust both second i-f transformer trimmers for maximum deflection on the output meter. One trimmer is accessible from the top of the i-f transformer; the other from the bottom.
4. Adjust both first i-f transformer trimmers for maximum signal as indicated on the output meter.

To assure most accurate trimmer setting, repeat the above adjustment several times, always using the lowest possible test oscillator output consistent with readable output meter scale deflection.

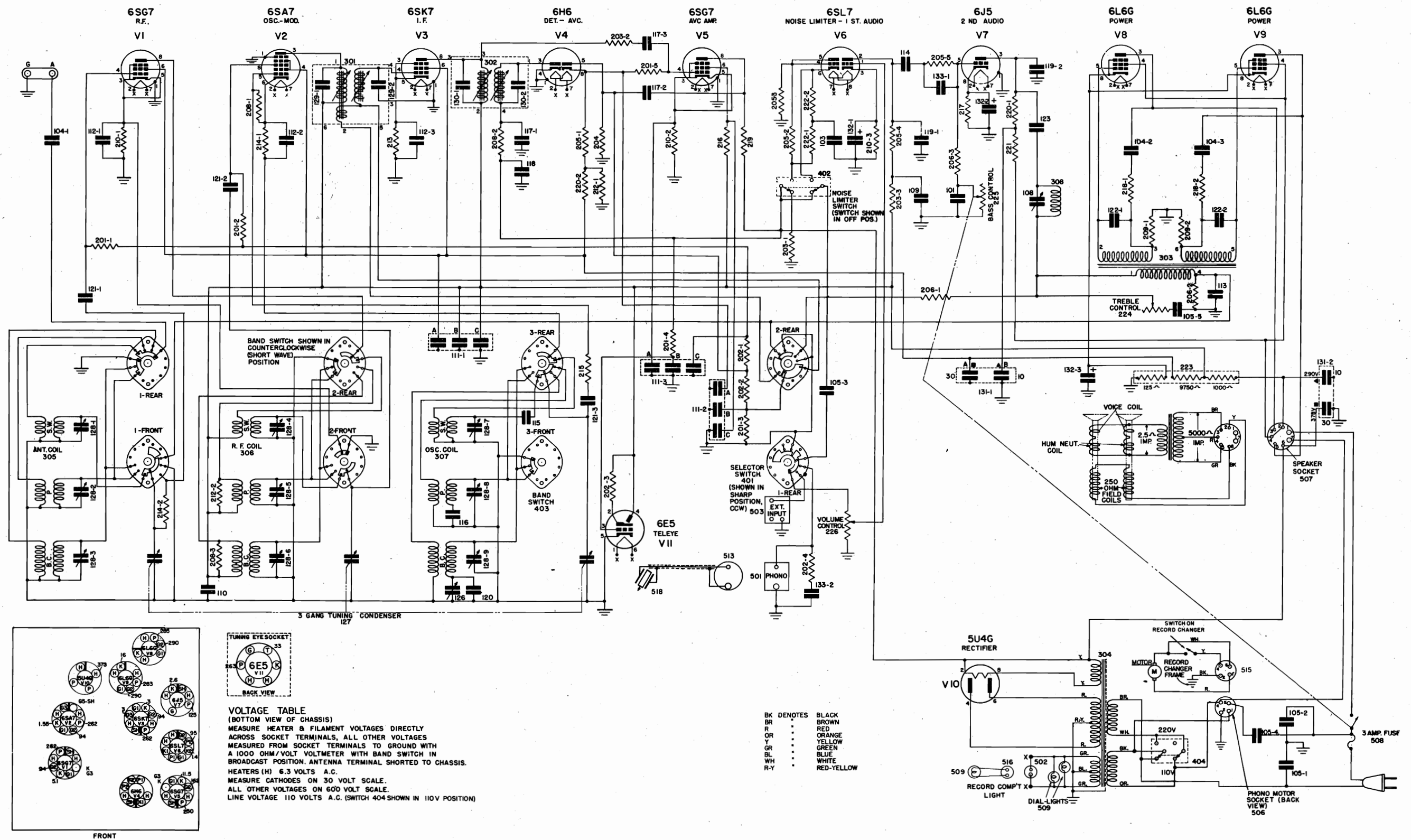
BROADCAST BAND ALIGNMENT

1. Check the tuning dial adjustment by turning the gang condenser until the condenser plates are completely meshed, at which point the dial pointer must coincide with the last line at the low frequency end of the dial scale. If the pointer is not in this position, remove the dial scale, loosen the screw that holds the pointer in place and set to the proper position.
2. Remove the test oscillator lead from the grid of the 6SA7 tube and connect it to the antenna terminal on the rear of the chassis through a .00025 mfd. series capacitor.
3. Set the band selector switch to BROADCAST.
4. Set the test oscillator frequency and receiver dial to EXACTLY 1400 kilocycles. Adjust the broadcast oscillator trimmer, r-f trimmer and antenna trimmer for maximum deflection on the output meter.
5. Set the test oscillator and receiver frequency to 600 kilocycles. While rocking the condenser gang slightly to the right and to the left, adjust the 600 kilocycle oscillator padder for maximum output. The 600 kc padder is located on the side of the chassis below the three-band oscillator coil. If this padder requires considerable adjustment, repeat operation given in step 4.

POLICE BAND ALIGNMENT

1. Replace the .00025 mfd. test oscillator antenna series capacitor with a 400 ohm resistor.
2. Set the band selector switch to POLICE.
3. Set the test oscillator frequency and receiver dial to EXACTLY 5000 kilocycles. Adjust the police oscillator trimmer, r-f trimmer and antenna trimmer for maximum deflection on the output meter.

THE MAGNAVOX CO.

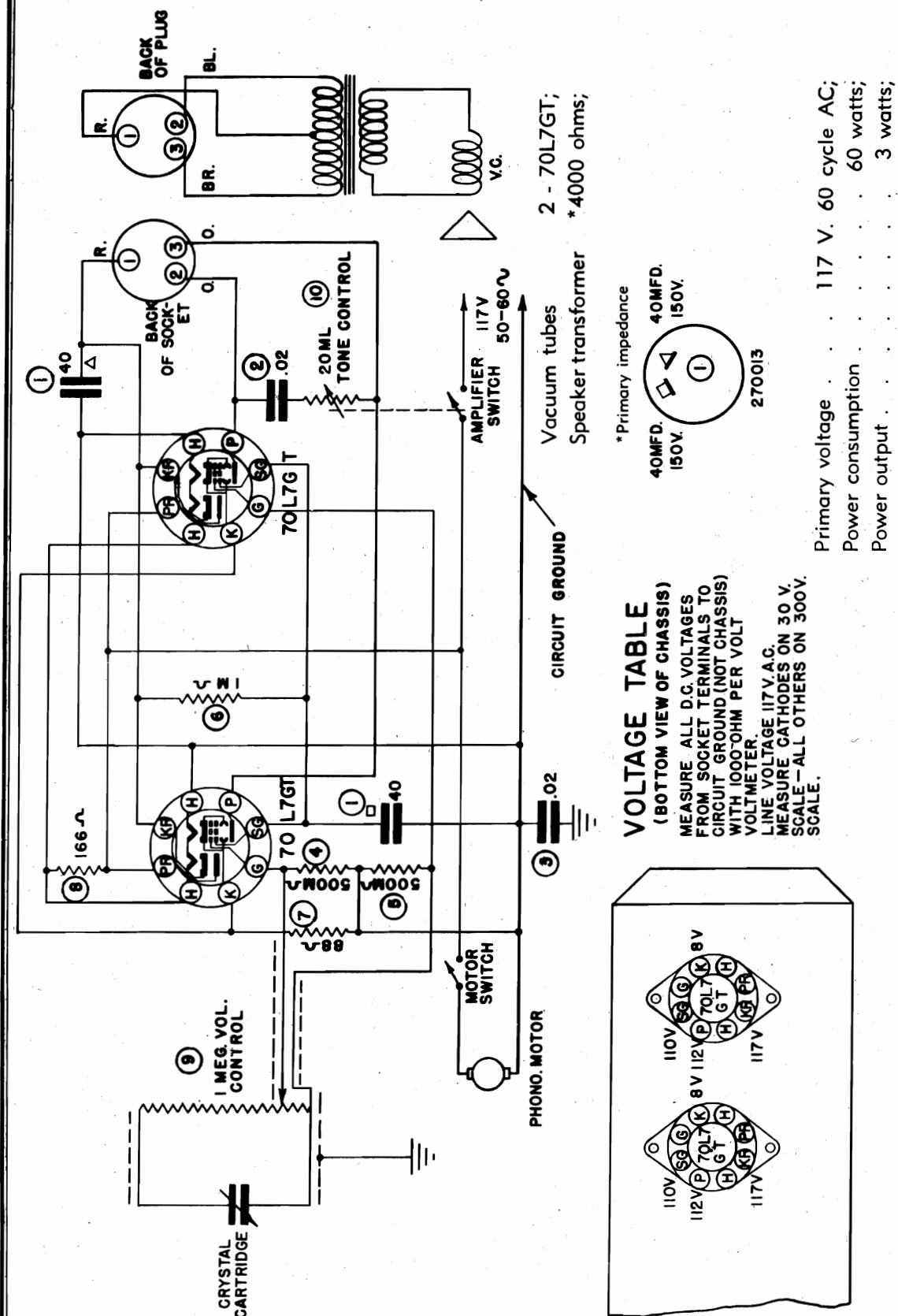


CR-183, CR-185

Ref. No.	Description	Magnavox Part No.	Ref. No.	Description	Magnavox Part No.
101	Capacitor, molded paper, .0047 mfd. $\pm 20\%$, 500 V. DC (working)	250110G51	206	Resistor, composition, pigtail, 47,000 ohm $\pm 10\%$, $\frac{1}{2}$ watt	230069G78
103	Capacitor, paper, tubular, .05 mfd. $\pm 20\%$, 600 V. DC (working)	250104G2	207	Resistor, composition, pigtail, 39,000 ohm $\pm 10\%$, $\frac{1}{2}$ watt	230069G81
104	Capacitor, molded paper, .01 mfd. $\pm 20\%$, 600 V. DC (working)	250129G2	208	Resistor, composition, pigtail, 22,000 ohm $\pm 10\%$, $\frac{1}{2}$ watt	230069G78
105	Capacitor, molded paper, .02 mfd. $\pm 20\%$, 600 V. DC (working)	250129G3	209	Resistor, composition, pigtail, 10,000 ohm $\pm 10\%$, $\frac{1}{2}$ watt	230069G74
106	Capacitor, molded paper, .0022 mfd. $\pm 20\%$, 500 V. DC (working)	250109G84	210	Resistor, composition, pigtail, 4700 ohm $\pm 10\%$, $\frac{1}{2}$ watt	230069G70
107	Capacitor, molded paper, .0039 mfd. $\pm 10\%$, 500 V. DC (working)	250110G41	211	Resistor, composition, pigtail, 2700 ohm $\pm 10\%$, $\frac{1}{2}$ watt	230069G67
108	Capacitor, variable, mica, 700-2000 mmfd.	250071	212	Resistor, composition, pigtail, 1000 ohm $\pm 10\%$, $\frac{1}{2}$ watt	230069G62
109	Capacitor, paper, oil-filled, 0.5 mfd. $\pm 5\%$, 600 V. DC (working)	250077G5	213	Resistor, composition, pigtail, 330 ohm $\pm 10\%$, $\frac{1}{2}$ watt	230069G56
110	Capacitor, paper, oil-filled, 0.1 mfd. $\pm 10\%$, 600 V. DC (working)	250126G4	214	Resistor, composition, pigtail, 150 ohm $\pm 10\%$, $\frac{1}{2}$ watt	230069G52
111	Capacitor, paper, oil-filled, 0.1-0.1-0.1 mfd. $\pm 20\%$, 600 V. DC (working)	250126G1	215	Resistor, composition, pigtail, 100 ohm $\pm 10\%$, $\frac{1}{2}$ watt	230069G50
112	Capacitor, molded paper, .05 mfd. $\pm 20\%$, 120 V. DC (working)	250129G5	216	Resistor, composition, pigtail, 0.15 megohm $\pm 10\%$, $\frac{1}{2}$ watt	230069G88
113	Capacitor, molded paper, .03 mfd. $\pm 20\%$, 400 V. DC (working)	250129G4	217	Resistor, composition, pigtail, 390 ohm $\pm 10\%$, $\frac{1}{2}$ watt	230069G57
114	Capacitor, molded mica, .0018 mfd. $\pm 3\%$, 500 V. DC (working)	250109G67	218	Resistor, composition, pigtail, 100,000 ohm $\pm 10\%$, 1 watt	230069G86
115	Capacitor, molded mica, .004 mfd. $\pm 3\%$, 500 V. DC (working)	250131G2	219	Resistor, composition, pigtail, 68,000 ohm $\pm 10\%$, 1 watt	230069G84
116	Capacitor, molded mica, .0013 mfd. $\pm 10\%$, 500 V. DC (working)	250131G1	220	Resistor, composition, pigtail, 15,000 ohm $\pm 10\%$, 1 watt	230069G76
117	Capacitor, molded mica, 270 mmf. $\pm 10\%$, 500 V. DC (working)	250107G87	221	Resistor, composition, pigtail, 10,000 ohm $\pm 10\%$, 1 watt	230069G74
118	Capacitor, molded mica, 470 mmf. $\pm 20\%$, 500 V. DC (working)	250107G98	222	Resistor, composition, pigtail, 300,000 ohm $\pm 10\%$, $\frac{1}{2}$ watt	230069G218
119	Capacitor, silver mica, 404 mmf. $\pm 1\%$, 500 V. DC	250107G102	223	Potentiometer, 1 megohm $\pm 20\%$	240023
120	Capacitor, molded mica, 50 mmf. $\pm 5\%$, 500 V. DC (working)	250085G25	224	Potentiometer, 1 megohm $\pm 20\%$ with switch	240024
121	Capacitor, molded mica, 15 mmf. $\pm 20\%$, 500 V. DC (working)	250107G3040	225	Potentiometer, 3 megohm $\pm 20\%$	220055
122	Capacitor, paper, tubular, 0.1 mfd. $\pm 20\%$, 600 V. DC (working)	250107G93	226	Transformer, including two 160 mmf. capacitors 129-1 and 129-2	220056G2
123	Capacitor, paper, tubular, 0.1 mfd. $\pm 20\%$, 600 V. DC (working)	250104G1	302	Transformer, including two 170 mmf. capacitors 130-1 and 130-2	360178
125	Capacitor, molded mica, .0033 mfd. $\pm 10\%$, 500 V. DC (working)	250109G85	303	Transformer, input	360179
126	Capacitor, variable, 5-50 mmf.	260042G2	304	Transformer, power 110-220 V. 50-60 cycle	320013
127	Capacitor, 3 gang variable, 422.2 mmf.	260011	305	Transformer, antenna, 3-band	300017
128	Capacitor, variable, 4.5-25 mmf.	260042G1	306	Transformer, R.F., 3-band	360186
129	Capacitor, silver mica, 160 mmf. $\pm 1\%$, 500 V. DC (working)	250085G28	307	Transformer, oscillator, 3-band	360188
130	Capacitor, silver mica, 170 mmf. $\pm 1\%$, 500 V. DC (working)	250085G29	308	Coil, 10 kc filter	360190
131	Capacitor, electrolytic, 30-10 mfd. 475 V. DC (working)	273610	401	Switch, rotary, 2-deck 4-position	160107
132	Capacitor, electrolytic, 40 mfd. 40 V. DC (working)	270020G3	402	Switch, rotary, D.P.D.T.	160106
133	Capacitor, molded mica, .001 mfd. $\pm 10\%$, 500 V. DC (working)	250109G64	403	Switch, rotary, 3-deck, 3-position	160089
201	Resistor, composition, pigtail, 2.2 megohms $\pm 10\%$, $\frac{1}{2}$ watt	230069G33	404	Switch, rotary, D.P.D.T., screwdriver slot adjustment	160091
202	Resistor, composition, pigtail, 1 megohm $\pm 10\%$, $\frac{1}{2}$ watt	230069G98	501	Socket	189741
203	Resistor, composition, pigtail, 0.27 megohm $\pm 10\%$, $\frac{1}{2}$ watt	230069G91	502	Socket	189788
204	Resistor, composition, pigtail, 0.22 megohm $\pm 10\%$, $\frac{1}{2}$ watt	230069G90	503	Socket	180060
205	Resistor, composition, pigtail, 100,000 ohm $\pm 10\%$, $\frac{1}{2}$ watt	230069G86	504	Socket, miniature bayonet	180078

THE MAGNAVOX CO.

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Models A-206 and A-206A amplifier chassis are alike electrically. They differ mechanically only to the extent that A-206A has its volume and tone controls mounted on the amplifier chassis; these controls are mounted on the case motorboard remote from the amplifier when A-206 is incorporated.

MODEL CR-187

THE MAGNAVOX CO.

I.F. — 455 K.C.

NOTES

1. BAND SWITCH SHOWN IN COUNTER-CLOCKWISE POSITION (SHORT WAVE) VIEWED FROM THE FRONT PANEL.
2. BAND EXPANDER SWITCH SHOWN BENEATH FIRST I-F TRANSFORMER IS ACTUATED BY THE TREBLE CONTROL KNOB.
3. ALL ELECTRICAL VALUES SHOWN ARE IN MICROFARADS OR OHMS UNLESS OTHERWISE SPECIFIED.

CABINET
S.W. ANTENNA

TUNING EYE SOCKET
BACK VIEW

VOLTAGE TABLE

NOTE—MEASURE HEATER AND FILAMENT VOLTAGES DIRECTLY ACROSS SOCKET TERMINALS. ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINAL TO GROUND WITH A 1000 OHM/VOLT VOLTMETER WITH BANDSWITCH IN SHORT WAVE POSITION.
(H) HEATERS 6.3 VOLTS A.C. MEASURE CATHODES ON 30 V. SCALE—ALL OTHERS ON 600 V. SCALE. LINE VOLTAGE 117 V. A.C. 94 WATTS.

Dial lamps.....	Mazda No. 51
Speaker:	
Field coil resistance.....	1000 ohms
Voice coil impedance (400 cycles).....	3.0 ohms
Output transformer.....	8000/3 ohms

STAGE GAINS*

Antenna Post to Converter Grid at:	
600 kc.	5.5
6 mc.	2.0
R-F on Converter Grid to I-F Grid at:	
600 kc.	28
6 mc.	22
I-F on Converter Grid to I-F Grid at:	
455 kc.	34
I-F Grid to Detector Plate at:	
455 kc.	67

AUDIO GAIN

Voltage required across Volume Control to produce .05 watt speaker output** at 400 cycles is .010 volt with Band Selector Switch in BDCST setting.

OSCILLATOR OUTPUT VOLTAGE

The DC voltage developed across Oscillator Grid Resistor (48) at:	
600 kc.	5.6
6 mc.	6.0

* Variations of $\pm 20\%$ are permissible. All readings made with sufficient input signal to provide .05 watt speaker output.

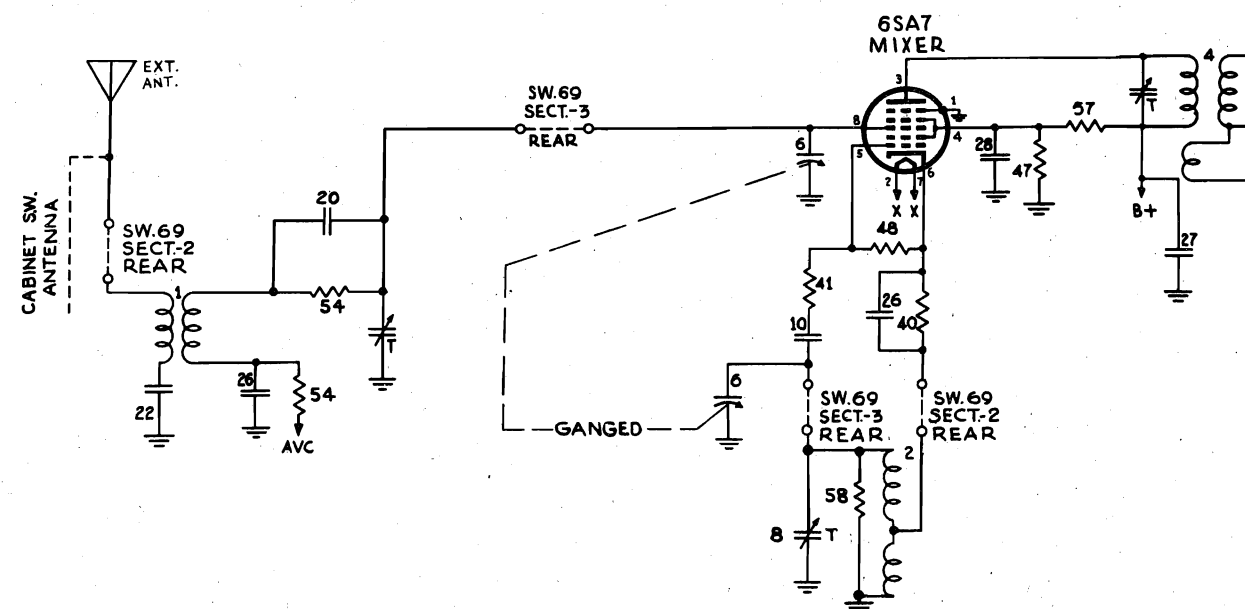
** .05 watt speaker output at 400 cycles is equivalent to a reading of 0.4 volts as measured by a high resistance AC voltmeter across the speaker voice coil.

Power supply.....	117 volts 50/60 cycles AC
Power consumption.....	93 watts
Power output.....	12 watts
Intermediate frequency.....	455 kc.
Tuning frequency range:	
Broadcast band.....	520—1620 kc.
Short Wave band.....	5.0—18.2 mc.

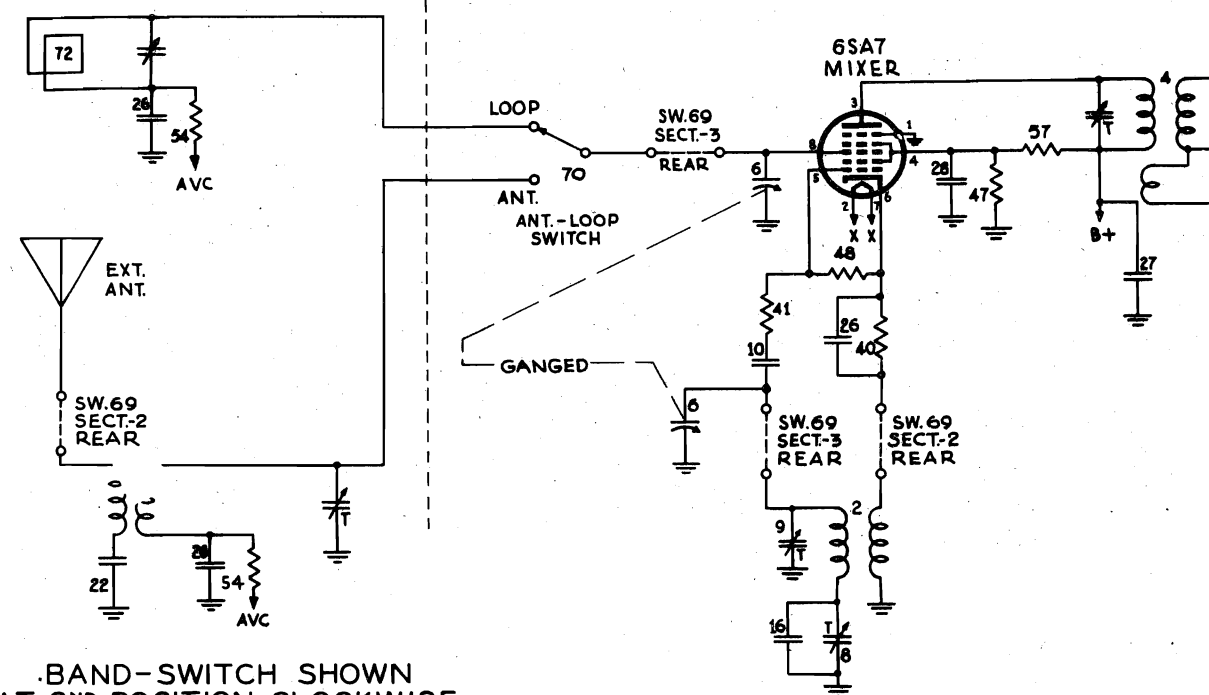
MAY, 1946

THE MAGNAVOX CO.

MODEL CR-187
MODEL CR-193



BAND-SWITCH SHOWN
AT 1ST POSITION.
SHORT WAVE BAND
5.0 - 18.2 MC.



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
BROADCAST BAND
520 - 1620 KC.

MODEL CR-187

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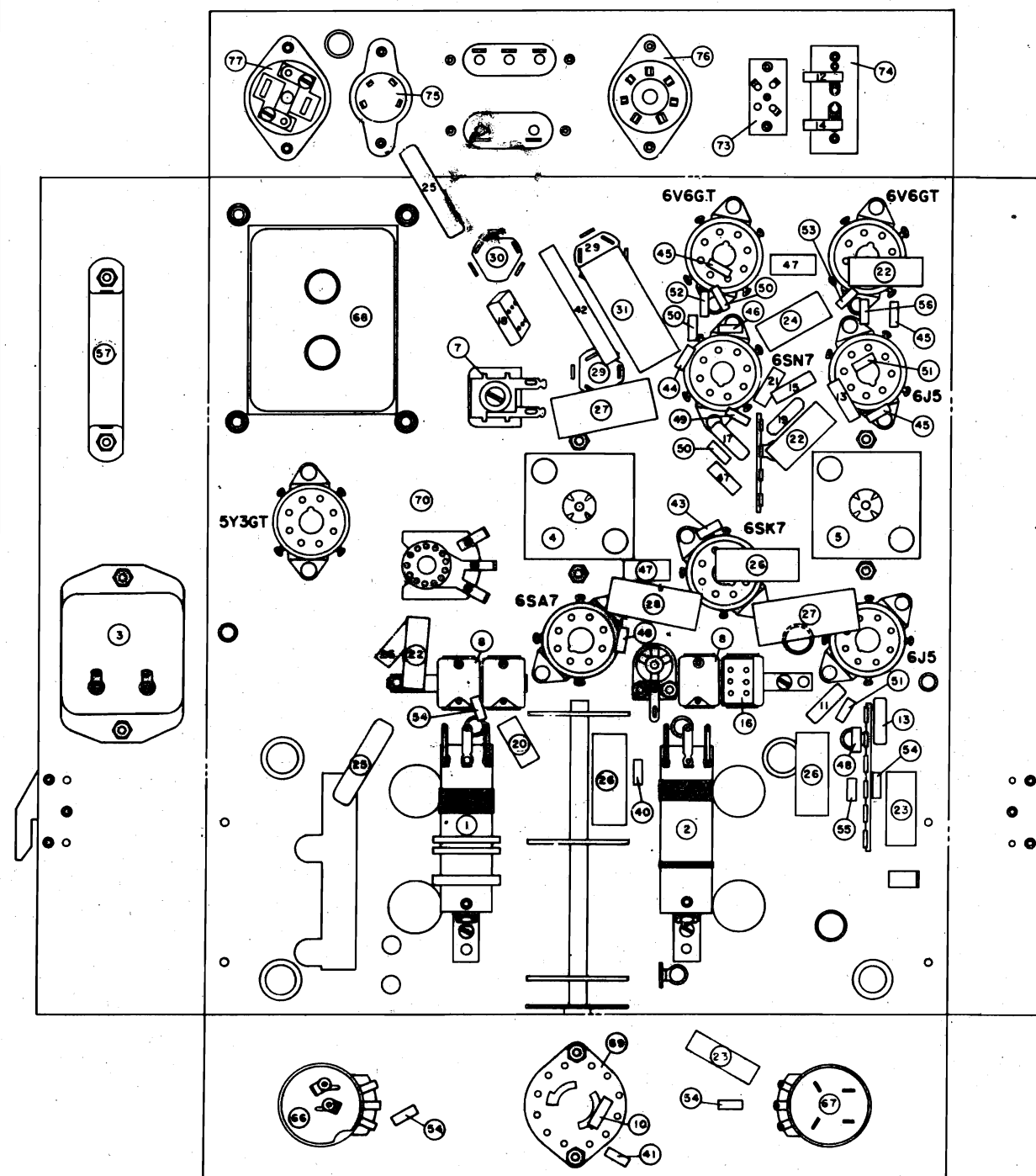


FIGURE 5

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MODEL CR-187

MODEL CR-188

MODEL CR-193

Completely unmesh the condenser gang and check the location of the hole or slot in pulley "D." If this hole is not approximately 45 degrees back from vertical as shown on Figure 1, loosen the two No. 6 Allen set screws in the hub of pulley "D" and slip the pulley on its shaft (while holding the condenser gang unmeshed) until the specified adjustment is obtained; then tighten one of the set screws securely. It will be shown later that this is a temporary setting. Next, tie a double knot in the exact center of a 25-inch length of dial cable and fold the cable back on itself so that the knot is at one end. The correct method for tying this knot is shown as an inset on Figure 1. Grasp the cable near the knotted end and slide it into the pulley slot so that the knot is against the inside rim of the pulley as shown in the sketch. The piece of cable nearest the dial frame should be wound in the direction shown for one-half turn; then over the lower pulley "B," around the bottom of the large pulley "D" and into the hole. Pull the cable taut and wrap the end around the small hook on pulley "D" temporarily.

The remaining piece of cable should be wound around pulley "A" in the direction shown, for one complete turn, over the upper pulley "C," and over the top of pulley "D." Thread the end through the small hole in pulley "D" and pull both ends of the cable taut. With one end of tension spring "E" fastened to the hook on pulley "D" lace the two free ends of the cable through the opposite end of the spring and tie a knot at a point that will allow $\frac{1}{4}$ " to $\frac{5}{16}$ " of cable between the spring and the inside rim of pulley "D." Be sure to tie the knot around one coil of the spring in the manner shown.

Now with the condenser gang completely meshed, check the position of the dial pointer. If it is not in line with the last calibration mark at the low frequency end of the dial, loosen the set screw in pulley "D" and turn it until the pointer is in the specified position. Be sure that the condenser gang does not move during this adjustment. Then tighten the two screws in pulley "D" securely completing the operation.

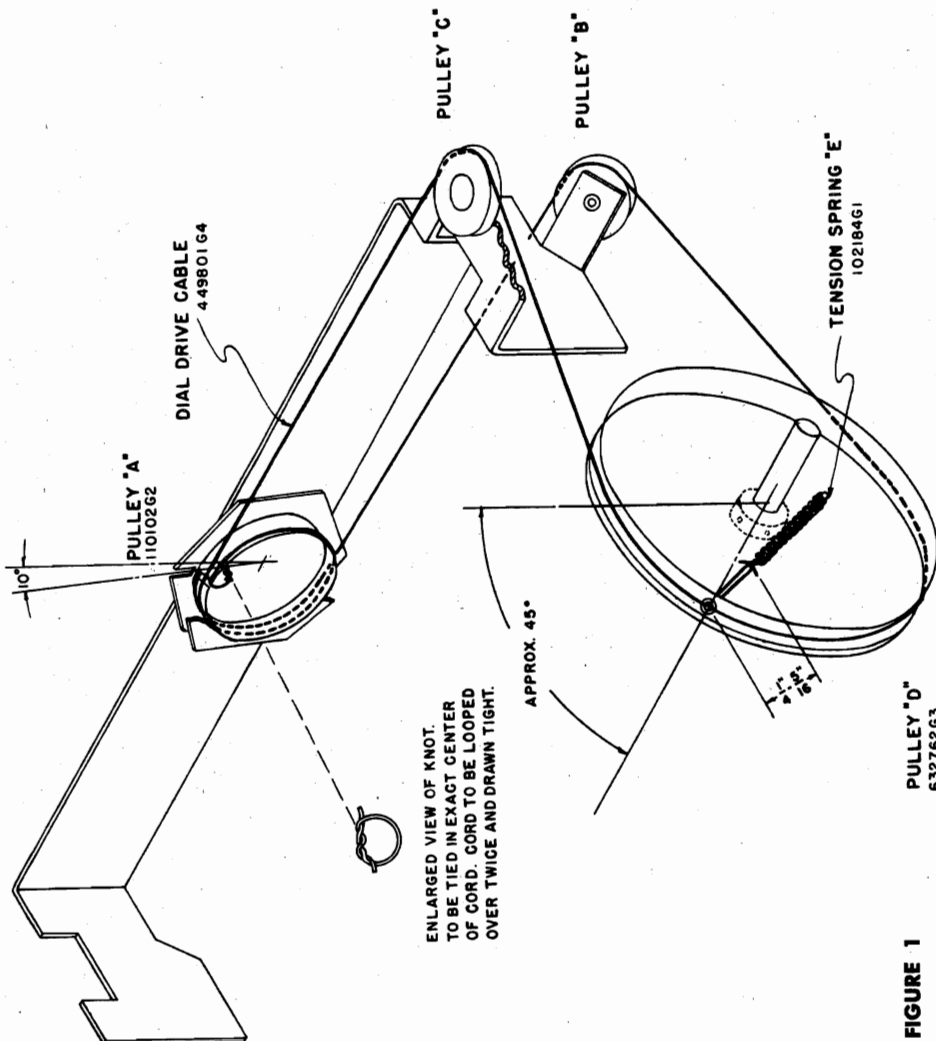


FIGURE 1

DIAL CORD REPLACEMENT

Rotate the brass pulley designated "A" in Figure 1 To correct this condition, first remove the glass dial until the dial pointer strikes the stop at the high and loosen the pointer screw. Then while holding frequency end of the dial calibration. In this condition pulley "A" so that its slot is approximately ten degrees the slot in pulley "A" should be approximately vertical (when viewed from the rear) adjust the pointer until it is resting against the ten degrees to the left of being vertical—see Figure 1. If the slot in the pulley is in some other position under stop at the high frequency end of its travel. Then the above mentioned conditions, the pointer set screw securely and replace the glass dial. If the slot in the pulley is in some other position under stop at the high frequency end of its travel. Then the above mentioned conditions, the pointer set screw securely and replace the glass dial. If the slot in the pulley is in some other position under stop at the high frequency end of its travel. Then the above mentioned conditions, the pointer set screw securely and replace the glass dial.

MODEL CR-187

MODEL CR-188

MODEL CR-193

THE MAGNAVOX CO.

CONDENSER GANG DRIVE ADJUSTMENTS

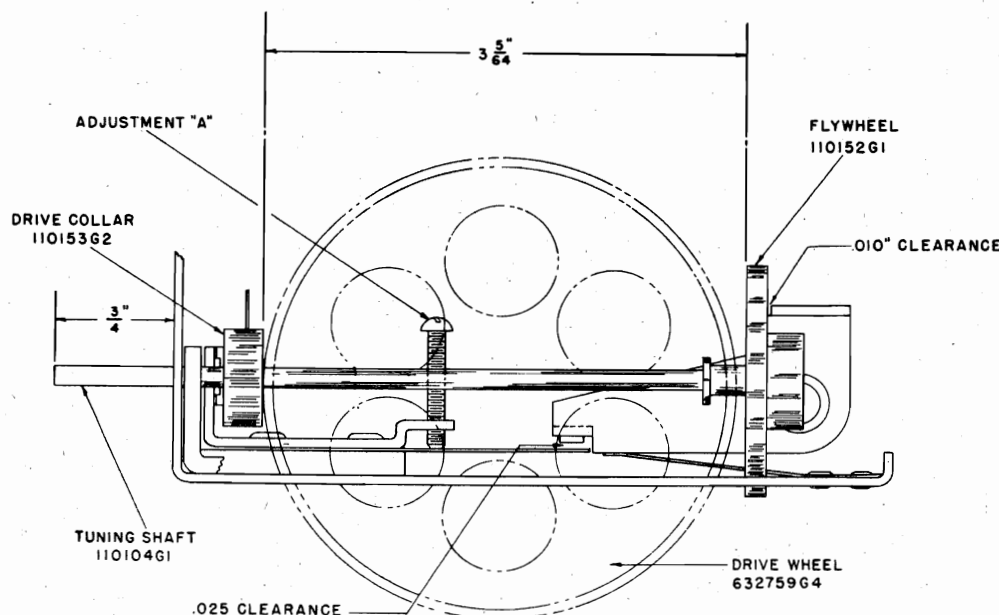


FIGURE 2

Whenever any of the mechanical parts in the condenser gang drive assembly require replacement due to rough handling or for any other reason, it is extremely important that clearances and adjustments shown on Figures 2 and 3 are affected; otherwise the tuning mechanism will be sluggish or it may slip during operation.

In reassembling the mechanism after any part was replaced, follow the procedure outlined below:

1. Assemble the Tuning Shaft, Drive Collar, Compression Spring, Spring Retainer and Flywheel in the manner shown on Figure 3. The Tuning Shaft must extend $\frac{3}{4}$ " from the front of the assembly and that the spacing between the rear of the Drive Collar and the front of the Flywheel must be $3\frac{5}{64}$ " as specified on Figure 2. Any excess length in the Tuning Shaft may extend beyond the rear of the Flywheel.
2. The distance between the rubber-tired Drive Wheel and the smaller diameter section of the Spring Retainer must be $\frac{1}{32}$ " to $\frac{1}{16}$ ". This adjustment is effected by loosening the two No. 6 Allen set screws in the Drive Wheel hub and sliding the wheel on its shaft until the required clearance is obtained. When the adjustment is completed, tighten the two screws in the hub of the Drive Wheel. See Figure 3.
3. While pressing down on the Treadle Bar at the location shown on Figure 3, adjust the Thrust Bracket until the clearance between the rest of the Flywheel and the projection on the Thrust Bracket is .010" as shown on the diagram. To make this adjustment, loosen the two No. 6 Allen set screws (use No. 6 Allen Wrench—Magnavox Part No. 800044G2) in the hub of Thrust Bracket and rotate the bracket until the specified clearance is obtained when the push buttons are NOT actuated. Tighten the two screws securely when the adjustment is completed. Press each push button and check that the Drive Collar is pushed away from the rubber-tired Drive Wheel.
4. Next, adjust the clearance in the muting switch contacts by turning the Phillips-head screw designated Adjustment "A" on Figure 2, until the specified clearance of .025" is obtained (when the push buttons are NOT actuated.)
5. While pressing any one of the push buttons in as far as possible, turn the screw designated Adjustment "B" (Figure 3) until a minimum clearance of .015" is obtained between the front surface of the Drive Collar and the switch spring directly in front of it. This setting should also cause a minimum clearance of .010" between the switch contacts actuated

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MODEL CR-187

MODEL CR-188

MODEL CR-193

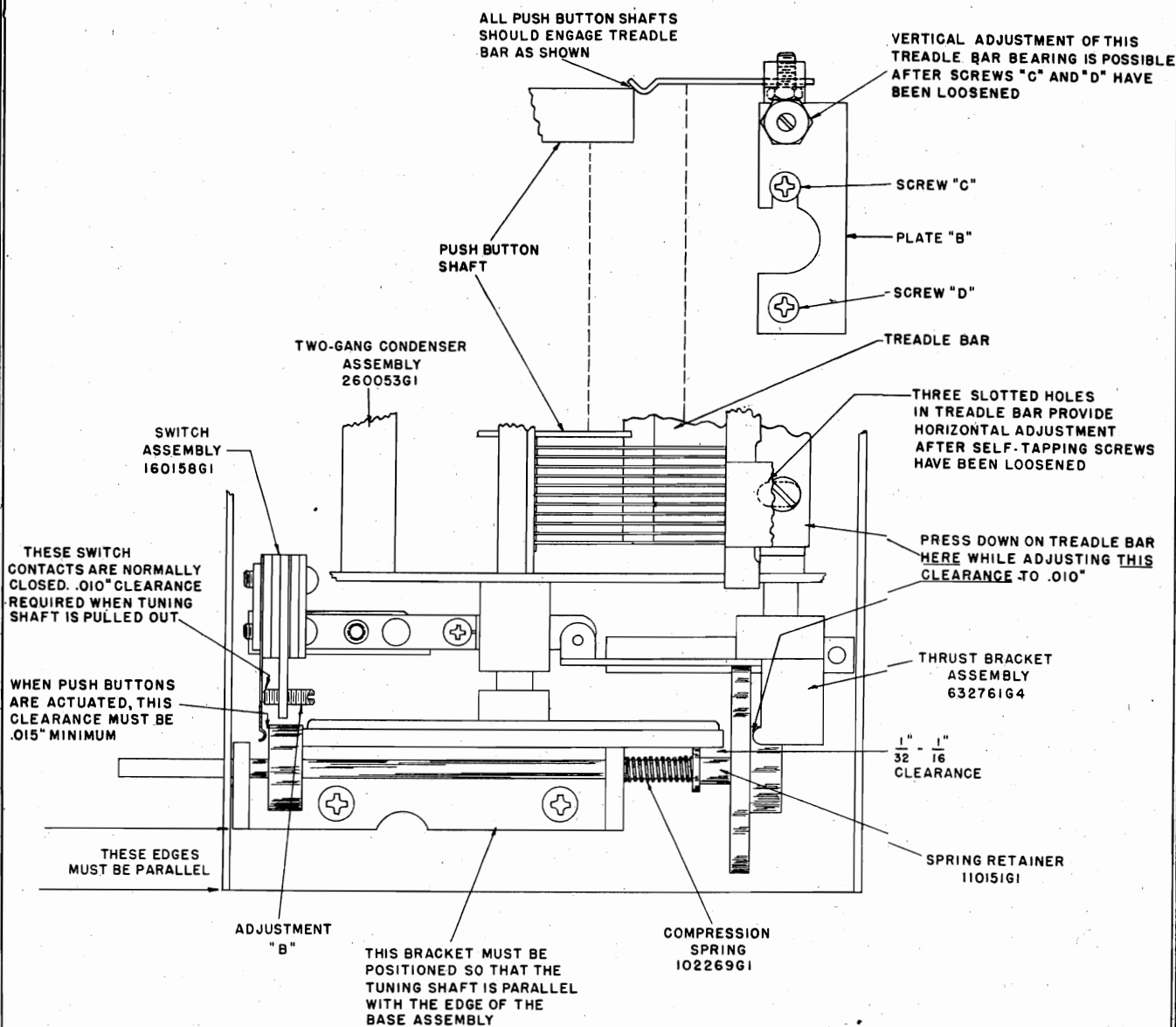


FIGURE 3

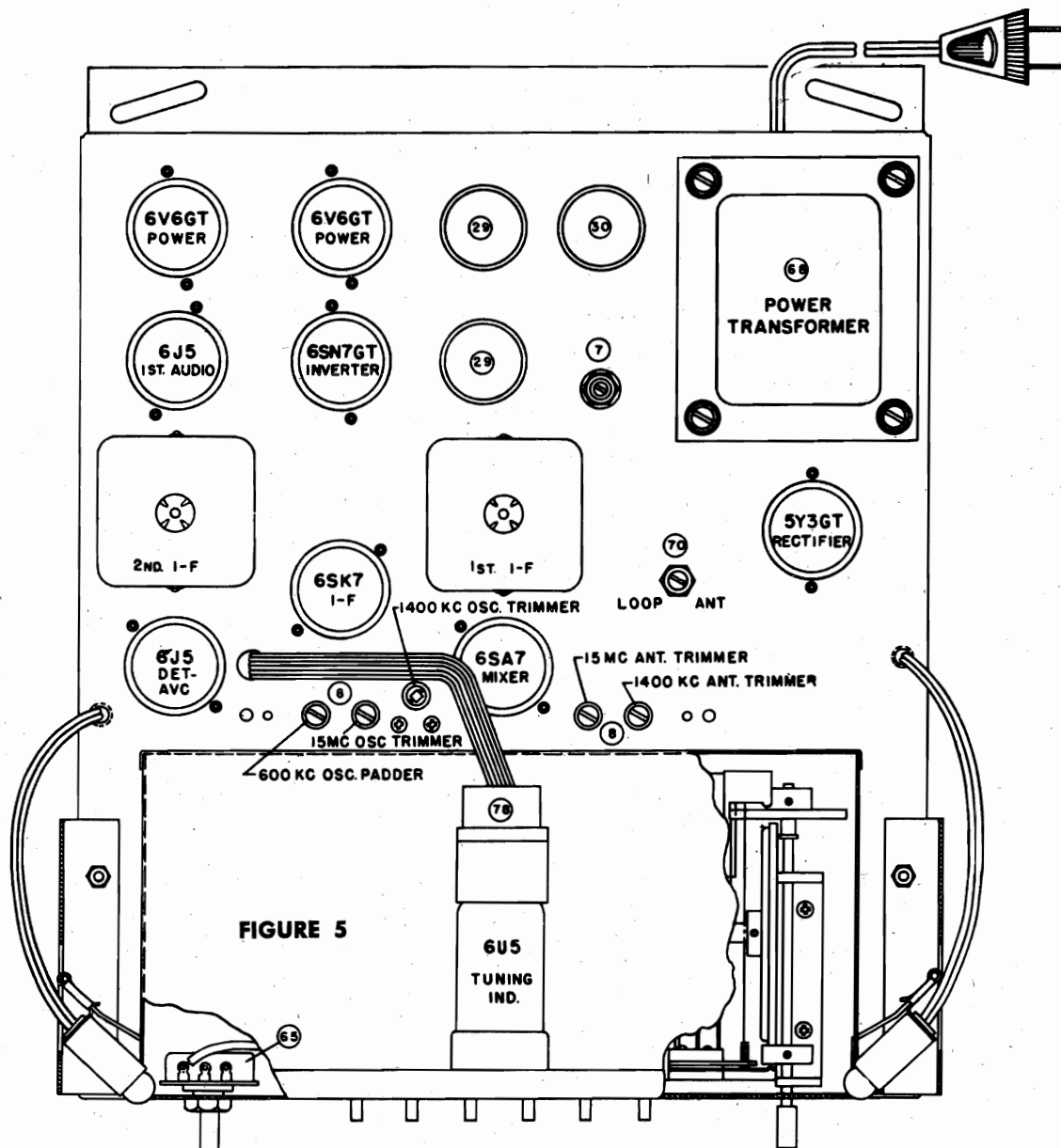
by pressure of the front surface of the Drive Collar, when the Tuning Shaft is pulled out. The function of this switch is to open the muting circuit when setting up the push buttons. As its contacts are wired in series with the large muting switch (contacts are shorted by pressing any push button), pulling out on the Tuning Shaft causes the small switch contacts to open the muting circuit so that a station can be heard while the push button is held in and tightened. On rare occasions it may be necessary to adjust the

relation between the push button bars and the Treadle Bar. Such adjustment might be required if when pushing any of the push buttons, sufficient motion is not transmitted to the Treadle Bar to cause a disengagement between the Drive Collar and the Drive wheel.

This can usually be accomplished by loosening the two screws designated "C" and "D" on Figure 3, and moving plate "B" in the direction required to correct this condition.

MODEL CR-187
MODEL CR-193

THE MAGNAVOX CO.



Method for Removing Chassis from Cabinet

Model CR-187 radio chassis is designed for easy removal from the cabinet in which it is installed. As the radio panel is permanently fastened to the chassis, the control knobs need not be removed when the chassis is taken out of the cabinet for service. To remove the chassis, first remove the antenna leads from their terminals and all plugs from the receptacles on the rear of the chassis. Then remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Lift the rear of the chassis about one inch and pull it straight back. Never remove the chassis tray from the cabinet—it has been properly positioned to bring the radio panel in place when the chassis is replaced. In replacing the chassis, slide it so that the small

hooks near the front, ride inside the flanges on the sides of the chassis tray. Push the chassis forward as far as it will go and the hook should then engage the slots in the chassis tray. Replace the two Phillips-head screws and nuts and tighten securely. Replace all plugs in their receptacles and the antenna leads on their correct terminals. The antenna terminal board for the loop antenna connections is designated S-L-H. The end of the short wave antenna that is fastened to the inside of the cabinet connects to S. Always disconnect this antenna from terminal S when an outdoor antenna is used as it may pick up noise. The two terminals on the loop are designated L and H. The leads connected to these terminals should be wired to the corresponding terminals (L and H) on the chassis.

THE MAGNAVOX CO.

MODEL CR-137

MODEL CR-193

The alignment of this receiver requires the use of an accurately calibrated r-f signal generator and an output meter. All trimmer condenser locations are shown on the chassis layout diagram, Figure 5. The radio volume control should be turned to maximum and the signal generator output kept as low as possible during alignment to prevent the AVC from operating and giving false readings. *Always set the Selectivity Switch to SHARP TUNE before aligning the i-f stages.* This is done by turning the Treble Control counter-clockwise as far as possible.

I-F ALIGNMENT

1. Connect the output of the signal generator to the oscillator grid (pin No. 5) of the 6SA7 tube through a .00025 mfd. capacitor. The ground on the signal generator should be connected to the radio chassis ground.

2. Turn the condenser gang until it is completely meshed, (low-frequency end of dial calibration) and set the band selector switch to BDCST as for broadcast band reception.

3. Adjust the signal generator to EXACTLY 455 kc. and peak the second i-f transformer and the first i-f transformer trimmers in that order.

On early models of the CR-187 chassis, the two i-f trimmers are located in the top of the respective i-f transformers. In later production, one trimmer is accessible from the top and the other from the bottom of each transformer as shown in the layout diagram, Figure 5.

BROADCAST BAND ALIGNMENT

1. Remove the signal generator lead from the 6SA7 grid and connect it to the radio antenna terminal through the .00025 mfd. capacitor. The ANT-LOOP switch (70) must be in the ANT. setting.

2. Check the tuning-dial pointer adjustment. When the plates of the tuning condenser are completely meshed, the dial pointer must be in line with the last calibration mark at the low frequency end of the dial. If it is not, loosen the set screws in the hub of pulley "D" shown on Figure 1 and make the necessary adjustment.

3. With the band selector still set for broadcast band reception, adjust the signal generator and the radio receiver to 600 kc. While rocking the gang condenser a few degrees to the right and to the left, adjust the 600 kc. oscillator padder for maximum indication on the output meter.

4. Set the signal generator and the radio receiver to 1400 kc.; adjust the 1400 kc. oscillator trimmer and the 1400 kc. antenna trimmer for maximum output. If considerable adjustment was necessary, recheck the 600 kc. padder setting.

5. If the loop antenna trimmer is out of adjustment it should be set after the radio chassis is in the cabinet. Set the ANT-LOOP switch (70) to the LOOP position. Adjust the signal generator to 1400 kilocycles and connect its output to a loop containing approximately five turns of wire eight inches in diameter placed eighteen inches from the receiver loop and in the same plane.

6. Set the receiver to 1400 kc. and adjust the trimmer on the receiver loop for maximum output.

SHORT WAVE BAND ALIGNMENT

1. Set the band selector switch to SW as for short wave reception and substitute a 400 ohm resistor for the capacitor in series with the signal generator lead connected to the antenna terminal on the receiver.

2. Set the signal generator and the radio receiver to 15 mc.; then adjust the 15 mc. oscillator trimmer and the 15 mc. antenna trimmer for maximum output. While adjusting the 15 mc. oscillator trimmer two peaks may be observed; only one is the correct peak for 15 mc. alignment. Screw in the trimmer to maximum capacity—then decrease the capacity until the first peak is observed. This is the correct one.

10 KC FILTER ADJUSTMENT

This chassis incorporates a 10 kc. filter circuit to eliminate the beat note heard as a whistle between stations on the broadcast band. If the trimmer is out of adjustment, the following procedure should be observed.

1. Set the Selectivity Switch to FULL RANGE by turning the Treble Control knob clockwise as far as possible.

2. Connect the output of an audio oscillator to the phonograph pickup socket on the radio chassis and adjust the oscillator to EXACTLY 10,000 cycles.

3. Set the band selector to PHONO and adjust the 10 kc. trimmer (7) for minimum output.

4. If an audio oscillator is not available for making this adjustment, set the band selector to BDCST, connect an antenna to the receiver and set the gang condenser to a point between two stations on adjacent channels having approximately the same power. If the 10 kc. trimmer is out of adjustment, a whistle will be heard. Adjust the trimmer until the whistle is eliminated.

MODEL CR-187

MODEL CR-194

THE MAGNAVOX CO.

CR-187

CR-194

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.	REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil assembly, r-f, two band	360238G1	1	Coil assembly, r-f, two band	360256G1
2	Coil assembly, oscillator, two band	360239G1	2	Coil assembly, oscillator, two band	360255G1
3	Coil assembly, 10 kc filter	360240G1	3	Coil assembly, 10 kc filter	360240G1
4	Transformer, first i-f	360266G1	4	Transformer, first i-f	360266G1
5	Transformer, second i-f	360267G1	5	Transformer, second i-f	360267G1
6	Capacitor, variable, two-gang tuning	260053G1	6	Capacitor, variable, two-gang tuning	260056G1
7	Capacitor, variable, 10 kc trimmer	250008G1	7	Capacitor, variable, 10 kc trimmer	250008G1
8	Capacitor, variable, 2 gang trimmer	260021G1	8	Capacitor, variable, 2 gang trimmer	260021G1
9	Capacitor, variable, oscillator padder	260042G2	9	Capacitor, variable, oscillator trimmer	260042G2
10	Capacitor, ceramic, 50 mmf.	250088G24	10	Capacitor, ceramic, 50 mmf.	250088G24
11	Capacitor, molded mica, 100 mmf. $\pm 20\%$	250159G98	11	Capacitor, molded mica, 100 mmf. $\pm 20\%$	250159G98
12	Capacitor, molded mica, 100 mmf. $\pm 10\%$	250159G82	12	Capacitor, molded mica, 100 mmf. $\pm 10\%$	250159G82
13	Capacitor, molded mica, 220 mmf.	250159G100	13	Capacitor, molded mica, 220 mmf. $\pm 20\%$	250159G100
14	Capacitor, molded mica, 330 mmf.	250159G88	14	Capacitor, molded mica, 330 mmf. $\pm 10\%$	250159G88
15	Capacitor, molded mica, 270 mmf.	250159G87	15	Capacitor, molded mica, 270 mmf. $\pm 10\%$	250159G87
16	Capacitor, silvered mica, 583 mmf. $\pm 1\%$	250085G33	16	Capacitor, silvered mica, 529 mmf. $\pm 1\%$	250085G34
17	Capacitor, molded mica, 470 mmf.	250159G102	17	Capacitor, molded mica, 470 mmf. $\pm 20\%$	260159G102
18	Capacitor, molded mica, 1000 mmf.	250160G82	18	Capacitor, molded mica, 1000 mmf. $\pm 20\%$	250160G82
19	Capacitor, molded mica, 1800 mmf.	250160G67	19	Capacitor, molded mica, 1800 mmf. $\pm 10\%$	250160G67
20	Capacitor, molded mica, 5100 mmf. $\pm 2\%$	250161G66	20	Capacitor, molded mica, 5600 mmf. $\pm 2\%$	250161G7
21	Capacitor, paper, .003 mfd. 400 V.	250152G43	21	Capacitor, paper, .003 mfd. 600 V.	250152G43
22	Capacitor, paper, .01 mfd. 600 V.	250152G38	22	Capacitor, paper, .01 mfd. 600 V.	250152G38
23	Capacitor, paper, .01 mfd. 200 V.	250152G18	23	Capacitor, paper, .01 mfd. 200 V.	250152G18
24	Capacitor, paper, .02 mfd. 400 V.	250152G26	24	Capacitor, paper, .02 mfd. 400 V.	250152G26
25	Capacitor, molded paper, .02 mfd. 600 V.	250129G3	25	Capacitor, molded paper, .02 mfd.	250129G3
26	Capacitor, paper, .05 mfd. 200 V.	250152G15	26	Capacitor, paper, .05 mfd. 200 V.	250152G15
27	Capacitor, paper, .1 mfd. 400 V.	250152G22	27	Capacitor, paper, .1 mfd. 400 V.	250152G22
28	Capacitor, paper, .1 mfd. 200 V.	250152G13	28	Capacitor, paper, .1 mfd. 200 V.	250152G13
29	Capacitor, electrolytic, 10 mfd. 450 V., 20 mfd. 25V.	270023G6	29	Capacitor, electrolytic, 10 mfd. 450 V.-20 mfd. 25 V.	270023G6
30	Capacitor, electrolytic, 10-30 mfd. 450 V.	270023G2	30	Capacitor, electrolytic, 10-30 mfd. 450 V.	270023G2
31	Capacitor, electrolytic, 20 mfd. 25V.	270027G2	31	Capacitor, electrolytic, 20 mfd. 25 V.	270027G2
40	Resistor, composition, 150 ohm $\frac{1}{2}$ W.	230084G8	40	Resistor, composition, 150 ohm $\frac{1}{2}$ W.	230084G8
41	Resistor, composition, 220 ohm $\frac{1}{2}$ W.	230084G9	41	Resistor, composition, 220 ohm $\frac{1}{2}$ W.	230084G9
42	Resistor, composition, 220 ohm 3 W.	230064G54	42	Resistor, wire wound, 125 ohm.	240021G11
43	Resistor, composition, 470 ohm $\frac{1}{2}$ W.	230084G1	43	Resistor, composition, 470 ohm $\frac{1}{2}$ W.	230084G11
44	Resistor, composition, 1500 ohm $\frac{1}{2}$ W.	230084G14	44	Resistor, composition, 1500 ohm $\frac{1}{2}$ W.	230084G14
45	Resistor, composition, 4700 ohm $\frac{1}{2}$ W.	230084G17	45	Resistor, composition, 4700 ohm $\frac{1}{2}$ W.	230084G17
46	Resistor, composition, 15,000 ohm $\pm 5\%$ $\frac{1}{2}$ W.	230084G187	46	Resistor, composition, 15,000 ohm $\pm 5\%$ $\frac{1}{2}$ W.	230084G187
47	Resistor, composition, 15,000 ohm 1 W.	230085G20	47	Resistor, composition, 15,000 ohm 1 W.	230085G20
48	Resistor, composition, 22,000 ohm $\frac{1}{2}$ W.	230084G21	48	Resistor, composition, 22,000 ohm $\frac{1}{2}$ W.	230084G21
49	Resistor, composition, 47,000 ohm $\frac{1}{2}$ W.	230084G23	49	Resistor, composition, 47,000 ohm $\frac{1}{2}$ W.	230084G23
50	Resistor, composition, 100,000 ohm $\frac{1}{2}$ W.	230084G25	50	Resistor, composition, 100,000 ohm $\frac{1}{2}$ W.	230084G25
51	Resistor, composition, 150,000 ohm $\frac{1}{2}$ W.	230084G26	51	Resistor, composition, 150,000 ohm $\frac{1}{2}$ W.	230084G26
52	Resistor, composition, 220,000 ohm $\pm 5\%$ $\frac{1}{2}$ W.	230084G215	52	Resistor, composition, 220,000 ohm $\pm 5\%$ $\frac{1}{2}$ W.	230084G215
53	Resistor, composition, 270,000 ohm $\frac{1}{2}$ W.	230084G91	53	Resistor, composition, 270,000 $\pm 10\%$ $\frac{1}{2}$ W.	230084G91
54	Resistor, composition, 470,000 ohm $\frac{1}{2}$ W.	230084G29	54	Resistor, composition, 470,000 ohm $\frac{1}{2}$ W.	230084G29
55	Resistor, composition, 1 megohm $\frac{1}{2}$ W.	230084G31	55	Resistor, composition, 1 megohm $\frac{1}{2}$ W.	230084G31
56	Resistor, composition, 4.7 megohm $\frac{1}{2}$ W.	230084G35	56	Resistor, composition, 4.7 megohm $\frac{1}{2}$ W.	230084G35
57	Resistor, wire wound, 10,000 ohm.	240035G2	57	Resistor, wire wound, 10,000 ohm.	240035G2
58	Resistor, composition, 15,000 ohm $\frac{1}{2}$ W.	230084G20	58	Resistor, composition, 15,000 ohm $\frac{1}{2}$ W.	230084G20
65	Control, volume, 1 megohm.	220044G15	59	Control, volume, 1 megohm.	220044G15
66	Control, bass, 1 megohm, with power switch	220045G2	35	Control, bass, 1 megohm, with power switch	220045G2
67	Control, treble, 1 megohm, with band expander switch	220071G2	36	Control, treble, 1 megohm, with band expander sw.	220071G2
68	Transformer, power, 117 V. 50/60 cycle	300025G1	67	Transformer, power, 117 V. 50/60 cycle	300032G1
69	Switch, rotary, band selector	160156G1	68	Switch, rotary, band selector	160156G1
70	Switch, rotary, loop to outdoor antenna	160157G1	69	Switch, rotary, loop to outdoor antenna	160157G1
71	Switch assembly, muting	160158G1	70	Switch assembly, muting	160158G1
72	Antenna, loop assembly	*	72	Antenna, loop assembly	*
73	Socket, external input	180060G1	73	Socket, external input	180060G1
74	Socket, phonograph input	189741G1	74	Socket, phonograph input	189741G1
75	Socket, phonograph motor	180501G5	75	Socket, phonograph motor	180501G5
76	Socket, speaker	180393G3	76	Socket, speaker	180393G3
77	Socket, FM power	180422G1	77	Socket, FM power	180422G1
78	Socket & Cable assembly, tuning indicator	180423G1	78	Socket and cable assembly, tuning indicator	180423G1

Due to the fact that a change was made in the mechanical construction of the dial assembly after the first CR-187 radio chassis production run, it is important that you follow the procedure outlined below in ordering replacement glass dials.

If the glass dial for which a replacement is required is marked 150260, order a 150276 dial glass assembly. If the glass is marked 150281, order a 150283 dial glass assembly. These assemblies include the rubber strips cemented in their correct positions.

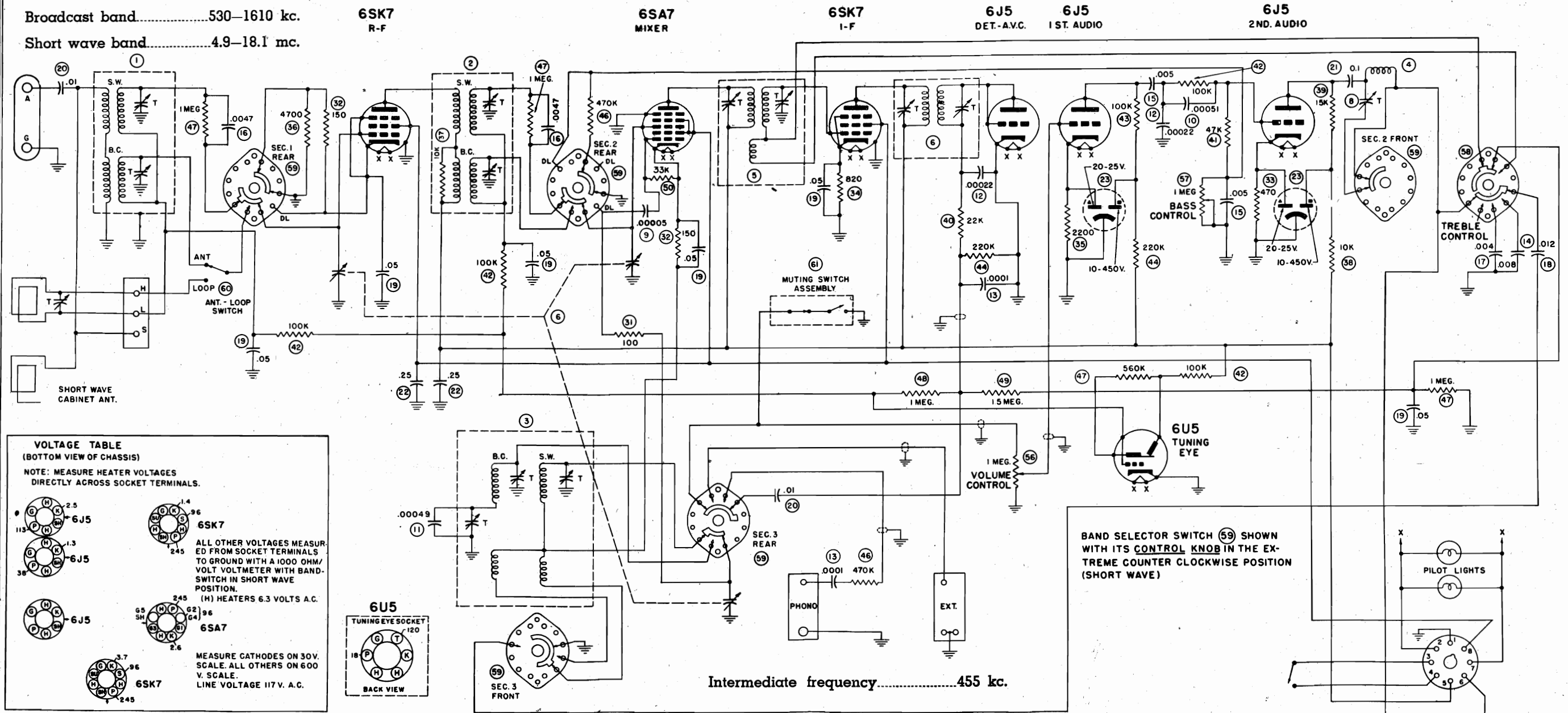
*The part number of the loop antenna assembly changes with different cabinets. It is therefore important that you specify the Style Number of the instrument when ordering a replacement loop antenna assembly.

THE MAGNAVOX CO.

Tuning frequency range:

Broadcast band.....530-1610 kc.

Short wave band.....4.9-18.1 mc.



REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil Assembly, antenna, two band.....	360254G1
2	Coil Assembly, r-f, two band.....	360254G2
3	Coil Assembly, oscillator, two band.....	360253G1
4	Coil Assembly, 10 kc. filter.....	360244G1
5	Transformer, first i-f.....	360266G1
6	Transformer, second i-f.....	360267G1
7	Capacitor, variable, three-gang tuning.....	260054G1
8	Capacitor, variable, 10 kc. trimmer.....	259610G1
9	Capacitor, ceramic, 50 mmf.....	250088G25
10	Capacitor, molded mica, 510 mmf.....	250159G64
11	Capacitor, silvered mica, 490 mmf. $\pm 1\%$	250085G32
12	Capacitor, molded mica, 220 mmf.....	250159G100
13	Capacitor, molded mica, 100 mmf.....	250159G98
14	Capacitor, paper, .008 mfd.....	250129G11

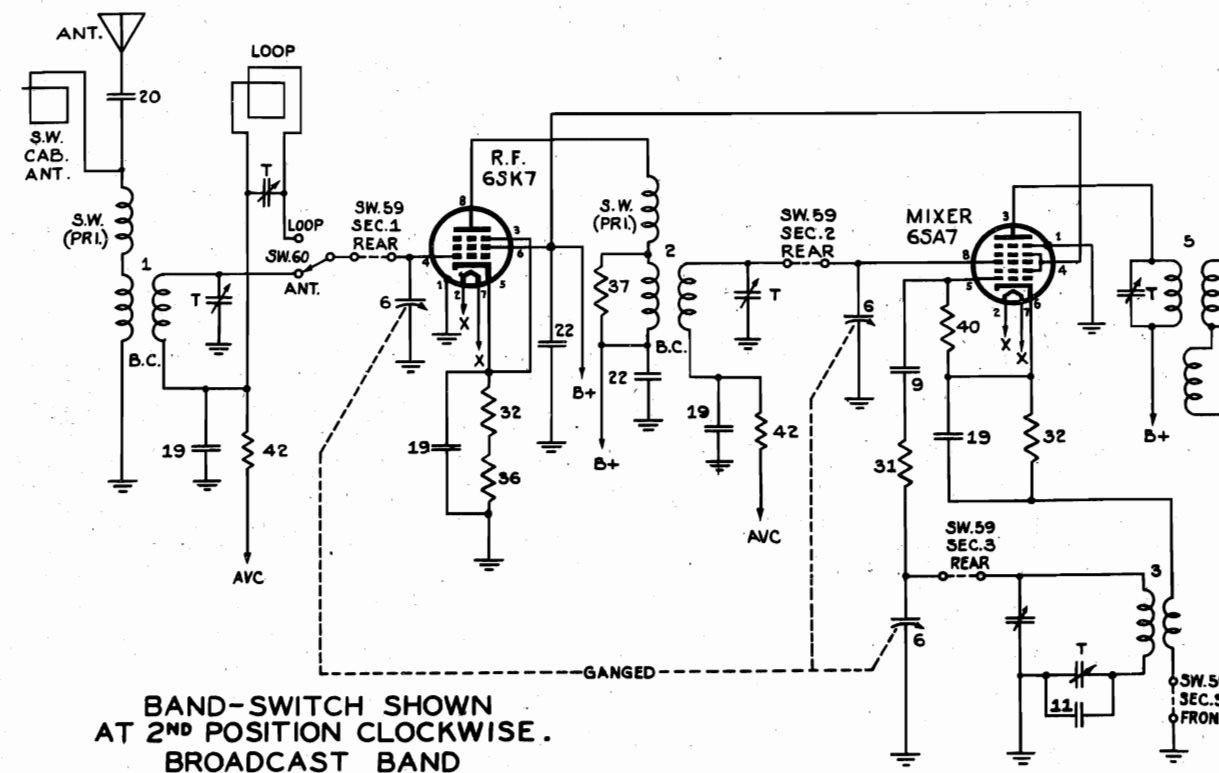
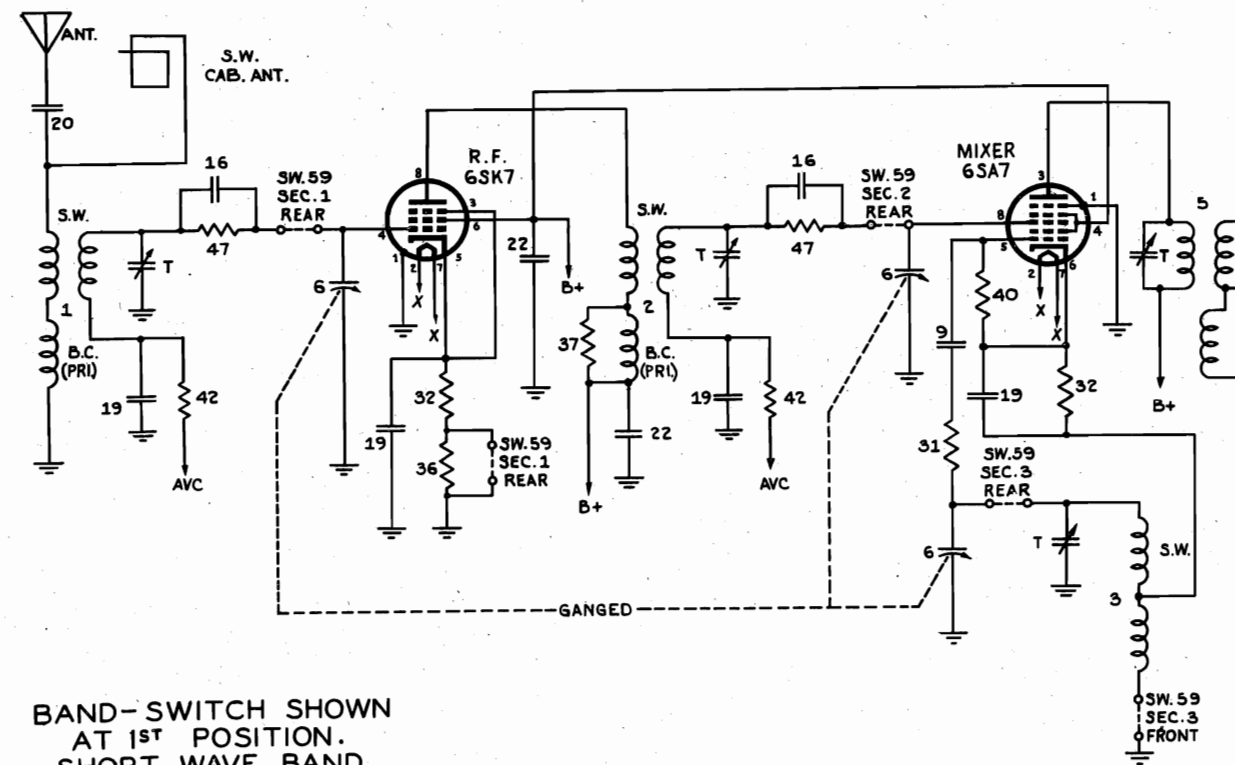
15	Capacitor, paper, .005 mfd.....	250129G10
16	Capacitor, molded mica, .0047 mfd.....	250161G5
17	Capacitor, paper, .004 mfd.....	250129G7
18	Capacitor, paper, .012 mfd.....	250129G13
19	Capacitor, paper, .05 mfd.....	250129G5
20	Capacitor, paper, .01 mfd.....	250129G9
21	Capacitor, paper, 0.1 mfd.....	250152G22
22	Capacitor, paper, 0.25 mfd.....	250152G21
23	Capacitor, electrolytic, 20 mfd. 25V-10 mfd. 450V.....	270023G6
31	Resistor, composition, 100 ohm $\frac{1}{2}$ W.....	230084G7
32	Resistor, composition, 150 ohm $\frac{1}{2}$ W.....	230084G8
33	Resistor, composition, 470 ohm $\frac{1}{2}$ W.....	230084G11
34	Resistor, composition, 820 ohm $\frac{1}{2}$ W.....	230084G61
35	Resistor, composition, 2200 ohm $\frac{1}{2}$ W.....	230084G15
36	Resistor, composition, 4700 ohm $\frac{1}{2}$ W.....	230084G17
37	Resistor, composition, 10,000 ohm $\frac{1}{2}$ W.....	230084G19
38	Resistor, composition, 10,000 ohm 1 W.....	230085G19
39	Resistor, composition, 15,000 ohm 1 W.....	230085G20
40	Resistor, composition, 22,000 ohm $\frac{1}{2}$ W.....	230084G21
41	Resistor, composition, 47,000 ohm $\frac{1}{2}$ W.....	230084G23
42	Resistor, composition, 100,000 ohm $\frac{1}{2}$ W.....	230084G25
43	Resistor, composition, 100,000 ohm 1 W.....	230085G25
44	Resistor, composition, 220,000 ohm $\frac{1}{2}$ W.....	230084G27
46	Resistor, composition, 470,000 ohm $\frac{1}{2}$ W.....	230084G29
47	Resistor, composition, 560,000 ohm $\frac{1}{2}$ W.....	230084G95
48	Resistor, composition, 1 megohm $\frac{1}{2}$ W.....	230084G31
49	Resistor, composition, 1.5 megohm $\frac{1}{2}$ W.....	230084G32
50	Resistor, composition, 33,000 ohm $\frac{1}{2}$ W.....	230084G22
56	Control, volume, 1 megohm.....	220044G15
57	Control, bass, 1 megohm with switch.....	220045G2
58	Switch, rotary, treble control.....	160161G1
59	Switch, rotary, band selector.....	160160G1

60	Switch, rotary, loop to outdoor antenna.....	160157G1
61	Switch assembly, muting.....	160158G2
62	Socket, external input.....	180060G1
63	Socket, phonograph input.....	189741G1
64	Plug, octal, amplifier connection.....	180511G14
	Antenna, loop assembly.....	*
	Dial glass assembly.....	150285

* The part number of the loop antenna changes with different cabinets. It is therefore important that you specify the **Style Number** of the instrument when ordering a replacement loop antenna assembly.

MAY 1946

THE MAGNAVOX CO.



THE MAGNAVOX CO.

STAGE GAINS*

Antenna Post to R-F Grid at:	
600 kc.	7.0
6 mc.	1.63
R-F to Converter Grid at:	
600 kc.	3.4
6 mc.	3.4
R-F on Converter Grid to I-F Grid at:	
600 kc.	40.0
6 mc.	35.5
I-F on Converter Grid to I-F Grid at:	
455 kc.	59
I-F Grid to Detector Plate at:	
455 kc.	68

AUDIO GAIN

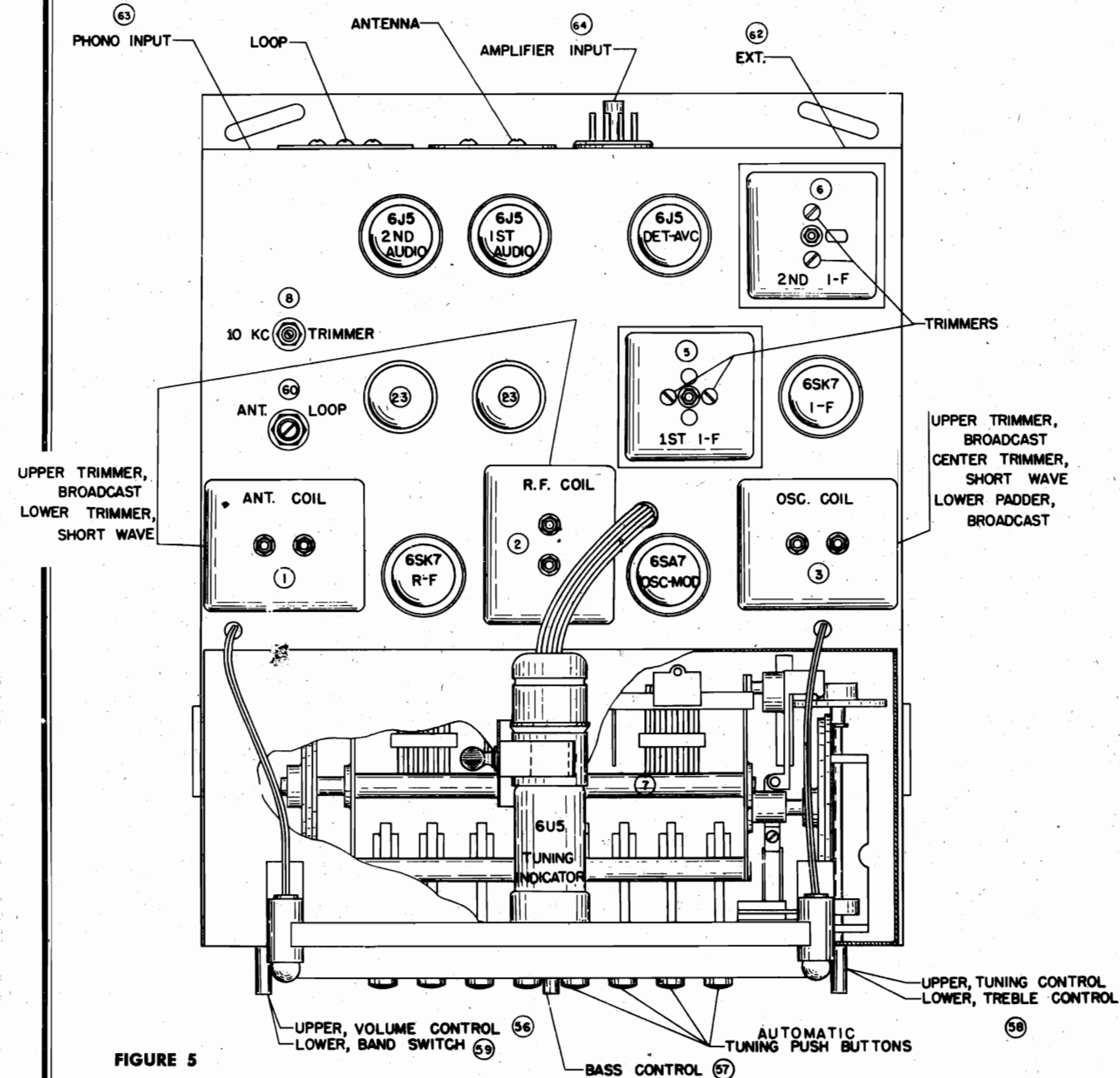
Voltage required across Volume Control to produce .05 watt speaker output** at 400 cycles is .014 volt with Band Selector Switch in BDCST setting.

OSCILLATOR OUTPUT VOLTAGE

The DC voltage developed across Oscillator Grid Resistor (40) at:

600 kc.	5.8
6 mc.	6.6

* Variations of $\pm 20\%$ are permissible. All readings made with sufficient input signal to provide .05 watt speaker output.
** .05 watt speaker output at 400 cycles is equivalent to a reading of 0.35 volts as measured by a high resistance AC voltmeter across the voice coil of either speaker.



THE MAGNAVOX CO.

MODEL CR-188

Model CR-188 radio chassis is designed for easy removal from the cabinet in which it is installed. As the radio panel is permanently fastened to the chassis, the control knobs need not be removed when the chassis is taken out of the cabinet for service. To remove the chassis, first remove the antenna leads from their terminals and all plugs from the receptacles on the rear of the chassis. Then remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Lift the rear of the chassis about one inch and pull it straight back. Never remove the chassis tray from the cabinet—it has been properly positioned to bring the radio panel in place when the chassis is replaced. In replacing the chassis, slide it so that the small hooks near the front, ride inside the flanges on the

ALIGNMENT

The alignment of this receiver requires the use of an accurately calibrated r-f signal generator and an output meter. All trimmer condenser locations are shown on the chassis layout diagram, Figure 5. The radio volume control should be turned to maximum and the signal generator output kept as low as possible during alignment to prevent the AVC from operating and giving false readings. Always set the Treble Control to **SHARP TUNE** before aligning the i-f stages. This is done by turning the Treble Control Knob to the No. 1 position.

I-F ALIGNMENT

1. Connect the output of the signal generator to the oscillator grid (pin No. 5) of the 6SA7 tube through a .00025 mfd. capacitor. The ground on the signal generator should be connected to the radio chassis ground.
 2. Turn the condenser gang until it is completely meshed, (low-frequency end of dial calibration) and set the band selector switch to BDCST as for broadcast band reception.
 3. Adjust the signal generator to **EXACTLY 455 kc.** and peak the second i-f transformer and the first i-f transformer trimmers in that order.
- On early models of the CR-188 chassis, the two i-f trimmers are located in the top of the respective i-f transformers as shown in the layout diagram Figure 5. In later production, one trimmer is accessible from

sides of the chassis tray. Push the chassis forward as far as it will go and the hooks should then engage the slots in the chassis tray. Replace the two Phillips-head screws and nuts and tighten securely. Replace all plugs in their receptacles and the antenna leads on their correct terminals. The antenna terminal board for the loop antenna connections is designated S-L-H. The end of the short wave antenna that is fastened to the inside of the cabinet connects to S. Always disconnect this antenna from terminal S when an outdoor antenna is used as it may pick up noise. The two terminals on the loop are designated L and H. The leads connected to these terminals should be wired to the corresponding terminals (L and H) on the chassis.

PROCEDURE

the top and the other from the bottom of each transformer.

BROADCAST BAND ALIGNMENT

1. Remove the signal generator lead from the 6SA7 grid and connect it to the radio antenna terminal through the .00025 mfd. capacitor. The ANT-LOOP switch (60) must be in the ANT. setting.
2. Check the tuning dial pointer adjustment. When the plates of the tuning condenser are completely meshed, the dial pointer must be in line with the last calibration mark at the low frequency end of the dial. If it is not, loosen the set screws in the hub of pulley "D" shown on Figure 1 and make the necessary adjustment.
3. With the band selector still set for broadcast band reception, adjust the signal generator and the radio receiver to 600 kc. While rocking the gang condenser a few degrees to the right and to the left, adjust the 600 kc. oscillator padder for maximum indication on the output meter.
4. Set the signal generator and the radio receiver to 1400 kc.; adjust the 1400 kc. oscillator trimmer and the 1400 kc. antenna trimmer for maximum output. If considerable adjustment was necessary, recheck the 600 kc. padder setting.
5. If the loop antenna trimmer is out of adjustment it should be set after the radio chassis is in the

cabinet. Set the ANT-LOOP switch (60) to the LOOP position. Adjust the signal generator to 1400 kilocycles and connect its output to a loop containing approximately five turns of wire eight inches in diameter placed eighteen inches from the receiver loop and in the same plane.

6. Set the receiver to 1400 kc. and adjust the trimmer on the receiver loop for maximum output.

SHORT WAVE BAND ALIGNMENT

1. Set the band selector switch to SW as for short wave reception and substitute a 400 ohm resistor for the capacitor in series with the signal generator lead connected to the antenna terminal on the receiver.
2. Set the signal generator and the radio receiver to 15 mc.; then adjust the 15 mc. oscillator trimmer and the 15 mc. antenna trimmer for maximum output. While adjusting the 15 mc. oscillator trimmer two peaks may be observed; only one is the correct peak for 15 mc. alignment. Screw in the trimmer to maximum capacity—then decrease the capacity until the first peak is observed. This is the correct one.

10 KC FILTER ADJUSTMENT

This chassis incorporates a 10 kc. filter circuit to eliminate the beat note heard as a whistle between stations on the broadcast band. If the trimmer is out of adjustment, the following procedure should be observed.

1. Turn the Treble Control to **FULL RANGE** (No. 4 position).
2. Connect the output of an audio oscillator to the phonograph pickup socket on the radio chassis and adjust the oscillator to **EXACTLY 10,000 cycles.**
3. Set the band selector to **PHONO** and adjust the 10 kc. trimmer (8) for minimum output.
4. If an audio oscillator is not available for making this adjustment, set the band selector to **BDCST**, connect an antenna to the receiver and set the gang condenser to a point between two stations on adjacent channels having approximately the same power. If the 10 kc. trimmer is out of adjustment, a whistle will be heard. Adjust the trimmer until the whistle is eliminated.

MODEL CR-188

THE MAGNAVOX CO.

Model CR-188 radio chassis is a two-band tuner that must be used in conjunction with a power amplifier, such as the Model AMP-101 for speaker operation. Heater and plate voltages for the CR-188 radio chassis

are supplied from the amplifier chassis; it is therefore essential that the radio and amplifier chassis be interconnected during alignment or for other electrical service operations.

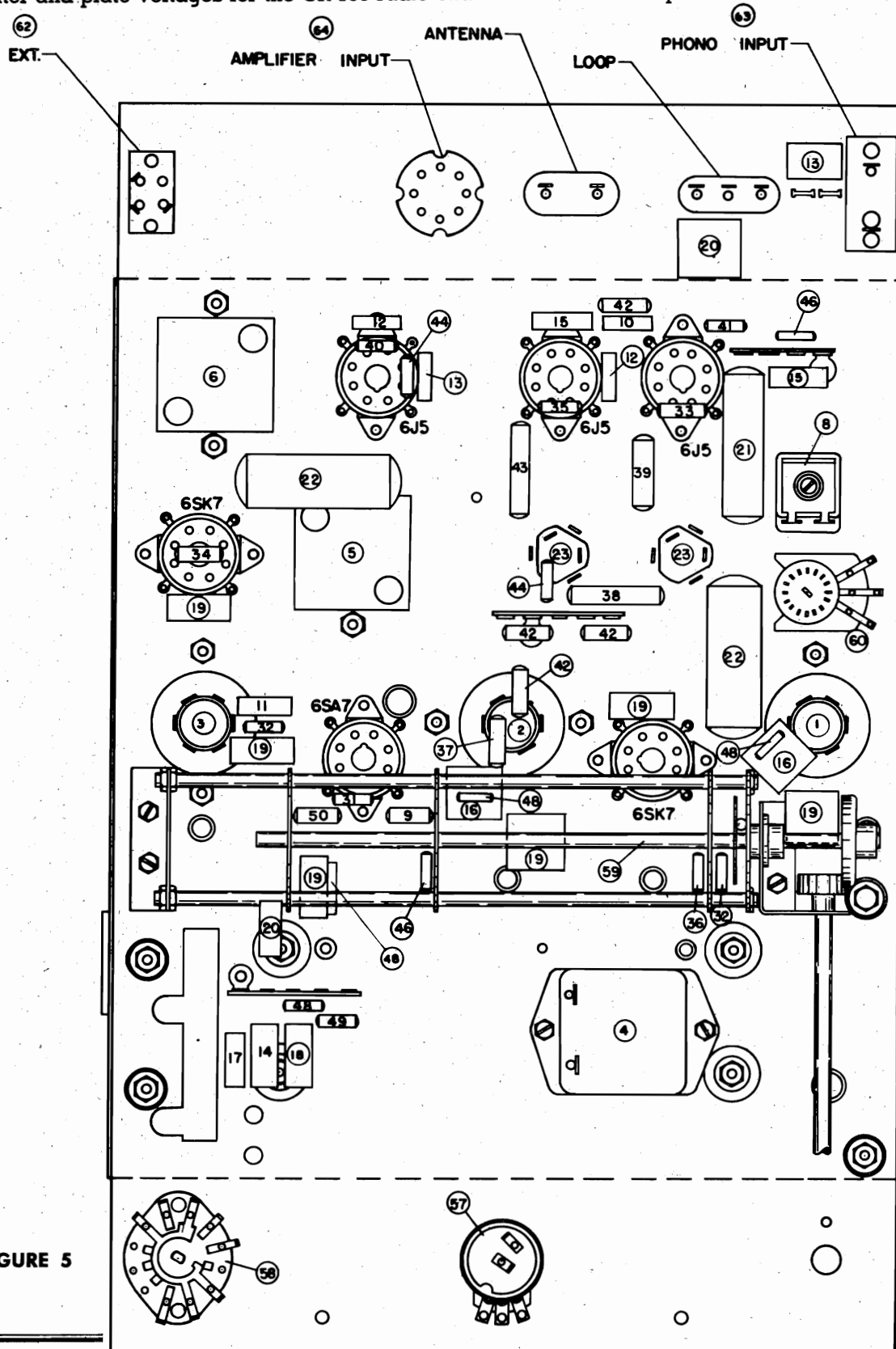
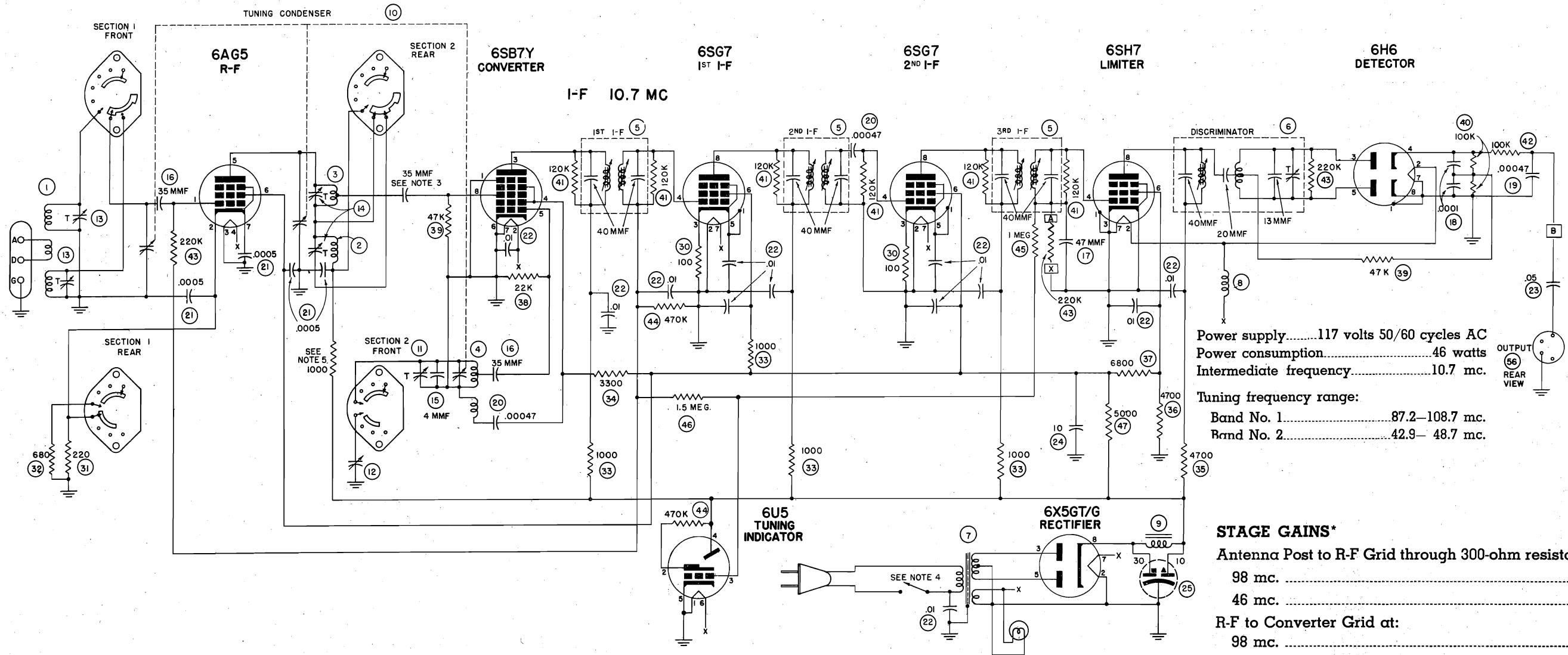
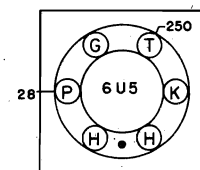
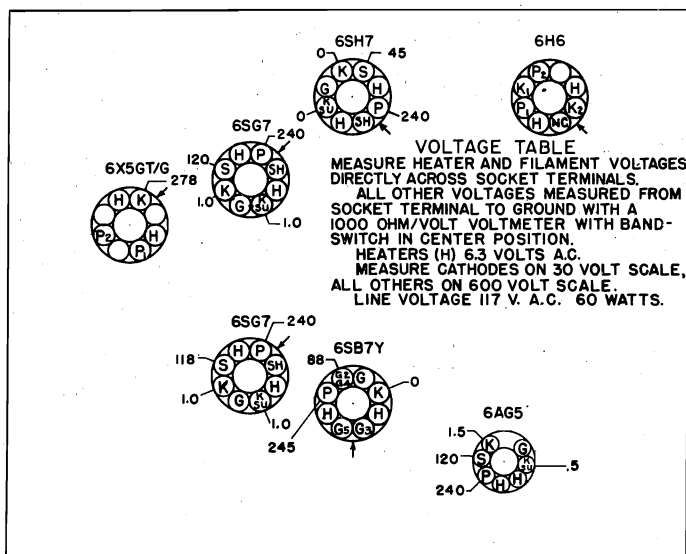


FIGURE 5

THE MAGNAVOX CO.

MODEL CR-189A,
CR-189B

JUNE 1946

TUNING IND. SOCKET
BACK VIEW

- NOTES -

- BAND SWITCH 55 SHOWN IN COUNTERCLOCKWISE POSITION VIEWED FROM THE FRONT PANEL.
- ALL ELECTRICAL VALUES SHOWN ARE IN MICRO-FARADS OR OHMS UNLESS OTHERWISE SPECIFIED.
- SUPPLIED AS PART OF 360261G2 R-F COIL ASSEMBLY.
- PART OF BAND SWITCH 55. POWER SWITCH IS IN OFF POSITION WHEN BAND SWITCH IS IN EXTREME COUNTERCLOCKWISE (NO. 1) POSITION. POWER IS ON IN NO. 2 AND NO. 3 POSITIONS OF BAND SWITCH.
- SUPPLIED AS PART OF 360262G1 R-F COIL ASSEMBLY.
- LETTERS SHOWN IN SQUARES DESIGNATE METER CONNECTION POINTS FOR ALIGNMENT AS DESCRIBED IN TEXT.

Model CR-189 series radio chassis are Frequency-Modulation tuners designed for connection to the F-M receptacle on any Magnavox A-M radio receiver. Two band operation provides complete coverage of the present 45 megacycle band as well as the new 100-megacycle band.

Because of the fact that in some cabinets the CR-189 F-M tuner must be mounted in an inverted position, the suffix letters A and B on the model number identify the change in dial mounting. The model number of this F-M tuner with an inverted dial assembly is CR-189B; when the upright dial assembly mounting is provided, the model number of the chassis is CR-189A.

STAGE GAINS*

Antenna Post to R-F Grid through 300-ohm resistor at:	
98 mc.	1.2
46 mc.	1.7
R-F to Converter Grid at:	
98 mc.	9.4
46 mc.	5.4
R-F on Converter Grid to 1st I-F Grid at:	
98 mc.	8.7
46 mc.	8.7
I-F on Converter to 1st I-F Grid at:	
10.7 mc.	10
I-F on 1st I-F Grid to 2nd I-F Grid at:	
10.7 mc.	30
2nd I-F Grid to Limiter Grid at:	
10.7 mc.	31

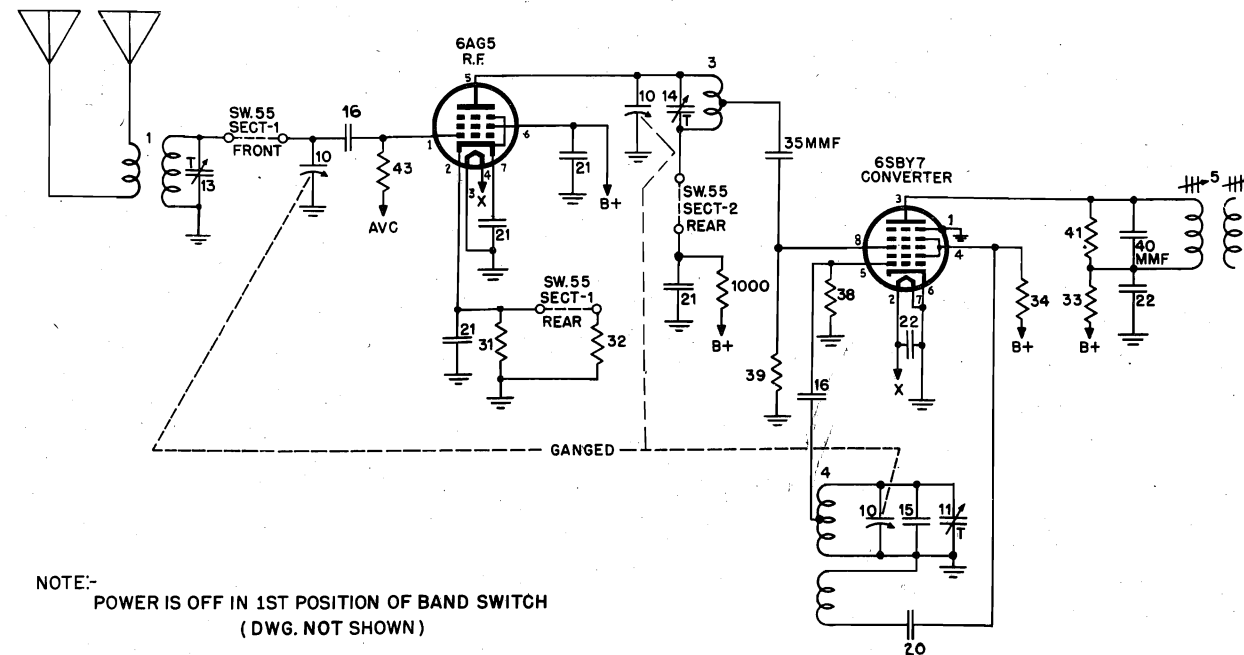
OSCILLATOR GRID VOLTAGE

The DC voltage developed across Oscillator Grid Resistor (38) at:	
98 mc.	7.0
46 mc.	4.6

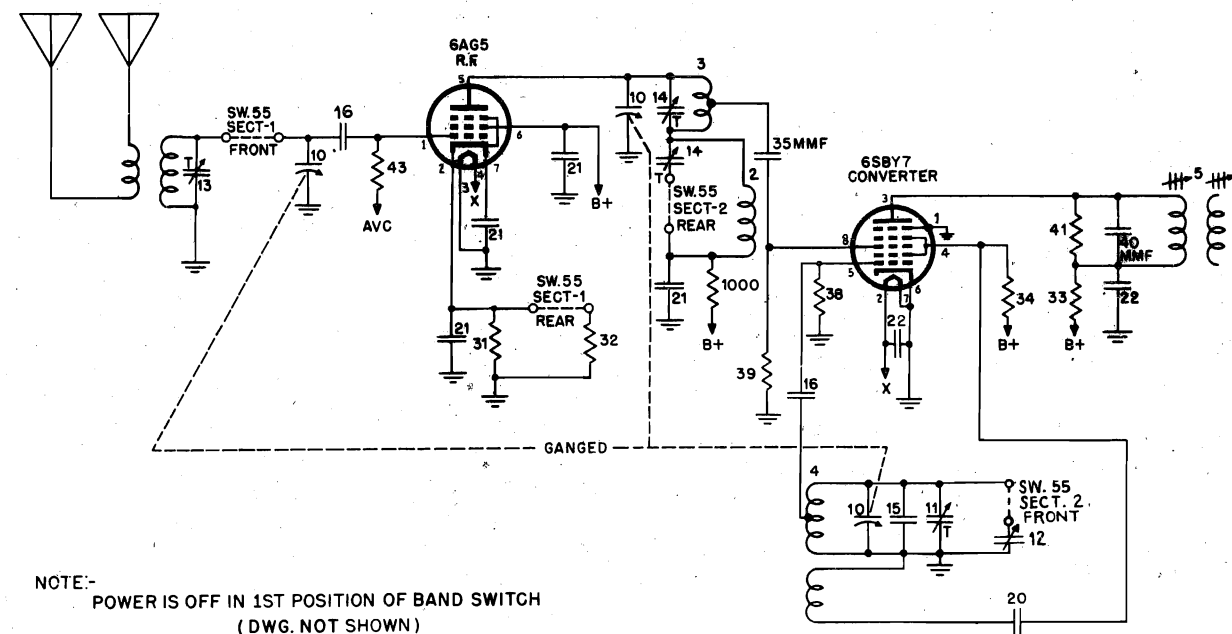
*Variations of $\pm 20\%$ are permissible. All readings made with sufficient signal to provide 15 millivolts output at 400 cycles with 22.5 kc. modulation.

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MODEL CR-189A,
CR-189B



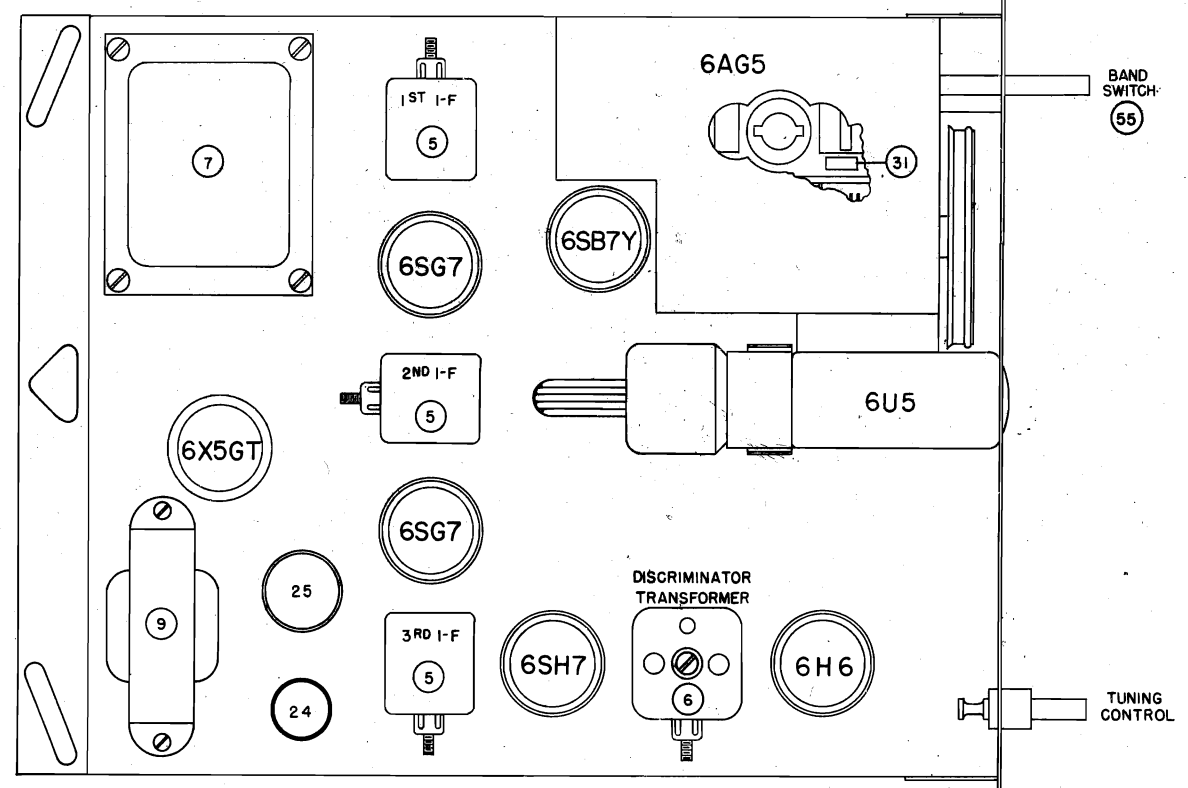
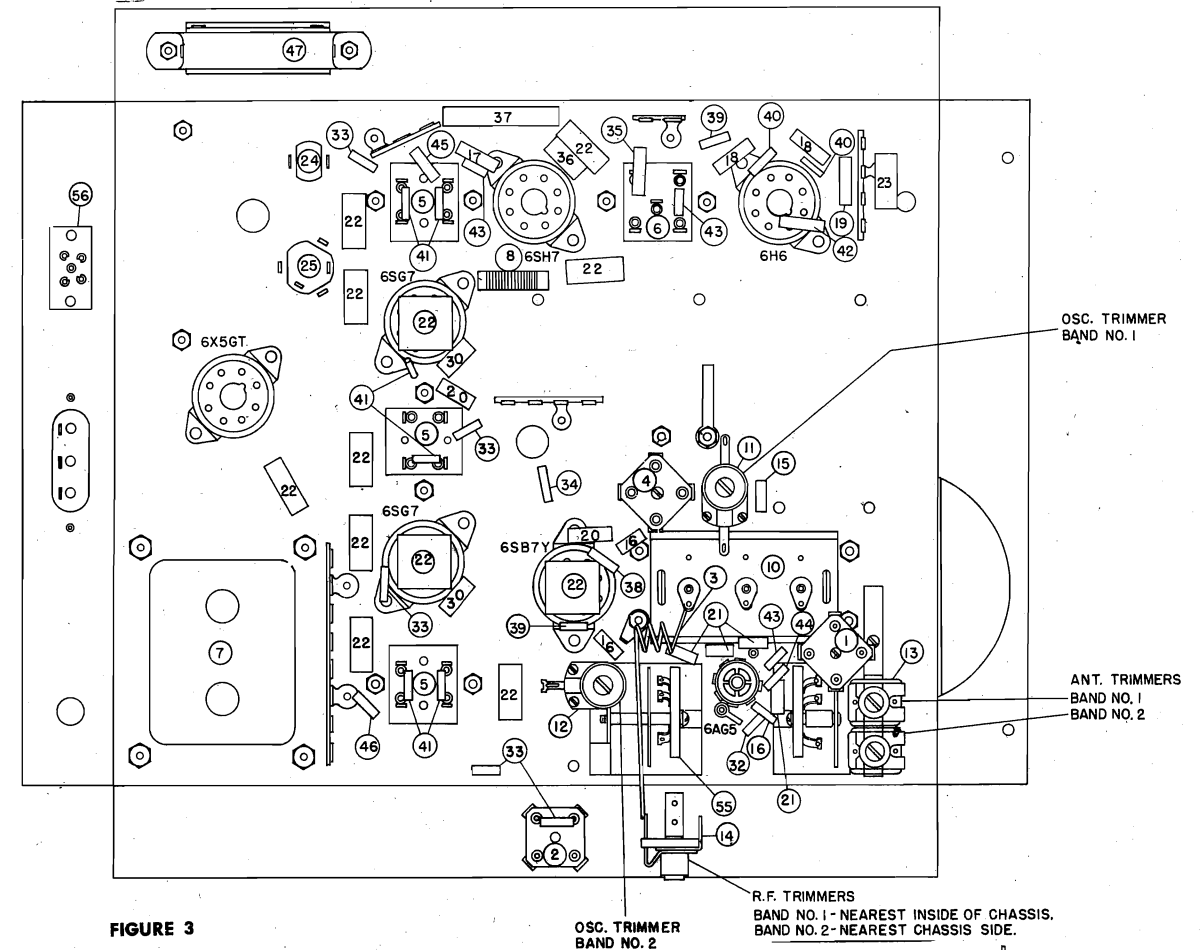
BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
F M BAND 1
87.2 — 108.7 MC.



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
F M BAND 2
42.9 - 48.7 MC.

MODEL CR-189A,
CR-189B

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**METHOD FOR REMOVING
CHASSIS FROM CABINET**

As the control panel is permanently fastened to the tuner in all models except those mounted in the Regency Symphony combination, it is not necessary to remove the control knobs from the cabinet. The instructions immediately following are for all combinations except the Regency Symphony. Separate instructions for removing the CR-189A chassis from that instrument are shown in this manual.

Before removing the chassis, disconnect the antenna and ground leads from their terminals, and the output and the power cables from their receptacles. While holding the rear of the chassis in place with one hand, remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Then while lowering the chassis, pull back on it to disengage the hooks from the slots in the tray to which the chassis is mounted, and withdraw the chassis from the cabinet.

In replacing the chassis, slide it in so that the small hooks near the front ride inside the flanges on the sides of the chassis tray. Push the chassis forward as far as it will go so that the hooks engage the slots in the chassis tray; then lift up the rear of the chassis until the guide pin in the chassis tray projects through the triangular opening the flange on the rear of the F-M chassis. Now pull back on the chassis. A ledge on the guide pin referred to above, will hold the chassis in place while the mounting screws are started into the captivated nuts on the top of the chassis tray. These nuts are accessible through the angular slots in the chassis flange and the Phillips-head screws should be turned in to within a few turns of being tight. Now slide the chassis forward until its panel is flush with the panel of the A-M radio chassis and tighten the two Phillips-head screws securely, completing the replacement operation.

REGENCY SYMPHONY. To remove the CR-189A chassis from the Regency Symphony first remove the antenna and ground leads from their terminals and the output and power cables from their receptacles. Then pull the control knobs from their shafts and remove the two fancy-head screws from the front panel. Next, remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis and pull the chassis out of the rear of the cabinet.

In replacing the chassis, the reverse order of the above instructions should be followed.

ALIGNMENT PROCEDURE

The alignment of this F-M tuner is made in three major steps namely, I-F alignment, Discriminator alignment and R-F alignment. An F-M generator is not required in aligning this F-M tuner. Any accurately calibrated signal generator covering a range in the vicinity of 10.7 megacycles may be used in aligning the I-F and the Discriminator stages. For R-F alignment, the generator must cover the tuning range of the tuner or approximately 42 to 110 megacycles. If such a signal generator is not available, this alignment may be made by using an F-M radio station as a frequency standard.

I-F ALIGNMENT

1. Connect the "high" side of the signal generator to Grid 3 (pin #8) of the 6SB7Y converter tube and the "low" side of the generator to the radio chassis.
2. If a vacuum tube voltmeter is available, connect it across the 220,000 ohm resistor in the grid circuit of the 6SH7 limiter tube at points designated "A" and "X" on the schematic diagram (Figure 2) to measure the limiter grid bias voltage. Set the signal generator to exactly 10.7 megacycles and adjust the third, second and the first i-f transformer trimmers in that order for maximum reading on the meter. A reading of 2 to 8 volts should be considered normal.

3. If a vacuum tube voltmeter is not available, connect a 0.50 or 0.200 microammeter in series with the "ground" end of the 220,000 ohm resistor in the grid circuit of the 6SH7 limiter tube at point "X" on the schematic diagram. Set the signal generator to exactly 10.7 megacycles and adjust the third, second and the first i-f transformer trimmers in that order for maximum meter readings. A normal reading will be in the range of 10 to 35 microamperes. At the completion of these adjustments, remove the microammeter and ground the 220,000 ohm resistor to the point where it was originally connected.

**DISCRIMINATOR
ALIGNMENT**

The accurate alignment of the discriminator transformer cannot be overemphasized. Incorrect alignment will result in badly distorted reception. The following steps should be followed in the order given:

1. A DC vacuum tube voltmeter is connected to the output circuit by connecting it from ground to point

"B" on the schematic diagram. This measures the detector output voltage. Adjust the signal generator frequency to exactly 10.775 megacycles and adjust both trimmers on the discriminator transformer for maximum reading. If the indicated voltage is less than 3 volts readjust the output of the generator until the meter indicates 3 volts or more. Now adjust the signal generator frequency to 10.7 megacycles and turn the trimmer screw on the top of the discriminator until the voltage is zero. This is an extremely important adjustment. Reset the generator frequency to 10.775 and record the meter reading.

2. Reverse the meter connections and set the signal generator frequency to 10.825 megacycles. The meter reading now obtained must be within 10% of the reading recorded in the previous operation—if it is not, the discriminator alignment was not done accurately and must be repeated.

3. The discriminator may also be aligned using a 0.50 or 0.200 microammeter if a vacuum tube voltmeter is not available. In this case, the detector output current is measured. Connect the microammeter to the same points specified in paragraph 1 and proceed in the manner outlined in paragraphs 1 and 2 of this section. In the operation described in paragraph 1, the meter reading should be at least 20 microamperes when the trimmers are peaked at 10.775 megacycles; if not, the generator should be adjusted until that value is obtained.

**BAND NO. 1
R-F ALIGNMENT**

It is essential that Band No. 1—the high frequency band, is aligned prior to the alignment of Band No. 2. If this is not done, Band No. 1 alignment will be incorrect.

1. Set the Band Selector switch to Band No. 1 and check that the dial pointer is in line with the last mark at the low frequency end of the dial calibration when the condenser gang is fully meshed. If it is not, slide the pointer on its string to the correct position, and crimp the lugs (on the rear of the pointer) tightly around the string and apply a drop of cement to hold the pointer in adjustment.

2. Connect the vacuum tube voltmeter to points "A" and "X" on the schematic diagram or connect a 0.50 or 0.200 microammeter in series with the "ground" end of the 220,000 ohm resistor in the grid circuit of the 6SH7 limiter tube at point "X" on the schematic diagram.

3. An extremely accurate signal generator is a necessity in making the following adjustments and it should be connected to the antenna post through a 300 ohm resistor. If such a generator is not available, connect an F-M antenna to the antenna terminal (A) and use an F-M transmitter for a frequency standard. It is preferable that this station be located in the high frequency end of the band—102 to 108 megacycles.

4. Set the signal generator (if one is used) and the F-M tuner to exactly 108 megacycles—if an F-M station is used as a frequency standard accurately set the tuner to the frequency of the F-M station and adjust the Band No. 1 oscillator trimmer for a maximum reading on the meter. Then adjust the Band No. 1 antenna trimmer and the r-f trimmer for a maximum meter indication. If too much signal is fed to the tuner, it might appear at several settings of the tuning dial and confuse the adjustment. When the adjustments are completed, the second harmonic of the oscillator frequency will be 10.7 megacycles lower than the signal frequency.

BAND NO. 2**R-F ALIGNMENT**

1. With the meter still connected to the tuner, set the Band Selector switch to Band No. 2. Set the signal generator and the F-M tuner to exactly 48 megacycles. If an F-M station is used as a frequency standard (this station should be in the high frequency end of the band) accurately set the tuner to the frequency of the F-M station. Adjust the Band No. 2 oscillator trimmer for a maximum reading on the meter. Then adjust the Band No. 2 antenna trimmer and the r-f trimmer for the highest meter reading. On Band No. 2, the oscillator frequency will be 10.7 megacycles lower than the signal frequency. This completes the alignment—remove the meter from the circuit and if the ground circuit of the 220,000 ohm resistor in the grid circuit of the 6SH7 limiter tube was opened for the connection of a microammeter, ground the resistor to restore the circuit to normal.

MODEL CR-189A,
CR-189B,
MODEL CR-192A,
CR-192B

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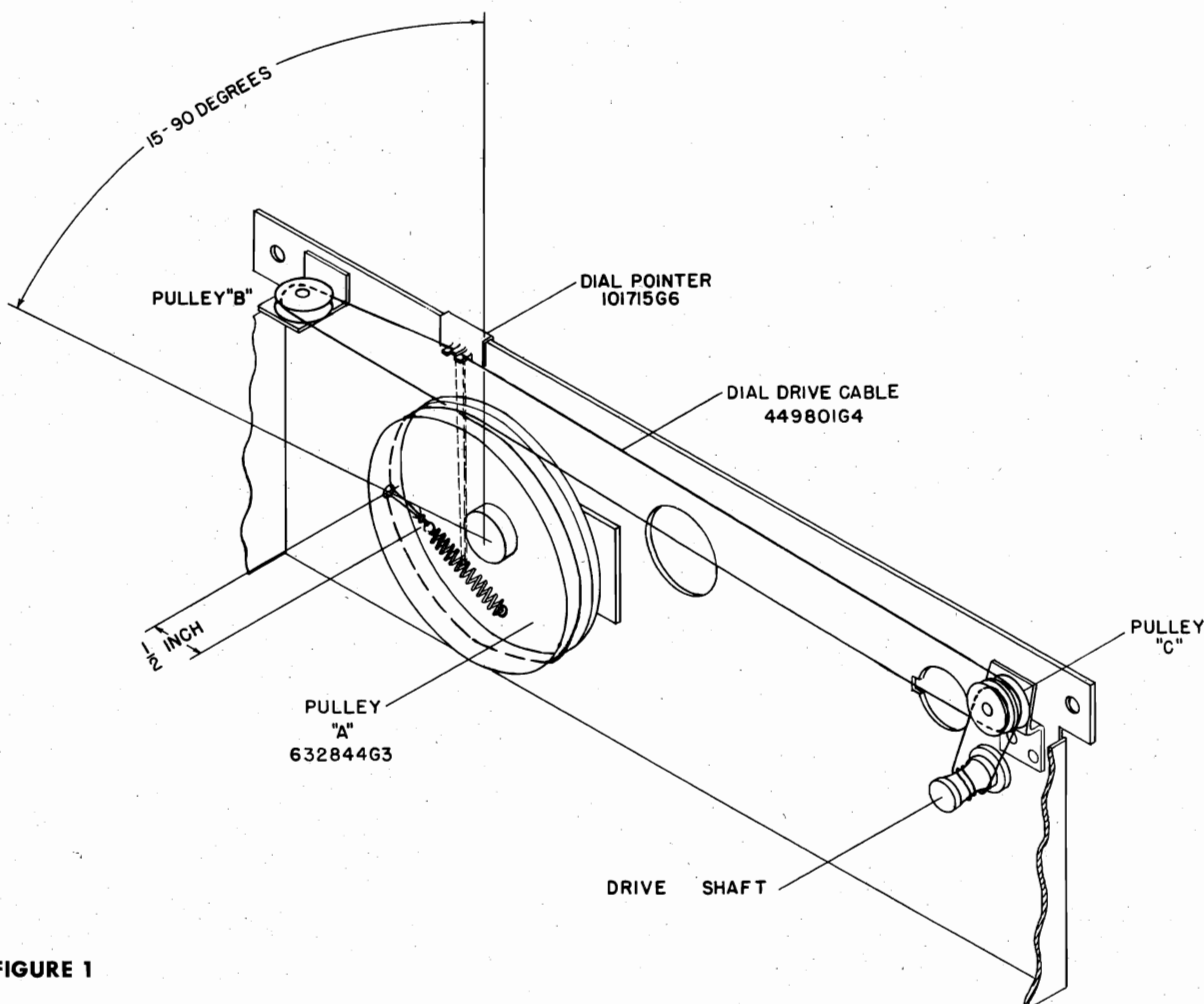


FIGURE 1

DIAL CORD REPLACEMENT

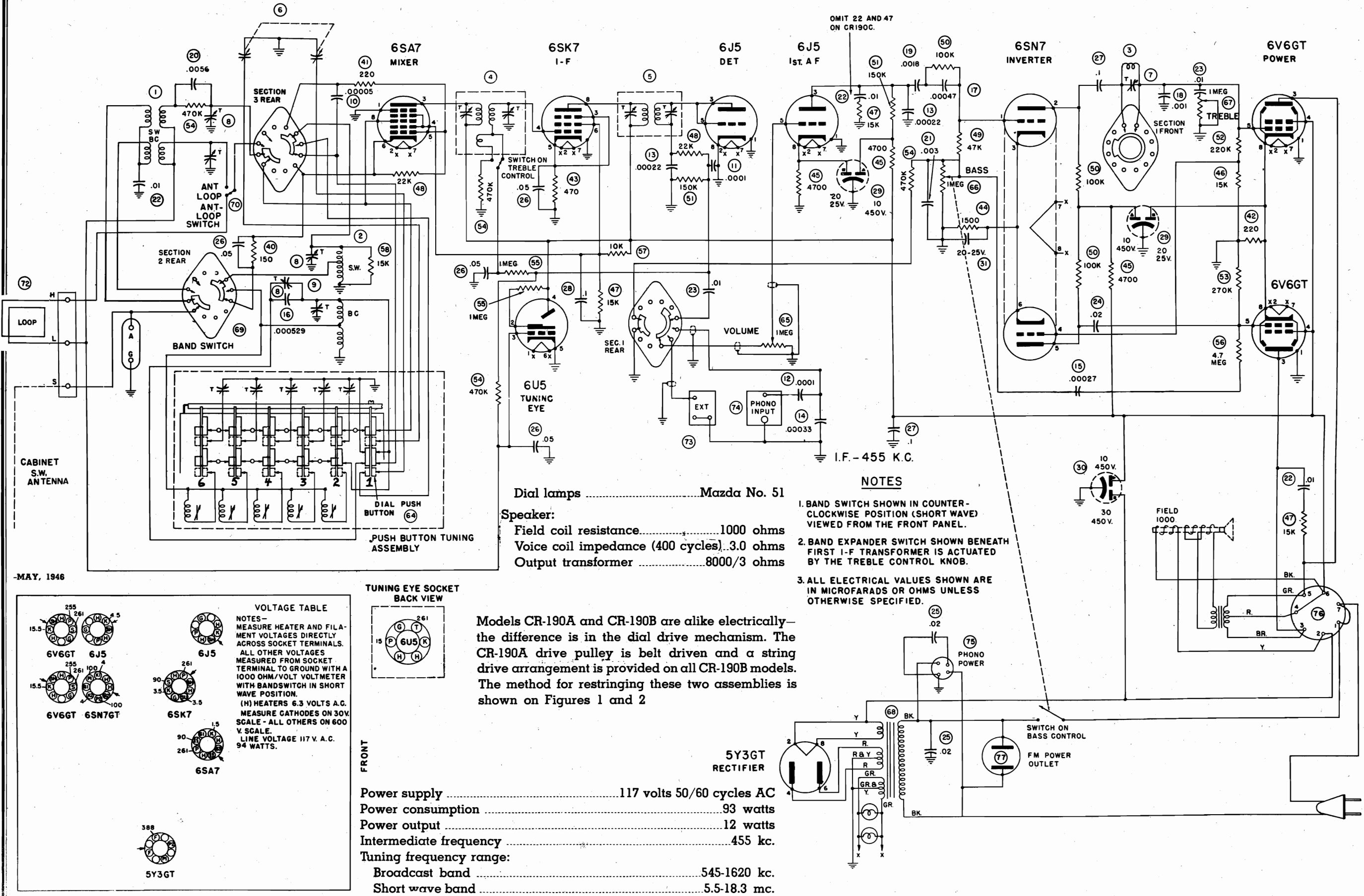
A single cable transmits motion from the dial tuning knob to rotate the condenser gang and to move the dial pointer. A 30-inch length of string is required to restrung this assembly. After the broken cable is removed, turn pulley "A" (see Figure 1) until the condenser gang plates are completely meshed. In this condition, the small hole in the rim of pulley "A" should be within the limits of 15 to 90 degrees to the left of being vertical as shown in Figure 1. If this hole is at a different position from the condition specified, loosen the two screws in the coupling to the condenser gang and turn pulley "A" while holding the condenser plates meshed. Tighten the two set screws after the adjustment has been made.

Lace one end of the new length of cable through the hole in pulley "A" and temporarily fasten it to the hook to which the spring is normally fastened. Make a complete turn around pulley "A" in a counter-clockwise direction, lace it around pulley "B" then across the rear of the dial scale and over the top of the front groove in pulley "C." Proceed down around the tuning shaft for $2\frac{1}{2}$ turns in a clockwise direction and wrapping the cable over pulley "D" from front to back. Continue up over the rear groove of pulley

"C" in a clockwise direction for one turn and extend the cable to the left so that the loose end is to the rear of the section of cable that it crosses. The loose end of the cable should now be wound over the top of pulley "A" so that it is nearest the dial frame and into the hole in the pulley groove. Remove the other end of the cable from the hook and while holding both ends taut, insert one end of the spring on the hook in pulley "A." Lace the two free ends of the cable through the opposite end of the spring and pull the cable until the spring is stretched to within $\frac{1}{2}$ -inch of the rim on the pulley. Tie a double knot so that the knot is around one coil of the spring, while maintaining tension on the cable.

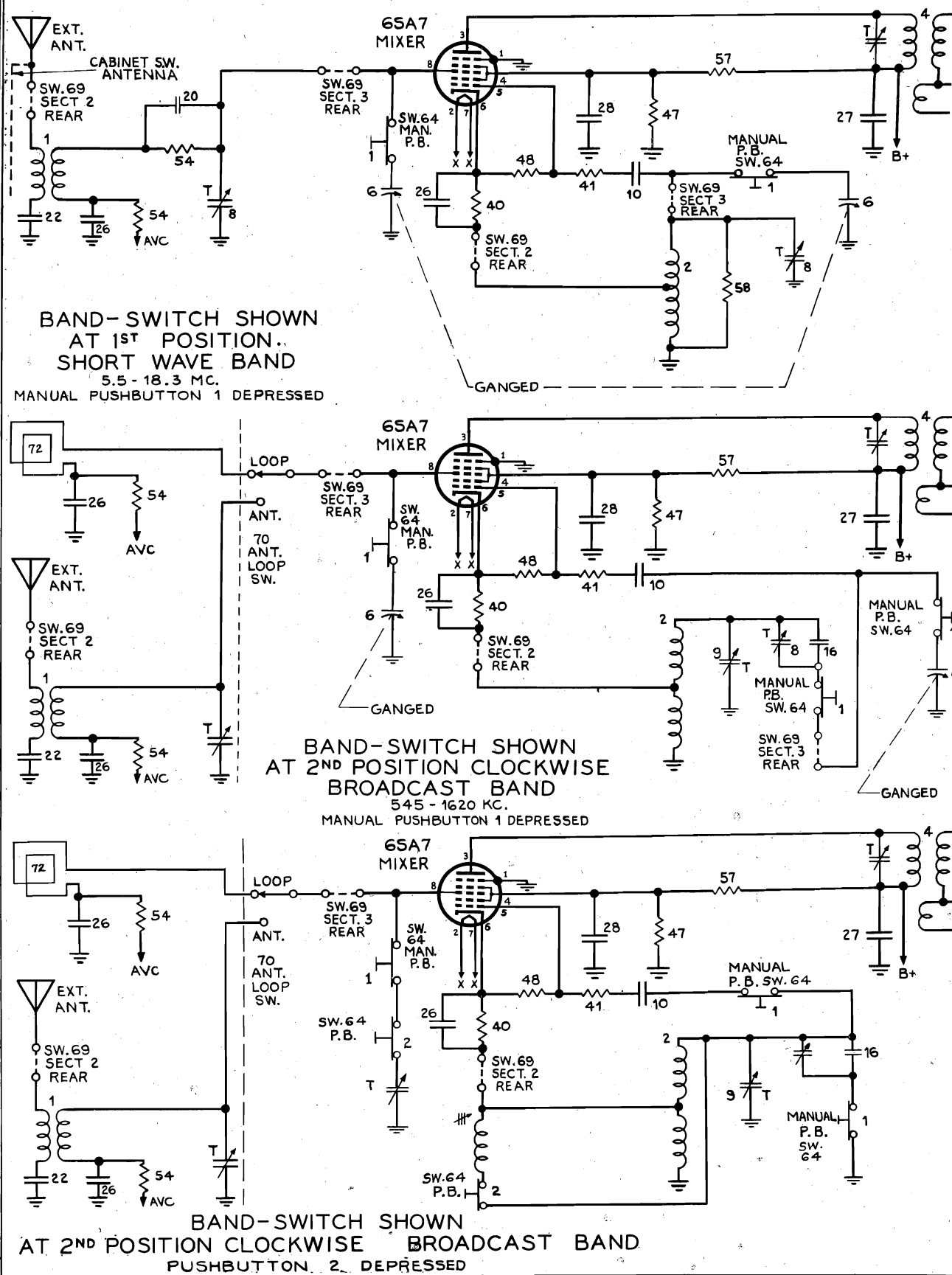
Turn the tuning control shaft until the condenser gang is completely meshed and slide the dial pointer on its track until it is in line with the last calibration mark at the low frequency end of the dial. Press the crimping lugs on the dial pointer together over the cable. After checking to see that the condenser gang is still completely meshed and the dial pointer is in the position specified previously, apply a few drops of cement to the cable where it is crimped by the pointer. This completes the operation.

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MODEL CR-190A,
190B
MODEL CR-194



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DIAL CORD REPLACEMENT

As mentioned previously in this Service Bulletin, two types of drive mechanisms are used to transmit the motion from the dial tuning knob to the large pulley that is coupled to the condenser gang. These two arrangements are shown on Figures 1 and 2. The cable used to drive the dial pointer is strung the same on all CR-190A and CR-190B receivers. Separate instructions for installing a replacement belt or string on the CR-190A or CR-190B chassis are given below.

CR-190A Condenser Drive Belt Replacement—Hook one end of the belt on the right-hand edge of the slot in pulley "C" so that the smooth side contacts the pulley surface. Keeping the belt near the back of the groove in pulley "C" wrap it in a clockwise direction around that pulley (as indicated by the arrows on Figure 1) over the idler pulley and under the tuning control shaft; then around the opposite side of pulley "C." One end of the belt tension spring is hooked on the free end of the belt and the other end on the left-hand edge of the slot in pulley "C," completing the operation.

CR-190B Condenser Drive Cable Replacement—Slide
a short length (approximately ½-inch) of sleeving over one end of a 19-inch length of dial cable, form a small loop and tie a knot in the manner shown on Figure 2. Hook this loop over the metal hook in pulley "C" and lace the cable through the pulley slot and around the pulley in a counter-clockwise direction when viewed from the rear of the panel, keeping the cable to the rear of the pulley groove. Lace the cable in the direction indicated by the arrow on Figure 2 wrapping 2½ turns around the smaller diameter portion of the tuning control shaft from front to back; then around the opposite side of pulley "C". Loop one end of tension spring "D" on the right-hand edge of the slot in pulley "C"; thread the free end of the drive cable through the opposite end of spring "D" and pull back on the cable until the spring coils are stretched to approximately one inch. Tie a double knot in the cable while maintaining tension on the spring, completing the operation.

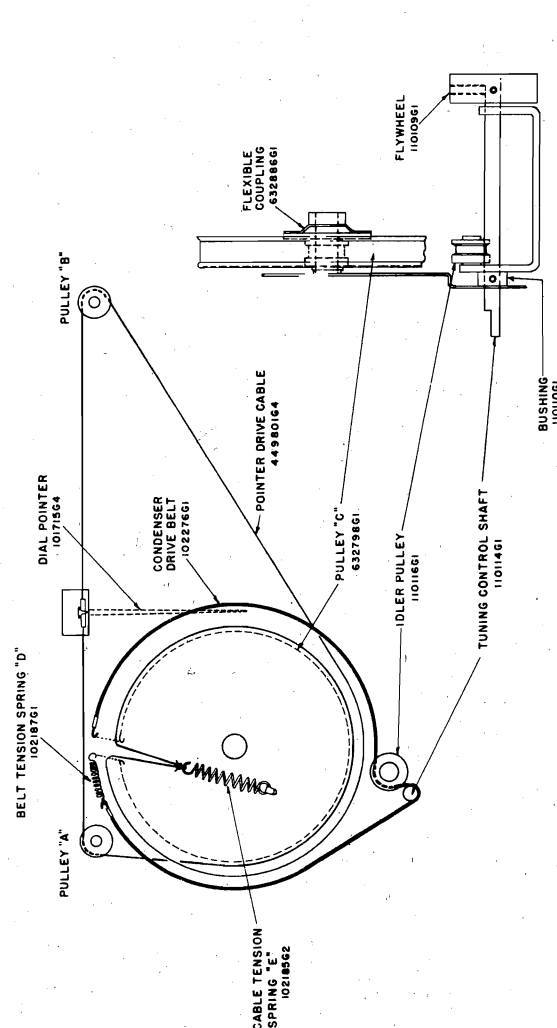


FIGURE 1

CR-190A and CR-190B Dial Pointer Drive Cable Re-
placement—Rotate the tuning control shaft until the
cable through the other end of the spring. Now pull
back on the cable until the tension spring coils are
stretched to approximately 1½ inches. Tie a double
knot in the cable while maintaining tension on the
spring.

Turn the tuning control shaft until the condenser gang is completely meshed and slide the dial pointer on its track until it is in line with the last calibration mark at the low frequency end of the dial. The short piece of sleeving installed prior to the stringing operation should be slid to the rear of the dial pointer and the crimping lugs on the dial pointer pressed together over the sleeving. After checking to see that the condenser gang is still completely meshed and the dial pointer is in the position specified previously, apply a few drops of cement to each end of the sleeving to which the dial pointer is fastened. This completes the operation.

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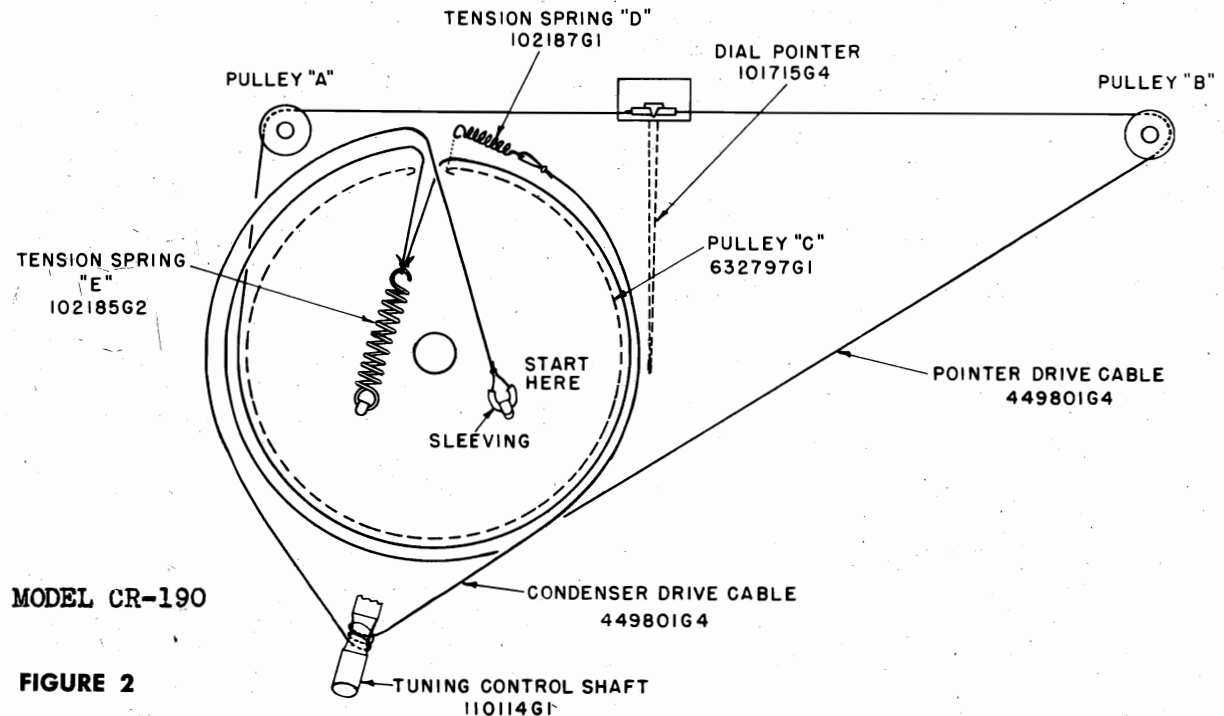
MODEL CR-190A,
CR-190B
MODEL CR-194

FIGURE 2

MODEL CR-190 **PUSH BUTTON ADJUSTMENTS** MODEL CR-194

There are six push buttons on the panel of the receiver, five of which may be pre-set to any station whose frequency is within the range covered by the respective buttons. See Figure 3. The right-hand button must be pressed for dial tuning.

Set-up Procedure—Turn on the receiver and allow it to operate for at least five minutes to permit tubes to reach normal operating conditions. Remove the push

button escutcheon plate and proceed in the following manner.

1. Turn the Band Control Switch knob to BDCST and press the push button at the right end of the assembly to permit dial tuning.
2. Using the Dial Tuning Control, carefully tune in the station to which the No. 1 push button is to be set and note the program. Be sure that the frequency of the station selected is within the frequency range covered by the No. 1 button.
3. Press the No. 1 button and carefully turn the oscillator screw for that button until the station that was tuned manually is heard. Carefully adjust the screw until the tuning indicator tube shows maximum deflection.
4. Adjust the No. 1 antenna trimmer for maximum speaker volume (tuning indicator tube shows maximum deflection).
5. Press the DIAL button to verify that the same station that was tuned manually was set up on the No. 1 button.
6. This completes the set-up of the No. 1 button. Follow the same procedure in setting up the remaining four buttons always adjusting the oscillator screw first, then the antenna trimmer screw.
7. After all five buttons have been set up, replace the escutcheon plate and insert the correct call letter tab in the space provided under each push button.

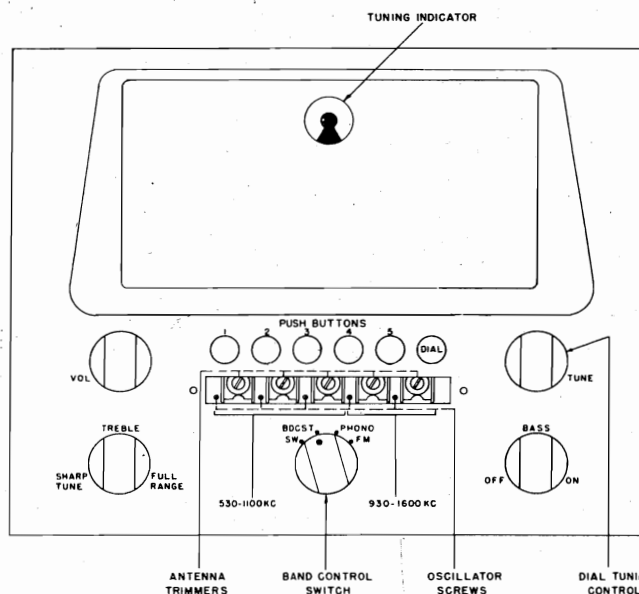


FIGURE 3

MODEL CR-190A,
CR-190B

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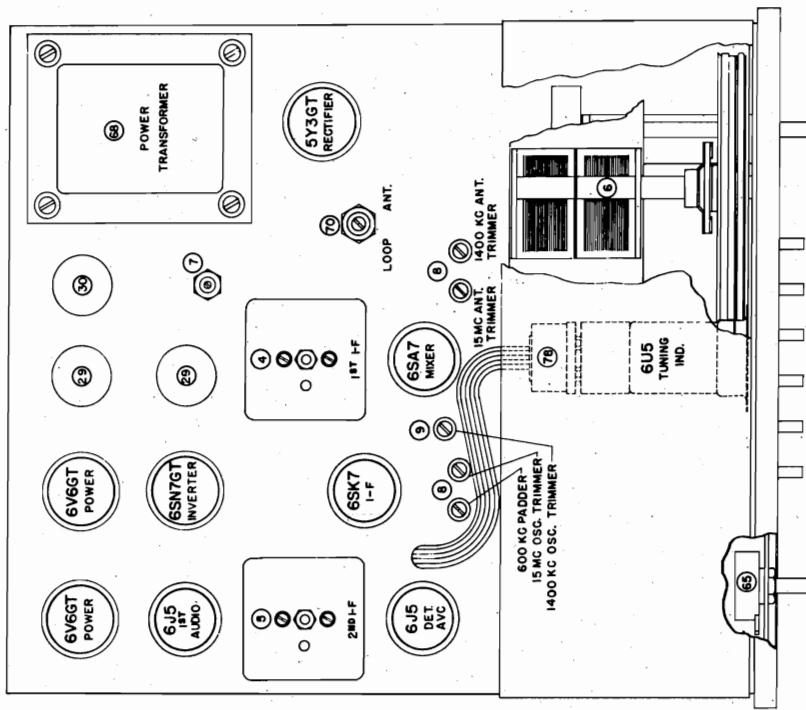


FIGURE 5

METHOD FOR REMOVING CHASSIS FROM CABINET

Model CR-190 radio chassis is designed for easy removal from the cabinet in which it is installed. As sides of the chassis tray, push the chassis forward the radio panel is permanently fastened to the chassis as far as it will go and the hooks should then, on the chassis, the control knobs need not be removed when gage the slots in the chassis tray. Replace the two the chassis is taken out of the cabinet for service. To Phillips-head screws and nuts and tighten securely, remove the chassis, first remove the antenna leads. Replace all plugs in their receptacles and the antenna from their terminals and all plugs from the receptacles on their correct terminals. The antenna terminals on the rear of the chassis. Then remove the chassis from the loop antenna connections is two Phillips-head screws from the angular slots in designated S-I-H. The end of the short wave antenna the flange at the rear of the chassis. Lift the rear of that is fastened to the inside of the cabinet connects the chassis about one inch and pull it straight back. S. Always disconnect this antenna from terminal Never remove the chassis tray from the cabinet—it has been properly positioned to bring the radio up noise. The two terminals on the loop are designated I and H. The leads connected to these terminals should be wired to the corresponding terminals in place when the chassis is replaced. In replacing the chassis, slide it so that the small minials (L and H) on the chassis.

MODEL CR-190A,
CR-190B

THE MAGNAVOX CO.

The alignment of this receiver requires the use of an accurately calibrated r-f signal generator and an output meter. All trimmer condenser locations are shown on the chassis layout diagram, Figure 5. The radio volume control should be turned to maximum and the signal generator output kept as low as possible during alignment to prevent the AVC from operating and giving false readings. Always set the Selectivity Switch to SHARP TUNE before aligning the i-f stages. This is done by turning the Treble Control counter-clockwise as far as possible.

I-F Alignment

1. Connect the output of the signal generator to the oscillator grid (pin No. 5) of the 6SA7 tube through a .00025 mfd. capacitor. The ground on the signal generator should be connected to the radio chassis ground.
2. Turn the condenser gang until it is completely meshed (low-frequency end of dial calibration) and set the band selector switch to BDCST as for broadcast band reception.
3. Adjust the signal generator to EXACTLY 455 kc. and peak the second i-f transformer and the first i-f transformer trimmers in that order.

On early models of CR-190 chassis, the two i-f trimmers are located in the top of the respective i-f transformers as shown in the layout diagram, Figure 5. In later production, one trimmer is accessible from the top and the other from the bottom of each transformer.

Broadcast Band Alignment

1. Remove the signal generator lead from the 6SA7 grid and connect it to the radio antenna terminal through the .00025 mfd. capacitor. The ANT-LOOP switch (70) must be in the ANT setting.
2. Check the tuning dial pointer adjustment. When the plates of the tuning condenser are completely meshed, the dial pointer must be in line with the last calibration mark at the low frequency end of the dial. If it is not, slide the pointer on its string to the correct position. Be sure to crimp the luqs (on the

rear of the pointer) tightly around the string to hold the pointer in adjustment.

3. With the band selector still set for broadcast band reception, adjust the signal generator and the radio receiver to 600 kc. While rocking the gang condenser a few degrees to the right and to the left, adjust the 600 kc. oscillator padder for maximum indication on the output meter.

4. Set the signal generator and the radio receiver to 1400 kc.; adjust the 1400 kc. oscillator trimmer and the 1400 kc. antenna trimmer for maximum output. If considerable adjustment was necessary, recheck the 600 kc. padder setting.

Short Wave Band Alignment

1. Set the band selector switch to SW as for Short Wave reception and substitute a 400 ohm resistor for the capacitor in series with the signal generator lead connected to the antenna terminal on the receiver.

2. Set the signal generator and the radio receiver to 15 mc.; then adjust the 15 mc. oscillator trimmer and the 15 mc. antenna trimmer for maximum output.

While adjusting the 15 mc. oscillator trimmer two peaks may be observed; only one is the correct peak for 15 mc. alignment. Screw in the trimmer to maximum capacity—then decrease the capacity until the first peak is observed. This is the correct one.

10 KC Filter Adjustment

This chassis incorporates a 10 kc. filter circuit to eliminate the beat note heard as a whistle between stations on the broadcast band. If the trimmer is out of adjustment, the following procedure should be observed.

1. Set the Selectivity Switch to FULL RANGE by turning the Treble Control knob clockwise as far as possible.
2. Connect the output of an audio oscillator to the phonograph pickup socket on the radio chassis and adjust the oscillator to EXACTLY 10,000 cycles.

3. Set the band selector to PHONO and adjust the 10 kc. trimmer (7) for minimum output.

4. If an audio oscillator is not available for making this adjustment, set the band selector to BDCST, connect an antenna to the receiver and set the gang condenser to a point between two stations on adjacent channels having approximately the same power. If the 10 kc. trimmer is out of adjustment, a whistle will be heard. Adjust the trimmer until the whistle is eliminated.

Special Service Information

The following information is provided for the serviceman who has a vacuum tube voltmeter or a similar measuring instrument available.

STAGE GAINS*

Antenna Post to Converter Grid at:	5.5
600 kc.	2.0
6 mc.	
R-F on Converter Grid to I-F Grid at:	
600 kc.	28
6 mc.	22
I-F on Converter Grid to I-F Grid at:	
455 kc.	34
I-F Grid to Detector Plate at:	
455 kc.	67

AUDIO GAIN

Voltage required across Volume Control to produce .05 watt speaker output** at 400 cycles is .010 volt with Band Selector Switch in BDCST setting.

OSCILLATOR OUTPUT VOLTAGE

The DC voltage developed across Oscillator Grid Resistor (48) at:

600 kc.	9.7
6 mc.	5.3

* Variations of $\pm 20\%$ are permissible. All readings made with sufficient input signal to provide .05 watt speaker output.
** .05 watt speaker output at 400 cycles is equivalent to a reading of 0.4 volts as measured by a high resistance AC voltmeter across the speaker voice coil.

MODEL CR-190A,
CR-190B
MODEL CR-193

THE MAGNAVOX CO.

CR-190

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil assembly, r-f, two band	360256G1
2	Coil assembly, oscillator, two band	360255G1
3	Coil assembly, 10 kc filter	360240G1
4	Transformer, first i-f	360266G1
5	Transformer, second i-f	360267G1
6	Capacitor, variable, two-gang tuning	260056G1
7	Capacitor, variable, 10 kc trimmer	250008G1
8	Capacitor, variable, 2 gang trimmer	260021G1
9	Capacitor, variable, oscillator trimmer	260042G2
10	Capacitor, ceramic, 50 mmf.	250088G24
11	Capacitor, molded mica, 100 mmf. $\pm 20\%$	250159G98
12	Capacitor, molded mica, 100 mmf. $\pm 10\%$	250159G82
13	Capacitor, molded mica, 220 mmf. $\pm 20\%$	250159G100
14	Capacitor, molded mica, 330 mmf. $\pm 10\%$	250159G88
15	Capacitor, molded mica, 270 mmf. $\pm 10\%$	250159G87
16	Capacitor, silvered mica, 529 mmf. $\pm 1\%$	250085G34
17	Capacitor, molded mica, 470 mmf. $\pm 10\%$	260159G102
18	Capacitor, molded mica, 1000 mmf. $\pm 20\%$	250160G82
19	Capacitor, molded mica, 1800 mmf. $\pm 10\%$	250160G67
20	Capacitor, molded mica, 5600 mmf. $\pm 2\%$	250161G7
21	Capacitor, paper, .003 mfd. 600 V.	250152G43
22	Capacitor, paper, .01 mfd. 600 V.	250152G38
23	Capacitor, paper, .01 mfd. 200 V.	250152G18
24	Capacitor, paper, .02 mfd. 400 V.	250152G26
25	Capacitor, molded paper, .02 mfd.	250129G3
26	Capacitor, paper, .05 mfd. 200 V.	250152G15
27	Capacitor, paper, .1 mfd. 400 V.	250152G22
28	Capacitor, paper, .1 mfd. 200 V.	250152G13
29	Capacitor, electrolytic, 10 mfd. 450 V.-20 mfd. 25 V.	270023G6
30	Capacitor, electrolytic, 10-30 mfd. 450 V.	270023G2
31	Capacitor, electrolytic, 20 mfd. 25 V.	270027G2
40	Resistor, composition, 150 ohm $\frac{1}{2}$ W.	230084G8
41	Resistor, composition, 220 ohm $\frac{1}{2}$ W.	230084G9
42	Resistor, composition, 220 ohm 2 W.	230064G54
43	Resistor, composition, 470 ohm $\frac{1}{2}$ W.	230084G11
44	Resistor, composition, 1500 ohm $\frac{1}{2}$ W.	230084G14
45	Resistor, composition, 4700 ohm $\frac{1}{2}$ W.	230084G17
46	Resistor, composition, 15,000 ohm $\pm 5\%$ $\frac{1}{2}$ W.	230084G187
47	Resistor, composition, 15,000 ohm 1 W.	230085G20
48	Resistor, composition, 22,000 ohm $\frac{1}{2}$ W.	230084G21
49	Resistor, composition, 47,000 ohm $\frac{1}{2}$ W.	230084G23
50	Resistor, composition, 100,000 ohm $\frac{1}{2}$ W.	230084G25
51	Resistor, composition, 150,000 ohm $\frac{1}{2}$ W.	230084G26
52	Resistor, composition, 220,000 ohm $\pm 5\%$ $\frac{1}{2}$ W.	230084G215
53	Resistor, composition, 270,000 $\pm 10\%$ $\frac{1}{2}$ W.	230084G91
54	Resistor, composition, 470,000 ohm $\frac{1}{2}$ W.	230084G29
55	Resistor, composition, 1 megohm $\frac{1}{2}$ W.	230084G31
56	Resistor, composition, 4.7 megohm $\frac{1}{2}$ W.	230084G35
57	Resistor, wire wound, 10,000 ohm.	240035G2
58	Resistor, composition, 15,000 ohm $\frac{1}{2}$ W.	230084G20
65	Control, volume, 1 megohm	220044G15
66	Control, bass, 1 megohm, with power switch	220045G2
67	Control, treble, 1 megohm, with band expander sw.	220071G2
68	Transformer, power, 117 V. 50/60 cycle	300025G1
69	Switch, rotary, band selector	160156G1
70	Switch, rotary, loop to outdoor antenna	160157G1
71	Switch assembly, muting	160158G1
72	Antenna, loop assembly	*
73	Socket, external input	180060G1
74	Socket, phonograph input	189741G1
75	Socket, phonograph motor	180501G5
76	Socket, speaker	180393G3
77	Socket, FM power	180422G1
78	Socket and cable assembly, tuning indicator	180423G1

CR-193

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil assembly, r-f, two band	360238G1
2	Coil assembly, oscillator, two band	360239G1
3	Coil assembly, 10 kc filter	360240G1
4	Transformer, first i-f	360266G1
5	Transformer, second i-f	360267G1
6	Capacitor, variable, two-gang tuning	260053G1
7	Capacitor, variable, 10 kc trimmer	250008G1
8	Capacitor, variable, 2 gang trimmer	260021G1
9	Capacitor, variable, oscillator padder	260042G2
10	Capacitor, ceramic, 50 mmf.	250088G24
11	Capacitor, molded mica, 100 mmf. $\pm 20\%$	250159G98
12	Capacitor, molded mica, 100 mmf. $\pm 10\%$	250159G82
13	Capacitor, molded mica, 220 mmf.	250159G100
14	Capacitor, molded mica, 330 mmf.	250159G88
15	Capacitor, molded mica, 270 mmf.	250159G87
16	Capacitor, silvered mica, 583 mmf. $\pm 1\%$	250085G33
17	Capacitor, molded mica, 470 mmf.	250159G102
18	Capacitor, molded mica, 1000 mmf.	250160G82
19	Capacitor, molded mica, 1800 mmf.	250160G67
20	Capacitor, molded mica, 5100 mmf. $\pm 2\%$	250161G6
21	Capacitor, paper, .003 mfd. 400 V.	250152G43
22	Capacitor, paper, .01 mfd. 600 V.	250152G38
23	Capacitor, paper, .01 mfd. 200 V.	250152G18
24	Capacitor, paper, .02 mfd. 400 V.	250152G26
25	Capacitor, molded paper, .02 mfd. 600 V.	250129G3
26	Capacitor, paper, .05 mfd. 200 V.	250152G15
27	Capacitor, paper, .1 mfd. 400 V.	250152G22
28	Capacitor, paper, .1 mfd. 200 V.	250152G13
29	Capacitor, electrolytic, 10 mfd. 450 V., 20 mfd. 25V.	270023G6
30	Capacitor, electrolytic, 10-30 mfd. 450 V.	270023G2
31	Capacitor, electrolytic, 20 mfd. 25V.	270027G2
40	Resistor, composition, 150 ohm $\frac{1}{2}$ W.	230084G8
41	Resistor, composition, 220 ohm $\frac{1}{2}$ W.	230084G9
42	Resistor, wire wound 125 ohm 10 W.	240021G11
43	Resistor, composition, 470 ohm $\frac{1}{2}$ W.	230084G1
44	Resistor, composition, 1500 ohm $\frac{1}{2}$ W.	230084G14
45	Resistor, composition, 4700 ohm $\frac{1}{2}$ W.	230084G17
46	Resistor, composition, 15,000 ohm $\pm 5\%$ $\frac{1}{2}$ W.	230084G187
47	Resistor, composition, 15,000 ohm 1 W.	230085G20
48	Resistor, composition, 22,000 ohm $\frac{1}{2}$ W.	230084G21
49	Resistor, composition, 47,000 ohm $\frac{1}{2}$ W.	230084G23
50	Resistor, composition, 100,000 ohm $\frac{1}{2}$ W.	230084G25
51	Resistor, composition, 150,000 ohm $\frac{1}{2}$ W.	230084G26
52	Resistor, composition, 220,000 ohm $\pm 5\%$ $\frac{1}{2}$ W.	230084G215
53	Resistor, composition, 270,000 ohm $\frac{1}{2}$ W.	230084G91
54	Resistor, composition, 470,000 ohm $\frac{1}{2}$ W.	230084G29
55	Resistor, composition, 1 megohm $\frac{1}{2}$ W.	230084G31
56	Resistor, composition, 4.7 megohm $\frac{1}{2}$ W.	230084G35
57	Resistor, wire wound, 10,000 ohm.	240035G2
58	Resistor, composition, 15,000 ohm $\frac{1}{2}$ W.	230084G20
59	Resistor, composition, 1000 ohm 2 W.	230064G62
65	Control, volume, 1 megohm	220044G15
66	Control, bass, 1 megohm, with power switch	220045G2
67	Control, treble, 1 megohm, with band expander switch	220071G2
68	Transformer, power, 117 V. 50/60 cycle	300032G1
69	Switch, rotary, band selector	160156G1
70	Switch, rotary, loop to outdoor antenna	160157G1
71	Switch assembly, muting	160158G1
72	Antenna, loop assembly	*
73	Socket, external input	180060G1
74	Socket, phonograph input	189741G1
75	Socket, phonograph motor	180501G5
76	Socket, speaker	180393G3
77	Socket, FM power	180422G1
78	Socket & Cable assembly, tuning indicator	180423G1
	Dial glass assembly	150283G1

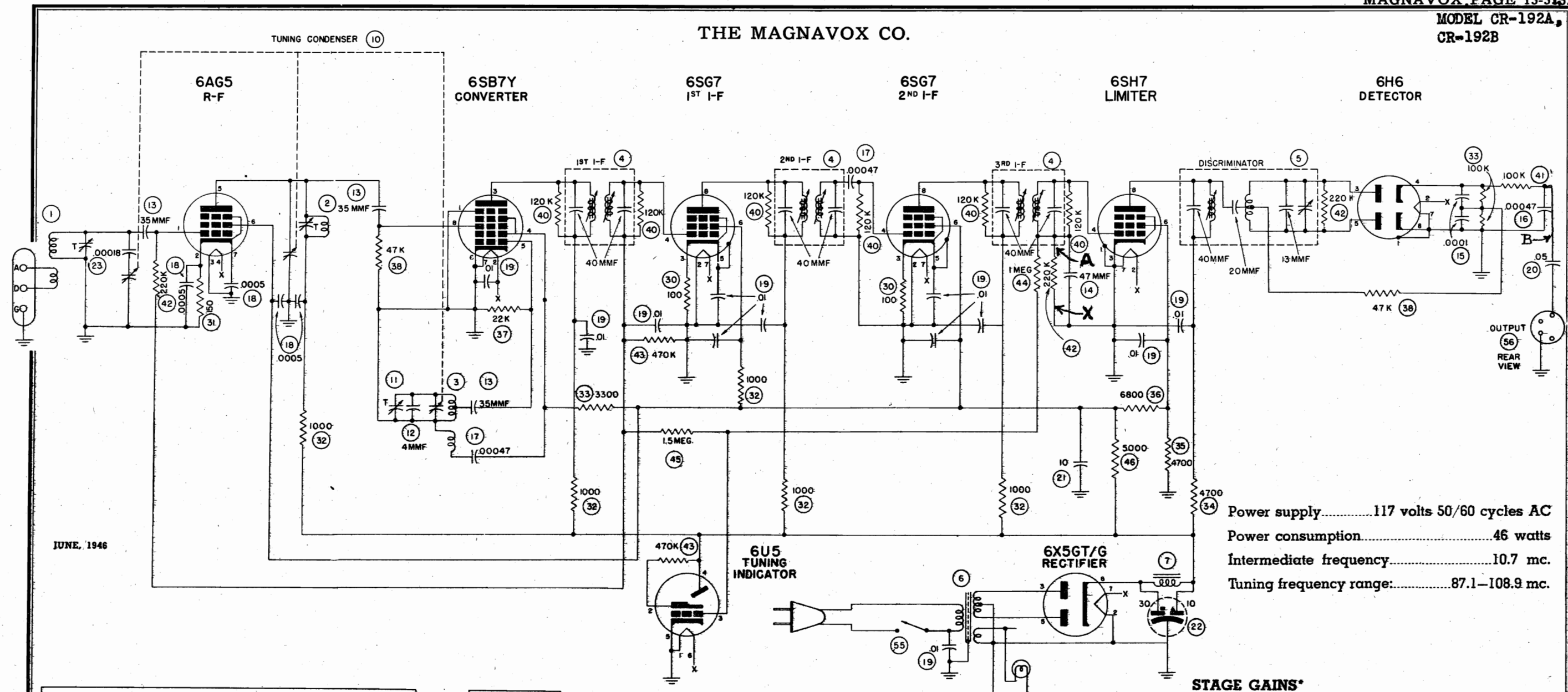
Due to the fact that a change was made in the mechanical construction of the dial assembly after the first CR-190 radio chassis production run, it is important that you follow the procedure outlined below in ordering replacement glass dials.

If the glass dial for which a replacement is required is marked 150269, order a 150278 dial glass assembly. If the glass is marked 150282, order a 150280 dial glass assembly. These assemblies include the rubber strips cemented in their correct positions.

*The part number of the loop antenna assembly changes with different cabinets. It is therefore important that you specify the *Style Number* of the instrument when ordering a replacement loop antenna assembly.

MODEL CR-192A,
CR-192B

THE MAGNAVOX CO.



JUNE, 1946

Power supply.....117 volts 50/60 cycles AC
 Power consumption.....46 watts
 Intermediate frequency.....10.7 mc.
 Tuning frequency range:.....87.1-108.9 mc.

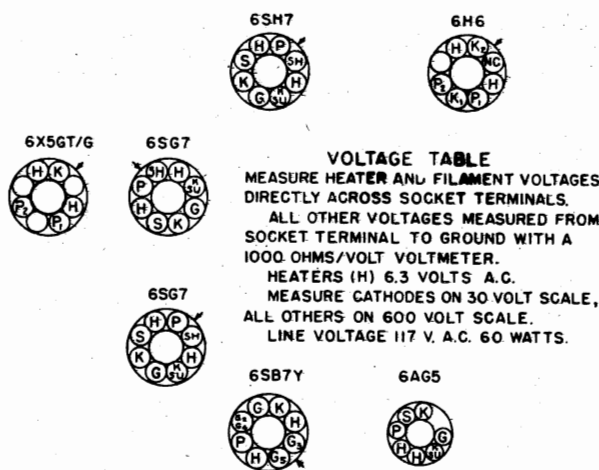
STAGE GAINS*

Antenna Post to R-F Grid through 300-ohm resistor at:
 98 mc.....1.0
 R-F to Converter Grid at:
 98 mc.....17.5
 R-F on Converter Grid to 1st I-F Grid at:
 98 mc.....8.3
 I-F on Converter Grid to 1st I-F Grid at:
 10.7 mc.....9.2
 I-F on 1st I-F Grid to 2nd I-F Grid at:
 10.7 mc.....34
 2nd I-F Grid to Limiter Grid at:
 10.7 mc.....33

OSCILLATOR GRID VOLTAGE

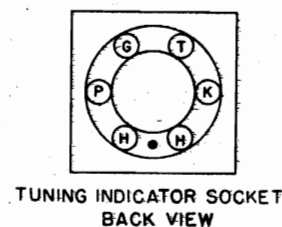
The DC voltage developed across Oscillator Grid resistor (37) at:
 98 mc.....7.0

*Variations of $\pm 20\%$ are permissible. All readings made with sufficient signal to provide 15 millivolts output at 400 cycles with 22.5 kc. modulation.



VOLTAGE TABLE

MEASURE HEATER AND FILAMENT VOLTAGES DIRECTLY ACROSS SOCKET TERMINALS. ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINAL TO GROUND WITH A 1000 OHMS/VOLT VOLTMETER. HEATERS (H) 6.3 VOLTS A.C. MEASURE CATHODES ON 30 VOLT SCALE, ALL OTHERS ON 600 VOLT SCALE. LINE VOLTAGE 117 V. A.C. 60 WATTS.

TUNING INDICATOR SOCKET
BACK VIEW

ALL ELECTRICAL VALUES SHOWN ARE IN MICROFARADS OR OHMS UNLESS OTHERWISE SPECIFIED.

I-F 10.7 MC

Model CR-192 series radio chassis are Frequency-Modulation tuners designed for connection to the F-M receptacle on any Magnavox A-M radio receiver.

Because of the fact that in some cabinets the CR-192 F-M tuner must be mounted in an inverted position, the suffix letters A and B on the model number identify the change in dial mounting. The model number of this F-M tuner with an inverted dial assembly is CR-192B; when the upright dial assembly mounting is provided, the model number of the chassis is CR-192A.

Dial Lamp.....Mazda No. 51

THE MAGNAVOX CO.

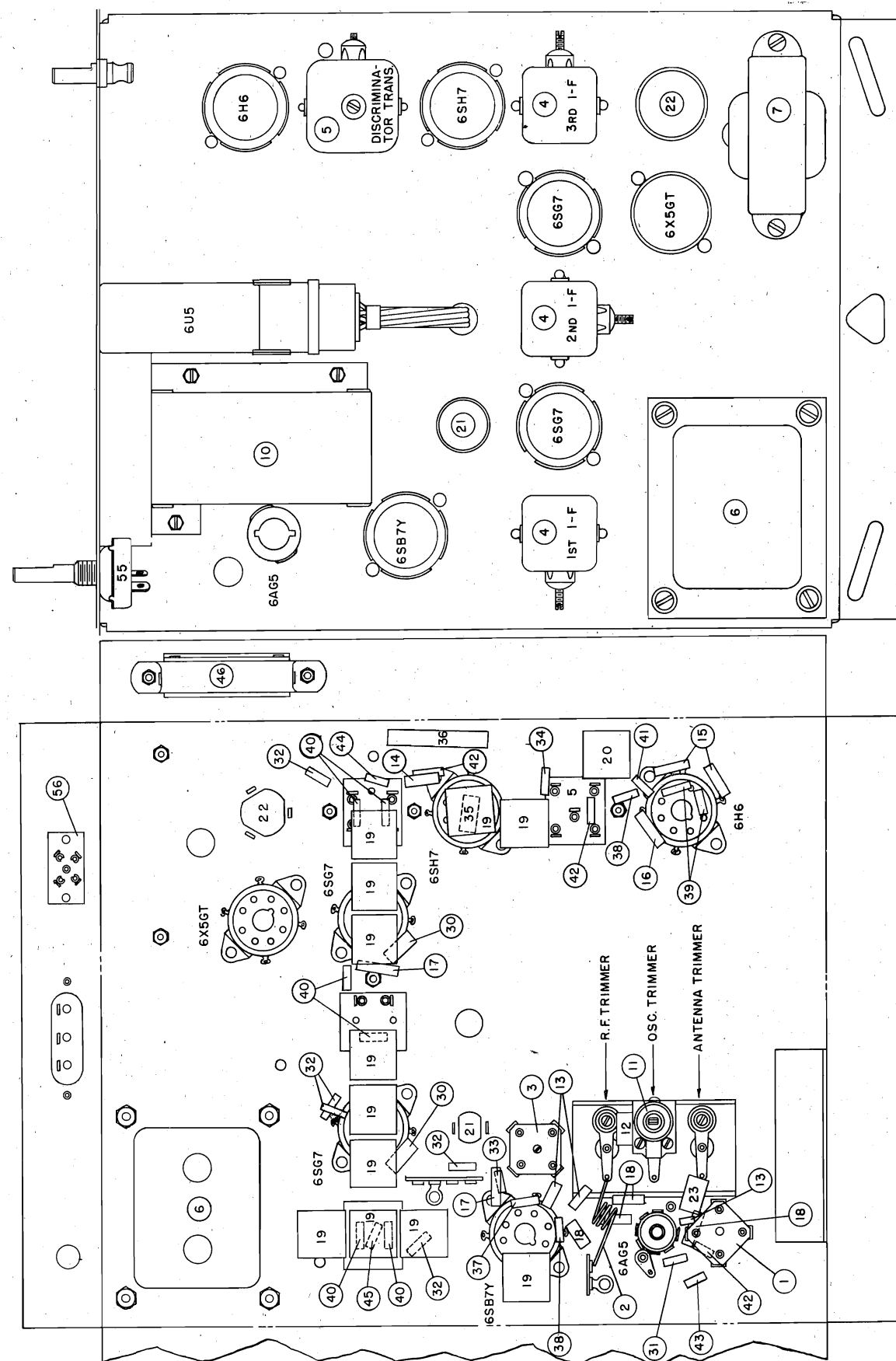
MODEL CR-192A,
CR-192B

FIGURE 3

MODEL CR-192A,
CR-192B

THE MAGNAVOX CO.

ALIGNMENT PROCEDURE

The alignment of this F-M tuner is made in three major steps namely, I-F alignment, Discriminator alignment and R-F alignment. An F-M generator is not required in aligning this F-M tuner. Any accurately calibrated signal generator covering a range in the vicinity of 10.7 megacycles may be used in aligning the I-F and the Discriminator stages. For R-F alignment, the generator must cover the tuning range of the tuner or approximately 87 to 110 megacycles. If such a signal generator is not available, this alignment may be made by using an F-M radio station as a frequency standard.

I-F ALIGNMENT

1. Connect the "high" side of the signal generator to Grid 3 (pin #8) of the 6SB7Y converter tube and the "low" side of the generator to the radio chassis.
2. If a vacuum tube voltmeter is available, connect it across the 220,000 ohm resistor in the grid circuit of the 6SH7 limiter tube at points designated "A" and "X" on the schematic diagram (Figure 2) to measure the limiter grid bias voltage. Set the signal generator to exactly 10.7 megacycles and adjust the third, the second and the first i-f transformer trimmers in that order for maximum reading on the meter. A reading of 2 to 8 volts should be considered normal.
3. If a vacuum tube voltmeter is not available, connect a 0-50 or 0-200 microammeter in series with the "ground" end of the 220,000 ohm resistor in the grid circuit of the 6SH7 limiter tube at point "X" on the schematic diagram. Set the signal generator to exactly 10.7 megacycles and adjust the third, the second and the first i-f transformer trimmers in that order for maximum meter readings. A normal reading will be in the range of 10 to 35 microamperes. At the completion of these adjustments, remove the microammeter and ground the 220,000 ohm resistor to the point where it was originally connected.

DISCRIMINATOR ALIGNMENT

The accurate alignment of the discriminator transformer cannot be overemphasized. Incorrect alignment will result in badly distorted reception. The following steps should be followed in the order given:

1. A DC vacuum tube voltmeter is connected to the output circuit by connecting it from ground to point "B" on the schematic diagram. This measures the detector output voltage. Adjust the signal generator frequency to exactly 10.775 megacycles and adjust both trimmers on the discriminator transformer for maximum reading. If the indicated voltage is less than 3 volts readjust the output of the generator until the meter indicates 3 volts or more. Now adjust the

signal generator frequency to 10.7 megacycles and turn the trimmer screw on the top of the discriminator until the voltage is zero. *This is an extremely important adjustment.* Reset the generator frequency to 10.775 and record the meter reading.

2. Reverse the meter connections and set the signal generator frequency to 10.625 megacycles. The meter reading now obtained must be within 10% of the reading recorded in the previous operation—if it is not, the discriminator alignment was not done accurately and must be repeated.

3. The discriminator may also be aligned using a 0-50 or 0-200 microammeter if a vacuum tube voltmeter is not available. In this case, the detector output current is measured. Connect the microammeter to the same points specified in paragraph 1 and proceed in the manner outlined in paragraphs 1 and 2 of this section. In the operation described in paragraph 1, the meter reading should be at least 20 microamperes when the trimmers are peaked at 10.775 megacycles; if not, the generator should be adjusted until that value is obtained.

R-F ALIGNMENT

1. Check that the dial pointer is in line with the last mark at the low frequency end of the dial calibration when the condenser gang is fully meshed. If it is not, slide the pointer on its string to the correct position, and crimp the lugs (on the rear of the pointer) tightly around the string and apply a drop of cement to hold the pointer in adjustment.
2. Connect the vacuum tube voltmeter to points "A" and "X" on the schematic diagram or connect a 0-50 or 0-200 microammeter in series with the "ground" end of the 220,000 ohm resistor in the grid circuit of the 6SH7 limiter tube at point "X" on the schematic diagram.
3. An extremely accurate signal generator is a necessity in making the following adjustments and it should be connected to the antenna post through a 300 ohm resistor. If such a generator is not available, connect an F-M antenna to the antenna terminal (A) and use an F-M transmitter for a frequency standard. It is preferable that this station be located in the high frequency end of the band—102 to 108 megacycles.
4. Set the signal generator (if one is used) and the F-M tuner to exactly 108 megacycles—if an F-M station is used as a frequency standard accurately set the tuner to the frequency of the F-M station and adjust the oscillator trimmer for a maximum reading on the meter. Then adjust the antenna trimmer and the r-f trimmer for a maximum meter indication. If too much signal is fed to the tuner, it might appear at several settings of the tuning dial and confuse the adjustment. When the adjustments are completed, the second harmonic of the oscillator frequency will be 10.7 megacycles lower than the signal frequency.

THE MAGNAVOX CO.

MODEL CR-192A,
CR-192B**METHOD FOR REMOVING CHASSIS FROM CABINET**

As the control panel is permanently fastened to the tuner in all models except those mounted in the Regency Symphony combination, it is not necessary to remove the control knobs from the cabinet. The instructions immediately following are for all combinations except the Regency Symphony. Separate instructions for removing the CR-192A chassis from that instrument are shown in this section.

Before removing the chassis, disconnect the antenna and ground leads from their terminals, and the output and the power cables from their receptacles. While holding the rear of the chassis in place with one hand, remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Then while lowering the chassis, pull back

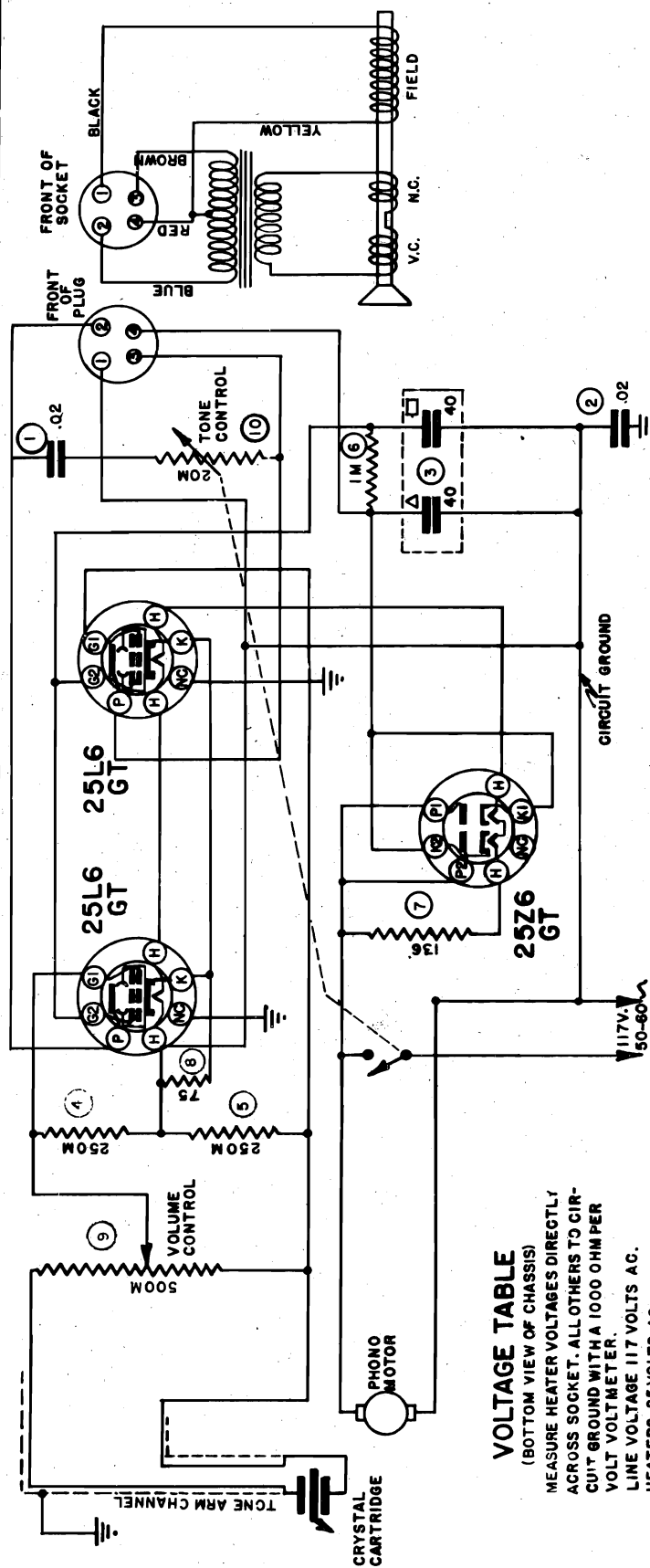
on it to disengage the hooks from the slots in the tray to which the chassis is mounted, and withdraw the chassis from the cabinet.

In replacing the chassis, slide it in so that the small hooks near the front ride inside the flanges on the sides of the chassis tray. Push the chassis forward as far as it will go so that the hooks engage the slots in the chassis tray; then lift up the rear of the chassis until the guide pin in the chassis tray projects through the triangular opening the flange on the rear of the F-M chassis. Now pull back on the chassis. A ledge on the guide pin referred to above, will hold the chassis in place while the mounting screws are started into the captivated nuts on the top of the chassis tray. These nuts are accessible through the

angular slots in the chassis flange and the Phillips-head screws should be turned in to within a few turns of being tight. Now slide the chassis forward until its panel is flush with the panel of the A-M radio chassis and tighten the two Phillips-head screws securely, completing the replacement operation.

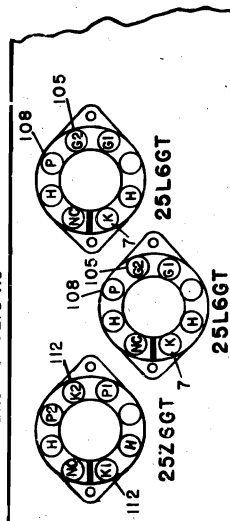
REGENCY SYMPHONY. To remove the CR-192A chassis from the Regency Symphony first remove the antenna and ground leads from their terminals and the output and power cables from their receptacles. Then pull the control knobs from their shafts and remove the two fancy-head screws from the front panel. Next, remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis and pull the chassis out of the rear of the cabinet.

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil assembly, antenna.....	360270G1
2	Coil assembly, r-f.....	360271G1
3	Coil assembly, oscillator.....	360263G1
4	Transformer, i-f.....	360258G1
5	Transformer, discriminator.....	360259G1
6	Transformer, power, 117 volt 50/60 cycle.....	300030G1
7	Choke, filter.....	350032G1
10	Capacitor, variable, three-gang tuning.....	260059G1
11	Capacitor, trimmer 1.5-7 mmf.....	260067G1
12	Capacitor, ceramic, 4 mmf.....	250088G28
13	Capacitor, ceramic, 35 mmf.....	250088G26
14	Capacitor, molded mica, 47 mmf.....	250159G96
15	Capacitor, molded mica, 100 mmf.....	250159G98
16	Capacitor, molded mica, 470 mmf. +10%.....	250159G90
17	Capacitor, molded mica, 470 mmf. +20%.....	250159G102
18	Capacitor, ceramic, 500 mmf.....	250088G31
19	Capacitor, paper, .01 mfd. 600V.....	250129G2
20	Capacitor, paper, .05 mfd. 600V.....	250129G5
21	Capacitor, electrolytic, 10 mfd. 450V.....	270026G3
22	Capacitor, electrolytic, 30-10 mfd. 475V.....	270023G2
23	Capacitor, molded mica, 180 mmf.....	250159G53
30	Resistor, composition, 100 ohm $\frac{1}{2}$ W.....	230084G7
31	Resistor, composition, 220 ohm $\frac{1}{2}$ W.....	230084G9
32	Resistor, composition, 1000 ohm $\frac{1}{2}$ W.....	230084G13
33	Resistor, composition, 3300 ohm $\frac{1}{2}$ W.....	230084G16
34	Resistor, composition, 4700 ohm $\frac{1}{2}$ W.....	230084G17
35	Resistor, composition, 4700 ohm 1 W.....	230085G17
36	Resistor, composition, 6800 ohm 2 W.....	230061G18
37	Resistor, composition, 22,000 ohm $\frac{1}{2}$ W.....	230084G21
38	Resistor, composition, 47,000 ohm $\frac{1}{2}$ W.....	230084G23
39	Resistor, composition, 100,000 ohm $\frac{1}{2}$ W. $\pm 20\%$	230084G25
40	Resistor, composition, 120,000 ohm $\frac{1}{2}$ W. $\pm 10\%$	230084G87
41	Resistor, composition, 100,000 ohm $\frac{1}{2}$ W. $\pm 10\%$	230084G86
42	Resistor, composition, 220,000 ohm $\frac{1}{2}$ W.....	230084G27
43	Resistor, composition, 470,000 ohm $\frac{1}{2}$ W.....	230084G29
44	Resistor, composition, 1 megohm $\frac{1}{2}$ W.....	230084G31
45	Resistor, composition, 1.5 megohm $\frac{1}{2}$ W.....	230084G32
46	Resistor, wire wound, 5000 ohm, 5 W.....	240035G4
55	Switch, rotary, power.....	160163G1
56	Socket, output.....	180060G1
	Calibrated glass dial—CR-192A.....	150287G1
	Calibrated glass dial—CR-192B.....	150287G2



VOLTAGE TABLE

(BOTTOM VIEW OF CHASSIS)
MEASURE HEATER VOLTAGES DIRECTLY
ACROSS SOCKET. ALL OTHERS TO CIR-
CUIT GROUND WITH A 1000 OHM PER
VOLT VOLTMETER.
LINE VOLTAGE 117 VOLTS AC.
HEATERS 25 VOLTS AC



Ref. No.

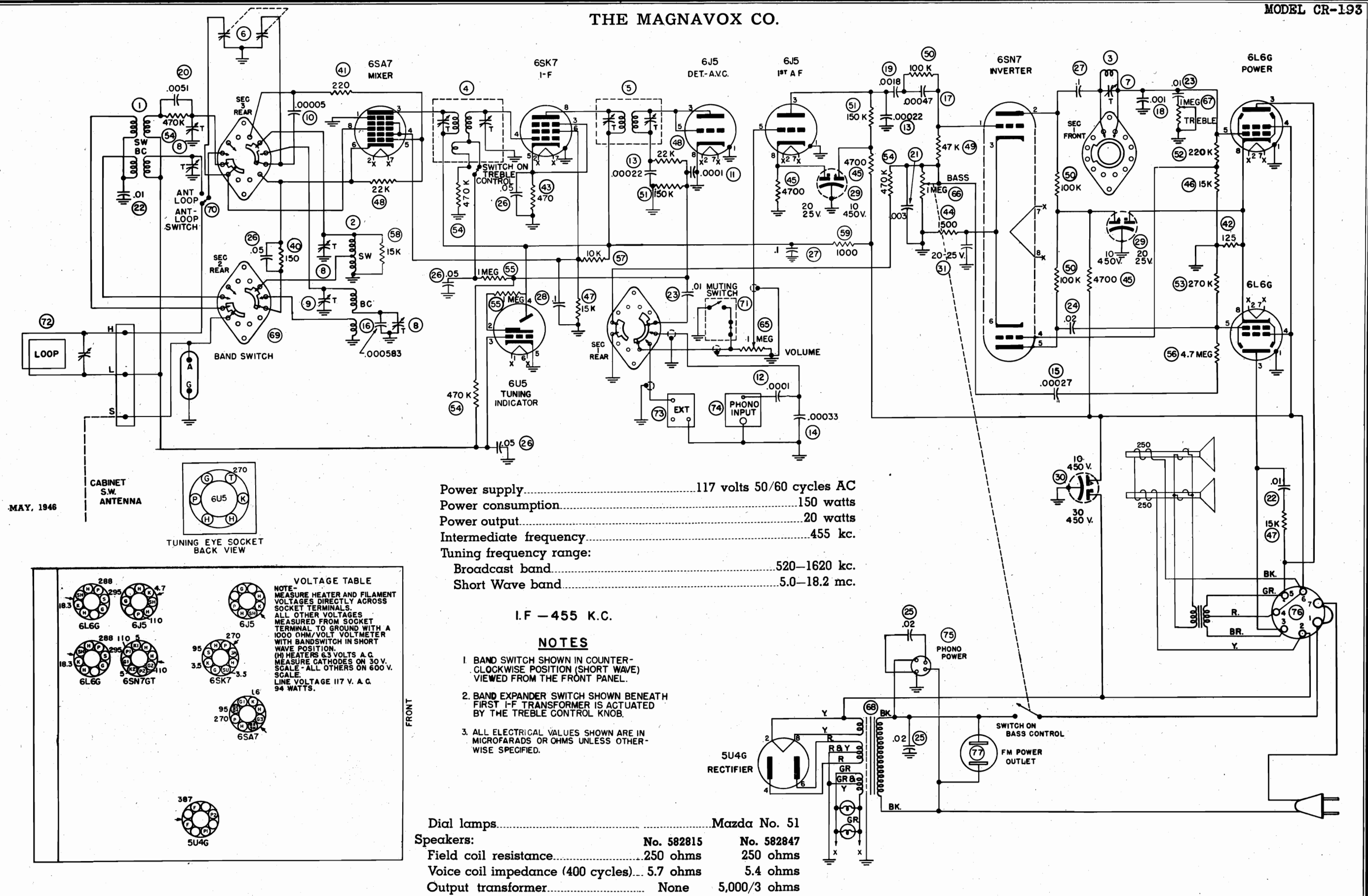
Magnavox Part No.

1	Capacitor, molded paper, .02 mfd. 600 V.	250056
2	Capacitor, molded paper, .02 mfd. 600 V.	250056
3	Capacitor, electrolytic, 40-40 mfd. 150 V.	270013
4	Resistor, carbon, 250,000 ohm 1/3 W.	230010
5	Resistor, carbon, 250,000 ohm 1/3 W.	230010
6	Resistor, carbon, 1000 ohm	239745
7	Resistor, wire wound, 136 ohm 15 W.	240014
8	Resistor, wire wound, 75 ohm 5 W.	230056
9	Control, volume, 500,000 ohm	220032
10	Control, tone with power switch, 20,000 ohm ..	220021
	Socket, octal marked 25L6GT	180128
	Socket, octal marked 25Z6GT	180129
	Knob, control stamped VOLUME	140035
	Knob, control stamped OFF-ON-TONE	140036

Primary voltage 117 V. AC-DC;
Power consumption 65 watts;
Power output 3 watts;
Vacuum Tubes 2 - 25L6GT; 1 - 25Z6GT;
Speaker: Field Coil *1800 ohms;
Transformer **3000 ohms;

* DC resistance. ** Primary impedance.

THE MAGNAVOX CO.



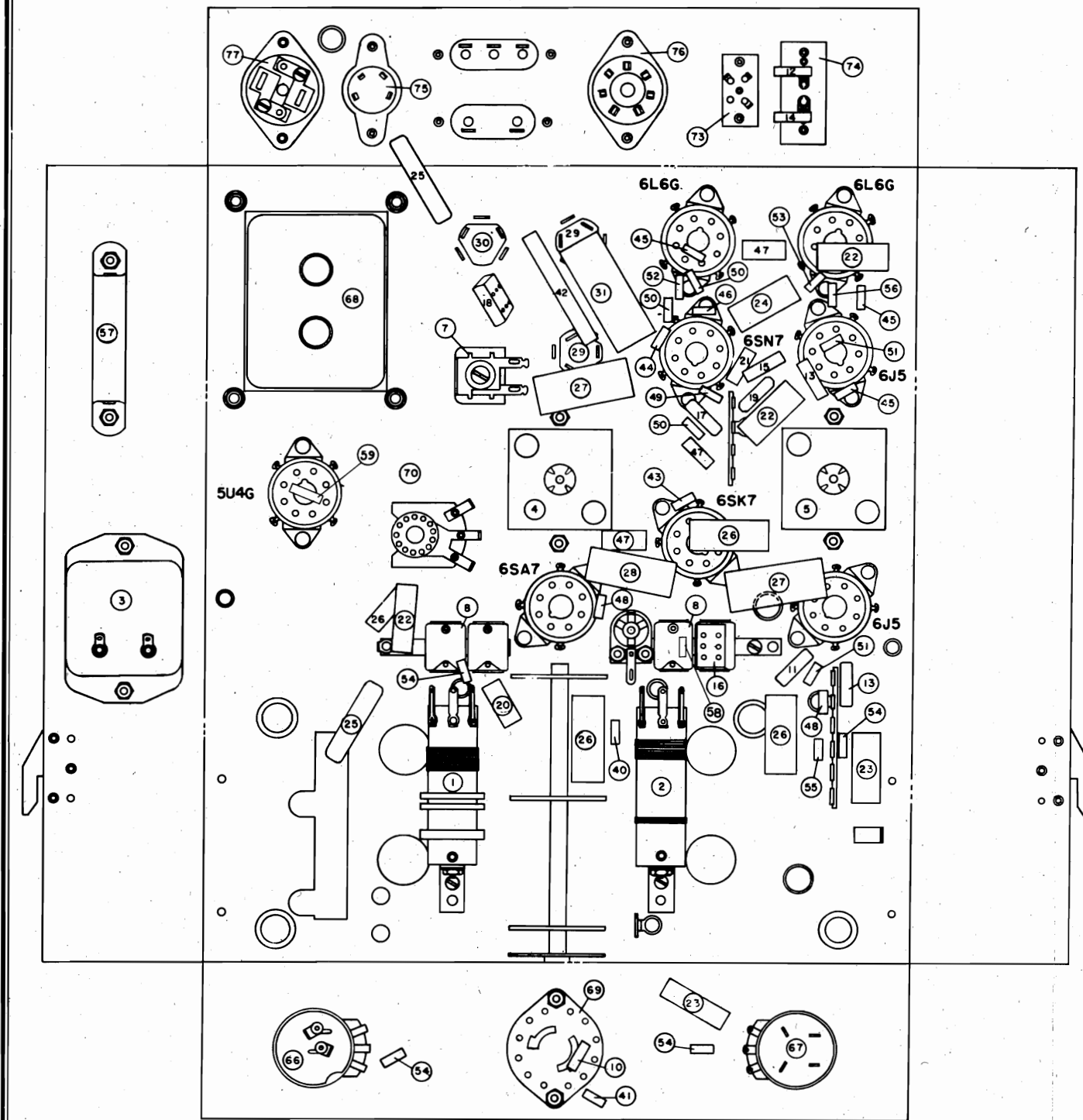
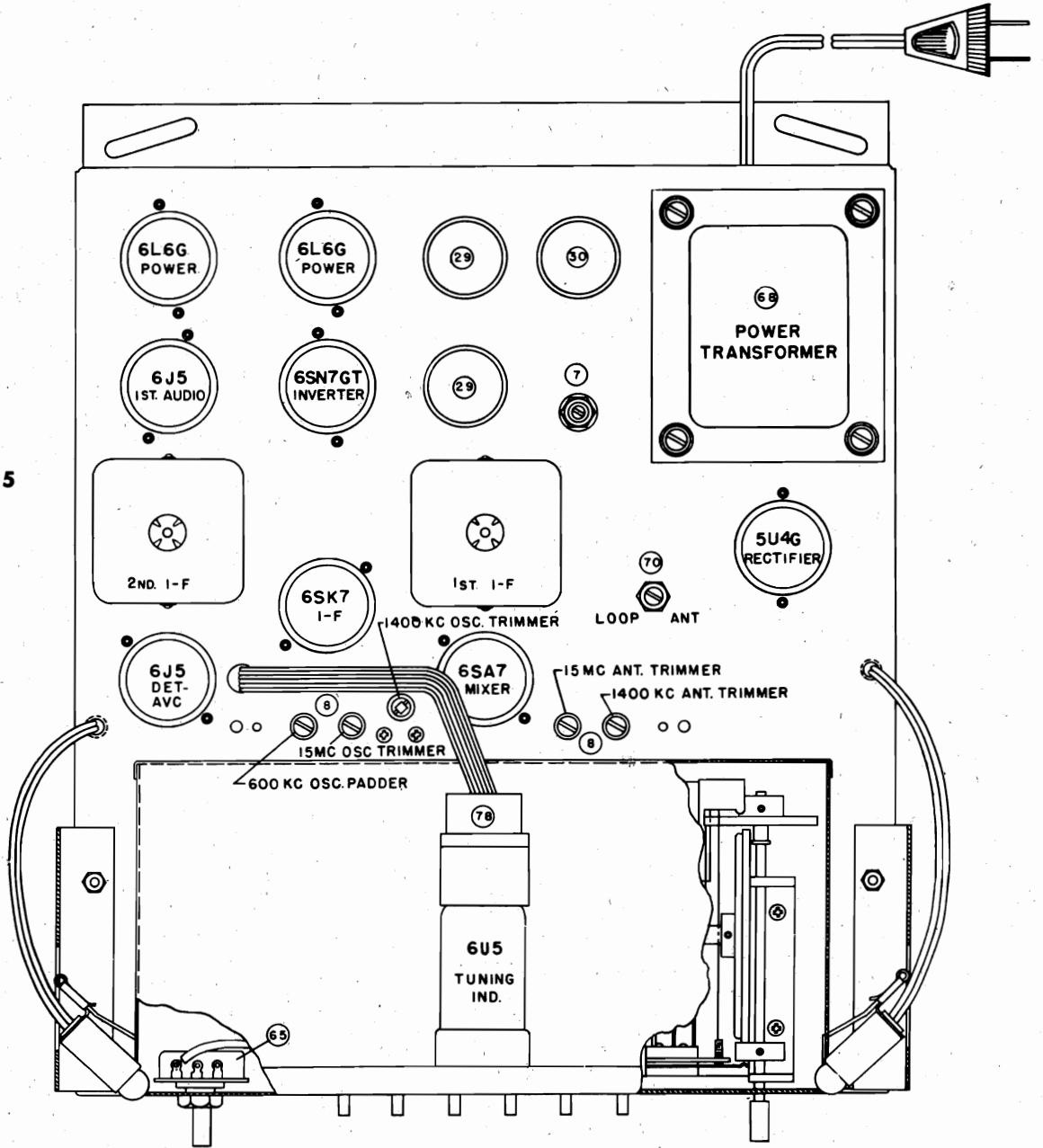


FIGURE 5



SPECIAL SERVICE INFORMATION

The following information is provided for the service man who has a vacuum tube voltmeter or a similar measuring instrument available.

STAGE GAINS*

Antenna Post to Converter Grid at:

600 kc.	5.5
6 mc.	2.0

R-F on Converter to I-F Grid at:

600 kc.	28
6 mc.	22

I-F on Converter Grid to I-F Grid at:

455 kc.	34
---------	----

I-F Grid to Detector Plate at:

455 kc.	67
---------	----

OSCILLATOR OUTPUT VOLTAGE

The DC voltage developed across Oscillator Grid Resistor (48) at:

600 kc.	5.6
6 mc.	6.0

AUDIO GAIN

Voltage required across Volume Control to produce .05 watt speaker output** at 400 cycles is .010 volt with Band Selector Switch in BDCST setting.

* Variations of $\pm 20\%$ are permissible. All readings made with sufficient input signal to provide .05 watt speaker output.

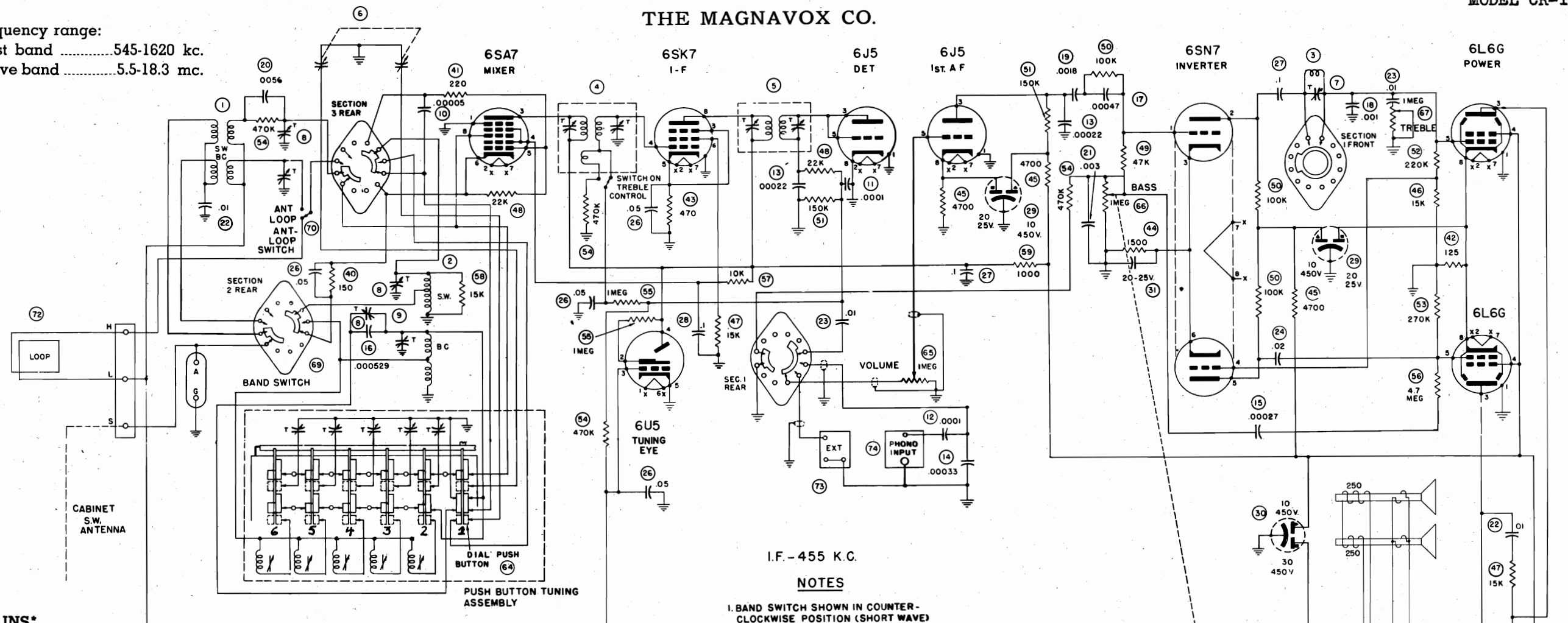
** .05 watt speaker output at 400 cycles is equivalent to a reading of 0.4 volts as measured by a high resistance AC voltmeter across the voice coil of either speaker.

THE MAGNAVOX CO.

Tuning frequency range:

Broadcast band545-1620 kc.

Short wave band5.5-18.3 mc.



I.F. - 455 K.C.

NOTES

1. BAND SWITCH SHOWN IN COUNTER-CLOCKWISE POSITION (SHORT WAVE) VIEWED FROM THE FRONT PANEL.
2. BAND EXPANDER SWITCH SHOWN BENEATH FIRST I-F TRANSFORMER IS ACTUATED BY THE TREBLE CONTROL KNOB.
3. ALL ELECTRICAL VALUES SHOWN ARE IN MICROFARADS OR OHMS UNLESS OTHERWISE SPECIFIED.

STAGE GAINS*

Antenna Post to Converter Grid at:

600 kc.	5.5
6 mc.	2.0

R-F on Converter Grid to I-F Grid at:

600 kc.	28
6 mc.	22

I-F on Converter Grid to I-F Grid at:

455 kc.	34
--------------	----

I-F Grid to Detector Plate at:

455 kc.	67
--------------	----

AUDIO GAIN

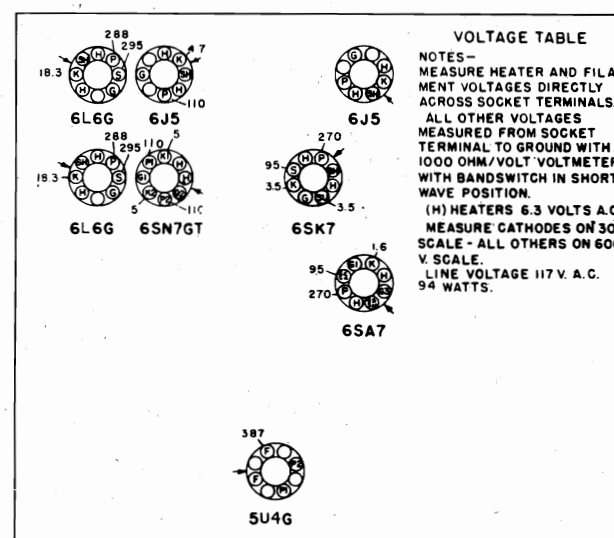
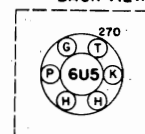
Voltage required across Volume Control to produce .05 watt speaker output** at 400 cycles is .010 volt with Band Selector Switch in BDCST setting.

OSCILLATOR OUTPUT VOLTAGE

The DC voltage developed across Oscillator Grid Resistor (48) at:

600 kc.	9.7
6 mc.	5.3

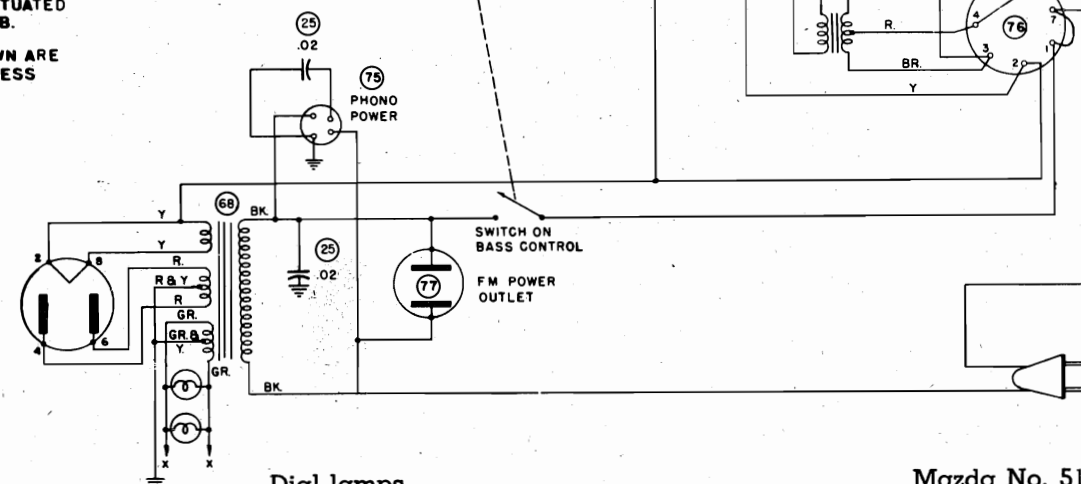
* Variations of 20% are permissible. All readings made with sufficient input signal to provide .05 watt speaker output.
 ** .05 watt speaker output at 400 cycles is equivalent to a reading of 0.4 volts as measured by a high resistance AC voltmeter across the voice coil of either speaker

TUNING EYE SOCKET
BACK VIEW

VOLTAGE TABLE

NOTES—MEASURE HEATER AND FILAMENT VOLTAGES DIRECTLY ACROSS SOCKET TERMINALS. ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINAL TO GROUND WITH A 1000 OHM/VOLT VOLTMETER WITH BANDSWITCH IN SHORT WAVE POSITION.
 (H) HEATERS 6.3 VOLTS A.C. MEASURE CATHODES ON 30V SCALE - ALL OTHERS ON 500 V. SCALE.
 LINE VOLTAGE 117 V. A.C. 94 WATTS.

FRONT

5U4G
RECTIFIER

Dial lamps Mazda No. 51

Speaker:	No. 582815	No. 582847
Field coil resistance.....	250 ohms	250 ohms
Voice coil impedance (400 cycles).....	5.7 ohms	5.4 ohms
Output transformer.....	None	5,000/3 ohms
Power supply	117 volts 50/60 cycles AC	
Power consumption.....	150 watts	
Power output.....	20 watts	
Intermediate frequency	455 kc.	

THE MAGNAVOX CO.

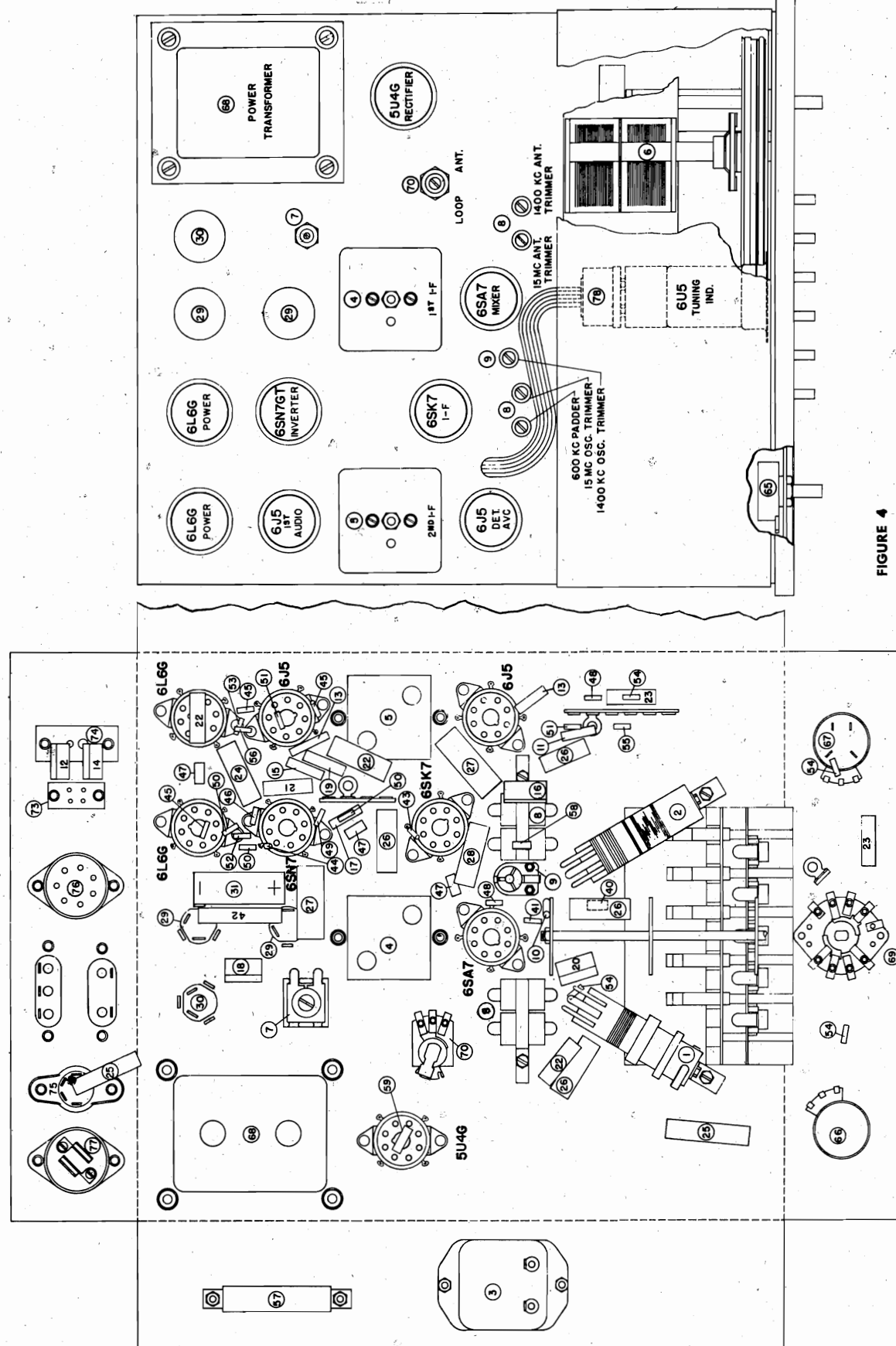


FIGURE 4

THE MAGNAVOX CO.

METHOD FOR REMOVING CHASSIS FROM CABINET

Model CR-194 radio chassis is designed for easy removal from the cabinet in which it is installed. As the radio panel is permanently fastened to the chassis, the control knobs need not be removed when the chassis is taken out of the cabinet for service. To remove the chassis, first remove the antenna leads from their terminals and all plugs from the receptacles on the rear of the chassis. Then remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Lift the rear of the chassis about one inch and pull it straight back.

Never remove the chassis tray from the cabinet—it has been properly positioned to bring the radio panel in place when the chassis is replaced.

In replacing the chassis, slide it so that the small hooks near the front, ride inside the flanges on the sides of the chassis tray. Push the chassis forward as far as it will go and the hooks should then engage the slots in the chassis tray. Replace the two Phillips-head screws and nuts and tighten securely. Replace all plugs in their receptacles and the antenna leads on their correct terminals. The antenna terminal board for the loop antenna connections is designated S-L-H. The end of the short wave antenna that is fastened to the inside of the cabinet connects to S. Always disconnect this antenna from terminal S when an outdoor antenna is used as it may pick up noise. The two terminals on the loop are designated L and H. The leads connected to these terminals should be wired to the corresponding terminals (L and H) on the chassis.

ALIGNMENT PROCEDURE

The alignment of this receiver requires the use of an accurately calibrated r-f signal generator and an output meter. All trimmer condenser locations are shown on the chassis layout diagram, Figure 4. The radio volume control should be turned to maximum and the signal generator output kept as low as possible during alignment to prevent the AVC from operating and giving false readings. Always set the Selectivity Switch to SHARP TUNE before aligning the i-f stages. This is done by turning the Treble Control counter-clockwise as far as possible.

4. Set the signal generator and the radio receiver to 1400 kc.; adjust the 1400 kc. oscillator trimmer and the 1400 kc. antenna trimmer for maximum output. If considerable adjustment was necessary, recheck the 600 kc. padder setting.

Short Wave Band Alignment

1. Set the band selector switch to SW as for Short Wave reception and substitute a 400 ohm resistor for the capacitor in series with the signal generator lead connected to the antenna terminal on the receiver.

2. Set the signal generator and the radio receiver to 15 mc.; then adjust the 15 mc. oscillator trimmer and the 15 mc. antenna trimmer for maximum output.

While adjusting the 15 mc. oscillator trimmer two peaks may be observed; only one is the correct peak for 15 mc. alignment. Screw in the trimmer to maximum capacity—then decrease the capacity until the first peak is observed. This is the correct one.

10 KC Filter Adjustment

This chassis incorporates a 10 kc. filter circuit to eliminate the beat note heard as a whistle between stations on the broadcast band. If the trimmer is out of adjustment, the following procedure should be observed.

1. Set the Selectivity Switch to FULL RANGE by turning the Treble Control knob clockwise as far as possible.

2. Connect the output of an audio oscillator to the phonograph pickup socket on the radio chassis and adjust the oscillator to EXACTLY 10,000 cycles.

3. Set the band selector to PHONO and adjust the 10 kc. trimmer (7) for minimum output.

4. If an audio oscillator is not available for making this adjustment, set the band selector to BDCST, connect an antenna to the receiver and set the gang condenser to a point between two stations on adjacent channels having approximately the same power. If the 10 kc. trimmer is out of adjustment, a whistle will be heard. Adjust the trimmer until the whistle is eliminated.

I-F Alignment.

1. Connect the output of the signal generator to the oscillator grid (pin No. 5) of the 6SA7 tube through a .00025 mfd. capacitor. The ground on the signal generator should be connected to the radio chassis ground.

2. Turn the condenser gang until it is completely meshed (low-frequency end of dial calibration), and set the band selector switch to BDCST as for broadcast band reception.

3. Adjust the signal generator to EXACTLY 455 kc. and peak the second i-f transformer and the first i-f transformer trimmers in that order.

Broadcast Band Alignment

1. Remove the signal generator lead from the 6SA7 grid and connect it to the radio antenna terminal through the .00025 mfd. capacitor. The ANT-LOOP switch (70) must be in the ANT setting.

2. Check the tuning dial pointer adjustment. When the plates of the tuning condenser are completely meshed, the dial pointer must be in line with the last calibration mark at the low frequency end of the dial. If it is not, slide the pointer on its string to the correct position. Be sure to crimp the lugs (on the rear of the pointer) tightly around the string to hold the pointer in adjustment.

3. With the band selector still set for broadcast band reception, adjust the signal generator and the radio receiver to 600 kc. While rocking the gang condenser a few degrees to the right and to the left, adjust the 600 kc. oscillator padder for maximum indication on the output meter.

THE MAGNAVOX CO.

DIAL CORD REPLACEMENT

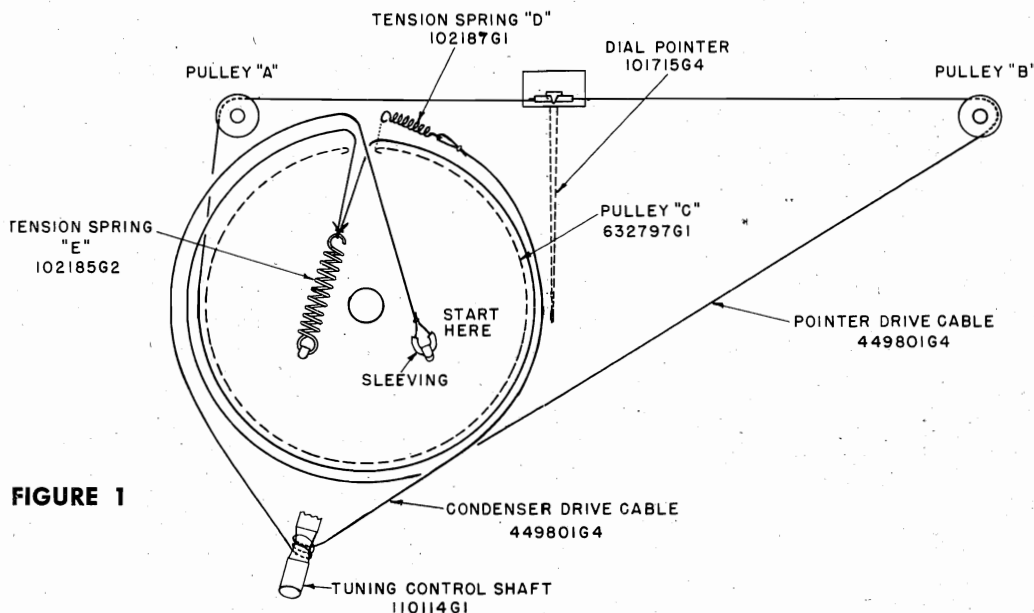
Two separate drive cables are used in the CR-194 dial assembly. One cable is used to transmit the motion from the dial tuning knob to the large pulley that is coupled to the condenser gang; the other cable actuates the dial pointer whenever the large pulley on the condenser gang is moved. Separate instructions for replacing either of these cables is given in the following paragraphs.

CONDENSER DRIVE CABLE REPLACEMENT

Slide a short length (approximately ½-inch) of sleeving over one end of a 19-inch length of dial cable, form a small loop and tie a knot in the manner shown on Figure 1. Hook this loop over the metal hook in pulley "C" and lace the cable through the pulley slot and around the pulley in a counter-clockwise direction when viewed from the rear of the panel, keeping the cable to the rear of the pulley groove. Lace the cable in the direction indicated by the arrow on the drawing wrapping 2½ turns around the smaller

approximately 40 inches long and slide a short piece of sleeving over the cable. Tie a small loop in one end of the cable and temporarily hook it over the metal hook in pulley "C." Lace the other end through the slot in the pulley groove and in a counter-clockwise direction around the large pulley, then around pulley "B" and straight across the back of the dial frame; over pulley "A" and in a counter-clockwise direction around pulley "C." This last wrap around pulley "C" must be at the front of the pulley groove or nearest the panel. *This is important!* Lace the free end of the cable through the slot in pulley "C" and remove the other end of the cable from the hook.

Fasten one end of tension spring "E" over the pulley hook and lace the two free ends of the drive cable through the other end of the spring. Now pull back on the cable until the tension spring coils are stretched to approximately 1½ inches. Tie a double knot in the cable while maintaining tension on the spring.

**FIGURE 1**

diameter portion of the tuning control shaft from front to back; then around the opposite side of pulley "C." Loop one end of tension spring "D" on the right-hand edge of the slot in pulley "C"; thread the free end of the drive cable through the opposite end of spring "D" and pull back on the cable until the spring coils are stretched to approximately one inch. Tie a double knot in the cable while maintaining tension on the spring, completing the operation.

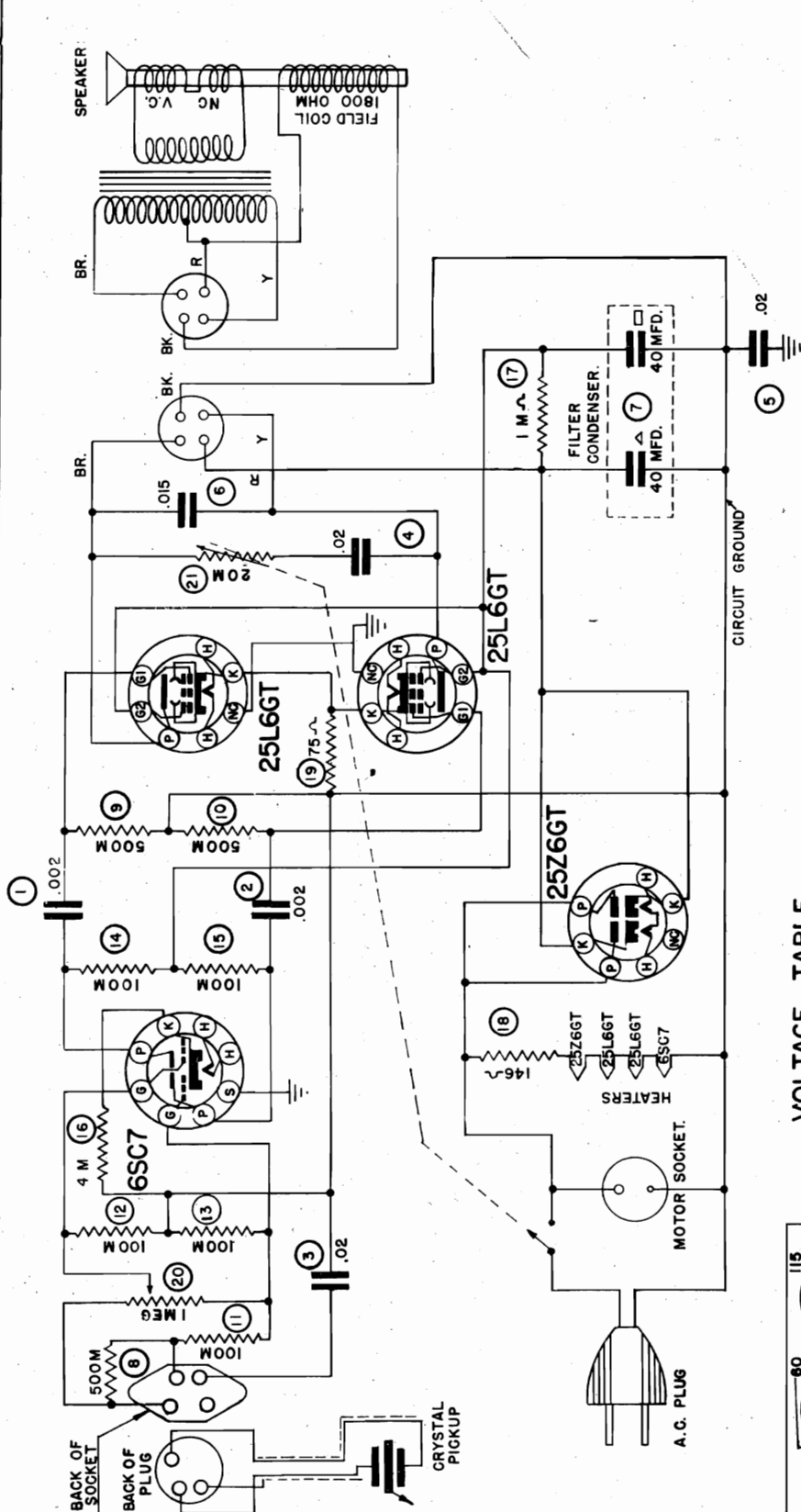
DIAL POINTER DRIVE CABLE REPLACEMENT

Rotate the tuning control shaft until the slot in the groove of pulley "C" is up. Cut a piece of dial cable

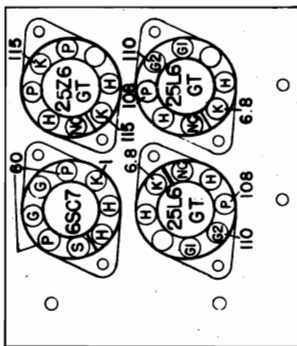
Turn the tuning control shaft until the condenser gang is completely meshed and slide the dial pointer on its track until it is in line with the last calibration mark at the low frequency end of the dial. The short piece of sleeving installed prior to the stringing operation should be slid to the rear of the dial pointer and the crimping lugs on the dial pointer pressed together over the sleeving. After checking to see that the condenser gang is still completely meshed and the dial pointer is in the position specified previously, apply a few drops of cement to each end of the sleeving to which the dial pointer is fastened. This completes the operation.

MODELS A-206F,
A-206G

THE MAGNAVOX CO.



VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
MEASURE ALL D.C. VOLTAGES DIRECT
TO CIRCUIT GROUND WITH A 1000 OHM
PER VOLT VOLTMETER CATHODE(K) 30V SCALE
ALL OTHERS ON 600 V. SCALE
LINE VOLTAGE 117 VOLTS AC.



Primary voltage	117 V. 60 cycle AC.
Power consumption	65 watts
Power output	3 watts
Vacuum tubes	1 - 6SC7; 2 - 25L6GT; 1 - 25Z6GT;
Speaker: Field Coil	*1800 ohms;
Transformer	**3000 ohms;

* DC resistance. ** Primary impedance.

Models A-206F and A-206G are alike electrically. They differ slightly only in their mechanical layout.

THE MAGNAVOX CO.

MODELS A-206F, A-206G

MODEL A-307P2

MODEL A-307P6

A-206F, A-206G

A-307P2

Ref. No.

Description

Magnavox Part No.

1	Capacitor, tubular, .002 mfd. 600 V.	254161
2	Capacitor, tubular, .002 mfd. 600 V.	254161
3	Capacitor, tubular, .02 mfd. 600 V.	250056
4	Capacitor, tubular, .02 mfd. 600 V.	250056
5	Capacitor, molded paper, .02 mfd. 600 V.	250056
6	Capacitor, molded paper, .015 mfd. 600 V.	250069
7	Capacitor, electrolytic, 40-40 mfd. 150 V.	270013
8	Resistor, carbon, 500,000 ohm 1/2 W.	239755
9	Resistor, carbon, 500,000 ohm 1/2 W.	239755
10	Resistor, carbon, 500,000 ohm 1/2 W.	239755
11	Resistor, carbon, 100,000 ohm 1/2 W.	239753
12	Resistor, carbon, 100,000 ohm 1/2 W.	239753
13	Resistor, carbon, 100,000 ohm 1/2 W.	239753
14	Resistor, carbon, 100,000 ohm 1/2 W.	239753
15	Resistor, carbon, 100,000 ohm 1/2 W.	239753
16	Resistor, carbon, 4,000 ohm 1/2 W.	230024
17	Resistor, carbon, 1,000 ohm 1/2 W.	239745
18	Resistor, wire wound, 146 ohm 15 W.	240015
19	Resistor, wire wound, 75 ohm 5 W.	230056
20	Control, volume, 1 megohm	222518
21	Control, tone with power switch, 20,000 ohm	220021
	Socket, octal marked 65C7	180126
	Socket, octal marked 25L6GT	180128
	Socket, octal marked 25Z6GT	180129
	Socket, crystal pickup	180081
	Socket and cable assembly, motor	460052
	Socket and cable assembly, speaker	460076
	Knob, control, stamped VOLUME	140035
	Knob, control, stamped OFF-ON-TONE	140036

Ref. No.

Description

Magnavox Part No.

C1	Capacitor, tubular, .005 mfd. 600 V.	254180
C2	Capacitor, tubular, .00025 mfd. 600 V.	254133
C3	Capacitor, tubular, .003 mfd. 600 V.	254163
C4	Capacitor, electrolytic, 25 mfd. 25 V.	274165
C5	Capacitor, electrolytic, 10 mfd. 150 V.	270001
C6	Capacitor, tubular, .2 mfd. 200 V.	254182
C7	Capacitor, tubular, .2 mfd. 200 V.	254182
C8	Capacitor, electrolytic, 16 mfd. 150 V.	274212
C9	Capacitor, electrolytic, 16 mfd. 150 V.	274212
C10	Capacitor, electrolytic, 16 mfd. 150 V.	274212
C11	Capacitor, tubular, .2 mfd. 200 V.	254182
C12	Capacitor, tubular, .02 mfd. 600 V.	254127
R1	Control, volume 100,000—500,000 ohm	222383
R2	Resistor, carbon, 100,000 ohm 1/2 W.	234445
R3	Resistor, carbon, 60,000 ohm 1/2 W.	234440
R4	Resistor, carbon, 20,000 ohm 1/2 W.	234435
R5	Control, treble, 20,000 ohm, with switch	222556
R6	Resistor, carbon, 1 megohm 1/2 W.	234450
R7	Resistor, carbon, 5,000 ohm 1/2 W.	234430
R8	Resistor, carbon, 50,000 ohm 1/2 W.	234439
R9	Resistor, carbon, 40,000 ohm 1/2 W.	234438
R10	Resistor, carbon, 10,000 ohm 1/2 W.	234433
R11	Resistor, carbon, 10,000 ohm 1/2 W.	234433
R12	Resistor, carbon, 100,000 ohm 1/2 W.	234445
R13	Resistor, carbon, 100,000 ohm 1/2 W.	234445
R14	Resistor, carbon, 100,000 ohm 1/2 W.	234445
R15	Resistor, wire wound, 60 ohm	247852
R16	Resistor, carbon, 3 megohm 1/2 W.	234452
R17	Resistor, carbon, 3 megohm 1/2 W.	234452
T1	Transformer, input	320189
	Choke, filter	350107
	Knob, control marked VOLUME	149570
	Knob, control marked TONE	149571
	Lamp, 120 V. pilot	182593
	Socket, octal marked 6C5	182658
	Socket, octal marked 25L6	182657
	Socket, octal marked 25Z5	182656
	Socket, 5-prong marked SPK	182525
	Socket, pilot lamp	182769
	Fuse, cartridge, 2 amp.	182606

A-307P6

Ref. No.

Description

Magnavox Part No.

1	Capacitor, tubular, .005 mfd. 600 V.	254180
2	Capacitor, tubular, .02 mfd. 400 V.	250015
3	Capacitor, tubular, .01 mfd. 400 V.	254158
4	Capacitor, tubular, .01 mfd. 400 V.	254158
5	Capacitor, tubular, .5 mfd. 200 V.	254134
6	Capacitor, electrolytic, 20 mfd. 15 V.	270018
7	Capacitor, electrolytic 40-40 mfd. 150 V.	270013
8	Resistor, carbon, 500,000 ohm 1/2 W.	239755
9	Resistor, carbon, 500,000 ohm 1/2 W.	239755
10	Resistor, carbon, 500,000 ohm 1/2 W.	239755
11	Resistor, carbon, 250,000 ohm 1/2 W.	230010
12	Resistor, carbon, 250,000 ohm 1/2 W.	230010
13	Resistor, carbon, 50,000 ohm 1/2 W.	239751
14	Resistor, carbon, 20,000 ohm 1/2 W.	239750

15

16

17

18

Resistor, carbon 4,000 ohm 1/2 W.

Resistor, carbon, 1,000 ohm 1/2 W.

Resistor, wire wound, 146 ohm

Resistor, carbon, 75 ohm

Socket, octal marked 65C7

Socket, octal marked 25L6GT

Socket, octal marked 25Z6GT

Socket, 5-prong marked SPK

Socket, 4-prong marked IN

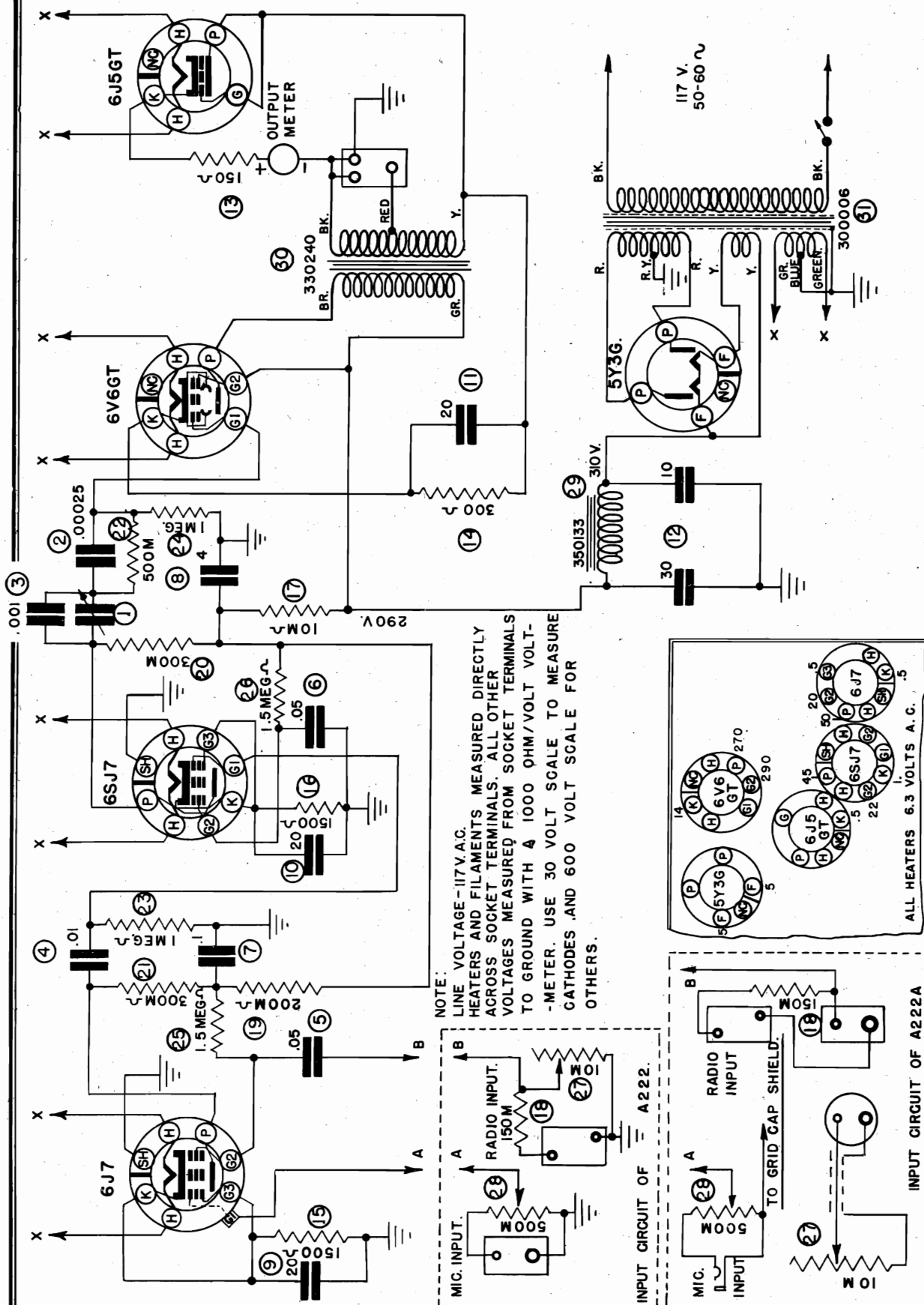
Socket, pilot lamp

Socket, crystal pickup

Lamp, 120 V. pilot

MODELS A-222
A-222A

THE MAGNAVOX CO.



Models A-222 and A-222A are alike electrically. The radio volume and microphone volume controls are mounted on the chassis of the A-222 amplifier; these two controls are mounted on an assembly external from the amplifier on the Model A-222A.

THE MAGNAVOX CO.

MODELS A-222, A-222A
MODEL A-3001

A-222, A-222A

Primary voltage	117 V. 60 cycle AC;
Power consumption	46 watts;
Input impedance: Radio Input	10,000 ohms;
Microphone Input	500,000 ohms;
Output impedance:	15 ohms;
Power output	3 watts;
Vacuum tubes	1-6J7; 1-6SJ7; 1-6V6GT; 1-6J5GT; 1-5Y3GT;

A-3001

Primary voltage	117 V. 60 cycle AC;
Power consumption	134 watts;
Power output	25 watts;
Vacuum tubes	1-6C5; 1-6L6G; 1-5Z3;
Speaker:	Model 132
Field coil	*2600 ohms
Transformer	None
	**5000 ohms;

* DC resistance. ** Primary impedance.

Ref. No. Description Magnavox Part No.

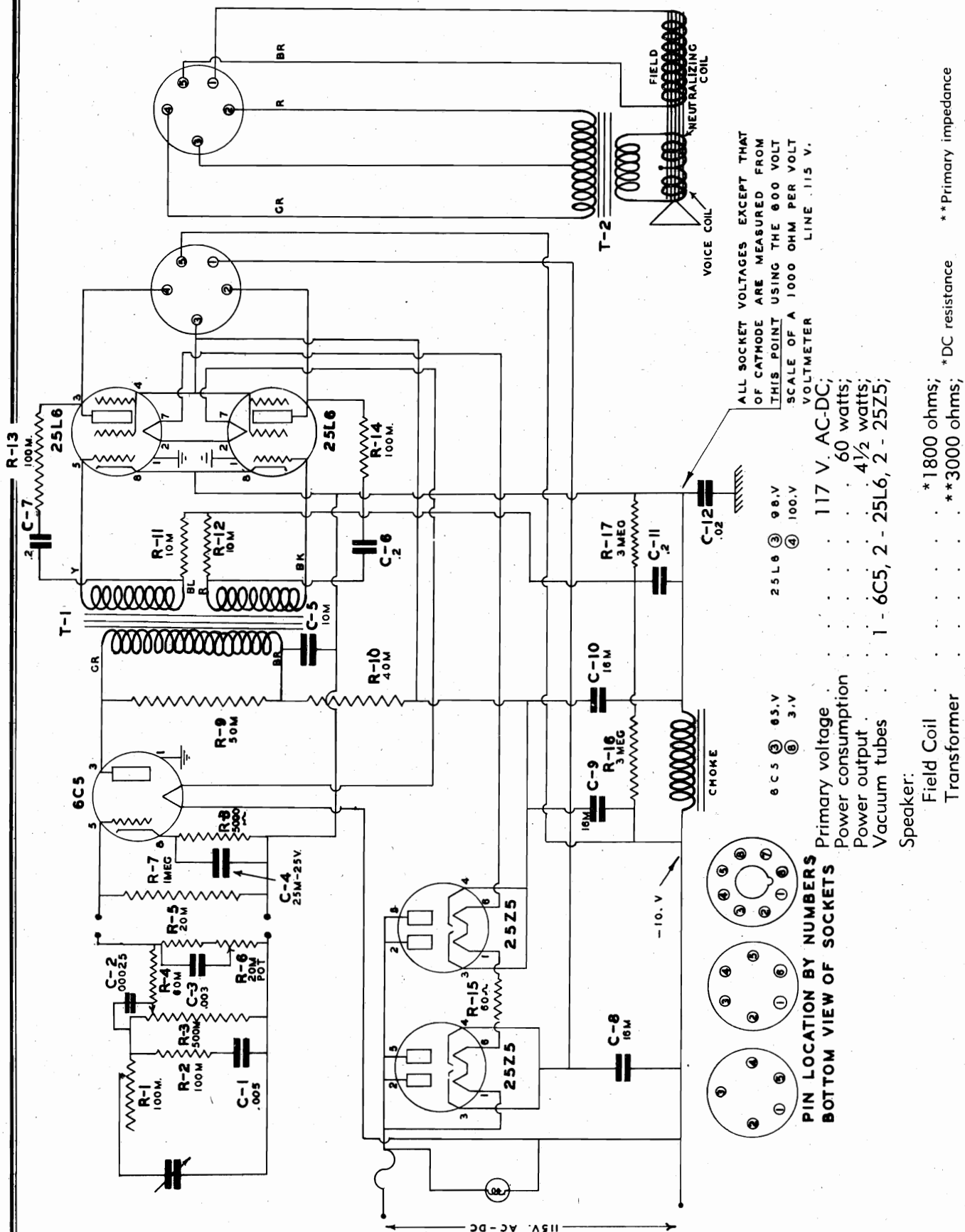
1	Capacitor, trimmer, 250-525 mmf.	250066
2	Capacitor, molded mica, .00025 mfd.	259772
3	Capacitor, molded mica, .001 mfd.	259604
4	Capacitor, paper, .01 mfd. 400 V.	254158
5	Capacitor, paper, .05 mfd. 400 V.	254146
6	Capacitor, paper, .05 mfd. 400 V.	254146
7	Capacitor, paper, .01 mfd. 400 V.	254166
8	Capacitor, electrolytic, 4 mfd. 450 V.	270015
9	Capacitor, electrolytic, 20 mfd. 25 V.	273611
10	Capacitor, electrolytic, 20 mfd. 25 V.	273611
11	Capacitor, electrolytic, 20 mfd. 25 V.	273611
12	Capacitor, electrolytic, 30-10 mfd. 450 V.	273610
13	Resistor, carbon, 150 ohm 1/3 W.	230033
14	Resistor, carbon, 300 ohm 2 W.	234508
15	Resistor, carbon, 1500 ohm 1/3 W.	230041
16	Resistor, carbon, 1500 ohm 1/3 W.	230041
17	Resistor, carbon, 10,000 ohm 1/3 W.	239749
18	Resistor, carbon, 150,000 ohm 1/3 W.	239785
19	Resistor, carbon, 200,000 ohm 1/3 W.	239754
20	Resistor, carbon, 300,000 ohm 1/3 W.	230017
21	Resistor, carbon, 300,000 ohm 1 W.	234488
22	Resistor, carbon, 500,000 ohm 1/3 W.	239755
23	Resistor, carbon, 1 megohm 1/3 W.	239756
24	Resistor, carbon, 1 megohm 1/3 W.	239756
25	Resistor, carbon, 1.5 megohm 1/3 W.	230012
26	Resistor, carbon, 1.5 megohm 1/3 W.	230012
27	Control, 10,000 ohm with power switch	220023
28	Control, 500,000 ohm	220026
29	Choke, filter	350133
30	Transformer, output	330240
31	Transformer, power, 117 V. 50-60 cycle	300006
	Lamp, 6-8 V. pilot	183657
	Socket, pilot lamp	180078
	Socket, octal marked 6J7	180100
	Socket, octal marked 6SJ7	180064
	Socket, octal marked 6V6GT	180099
	Socket, octal marked 6J5GT	180085
	Socket, octal marked 5Y3GT	180094
	Socket, output	180097
	Socket, radio input	180098
	Socket, microphone input	189741
	Socket, output meter	182776

AMPLIFIER

Ref. No.	Description	Magnavox Part No.
C1, C6	Capacitor, electrolytic, 25 mfd. 25 V., 25 mfd. 50 V.	274224
C2	Capacitor, tubular, .5 mfd. 400 V.	254147
C3	Capacitor, tubular, .5 mfd. 400 V.	254147
C4	Capacitor, tubular, .5 mfd. 400 V.	254147
C5	Capacitor, tubular, .002 mfd. 600 V.	254161
C7	Capacitor, tubular, .01 mfd. 600 V.	254153
C8	Capacitor, tubular, .01 mfd. 600 V.	254153
C9	Capacitor, tubular, .5 mfd. 400 V.	254147
C10	Capacitor, electrolytic, 10 mfd. 500 V.	274194
C11	Capacitor, tubular, .2 mfd. 200 V.	254182
C12	Capacitor, electrolytic, 10 mfd. 500 V.	274194
C13	Capacitor, tubular, .1 mfd. 200 V.	254152
R1	Resistor, carbon, 200,000 ohm 1/2 W.	234447
R2	Resistor, carbon, 2000 ohm 1/2 W.	234426
R3	Resistor, carbon, 15,000 ohm 1/2 W.	234434
R4	Resistor, carbon, 15,000 ohm 1/2 W.	234434
R5	Resistor, carbon, 15,000 ohm 1/2 W.	234434
R6	Resistor, wire wound, 200 ohm	242607
R7	Resistor, carbon, 7500 ohm 2 W.	234518
R8	Resistor, carbon, 7500 ohm 2 W.	234518
T1	Transformer, input	320187
T2	Transformer, output	330188
T3	Transformer, power, 117 V. 50-60 cycle	300106
1	Choke, tone filter	350122
	Choke, filter	350113

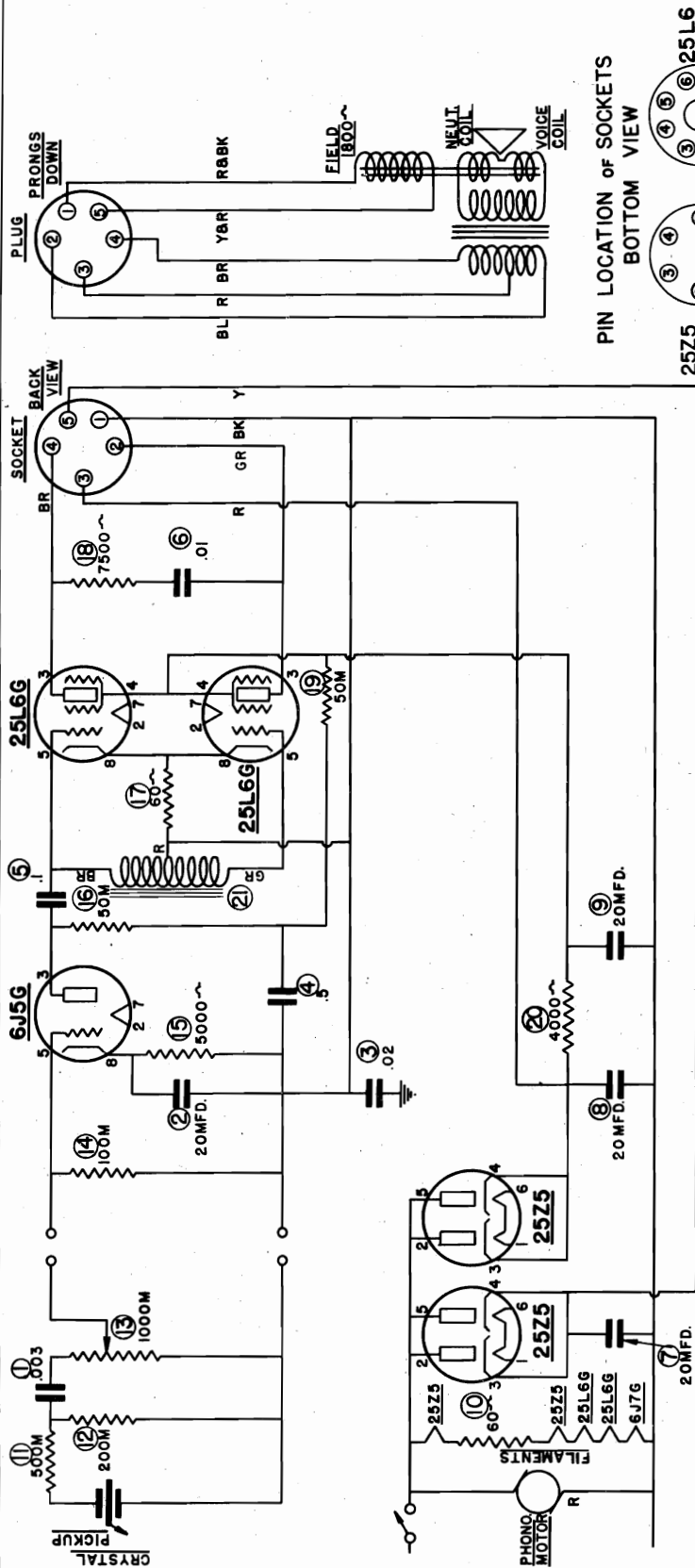
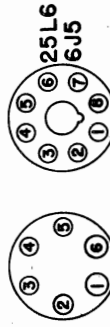
CONTROL PANEL

C1	Capacitor, molded mica, .002 mfd.	259603
C2	Capacitor, molded mica, .001 mfd.	259604
C3	Capacitor, molded mica, .002 mfd.	259603
R1	Control, bass, 1 megohm	222444
R2	Resistor, carbon, 150,000 ohm 1/2 W.	234446
R3	Control, volume, 1 megohm	222444
R4	Resistor, carbon, 50,000 ohm 1/2 W.	234439
R5	Control, treble, 200,000 ohm	222445
1	Choke, tone filter	362463
2	Switch, "radio-phonograph" changeover	169602
	Socket, Phonograph pickup cable	182465
	Socket, pilot lamp	182803



THE MAGNAVOX CO.

MODEL A-307P4

PIN LOCATION OF SOCKETS
BOTTOM VIEWNUMBERS IN CIRCUIT ARE NUMBERS SHOWN
WHEN VIEWING CHASSIS FROM BOTTOM SIDE

SOCKET VOLTAGES

LINE VOLTAGE 117 V. A.C.

ALL VOLTAGES MEASURED TO CONDENSER (FILTER) GROUND
WITH A 1000 OHM/VOLT VOLTMETER ON 500 V. SCALE.
MEASURE CATHODES ON 30 V. SCALE

25L6G	6J5G	Primary voltage	117 V. AC-DC;
③	③	Power consumption	60 watts;
④	④	Power output	6 watts;
⑤	⑤	Vacuum tubes	1 - 6J5, 2 - 25L6G, 2 - 25Z5

Speaker:

Field Coil	*1800 ohms;
Transformer	**3500 ohms;

Resistor, carbon, 4,000 ohm 1/2 W	234429
Transformer, input	320233
Socket, octal marked 6J5	189914
Socket, octal marked 25L6	189995
Socket, octal marked 25Z5	189996
Knob, control	144100

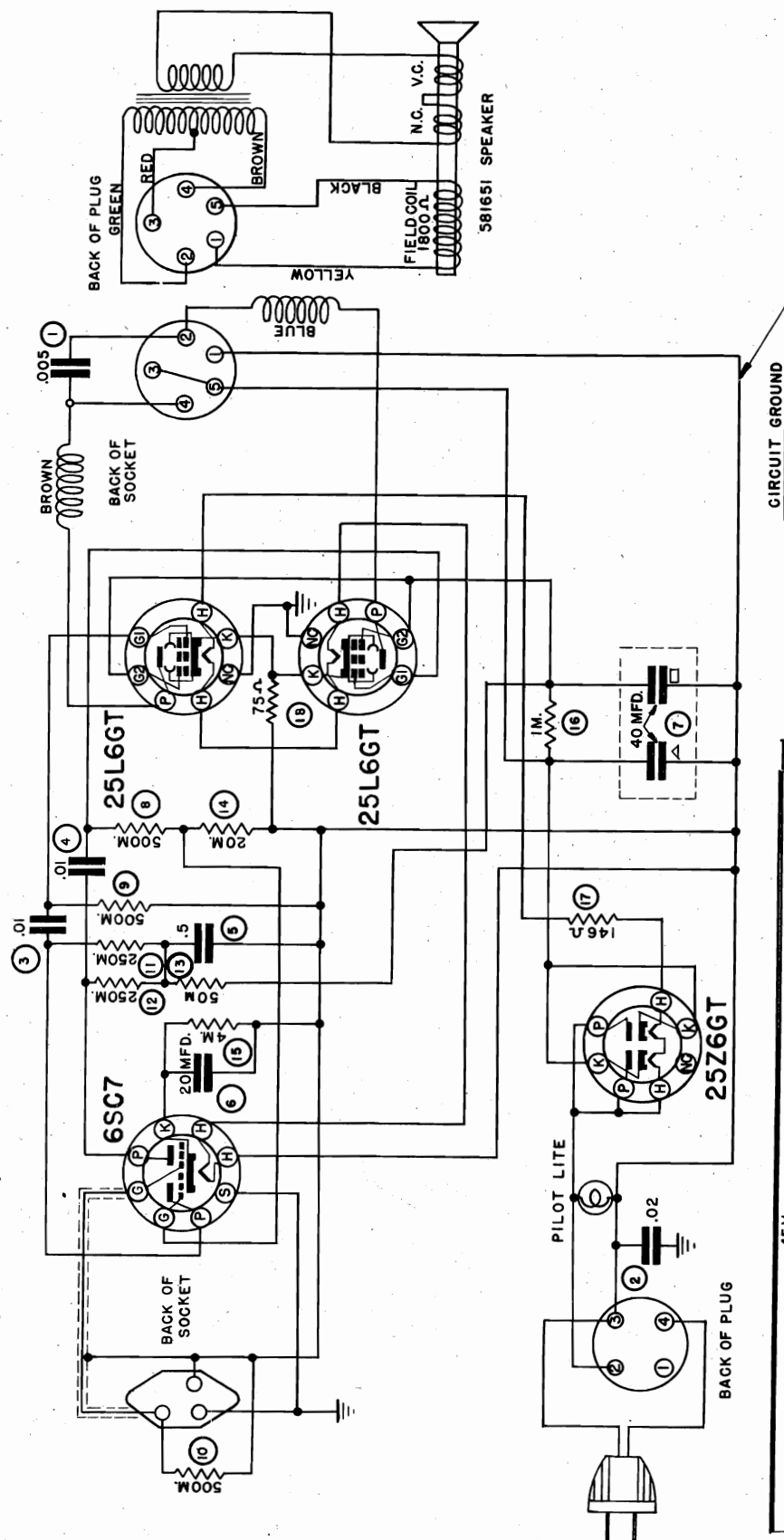
Description Magnavox Part No.

Capacitor, mica, .003 mfd.	259778
Capacitor, electrolytic, 20 mfd. 25 V.	279993
Capacitor, tubular, .02 mfd. 600 V.	254127
Capacitor, tubular, .5 mfd. 200 V.	254134
Capacitor, tubular, .1 mfd. 400 V.	254166
Capacitor, tubular, .01 mfd. 400 V.	254158
Capacitor, electrolytic, 20 mfd. 150 V.	279992
Capacitor, electrolytic, 20 mfd. 150 V.	279992
Capacitor, electrolytic, 20 mfd. 150 V.	279992
Resistor, wire wound, 60 ohm 10 W.	247852
Resistor, carbon, 500,000 ohm 1/3 W.	239755
Resistor, carbon, 200,000 ohm 1/3 W.	239754
Control, volume, 1 megohm, with switch	223555
Resistor, carbon, 100,000 ohm 1/3 W.	239753
Resistor, carbon, 5,000 ohm 1/2 W.	234430
Resistor, carbon, 50,000 ohm 1/2 W.	234439
Resistor, carbon, 60 ohm 2 W.	234502
Resistor, carbon, 7,500 ohm 1/2 W.	239991
Resistor, carbon, 50,000 ohm 1/2 W.	234439

Ref. No.

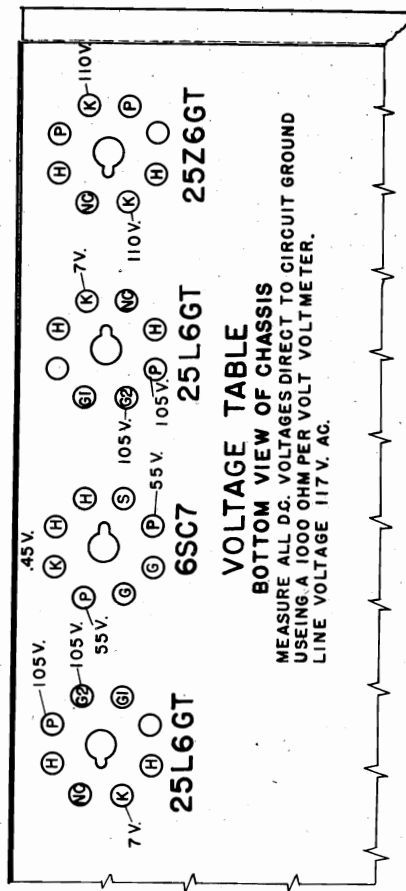
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
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SPECIFICATIONS

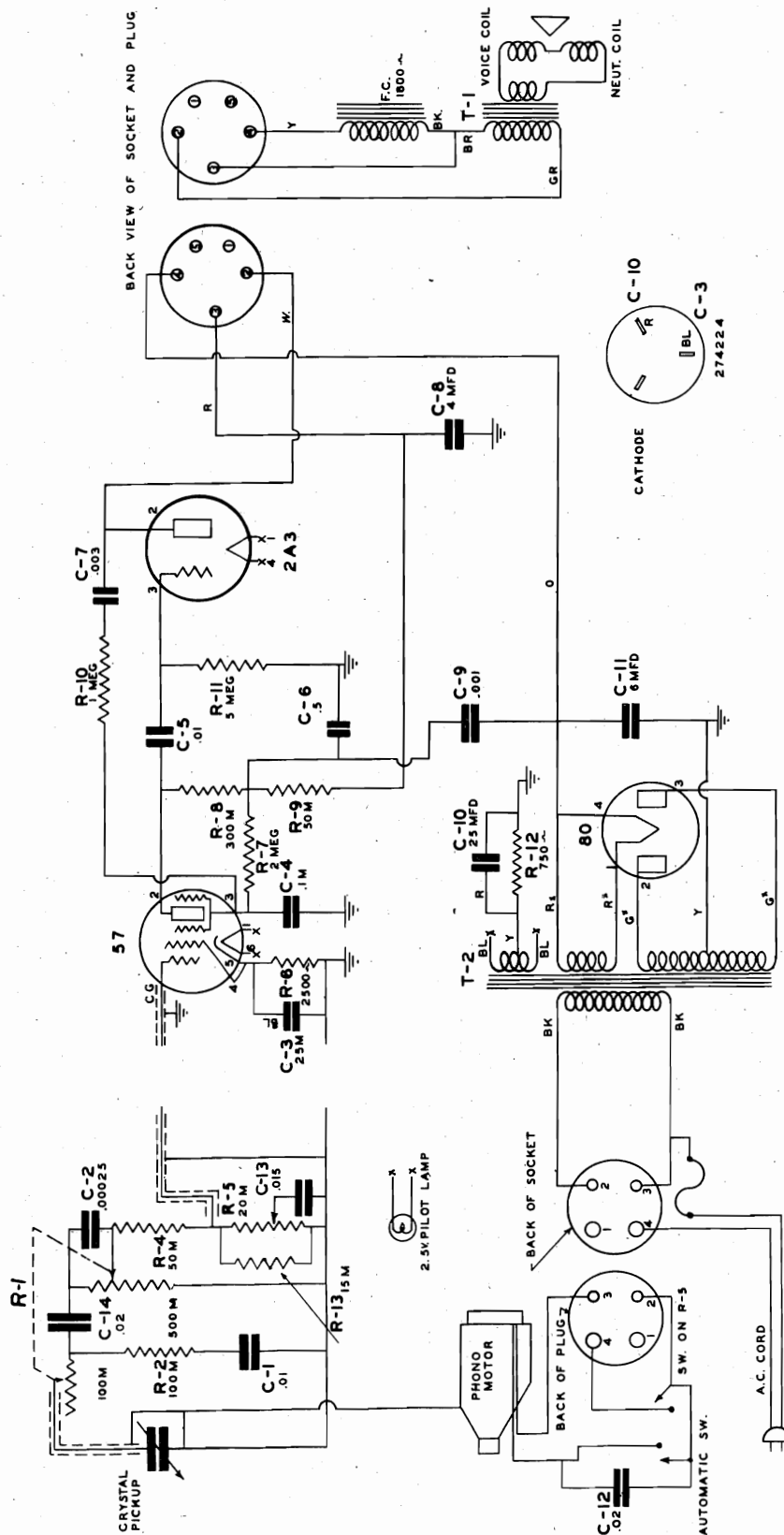


Primary voltage	117 V.	AC-DC;
Power consumption	60 watts;	
Power output	4½ watts;	
Vacuum tubes	1 - 6SC7; 2 - 25L6GT; 1 - 25Z6GT;	
Speaker: Field Coil	* 1800 ohms;	
Transformer	** 3000 ohms;	

* DC resistance.
** Primary impedance.



THE MAGNAVOX CO.



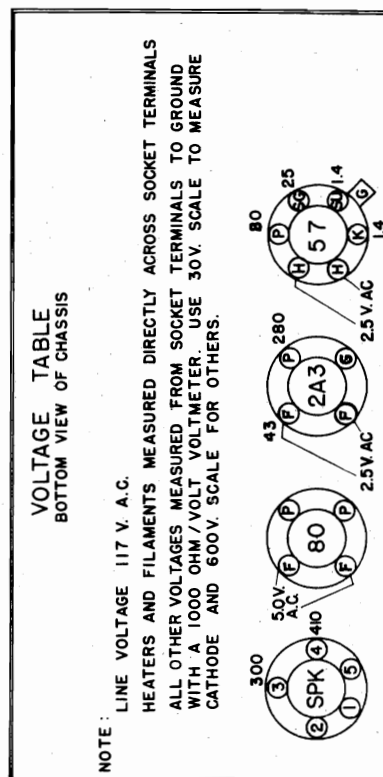
SOCKET VOLTAGES EXCEPT THOSE OF CATHODES ARE MEASURED FROM GROUND USING THE 600 VOLT SCALE OF A 1000 OHMS PER VOLT VOLTMETER. LINE 115 V.

57
 ② - 85 V.
 ③ - 25 V.
 ④ - 1.3 V.

2A3
 ② - 282 V.
 ③ - 43 V.

Primary voltage	117 V. 60 cycle AC;
Power consumption	62 watts;
Power output	4½ watts;
Vacuum tubes	1 57, 1 2A3, 1 80;
Speaker:	
Field Coil	* 1800 ohms;
Transformer	** 2500 ohms;
* DC resistance.	
** Primary impedance.	

THE MAGNAVOX CO.



* DC resistance.

THE MAGNAVOX CO.

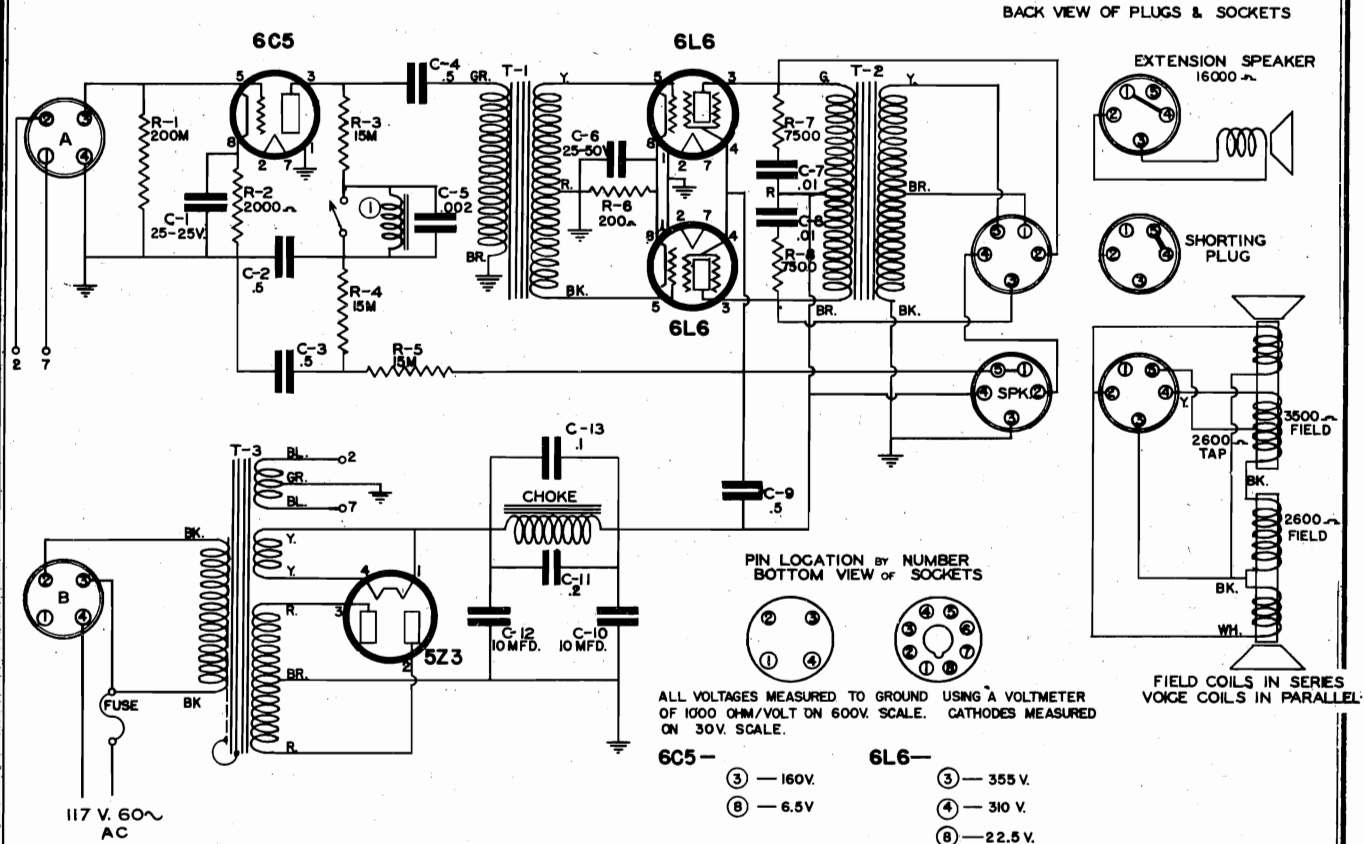
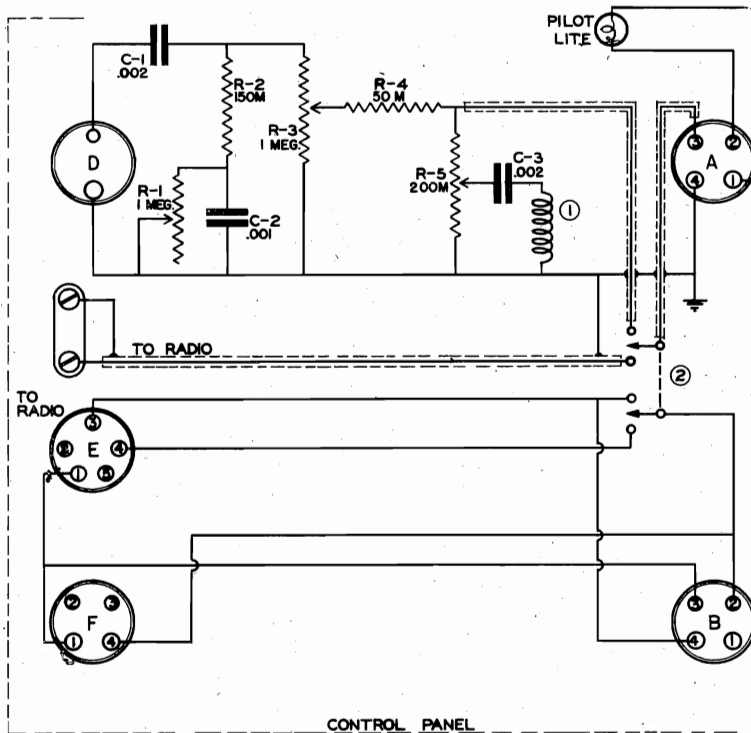
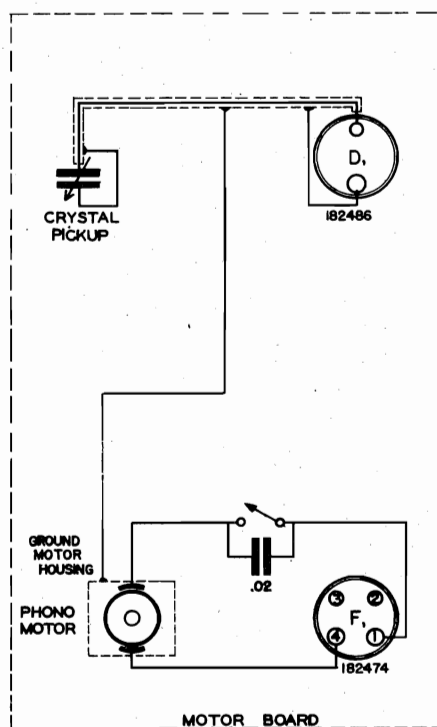
MODEL A-501
MODEL A-501B

A-501B

Ref. No.	Description	Magnavox Part No.	Ref. No.	Description	Magnavox Part No.
C1	Capacitor, tubular, .01 mfd. 600 V.	254153	1	Capacitor, electrolytic, 20 mfd. 25 V.	273611
C2	Capacitor, tubular, .00025 mfd. 600 V.	254133	2	Capacitor, tubular, .1 mfd. 600 V.	254181
C3, C10	Capacitor, electrolytic, 25 mfd. 25 V., 25 mfd. 50 V.	274224	3	Capacitor, tubular, .003 mfd. 600 V.	254163
C4	Capacitor, tubular, .1 mfd. 600 V.	254181	4	Capacitor, tubular, .01 mfd. 600 V.	254153
C5	Capacitor, tubular, .01 mfd. 600 V.	254153	5	Capacitor, tubular, .5 mfd. 400 V.	254147
C6	Capacitor, tubular, .5 mfd. 400 V.	254147	6, 7	Capacitor, electrolytic, 30-10 mfd. 450 V.	273610
C7	Capacitor, tubular, .003 mfd. 600 V. +10%	254163	8	Capacitor, electrolytic, 30 mfd. 50 V.	270003
C8	Capacitor, electrolytic, 4 mfd. 500 V.	274238	9	Resistor, carbon, 2500 ohms 1/2 W.	234427
C9	Capacitor, tubular, .001 mfd. 600 V.	254142	10	Resistor, carbon, 2 megohm 1/2 W.	234451
C11	Capacitor, electrolytic, 6 mfd. 500 V.	274250	11	Resistor, carbon, 1 megohm 1/2 W.	234450
C12	Capacitor, tubular, .02 mfd. 110 V. AC.	259228	12	Resistor, carbon, 300,000 ohm 1/2 W.	234448
C13	Capacitor, tubular, .015 mfd. 600 V.	254131	13	Resistor, carbon, 50,000 ohm 1/2 W.	234439
C14	Capacitor, tubular, .02 mfd. 600 V.	254127	14	Resistor, wire wound, 750 ohm 5 W.	240005
R1	Control, volume, 110,000-500,000 ohm.	222383	15	Resistor, carbon, 5 megohm 1/2 W.	234454
R2	Resistor, carbon, 100,000 ohm 1/2 W.	234445	16	Transformer, power, 117 V. 60 cycle.	300153
R4	Resistor, carbon, 50,000 ohm 1/2 W.	234439	17	Capacitor, tubular, .02 mfd. 600 V.	254127
R5	Control, treble, 20,000 ohm.	222556	18	Capacitor, tubular, .01 mfd. 600 V.	254153
R6	Resistor, carbon, 2,500 ohm 1/2 W.	234427	19	Capacitor, tubular, .00025 mfd. 600 V.	254133
R7	Resistor, carbon, 2 megohm 1/2 W.	234451	20	Capacitor, tubular, .015 mfd. 600 V.	254131
R8	Resistor, carbon, 300,000 ohm 1/2 W.	234448	21	Capacitor, tubular, .02 mfd. 110 V. AC.	259935
R9	Resistor, carbon, 50,000 ohm 1/2 W.	234439	22	Resistor, carbon, 100,000 ohm 1/2 W.	234445
R10	Resistor, carbon, 1 megohm 1/2 W.	234450	23	Resistor, carbon, 50,000 ohm 1/2 W.	234439
R11	Resistor, carbon, 5 megohm 1 W.	234498	24	Resistor, carbon, 15,000 ohm 1/2 W.	234434
R12	Resistor, wire wound, 750 ohm.	247816	25	Control, volume, 500,000—100,000 ohm.	222383
T1	Transformer, power, 117 V. 60 cycle.	300100	26	Control, treble, 20,000 ohm.	222556

Knob, "volume"	149570	Socket, 2 prong, phonograph input	189741
Knob, "tone"	149571	Socket, 6 prong marked 57	180011
Socket, pilot lamp	182458	Socket, 5 prong marked SPK	180012
Socket, 6 prong marked 57	187334	Socket, 4 prong marked IN	180014
Socket, 4 prong marked 2A3	187332	Socket, 4 prong marked 2A3	180013
Socket, 4 prong marked 80	187326	Socket, 4 prong marked 80	180010
Socket, 5 prong (for speaker plug)	187331	Socket, pilot lamp	180017
Socket, 4 prong (for motor plug)	182668	Knob, marked VOLUME	149570
Lamp, 2.5 V. pilot	187152	Knob, marked TONE	149571
Fuse, 2 amp. cartridge	182606		

THE MAGNAVOX CO.



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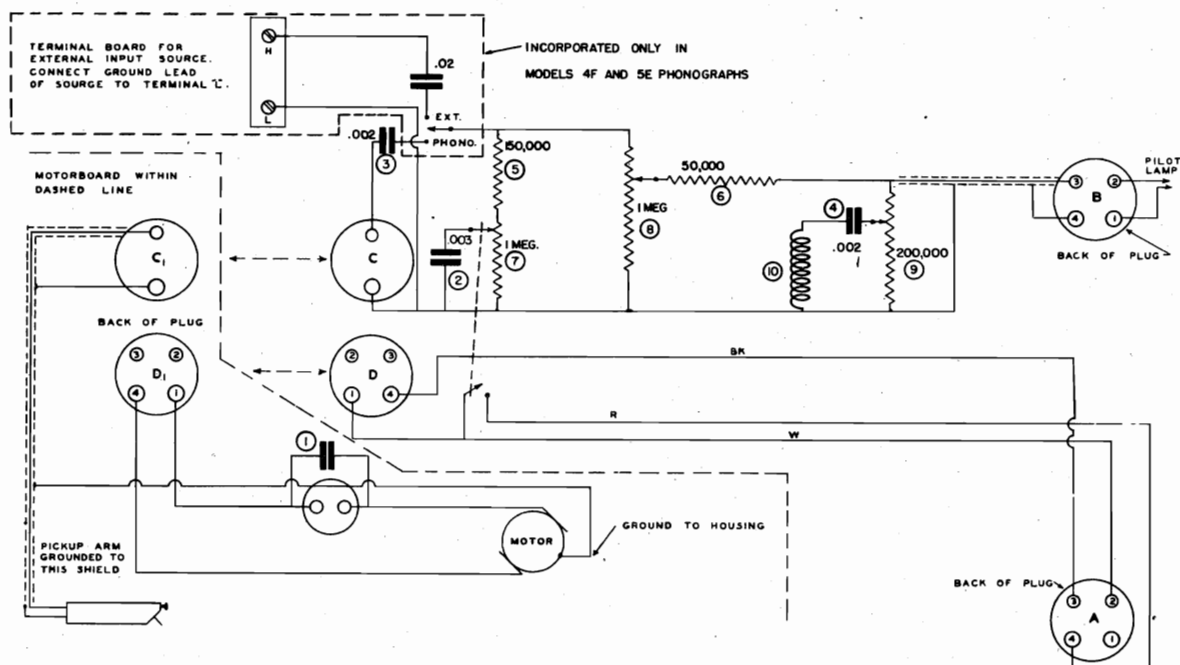


Primary voltage	117 V. 60 cycle AC;
Power consumption	134 watts;
Power output	25 watts;
Vacuum tubes	.	.	.	.	.	.	.	.	.	1-6C5; 2-6L6G; 1-5Z3;
Speaker:	.	.	.	.	.	.	.	.	.	Model 132 Model 302
Field Coil	.	.	.	.	.	.	.	.	.	*2600 ohms
Transformer	.	.	.	.	.	.	.	.	.	*3500 ohms; **5000 ohms;
	.	.	.	.	.	.	.	.	.	None

* DC resistance. ** Primary impedance.

MODEL A-3001B

THE MAGNAVOX CO.



Ref. No.

Description

Magnavox Part No.

AMPLIFIER CHASSIS

1, 2, 5	Capacitor, electrolytic 20-20 mfd. 25 V., 5 mfd. 450 V.	270007
3	Capacitor, tubular, .02 mfd. 600 V.	254127
4	Capacitor, tubular, .5 mfd. 400 V.	254147
6	Capacitor, tubular, .005 mfd. 1200 V.	250042
7	Capacitor, tubular, .5 mfd. 400 V.	254147
8, 9	Capacitor, electrolytic 30-10 mfd. 450 V.	273610
10	Resistor, carbon, 200,000 ohm 1/2 W.	234447
11	Resistor, carbon, 2000 ohm 1/2 W.	234426
12	Resistor, carbon, 30,000 ohm 1 W.	234477
13	Resistor, carbon, 20,000 ohm 1 W.	234475
14	Resistor, carbon, 7500 ohm 1/2 W.	239991
15	Resistor, wire wound, 200 ohm 5 W.	240009
16	Resistor, carbon, 9000 ohm 3 W.	230039
17	Transformer, input	320240
18	Transformer, output	330188
19	Transformer, power, 117 V. 50-60 cycle	300106
20	Choke, filter	350113
	Socket, octal marked 6L6	182532
	Socket, octal marked 6C5	180051
	Socket, 5 prong marked SPK	182525
	Socket, 4 prong marked 5Z3	182530
	Socket, 4 prong—no marking	182668
	Fuse, 3 amp. 250 V. cartridge	189887

CONTROL PANEL

1	Capacitor, tubular, .02 mfd. 110 V.	259935
2	Capacitor, tubular, .003 mfd. 600 V.	254163
3	Capacitor, tubular, .002 mfd. 600 V.	254161
4	Capacitor, tubular, .002 mfd. 600 V.	254161
5	Resistor, carbon, 150,000 ohm 1/2 W.	234446
6	Resistor, carbon, 50,000 ohm 1/2 W.	234439
7	Control, bass, 1 megohm—with power switch	222446
8	Control, volume, 1 megohm	222444
9	Control, treble, 200,000 ohm	222445
10	Choke, filter	362463
	Knob, control	140019
	Lamp, pilot 6.3 V.	182592

THE MAGNAVOX CO.

MODELS
IDENTIFICATION

IDENTIFICATION OF MAGNAVOX MODELS FROM 1937 TO 1946

The list of Magnavox models in the following pages has been arranged in such a way that the identifying number for servicing these receivers is in all cases the style number (such as C101G11). This style number is on a serial plate which is attached to all phonograph and radio-phonographs. It should not be confused with the model number (such as 155B) which can not be used in locating the necessary information since instruments having as many as ten different style numbers may all have the same model number.

The model number indicates a series of instruments while the style number indicates any changes made during the production of a series. These changes might be a different phonograph pick-up, a different radio chassis, a different speaker, etc. As an example, instrument style number 101G11 is instrument model number 155B and instrument style numbers C101G13, C101G21, C101G23, C101G41, C101G43, are also model 155B. Each of the style numbers has some change.

In previous indexes of Rider's Manuals we have listed radio chassis numbers of Magnavox receivers first, giving model numbers and style numbers. To use this new listing successfully you would look up the instrument style number, which is tabulated in numerical order, and following through to the chassis number, would refer to this chassis number in past indexes. In case of record changer troubles, you would follow the same procedure and would find the details of the record changer in Rider's "Automatic Record Changers and Recorders" or in this Manual.

STYLE NOS. C101G11
TO C103G15

THE MAGNAVOX CO.

MAGNAVOX MODEL IDENTIFICATION FROM 1937 TO 1946

The Style Number and Model Number are shown on the serial plate attached to each cabinet.

*THIS PICK-UP ARM INCLUDES ONE 563584 CRYSTAL PICK-UP.

**THIS PICK-UP ARM INCLUDES ONE 560006 CRYSTAL PICK-UP.

†THIS PICK-UP ARM INCLUDES ONE 560015 CRYSTAL PICK-UP.

INSTRUMENT STYLE No.	INSTRUMENT MODEL No.	A.M. RADIO CHASSIS MODEL No.	F.M. RADIO CHASSIS MODEL No.	RECORD CHANGER PART No.	AMPLIFIER CHASSIS MODEL No.	PHONOGRAPH PICK-UP ARM PART No.	CRYSTAL PICK-UP PART No.	TURNTABLE MOTOR PART No.	PART No. SPEAKER	CURRENT
C101G11	155B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C101G12	155BF	CR-188A	CR-189A	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C101G13	155B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C101G14	155BF	CR-188A	CR-189A	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C101G21	155B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C101G22	155BF	CR-188A	CR-189A	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C101G23	155B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C101G24	155BF	CR-188A	CR-189A	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C101G41	155B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C101G42	155BF	CR-188A	CR-189A	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C101G43	155B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C101G44	155BF	CR-188A	CR-189A	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G11	142B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G12	142BF	CR-188A	CR-189B	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G13	142B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G14	142BF	CR-188A	CR-189B	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G15	242B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G16	242BF	CR-188A	CR-189B	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G21	142B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G22	142BF	CR-188A	CR-189B	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G23	142B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G24	142BF	CR-188A	CR-189B	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G25	242B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G26	242BF	CR-188A	CR-189B	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G31	142B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G32	142BF	CR-188A	CR-189B	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G33	142B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G34	142BF	CR-188A	CR-189B	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G35	242B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G36	242BF	CR-188A	CR-189B	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G45	242B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G46	242BF	CR-188A	CR-189B	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C103G11	151B	CR-187A		520508			560049G3		582806	60 cyc.
C103G12	151BF	CR-187A	CR-189B	520508			560049G3		582806	60 cyc.
C103G13	151B	CR-190B		520508			560049G3		582806	60 cyc.
C103G14	151BF	CR-190B	CR-189B	520508			560049G3		582806	60 cyc.
C103G15	151B	CR-187A		520508			560049G3		582806	60 cyc.

*Model 242 Series has drawer-type record changer.

STYLE NOS. C103G16
TO C105G15

THE MAGNAVOX CO.

INSTRUMENT STYLE No.	INSTRUMENT MODEL No.	A.M. RADIO CHASSIS MODEL No.	F.M. RADIO CHASSIS MODEL No.	RECORD CHANGER PART No.	AMPLIFIER CHASSIS MODEL No.	PHONOGRAPH PICK-UP ARM PART No.	CRYSTAL PICK-UP PART No.	TURNTABLE MOTOR PART No.	PART No. SPEAKER	CURRENT
C103G16	151BF	CR-187A	CR-189B	520508			560049G3		582806	60 cye.
C103G21	151B	CR-187A		520508			560049G3		582806	60 cye.
C103G22	151BF	CR-187A	CR-189B	520508			560049G3		582806	60 cye.
C103G23	151B	CR-190B		520508			560049G3		582806	60 cye.
C103G24	151BF	CR-190B	CR-189B	520508			560049G3		582806	60 cye.
C103G25	151B	CR-187A		520508			560049G3		582806	60 cye.
C103G26	151BF	CR-187A	CR-189B	520508			560049G3		582806	60 cye.
C103G41	151B	CR-187A		520508			560049G3		582806	60 cye.
C103G42	151BF	CR-187A	CR-189B	520508			560049G3		582806	60 cye.
C103G43	151B	CR-190B		520508			560049G3		582806	60 cye.
C103G44	151BF	CR-190B	CR-189B	520508			560049G3		582806	60 cye.
C103G113	151B	CR-187A		520508			560049G3		582806	60 cye.
C103G114	151BF	CR-187A	CR-189B	520508			560049G3		582806	60 cye.
C103G127	151B	CR-190D		520508			560049G3		582806	60 cye.
C103G128	151BF	CR-190D	CR-189B	520508			560049G3		582806	60 cye.
C103G213	151B	CR-187A		520508			560049G3		582806	60 cye.
C103G214	151BF	CR-187A	CR-189B	520508			560049G3		582806	60 cye.
C103G227	151B	CR-190D		520508			560049G3		582806	60 cye.
C103G228	151BF	CR-190D	CR-189B	520508			560049G3		582806	60 cye.
C103G413	151B	CR-187A		520508			560049G3		582806	60 cye.
C103G414	151BF	CR-187A	CR-189B	520508			560049G3		582806	60 cye.
C103G427	151B	CR-190D		520508			560049G3		582806	60 cye.
C103G428	151BF	CR-190D	CR-189B	520508			560049G3		582806	60 cye.
C104G11	148B	CR-187A		520508			560049G3		582806	60 cye.
C104G12	148BF	CR-187A	CR-189B	520508			560049G3		582806	60 cye.
C104G13	148B	CR-190B		520508			560049G3		582806	60 cye.
C104G14	148BF	CR-190B	CR-189B	520508			560049G3		582806	60 cye.
C104G21	148B	CR-187A		520508			560049G3		582806	60 cye.
C104G22	148BF	CR-187A	CR-189B	520508			560049G3		582806	60 cye.
C104G23	148B	CR-190B		520508			560049G3		582806	60 cye.
C104G24	148BF	CR-190B	CR-189B	520508			560049G3		582806	60 cye.
C104G31	148B	CR-187A		520508			560049G3		582806	60 cye.
C104G32	148BF	CR-187A	CR-189B	520508			560049G3		582806	60 cye.
C104G33	148B	CR-190B		520508			560049G3		582806	60 cye.
C104G34	148BF	CR-190B	CR-189B	520508			560049G3		582806	60 cye.
C104G41	148B	CR-187A		520508			560049G3		582806	60 cye.
C104G42	148BF	CR-187A	CR-189B	520508			560049G3		582806	60 cye.
C104G43	148B	CR-190A		520508			560049G3		582806	60 cye.
C104G44	148BF	CR-190A	CR-189B	520508			560049G3		582806	60 cye.
C104G115	148B	CR-187A		520508			560049G3		582806	60 cye.
C104G116	148BF	CR-187A	CR-189B	520508			560049G3		582806	60 cye.
C104G127	148B	CR-190D		520508			560049G3		582806	60 cye.
C104G128	148BF	CR-190D	CR-189B	520508			560049G3		582806	60 cye.
C104G215	148B	CR-187A		520508			560049G3		582806	60 cye.
C104G216	148BF	CR-187A	CR-189B	520508			560049G3		582806	60 cye.
C104G227	148B	CR-190D		520508			560049G3		582806	60 cye.
C104G228	148BF	CR-190D	CR-189B	520508			560049G3		582806	60 cye.
C104G315	148B	CR-187A		520508			560049G3		582806	60 cye.
C104G316	148BF	CR-187A	CR-189B	520508			560049G3		582806	60 cye.
C104G327	148B	CR-190D		520508			560049G3		582806	60 cye.
C104G328	148BF	CR-190D	CR-189B	520508			560049G3		582806	60 cye.
C104G413	148B	CR-190B		520508			560049G3		582806	60 cye.
C104G414	148BF	CR-190B	CR-189B	520508			560049G3		582806	60 cye.
C104G415	148B	CR-187A		520508			560049G3		582806	60 cye.
C104G416	148BF	CR-187A	CR-189B	520508			560049G3		582806	60 cye.
C104G419	148B	CR-187A		520508			560049G3		582806	60 cye.
C104G427	148B	CR-190D		520508			560049G3		582806	60 cye.
C104G428	148BF	CR-190D	CR-189B	520508			560049G3		582806	60 cye.
C105G11	132B	CR-187B		520508			560049G3		582840	60 cye.
C105G12	132B	CR-190C		520508			560049G3		582840	60 cye.
C105G13	132B	CR-187B		520508			560049G3		582840	60 cye.
C105G15	132B	CR-190E		520508			560049G3		582840	60 cye.

STYLE NOS. C105G16

TO EA-307P10

THE MAGNAVOX CO.

INSTRUMENT STYLE No.	INSTRUMENT MODEL No.	A.M. RADIO CHASSIS MODEL No.	F.M. RADIO CHASSIS MODEL No.	RECORD CHANGER PART No.	AMPLIFIER CHASSIS MODEL No.	PHONOGRAPH PICK-UP ARM PART No.	CRYSTAL PICK-UP PART No.	TURNTABLE MOTOR PART No.	PART No. SPEAKER	CURRENT
C105G16	132B	CR-190E		520508			560049G3		582840	60 cye.
C105G21	132B	CR-187B		520508			560049G3		582840	60 cye.
C105G22	132B	CR-190C		520508			560049G3		582840	60 cye.
C105G23	132B	CR-187B		520508			560049G3		582840	60 cye.
C105G25	132B	CR-190E		520508			560049G3		582840	60 cye.
C105G26	132B	CR-190E		520508			560049G3		582840	60 cye.
C105G31	132B	CR-187B		520508			560049G3		582840	60 cye.
C105G32	132B	CR-190C		520508			560049G3		582840	60 cye.
C105G33	132B	CR-187B		520508			560049G3		582840	60 cye.
C105G34	132B	CR-190C		520508			560049G3		582840	60 cye.
C105G35	132B	CR-190E		520508			560049G3		582840	60 cye.
C105G36	132B	CR-190E		520508			560049G3		582840	60 cye.
C105G41	132B	CR-187B		520508			560049G3		582840	60 cye.
C105G42	132B	CR-190C		520508			560049G3		582840	60 cye.
C105G43	132B	CR-187B		520508			560049G3		582840	60 cye.
C105G44	132B	CR-190C		520508			560049G3		582840	60 cye.
C105G45	132B	CR-190E		520508			560049G3		582840	60 cye.
C105G46	132B	CR-190E		520508			560049G3		582840	60 cye.
C106G13	154B	CR-193B		520516			560049G3		582815 582847	60 cye.
C106G14	154BF	CR-193B	CR-189B	520516			560049G3		582815 582847	60 cye.
C106G15	154B	CR-194B		520508			560049G3		582815 582847	60 cye.
C106G16	154BF	CR-194B	CR-189B	520508			560049G3		582815 582847	60 cye.
C106G23	154B	CR-193B		520516			560049G3		582815 582847	60 cye.
C106G24	154BF	CR-193B	CR-189B	520516			560049G3		582815 582847	60 cye.
C106G33	154B	CR-193B		520516			560049G3		582815 582847	60 cye.
C106G34	154BF	CR-193B	CR-189B	520516			560049G3		582815 582847	60 cye.
C106G43	154B	CR-193B		520516			560049G3		582815 582847	60 cye.
C106G44	154BF	CR-193B	CR-189B	520516			560049G3		582815 582847	60 cye.
RT-5	6					631600	562729	507601		60 cye.
RT-5A	6A					631600	562729	507601		60 cye.
RTU-5	U6					631600	562729	507602		AC-DC
RTU-5A	U6A					631600	562729	507602		AC-DC
RT-8	6					*569889	563584	500029		60 cye.
RT-8A	6A					*569889	563584	500029		60 cye.
RTU-8	U6					*569889	563584	507602		AC-DC
RTU-8A	U6A					*569889	563584	507576		AC-DC
RT-9	6B					*569889	563584	507576		50-60 cye.
RT-9A	6C					*569889	563584	507602		50-60 cye.
EA-101P	2				A-101P	631595	562729	507601	58415	60 cye.
EA-106P	U2				A-106P	631595	562729		58416	AC-DC
EA-201	10				A-201	**560005	560006	500015	581533	Battery
EA-201B	10A				A-201	**560005	560006	500015	581533	Battery
EA-205	2C				A-205	**560007	560006	500026	581543	60 cye.
EA-205B	2C				A-205	**560007	560006	500026	581723	60 cye.
EA-205E	2C				A-205	+560017	560015	500026	581723	60 cye.
EA-205H	2C-1				A-205	+560017	560015	500026	581723	50-60 cye.
EA-205L	2D				A-205C	+560017	560015	500026	582298	60 cye.
EA-205N	2D-1				A-205C	+560017	560015	500026	582298	50-60 cye.
EA-307P2	U3				A-307P2	631595	562729	507602	58946	AC-DC
EA-307P4	U2A				A-307P4	*569934	563584	507602	581389	AC-DC
EA-307P5	U3				A-307P2	633541	562729	507602	58946	AC-DC
EA-307P6	U2A				A-307P4	630209	563584	507602	581389	AC-DC
EA-307P7	U3B				A-307P2	633541	562729	507602	581651	AC-DC
EA-307P8	U3B				A-307P2	630238	562729	507602	581651	AC-DC
EA-307P9	U3D				A-307P5	630341	560022	507602	581651	AC-DC
EA-307P10	U3D				A-307P6	630341	560022	507602	581651	AC-DC

STYLE NOS. EA-401

TO TPR-337

THE MAGNAVOX CO.

INSTRUMENT STYLE No.	INSTRUMENT MODEL No.	A.M. RADIO CHASSIS MODEL No.	F.M. RADIO CHASSIS MODEL No.	RECORD CHANGER PART No.	AMPLIFIER CHASSIS MODEL No.	PHONOGRAPH PICK-UP ARM PART No.	CRYSTAL PICK-UP PART No.	TURNTABLE MOTOR PART No.	PART No. SPEAKER	CURRENT
EA-401	2A				A-401	*569889	563584	509888	581358	60 cye.
EA-401A	2B				A-401	*569889	563584	507601	581358	50-60 cye.
EA-401B	2A				A-401	630209	560006	500043	581358	60 cye.
EA-401C	2A				A-206	630209	560015	500043	581779	60 cye.
EA-401D	2F				A-206A	+560017	560015	500026	581834	60 cye.
EA-401E	2F-1				A-206A	+560017	560015	500026	581834	50-60 cye.
EA-401F	2F-1			520173	A-206F		560031		582398	60 cye.
EAU-401D	U2F				A-206A	+560017	563584	507602	581834	AC-DC
EAU-401F	2G				A-206E	+560017	560015	500026	582318	60 cye.
EA-401F-1	2G-1				A-206E	+560017	560015	500026	582318	50-60 cye.
EAU-401G	U2G				A-206E	+560017	560015	507602	582318	AC-DC
EA-501	3				A-501	631595	562729	507601	58622	60 cye.
EA-501E	3				A-501	633541	562729	509888	58622	60 cye.
EA-501F	3A				A-501	633541	562729	507576	58622	50-60 cye.
EA-501G	3				A-501B	633541	562729	500029	58622	60 cye.
EA-501H	3A				A-501B	633541	562729	507576	58622	50-60 cye.
EA-501I	3C				A-501B	633541	562729	507576	581615	50-60 cye.
EA-501J	3B				A-501B	633541	562729	500029	581651	60 cye.
EA-501K	3B				A-501B	630238	562729	500029	581651	60 cye.
EA-501L	3C				A-501B	630238	562729	507576	581615	50-60 cye.
EA-501M	3D				A-501B	630341	560022	500029	581615	60 cye.
EA-501N	3D-1				A-501B	630341	560022	507576	581615	50-60 cye.
EA-501N	3D-1			520173	A-206G				582318	60 cye.
EA-501N	3D-1			529562	A-3001				58869	60 cye.
CPAR-301	35	CR-101M					562729		582140	
CPAR-302	36	CR-101M		529650	A-3001		560008		58869	50-60 cye.
CPAR-302	36	CR-101M		529650	A-3001		560008		582140	
CPR-305	33	CR-109				631595	562729	507601	582125	60 cye.
EPR-306	32	CR-103				631600	562729	507601	582125	60 cye.
TPR-307	31	CR-102				631595	562729	507601	582124	60 cye.
RTR-308	37	CR-101								50-60 cye.
TPR-309	31	CR-104				631595	562729	507601	582124	60 cye.
EPR-310	32	CR-105				631600	562729	507601	582125	60 cye.
TPUR-311	U31	CR-107				631595	562729	507602	58946	AC-DC
CPAR-312	35A	CR-101M		529650	A-3001		560008		58869	50-60 cye.
CPAR-312	35A	CR-101M		529650	A-3001		560008		582148	
EPR-313	32	CR-109				631600	562729	507601	582125	60 cye.
EPUR-314	U32	CR-110				631600	562729	507602	581313	AC-DC
CPAR-315	34	CR-111		529562			562729		581314	60 cye.
TPR-316	31	CR-106				631595	562729	507601	582124	60 cye.
CPUR-317	U33	CR-110				631595	562729	507602	581313	AC-DC
CPAUR-318	U34	CR-112		529797			562729		581315	AC-DC
CPAR-319	35	CR-108		529562	A-3001		562729		58869	60 cye.
CPAR-319	35	CR-108		529562	A-3001		562729		582140	
CPAR-320	36	CR-108		529650	A-3001		560008		58869	50-60 cye.
CPAR-320	36	CR-108		529650	A-3001		560008		582140	
CPAR-321	34A	CR-111		529650			560008		581314	60 cye.
PR-322	30	CR-117				*569889	563584	509888	581349	60 cye.
TPR-323	31	CR-113				631595	562729	507601	581342	60 cye.
EPR-324	32	CR-114				631600	562729	507601	581343	60 cye.
CPR-325	33	CR-115				631595	562729	507601	581343	60 cye.
CPAR-326	34	CR-118		529562			562729		581341	60 cye.
CPAR-327	34A	CR-118		529650			560008		581341	60 cye.
CPAUR-328	U34A	CR-119		529894			560008		581315	AC-DC
CPAR-329	35A	CR-108		529650	A-3001		560008		58869	50-60 cye.
CPAR-329	35A	CR-108		529650	A-3001		560008		582140	
CPR-330	34B	CR-118				631595	562729	507601	581341	60 cye.
PRU-331	U30	CR-107				*569889	563584	507602	581357	AC-DC
CPUR-332	U34B	CR-119				631595	562729	507602	581315	AC-DC
PAR-333	36A	CR-108		529650	A-3001		560008		58869	50-60 cye.
PAR-333	36A	CR-108		529650	A-3001		560008		582140	
EPR-334	32A	CR-114				631600	562729	507576	581343	50-60 cye.
TPR-335	31	CR-107				631595	562729	507601	58946	60 cye.
EPR-336	32	CR-110				631600	562729	507601	581313	60 cye.
TPR-337	31	CR-113				633541	562729	509888	581342	60 cye.

STYLE NOS.TPR-338
TO CPR-401

THE MAGNAVOX CO.

INSTRUMENT STYLE No.	INSTRUMENT MODEL No.	A.M. RADIO CHASSIS MODEL No.	F.M. RADIO CHASSIS MODEL No.	RECORD CHANGER PART No.	AMPLIFIER CHASSIS MODEL No.	PHONOGRAPH PICK-UP ARM PART No.	CRYSTAL PICK-UP PART No.	TURNTABLE MOTOR PART No.	PART No. SPEAKER	CURRENT
TPR-338	31B	CR-141				630213	563584	500037	581630	60 cyc.
TPUR-339	U31B	CR-107				630213	562729	507602	58946	AC-DC
TPR-340	31C	CR-141				630213	563584	507576	581430	50-60 cyc.
CPR-341	33A	CR-118				631595	562729	507576	581343	50-60 cyc.
CPR-342	34C	CR-115				631595	562729	507576	581341	50-60 cyc.
CPR-343	38	CR-121				633541	562729	509888	581420	AC-DC
CPUR-344	U38	CR-127				633541	562729	507602	581315	60 cyc.
CPR-345	38A	CR-121				633541	562729	507576	581420	50-60 cyc.
CPAR-346	38B	CR-123		529650			560008		581419	60 cyc.
CPAUR-347	U38B	CR-127		529894			560008		581315	AC-DC
PR-348	30A	CR-117				569889	563584	507576	581349	50-60 cyc.
TPR-349	31A	CR-113				633541	562729	507576	581342	50-60 cyc.
EPR-350	32B	CR-123				633781	562729	509888	581419	60 cyc.
CPAR-351	34A	CR-125		529650			560008		581341	60 cyc.
CPAR-352	36	CR-122		529650	A-3001		560008		58869 582140	50-60 cyc.
CPAR-353	34D	CR-121		529650			560008		581420	60 cyc.
CPAR-354	34E	CR-124		529650			560008		581421 581422	60 cyc.
EPUR-355	U32	CR-110				633781	562729	507602	581313	AC-DC
CPAR-356	35A	CR-122		529650	A-3001		560008		58869 582140	50-60 cyc.
EPR-358	32	CR-114				631600	562729	509888	581343	60 cyc.
CPAUR-359	U34A	CR-126		529894			560008		581315	AC-DC
TPR-360	31D	CR-123				633541	562729	509888	581430	60 cyc.
TPUR-361	U31	CR-107				633541	562729	507602	58946	AC-DC
EPR-362	32C	CR-123				633781	562729	507576	581419	50-60 cyc.
TPR-363	31E	CR-123				633541	562729	507576	581430	50-60 cyc.
CPAR-364	34D	CR-121		529650			560008		581420	60 cyc.
CPAR-365	34E	CR-124		529650			560008		581421 581422	60 cyc.
CPR-366	40	CR-128				633781	562729	509888	581419	60 cyc.
CPAR-370	38B	CR-128		529650			560008		581419	60 cyc.
CPR-371	38	CR-121				633541	562729	509888	581420	60 cyc.
CPR-372	38A	CR-121				633541	562729	507576	581420	50-60 cyc.
CPAR-373	38B	CR-128		529650			560008		581419	60 cyc.
CPAUR-374	U38B	CR-127		529894			560008		581315	AC-DC
CPUR-375	U38	CR-127				633541	562729	507602	581315	AC-DC
PBR-378	41	CR-133				569889	563584	500015	581515	Battery
EPR-379	32B	CR-144				633781	562729	500029	581419	60 cyc.
CPR-380	40B	CR-134				633781	562729	500029	581520	60 cyc.
CPAR-381	38C	CR-121		520005			560008		581420	50-60 cyc.
EPR-382	32C	CR-144				633781	562729	507576	581419	50-60 cyc.
TPR-383	31D	CR-134				633541	562729	500029	581430	60 cyc.
CPAR-384	42	CR-136		520001			560008		581421 581422	50-60 cyc.
CPAR-385	35B	CR-122		520001	A-3001B		560008		58869 582140	50-60 cyc.
CPAR-386	36B	CR-122		520001	A-3001		560008		58869 582140	50-60 cyc.
CPR-387	40A	CR-134				633781	562729	507576	581520	50-60 cyc.
CPAR-388	34F	CR-121		529650			560008		581420	60 cyc.
CPAR-389	43	CR-151		520007			560012		581420	60 cyc.
EPR-391	44	CR-141				630213	563584	500037	581630	60 cyc.
EPR-392	45	CR-141				630213	563584	500037	581630	60 cyc.
CPAR-393	42	CR-147		520001			560008		581421 581422	50-60 cyc.
CPAR-394	34F	CR-146		520001			560008		581420	60 cyc.
CPAR-395	38C	CR-146		520005			560008		581420	50-60 cyc.
CPR-396	38	CR-146				633541	562729	500029	581420	60 cyc.
CPR-397	38A	CR-146				633541	562729	507576	581420	50-60 cyc.
EPR-398	32B	CR-140				633781	562729	500029	581420	60 cyc.
CPR-399	40B	CR-140				633781	562729	500029	581625	60 cyc.
CPAR-400	43A	CR-140		520005			560008		581420	50-60 cyc.
CPR-401	40A	CR-140				633781	562729	500029	581625	50-60 cyc.

THE MAGNAVOX CO.

STYLE NOS. CPAR-402
TO CPAR-457

INSTRUMENT STYLE No.	INSTRUMENT MODEL No.	A.M. RADIO CHASSIS MODEL No.	F.M. RADIO CHASSIS MODEL No.	RECORD CHANGER PART No.	AMPLIFIER CHASSIS MODEL No.	PHONOGRAPH PICK-UP ARM PART No.	CRYSTAL PICK-UP PART No.	TURNTABLE MOTOR PART No.	PART No. SPEAKER	CURRENT
CPAR-402	42	CR-148		520001			560008		581421 581422	50-60 cye.
EPR-403	32C	CR-140				633781	562729	507576	581420	50-60 cye.
CPAR-404	61	CR-150		520007			560012		581420	60 cye.
CPAR-405	42	CR-149		520001			560008		581421 581422	50-60 cye.
CPAR-406	38C	CR-146		520005			560008		581420	50-60 cye.
CPR-407	38	CR-146				630238	562729	500029	581420	60 cye.
CPR-408	38A	CR-146				630238	562729	507576	581420	50-60 cye.
CPAR-409	46	CR-140				630238	562729	500029	581420	60 cye.
CPAUR-410	U43A	CR-143		520021		630238	560008		581652	AC-DC
EPUR-411	U44	CR-145					562729	507602	581651	AC-DC
EPUR-412	U45	CR-145				630238	562729	507602	581651	AC-DC
TPUR-413	U31B	CR-145				630238	562729	507602	581651	AC-DC
CPAUR-414	U38C	CR-143		529894			560008		581652	AC-DC
CPUR-415	U38	CR-143				630238	562729	507602	581652	AC-DC
EPUR-416	U32B	CR-143				633781	562729	507602	581652	AC-DC
CPUR-417	U40B	CR-143				633781	562729	507602	581652	AC-DC
CPAUR-418	U38C	CR-143		520021			560008		581652	AC-DC
CPAUR-419	U34F	CR-143		520022			560008		581652	AC-DC
CPR-420	46A	CR-140				630238	562729	507607	581420	50-60 cye.
CPAR-421	43A	CR-140		520005			560008		581420	50-60 cye.
CPUR-422	U46	CR-143				630238	562729	507602	581652	AC-DC
CPAR-423	34E	CR-147		529650			560008		581421 581422	60 cye.
CPAR-424	34E	CR-147		520001			560008		581421 581422	60 cye.
CPAUR-425	U34F	CR-143		529894			560008		581652	AC-DC
EPR-426	32B	CR-141				633541	562729	500029	581420	60 cye.
CPR-427	42	CR-149				633541	562729	500029	581421 581422	50-60 cye.
CPAR-428	38E	CR-156		520076			560022		581917	60 cye.
CPAR-429	51C	CR-156	CR-158 (FM)	520090	A-222A		560023		581917	60 cye.
CPAR-430	51C-1	CR-156	CR-158 (FM)	520091	A-222A		560023		581917	50 cye.
CPAR-431	42	CR-152		520001			560008		581421 581422	50-60 cye.
EPAR-432	32D	CR-140		520005			560008		581420	50-60 cye.
EPAUR-433	U32D	CR-145		520021			560008		581652	AC-DC
CPAR-434	35C	CR-152		520001			560008		581421 581422	50-60 cye.
CPAR-436	61A	CR-140		520005			560008		581420	50-60 cye.
EPAR-437	32E	CR-156		520076			560022		581917	60 cye.
EPAR-438	32E-1	CR-156		520078			560022		581917	50 cye.
CPAR-439	61B	CR-140		520077			560008		581420	60 cye.
CPAR-440	62	CR-154C		520080			560023		581915 581916	60 cye.
CPAR-441	72	CR-154C		520080			560023		581913 581914	60 cye.
CPAR-442	38E-1	CR-156		520078			560022		581917	50 cye.
CPAR-443	72-1	CR-154C		520081			560023		581913 581914	50 cye.
CPAR-444	62-1	CR-154C		520081			560023		581915 581916	50 cye.
CPAR-445	49	CR-156		520080			560023		581917	60 cye.
CPAR-446	49-1	CR-156		520081			560023		581917	50 cye.
CPAR-447	48	CR-156		520080			560023		581917	60 cye.
CPAR-448	48-1	CR-156		520081			560023		581917	50 cye.
CPAR-449	42A	CR-154		520085			560022		581915 581916	50-60 cye.
CPAR-450	38D	CR-156		520094			560022		581917	50-60 cye.
CPAR-451	47	CR-157		520082			560025		581420	60 cye.
TPR-452	31F	CR-159				630341	560022	500037	581630	50-60 cye.
EPR-453	44A	CR-159				630341	560022	500037	581630	60 cye.
CPAR-454	34G	CR-155		520080			560023		581917	60 cye.
CPAR-455	34G-1	CR-155		520081			560023		581917	50 cye.
CPAR-456	34G	CR-155		520080			560023		581917	60 cye.
CPAR-457	34G-1	CR-155		520081			560023		581917	50 cye.

STYLE NOS. CPAR-458

TO CPAR-506

THE MAGNAVOX CO.

INSTRUMENT STYLE No.	INSTRUMENT MODEL No.	A.M. RADIO CHASSIS MODEL No.	F.M. RADIO CHASSIS MODEL No.	RECORD CHANGER PART No.	AMPLIFIER CHASSIS MODEL No.	PHONOGRAPH PICK-UP ARM PART No.	CRYSTAL PICK-UP PART No.	TURNTABLE MOTOR PART No.	PART No. SPEAKER	CURRENT
CPAR-458	38G	CR-160		520093			560022		581420	60 cye.
CPAR-459	38G-1	CR-160		520005			560022		581420	50-60 cye.
CPAR-460	42A	CR-161		520085			560022		581915 581916	50-60 cye.
CPAR-461	72A	CR-154C	CR-158 (FM)	520080			560023		581913 581914	60 cye.
CPAR-462	72A-1	CR-154C	CR-158 (FM)	520081			560023		581913 581914	50 cye.
CPAR-463	50	CR-155		520080			560023		581917	60 cye.
CPAR-464	50-1	CR-155		520081			560023		581917	50 cye.
CPAR-465	50A	CR-155	CR-158 (FM)	520080			560023		581917	60 cye.
CPAR-466	50A-1	CR-155	CR-158 (FM)	520081			560023		581917	50 cye.
CPAR-467	51	CR-156		520080			560023		581917	60 cye.
CPAR-468	51-1	CR-156		520081			560023		581917	50 cye.
CPAR-469	51A	CR-156	CR-158 (FM)	520080			560023		581917	60 cye.
CPAR-470	51A-1	CR-156	CR-158 (FM)	520081			560023		581917	50 cye.
CPAR-471	51B	CR-156	CR-158 (FM)	520090	A-222A		560023		581917	60 cye.
CPAR-472	62A	CR-154C	CR-158 (FM)	520080			560023		581915 581916	60 cye.
CPAR-473	62A-1	CR-154C	CR-158 (FM)	520081			560023		581915 581916	50 cye.
CPAR-474	62B	CR-154C		520090	A-222		560023		581915 581916	60 cye.
CPAR-475	62B-1	CR-154C		520091	A-222		560023		581915 581916	50 cye.
CPAR-476	62C	CR-154C		520090	A-222		560023		581915 581916	60 cye.
CPAR-477	62C-1	CR-154C	CR-158 (FM)	520091	A-222		560023		581915 581916	50 cye.
CPAR-480	72D	CR-154C		520085			560022		581913 581914	50-60 cye.
CPAR-481	62D	CR-154C		520085			560022		581913 581914	50-60 cye.
CPAR-482	50B	CR-155		520090	A-222		560023		581917	60 cye.
CPAR-483	50B-1	CR-155		520091	A-222		560023		581917	50 cye.
CPAR-484	62E	CR-154C	CR-158 (FM)	520085			560022		581913 581914	50-60 cye.
CPAR-485	72E	CR-154C	CR-158 (FM)	520085			560022		581913 581914	50-60 cye.
CPAR-489	55	CR-154C		520080			560023		581915 581916	60 cye.
CPAR-490	55-1	CR-154C		520081			560023		581915 581916	50 cye.
CPAR-491	55A	CR-154C		520080			560023		581915 581916	60 cye.
CPAR-492	55A-1	CR-154C	CR-158 (FM)	520081			560023		581915 581916	50 cye.
CPAR-493	55B	CR-154C		520090	A-222		560023		581915 581916	60 cye.
CPAR-494	55B-1	CR-154C		520091	A-222		560023		581915 581916	50 cye.
CPAR-495	38G	CR-156		520093			560022		581917	60 cye.
CPAR-496	38G-1	CR-156		520092			560022		581917	50-60 cye.
CPAR-497	42A	CR-162		520085			560022		581915 581916	50 cye.
CPAR-498	51B-1	CR-156	CR-158 (FM)	520091			560023		581917	50-60 cye.
CPAR-499	42A	CR-154		520072			560022		581915 581916	50-60 cye.
CPAR-500	55D	CR-154C		520094			560022		581915 581916	50-60 cye.
CPAR-501	55E	CR-154C	CR-158 (FM)	520094			560072		581915 581916	50-60 cye.
CPAR-502	72H	CR-154C		520090	A-222		560023		581913 581914	60 cye.
CPAR-503	72H-1	CR-154C		520091	A-222		560023		581913 581914	50 cye.
CPAR-504	72J	CR-154C	CR-158 (FM)	520090	A-222		560023		581913 581914	60 cye.
CPAR-505	72J-1	CR-154C	CR-158 (FM)	520091	A-222		560023		581913 581914	50 cye.
CPAR-506	72E	CR-154C		520072			560022		581913 581914	50-60 cye.

STYLE NOS. CPAR-507
TO CPAR-557

THE MAGNAVOX CO.

INSTRUMENT STYLE No.	INSTRUMENT MODEL No.	A.M. RADIO CHASSIS MODEL No.	F.M. RADIO CHASSIS MODEL No.	RECORD CHANGER PART No.	AMPLIFIER CHASSIS MODEL No.	PHONOGRAPH PICK-UP ARM PART No.	CRYSTAL PICK-UP PART No.	TURNTABLE MOTOR PART No.	PART No. SPEAKER	CURRENT
CPAR-507	72D	CR-154C	CR-158 (FM)	520072			560022		581913 581914	50-60 cye.
CPAR-508	62D	CR-154C		520072			560022		581913 581914	50-60 cye.
CPAR-509	62E	CR-154C	CR-158 (FM)	520072			560022		581913 581914	50-60 cye.
CPAUR-510	U34F	CR-163		520022			560022		581652	AC-DC
CPAUR-511	U38C	CR-163		520021			560022		581652	AC-DC
EPUR-512	U44A	CR-164				507602	560022	630341	581630	AC-DC
TPUR-513	U31F	CR-164				507602	560022	630341	581630	AC-DC
EPAUR-514	U32D	CR-163		520021			560022		581652	AC-DC
CPAR-515	42B	CR-154		520094			560022		581915 581916	50-60 cye.
CPAUR-516	U38E	CR-165		520151			560022		581987	AC-DC
EPAUR-517	U32E	CR-165		520151			560022		581652	AC-DC
EPR-518	45A	CR-159				500037	560022	630341	581630	60 cye.
CPAUR-519	U38D	CR-165		520098			560022		581987	AC-DC
CPAUR-520	U49	CR-165		520151			560022		581987	AC-DC
CPAUR-521	U48	CR-165		520151			560022		581987	AC-DC
CPAR-522	49D	CR-156		520094			560022		581917	50-60 cye.
CPAR-523	50D	CR-155		520094			560022		581917	50-60 cye.
CPAR-524	50E	CR-155	CR-158 (FM)	520094			560022		581917	50-60 cye.
CPAR-525	51D	CR-156		520094			560022		581917	50-60 cye.
CPAR-526	51E	CR-156	CR-158 (FM)	520094			560022		581917	60 cye.
CPAR-527	42A	CR-154		520094			560022		581915 581916	50-60 cye.
CPAR-530	42B	CR-154		520099			560022		581915 581916	50-60 cye.
CPAR-531	42A	CR-154		520099			560022		581915 581916	50-60 cye.
CPAR-532	42A	CR-154		520099			560022		581915 581916	50-60 cye.
CPAR-533	55D	CR-154C		520099			560022		581915 581916	50-60 cye.
CPAR-534	55E	CR-154C	CR-158 (FM)	520099			560022		581915 581916	50-60 cye.
CPAR-535	50	CR-155		520080			560023		581917	60 cye.
CPAR-536	50-1	CR-155		520081			560023		581917	50 cye.
CPAR-537	50A	CR-155	CR-158 (FM)	520080			560023		581917	60 cye.
CPAR-538	50A-1	CR-155	CR-158 (FM)	520081			560023		581917	50 cye.
CPAR-539	50B	CR-155		520090	A-222		560023		581917	60 cye.
CPAR-540	50B-1	CR-155		520091	A-222		560023		581917	50 cye.
CPAR-541	42E	CR-154	CR-167 (FM)	520099			560022		581915 581916	50-60 cye.
CPAR-542	55	CR-154C		520080			560023		581915 581916	60 cye.
CPAR-543	55-1	CR-154C		520081			560023		581915 581916	50 cye.
CPAR-544	55A	CR-154C	CR-158 (FM)	520080			560023		581915 581916	60 cye.
CPAR-545	55A-1	CR-154C	CR-158 (FM)	520081			560023		581915 581916	50 cye.
CPAR-546	55B	CR-154C		520090	A-222		560023		581915 581916	60 cye.
CPAR-547	55B-1	CR-154C		520091	A-222		560023		581915 581916	50 cye.
CPAR-548	62D	CR-154C		520099			560022		581913 581914	50-60 cye.
CPAR-549	62E	CR-154C	CR-158 (FM)	520099			560022		581913 581914	50-60 cye.
CPAR-550	42E	CR-154	CR-167 (FM)	520094			560022		581915 581916	50-60 cye.
CPAR-551	48	CR-156		520080			560023		581917	60 cye.
CPAR-552	48-1	CR-156		520081			560023		581917	50 cye.
CPAR-553	51	CR-156		520080			560023		581917	60 cye.
CPAR-554	51-1	CR-156		520081			560023		581917	50 cye.
CPAR-555	51K	CR-156	CR-169 (FM)	520080			560023		581917	60 cye.
CPAR-556	51K-1	CR-156	CR-169 (FM)	520081			560023		581917	50 cye.
CPAR-557	51B	CR-156	CR-169 (FM)	520090	A-222A		560023		581917	60 cye.

STYLE NOS. CPAR-558
TO CPAR-613

THE MAGNAVOX CO.

INSTRUMENT STYLE No.	INSTRUMENT MODEL No.	A.M. RADIO CHASSIS MODEL No.	F.M. RADIO CHASSIS MODEL No.	RECORD CHANGER PART No.	AMPLIFIER CHASSIS MODEL No.	PHONOGRAPH PICK-UP ARM PART No.	CRYSTAL PICK-UP PART No.	TURNTABLE MOTOR PART No.	PART No. SPEAKER	CURRENT
CPAR-558	51B-1	CR-156	CR-169 (FM)	520091			560023		581917	50 cye.
CPAR-559	50D	CR-155		520094			560022		581917	50-60 cye.
CPAR-560	50E	CR-155	CR-158 (FM)	520094			560022		581917	50-60 cye.
CPAR-561	48K	CR-156	CR-170 (FM)	520080			560023		581917	60 cye.
CPAR-562	48K-1	CR-156	CR-170 (FM)	520081			560023		581917	50 cye.
CPAR-563	49F	CR-156		520170			560023		581917	60 cye.
CPAR-564	49F	CR-156		520172			560023		581917	60 cye.
EPAR-566	32F	CR-156		520170			560023		581917	60 cye.
CPAR-567	50D	CR-155		520099			560022		581917	50-60 cye.
CPAR-568	50E	CR-155	CR-158 (FM)	520094			560022		581917	50-60 cye.
CPAUR-569	U48D	CR-165		520098			560022		581987	AC-DC
EPAUR-570	U32D	CR-165		520098			560022		581652	AC-DC
CPAR-571	48D	CR-156		520094			560022		581917	50-60 cye.
CPAR-572	48DK	CR-156	CR-170 (FM)	520094			560022		581917	50-60 cye.
CPAR-573	48FK	CR-156		520170			560023		581917	60 cye.
CPAR-574	48F	CR-156	CR-170 (FM)	520170			560023		581917	60 cye.
CPAR-575	51F	CR-156		520170			560023		581917	60 cye.
CPAR-576	51FK	CR-156	CR-169 (FM)	520170			560023		581917	60 cye.
CPAR-577	48G	CR-156		520301			560023		581917	60 cye.
CPAR-578	48GK	CR-156		520301			560023		581917	60 cye.
CPAR-579	49G	CR-156		520301			560023		581917	60 cye.
CPAR-580	51G	CR-156		520301			560023		581917	60 cye.
CPAR-581	51GA	CR-156		520301			560023		581917	60 cye.
CPAR-582	51GK	CR-156	CR-169 (FM)	520301			560023		581917	60 cye.
CPAR-583	51D	CR-156		520099			560022		581917	50-60 cye.
CPAR-584	51DK	CR-156	CR-158 (FM)	520099			560022		581917	50-60 cye.
CPAR-585	51DA	CR-156	CR-169 (FM)	520099			560022		581917	50-60 cye.
CPAR-586	51FA	CR-156	CR-158 (FM)	520170			560023		581917	60 cye.
CPAR-587	50L	CR-155		520302			560023		581917	60 cye.
CPAR-588	48D	CR-156		520099			560022		581917	50-60 cye.
CPAR-589	48DK	CR-156	CR-170 (FM)	520099			560022		581917	50-60 cye.
CPAR-590	50G	CR-155		520301			560023		581917	60 cye.
CPAR-591	50GA	CR-155	CR-158 (FM)	520301			560023		581917	60 cye.
CPAR-592	50GK	CR-155	CR-169 (FM)	520301			560023		581917	60 cye.
CPAR-593	50F	CR-155		520170			560023		581917	60 cye.
CPAR-594	50FA	CR-155	CR-158 (FM)	520170			560023		581917	60 cye.
CPAR-595	50FK	CR-155	CR-169 (FM)	520170			560023		581917	60 cye.
CPAR-596	50DK	CR-155	CR-169 (FM)	520099			560022		581917	50-60 cye.
CPAR-597	42AK	CR-154	CR-170 (FM)	520099			560022		581915 581916	50-60 cye.
CPAR-598	55DK	CR-154C	CR-169 (FM)	520099			560022		581915 581916	50-60 cye.
CPAR-599	55G	CR-154C		520301			560023		581915 581916	60 cye.
CPAR-600	55GA	CR-154C		520301			560023		581915 581916	60 cye.
CPAR-601	55GK	CR-154C	CR-169 (FM)	520301			560023		581915 581916	60 cye.
CPAR-602	55L	CR-154C		520302	A-222		560023		581915 581916	60 cye.
CPAR-603	51F	CR-156		520170			560023		581917	60 cye.
CPAR-604	51L	CR-156		520302	A-222		560023		581917	60 cye.
CPAR-605	51LA	CR-156	CR-158 (FM)	520302	A-222		560023		581917	60 cye.
CPAR-606	51LK	CR-156	CR-169 (FM)	520302	A-222		560023		581917	60 cye.
CPAR-607	51A	CR-156	CR-158 (FM)	520080			581917		560023	60 cye.
CPAR-608	51A-1	CR-156	CR-158 (FM)	520081			581917		560023	50 cye.
CPAR-609	62G	CR-154C	CR-158 (FM)	520301			581913 581914		560023	60 cye.
CPAR-610	62GA	CR-154C		520301			581913 581914		560023	60 cye.
CPAR-611	62GK	CR-154C	CR-169 (FM)	520301			581913 581914		560023	60 cye.
CPAR-612	72G	CR-154C		520301			581913 581914		560023	60 cye.
CPAR-613	72GA	CR-154C	CR-158 (FM)	520301			581913 581914		560023	60 cye.

THE MAGNAVOX CO.

STYLE NOS. CPAR-614
TO CPAR-661

INSTRUMENT STYLE No.	INSTRUMENT MODEL No.	A.M. RADIO CHASSIS MODEL No.	F.M. RADIO CHASSIS MODEL No.	RECORD CHANGER PART No.	AMPLIFIER CHASSIS MODEL No.	PHONOGRAPH PICK-UP ARM PART No.	CRYSTAL PICK-UP PART No.	TURNTABLE MOTOR PART No.	PART No. SPEAKER	CURRENT
CPAR-614	62DK	CR-154C	CR-169 (FM)	520072			581913 581914		560022	50-60 cyc.
CPAR-615	72GK	CR-154C	CR-169 (FM)	520301			581913 581914		560023	60 cyc.
CPAR-616	72L	CR-154C		520302	A-222		581913 581914		560023	60 cyc.
CPAR-617	62DK	CR-154C	CR-169 (FM)	520099			581913 581914		560022	50-60 cyc.
CPAR-618	47F	CR-171		520170			581917		560022	60 cyc.
CPAR-619	47F	CR-171		520170			581917		560022	60 cyc.
CPAR-620	62L	CR-154C		520302	A-222		581913 581914		560023	60 cyc.
CPAR-621	62LA	CR-154C	CR-158 (FM)	520302	A-222		581913 581914		560023	60 cyc.
CPAR-622	62LK	CR-154C	CR-169 (FM)	520302	A-222		581913 581914		560023	60 cyc.
CPAR-623	38F	CR-156		520170			560023		581917	60 cyc.
CPAR-624	72LA	CR-154C	CR-158 (FM)	520302	A-222		560023		581913 581914	60 cyc.
CPAR-625	72LK	CR-154C	CR-169 (FM)	520302	A-222		560023		581913 581914	60 cyc.
CPAR-626	42G	CR-154		520301			560023		581915 581916	60 cyc.
CPAR-627	42GA	CR-154	CR-167 (FM)	520301			560023		581915 581916	60 cyc.
CPAR-628	42GK	CR-154	CR-170 (FM)	520301			560023		581915 581916	60 cyc.
CPAR-629	32F	CR-171		520170			560023		581917	60 cyc.
CPAR-630	38F	CR-171		520170			560023		581917	60 cyc.
CPAR-631	28M	CR-178		520173			560031		581917	60 cyc.
CPAR-632	52F	CR-156		520170			560023		581917	60 cyc.
CPAR-633	52FK	CR-156	CR-170 (FM)	520170			560023		581917	60 cyc.
CPAR-634	52G	CR-156		520301			560023		581917	60 cyc.
CPAR-635	52GK	CR-156	CR-170 (FM)	520301			560023		581917	60 cyc.
TPAR-636	26M	CR-168		520173			560031		582402	60 cyc.
TPR-637	20	CR-168				†560033	560031	500026	282402	60 cyc.
TPR-639	20-1	CR-168				†560033	560031	500026	582402	50 cyc.
CPAR-640	43F	CR-140		520170			560023		581917	60 cyc.
CPAR-641	35D	CR-154		520099			560022		581915 581916	50-60 cyc.
CPAR-642	72D	CR-154C		520099			560022		581913 581914	50-60 cyc.
CPAR-643	72E	CR-154C	CR-158 (FM)	520099			560022		581913 581914	50-60 cyc.
CPAR-644	72DK	CR-154C	CR-169 (FM)	520099			560022		581913 581914	50-60 cyc.
CPAR-645	47HF	CR-178		520170			560023		581917	60 cyc.
CPAR-646	47HFK	CR-178	CR-169 (FM)	520170			560023		581917	60 cyc.
CPAR-647	54F	CR-177		520170			560023		581915 581916	60 cyc.
CPAR-648	54FA	CR-177	CR-167 (FM)	520170			560023		581915 581916	60 cyc.
CPAR-649	54FK	CR-177	CR-170 (FM)	520170			560023		581915 581916	60 cyc.
CPAUR-650	U52D	CR-165		520098			560022		581987	AC-DC
EPAR-651	32NF	CR-176		520170			560023		581917	60 cyc.
EPAR-652	32HF	CR-178		520170			560023		581917	60 cyc.
CPAR-653	38HF	CR-178		520170			560023		581917	60 cyc.
CPAR-654	38HFK	CR-178	CR-169 (FM)	520170			560023		581917	60 cyc.
CPAR-655	50K	CR-155	CR-169 (FM)	520080			560023		581917	60 cyc.
CPAR-656	55G	CR-174C		520301			560023		581915 581916	60 cyc.
CPAR-657	55GA	CR-174C	CR-158 (FM)	520301			560023		581915 581916	60 cyc.
CPAR-658	55GK	CR-174C	CR-169 (FM)	520301			560023		581915 581916	60 cyc.
CPAR-659	55L	CR-174C		530302	A-222		560023		581915 581916	60 cyc.
CPAR-660	55D	CR-174C		520099			560022		581915 581916	50-60 cyc.
CPAR-661	55E	CR-174C	CR-158 (FM)	520099			560022		581915 581916	50-60 cyc.

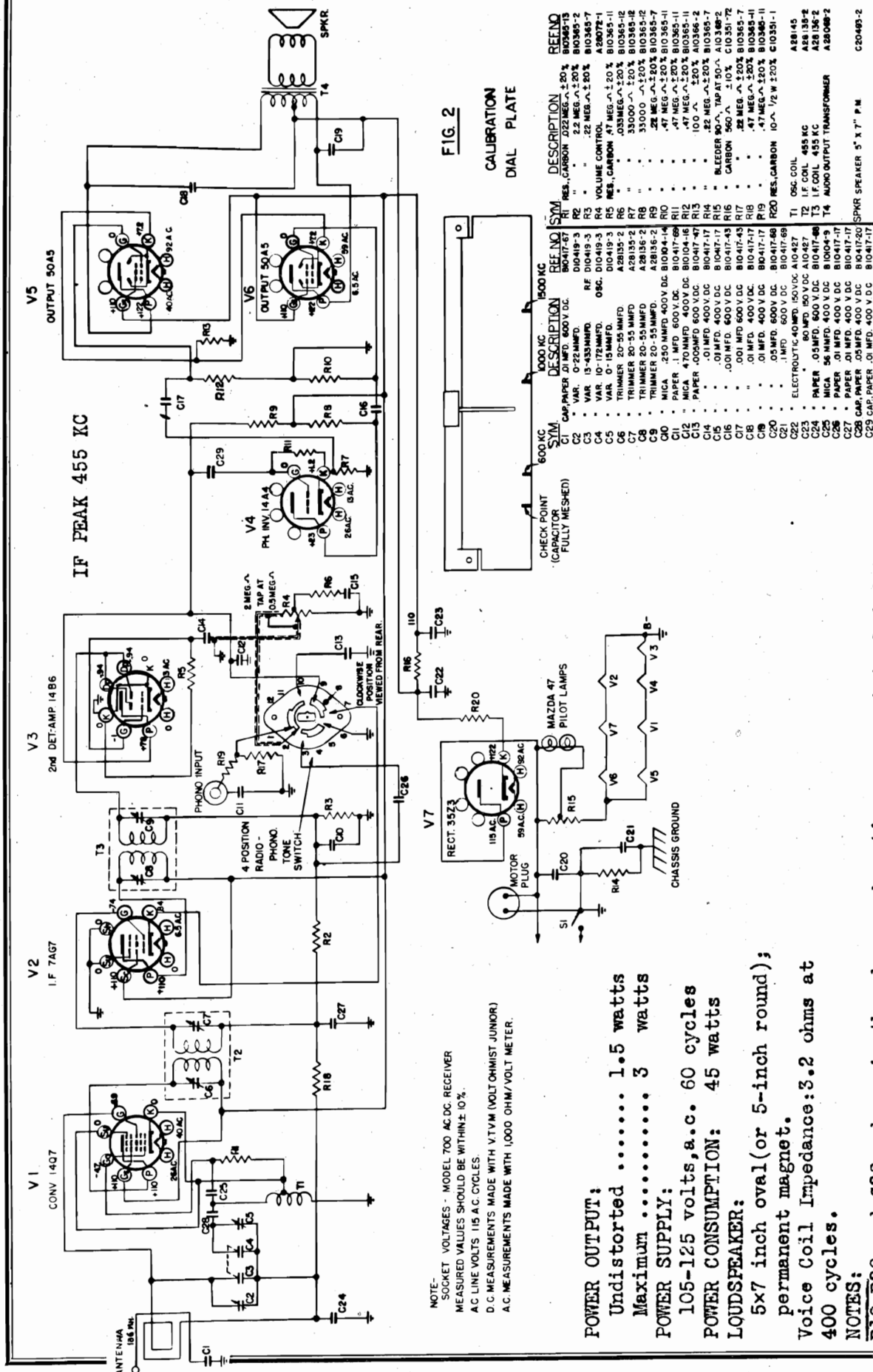
STYLE NOS. CPAR-662
TO CPA-3001L

THE MAGNAVOX CO.

INSTRUMENT STYLE No.	INSTRUMENT MODEL No.	A.M. RADIO CHASSIS MODEL No.	F.M. RADIO CHASSIS MODEL No.	RECORD CHANGER PART No.	AMPLIFIER CHASSIS MODEL No.	PHONOGRAPH PICK-UP ARM PART No.	CRYSTAL PICK-UP PART No.	TURNTABLE MOTOR PART No.	PART No. SPEAKER	CURRENT
CPAR-662	55DK	CR-174C	CR-169 (FM)	520099			560022		581915 581916	50-60 cye.
CAPR-663	52F	CR-176		520170			560023		581917	60 cye.
CPAR-664	52FK	CR-176	CR-170 (FM)	520170			560023		581917	60 cye.
CPAR-665	52G	CR-176		520301			560023		581917	60 cye.
CPAR-666	52GK	CR-176	CR-170 (FM)	520301			560023		581917	60 cye.
CPAR-667	48G	CR-176		520301			560023		581917	60 cye.
CPAR-668	48GK	CR-176	CR-170 (FM)	520301			560023		581917	60 cye.
CPAR-669	48F	CR-176		520170			560023		581917	60 cye.
CPAR-670	48FK	CR-176	CR-170 (FM)	520170			560023		581917	60 cye.
CPAR-671	48D	CR-176		520099			560022		581917	50-60 cye.
CPAR-672	48DK	CR-176	CR-170 (FM)	520099			560022		581917	50-60 cye.
CPAR-673	48G	CR-176		520301			560023		581917	60 cye.
CPAR-677	42G	CR-174		520301			560023		581915 581916	60 cye.
CPAR-678	42GA	CR-174	CR-167 (FM)	520301			560023		581915 581916	60 cye.
CPAR-679	42GK	CR-174	CR-170 (FM)	520301			560023		581915 581916	60 cye.
CPAR-681	72D	CR-174C		520099			560022		581913 581914	50-60 cye.
CPAR-682	72E	CR-174C	CR-158 (FM)	520099			560022		581913 581914	50-60 cye.
CPAR-683	72DK	CR-174C	CR-169 (FM)	520099			560022		581913 581914	50-60 cye.
CPAR-685	38NF	CR-176		520170			560023		581917	60 cye.
CPAR-686	38NFK	CR-176	CR-169 (FM)	520170			560023		581917	60 cye.
CPAR-687	54F	CR-181		520170			560023		581915 581916	60 cye.
CPAR-688	54FA	CR-181	CR-167 (FM)	520170			560023		581915 581916	60 cye.
CPAR-689	54FK	CR-181	CR-170 (FM)	520170			560023		581915 581916	60 cye.
CPAR-692	49	CR-176		520080			560023		581917	60 cye.
CPAR-693	43M	CR-159		520173			560023		581917	60 cye.
EPAUR-694	U32E	CR-164		520151			560022		581652	AC-DC
CPAUR-695	U48E	CR-165		520151			560022		581987	AC-DC
CPAUR-696	U52E	CR-165		520151			560022		581987	AC-DC
EPAR-697	32NF	CR-176		520170			560023		581917	60 cye.
CPAR-698	72L	CR-174C		520302	A-222		560023		581913 581914	60 cye.
CP-1101	4K				A-1101	630341	560023	500029	582331	60 cye.
CP-3001A	4				A-3001A	631595	562729	507605	58869 58968	60 cye.
CP-3001B	4A				A-3001A	631595	562729	507605	58869 58968	60 cye.
CP-3001C	4B				A-3001A	631595	562729	507607	58869 58968	50-60 cye.
CP-3001D	4C				A-3001A	631595	562729	507607	58869 58968	50-60 cye.
CP-3001E	4D				A-3001A	633541	562729	509888	58869 58968	60 cye.
CP-3001F	4E				A-3001A	633541	562729	509888	58869 58968	60 cye.
CP-3001G	4F				A-3001B	633541	562729	507576	58869 58968	50-60 cye.
CP-3001H	4G				A-3001B	633541	562729	509888	58869 58968	60 cye.
CP-3001K	4H				A-3001C	630341	560022	509888	58869 58968	60 cye.
CP-3001L	4J				A-3001C	630341	560022	509888	58869 58968	60 cye.
CPA-3001A	5			529562	A-3001A		562729		58869 58968	60 cye.
CPA-3001B	5A			529562	A-3001A		562729		58869 58968	60 cye.
CPA-3001C	5B			529650	A-3001A		560008		58869 58968	60 cye.
CPA-3001D	5C			529650	A-3001A		560008		58869 58968	60 cye.
CPA-3001E	5D			529650	A-3001A		560008		58869 58968	60 cye.
CPA-3001F	5E			529650	A-3001A		560008		58869 58968	60 cye.
CPA-3001G	5D			529650	A-3001A		560008		58869 58968	60 cye.
CPA-3001H	5E			529650	A-3001B		560008		58869 58968	60 cye.
CPA-3001I	5G			520001	A-3001B		560008		58869 58968	60 cye.
CPA-3001J	5F			520001	A-3001B		560008		58869 58968	60 cye.
CPA-3001K	5H			520072	A-3001C		560022		58869 58968	50-60 cye.
CPA-3001L	5J			520072	A-3001C		560022		58869 58968	50-60 cye.

MAGUIRE INDUSTRIES INC.

MODEL 700



NOTE: SOCKET VOLTAGES - MODEL 700 AC DC RECEIVER
MEASURED VALUES SHOULD BE WITHIN ± 10%
AC LINE VOLTS 115 AC CYCLES
D.C. MEASUREMENTS MADE WITH VTVM (VOLT OHMMETER JUNIOR)
A.C. MEASUREMENTS MADE WITH 1000 OHM/VOLT METER

POWER OUTPUT:

Undistorted 1.5 watts

Maximum 3 watts

POWER SUPPLY:

105-125 volts, a.c. 60 cycles

POWER CONSUMPTION: 45 watts

LOUDSPEAKER:

5x7 inch oval (or 5-inch round);
permanent magnet.

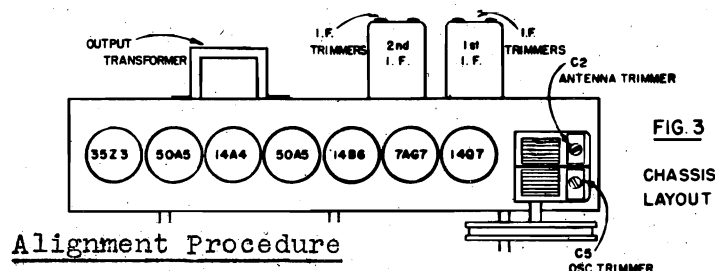
Voice Coil Impedance: 3.2 ohms at
400 cycles.

NOTES:

R19, R20 and C28, shown in the above schematic, were not included in earlier models.
The following changes were effected in later models: R2 changed from 10 to 2.2 megohms;
R16 changed from 1800 to 560 ohms; R17 changed from 0.47 megohm to 0.22 megohm.
The rectifier output voltage of +110 volts, as shown above, may be 10 to 15 volts
lower in earlier models due to the higher resistance of R16 in the filter section.

MODEL 700

MAGUIRE INDUSTRIES INC.

Alignment Procedure

A signal generator capable of producing a modulated radio-frequency signal, and a suitable output meter are required for proper alignment of the receiver.

Adjust the signal generator for 30%, 400 cycle modulation. At all times, use only the minimum signal intensity which will produce a readable indication on the output meter, in order to minimize alignment error due to a.v.c. action in the receiver.

Set the receiver controls for "Radio", maximum volume, and treble tone.

Make all adjustments with the signal generator connected directly to the external antenna lead of the receiver, and with the output meter across the speaker voice coil.

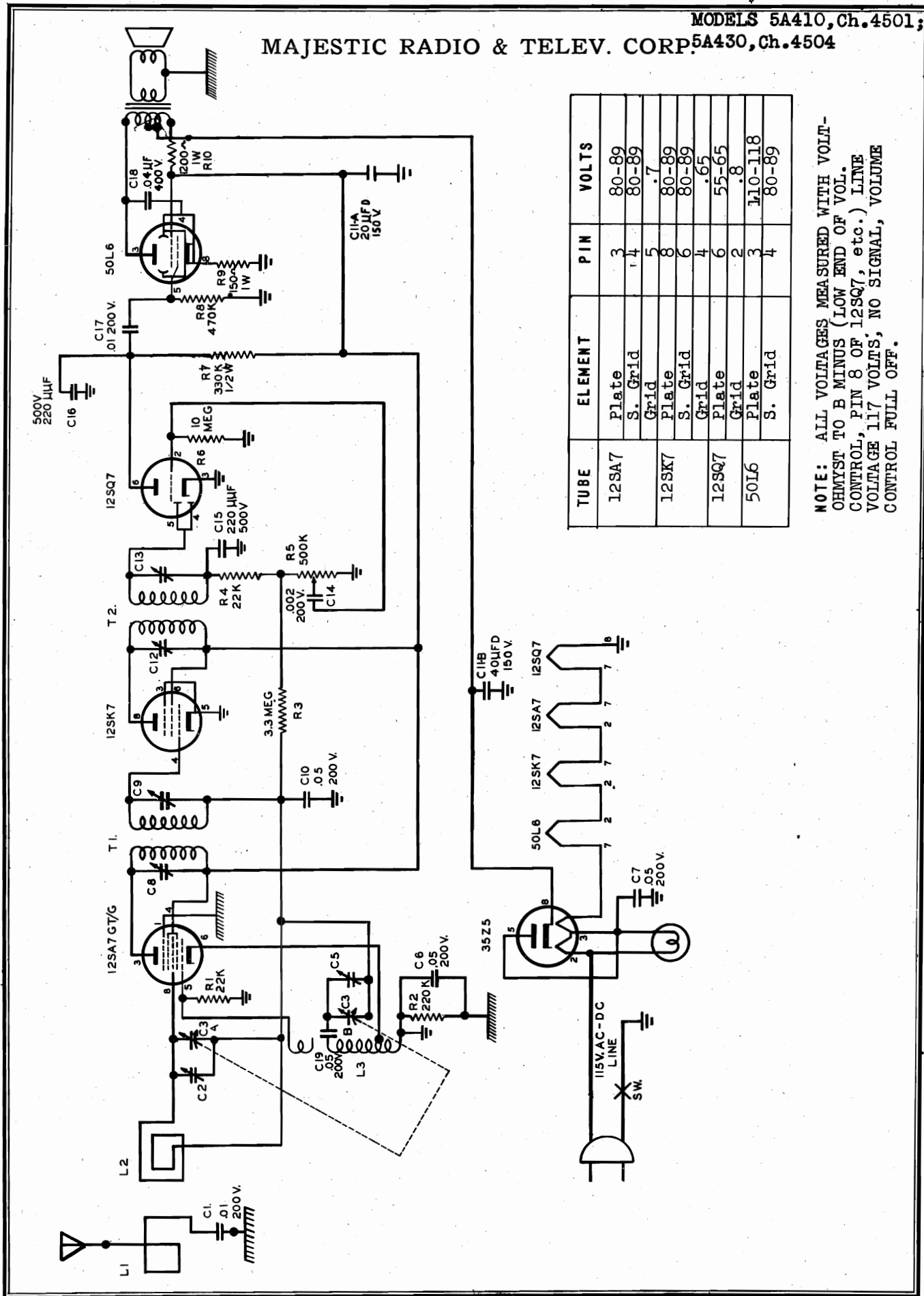
Use a non-metallic screwdriver in making all receiver alignment adjustments.

NOTE: The calibrated tuning dial of the receiver is fastened in the cabinet and cannot be used for reference during alignment. Therefore, calibration marks have been stamped on the plate on the front of the chassis, as shown in Figure 2. These are the reference marks referred to in the following procedure:

- Step 1. Set signal generator to 455 kc. and the receiver dial to a "quiet spot" between stations. Peak the I.F. trimmer condensers (Figure 3) for maximum signal indication on the output meter, beginning with the 2nd I.F. transformer.
- Step 2. Turn ganged tuning condenser to maximum capacity (fully meshed) and adjust dial pointer on cord so that it coincides with the extreme left hand white mark on the metal dial plate.
- Step 3. Set signal generator to 1500 kc. Turn ganged tuning condenser until pointer coincides with extreme right hand (1500 kc.) calibration mark. Adjust oscillator trimmer condenser C5 (Figure 3) for maximum indication on the output meter.
- Step 4. With the signal generator and receiver dial set as in step 3, adjust the antenna trimmer condenser C2 for maximum indication on the output meter.

When chassis has been returned to cabinet after alignment, the receiver calibration should be checked against the tuning dial. It may be found necessary to slide the dial pointer slightly in either direction on the cord to correct for small deviations in calibration.

MAJESTIC RADIO & TELEV. CORP. MODELS 5A410, Ch.4501;
5A430, Ch.4504



TUBE	ELEMENT	PIN	VOLTS
12SA7	Plate	3	80-89
	S. Grid	4	80-89
	Grid	5	.7
12SK7	Plate	8	80-89
	S. Grid	6	80-89
	Grid	4	.65
12SQ7	Plate	6	55-65
	Grid	2	.8
50L6	Plate	3	110-118
	S. Grid	4	80-89

NOTE: ALL VOLTAGES MEASURED WITH VOLT-OHMYST TO B MINUS (LOW END OF VOL. CONTROL, PIN 8 OF 12SQ7, etc.) LINE VOLTAGE 117 VOLTS, NO SIGNAL, VOLUME CONTROL FULL OFF.

MODELS 5A410, Ch.4501;
5A430, Ch.4504

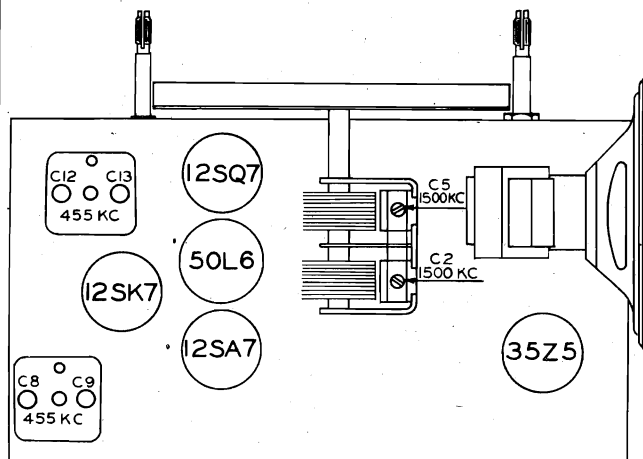
MAJESTIC RADIO & TELEV. CORP.

Before aligning, set the dial pointer as follows: Close the tuning gang condenser (plates fully meshed). Set dial pointer so that its left hand edge is in line with the right hand edge of the last mark at the low frequency end of the dial scale.

While aligning this receiver, turn the volume control full on, and keep the signal generator output as low as possible to prevent AVC action and false readings.

STEP	DUMMY ANT.	TEST OSC. CONNECTION	TEST OSC. FREQUENCY	RECEIVER DIAL	ADJUST	REMARKS
1	.01 mfd.	12SA7 grid (pin No.5)	455 kc. modulated	Any quiet spot	C13,C12,C9,C8 for max. output	Repeat in reverse order
2	-----	Loop*	1500 kc. modulated	150	C5 for maximum output	
3	-----	Loop*	1500 kc. modulated	150	C2 for maximum output	Rock gang while adjusting
4	REPEAT COMPLETE ALIGNMENT PROCEDURE CAREFULLY					

* Make a two or three turn loop about 12 inches in diameter. Connect to output terminals of the signal generator. Place this loop in a plane parallel to the receiver loop antenna and about a foot away from the receiver loop. IMPORTANT: WHEN MAKING RF. ADJUSTMENTS, THE RECEIVER LOOP ANTENNA MUST BE MOUNTED ON THE CHASSIS EXACTLY AS WHEN THE RECEIVER IS IN THE CABINET.



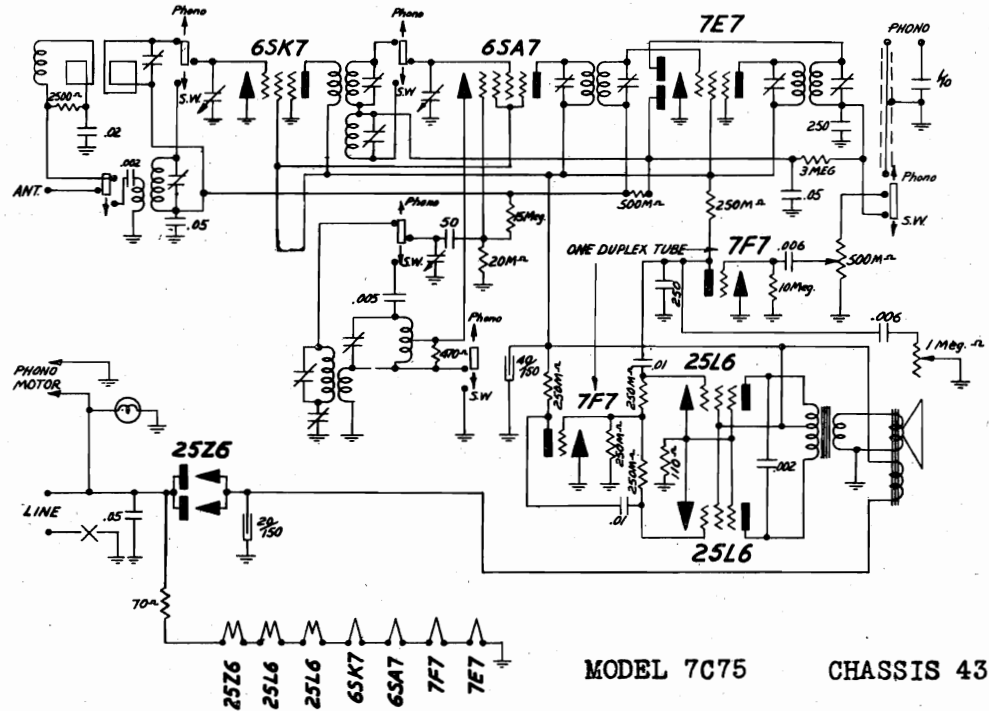
TUBE LAYOUT

ITEM	DESCRIPTION	PART NO.
R1,R4	22,000 ohm 20% 1/3 watt	9-184
R2	220,000 ohm 20% 1/3 watt	9-182
R3	3.3 megohm 20% 1/3 watt	9-206
R5	Volume Control with switch	13-14
R6	10 megohm 20% 1/3 watt	9-160
R7	330,000 ohm 20% 1/2 watt	9-89
R8	470,000 ohm 20% 1/3 watt	9-207
R9	150 ohm 20% 1 watt	9-251
R10	1,200 ohm 10% 1 watt	9-216
C1,C17	.01 mfd +20% -10% 200 v	6-112
C2,C3,C5	Ganged Tuning Condenser	7-16
C6	.05mfd +40% -10% 200 v	5-40
C7,C10	.05 mfd +40% -10% 200 v	5-40
C8,C9,	Trimmer, 135 mmfd, mica	8-46
C12,C13	20-40 mfd 150 v elec-trolytic	19-24
C14	.002 mfd +40% -10% 200 v	5-52
C15,C16	220 mmfd 20% 500 v mica	6-151
C18	.04 mfd +20% -10% 400 v	5-58
C19	.05 mfd + 40% - 10% 200 v	5-40
T1	1st IF Transformer	3-116
T2	2nd IF Transformer	3-117
L3	Oscillator Coil Assembly	3-158
	Speaker	22-12
	Dial Glass	117-30
	Dial Cord Tension Spring	129-29
	Dial Pointer	135-5
	MODEL 5A410	
	Cabinet, walnut	116-1
	Cabinet, white	116-2
	Loop antenna & back cover	20-7
	Knobs, walnut	128-23
	Knobs, black	128-25
	MODEL 5A430	
	Cabinet	115-6
	Loop antenna & back cover	20-17
	Knobs	128-32

MAJESTIC RADIO & TELEV. CORP.

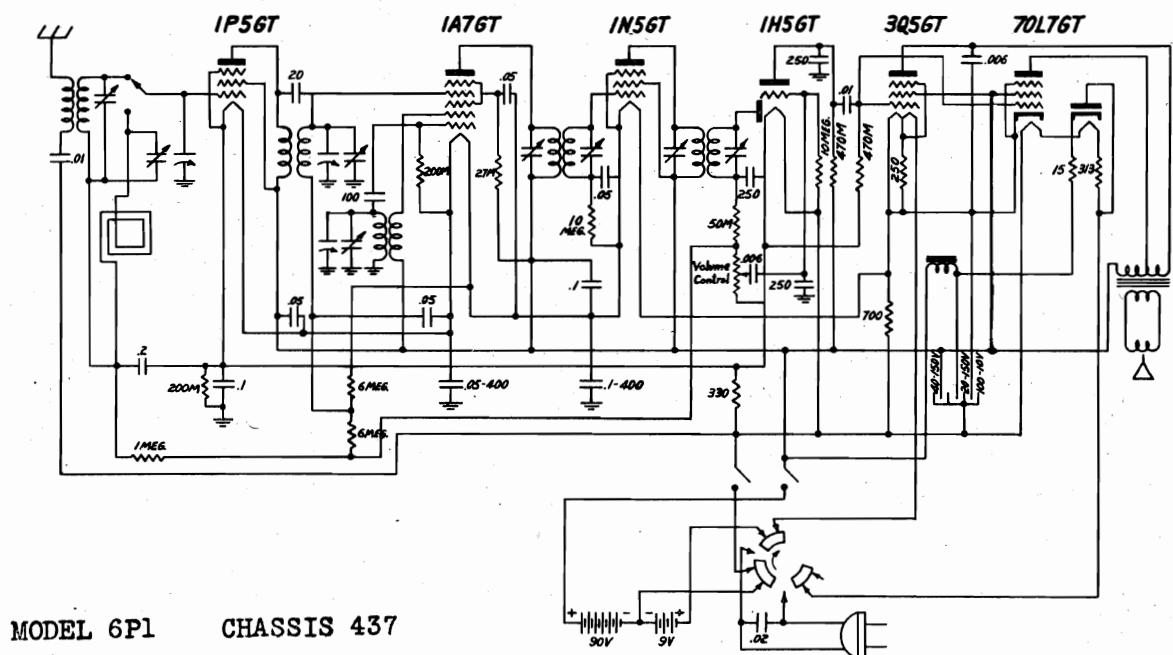
MODEL 6P1, Ch. 437
MODEL 7C75, Ch. 435

SCHEMATIC DIAGRAM



Chassis 435

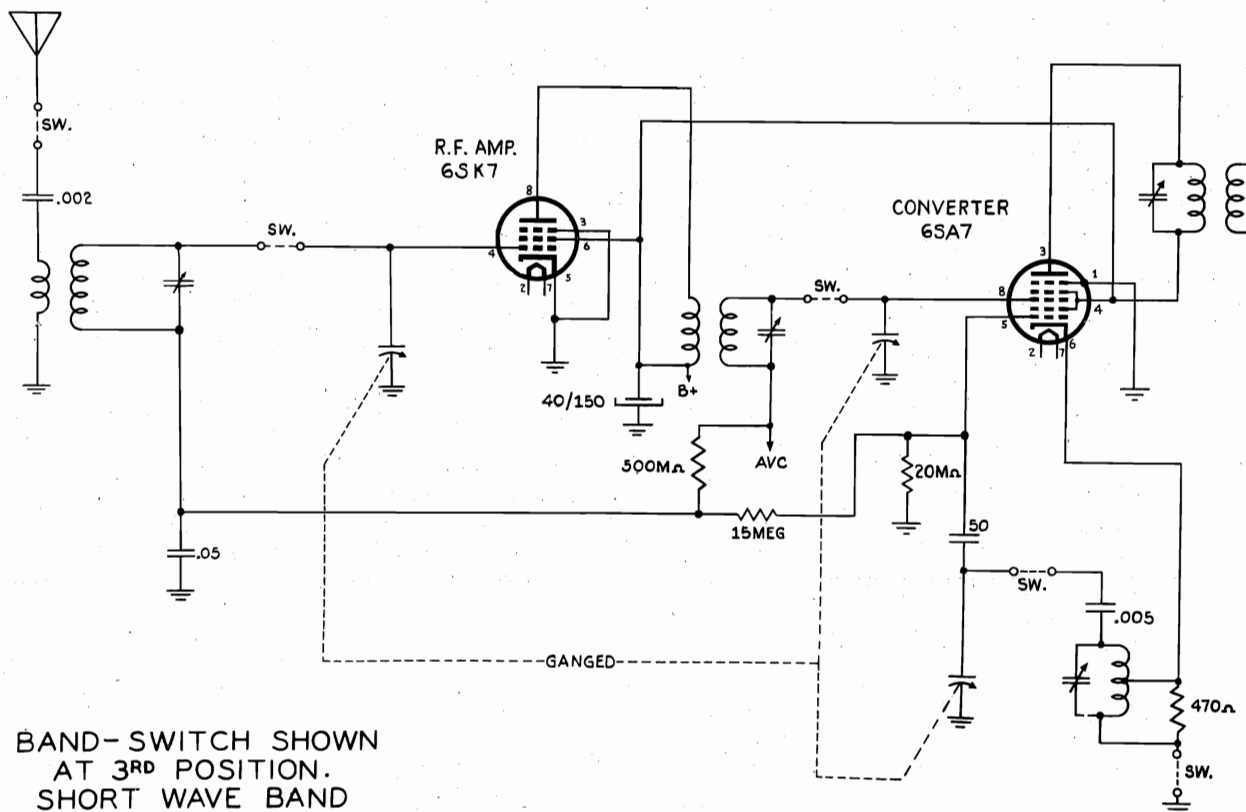
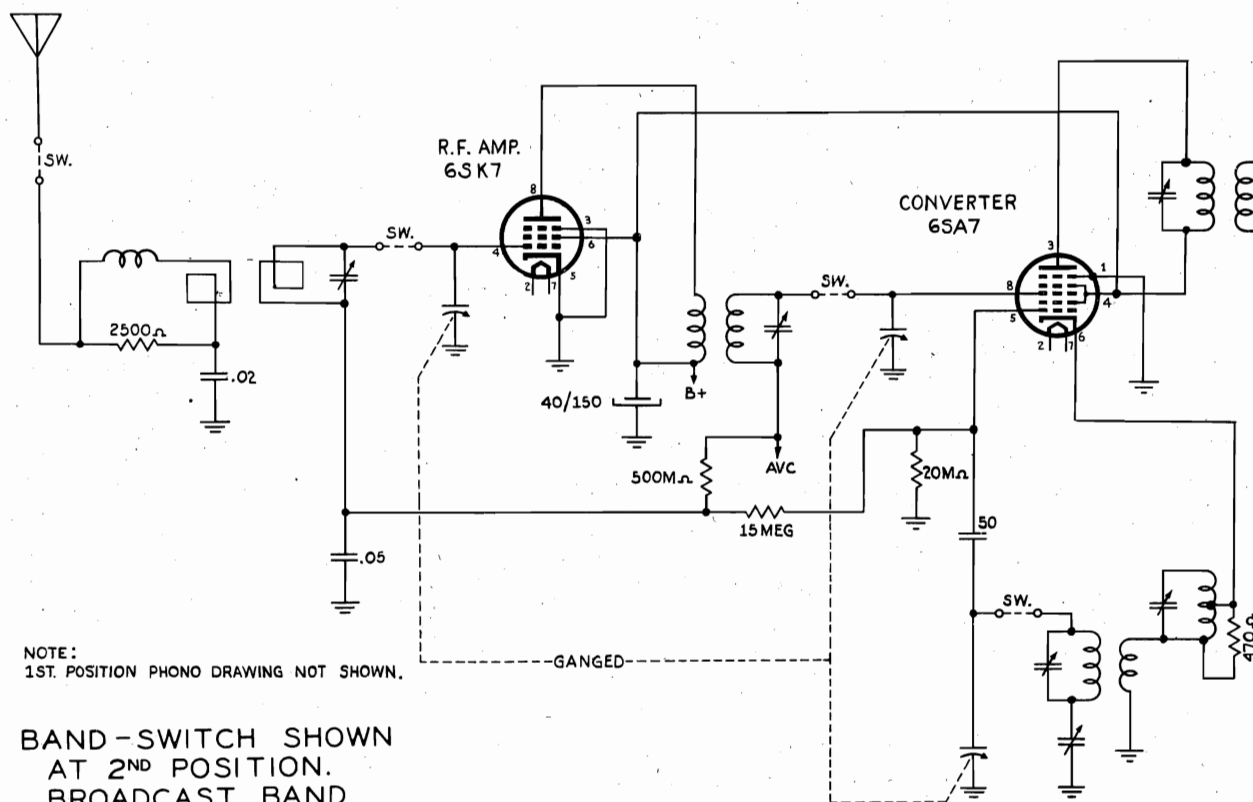
SCHEMATIC DIAGRAM



Chassis 437

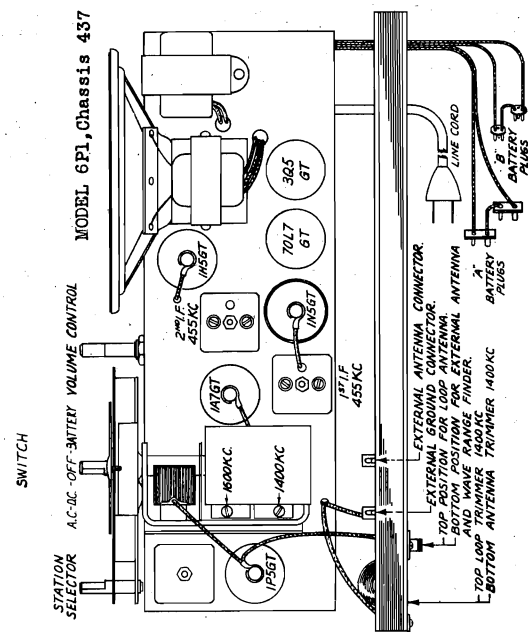
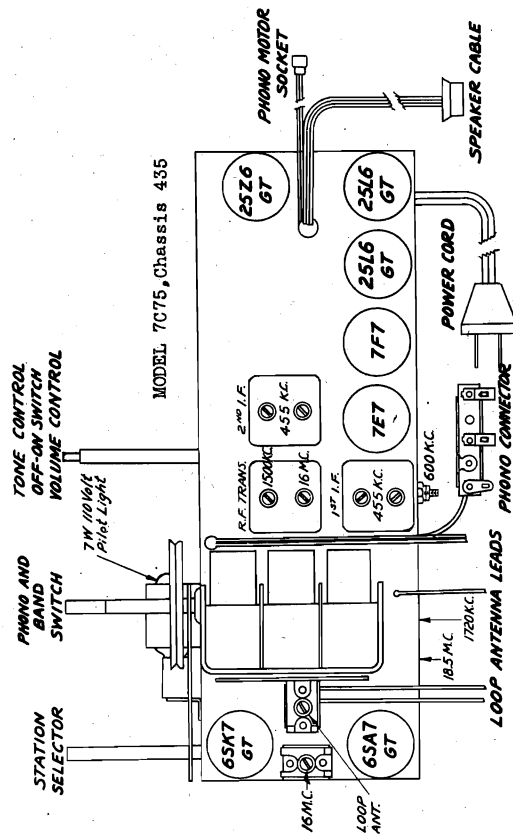
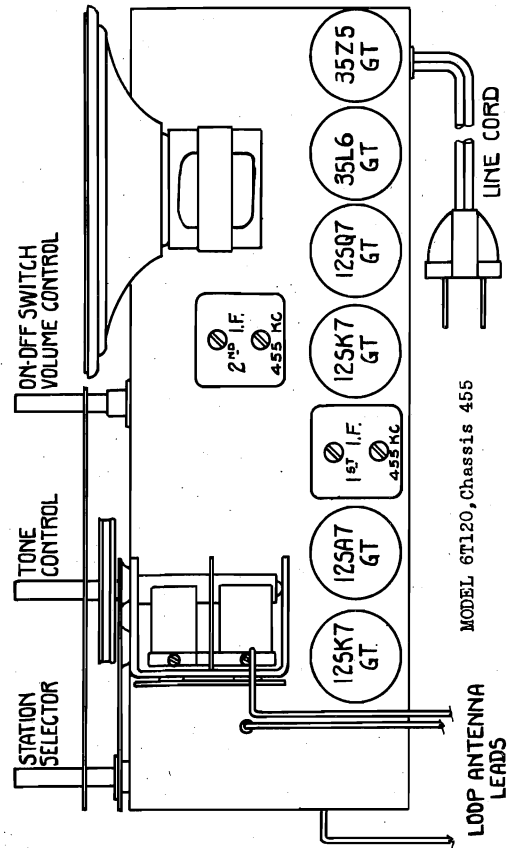
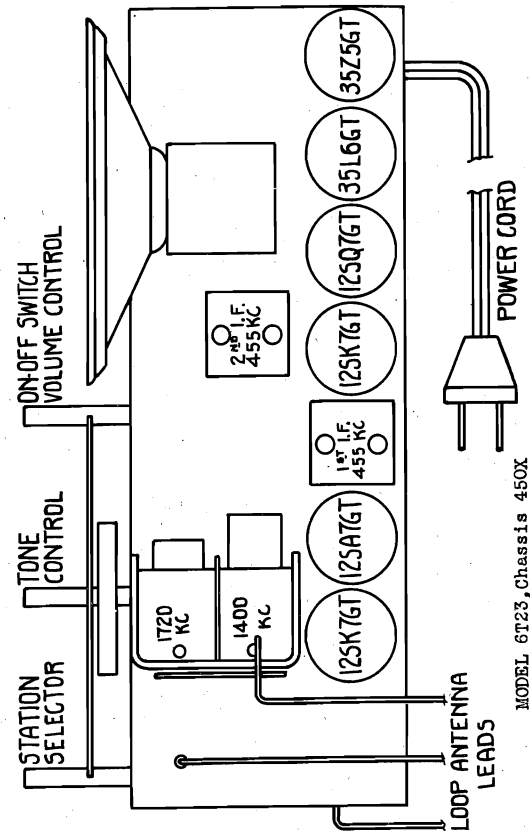
MODEL 7C75, Ch. 435

MAJESTIC RADIO & TELEV. CORP.



MAJESTIC RADIO & TELEV. CORP.

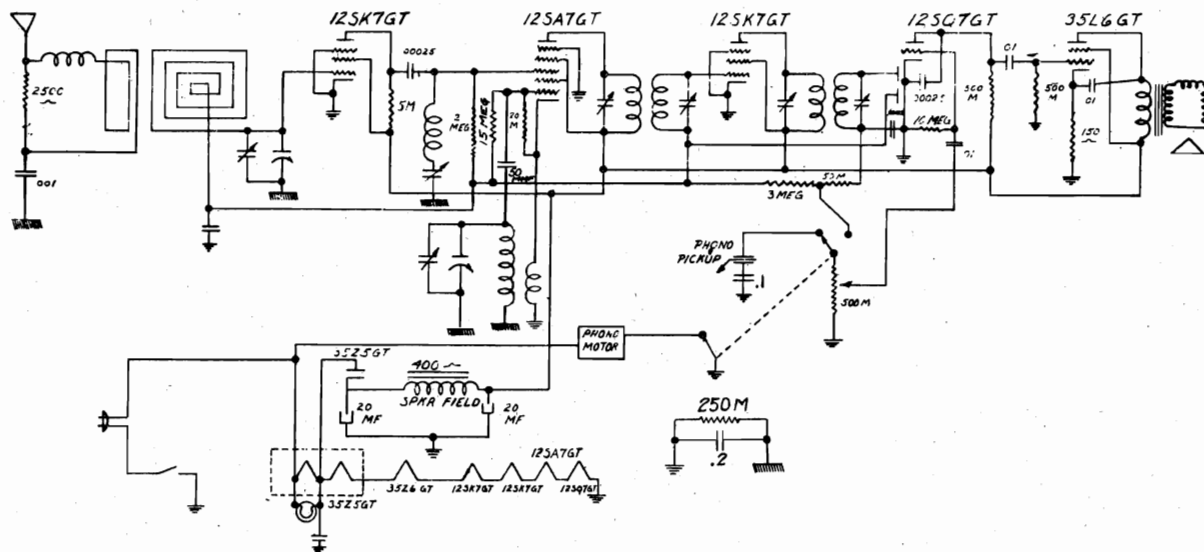
MODEL 6P1, Ch. 437
MODEL 6T23, Ch. 450X
MODEL 6T120, Ch. 455
MODEL 7C75, Ch. 435



MODEL 6C137, Ch. 456

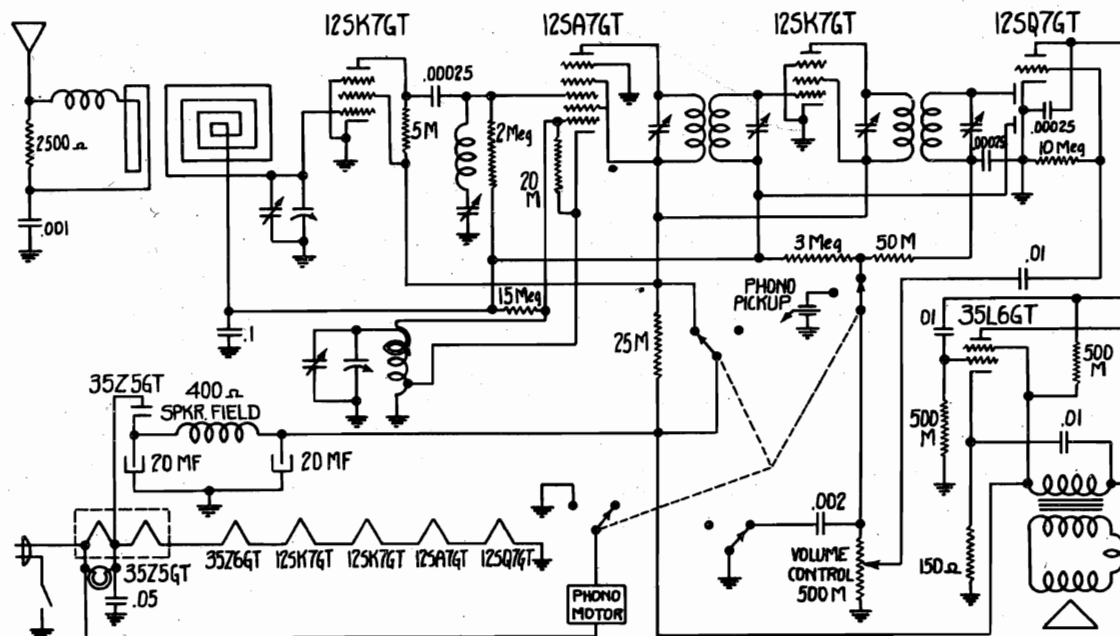
MODEL 6CU35, Ch. 440

MAJESTIC RADIO & TELEV. CORP.



MODEL 6CU35 CHASSIS 440

Chassis 440

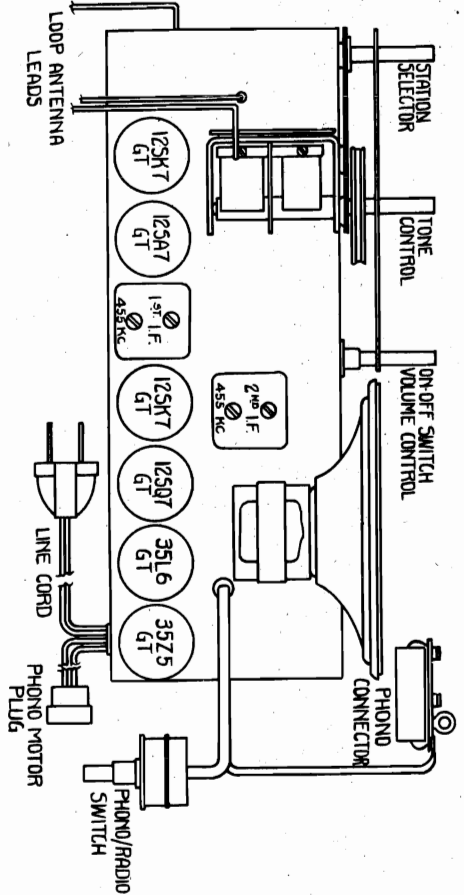


MODEL 6C137
CHASSIS 456

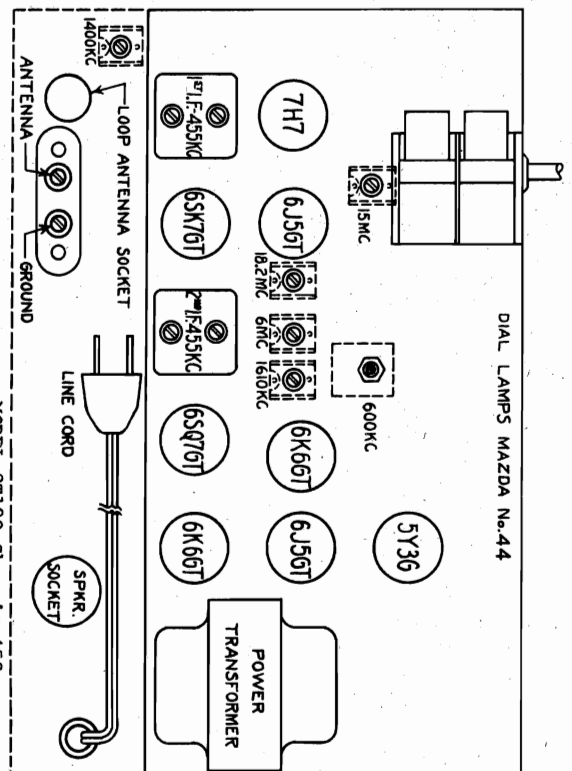
Chassis 456

MAJESTIC RADIO & TELEV. CORP.

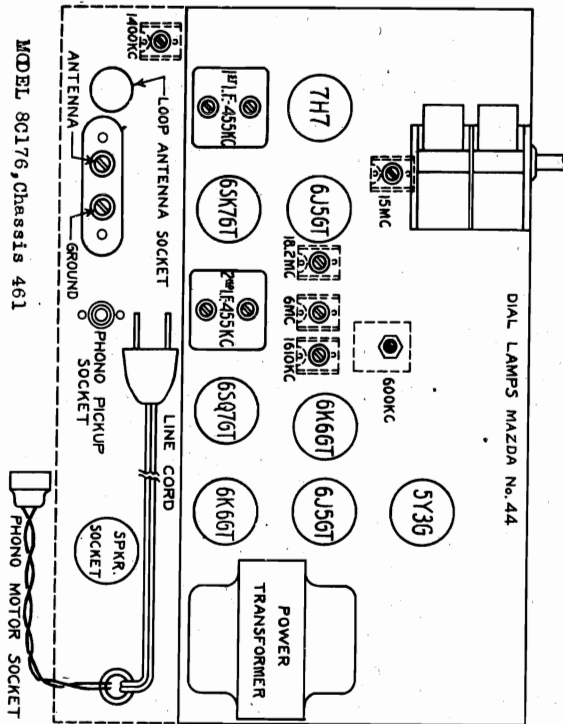
MODEL 6C137, Ch. 456
 MODEL 8C176, Ch. 461
 MODEL 8T129, Ch. 459;
 8K161, Ch. 460



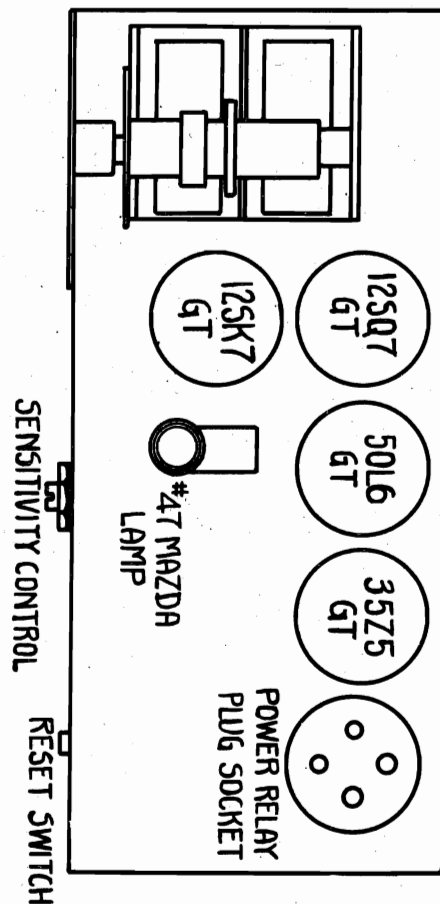
MODEL 6C137, Chassis 456



MODEL 8T129, Chassis 459
 8K161, Chassis 460



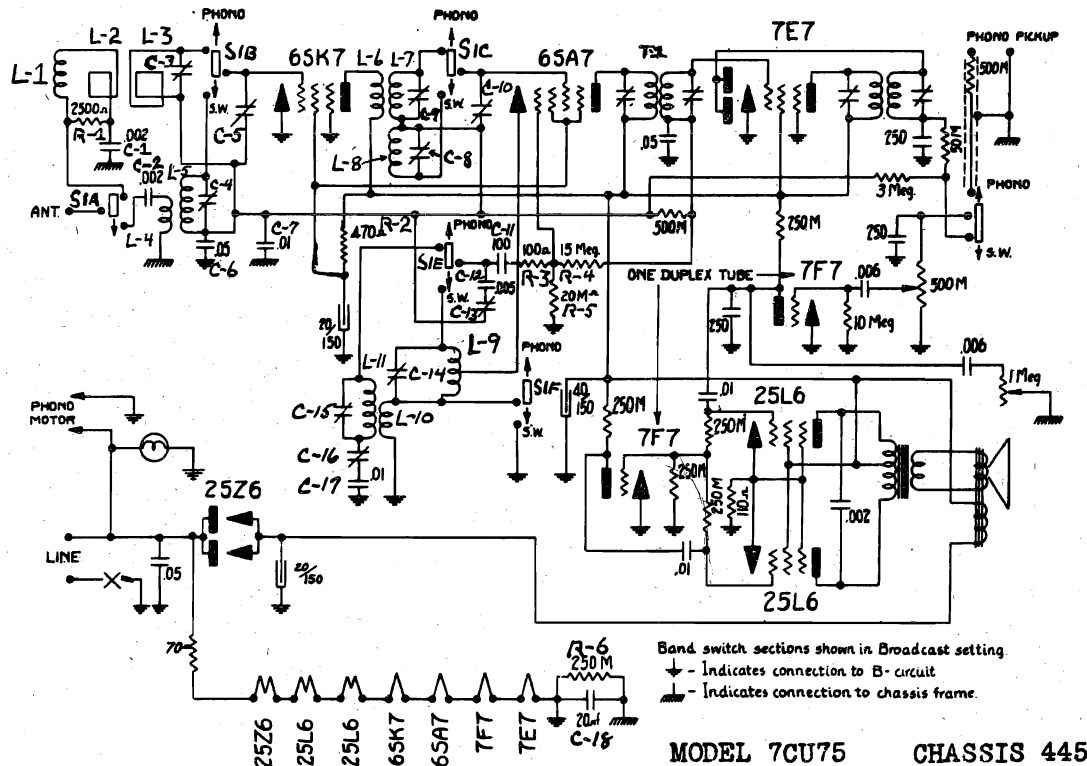
MODEL 8C176, Chassis 461



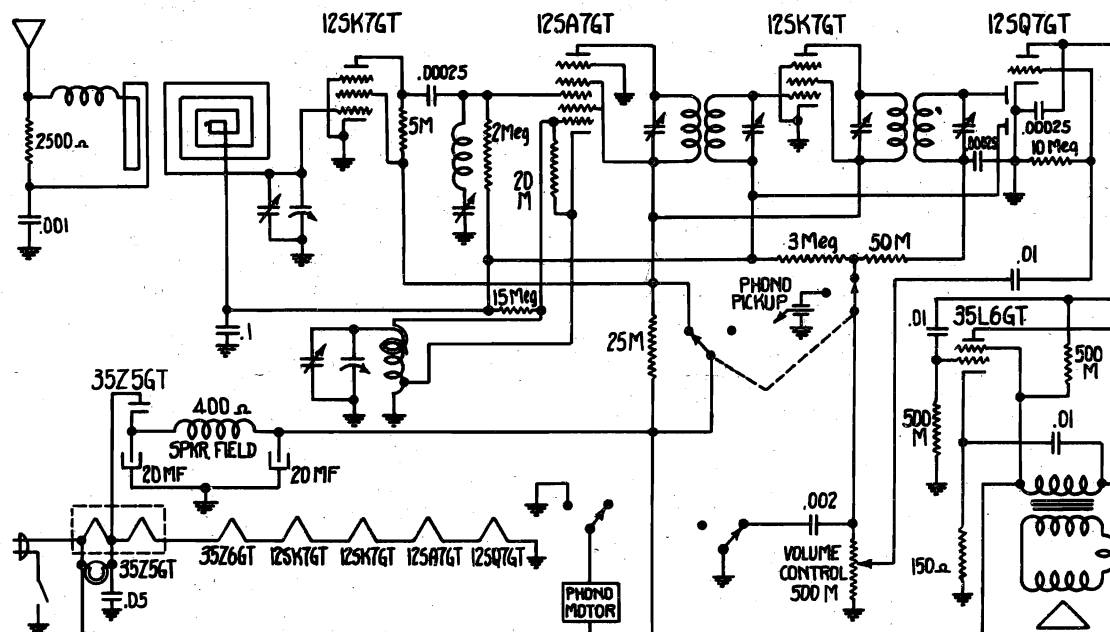
MODEL 6C141, Ch. 457

MODEL 7CU75, Ch. 445

MAJESTIC RADIO & TELEV. CORP.

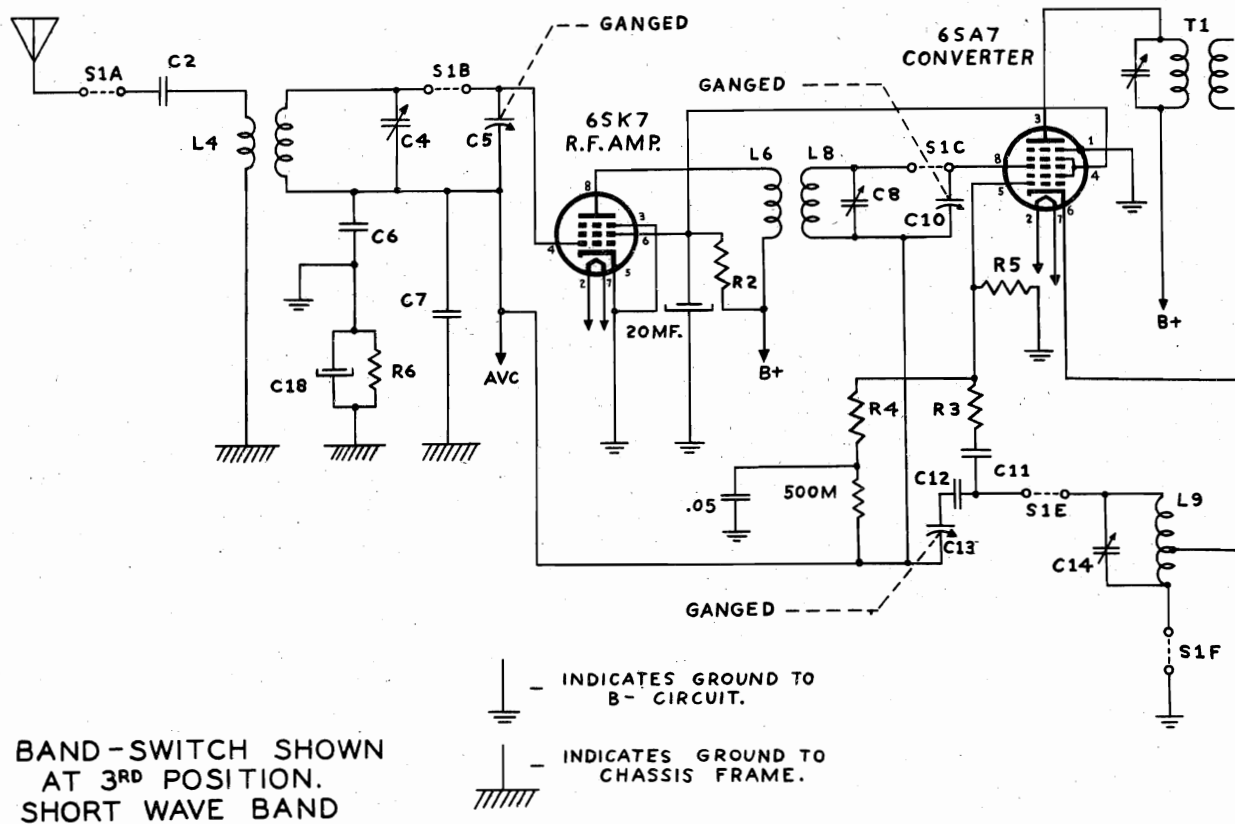
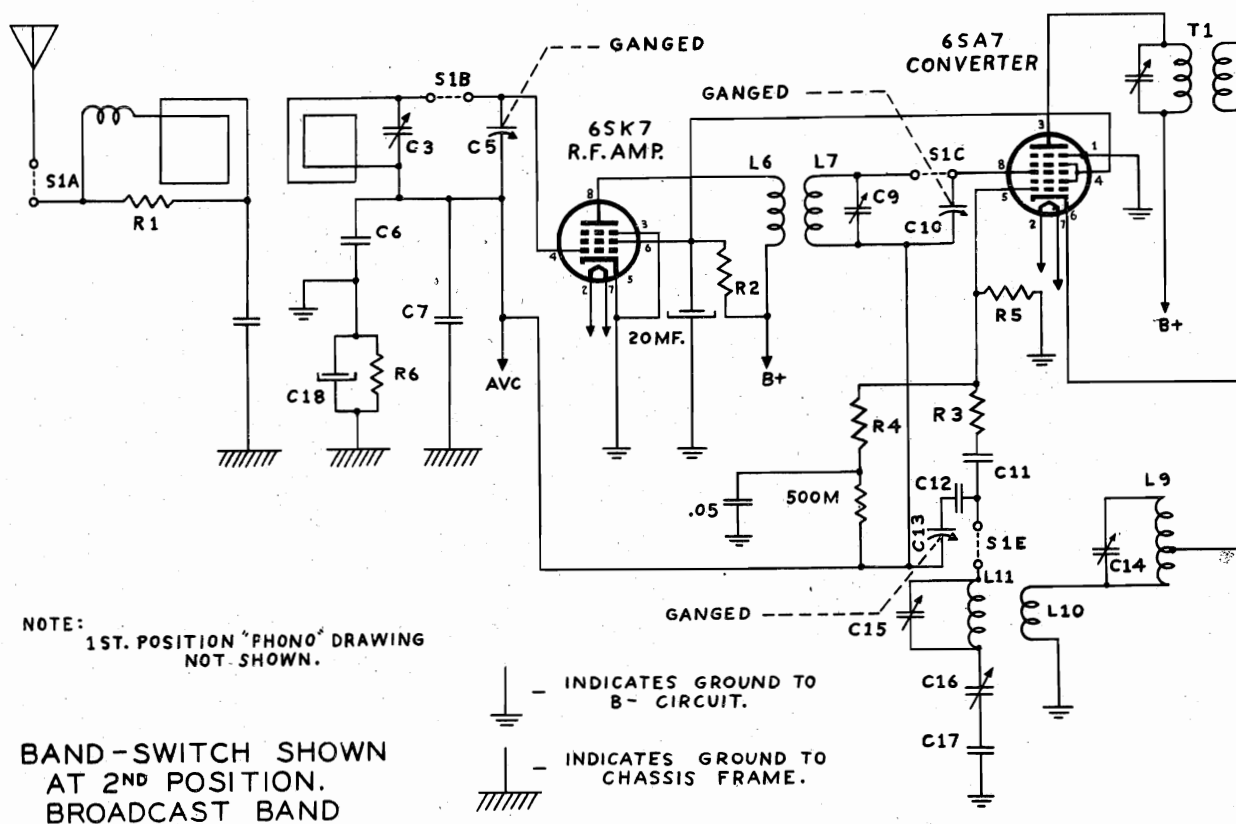


Chassis 445



Chassis 457

MAJESTIC RADIO & TELEV. CORP.



MAJESTIC RADIO & TELEV. CORP.



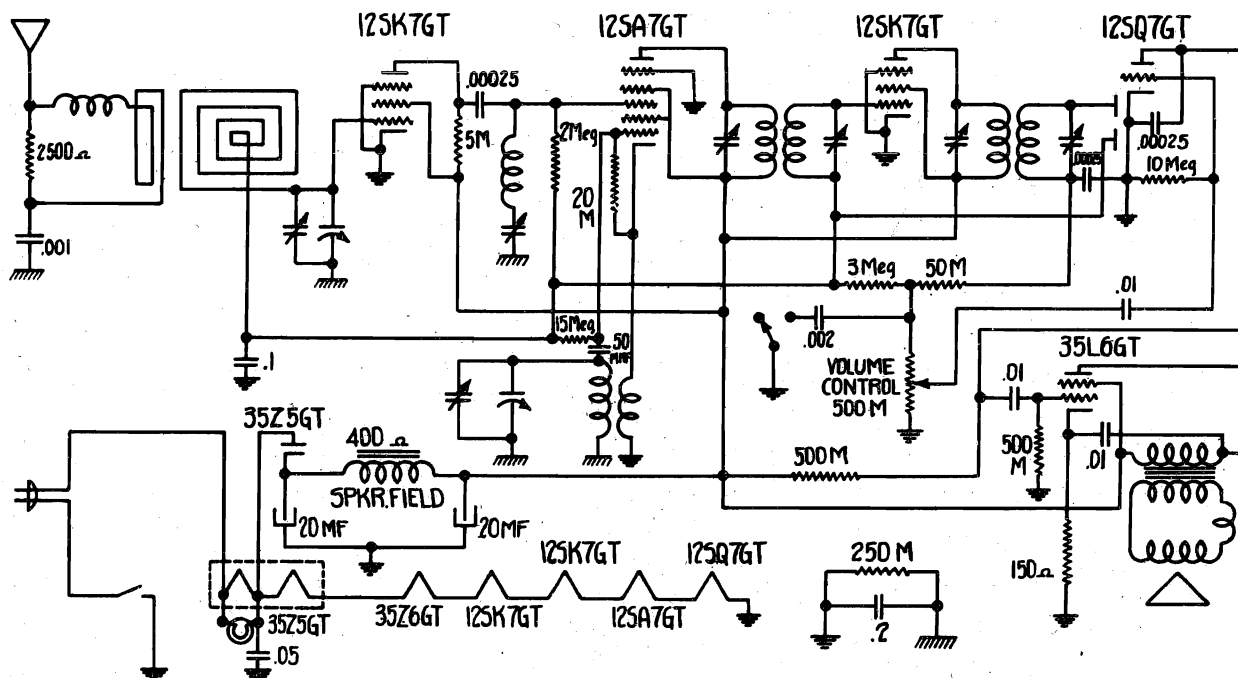
Chassis 450X



Chassis 455

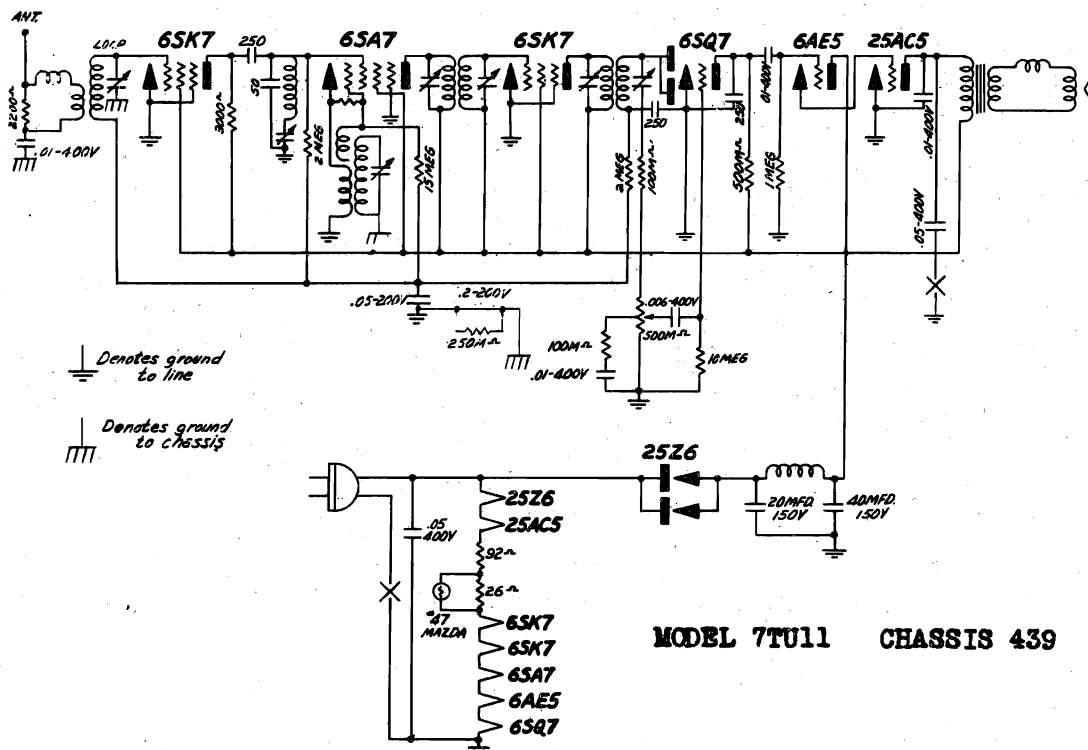
MODEL 6TU120, Ch. 462

MODEL 7TU11, Ch. 439 MAJESTIC RADIO & TELEV. CORP.



MODEL 6TU120 CHASSIS 462

Chassis 462



MODEL 7TU11 CHASSIS 439

Chassis 439

MODEL 7K60, Ch. 434
MODEL 410, Ch. 410

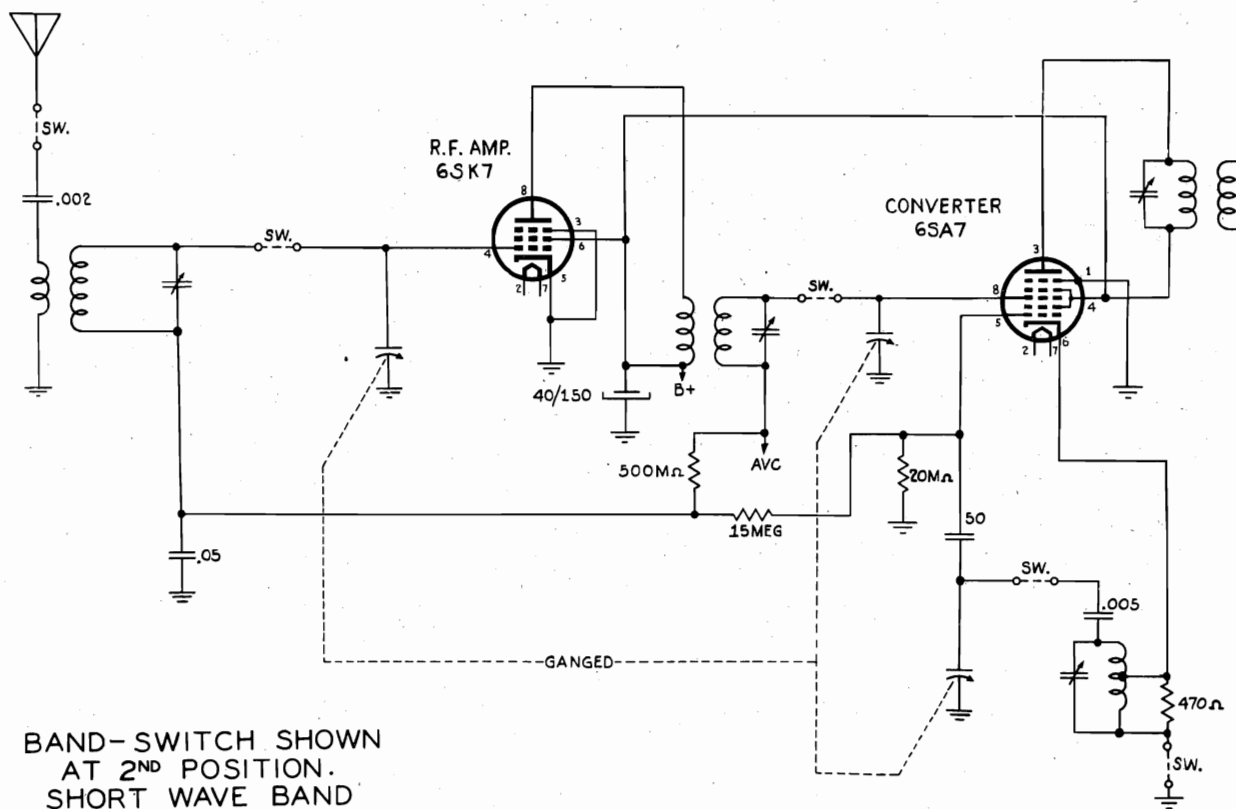
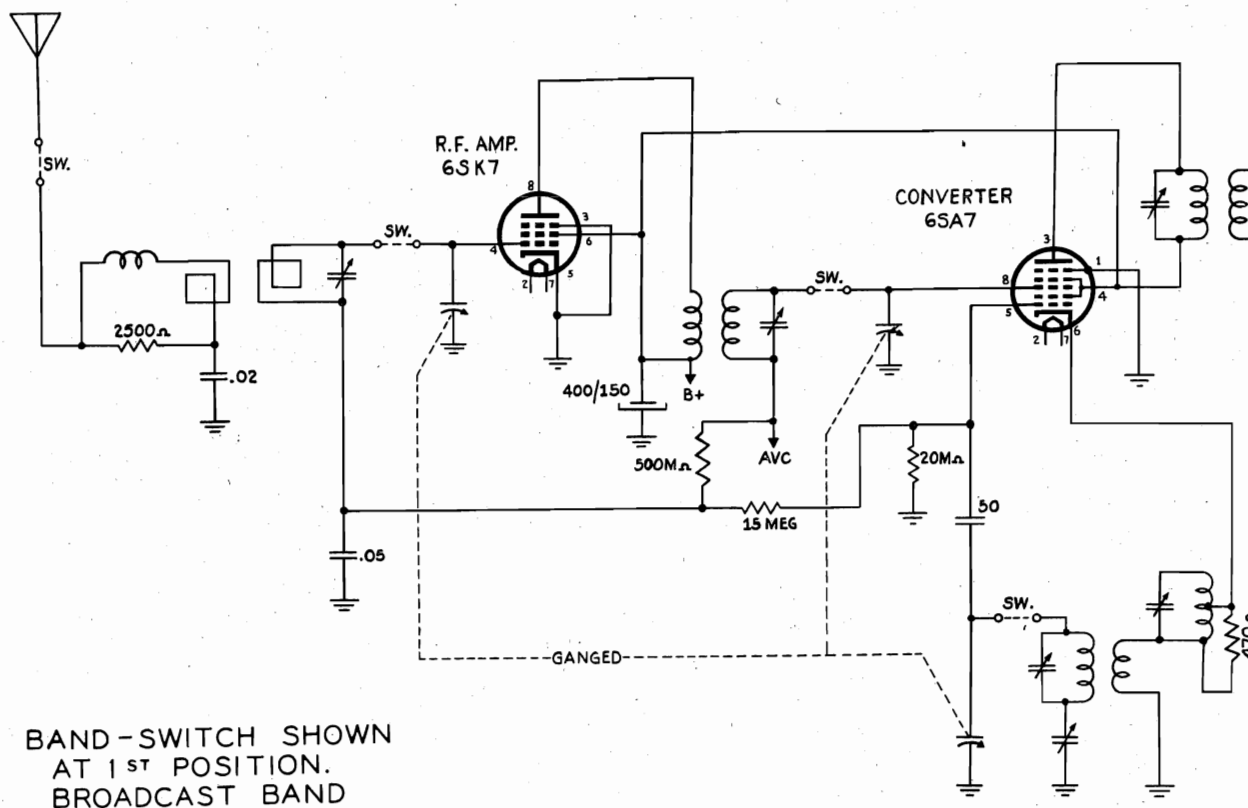
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Band Switch shown in Broadcast - High Tone Setting.

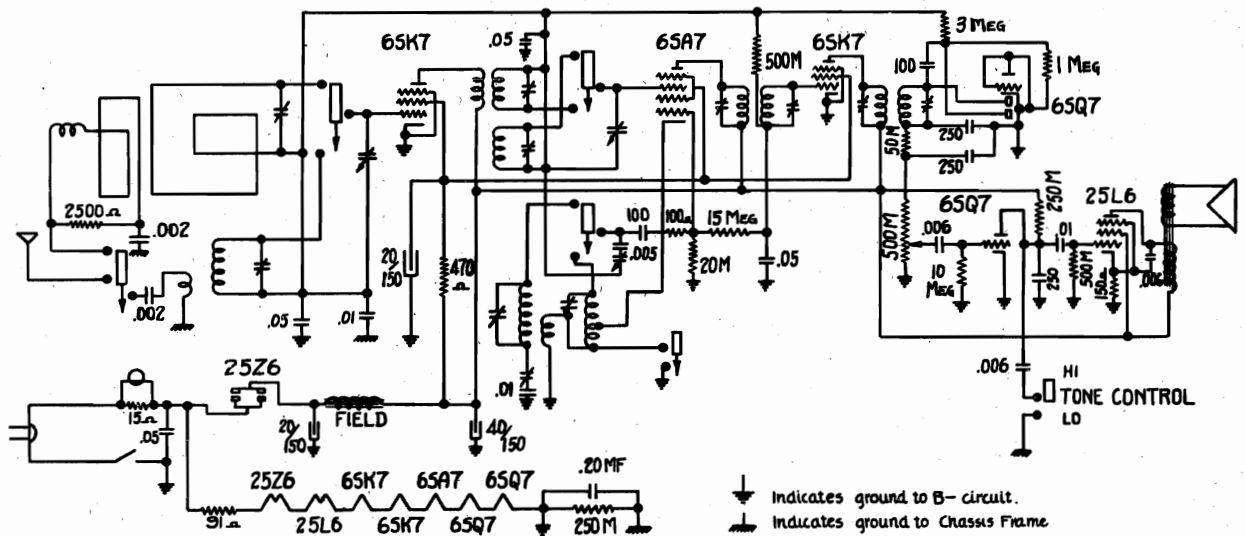
CHASSIS 434

MODEL 7K60, Ch. 434

MAJESTIC RADIO & TELEV. CORP.

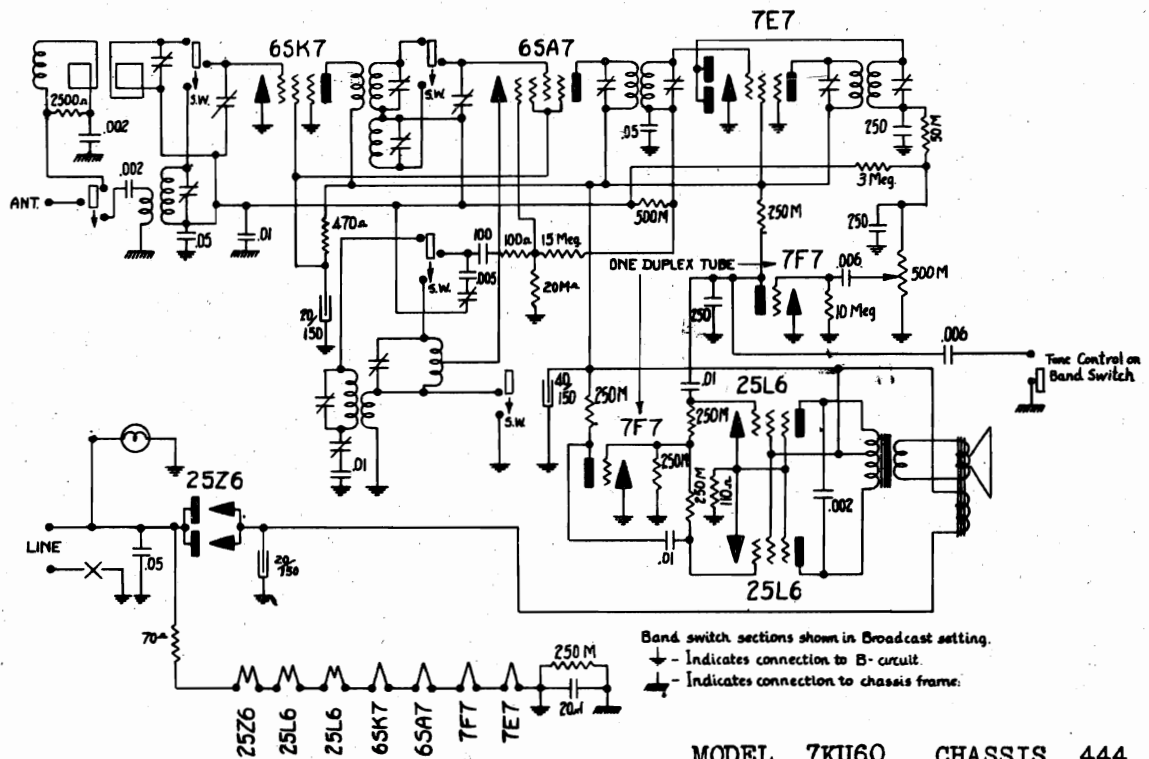


MAJESTIC RADIO & TELEV. CORP.

MODEL 7KU60, Ch. 444
MODEL 7TU20, Ch. 442

MODEL 7TU20 CHASSIS 442

Chassis 442

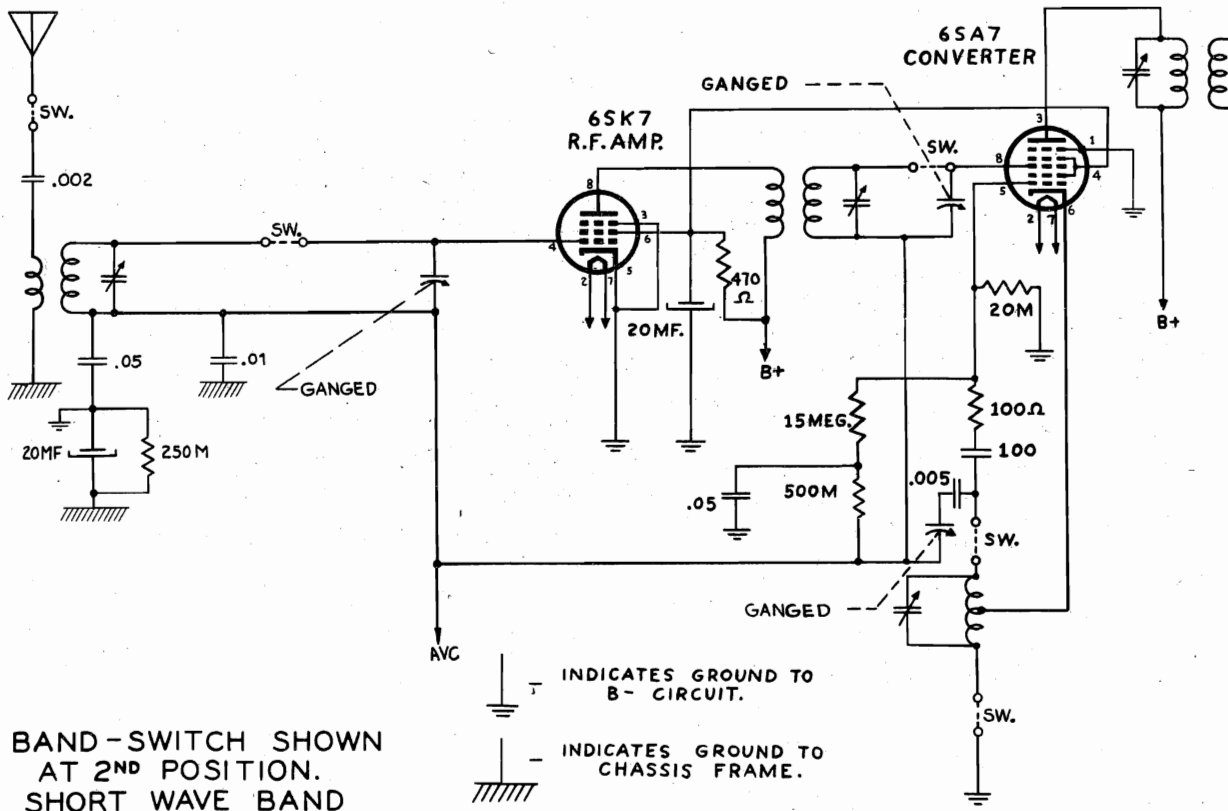
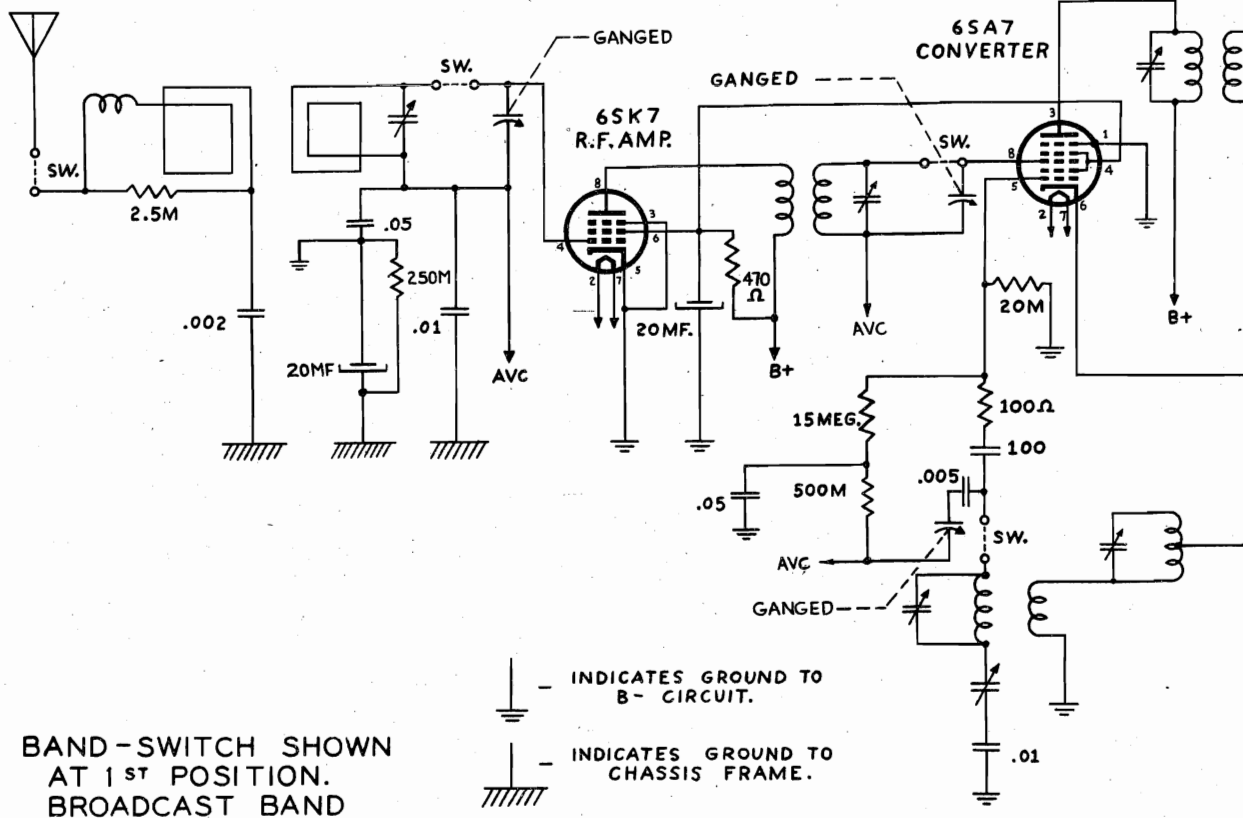


MODEL 7KU60 CHASSIS 444

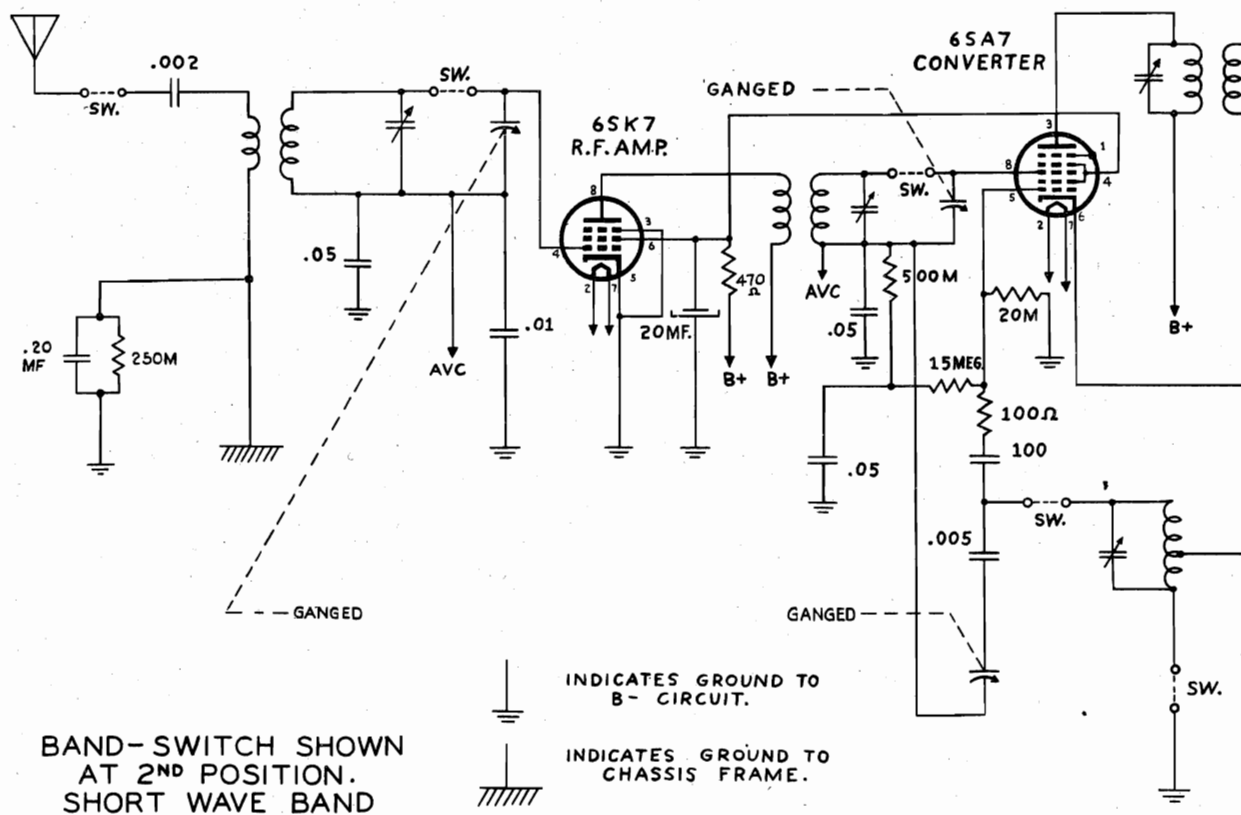
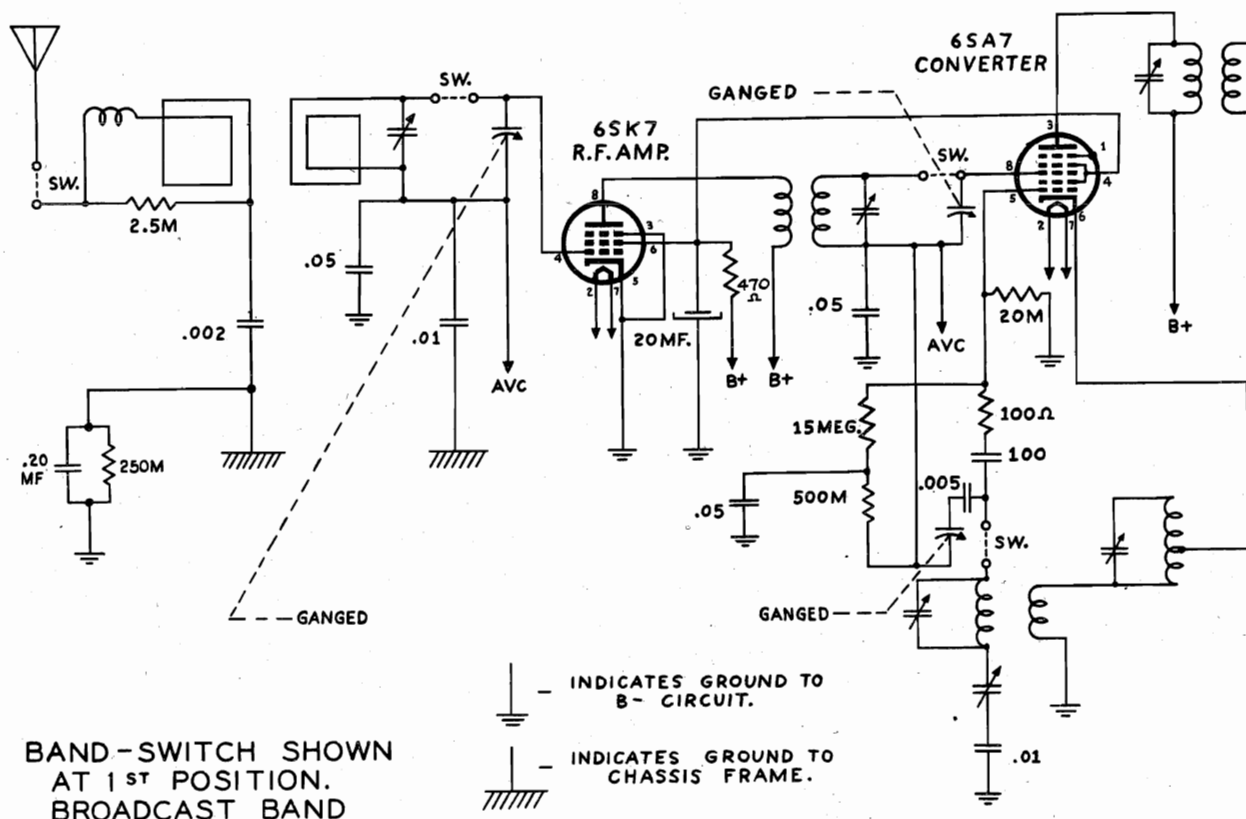
Chassis 444

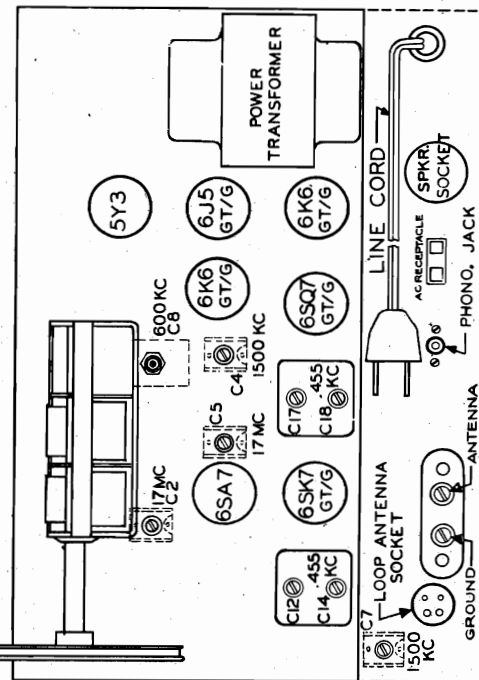
MODEL 7KU60, Ch. 444

MAJESTIC RADIO & TELEV. CORP.



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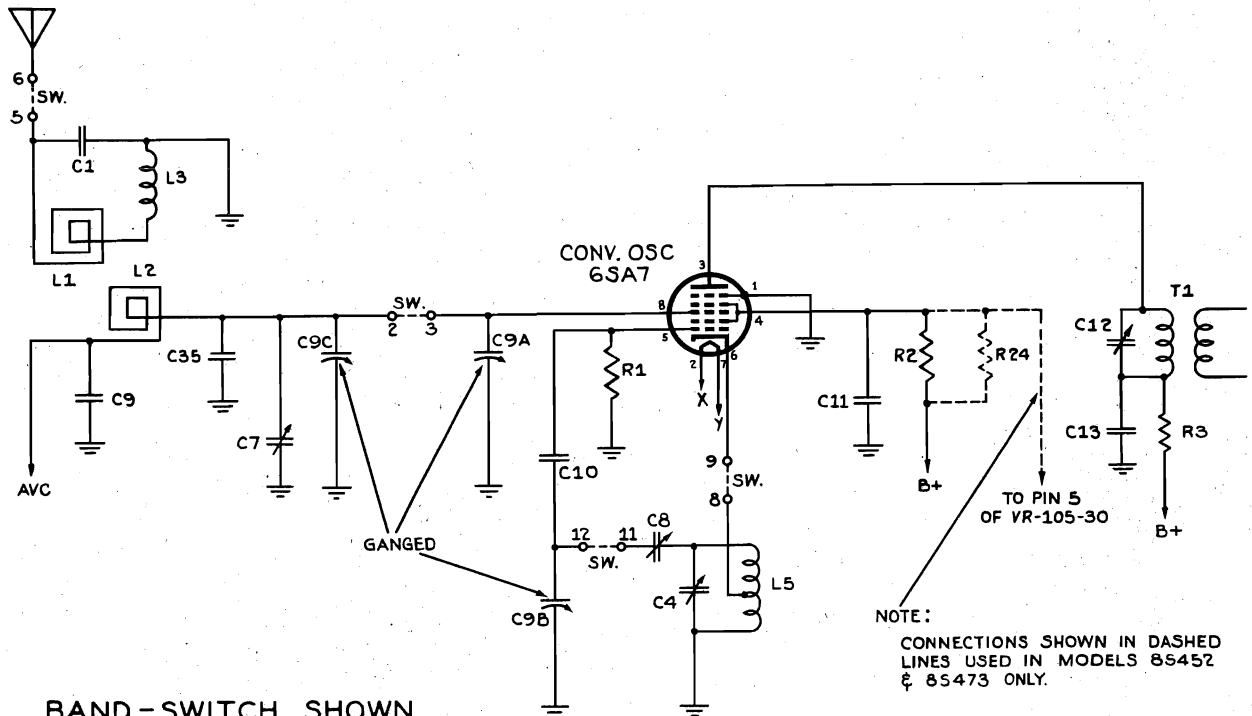


VOLTAGE TABLE

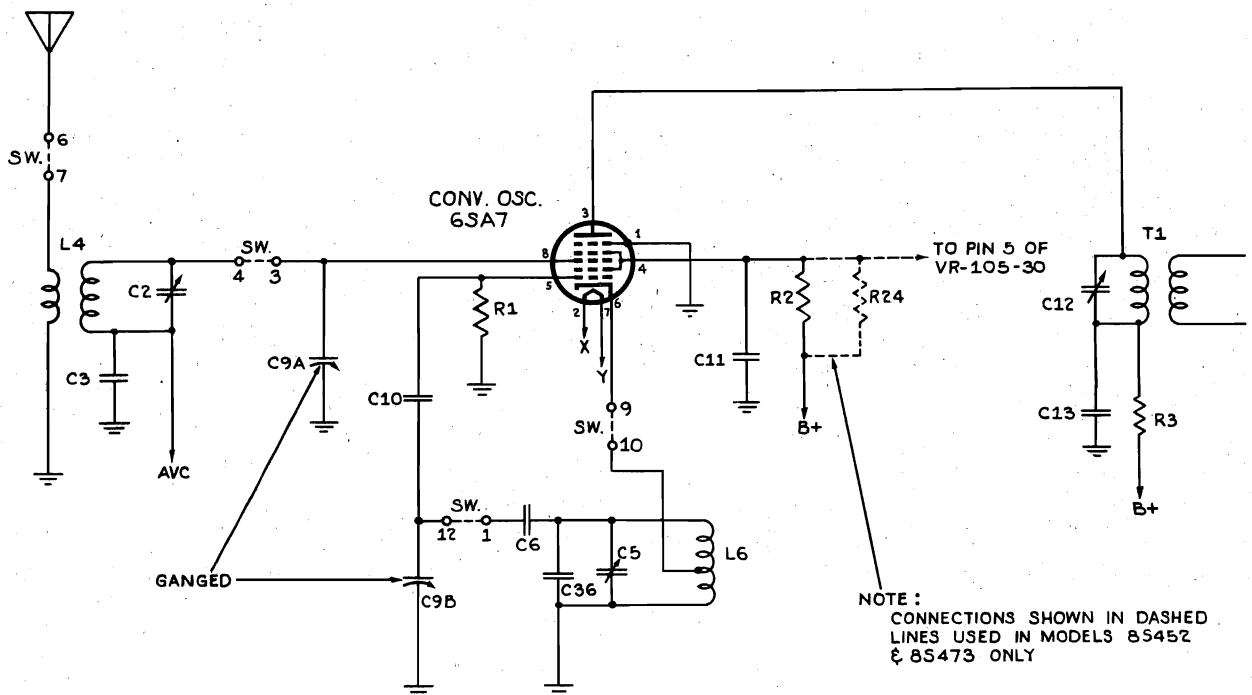
Tube	Plate	Screen	Grid
6SA7 (Conv)	240-265	85-98	0
6SK7 (I.F.)	282-296	106-122	2.1 - 2.5
6SQ7 (A.F.)	72-84	-	0
6J5 (Ph. Inv.)	208-220	-	6.0 - 7.5
6K6 (Out)	270-280	280-285	22.5 - 24

NOTE: All voltages measured to ground with 1,000 ohm per volt meter.

MAJESTIC RADIO & TELEV. CORP.

MODELS 7S433, 7S450,
7S470


BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
SHORT WAVE BAND

MODELS 7S433, 7S450,

7S470

MODELS, 8S452, 8S473

MAJESTIC RADIO & TELEV. CORP.

ALIGNMENT

Before aligning, close tuning condenser (plates fully meshed). Set pointer to center of extreme left hand mark on the dial.

When aligning broadcast band, connect to output of the signal generator a loop, about 12 inches in diameter, consisting of two or three turns of wire. Place this loop in a plane parallel to that of the receiver loop antenna and about a foot away from it. The receiver loop antenna should be in about the same position relative to the chassis as it is when installed in the cabinet.

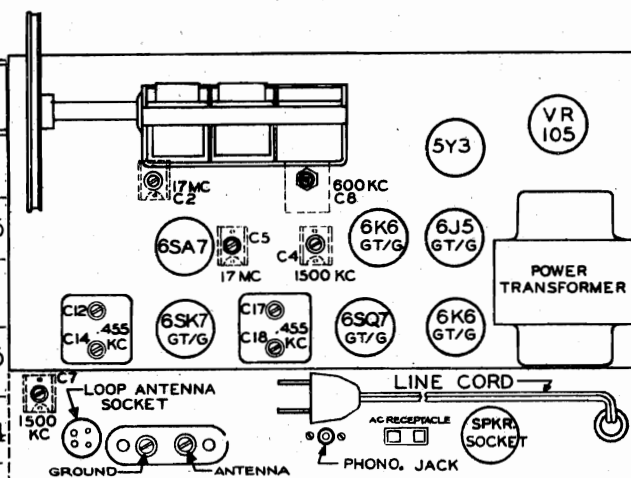
While aligning, turn the volume control full on and keep the signal generator output as low as possible.

Step	Dummy Antenna	Test Oscillator Connection	Test Oscillator Frequency	Receiver Bandswitch	Receiver Dial	Adjust for Maximum	Notes
1	.01 mfd	6SA7 grid	455 kc	B.C.	Any quiet spot	C18, C17 C14, C12	
2	Loop	-	1500 kc	B.C.	150	C4, C7	
3	Loop	-	600 kc	B.C.	60	C8	Note #1
4	400 ohms	Receiver antenna post	17 mc	S.W.	17	C2, C5	

Note #1 - Rock gang while making this adjustment. Then recheck step 2.

VOLTAGE TABLE

Tube	Plate	Screen	Grid
6SA7 (Conv)	240-265	105	0
6SK7 (I.F.)	282-296	106-122	2.1 - 2.5
6SQ7 (A.F.)	72-84	-	0
6J5 (Ph. Inv.)	208-220	-	6.0 - 7.5
6K6 (Out)	270-280	280-285	22.5 - 24
VR-105	105	-	-



TUBE LAYOUT

NOTE: All voltages measured to ground with 1,000 ohm per volt meter.

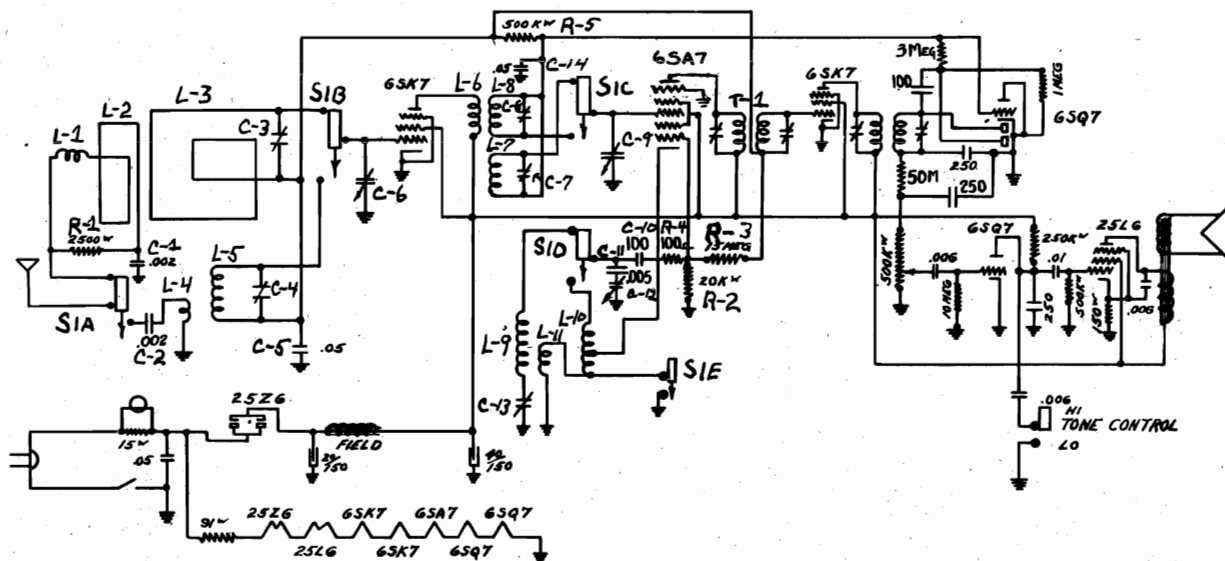
MAJESTIC RADIO & TELEV. CORP.

MODELS 78433, 78450,
78470
MODELS 88452, 88473

Item	Description	Part #	T1 T2 T3 T4	1st I-F transformer 2nd I-F transformer Power transformer Output transformer Bandswitch Phono-radio switch Phono-motor receptacle Pilot light, Mazda #44 Dial pointer Dial cord spring Dial cord Knob, phono-radio Knob, off-volume Knob, B.C. - S.W. Knob, bass-treble Knob, tuning Knob, plain Cabinets: 7S433 7S450 7S470 Speaker, 8" electrodynamic Escutcheon, 7S433 Glass escutcheon, 7S450, 7S470 Metal escutcheon, 7S470 Dial scale, 7S433 Dial scale, 7S450, 7S470 Escutcheon clamp, 7S450, 7S470 Loop antenna assembly, 7S433 Loop antenna assembly, 7S450, 7S470 Pilot light socket Speaker plug	3-165 3-166 2-12 22-8-2 11-46 11-45 15-98 26-7 135-6 129-32 S-1152 128-45 128-46 128-47 128-48 128-49 128-32 115-8 115-12 115-15 22-8-1 112-23 122-18 122-29 117-60 117-51 112-283 S-1192 20-20 15-84 22-8-5
C1	50 mmfd \pm 20% 500 v mica	6-125		1st I-F transformer	3-165
C2, C4	Trimmer, 2.5 - 3C mmfd	8-35		2nd I-F transformer	3-166
C3, C15	.1 mfd \pm 40% - 10% 200 v paper	5-39		Power transformer	2-12
C5	Trimmer, 1.5 - 15 mmfd	8-36		Output transformer	22-8-2
C6	6900 mmfd \pm 10% 500 v mica	6-177		Bandswitch	11-46
C7	Trimmer, 1.5 - 15 mmfd	8-36		Phono-radio switch	11-45
C8	Padder, 330 - 960 mmfd	8-33		Phono-motor receptacle	15-98
C9a, C9b, C9c	Tuning Condenser	7-18		Pilot light, Mazda #44	26-7
C10	47 mmfd \pm 20% 500 v ceramic	6-159		Dial pointer	135-6
C11, C19, C24, C28				Dial cord spring	129-32
C29	.01 mfd \pm 20% - 10% 400 v paper	6-132		Dial cord	S-1152
C12, C14, C17, C18	Dual trimmer	8-41		Knob, phono-radio	128-45
C13, C16	.05 mfd \pm 40% - 10% 400 v paper	6-130		Knob, off-volume	128-46
C20, C21	220 mmfd \pm 20% mica	6-151		Knob, B.C. - S.W.	128-47
C22, C25	.006 mfd \pm 20% 400 v paper	6-133		Knob, bass-treble	128-48
C23	.01 mfd \pm 40% - 10% 200 v paper	5-57		Knob, tuning	128-49
C26	.05 mfd \pm 40% - 10% 200 v paper	5-40		Knob, plain	128-32
C30, C31, C32	.001 mfd \pm 50% - 25% 400 v paper	6-129		Cabinets:	115-8
C33, C34	16-16 mfd 450 v electrolytic	19-16		7S433	115-12
R1	22,000 ohms 20% 1/3 watt	9-184		7S450	115-15
R2	22,000 ohms 10% 1 watt	9-186		7S470	22-8-1
R3	10,000 ohms 10% 1/2 watt	9-17		Speaker, 8" electrodynamic	112-23
R4	180 ohms 10% 1/2 watt	9-173		Escutcheon, 7S433	122-18
R5, R22	2.2 megohms 20% 1/3 watt	9-183		Glass escutcheon, 7S450, 7S470	122-29
R6	56,000 ohms 10% 1/2 watt	9-177		Metal escutcheon, 7S470	117-60
R7	47,000 ohms 10% 1/2 watt	9-226		Dial scale, 7S433	117-51
R8	47,000 ohms 10% 1/2 watt	9-227		Dial scale, 7S450, 7S470	112-283
R9	470,000 ohms 10% 1/2 watt	9-160		Escutcheon clamp, 7S450, 7S470	S-1192
R10, R14, R19, R20	10 megohms 20% 1/3 watt	9-4		Loop antenna assembly, 7S433	20-20
R11	470,000 ohms 10% 1/2 watt	9-225		Loop antenna assembly, 7S450, 7S470	15-84
R12	18,000 ohms 10% 1/2 watt	13-15		Pilot light socket	22-8-5
R13	Volume control, 2 megohm with SPST switch	14-4		Speaker plug	
R15	Tone control, 2 megohms	9-182			
R16	220,000 ohms 20% 1/3 watt	9-7			
R17	2200 ohms 10% 1/2 watt	9-95			
R18	18,000 ohms 10% 1/2 watt	9-180			
R21	22,000 ohms 10% 1/2 watt	9-185			
L4	390 ohms 10% 2 watt	3-120			
L5, L6	S.W. antenna coil	3-118			
	Oscillator coil				

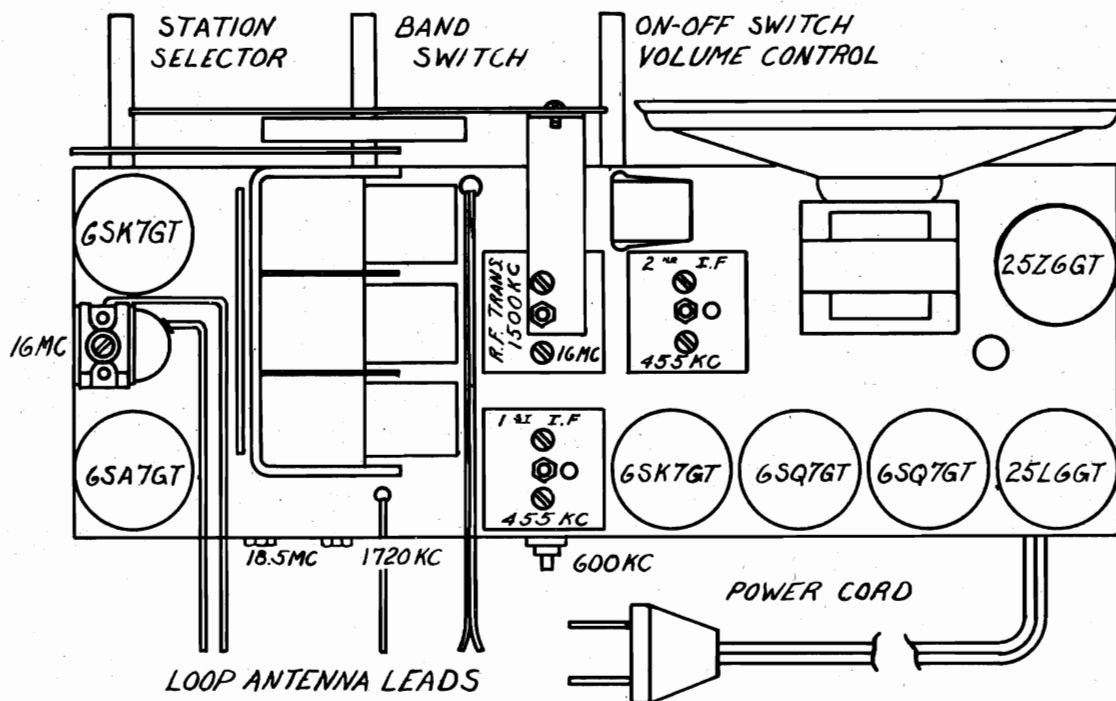
MODEL 7T20, Ch. 432

MAJESTIC RADIO & TELEV. CORP.



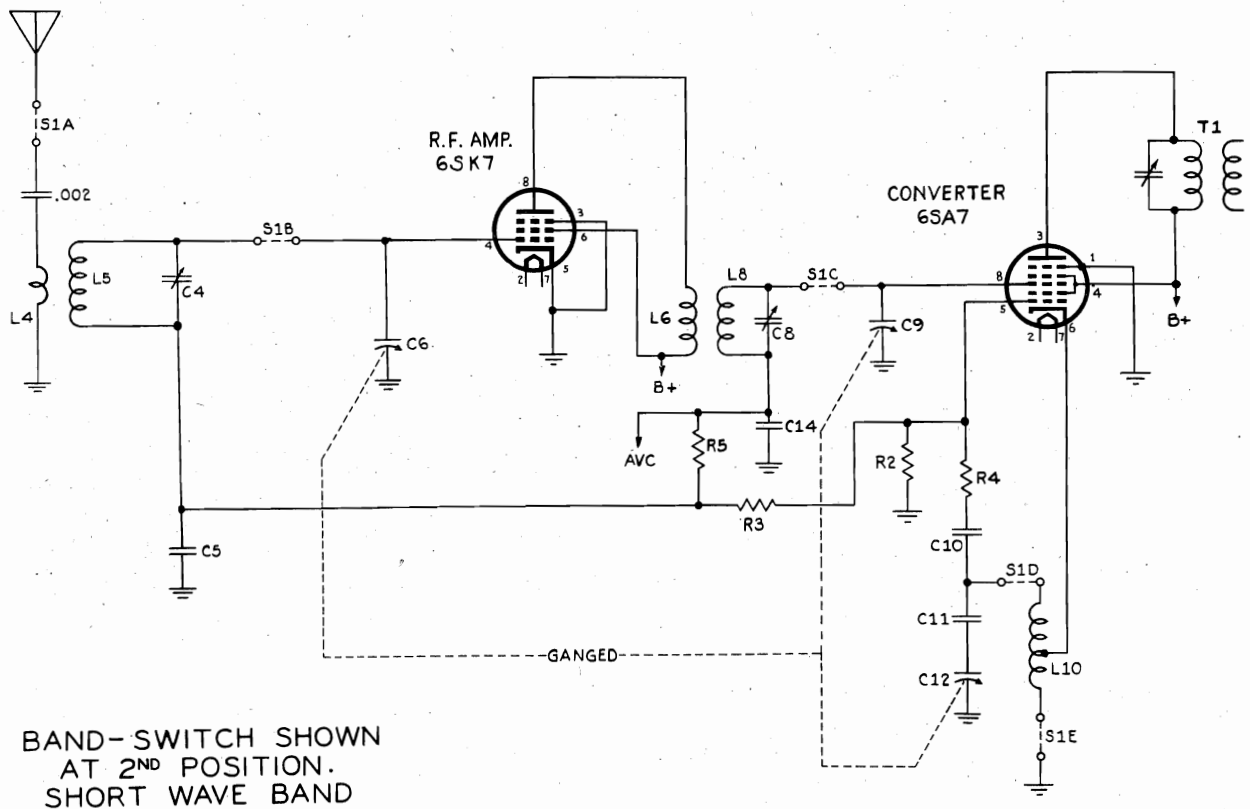
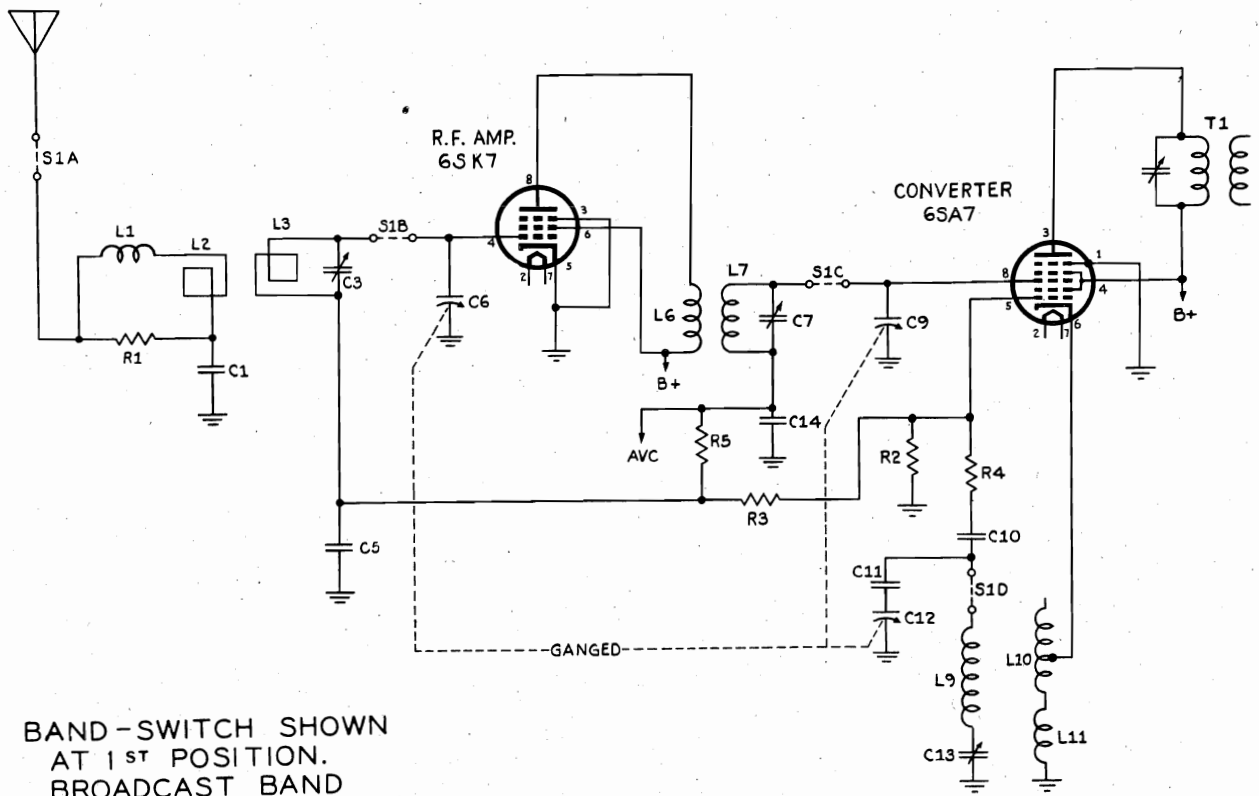
MODEL 7T20 CHASSIS 432

Chassis 432



Tube Layout

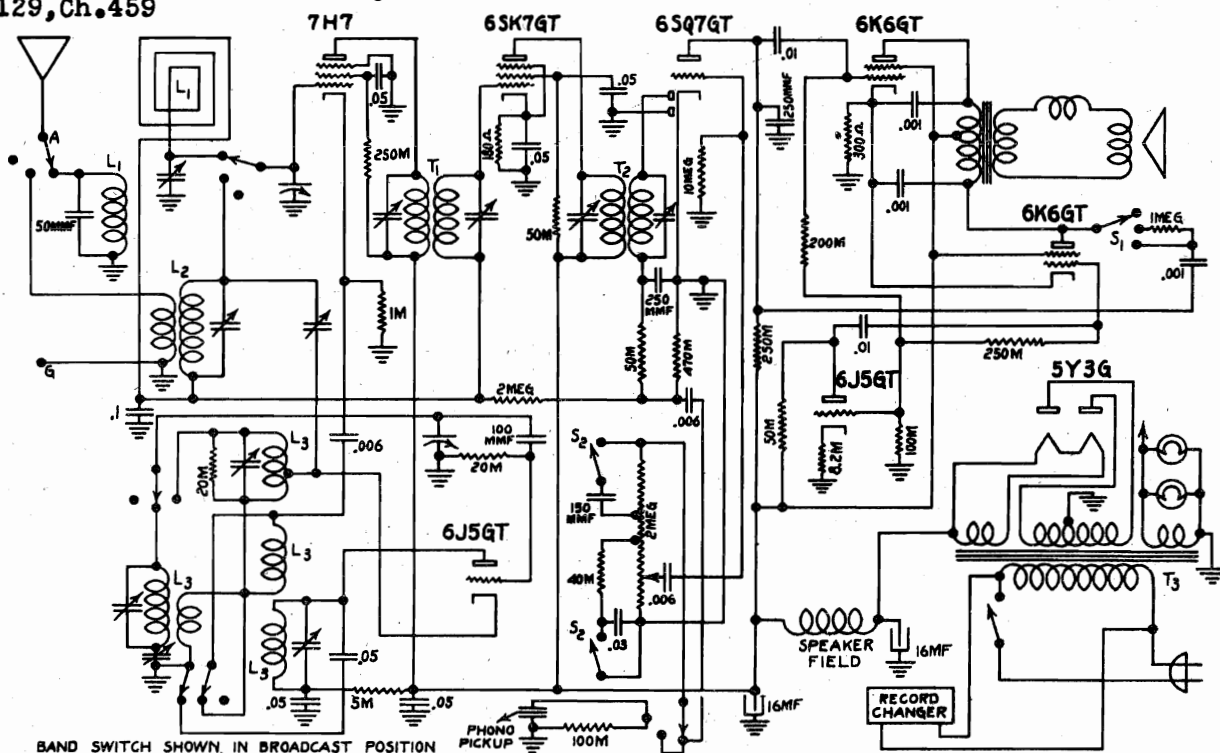
MAJESTIC RADIO & TELEV. CORP.



MODEL 8C176, Ch. 461

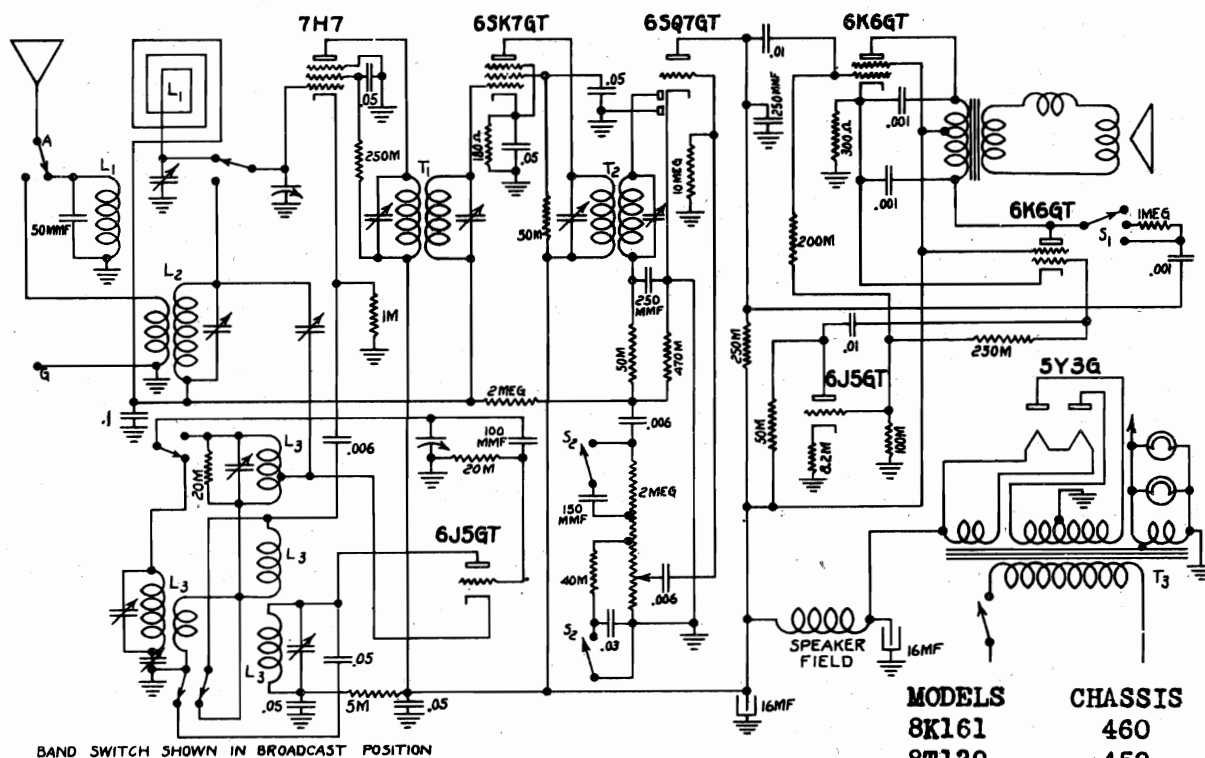
MODELS 8K161, Ch. 460; MAJESTIC RADIO & TELEV. CORP.

8T129.Ch.459



MODEL 8C176 CHASSIS 461

Chassis 461

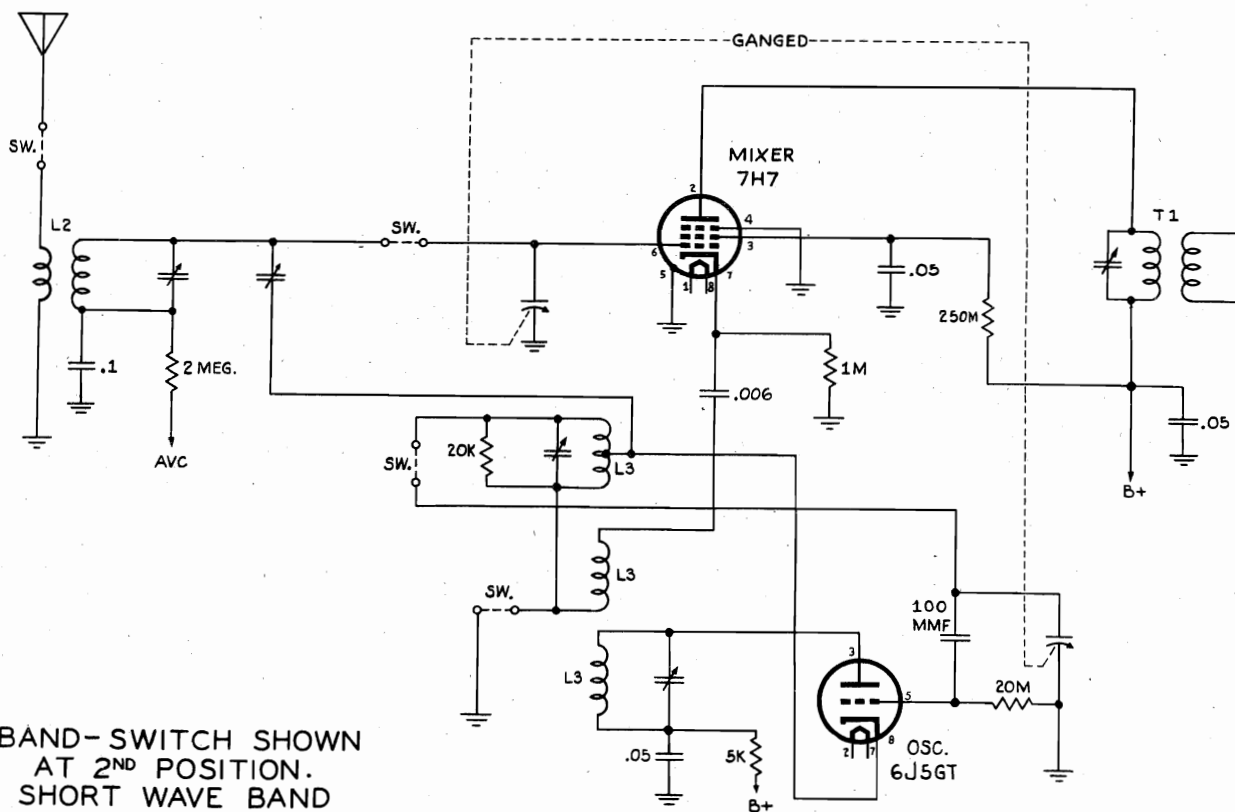
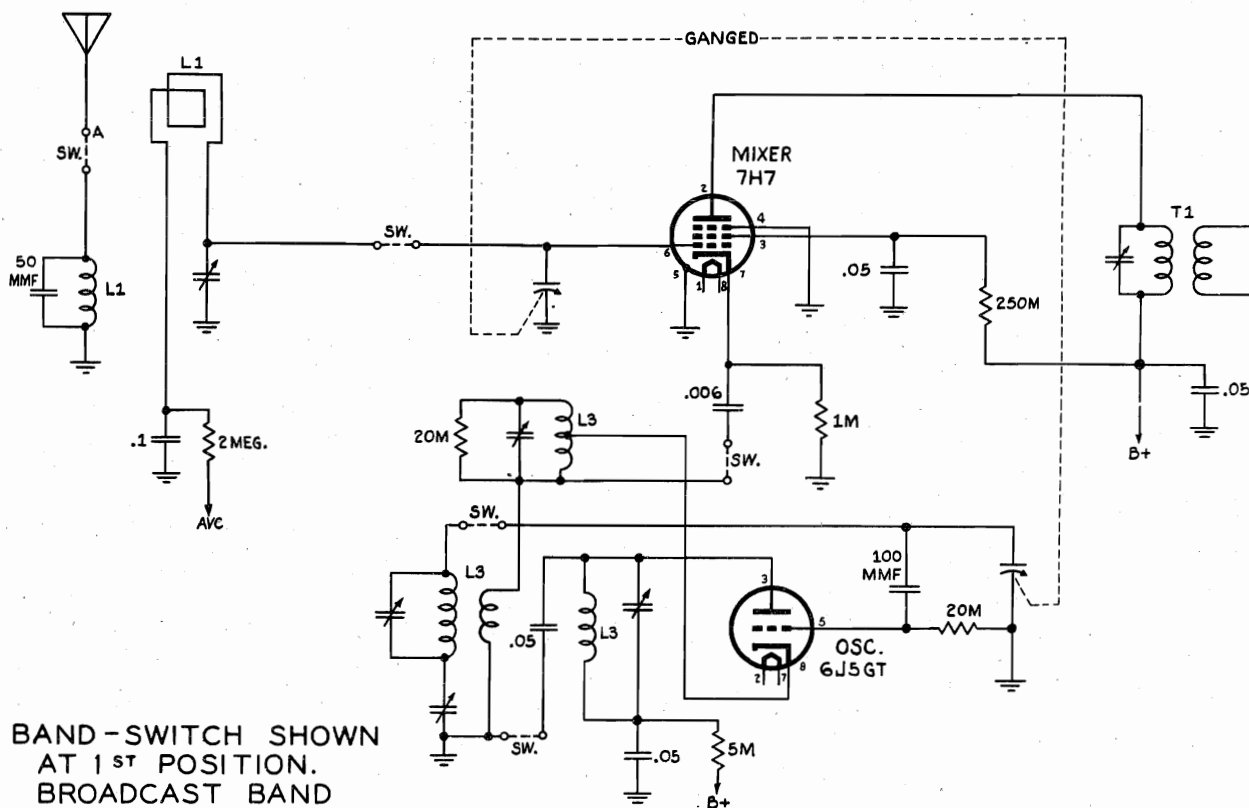


MODELS	CHASSIS
8K161	460
8T129	459

Chassis 459 - 460

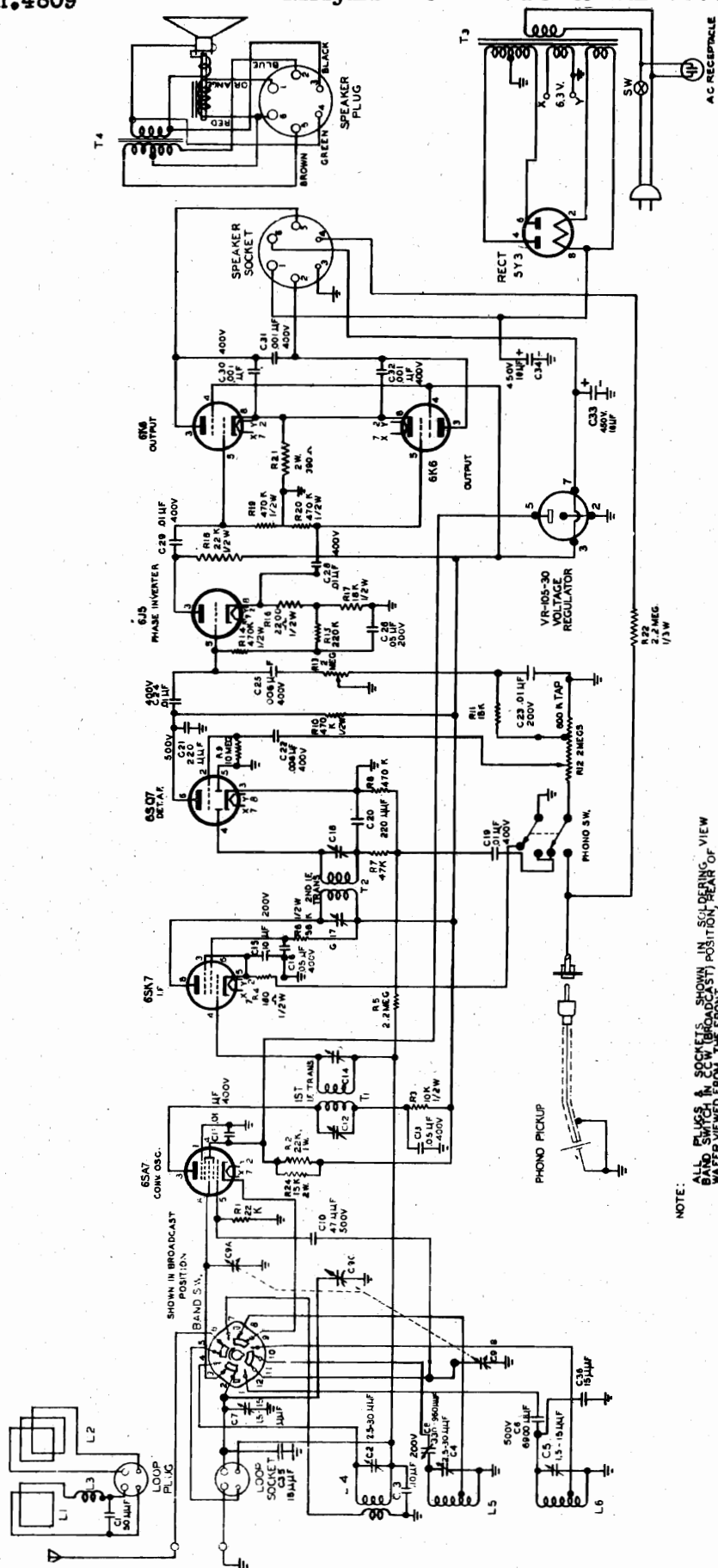
MAJESTIC RADIO & TELEV. CORP.

MODEL 8C176
MODELS 8K161, 8T129



MODELS 8S452, 8S473,
Ch. 4809

MAJESTIC RADIO & TELEV. CORP.



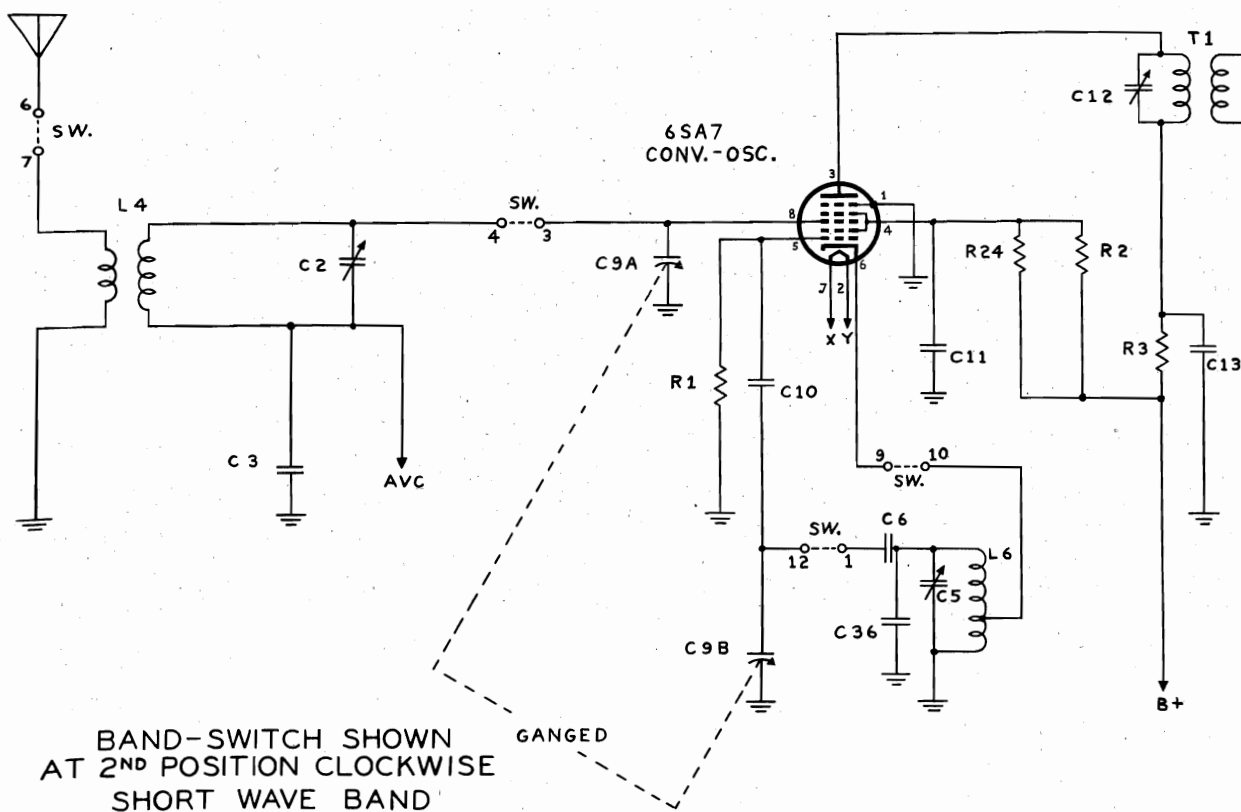
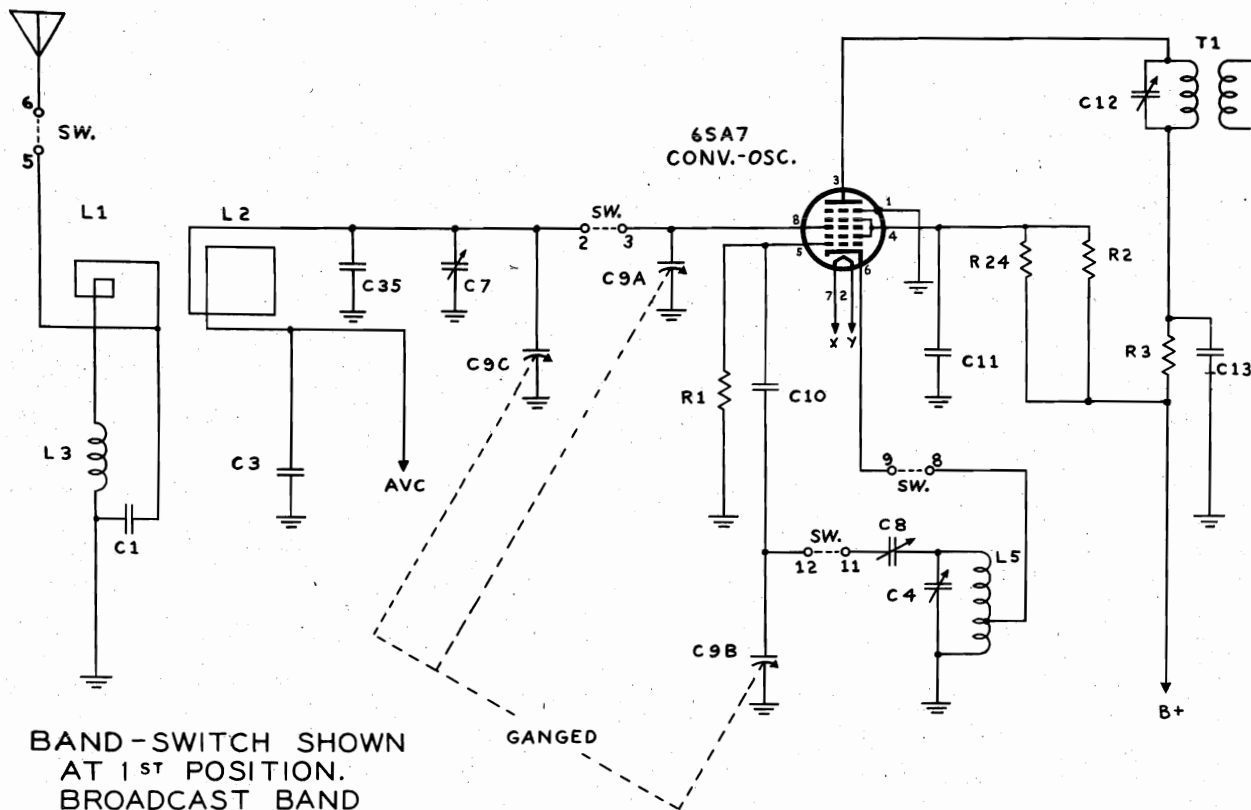
NOTE:
ALL PLUGS & SOCKETS SHOWN IN NORMAL POSITION
REAR VIEW OF CHASSIS SHOWN FROM THE FRONT

SCHEMATIC DIAGRAM - CHASSIS 4809

Parts for Model 8S452 correspond to Model 7S450 and Model 8S473 to Model 7S470. R24, 15,000 ohms, 2 watts (Part number 9-299) has been added in addition to the VR-105 tube.

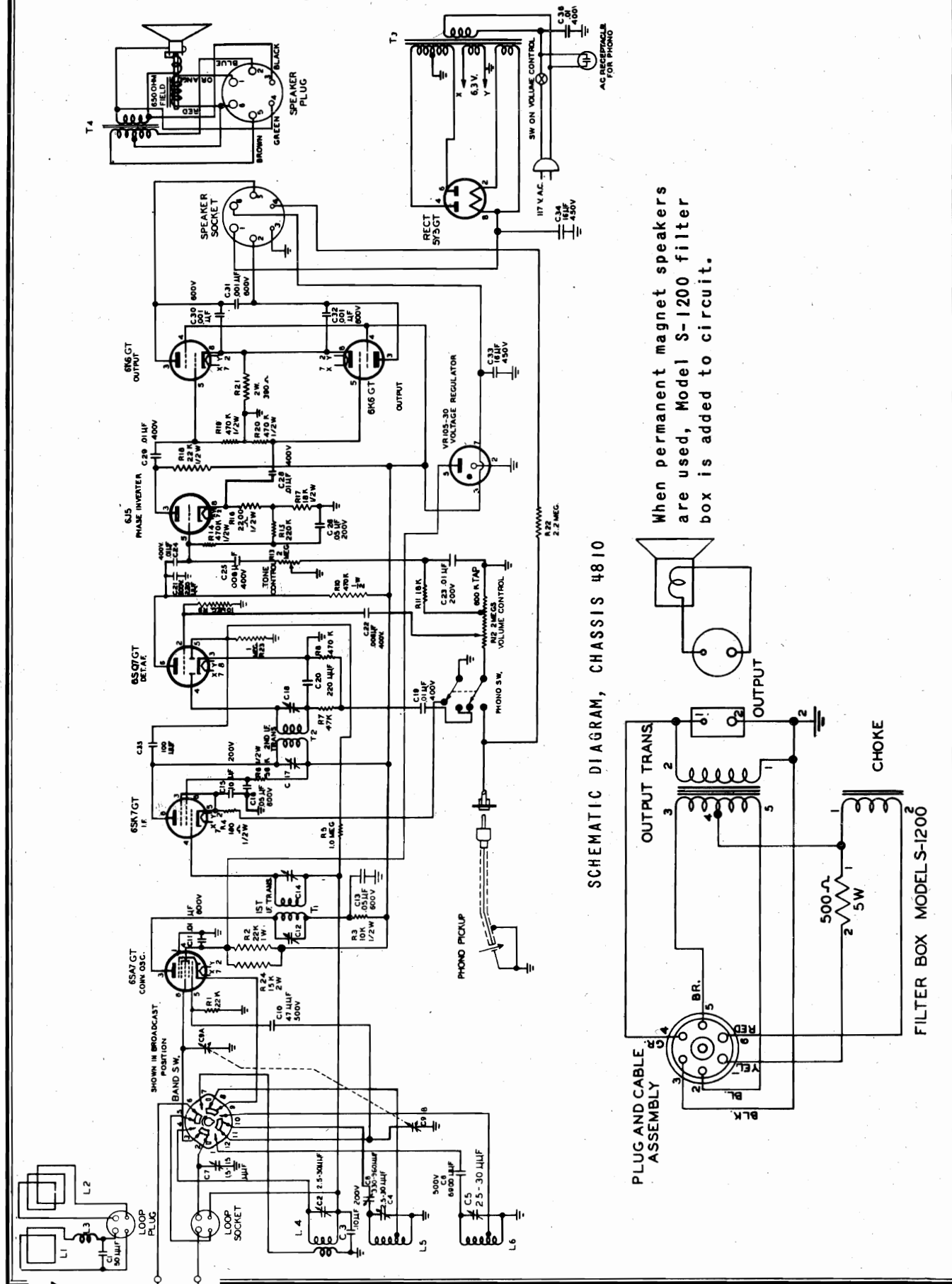
MAJESTIC RADIO & TELEV. CORP.

MODELS 8S452, 8S473,
Ch. 4809

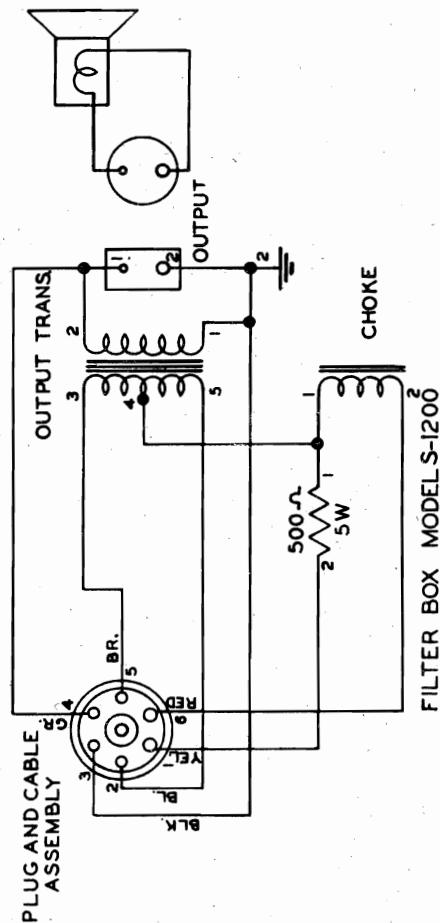


MODELS 8S452, 8S473,
Ch.4810

MAJESTIC RADIO & TELEV. CORP.



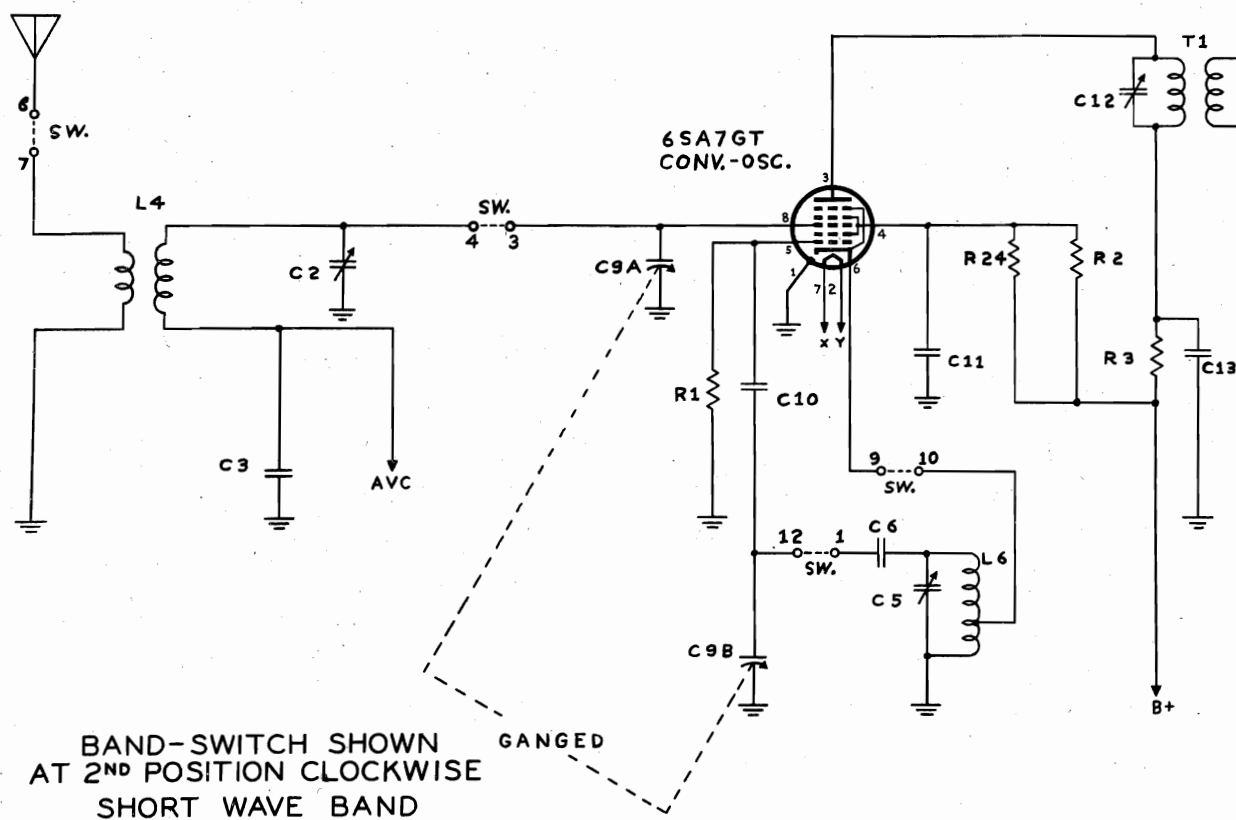
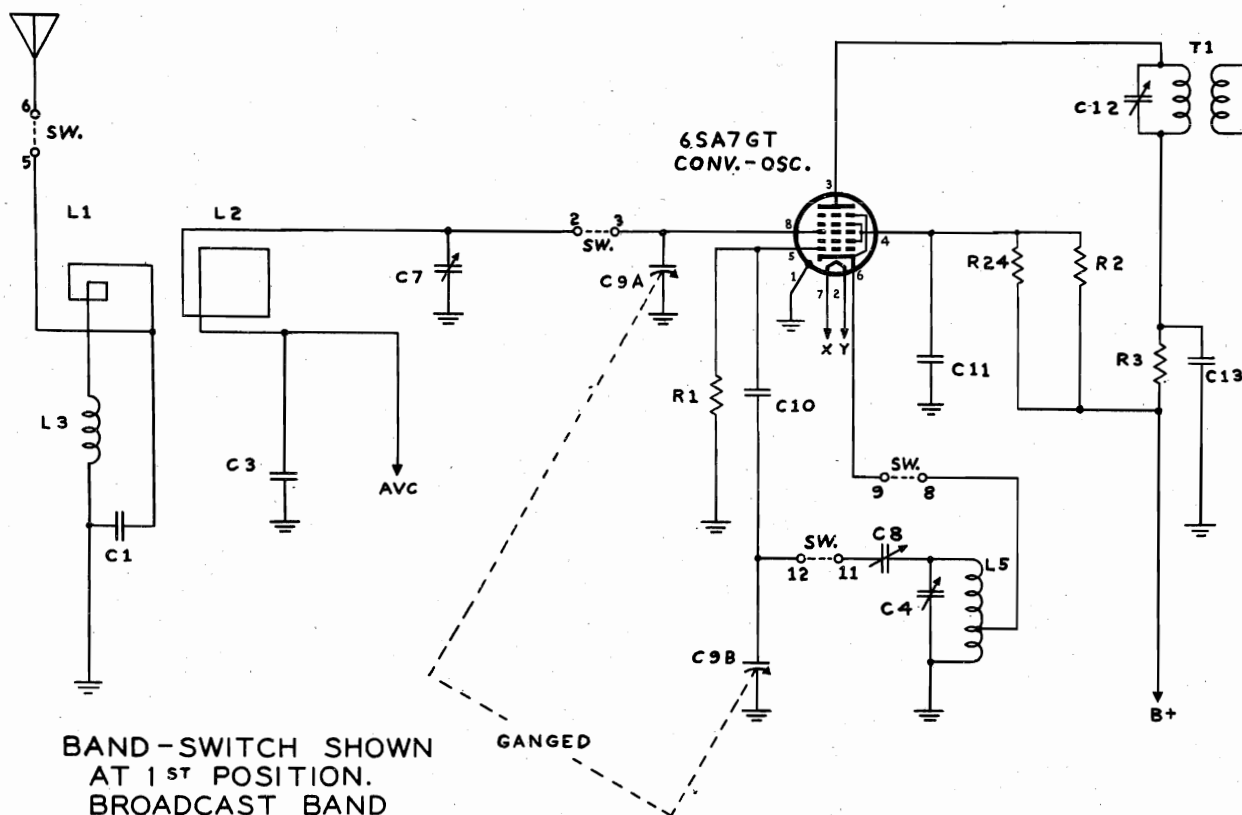
SCHEMATIC DIAGRAM, CHASSIS 4810



MAJESTIC RADIO & TELEV. CORP.

MODELS 8S452, 8S473

Ch.4810



MODELS 8S452, 8S473

Ch.4810

MAJESTIC RADIO & TELEV. CORP.

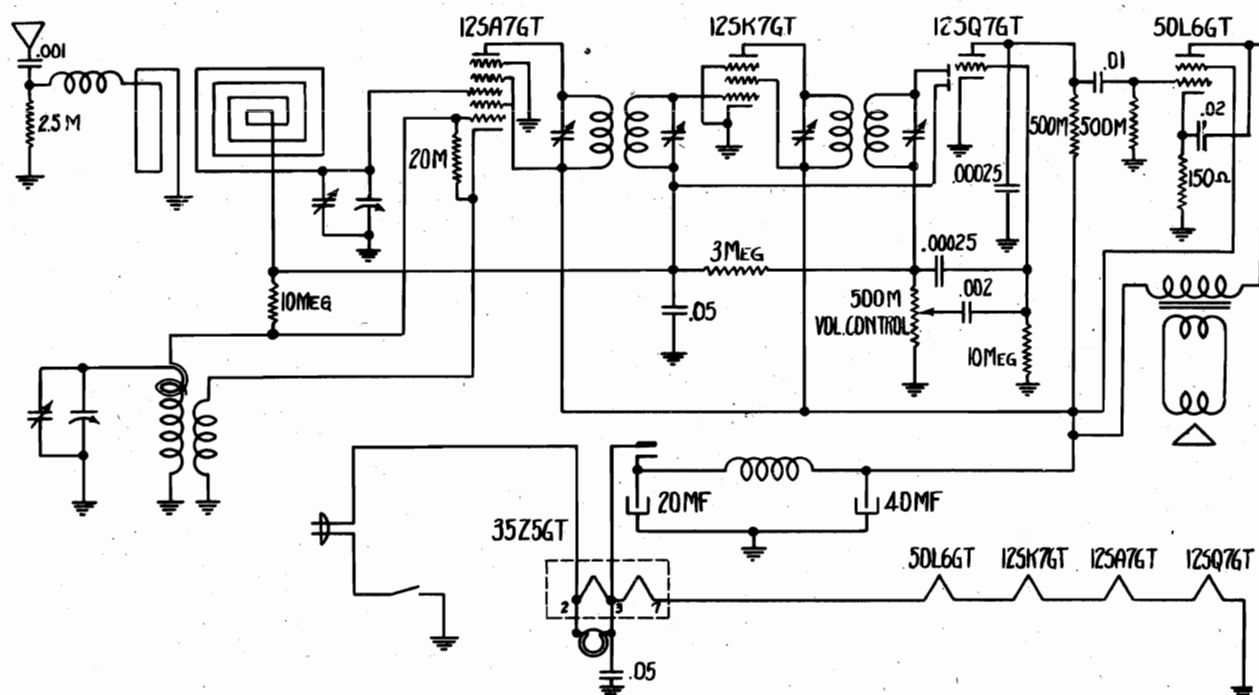
ITEM	DESCRIPTION	PART NO.
C2, C4, C5	Phono-motor receptacle	15-98
C3, C15	Pilot light, Mazda #44	26-7
C6	Dial pointer	135-6
C7	Dial cord spring	129-29
C8	Dial cord	S-1263
C9a, C9b, C9c	Knob, phono-radio	128-45
C10	Knob, off-volume	128-46
C11	Knob, B.C. - S.W.	128-47
C19, C24, C28	Knob, bass-treble	128-48
C29, C36	Knob, tuning	128-49
C12, C14, C17, C18	Knob, plain	128-32
C13, C16	Cabinets:	115-12
C20, C21	8S452	115-15
C22, C25	8S473	22-8-1
C23	Speaker, 8" electrodynamic	22-14-1
C26	Speaker, 10" electrodynamic	122-18
C30, C31, C32	Glass escutcheon	122-29
C33, C34	Metal escutcheon	117-69
C35	Dial scale,	112-355
R1	Escutcheon clamp	20-8
R2	Loop antenna assembly	15-84
R3	Pilot light socket	22-8-3
R4	Speaker plug	
R5, R23	S-1200 Filter Box	
R6	Resistor, 500 ohms, 5 watt, wire wound	9-237
R7	Transformer	12-23
R8	Choke	12-29
R9	Speakers: 8" P.M.	22-21
R10, R14, R19, R20	10" P.M.	22-22
R11	12" P.M.	22-23
R12		
R13		
R15		
R16		
R17		
R18		
R21		
R22		
R24		
I4		
I5, I6		
T1		
T2		
T3		
T4		

ITEM	DESCRIPTION	PART NO.
C2, C4, C5	Trimmer, 2.5 - 30 mmfd	8-35
C3, C15	.1 mfd + 40% - 10% 200 v paper	5-39-
C6	6900 mmfd + 10% 500 v mica	6-177
C7	Trimmer, 1.5 - 15 mmfd	8-36
C8	Padder, 330 - 960 mmfd	8-33
C9a, C9b, C9c	Tuning Condenser	7-22 or
C10	47 mmfd + 20% 500 v ceramic	7-23
C11	.01 mfd 20% 600 v paper	6-159
C19, C24, C28	.01 mfd + 30% - 10% 400 v paper	5-74
C29, C36	Dual trimmer	6-132
C12, C14, C17, C18	.05 mfd 20% 600 v paper	8-41
C13, C16	220 mmfd + 20% mica	5-77
C20, C21	.006 mfd + 20% 400 v paper	6-151
C22, C25	.01 mfd + 40% - 10% 200 v paper	6-133
C23	.05 mfd + 40% - 10% 200 v paper	5-57
C26	.001 mfd + 50% - 25% 600 v paper	5-40
C30, C31, C32	16-16 mfd 450 v electrolytic	5-79
C33, C34	100 mmfd + 20% 500 v mica	19-16
C35	22,000 ohms 20% 1/4 watt	6-232
R1	22,000 ohms 10% 1 watt	9-222
R2	22,000 ohms 10% 1 watt	9-186
R3	10,000 ohms 10% 1/2 watt	9-17
R4	180 ohms 10% 1/2 watt	9-272
R5, R23	1 megohm 20% 1/4 watt	9-255
R6	56,000 ohms 10% 1/2 watt	9-177
R7	47,000 ohms 10% 1/4 watt	9-226
R8	470,000 ohms 10% 1/4 watt	9-227
R9	10 megohms 20% 1/4 watt	9-213
R10, R14, R19, R20	470,000 ohms 10% 1/2 watt	9-234
R11	18,000 ohms 10% 1/4 watt	9-225
R12	Volume control, 2 megohm with SPST switch	13-15
R13	Tone control, 2 megohms	14-4
R15	220,000 ohms 20% 1/4 watt	9-220
R16	2200 ohms 10% 1/2 watt	9-107
R17	18,000 ohms 10% 1/2 watt	9-95
R18	22,000 ohms 10% 1/2 watt	9-180
R21	390 ohms 10% 2 watt	9-185
R22	2.2 megohms 20% 1/4 watt	9-296
R24	15,000 ohms 20% 2 watt	9-299
I4	S.W. antenna coil	3-120
I5, I6	Oscillator coil	3-118
T1	1st I-F transformer	3-165
T2	2nd I-F transformer	3-166
T3	Power transformer	2-12
T4	Output transformer	22-8-2

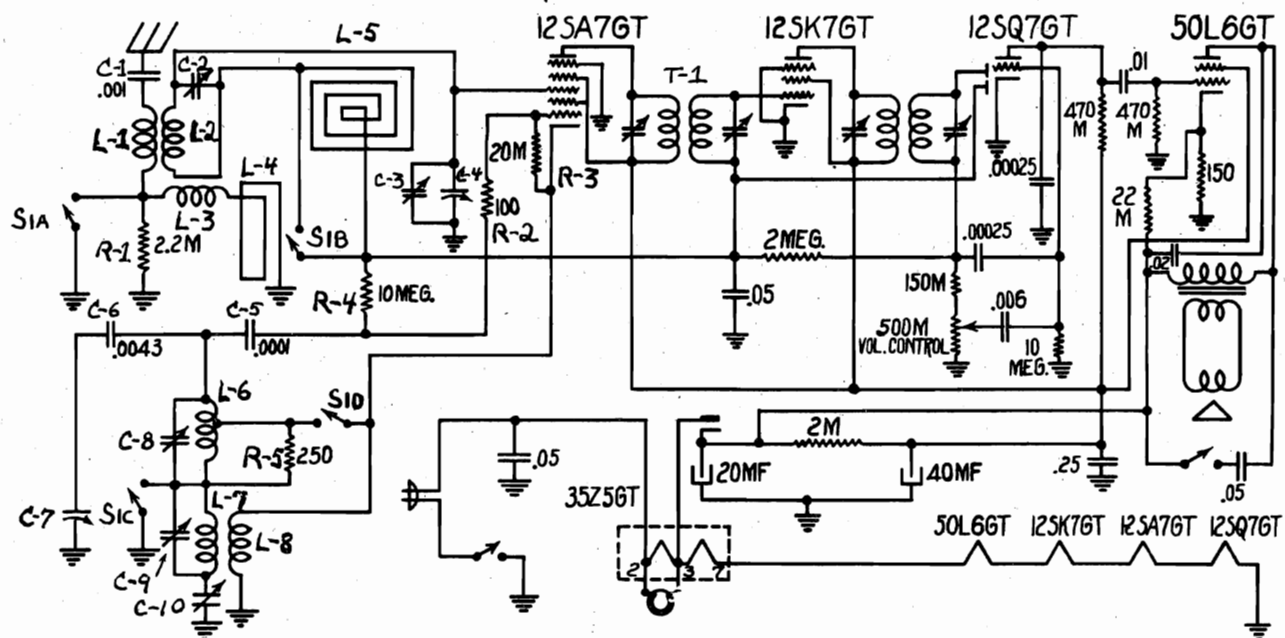
MAJESTIC RADIO & TELEV. CORP.

MODEL 400, Ch. 400

MODEL 401, Ch. 401



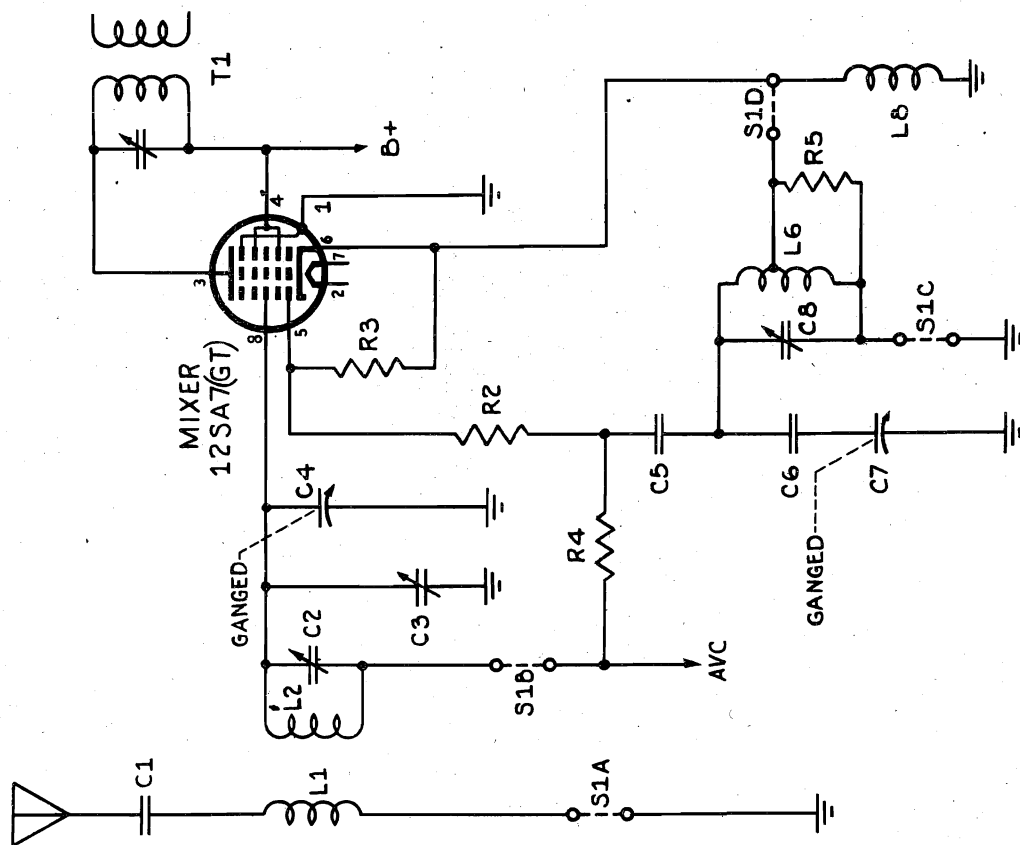
MODEL 400, Chassis 400



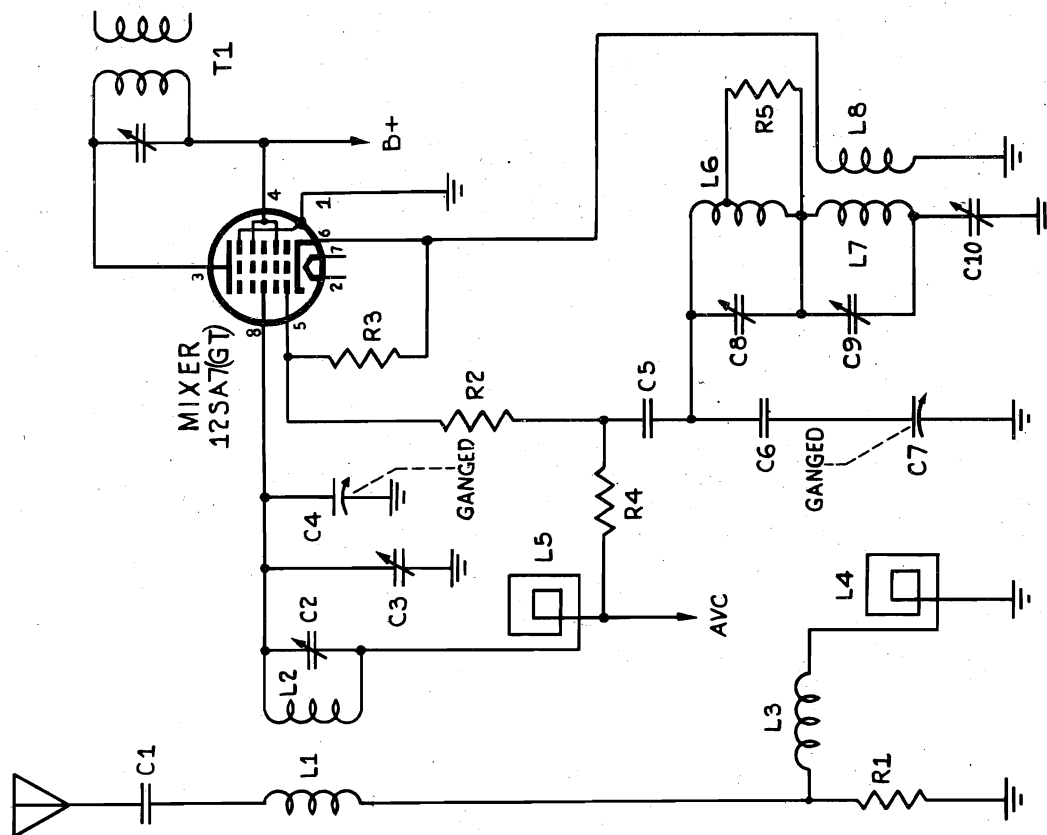
MODEL 401, Chassis 401

MODEL 401, Ch. 401

MAJESTIC RADIO & TELEV. CORP.



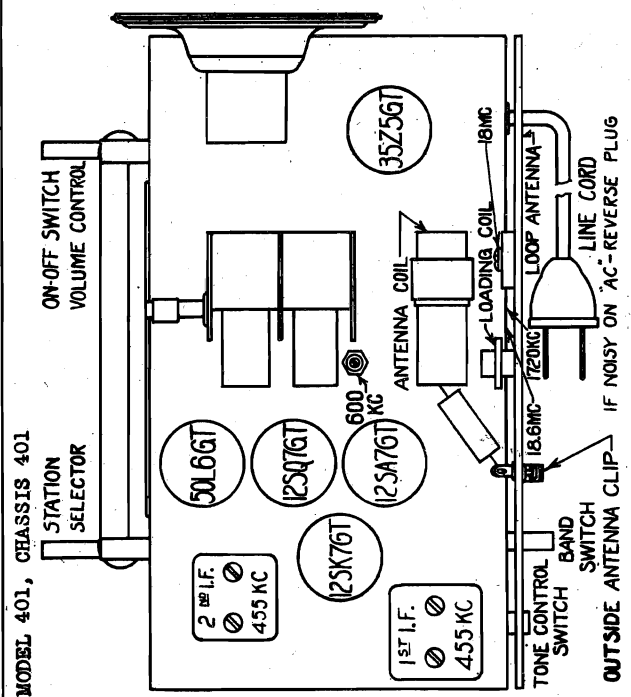
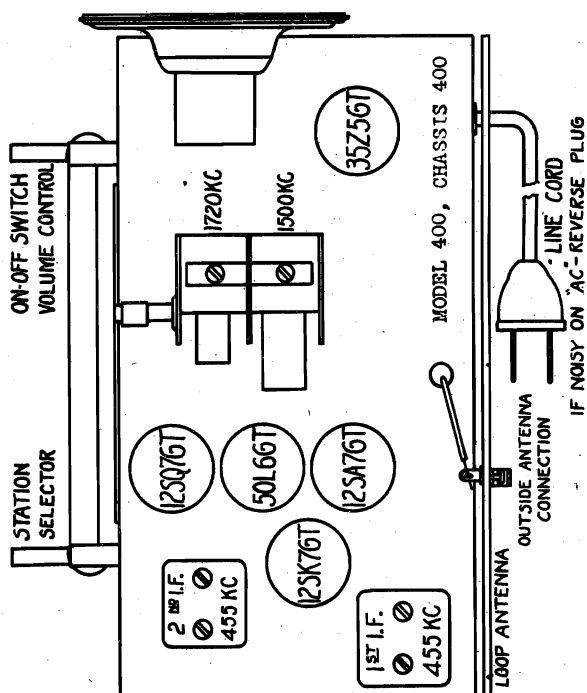
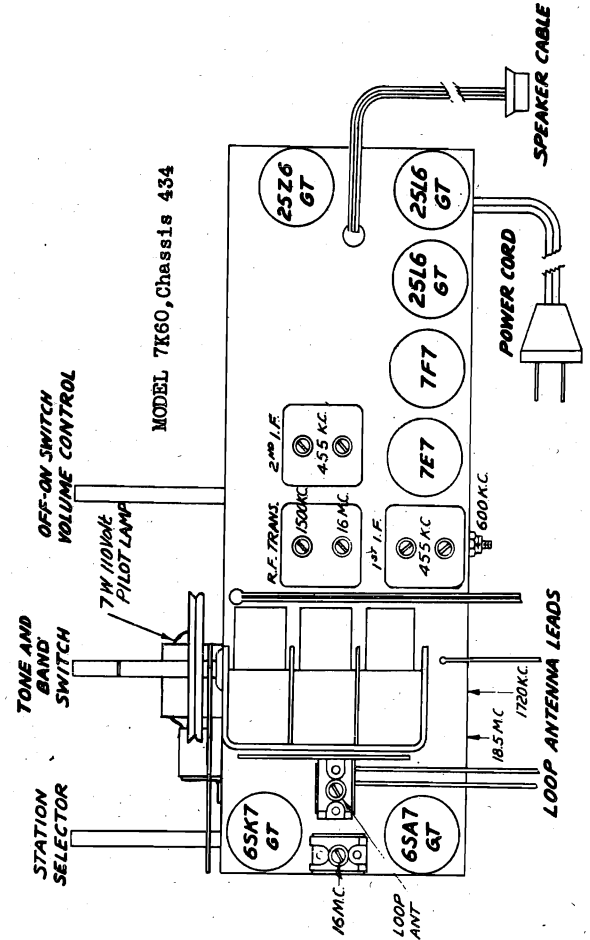
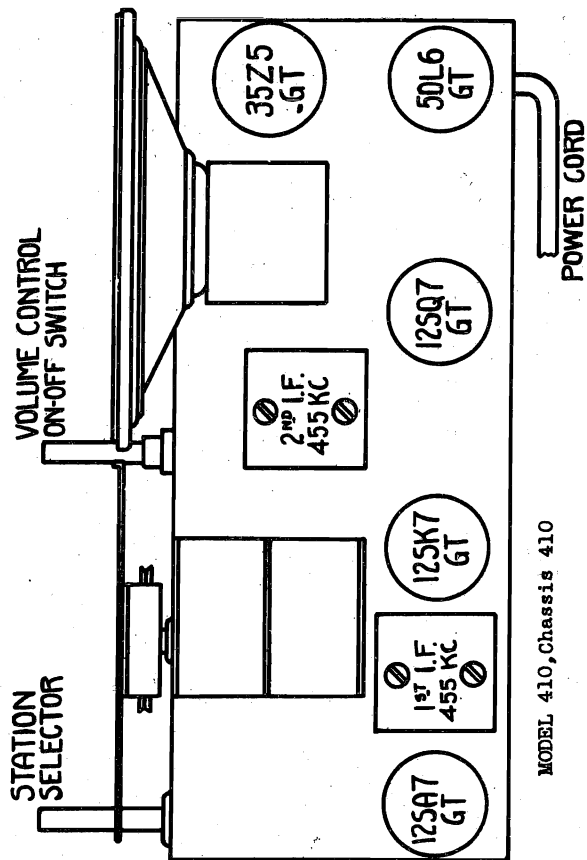
BAND-SWITCH
CLOSED IN
SHORT WAVE BAND



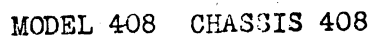
BAND-SWITCH
OPEN IN
BROADCAST BAND

MAJESTIC RADIO & TELEV. CORP.

MODEL 7K60, Ch. 434
 MODEL 400, Ch. 400
 MODEL 401, Ch. 401
 MODEL 410, Ch. 410



Chassis 407



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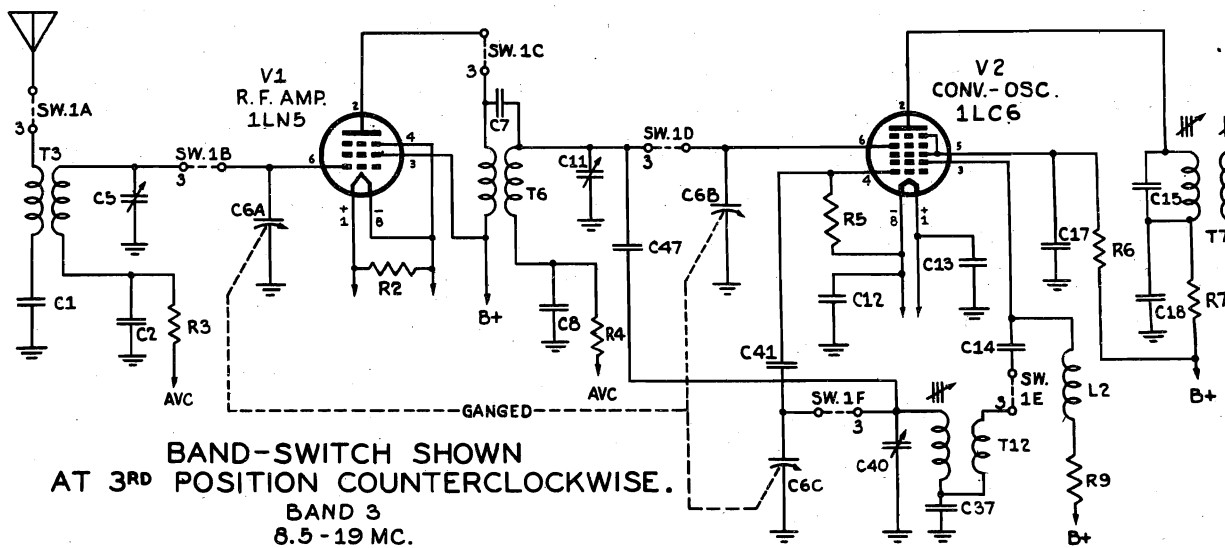
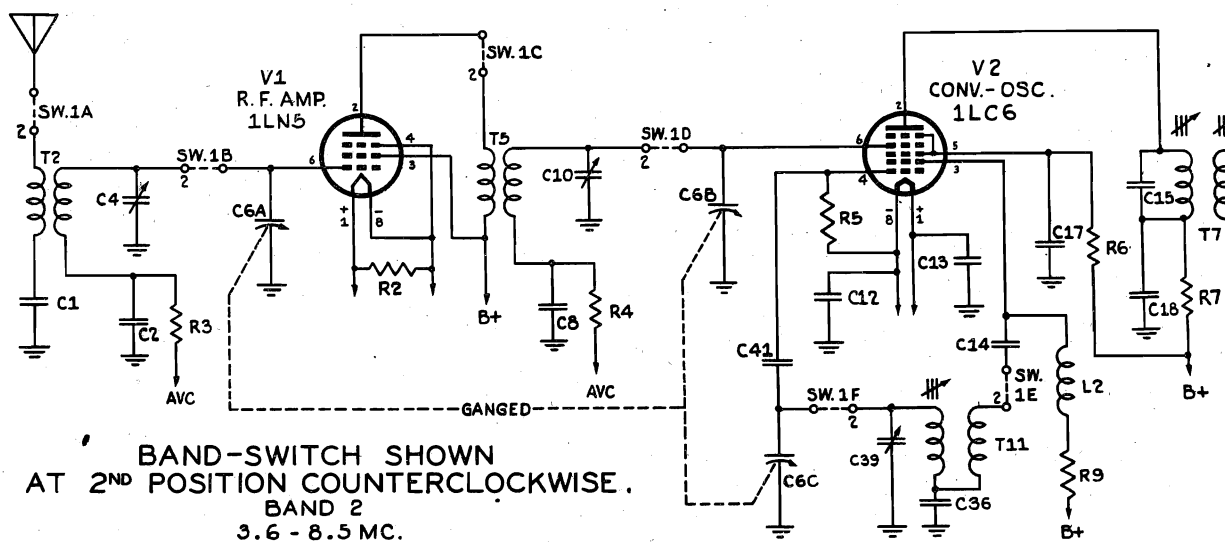
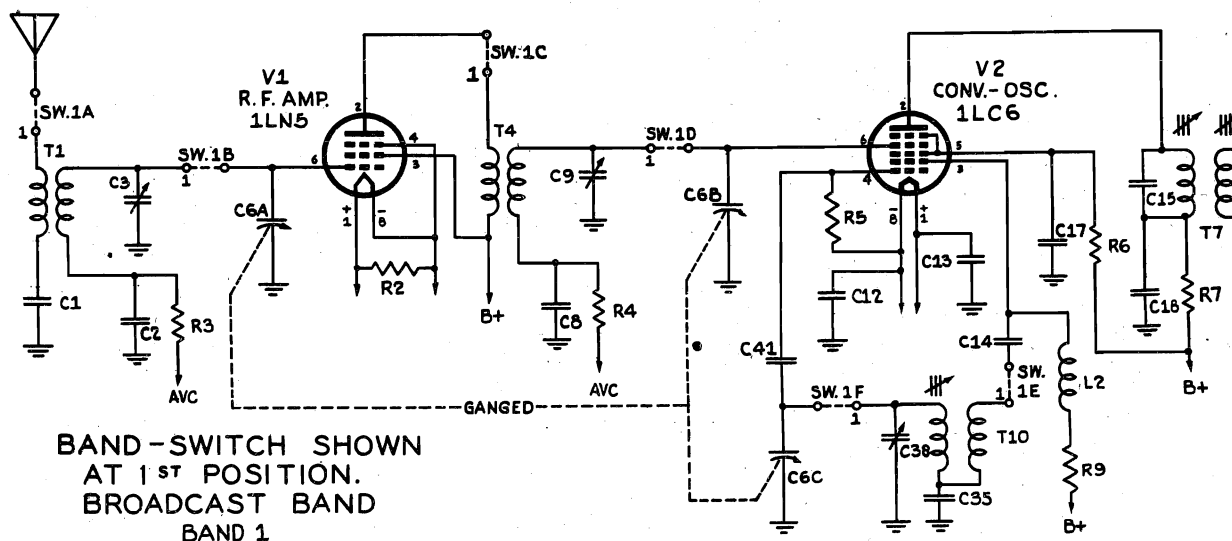
MAJESTIC RADIO & TELEV. CORP. Gr-426Y, Ch. 4808



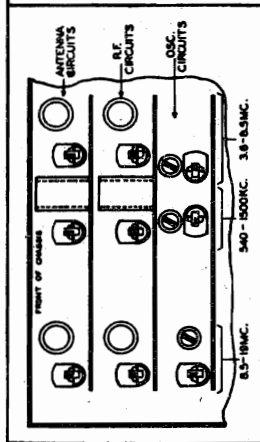
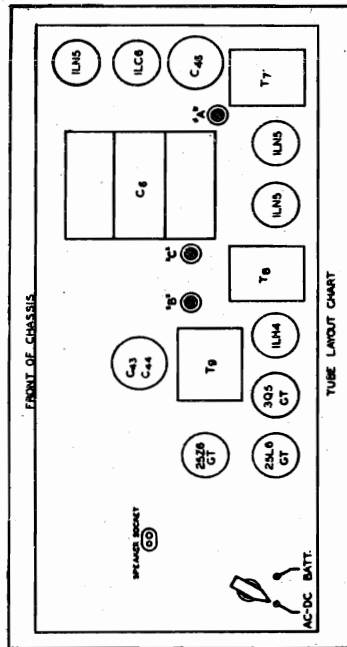
USE CAUTION WHEN WORKING ON THIS RECEIVER WITH VOLTAGE APPLIED, AS 117 OR 230 VOLTS MAY EXIST BETWEEN CHASSIS AND GROUND. BEFORE CONNECTING SIGNAL GENERATOR, CHECK TO SEE WHETHER A POTENTIAL EXISTS BETWEEN CHASSIS OF RECEIVER AND GROUND SIDE OF TEST EQUIPMENT. IF SO, REVERSE PLUG ON LINE CORD OF RECEIVER.

MODELS G1-426,
G1-426Y

MAJESTIC RADIO & TELEV. CORP.



MAJESTIC RADIO & TELEV. CORP.

MODELS G1-426,
G1-426Y

VOLTAGE TABLE

TUBE	PLATE	SCREEN	PLUS FIL.	MINUS FIL.	CATHODE
1LN5 (V1)	100	100	2.5	1.4	
1LC6 (V2)	100	50 (pin 3)	4	2.5	
			40 (pin 5)		
1LN5 (V3)	55	100	5.1	4	
1LN5 (V4)	100	100	6.2	5.1	
1LE4 (V5)	60		1.4	0	
25L6 (V6)	110	115	25 A.C.	0	9
25Z6 (V7)	110AC		50 A.C.	25 A.C.	140

NOTE: All voltages measured with respect to chassis with 1,000 ohm per volt meter, line voltage 117 volts A.C.

ALIGNMENT

Before aligning, make sure that the dial pointer is exactly horizontal when the tuning condenser is closed (plates fully meshed). While aligning the receiver, turn the volume control full on and keep the signal generator output as low as possible, to prevent AVC action and false readings.

Band-switch positions are extreme right for Broadcast, center for 3.6 to 8.5 mc., extreme left for 8.5 to 19 mc.

STEP	DUMMY ANT.	TEST. OSC. CONNECTION	TEST. OSC. FREQUENCY	RECEIVER BANDSWITCH	RECEIVER DIAL	ADJUST IN ORDER SHOWN	NOTES
1	.01 mfd	1LC6 grid (pin 6)	455 KC.	Right	Any	T8, T7	#1
2	200 mmfd	ANT. post	600 KC.	Right	Quiet Spot	"C"	#2
3	200 mmfd	ANT. post	1400 KC.	Right	.6	Osc. Trimmer	
4	200 mmfd	ANT. post	1400 KC.	Right	1.4	R.F. Trimmer	#3
5	400 ohms	ANT. post	4 MC.	Center	4	Ant. Trimmer	#2
6	400 ohms	ANT. post	8 MC.	Center	8	Osc. Trimmer	#4
7	400 ohms	ANT. post	8 MC.	Center	8	R.F. Trimmer	
8	400 ohms	ANT. post	9 MC.	Left	9	Ant. Trimmer	#2
9	400 ohms	ANT. post	18 MC.	Left	18	Osc. Trimmer	#4
10	400 ohms	ANT. post	18 MC.	Left	18	R.F. Trimmer	

NOTES

NOTE #1 - Ground oscillator grid (1LC6 pin 4) while adjusting I.F. transformers.

NOTE #2 - "Rock" tuning gang while making this adjustment.

NOTE #3 - Carefully repeat steps 1 through 4.

NOTE #4 - When making short wave oscillator adjustments, take great care to see that alignment is not made on the image. When the trimmer is correctly adjusted, a weaker peak will be noticed at a receiver dial adjustment which is 910 KC lower than the aligning frequency. It may be necessary to greatly increase the output of the signal generator in order to find this weaker peak.

MODELS G1-426,

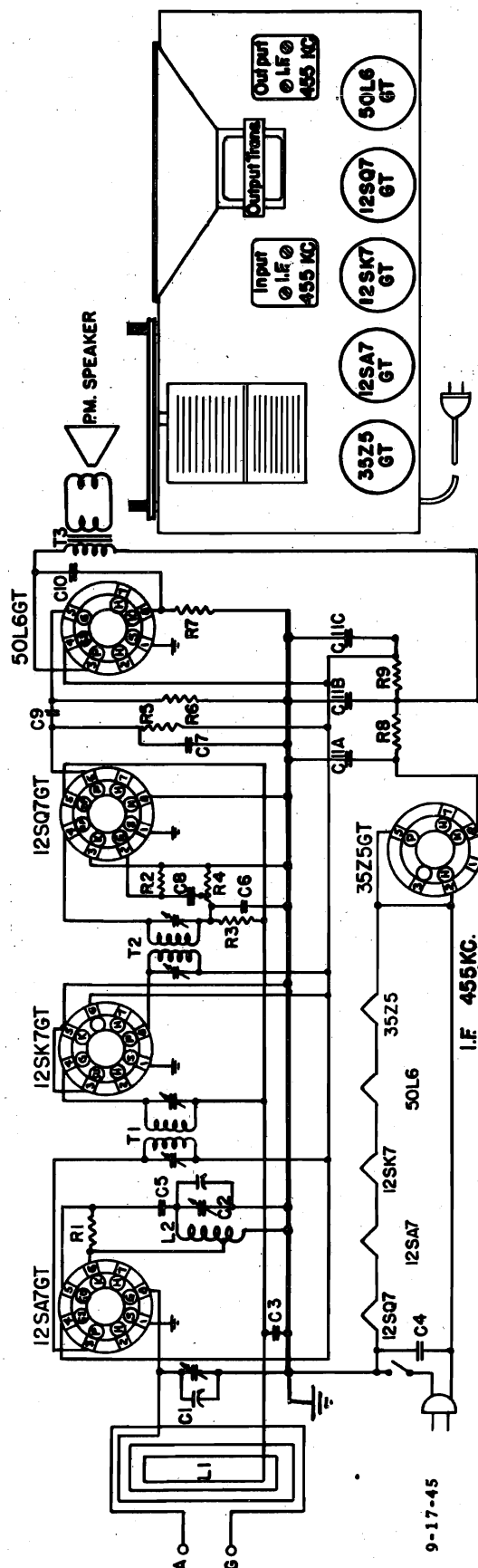
G1-426Y

MAJESTIC RADIO & TELEV. CORP.

ITEM	DESCRIPTION	PART NUMBER
C1,C28,C30,C48	.006 mfd +20% 600 v molded paper	6-96
C2,C8	.05 mfd +20% -10% 200 v molded paper	6-135
C3,C9,C10,C38,C39,C40	Ceramic Trimmer 7-35 mmfd	8-26
C4,C5,C11	Ceramic Trimmer 34-72 mmfd	8-49
C6A,C6B,C6C	Variable, 3 gang	7-9
C7	15 mmfd +20% 500 v fixed ceramic	6-88
C12,C13,C21,C25,C31,C49	.1 mfd +40% -10% 400 v molded paper	6-91
C14	.0022 mfd 10% 500 v mica	6-109
C15	150 mmfd 5% 500 v mica	6-106
C16,C23	82 mmfd 5% 500 v mica	6-108
C17,C19	.02 mfd +40% -10% 200 v molded paper	6-93
C18	.01 mfd +20% -10% 400 v molded paper	6-97
C20	220 mmfd 20% 400 v fixed ceramic	6-86
C22	51 mmfd 5% 500 v mica	6-107
C24	.05 mfd +40% -10% 600 v molded paper	6-99
C26,C27,C41	100 mmfd 20% 500 v molded mica	6-82
C29	470 mmfd 20% 500 v molded paper	6-102
C33,C45	.01 mfd +40% -10% 600 v molded paper	6-98
C34,C43,C42,C44	40-40 mfd 250 v dual electrolytic	19-2
C35	430 mmfd 2% 500 v molded mica	6-101
C36	2200 mmfd 5% 500 v molded mica	6-84
C37	.003 mfd 5% 500 v molded mica	6-149
C46	1000 mfd 15 v electrolytic	19-6
J1	Phone jack	18-27
L1	Line filter choke coil	3-102
L2	R.F. choke	3-104
LS1	Speaker, P.M. 6"	22-5
S01	Speaker receptacle	15-66
PL1	Speaker plug	18-28
R2	270 ohm 10% $\frac{1}{4}$ watt carbon	9-122
R3,R8,R10	3.3 megohms 10% $\frac{1}{4}$ watt carbon	9-135
R4	3.9 megohms 10% $\frac{1}{4}$ watt carbon	9-136
R5	220,000 ohm 20% $\frac{1}{4}$ watt carbon	9-115
R6	68,000 ohm 10% $\frac{1}{4}$ watt carbon	9-116
R7,R13	1,000 ohm 20% $\frac{1}{4}$ watt carbon	9-131
R9,R11	22,000 ohm 10% $\frac{1}{4}$ watt carbon	9-140
R12,R15,R18	470,000 ohm 20% $\frac{1}{4}$ watt carbon	9-120
R14	47,000 ohm 20% $\frac{1}{4}$ watt carbon	9-121
R16,R29	330 ohm 10% $\frac{1}{4}$ watt carbon	9-126
R17	1 megohm 20% variable with switch	13-12
R19	100,000 ohm 20% $\frac{1}{4}$ watt carbon	9-123
R20	470,000 ohm 10% $\frac{1}{4}$ watt carbon	9-118
R21	62 ohm 5% $\frac{1}{4}$ watt carbon	9-137
R22	10 ohm 20% 1 watt carbon	9-128
R23	220 ohms 5% 30 watt wirewound	9-134
R24	43 ohm 5% 8 watt wirewound	9-132
R25	2200 ohm 10% $\frac{1}{4}$ watt carbon	9-7
R26	260 ohm 5% 60 watt wirewound	9-133
R27	4700 ohm 10% 1 watt carbon	9-139
R28	820 ohm 10% $\frac{1}{4}$ watt carbon	9-127
R30	27 ohm 10% $\frac{1}{4}$ watt carbon	9-125
R31	12 megohms 10% $\frac{1}{4}$ watt carbon	9-138
SW1A,B,C,D	Switch wafer	11-40
SW1E,F	Switch wafer	11-41
SW3	4P 2-position switch	11-39
T1	Band 1 antenna	3-99
T2	Band 2 antenna	3-91
T3	Band 3 antenna	3-96
T4	Band 1 R.F.	3-100
T5	Band 2 R.F.	3-94
T6	Band 3 R.F.	3-95
T7	1st I.F.	3-93
T8	2nd I.F.	3-101
T9	Output transformer	12-16
T10	Band 1 oscillator	3-92
T11	Band 2 oscillator	3-97
T12	Band 3 oscillator	3-98
Chassis mounting stud assembly	111-149	Dial cord 134-5
Knobs, band switch and volume control	128-17	Dial pointer, black 135-1
Cabinet back assembly	112-190	Dial pointer, white 135-11
Tuning knob	128-18	Dial, white 112-179
AC-DC - BATT knob	128-19	Dial, black 112-336
		Dial window 117-28

MODELS 5C5, 5C5-A,
5C5-B, 5C5-C
Trail Blazer

JOHN MECK INDUSTRIES



Circuit Symbol	Part Number	Description	Model	Symbol	Part Number	Description	Model
C1, C2	CV-10002	Condenser-Variable, with pulley	RC-5C5	R6	RC-35003	Resistor-Carbon, 500,000 ohms ½ watt	All
C1, C2	CV-10002-A	Condenser-Variable, with pulley	RC-5C5-A	R7	RC-31500	Resistor-Carbon, 150 ohms ½ watt	All
C1, C2	CV-10002-B	Condenser-Variable, with pulley	RC-5C5-B	R8	RC-32000	Resistor-Carbon, 200 ohms ½ watt	All
C1, C2	CV-10002-C	Condenser-Variable, with pulley	RC-5C5-C	R9	RC-31001	Resistor-Carbon, 1000 ohms ½ watt	All
C3, C4, C10	CP-14503	Condenser-Paper, 0.05mfd. 400V	All	L1	AL-10000	Antenna-Loop	RC-5C5, A, B, RC-5C5-C
C5	CM-15500	Condenser-Mica, 0.0005mfd.	All	L2	AL-10001-C	Coil-Oscillator	RC-5C5, A, B, RC-5C5-C
C6, C7	CM-15251	Condenser-Mica, 0.00025mfd.	All	L2	TRC-10000	Coil-Oscillator	RC-5C5, A, B, RC-5C5-C
C8, C9	CP-14103	Condenser-Paper, 0.01mfd. 400V	All	T1	TS-10000	Transformer-1st I.F.	All
C11A, C11B, C11C	CL-10001	Condenser-Electrolytic 20/20/20 mfd 150V	All	T2	TS-10001	Transformer-2nd I.F.	All
R1	RC-32002	Resistor-Carbon, 20,000 ohms ½ watt	All	T3	TO-10000	Transformer-Output	All
R2	RC-31005	Resistor-Carbon, 10 megohms ½ watt	All	SPKR	SR-10000	Speaker-P.M. ¼" round, less T3	All
R3	RC-32004	Resistor-Carbon, 2 megohms ½ watt	All	SPKR	SR-10001	Speaker-P.M. ¼" round, with T3	All
R4	VC-10103	Control-Volume, with switch, 1 megohm	All				
R5	RC-32503	Resistor-Carbon, 250,000 ohms ½ watt	All				

VOLTAGE TABLE - Use high resistance voltmeter of 1000 ohms per volt

Type tube	1	2	3	4	5	6	7	8
12SA7	0	24AC	78	78	-7 to -12	0	12AC	-.65 to -1.2
12SK7	0	36AC	0	-.8 to -1.2	0	78	24AC	78
12SQ7	0	-.9 to -1.2	0	0	-.8 to -1.2	55	12AC	0
50L6	0	--	95	78	0	--	36AC	4 to 5
35Z5	-	82	--	78	115 AC	100	115 AC	110

MODELS 5C5, 5C5-A,

5C5-B, 5C5-C

JOHN MECK INDUSTRIES

Trail Blazer

The Meck Trail Blazer Models 5C5; 5C5-A; 5C5-B; 5C5-C are five tube superheterodyne receivers covering the broadcast band from 535 to 1720 kilocycles. A loop antenna is incorporated in the top of the cabinet. When an external antenna and ground are used, connect the antenna to the red wire and the ground wire to the black wire extending from the back of the cabinet.

The circuit employs automatic volume control (A.V.C.) through the action of the type 12SQ7GT tube. These models are designed to operate on 110 to 120 volts AC-DC in operation; the incoming signal is first passed to the tuned first detector circuit and then beats with the oscillator output to produce a 455 kilocycle intermediate frequency signal.

The intermediate frequency signal is amplified in an exceptionally high gain stage, and is then rectified by the diodes of the type 12SQ7GT tube. Detection is accomplished by the diode directly connected to the output intermediate frequency transformer. A modulated direct current voltage drop is produced across the one megohm potentiometer by the rectified current. The volume is controlled by selecting any desired portion of the audio frequency voltage with the moving arm of the potentiometer which is connected to the grid of the type 12SQ7GT tube. The triode section of this tube acts as an audio amplifier and is resistance coupled to the 50L6GT output tube.

PRELIMINARY: Before attempting to align a radio set, the service man should become familiar with the general layout of the chassis and with the function and location of the various trimmer condensers. The following discussion briefly explains the action of each alignment step.

R.F. alignment and calibration are accomplished by the two trimmer condensers located on the side of the variable condenser gang. The oscillator is kept in exact step with the R.F. circuit by the special shape of the stator plates in the oscillator tuning section.

Both windings of the I.F. transformers are tuned. The I.F. trimmers are mounted in their respective I.F. coil cans, and are reached through holes in the top of each I.F. coil can.

EQUIPMENT and PRELIMINARY STEPS: A good modulated oscillator, an output meter, an isolation or a coupling transformer and a loop antenna are essential for the proper alignment. The attenuator on the oscillator must be capable of reducing the signal to a low value because the A.V.C. will function if the signal is too strong and thus make correct alignment impossible. The output meter must be sensitive enough to give a satisfactory reading with a small signal. An isolation or a coupling transformer must be used when an AC-DC radio is to be aligned. The loop antenna can be made by winding five to ten turns of insulated wire on a three or four inch form and closely coupled to the loop antenna of the receiver.

The output meter should be connected across the speaker voice coil or connected from the plate of the 50L6GT to ground or chassis through a 0.25 mfd. condenser, depending upon the type of output meter used.

All alignment adjustments must be made with the volume control full on, but with no broadcast signal being received.

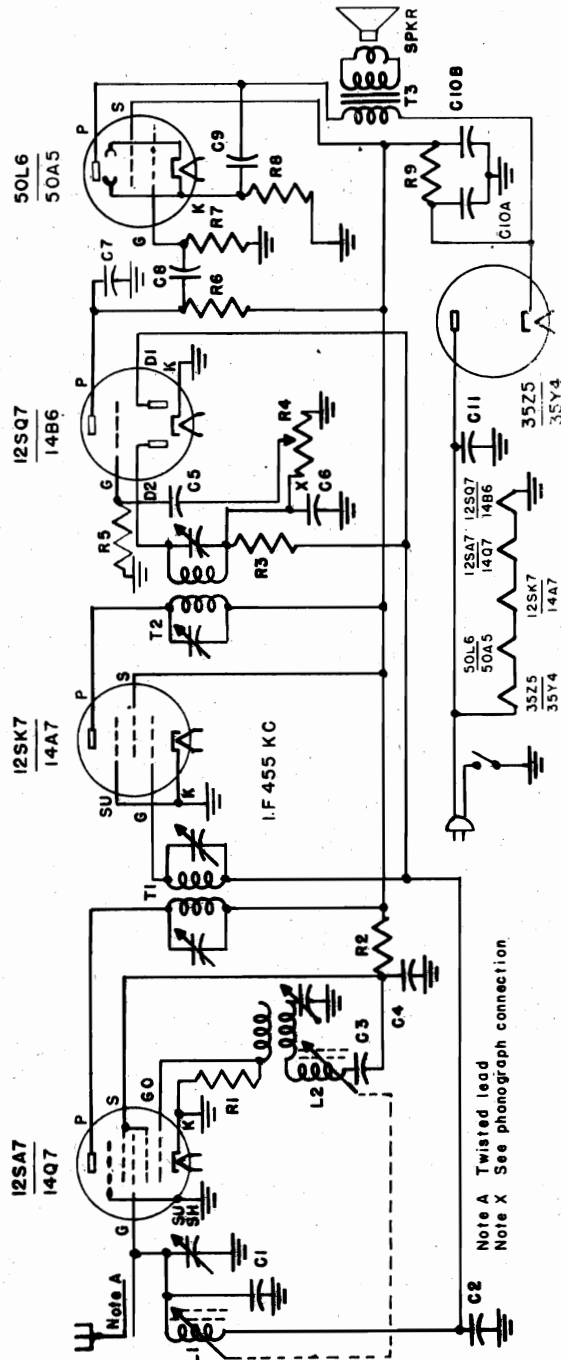
I.F. ALIGNMENT: The step-by-step routine given below should be carefully followed after reading the preceding instructions:

1. The modulated oscillator must be tuned to 455 K.C.
2. Connect the high side of the oscillator output to the lug on the R.F. section of the gang condenser. The low side of the oscillator is connected to the chassis through a .01 condenser.
3. Set the gang condenser of the radio to 1720 on the dial and turn the volume control on full.
4. Adjust the four I.F. trimmers tuning each carefully to get the maximum deflection of the output meter. Reduce the oscillator output if the output meter goes off scale.
5. Repeat all four adjustments since the adjustment of each I.F. trimmer may effect the others to a certain extent.

R.F. AND OSCILLATOR ALIGNMENT:

1. Connect the oscillator output to the external loop antenna and closely couple to the loop antenna of the receiver.
2. Set the generator at 1720 KC and turn the gang condenser to 1720 on the dial. Adjust the oscillator trimmer for maximum output.
3. Set the generator at 1400 KC and turn the gang condenser to 1400 on the dial. Adjust the R.F. trimmer for maximum output while rocking the gang.
4. Set the generator at 600 KC and turn the gang to 600 KC on the dial and check for tracking.

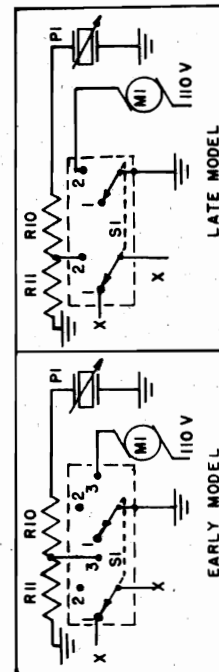
JOHN MECK INDUSTRIES



VOLTAGE TABLE - Use high resistance voltmeter of 1000 ohms per volt

Type tube	1	2	3	4	5	6	7	8
12SA7	0	24AC	78	78	-7 to -12	0	12AC	-65 to -1.2
12SK7	0	36AC	0	0	0	78	24AC	78
50L6	0	-0.9 to -1.2	0	0	-0.8 to -1.2	55	12AC	0
35Z5	-	82	95	78	0	100	36AC	4 to 5
14Q7	24AC	78	78	78	0	115 AC	115 AC	110
14A7	0	55	-0.9 to -1.2	0	0	0	0	12AC
50A5	82AC	95	78	78	-0.8 to -1.2	0	0	12AC
35Y4	115AC	115AC	78	78	100	0	4 to 5	36AC
							110	82AC

IF PEAK 455 KC



Circuit Symbol	Part Number	Description
C1	CH-15250	Condenser-Mica, 25 mmf., 500 volt
C2, C9, C11	CP-145031	Condenser-Paper, 0.05 mfd., 400 volt
C3, C5, C8	CP-14103	Condenser-Paper, 0.01 mfd., 400 volt
C4	CH-15301	Condenser-Mica, 300 mmf., 500 volt
C6, C7	CH-15251	Condenser-Mica, 250 mmf., 500 volt
C10A, C10B	CL-10001	Condenser-Elect., 20/20 mfd., 150 volt
L1, L2	VP-10000	Tuner-Permeability, assembly
R1	RC-32002	Resistor-Carbon, 20,000 ohms, 1/2 watt
R2	RC-34001	Resistor-Carbon, 4000 ohms, 1/2 watt
R3	RC-32004	Resistor-Carbon, 2 megohms, 1/2 watt
R4	VC-0105	Control-Volume, 1 megohm with switch
R5	RC-31005	Resistor-Carbon, 10 megohms, 1/2 watt
R6	RC-32502	Resistor-Carbon, 250,000 ohms, 1/2 watt
R7	RC-35003	Resistor-Carbon, 500,000 ohms, 1/2 watt
R8	RC-31500	Resistor-Carbon, 150 ohms, 1/2 watt
R9	RC-31001	Resistor-Carbon, 1000 ohms, 1/2 watt
SPKR	SR-10000	Speaker-P.M. 1/4" round less T3
T1	TS-10000	Transformer-1st. I.F.
T2	TS-10001	Transformer-2nd. I.F.
T3	TO-10000	Transformer-Output
PHONOGRAPH MODEL		
M1	PRS-10000	Motor-Phono, with turntable
P1	PA-10000	Pickup-Crystal
R10	RC-31004	Resistor-Carbon, 1 megohm, 1/2 watt
R11	RC-37503	Resistor-Carbon, 750,000 ohms, 1/2 watt
S1	VS-10000	Switch-Radio, phono

MODELS FM-5C5-P,
RC-5C5-P

JOHN MECK INDUSTRIES

ALIGNMENT

PRELIMINARY: Before attempting to align the RC-5C5-P chassis, the service man should become familiar with the general layout of the chassis, with the function and location of the various trimmers. The following discussion briefly explains the action of each alignment step.

R.F. alignment and calibration are accomplished by the two trimmers mounted on top of the permeability tuner assembly. Facing the dial of the chassis, the r.f. trimmer is to the left and the oscillator trimmer to the right.

I.F. The i.f. trimmers are mounted in their respective i.f. coil cans and are reached through holes in the top of each i.f. coil can.

EQUIPMENT and PRELIMINARY STEPS: A good modulated oscillator, an output meter and an isolation transformer are essential for the proper alignment. The attenuator on the oscillator must be capable of reducing the signal to a low value because the a.v.c. will function if the signal is too strong and thus make correct alignment impossible. The output meter must be sensitive enough to give a satisfactory reading with a small signal. An isolation transformer must be used when aligning an AC-DC radio chassis.

The output meter may be connected across the voice coil of the speaker or one lead of the output meter may be connected to the plate of the output tube and the other lead of the meter to one side of a 0.25 mfd. condenser which is then connected to the chassis, depending upon the type of output meter used.

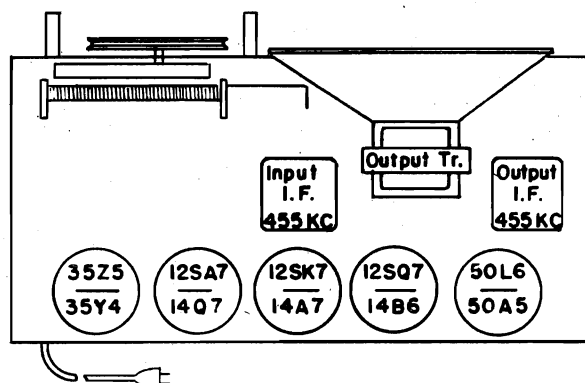
All alignment adjustments must be made with the volume control full on, but with no broadcast signal being received.

I.F. ALIGNMENT: The step-by-step routine given below should be carefully followed after reading the preceding instructions.

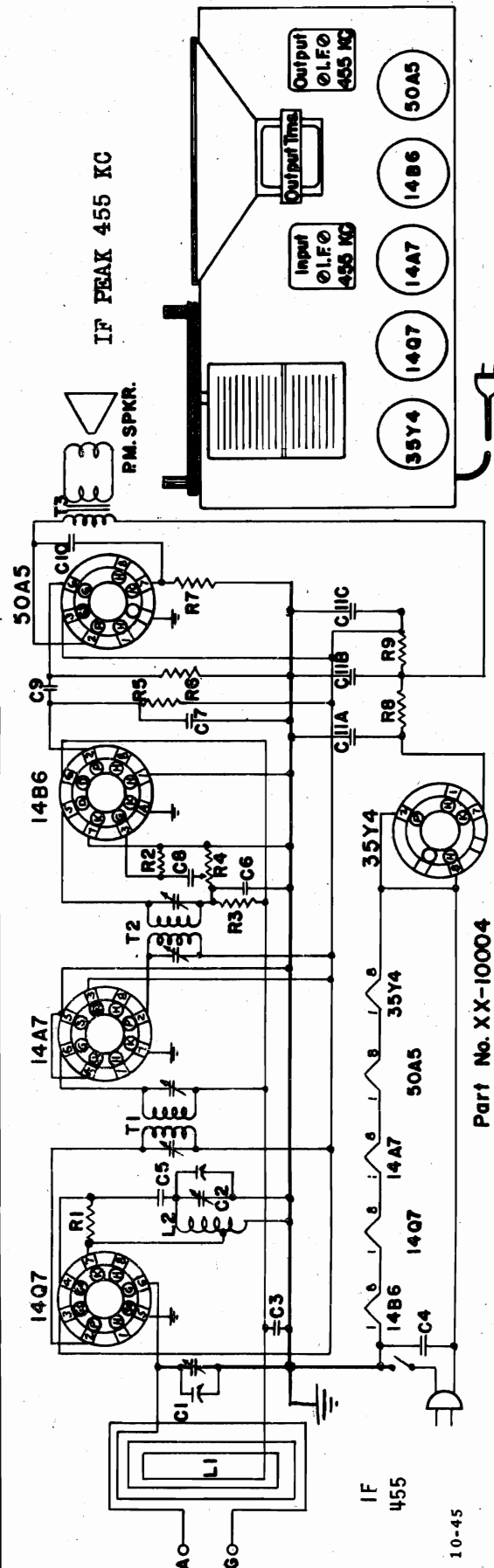
1. The signal generator must be set at 455 kilocycles.
2. Connect the output meter so that the output can be determined.
3. Connect the high side of the signal generator output to the antenna lead of the tuner, the white wire. The low side of the signal generator output lead is connected to the chassis through a 0.01 mfd. condenser.
4. Turn the volume control on full and turn the dial drive shaft so that the slugs of the tuner unit are all the way out against the stop.
5. Adjust the four I.F. trimmers, tuning each carefully to get the maximum deflection of the output meter. Reduce the signal generator output if the output meter goes off scale.
6. Repeat all four adjustments since the adjustment of each I.F. trimmer may effect the others to a certain extent.

OSCILLATOR and R.F. ALIGNMENT:

1. Connect the high side of the signal generator output to the insulation covering of the antenna wire and not the wire itself.
2. Set the signal generator to 1680 kilocycles with the slugs of the tuner all the way out against the stop. Adjust the oscillator trimmer, right hand trimmer screw, for maximum reading on the output meter.
3. Set the signal generator at 1120 kilocycles and turn the dial drive shaft until the 1120 kilocycle note is heard. Adjust the R.F. trimmer, left hand trimmer, for maximum reading on the output meter. Set the dial pointer on 1120 kilocycles on the dial scale. By aligning the R.F. section at 1120 kilocycles the overall alignment will be very good.



JOHN MECK INDUSTRIES



Circuit Symbol	Part Number	Description	Model	Circuit Symbol	Part Number	Description	Model
C1, C2	CV-10002-C	Condenser-Variable, with pulley	RC-5C5-CL	R6	RC-35003	Resistor-Carbon, 500,000 ohms 1/2 watt	All
C1, C2	CV-10002-D	Condenser-Variable, with pulley	RC-5C5-DL	R7	RC-31500	Resistor-Carbon, 150 ohms 1/2 watt	All
C3, C4, C10	CP-14503	Condenser-Paper, 0.05mfd. 400V	All	R8	RC-32000	Resistor-Carbon, 200 ohms 1/2 watt	All
C5	CM-15500	Condenser-Mica, 0.00005mfd.	All	R9	RC-31001	Resistor-Carbon, 1000 ohms 1/2 watt	All
C6, C7	CM-15251	Condenser-Mica, 0.00025mfd.	All	L1	AL-10000-D	Antenna-Loop	RC-5C5-DL
C8, C9	CP-14103	Condenser-Paper, 0.0mfd. 400V	All	L2	TRC-10000	Coil-Oscillator	RC-5C5-CL
C11A, C11B, C11C	CL-10001	Condenser-Electrolytic 20/20/20 mfd 150V	All	L2	TRC-10000-C	Coil-Oscillator	RC-5C5-DL
R1	RC-32002	Resistor-Carbon, 20,000 ohms 1/2 watt	All	T1	TS-10000	Transformer-1st I.F.	RC-5C5-CL
R2	RC-31005	Resistor-Carbon, 10 megohms 1/2 watt	All	T2	TS-10001	Transformer-2nd I.F.	All
R3	RC-32004	Resistor-Carbon, 2 megohms 1/2 watt	All	T3	TO-10000	Transformer-Output	All
R4	VC-10105	Control-Volume, with switch, 1 megohm	All	SPKR	SR-10001	Speaker-P.M. 4" round, with T3	All
R5	RC-32503	Resistor-Carbon, 250,000 ohms 1/2 watt	All				

VOLTAGE TABLE - Use high resistance voltmeter of 1000 ohms per volt

Type tube	1	2	3	4	5	6	7	8
14Q7	24AC	78	78	-7 to-12	0	-65 to-1.2	0	12AC
14A7	36AC	78	78	0	0	-8 to-1.2	0	24AC
14B6	0	55	-9 to-1.2	0	-8 to-1.2	0	0	12AC
50A5	82AC	95	78	--	---	0	4 to 5	36AC
35Y4	115AC	115AC	78	--	100	--	110	82AC

**MODELS RC-5C5-CL,
RC-5C5-DL**

JOHN MECK INDUSTRIES

The Meck Trail Blazer Chassis RC-5C5-CL and RC-5C5-DL are five tube superheterodyne receivers. The RC-5C5-CL covers the broadcast band from 545 to 1520 kilocycles and the RC-5C5-DL covers the broadcast band from 535 to 1720 kilocycles. A loop antenna is incorporated in the top of the cabinet. The red and black wires extending from the back of the cabinet are used when an external antenna and ground are used. The external antenna is connected to the red wire and the ground to the black wire. **DO NOT CONNECT A GROUND WIRE TO THE METAL CHASSIS.**

The circuit employs automatic volume control (A.V.C.) through the action of the type 14B6 tube. These models are designed to operate on 110 to 120 volts AC-DC. In operation; the incoming signal is first passed to the tuned first detector circuit and then beats with the oscillator output to produce a 455 kilocycle intermediate frequency signal.

The intermediate frequency signal is amplified in an exceptionally high gain stage, and is then rectified by the diodes of the type 14B6 tube. Detection is accomplished by the diode directly connected to the output intermediate frequency transformer. A modulated direct current voltage drop is produced across the one megohm potentiometer by the rectified current. The volume is controlled by selecting any desired portion of the audio frequency voltage with the moving arm of the potentiometer which is connected to the grid of the type 14B6 tube. The triode section of this tube acts as an audio amplifier and is resistance coupled to the 50A5 output tube.

PRELIMINARY: Before attempting to align a radio set, the service man should become familiar with the general layout of the chassis and with the function and location of the various trimmer condensers. The following discussion briefly explains the action of each alignment step.

R.F. alignment and calibration are accomplished by the two trimmer condensers located on the side of the variable condenser gang. The oscillator is kept in exact step with the R.F. circuit by the special shape of the stator plates in the oscillator tuning section.

Both windings of the I.F. transformers are tuned. The I.F. trimmers are mounted in their respective I.F. coil cans, and are reached through holes in the top of each I.F. coil can.

EQUIPMENT and PRELIMINARY STEPS: A good modulated oscillator, an output meter, an isolation or a coupling transformer and a loop antenna are essential for the proper alignment. The attenuator on the oscillator must be capable of reducing the signal to a low value because the A.V.C. will function if the signal is too strong and thus make correct alignment impossible. The output meter must be sensitive enough to give a satisfactory reading with a small signal. An isolation or a coupling transformer must be used when an AC-DC radio is to be aligned. The loop antenna can be made by winding five to ten turns of insulated wire on a three or four inch form and closely coupled to the loop antenna of the receiver.

The output meter should be connected across the speaker voice coil or connected from the plate of the 50A5 to ground or chassis through a 0.25 mfd. condenser, depending upon the type of output meter used.

All alignment adjustments must be made with the volume control full on, but with no broadcast signal being received.

I.F. ALIGNMENT: The step-by-step routine given below should be carefully followed after reading the preceding instructions:

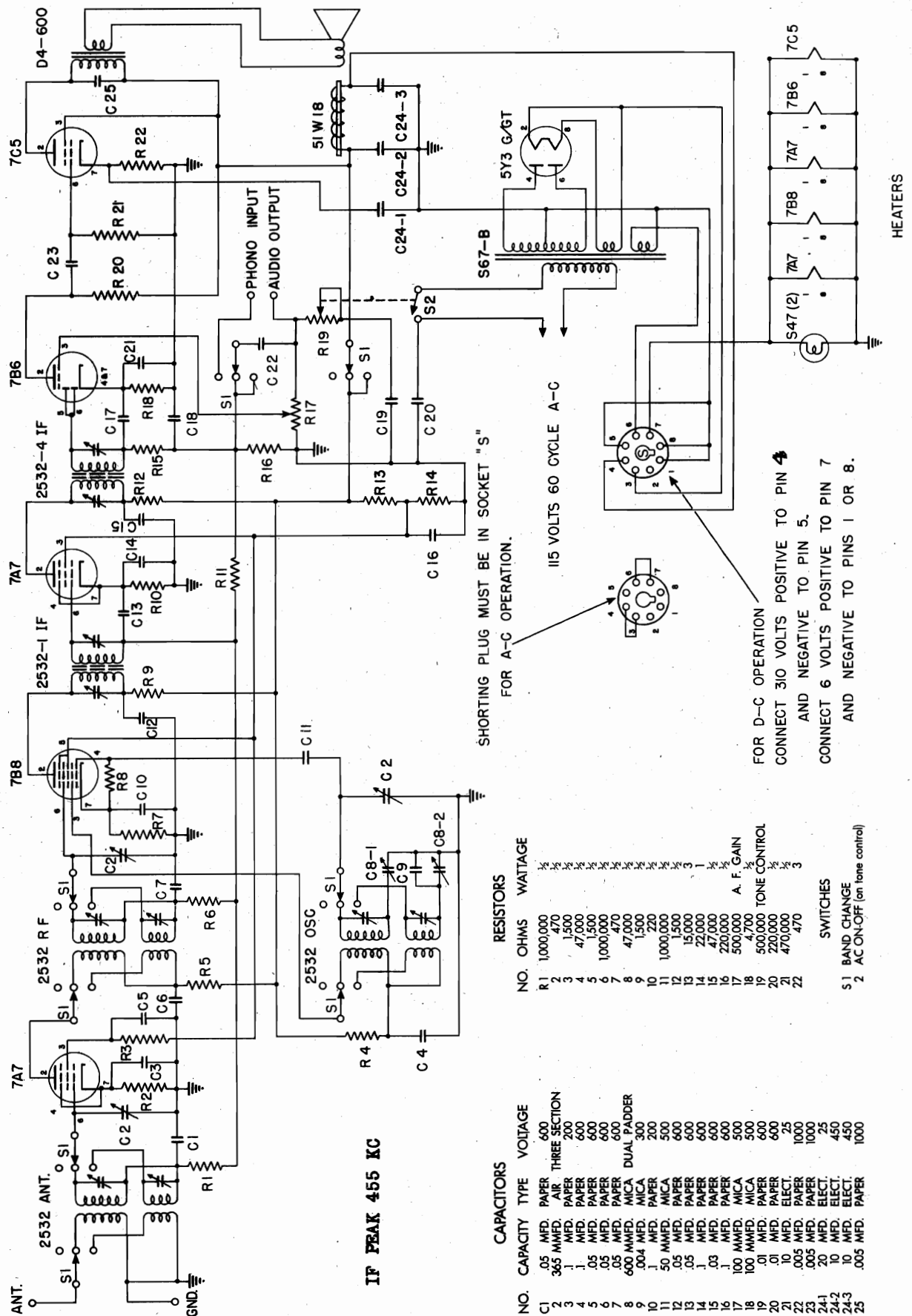
1. The modulated oscillator must be tuned to 455 K.C.
2. Connect the high side of the oscillator output to the lug on the R.F. section of the gang condenser. The low side of the oscillator is connected to the chassis through a .01 condenser.
3. Set the gang condenser of the radio to the low end of the dial and turn the volume control on full.
4. Adjust the four I.F. trimmers tuning each carefully to get the maximum deflection of the output meter. Reduce the oscillator output if the output meter goes off scale.
5. Repeat all four adjustments since the adjustment of each I.F. trimmer may effect the others to a certain extent.

R.F. AND OSCILLATOR ALIGNMENT:

1. Connect the oscillator output to the external loop antenna and closely couple to the loop antenna of the receiver.
2. Set the generator at 1500 KC and turn the gang condenser to 1500 on the dial. Adjust the oscillator trimmer for maximum output.
3. Set the generator at 1400 KC and turn the gang condenser to 1400 on the dial. Adjust the R.F. trimmer for maximum output while rocking the gang.
4. Set the generator at 600 KC and turn the gang to 600 KC on the dial and check for tracking.

MEGARD CORP.

SCHEMATIC DIAGRAM — HOLLYWOOD ELECTRONICS — MODEL HE-621

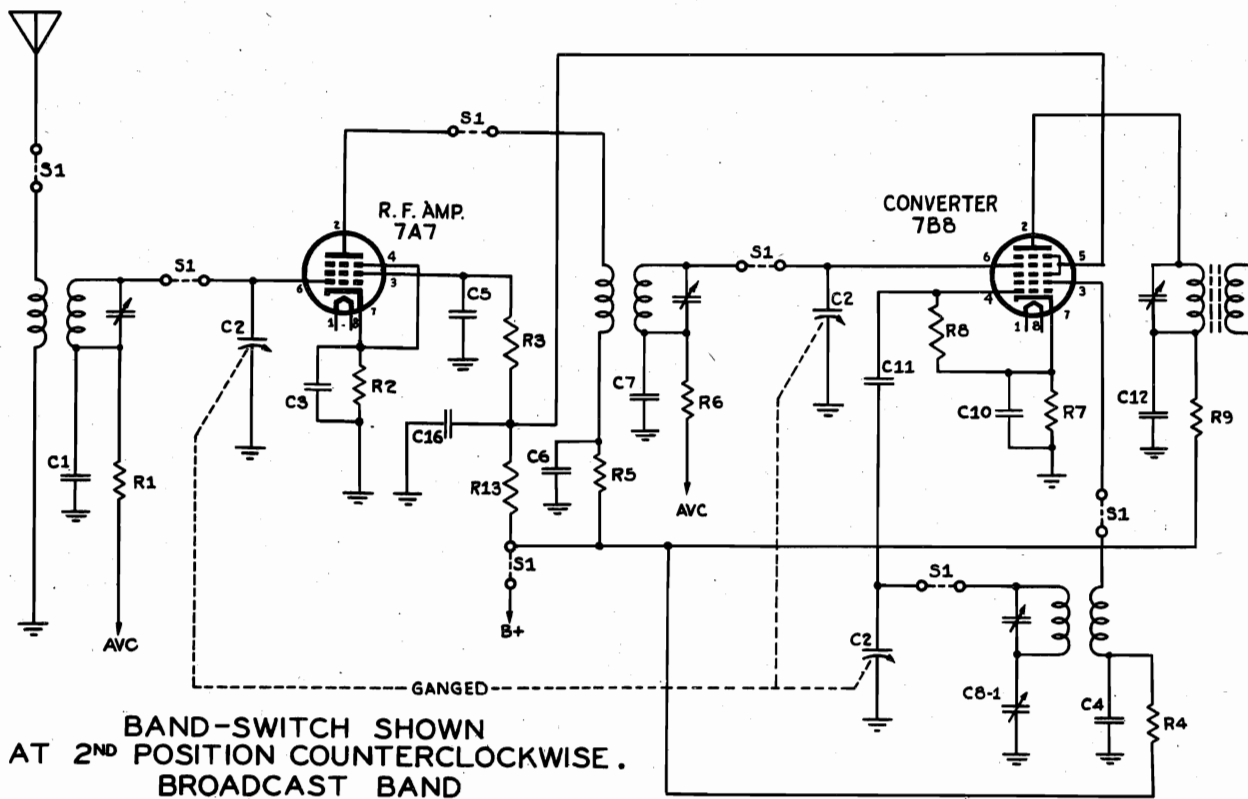
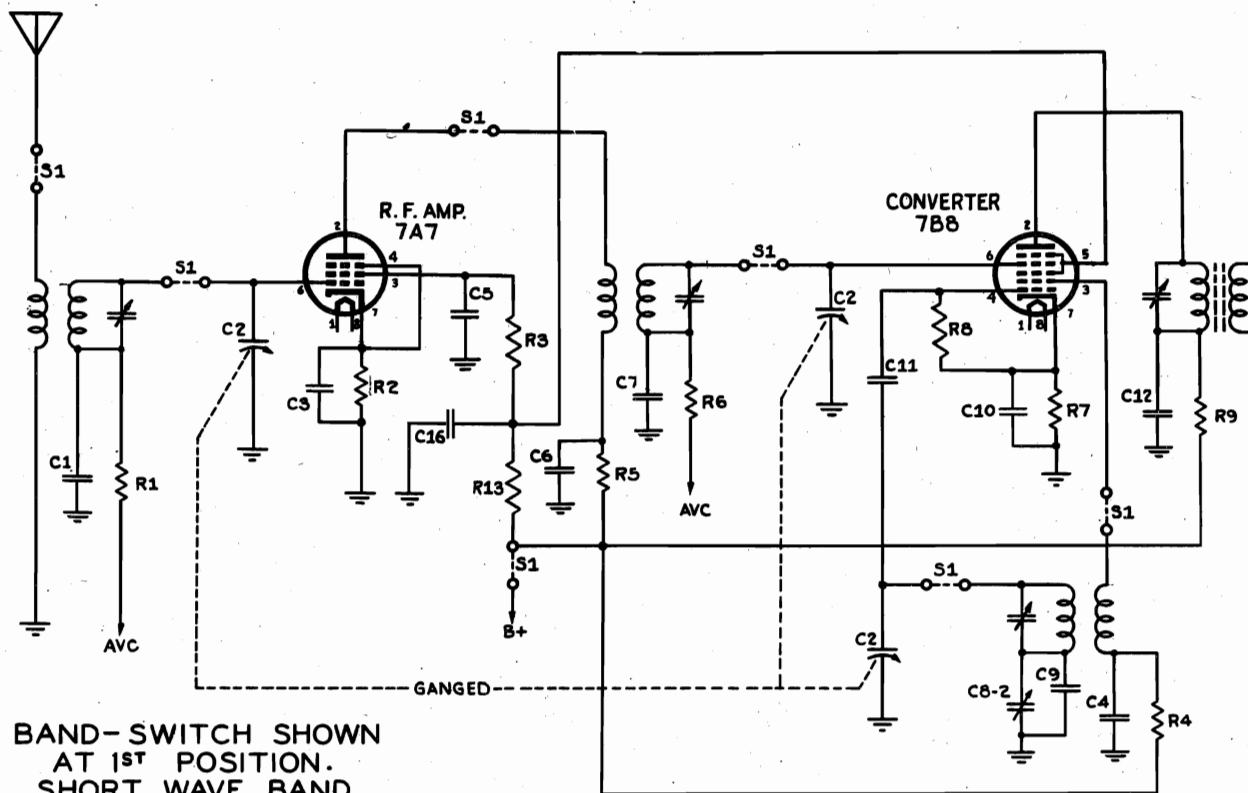


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PAGE 15-2 MEGARD

MODEL HE-621

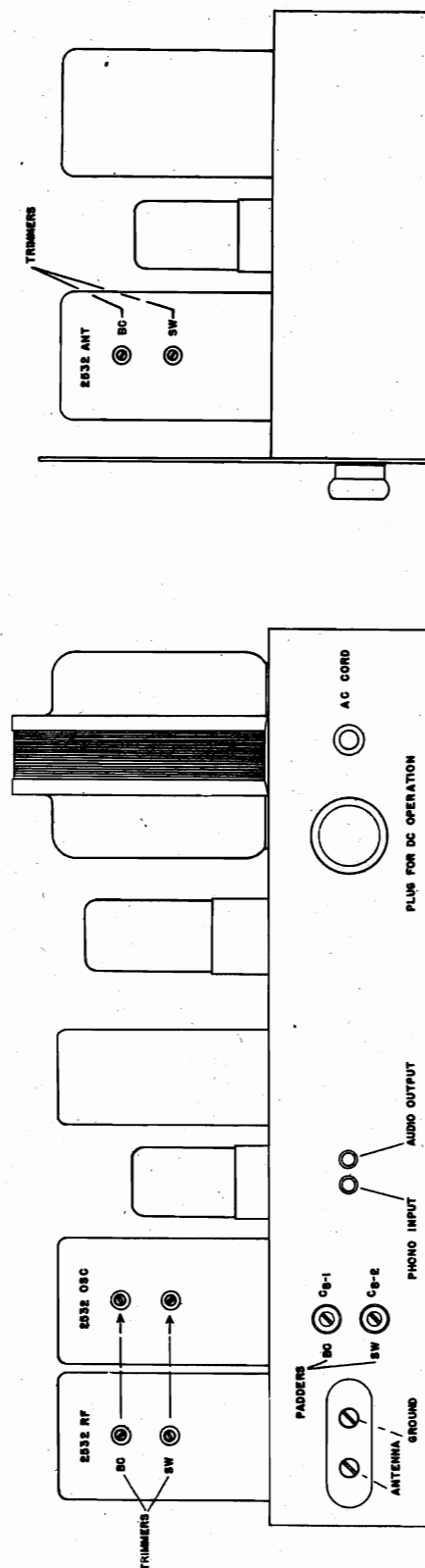
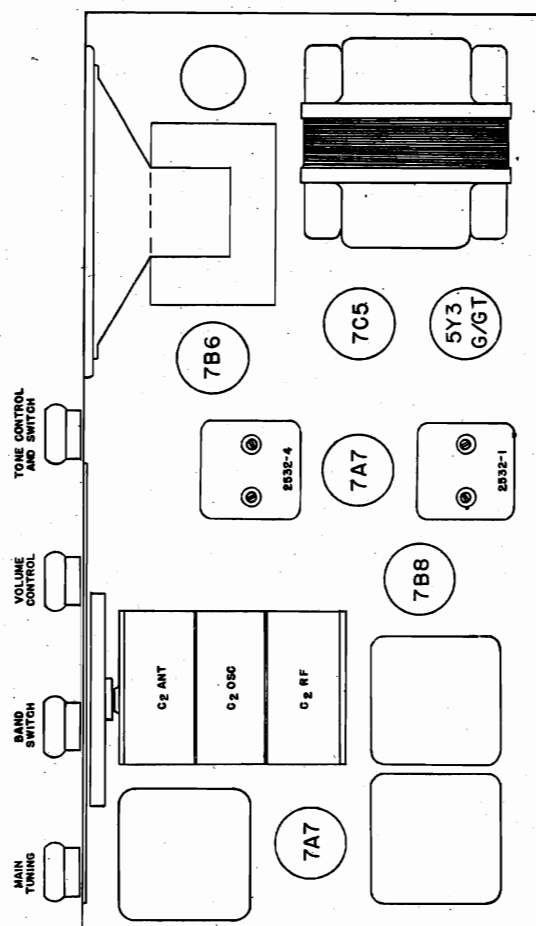
MEGARD CORP.



MEGARD CORP.

BATTERY OPERATION

The HE-621 is intended to be supplied from a 115 volt 50 to 60 cycle A.C. source but if desired the jumper wires of the plug located next to the A.C. cord on the rear apron of the chassis may be removed and the plug wired as indicated on the diagram to allow operation from batteries or a battery pack.



MEGARD CORP.

INTERMEDIATE FREQUENCY ALIGNMENT

Prepare the receiver as follows:

Remove the antenna completely.

Band switch on "BC" or middle position.

Set dial to a point near the high frequency or 1500 Kc. end where no station is received.

Turn tone and volume controls to maximum clockwise rotation

Connect a signal generator to the stator connection of the tuning condenser section C2 RF or to the RF input grid (socket connection #6) of the 7B8 tube. If there is no blocking condenser in the output lead of the signal generator, the lead should be connected through a .1 Mfd. condenser instead of directly. Connect the ground of the signal generator to the chassis of the receiver or to the terminal on the antenna ground strip marked "G".

After the above connections have been made, set the signal generator for 455 Kc. 30% modulated signal output.

Now adjust the condensers on IF transformers 2532-1 and 2532-4 for exact resonance which will be indicated by maximum signal output. An output meter of the rectifier type should be used and may be connected through a suitable coupling condenser to the plate (socket connection #2) of the 7C5 output tube or to the voice coil leads of the speaker. When making the final adjustments to the IF tuning condensers, it is advisable to use as low an input signal level as possible.

RADIO FREQUENCY ALIGNMENT

Replace the .1 Mfd. condenser in series with the generator lead with a 400 ohm resistor. Connect the generator to the terminal marked "A" on the antenna-ground strip which is mounted on the rear apron of the chassis. All trimmer adjustments are for the high frequency ends of the bands and are located in the sides of the coil shield cans. The Broadcast band trimmer is the uppermost one in each case. All padder adjustments are for the low frequency ends of the bands and are located on the rear apron of the chassis. The padder for the Broadcast band is the uppermost one.

BROADCAST BAND.

Place band switch in the middle or BC position. Set generator to 1400 Kc. and adjust the oscillator trimmer to receive the signal at the proper calibration on the receiver dial. Adjust the "BC" RF and ANT trimmers for maximum signal. Re-set generator and receiver to 600 Kc. and adjust padder condenser C8-1 for proper calibration or maximum signal. If it should prove necessary to change the adjustment of padder C8-1 to any appreciable extent, it may also be necessary to re-adjust the oscillator trimmer condenser for exact calibration at the high frequency end of the band.

SHORT WAVE BROADCAST BAND.

Place band switch in the clockwise or "SW" position. Set generator and receiver dial to 15 Mc. and adjust oscillator trimmer for proper calibration. (More than one signal may be heard as the trimmer condenser is rotated. At least two major signals will be observed. The proper signal will be the one tuned nearest maximum anti-clockwise rotation of the trimmer condenser.) Re-set receiver and signal generator to approximately 13 Mc. and adjust "SW" RF and ANT trimmers for maximum signal. (Again more than one position of the trimmers may result in maximum signal. The one nearest maximum clockwise rotation is the correct one.) Re-set signal generator to 6 Mc. and adjust padder condenser C8-2 for maximum signal.

ANTENNA

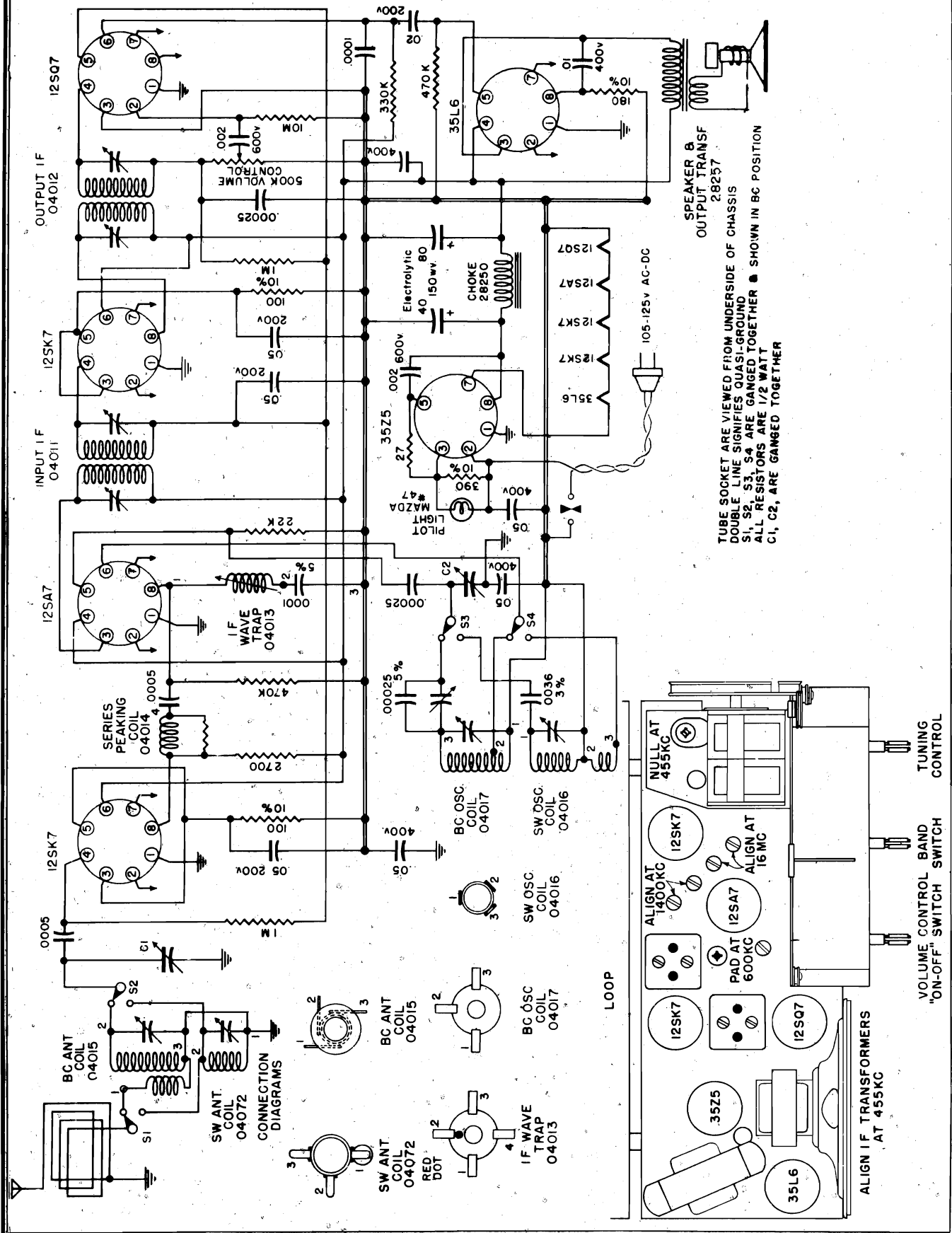
The receiver should be used with as short an antenna as may be practical under the particular conditions of use. An antenna length of 6 to 15 feet is recommended for average conditions.

PHONO OR TUNER

To use the HE-621 receiver as a tuner to feed a public address amplifier etc., output may be obtained from the jack farthest from the antenna-ground strip on the rear apron of the receiver. An amplifier of high impedance input should be used.

To use the HE-621 as an amplifier for use with a record player turntable and pickup, the output of the pickup (which should be of the high impedance type) may be plugged into the jack nearest the antenna-ground strip on the rear apron of the chassis. The band change switch should be turned to its extreme counterclockwise or "PHONO" position

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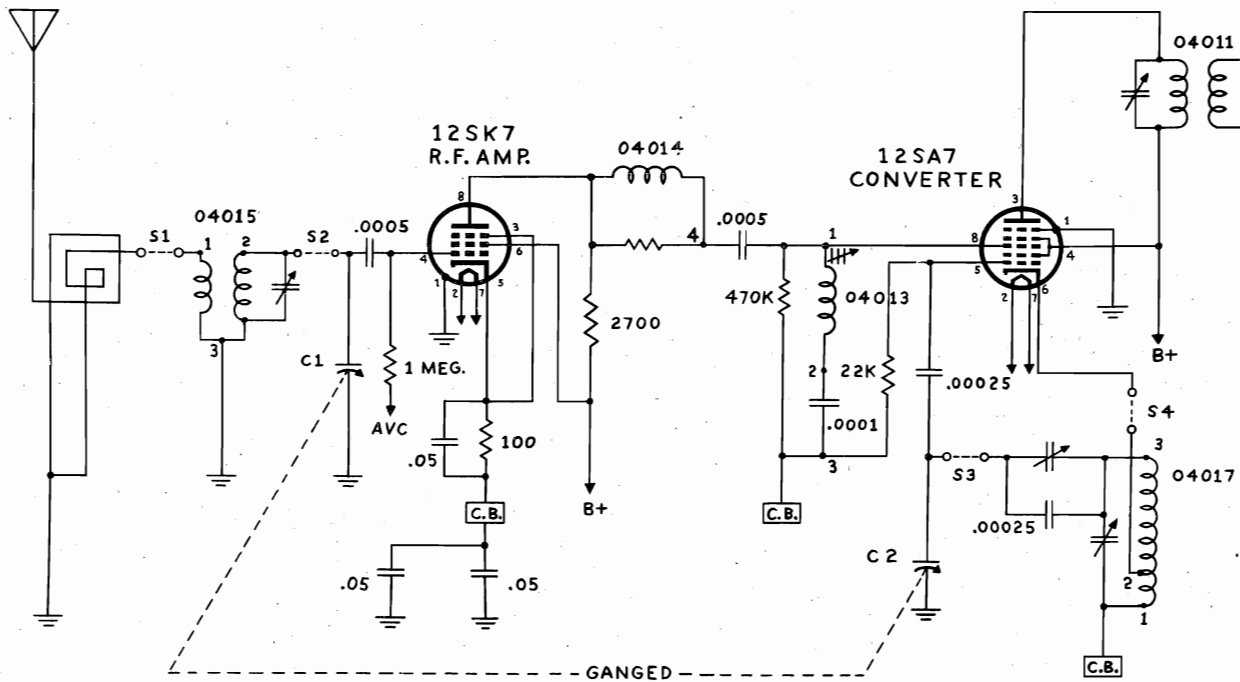


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PAGE 15-2 MEISSNER

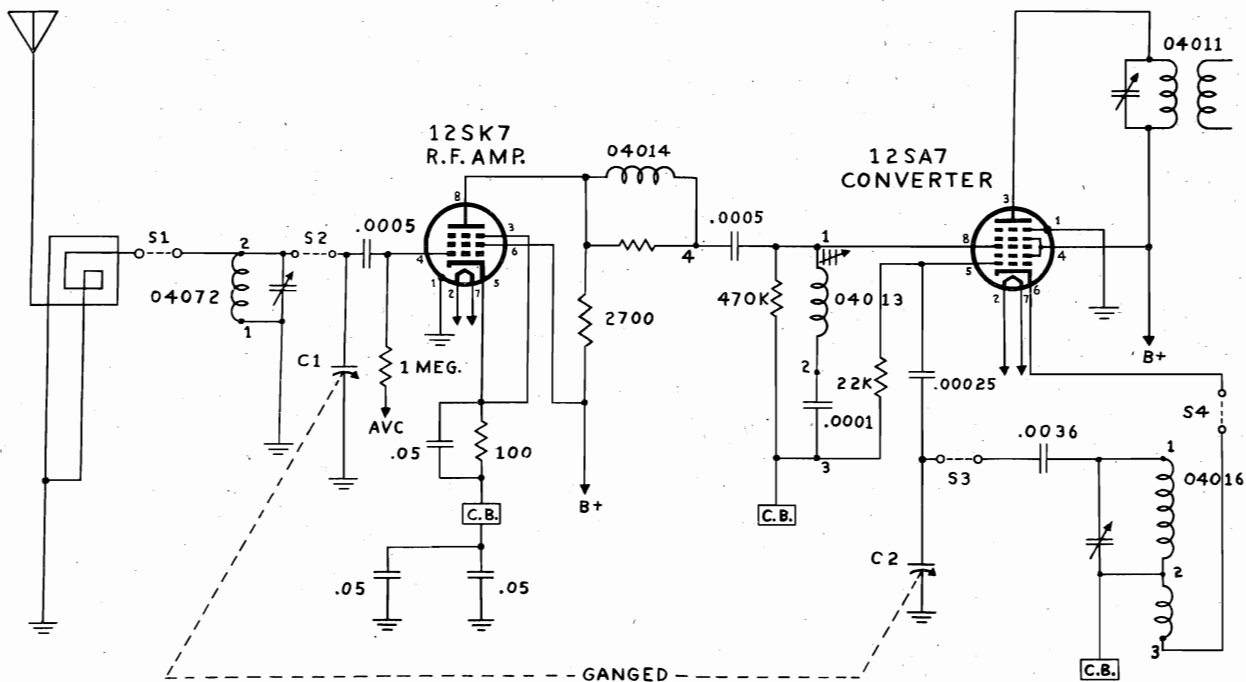
MODELS 9-1084, 9-1086

MEISSNER MFG. DIV.-
MAGUIRE INDUSTRIES INC.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
530-1600 KC.

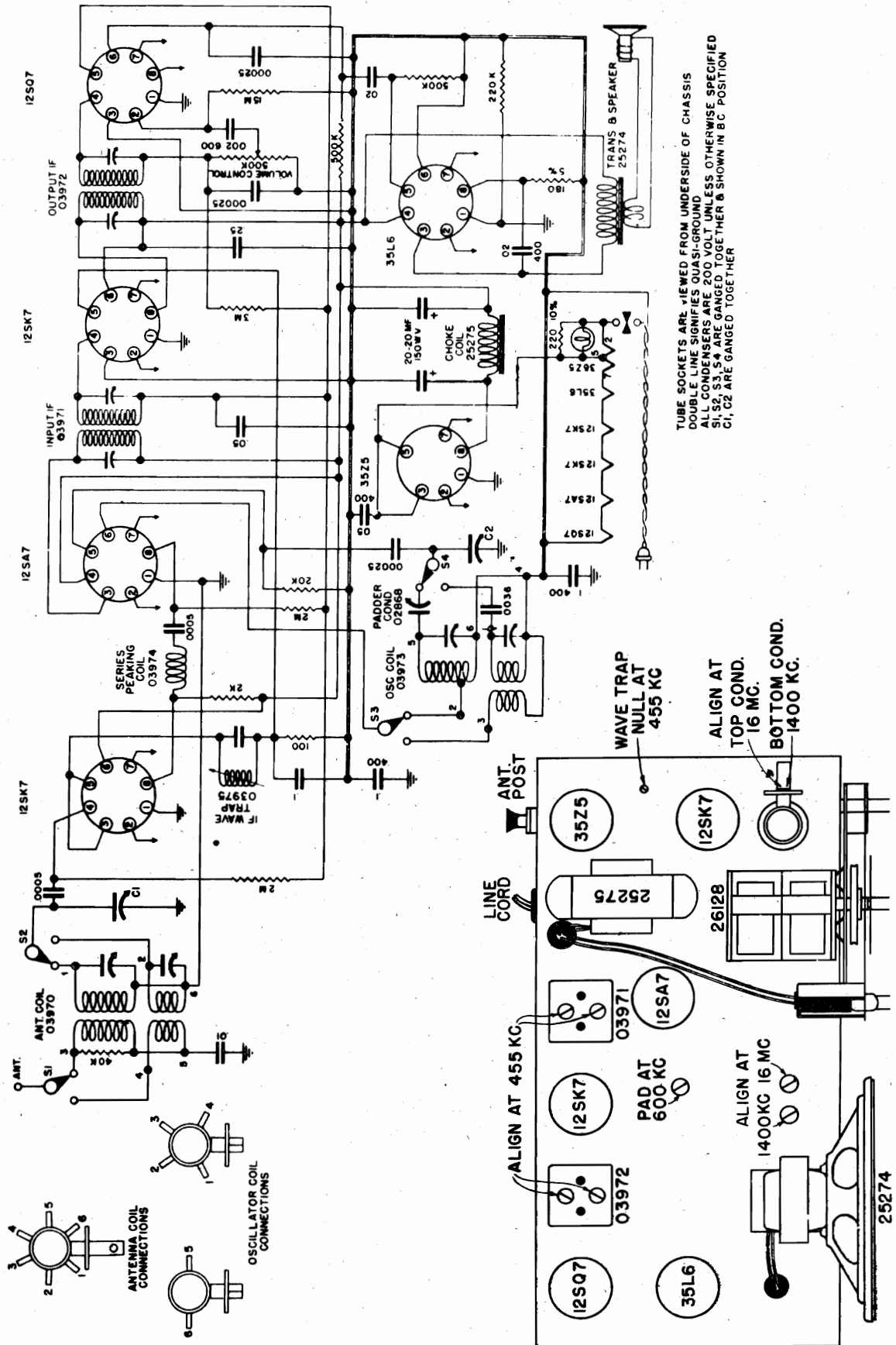
[C.B.] - DENOTES COMMON BUS



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
SHORT WAVE BAND
6-18 MC.

[C.B.] - DENOTES COMMON BUS

MEISSNER MFG. DIV.-
MAGUIRE INDUSTRIES INC.

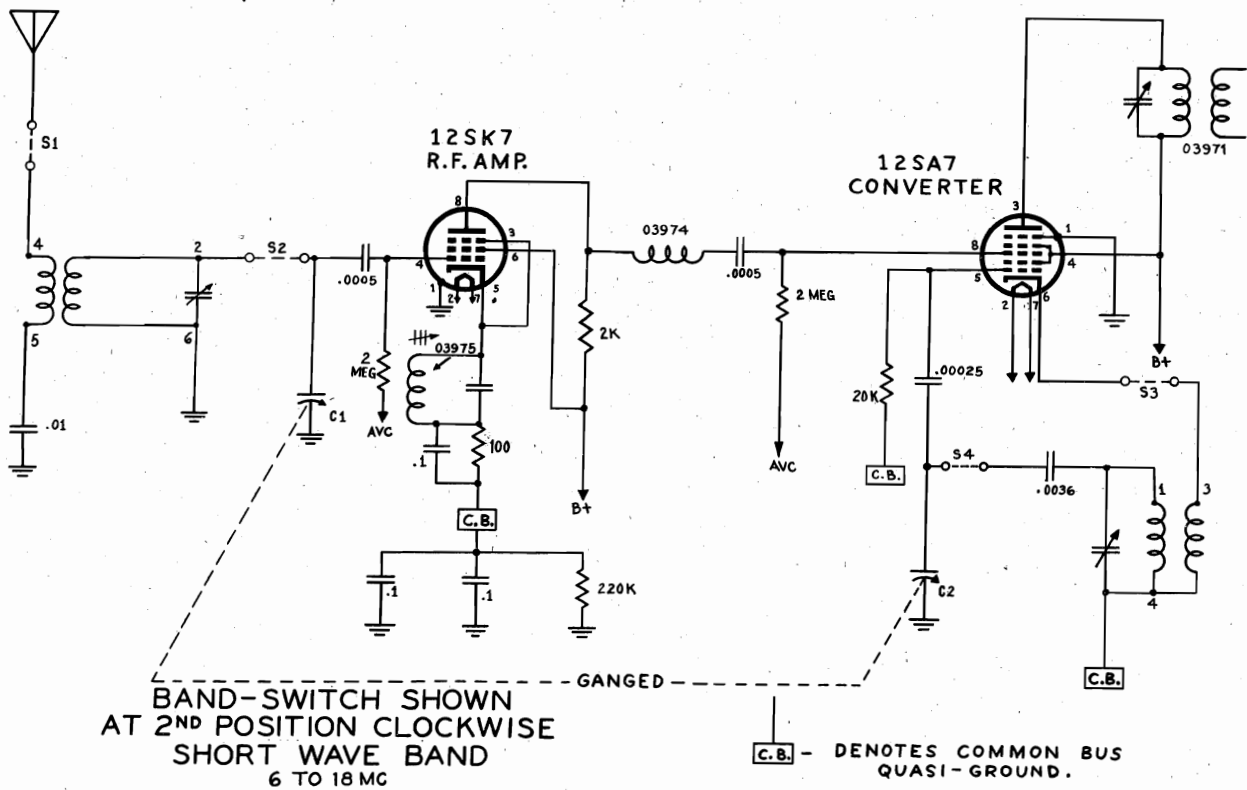
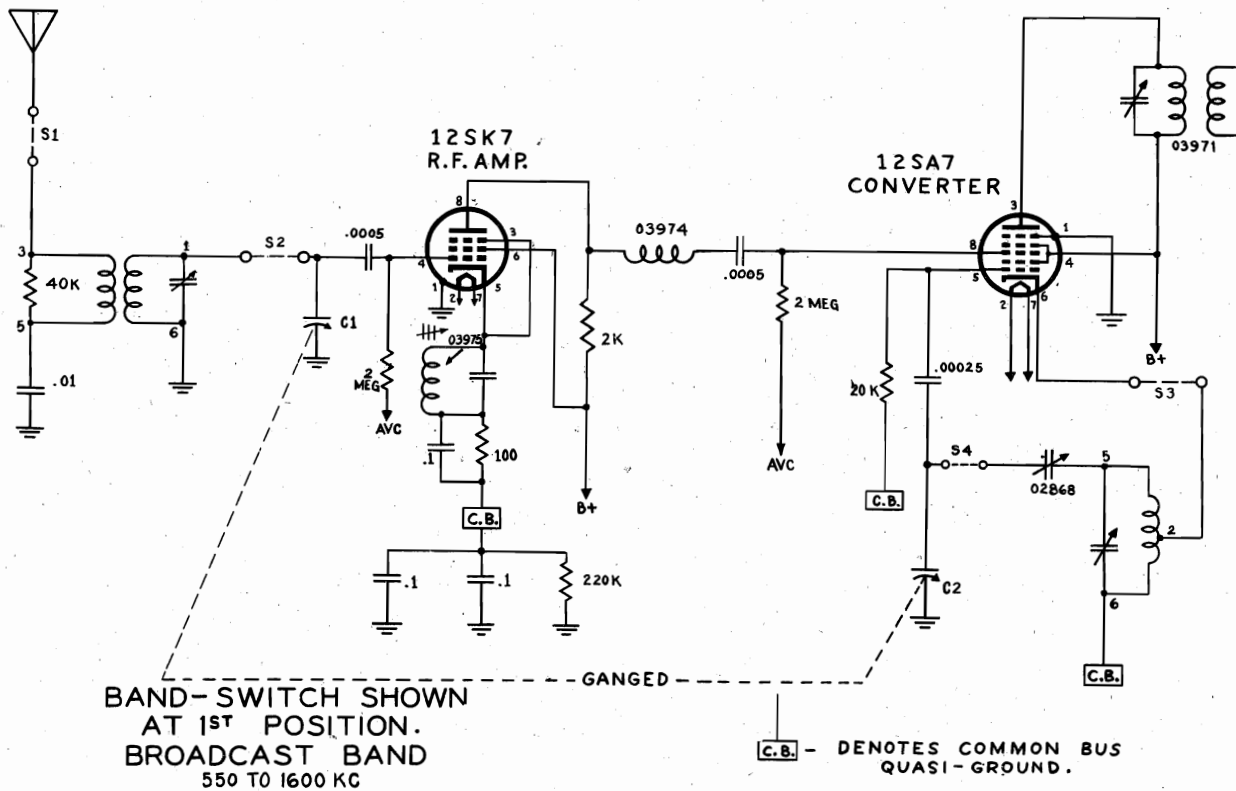


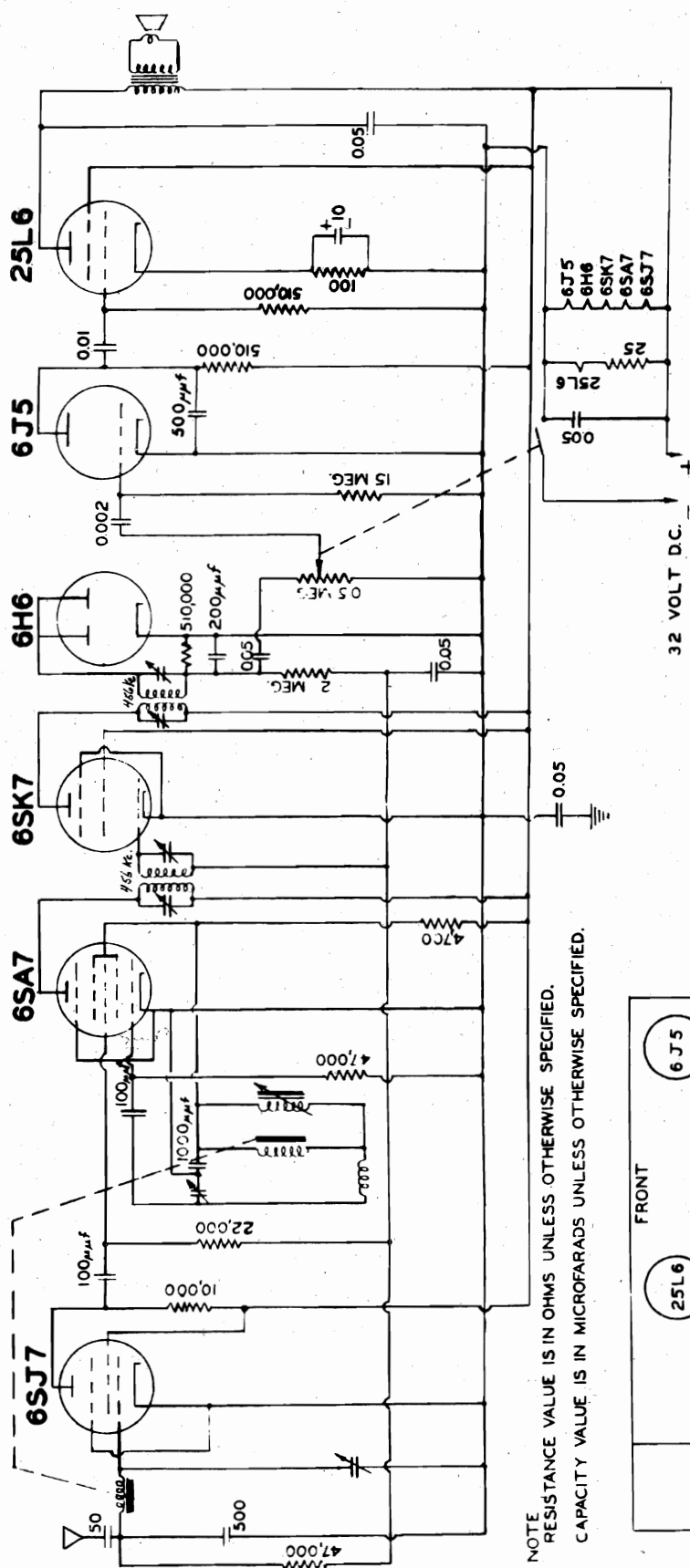
"clarified schematics"

PAGE 15-4 MEISSNER

MODEL 9-1085

MEISSNER MFG. DIV.-
MAGUIRE INDUSTRIES INC.





NOTE
RESISTANCE VALUE IS IN OHMS UNLESS OTHERWISE SPECIFIED.
CAPACITY VALUE IS IN MICROFARADS UNLESS OTHERWISE SPECIFIED.

FRONT		TUBE LOCATION	
6SJ7	25L6	6SA7	6SK7
		1F	1F.
	6J5	6H6 6Y 6J5	

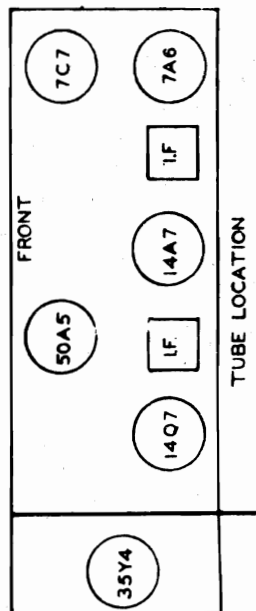
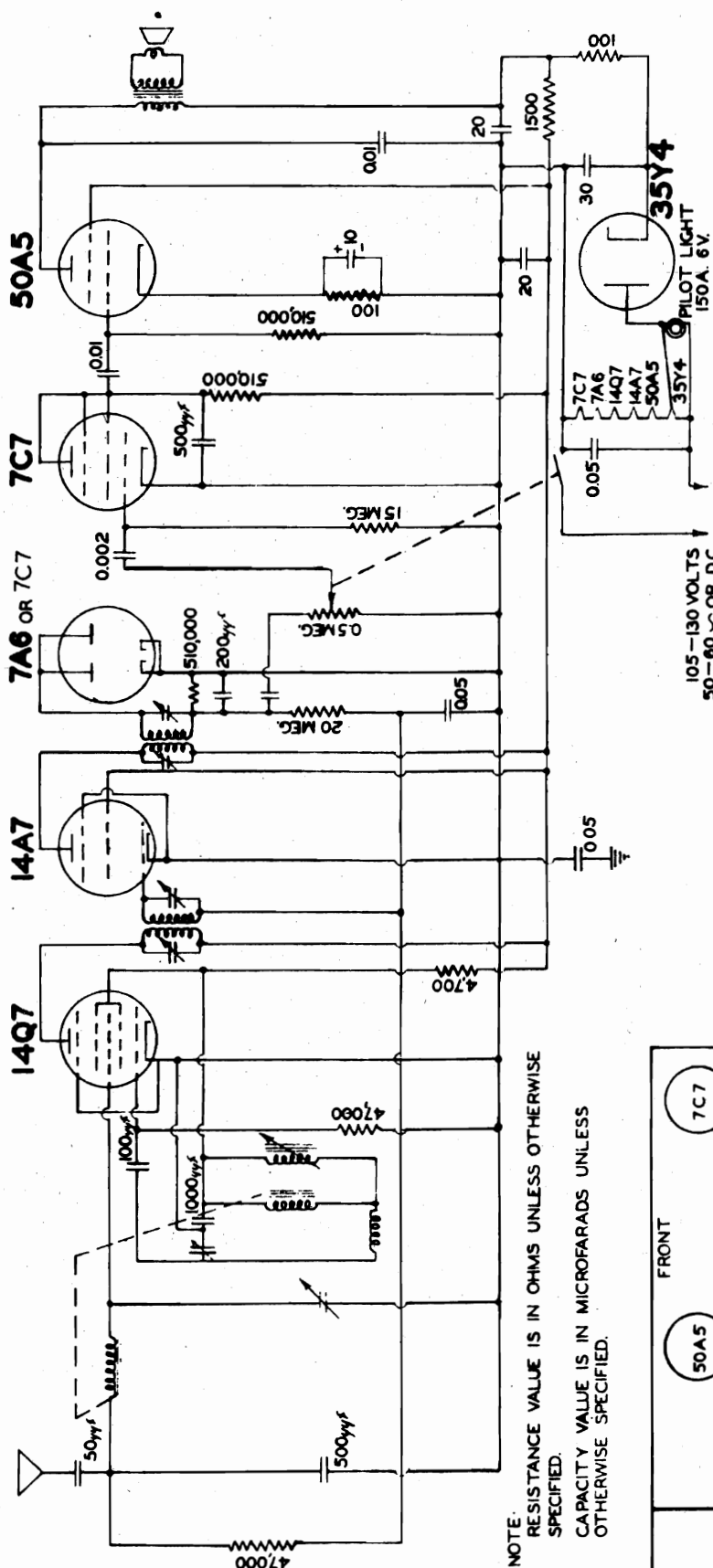
IF PEAK 456 KC

TOLERANCES UNLESS OTHERWISE SPECIFIED		NOTE	
FRACTIONAL DIMENSIONS	$\pm 1/64"$	DRAWN <i>KTH</i> CHECKED _____ APPROVED _____ DATE <i>7-15-46</i>	
DECIMAL DIMENSIONS	$\pm .003$		
ALL ANGLES INCLUDING	$\pm 1/4^\circ$		
RIGHT ANGLES	$\pm 1/4^\circ$		
MIDLAND MANUFACTURING CO. DECORAH, IOWA		PART NO. <i>32-104</i> NO REQ. _____ PART NAME <i>SCHEMATIC</i> MATERIAL <i>B6A</i>	
SALE _____ JOHNSON & SONS, INC.			

Model B6B is identical with B6A, except that a 28-D-7 tube is substituted for the 25L6 audio output tube. The plates and grids of the 28-D-7 are parallel connected.

MODELS M6A, M6D

MIDLAND MFG. CO



MIDLAND MANUFACTURING CO. DECORAH, IOWA	
PART NAME LOCAL SCHEMATIC M6A	
MATERIAL	
PART NO. 32-100	NO. REV.
SCALE	DRG. NO.
APPROVED	DATE 4-27-46
DRAWN ADW	
TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONAL DIMENSIONS ± 1/64 ALL ANGLES INCLUDE 90° ± 1° RIGHT ANGLE	

Some receivers of this model will be found with 470,000 ohm resistor in the AVC return of the converter grid. This was subsequently changed to 47,000 ohms to reduce hum caused by incorrect polarity of line cord.

IF PEAK 456 KC

NOTE
RESISTANCE VALUE IS IN OHMS UNLESS OTHERWISE SPECIFIED.
CAPACITY VALUE IS IN MICROFARADS UNLESS OTHERWISE SPECIFIED.

12SA7 12SK7 12J5 12J5 35L6 35Z5

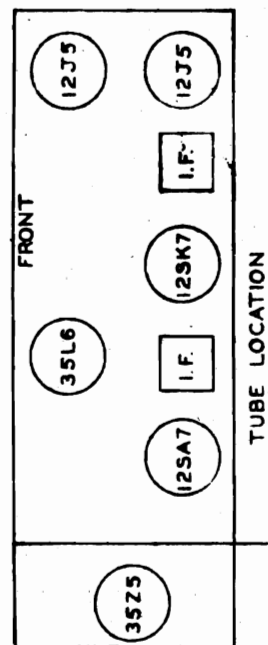
105-130 VOLTS 50-400 OHMS D.C.

PILOT LIGHT 35Z5

FRONT 35L6 12J5

RESISTANCE VALUE IS IN OHMS UNLESS OTHERWISE SPECIFIED.

CAPACITY VALUE IS IN MICROFARADS UNLESS OTHERWISE SPECIFIED



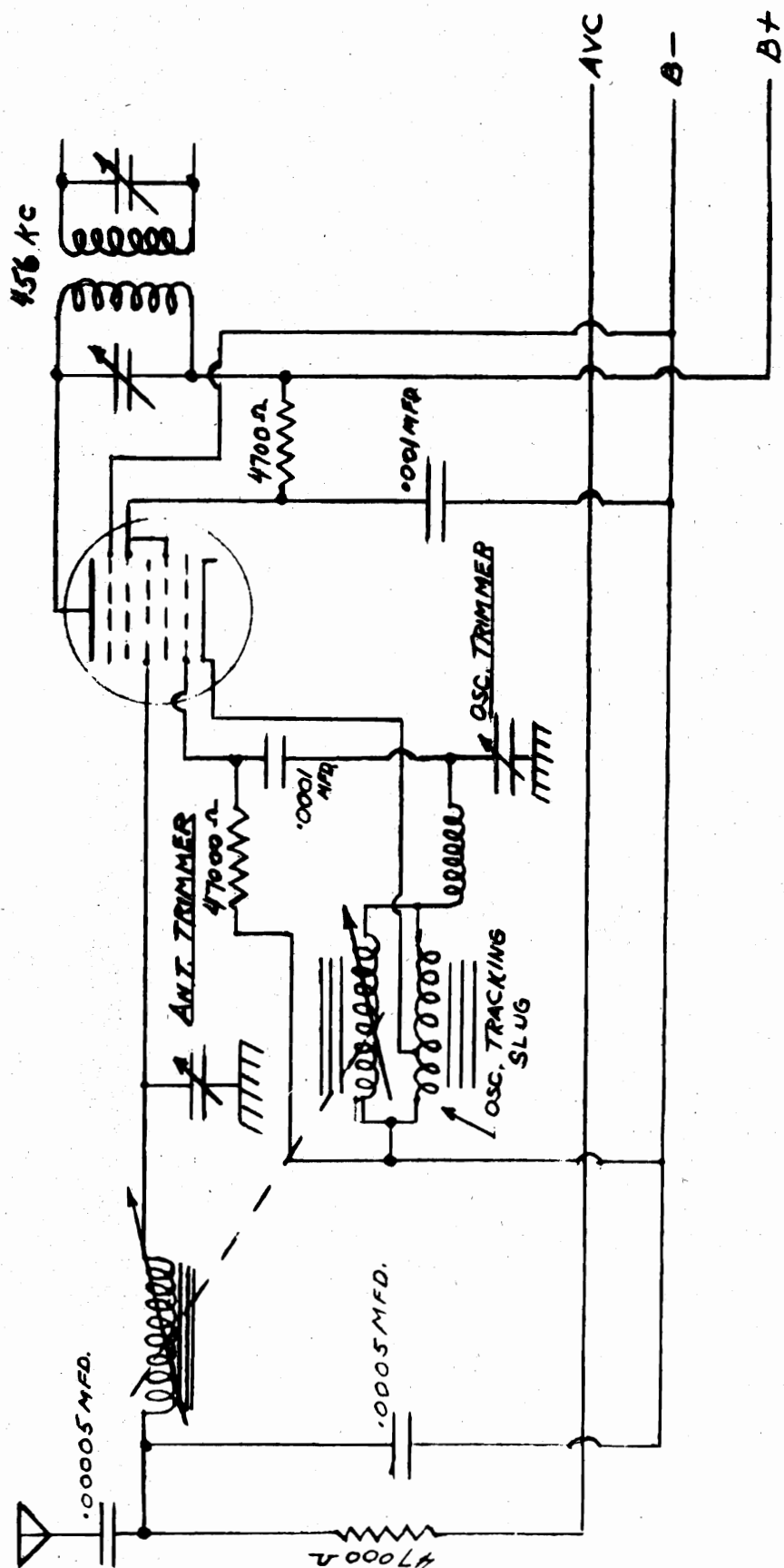
IF PEAK 456 KC

NOTE 1. 1/2" DIA.	MIDLAND MANUFACTURING CO. DECORAH, IOWA		
	PART NAME OCTAL SCHEMATIC M68		
	MATERIAL		
	PART NO 32-101	INC REQ.	ENG INC.
DRAWN NDM	CHECKED 4-27-46	SCALE	DO NOT SCALE DRAWING
APPROVED			

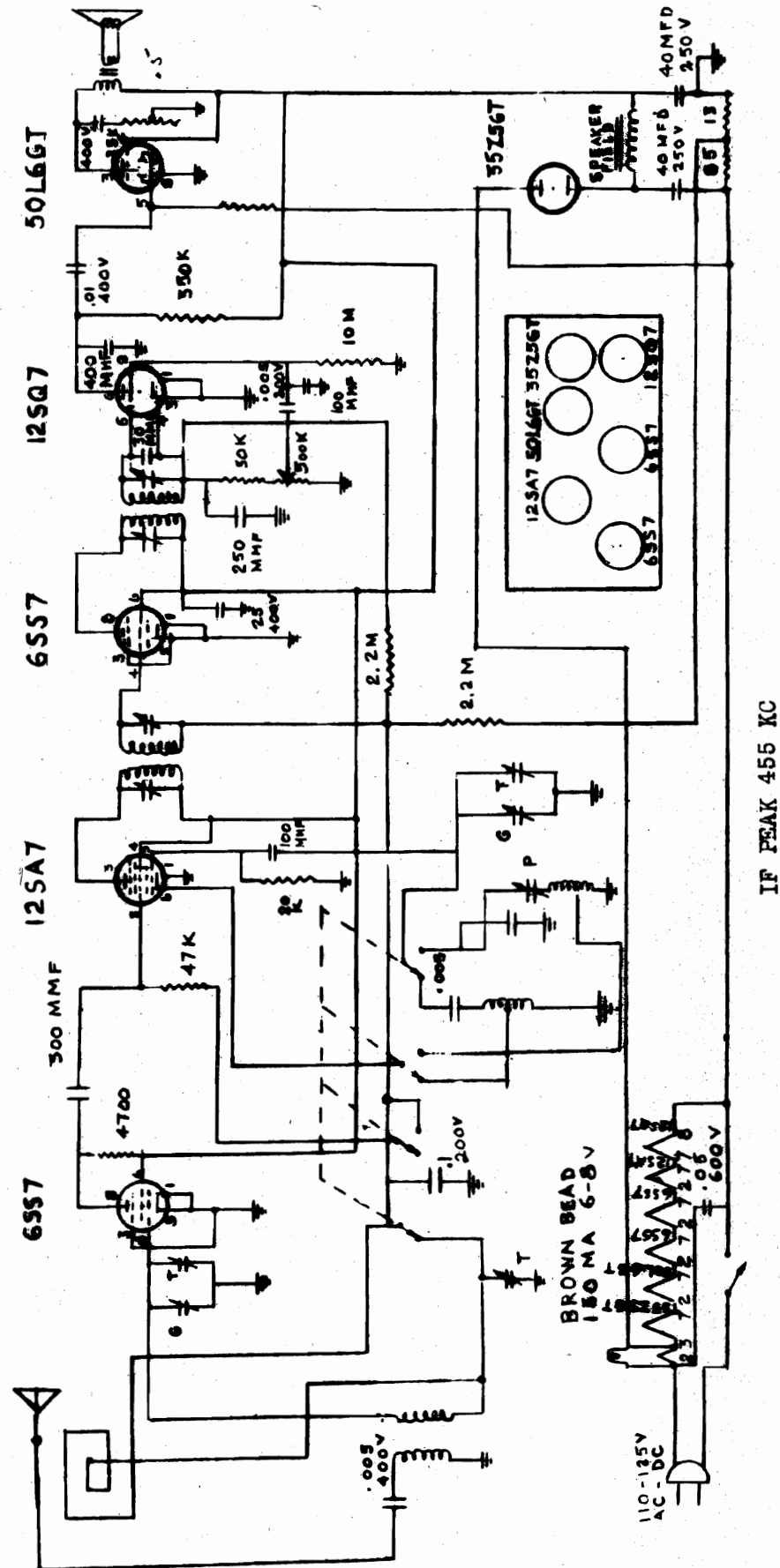
The 2nd Detector socket is wired for either a 12J5 or 12H6 tube.

The tuner may be either the one shown in the above schematic or that shown on the following page, P.15-4.

12SA7 CONV.

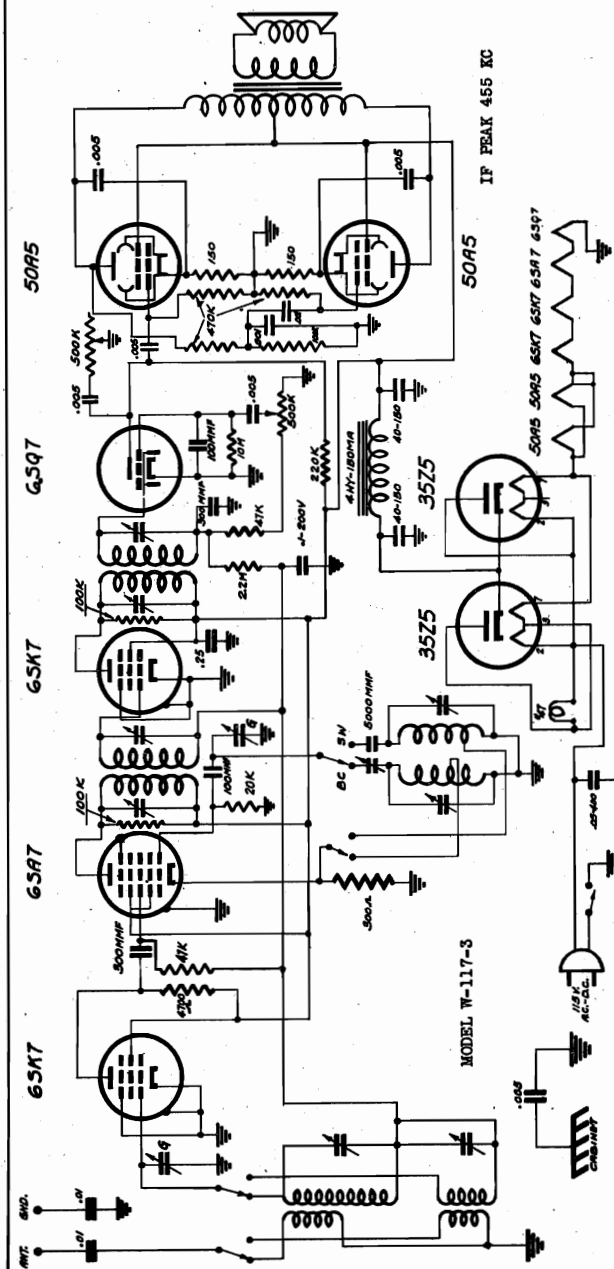
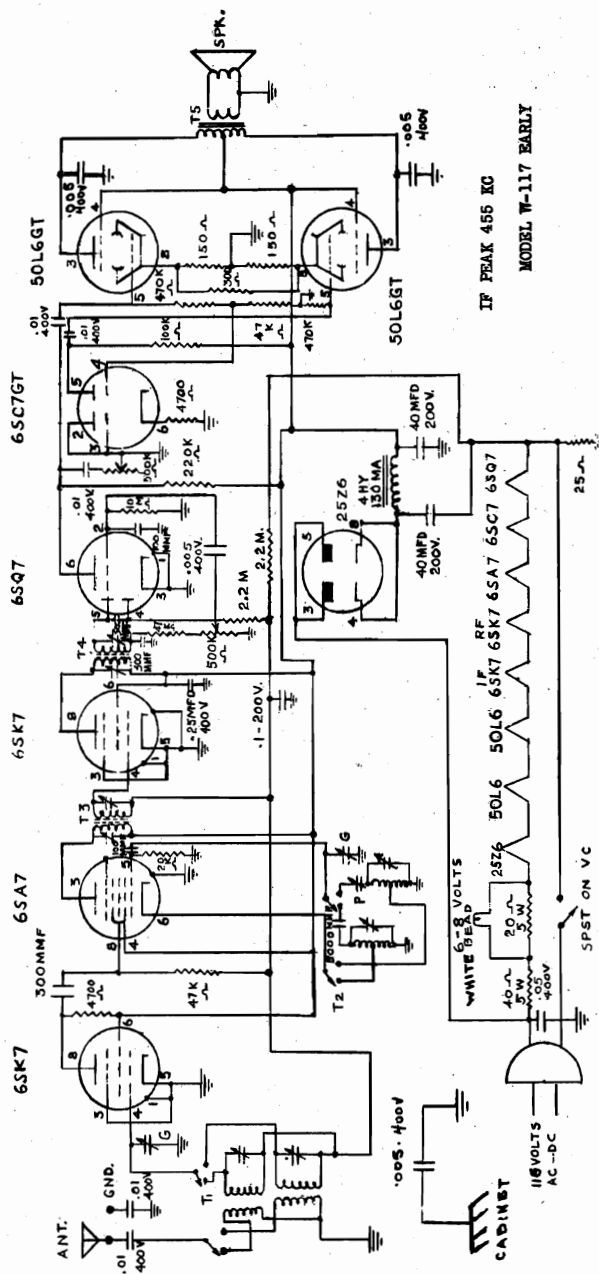


MINERVA CORP. OF AMERICA

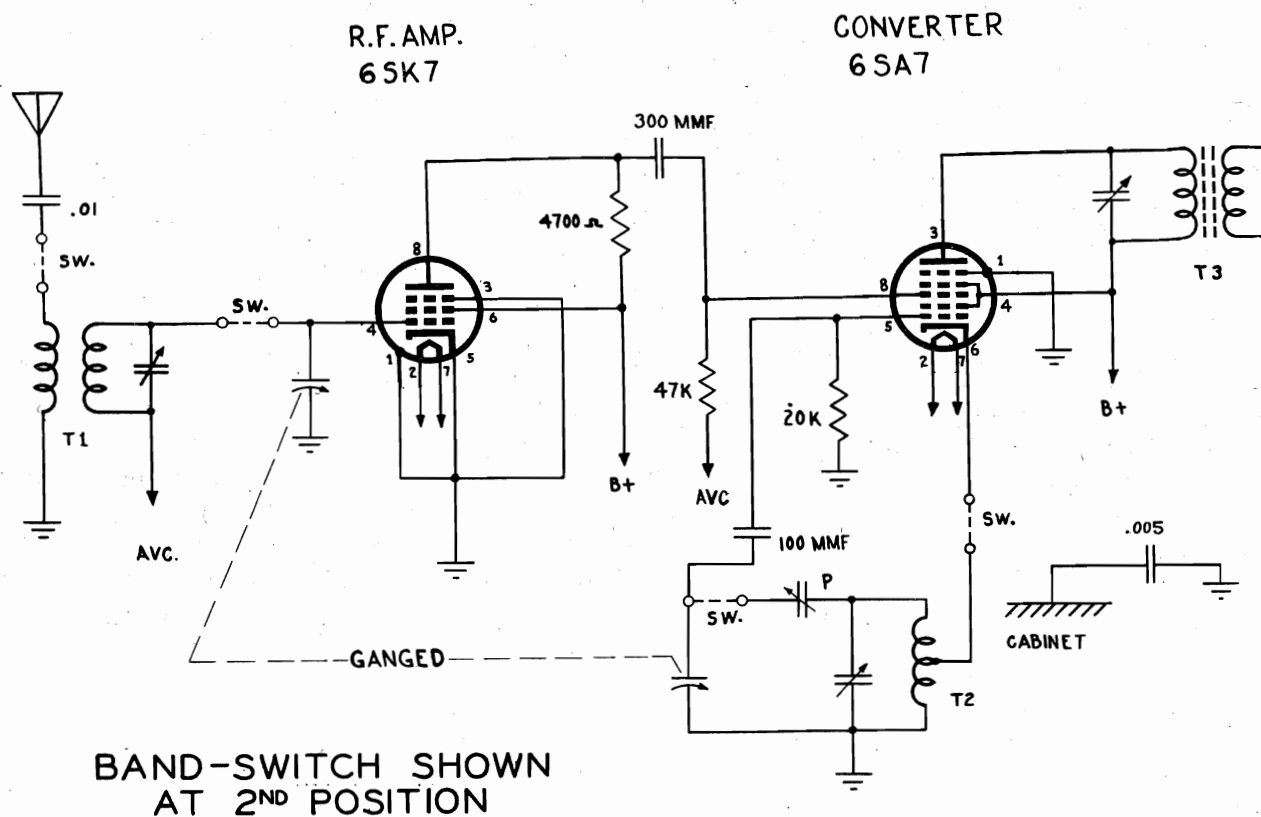
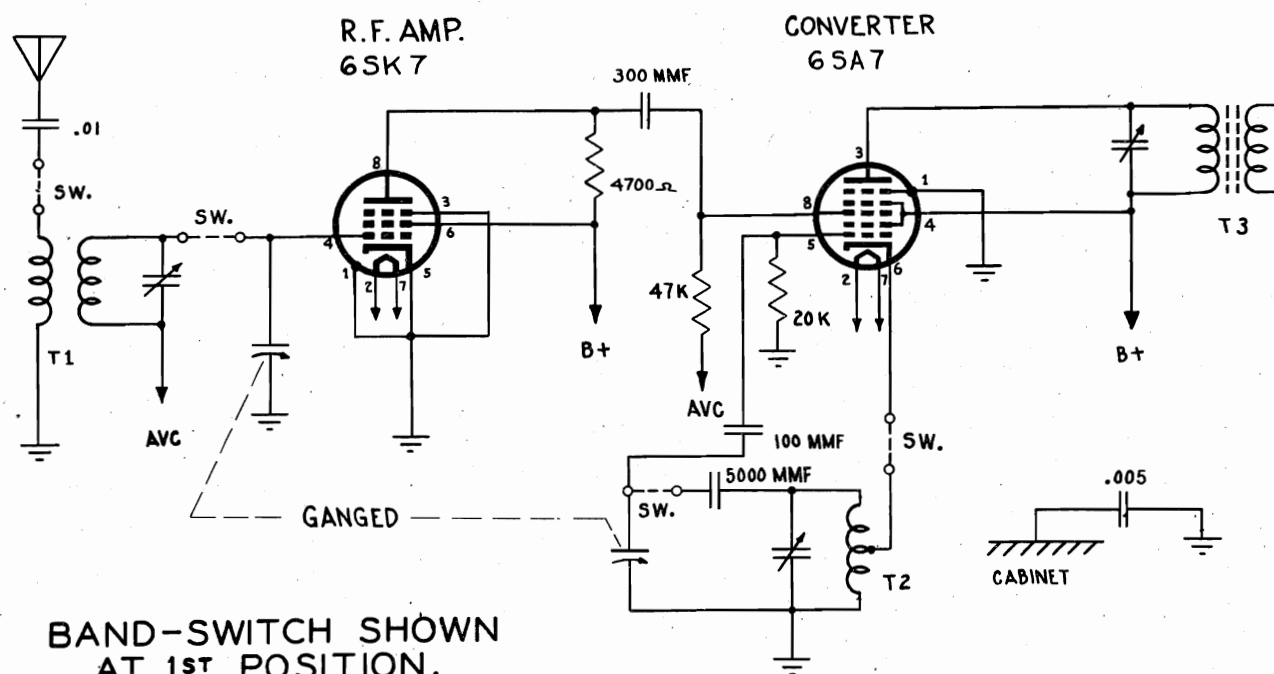


MODEL W117 Early
MODEL W117-3

MINERVA CORP. OF AMERICA



MINERVA CORP. OF AMERICA



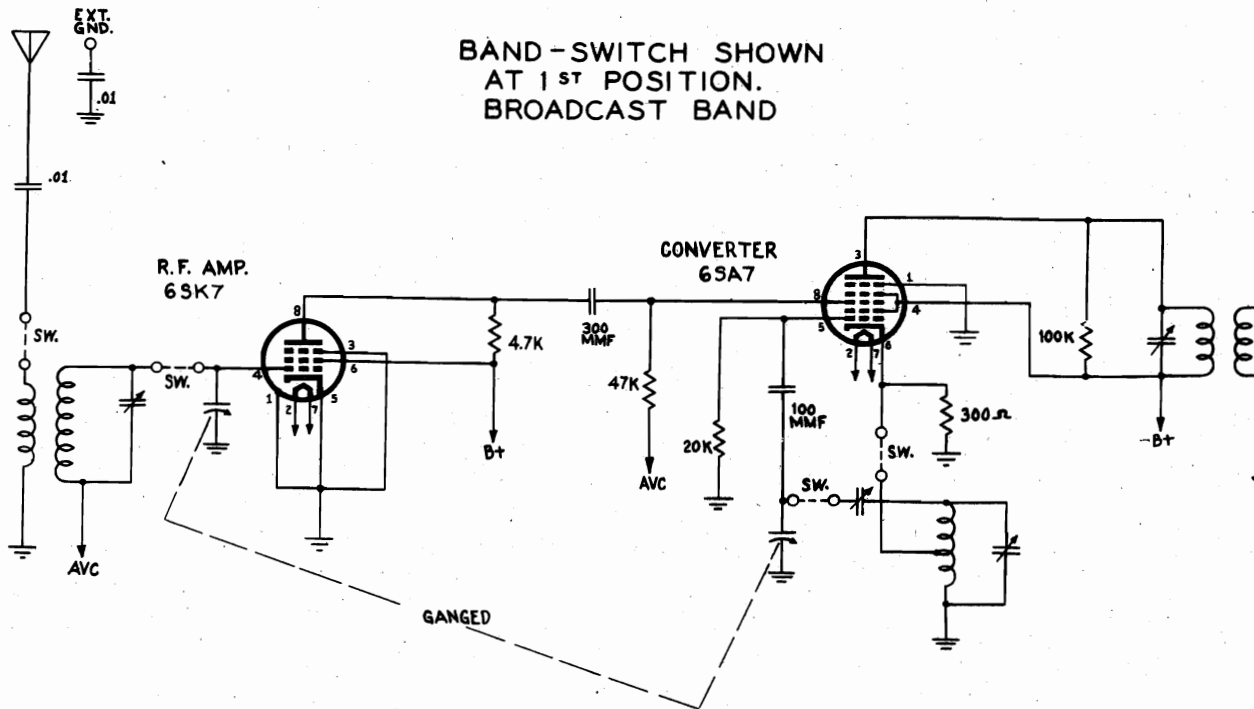
"clarified schematics"

PAGE 15-4 MINERVA

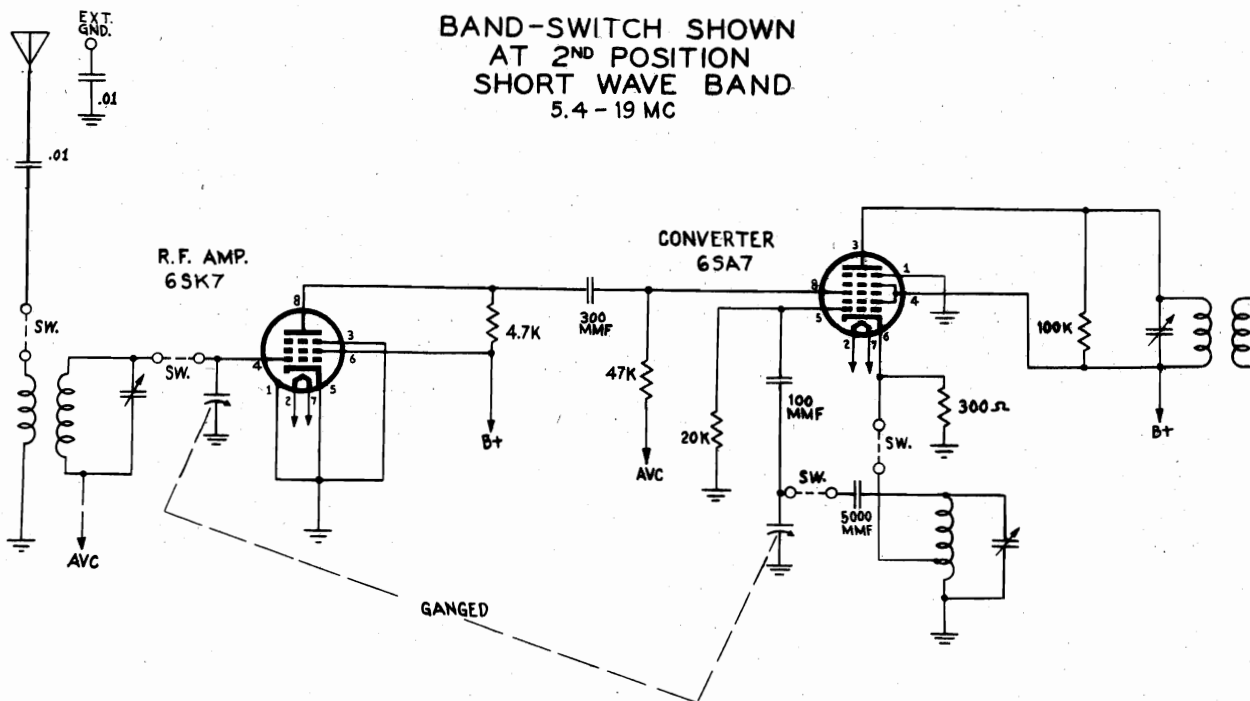
MODEL W117-3

MINERVA CORP. OF AMERICA

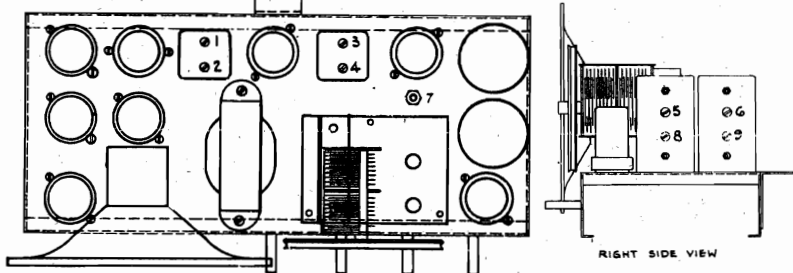
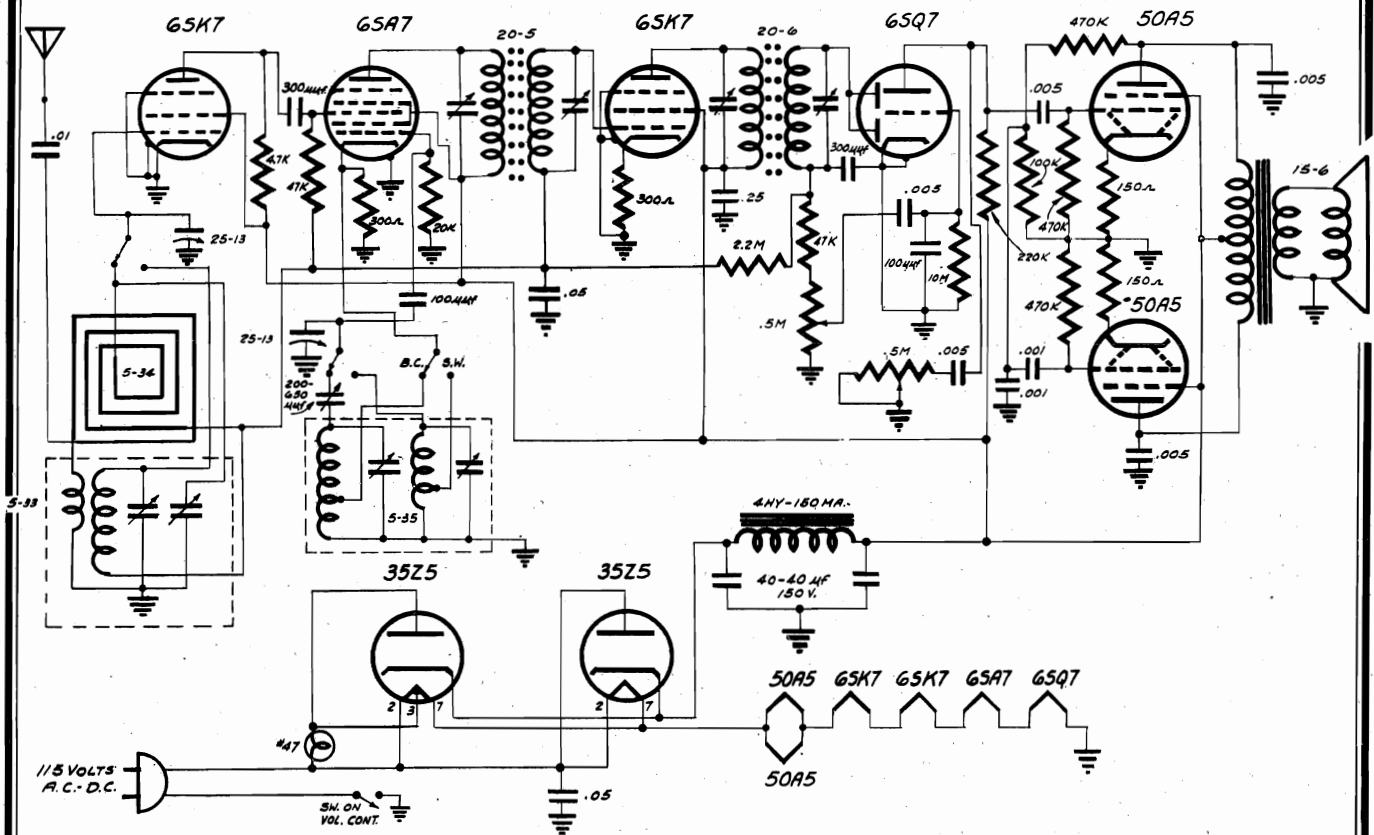
BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND



BAND-SWITCH SHOWN
AT 2ND POSITION
SHORT WAVE BAND
5.4 - 19 MC



MINERVA CORP. OF AMERICA



Tube Complement:—

- 1 — 6SK7 RF Amplifier
- 1 — 6SA7 Converter
- 1 — 6SK7 IF Amplifier
- 1 — 6SQ7 2nd Detector, AVC, 1st Audio
- 2 — 50A5 Power Amplifiers
- 2 — 35Z5 Rectifiers

GENERATOR CONNECTION	DUMMY ANT.	FREQ.	ADJ. TRIMMERS	OUTPUT
Stator front section	.1 MFD Cond.	455 KC	1, 2, 3, 4	Max.
Antenna Post	200 MMF Cond.	1500 KC	6, 5	Max.
Antenna Post	200 MMF Cond.	600 KC	7 rockgang	Max.
Antenna Post	200 MMF Cond.	1500 KC	6, 5	Max.
Antenna Post	400 ohm Res.	18 MC	9, 8	Max.

Tuning Range :

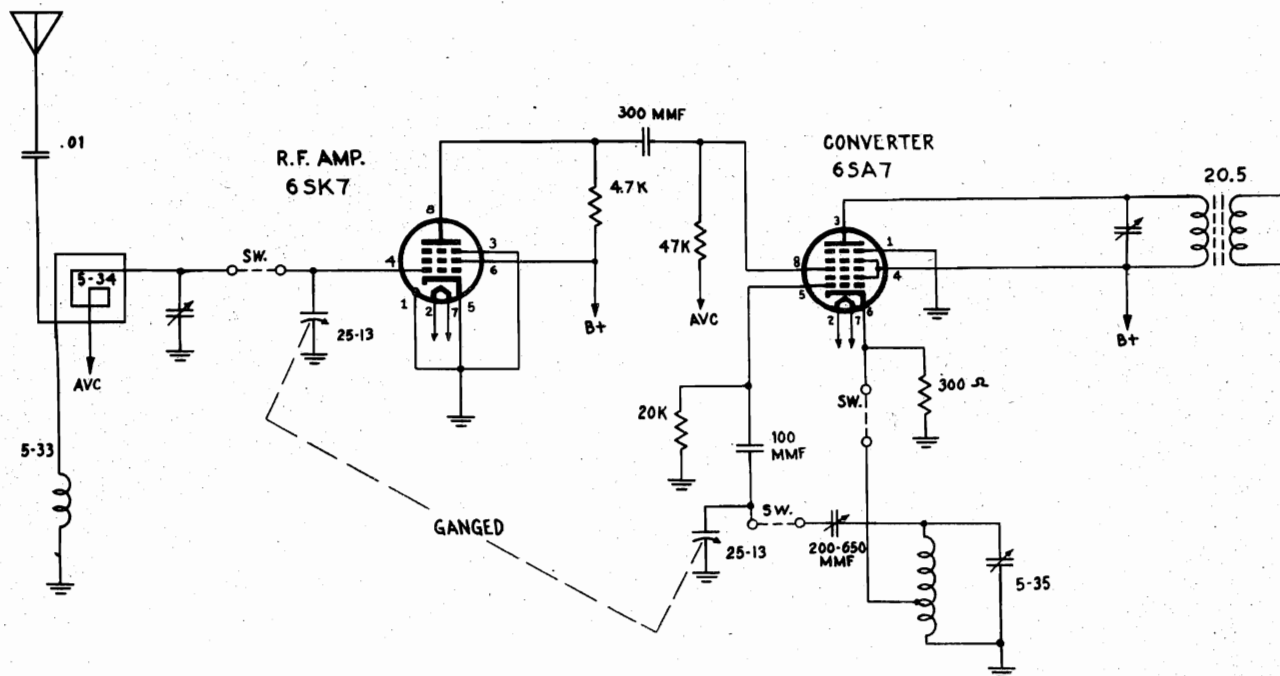
Standard Broadcast 540-1640 Kcs.
International Shortwave 5.5-19 Mcs.

Power Supply: 105-125 volts direct current or 50-60 cycle alternating current.

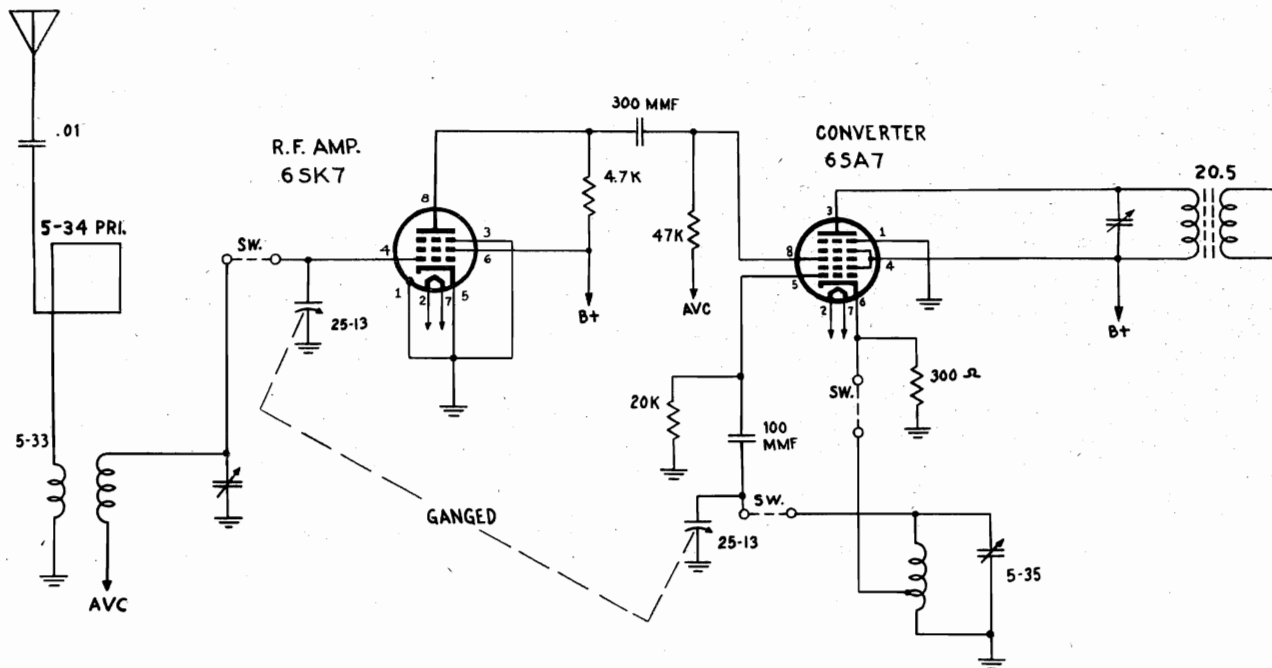
Power Consumption:—60 watts.

Volume control at maximum. Tone control at treble. Keep signal generator at lowest level consistent with readable output.

MINERVA CORP. OF AMERICA



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540-1640 KC.

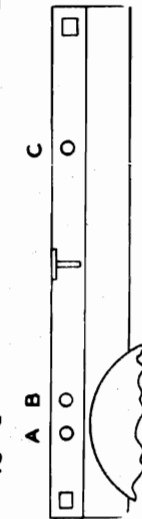


BAND-SWITCH SHOWN
AT 2ND POSITION.
SHORT WAVE BAND
5.5-19 MC

MINERVA CORP. OF AMERICA

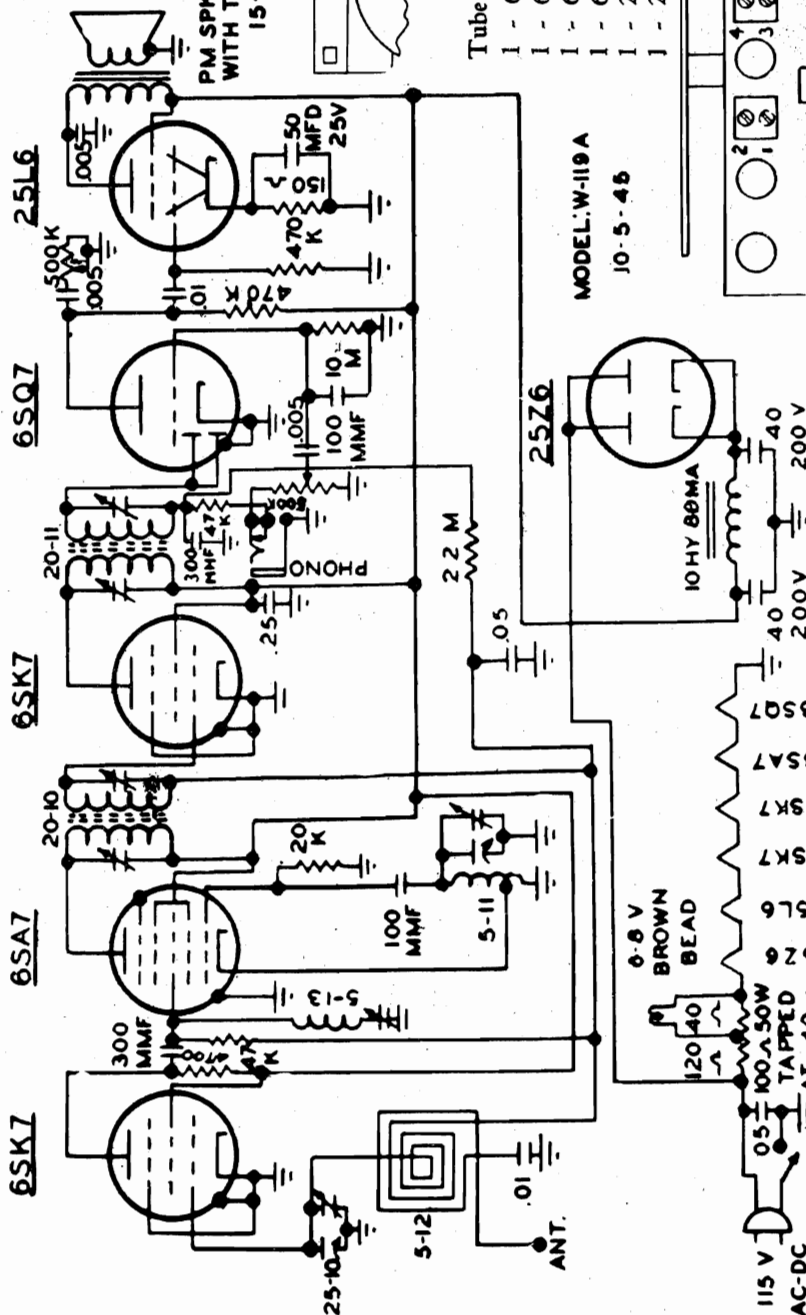
ALL RESISTORS 1/2 W
ALL CONDENSERS 400 V
UNLESS OTHERWISE SPEC.
K = 1000 μ
M = 1000,000 μ

Pointer Settings:
Gang Closed—Pointer Covers A
1500 KC —Pointer Covers C
600 KC —Pointer Covers B



DIAL PLATE

Tube Complement—
1 - 6SK7 RF Amplifier
1 - 6SA7 Converter
1 - 6SK7 IF Amplifier
1 - 6SQ7 2nd Detector, AVC, 1st Audio
1 - 25L6 Power Amplifier
1 - 25Z6 Rectifier



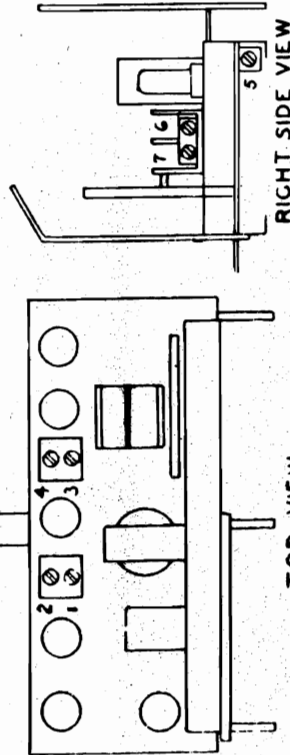
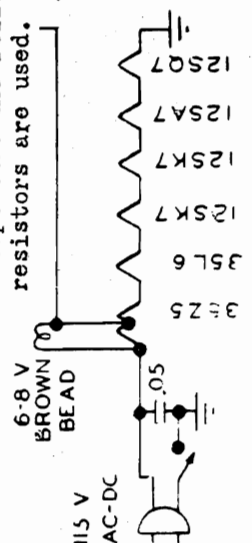
MODEL W-119A
10-5-45

Power Supply—105 - 125 volts direct current or 50 - 60 cycle alternating current.

Tuning Range—Standard Broadcast 550 - 1600 KCS.

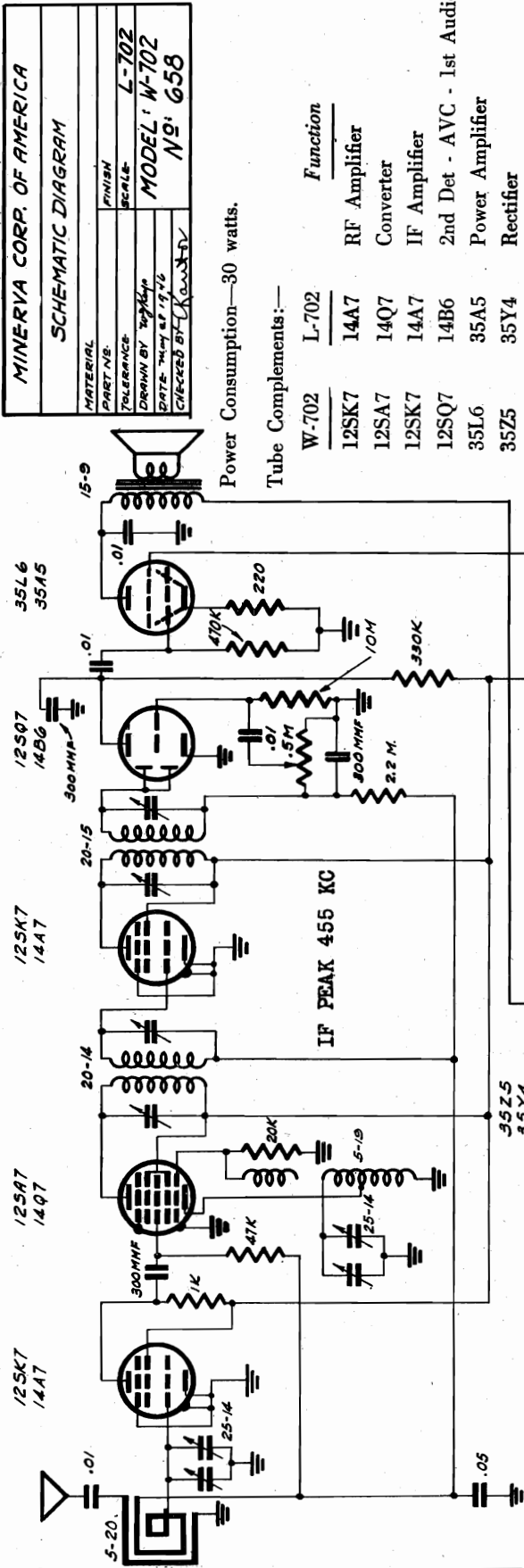
MODEL W-119 is the same as MODEL W-119A except that the following tubes and resistors are used.

Tube Complement—
1 - 12SK7 RF Amplifier
1 - 12SA7 Converter
1 - 12SK7 IF Amplifier
1 - 12SQ7 2nd Detector, AVC, 1st Audio
1 - 35L6 Power Amplifier
1 - 35Z5 Rectifier



Generator Connection	Dummy Ant.	Freq.	Adj. Trimmers	Output
Stator front section gang open	Cond. .1 MFD	455 KC	1, 2, 3, 4	Max.
Antenna Post	200 MMF Cond.	455 KC	5	Min.
Antenna Post	200 MMF Cond.	1400 KC	6, 7	Max.

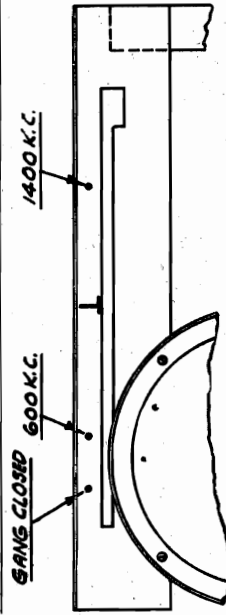
MINERVA CORP. OF AMERICA



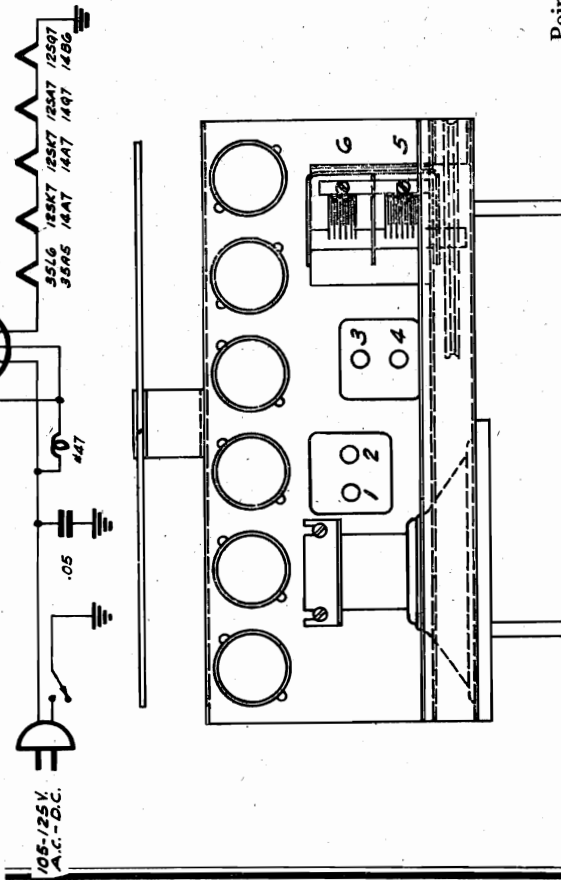
ALIGNMENT NOTES

The screws for adjusting the IF and RF Amplifiers, together with the frequencies at which adjusting is to be made, are shown in diagrams below

GENERATOR CONNECTION	DUMMY ANT.	FREQ.	ADJ. TRIMMERS	OUTPUT
Stator large section gang open	.1 MFD Cond.	455 KC	1, 2, 3, 4	Max.
Antenna Lead	200 MMF Cond.	1400 KC	5, 6	Max.

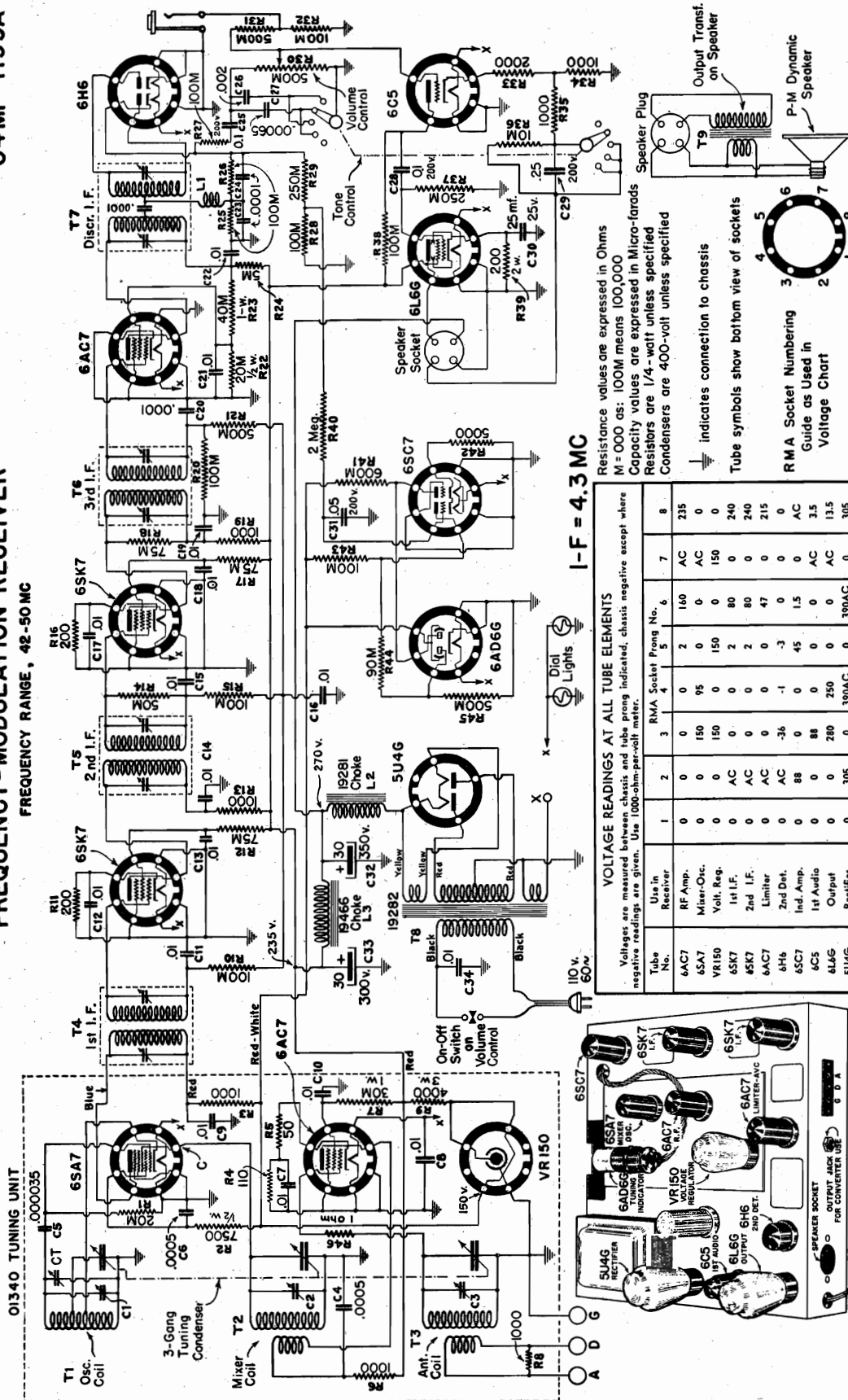


Pointer Settings:—As indicated above.



O4MF-1199A

FREQUENCY-MODULATION RECEIVER



MODEL 04MF-1199A

MONTGOMERY WARD

REPLACEMENT PARTS LIST

MISCELLANEOUS

Part No.	Description	Selling Price
M25-8437	Molded Bakelite Octal Tube Socket (8-prong)	\$.10
M25-8209	Ceramic Octal Tube Socket (8-prong)	\$.30
M19235	Bakelite Speaker Socket (5-prong)	\$.06
M19588	Tuning Eye Socket Assembly with Cable	\$.53
DIAL AND KNOBS		
M19581	Linear Dial Mechanism, Complete	1.50
M19586	Translucent Dial Scale	.40
M19262	Dial Lamp, 6 to 8 volt, No. 51	.10
M19591	Dial Lamp Socket and Bracket	.15
M19594	Tone Control Knob, Bakelite	.06
M19592	Volume Control Knob, Bakelite	.06
M19266	Tuning Control Knob, Bakelite	.06
M19266	Escutcheon for Dial Scale	.74
M19590	Escutcheon for Tuning Eye	.15

GENERAL

M01340	42-50 MC Tuning Unit, Complete Assembly	9.50
M19587	8" P.M. Dynamic Speaker with Cord and Plug	5.45
M19580	Tone Control Switch, 2-pole, 5-position	.48
M19470	Single Circuit Output Jack	.35
M12434	Line Cord and Plug Assembly	.26
M16738	A-D-G Antenna Terminal Strip	.04
M25-5732	Terminal Strip, 2 Insulated Lugs, 1 Mounting Foot	.03
M25-5731	Terminal Strip, 3 Insulated Lugs, 1 Mounting Foot	.04
M25-5715	Terminal Strip, 4 Insulated Lugs, 1 Mounting Foot	.05
M25-5716	Terminal Strip, 4 Insulated Lugs, 1 Mounting Foot	.06

TRANSFORMERS AND COILS

Part No.	Description	Selling Price
M01342	T1 Antenna Coil Assembly with Trimmer	\$.50
M01342	T2 Mixer Coil Assembly with Trimmer	\$.50
M01346	T3 Oscillator Coil Assembly	1.06
M01348	T4 1st I.F. Transformer	.53
M01348	T5 2nd I.F. Transformer	.53
M01348	T6 3rd I.F. Transformer	.53
M01350	T7 Discriminator I.F. Transformer	3.30
M19282	T8 Power Transformer, 117-volt, 60-cycle	2.59
M19582	L1 R. F. Choke	.40
M19281	L2 1st Filter Choke	.38
M19466	L3 2nd Filter Choke	.36

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	Selling Price
M14110	C7, C8	.01 mfd.	400	\$.06
M14110	C9, C10	.01 mfd.	400	.06
M14110	C11, C12	.01 mfd.	400	.06
M14110	C13, C14	.01 mfd.	400	.06
M14110	C15, C16	.01 mfd.	400	.06
M14110	C17, C18	.01 mfd.	400	.06
M14110	C19, C21	.01 mfd.	400	.06
M14110	C22, C34	.01 mfd.	400	.06

Prices Subject to Change Without Notice.

SPECIFICATIONS

Power Consumption	- 110 watts (At 117 volts 60 cycles)	Intermediate Frequency	- - - - - 4.3 Megacycles
Power Output	- - - - - 6 Watts Undistorted	Speaker	- - - - - 8" P.M. Dynamic
Selectivity	- - - - - 170 KC Broad at 2 times Signal	Tuning Frequency Range	- - - - - 42 to 50 Megacycles
		Sensitivity	- - - - - 10 Microvolts Average

ALIGNMENT

If distortion, weak reception or other type of unsatisfactory performance is thought to be due to improper alignment, do not attempt to align the I-F or R-F system. Because of the wide band accepted by the I-F system and the lack of suitable generators and test equipment required to do a satisfactory job, it is recommended that the chassis be sent to one of the main Montgomery Ward Service Shops.

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	Selling Price
M14169	R1	20,000 Ohm	0.25	\$.06
M16155	R2	7,500 Ohm	0.25	.06
M14191	R3, R6, R8	1,000 Ohm	0.25	.06
M17152	R4	110 Ohm	0.25	.06
M16143	R5	50 Ohm	0.25	.12
M15189	R7	30,000 Ohm	1.00	.30
M17180	R9	4,000 Ohm	3.00	.06
M17184	R10, R15	100,000 Ohm	0.25	.06
M17184	R20, R25	100,000 Ohm	0.25	.06
M17184	R26, R27	100,000 Ohm	0.25	.06
M17184	R28, R32	100,000 Ohm	0.25	.06
M17184	R38, R43	100,000 Ohm	0.25	.06
M15136	R11, R16	200 Ohm	0.25	.06
M14195	R12, R17, R18	75,000 Ohm	0.25	.06
M14191	R13, R19	1,000 Ohm	0.25	.06
M14191	R34, R35	1,000 Ohm	0.25	.06
M14151	R14	500,000 Ohm	0.25	.06
M14155	R21, R31, R45	20,000 Ohm	0.25	.10
M16132	R22	20,000 Ohm	1.00	.06
M15186	R23, R42	5,000 Ohm	0.25	.06
M14177	R24, R47	5,000 Ohm	0.25	.06
M14150	R27, R37	250,000 Ohm	0.25	.06
M16117	R33	10,000 Ohm	0.25	.06
M14143	R36	200 Ohm	3.00	.20
M16115	R39	2 Megohm	0.25	.06
M17109	R40	600,000 Ohm	0.50	.06
M17133	R41	90,000 Ohm	0.25	.06
M17185	R44	1 Ohm	0.50	.06
M17153	R46	1 Ohm	0.50	.06
VARIABLE				
M19579	R30	500,000 Ohm	With Switch	.48

VOLTAGES AT SOCKETS

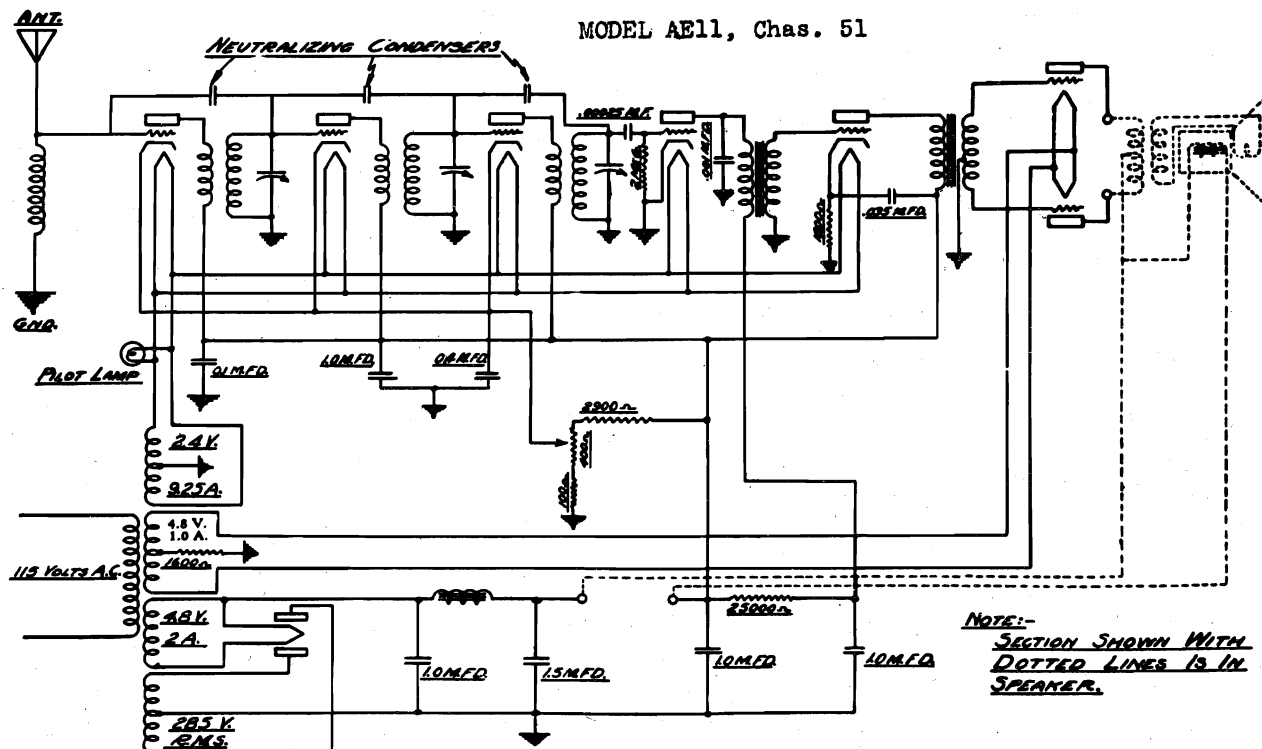
The voltages that should be considered normal at each tube socket terminal are indicated in the table at the bottom of the schematic circuit diagram. All voltages indicated are measured between the socket terminal and ground (chassis). Readings shown are positive on the socket terminal with the chassis as the negative terminal except where a negative voltage reading is given in which case the chassis is positive. Readings marked "AC" indicate normal AC heater voltage and should not be read with a DC meter.

These voltages are read under the following conditions:

- Line Voltage—117 volts
- Volume Control—Maximum
- No Signal Being Received

Readings are taken with a 1000-ohm-per-volt meter. Plate and screen voltages are read on the 500-volt scale. All readings under 50 volts are read on the 50-volt scale.

MODEL AE11, Chas. 51



NOTE:-
SECTION SHOWN WITH
DOTTED LINES IS IN
SPEAKER.

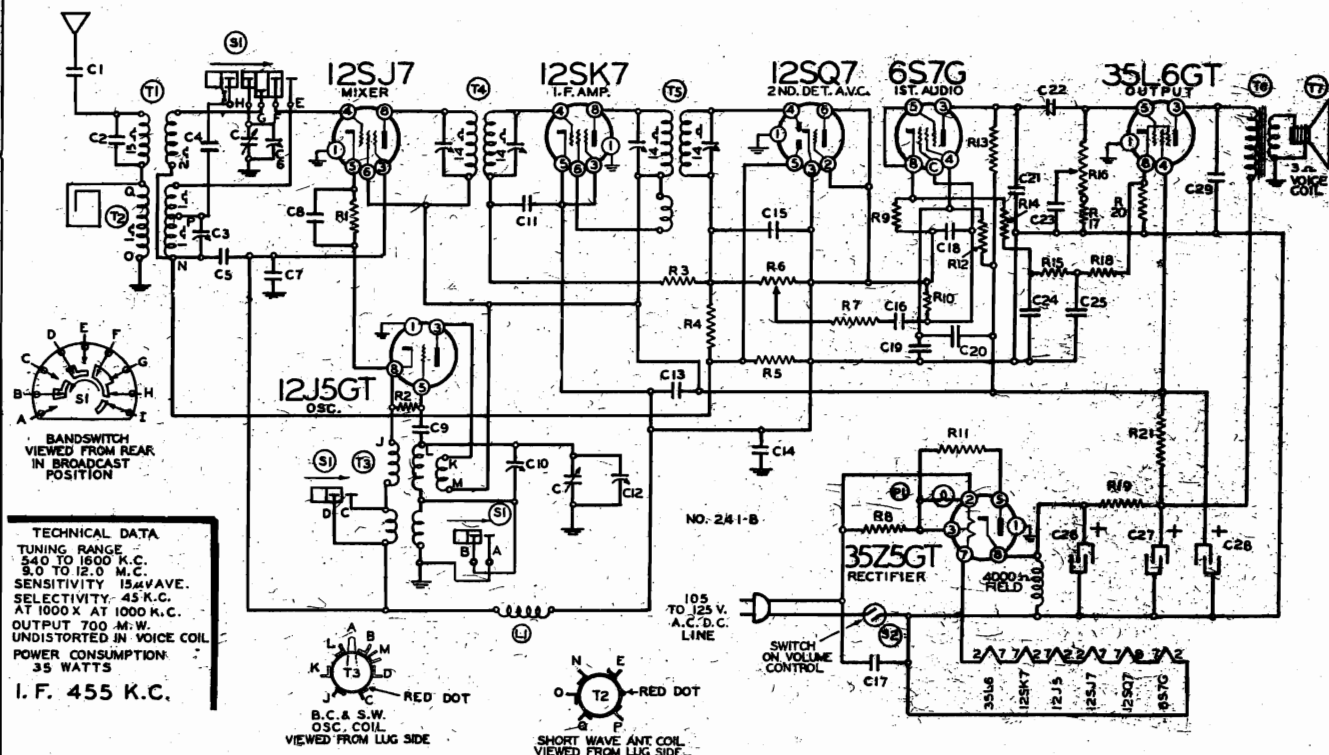
MODELS 227, 1422, 1423, 1482, 1483

5-28

A- Black
 C+ White
 B- Green
 B+90 Blue
 A+ Red
 B+ Pwr Blue
 C- Pwr Yellow
 C- 4 1/2 Slate
 B+45 Brown

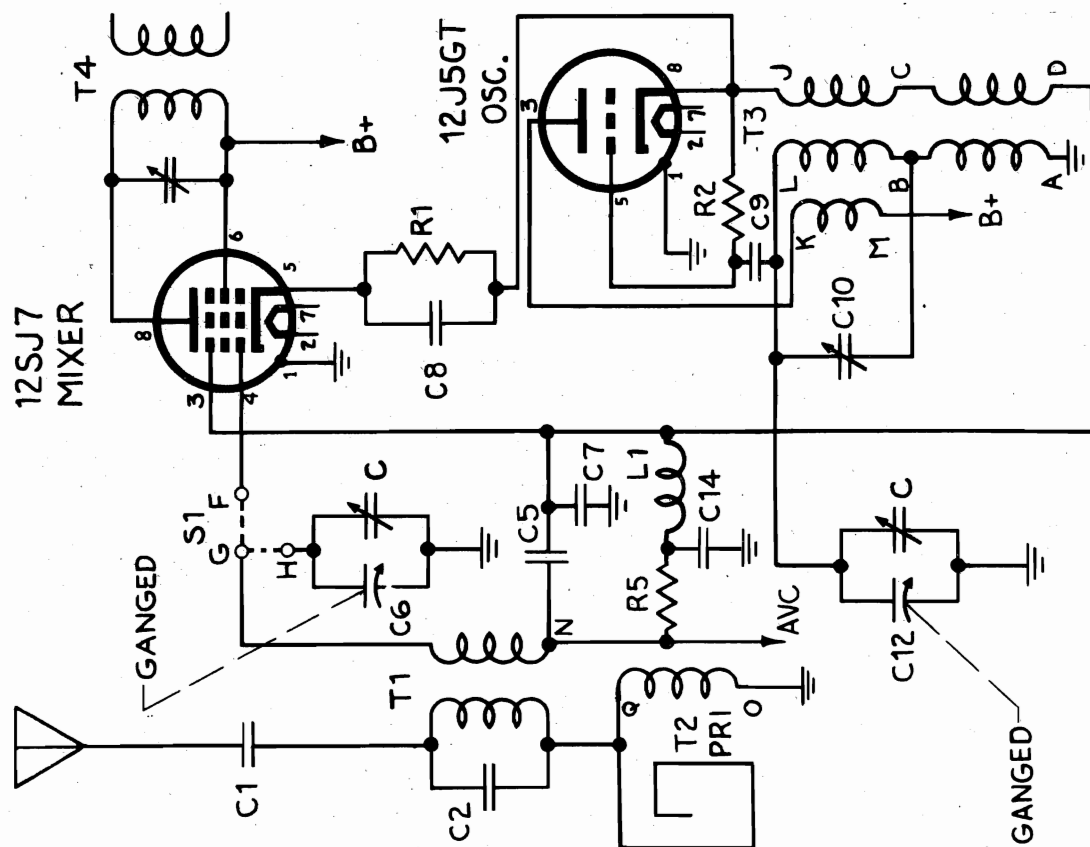
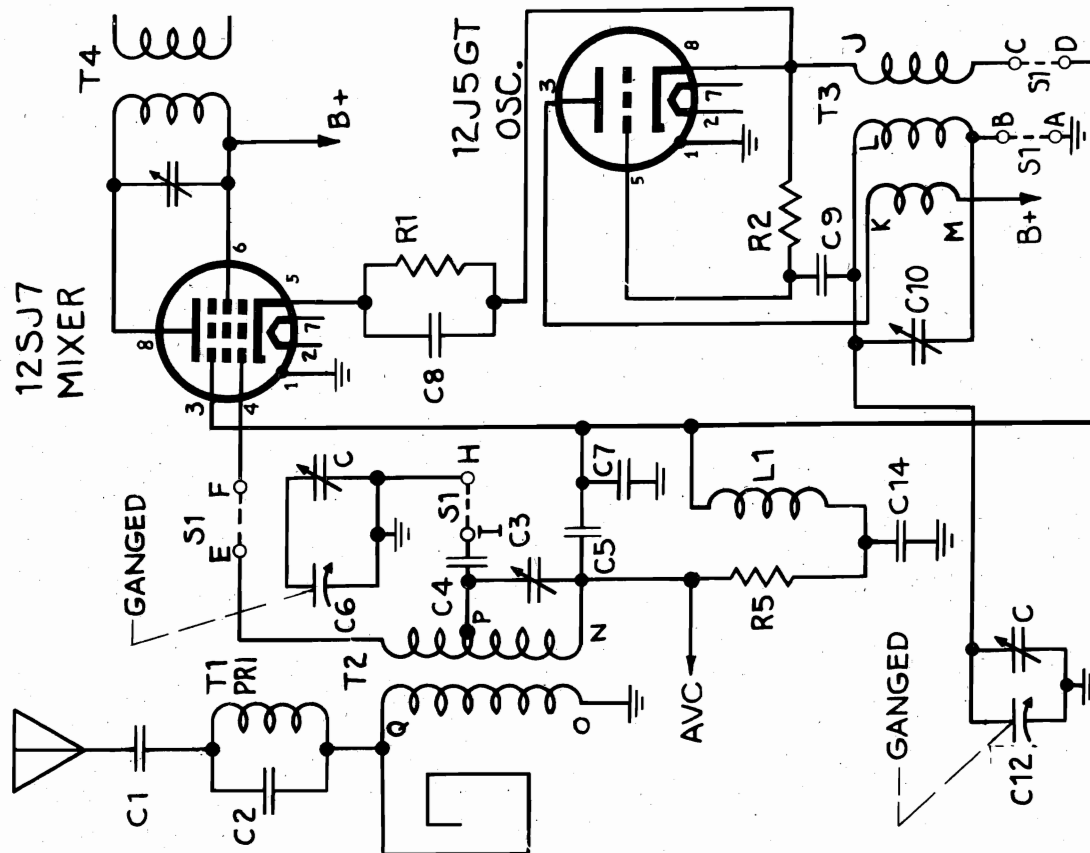
MODELS 14BR-734B,
14BR-735B

MONTGOMERY WARD



Part No.	Schematic Reference	Description	No. Used In Set	Selling Price Each	Part No.	Schematic Reference	Description	No. Used In Set	Selling Price Each
CONDENSERS									
BE100142	C20	.04 x 200 Volt Tubular Condenser	1	.12	BE1121023		Dial Scale	1	.28
BE100130	C21, C22	Dual Condenser—.00025 x .02 x 400 Volt	1	.24	BE112964		Pointer	1	.06
BE100111	C29	.01 x 400 Volt Tubular Condenser	1	.12	BE112962		Crystal for Dial	1	.32
BE1009	C16	.05 x 200 Volt Tubular Condenser	1	.12	BE13143		Snap-in Rivets to Fasten Dial Scale	5	.02
BE100119	C11, C23	.005 x 600 Volt Tubular Condenser	2	.12	BE112959		Dial Drum Pulley	1	.06
BE10020	C13, C19, C24, C25	.1 x 200 Volt Tubular Condenser	4	.12	BE115757		Dial Support Plate with Idler Pulleys and 2 bearings	1	.14
BE10037	C1	.005 x 600 Volt Tubular Condenser	1	.12	BE117906		Tuning Shaft with Drive Pulley	1	.14
BE100119	C7, C14	.1 x 400 Volt Tubular Condenser	2	.12	BE117910		Pointer Shaft	1	.06
BE100127	C8	.01 x 120 Volt Tubular Condenser	1	.12	BE1120372		Coiled Tension Spring for Dial String	1	.02
BE100128	C3	.05 x 120 Volt Tubular Condenser	1	.12	BE120375		String for Dial	Yard	.12
BE100138	C17	.03 x 400 Volt Tubular Condenser	1	.12	MISCELLANEOUS				
BE119129		Electrolytic Filter Cond. added for 25 cycle only. 40 mfd. x 150 Volts across C22 and 20 Mfd. x 150 Volts across C23	1	.70	BE101262	R6, S2	Volume Control and Switch (1 Megohm)	1	.62
BE119128	C26, C27, C28	Electrolytic Filter Condenser—40 mfd. 20 mid.—30 mfd. x 150 Volts	1	.70	BE101263	R11	Tone Control (500M Ohms)	1	.50
BE124139	C3, C10	S. W. Antenna and Oscillator Trimmer Condenser	2	.16	BE125167	S1	Band Switch	1	.40
BE1295	C9, C18	.0001 Mica Type Condenser—20%	2	.12	BE101243B	C. C6, C12	Two Gang Variable Condenser with B. C. Antenna and Osc. Trimmers and 6 Burton Automatic Tuner Assembly	1	5.00
BE12921	C15	.0002 Mica Type Condenser—20%	1	.12	BE10798D		Line Cord and Plug	1	.30
BE12960	C2	.00015 Mica Type Condenser—10%	1	.12	BE107249	P1	6-8 V. Pilot Lite Bulb, Type T-47	1	.10
BE129181	C4	.000445 Mica Type Condenser—3%	1	.18	BE107358		Socket Assembly for Pilot Lite	1	.10
BE12912	C19	.00025 Mica Type Condenser	1	.12	BE128656-36		Walnut Bakelite Cabinet	1	3.60
RESISTORS									
BE13012	R2, R7	50M ohm—1/4 Watt Resistor—20%	2	.10	BE128656-9		Ivory Color Bakelite Cabinet	1	4.40
BE13038	R4	2 Megohm—1/4 Watt Resistor—20%	1	.10	BE131356		Snap-in Rivets to Fasten Back	5 Doz.	.10
BE13084	R19	200 Ohm—1/4 Watt Resistor—20%	1	.10	BE132264		No. 8-18 x 1/4 Chassis Mounting Screws	2	.02
BE130128	R11	20 Ohm—1/4 Watt Resistor—20%	1	.10	BE112972		Wood Spacers for Loop	5 Doz.	.10
BE130166	R8, R26	150 Ohm—1/4 Watt Resistor—10%	2	.10	BE131356		Snap-in Buttons to Mount Loop	5 Doz.	.10
BE130218	R1	5M Ohm—1/4 Watt Resistor—10%	1	.10	BE134123		Rubber Bumpers for Bottom of Cab.	4	.02
BE130257	R10	5 Megohm—1/4 Watt Resistor—25%	1	.10	BE128717		Brown Cardboard Back for Cabinet	1	.12
BE130287	R21	1200 Ohm—1/4 Watt Resistor—10%	1	.10	BE112973		Set of Station Call Letters	1	.06
BE130350	R3, R5	3.2 Megohm—1/4 Watt Resistor—20%	2	.10	BE112979		Walnut Bakelite Buttons (left)	3	.08
BE1302	R9	1M Ohm—1/4 Watt Resistor	1	.10	BE128656-36		Walnut Bakelite Buttons (right)	3	.08
BE130354	R12	525M Ohm—1/4 Watt Resistor	1	.10	BE128686-37		Knob—Walnut—"Volume"	1	.12
BE130103	R13	100M Ohm—1/4 Watt Resistor	1	.10	BE128687-37		Knob—Walnut—"Tone"	1	.12
BE130193	R14, R18	3M Ohm—1/4 Watt Resistor	2	.10	BE128683-37		Knob—Walnut—"Tuning"	1	.12
BE130355	R15	8M Ohm—1/4 Watt Resistor	1	.10	BE128686-8		Knob—Walnut—"Band SW"	1	.12
BE130100	R17	150M Ohm—1/4 Watt Resistor	1	.10	BE128688-8		Knob—Ivory—"Volume"	1	.12
SOCKETS									
BE121210		Eight Prong Molded Octal Socket	6	.10	BE128688-8		Knob—Ivory—"Tone"	1	.12
BE121273		Eight Prong Water Octal Socket—with Shield for Guide Pin	1	.10	BE128687-8		Knob—Ivory—"Tuning"	1	.12
SPEAKER									
BE114271	T7	Six Inch Electro Dynamic Speaker. Less Output Transformer	1	.50	BE128683-8		Knob—Ivory—"Band SW"	1	.12
BE105134	T6	Output Transformer for Speaker	1	.50	BE131383		Screw Driver	1	.06
COILS									
BE108206	T4	Input I. F. Coil Complete in Can	1	.76	NOTICE —There is a model number label on the chassis. This model number identifies the radio as to year, manufacturer, chassis and issue number or letter. When ordering parts or writing, be sure to mention the complete model number.				
BE108205	T3	Output I. F. Coil Complete in Can	1	.76	PRICES SUBJECT TO CHANGE WITHOUT NOTICE				
BE110184	T3	B. C. - S. W. Oscillator Coil	1	.60					
BE111249	T2	S. W. Antenna Coil	1	.30					
BE111250	T1	Loop Antenna Assembly	1	.90					
BE12316	L1	Choke Coil	1	.18					

MONTGOMERY WARD



MODELS 14BR-734B

14BR-735B

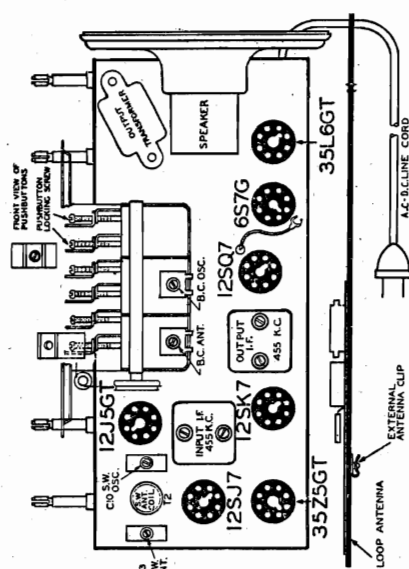
MONTGOMERY WARD

SETTING THE PUSHBUTTONS

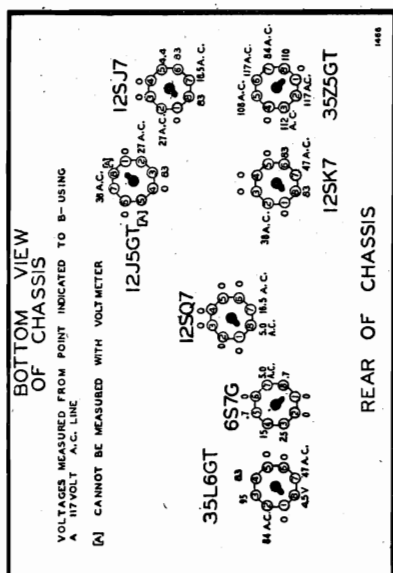
Make a list of your 6 favorite stations—push out the call letters of these stations from the call letter sheets supplied. Next insert a long slim screw driver into the hole in front of one of the pushbuttons and unscrew the pushbutton locking screw (to the left) several turns. Now with the screw driver still engaged in the locking screw slot push it all the way in. Hold it in this position and tune in the station you want with the tuning knob. Now tighten up the pushbutton locking screw by turning it to the right. Tighten firmly. Continue setting each button in the same way. When you have set your stations insert the call letter of each station in the front of the proper button and put one of the celluloid tabs over the station call letter.

To change stations simply repeat the above procedure.

If you are unable to set a station on any particular button it is probably because the pushbutton locking screw has not been fully unloosened (turned to the left).



Chassis View, showing Tube Location and the Outside Antenna Clip.



Voltage Chart

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect B—of radio chassis to ground post of signal generator through .1 Mfd. condenser.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted to Maximum
I. F.	455 Kc.	.1 MFD.	Grid of 12SK7 I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top of Output I. F.
	455 Kc.	.1 MFD.	Grid of 12SJ7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top of Input I. F.
SHORT WAVE BAND	12 Mc.	400 Ohms	External Antenna and B—	Short Wave	Set Dial at 12 Mc.	S.W. Osc. trimmer C10 S.W. Ant. trimmer C3
BROAD-CAST BAND	1600 Kc.	.1 mmf.	Grid of 12SJ7 External Antenna and B—	Broadcast	Rotor full open (Plates out of mesh)	R.C. Osc. trimmer C12 on Gang
	1400 Kc.	200 mmf.	Antenna and B—	Broadcast	Set Dial at 1400 K. C.	R.C. Ant. trimmer C6

NOTE: The Oscillator Frequency is lower than the signal frequency and should be aligned accordingly.

The loop antenna should be connected to the radio when making all adjustments.

©John F. Rider



The 250,000 ohm resistor R20 is not used on all receivers.

VOLTAGES AT SOCKETS FOR 117V A.C. LINE.
ALL VOLTAGES EXCEPT HEATERS ARE
BETWEEN SOCKET TERMINALS & "X" POINT.
FOR HEATER VOLTAGES SEE SCHEMATIC.
VOLUME CONTROL - MAXIMUM
READINGS TAKEN WITH 1000 OHM
PER-VOLT METER PLATE & SCREEN
VOLTAGES ARE READ ON 500 VOLT
SCALE.

MODEL 14WG-538B

MONTGOMERY WARD

SPECIFICATIONS

Input Voltages and Currents—Battery Operation

"A" Battery 1½ Volts—25 Amp.

"B" Battery 58½ Volts—8. Ma.

Power Consumption 30 Watts
(At 117 Volts AC Supply)

Power Output

Battery Operation . . 55 Mw. Undistorted
110 Mw. MaximumAC Operation 80 Mw. Undistorted
170 Mw. Maximum

Selectivity - 40 KC Broad at 1000 Times Signal

Intermediate Frequency 456 KC

Speaker 4" P.M. Dynamic

Tuning Frequency Range - 535 to 1610 KC

Sensitivity - 400 Microvolts per Meter Average
(For .05 Watt Output)

ALIGNMENT PROCEDURE

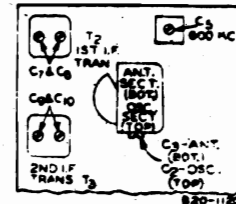
Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.



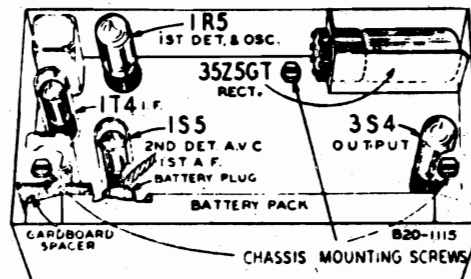
NOTE A—Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Place radio approximately 2 feet (6" for I.F. adjustment) from loop.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

Use Loop for All Adjustments—See Note "A"

SIGNAL GEN. FREQUENCY SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
456 KC	Turn Rotor to Full Open	1st I.F. (C7) & (C8) 2nd I.F. (C9) & (C10)
1610 KC	Turn Rotor to Full Open	Oscillator (C2)
1500 KC	Turn Rotor to Max. Output Set Knob to 1500 KC	Antenna (C3)
600 KC	Turn Rotor to Max. Output	600 KC (C5) Rock Rotor—See Note B
1500 KC	Turn Rotor to Max. Output	Antenna (C3)

To replace the 35Z5GT rectifier tube, pull line cord plug out of case. Carefully pry off the 2 control knobs. Remove screw on the front panel above tuning knob at side of on-off switch plunger. Then take out the 3 chassis screws (shown in illustration) with a ¼ inch socket wrench. Carefully lift chassis, tilting it at the same time, as far as connecting wires permit. Insert a screwdriver between rectifier tube and socket and pry tube out of socket.



MISCELLANEOUS

Part No.	Description	Selling Price
12A388	4" P.M. Dynamic Speaker	\$2.00
	Cone and Voice Coil Assembly (Specify part number and letters stamped on the above speaker)	.76
14X282	Grille Cloth for Speaker	.06
3A312	Tube Socket—Miniature Type	.06
3A314	Tube Socket—Octal (8 prong) Water Type	.06
32X221	Tube Shield	.04
13X453	"A" and "B" Battery Cable and Plug Assembly	.24
6A236	Four Prong Plug for above Battery Cable	.04
13X427	Line Cord and Plug Assembly	.76
6A235	Line Plug (on Chassis)	.08
2A201	On-Off Switch	.28
10A367	Knobs (Tuning Control and Volume Control)	.06
4X613	Front Panel Escutcheon	1.06
26A301	AC-DC—Battery Switch Assembly	.58
14X283	Speaker Grille	.28
26A346	Case Assembly complete with Door, Cover, Speaker Grille, Grille Cloth, Handle, and Loop Aerial	11.74
8X798	Rubber Feet (at Bottom of Case)	Dos. .06
4X663	Escutcheon	1.24

TRANSFORMERS AND COILS

9A1551	Loop Aerial only	.82
9A1552	T1 Oscillator Coil Assembly	.44
9A1413	T2 1st I.F. Transformer and Can Assembly	.90
9A1414	T3 2nd I.F. Transformer and Can Assembly	.90
51X794	T4 Output Transformer	.40

CONDENSERS

46X329	C1, C16, C21	.05 mf. 120 Volts Tubular	\$0.06
17A186	C5	30-120 mmf. Trimmer	.16
47X366	C4, C12, C14	50 mmf. Molded	.06

46X330	C6	.10 mf. 120 Volts Tubular	.08
	C7	Part of 1st I.F. Assembly	
	C8	Part of 2nd I.F. Assembly	
	C9		
	C10		
	C11	.01 mf. 120 Volts Tubular	.06
	C13, C15	.001 mf. 120 Volts Tubular	.06
	C17	.005 mf. 120 Volts Tubular	.06
	C18A	40 mf. 150 Volts Dry Electrolytic	.64
	C18B	40 mf. 150 Volts	2 USED ON 25 CYCLE MODELS
	C18C	200 mf. 12 Volts	
	C19	.05 mf. 400 Volts Tubular	.06
	C20	.10 mf. 400 Volts Tubular	.14
		2 Section Gang Condenser	4.50
	C22	.10 mf. 200 Volts Tubular	.15
	C23	.175 mmf. Molded	.16

RESISTORS

A84104	R1	100,000 Ohm	0.2 Watt Carbon	\$0.08
A85505	R2	5 Megohm	0.2 Watt Carbon	.06
A85205	R3	2 Megohm	0.2 Watt Carbon	.06
A85305	R4	3 Megohm	0.2 Watt Carbon	.06
A85205	R4, R9	2 Megohm	0.2 Watt Carbon	.06
36X306	R5	1 Megohm	Volume Control	.30
A85106	R6	10 Megohm	0.2 Watt Carbon	.06
A84406	R7	4 Megohm	0.2 Watt Carbon	.08
A84105	R8	1 Megohm	0.2 Watt Carbon	.08
A84751	R10	750 Ohm	0.2 Watt Carbon	.08
A84502	R11	5000 Ohm	0.2 Watt Carbon	.08
A84301	R12, R13	300 Ohm	0.2 Watt Carbon	.08
A84901	R14	900 Ohm	0.2 Watt Carbon	.08
43X107	R15	1750 Ohm	Wire Wound	.22
B94202	R16	2000 Ohm	0.5 Watt Carbon	.08
A84550	R17	55 Ohm	0.2 Watt Carbon	.08
A85605	R18	6 Megohm	0.2 Watt Carbon	.06
A84152	R19	1500 Ohm	0.2 Watt Carbon	.08
A85254	R20	280,000 Ohm	0.2 Watt Carbon	.06

Prices Subject to Change Without Notice.

BOTTOM VIEW OF CHASSIS

MODELS 14WG-610B,
14WG-611B

MONTGOMERY WARD

DRIVE CORD
REPLACEMENT

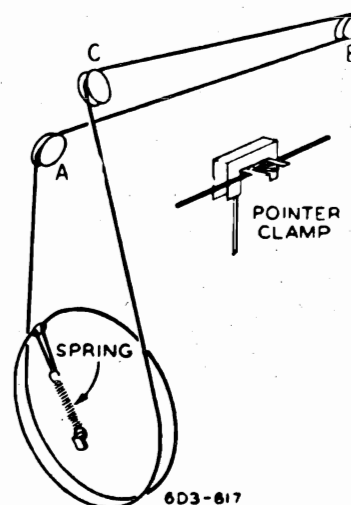
Knot both ends of new drive cord to same loop on tension spring. The doubled drive cord should measure $16\frac{1}{4}$ inches. Turn gang condenser to full open position—See illustration.

Thread looped end of drive cord up through hole in rim of drive pulley. Pull spring flush against inside of rim. Wind right hand portion of drive cord (from drive pulley side of chassis) one turn clock-

wise around drive pulley. This turn should be on right side of pulley groove (from back of chassis).

Continue cord over pulleys A, B, and C as shown. Loop remaining portion of cord counter-clockwise (from spring) (drive pulley side of chassis) around drive pulley. Secure spring to hook on drive pulley—See illustration.

Calibration—Tune in a signal of known frequency. Set pointer at this frequency mark on the dial scale. Fasten pointer to drive cord—See illustration.



Power Consumption - 28 Watts (At 117 volts AC Supply)
Power Output - .8 Watt Undistorted
Selectivity - 50 KC Broad at 1000 times Signal
Intermediate Frequency - 456 KC

Speaker - 5" Electro Dynamic
Tuning Frequency Range - 528 to 1600 KC
Sensitivity (For .05 Watt Output)
External Antenna - 10 Microvolts Average

CAUTION

The metal chassis is connected to one side of the line through a .2 mfd. condenser. Both AC and DC power lines are generally grounded on one side. If the side of the line not con-

nected to the metal chassis through this condenser is grounded and the metal chassis comes in contact with an external ground, this condenser will be connected across the line and there will be an increase in hum.

Therefore, in any service work on the chassis, keep it on a wood or other insulated surface to avoid contacts with ground. The person working on the set should avoid getting in contact with any ground.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

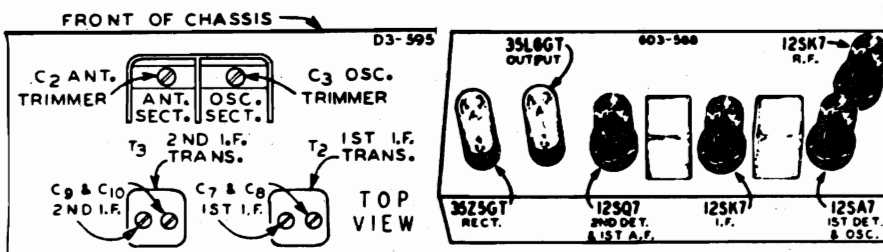
Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 100 mmf.

SIGNAL GENERATOR			DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION			
456 KC	Control Grid 12SK7—I.F.	Point "X" (12SK7—R.F.) (Prong No. 3)	.1 mf.	Turn Rotor to full open	2nd I.F. (C9) & (C10)
456 KC	Control Grid 12SA7—1st Det.	Same As Above	.1 mf.	Turn Rotor to full open	1st I.F. (C7) & (C8)
1600 KC	Control Grid 12SA7—1st Det.	Same As Above	.1 mf.	Turn Rotor to full open	Oscillator (C3)
1500 KC	External Antenna Clip On Loop —See Note A	External Ground Clip On Loop	100 mmf.	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note B	Antenna (C2)

NOTE A—By means of wooden blocks, stand the loop aerial assembly upright exactly $1\frac{1}{4}$ inches from the back of the chassis.

NOTE B—If the pointer is not at 1500 KC on the dial, tune in a 1500 KC signal. Set pointer at the 1500 KC mark on the dial scale.



MONTGOMERY WARD

MODELS 14WG-610B,
14WG-611B

PROCEDURE FOR SETTING THE STATION BUTTONS

SELECTING THE STATIONS
TO BE SET

There are 6 buttons on the automatic tuning dial by means of which 6 stations may be set for quick tuning.

Make a list of your favorite stations, those which you tune in regularly. There may be any number up to and including 6 in this list.

It is better to list the station with the lowest kilocycle number first, the station with the next higher kilocycle number next, and so on.

Any button may be used for any station you can receive, although it will be more convenient to set the stations so that the kilocycle numbers increase from left to right.

SETTING A
STATION BUTTON

Pull the button at the left off the shaft. When this is done, the locking screw shaft will be exposed.

Insert a screwdriver in the slot of the locking screw and depress it by pressing in with the screwdriver. Loosen the locking screw by turning 3 or 4 turns in a counter-clockwise direction. Continue to press in firmly on the screwdriver, thus holding the locking screw shaft depressed. Select the first station from the list you have prepared and carefully tune in this station by means of the manual tuning control until the station is clearest and strongest.

Continue to press in firmly on the screwdriver and lock the mechanism by turning the locking screw in a clockwise direction. Tighten firmly but not excessively. The station is

now set on this button.

Proceed in the same manner to set stations on any of the remaining buttons.

Remove the correct station call letter tab from the sheets supplied by bending the sheet back and forth at the score mark until the tab can be broken off. Press this tab all the way to the bottom of the space provided in the button. Cover the call letter tab with a celluloid tab, pressing this in until it snaps into place.

Replace the button on its shaft with the lip at the bottom and the button placed so that the call letters are straight up and down.

If at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will not affect the setting of any of the other buttons.

MISCELLANEOUS

SPEAKER

Sta. No.	Part No.	Description	Selling Price
	12A347	5" Electro-Dynamic Speaker Cone and Voice Coil Assembly (Specify part number of Speaker and letters preceding part number stamped on the speaker)	\$1.82
	14X261	Grille Cloth for above Speaker—Ivory Cabinet	.26

GENERAL

3A303	Tube Socket—Octal (8 prong)	.86
10A277	Knobs (Volume Control and Tone Control)—Walnut Cabinet	.84
10A300	Knobs (Volume Control and Tone Control)—Ivory Cabinet	.86
13X228	Line Cord and Plug	.18
28X246	Phosphor Bronze Ground Plate (For 2nd I.F. Can)	.86
885	Bakelite Cabinet—Walnut	3.78
887	Bakelite Cabinet—Ivory	
28X272	Snap Buttons (To hold Cardboard Back to Cabinet)	.12
10A276	Tuning Control Drum—Walnut Cabinet	.86
10A301	Tuning Control Drum—Ivory Cabinet	.86
10A275	Station Buttons—Walnut Cabinet	.84
10A282	Station Buttons—Ivory Cabinet	.86
8X78	Rubber Feet (Bottom of Cabinet)	Dos. .04

TRANSFORMERS AND COILS

Sta. No.	Part No.	Code	Description	Selling Price
	9A1246		Loop Antenna Assembly complete with Condensers and cardboard back—Walnut Cabinet	\$1.02
	9A1239		Loop Antenna Assembly complete with Condensers and cardboard back—Ivory Cabinet	1.02
	9A1240	T1	Oscillator Coil Assembly	.20
	9A1241	T2	1st I. F. Transformer and Can Assembly	.46
	9A1242	T3	2nd I. F. Transformer and Can Assembly	.46
	51X78	T4	Output Transformer	.46

CONDENSERS

TUBULAR

Sta. No.	Part No.	Code	Capacitance	Voltage	Selling Price
	44X250	C11	.04 mf.	180	\$0.04
10888	44X284	C13	.004 mf.	180	.86
11254	44X249	C15	.01 mf.	180	.86
	44X304	C18	.02 mf.	300	.86
	44X307	C19	.10 mf.	300	.18
	44X304	C20	.20 mf.	180	.18
10934	44X248	C22	.002 mf.	180	.86

MOLDED

11338	47X150	C1	300 mmf.	.86
10874	47X284	C4	50 mmf.	.86
10876	47X287	C5, C23	100 mmf.	.86
10899	47X283	C6	35 mmf.	.86
	47X465	C17	250 mmf.	.10

ELECTROLYTIC

45X282	C14	20 mf.	150	Dry Electrolytic	.22
45X276	C16A	20 mf.	200	Dry Electrolytic	.48
	C16B	20 mf.	150	Dry Electrolytic	.48
	C16C	20 mf.	12	40 CYCLE MODELS	
	C16A	50 mf.	200	Dry Electrolytic	.70
	C16B	40 mf.	150	Dry Electrolytic	.70
	C16C	20 mf.	12	25-40 CYCLE MODELS	

MISCELLANEOUS

	C2	Part of Gang Condenser	
	C3	Part of 1st I.F. Transformer Assembly	
	C4	Part of 2nd I.F. Transformer Assembly	
	C5	50 mmf. Dual Mica	.86
47X112	C10	50 mmf. Ceramic	.12
47X138	C12A		
	C12B		
	C21		

RESISTORS

CARBON

Sta. No.	Part No.	Code	Resistance	Wattage	Selling Price
	A85502	R1	5,000 Ohm	0.2	\$0.06
	A85302	R2	3,000 Ohm	0.2	.86
	A85254	R3, R10	250,000 Ohm	0.2	.04
10971	A85403	R4	40,000 Ohm	0.2	.04
11118	A85205	R6	2 Megohm	0.2	.04
11886	B85104	R7	100,000 Ohm	0.5	.04
	A85405	R9	4 Megohm	0.2	.04
	B85501	R11	500 Ohm	0.5	.86
10081	A85250	R12	25 Ohm	0.2	.04
11886	A85804	R13	500,000 Ohm	0.2	.04
	B84171	R14	170 Ohm	0.5	.08
	B85205	R16	2 Megohm	0.5	.86
	B85171	R17	170 Ohm	0.5	.04

MISCELLANEOUS

34X279	R8	500,000 Ohm	Volume Control and On-Off Switch	.40
40X247	R15	2 Megohm	Tone Control	.30
43X104	R20	1,400 Ohm	12 Wire Wound (25 CYCLE MODELS)	.30

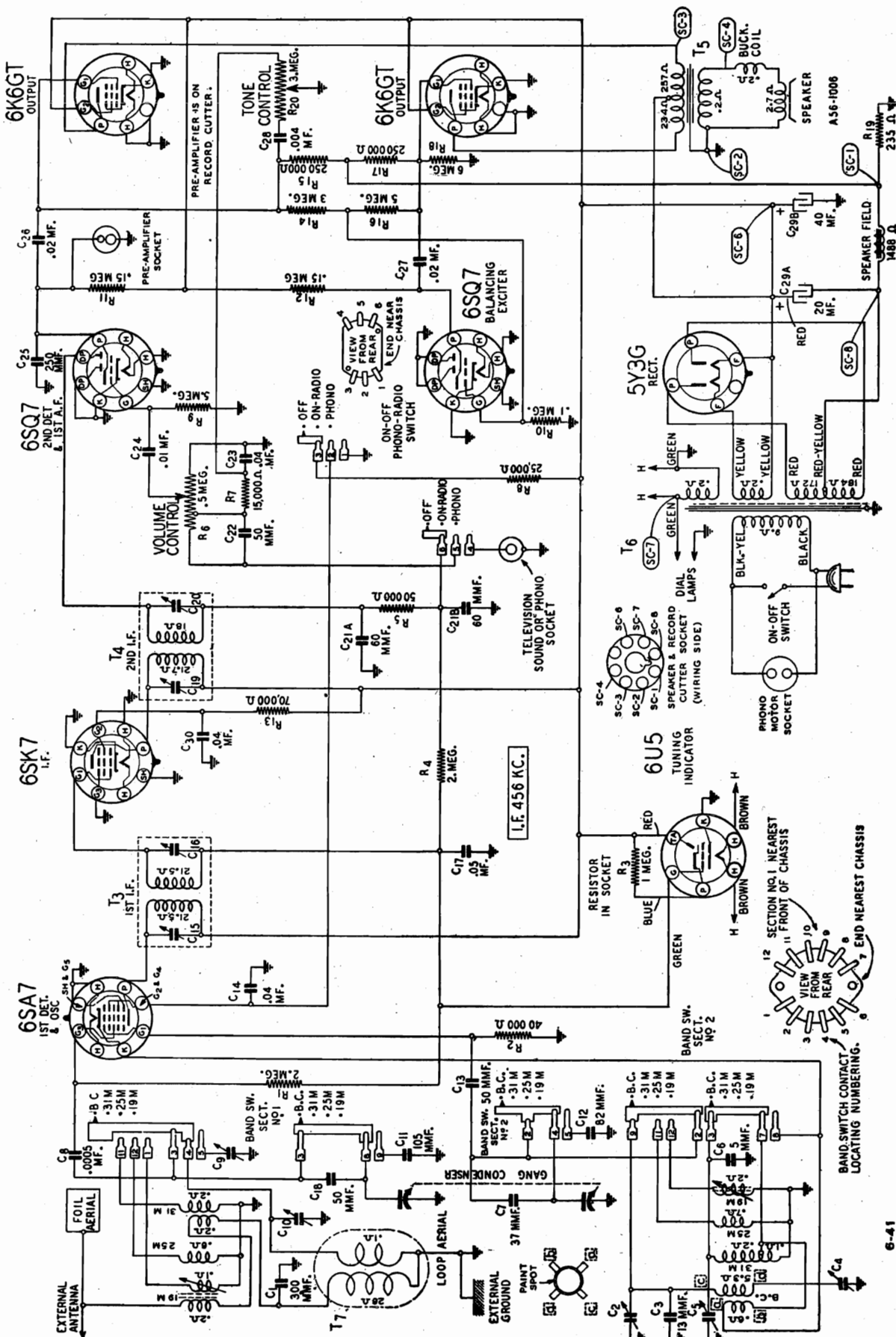
AUTOMATIC TUNING
AND DIAL ASSEMBLY

Sta. No.	Part No.	Description	Selling Price
	28A75	Automatic Tuning Assembly complete with Gang Condenser and Drive Pulley	\$2.38
	20X326	Locking Screws for Automatic Tuning Assembly	.10
	26A344	Dial Scale Mounting Plate complete with Pulleys less Tone and Volume Controls	.24
	58X472	Dial Scale	.42
	58X473	Paper Background for Dial Scale	.04
	28X36	Clamp Buttons to hold Dial Scale and Dial Background to Mounting Plate	Dos. .06
	18X178	Pointer for Dial Scale	.86
	28X95	36" Drive Cord (18 lb. Test)	.04
	7A114	Tension Spring for above Drive Cord	Dos. .16
11122	7A32	Dial Lamp Socket and Cable complete with Bracket	.10
	26A166	Dial Lamp (No. 51)	.10
	58X375	Call Letter Sheets and Celluloid Tabs	.04
		Celluloid Tabs	Dos. .06

Prices Subject to Change Without Notice.

MODELS 14WG-808WA,
14WG-808MA

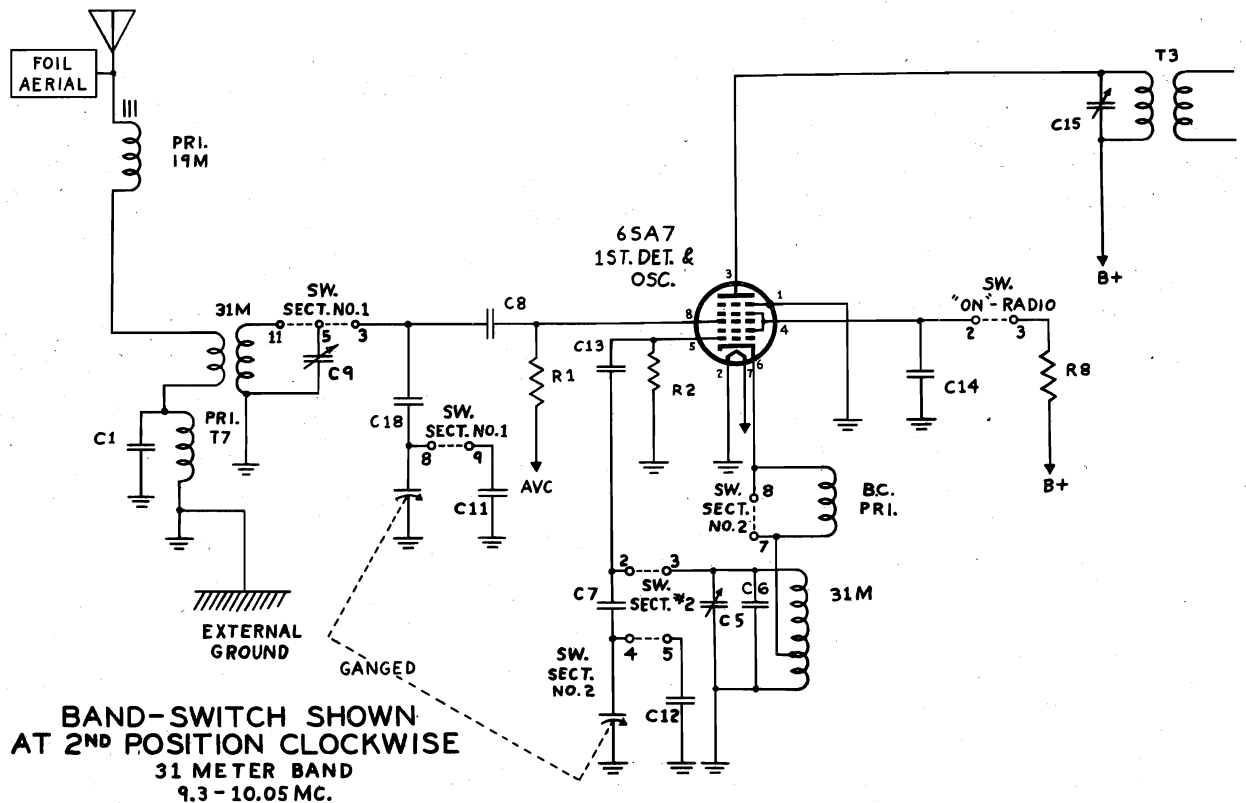
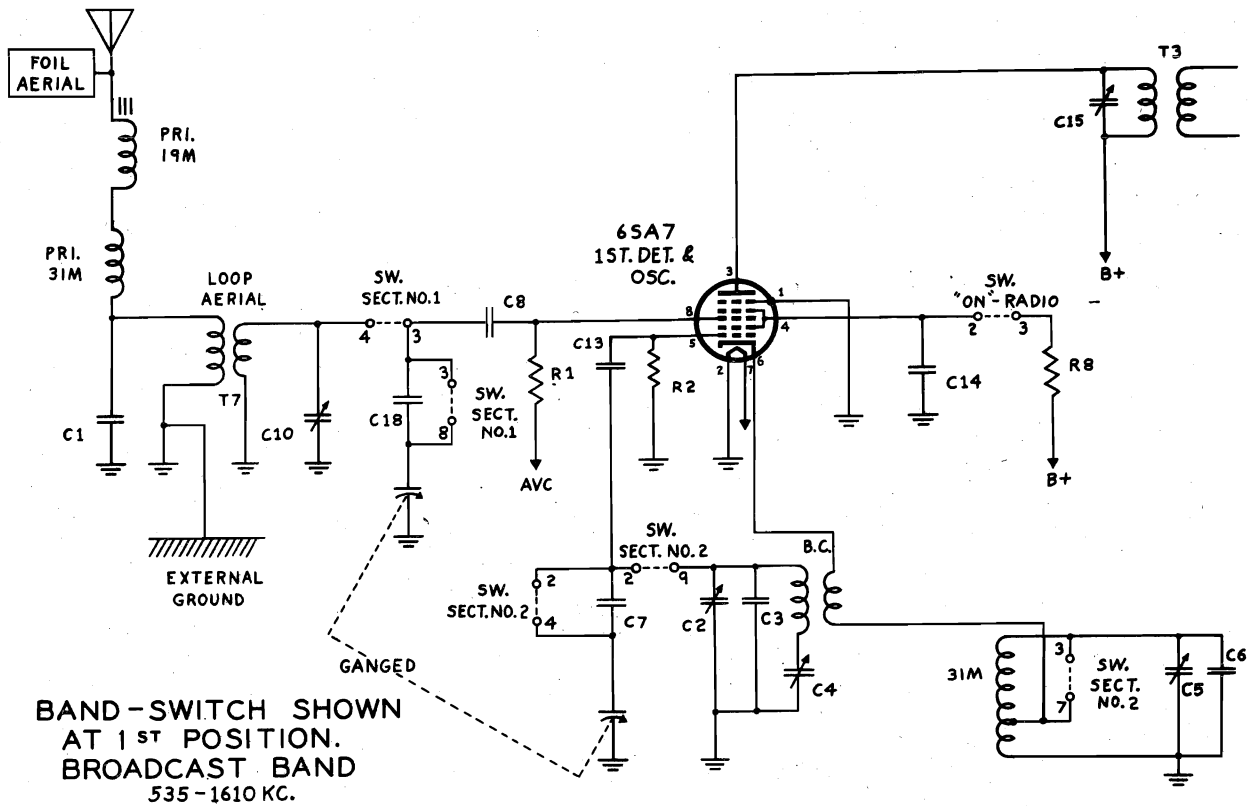
MONTGOMERY WARD



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MONTGOMERY WARD

MODELS 14WG-808WA,
14WG-808MA

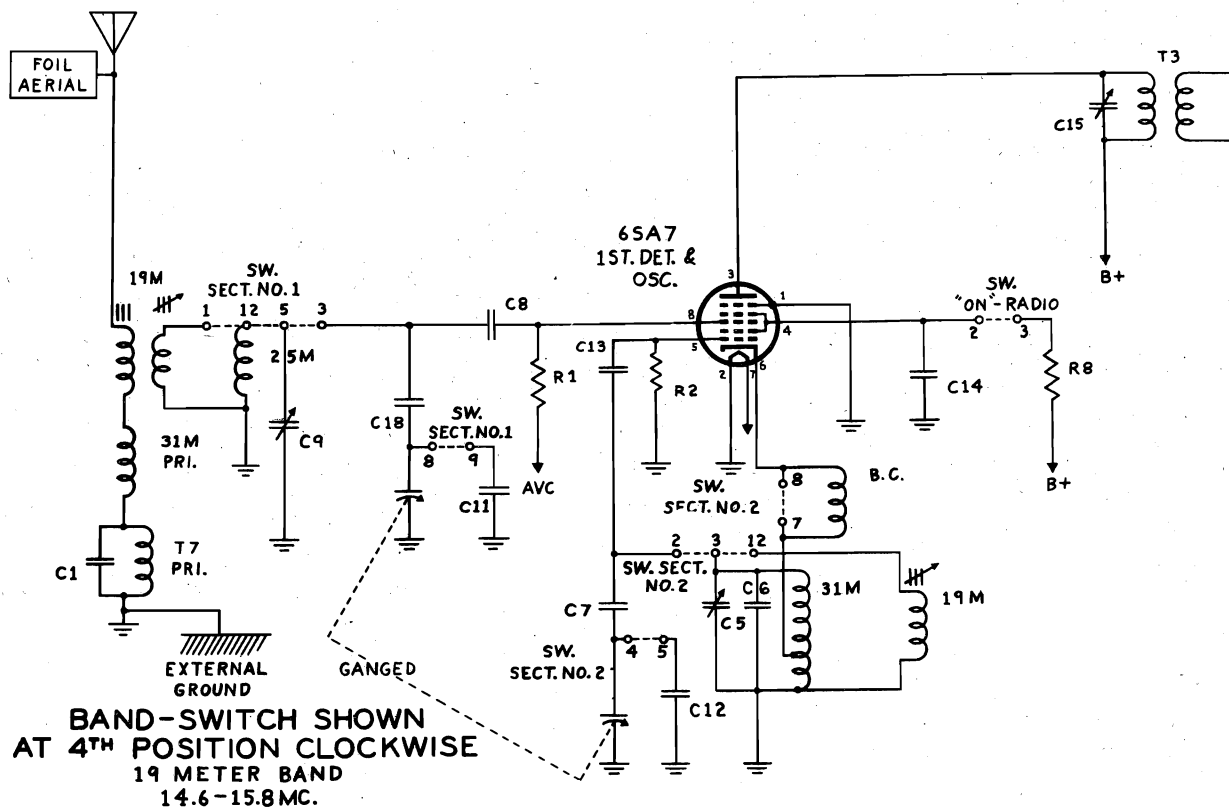
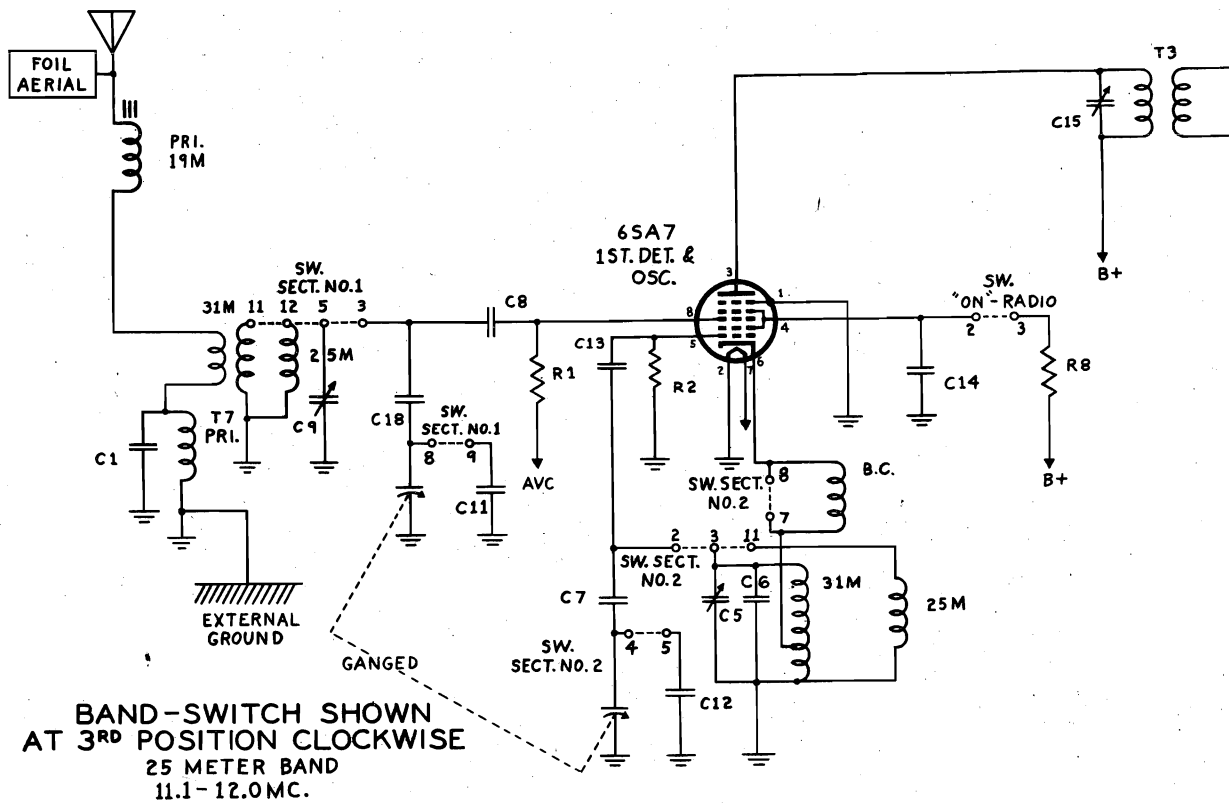


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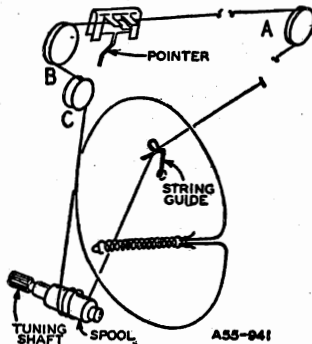
PAGE 15-14 MONT-WARD

MODELS 14WG-808WA,
14WG-808MA

MONTGOMERY WARD



MONTGOMERY WARD

MODELS 14WG-808WA,
14WG-808MA

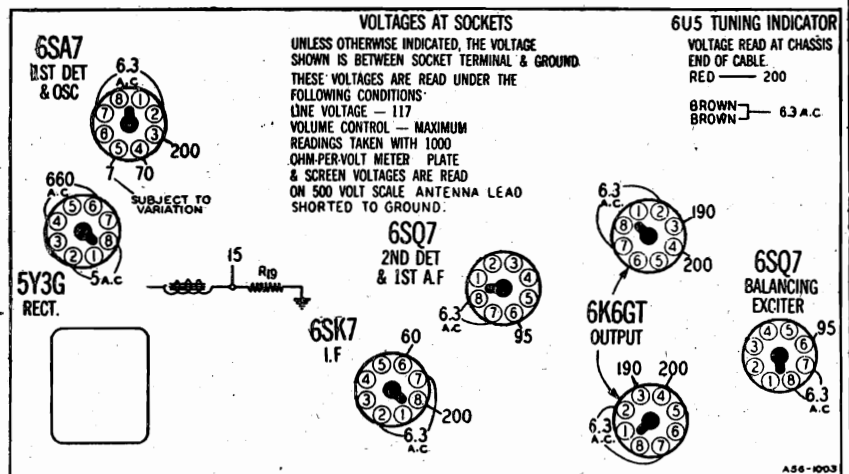
DRIVE CORD REPLACEMENT

Turn gang condenser to full closed position. Using a new drive cord 42 inches in length, tie one end to tension spring. Fasten other end of tension spring to hook on drive pulley. Pass drive cord through slot in drive pulley rim. Continue cord $\frac{1}{2}$ turn counter-clockwise (from gang end of chassis) around drive pulley—See illustration. Wind $2\frac{1}{2}$ turns, counter-clockwise (from rear of chassis), around wooden spool on tuning shaft. Turns should progress toward the rear of chassis.

Pass cord through wire string guide and around pulleys A, B, and C as shown. Continue cord $\frac{1}{2}$ turn, counter-clockwise (from gang end of chassis) around drive pulley and pass through slot in pulley rim. Stretch tension spring and tie drive cord to tension spring.

Power Consumption - 57 Watts (at 117 volts 60 cycles)
77 Watts (Phonograph Operating)
Power Output - - - - 3.0 Watts Undistorted
4.5 Watts Maximum
Selectivity - 38 KC Broad at 1000 times Signal
Intermediate Frequency - - - - 456 KC
Speaker - - - - - 10" Electro-Dynamic

Band	Tuning Frequency Range	Sensitivity External Antenna (For 0.5 Watt Output)
B Range...	535 to 1610 KC...	15 Microvolts Aver.
19 Meter...	14.6 to 15.8 MC...	26 Microvolts Aver.
25 Meter...	11.1 to 12.0 MC...	25 Microvolts Aver.
31 Meter...	9.3 to 10.05 MC...	22 Microvolts Aver.



PROCEDURE FOR SETTING THE STATION BUTTONS

Make a list of your six favorite stations, those which you tune in regularly. It is better to list the station with the highest kilocycle number first, the station with the next lower kilocycle number next, and so on.

Grasp the left-hand button at the sides (depress the adjacent button) and pull it out as far as it will go. A click will be heard. If it is impossible to depress the button which is adjacent to the button you are setting, rotate the tuning knob a few turns.

Select the first station from the list you have prepared. *Carefully* tune in this station by means of the manual tuning knob until the dark sector in the tuning eye is narrowest.

Now lock the mechanism by pushing the button all the way in until it is felt to lock into place.

Proceed in the same manner to set stations on any of the remaining buttons. Any button may be used for any station you can receive, although it will be more convenient to set the stations so that the kilo-

cycle numbers decrease from left to right.

Remove the correct station call letter tab from the sheets supplied by bending the sheet back and forth at the score mark until the tab can be broken off. Press the tab **all the way** to the bottom of the space provided in the button. Cover the call letter tab with a celluloid tab, pressing this in until it snaps into place.

Changing the setting of one button will not affect the setting of any of the other buttons.

REPLACING
BAND SPREAD COILS

It is not practicable to make field replacements of the individual antenna and oscillator coils in the Band Spread Assembly Unit.

Should one of these coils be damaged in any way, remove the Band Spread Assembly Unit (consisting of the 3 antenna and 4 oscillator coils, the right-angle mounting plate, and the band switch) from the chassis and return to the factory for replacement.

CAUTION—Two of the coils in the band spread coil assembly, the 19 Meter Antenna and Oscillator coils, have adjustable iron cores. One of the adjusting screws extends out from the front panel of the chassis base at the left of the band switch. The other adjusting screw extends up from the chassis base in front of the 1st I.F. Transformer.

DO NOT CHANGE THE POSITION OF THESE ADJUSTING SCREWS as they have been properly set at the factory and cannot be satisfactorily re-adjusted in the field.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1400 KC on the dial, remove pointer from drive cord. Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—Reassemble chassis in cabinet.

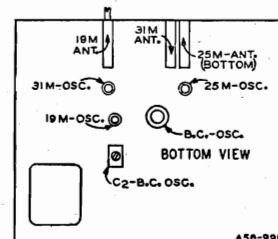
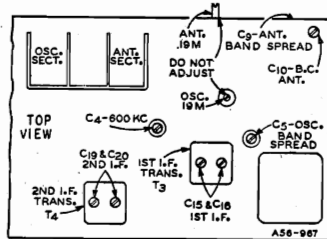
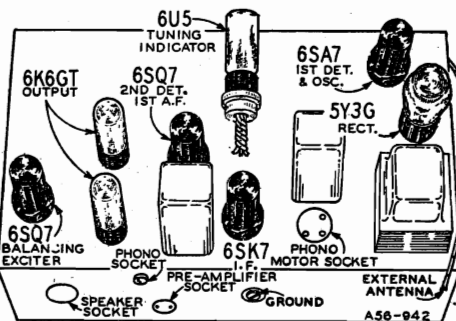
MODELS 14WG-808WA,
14WG-808MA

MONTGOMERY WARD

ANTENNA AND GROUND

Two built-in Air Wave Aerials are incorporated in the cabinet.

One of these, the loop aerial, is used for broadcast band reception. The other, a counterpoise foil aerial, is used for reception on the short wave band. For the reception of local or nearby stations, an outside antenna and ground are usually not required.



ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver. Dummy Antennas—1 mf., 100 mmf., and 400 ohms.

	SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
	Remove chassis from cabinet but do not disconnect leads to loop aerial.					
I.F.	456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C15) & (C16) 2nd I.F. (C19) & (C20)
RANGE B	1610 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C2)
	1400 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC— See Note A	Ant. Range B (C10) 600 KC (C4) Rock Rotor—See Note B
SHORT WAVE BANDS	600 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output	
	9700 KC	Antenna Lead	400 Ohm	31 Meter at 9.7 MC	Turn Tuning Knob until Pointer is	Oscillator Band Spread (C5)
	9700 KC	Antenna Lead	400 Ohm	31 Meter as above	Leave Setting	Antenna Band Spread (C9)
LOOP RANGE B	1400 KC	Antenna Lead See Note C	100 mmf.	B Range	Turn Rotor to Max. Output	Ant. Range B (C10)

MISCELLANEOUS

Part No.	Description	Selling Price
12A399	10" Electro-Dynamic Speaker Cone and Voice Coil Assembly (Specify part number and letters stamped on above Speaker)	\$4.24
10A405	Knob (Tuning)—Mahogany Phone Combination	.12
10A406	Knob (Tone Control)—Mahogany Phone Combination	.08
10A407	Knob (Volume Control)—Mahogany Phone Combination	.10
10A408	Knob (Band Change Switch)—Mahogany Phone Combination	.10
10A409	Knob (Control Switch)—Mahogany Phone Combination	.10
10A372	Knob (Tuning)—Walnut Console and Phone Combination	.06
10A373	Knob (Tone Control)—Walnut Console and Phone Combination	.06
10A374	Knob (Volume Control)—Walnut Console and Phone Combination	.10
10A398	Knob (Band Change Switch)—Walnut Console and Phone Combination	.10
10A404	Knob (Control Switch)—Walnut Console and Phone Combination	.10
3A303	Tube or Speaker Socket—Octal (8 Prong)	.06
3A315	Molded Type Tube Socket—Octal (8 prong)—Wafer Type— 6SA7 Tube	.10
3A305	Single Pin Tip Socket (Phone)	.06
3A304	Phono Motor Socket	.06
3A307	Microphone Amplifier Socket	.06
14X428	Tuning Eye Tube Socket and Cable Assembly	.28
2A209	On-Off—Radio-Phone Switch	.84
2A207	Band Change Switch	.84
8X23	Rubber Mounting Cushions (under Chassis)	.04
13X328	Line Cord and Plug Assembly	.18
8X113	Rubber Mounting Cushions (at front of Chassis)—Phone Combinations only—each	.06
25X826	Brackets for Cushions (at front of Chassis)— Phone Combinations only—each	.04
8X83	Rubber Mounting Cushions (Under rear of Chassis)	.04
25X655	Brackets for Rear Rubber Mounting Cushions	.02
26A231	Counterpoise Foil Aerial	.10

TRANSFORMERS AND COILS

Antenna & Oscillator Coils in Band Spread Assembly cannot be replaced individually—Entire Band Spread Assembly Unit must be ordered—See article "Replacing Band Spread Assembly"

26A323	Band Spread Assembly Unit complete with 3 Antenna Coils, 4 Oscillator Coils, Band Switch, Right-Angle Mounting Plate, and 4 Ceramic Con- densers	\$6.12
9A1461	Oscillator Coil Assembly—Broadcast Range	.18

9A1428	T3	1st I.F. Transformer and Can Assembly	.60
9A1429	T4	2nd I.F. Transformer and Can Assembly	.50
51X38	T5	Output Transformer	.72
53X245	T6	117 Volt, 60 Cycle Standard Power Transformer	2.44
53X246	T6	117 Volt 25 Cycle Standard Power Transformer	5.94
53X247	T6	117-234 Volt, 40-60 Cycle Universal Power Transformer	4.26
9A1457	T7	Loop Aerial Assembly—Broadcast Range	.78

CONDENSERS

47X180	C1	300 mmf.	Molded	\$0.06
17A151	C2	2-25 mmf.	Oscillator—B Range Trimmer	.10
47X185	C3	13 mmf.	Ceramic	.12
17A155	C4	350-450 mmf.	600 K. C. Padder	.18
17A158	C5	1-12 mmf.	Oscillator Band Spread Trimmer	.18
47X156	C6	3 mmf.	Ceramic	.12
47X151	C7	37 mmf.	Ceramic	.12
066501	C8	.0005 mf.	400 V. Tubular	.06
17A150	C9	2-25 mmf.	Antenna Band Spread Trimmer	.10
17A150	C10	2-25 mmf. Ant. B Range	Trimmer	.10
47X183	C11	105 mmf.	Ceramic	.12
47X182	C12	82 mmf.	Ceramic	.12
47X56	C13, C22	50 mmf.	Molded	.06
066403	C14, C30	.04 mf.	400 V. Tubular	.06
	(C15)	Part of 1st I.F. Can Assembly		
066503	C17	.05 mf.	200 V. Tubular	.06
47X154	C18	50 mmf.	Ceramic	.18
	(C19)	Part of 2nd I.F. Can Assembly		
47X172	(C21A)	60 mmf.	Dual Mica	.10
066403	(C21B)	60 mmf.		
066403	C23	.04 mf.	200 V. Tubular	.06
066103	C24	.01 mf.	200 V. Tubular	.06
47X85	C25	250 mmf.	Molded	.10
066203	C26, C27	.02 mf.	400 V. Tubular	.06
066402	C28	.004 mf.	200 V. Tubular	.06
45X305	(C29A)	20 mf. 450 V.	Dry Electrolytic	.84
	(C29B)	40 mf. 400 V.		
		2 Section Gang Condenser (See "Auto- matic Tuning and Dial Assembly")		

RESISTORS

895205	R1, R4	2.0 Megohm	0.5 W. Carbon	\$0.06
895403	R2	40,000 Ohm	0.5 W. Carbon	.06
895503	R5	50,000 Ohm	0.5 W. Carbon	.06
86X313	R6	500,000 Ohm	Volume Control	.34
894153	R7	15,000 Ohm	0.5 W. Carbon	.08
094253	R8	25,000 Ohm	2.0 W. Carbon	.16
895505	R9	6.0 Megohm	0.5 W. Carbon	.06
895104	R10	100,000 Ohm	0.5 W. Carbon	.10
895154	R11, R12	150,000 Ohm	0.5 W. Carbon	.06
894703	R13	70,000 Ohm	0.5 W. Carbon	.08
893305	R14	3.0 Megohm	0.5 W. Carbon	.10
895254	R15, R17	250,000 Ohm	0.5 W. Carbon	.06
894505	R16	5.0 Megohm	0.5 W. Carbon	.08
895005	R18	6.0 Megohm	0.5 W. Carbon	.06
0932350	R19	235 Ohm	2.0 W. Carbon	.20
40X261	R20	3.0 Megohm	Tone Control	.30

AUTOMATIC TUNING AND DIAL ASSEMBLY

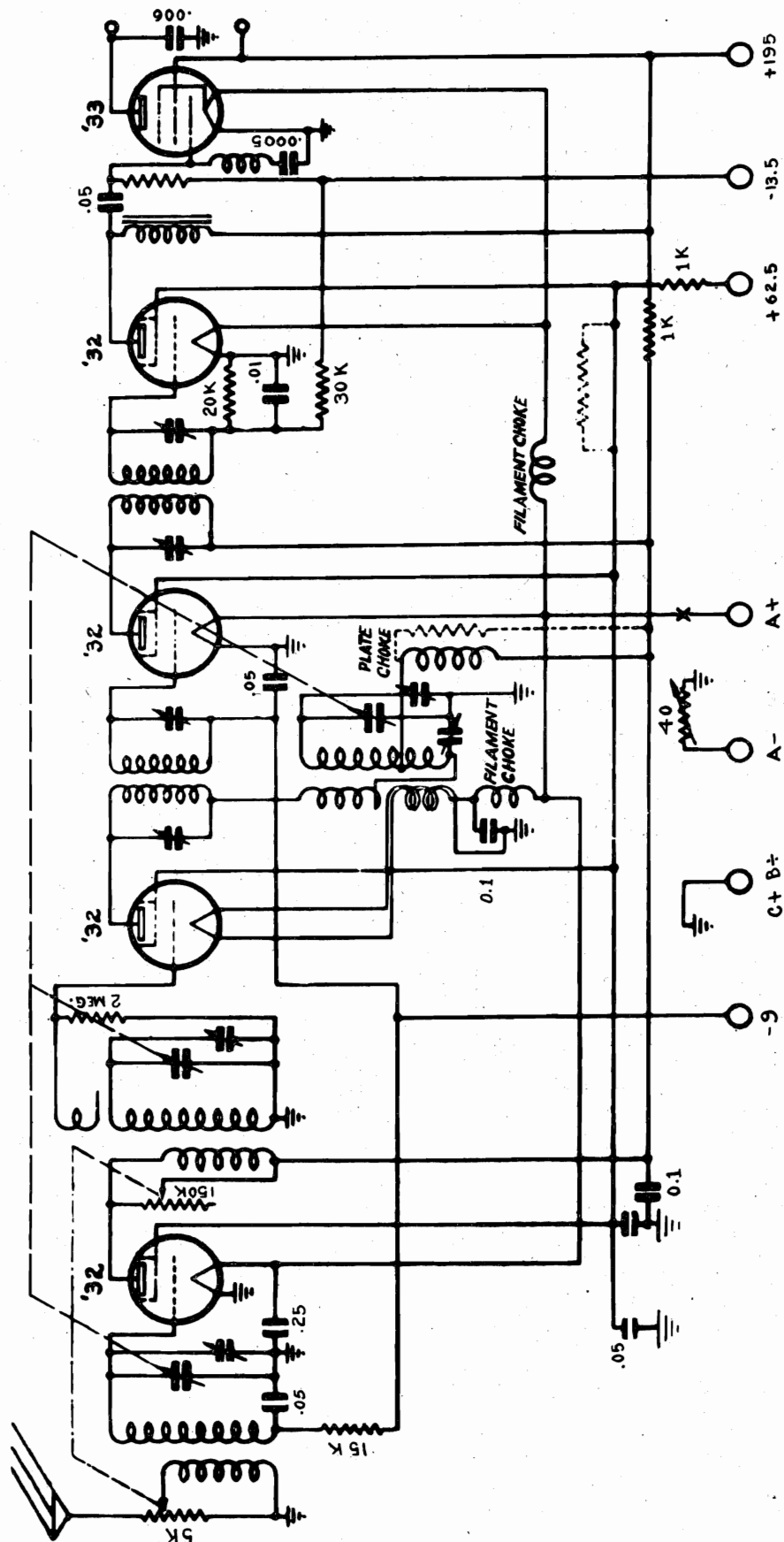
20A87	Automatic Tuning Assembly complete with Gang Condenser and Drive Pulley, less Tuner and Pulley Mounting Plate and Station Buttons	\$3.90
26A322	Tuner and Pulley Mounting Plate Assembly complete with Tuning Eye Tube Clamp, Brace Bracket, String Guide, Idler Pulleys, Tuning Shaft and Bracket	
58X542	Dial Scale Glass	1.00
30X184	Clamps for Dial Scale Glass	.30
58X531	Cardboard Dial Background	.06
28X56	Snaps Pins (To hold Dial Background to Mounting Plate)	.06
41X62	Lucite Light Intensifier	.54
4X619	Dial Escutcheon—Walnut Console and Phone Combination	.48
4X660	Dial Escutcheon—Mahogany Phone Combi- nation	.52
15X193	Pointer for Dial Scale	.06
28X44	Drive Cord (18 Lb. Test)	.02
19X192	"C" Washers for Tuning Shaft	.02
7A139	Dial Lamp Socket and Cable Assembly	.10
7A144	Pilot Light Socket and Cable Assembly— "On" Indicator	.16
7A32	Dial and "On" Indicator Lamps—No. 51	.10
7A147	"On" Indicator Jewel	.10
10A375	Station Buttons—Walnut Console and Phone Combination	.10
10A420	Station Buttons—Mahogany Phone Combi- nation	.10
26A315	Set of Call Letter Shells and Celluloid Tabs	.12
58X540	Celluloid Tabs only (Sheet of 8)	.18

TYPE S-28A65 AUTOMATIC RECORD CHANGER

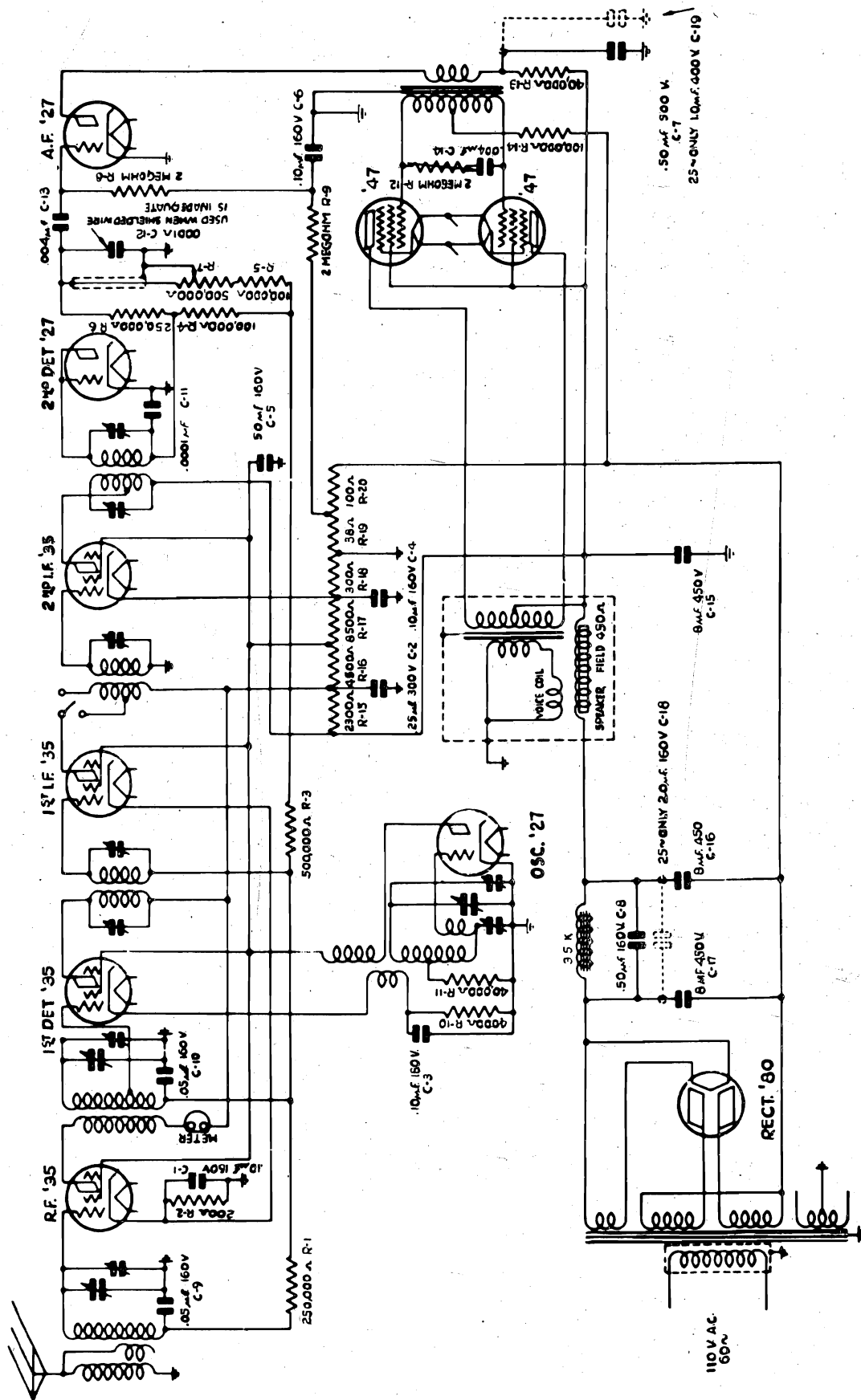
PARTS		
S1-22021	1/4" Snap Washer	Doz. \$0.18
SH-20065	3/16" Snap Washer	Doz. .18
SB-27003	Tone Arm Lift Pin	.10
SB-27026	A.C. Switch	.30
SB-27355-A	Control Lever Assembly	1.06
S1-22278	Turntable	1.62
SB-27079	Control Knob	.16
SB-27132-A	Selector Arm and Blade Assembly—No. 1	.30
SB-27133-A	Selector Arm and Blade Assembly—No. 2	.30
SH-20014	Thrust Washer (used under Selector Arms)	Doz. .18
SB-27587	Tone Arm	1.30
SB-22404	Tone Arm Cartridge with Sapphire Point Needle	6.36
S1-22099	Retractable Pin for J-22278 Turntable	.10
SB-27110	12" Selector Blade	.12
S1-22143	Motor Assembly—115 V., 60 cycles	4.06
SB-27018	Motor Idler Wheel	.60
SB-27091	Switch Control Knob	.16
	Plug Buttons	Doz. .72
	Idler Wheel Tension Spring	.10
SB-27020	Tone Arm Counter Balance Spring	.10
SB-27136	Tone Arm Bracket Assembly	1.50
SH-20143	Panel Mounting Spring	.10
SB-27545	Spring Mounting Stud	.04

Prices Subject to Change Without Notice.

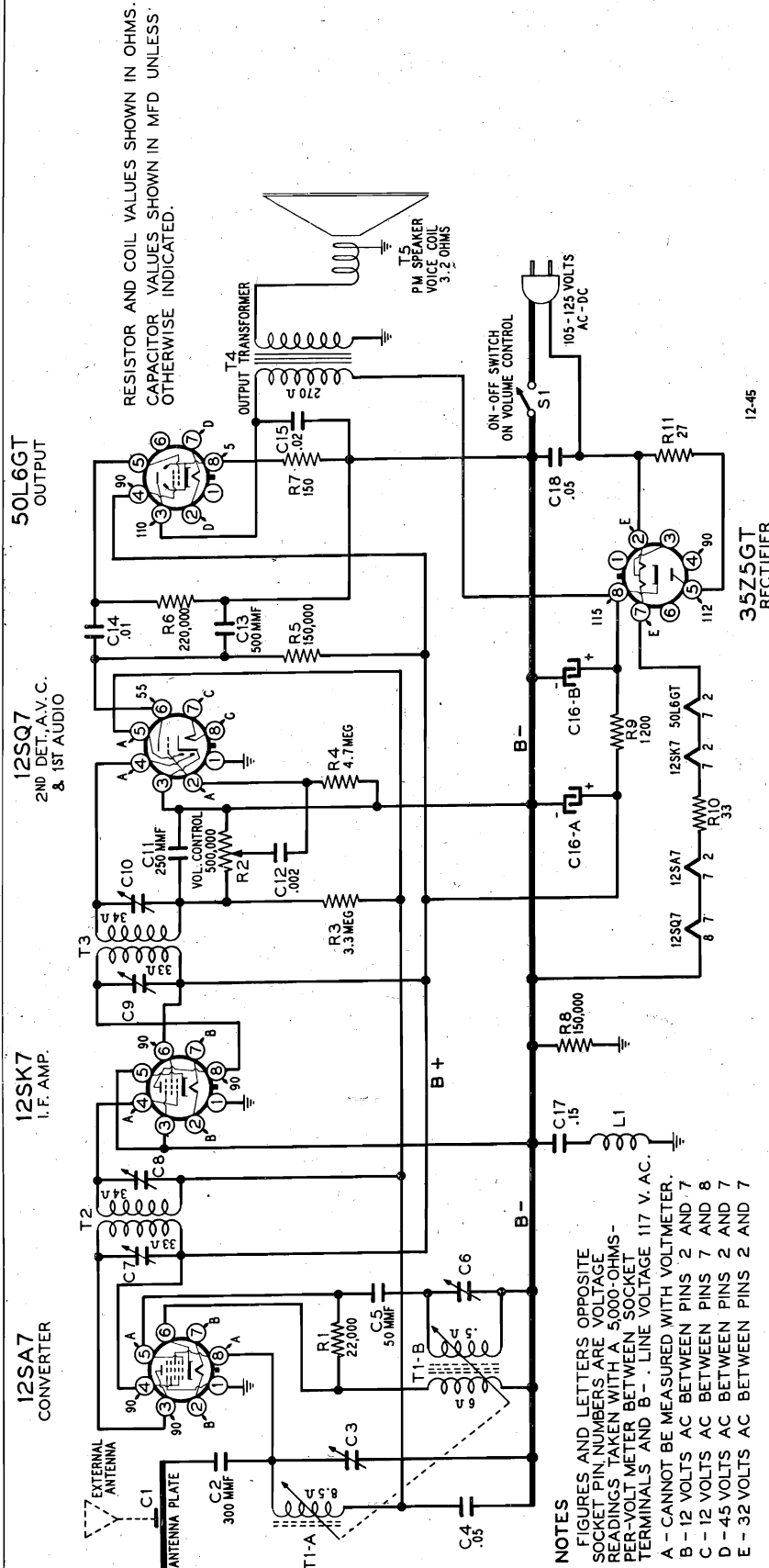
MONTGOMERY WARD



MONTGOMERY WARD

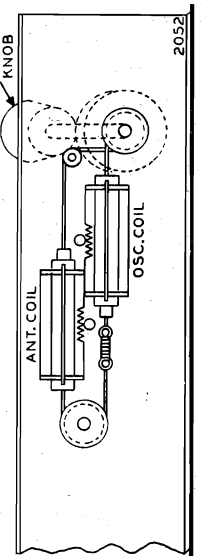


MONTGOMERY WARD

MODELS 54BR-1501A,
54BR-1502A


ANTENNA COIL ADJUSTMENT

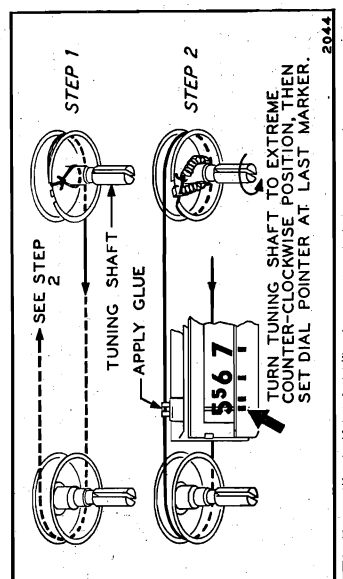
The antenna coil assembly (see illustration) is made so that it is movable left or right. When making the adjustment as required in the alignment procedure, move the coil assembly very slowly, either by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.



View of Tuning Coil Assembly

NOTES ON DRIVE CORD REPLACEMENT

1. Eighteen inches (18") of cord are required.
2. When tying the string to the tension spring (step 2), make sure that the spring takes up all slack.



ELECTRICAL SPECIFICATIONS

Power Supply	105 to 125 volts, DC or 50-60 cycle AC, 28 watts. Also made for 25-cycle AC.
Frequency Range	540 to 1720 kc.
Intermediate Freq.	455 kc.
Selectivity	At 1000 kc, 69 kc at 1000 x signal.
Sensitivity	28 microvolts average for .05 watt output.
Power Output	0.96 watts undistorted, 1.58 watts maximum.
Loud Speaker	4", P.M., v.c. impedance 3.2 ohms.

MODELS 54BR-1501A,
54BR-1502A

MONTGOMERY WARD

Output meter across 3.2-ohm output load.
Volume control at maximum for all adjustments.

- Align for maximum output.
- Reduce input as needed to keep output near 0.4 volts

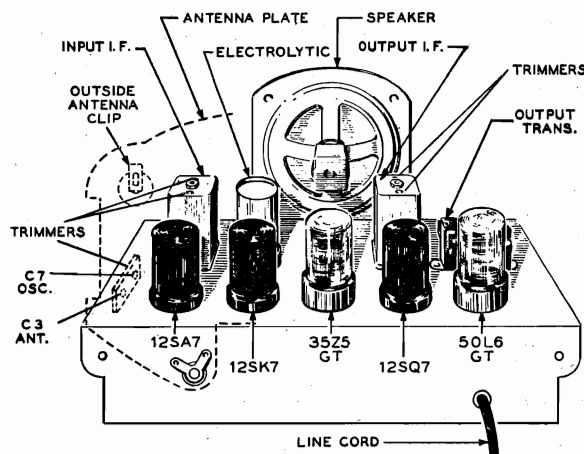
SIGNAL GENERATOR				TUNER SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT in order shown
Frequency	Coupling Capacitor	Connection to Radio	Ground Connection		
455 kc	.1 mf	Metal antenna plate	12SQ7 Pin 3	Iron cores all the way out	Trimmers on output and input I.F. cans
1720 kc	.1 mf	Metal antenna plate	12SQ7 Pin 3	Iron cores all the way out	Oscillator trimmer C6
1720 kc	200 mmf	External antenna clip	12SQ7 Pin 3	Iron cores all the way out	Antenna trimmer C3
1400 kc	200 mmf	External antenna clip	12SQ7 Pin 3	Turn dial to 1400 kc	Adjust position of ant. coil (see coil assembly view)
1720 kc	200 mmf	External antenna clip	12SQ7 Pin 3	Turn dial to 1720 kc	Antenna trimmer C3*

*After the antenna coil has been tracked at 1400 kc, it is necessary to check the antenna trimmer C3 again at 1720 kc. If no appreciable change in trimmer adjustment is necessary, the coil is in track. If the trimmer requires considerable change, the position of the antenna coil at 1400 kc must be readjusted. These two adjustments should be made several times, until no trimmer adjustment is required at 1720 kc.

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 kc for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm, 5-watt resistor across the secondary winding of the output transformer. A reading of .4 volts AC across this resistor will be equivalent to a 50-milliwatt output with the speaker connected.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000-kc and

455-kc signals modulated 30% with a 400-cycle audio signal. Variations of plus or minus 25% are usually permissible.



SIGNAL GENERATOR				INPUT FOR 50-MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Radio	Ground Connection	
1000 kc	200 mmf or RMA dummy antenna	External antenna clip	12SQ7 Pin 3	28 microvolts
1000 kc	.1 mf	Converter 12SA7, pin 8	12SQ7 Pin 3	89 microvolts
455 kc	.1 mf	Converter 12SA7, pin 8	12SQ7 Pin 3	79 microvolts
455 kc	.1 mf	I.F. amplifier 12SK7, pin 4	12SQ7 Pin 3	4000 microvolts
400 cycles	.1 mf	Audio amplifier 12SQ7, pin 2	12SQ7 Pin 3	.05 volts
400 cycles	.1 mf	Power amplifier 50L6GT, pin 5	12SQ7 Pin 3	2.2 volts

**MODELS 54BR-1501A,
54BR-1502A
MODELS 54BR-1503A,
54BR-1504A**

MONTGOMERY WARD

MODELS 54BR-1501A, 1502A

Ref. No.	Part No.	Description	Qty. Used in Set
CAPACITORS			
C1		Washer capacitor mounted on antenna plate	1
C2	BE129114	300 mmf, 20%, mica, 500 volts	1
C3, C6	BE124137	Antenna and oscillator trimmers; dual mounted; C3 (ant.) range is 74 to 136 mmf; C6 (osc.) range is 95 to 175 mmf	1
C4	BE1009	.05 mf, 25%, 200 volts	1
C5	BE12939	50 mmf, 20%, mica, 500 volts	1
C7, C8		Primary and secondary trimmers in input IF can T2; dual mounted; range of each is 39 to 73 mmf	1
C9, C10		Primary and secondary trimmers in output IF can T3; dual mounted; range of each is 39 to 73 mmf	1
C11	BE12912	250 mf, 20%, mica, 500 volts	1
C12	BE10025	.002 mf, 25%, 600 volts	1
C13	BE1292	500 mmf, 20%, mica, 500 volts	1
C14	BE10011	.01 mf, 25%, 400 volts	1
C15	BE10026	.02 mf, 25%, 400 volts	1
C16-A, C16-B	BE11992	Dual electrolytic for 50-60 cycle models; 20 mf, 150 volts; 40 mf, 150 volts	1
	BE11993	Dual electrolytic for 25 cycle models; 40 mf, 150 volts; 60 mf, 150 volts	1
C17	BE10091	.15 mf, 25%, 400 volts	1
C18	BE10013	.05 mf, 25%, 400 volts	1
RESISTORS*			
R1	BEA-981-78	22,000 ohms, 10%, 1/2 watt	1
R2, S1	BE101255	500,000-ohm volume control with on-off switch	1
R3	BEA-981-34	3.3 megohms, 20%, 1/2 watt	1
R4	BEA-981-35	4.7 megohms, 20%, 1/2 watt	1
R5, R8	BEA-981-26	150,000 ohms, 20%, 1/2 watt	2
R6	BEA-981-27	220,000 ohms, 20%, 1/2 watt	1
R7	BEA-981-52	150 ohms, 10%, 1/2 watt	1
R9	BEA-982-63	1200 ohms, 10%, 1/2 watt	1
R10	BEA-982-4	33 ohms, 20%, 1 watt	1
R11	BEA-981-43	27 ohms, 10%, 1/2 watt	1
COILS AND TRANSFORMERS			
L1	BE105138	RF choke coil	1
T1-A, T1-B	BE13614	Antenna and oscillator coil tuning assembly complete with cores, drive cord, and tuning drive shaft	1
T2	BE108157H	Input IF transformer complete in can with trimmers	1

MODELS 54BR-1503A, 1504A

Ref. No.	Part No.	Description	Qty. Used in Set
CAPACITORS			
C, C3, C4	B-210-10040	2-gang capacitor assembly, including antenna and oscillator trimmers	1
C1	C-8D-10761	.01 mf, 400 volts, 20%	1
C2, C8, C9	C-8F3-10	220 mmf, 500 volts, 20%, mica	3
C5, C7	C-8F3-8	100 mmf, 500 volts, 20%, mica	2
C6	C-8D-10770	.05 mf, 200 volts, 20%	1
C10	C-8D-10788	.004 mf, 600 volts, 20%	1
C11	C-8D-10772	.02 mf, 600 volts, 20%	1
C12, C16	C-8D-10760	.1 mf, 400 volts, +20-10%	2
C13, C14, C15	A-8C-10946	Electrolytic for 60 cycles; 40 mf x 150 volts, 20 mf x 150 volts, 20 mf x 150 volts	1
C17	C-8D-10789	.002 mf, 600 volts, 20%	1
C18	C-8D-10771	.1 mf, 200 volts, +20-10%	1
RESISTORS*			
R1	C-981-13	1000 ohms, 1/2 watt, 20%	1
R2	C-981-31	1 megohm, 1/2 watt, 20%	1
R3	C-981-78	22,000 ohms, 1/2 watt, 10%	1
R4, R9	C-981-90	220,000 ohms, 1/2 watt, 10%	2
R5	C-981-82	47,000 ohms, 1/2 watt, 10%	1
R6, S1	A-10A-10075	Volume control (500,000 ohms) and switch	1
R7	C-981-34	3.3 megohms, 1/2 watt, 20%	1
R8	C-981-37	10 megohms, 1/2 watt, 20%	1
R10	C-981-94	470,000 ohms, 1/2 watt, 10%	1
R11	C-981-52	150 ohms, 1/2 watt, 10%	1
R12	C-981-43	27 ohms, 1/2 watt, 10%	1
R13	C-982-53	180 ohms, 1 watt, 10%	1
R14	C-982-63	1200 ohms, 1 watt, 10%	1
R15	C-981-5	47 ohms, 1/2 watt, 20%	1
TRANSFORMERS AND COILS			
L1	A-16A-10090	Choke coil	1
T1	C-212-10435	Loop antenna assembly, for walnut cabinet (includes loop, back, resistor R1, and capacitor C1)	1
T1	C-212-10435-I	Loop antenna assembly, for ivory cabinet (includes loop, back, resistor R1, and capacitor C1)	1

*The values of the resistors listed above are based on RMA standards. Due to conditions beyond our control some receivers have been shipped with resistors of pre-standardized values. This receiver will operate equally well with resistors of either group. An illustration of the difference follows:

Pre-standardized value—50,000 ohms, $\pm 10\%$, 1/2 watt
RMA value—47,000 ohms, $\pm 10\%$, 1/2 watt

Ref. No.	Part No.	Description	Qty. Used in Set
T3	BE108157I	Output IF transformer complete in can with trimmers	1
T4	BE105128B	Output transformer for speaker	1
SPEAKER			
T5	BEB-18A-10251	4-inch P. M. speaker	1
SOCKETS			
BE121176		Octal wafer socket stamped "125A7"	1
BE121177		Octal wafer socket stamped "125K7"	1
BE121178		Octal wafer socket stamped "125Q7"	1
BE121318		Octal wafer socket stamped "50L6GT"	1
BE121181		Octal wafer socket stamped "3Z5GT"	1
BE121216		Bakelite socket for electrolytic capacitor	1
DIAL AND TUNING PARTS			
BEA-6D-10049-1		Dial scale, ivory	1
BEA-6D-10049-2		Dial scale, walnut	1
BEA-2D-10050		Dial background	1
BE115731		Dial bracket	1
BEA-2G-10051		Dial pointer	1
BE120214		Dial pointer drive cord	1
BE120364		Coil spring for drive cord	1
BE128640-9		Knob, "VOLUME", ivory	1
BE128640-46		Knob, "VOLUME", walnut	1
BE128661-9		Knob, "TUNING", ivory	1
BE128661-46		Knob, "TUNING", walnut	1
MISCELLANEOUS			
S1		On-off switch on volume control R2	1
BE115597C		Antenna plate (back plate of cabinet, includes capacitor C1), ivory	1
BE115597		Antenna plate (back plate of cabinet, includes capacitor C1), walnut	1
BE131193		Cinch buttons, for fastening antenna plate to cabinet	4
BE128652-9		Cabinet, bakelite, ivory	1
BE10798E		Cabinet, bakelite, walnut	1
BEA-2H-10715		Line cord and plug	1
BE131033		Tube shield (125A7, 50L6GT)	2
BE131263		Rubber washers for mounting chassis	2
		Offset washers for mounting chassis	2
BE13220		Screws, 6-32 x 3/8", for mounting chassis	2

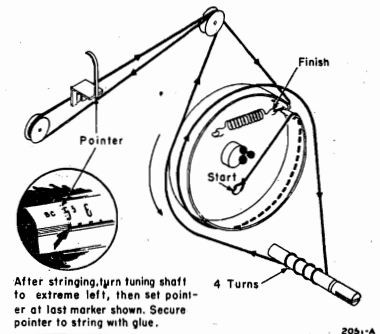
Ref. No.	Part No.	Description	Qty. Used in Set
T2	A-13D-10089	Oscillator coil	1
T3	B-13B-10091	Input IF transformer, complete in can. (Range of trimmers: 45-85 mmf each)	1
T4	B-13B-10092	Output IF transformer, complete in can. (Range of trimmers: 43-80 mmf each)	1
T5	B-12C-10074	Output transformer for speaker	1
SPEAKER			
T6	B-18A-10094	4-in. x 6-in. oval P.M. speaker	1
DIAL AND TUNING PARTS			
B-200-10447		Dial bracket assembly	1
B-6D-10031		Dial scale (for walnut cabinet)	1
B-6D-10031-I		Dial scale (for ivory cabinet)	1
B-2M-7758		Cinch button, for fastening dial scale	7
A-6J-10032		Crystal for dial	1
A-2D-10036		Bracket for crystal	1
A-2G-10095		Pointer guard (for walnut cabinet)	1
B-2H-10039-I		Pointer guard (for ivory cabinet)	1
A-53A-10576		Drive cord for dial pointer	36
A-49A-10078		Tension spring for dial drive cord	1
A-46A-3560		Dial light bulb, 6-8 volts, type T-47	1
A-55A-10093		Socket and bracket for dial light	1
A-3A-10035		Tuning shaft	1
B-29E-466		Spring washer, for tuning shaft	1
MISCELLANEOUS			
5C-10000-46		Cabinet, bakelite, walnut	1
5C-10000-9		Cabinet, bakelite, ivory	1
B-5B-10011-47		Knob, tenite, walnut	2
B-5B-10011-8		Knob, tenite, ivory	2
A-15B-10440		Socket, octal, for tubes	6
B-14M-10088		Line cord and plug	1
A-2M-10096		Stud, for fastening back to cabinet	1
42A-10097		Screw, 8-18 x 7/8 hex head, for mounting chassis	4

NOTE ON TUBE REPLACEMENT

Replace a defective metal 125K7 tube with another metal tube. Replace a glass 125K7 tube with a metal tube or with an exact duplicate of the tube now in the set.

**MODELS 54BR-1503B,
54BR-1504B**

MODELS 54BR-1503B, 1504B



Dial Stringing Diagram

Ref. No.	Part No.	Description	Qty. Used in Set
CAPACITORS			
C, C3, C4	B-210-10040	2-gang capacitor assembly, including antenna and oscillator trimmers	1
C1	C-8D-10761	.01 mf, 400 volts, 20%	1
C2, C8, C9	C-8F3-10	220 mmf, 500 volts, 20%, mica	3
C5, C7	C-8F3-8	100 mmf, 500 volts, 20%, mica	2
C6	C-8D-10770	.05 mf, 200 volts, 20%	1
C10	C-8D-10788	.004 mf, 600 volts, 20%	1
C11	C-8D-10772	.02 mf, 600 volts, 20%	1
C12, C16	C-8D-10760	.1 mf, 400 volts, +20-10%	2
C13, C14, C15	A-8C-10946	Electrolytic for 60 cycles; 40 mf x 150 volts, 20 mf x 150 volts, 20 mf x 150 volts	1
C17	C-8D-10789	.002 mf, 600 volts, 20%	1
C18	C-8D-10771	.1 mf, 200 volts, +20-10%	1
RESISTORS*			
R1	C-981-13	1000 ohms, 1/2 watt, 20%	1
R2	C-981-31	1 megohm, 1/2 watt, 20%	1
R3	C-981-78	22,000 ohms, 1/2 watt, 10%	1
R4, R9	C-981-90	220,000 ohms, 1/2 watt, 10%	2
R5	C-981-82	47,000 ohms, 1/2 watt, 10%	1
R6, S1	A-10A-10075	Volume control (500,000 ohms) and switch	1
R7	C-981-34	3.3 megohms, 1/2 watt, 20%	1
R8	C-981-37	10 megohms, 1/2 watt, 20%	1
R10	C-981-94	470,000 ohms, 1/2 watt, 10%	1
R11	C-981-52	150 ohms, 1/2 watt, 10%	1
R12	C-981-43	27 ohms, 1/2 watt, 10%	1
R13	C-982-53	180 ohms, 1 watt, 10%	1
R14	C-982-63	1200 ohms, 1 watt, 10%	1
R15	C-981-5	47 ohms, 1/2 watt, 20%	1
TRANSFORMERS AND COILS			
L1	A-16A-10090	Choke coil	1
T1	C-212-10435	Loop antenna assembly, for walnut cabinet (includes loop, back, resistor R1, and capacitor C1)	1
T1	C-212-10435-I	Loop antenna assembly, for ivory cabinet (includes loop, back, resistor R1, and capacitor C1)	1
T2	A-13D-10089	Oscillator coil	1
T3	B-13B-10091	Input IF transformer, complete in can. (Range of trimmers: 45-85 mmf each)	1
T4	B-13B-10092	Output IF transformer, complete in can. (Range of trimmers: 43-80 mmf each)	1
T5	B-12C-10074	Output transformer for speaker	1
SPEAKER			
T6	B-18A-10094	4-in. x 6-in. oval P.M. speaker	1
DIAL AND TUNING PARTS			
B-200-10447		Dial bracket assembly	1
B-6D-10031		Dial scale (for walnut cabinet)	1
B-6D-10031-I		Dial scale (for ivory cabinet)	1
A-6A-10078		Diffuser	1
B-2M-7758		Cinch button, for fastening dial scale	7
A-6J-10032		Crystal for dial	1
A-2D-10036		Bracket for crystal (walnut)	2
A-2D-10036-I		Bracket for crystal (ivory)	1
A-2G-10095		Pointer guard (for walnut cabinet)	1
B-2H-10039-I		Pointer guard (for ivory cabinet)	1
A-53A-10576		Drive cord for dial pointer	36
A-49A-10078		Tension spring for dial drive cord	1
A-46A-3560		Dial light bulb, 6-8 volts, type T-47	1
A-55A-10093		Socket and bracket for dial light	1
A-3A-10035		Tuning shaft	1
B-29E-466		Spring washer, for tuning shaft	1
MISCELLANEOUS			
5C-10000-46		Cabinet, bakelite, walnut	1
5C-10000-9		Cabinet, bakelite, ivory	1
B-5B-10011-47		Knob, tenite, walnut	2
B-5B-10011-8		Knob, tenite, ivory	2
A-15B-10440		Socket, octal, for all tubes but 125K7	4
121177		Socket, octal, for 125K7	1
B-14M-10088		Line cord and plug	1
A-2M-10096		Stud, for fastening back to cabinet	4
42A-10097		Screw, 8-18 x 7/8 hex head, for mounting chassis	3

DIAL DRIVE FOR
MODELS 54BR-1503A
and 54BR-1504A



12SQ7

2ND. DET., A.V.C.
& 1ST AUDIO

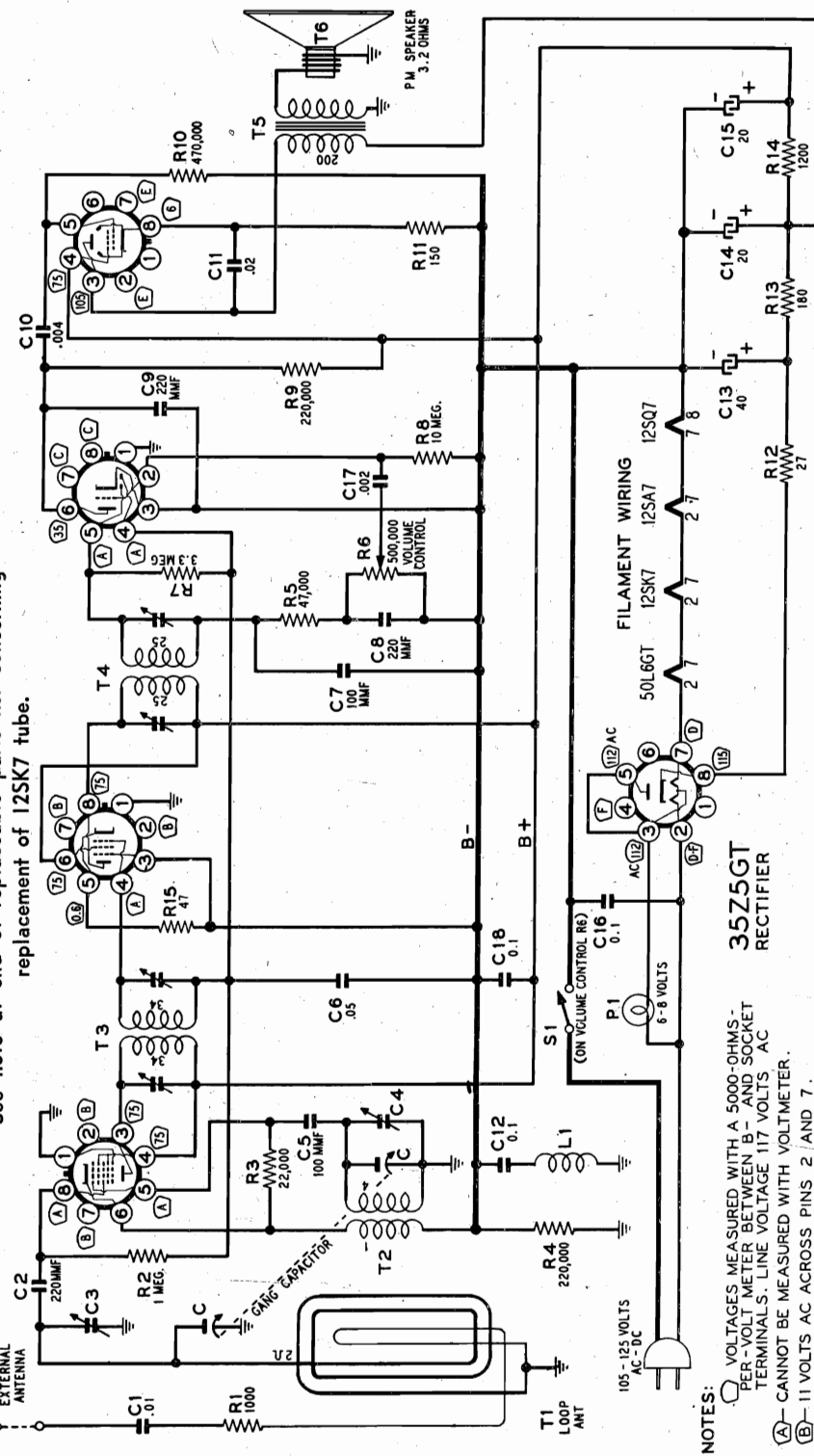
12SK7

I. F. AMP.

and of replaceable parts list concerning replacement of 12SK7 tube.



5



NOTES:

⓪ VOLTAGES MEASURED WITH A 5000-OHMS-
PER-VOLT METER BETWEEN B- AND SOCKET
TERMINALS. LINE VOLTAGE 117 VOLTS AC

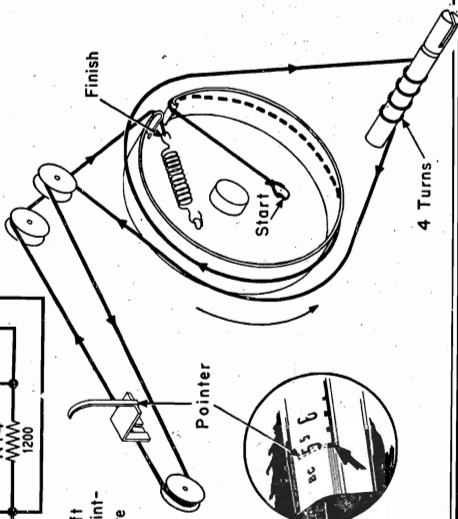
Ⓐ CANNOT BE MEASURED WITH VOLTMETER.

(A) CANNOT BE MEASURED WITH VOLTMETER.
(B) 11 VOLTS AC ACROSS PINS 2 AND 7.
(C) 11 VOLTS AC ACROSS PINS 7 AND 8.
(D) 35 VOLTS AC ACROSS PINS 2 AND 7.
(E) 49 VOLTS AC ACROSS PINS 2 AND 7.
(F) 117 VOLTS AC ACROSS PINS 2 AND 4.
WHERE NO READING IS INDICATED
VOLTAGE IS ZERO.

CAPACITOR VALUES IN MFD UNLESS OTHERWISE INDICATED.
RESISTOR AND COIL VALUES IN OHMS
WHERE VALUE OF COIL IS NOT SHOWN
RESISTANCE IS LESS THAN ONE OHM

Power Supply.....	105 to 125 volts, DC or 50-60 cycle AC, 24 watts.	Also made for 25-cycle AC.	Power Output.....	0.9 watt undistorted, 1.0 watt maximum.
Frequency Range.....	530 to 1630 kc.		Loud Speaker.....	4" x 6" oval, P.M., v.c. impedance 3.2 ohms.

Selectivity.....At 1000 kc, 60 kc at 1000 x signal.
Sensitivity.....26 microvolts average for .05-watt output.



After stringing, turn tuning shaft to extreme left, then set pointer at last marker shown. Secure pointer to string with glue.

MONTGOMERY WARD

MODELS 54BR-1503A,
54BR-1504A
MODELS 54BR-1503B,
54BR-1504B
MODELS 54BR-1503C,
54BR-1504C

ALIGNMENT PROCEDURE

Output meter across 3.2-ohm output load.
Volume control at maximum for all adjustments.
Align for maximum output. Reduce input as needed to

keep output near .4 volts.
Loop antenna should be connected to receiver and in
its proper position when making adjustments.

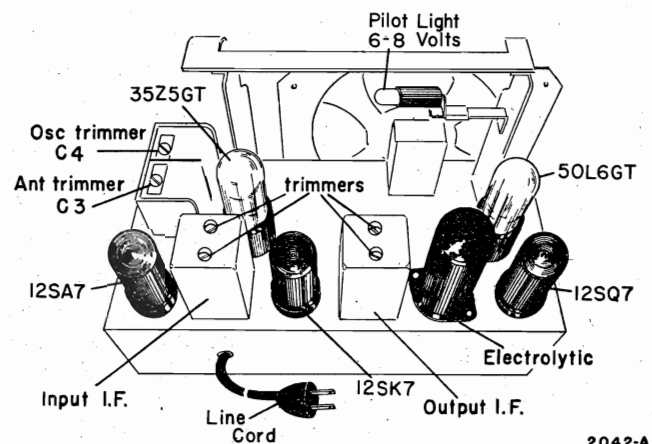
SIGNAL GENERATOR				TUNER SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT in order shown
Frequency	Coupling Capacitor	Connection to Radio	Ground Connection		
455 kc	0.1 mf	Grid (pin 4) of 12SK7	Pin 3 of 12SK7 (B- of set)	Capacitor full open (plates out of mesh)	2 trimmers on output IF can
455 kc	0.1 mf	Grid (pin 8) of 12SA7	Pin 3 of 12SK7 (B- of set)	Capacitor full open (plates out of mesh)	2 trimmers on input IF can
1630 kc	0.1 mf	Grid (pin 8) of 12SA7	Pin 3 of 12SK7 (B- of set)	Capacitor full open (plates out of mesh)	Oscillator trimmer C4 on gang
1400 kc	200 mmf	External antenna clip	Pin 3 of 12SK7 (B- of set)	Set dial pointer at 1400 kc	Antenna trimmer C3 on gang

RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 kc for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm, 5-watt resistor across the secondary winding of the output transformer. A reading of 0.4 volts AC across this resistor will be equivalent to a 50-milliwatt output with the speaker connected.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 kc and 455 kc signals modulated 30% with a 400-cycle audio signal. Variations of plus or minus 25% are usually permissible.

The volume control must be set to maximum.



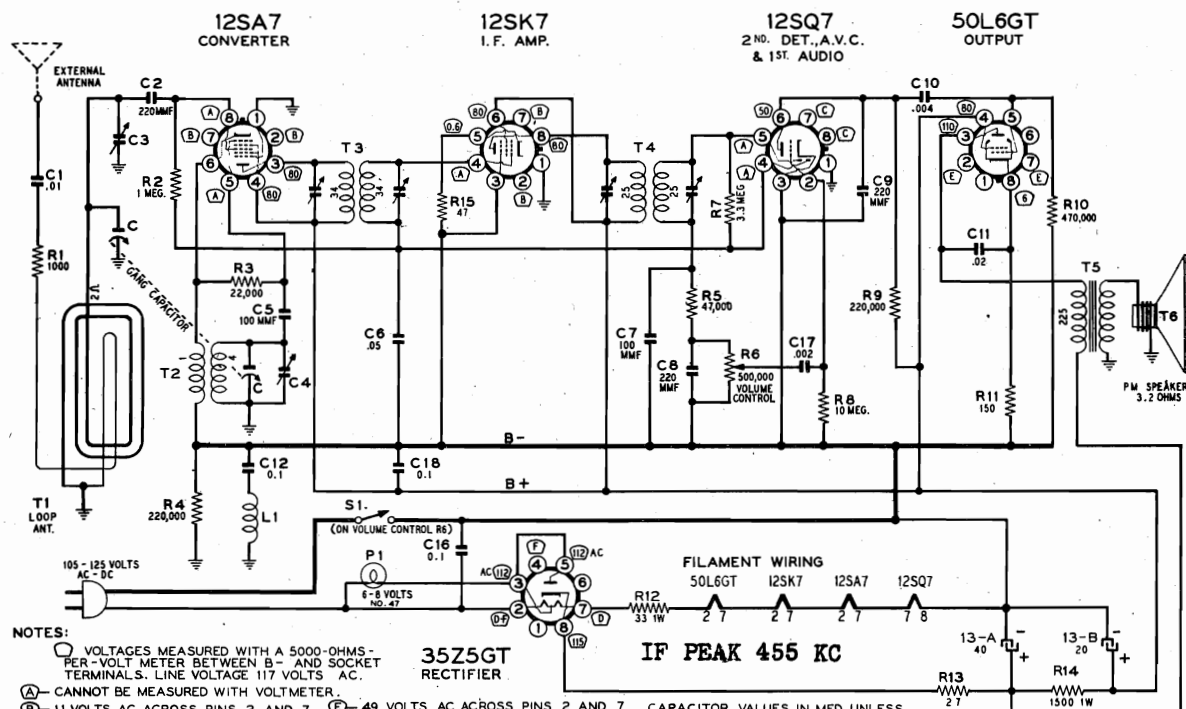
2042-A

Chassis View, Showing Trimmer Location

SIGNAL GENERATOR				INPUT FOR 50-MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Radio	Ground Connection	
1000 kc	200 mmf or RMA dummy antenna	External antenna clip	Pin 3 of 12SK7 (B- of set)	24 microvolts
1000 kc	0.1 mf	Grid (pin 8) of converter (12SA7)	Pin 3 of 12SK7 (B- of set)	98 microvolts
455 kc	0.1 mf	Grid (pin 8) of converter (12SA7)	Pin 3 of 12SK7 (B- of set)	74 microvolts
455 kc	0.1 mf	Grid (pin 4) of I.F. amp. (12SK7)	Pin 3 of 12SK7 (B- of set)	3200 microvolts
400 cycles	0.1 mf	Grid (pin 2) of audio amp. (12SQ7)	Pin 3 of 12SK7 (B- of set)	.043 volts
400 cycles	0.1 mf	Grid (pin 5) of output amp. (50L6GT)	Pin 3 of 12SK7 (B- of set)	2.0 volts

MODELS 54BR-1503C,
54BR-1504C

MONTGOMERY WARD



NOTES:

VOLTAGES MEASURED WITH A 5000-OHMS-
PER-VOLT METER BETWEEN B- AND SOCKET
TERMINALS. LINE VOLTAGE 117 VOLTS AC.

(A) CANNOT BE MEASURED WITH VOLT-METER.

(B) 11 VOLTS AC ACROSS PINS 2 AND 7. (E) 49 VOLTS AC ACROSS PINS 2 AND 7.

(C) 11 VOLTS AC ACROSS PINS 7 AND 8. (F) 117 VOLTS AC ACROSS PINS 2 AND 4.

(D) 35 VOLTS AC ACROSS PINS 2 AND 7 WHERE NO READING IS INDICATED
VOLTAGE IS ZERO.

CAPACITOR VALUES IN MFD UNLESS
OTHERWISE INDICATED.

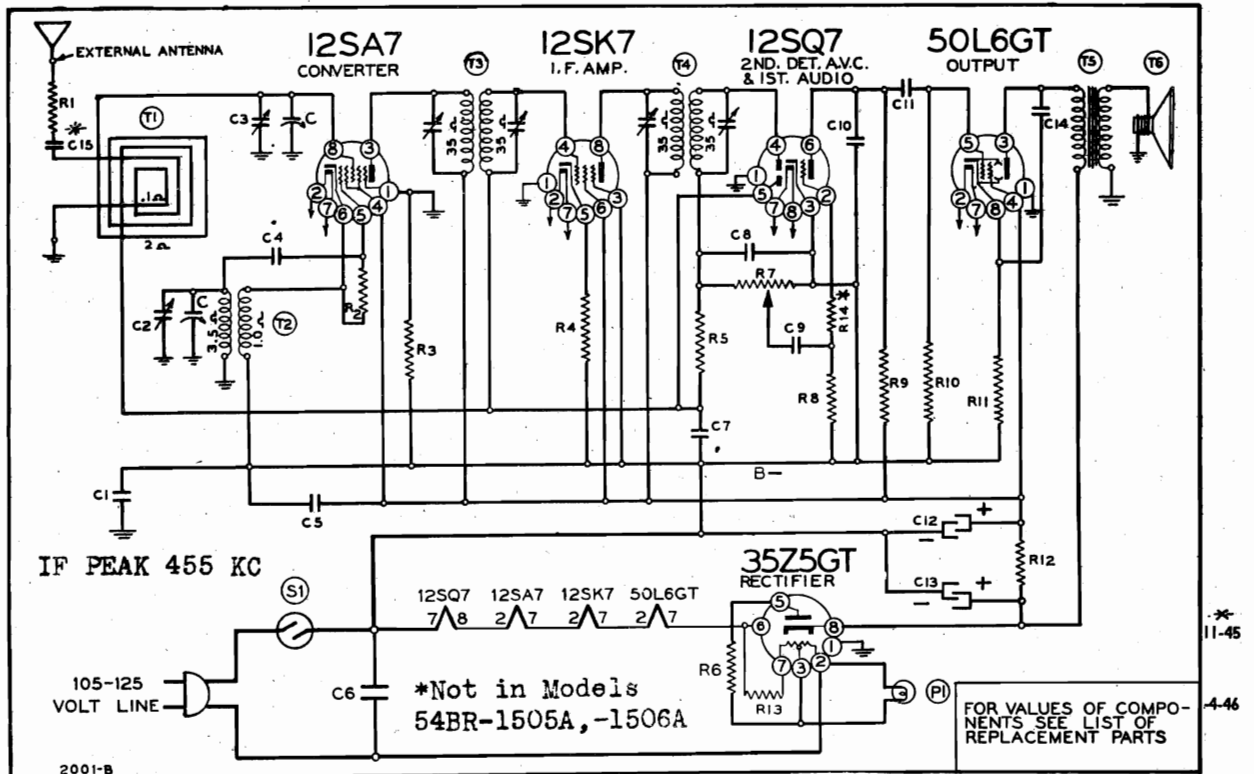
RESISTOR AND COIL VALUES IN OHMS.

WHERE VALUE OF COIL IS NOT SHOWN,
RESISTANCE IS LESS THAN ONE OHM.

Ref. No.	Part No.	Description	Qty. Used in Set
CAPACITORS*			
C, C3, C4	B-210-10040	2-gang capacitor assembly, including antenna and oscillator trimmers	1
C1	C-8D-10761	.01 mf, 400 volts, 20%	1
C2, C8, C9	C-8F3-10	220 mmf, 500 volts, 20%, mica	3
C5, C7	C-8F3-8	100 mmf, 500 volts, 20%, mica	2
C6	C-8D-10770	.05 mf, 200 volts, 20%	1
C10	C-8D-10788	.004 mf, 600 volts, 20%	1
C11	C-8D-10772	.02 mf, 600 volts, 20%	1
C12, C16	C-8D-10760	.1 mf, 400 volts, +20-10%	2
C13-A, B	11992	Electrolytic for 60 cycles; 40 mf x 150 volts, 20 mf x 150 volts	1
C13-A, B	11993	Electrolytic for 25 cycles; 60 mf x 150 volts, 40 mf x 150 volts	1
C17	C-8D-10789	.002 mf, 600 volts, 20%	1
C18	C-8D-10771	.1 mf, 200 volts, +20-10%	1
RESISTORS*			
R1	C-9B1-13	1000 ohms, 1/2 watt, 20%	1
R2	C-9B1-31	1 megohm, 1/2 watt, 20%	1
R3	C-9B1-78	22,000 ohms, 1/2 watt, 10%	1
R4, R9	C-9B1-90	220,000 ohms, 1/2 watt, 10%	2
R5	C-9B1-82	47,000 ohms, 1/2 watt, 10%	1
R6, S1	A-10A-10075	Volume control (500,000 ohms) and switch	1
R7	C-9B1-34	3.3 megohms, 1/2 watt, 20%	1
R8	C-9B1-37	10 megohms, 1/2 watt, 20%	1
R10	C-9B1-94	470,000 ohms, 1/2 watt, 10%	1
R11	C-9B1-52	150 ohms, 1/2 watt, 10%	1
R12	C-9B2-44	33 ohms, 1 watt, 10%	1
R13	C-9B1-43	27 ohms, 1/2 watt, 10%	1
R14	C-9B2-64	1500 ohms, 1 watt, 10%	1
R15	C-9B1-5	47 ohms, 1/2 watt, 20%	1
TRANSFORMERS AND COILS			
L1	A-16A-10090	Choke coil	1
T1	C-212-10435	Loop antenna assembly, for walnut cabinet (includes loop, back, resistor R1, and capacitor C1)	1
T1	C-212-10435-1	Loop antenna assembly, for ivory cabinet (includes loop, back, resistor R1, and capacitor C1)	1
T2	A-13D-10089	Oscillator coil	1

Ref. No.	Part No.	Description	Qty. Used in Set
T3	B-13B-10091	Input IF transformer, complete in can. (Range of trimmers: 45-85 mmf each)	1
T4	B-13B-10092	Output IF transformer, complete in can. (Range of trimmers: 43-80 mmf each)	1
T5	B-12C-10074	Output transformer for speaker	1
SPEAKER			
T6	B-18A-10094	4-in. x 6-in. oval P.M. speaker	1
DIAL AND TUNING PARTS			
	B-200-10447	Dial bracket assembly	1
	B-6D-10031	Dial scale (for walnut cabinet)	1
	B-6D-10031-1	Dial scale (for ivory cabinet)	1
	A-6A-11078	Diffuser	1
	B-2M-7758	Cinch button, for fastening dial scale	7
	A-6J-10032	Crystal for dial	1
	A-2D-10036	Bracket for crystal (walnut)	2
	A-2D-10036-1	Bracket for crystal (ivory)	2
	A-2G-10095	Pointer	1
	B-2H-10039	Pointer guard (for walnut cabinet)	1
	B-2H-10039-1	Pointer guard (for ivory cabinet)	1
	A-53A-10576	Drive cord for dial pointer	36"
	A-49A-10078	Tension spring for dial drive cord	1
	A-46A-3560	Dial light bulb, 6-8 volts, type T-47	1
	A-55A-10093	Socket and bracket for dial light	1
	A-3A-10035	Tuning shaft	1
	B-29E-466	Spring washer, for tuning shaft	1
MISCELLANEOUS			
	5C-10000-46	Cabinet, bakelite, walnut	1
	5C-10000-9	Cabinet, bakelite, ivory	1
	B-5B-10011-17	Knob, tenite, walnut	2
	B-5B-10011-8	Knob, tenite, ivory	2
	A-15B-10440	Socket, octal, for all tubes but 12SK7	4
	121177	Socket, octal, for 12SK7	1
	B-14M-10088	Line cord and plug	1
	A-2M-10096	Stud, for fastening back to cabinet	4
	42A-10097	Screw, 8-18 x 7/8 hex head, for mounting chassis	3

MONTGOMERY WARD

MODELS 54BR-1505A, 54BR-1506A,
MODELS 54BR-1505B, 54BR-1506B

Part No.	Schematic Diagram Reference	Description	No. Used In Set
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CONDENSERS

BE100110	C1	.2 x 400 volt tubular condenser.....	1
BE12921	C4	.0002 mica type condenser, 20%.....	1
BE1009	C5, C7	.05 x 200 volt tubular condenser.....	2
BE1001	C6	.1 x 400 volt tubular condenser.....	1
BE1295	C8	.0001 mica type condenser, 20%.....	1
BE10025	C9	.002 x 600 volt tubular condenser.....	1
BE12912	C10	.00025 mica type condenser, 20%.....	1
BE100106	C11	.004 x 600 volt tubular condenser.....	1
BE11992	C12, C13	Electrolytic filter condenser, 50 to 60 cycles, 20 mfd.-40 mfd. x 150 volts.....	1
BE11993	C12, C13	Electrolytic filter condenser, 25 cycles, 40 mfd.-60 mfd. x 150 volts.....	1
BE10026	C14	.02 x 400 volt tubular condenser.....	1
BEC-8D-10778	C15 *	.002 x 600 volt tubular condenser.....	1

RESISTORS*

BEA-9B1-13	R1	1,000 ohm, 1/2 watt resistor, 20%.....	1
BEA-9B1-82	R2	47,000 ohm, 1/2 watt resistor, 10%.....	1
BEA-9B1-27	R3	220,000 ohm, 1/2 watt resistor, 20%.....	1
BEA-9B1-46	R4	47 ohm, 1/2 watt resistor, 10%.....	1
BEA-9B1-34	R5	3.3 megohm, 1/2 watt resistor, 20%.....	1
BEA-9B1-42	R6	22 ohm, 1/2 watt resistor, 10%.....	1
BEA-9B1-35	R8	4.7 megohm, 1/2 watt resistor, 20%.....	1
BEA-9B1-29	R9	470,000 ohm, 1/2 watt resistor, 20%.....	1
BEA-9B1-30	R10	680,000 ohm, 1/2 watt resistor, 20%.....	1
BEA-9B1-52	R11	150 ohm, 1/2 watt resistor, 10%.....	1
BEA-9B2-63	R12	1200 ohm, 1 watt resistor, 10%.....	1
BEA-9B2-4	R13	33 ohm, 1 watt resistor, 20%.....	1
BEA-9B1-23	R14 *	47,000 ohm, 1/2 watt resistor, 20%.....	1

COILS

BE108140K	T3	Input I.F. coil, complete in can.....	1
BE108141F	T4	Output I.F. coil, complete in can.....	1
BE110145	T2	Oscillator coil.....	1
BE111252B	T1	Loop antenna only (les; back).....	1
BE128724		Back for loop, brown.....	1
BE128724B		Back for loop, ivory.....	1

*SPECIAL NOTE ON RESISTORS: The values of all resistors listed above are based on RMA standards. Due to conditions beyond our control some receivers have been shipped with resistors of pre-standardized values. This receiver will operate equally well with resistors of either group. An illustration of the difference follows:

Pre-standardized value—50,000 ohms, $\pm 10\%$, 1/3 watt
RMA value—47,000 ohms, $\pm 10\%$, 1/2 watt

NOTE ON TUBE REPLACEMENT

Replace a defective metal 12SK7 tube with another metal tube. Replace a glass 12SK7 tube with either a metal tube or with an exact duplicate of the tube now in the set.

Part No.	Schematic Diagram Reference	Description	No. Used in Set
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SPEAKER

BE114248C	T6	Five-inch P.M. dynamic speaker (less output transformer).....	1
BE105108B	T5	Output transformer for speaker.....	1

MISCELLANEOUS

BE101265	R7, S1	Volume control and switch (1 megohm).....	1
BEB-8A-10209	C, C2, C3	Two-gang variable condenser with 5-button automatic tuner assembly.....	1
BE107-98		Line cord and plug.....	1
BE121210		Eight-prong octal socket.....	5
BE107249	P1	6-8 volt pilot light bulb, type T-47.....	1
BE107358		Socket assembly for pilot light.....	1
BE132264		No. 8-18 x 1/4 chassis mounting screw.....	1
BE134123		Rubber bumper for bottom of cabinet.....	4
BE128655-46		Bakelite cabinet, walnut.....	1
BE128655-9		Bakelite cabinet, ivory.....	1

DIAL AND TUNING PARTS

BE112945B		Dial plate.....	1
BEB-6D-10117		Dial scale (Model 54BR-1505A only).....	1
BEB-6D-10117-1		Dial scale (Model 54BR-1506A only).....	1
BE112969		Pointer.....	1
BEA-2M-7758		Crystal for dial.....	1
BE120375		Button for fastening dial scale.....	2
BE120372		String for dial.....	3 ft.
BE112959		Coiled tension spring for dial string.....	1
BE117910		Pulley for dial.....	1
BEA-3A-10119		Pointer shaft.....	1
BE117902		Tuning shaft.....	1
BE128795-47		Rod for pushbuttons.....	1
BE128794-47		Pushbutton, left, walnut.....	2
BE128795-8		Pushbutton, right, walnut.....	3
BE128794-8		Pushbutton, left, ivory.....	2
BE112973		Pushbutton, right, ivory.....	3
BE112979		Set of station call letters.....	1 set
BE128686-47		Set of celluloid tabs.....	1 set
BE128687-47		Knob, "Volume," walnut.....	1
BE128686-8		Knob, "Tuning," walnut.....	1
BE128687-8		Knob, "Volume," ivory.....	1
BE131383		Knob, "Tuning," ivory.....	1
		Screwdriver.....	1

MODELS 54BR-1505A, 54BR-1506A

MODELS 54BR-1505B, 54BR-1506B

MONTGOMERY WARD

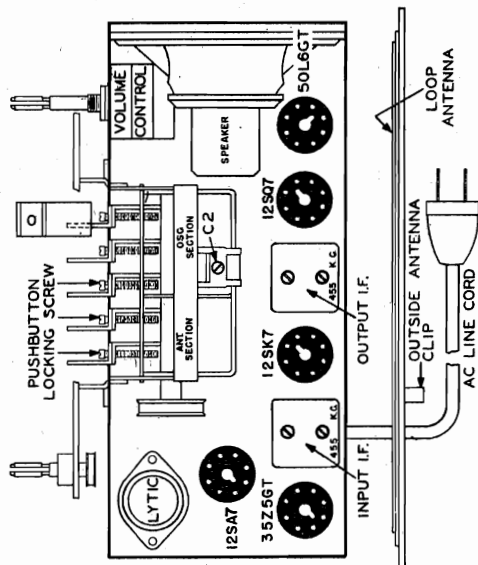
ALIGNMENT PROCEDURE

Volume control setting—Maximum (extreme clockwise) for all adjustments.

Connect ground lead of signal generator to B— of radio chassis through a 0.1 mfd. condenser.

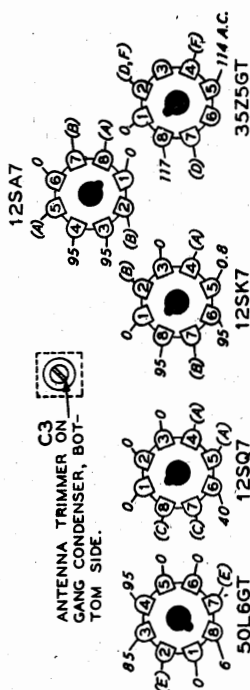
The loop antenna should be connected to the radio and in its proper position when making all adjustments.

BAND	Signal Generator Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmer Adjusted to Maximum
I. F.	455 Kc.	.1 mfd.	Grid of 12SK7 I. F.	Rotor full open (Plates out of mesh)	Two trimmers on top of Output I. F.
	455 Kc.	.1 mfd.	Grid of 12SA7 Mixer	Rotor full open (Plates out of mesh)	Two trimmers on top of Input I. F.
	1600 Kc.	200 mmf.	Grid of 12SA7	Rotor full open (Plates out of mesh)	B.C. Osc. trimmer C2 on Gang
BROADCAST	1400 Kc.	200 mmf.	External Antenna and B—	Set Dial at 1400 K. C.	B.C. Ant. trimmer C3 under Gang



A—CANNOT BE MEASURED BY VOLT-METER
B—11 VOLTS A.C. ACROSS PINS 2 AND 7
C—11 VOLTS A.C. ACROSS PINS 7 AND 8
D—33 VOLTS A.C. ACROSS PINS 2 AND 7
E—48 VOLTS A.C. ACROSS PINS 2 AND 7
F—117 VOLTS A.C. ACROSS PINS 2 AND 4

Volts at tube socket terminals



BOTTOM VIEW OF CHASSIS

REPLACING DIAL STRING

USE STRING 36 INCHES LONG.
IN STEP 3, WIND $1\frac{1}{2}$ TURNS CLOCK-
WISE. PASS STRING UNDER CLIP.
IN STEP 4, WIND 3 TURNS
TOWARD FRONT OF CHASSIS.
IN STEP 7, BE SURE SPRING
IS STRETCHED ENOUGH TO
TAKE UP ALL SLACK.

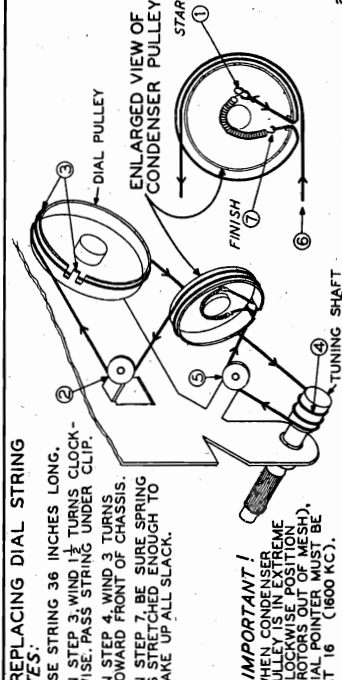
Technical Data

Tuning range	.....535 to 1600 Kc.
Intermediate Frequency	.....455 Kc.
Power consumption	.....35 watts
Sensitivity (for 0.05 watt output)	30 microvolts average
Selectivity. 58 Kc. broad at 1000 times signal at 1000 Kc.	
Power output (in voice coil)	
Undistorted	.....1.0 watt at 10%
Maximum	.....1.7 watts
Voice coil impedance	.....3.2 ohms at 16 (1600 KC).

SETTING THE PUSHBUTTONS

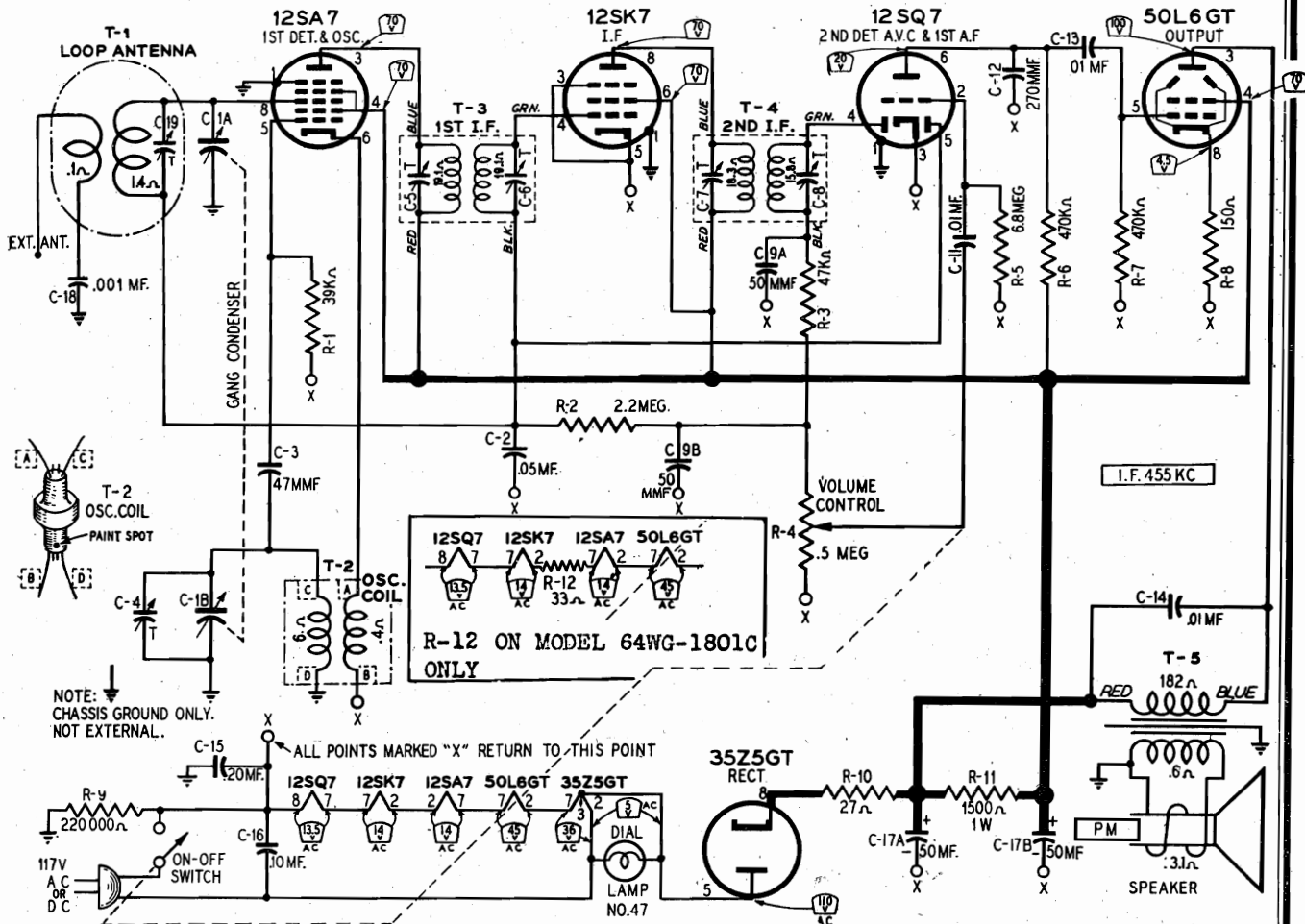
The pushbuttons may be used, after adjustment, for the automatic tuning of any five stations which you select. They can be set up in any order.

1. Turn on the radio. Allow it to warm up for at least one minute.
2. Push out the call letters of the five stations from the sheets supplied with this manual.
3. Insert the long thin screwdriver (supplied with the set) into the hole in one of the pushbuttons and turn the pushbutton locking screw several turns to the left.
4. With the screwdriver still engaged in the locking screw slot, push the screw all the way in. Hold it in this position and with the tuning knob tune in the station you want.
5. Now turn the pushbutton locking screw to the right and tighten it firmly. Remove the screwdriver.
6. Press the pushbutton all the way in (this tunes in the station) and, by rotating the tuning dial back and forth, determine whether the button has been properly set. If it has not, repeat the procedure described above.
7. Insert the call letters for the station in the button and put one of the celluloid tabs over the letters.
8. Set each of the four other buttons, one for each station, in the same way. If you are unable to set a station on any particular button, it is probably because the pushbutton locking screw has not been loosened.
9. Any of the five stations may now be tuned in simply by pushing the proper button in as far as it will go.



IMPORTANT!
WHEN CONDENSER PULLEY IS IN POSITION (ROTORS OUT OF MESH), DIAL POINTER MUST BE AT 16 (1600 KC).

MONTGOMERY WARD

MODELS 54WG-1801A, 54WG-1801B
MODEL 64WG-1801C

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages except those for the heater and dial lamp are between the socket terminal and "X" point.

The readings were taken with a 1000 ohm per volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

Line voltage.....117 volts AC

Volume control.....maximum

Signal input.....none

RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm 5 watt resistor across the secondary winding of the output transformer. A reading of .4 volts across

this resistor will be equivalent to a 50 milliwatt output with the speaker connected. The volume control must be set to maximum.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations of plus or minus 25% are usually permissible.

SIGNAL GENERATOR

Freq.	Coupling Capacitor	Connection to Receiver	Ground Connection	INPUT FOR 50 MILLIWATT OUTPUT
1000 kc	200 mmf or RMA Dummy Antenna	Loop Antenna—external antenna clip	Chassis	24 microvolts
1000 kc	.05 mf	12SA7 1st Detector pin 8	Point "X" (12SK7 pin 3)	125 microvolts
455 kc	.05 mf	12SA7 1st Detector pin 8	Same as above	100 microvolts
455 kc	.05 mf	12SK7, I-F Amp. pin 4	Same as above	2500 microvolts
400 cycles	.05 mf	12SQ7, 1st AF, pin 2	Same as above	.042 volts
400 cycles	.05 mf	50L6GT Output, pin 5	Same as above	1.9 volts

MODELS 54WG-1801A, 54WG-1801B

MODEL 64WG-1801C

MODEL 54WG-2007A, 54WG-2007B

MONTGOMERY WARD

MODELS 54 WG-1801A, 54 WG-2007A

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 50 mf.

SIGNAL GENERATOR				CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM See Trimmer Illustration
Frequency Setting	Coupling Capacitor	Connection To Radio	Ground Connection		
455 kc	.1 mf	Control Grid 12SK7—I-F	Point "X" 12SK7—I-F Prong No. 3	Turn Rotor to full open	2nd I-F (C7) & (C8)
455 kc	.1 mf	Control Grid 12SA7—1st Det.	Same as above	Turn Rotor to full open	1st I-F (C5) & (C6)
1600 kc 2	.1 mf	Control Grid 12SA7—1st Det.	Same as above	Turn Rotor to full open	Oscillator (C4)
1400 kc	50 mmf	External Antenna Clip on Loop See Note A	Chassis	Turn Rotor to Max. Output Set Indicator to 1400 KC— See Note B	Antenna (C19)

NOTE A—Re-assemble chassis in cabinet. Replace back on cabinet.

NOTE B—Tune in a 1400 KC signal. If pointer is not at the 1400 KC mark on the dial scale, pull pointer off shaft. Set pointer at the 1400 KC mark and push back on shaft.

Power Supply..... 105-125 volts AC—50-60

cycles—30 watts

105-125 volts DC

Frequency Range..... 535 to 1620 KC

Intermediate Frequency..... 455 KC

Selectivity..... 55.5 KC broad at 1000 times signal, 1000 KC

Sensitivity (for .05 watt output)

with external antenna..... 25 microvolts average

Power Output..... 1.5 watts maximum, .9 watt (10% distortion)

Loud speaker..... 5" PM dynamic

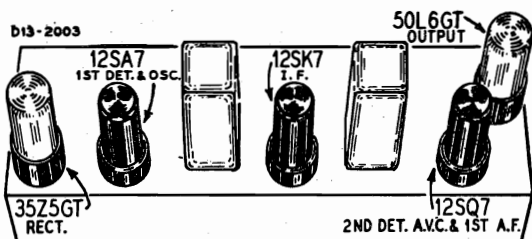
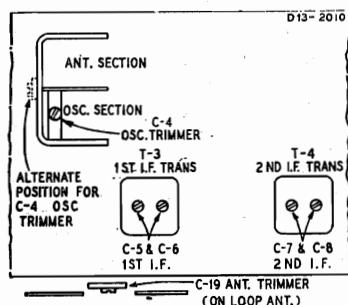
Voice coil impedance..... 3.2 ohms at 400 cycles

DRIVE CORD REPLACEMENT

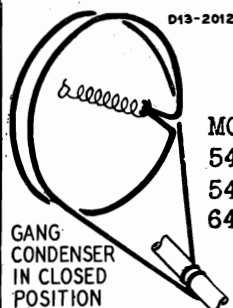
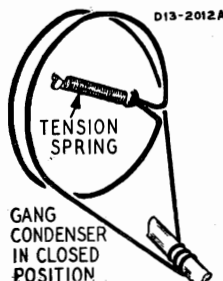
MODELS 54 WG-1801A, 54 WG-2007A

Turn the gang condenser to the fully closed position. Use a new drive cord 12 inches in length and tie one end to the tension spring. Fasten the other end of the tension spring to the hook on the drive pulley. Pass the cord through the slot in the drive pulley rim and continue around pulley one half turn, counterclockwise. Wind 2½ turns counterclockwise (from front of chassis) around tuning shaft. Turns should progress toward rear of chassis. (Wind 3 1/2 turns in tuning shaft for 54 WG-1801-B.) Wind cord counterclockwise around drive pulley in back of previous ½ turn. Pass cord through the slot in the pulley rim. Stretch tension spring and tie free end of cord to the spring. Cut off any excess string.

TRIMMER POSITIONS

MODELS 54WG-1801B
64WG-1801C

DRIVE CORD DIAGRAM

MODELS
54WG-1801A
54WG-2007A
64WG-2007B

MONTGOMERY WARD

MODELS 54WG-1801A, 54WG-1801B

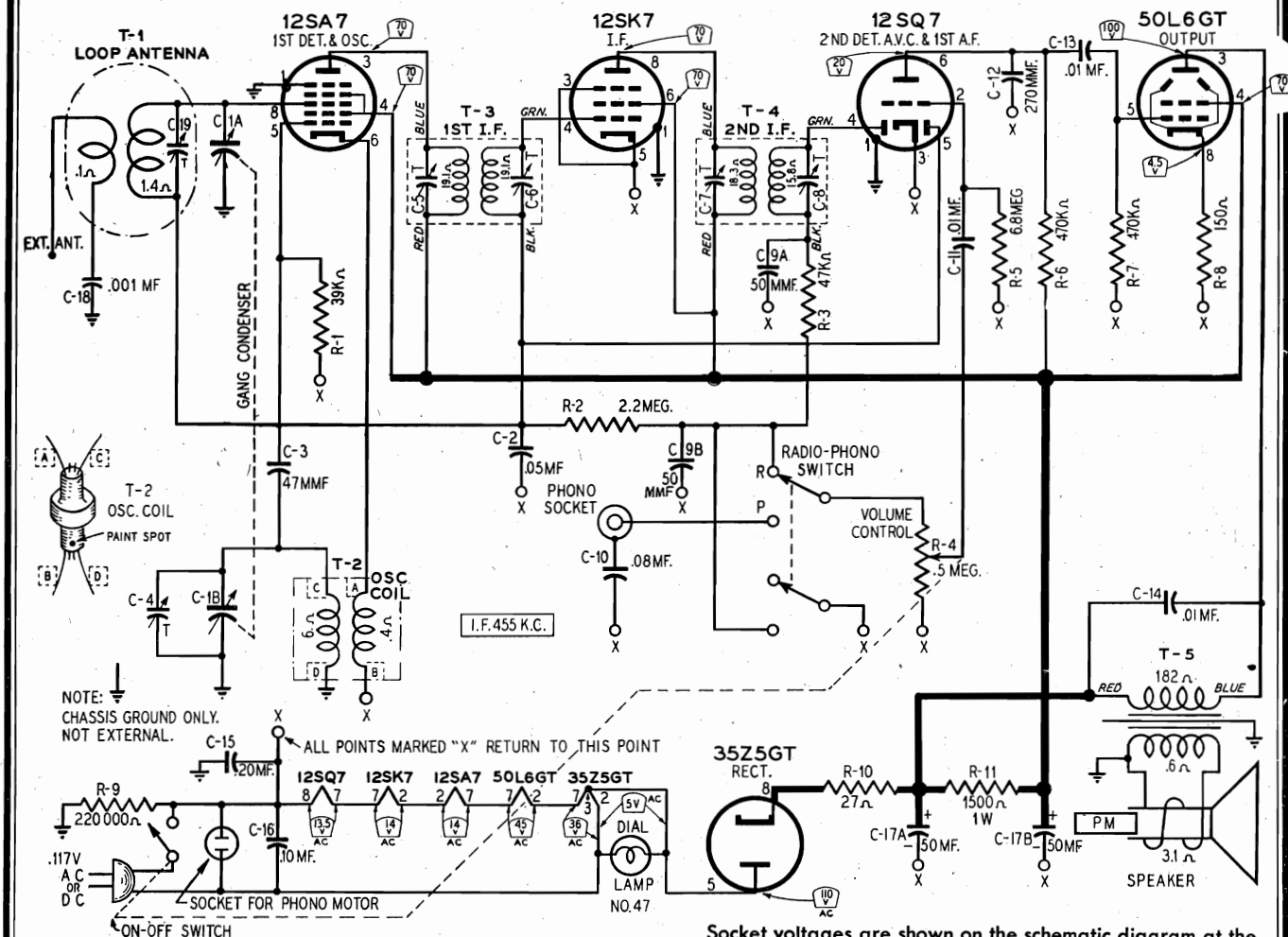
MODEL 64WG-1801C

MODELS 54WG-2007A, 64WG-2007B

MODELS 54 WG-1801A, 54 WG-1801B, 64WG-1801C			
Ref. No.	Part No.	Description	Qty. Used in Set
CAPACITORS			
C-1A	14A176	Gang condenser with pulley.	1
C-1B			
C-2	B66503	.05 mf 200 V Tubular.	1
C-3	47X446	47 mf Molded.	1
C-4		Part of C-1.	
C-5		Part of T-3 1st I-F Transformer.	
C-6		Part of T-4 2nd I-F Transformer.	
C-7			
C-8			
C-9A	47X112	Dual mica condenser, 50 mmf.	1
C-9B			
C-11	B66103	.01 mf 200 V Tubular.	3
C-13			
C-14	47X445	270 mmf Molded.	1
C-12	B66204	.20 mf 200 V Tubular.	1
C-15	D66104	.10 mf 400 V Tubular.	1
C-16			
C-17A	45X341	50 mf 150 V Dry electrolytic condenser	1
C-17B			
C-18	D66102	.001 mf 400 V Tubular.	1
C-19	17A116	2.5-23 mmf Trimmer.	1
RESISTORS			
R-1	B84393	39,000 0.5 Carbon.	1
R-2	B85225	2.2 meg 0.5 Carbon.	1
R-3	B85473	47,000 0.5 Carbon.	1
R-4	36X340	.5 meg Volume control and switch	1
R-5	B85685	6.8 meg 0.5 Carbon.	1
R-6	B84474	470,000 0.5 Carbon.	1
R-7	B85474	470,000 0.5 Carbon.	1
R-8	B83151	150 0.5 Carbon.	1
R-9	B85224	220,000 0.5 Carbon.	1
R-10	B84270	27 0.5 Carbon.	1
R-11	C85152	1500 1.0 Carbon.	1
R-12	B85105	1 meg 0.5 Carbon.	1
R-13	C85330	33 1.0 Carbon.	1
T-1	9A1795	"B" Band Loop Antenna.	1
T-2	9A1805	Oscillator coil assembly.	1
T-3	9A1782	1st I-F Transformer and can assembly.	1
T-4	9A1783	2nd I-F Transformer and can assembly.	1
T-5	51X119	Output Transformer.	1
MISCELLANEOUS			
12A429		5" P.M. speaker.	1
		Cone and voice coil assembly for the above speaker (specify part number and letters stamped on above speaker).	1
3A303		Tube socket—octal (8 prong) molded	5
3A305		Single pin tip socket (Phone).	1
10A297		Knob (on-off switch and volume control, tuning).	2
10A526		Knob (Phone-Switch).	1
28X392		Snap button (mounting loop to cabinet).	4
13X328		Line cord and plug assembly.	1
2A355		Radio photo switch.	1
28A112		Photo-motor assembly.	1
2A170		Photo on-off switch.	1
6A227		Two prong motor plug.	1
28A113		Pickup arm.	1
13X542		Photo motor socket and cable assembly.	1
DIAL AND DRIVE ASSEMBLY			
25X1380		Gang condenser mounting bracket.	1
58X385		Dial.	1
20X1444		Screws, dial.	4
15X216		Pointer.	1
26X463		Speed nuts, 2-56 No. 102.	4
19X192		Clip No. 2401 (for painter).	1
7A185		Drive shaft (tuning).	1
28X310		"C" washer for drive shaft.	2
		Pilot light cable & socket assembly.	1
		No. 47 Pilot light bulb.	1
		Drive cord tension spring.	1
		12" drive cord (18 lb. test).	1
CAPACITORS			
C-1A	14A176	Gang condenser with pulley.	1
C-1B			
C-2	B66503	.05 mf 200 V Tubular.	1
C-3	47X446	47 mf Molded.	1
C-4		Part of C-1.	
C-5		Part of T-3 1st I-F Transformer.	
C-6		Part of T-4 2nd I-F Transformer.	
C-7			
C-8			
C-9A	47X112	Dual mica condenser, 50 mmf.	1
C-9B			
C-10	B66803	.08 mf 200 V Tubular.	1
C-11	B66103	.01 mf 200 V Tubular.	3
C-12	47X445	270 mmf Molded.	1
C-15	D66204	.20 mf 200 V Tubular.	1
C-16			
TRANSFORMERS AND COILS			
T-1	9A1734	"B" Band Loop antenna	1
T-2	9A1805	Oscillator coil assembly.	1
T-3	9A1782	1st I-F Transformer and can assembly	1
T-4	9A1783	2nd I-F Transformer and can assembly	1
T-5	51X123	Output Transformer.	1

MODELS 54WG-2007A, 64WG-2007B

MONTGOMERY WARD



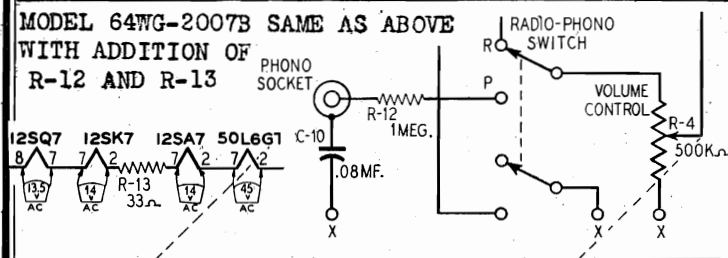
Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages except those for the heater and dial lamp are between the socket terminal and "X" point.

The readings were taken with a 1000 ohm per volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

- Line voltage.....117 volts AC
- Volume control.....maximum
- Signal input.....none

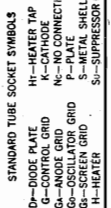
The table below lists the sensitivity at the input of each stage. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm 5 watt resistor across the secondary winding of the output transformer. A reading of .4 volts across this resistor will be equivalent to a 50 milliwatt output

with the speaker connected. The volume control must be set to maximum. The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations of Plus or Minus 25% are usually permissible.



SIGNAL GENERATOR

Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	INPUT FOR 50 MILLIWATT OUTPUT
1000 kc	200 mmf or RMA Dummy Antenna	Loop Antenna—external antenna clip	Chassis	24 microvolts
100Q kc	.05 mf	12SA7 1st Detector Pin 8	Point "X" (12SK7 Pin 3)	125 microvolts
455 kc	.05 mf	12SA7 1st Detector Pin 8	Same as above	100 microvolts
455 kc	.05 mf	12SK7, I-F Amp. Pin 4	Same as above	2500 microvolts
400 cycles	.05 mf	12SQ7, 1st A-F, Pin 2	Same as above	.042 volts
400 cycles	.05 mf	50L6GT Output, Pin 5	Same as above	1.9 volts

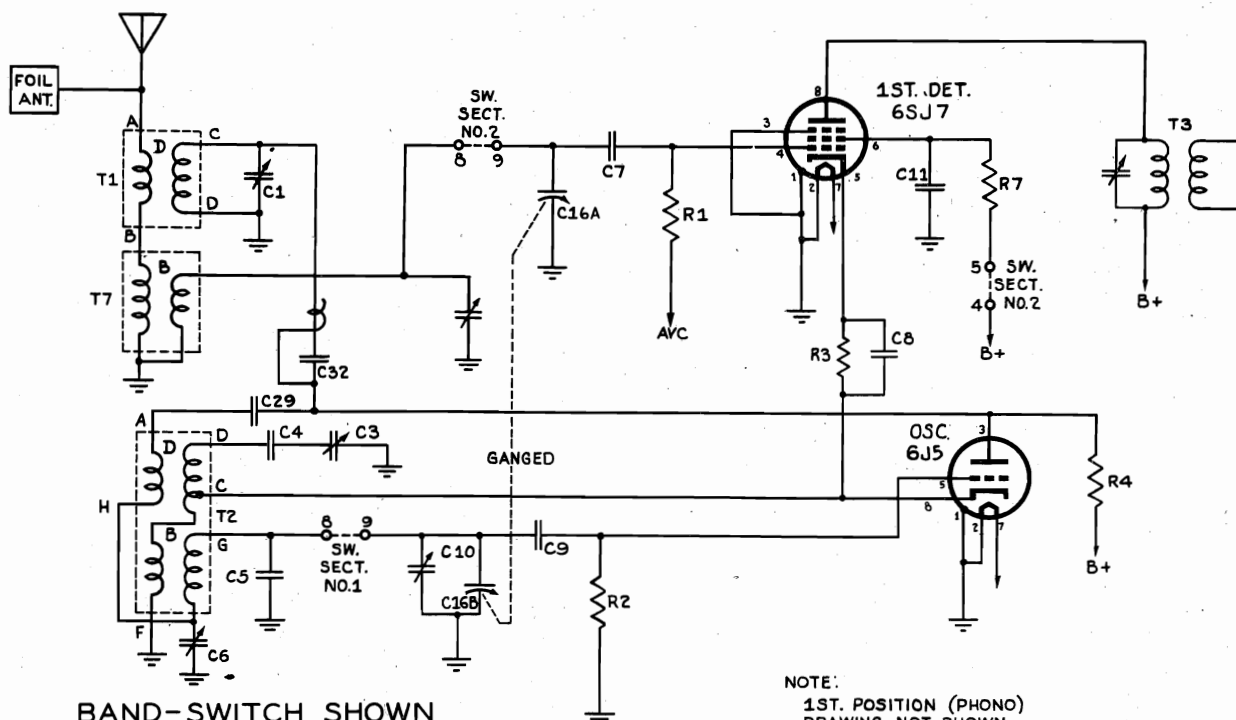


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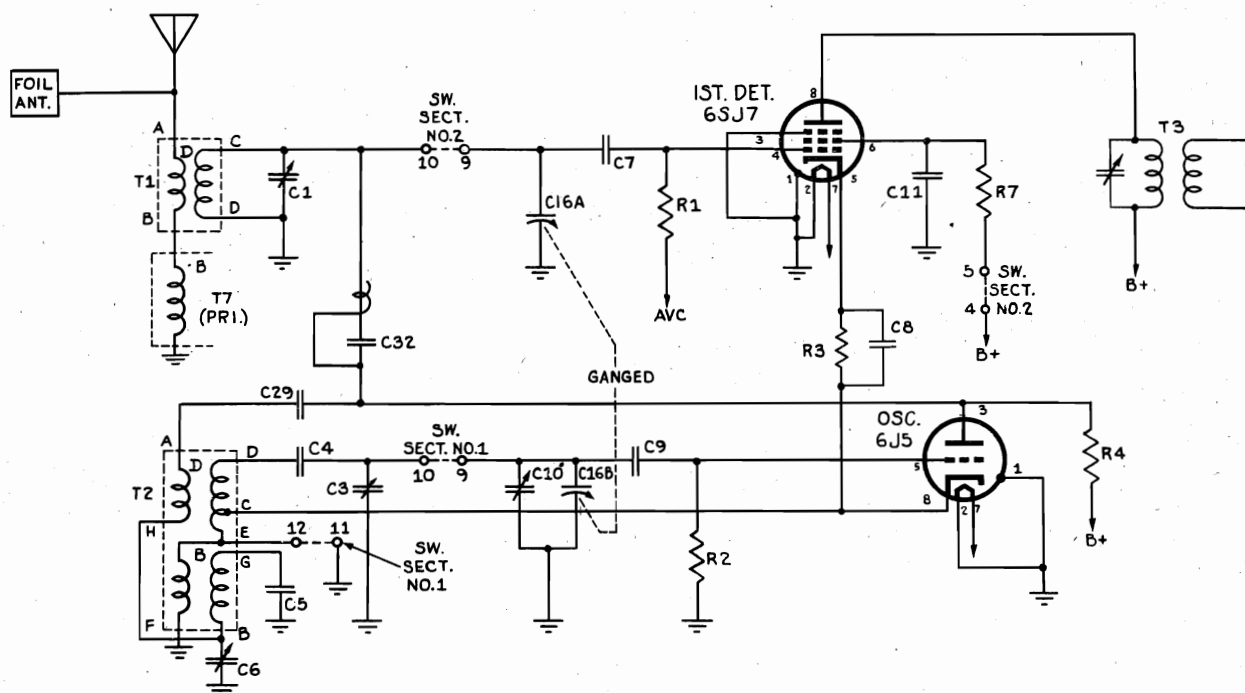
PAGE 15-32 MONT.-WARD

MODELS 54WG-2500A, 54WG-2700A,
64WG-2500B, 64WG-2700A

MONTGOMERY WARD



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
BROADCAST BAND
528 - 1600 KC.



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
SHORT WAVE BAND
5.75 - 18.3 MC.

MONTGOMERY WARD

MODELS 54WG-2500A, 54WG-2700A, RECEIVER STAGE SENSITIVITIES 64WG-2500B, 64WG-2700A

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of .5 watts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm, 5 watt resistor across the secondary winding of the output transformer. A reading of 1.26 volts across this resistor will be equivalent to a .5 watt output with the speaker connected. The volume control must be set to maximum. The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations of Plus or Minus 25% are usually permissible.

SIGNAL GENERATOR			Ground Connection	INPUT FOR .5 WATT OUTPUT
Frequency	Coupling Capacitor	Connection to Receiver		
1000 kc	200 mmf or RMA Dummy Antenna	External antenna lead (white)	Chassis	2.3 microvolts
1000 kc	.05 mf	6SJ7 1st Detector, Pin 4	Same as above	17 microvolts
455 kc	.05 mf	6SJ7 1st Detector, Pin 4	Same as above	5.0 microvolts
455 kc	.05 mf	6SK7 1st I-F, Pin 4	Same as above	1300 microvolts
455 kc	.05 mf	6SK7 2nd I-F, Pin 4	Same as above	3400 microvolts
400 cycles	.05 mf	6SQ7 1st A-F, Pin 2	Same as above	.07 volts
400 cycles	.05 mf	6V6GT Output, Pin 5	Same as above	3.8 volts

ELECTRICAL SPECIFICATIONS

Power Supply.....105-125 volts AC, 50-60 cycles, MODEL 54 WG-2500A 55 watts.

Power Supply.....105-125 volts AC, 60 cycles, MODEL 64WG-2500B

Power Supply.....105-125 volts AC, 60 cycles, MODEL 54 WG-2700A 55 watts normal, 72 watts phono

MODEL 64WG-2700A operating

MODELS 54WG-2500A, 54WG-2700A, *64WG-2500B, 64WG-2700A

Frequency Range.....B range—528-1600 KC

D range—575 to 18.3 MC

Intermediate Frequency. 455 KC

Selectivity.....43 KC broad at 1000 times signal, 1000 KC

Sensitivity.....(for .5 watt output) with external antenna

B range—2.5 microvolts average

D range—12 microvolts average

Power Output.....3.5 watts maximum

2 watts, 10% distortion

Loud Speaker.....8" electro dynamic

Voice Coil Impedance...3.2 ohms at 400 cycles

*MODEL 64WG-2500B uses a 10" speaker

MODEL 64WG-2700A

MODEL 54 WG-2700A

50 CYCLE OPERATION

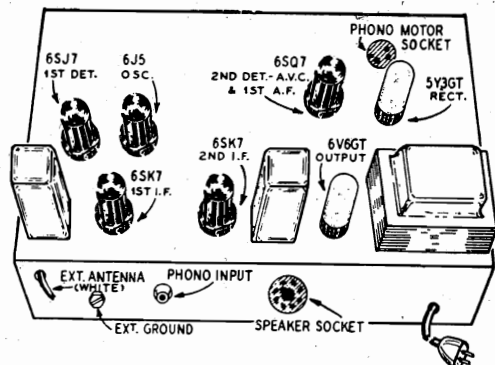
If it is desired to use the radio and record player on a 50 cycle power supply, it will be necessary to replace the metal drive pulley on the record player motor shaft with a 50 cycle pulley. This pulley is listed in the parts list.

To change the pulley, turn the record selector post to the 12" position and lift the turntable off of the record changer. Loosen the set screw holding the drive pulley on the motor shaft and remove the old pulley. Install the new 50 cycle pulley and replace the turntable.

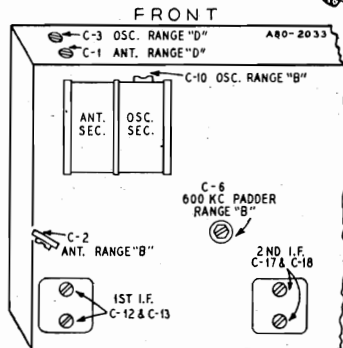
MODELS 54WG-2500A, 54WG-2700A

64WG-2500B, 64WG-2700A

MONTGOMERY WARD

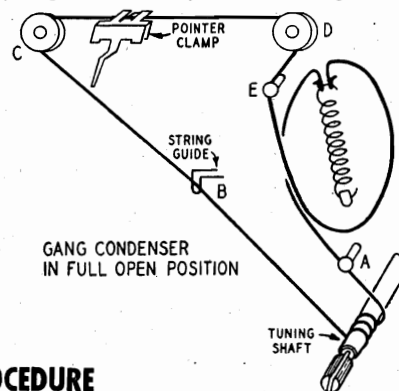


TRIMMER POSITIONS



DRIVE CORD REPLACEMENT

Turn the gang condenser to the fully open position. Use a new drive cord 40" long and tie one end to the tension spring. Hook the other end of the tension spring to the tab on the drive pulley. Pass the cord through the slot in the drive pulley rim and continue one half turn counterclockwise around the drive pulley. Then pass the cord around idler stud A and wind three turns clockwise around the tuning shaft (turns must progress away from chassis). Pass cord through string guide B, over pulleys C and D and around idler stud E. Wrap $\frac{3}{4}$ turn counterclockwise around drive pulley, stretch the tension spring and tie free end of the cord to spring. Cut off any excess string.



DRIVE CORD DIAGRAM

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter; Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

	SIGNAL GENERATOR		Dummy Antenna	Band Switch Setting	Condenser Setting	ADJUST TRIMMERS TO MAXIMUM
	Frequency Setting	Connection at Radio				
I-F	455 kc	6SJ7, Pin 4	.1 mf	B Range	Turn Rotor to Full Open	2nd I-F (C17) & (C18) 1st I-F (C12) & (C13)
RANGE B	1600 kc	Antenna Lead	100 mmf	B Range	Turn Rotor to Full Open	Oscillator Range B (C10)
	1400 kc	Antenna Lead	100 mmf	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC See Note A	Antenna Range B (C2)
	600 kc	Antenna Lead	100 mmf	B Range	Turn Rotor to Max. Output	600 kc (C6) Rock Rotor—See Note B

Repeat above oscillator adjustments at 1600 and 600 KC until readjusting the oscillator Range B Trimmer (C10) causes no further improvement in output.

RANGE D	18,300 kc	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C3)
	17,000 kc	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Antenna Range D (C1) Rock Rotor—See Note B
LOOP RANGE B	Reassemble chassis in cabinet. 1400 kc	Antenna Lead	100 mmf	B Range	Turn Rotor to Max. Output	Antenna Range B (C2)

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1400 KC on the dial, re-set

pointer at the 1400 KC mark on the dial scale.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

MONTGOMERY WARD

MODELS 54WG-2500A, 54WG-2700A,
64 WG-2500B, 64 WG-2700A

MODELS 54 WG-2500A, *54 WG-2700A, *64 WG-2500B, *64 WG-2700A

Ref. No.	Part No.	Description	Qty. Used in Set	Ref. No.	Part No.	Description	Qty. Used in Set
CAPACITORS				TRANSFORMERS AND COILS			
C-1	17A163	2-25 mmf Ant. "D" Range Trimmer..	1	T-1	9A1451	Antenna transformer assembly "D" range.....	1
C-3		2-25 mmf Osc. "D" Range Trimmer.		T-2	9A1452	Oscillator coil assembly.....	1
C-2	17A149	1.2-12 mmf Loop aerial trimmer.....	1	T-3	9A1810	1st I-F transformer and can assembly.	1
C-4	46X289	.00475 180 V Tubular.....	1	T-4	9A1811	2nd I-F transformer and can assembly	1
C-5	47X482	20 mmf Molded.....	1	T-5	51X97	Output transformer.....	1
C-6	17A234	250-525 mmf 600 kc Padder.....	1	T-6	53X235	117 volt, 60 cycle standard power transformer.....	1
C-7	D66501	.0005 mf 500 V Tubular.....	1	T-6	53X237	117 volt, 25 cycle standard power transformer.....	1
C-8	B66203	.02 mf 200 V Tubular.....	2	T-6	53X236	117-234 volt, 40-60 cycle Universal power transformer.....	1
C-29				T-7	9A1453	"B" Band loop antenna.....	1
C-9	47X463	47 mmf Molded.....	1	MISCELLANEOUS			
C-10		Part of gang condenser C-16.....		12A398	8" Electro dynamic speaker.....	1	
C-11	D66403	.04 mf 400 V Tubular.....	2		Cone and voice coil assembly (specify part number and letter stamped on above speaker).....	1	
C-12				3A303	Tube socket—octal (8 prong) molded	7	
C-13		Part of 1st I-F Assembly		3A293	Speaker socket—octal (8 prong) molded.....	1	
C-14	B66503	.05 mf 200 V Tubular.....	1	3A304	Phono motor socket.....	1	
C-15	47X477	10 mmf Molded.....	1	3A305	Single pin-tip socket (phono).....	1	
C-16	14A185	2 section gang condenser complete with drive pulley.....	1	10A530	Knob (volume control).....	1	
C-17	47X112	50 mmf Dual Mica.....	1	10A531	Knob (tuning).....	1	
C-18		50 mmf		10A532	Knob (tone control).....	1	
C-19-A	B66103	.01 mf 200 V Tubular.....	1	10A533	Knob (band change switch).....	1	
C-19B		220 mmf Molded.....	1	13X328	Line cord and plug assembly.....	1	
C-20	D66203	.02 mf 400 V Tubular.....	2	2A177	Band and phono switch.....	1	
C-21				9A1229	Counterpoise antenna foil.....	1	
C-22	B66402	.004 mf 200 V Tubular.....	1	8X99	Rubber chassis cushions (chassis to cabinet).....	4	
C-23	D66302	.003 mf 400 V Tubular.....	1	DIAL AND DRIVE ASSEMBLY			
C-24	B66254	.25 mf 200 V Tubular.....	1	25X839	Gang mounting bracket.....	1	
C-25	45X277	40 mf 400 V Dry electrolytic..	1	6X26	Rubber grommets } Mounting gang	4	
C-26A		20 mf 450 V		20X347	Con. cushion studs } condenser and	4	
C-26B				19X163	Flt washer } bracket to chassis	4	
C-32	47X478	4.7 mmf Molded.....	1	24X360	Idler pulley.....	2	
RESISTORS				20X268	Idler stud.....	4	
		Ohms Watts		25X841	Brace bracket.....	1	
R-1	B85225	2.2 meg. 0.5 Carbon.....	2	58X593	Dial scale glass.....	1	
R-10				30X475	Glass clamp.....	2	
R-2	B84393	39,000 0.5 Carbon.....	1	58X601	Dial background.....	1	
R-3	B84222	2200 0.5 Carbon.....	1	25X838	Dial bracket.....	1	
R-4	C84103	10,000 1.0 Carbon.....	1	4X871	Dial escutcheon.....	1	
R-6	B84272	2700 0.5 Carbon.....	1		No. 2 x 3/8 Phillips Fr. oval hd. Stat. bronze (screws for escutcheon mounting).....	2	
R-7	B84683	68,000 0.5 Carbon.....	1		No. 2 x 3/8 Phillips Fr. oval hd. Stat. bronze (screws for escutcheon mounting).....	2	
R-8	C84393	39,000 1.0 Carbon.....	1	15X225	Pointer for dial scale.....	1	
R-9	B85105	1.0 meg. 0.5 Carbon.....	1		40" drive cord (18 lb. test).....	1	
R-11	B85473	47,000 0.5 Carbon.....	1	28X44	Tension spring for drive cord.....	1	
R-12	36X311	500,000 Volume control, ON-OFF switch.....	1	26X336	Drive shaft (tuning).....	1	
R-13	B85475	4.7 meg. 0.5 Carbon.....	1	25X580	Drive shaft bracket.....	1	
R-14	B85474	470,000 0.5 Carbon.....	1	19X192	"C" washers for drive shaft.....	2	
R-15	B85334	330,000 0.5 Carbon.....	1	7A142	Pilot light socket assembly.....	2	
R-16	40X259	3. meg. Tone control.....	1		Dial lamp (No. 51).....	2	
R-17	B83913	91,000 0.5 Carbon.....	1	41X75	Light shield.....	2	
R-18	B83624	620,000 0.5 Carbon.....	1				
R-20	B85221	220 0.5 Carbon.....	1				

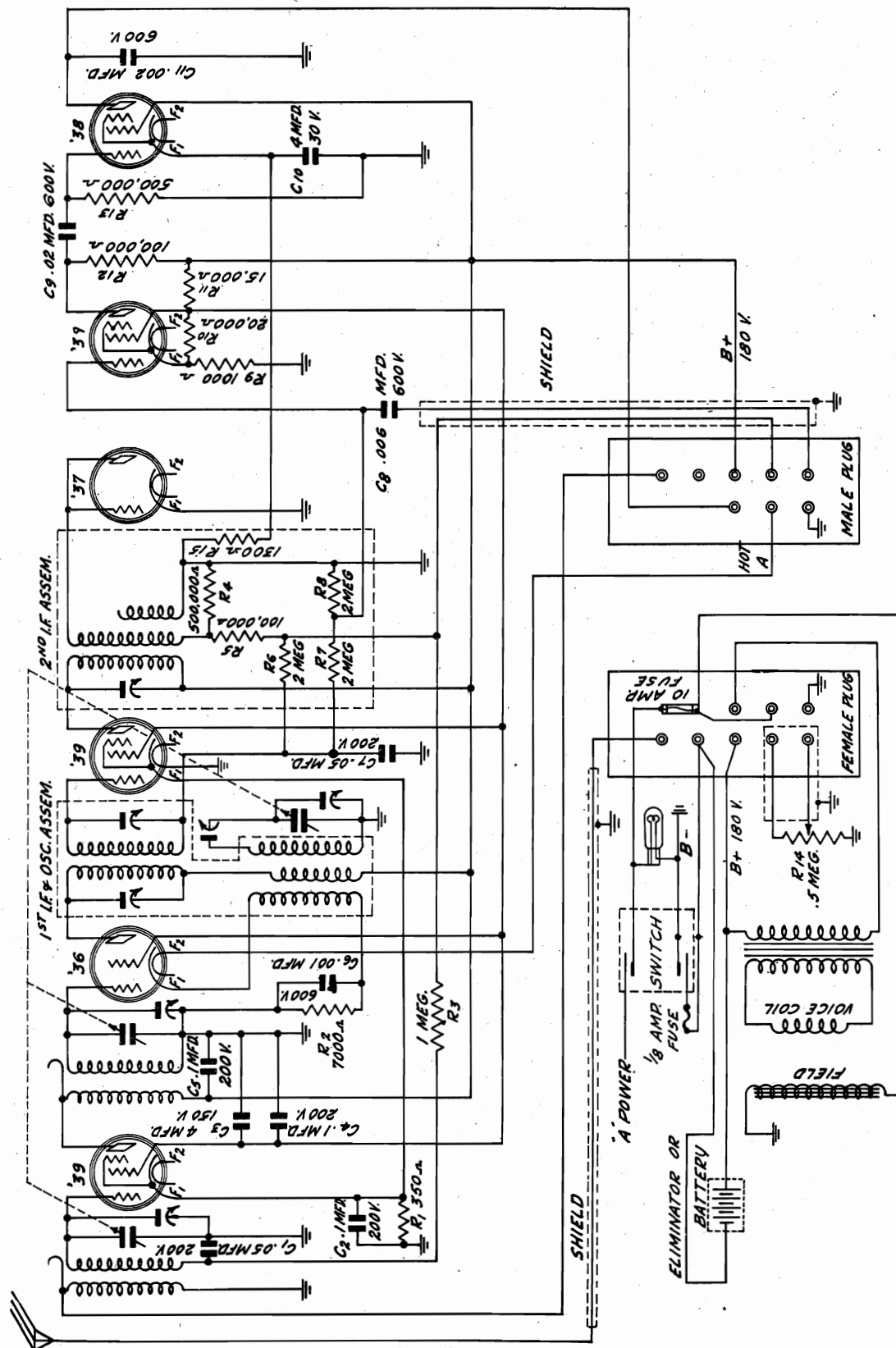
*The parts listed in the second column apply to all models with the following exceptions for MODELS 54 WG-2700A and 64 WG-2700A:

T-6	53X235	117 volt, 60 cycle standard power transformer.....	1	12A401	8" Electro dynamic speaker.....	1
T-7	9A1395	"B" Band loop antenna.....	1	9A1842	Counterpoise antenna foil.....	1
	26A382	Pulley Mtg. Plate Assem. Complete with idler pulleys, idler studs, brace brackets, string guide and dial back- ground.....	1	TYPE W-28111 RECORD CHANGER PARTS		
				W-15X084-6	Motor assembly, 60 cycle, 115 volt...	1
				Astatic L-75	Crystal cartridge.....	1
				41P544-4	50 cycle drive pulley.....	1

* The parts listed in the second column apply to all models with the following exceptions for MODEL 64 WG-2500B:

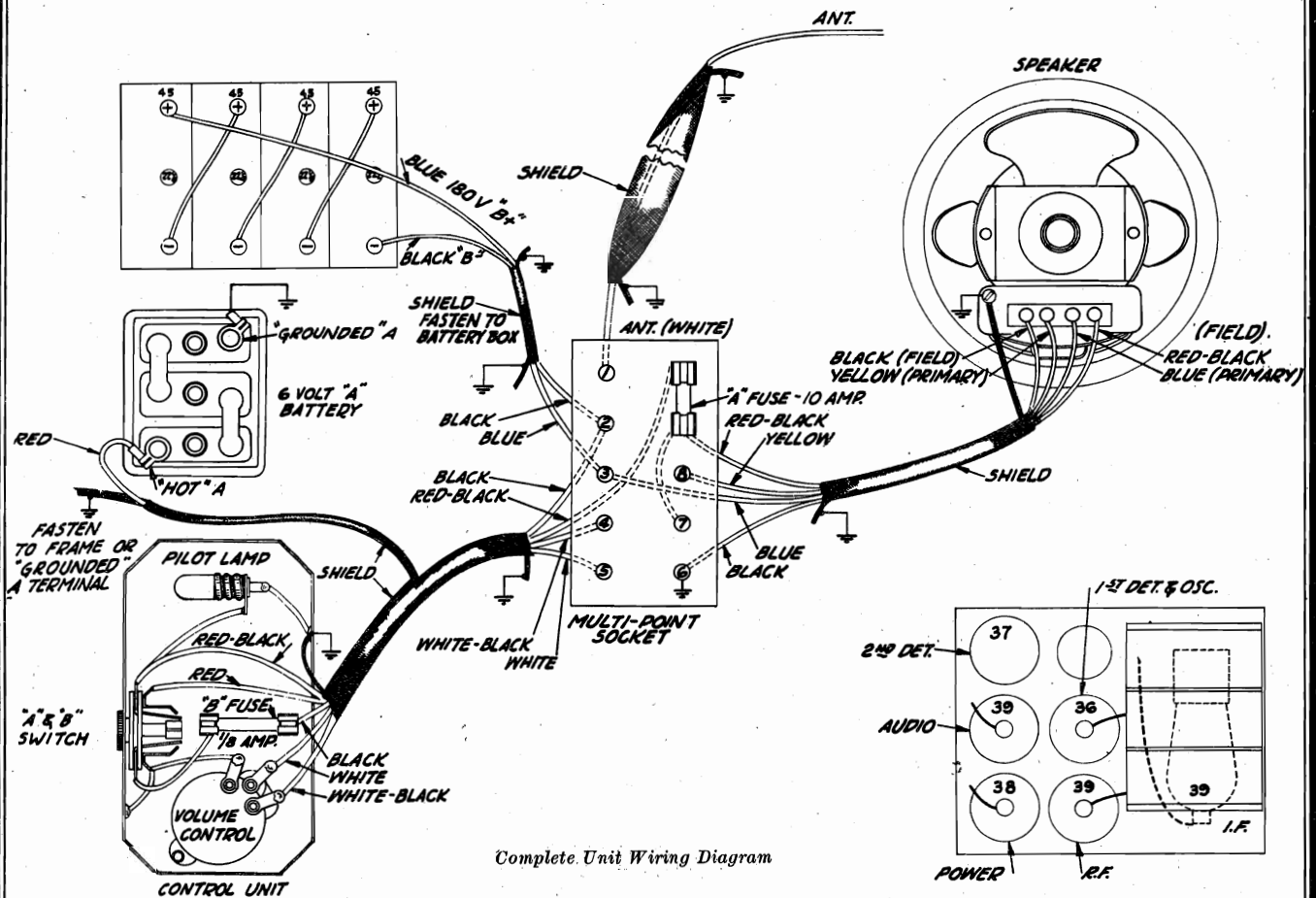
C-7	D67501	.0005 mf 400 V Tubular.....	1
	9A1842	Counterpoise antenna foil.....	1
	12A399	10" Electro dynamic speaker.....	1

MONTGOMERY WARD



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MONTGOMERY WARD



Voltages at Sockets

In the following chart are given the voltages at the sockets. Before checking the voltages at the sockets, a convenient point, in some cases, to check the applied "A" and "B" voltages is at the speaker terminal strip. A high resistance voltmeter should be used.

CAUTION—Do not check the "A" and "B" voltages at the multi-point socket on the cable head, as the pilot light may be burned out when the switch is turned off. This is due to the high inductance of the speaker field, which will increase the voltage at the break of the circuit. Also, when the cable head and multi-point socket is taken off, the connections between the chassis and power unit are open so that readings are not made under load conditions.

To read the voltages at the sockets, the chassis box, in most cases, will have to be taken off of its mount-

ing. In some instances, the cables, which may be attached to the dash or at other points, will have to be taken off. The voltages can be read at the sockets with a long plug or with a pair of long, insulated test prods. If these are not available, it will be necessary to remove the chassis from the box. The multi-point socket on the cable head is then re-connected to the multi-point plug on the chassis. Considerable care must be taken when the chassis is out of the case in this manner to prevent accidental short circuits of plus "B" or plus "A" points to ground.

All tubes must be inserted and all units connected. A signal will effect the control voltages on the R. F., I. F., and first audio tubes. If signals are received, ground the antenna and remove the second detector tube to make the other readings.

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	0
'39	1st Audio	6.	54	77	6	1.2
'38	Output	6.	159	165	15.5	10

⁽¹⁾ Will vary with dial setting.

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

MODEL 62 Series

MONTGOMERY WARD

CHASSIS PARTS

Part No.	Description	Cost Price	Selling Price
P-1531	No. 39 Tube Socket (Long Lug)	.03	\$0.08
P-1536	No. 39 Tube Socket (Short Lug)	.04	.10
P-1530	No. 38 Tube Socket (Long Lug)	.03	.08
P-1529	No. 37 Tube Socket (Long Lug)	.03	.08
P-1555	No. 36 Tube Socket (Short Lug)	.04	.10
P-5021	First I. F. and Oscillator Assembly, Complete with Trimmer Condensers and can	.83	2.08
P-5022	Second I. F. Transformer Assembly, Complete with Trimmer Condenser, Resistors and Can	.91	2.28
P-5023	Antenna and Interstage R. F. Transformer Assembly, Complete with Can	.53	1.33
P-5024	Antenna R. F. Transformer	.24	.60
P-5025	Interstage R. F. Transformer	.24	.60
P-1539	Oscillator 600 K. C. Tracking Condenser	.11	.28
P-1560	Drive Gear Hub (for Gang Condenser)	.04	.10
P-30376	Condenser Drive Bushing	.03	.08
P-10924	Rubber Drive Pinion	.02	.05
P-1092	Grid Cap & Wire	.02	.05
P-1532	Multi-Point Plug	.06	.15
P-1543	Multi-Point Socket	.12	.30
P-10211	Long Rubber Bumper (for top of tubes)	.02	.05
P-10210	Short Rubber Bumper (for top of tubes)	.02	.05
P-20516	6-32 Wing Nuts (for Chassis box cover)	.02	.05

Resistors

Part No.	Key No.	Resistance	Type	Cost Price	Selling Price
P-A-90953	R-1	350 Ohms	Carbon	\$0.06	\$0.15
P-A-90979	R-2	7,000 Ohms	Carbon	.06	.15
P-A-90948	R-3	1 Megohm	Carbon	.06	.15
P-A-90939	R-4	500,000 Ohms	Carbon	.06	.15
P-A-90912	R-5	100,000 Ohms	Carbon	.06	.15
P-A-90949	R-6	2 Megohm	Carbon	.06	.15
P-A-90949	R-7	2 Megohm	Carbon	.06	.15
P-A-90949	R-8	2 Megohm	Carbon	.06	.15
P-A-91023	R-9	800 Ohms	Carbon	.05	.13
P-A-90930	R-10	10,000 Ohms	Carbon	.05	.13
P-A-90930	R-10-A	10,000 Ohms	Carbon	.05	.13
P-B-91020	R-11	15,000 Ohms	Carbon	.06	.15
P-A-90954	R-12	250,000 Ohms	Carbon	.06	.15

Prices subject to change without notice.

Part No.	Key No.	Resistance	Type	Cost Price	Selling Price
P-A-90948	R-13	1 Megohm	Carbon	\$0.06	\$0.15
P-91009	R-14	0-500,000 Ohms	Volume Control	.22	.55
P-A-91022	R-15	900 Ohms	Carbon	.05	.13
P-91013	R-16	0-150,000 Ohms	Tone Control	.21	.53

Part No.	Key No.	Capacity	Type	Cost Price	Selling Price
P-80907	C-12	.02 mfd.	Metal Case (for tone control)	\$0.13	\$0.33
P-80902-D	C-10	4.0 mfd.	Electrolytic	.53	1.33
	C-3	4.0 mfd.	Condenser		
	C-1	.05 mfd.	Block		
P-80903-D	C-9	.02 mfd.	Block	.42	1.05
	C-7	.05 mfd.			
	C-5	.10 mfd.			
	C-2	.10 mfd.			
	C-4	.10 mfd.			
P-80908	C-11	.002 mfd.	Molded	.07	.18
P-80822	C-8	.006 mfd.	Molded	.17	.43
P-80821	C-6	.001 mfd.	Molded	.06	.15
P-80904		Three-Gang Variable Condenser		1.05	2.63

Condensers

(In One Package)—Supplied with each set.

P-10216	6 Felt Strips	.04 doz.
P-20514-B	Dash Mounting Plate (A)	.06 ea.
P-20496	Chassis Mounting Base (D)	.10 ea.
P-20495	Chassis Mounting Clamp (D)	.06 ea.
P-10223	12 feet $\frac{1}{8}$ " Loom (G)	.22 ea.

(In One Bag)—Supplied with each set.

Quantity	3- $\frac{1}{4}$ "-20 x 3" Special Square Head Bolts (A)	.10 doz.
	9- $\frac{1}{4}$ "-20 Square Nuts (A)	.03 doz.
	8- $\frac{1}{4}$ " x 1" Steel Washers, No. 266 (A)	.03 doz.
	4- $\frac{1}{4}$ " Lockwashers (A)	.03 doz.
	4-Flat Washers, No. 10 x $\frac{1}{2}$ OD (A)	.03 doz.
	5-6-32 x $\frac{1}{4}$ " Blued Finish Fillister Head Screws (B)	.03 doz.
	5-No. 6 Lockwashers (B)	.03 doz.
	6-No. 10213 Rubber Bands (C)	.04 doz.
	10-10-32 x $\frac{3}{8}$ " Blued Finish Fillister Head Screws (D)	.03 doz.
	10-No. 10 Lockwashers (D)	.03 doz.
	2- $\frac{1}{4}$ " Headless Cup Point Set Screw (D)	.10 doz.
	2-8-32 Headless Cup Point Set Screw (E)	.05 doz.
	4-8-32 x $\frac{3}{8}$ " Blued Finish Fillister Head Screws (E)	.03 doz.
	4-No. 8 Lockwashers (E)	.03 doz.
	2-Radio Switch Keys	.06 ea.
	1-No. 20511-B Steering Post Clamp (E)	.04 ea.
	4-Carpet Tacks (F)	.03 doz.

(A)—Used for Mounting Chassis to Dash
 (B)—Used for Attaching Cable Head to Chassis
 (C)—For Tubes
 (D)—Used for Mounting Chassis on Steering Column
 (E)—Used for Mounting Control Unit
 (F)—Used to Tack Back on Speaker
 (G)—Used to Cover "B" Cable if Cable Is Under Car Body

CONTROL UNIT PARTS

Part No.	Description	Cost Price	Selling Price
P-91009	R-14 Volume Control	\$0.22	\$0.55
P-1567	$\frac{1}{4}$ amp. "B" Fuse	.03	.08
P-1544	Lock Switch	.24	.60
P-1563	8 Volt Pilot Lamp	.06	.15
P-1562	Control Knob	.04	.10
P-1591	Pilot Lamp Socket & Clip	.04	.10
P-1592	Dial Strip & Gear Assembly	.06	.15
P-10224	Rubber Drive Pinion	.02	.05

SHIELDED CABLES

Part No.	Description	Cost Price	Selling Price
P-70723	Shielded Antenna Cable	\$0.20	\$0.50
P-70724	Control Box Shielded Cable	.40	1.00
P-70725	Shielded Speaker Cable	.24	.60
P-70726	Shielded "B" Supply Cable	.34	.85

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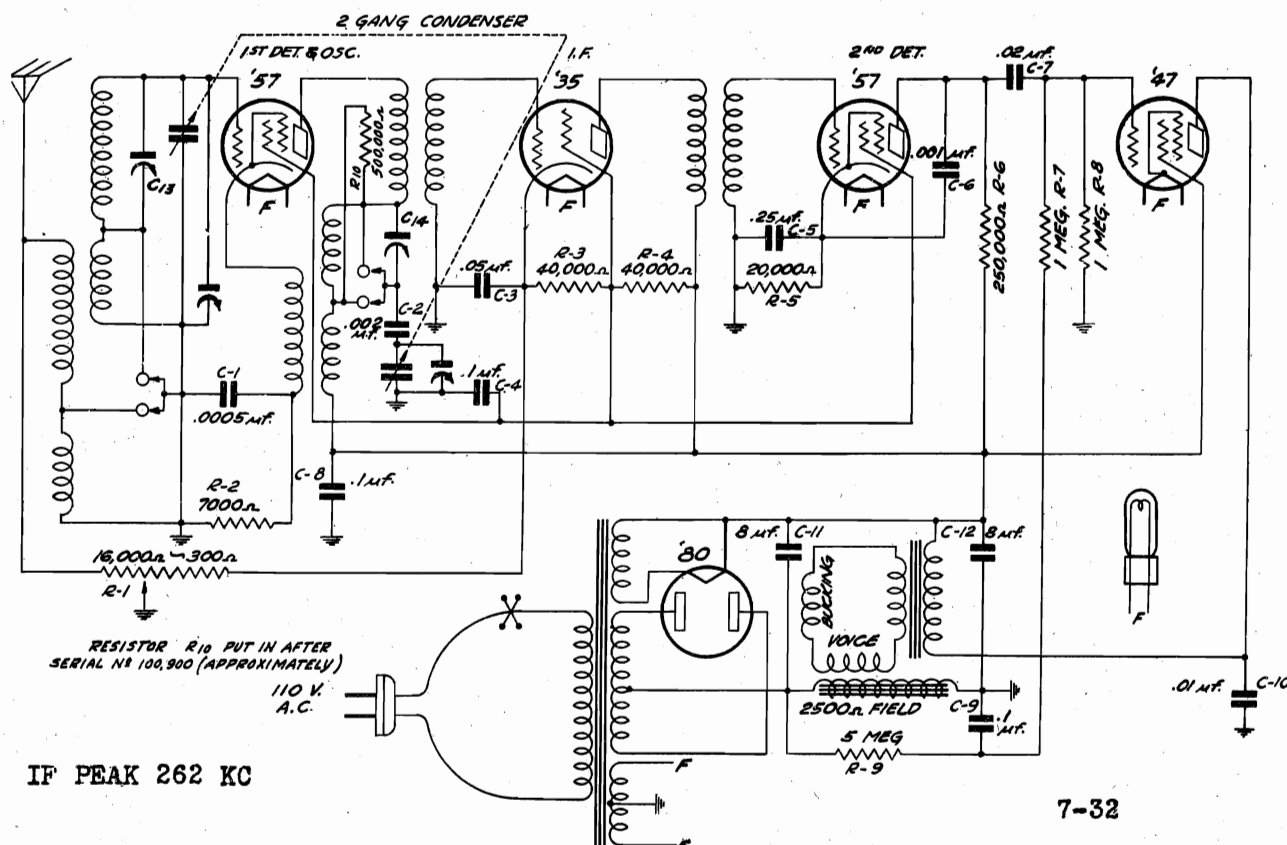
IF PEAK 256 KC

	RECOMMENDED	CAN ALSO BE USED
A+	3 VOLTS	2704 VOLTS
B+ PWR	125 VOLTS	180 VOLTS
C+ PWR	-10½ VOLTS	-15½ VOLTS (FOR 180 VOLTS)

Part No.		Description		Cost Price	Selling Price	Part No.	Code	Resistance	Type	Cost Price	Selling Price
P-20388	Condenser Shield (for 3-Gang Condenser).....	.05	.11	P-A-90949	R-1	2 Megohms	Carbon	.06	.15		
P-20406	Tube Shield03	.08	P-A-90949	R-2	2 Megohms	Carbon	.06	.15		
P-20408	Tube Shield Base02	.05	P-A-90954	R-3	250,000 ohms	Carbon	.06	.15		
P-1472	No. 34 Tube Socket03	.08	P-A-90929	R-4	500,000 ohms	Carbon	.06	.15		
P-1471	No. 30 Tube Socket03	.08	P-A-90941	R-5	50,000 ohms	Carbon	.06	.15		
P-70733	Nine-Wire Battery Cable24	.60	P- 91027	R-6	500,000 ohms	Volume Control	.24	.60		
P-1520-A	Off-On Switch18	.45	P-A-90949	R-7	2 Megohm	Carbon	.06	.15		
P-1647	Small Walnut Knob04	.10	P-A-90912	R-8	100,000 ohms	Carbon	.06	.15		
P-1646	Large Walnut Knob04	.10	P-A-90949	R-9	2 Megohm	Carbon	.06	.15		
P-1508	Black Bakelite Knob for Filament Control..	.05	.13	P- 91028	R-10	150,000 ohms	Tone Control	.19	.48		
P-5041	Antenna R.F. Transformer Assembly16	.40	P-A-90949	R-11	2 Megohm	Carbon	.06	.15		
P-5040	Interstage R.F. Transformer Assembly18	.45	P-A-90948	R-12	1 Megohm	Carbon	.06	.15		
P-5042	Oscillator Coil Assembly24	.60	P-A-90982	R-13	12,000 ohms	Carbon	.06	.15		
P-5043	1st I.F. Assembly, complete with can.....	.46	1.15	P- 90996	R-14	4 ohm	Filament Control	.18	.45		
P-5044	2nd I.F. Assembly, complete with can.....	.48	1.20	P-A-90916	R-15	40,000 ohms	Carbon	.06	.15		
P-5018	Filament Choke Coil09	.23	P-A-90954	R-16	250,000 ohms	Carbon	.06	.15		
P-5061	Oscillator Series Filament Choke Coil.....	.07	.18	CONDENSERS							
P-50551	Audio Transformer58	1.45	Part No.	Code	Capacity	Voltage	Type	Cost Price	Selling Price	
P-40413	Can for R.F. and Oscillator Assemblies.....	.05	.13	P-80862-B	C-1	.05 mfd.	200 V.	Tubular	.07	.18	
P-1627	Tuning Meter58	1.45	P-80878-A	C-2	4.0 mfd.	150 V.	Electrolytic	.19	.48	
P-1393	Pointer Assembly06	.15	P-80864-C	C-3	.1 mfd.	200 V.	Tubular	.07	.18	
P-1382	Drive Disc Hub and Fulcrum Assembly.....	.07	.18	P-80862-B	C-4	.05 mfd.	200 V.	Tubular	.07	.18	
P-20434-A	Bracket for Dial Strip02	.05	P-80888	C-5	.25 mfd.	200 V.	Tubular	.10	.25	
P-1510	White Celluloid Dial Strip06	.15	P-80862-B	C-6	.05 mfd.	200 V.	Tubular	.07	.18	
P-20555	Tension Spring (Tone control pointer).....	.02	.05	P-80888	C-7	.25 mfd.	200 V.	Tubular	.10	.25	
P-20556	Tension Spring (Volume control pointer).....	.02	.05	P-80898	C-8	.006 mfd.	600 V.	Molded	.04	.10	
P-30374	Bushing for Rubber Pinion03	.08	P-80898	C-9	.006 mfd.	600 V.	Molded	.04	.10	
P-10224	Rubber Pinion02	.05	P-80864-C	C-10	.1 mfd.	200 V.	Tubular	.07	.18	
P-1634	Permanent Magnet Dynamic Speaker	3.85	9.63	P-80888	C-11	.25 mfd.	200 V.	Tubular	.10	.25	
				P-80897	Three-Gang Variable Condenser					1.42	3.55
				P-1385	Oscillator 600 K.C. Trim Cond.					.20	.50

Prices subject to change without notice.

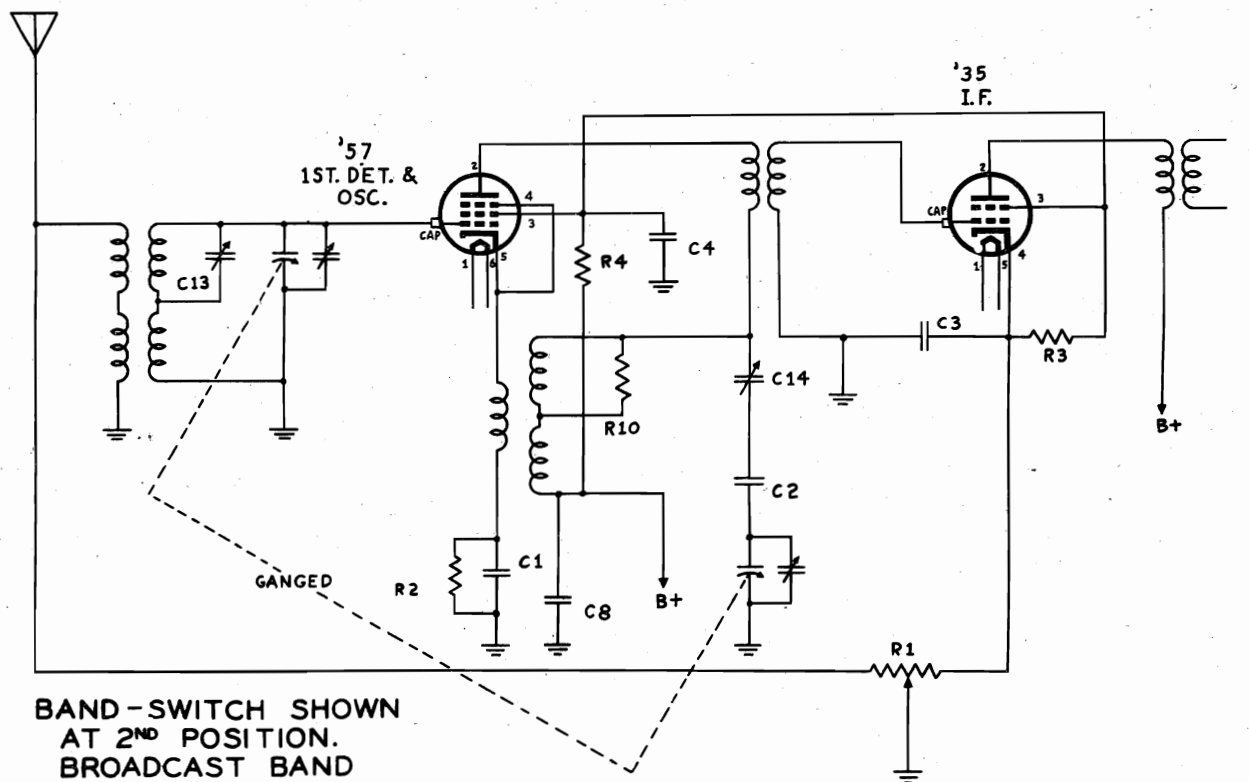
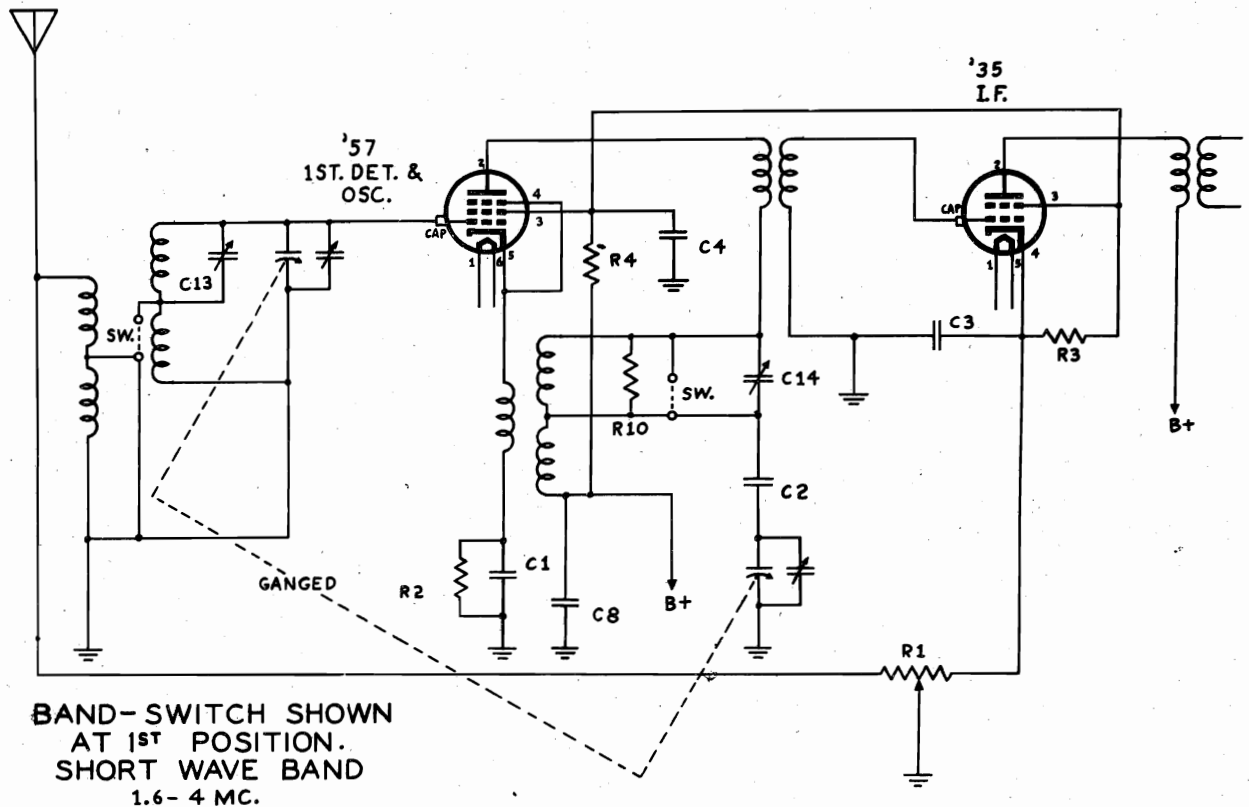
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RESISTORS							
Part No.	Code	Resistance	Type	Cost Price	Selling Price	Part No.	Name
P-91019	R-1	Volume Control & 110 V. A.C. Switch		.34	.85	P-50548	110 V. 60 Cycle Power Transformer
P-A-90979	R-2	7,000 ohm	Carbon	.06	.15	P-50558	110 V. 25 Cycle Power Transformer
P-B-91021	R-3	40,000 ohm	Carbon	.06	.15	P-1474	'80 Tube Socket
P-B-91021	R-4	40,000 ohm	Carbon	.06	.15	P-1464	'35 Tube Socket
P-A-90959	R-5	20,000 ohm	Carbon	.05	.13	P-1468	'47 Tube Socket
P-A-90954	R-6	250,000 ohm	Carbon	.05	.13	P-1580	'57 Tube Socket
P-A-90948	R-7	1,000,000 ohm	Carbon	.06	.15	P-1273	Pilot Light, 2.5 V.
P-A-90948	R-8	1,000,000 ohm	Carbon	.06	.15	P-20479	Mounting Strap for Electrolytic Condenser
P-A-91015	R-9	5,000,000 ohm	Carbon	.06	.15	P-70702	Attachment Cord and Plug
P-A-90929	R-10	500,000 ohm	Carbon	.06	.15	P-20513	L. Bracket for Broadcast Short-Wave Switch
CONDENSERS							
Part No.	Code	Capacity Voltage	Type	Cost Price	Selling Price	Part No.	Name
P-80867	C-1	.0005 mfd., 600 V.	Moulded	.05	.13	P-1578	Broadcast Short-Wave Switch
P-80808	C-2	.002 mfd., 600 V.	Moulded	.07	.18	P-1441	Two-Terminal Mounting Strip
P-80890	C-3	.05 mfd., 400 V.	Tubular	.05	.13	P-1515	Small Knob
P-80887	C-4	10 mfd., 400 V.	Tubular	.10	.25	P-1516	Large Knob
P-80888	C-5	.25 mfd., 200 V.	Tubular	.10	.25	P-5037	R.F. Transformer Assembly
P-80905	C-6	.001 mfd., 400 V.	Tubular	.04	.10	P-5038	1st I.F. and Oscillator Assembly, Complete with Can
P-80868	C-7	.02 mfd., 600 V.	Tubular	.06	.15	P-5039	2nd I.F. Assembly, Complete with Can
P-80887	C-8	.10 mfd., 400 V.	Tubular	.10	.25	P-30374	Bushing for Rubber Pinion
P-80864	C-9	.10 mfd., 200 V.	Tubular	.07	.18	P-10224	Rubber Pinion
P-80872	C-10	.01 mfd., 600 V.	Tubular	.06	.15	P-1590	Dial Strip
P-80894	C-11	8.0 mfd., 450 V.	Electrolytic	.69	1.73	P-1497	Pilot Light Bracket & Drive Disc Assembly
	C-12	8.0 mfd., 450 V.	Block	.69	1.73	P-1383	Drive Bracket Bearing Assembly
2 Neg. leads, green, Pos. lead yellow, common							
P-1575	C-13	Short Wave Adjusting Condenser		.09	.23	P-1478	Escutcheon
P-1442	C-14	Oscillator 600 K.C. Trimmer Condenser		.12	.30	P-20460	Drive Shaft
P-80910		Two Gang Variable Condenser		.72	1.80	P-20406	Tube Shield
						P-20408	Tube Shield Base
						P-1588-A	Electrodynamic Speaker

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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. A signal generator that will provide accurately calibrated signals over the broadcast band and an output indicating meter are desirable. The procedure is as follows:

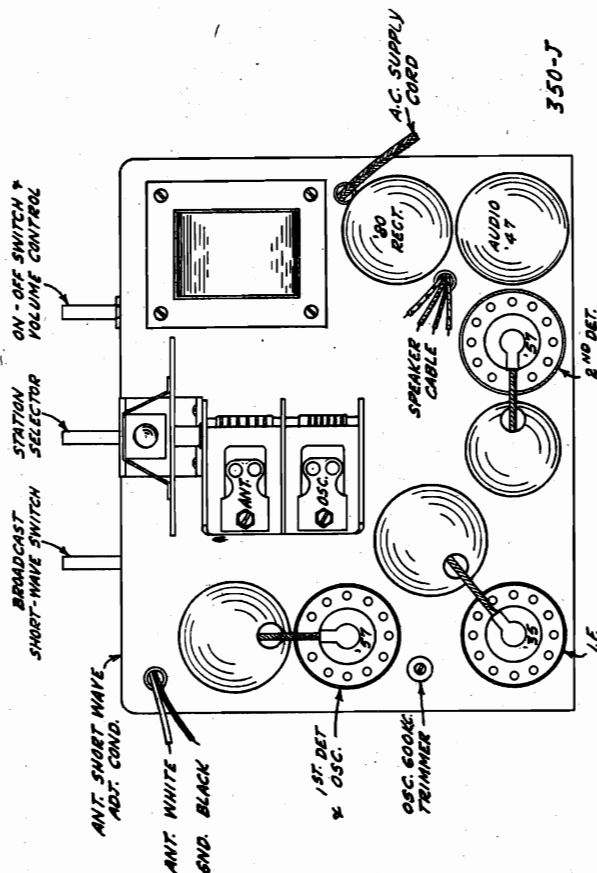
As the I.F. stages are self-tuned, no I.F. aligning at the intermediate frequency of 262 K.C. is required.

First set the signal generator for a signal of exactly 1400 K.C. Connect the antenna lead from the signal generator to the antenna lead of the receiver and the ground lead of the signal generator to the ground of the receiver. Then turn the tuning condenser rotor until the marker is at 1400 K.C. on the dial scale. In order to do this, it will be necessary to put the chassis back in the cabinet. Adjust the two trimmers on the tuning condenser for maximum output adjusting the oscillator trimmer first (section nearest back of receiver).

Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. This adjusting screw is between the 1st detector '57 and I.F. '35 sockets and is reached from the top of the chassis. 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.

The last step is to adjust the antenna short-wave adjusting condenser. Turn the Broadcast Short-Wave switch to the short-wave position. Set the signal generator for a signal of 1700 K.C. If the generator does not cover that frequency the 2nd harmonic of an 850 K.C. signal is satisfactory. Set the signal generator for a signal of 850 K.C. and the 2nd harmonic of this signal will be 1700 K.C., the required frequency. Turn the tuning condenser rotor until maximum output is obtained. Then adjust the antenna short-wave trimmer condenser to maximum output. The adjusting nut for this condenser is reached from the front of the chassis at the right hand side. A No. 4 Spintie wrench is necessary.



Voltages at Sockets

LINE VOLTAGE 115—VOLUME CONTROL AT MAXIMUM—ANT. SHORTED TO GND.

Type of Tube	Function	Across Filament or Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA	
'57	1st Det.	2.15	225	90	4	.5	
'35	I.F.	2.15	230	90	3.2 ⁽¹⁾	6.2	
'57	2nd Det.	2.15	170	90	4.3	.2	
'47	Audio	2.15	225	240	14 ⁽²⁾	23.	
'80	Rect.	.475	620 volts plate to plate				20. per plate

(1) If read with cord and plug, ground the control grid.
(2) Computed figure—cannot be accurately read with ordinary voltmeter. Voltage consists of drop across 1 megohm resistor, R 8.

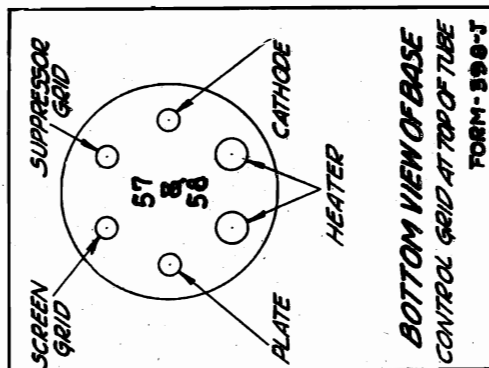
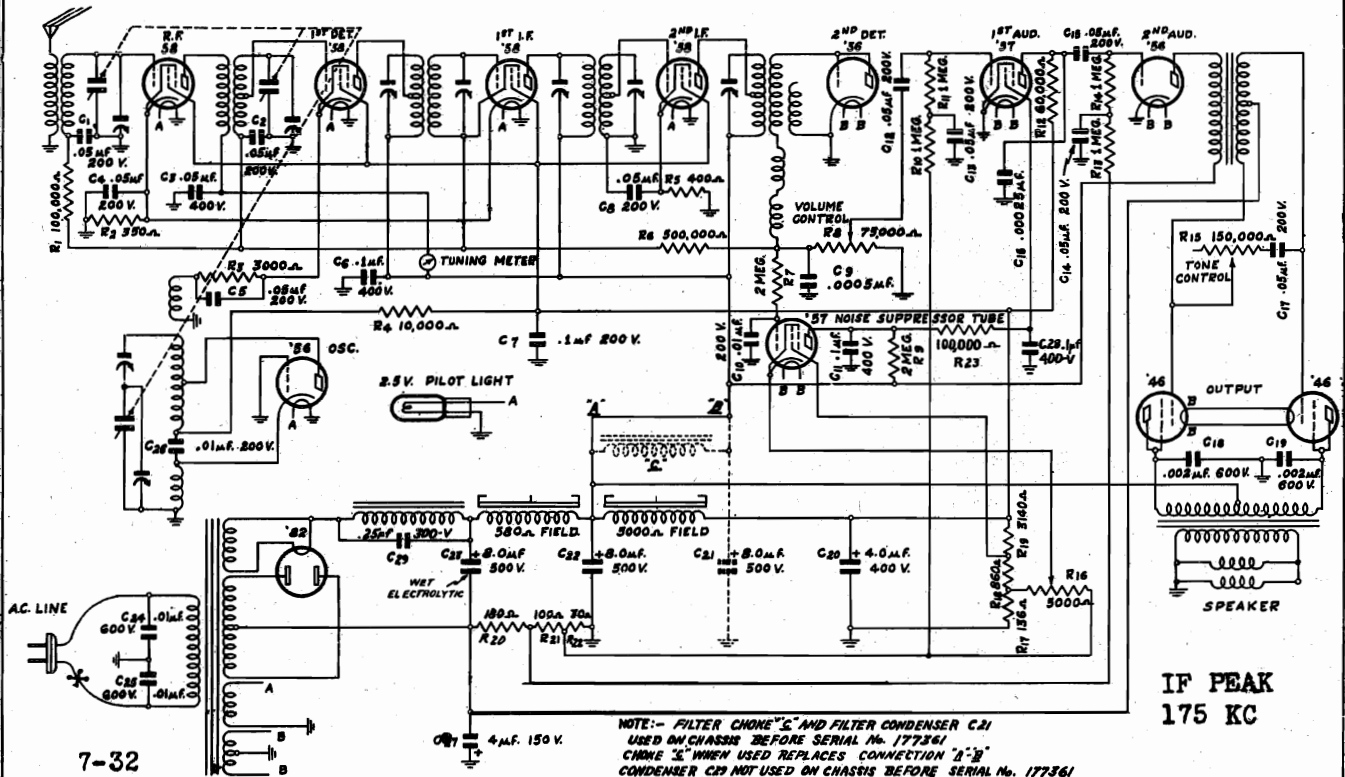


Fig. 3—Terminal Arrangement of 57 and 58 Tubes

MONTGOMERY WARD

MODELS 62-51, 62-64,
62-64X

Differences in Early Models

In the first models of this receiver a slightly different filter system was used in the power unit. Condenser C-29, which tunes the separate choke, was not used. Condenser C-21, shown with dashed lines and the choke shown with dashed lines above the 5,000 ohm speaker field in Fig. 1 were used.

In the first models of this receiver individual tubular condensers were used instead of Condenser Block No. 80922. The condensers which make up this block are shown in the parts list. If replacements of any of the condensers are required, it is recommended that the individual tubular condensers be used.

In the early models, a vitreous enamel, six-section voltage divider resistor was used instead of the wire wound type used at the present time.

Setting the Noise Suppressor

The action of the noise suppressor is to establish a certain signal strength level below which all signals are cut out, and above which all signals come through without being reduced in intensity.

The general method of using the noise suppressor is to first turn the knob to the "Power" or right hand position. At this point there is usually considerable noise received. Turn the knob to the left until the noise is eliminated, and then continue to tune the set in the regular manner to whatever stations are wanted.

When tuning for far, distant stations, the knob should be turned to the extreme right hand or "Power" position, as the weak station signals may be cut out along with the noise signals if the noise suppressor is used.

When tuning in local stations the knob may be turned well toward the left hand or "Quiet" position, as the station signals are very powerful compared with the noise signals.

If the signal of a station is distorted, turn the noise suppressor knob to the right until the signal becomes clear.

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	Noise Sup.	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.

MODELS 62-51, 62-64,
62-64X

MONTGOMERY WARD

Condenser Alignment

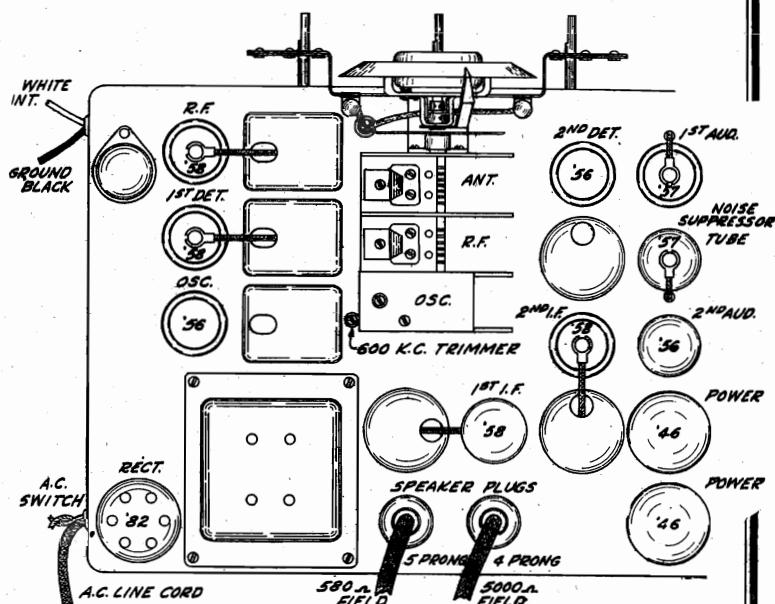
Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of 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 five 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 tuning condenser and the coil cans. 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.



Part No.	Name	Cost	Selling Price
P-10224	Rubber Drive Pinion	.02	.05
P-30374	Bushing for Rubber Drive	.03	.08
P-1657	Tuning Meter	.58	1.45
P-1415	Pilot Lamp Socket and Clip	.04	.10
P-1273	Pilot Lamp, 2.5 V.	.06	.15
P-1540	Knob	.05	.13
P-20425-B	Chassis Bottom Plate	.11	.28
P-40412-A	Aluminum Coil Cans	.06	.15
P-10240	Rubber Cushions (in tube shields)	.02	.05
P-1054	On-Off Switch	.18	.45
P-1504	Insulated Terminal Strip with 8 lugs	.03	.08
P-1661	Dynamic Speaker (5,000 ohm field)	1.70	4.25
P-1662	Dynamic Speaker (580 ohm field)	1.77	4.43

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	Cost	Selling Price
P-80862-P	C-1	.05 mfd.	200 V.	Tubular	.07	.18
P-80862-B	C-2	.05 mfd.	200 V.	Tubular	.07	.18
P-80890	C-3	.05 mfd.	400 V.	Tubular	.05	.13
P-80862-B	C-4	.05 mfd.	200 V.	Tubular	.07	.18
P-80862-B	C-5	.05 mfd.	200 V.	Tubular	.07	.18
P-80887-A	C-6	.10 mfd.	400 V.	Tubular	.10	.25
P-80862-B	C-7	.10 mfd.	200 V.	Tubular	.07	.18
P-80862-B	C-8	.05 mfd.	200 V.	Tubular	.07	.18
P-80855	C-9	.0005 mfd.	600 V.	Molded	.06	.15
P-80917	C-10	.01 mfd.	200 V.	Tubular	.05	.13
P-80887-A	C-11	.10 mfd.	400 V.	Tubular	.10	.25
P-80862-B	C-12	.05 mfd.	200 V.	Tubular	.07	.18
P-80862-B	C-13	.05 mfd.	200 V.	Tubular	.07	.18
P-80862-B	C-14	.05 mfd.	200 V.	Tubular	.07	.18
P-80862-B	C-15	.05 mfd.	200 V.	Tubular	.07	.18
P-80919	C-16	.00025 mfd.	600 V.	Molded	.05	.13
P-80862-B	C-17	.05 mfd.	200 V.	Tubular	.07	.18
P-80914	C-18	.002 mfd.	600 V.	Tubular	.05	.13
P-80914	C-19	.002 mfd.	600 V.	Tubular	.05	.13
*P-80915	C-20	4.0 mfd.	400 V.	Electrolytic	.83	2.08
	C-21	8.0 mfd.	500 V.			
	C-22	8.0 mfd.	500 V.	Electrolytic	.57	1.43
	C-23	8.0 mfd.	500 V.			
P-80916	C-23	8.0 mfd.	500 V.	Wet Electrolytic	.36	.90
P-80918	C-24	.01 mfd.	600 V.	Dual Tubular	.09	.23
	C-25	.01 mfd.	600 V.			
P-80917	C-26	.01 mfd.	200 V.	Tubular	.05	.13
P-80891	C-27	4.0 mfd.	150 V.	Electrolytic	.20	.50

P-50552	Power Transformer Assembly—60 cycle	\$1.95	\$4.88
P-50563	Power Transformer Assembly—25 cycle	4.45	11.13
P-50360	Large Filter Choke Assembly	.54	1.35
P-50554	Small Filter Choke Assembly	.36	.90
P-50555	Audio Input Transformer Assembly	.72	1.80
P-50556	Audio Output Transformer Assembly	.46	1.15
P-50500	Antenna R.F. Transformer Assembly	.23	.58
P-50501	Interstage R.F. Transformer Assembly	.23	.58
P-50502	Oscillator Coil Assembly	.22	.55
P-5046	Double R.F. Choke	.16	.40
P-5047	First I.F. Transformer Assembly complete with can	.48	1.20
P-5048	Second I.F. Transformer Assembly complete with can	.50	1.25
P-5049	Third I.F. Transformer Assembly complete with can	.50	1.25
P-1636	No. 56 Tube Socket	.03	.08
P-1635	No. 46 Tube Socket	.03	.08

P-80887-A	C-28	.10	mfd.	400 V.	Tubular	.....	.10	.25
†P-80925	C-29	.25	mfd.	300 V.	Tubular	.....	.07	.18
P-80913	Three Gang Condenser						1.04	2.60
P-1442	Oscillator 600 K.C. Trimmer Condenser						.12	.30
					Lead Color			
†P-80922	C-10	.01	mfd.	200 V.	White	Bypass Cond. Block	.40	1.00
	C-14	.05	mfd.	200 V.	White-Red			
	C-8	.05	mfd.	200 V.	White-Red			
	C-6	.10	mfd.	400 V.	Yellow			
	C-28	.10	mfd.	400 V.	Green			
	C-11	.10	mfd.	400 V.	Red			
	C-13	.05	mfd.	200 V.	White-Green			

(The first four condensers in the Condenser Block List have one side grounded to the can. The last three have a common black lead.)

RESISTORS

Part No.	Code	Resistance	Type	Cost	Selling Price
P-A-90912	R-1	100,000 ohm	Carbon	\$0.06	\$0.15
P-A-90953	R-2	350 ohm	Carbon	.06	.15
P-A-91034	R-3	3,000 ohm	Carbon	.05	.13
P-B-91037	R-4	10,000 ohm	Carbon	.05	.13
P-A-91035	R-5	400 ohm	Carbon	.05	.13
P-A-90929	R-6	500,000 ohm	Carbon	.06	.15
P-A-90949	R-7	2 Megohm	Carbon	.05	.15
P-91030	R-8	75,000 ohm	Volume Control	.24	.60
P-A-90949	R-9	2 Megohm	Carbon	.06	.15
P-A-90948	R-10	1 Megohm	Carbon	.05	.15
P-A-91036	R-11	1 Megohm	Carbon	.06	.15
P-A-90948	R-12	60,000 ohm	Carbon	.05	.13
P-A-90948	R-13	1 Megohm	Carbon	.06	.15
P-A-90948	R-14	1 Megohm	Carbon	.06	.15
P-91031	R-15	150,000 ohm	Tone Control	.19	.48
P-91032	R-16	5,000 ohm	Noise Suppressor	.19	.48
P-91033	R-17	136 ohm	Armored Wire Wound Resistor	.29	.73
	R-18	860 ohm			
	R-19	3140 ohm			
	R-20	180 ohm			
	R-21	100 ohm			
	R-22	30 ohm			
P-A-90912	R-23	100,000 ohm	Carbon	.06	.15

* Used on Models before Serial No. 177361 Only.

† Used on Models after Serial No. 177361 Only.

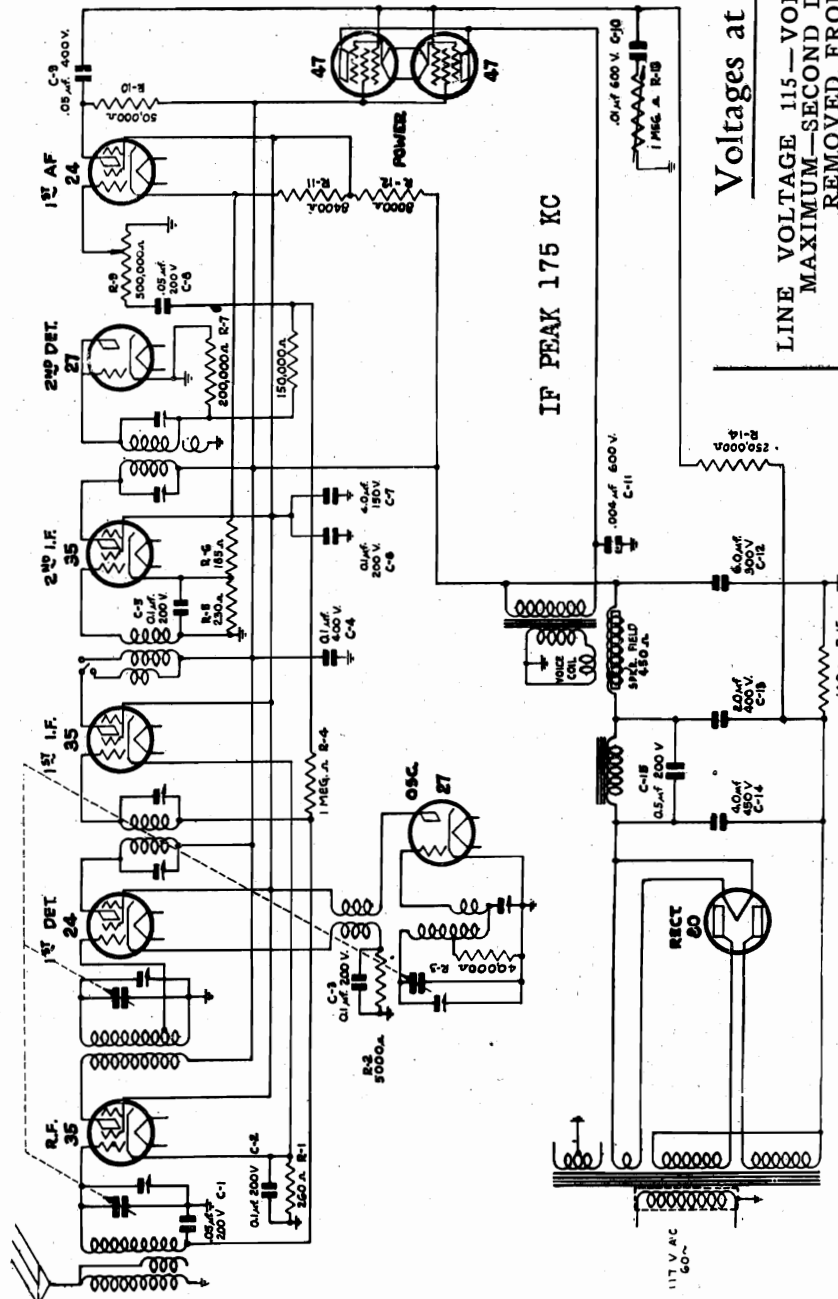
‡ Early models used separate condensers as shown in list. In later models block replaces condensers as shown in code list.

P-1640	Speaker Socket—Four-prong	.03	.08
P-1637	Speaker Socket—Five-prong	.03	.08
P-1670	No. 82 Tube Socket	.03	.08
P-1648	No. 58 Tube Socket	.04	.10
P-1649	No. 57 Tube Socket	.04	.10
P-40420	Tube Shield	.05	.13
P-40423	Tube Shield Cap	.03	.08
P-40424	Tube Shield Base	.02	.05
P-10142	Rubber Washer, 1/2" long (cond. mtg.)	.01	.02
P-10143	Rubber Washer, 1/4" long (cond. mtg.)	.01	.03
P-20555	Pointer Tension Spring (Right Hand)	.02	.05
P-20556	Pointer Tension Spring (Left Hand)	.02	.05
P-1393	Dial Pointer Assembly	.05	.13
P-1389	Celluloid Dial Strip	.06	.15
P-20554	Drive Shaft	.02	.05
P-30398	Brass Take-up Collar	.03	.08
P-1382	Drive Disc and Hub Assembly	.07	.18

Prices subject to change without notice.

Voltages at Sockets

LINE VOLTAGE 115—VOLUME CONTROL AT
MAXIMUM—SECOND DETECTOR TUBE
REMOVED FROM SOCKET



Type of Tube	Function	Across Filament or Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M.A.
'35	R.F.	2.2	260	103	3.8 ⁽¹⁾	6.5
'24	1st. Det.	2.2	252	98	9.	2.2
'27	Osc.	2.2	100		8. ⁽²⁾	7. ⁽²⁾
'35	1st. I.F.	2.2	260	103	3.8 ⁽¹⁾	6.5
'35	2nd. I.F.	2.2	257	100	4.5	4.7
'24	1st. Audio	2.2	200	97	7. ⁽³⁾	1.
'47	2nd. Audio	2.2	240	260	18. ⁽⁴⁾	31.
'80	Rect.	4.8	725 volts plate to plate			65 per plate

Replacing Rubber Drive

You will note that the Vernier tuning drive on this chassis uses a rubber pinion. Under normal operating conditions this rubber will last for a number of years. Should it become worn it can be readily replaced by loosening the set screw of the brass bushing located next to the rubber pinion and pulling out the station selector shaft. Place a new bushing in position, slip the station selector shaft in place and tighten the set screw.

- (1) Read from cathode to ground.
- (2) Subject to variation with dial setting.
- (3) Read across 230 and 185 ohm sections of voltage divider.
- (4) Read across 140 ohm section of voltage divider resistor.

NOTE:—All readings, except heater, for second detector tube are zero.

MODEL 62-52

MONTGOMERY WARD

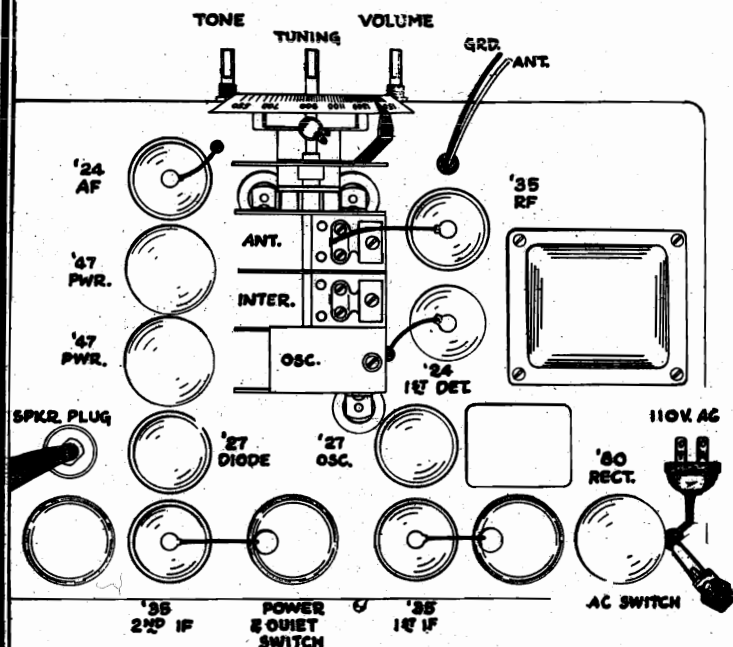
Condenser Alignment

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. Disconnect the grid cap from the first detector tube. Connect the antenna lead from the signal generator to the grid terminal of this tube. The ground lead goes to the ground connection. 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 1400 K.C. The input in this instance is made to the antenna lead of the receiver. Replace the grid cap on the first detector tube. 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.

Then, set the signal generator for a signal of 600 K.C. The oscillator 600 K. C. trimmer condenser is underneath the chassis but the adjusting screw is reached from the top of the chassis and is adjacent to the oscillator coil can. Adjust this oscillator 600 K.C. trimmer condenser for maximum output, turning the rotor slowly back and forth over the 600 K.C. setting until highest output is obtained. A recheck may then be made of the alignment at 1400 K.C.



Part No.	Name	Cost Price	Selling Price
P-1468	No. 47 Tube Socket	.04	.10
P-1474	No. 80 Tube Socket	.04	.10
P-1521	Speaker Socket	.04	.10
P-1504	Terminal Strip (8 lugs)	.03	.08
P-1273	Pilot Lamp (2.5 v.)	.06	.15
P-1407	Pilot Light Socket (less bulb)	.06	.15
P-20408	Tube Shield Base	.01	.03
P-20406	Tube Shield	.03	.08
P-20430	Mtg. Strap for 2, 4, and 6 mfd. Electrolytic Condenser Block	.03	.08
P-20476	Mtg. Strap for 4 mfd. electrolytic cond.	.02	.05
P-70702	Attachment Cord and Plug	.23	.58
P-1540	Plain Walnut Knob	.05	.13
P-1509	Escutcheon Plate	.16	.40
P-1326	Rectangular Coil Can (Antenna)	.08	.20
P-1327	Rectangular Coil Can (Interstage)	.08	.20
P-1328	Oscillator Assembly Can	.06	.15
P-80889	Three-gang Condenser	1.43	3.58
P-10142	1/2" Rubber Cushions	.01	.03
P-10143	1/4" Rubber Cushions	.01	.03
P-20473	Drive Shaft	.01	.03
P-30374	Rubber Drive Bushing	.03	.08
P-10182	Rubber Drive Pinion	.02	.05
P-1394	Dial Strip and Bracket Assembly	.10	.25
P-20483	Dial Strip Support Plate	.02	.05
P-1382	Drive Disc and Hub	.07	.18
P-1383	Drive Bracket and Bearing	.07	.18
P-1393	Indicator Assembly	.05	.13
P-20425	Bottom Plate	.11	.28
P-20235	J. Bolt for Chassis	.01	.03
P-1534	Electrodynamic Speaker with Cord	1.82	4.55
P-1535	Electrodynamic Speaker	1.70	4.25
P-50547	Output Transformer Assembly	.42	\$1.05
P-50534	Power Choke Assembly	.34	.85
P-50532	Power Transformer Assembly (60 cycle)	1.66	4.15
P-1433	First I. F. Transformer assembly with can	.50	1.25
P-5032	Second I. F. Transformer assembly with can	.47	1.18
P-5033	Third I. F. Transformer assembly with can	.54	1.35
P-1502	Interstage R. F. Coil assembly less can	.24	.60
P-5036	Antenna R. F. Coil assembly less can	.28	.70

RESISTORS

Part No.	Key No.	Resistance	Type	Cost Price	Selling Price
P-90965	R2	5,000 Ohms	Carbon	.06	.15
P-90916	R3	40,000 Ohms	Carbon	.06	.15
P-90933	R4	1 Megohm	Carbon	.08	.20
P-90995	R7	200,000 Ohms	Carbon	.05	.13
P-90963-C	R8	150,000 Ohms	Carbon	.06	.15
P-90941-B	R10	50,000 Ohms	Carbon	.05	.13
P-90954-B	R14	250,000 Ohms	Carbon	.05	.13
P-90980-B	R9	0-500,000 Ohms	Volume Control	.32	.80
P-90986-B	R13	0-1 Megohm	Tone Control	.23	.58
P-91007	R1	260 Ohm	Vitreous Enamel	.35	.88
	R15	140 Ohm			
	R5	230 Ohm			
	R6	185 Ohm			
	R11	8400 Ohm			
	R12	8000 Ohm			

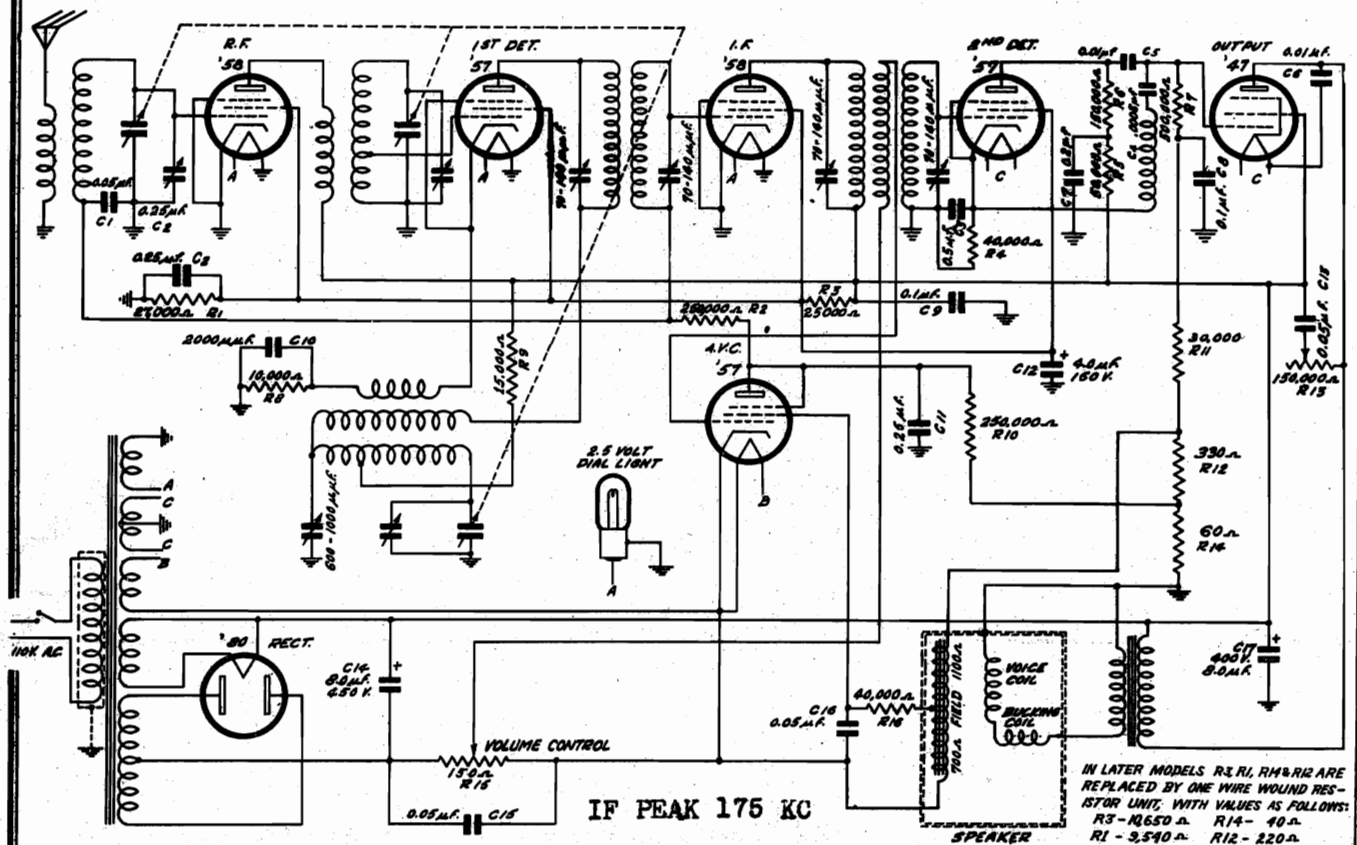
CONDENSERS

Part No.	Key No.	Capacity	Type	Voltage Rating	Cost Price	Selling Price
P-80862-B	C1	0.05 mfd.	Tubular	200 V.	.07	.18
P-80864-C	C2	0.1 mfd.	Tubular	200 V.	.07	.18
P-80864-C	C3	0.1 mfd.	Tubular	200 V.	.07	.18
P-80887-A	C4	0.1 mfd.	Tubular	400 V.	.10	.25
P-80864-C	C5	0.1 mfd.	Tubular	200 V.	.07	.18
P-80864-C	C6	0.1 mfd.	Tubular	200 V.	.07	.18
P-80878	C7	4.0 mfd.	Electrolytic	150 V.	.19	.48
P-80862-B	C8	0.05 mfd.	Tubular	200 V.	.07	.18
P-80890	C9	0.05 mfd.	Tubular	400 V.	.05	.13
P-80872	C10	0.01 mfd.	Tubular	600 V.	.06	.15
P-80863	C11	0.004 mfd.	Tubular	600 V.	.06	.15
P-80896	C12	2.0	Green-Yellow +	300 V.	.62	1.55
Electrolytic Block	C13	4.0	Green-Red +	400 V.		
	C14	6.0	Blue-Brown +	450 V.		
P-80827	C15	0.5 mfd.	Metal Can	200 V.	.13	.33
P-1400-A	Oscillator Coil Assembly less can				.35	.88
P-1385-B	Oscillator 600 K. C. Trimmer condenser				.20	.50
P-1011-A	Quiet-Power Switch				.15	.38
P-1054	Off-On Switch				.18	.45
P-1462	No. 27 Tube Socket				.04	.10
P-1464	No. 35 Tube Socket				.04	.10
P-1461	No. 24 Tube Socket				.04	.10

Prices subject to change without notice.

MODELS 62-53, 62-71,
62-74, 62-74X

MONTGOMERY WARD

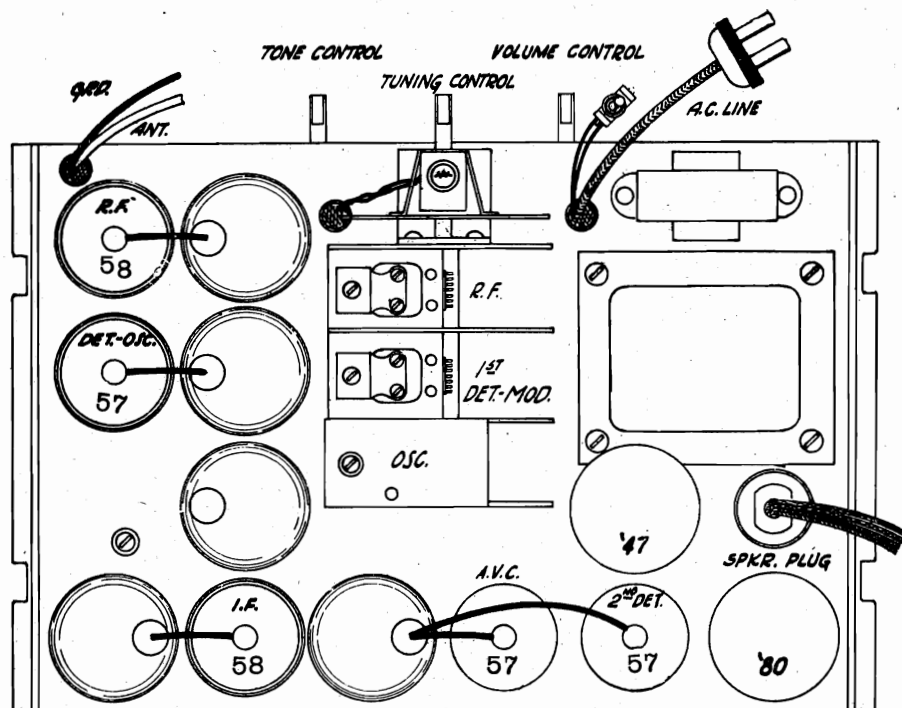


September, 1932

Part No.					Cost Selling Price		Prices subject to change without notice.							
P-1677	No. 57	Tube Socket			\$.04	\$.10	P-80837-B	C-9	.1	mfd.	400 V.	Tubular	.10	.25
P-1678	No. 58	Tube Socket			.04	.10	P-80914	C-10	.002	mfd.	600 V.	Tubular	.05	.13
P-1468	No. 47	Tube Socket			.04	.10	P-80891-B	C-12	4.0	mfd.	150 V.	Electrolytic	.20	.50
P-1474	No. 80	Tube Socket			.04	.10	P-80890-B	C-13	.05	mfd.	400 V.	Tubular	.05	.13
P-1479	Speaker	Socket			.04	.10	P-80894-B	{ C-14	8.0	mfd.	450 V. }	lytic Block	.69	1.73
P-40420	Aluminum	Tube Shield			.05	.13		{ C-17	8.0	mfd.	450 V. }			
P-40425	Tube	Shield Base			.02	.05	P-80862-C	C-15	.05	mfd.	200 V.	Tubular	.07	.18
P-40411	Aluminum	Coil Shield—R.F. Coils			.05	.13	P-80862-C	C-16	.05	mfd.	200 V.	Tubular	.07	.18
P-1476	Three-Lug	Insulated Terminal Strip			.03	.08	P-80849		8.0	mfd.	450 V.	Wet Electrolytic		
P-1513	Eleven-Lug	Insulated Terminal Strip			.04	.10					(25 Cycle only)		.53	1.33
P-1054	"On-Off"	Switch			.18	.45	P-1385-B				600 K.C Trimmer Condenser		.20	.50
P-20529	Drive	Shaft			.02	.05	P-80882				Three-Gang Condenser		1.37	3.43
P-10224	Rubber	Drive Pinion			.02	.05								
P-30374	Brass	Bushing for Rubber Pinion			.03	.08								
P-1273	Pilot	Lamp 2.5 Volt			.06	.15								
P-5062	Antenna	R.F. Transformer Assembly			.19	.48								
P-5057	Interstage	R.F. Transformer Assembly			.19	.48								
P-5058	Oscillator	Coil Assembly			.23	.58								
P-5059	1st I.F.	Transformer Assembly, complete with can			.54	1.35								
P-5060	2nd I.F.	Transformer Assembly, complete with can			.60	1.50								
P-50541	Output	Transformer Assembly			.42	1.05								
P-50542	Power	Transformer, 60 cycle, 110 volt.			1.26	3.15								
P-50543	Power	Transformer, 25 cycle, 110 volt.			2.05	5.13								
P-1497	Pilot	Light Bracket and Drive Gear Assembly			.11	.28								
P-1383-C	Drive	Bracket and Bearing			.07	.18								
P-1684	Celluloid	Dial Strip			.05	.13								
P-1525	Dynamic	Speaker			1.32	3.30								
P-1526	Dynamic	Speaker—With plug			1.50	3.75								
RESISTORS														
Part No.		Code	Resistance	Wattage	Type	Cost Price	Selling Price							
*P-91003		R-1	27,000 ohms	.5 Watts	Carbon	.06	.15							
P-90954		R-2	250,000 ohms	.2 Watts	Carbon	.06	.15							
*P-91002		R-3	25,000 ohms	1.0 Watts	Carbon	.06	.15							
P-90916		R-4	40,000 ohms	.2 Watts	Carbon	.06	.15							
P-90941		R-5	50,000 ohms	.2 Watts	Carbon	.06	.15							
P-90963		R-6	150,000 ohms	.2 Watts	Carbon	.06	.15							
P-90929		R-7	500,000 ohms	.2 Watts	Carbon	.06	.15							
P-90930		R-8	10,000 ohms	.2 Watts	Carbon	.05	.13							
P-90905		R-9	15,000 ohms	.2 Watts	Carbon	.06	.15							
P-90954		R-10	250,000 ohms	.2 Watts	Carbon	.06	.15							
P-90956		R-11	30,000 ohms	.2 Watts	Carbon	.06	.15							
*P-91040		{ R-12	330 ohms		Vitreous Enamel	.12	.30							
		{ R-14	60 ohms											
P-90993		R-13	150,000 ohms		Tone Control	.22	.55							
P-91041		R-15	150 ohms		Volume Control	.19	.48							
P-90916		R-16	40,000 ohms	.2 Watts	Carbon	.06	.15							
†P-91048		{ R12	220 ohm	1.0 Watts	Armored Wire-wound Resistor	.25	.63							
		{ R14	40 ohm	.2 Watts										
		{ R1	9540 ohm	1.0 Watts										
		{ R3	10650 ohm	2.5 Watts										
* Used in early models—in later models these resistors are replaced by resistor P-91048.														
† See above.														

MODELS 62-53, 62-71,
62-74, 62-74X

MONTGOMERY WARD



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.

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 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.

Voltages at Sockets

LINE VOLTAGE 115—ANTENNA LEAD SHORTED TO GROUND—VOLUME CONTROL AT MAXIMUM

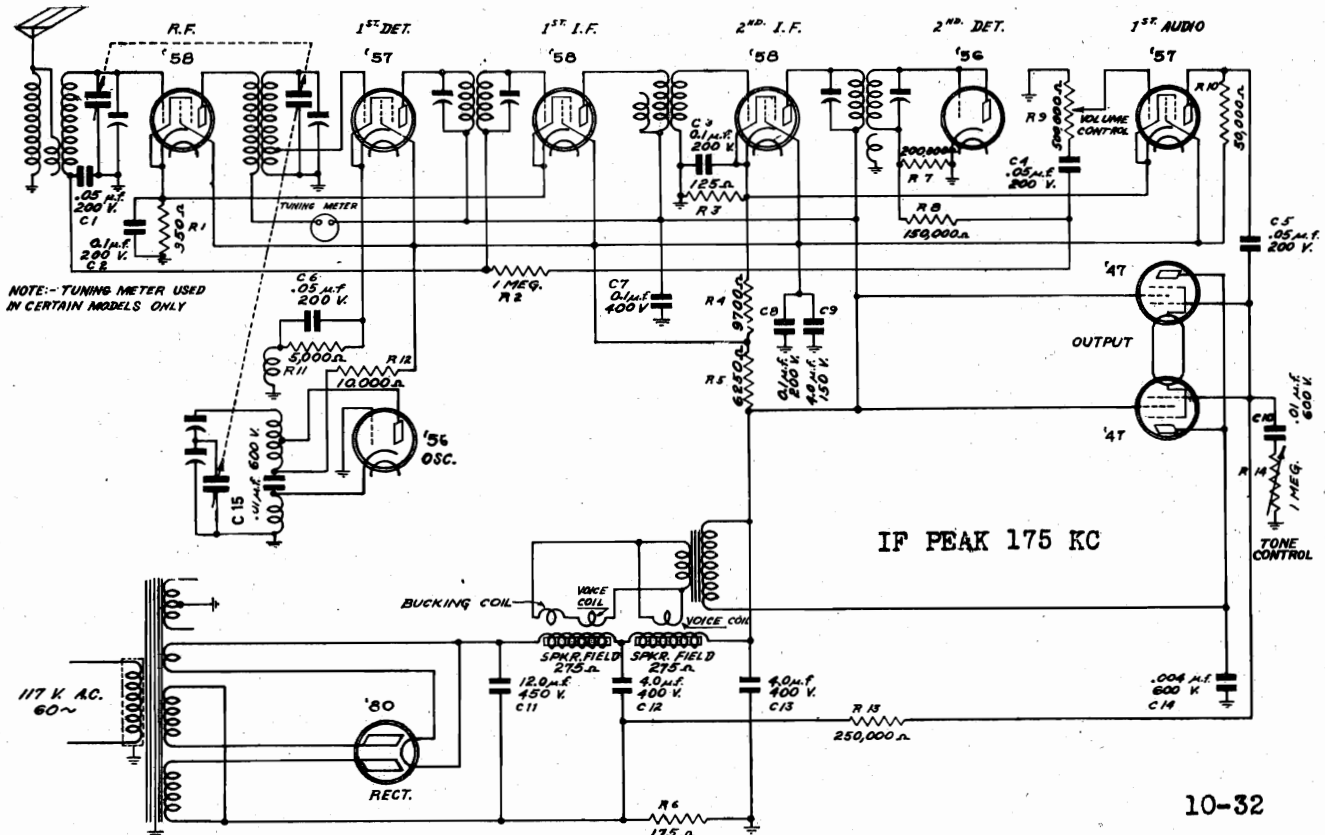
Type of Tube	Function	Across Filament or Heater	For early Models with 2-section vitreous enamel resistor.				For later Models with 4-section armoured wire-wound resistor.			
			Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal 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

MONTGOMERY WARD

MODELS 62-55, 62-76,
62-76X

10-32

Voltages at Sockets

LINE VOLTAGE, 115 — ANTENNA LEAD
SHORTED TO GROUND

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	275	100	4.2 ⁽¹⁾	5.2
57	1st Det.	2.4	265	99	5.4	.9
56	Osc.	2.4	28		0	8.6
58	1st I.F.	2.4	275	100	4.2 ⁽¹⁾	5.2
58	2nd I.F.	2.4	275	102	3.0	8.5
56	2nd Det.	2.4	0		0	0
57	1st Audio	2.4	12	102	3.0 ⁽¹⁾	1.8
47	Output	2.4	265	280	18.5 ⁽²⁾	30.0
80	Rect.	4.9				55.0 per plate

(1) Measured from cathode to ground.

(2) Measured across Resistor R6.

Voltages

Check the voltages at the sockets to see if correct voltages are being delivered to the tubes. The antenna and ground should be disconnected and the antenna and ground leads from the set connected together.

All of the D.C. voltage readings as shown on 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.

Owing to the high resistance in the grid circuits of the R.F., 1st I.F., 1st audio and output tubes, the bias voltage cannot be read between the control grid and cathode of these tubes but must be read across the points as indicated in the references under the chart.

If a cable and plug are used to read the voltages, when making the readings at the I.F. socket, ground the control grid through a condenser to prevent oscillation.

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 and variations in tube characteristics. All voltages in the chart are taken with a line voltage of 115. Differences in line voltage as well as differences in test equipment used will introduce other variations in the voltage readings.

MODELS 62-55, 62-76,
62-76X

MONTGOMERY WARD

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:

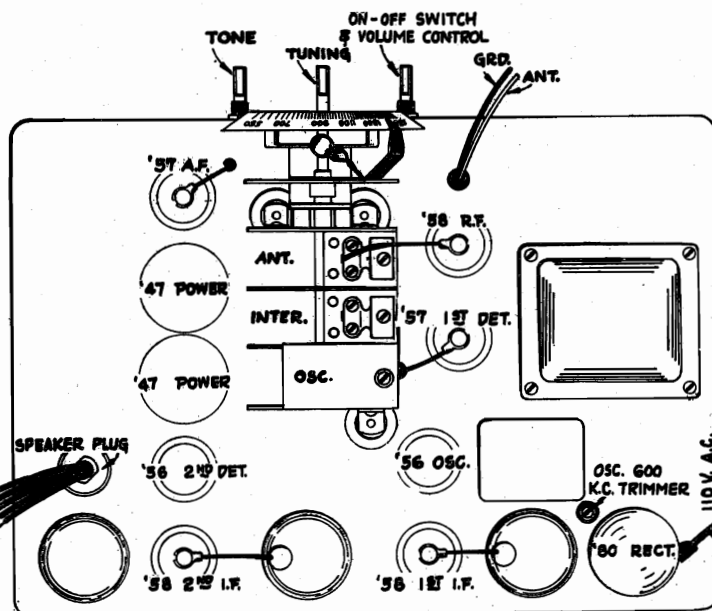
Set the signal generator for 175 K.C. Connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. 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.

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 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.



Replacing Rubber Drive

You will note that the Vernier tuning drive on this chassis uses a rubber pinion. Under normal operating conditions this rubber will last for a number of years. Should it become worn it can be readily replaced by loosening the set screw of the brass bushing located next to the rubber pinion and pulling out the station selector shaft. Place a new bushing in position, slip the station selector shaft in place and tighten the set screw.

Dual Speaker Connections

Two speakers are used in this model. The fields of these speakers are connected in series and the voice coils in parallel. The resistance of each speaker field is 275 ohms

Part No.	Name	Cost	Selling Price
P-1703	No. 47 Tube Socket	.04	.10
P-1706	No. 56 Tube Socket	.04	.10
P-1699	No. 57 Tube Socket	.04	.10
P-1700	No. 58 Tube Socket	.04	.10
P-1696	No. 80 Tube Socket	.04	.10
P-1704	Speaker Socket	.04	.10
P-40425	Tube Shield Base	.02	.05
P-40420	Tube Shield	.05	.13
P-20425-B	Bottom Plate	.11	.28
P-40426	R.F. Coil Shields	.06	.15
P-10142	1/4" Rubber Washer for Gang Condenser	.01	.03
P-10143	1/4" Rubber Washer for Gang Condenser	.01	.03
P-10240	Tube Cushions	.02	.05
P-40412	Oscillator Coil Shield	.06	.15
P-20461	Gang Condenser Shield	.03	.08
P-1273	2.5 V. Pilot Lamp	.06	.15
P-20473	Drive Shaft	.01	.03
P-1382-A	Drive Disc Hub and Fulcrum	.07	.18
P-1389-C	Celluloid Dial Strip	.06	.15
P-1393	Pointer Assembly	.05	.13
P-1383-C	Drive Bracket	.07	.18
P-10224	Rubber Drive Pinion	.02	.05
P-30374	Brass Bushing for Rubber Pinion	.03	.08
P-1415	Pilot Light Socket	.04	.10
P-1691	Dynamic Speaker with Plug	1.74	4.35
P-1692	Dynamic Speaker	1.56	3.90
P-50562	Power Transformer, 60 cycle, 110 Volt	1.66	4.15
P-50565	Power Transformer, 25 cycle, 110 Volt	3.14	7.85
P-50561	Output Transformer	.42	1.05
P-5067	Antenna R.F. Transformer	.24	.60
P-5066	Interstage R.F. Transformer	.24	.60
P-5052	Oscillator Coil Assembly	.22	.55

P-1433	1st I.F. Transformer Assembly, complete with can	.50	1.25
P-5068	2nd I.F. Transformer Assembly, complete with can	.50	1.25
P-5033	3rd I.F. Transformer Assembly, complete with can	.54	1.35
P-1540	Knobs	.05	.13

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	Cost Price	Selling Price
P-80862	C-1	.05 mfd.	200 V.	Tubular	.07	.18
P-80864	C-2	.1 mfd.	200 V.	Tubular	.07	.18
P-80864	C-3	.1 mfd.	200 V.	Tubular	.07	.18
P-80862	C-4	.05 mfd.	200 V.	Tubular	.07	.18
P-80862	C-5	.05 mfd.	200 V.	Tubular	.07	.18
P-80862	C-6	.05 mfd.	200 V.	Tubular	.07	.18
P-80887	C-7	.1 mfd.	400 V.	Tubular	.10	.25
P-80864	C-8	.1 mfd.	200 V.	Tubular	.07	.18
P-80878	C-9	4.0 mfd.	150 V.	Electrolytic	.19	.48
P-08872	C-10	.01 mfd.	600 V.	Tubular	.06	.15
P-80923	{ C-11	12.0 mfd.	450 V.	Electrolytic Block	.57	1.43
P-80873-D	{ C-12	4.0 mfd.	400 V.	Electrolytic	.28	.70
P-80863	C-13	1.0 mfd.	400 V.	Electrolytic	.06	.15
P-80863	C-14	.004 mfd.	600 V.	Tubular	.06	.15
P-80872	C-15	.01 mfd.	600 V.	Tubular	.06	.15
P-1442		600 K.C. Trimmer			.12	.30
P-80889		Three-Gang Variable Condenser			1.43	3.58

RESISTORS

Part No.	Code	Resistance	Wattage	Type	Cost Price	Selling Price
P-A-90953	R-1	350 ohm	.2 Watts	Carbon	.06	.15
P-A-90948	R-2	1 Megohm	.2 Watts	Carbon	.06	.15
P-91044	{ R-3	125 ohm		Armored		
	{ R-4	9700 ohm		Wire Wound	.25	.63
	{ R-5	6250 ohm				
	{ R-6	175 ohm				
P-A-90995	R-7	200,000 ohm	.2 Watts	Carbon	.05	.13
P-A-90963	R-8	150,000 ohm	.2 Watts	Carbon	.06	.15
P-91043	R-9	500,000 ohm	Vol. Control & Switch	Carbon	.33	.83
P-A-90941	R-10	50,000 ohm	.2 Watts	Carbon	.05	.13
P-A-90965	R-11	5,000 ohm	.2 Watts	Carbon	.06	.15
P-B-91037	R-12	10,000 ohm	.5 Watts	Carbon	.06	.15
P-A-90954	R-13	250,000 ohm	.2 Watts	Carbon	.06	.15
E-90986-C	R-14	1 Megohm	Tone Control	Carbon	.23	.58

Prices subject to change without notice.

MONTGOMERY WARD

SOCKETS		Net Price Selling	
		Each	Price
K-2-2-509	57 socket.	\$0.03	\$0.08
K-3-2-509	58 socket	.03	.08
K-4-2-509	53 socket	.03	.08
K-4-7-514	59 socket.	.03	.08
K-2-7-514	47 socket.	.03	.08
K-2-7-508	60 socket.	.03	.08
K-2-7-514	Unnumbered 5 prong socket.	.03	.08
CONDENSERS			
K-3-4-4-301	3 gang var. tuning condenser	1.00	2.50
K-1-10-302	Dual 8 mfd. filter cond.	.53	1.33
K-2-4-226	.01 mfd. cond. 400 volt.	.04	.10
K-1-6-226	.5 mfd. cond. 200 volt.	.08	.20
K-1-2-226	.06 mfd. cond. 400 volt.	.03	.13
K-3-3-226	.06 mfd. cond. 200 volt.	.045	.11
K-1-3-306	.15 mfd. cond. 200 volt.	.05	.16
K-1-3-306	.15 mfd. cond. 200 volt.	.05	.16
K-3-3-474	.001 mfd. cond. molded bakelite	.06	.15
K-3-3-462	Adjustable padding cond. 1500 mmfd. max.	.15	.38
RESISTORS			
K-4-2-476	500 ohm Wire Wound Resistors, Flex.	\$0.04	\$0.10
K-1-3-172	300 ohm 1/2 watt Carbon Resistor.	.05	.13
K-1-3-172	400 ohm 1/2 watt Carbon Resistor.	.05	.13
K-1-1-175	400 ohm 1/2 watt Carbon Resistor.	.05	.13
K-1-1-175	250 ohm 1/2 watt Carbon Resistor.	.05	.13
K-1-1-4224	500M ohm 1/2 watt Carbon Resistor.	.05	.13
K-1-1-8484	100M ohm 1/2 watt Carbon Resistor.	.05	.13
K-1-1-4225	500M ohm 1/2 watt Carbon Resistor.	.05	.13
K-2-1-173	15M ohm 1 watt Carbon Resistor.	.05	.13
K-2-1-172	5M ohm 1 watt Carbon Resistor.	.05	.13
COILS			
K-1-6-601	Antenna Coil Assembly.	.20	.50
K-1-3-450	R.F. Coil Assembly.	.38	.96
K-3-3-450	Oscillator Coil Assembly.	.15	.36
TRANSFORMERS			
K-6-7-201	Power Transformer 60 cycle	\$1.15	\$2.88 ea
K-4-5-963	No. 1 I.F. Transformer Assembly	.50	1.25
K-5-5-963	No. 2 I.F. Transformer Assembly	.50	1.25
SHIELDS			
K-0-5-103	Coil Shields*		.08 ea.
K-3-5-103	I.F. Transformer Shield	.04	.10
K-1-1-744	Inner Coil Shield for Sub Base.	.50	1.25 C
K-1-8-219	Variable Cond. Shield	.10	.25 ea
K-1-3-364	6-32 St. Spade Screws for Coil Shield.	2.00	5.00 M

SHIELDS	Price	Quantity	Unit Price
K-0-5-103	03	.08 ea.
K-3-5-103	04	.10 "
K-1-1-74450	1.23 C
K-1-8-21910	.26 ea.
K-1-3-364	2.00	5.00 M.

TERMINAL STRIPS		
K-1-1-F438	Large Term. Strip	.02
K-1-1-F531	Small Term. Strip	.01
K-1-1-F531	Small Term. Strip	.02
K-1-1-0-419	Insulator for Small Term. Strip	.50
K-1-2-F419	Insulator for Large Term. Strip	.50
K-1-1-4430	Small Double Solder Lugs	1.00
K-1-1-3504	200 Short Eyelets	.50

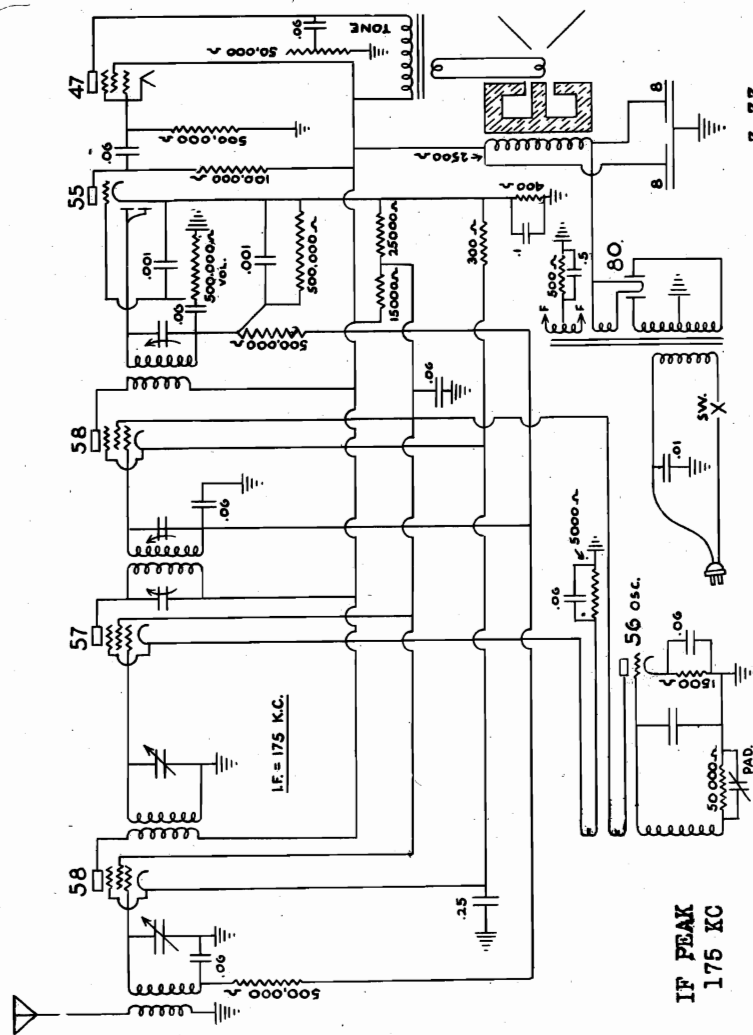
	\$0.01	\$0.03 ea.
MISCELLANEOUS PARTS		
K-1-5-457 Sub Shield Base.....	.15	.38 "
K-1-7-101 Tub Base.....	.31	.78 "
K-4-4-122 Dial Assembly with Strip.....	.03	.08 "
K-2-6-320 Var. Cond. Mtg. Bracket, Front.....	.03	.08 "
K-1-6-320 Var. Cond. Mtg. Bracket, Rear.....	.02	.05 "
K-1-3-416 Dial Mtr. Strap.....	.02	.05 "

K-1-3-114	Dial Lamp Socket	0.3	08 *
K-1-3-115	2.5 volt Dial Lamp	0.7	18 *
K-2-3-4167	5.5 volt Dial Lamp	50	125 C
K-2-4-116	Control Grid Clips	12	30 ea.
K-5-7-406	Power Cord Set	30	75 *
K-5-7-406	Volume Control	23	58 *
K-5-5-369	Tone Control	15	38 C
K-1-3-396	5/8" Internal Tooth	40	100 *
K-1-4-411	5/8" Volume Control	40	100 *
K-1-4-411	5/8" Volume Control Nut	40	100 *

K-1-2-409	Large Bakelite Pattern Washer for C. Con.	75	1.88	ea.
K-1-2-3410	Large Fiber Extruded Washer for C. Con.	75	1.75	ea.
K-1-1-27	Brass Cond. Spacer (rear mtg.)	01	03	ea.
K-1-1-27	Brass Cond. Spacer (front mtg.)	01	03	ea.
K-2-1-3124	Gun Rubber Grommets	50	1.25	C.
K-2-1-3125	Gun Rubber Grommets	50	1.25	C.
K-1-3-47	1-P. Transformer Hold-down Clamp.	04	1.00	ea.
K-1-3-47	Tube Shield	04	1.00	ea.

K-0-1-635	Tube Shield Cap.	..02	..05
K-1-7-132	Excuse/Don Plate	..10	..25
K-1-8-132	Small Control Knob	..03	..08
K-2-8-134	Large Control Knob	..04	..10

Prices subject to change without notice.



Circuit Description And Aligning Procedure

The tubes employed are as follows, and are operated at stated voltages and biases:

R.F.	58	Osc.	56
1st Det.	57	2nd Det.	55
I.F.	58	Audio	47
		Rectifier.....	80

The second detector is the new dual diode triode, the diode portion operating as a detector and providing automatic volume control—acting on the grids of the R.F. and I.F. stages. The triode portion of this tube is operated as an individually biased A.F. amplifier.

In aligning, it is first desirable to see that the I.F. transformers are properly set. Both are on top of the base, the first having two adjustments, the second but one adjustment. The intermediate frequency is 175 K.C. Couple test oscillator into grid of first detector. Use an output meter.

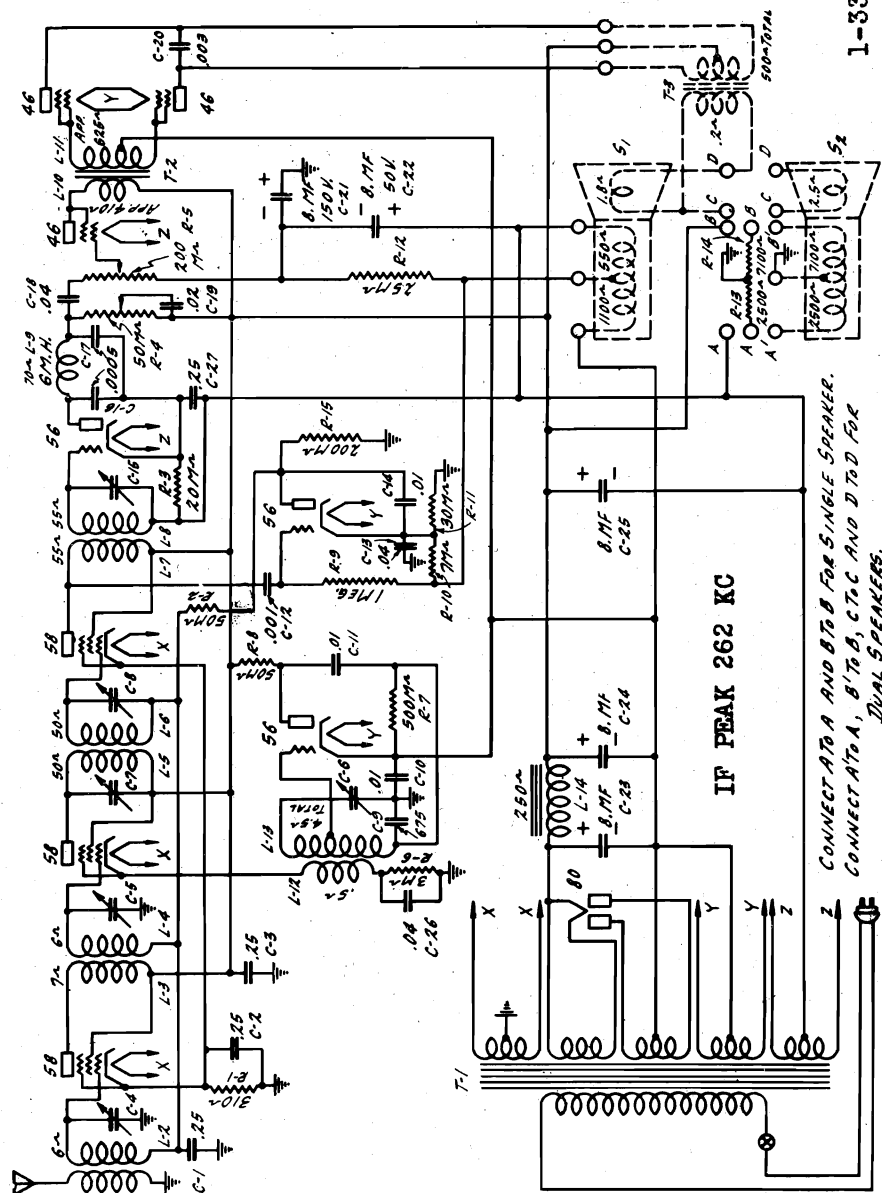
The tuning condenser may be adjusted for alignment or "tracking" of the tuned circuits by means of an oscillator and output meter, also. The oscillator should cover the band from 550 to 1500 K.C. The energy from the oscillator should be coupled weakly into the antenna circuit. The receiver and oscillator are first tuned to approximately 1500 K.C., and, by watching the output meter the three condenser trimmers are adjusted for maximum output. These three trimmers must then be left untouched for all further aligning.

The next step is to tune both receiver and oscillator to some point near 550 K.C. Here the alignment is made by adjusting the oscillator "pad" condenser for maximum response. It may be reached through hole in base between stator and oscillator tubes. If necessary to adjust the two R.F. condenser sections it may be done by bending the slotted condenser rotor end plates. If necessary to align at points other than the ends of the "band" it may be done by bending portions of these slotted plates. Alignment of the two ends of the scale is usually quite sufficient.

IMPORTANT: It is desirable to move the dial back and forth across the signal while making the above alignments. This is particularly necessary when altering any capacities connected with the oscillator circuit. Use an insulated or bakelite screw driver.

Be certain that good tubes are used in all sockets.

Prices subject to change without notice.



VOLTAGES AT SOCKETS—LINE VOLTAGE 115—VOLUME CONTROL AT MAXIMUM

[illegible]

(1)	Actual Voltage measured across 310 ohm biasing resistor—5.0 Volts.	(5)	Actual Voltage measured across 30,000 ohm voltage divider resistor—92 Volts.
(2)	Actual Voltage measured across 3,000 ohm bias resistor—10 Volts.	(6)	Actual Voltage measured across 7,000 ohm voltage divider resistor—22 Volts.
(3)	Read with Volume Control at minimum.	(7)	Plate current at no signal.
(4)	Varies as shown with frequency. Actual voltage measured across 500,000 ohm bias resistor—15 to 35 Volts.		

MONTGOMERY WARD

MODELS 62-79, 62-84,
62-84X, 62-94, 62-94X
MODEL 62-83

Model No. 62-83

"B" POWER UNIT PARTS

Part No.	Code	Capacity	Voltage	Type	Cost Price	Selling Price
P-80929-B	C10	.5 mfd.	160 V.	Electrolytic	.13	.33
P-80931-A	C11	.5 mfd.	500 V.	Electrolytic	.28	.70
P-50580		"A" Choke Assembly for Dynamotor			.23	.58
P-1735		Celotex Box (Dynamotor "B" Supply)			.47	1.18
P-1745		Dynamotor (without Rubber Mountings)			6.98	17.45
P-10253		Male Rubber Dynamotor Cushion			.02	.05
P-10254		Female Rubber Dynamotor Cushion			.02	.05
P-10255		Moulded Sponge Rubber (Celotex Box)			.02	.05
P-20596		Dynamotor Base Plate			.05	.13

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	Cost Price	Selling Price
P-80928-A	C1	.05 mfd.	200 V.	Bypass	.04	1.00
	C2	.006 mfd.	600 V.	Block		
	C3	.05 mfd.	160 V.			
	C4	.001 mfd.	600 V.			
	C5	.1 mfd.	160 V.			
	C7	.1 mfd.	300 V.			
	C8	.1 mfd.	300 V.			
P-80891-B	C6	.4 mfd.	150 V.	Electrolytic	.20	.50
P-80914	C9	.002 mfd.	600 V.	Tubular	.05	.13
P-1442		Oscillator 600 K.C. Trimmer Condenser			.12	.30
P-80882		Three Gang Condenser Assembly			.94	2.35

RESISTORS

Part No.	Code	Resistance	Type	Cost Price	Selling Price
P-91054-A	R1	10,000 - 40,000 ohm	Tone Control	\$0.21	\$0.53
P-90929	R2	500,000 ohm	Carbon	.06	.15
P-90948	R3	1.0 megohm	Carbon	.06	.15
P-90912	R4	100,000 ohm	Carbon	.06	.15
P-90980-B	R5	0.500,000 ohm	Volume Control	.32	.80
P-91055	R6	260 ohm	Carbon	.05	.13
P-90979	R7	7,000 ohm	Carbon	.06	.15
P-90905	R8	15,000 ohm	Carbon	.06	.15
P-90953	R9	350 ohm	Carbon	.06	.15
P-91049	R10	10,000 ohm	Carbon	.05	.13
P-91053-A	R11	340 ohm	Armored Wire	.13	.33
	R12	144 ohm	Wound Resistors		

Part No.	Code	Capacity	Voltage	Type	Cost Price	Selling Price
P-50578		Audio Input Transformer Assembly			\$0.48	\$1.20
P-50579		Audio Output Transformer Assembly			.36	.90
P-50538-A		"B" Power Filter Choke Assembly			.46	1.15
P-5072		Oscillator Coil Assembly			.22	.55
P-5059		First I.F. Transformer Complete with Can			.54	1.35
P-5071		Second I.F. Transformer Complete with Can			.51	1.28
P-5070		Antenna R.F. Transformer Assembly			.18	.45
P-5057		Interstage R.F. Transformer Assembly			.19	.48
P-1734		"B" PWR Socket Four-Prong			.03	\$0.08
P-1704		Speaker Socket Five-Prong			.04	.10
P-1733		36 Socket			.03	.08
P-1732		39 Socket			.03	.08
P-1731		41 Socket			.03	.08
P-40420		Tube Shield			.05	.13
P-40425		Tube Shield Base			.02	.05
P-1684		Dial Strip			.05	.13
P-1497		Dial Light & Bracket and Drive Disc Assembly			.11	.28
P-30374		Bushing for Rubber Drive			.03	.08
P-10224		Rubber Drive Pinion			.02	.05
P-3563-A		Dial Lamp			.06	.15
P-20460		Drive Shaft			.02	.05
P-1540		Knob			.05	.13
P-1054		On-Off Switch with Leads			.02	.05
P-10240		Rubber Cushions (in tube shield)			.02	.05
P-40411		Aluminum Coil Cans			.05	.13
P-1736		Dynamic Speaker			1.92	4.80
P-20456		Bottom Plate - Chassis			.13	.33

INTERFERENCE ELIMINATION PARTS

Part No.	Code	Capacity	Voltage	Type	Cost Price	Selling Price
P-5424		Spark Plug Suppressor			.12	.39
P-80933		Dual 5 Mfd. Generator Condenser			.24	.50

No. 62-79 62-84 62-84X 62-94 62-94X

Alignment

This receiver may be aligned on a broadcasting station or oscillator. It is advisable, however, to insert a dummy 56 tube which has one filament prong removed in the AVC socket, to prevent any AVC action from making determination of the output peak difficult. The intermediate frequency is 262 K. C. and the I. F. trimming condenser adjusting screws are accessible from beneath the chassis.

These chassis may be easily distinguished by keeping in mind that the No. 62-84 uses dual dynamic speakers, while the No. 62-94 uses a single dynamic. The No. 62-79 is the same in all respects as the No. 62-84, with the exception that this chassis uses chromatic tuning and, therefore, a different tuning condenser assembly and drive. The tone, volume, and noise suppressor control are also of slightly different values.

Part No.	Description	No. Used in Set	Cost Price Each	List Price Each
U4472	Tube Shield Can-58	3	\$0.04	\$0.10
U4473	Tube Shield Cap-58	3	.03	.08
U4492	Tube Shield-56	1	.05	.13
U5137	Tuning Condenser Drive Assembly with Pilot Lamp	1	.32	.80
U5138	Drive Plate and Dial Chart	1	.09	.23
U5139	1st Detector Transformer (L-3, L-4)	1	.16	.40
U5143	Power Transformer, 105-125 Volts, 60 Cycles (T-1)	1	1.42	3.55
U5145	Tuning Condenser Assembly (C-4, C-5, C-6)	1	1.05	2.51
U5148	Volume Control, 200,000 Ohm with Power Switch (R-5)	1	.35	.88
U5276	Power Transformer, 105-125 Volts, 25 Cycles (T-1)	1	2.35	5.95
U5295	Tone Control, 50,000 Ohm (R-4)	1	.28	.70
U5402	Condenser, .003 Mfd., 500 Volt (C-20)	1	.05	.13

SPEAKERS AND SPEAKER PARTS
Dual 8-inch Speakers

Part No.	Description	No. Used in Set	Cost Price Each	List Price Each
U4247	8" Electrodynamical Speaker without Input Transformer	1	1.69	4.23
U5159	8" Electrodynamical Speaker with Input Transformer	1	2.08	5.20
U4741	Speaker Plug-6 Prong	1	.09	.23
U4742	Terminal Strip for U5159 Speaker	1	.13	.33
U4743	Input Transformer for U5159 Speaker	1	.75	1.88
U4744	Terminal Strip Cover for U5159 Speaker	1	.13	.33

SUPPLEMENTARY PARTS LIST FOR NO. 62-94 CHASSIS
Add to No. 62-84 Parts List

Part No.	Description	No. Used in Set	Cost Price Each	List Price Each
U4132	Resistor, 310-2500-7100 Ohm, Candohm (R-1, R-13, R-14)	1	.24	.60
U4245	8" Electrodynamical Speaker with Input Transformer	1	2.08	5.20
U4740	Input Transformer for U4245 Speaker	1	.75	1.88
U4741	Speaker Plug-6 Prong	1	.09	.23

Omit from No. 62-84 Parts List

Part No.	Description	No. Used in Set	Cost Price Each	List Price Each
U4243	Resistor, 310 Ohm, Candohm (R-1)	1	.05	.13

Omit All Speakers and Speaker Parts on No. 62-84 Chassis Parts List

SUPPLEMENTARY PARTS LIST FOR NO. 62-79 CHASSIS
Add to No. 62-84 Parts List

Part No.	Description	No. Used in Set	Cost Price Each	List Price Each
U5703	Tone Control	1	.28	.70
U5705	Volume Control	1	.35	.88
U5706	Noise Suppressor Control	1	.27	.68
U5708	Tuning Condenser Assembly complete with Drive	1	1.63	4.08
	Omit from No. 62-84 Parts List			
U3404	Condenser Drive Disc Assembly	1	.10	.25
U5137	Tuning Condenser Drive Assembly	1	.32	.80
U5138	Drive Plate and Dial Chart	1	.09	.23
U5145	Tuning Condenser Assembly	1	1.05	2.51
U5148	Volume Control	1	.35	.88
U5295	Tone Control	1	.28	.70

Part No.	Description	No. Used in Set	Cost Price Each	List Price Each
U 115	Pilot Light Lamp	1	\$0.06	\$0.15
U 678	Ground Binding Post	1	.01	.03
U 709	Resistor, 25,000 Ohm, Carbon, 1 Watt (R-12)	1	.04	.10
U 705	A.C. Cord and Plug	1	.10	.25
U 929	Resistor, 50,000 Ohm, Carbon, 1 Watt (R-8)	1	.08	.20
U 962	Grid Cap Only	4	.01	.03
U1312	Horizontal Insulated Terminal	1	.01	.03
U1348	Resistor, 7,000 Ohm, Carbon, 1 Watt (R-10)	1	.09	.23
U1349	Resistor, 500,000 Ohm, Carbon, 1 Watt (R-7)	1	.09	.23
U1751	Resistor, 200,000 Ohm, Carbon, 1 Watt (R-15)	1	.09	.23
U2266	Resistor, 1 Megohm Carbon, 1 Watt (R-9)	1	.09	.23
U2333	Antenna Binding Post	1	.02	.05
U2716	Condenser, .01 Mfd., 400 Volt (C-10, C-11, C-14)	3	.09	.23
U2830	1st I. F. Transformer (L-5, L-6)	1	.38	.95
U2851	Condenser, .04 Mfd., 400 Volt (C-13, C-18, C-26)	3	.06	.15
U3063	Resistor, 36,000 Ohm, Carbon, 1 Watt (R-11)	1	.08	.20
U3087	Resistor, 3,000 Ohm, Candohm (R-6)	1	.05	.13
U3119	I. F. Shield	1	.01	.03
U3178	Dual R. F. Shield Can	1	.12	.30
U3358	Vertical Insulated Terminal	3	.01	.03
U3404	Condenser Drive Disc Assembly with Hub and Set Screws	1	.10	.25
U3568	Detector Plate Choke Assembly (L-9)	1	.11	.28
U3644	2nd I. F. Transformer (L-7, L-8)	1	.28	.70
U3853	Resistor, 50,000 Ohm, 1 Watt (R-2)	1	.06	.15
U4074	Oscillator Transformer (L-12, L-13)	1	.15	.38
U4075	Antenna Transformer (L-1, L-2)	1	.19	.48
U4085	Oscillator Series Condenser, 675 Mmf. (C-9)	1	.08	.20
U4116	Filter Condenser, Dual 8 Mfd., 450 Volt (C-23, C-24)	1	.59	1.48
U4118	Tube Socket-58	3	.04	.10
U4128	Electrolytic Condenser (Clamp)	1	.01	.03
U4129	Tube Socket-46	3	.04	.10
U4130	Tube Socket-56	1	.04	.10
U4131	Speaker Socket, 6 Contact	1	.04	.10
U4197	Condenser, 25 Mfd., 200 Volt (C-1, C-2, C-3, C-27)	1	.07	.18
U4199	Condenser, 8 Mfd., 450 Volt Electrolytic (C-25)	1	.38	.95
U4243	Resistor, 310 Ohm, Candohm (R-1)	1	.05	.13
U4248	Walnut Knob, small	3	.05	.13
U4249	Walnut Knob, large	1	.06	.15
U4254	Condenser, 1000 Mmf. (C-12)	1	.07	.18
U4255	Condenser, 500 Mmf. (C-16, C-17)	2	.06	.15
U4263	Audio Transformer (T-2)	1	.54	1.35
U4317	Resistor, 20,000 Ohm, Carbon, 1 Watt (R-3)	1	.07	.18
U4321	Filter Choke (L-14)	1	.29	.73
U4325	Condenser, Dual 8 Mfd. Bypass (C-21, C-22)	1	.34	.85
U4397	Oscillator Transformer Shield Can	1	.05	.13
U4435	Condenser, .02 Mfd., 400 Volt (C-19)	1	.05	.13
U4471	Tube Shield Base-56 and 58	4	.02	.05

Prices subject to change without notice.

MODELS 62-81, 62-81X

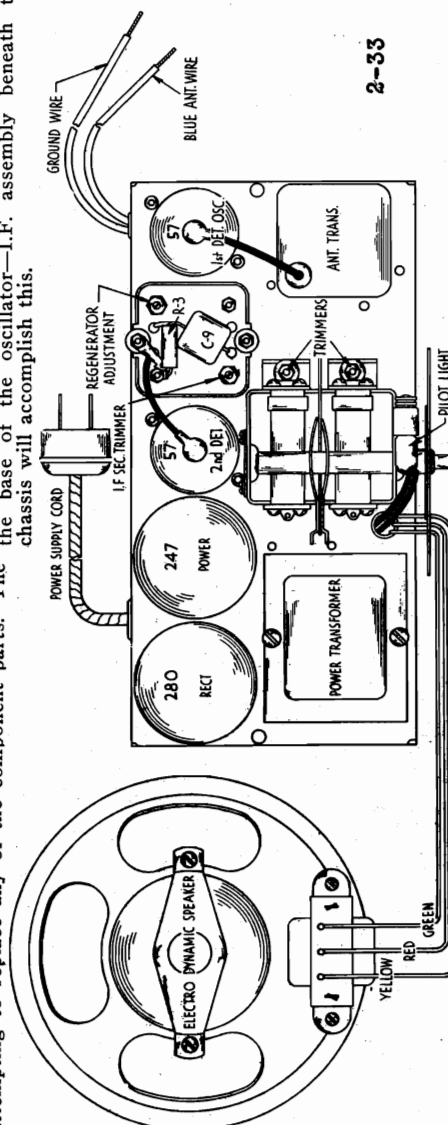
MONTGOMERY WARD

Part No.	Description	No. Used in Set	Cost Price	Selling Price
U 115	Pilot Light Lamp	1	\$0.06	\$0.15
U 701	Tube Socket—280	1	.04	.10
U 861	Attachment Cord and Plug	1	.25	.25
U 962	Grid Cap Only	2	.01	.03
U1612A	Condenser, .006 Mfd., 400 Volt	1	.05	.13
U2757	Tube Socket—247	1	.04	.10
U2857	Resistor, 10,000 Ohm Carbon, 1 Watt (R-4)	1	.08	.20
U2858	Resistor, 1 Megohm, .1 Watt (R-5)	1	.08	.20
U2927	Condenser, .1 Mfd., 200 Volt (C-8, C-13)	2	.06	.45
U3358	Vertical Insulated Terminal	2	.01	.03
U3849	Resistor, 500,000 Ohm, .1 Watt (R-7)	1	.06	.15
U3998	Resistor, 250,000 Ohm, .1 Watt (R-6, R-8)	2	.06	.15
U4117	Tube Socket—57	2	.04	.10
U4254	Condenser, 1,000 Mmf. (C-3)	1	.07	.18
U4255	Condenser, 500 Mmf. (C-12)	1	.06	.15
U4256	Condenser, 390 Mmf. (C-7)	1	.06	.15
U4257	Bakelite Knob, Station Selector	1	.05	.13
U4258	Bakelite Knob, Volume Control	1	.03	.08
U4355	Condenser, 50 Mmf. (C-9)	1	.06	.15
U4435	Condenser, .02 Mfd., 400 Volt (C-11)	1	.05	.13
U4471	Tube Shield Base—57	1	.02	.05
U4472	Tube Shield Can—57	1	.04	.10
U4473	Tube Shield Cap—57	1	.03	.08
U4786	Resistor, 3 Megohm, .1 Watt (R-3)	1	.06	.15
U4789	Condenser, 4 Mfd., 20 Volt Electrolytic (C-16)	1	\$0.16	\$0.40
U5298	Power Transformer, 105-125 Volts, 60 Cycle (T-1)	1	.60	1.50
U5319	Escutcheon Plate, "U.S. Radio"	1	.07	.18
U5321	Dual 8 Mfd. Filter Condenser (C-14, C-15)	1	.53	1.33
U5331	Resistor, 500 Ohm Candohm (R-9)	1	.06	.15
U5338	Dial Plate and Chart	1	.08	.20
U5350	Volume Control, 0-20,000 Ohm, with Power Switch (R-1)	1	.26	.65
U5356	Antenna Transformer (L-1, L-2)	1	.14	.35
U5358	Oscillator—I. F. Assembly (L-3, L-4, L-5)	1	.91	2.28
U5359	Tuning Condenser Assembly (C-1, C-2)	1	.61	1.53
U5361	Pilot Light Socket and Mounting Bracket	1	.05	.13
U5368	Speaker Cable	1	.04	.10
U5369	Antenna Transformer Shield Can	1	.07	.18
U5373	Antenna and Ground Leads	1	.04	.10
U5374	Resistor, 5,000 Ohm Candohm (R-2)	1	.08	.20
U5399	Power Transformer, 105-125 Volts 25 Cycles	1	1.07	2.68
U5333	ELECTRODYNAMIC SPEAKER 6-inch Electrodynamic Speaker with Input Trans.	1	1.78	4.45
U5962	Input Transformer (T-2)	1	.38	.95

Prices subject to change without notice

The chassis may be aligned either on the oscillator or a replacement assembly will be supplied as a unit but none of the component parts can be supplied separately.

When any defects are located in the Oscillator I.F. assembly, other than simple wiring breaks which are easily repaired, the entire unit should be replaced rather than attempting to replace any of the component parts. The chassis will accomplish this.



2-33

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3-33

The tubes employed are as follows, and are operated at rated voltages and biases:

Oscillator and Mixer.....	57
Intermediate Frequency	58
Second Detector	55
Output	247
Rectifier	280

This receiver employs a combination oscillator and first detector, or mixer. The second detector is the new dual diode-triode, the diode portion acting as detector and providing automatic volume control—acting on the grid of the type 58 I.F. tube. The triode portion of the second detector is operated as an individually biased A.F. amplifier.

The first two variable tuned circuits are not electrically coupled. They are mutually coupled by being placed close together and left unshielded. In all other respects the circuits are entirely conventional.

In aligning, it is first desirable to see that the I.F. transformers are properly set. The first I.F. transformer is on top of the base and has two adjustments. The second is inside the base but its single adjustment may be reached through a hole in the rear-center of the base. The intermediate frequency is 175 K.C.

General Description and Aligning Procedure

The tuning condenser may be adjusted for alignment or "tracking" of the tuned circuits by means of an oscillator and output meter. The oscillator should cover the band from 550 to 1500 K.C. The energy from the oscillator is coupled weakly into the antenna circuit—a simple means being to place the oscillator near the antenna wire. The receiver and oscillator are first tuned to approximately 1500 K.C., and by watching the output indicator, the three condenser trimmers are adjusted for maximum output. These three trimmers must then be left untouched for all further aligning.

The next step is to tune both receiver and oscillator to some point near 550 K.C. Here the alignment is made by adjusting the oscillator "pad" condenser for maximum response. It may be reached through hole in base near the first I.F. transformer. If necessary to adjust the two R.F. condenser sections, it may be done by bending the condenser end plates. If necessary to align at points other than the ends of the "band" it may be done by bending proportions of the slotted end plates of the condenser rotor sections. Alignment of the two ends of the scale is usually quite sufficient.

	Net Price	Selling Price
ISOCKETS		
K-2-2-509	57 Socket	\$0.03
K-3-2-509	58 Socket	.08
K-4-2-509	55 Socket	.08
K-2-7-514	47 Socket	.08
K-2-4-508	80 Socket	.03

CONDENSERS

K-3-3-301	3 gang Var. Tuning Condenser	.....	.95	2.38
K-2-10-302	Dual 8 mfd. 450 volt. Condenser (Less mtg. flanges, mounted to base horiz.)	.....	.52	1.30
K-1-10-302	Dual 8 mfd. 450 volt Filter Condenser (with mtg. flanges mounted to base vert.)	.....	.53	1.33
K-1-6-226	.5 mfd. Condenser 200 volt.	.....	.08	.20
K-2-4-226	.01 mfd. Condenser 400 volt.	.....	.04	.10
K-1-3-226	.00 mfd. Condenser 200 volt.	.....	.04	.11
K-1-3-362	.1 mfd. Condenser 200 volt.	.....	.05	.13
K-3-3-462	Adjustable Paddling Cond. 1,500 mfd. max.	.....	.15	.38

RESISTORS

Part Number	Description	Unit Price	Quantity	Total Price
K-4-2-372	300 ohm Wire Wound Resistor	\$0.04	1	\$0.04
K-4-2-176	300 ohm 1/2 watt Resistor	05	1	05
K-1-2-172	400 ohm 1/2 watt Carbon Resistor	05	1	05
K-1-2-172	400 ohm 1/2 watt Carbon Resistor	05	1	05
K-1-1-4215	5M ohm 1/2 watt Carbon Resistor	05	1	05
K-1-1-3766	25M ohm 1/2 watt Carbon Resistor	05	1	05
K-1-1-1848	100M ohm 1/2 watt Carbon Resistor	05	1	05
K-1-1-4225	500M ohm 1/2 watt Carbon Resistor	05	1	05
K-1-1-4225	500M ohm 1/2 watt Carbon Resistor	05	1	05
K-2-7-406	Volume Control and Switch	30	1	30

COILS

K-1-8-601	Antenna Coil Assembly.....	.20	.50
K-1-6-602	Int. Coil Assembly R. F.....	.15	.38
K-3-4-450	Oscillator Coil Assembly.....	.15	.38
K-1-6-170	Antenna Choke Coil Assembly.....	.50	.13

TRANSFORMERS

K-2-12-201	Power Transformer 60 cycle.....	\$0.85	\$2.13 ^{ea.}
K-3-5-963	No. 1 175 KC IF Transformer Assy.....	.50	1.25 "
K-2-5-963	No. 2 175 KC IF Transformer Assy.....	.50	1.25 "

STRIPS

K-1-1-F538	Large Anchor Strip.....	.02	.05 "
K-1-2-531	Small Anchor Strip.....	.01	.03 "
K-1-2-F419	Insulator for Large Anchor Strip.....	.50	1.25 "C
K-1-10-419	Insulator for Small Anchor Strip.....	.50	1.25 "
K-1-1-4430	Small Double Solder Lug for above.....	1.00	2.50 "M
K-1-1-3504	200 Short Eyelets for above.....	.50	1.25 "C

MISCELLANEOUS

K-1-5-457	Tube Shield Base.		\$0.03 ea.
K-1-7-103	Coil Shield for RF Coils	.03	.08
K-1-3-364	6-32 St. Shade Screws for Coil Shield.	2.00	5.00 M
K-1-1-F114	Dial Lamp Socket.	2.50	6.25 C
K-1-1-3154	2.5 volt Dial Lamp.	.07	18 ea.
K-1-7-122	Dial Assembly.	.21	.53 ea.
K-6-6-468	4 point Coil Switch.	.15	.38
K-2-4-116	Power Cord Set.	.12	.30
K-1-2-4168	Wire Anchor Strap.	.50	1.25 C
K-1-3-437	I.F. Transformer Clamp	.950	1.25
K-1-3-186	No. 6x½ Self Tapping Screws.	2.50	6.25 M
K-1-3-1340	Large Extruded Fiber Washer for Vol. Cont.	.70	1.75 C
K-0-4-104	Tube Shield.	.04	10 ea.
K-0-1-635	Tube Shield Caps.	.02	.05
K-1-8-149	Dial Strip.	.03	.08
K-1-9-416	Chassis Hold-down Strap	.01	.03
K-1-8-134	Small Control Knob.	.03	.08
K-2-8-134	Large Control Knob.	.04	.10
K-2-3-167	Control Grid Clip.	.50	1.25 C
K-1-5-186	No. 8x1" Self Tap. Chassis Mtg. Screws....	.40	1.00

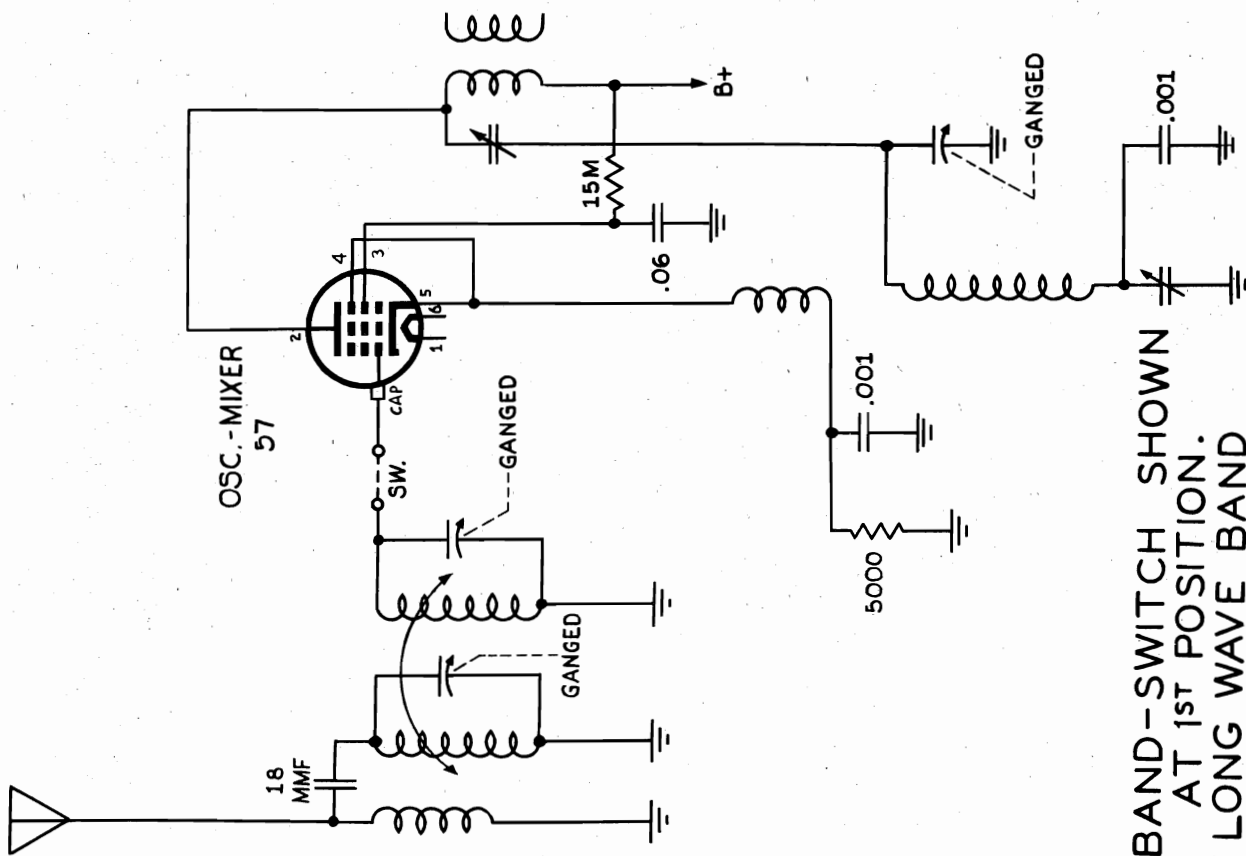
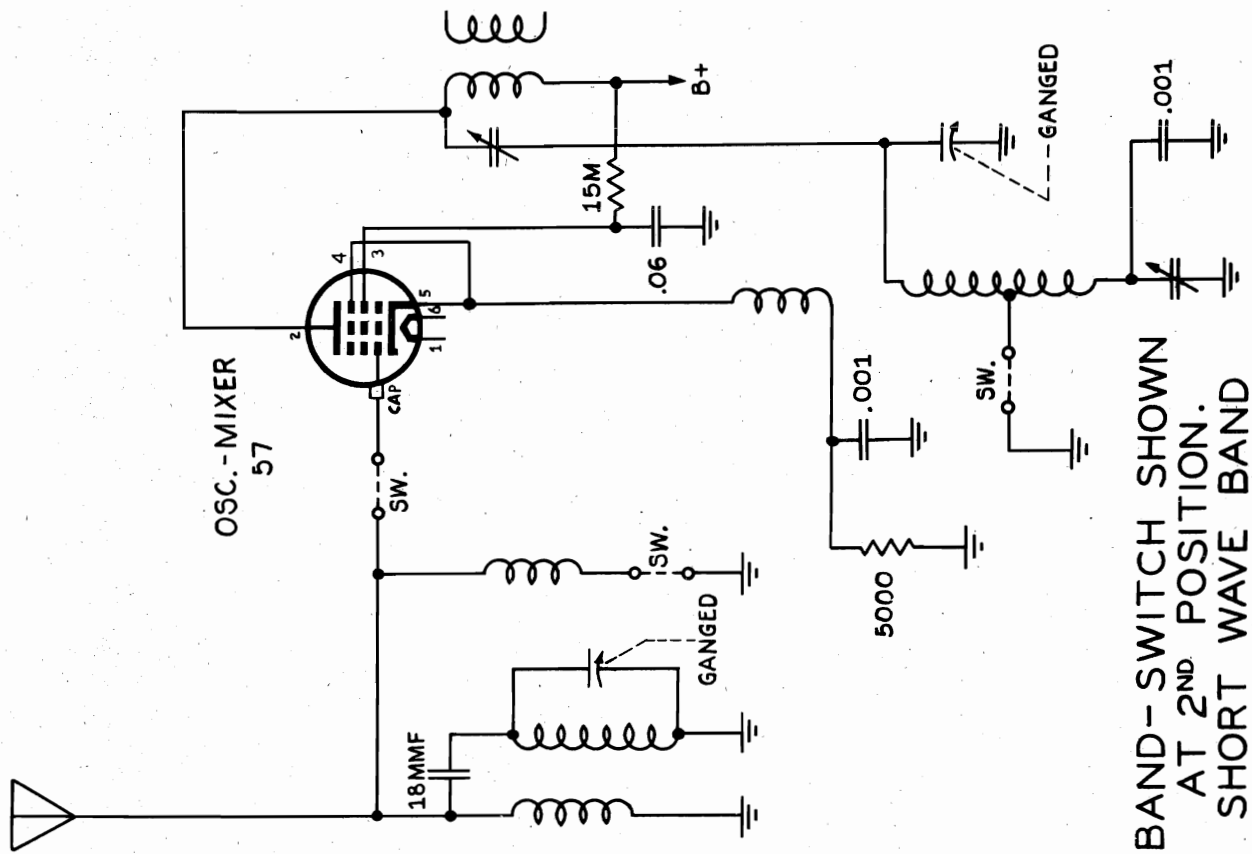
Prices subject to change without notice.

IMPORTANT: It is desirable to move the dial back and forth across the signal while making the above alignments. This is particularly necessary when altering any capacities connected with the oscillator circuit. Use an inductively coupled or bakelite screw driver. No aligning, other than of i.f. transformers, is necessary for the short wave band (5 to 200 meters) as no attempt has been made to tune more than the oscillator.

Be certain that a good 57 tube is used in the first socket.

"clarified schematics"

MONTGOMERY WARD



MONTGOMERY WARD

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 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. Keep the signal weak enough to prevent action of the A.V.C. 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.

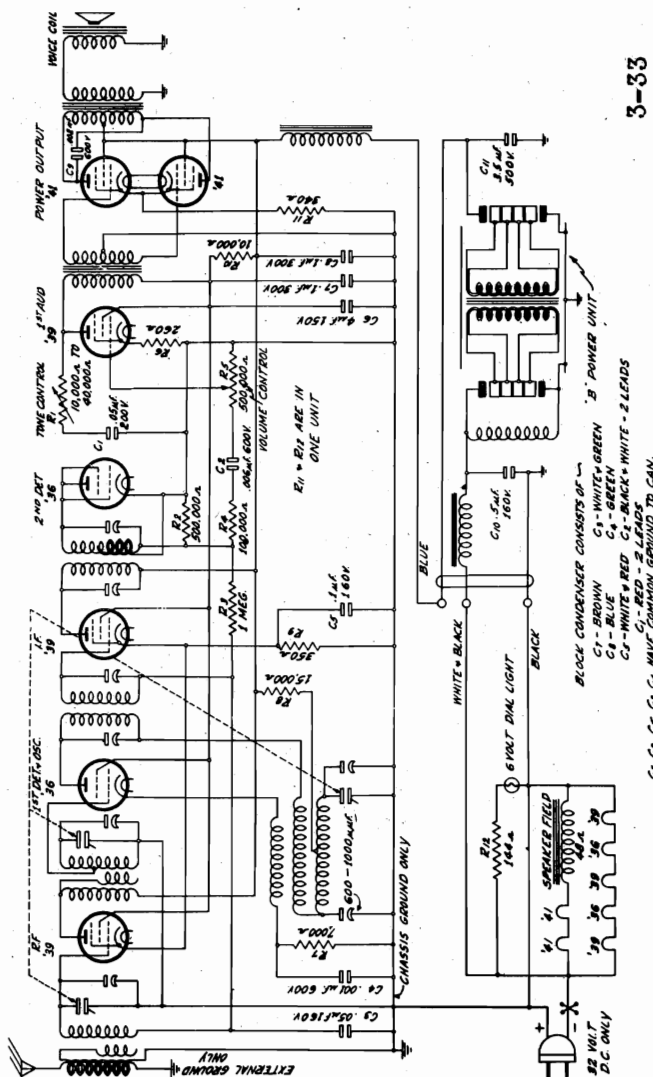
A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained. Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

Line Voltage Range

The receiver will operate satisfactorily within a line voltage range of 28 to 36 volts. If the line voltage runs higher, it will have to be cut down and one method of doing this is to use a series resistor. Let us say the line voltage is 40. The receiver uses 1.35 amps. at 32 volts. A resistance of 5.16 ohms, therefore, capable of dissipating 12.4 watts will be required in the receiver line to cut the voltage down to 32. If the line voltage varies a variable resistor may be required.

IMPORTANT—POLARITY OF THE POWER SUPPLY TO THE RECEIVER MUST BE OBSERVED.

There is a red mark on the plug. The prong of the plug at which the red mark is placed must be plugged into the positive side of the line. Use a receptacle on the 32 volt line from which the plug will not have to be removed after it has once been correctly inserted.



3-33

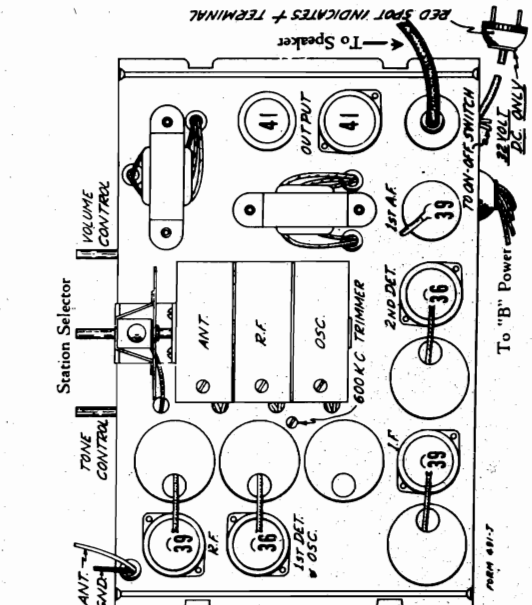
Voltages at Sockets

INPUT 32 VOLTS—GROUND R.F. GRID

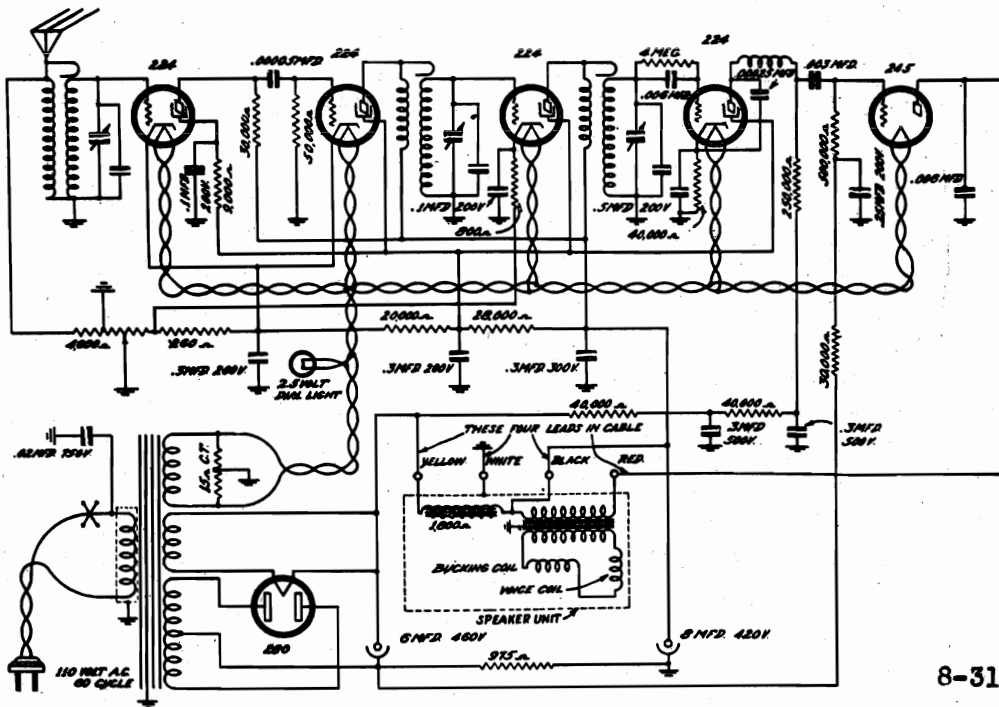
Type of Tube	Function	Heater	Plate to Cathode/Volts	Screen to Cathode/Volts	Grid to Cathode/Volts	Normal Plate MA
'39	R.F.	6.4	190	90	3.0(1)	5.0
'36	1st Det. & Osc.	6.4	170	86	6.5(2)	.6
'39	I.F.	6.4	190	90	3.0(1)	5.0
'36	2nd Det.	6.4	0	0	0	0
'39	1st A.F.	6.4	70	90	1.75(1)	6.0
'41	Output	6.4	180	185	14.0	18.0

(1) Cathode to Ground.

(2) Subject to Variation with dial setting.



MONTGOMERY WARD



8-31

When ordering repair parts, be sure to state the stock number of the part, the serial number of the chassis, and the identification number or color of the part.

Part No.	Name	Cost	Selling Price
RESISTORS			
P-90942	Volume Control (R1).....	.41	\$ 1.64
P-90967	Candohm Resistor Unit (R2, R3, R4).....	.13	.52
P-90916	40,000 Ohm Carbon Resistor (R11, R15, R16).....	.08	.32
P-90954	25,000 Ohm Carbon Resistor (R12).....	.08	.32
P-90959	20,000 Ohm Carbon Resistor (R8).....	.08	.32
P-90970	28,000 Ohm Carbon Resistor (R9).....	.08	.32
P-90941	50,000 Ohm Carbon Resistor (R7).....	.08	.32
P-90956	30,000 Ohm Carbon Resistor (R14).....	.08	.32
P-90972	4 Megohm Carbon Resistor (R10).....	.08	.32
P-1094	Resistor Mounting Strip.....	.02	.08
P-90968	Center Tapped Resistor.....	.06	.24
P-90946	30,000 Ohm Carbon Resistor (R6).....	.08	.32
P-90971	9,000 Ohm Carbon Resistor (R5).....	.08	.32
CONDENSERS			
P-80851	Filter Condenser Block (C1, C2, C4, C5, C6, C8, C11, C13, C14, C17).....	1.32	5.28
P-80849	8 Mfd. Electrolytic Condenser 460 volt.....	.53	2.12
P-80848	6 Mfd. 420 Volt Electrolytic Condenser.....	.50	2.00
P-80807	.002 Mfd. Moulder Condenser (C9).....	.06	.24
P-80822	.006 Mfd. Moulded Condenser (C10).....	.16	.64
P-80853	.003 Mfd. Moulded Condenser (C12).....	.11	.44
P-80829A	.00005 Mfd. Moulded Condenser (C3).....	.06	.24
P-80852	3-Gang Condenser and Shield.....	1.54	6.16
P-1279	Detector Overload Control Assembly.....	.25	1.00
COILS AND TRANSFORMERS			
P-5052A	25 Cycle Power Transformer Assem.....	2.41	9.64
P-50525	Power Transformer Assembly.....	1.50	6.00
P-1290	Complete Set Shielded R.F. Coils.....	1.69	6.76
P-1284	Shielded Antenna Coil Assembly.....	.46	1.84
P-1283	Shielded Interstage Coil Assembly.....	.48	1.92
P-1293	Shielded Detector Coil Assembly.....	.76	3.04
P-1189	Coil Shield Assembly.....	.08	.32
P-1282	R.F. Resistance Coupling Unit Ass'y.....	.26	1.04
P-1171	R.F. Choke Coil.....	.13	.52
P-1092	Grid Clip Assembly.....	.02	.08
SOCKETS			
P-1047	224 Tube Socket.....	.04	.16
P-1052	245 Tube Socket.....	.04	.16
P-1062	280 Tube Socket.....	.04	.16
P-10131	4 Prong Socket Shield.....	.01	.04
P-10124	5 Prong Socket Shield.....	.01	.04

Tube Voltages

All D.C. voltages taken with a 1000 ohm per volt meter on the scale indicated in column headed "Meter Scale." Turn on the volume control all the way and connect the antenna and ground leads together. The grid, plate, and screen grid voltages are measured to cathode of the heater tubes and to filament of the 245 tube.

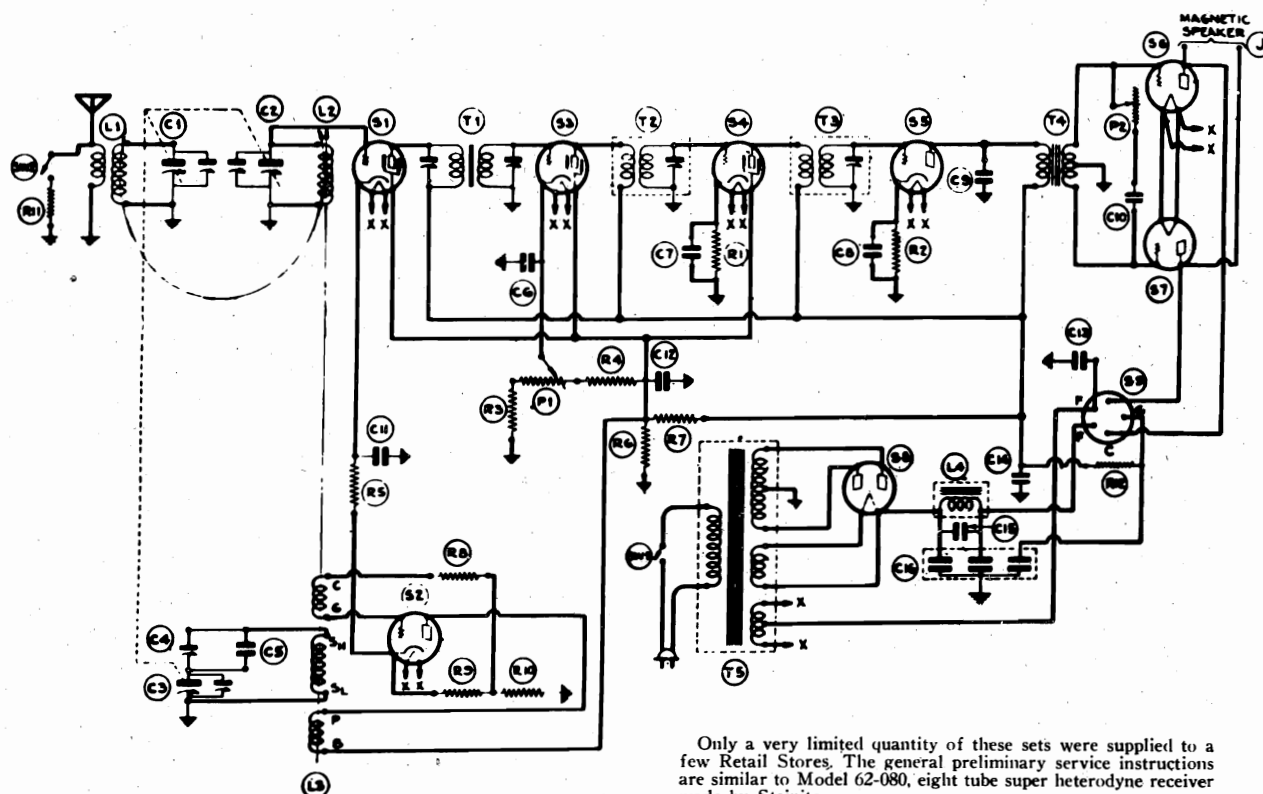
Tube	Circuit	Meter Scale	90 V.	100 V.	110 V.	120 V.	130 V.
1st R. F. 224	Grid Screen-Grid Plate	0-10	2	2.3	2.6	3	3.3
		0-100	52	58	63	68	73
		0-250	133	142	155	167	178
2nd R. F. 224	Grid Screen-Grid Plate	0-10	.4	.5	.6	.7	.8
		0-100	60	67	72	78	83
		0-1000	190	210	230	250	278
3rd R. F. 224	Grid Screen-Grid Plate	0-10	2	2.3	2.6	3	3.3
		0-100	60	67	72	78	83
		0-1000	190	210	230	250	278
Detector 224	Grid Screen-Grid Plate	0-10	.08	.09	.1	.11	.12
		0-100	48	54	59	63	67
		0-100	58	66	72	78	87
Audio 245	Grid Plate	0-100	23	27	31	35	40
		0-1000	202	242	262	282	
280 Rect.	Plate Current	0-100	40	45	50	56	64
			mils.	mils.	mils.	mils.	mils.
280 Rect.	Filament to Ground	0-1000	265	298	330	358	392

MISCELLANEOUS

P-70710	Dynamic Speaker Cord and Terminal Strip Assembly.....	.19	.76
P-70702	Attachment Cord and Plug Assembly.....	.23	.92
P-20384	Tube Shield.....	.23	.92
P-1278	Tube Shield Clip Assembly.....	.02	.08
P-1287	Pilot Lamp Assembly.....	.06	.24
P-1059	Control Knob.....	.06	.24
P-1280	Escutcheon Plate.....	.10	.40
P-1190	A. C. Switch.....	.14	.56
P-10143	1/4 Inch Rubber Cushion.....	.01	.04
P-10142	1/2 Inch Rubber Cushion.....	.01	.04
P-1194	Dial and Drive Assembly.....	.11	.44
P-1277	Dynamic Speaker.....	2.59	10.36

Prices subject to change without notice.

MONTGOMERY WARD



Design Data

L1—161 Coil
 L2—160 Coil
 L3—163 Oscillator Coil
 L4—339U Choke
 T1—1st I.F. Transformer
 T2—2nd I.F. Transformer
 T3—3rd I.F. Transformer
 T4—A-270 Audio Transformer
 T5—360 Power Transformer
 C1-C2-C3—425 Mmfd. Max., 417 nominal
 C4—Variable 250-600 Mmfd.
 C5—750 Mmfd. Nominal 10% (Mica)
 C6—.01 Mfd.
 C7—.01 Mfd.
 C8—1.0 Mfd. 150 V.
 C9—.001 Mfd. Mica
 C10—.003 Mfd.
 C11—.01 Mfd.
 C12—1.0 Mfd. 150 V.
 C13—.01 Mfd.
 C14—1.0 Mfd. 300 V.
 C15—.25 Mfd.
 C16—Three 4 Mfd. Units (Dry Electrolytic)

Only a very limited quantity of these sets were supplied to a few Retail Stores. The general preliminary service instructions are similar to Model 62-080, eight tube super heterodyne receiver made by Steinite.

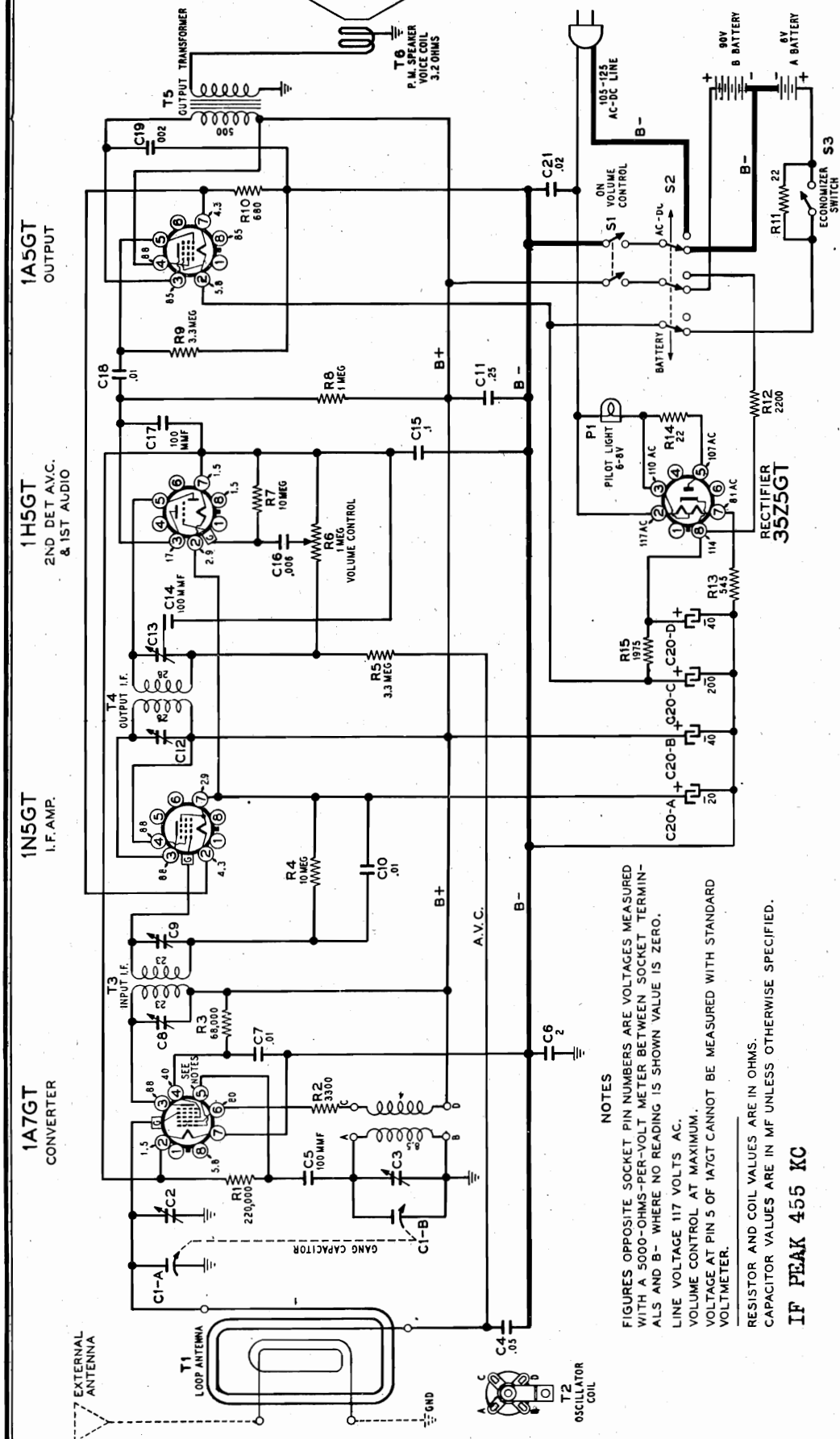
Prices subject to change without notice.

R1—750 ohms wire wound
 R2—25,000 ohms 1 watt
 R3—200 ohms wire wound
 R4—25,000 ohms 1 watt
 R5—10,000 ohms 1 watt
 R6—10,000 ohms 1 watt
 R7—3500 ohms 3 watt
 R8—400 ohms wire wound
 R9—100 ohms—wire wound, tapped at 100 ohms
 R10—1000 ohms
 R11—100 ohms
 R12—4000 ohms 2-watt
 S1-S3-S4—24 tubes
 S2-S5—27 tubes
 S6-S7—45 tubes
 S8—80 tube
 S9—SPKR
 J—Twin tip jack for magnetic speaker
 P1—10,000 ohm wire wound pot.
 P2—1/2 megohm variable tapered res.
 SW1—Operating switch (on-off)
 SW2—Local-Distance switch

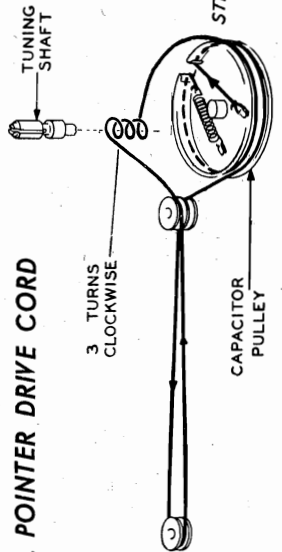
Part No.	Description	Cost	Selling Price
SM 6443	Osc. Trimmer and Condenser Assem.	\$.30	\$1.20
SM 4432	"Ant" B. P.	.02	.08
SM 4422	"Gnd" B. P.	.02	.08
SM 360S	Transformer (T5)	2.44	9.76
SM 6433	160 and 163 Osc. Coil Assem. (L3)	.89	3.56
SM 1040	Set I. F. Trans. (T1, T2, T3)	1.27	5.08
SM 5485	A.C. Switch (SW1)	.25	1.00
SM 3351	10' C. and P. Cable	.30	1.20
SM 4492	10,000 Ohm Pot (P1)	.25	1.00
SM 13124	3 Gang 1040 Cond.	1.76	7.04
SM 3220	1/10 Mfd. Cond. (C11, C13)	.11	.44
SM 13120	Filter Condenser (C16)	1.36	5.44
SM 7114	.25 Mfd. Condenser (C15)	.20	.80
SM 339U	Filter Choke (L4)	.68	2.72
SM 4789	10,000 Ohm 3 Watt	.15	.60
SM 4697	25,000 Ohm 1 Watt (R4)	.09	.36
SM 4786	750 Ohm Wire Wound (R1)	.09	.36
SM 4787	4,000 Ohm 2 Watt (R12)	.12	.48

Part No.	Description	Cost	Selling Price
SM 3333	.025 Mfd. Condenser	.15	.60
SM 4768	1100 Ohm Tapped Resistor	.12	.48
SM 270U	Input Transformer (T4)	1.18	4.72
SM 6449	161 Antenna Coil (L1)	.67	2.68
SM 6436	100 Ohm Resistor (R9)	.30	1.20
SM 3819	Knobs, Small	.06	.24
SM 3820	Knobs, Large	.075	.30
SM 637	Tube Shield and Base	.15	.60
SM 4786	1100 Ohm Resist.	.11	.44
SM 7039	.001 Mfd. Cond. (C9)	.08	.32
SM 3311	.002 Mfd. Cond.	.09	.36
SM 4507	1/2 Meg. Pot (P2)	.30	1.20
SM 4743	RU100 Resistor (R11)	.06	.24
SM 6389	Local Distance Switch Assem.	.30	1.20
SM 6167	Grid Cap Assem.	.08	.32
SM 4367	Resist. Strip Insulator	.01	.04
SM 16018	Dial Drum and Scale Assem.	.27	1.08
SM-227-245-224-28	Sockets	.075	.30

MONTGOMERY WARD



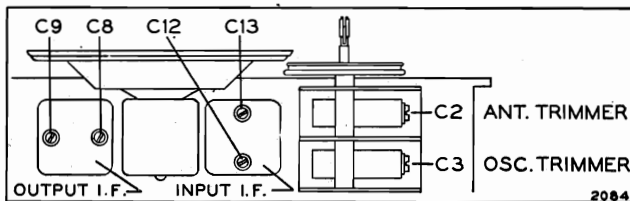
REPLACING DIAL POINTER DRIVE CORD



MODEL 64BR-1051A

MONTGOMERY WARD ALIGNMENT PROCEDURE

- Output meter across 3.2 ohm output load.
- Volume control at maximum for all adjustments.
- Align for maximum output.
- Reduce input as needed to keep output near 0.4 volts.



SIGNAL GENERATOR

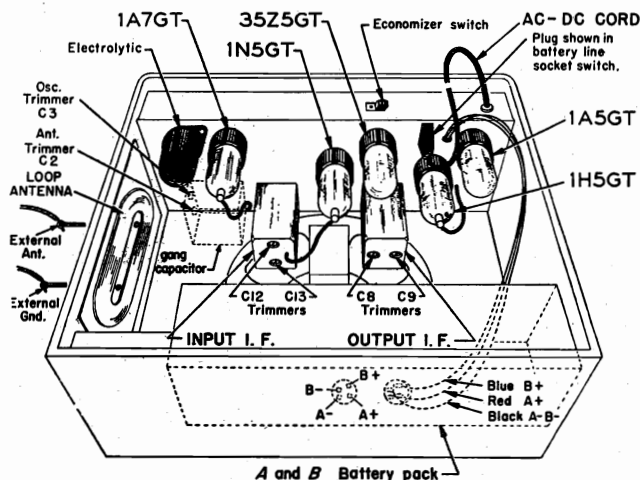
Frequency	Coupling Capacitor	Connection to Radio	Ground Connection	DIAL SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT in order shown
455 kc	.1 mf	1A7GT grid cap*	1A7GT Pin 7	Rotor full open (plates out of mesh)	Input and output trimmers on IF cans
1650 kc	.1 mf	1A7GT grid cap*	1A7GT Pin 7	Rotor full open (plates out of mesh)	Osc. trimmer on gang (see trimmer view)
1400 kc	200 mmf	External antenna clip	External ground clip	1400 kc	Ant. trimmer on gang (see trimmer view)

*For these adjustments insert a 1 megohm resistor between loop antenna and 1A7GT grid cap.

RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivities at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm 5 watt resistor across the secondary winding of the output transformer. A reading of .4 volts AC across this resistor will be equivalent to a 50 milliwatt output with speaker connected. The volume control must be set to maximum.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations of plus or minus 25% are usually permissible.



Note: For battery operation, line cord plug must be inserted in battery-line socket switch as shown; switch contacts are automatically moved.

SIGNAL GENERATOR

Frequency	Coupling Capacitor	Connection to Radio	Ground Connection	INPUT FOR 50 MILLIWATT OUTPUT
1000 kc	200 mmf or RMA dummy antenna	External antenna clip	External ground clip	25 microvolts
1000 kc	.05 mf	Converter (1A7GT) grid cap	1A7GT Pin 7	140 microvolts
455 kc	.05 mf	Converter (1A7GT) grid cap	1A7GT Pin 7	100 microvolts
455 kc	.05 mf	IF amp. (1N5GT) grid cap	1A7GT Pin 7	4500 microvolts
400 cycles	.05 mf	AF amp. (1H5GT) grid cap	1A7GT Pin 7	.06 volts
400 cycles	.05 mf	Power amp. (1A5GT) grid (pin 5)	1A7GT Pin 7	3 volts

MONTGOMERY WARD

MODEL 64BR-1051A
MODELS 64BR-1205A,
64BR-1206A

Ref. No.	Part No.	Description	Qty. Used in Set
CAPACITORS			
C1-A, C1-B	BE8-BA-10113	Two-gang variable capacitor	1
C2		Antenna trimmer on gang	1
C3		Oscillator trimmer on gang	1
C4	BE100-128	.05 mf, 25%, 120 volts	1
C5, C17	BE129-5	100 mmf, 20%, mica	2
C6	BE100-110	.2 mf ±30%—10%, 400 volts	1
C7, C10	BE100-127	.01 mf, 25%, 120 volts	2
C8		Primary trimmer on input IF transformer, range 53 to 97 mmf	1
C9		Secondary trimmer on input IF transformer, range 53 to 97 mmf	1
C11	BE100-135	.25 mf, 25%, 120 volts	1
C12		Primary trimmer on output IF transformer, range 39 to 71 mmf	1
C13		Secondary trimmer on output IF transformer, range 39 to 71 mmf	1
C14		100 mmf ±30%—10%, part of output IF can	1
C15	BE100-133	.1 mf, 25%, 120 volts	1
C16	BE100-134	.006 mf, 25%, 120 volts	1
C18	BE100-78	.01 mf, 25%, 200 volts	1
C19	BE100-25	.002 mf, 25%, 400 volts	1
C20-A, C20-B, C20-C, C20-D	BE119-126	Dry electrolytic for 50-60 cycles; 20 mf, 150 volts; 40 mf, 150 volts; 200 mf, 10 volts; 40 mf, 150 volts	1
	or		
	BE-119-133	Wet electrolytic for 25 cycles; 10 mf, 150 volts; 80 mf, 150 volts; 200 mf, 10 volts; 80 mf, 150 volts	1
C21	BE100-26	.02 mf, 25%, 400 volts	1
RESISTORS*			
R1	BEA-981-27	220,000 ohms, 20%, 1/2 watt	1
R2	BEA-981-16	3,300 ohms, 20%, 1/2 watt	1
R3	BEA-981-84	48,000 ohms, 10%, 1/2 watt	1
R4, R7	BEA-981-37	10 megohms, 20%, 1/2 watt	2
R5, R9	BEA-981-34	3.3 megohms, 20%, 1/2 watt	2
R6, S1	BE101-258	1 megohm volume control with switch	1
R8	BEA-981-31	1 megohm, 20%, 1/2 watt	1
R10	BEA-981-60	680 ohms, 10%, 1/2 watt	1

Ref. No.	Part No.	Description	Qty. Used in Set
R11, R14	BEA-981-42	22 ohms, 10%, 1/2 watt	2
R12	BEA-981-66	2,200 ohms, 10%, 1/2 watt	1
R13	BE130-343	545 ohms, 5%, 14 watts, wire-wound	1
R15	BE130-344	1,975 ohms, 5%, 6 watts, wire-wound	1
COILS AND TRANSFORMERS			
T1	BEB-13E-10240	Loop antenna assembly	1
T2	BEA-13D-10239	Oscillator coils	1
T3	BE108-2018	Input IF transformer complete in can with trimmers	1
T4	BE108-2008	Output IF transformer complete in can with trimmers and C14	1
T5	BE105-132	Output transformer	1
SPEAKER			
T6	BE114-2468	5" P.M. speaker	1
SOCKETS			
	BE121-171	Octal wafer socket	5
	BE121-243	Bakelite socket base for filter capacitor	1
DIAL AND TUNING PARTS			
	BEB-6D-10115	Dial scale	1
	BEB-6D-10116	Dial calibration	1
	BE112-949	Pointer	1
	BE120-143	Coiled tension spring for dial string	1
	BE120-9	String for dial	2 1/2'
	BE115-741	Plate for dial, with pulleys	1
	BE117-896	Tuning shaft	1
	BE131-210	"C" washer	1
	BE128-660-39	Knob, "Volume"	1
	BE128-661-39	Knob, "Tuning"	1
	BE107-249	Pilot bulb, 6-8 volt, No. T-47	1
	BE107-371	Pilot light socket assembly	1
MISCELLANEOUS			
S1		On-off switch on volume control	1
S2	BE125-161	Line-battery socket switch	1
S3	BE125-166	Battery economizer switch	1
	BE120-416	Battery cable assembly	1
	BEB-2K-10114	Grill screen	1
	BE128-673-1	Grill cloth	1
	BE112-947	Escutcheon for dial	1
	BE107-370	Line cord and plug	1
	BE115-396	Tube shield	1

MODEL 64BR-1051A

ELECTRICAL SPECIFICATIONS

Power Supply..... 105-125 volts DC or 50-60 cycle AC, 30 watts. Also made for 25 cycle AC.
Battery: Wards Battery Pack No. 62-30
Size: 10-9/16" by 2 3/4" by 4 1/4".
"A"—6 volts, 50 milliamperes.
"B"—90 volts, 8.5 milliamperes.

Frequency Range..... 530 to 1650 kc.
Intermediate Freq..... 455 kc.
Selectivity..... At 1000 kc, 48 kc at 1000 x signal.
Sensitivity..... 40 microvolts average for .05 watt output.
Power Output..... 80 milliwatts undistorted.
180 milliwatts maximum.
Loud Speaker..... 5", P.M., v.c. impedance 3.2 ohms.
Tube Complement..... 35Z5GT rectifier.
1A7GT converter.
1N5GT I.F. amplifier.
1H5GT detector, AVC, audio amplifier.
1A5GT output amplifier.
T-47 pilot lamp, 6-8 volts.

MODELS 64BR-1205A, 1206A

ELECTRICAL SPECIFICATIONS

Power Supply..... Battery: Wards Battery Pack 62-59
Size: 10 3/4" x 2 5/8" x 6 1/4".
"A"—1 1/2-volts, 250 milliamperes
"B"—90 volts, 10.5 milliamperes

Frequency Range..... 540 to 1700 kc.
Intermediate Freq..... 455 kc.
Selectivity..... At 1000 kc, 49 kc at 1000 x signal
Sensitivity..... 40 microvolts average for 50-milli-watt output.
Power Output..... 0.120 watt undistorted.
0.140 watt maximum.
Loud Speaker..... 5-inch; P.M.; voice coil impedance 3.2 ohms.
Tube Complement..... 1R5, converter
1T4, I. F. amplifier
1S5, detector, AVC, audio
354, output amplifier

ALIGNMENT PROCEDURE

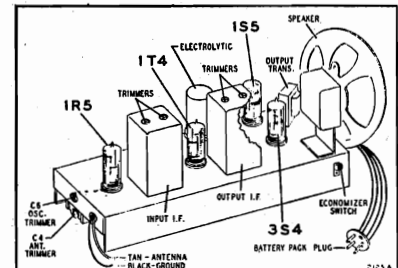
- Output meter across 3.2-ohm output load.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.
- Volume control at maximum for all adjustments.
- Connect ground post of signal generator to radio chassis.

SIGNAL GENERATOR			TUNER SETTING	ADJUST FOR MAXIMUM OUTPUT (in order shown)
Frequency	Coupling Capacitor	Connection to Radio		
455 kc	.1 mf	Grid (pin 6) of 1R5	Iron cores all the way out	Trimmers on output and input I. F. cans
1700 kc	.1 mf	Grid (pin 6) of 1R5	Iron cores all the way out	Oscillator trimmer C6
1700 kc	200 mmf	Antenna lead	Iron cores all the way out	Antenna trimmer C4
1400 kc	200 mmf	Antenna lead	Turn dial to 1400 kc	Adjust position of ant. coil (see coil view)*

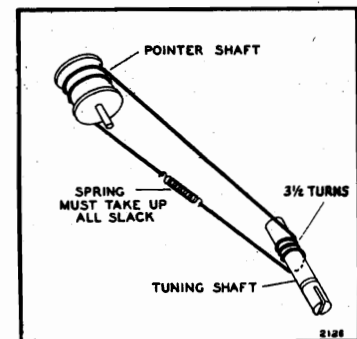
*This adjustment and the previous adjustment are interlocking; therefore repeat the two adjustments alternately for best results.

Ref. No.	Part No.	Description	Qty. Used in Set
CAPACITORS*			
C1	BEC-8F3-11	330 mmf, 500 volts, 20%, mica	1
C2	BEB-8G-10426	45 mmf, 10%, ceramic	1
C3	BEC-8D-10787	.001 mf, 600 volts, 20%	1
C4, C6	BEA-8H-10320	Dual trimmer, antenna and oscillator. Range of each: 84-156 mmf each	1
C5	BEC-8F3-6	47 mmf, 500 volts, 20%, mica	1
C7	BEC-8D-10771	.1 mf, 200 volts, ±20%—10%	1
C8	BEC-8D-10775	.25 mf, 200 volts, ±20%—10%	1
C9	BEC-8D-10770	.05 mf, 200 volts, 20%	1
C10		Approx. 100 mmf. Part of I.F. can.	1
C11	BEC-8D-10786	.003 mf, 600 volts, 20%	1
C12	BEC-8D-10774	.02 mf, 400 volts, 20%	1
C13	BEC-8D-10785	.006 mf, 600 volts, 20%	1
C14-A, B	BEA-8C-10258	Dual electrolytic, 10 mf x 150 volts each section	1
C15	BEC-8D-10784	.002 mf, 600 volts, 25%	1
RESISTORS*			
R1, R14	BEC-981-74	10,000 ohms, 1/2 watt, 10%	2
R2, R5, R9	BEC-981-34	3.3 megohms, 1/2 watt, 20%	3
R3	BEC-981-86	100,000 ohms, 1/2 watt, 10%	1
R4	BEC-981-76	15,000 ohms, 1/2 watt, 10%	1
R6	BEC-981-85	82,000 ohms, 1/2 watt, 10%	1
R7, S2	BEA-108-10368	Volume control (1 megohm) and on-off switch	1
R8	BEC-981-37	10 megohms, 1/2 watt, 20%	1
R10	BEC-981-47	820,000 ohms, 1/2 watt, 10%	1
R11	BEC-981-33	2.2 megohms, 1/2 watt, 20%	1
R12, R13	BEC-981-56	330 ohms, 1/2 watt, 10%	2
R15	BEC-981-77	18,000 ohms, 1/2 watt, 10%	1

Ref. No.	Part No.	Description	Qty. Used in Set
COILS AND TRANSFORMERS			
T1-A, B	BEC-211-10403	Tuner assembly complete, including antenna and oscillator coils	1
T2	BEB-13A-10333	Input I. F. transformer, complete in can. Range of trimmers: 53-97 mmf each	1
T3, C10	BEB-13B-10334	Output I. F. transformer, complete in can. Range of trimmers: 39-71 mmf each	1
T4	BEB-12C-10328	Output transformer	1
MISCELLANEOUS			
	BEB-18A-10294	Speaker, 5-inch, P.M.	1
	BEA-15B-10326	Tube socket	4
	BEA-20C-10317	Economizer switch	1
	BEB-14A-10386	Battery cable assembly	1
	BEB-6D-10287	Dial scale (for brown cabinet)	1
	BEB-6D-10287-1	Dial scale (for ivory cabinet)	1
	BEB-6D-10290	Dial crystal	1
	BEB-2G-10118	Pointer	1
	BEA-53A-10576	Cord for dial pointer drive	14"
	BEA-49A-10078	Spring for drive cord	1
	BEB-2M-7758	Snap-in rivet for dial scale	2
	BESC-10108-46	Cabinet, brown	1
	BESC-10108-9	Cabinet, ivory	1
	BEA-5B-10373-17	Knob, volume, brown	1
	BEA-5B-10373-8	Knob, volume, ivory	1
	BEB-5B-10377-17	Knob, tuning, brown	1
	BEB-5B-10377-8	Knob, tuning, ivory	1
	BE134101	Rubber foot for cabinet	4



Chassis and Trimmer View



Replacement of Dial Pointer Drive Cord

NOTES

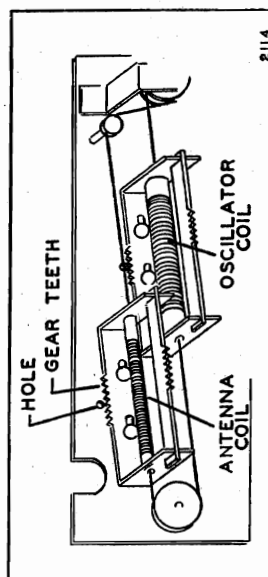
LETTERS AND FIGURES OPPOSITE SOCKET PIN NUMBERS ARE VOLTAGE READINGS TAKEN WITH A 5000-OHMS PER-VOLT METER BETWEEN SOCKET TERMINALS AND CHASSIS. BATTERIES AT FULL VOLTAGE. ECONOMIZER SWITCH OPEN.

A - CANNOT BE MEASURED WITH ABOVE METER.

RESISTOR AND COIL VALUES SHOWN IN OHMS.

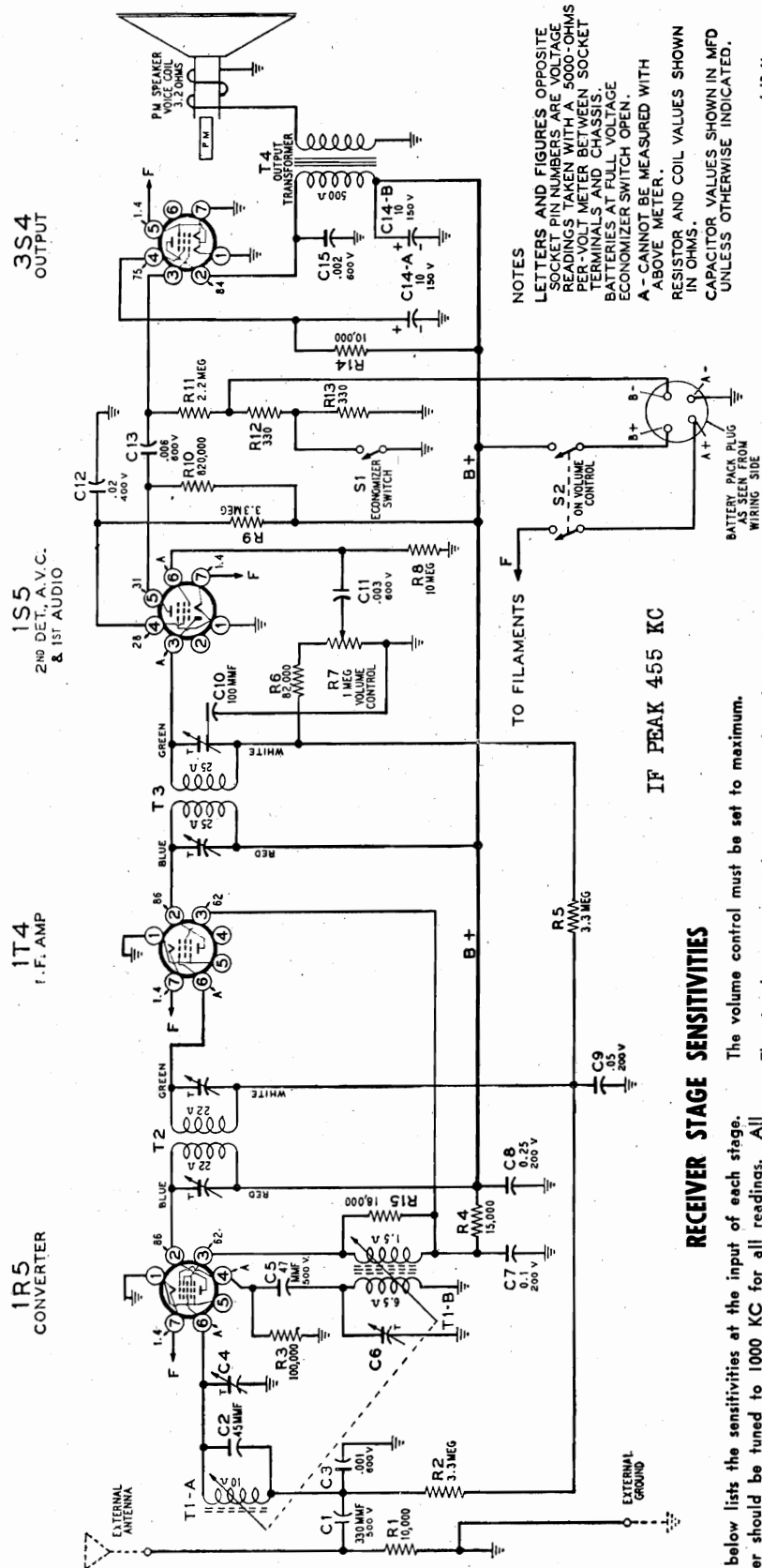
CAPACITOR VALUES SHOWN IN MFD UNLESS OTHERWISE INDICATED.

6-13-46



View of Coil Assembly

The antenna coil assembly is movable left or right. When making the adjustment as required in the alignment procedure, move the coil assembly very slowly, either by hand or by pivoting one edge of a screwdriver blade in the hole and engaging the blade in the gear teeth of the coil form.



RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivities at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm, 5-watt resistor across the secondary winding of the output transformer. A reading of .4 volts AC across this resistor will be equivalent to a 50-milliwatt output with speaker connected.

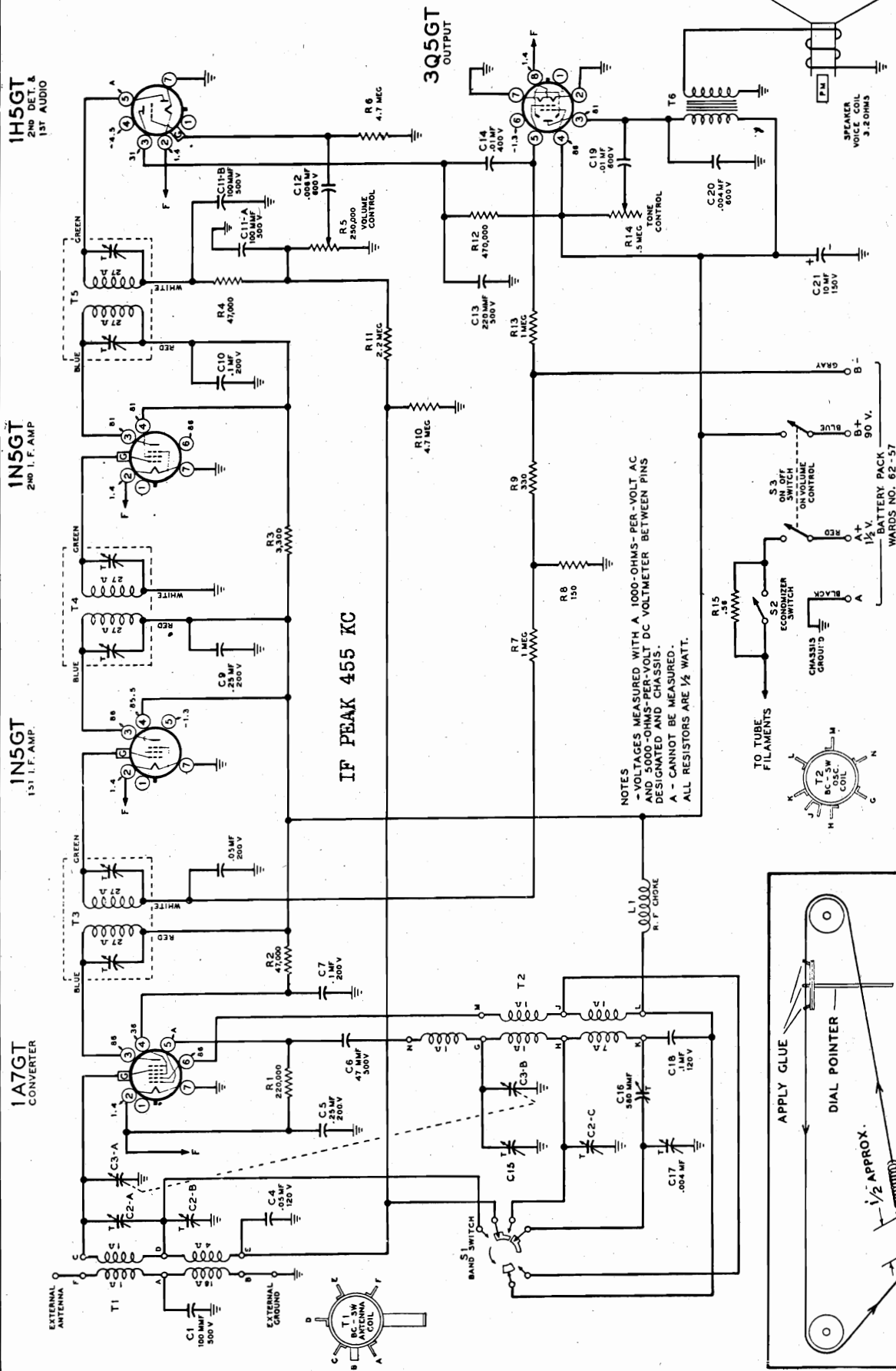
The volume control must be set to maximum.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 kc and 455 kc signals modulated 30% with a 400-cycle audio signal.

Variations in sensitivities of plus or minus 25% are usually permissible.

SIGNAL GENERATOR				INPUT FOR 50-MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Radio	Ground Connection	
1000 kc	200 mmf	External antenna lead	Chassis	45 microvolts
1000 kc	.1 mf	Converter I R5 (pin 6)	Chassis	129 microvolts
455 kc	.1 mf	Converter I R5 (pin 6)	Chassis	120 microvolts
455 kc	.1 mf	IF amp. 1 T4 (pin 6)	Chassis	3400 microvolts
400 cycles	.1 mf	AF amp. 1 S5 (pin 6)	Chassis	.027 volts
400 cycles	.1 mf	Power amp. 3 S4 (pin 3)	Chassis	2.5 volts

MONTGOMERY WARD

MODELS 64BR-1208A,
64BR-2200A1H5GT
2ND DET. &
1ST AUDIO1N5GT
2ND I.F. AMP1N5GT
1ST I.F. AMP1A7GT
CONVERTER

5-14-46

Replacement of Dial Pointer Drive Cord

After installing cord and spring as shown, tune to station of known frequency. Then set pointer to proper position along dial and secure with glue.

2096

MONTGOMERY WARD



MONTGOMERY WARD

MODELS 64BR-1208A,
64BR-2200A

ELECTRICAL SPECIFICATIONS

Power Supply.....Wards Battery Pack No. 62-57.
Size: 16" x 6 $\frac{5}{8}$ " x 4 $\frac{1}{2}$ ".
"A"- 1 $\frac{1}{2}$ volts, 300 ma.
"B"- 90 volts, 13 ma.

Frequency Range.....Broadcast—535 to 1720 kc.
Short Wave—5.6 to 18.1 mc.

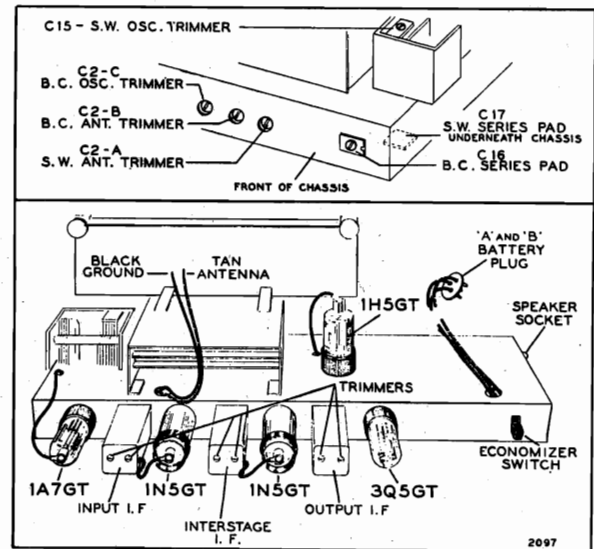
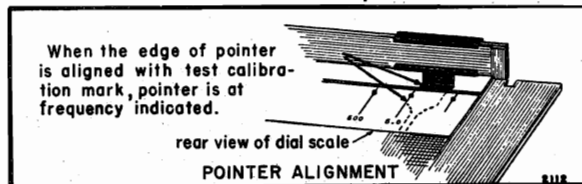
Intermediate Freq.....455 kc.

Selectivity.....At 1000 kc, 36 kc at 1000 x signal.

Sensitivity.....10 microvolts average for 50-milli-watt output.

Power Output.....150 milliwatts undistorted.
250 milliwatts maximum.

Speaker.....6" (1208A) or 8" (2200A).
P.M., v.c. impedance 3.2 ohms.



View of Chassis and Trimmers

ALIGNMENT PROCEDURE

- Output meter across 3.2-ohm output load.
- Volume control at maximum.
- Tone control at maximum treble.
- Connect ground post of signal generator to ground lead of radio.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.

BAND SWITCH SETTING	SIGNAL GENERATOR			TUNER SETTING	ADJUST TO MAXIMUM OUTPUT (in order shown)
	Frequency	Coupling Capacitor	Connection to Radio		
BROADCAST (counter-clockwise)	455 kc	.1 mf	Second I.F. (1N5GT) grid cap	Rotor full open (plates out of mesh)	Trimmers on top of output I.F. can
	455 kc	.1 mf	First I.F. (1N5GT) grid cap	Rotor full open (plates out of mesh)	Trimmers on top of interstage I.F. can
	455 kc	.1 mf	Converter (1A7GT)	Rotor full open (plates out of mesh)	Trimmers on top of input I.F. can
SHORT WAVE (clockwise)	18.1 mc	400 ohms	Antenna lead	Rotor full open (plates out of mesh)	S.W. osc. trimmer C15
	16 mc	400 ohms	Antenna lead	16 mc* (see below for pointer alignment)	S.W. ant. trimmer C2-A
	6 mc	400 ohms	Antenna lead	6 mc (see below for pointer alignment)	S.W. osc. series pad C17†
BROADCAST (counter-clockwise)	1720 kc	200 mmf	Antenna lead	Rotor full open (plates out of mesh)	B.C. osc. trimmer C2-C
	1500 kc	200 mmf	Antenna lead	1500 kc (see below for pointer alignment)	B.C. ant. trimmer C2-B
	600 kc	200 mmf	Antenna lead	600 kc (see below for pointer alignment)	B.C. osc. series pad C16†

* First set signal generator to 16 mc; then, with gang all the way out, approach 16 mc by slowly rotating gang inward. The first signal is the one on which the alignment should be made. The next signal is the image; do not align on this signal.

† Turn the dial back and forth slightly (rock) and adjust padder until peak output is obtained. After this adjustment check previous adjustments for interlocking effects.

MODELS 64BR-1208A,
64BR-2200A

MONTGOMERY WARD

RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 kc for all readings on the standard broadcast band and to 10 mc for the short-wave readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm, 5-watt resistor across the secondary winding of the output transformer. A reading of 0.4 volts AC across this resistor will be equivalent to a 50-milliwatt output

with the speaker connected.

The signal source must be an accurately calibrated signal generator capable of supplying the frequencies designated, modulated 30% with a 400-cycle audio signal. Variations in sensitivities of plus or minus 25% are usually permissible.

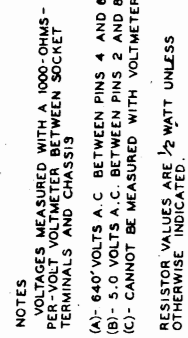
The volume control should be set at maximum, and the tone control at maximum treble.

SIGNAL GENERATOR				INPUT FOR 50-MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Radio	Ground Connection	
10 mc	400 ohms	Antenna lead	Ground lead	18 microvolts
1000 kc	200 mmf	Antenna lead	Ground lead	10 microvolts
10 mc	.1 mf	Converter (1A7GT) grid cap	Ground lead	32 microvolts
1000 kc	.1 mf	Converter (1A7GT) grid cap	Ground lead	35 microvolts
455 kc	.1 mf	Converter (1A7GT) grid cap	Ground lead	32 microvolts
455 kc	.1 mf	First I.F. (1N5GT) grid cap	Ground lead	630 microvolts
455 kc	.1 mf	Second I.F. (1N5GT) grid cap	Ground lead	.01 volt
400 cycles	.1 mf	Audio amp. (1H5GT) grid cap	Ground lead	.06 volt
400 cycles	.1 mf	Power amp. (1A5GT) grid (pin 5)	Ground lead	3 volts

Ref. No.	Part No.	Description	Qty. Used in Set
CAPACITORS			
C1	BE1295	100 mmf, mica, 20%	1
C2-A, B, -C	BE124171	Triple trimmer; S.W. antenna, C2-A; B.C. antenna, C2-B; B.C. oscillator, C2-C. Range of each is approx. 4-30 mmf	1
C3-A, B C15	BEB-8A-10243	Two-gang variable capacitor, including S.W. oscillator trimmer	1
C4	BE100128	.05 mf, 120 volts, 25%	1
C5, C9	BE1006	.25 mf, 200 volts, 20%	2
C6	BE12939	50 mmf, mica, 20%	1
C7, C10	BE10020	.1 mf, 200 volts, 25%	2
C8	BE10022	.05 mf, 200 volts, 25%	1
C11-A, B	BE129161	Dual, mica, 100 mmf each section	1
C12	BE10019	.006 mf, 600 volts, 25%	1
C13	BE12921	200 mmf, mica, 20%	1
C14	BE10011	.01 mf, 400 volts, 25%	1
C16	BE124173	B.C. series padder; range 420-780 mmf	1
C17	BE129125	S.W. series padder; mica, 4000-4350 mmf	1
C18	BE100133	.1 mf, 120 volts, 25%	1
C19	BE10087	.01 mf, 600 volts, 25%	1
C20	BE10071	.004 mf, 600 volts, 25%	1
C21	BE119130	10 mf, 150 volts, electrolytic	1
RESISTORS*			
R1	BEA-9B1-27	220,000 ohms, 1/2 watt, 20%	1
R2, R4	BEA-9B1-23	47,000 ohms, 1/2 watt, 20%	2
R3	BEA-9B1-16	3300 ohms, 1/2 watt, 20%	1
R5, S3	BE101257	Volume control (250,000 ohms) and on-off switch	1
R6, R10	BEA-9B1-35	4.7 megohms, 1/2 watt, 20%	2
R7, R13	BEA-9B1-31	1 megohm, 1/2 watt, 20%	2
R8	BEA-9B1-8	150 ohms, 1/2 watt, 20%	1
R9	BEA-9B1-10	330 ohms, 1/2 watt, 20%	1
R11	BEA-9B1-33	2.2 megohms, 1/2 watt, 20%	1
R12	BEA-9B1-29	470,000 ohms, 1/2 watt, 20%	1
R14	BE101264	Tone control (500,000 ohms)	1
R15	BE130346	.56 ohms, 1/3 watt, 10%, wire-wound	1
COILS AND TRANSFORMERS			
T1	BE111248	Broadcast and S.W. antenna coil	1
T2	BE110183	Broadcast and S.W. oscillator coil	1

Ref. No.	Part No.	Description	Qty. Used in Set
T3	BE108204	Input I.F. coil complete in can. Range of trimmers: 80-150 mmf each	1
T4	BE108204B	Interstage I.F. coil complete in can. Range of trimmers: 80-150 mmf each	1
T5	BE108188B	Output I.F. coil complete in can. Range of trimmers: 80-150 mmf each	1
T6	BE105119B	Output transformer	1
L1	BE1233	R.F. choke coil	1
MISCELLANEOUS			
	BE114245	Speaker, 6-inch, P.M. (1208A)	1
	BEC-18A-11471	Speaker, 8-inch, P.M. (2200A)	1
	BE121280	Socket, for speaker plug	1
	BE121171	Socket, for tubes	5
S1	BE125160	Band switch	1
S2	BE12588B	Battery economizer switch	1
	BE107377	Battery cable assembly	1
	BE115396	Tube shield	2
	BE134128	Rubber grommet for mounting speaker	4
	BEB-6D-10043	Dial scale	1
	BED-5C-10007-37	Escutcheon	1
	BE112530	Clip for mounting escutcheon	4
	BE128686B-37	Knob, volume	1
	BE128681-37	Knob, tuning	1
	BE128680-37	Knob, tone	1
	BE128683-37	Knob, band switch	1
	BE112961	Station call letters	1 set
TUNER ASSEMBLY PARTS			
	BE117907	Tuning shaft	1
	BE117798	Pinion gear on tuning shaft	1
	BEB-2C-7245	Gear segment	1
	BE115618	Drive link and drive link bushing	1
	BE115617	Driven link and collar	1
	BE115616	Connecting link	1
	BE120372	Spring for connecting link assembly	1
	BE128678-37	Pushbutton	6
	BE112819	Pushrod assembly, complete	6
	BEA-49A-7186	Spring for pushrod return	6
	BE112974	Paper background for dial	1
	BE112806	Drive pulley and bushing	1
	BE112971	Pointer	1
	BE120214	Cord for dial pointer drive	2 ft.
	BE120377	Spring for pointer drive cord	1

Voice coil impedance 3.2 ohms.



-9-20-46

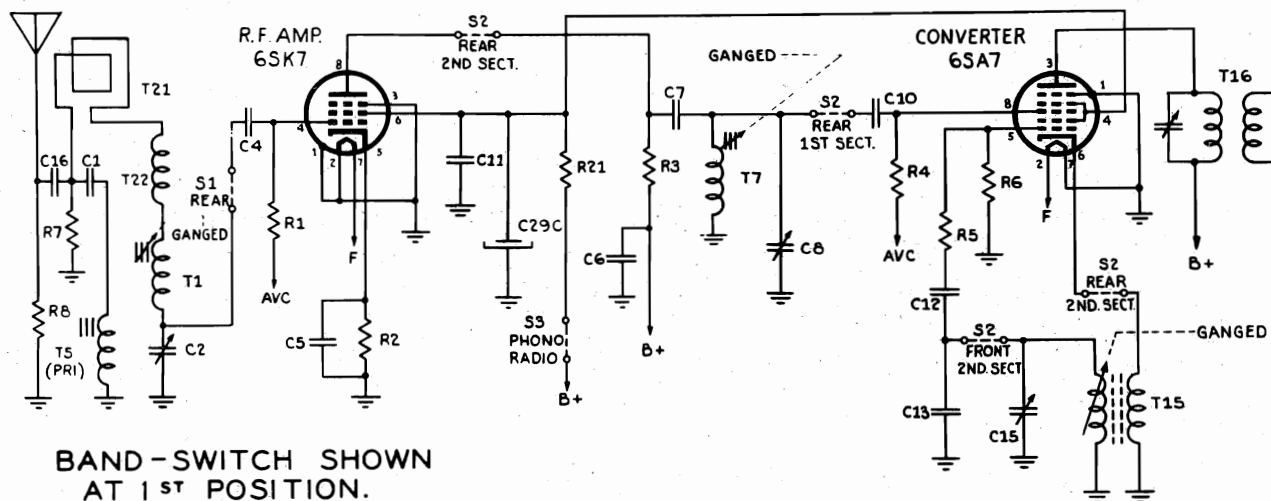
IF PEAK
455 KC

"clarified schematics"

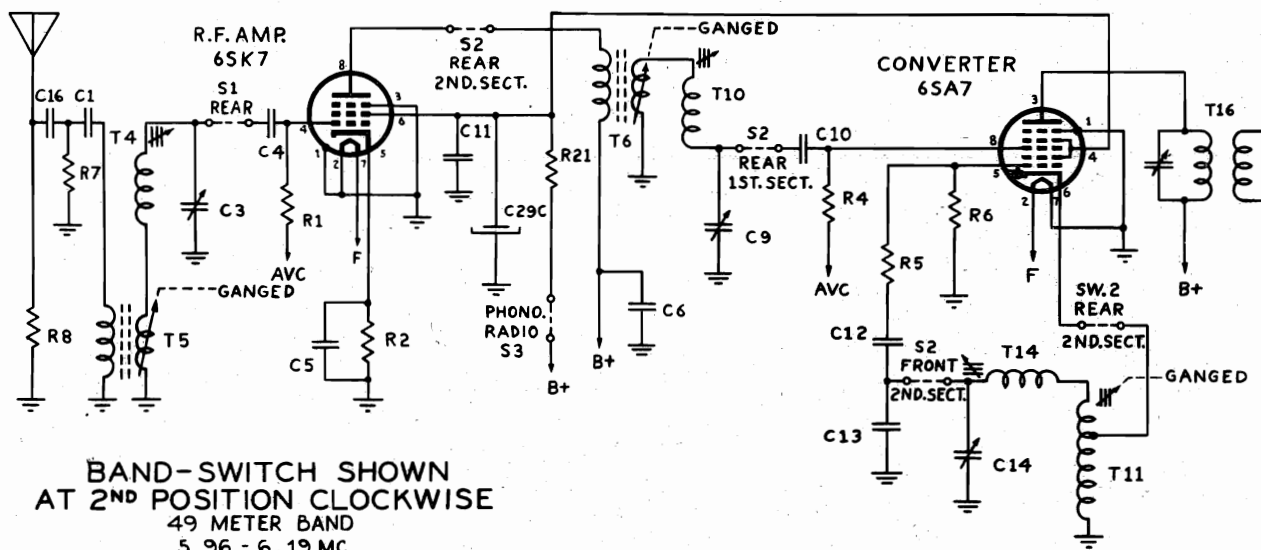
PAGE 15-70 MONT.-WARD

MODEL 64BR-2701A

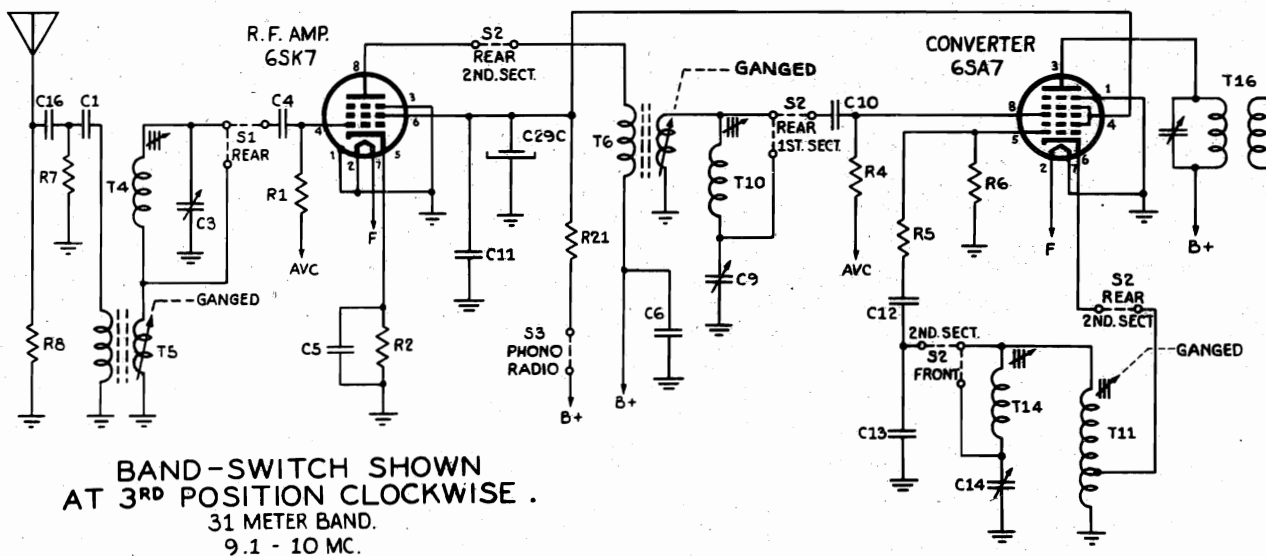
MONTGOMERY WARD



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540-1600 KC

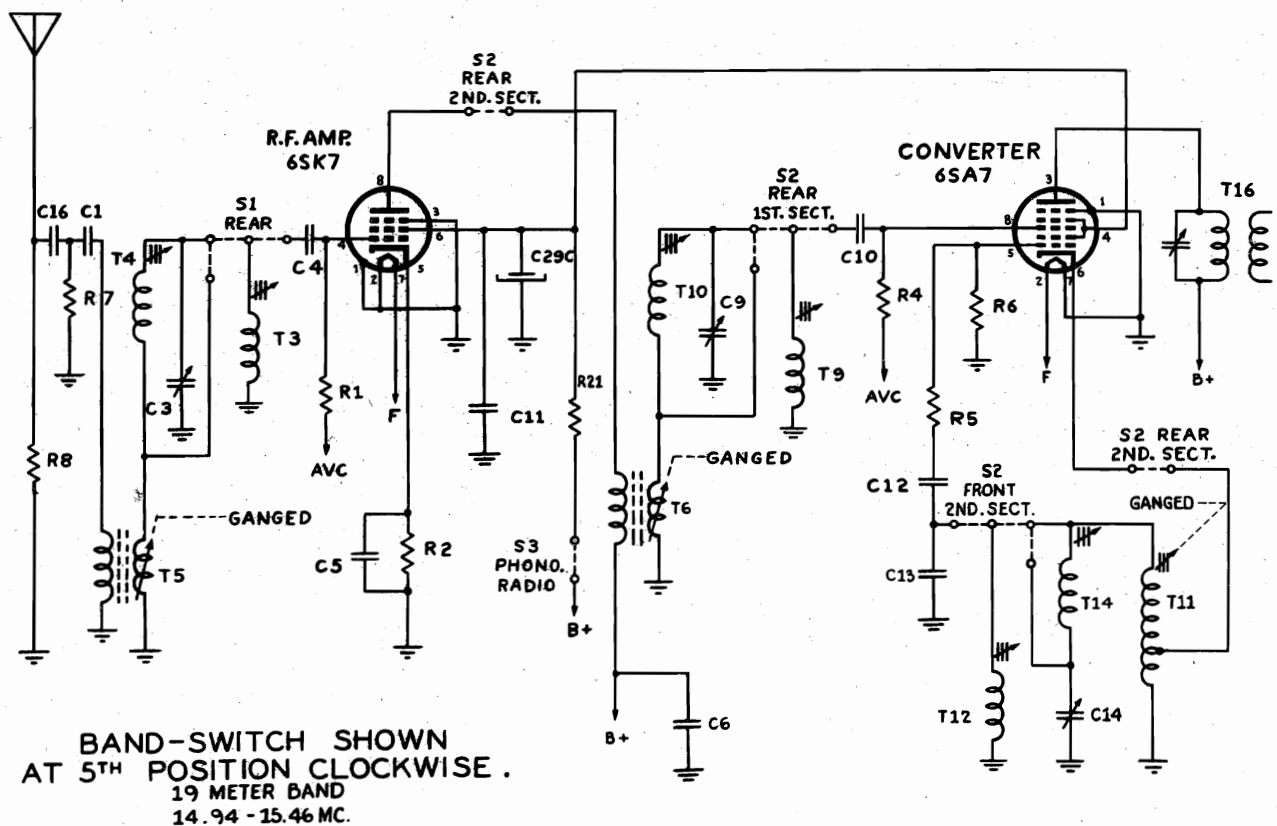
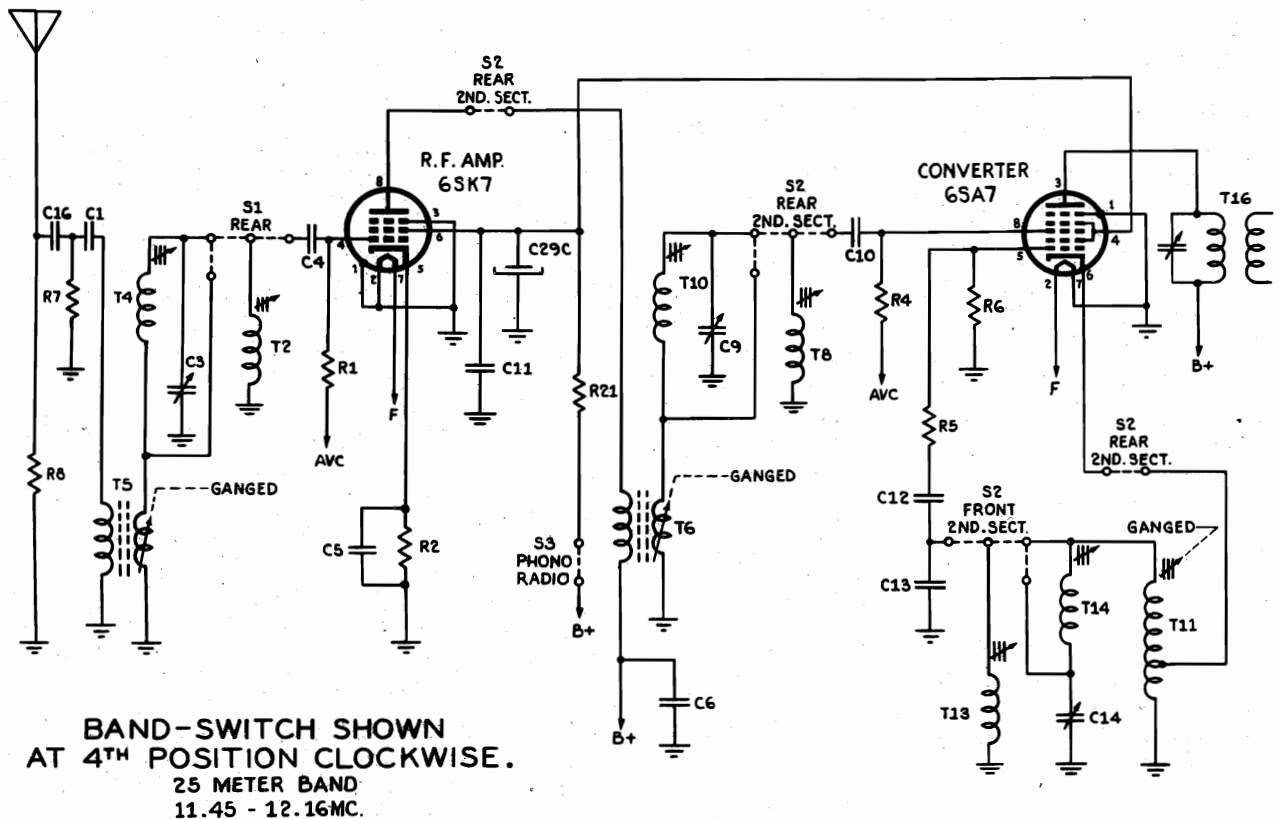


BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
49 METER BAND
5.96 - 6.19 MC.



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE .
31 METER BAND.
9.1 - 10 MC.

MONTGOMERY WARD



ALIGNMENT PROCEDURE

With the core bar in this position, adjust the dial pointer to coincide with 1600 kc on the dial scale.

Locations of all the trimmers and coils are shown in the illustrations below. After adjustment, seal the coil cores with collodion or a similar substance (do not use cement).

TRIMMERS
C3 S.W.ANT. C2 BC.ANT.

POWER TRANSFORMER

6SK7 6SA7

5Y3G

6SK7

6SK7 6K6 6J5 6K6

OUTPUT I.F.

TRIMMERS

INPUT I.F.
PHONO PICKUP SOCKET
PHONO MOTOR SOCKET

BLACK-EXT.GND.
TAN-EXT.ANT.

LOOP ANT. PLUG

ELECTROLYTIC

SPEAKER SOCKET
OUTPUT TRANS.

MONTGOMERY WARD

Frequency Ranges.....Broadcast band—540 to 1600 kc.
 49-meter band—5.96 to 6.19 mc.
 31-meter band—9.1 to 10 mc.
 25-meter band—11.45 to 12.16 mc.
 19-meter band—14.94 to 15.46 mc.

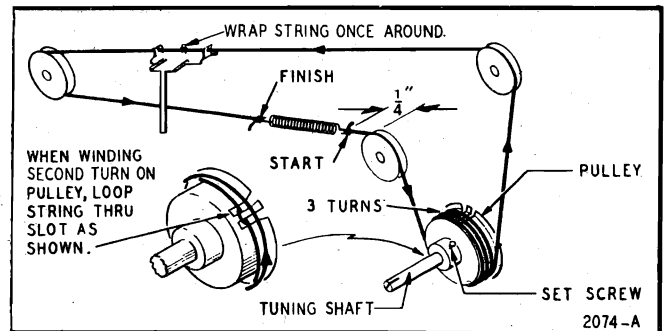
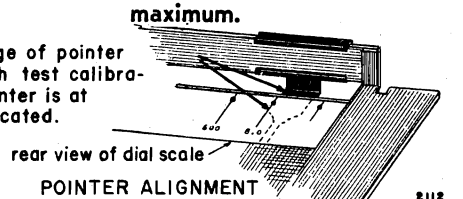
Intermediate Freq....455 kc.

Selectivity.....at 1000 kc, 35 kc at 1000 x signal

Sensitivity.....3.75 microvolts average for 1/2 watt output.

Power Output.....5.5 watts undistorted, 7.5 watts maximum.

When the edge of pointer is aligned with test calibration mark, pointer is at frequency indicated.



Replacing Dial Pointer Drive Cord

After stringing, spring must be 1/4" from idler when tuning shaft is in extreme counterclockwise position. To do this: Loosen set screw; hold tuning shaft firm and turn pulley by hand until spring is 1/4" from idler; tighten screw.

RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivities at the inputs of various stages. All measurements are based on an output of 1/2 watt. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm resistor across the secondary winding of the output transformer. A reading of 1.3 volts AC across this resistor will be approximately equivalent to a 1/2-watt output with the

speaker connected. The volume control must be set at maximum.

The signal source must be an accurately calibrated signal generator capable of supplying the frequencies designated, modulated 30% with a 400-cycle audio signal. Variations in sensitivities of plus or minus 25% are usually permissible.

BAND	SIGNAL GENERATOR				INPUT FOR 500-MILLIWATT OUTPUT
	Frequency	Dummy Antenna	Connection to Receiver	Ground Connection	
Broadcast	1000 kc	200 mmf	External Antenna clip	Chassis	3.5 microvolts
	1000 kc	.1 mf	Grid (pin 4) of R. F. amp. (6SK7)	Chassis	8.9 microvolts
	1000 kc	.1 mf	Grid (pin 8) of Converter (6SA7)	Chassis	125 microvolts
	455 kc	.1 mf	Grid (pin 8) of Converter (6SA7)	Chassis	100 microvolts
	455 kc	.1 mf	Grid (pin 4) of I. F. amp. (6SK7)	Chassis	4500 microvolts
	400 cycles	.1 mf	Grid (pin 2) of Audio amp. (6SQ7)	Chassis	.1 volt
	400 cycles	.1 mf	Grid (pin 5) of Inverter (6J5GT)	Chassis	4.8 volts
31 meter*	9.6 mc	400 ohms	External Antenna clip	Chassis	1.6 microvolts
49 meter*	6.1 mc	400 ohms	External Antenna clip	Chassis	3.0 microvolts
25 meter*	11.8 mc	400 ohms	External Antenna clip	Chassis	5.0 microvolts
19 meter*	15.2 mc	400 ohms	External Antenna clip	Chassis	9.0 microvolts

*Average sensitivity on short-wave bands at grid (pin 4) of R. F. amplifier is 8.5 microvolts.

MODEL 64BR-2701A

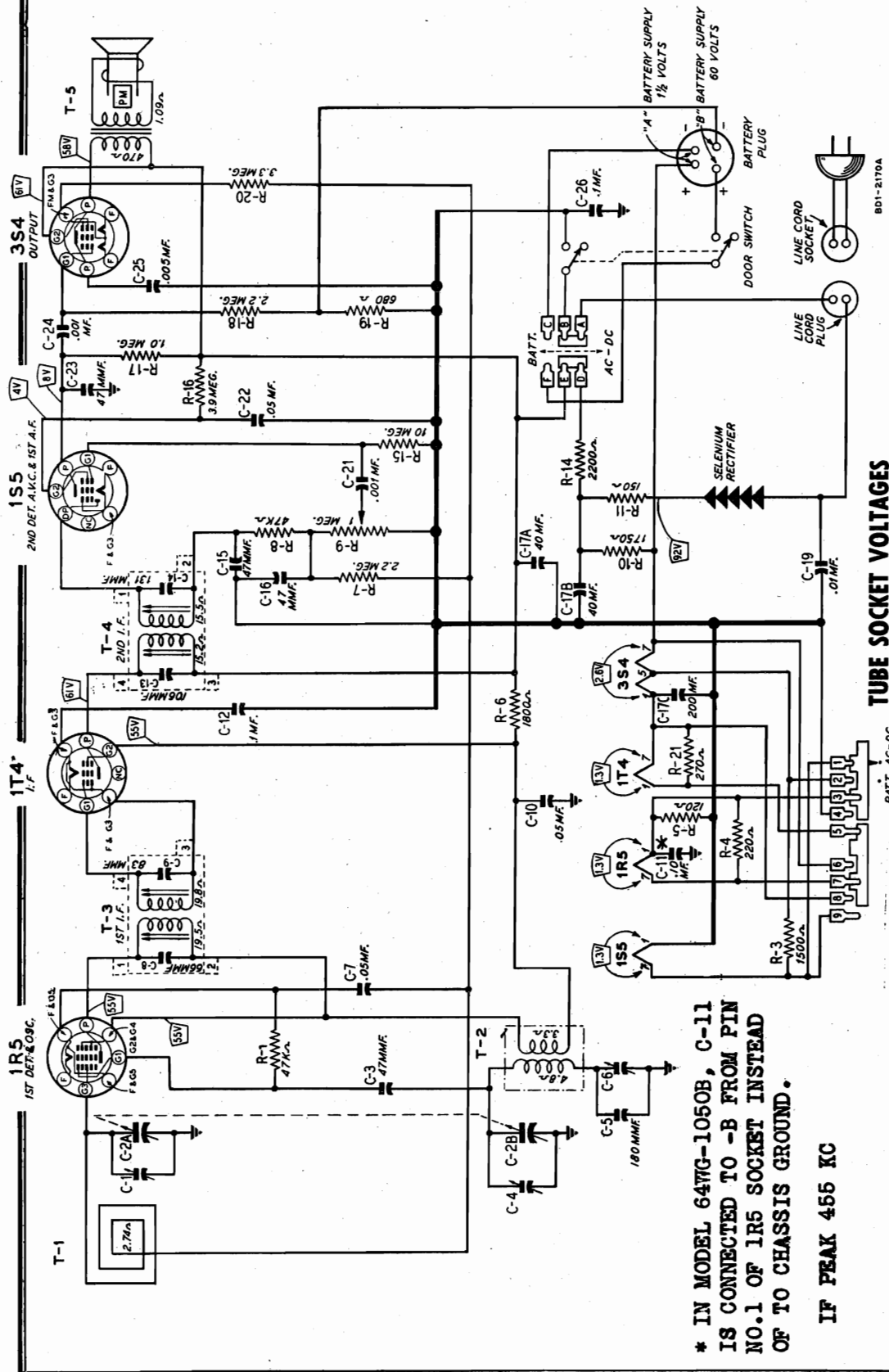
MONTGOMERY WARD

Ref. No.	Part No.	Description	Qty. Used In Set
REMOVABLE TUNER ASSEMBLY			
CAPACITORS*			
C1	BEB-8F-10767	.002 mf, 500 volts, 10%, mica	1
C2, C3	BE-124143	Dual, broadcast (67-123 mmf) and 9 mc (95-175 mmf) ant. trim- mers	1
C4, C10	BEB-8F3-121	470 mmf, 500 volts, 10%, mica	2
C5	BEC-8D-10771	.1 mf, 200 volts, +20%—10%	1
C6, C11	BEC-8D-10760	.1 mf, 400 volts, +20%—10%	2
C7	BEB-8F5-101	10 mmf, 500 volts, 10%, silver mica	1
C8	BEA-8G-7205	Broadcast RF trimmer (120- 220 mmf)	1
C9	BEA-8G-7206	9 mc RF trimmer (60-110 mmf)	1
C12	BEB-8F3-109	47 mmf, 500 volts, 10%, mica	1
C13	BEB-8F-10763	200 mmf, 500 volts, 3%, silver mica	1
C14	BE-124145	9 mc oscillator trimmer (7-35 mmf)	1
C15	BE-124144	Broadcast oscillator trimmer (15-27 mmf)	1
C22	BEC-8D-10935	.005 mf, 600 volts, +40%—15%	1
RESISTORS*			
R1, R4	BEC-9B1-31	1 megohm, 1/2 watt, 20%	2
R2	BEC-9B1-55	270 ohms, 1/2 watt, 10%	1
R3	BEC-9B1-70	4700 ohms, 1/2 watt, 10%	1
R5	BEC-9B1-46	47 ohms, 1/2 watt, 10%	1
R6	BEC-9B1-79	27,000 ohms, 1/2 watt, 10%	1
R12	BEC-9B1-22	33,000 ohms, 1/2 watt, 20%	1
COILS (complete with cores)			
T1	BE-111195	Broadcast antenna coil	1
T2	BE-111191	12 mc antenna coil	1
T3	BE-111192	15 mc antenna coil	1
T4	BE-111189	6 mc antenna coil	1
T5	BE-111190	9 mc antenna coil	1
T6	BE-10959	9 mc RF coil	1
T7	BE-10962	Broadcast RF coil	1
T8	BE-10960	12 mc RF coil	1
T9	BE-10961	15 mc RF coil	1
T10	BE-10958	6 mc RF coil	1
T11	BE-110157	9 mc oscillator coil	1
T12	BE-110159	15 mc oscillator coil	1
T13	BE-110158	12 mc oscillator coil	1
T14	BE-110156	6 mc oscillator coil	1
T15	BE-110161	Broadcast oscillator coil	1
MISCELLANEOUS			
S1	BEB-20A-10526	Band switch, antenna	1
	or		
	BEB-20A-11053		
S2	BEB-20A-10527	Band switch, oscillator and RF	1
	or		
	BEB-20A-11054		
S3	BE-125129	Radio-phonograph switch	1
S6	BEA-20F-7322-2	Tone switch, 3-position	1
	BE-121210	Socket, octal, molded (6SA7)	1
	BE-121171	Socket, laminated (6SK7GT)	1
	BEA-3A-10476	Tuning shaft	1
	BE-117798	Pinion gear on tuning shaft	1
	BE-120393	Spring, intermediate link, under ends of treadle bar	2
	BE-131251	Washer, "C," on slug tuning bar	4
	BEB-2C-7245	Gear segment	1
	BEA-2J-7439	Spring clip, for coils	9
	BE-131316B	Washer, "C," for 9 mc coils	3
	BE-134134	Grommet for core mounting (all broadcast and 9 mc coils)	6
	BE-134126	Grommet for coil mounting (broad- cast RF and antenna coils)	2
	BE-134125	Grommet for coil mounting (broad- cast oscillator coil)	1
	BEA-25A-7619	Grommet for all 9 mc coils	3
	BE-115659B	Pushrod, tone switch	1
	BE-115670	Pushrod, radio-phonograph switch	1
	BEB-202-10475	Pushrod assembly, station selectors	6
	BE-120366	Spring, pushrod return	6
	BEA-2J-7176	Cam-locking spring on pushrod ass'y	6
	BEA-2J-7627-1	Retainer spring on pushrod ass'y	6
	BE-121281	Plug, 5-prong	1
	BE-128678-37	Pushbutton	8
	BE-131210	Washer, "C," on end plate	2

Ref. No.	Part No.	Description	Qty. Used In Set
MAIN CHASSIS			
CAPACITORS*			
C16	BEC-8F3-12	470 mmf, 20%, mica	1
C17, C19	BEC-8D-10774	.02 mf, 400 volts, 20%	2
C18	BEC-8D-10771	.1 mf, 200 volts, +20% —10%	1
C20-A	BE-129165B	Dual, 50 mmf each section, mica, 20%	1
C20-B			
C21	BEC-8D-10813	.05 mf, 400 volts, 20%	1
C23	BEC-8F3-10	220 mmf, 20%, mica	1
C24	BEC-8D-10770	.05 mf, 200 volts, 20%	1
C25	BEC-8D-10788	.004 mf, 600 volts, 20%	1
C27	BEC-8D-10992	.03 mf, 200 volts, 20%	1
C28	BEC-8D-10785	.006 mf, 600 volts, 20%	1
C29-A, -B, -C	BE-119109	Electrolytic, 15 mf x 450 volts, 15 mf x 450 volts, 10 mf x 350 volts	1
C30, C31	BEC-8J-11321	.02 mf, 600 volts, 20%	2
RESISTORS*			
R7, R8	BEC-9B1-21	22,000 ohms, 1/2 watt, 20%	2
R9	BEC-9B1-59	560 ohms, 1/2 watt, 10%	1
R10	BEC-9B1-23	47,000 ohms, 1/2 watt, 20%	1
R11	BEC-9B1-34	3.3 megohms, 1/2 watt, 20%	1
R13	BEC-9B1-27	220,000 ohms, 1/2 watt, 20%	1
R14, R17	BEC-9B1-86	100,000 ohms, 1/2 watt, 10%	2
R15	BEC-9B1-31	1 megohm, 1/2 watt, 20%	1
R16	BEC-9B1-70	4700 ohms, 1/2 watt, 10%	1
R18, R19	BEC-9B1-29	470,000 ohms, 1/2 watt, 20%	2
R20	BEC-9B2-56	330 ohms, 1 watt, 10%	1
R21	BE-10662	12,500 ohms, 3 watts, 10%	1
R23	BEC-9B1-20	15,000 ohms, 1/2 watt, 20%	1
R24, S4	BEA-10A-10832	Volume control (500,000 ohms) and on-off switch	1
R25	BEC-9B1-35	4.7 megohms, 1/2 watt, 20%	1
COILS AND TRANSFORMERS			
T16	BE-108177	Input IF coil complete in can (Range of trimmers: 110-210 mmf)	1
T17	BE-108176	Output IF coil complete in can (Range of trimmers: 80-140 mmf)	1
T18	BEB-12C-10234	Output transformer	1
T20	BE-104202B	Power transformer, for 50-60 cycles (for 25 cycles, 104203B) (for 40 cycles, 104205B)	1
SOCKETS			
	BE-121200	Socket, 4-terminal, for loop ant.	1
	BE-121279	Socket, 5-terminal, for tuner	1
	BEA-15B-11538	Socket, 4-terminal, for speaker	1
	BE-121199	Socket, 2-terminal, for phono motor	1
	BE-121210	Socket, octal, molded (all tubes except 6SK7, IF amp.)	5
	BE-121273	Socket, octal, laminated (for 6SK7, IF amplifier)	1
	BE-121280	Socket, 1-terminal, for phono pickup	1
	BEB-47A-10808-1	Socket assembly for dial light	1
MISCELLANEOUS			
T19	BEB-18B-10616	Speaker, 12" electrodynamic	1
	BEA-19A-11539	Plug on speaker leads	1
T21	BE-14MA-11066	Loop antenna (ribbon only)	1
T22	BEA-16A-11045	Choke on loop terminal board	1
	BEA-19A-11322	Plug on loop antenna leads	1
	BE-107401	Phono motor cable assembly	1
PI	BE-10724	Plug on phono pickup leads	1
	BEC-6D-10897	Dial scale	1
	BE-10794	Dial light, 6-8 volts, type 44	2
	BEB-2G-10511	Dial pointer	1
	BEB-53A-10989	String for dial pointer	32"
	BE-120377	Tension spring for dial pointer string	1
	BEB-5C-10269-48	Escutcheon, for pushbuttons	1
	BEB-5C-10257-48	Escutcheon, for dial scale	1
	BE128683-37	Knob, band switch	1
	BEB-5B-10377-37	Knob, tuning	1
	BEB-5B-10376-37	Knob, volume	1
	BE-107266	Line cord and plug	1
	BEA-2L-11293	Band switch link	1
	BE-112961	Station call letters	1 set

MONTGOMERY WARD

MODELS 64WG-1050A,
64WG-1050B



* IN MODEL 64WG-1050B, C-11
IS CONNECTED TO -B FROM PIN
NO.1 OF 1R5 SOCKET INSTEAD
OF TO CHASSIS GROUND.

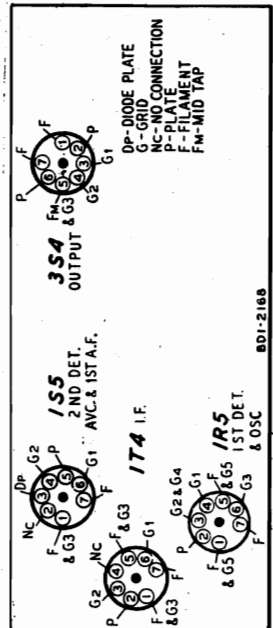
IF PEAK 455 KC

TUBE SOCKET VOLTAGES

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages except those for the filaments are between the socket terminal and the black or negative lead on C-17.

The readings were taken with a 1000 ohm per volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

Line voltage.....117 volts AC
Volume control.....maximum
Signal input.....none
A variation of $\pm 10\%$ is usually permissible.

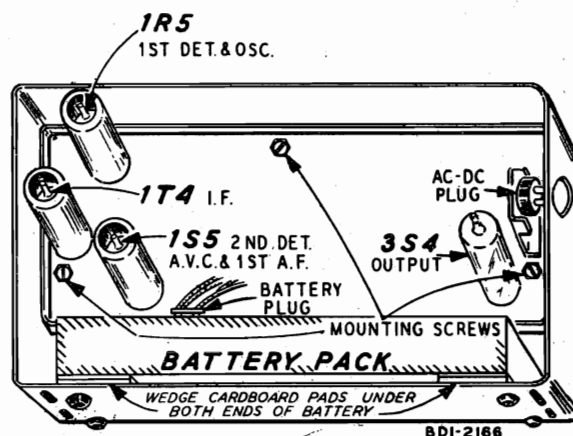


MODELS 64WG-1050A,
64WG-1050B

MONTGOMERY WARD

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm 5 watt resistor across the secondary winding of the output transformer. A reading of .4 volts across this resistor will be equivalent to a 50 milliwatt output with the speaker connected. The volume control must be set to maximum.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations of plus or minus 25% are usually permissible.



SIGNAL GENERATOR

Freq.	Coupling Capacitor	Connection to Receiver	Ground Connection	INPUT FOR 50 MILLIWATT OUTPUT
1000 kc	.05 mf	1R5 Mixer Pin 6	C-17 Black Lead	148 microvolts
455 kc	.05 mf	1R5 Mixer Pin 6	Same as above	118 microvolts
455 kc	.05 mf	1T4 IF Amp. Pin 6	Same as above	5000 microvolts
400 cycles	.05 mf	1S5 2nd Det. Pin 6	Same as above	.068 Volts
400 cycles	.05 mf	3S4 Output Pin 3	Same as above	4.2 volts

Volume Control — Maximum All Adjustments.

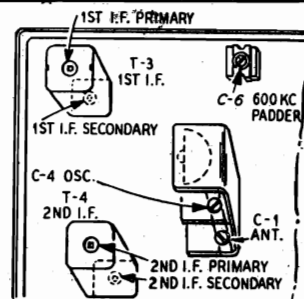
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning.

A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter — Non-Metallic Screwdriver.

Dummy Antenna—.1 mf.



SIGNAL GENERATOR

RECEIVER

Frequency Setting	Coupling Capacitor	Connection to Radio	Ground Connection	Condenser Setting	Adjust for maximum output. See trimmer illustration.
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Remove chassis from case (See paragraph Removal of Chassis From Case) and temporarily solder a 50,000 ohm resistor across the two antenna leads on the chassis.

455 kc	.1 mf	Control Grid 1R5—Pin 6	Chassis	Rotor to full open	1st IF Pri. & Sec. 2nd IF Pri. & Sec.
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Remove temporary resistor, replace chassis in case and solder antenna leads to hinges.

1610 kc	.1 mf	Door Hinge Above Tuning Control	Chassis	Rotor to full open	Oscillator (C-4)
1500 kc	.1 mf	Door Hinge Above Tuning Control	Chassis	Turn Rotor to Maximum Output	Set Tuning Knob at 1500 kc
1400 kc		Loop See Note A	Loop See Note A	Turn Rotor to Maximum Output	Antenna (C-1)
600 kc		Loop See Note A	Loop See Note A	Turn Rotor to Maximum Output	600 kc (C-6) Rock Rotor—See Note B
1400 kc		Loop See Note A	Loop See Note A	Turn Rotor to Maximum Output	Antenna (C-1)

NOTE A: Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Place radio approximately 2 feet from loop.

NOTE B: Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

MONTGOMERY WARD

MODELS 64WG-1050A,
64WG-1050B
MODEL 64WG-1052A

MODEL 64WG-1050A

To remove the chassis from the case it will be necessary to remove the line cord if connected, and the back panel from the case. Open the front cover and carefully remove the two control knobs and the screw on the front panel above the tuning knob at the side of the ON-OFF switch plunger. Withdraw the battery pack from the case and disconnect the plug connecting to the battery pack. Then remove the 3 chassis mounting screws protruding above the chassis as shown in the tube position illustration. Carefully lift the chassis, and move it over into the battery space. Unsolder the two antenna wires at the door hinges.

OPERATING VOLTAGES—Chassis for Model 64WG-1050A are available for operation on the following power supplies:

Power Line 105-125 Volts AC 50-60 Cycles or 105-125 Volts DC
Battery Wards Battery A Section 1.5 Volts
Pack No. 62-32 B Section 60 Volts

Ref. No.	Part No.	Description	Qty. Used in Set
C1, C4		CAPACITORS	
C2A, C2B	14A158	Part of C2 (Gang Capacitor)	1
C3, C15	47K495	47 mfd	4
C16, C23	180 mfd	Silvered Mica	1
C5	47K486	47 mfd	1
C6	17A186	30-120 mfd	1
C7, C10	86A503	85 mfd	3
C22		200 V Tubular	1
C8		66 mfd Part of T-3 (1st I-F Transformer)	1
C9		83 mfd Part of T-3 (1st I-F Transformer)	1
C11	86A104	10 mfd	1
C12	46X330	120 V Tubular	1
C13		106 mfd Part of T-4 (2nd I-F Transformer)	1
C14		131 mfd Part of T-4 (2nd I-F Transformer)	1
C17A	45X350	40 mfd 150 V Dry Electrolytic	1
C17B		40 mfd 150 V	1
C17C	86A103	20 mfd 200 V Tubular	1
C21	46X334	200 mfd 200 V Tubular	1
C24	86Y102	200 mfd 200 V Tubular	1
C25	86A502	200 mfd 200 V Tubular	1
C26	58Y104	400 V Tubular	1
R1, R8	88A473	47 K OHMS	2
R3	88A152	1500 WATTS	1
R4	88A221	220 0.5 Carbon	1
R5	88A121	120 0.5 Carbon	1
R6	88A182	1800 0.5 Carbon	1
R7, R18	88Y225	2.2 meg 0.5 Carbon	2
R9	36X305	1.0 meg Volume Control	1
R10	43X107	1750 4.0 Wire wound	1
R11	88A151	150 2.0 Carbon	1
R14	88A222	2200 0.5 Carbon	1
R15	88Y106	10 meg 0.5 Carbon	1
R16	88A295	3.9 meg 0.5 Carbon	1
R17	88Y105	1.0 meg 0.5 Carbon	1
R19	88A481	480 0.5 Carbon	1
R20	88Y335	3.3 meg 0.5 Carbon	1
R21	88A271	270 0.5 Carbon	1

ELECTRICAL SPECIFICATIONS

Power Supply A Battery Supply 1.5 volts, .050 amp.
B Battery Supply 60 volts, 8 MA
105-125 volts AC, 50-60 cycles, 10 watts
or
105-125 volts DC
Wards Battery Pack No. 62-32
Frequency Range 540-1600 Kc
Intermediate Frequency 455 Kc
Selectivity At 1000 kc, 40 kc wide at 1000 times signal
300 microvolts per meter average (for .05 watt output)
Power Output .070 watt 10% distortion
Loud Speaker 4" PM Dynamic
Voice Coil Imp. 3.2 ohms at 400 cycles

Tube Complement 1 1R5 Mixer
1 1T4 I-F Amplifier
1 1S5 2nd Detector AVC and 1st AF Amplifier
1 3S4 Output

TRANSFORMERS AND COILS
T-1 9A1551 "B" Band Loop Antenna
T-2 9A1552 Oscillator Coil Assembly
T-3 9A1823 1st I-F Transformer and Con Assembly
T-4 9A1824 2nd I-F Transformer and Con Assembly
T-5 51X94 Output Transformer

Ref. No.	Part No.	Description	Qty. Used in Set
T-1	9A1551	"B" Band Loop Antenna	1
T-2	9A1552	Oscillator Coil Assembly	1
T-3	9A1823	1st I-F Transformer and Con Assembly	1
T-4	9A1824	2nd I-F Transformer and Con Assembly	1
T-5	51X94	Output Transformer	1
		MISCELLANEOUS	
12A447		4" P.M. Dynamic Speaker	1
		Cone and Voice Coil Assembly (Specify Part Number and Letters Stamped on Speaker)	1
68X7		Selenium Rectifier	1
14X351		Metal Grille (Speaker)	1
34X312		Tube Socket—Miniature Type	4
33X321		Tube Shield—Miniature	3
13X453		"A" and "B" Battery Cable and Plug Assembly	1
24X201		On-Off Switch	1
26A469		Change-Over Switch Assembly	1
13X545		Line Cord and Socket Assembly	1
6A299		Line Plug (on Chassis)	1
10A590		Knob	2
26A407		Cone and Cover Assembly Complete with Loop, Loop Cover and Back, Etc. with Knob and Speaker Grille	1
26A408		Case Bottom Assembly	1
4X939		Wraparound	1
4X940		Rear Panel Cover	1
4X941		Front Panel Cover	1
67X33		Wrench (for I-F Transformer Alignment)	1

MODEL 64 WG-1052A

ELECTRICAL SPECIFICATIONS

Power Supply "A" Battery Supply—9 Volts, 50 Ma.
"B" Battery Supply—90 Volts, 11 Ma. or 105-125 volts AC, 50-60 cycles, 10 watts or 105-125 volts DC
Wards Battery Pack No. 62-35
Frequency Range 540-1600 Kc
Intermediate Frequency 455 Kc
Selectivity At 1000 Kc, 53 Kc wide at 1000 times signal
300 microvolts average (for .05 watt output with external antenna) 20 microvolts average
Power Output .070 watt 10% distortion
Loud Speaker 5 1/2" PM Dynamic
Voice Coil Impedance 3.2 ohms at 400 cycles

TRANSFORMERS AND COILS
T-1 9A1843 "B" Range Loop Antenna
T-2 9A1844 Oscillator Coil Assembly
T-3 9A1845 1st I-F Transformer and Con Assembly
T-4 9A1846 2nd I-F Transformer and Con Assembly
T-5 Output Transformer (See Miscellaneous)

Ref. No.	Part No.	Description	Qty. Used in Set
T-1	9A1843	"B" Range Loop Antenna	1
T-2	9A1844	Oscillator Coil Assembly	1
T-3	9A1845	1st I-F Transformer and Con Assembly	1
T-4	9A1846	2nd I-F Transformer and Con Assembly	1
T-5		Output Transformer (See Miscellaneous)	1
		DIAL AND DRIVE ASSEMBLY	
26A381		Dial Scale Mounting Plate Aligned with Dial	1
		Bracket for Drive Shaft and Dial Scale, Brace Bracket, Drive Shaft and Gang Capacitor	1
25X1504		Dial Scale	1
58X433		Snap Button (Mg. Dial Scale & Calibrated Crystal to Dial Bracket)	1
28X356		Calibrated Crystal	1
17X45		Painter for Dial Scale	1
13X191		Gang Capacitor Mounting Bracket	1
25X832		Rubber Grommet	3
57X176		Mounting Plate	1
20X329		Cond. Cushion Stud	3
28X95		Drive Cord Tension Spring	1
4X942		Escutcheon	1
26X489		Drive Shaft	1
19X192		"C" Washer for Drive Shaft	2
		MISCELLANEOUS	
12A443		5 1/2" P.M. Speaker complete with Cone and Voice Coil Assembly (Specify part number and letters stamped on speaker)	1
25A1019		Output Transformer (Specify part number and letters stamped on speaker)	1
3A303		Selenium Rectifier and Housing	1
3A302		Socket-Outlet (8 prong) Moulded	1
3A312		Tube Socket (Miniature)	5
32X221		Tube Shield (Economy)	4
2A303		On-Off Switch (ACDC, Battery Switch)	1
13X429		Battery Cable and Plug Assembly	1
10A595		Knob, Switch	1
10A596		Knob, Tuning	1
10A597		Knob, Volume	1
11X117		Shield, Volume Control (Paper)	1
32X368		Shield, Volume Control and Switch (Metal)	1

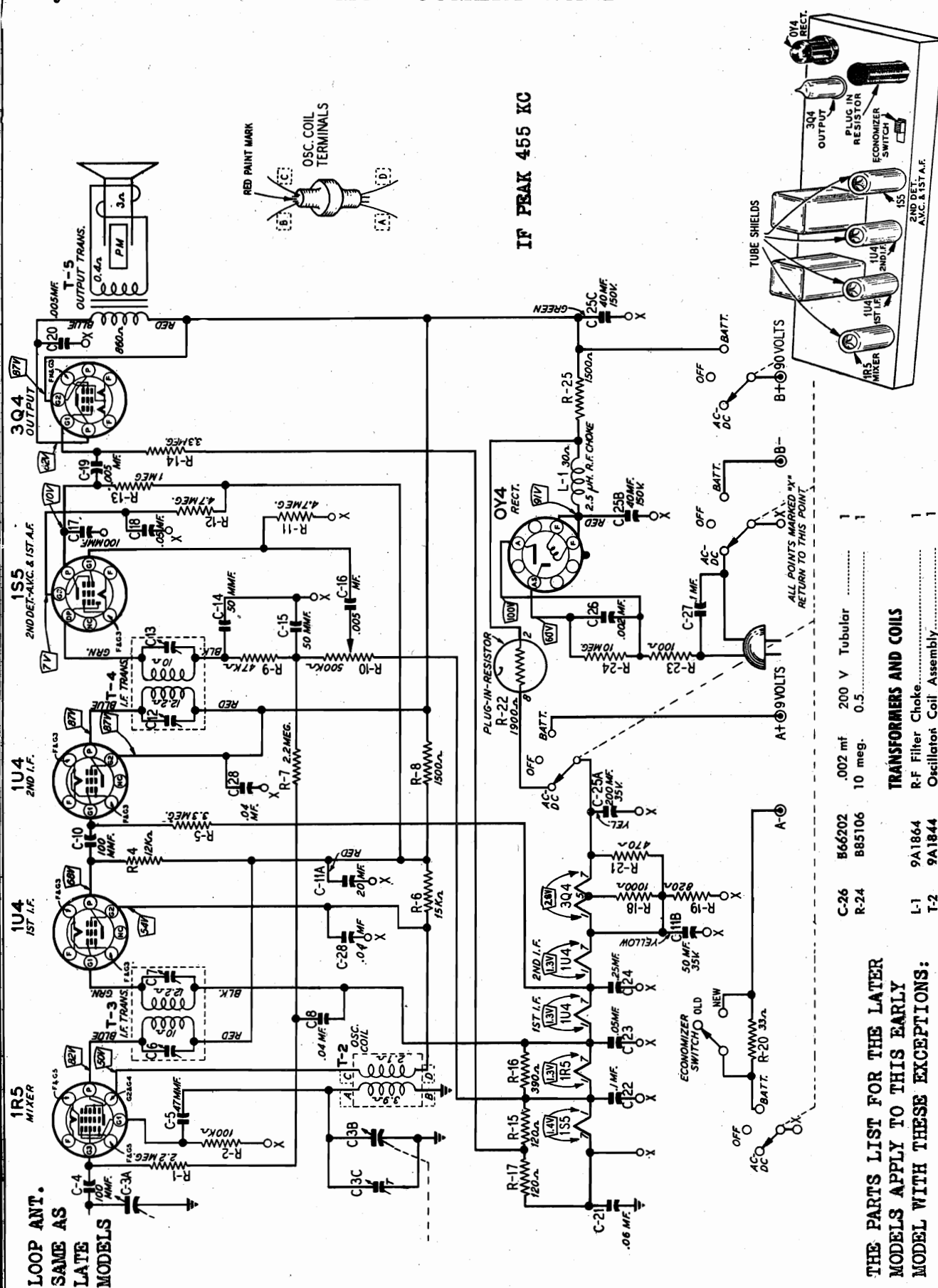
REMOVAL OF CHASSIS FROM CABINET

Pull off the three control knobs and disconnect the battery plug. Unwrap the power cord from the radio at the top of the cabinet if necessary. Remove the four screws that fasten the chassis to the cabinet (2 on the outside at each end of the cabinet). Tip the chassis slightly forward and at the same time withdraw it from the cabinet.

Tube Complement 1 1R5 Mixer
2 1U4 I-F Amplifier
1 1S5 2nd Detector, AVC and 1st AF Amplifier
1 3Q4 Power Output

OPERATING VOLTAGES—Chassis for Model 64WG-1052A are available for operation on the following power supplies:
Power Line 105-125 Volts AC 50-60 Cycles or 105-125 Volts DC
Battery Wards Battery 1A Section 9 Volts
Pack No. 62-35 B Section 90 Volts

IF PEAK 455 KC



THE PARTS LIST FOR THE LATER
MODELS APPLY TO THIS EARLY
MODEL WITH THESE EXCEPTIONS:

TRANSFORMERS AND COILS

C-26	B66202	.002 mf	200 V	Tubular	1
R-24	B85106	10 meg.	0.5		1

MONTGOMERY WARD

MODEL 64WG-1052A,
Early, Late

Volume Control—Maximum All Adjustments. Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Allow Chassis and Signal Generator to "Heat Up" for several Minutes. Output Indicating Meter; Non-Metallic Screwdriver.

The equipment in column at right is required for aligning: Dummy Antenna—.1 mf., 50 mmf.

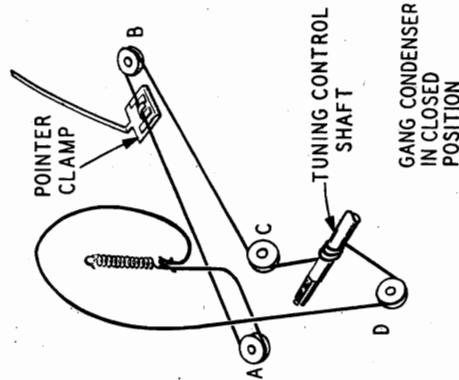
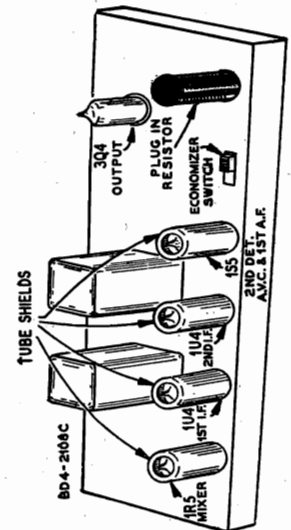
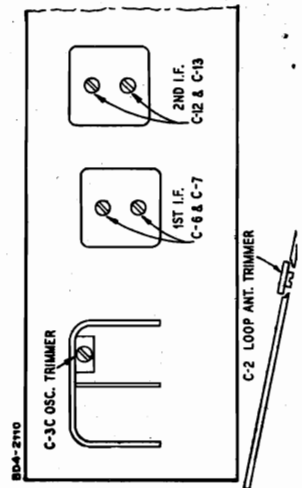
SIGNAL GENERATOR			CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM See Trimmer Illustration
Frequency Setting	Coupling Capacitor	Connection to Radio Ground Connection		
455 kc	.1 mf	Control Grid 1U4—1st I-F Pin 6	Turn Rotor to full open	2nd I-F (C13) & (C12)
455 kc	.1 mf	Control Grid 1R5—Mixer Pin 6 See Note C	Turn Rotor to full open	1st I-F (C7) & (C6)
1620 kc	.1 mf	Control Grid 1R5—Mixer Pin 6	Turn Rotor to full open	Oscillator (C3C)
1400 kc	50 mmf	External Antenna Clip on Loop See Note A	Turn Rotor to Max. Output Set Indicator to 1400 KC See Note B	Antenna (C2)

NOTE A—Re-assemble chassis in cabinet and close the cabinet back before making adjustment.

NOTE B—Tune in a 1400 KC signal. If pointer is not at the 1400 KC mark on the dial scale, move the pointer on

the string to the 1400 KC mark.

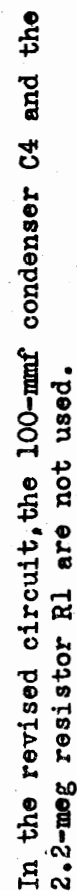
NOTE C—Short out the oscillator section of the gang condenser for this adjustment only.



DRIVE CORD REPLACEMENT

Turn the gang condenser to the fully closed position. Use a new cord 23" long and tie one end to the tension spring. Fasten the other end of the tension spring to the hook on the drive pulley. Pass the cord through the slot in the drive pulley rim and continue around pulley rim $\frac{1}{4}$ turn clockwise. Pass cord around pulleys A, B, and C as shown in the illustration. Wind three turns clockwise (viewed from rear of chassis) around tuning control shaft. The turns must progress toward rear of chassis. Pass cord around pulley D and continue $\frac{3}{4}$ turn clockwise around large drive pulley. Pass cord through the slot in the pulley rim then stretch the tension spring and tie free end of cord to it. Cut off any excess string.

IF PEAK
455 KC



REVISED CIRCUIT

MONTGOMERY WARD

MODEL 64WG-1052A,
Early, Late, Revised
MODEL 54WG-2007A

MODEL 64 WG-1052A

RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm 5 watt resistor across the secondary winding of the output transformer. A reading of .4 volts AC

across this resistor will be equivalent to a 50 milliwatt output with the speaker connected. The volume control must be set to maximum. The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Output variations of Plus or Minus 25% are usually permissible.

SIGNAL GENERATOR			Ground Connection	INPUT FOR 50 MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Receiver		
1000 kc	200 mmf or RMA Dummy Antenna	Loop Antenna—External antenna clip	Chassis	20 microvolts
1000 kc	.05 mf.	1R5 Mixer—Pin 6	Point "X" (1S5 Pin 1)	30 microvolts
*455 kc	.05 mf.	1R5 Mixer—Pin 6	Same as above	15 microvolts
455 kc	.05 mf.	1U4 1st I-F—Pin 6	Same as above	440 microvolts
455 kc	.05 mf.	1U4 2nd I-F—Pin 6	Same as above	2200 microvolts
400 cycles	.05 mf.	1S5 1st A-F—Pin 6	Same as above	.022 volts
400 cycles	.05 mf.	3Q4 Output—Pin 3	Same as above	1.8 volt

*Short out the oscillator section of the gang condenser while making this measurement.

MODEL 54 WG-2007A

ELECTRICAL SPECIFICATIONS

Power Supply.....105-125 volts AC—
60 cycles—30 watts
(42 watts Phono Operating)

Frequency Range.....535 to 1620 KC

Intermediate Frequency.....455 KC

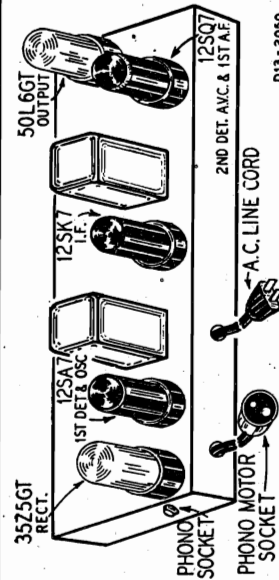
Selectivity.....55.5 KC broad at 1000
times signal, 1000 KC

Sensitivity (for .05 watt output)
with external antenna.....25 microvolts average

Power Output.....1.5 watts maximum,
.9 watt (10% distortion)

Loud speaker.....5" PM dynamic

Voice coil impedance.....3.2 ohms at 400 cycles

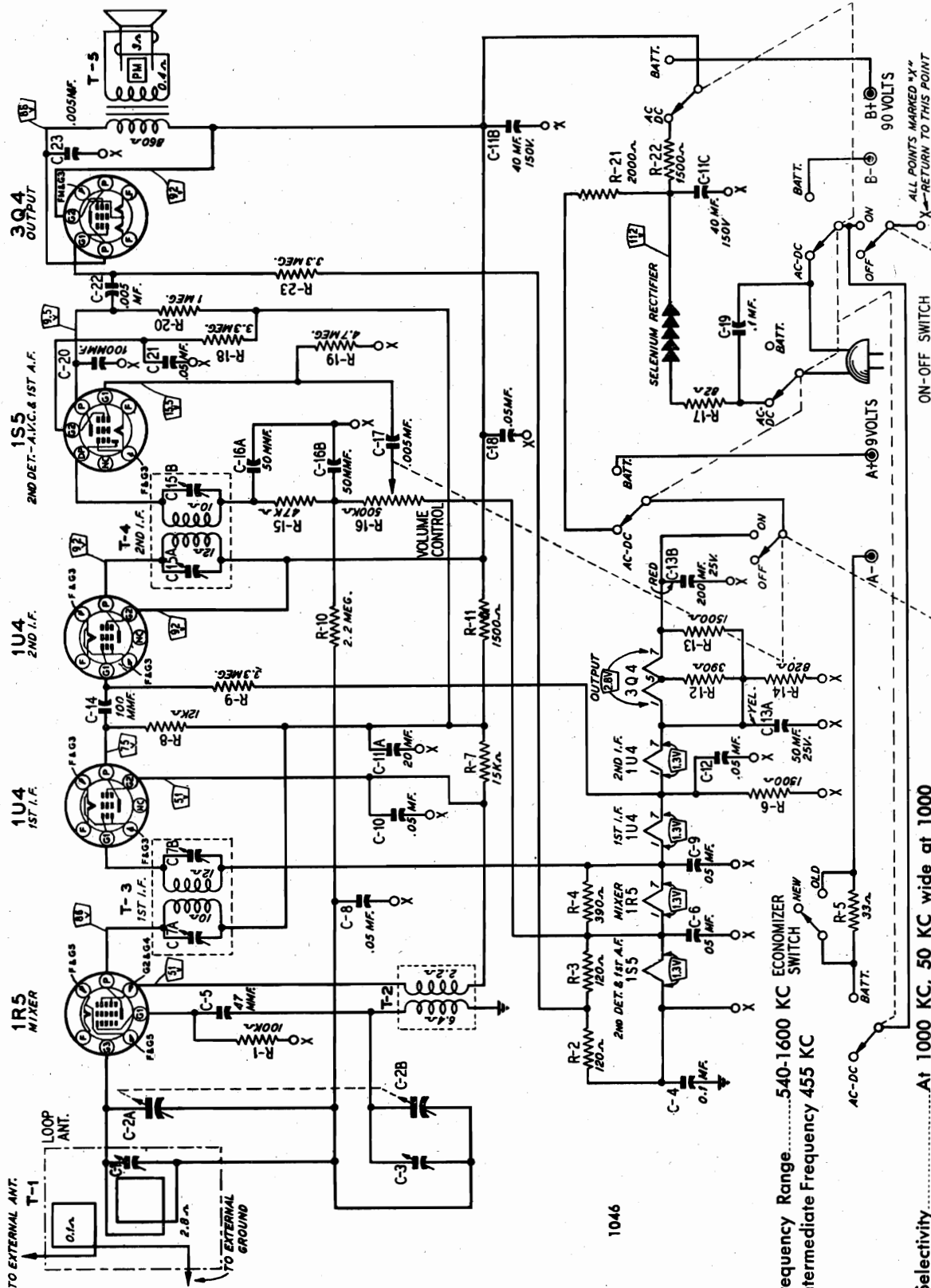


REMOVAL OF CHASSIS FROM CABINET

To remove the chassis from the cabinet it is necessary to pull the two control knobs and the dial pointer from their shafts. Remove the four screws in the bottom of the cabinet and the four snap pins that hold the cabinet back in place. Care must be taken when removing the dial pointer that it is not damaged in such a manner that reinstallation will not be possible.

MODEL 64WG-1054A

MONTGOMERY WARD



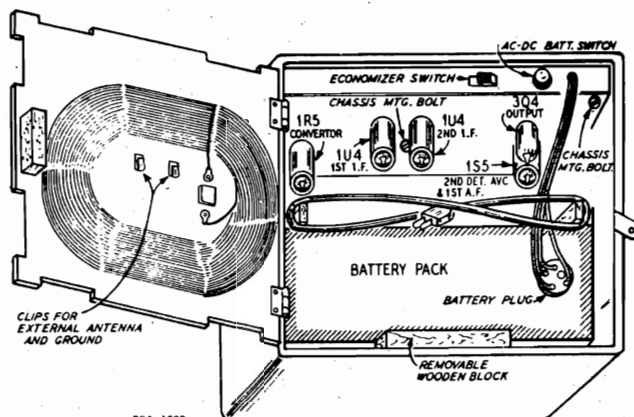
Frequency Range.....	540-1600 KC ECONOMIZER
Intermediate Frequency.....	455 KC
Selectivity.....	At 1000 KC, 50 KC wide at 1000 times signal
Sensitivity.....	for .05 watt output with external antenna) 15 microvolts average
Power Output.....	0.3 watts maximum 0.15 watt 10% distortion
Power Supply.....	"A" Battery Supply—9 Volts, 50 Ma. "B" Battery Supply—90 Volts, 12 Ma. or 105-125 volts AC, 50-60 cycles, 10 watts or 105-125 volts DC
Battery Pack.....	Ward's Battery Pack No. 62-33
Loud Speaker.....	5" PM dynamic
Voice Coil Impedance.....	3.2 ohms at 400 cycles

MONTGOMERY WARD

REMOVAL OF CHASSIS FROM CABINET

To remove the chassis from the cabinet, it is necessary to pull off the 2 control knobs, disconnect the battery and then unscrew the 2 screws fastening the chassis to the cabinet. (The 2nd I-F Tube must be removed in order to

reach the mounting screw in the center of the chassis.) See the tube position illustration for the location of these screws. After these screws have been removed, carefully pull out the chassis taking care not to damage the connections to the loop antenna.



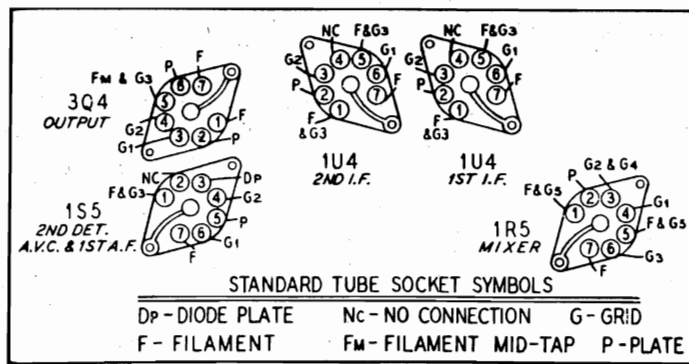
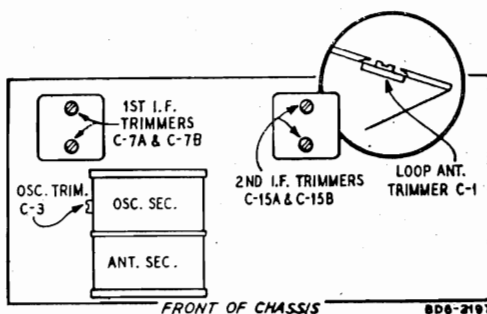
TUBE SOCKET VOLTAGES

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages except those for the filaments are between the socket terminal and "X" point.

The readings were taken with a 1000 ohm-per-volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

Line voltage.....117 volts AC
Volume control.....maximum
Signal input.....none

A variation of $\pm 10\%$ is usually permissible.



STANDARD TUBE SOCKET SYMBOLS

DP - DIODE PLATE NC - NO CONNECTION G - GRID
F - FILAMENT FM - FILAMENT MID-TAP P - PLATE

SIGNAL GENERATOR

Frequency Setting	Coupling Capacitor	Connection to Radio	Ground Connection	CONDENSER SETTING	ADJUST TRIMMER TO MAXIMUM See Trimmer Illustration
455 kc	.1 mf	Control Grid 1U4 1st I-F Pin 6	Point "X" At Electrolytic Capacitor Black Lead	Turn Rotor to full open	2nd I-F (C-15A) & (C-15B)
455 kc	.1 mf	Antenna Wire connecting to Stator of Antenna Section of Tuning Condenser	Same as above	Turn Rotor to full open	1st I-F (C-7A) & (C-7B)
1620 kc	.1 mf		Same as above	Turn Rotor to full open	Oscillator (C-3)
1400 kc	50 mmf	External Antenna Clip on Loop See Note A	External Ground connection on loop	Turn Rotor to Max. Output Set Indicator to 1400 KC See Note B	Antenna (C-1)

NOTE A—Re-assemble chassis in cabinet and close the cabinet back before making adjustment.

NOTE B—Tune in a 1400 KC signal. If pointer is not at the 1400 KC mark on the dial scale, pull pointer off shaft. Set pointer at the 1400 KC mark and push back on shaft.

MODEL 64WG-1054A

MONTGOMERY WARD

RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm 5 watt resistor across the secondary winding of the output transformer. A reading of .4 volts AC across this resistor will be equivalent to a 50 milliwatt

output. The volume control must be set to maximum.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations in sensitivity of Plus or minus 25% are usually permissible.

SIGNAL GENERATOR				INPUT FOR 50 MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	
1000 kc	200 mmf or RMA Dummy Antenna	Loop Antenna— External antenna clip	Chassis	15 microvolts
1000 kc	.05 mf.	1R5 Mixer—Pin 6	Point "X" (1S5 Pin 1)	30 microvolts
455 kc	.05 mf.	1R5 Mixer—Pin 6	Same as above	20 microvolts
455 kc	.05 mf.	1U4 1st I-F—Pin 6	Same as above	440 microvolts
455 kc	.05 mf.	1U4 2nd I-F—Pin 6	Same as above	2200 microvolts
400 cycles	.05 mf.	1S5 1st A-F—Pin 6	Same as above	.022 volts
400 cycles	.05 mf.	3Q4 Output—Pin 3	Same as above	2.2 volt

REPLACEMENT PARTS LIST

Use only genuine factory tested parts to insure service jobs you can depend on and to obtain original set performance

Ref. No.	Part No.	Description	Qty. Used
CAPACITORS			
C-1	17A123	1.0-12 mmf Trimmer	1
C-2	14A192	Gang Condenser	1
C-3	Part of C-2 Gang Condenser		
C-4	D67104	.10 mf 400 V Tubular	2
C-19	47X643	47mmf Molded	1
C-5			
C-6			
C-8			
C-9	B66503	.05 mf 200 V Tubular	7
C-10			
C-12			
C-18			
C-21			
C-7A	Part of T-3 1st I-F Transformer		
C-7B			
C-11A		20 mf 150 V Dry	
C-11B	45X353	40 mf 150 V Electrolytic	1
C-11C		40 mf 150 V	
C-13A		50 mf 25 V Dry	
C-13B	45X354	200 mf 25 V Electrolytic	1
C-14			
C-20	47X476	100 mmf Molded	2
C-15A			
C-15B	Part of T-4 2nd I-F Transformer		
C-16A			
C-16B	47X112	50 mmf Dual Mica	1
C-17	B66502	.005 mf 200 V Tubular	2
C-22			
C-23	D66502	.005 mf 400 V Tubular	1

RESISTORS

		Ohms	Watts	Material	
R-1	B84104	100k	0.5	Carbon	1
R-2	B84121	120	0.5	Carbon	2
R-3					
R-4	B84391	390	0.5	Carbon	2
R-12					
R-5	B85330	33	0.5	Carbon	1
R-6					
R-11	B84152	1500	0.5	Carbon	4
R-13					
R-22					
R-7	B84153	15k	0.5	Carbon	1
R-8	B84123	12k	0.5	Carbon	1

Ref. No.	Part No.	Description	Qty. Used
R-9			
R-18	B85335	3.3 meg 0.5 Carbon	3
R-23			
R-10	B85225	2.2 meg 0.5 Carbon	1
R-14	B84821	820 0.5 Carbon	1
R-15	B85473	47k 0.5 Carbon	1
R-16	36X310	500k Volume Control and Switch	1
R-17	D84820	82 2.0 Carbon	1
R-19	B85475	4.7 meg 0.5 Carbon	1
R-20	B84105	1.0 meg 0.5 Carbon	1
R-21	43X220	2000 7.0 W.W.	1

TRANSFORMERS & COILS

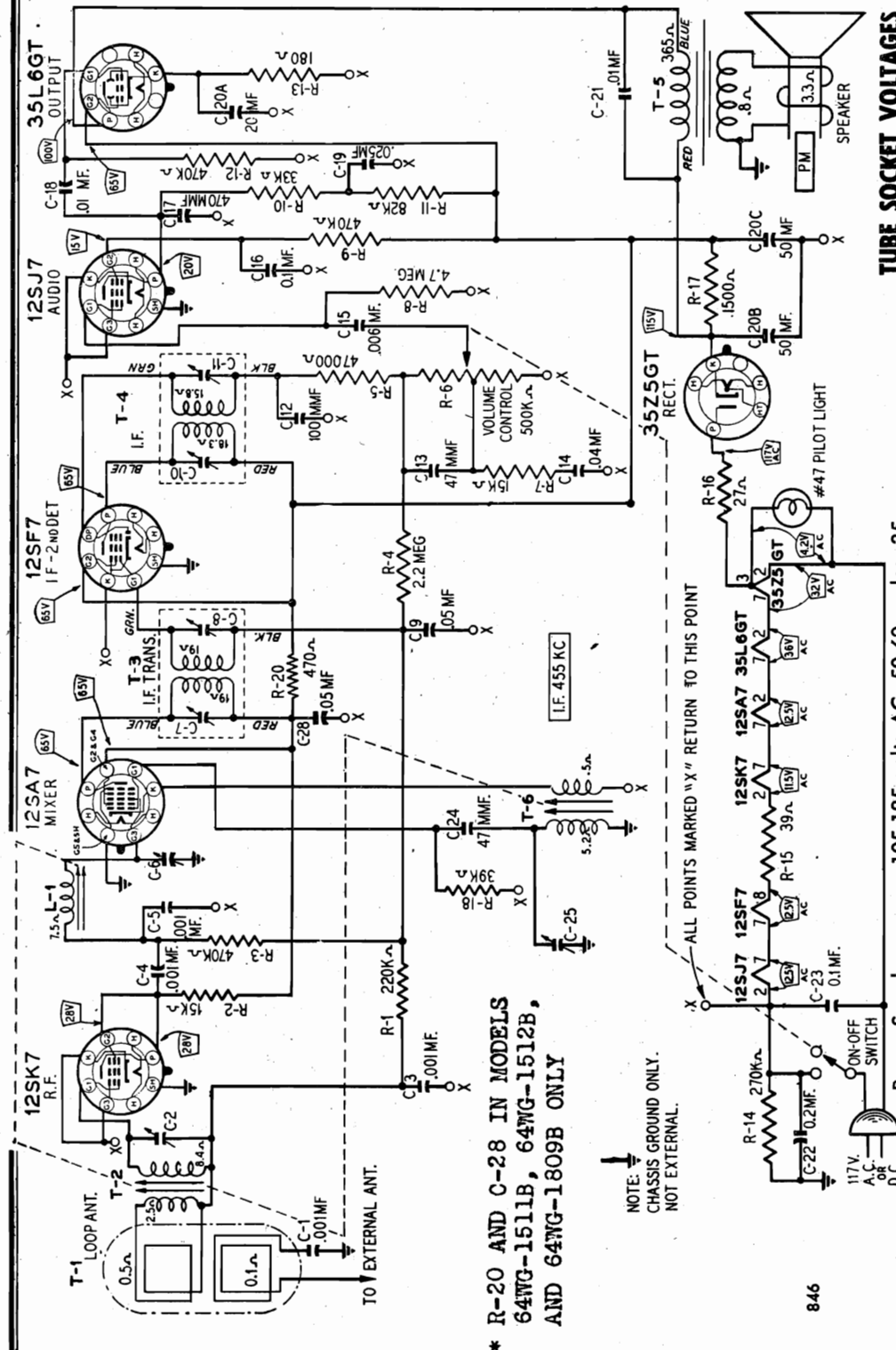
T-1	26A430	Loop Antenna Assembly	1
T-2	9A1893	Oscillator Coil Assembly	1
T-3	9A1889	1st I-F Transformer & Can Assembly	1
T-4	9A1890	2nd I-F Transformer & Can Assembly	1
T-5	51X130	Output Transformer	1

MISCELLANEOUS

12A446	5" P.M. Speaker	1
	Cone and Voice Coil Assembly. (Specify part number and letters stamped on speaker)	
25A1019	Selenium Rectifier and Housing Assembly	1
3A312	Miniature Tube Socket	5
32X221	Tube Shield	4
11X131	Shield, Volume Control	1
2A368	Change over Switch (AC-DC, Battery Switch)	1
2A175	On-Off Switch (Economizer)	1
13X328	Line Cord and Plug Assembly	1
30X132	Line Cord Clamp	1
13X550	Battery Cable & Plug Assembly	1
4X954	Escutcheon & Grille Assembly	1
10A598	Knob (Volume)	1
10A421	Knob (Change over Switch)	1
10A300	Knob (Tuning)	1
15X235	Pointer Disc	2
19X446	Cup Washers	
6X52	Rubber Grommet (Mtg. Gang. Cond.)	2

MONTGOMERY WARD

MODELS 64WG-1511A,-1511B,
64WG-1512A,-1512B,
64WG-1809A,-1809B



TUBE SOCKET VOLTAGES

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages except those for the heater and dial lamp are between the socket terminal and "X" point.

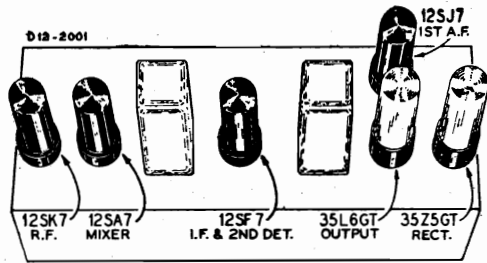
The readings were taken with a 1000 ohm-per-volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

Line voltage.....117 volts AC
Volume control.....maximum
Signal input.....none
A variation of $\pm 10\%$ is usually permissible.

Power Supply.....105-125 volts AC, 50-60 cycles, 35 watts or 105-125 volts DC
Frequency Range.....540-1600 KC
Selectivity.....At 1000 KC, 50 KC wide at 1000 times signal
Sensitivity.....(for .05 watt output with external antenna) 15 microvolts average
Power Output.....1.3 watts maximum
Loud Speaker......75 watt 10% distortion
Voice Coil Impedance.....4" x 6" PM dynamic
Voice Coil Impedance.....3.2 ohms at 400 cycles

MODELS 64WG-1511A,-1511B,
64WG-1512A,-1512B,
64WG-1809A,-1809B

MONTGOMERY WARD

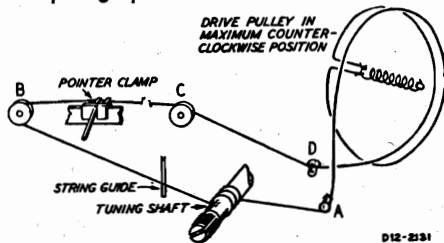


DRIVE CORD REPLACEMENT

Turn the large drive pulley counterclockwise to the stop position. Use a new drive cord 36" long and tie one end to the tension spring. Hook the other end of the tension spring over the tab on the drive pulley. Pass the cord through the slot on the drive pulley rim and continue around pulley 1 1/4 turns counterclockwise. Pass cord around stud A and wind three turns clockwise (from front of chassis) around the tuning shaft. Turns must progress away from chassis. Run the cord in front of the string guide, then pass cord around pulleys B and C and stud D. Pass cord under drive pulley and wind 3/4 turn counterclockwise around drive pulley. Stretch tension spring and tie free end of cord to spring. Cut off any excess string.

Note: On sets having a black vinylite sleeve on the tuning shaft wind only two turns clockwise around the tuning shaft.

Attach the dial pointer to the cord and position, as instructed in paragraph DIAL CALIBRATION.



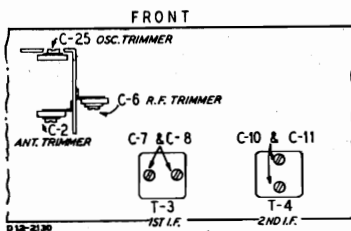
ALIGNMENT PROCEDURE

Check dial pointer position, see Dial Calibration paragraph.

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The equipment in column at right is required for aligning:



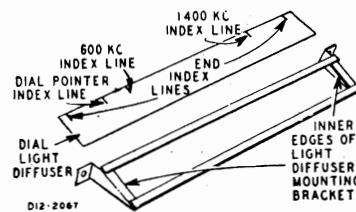
NOTE A:—Index line is on dial light diffuser strip. See DIAL CALIBRATION paragraph.

DIAL CALIBRATION

In order to align the receiver, the dial pointer must be positioned on the dial string correctly with reference to the dial. Index lines are provided on the dial light diffuser for this purpose.

Before aligning the receiver (or when replacing the dial light diffuser) check the position of the diffuser strip, making certain that the two end index lines are aligned with the inner edges of the diffuser mounting bracket opening. The bracket should be crimped at one point to prevent movement of the diffuser strip. To position the dial pointer, adjust the radio to the stop position at the low frequency end of the dial. The dial pointer should be directly over the dial pointer index line (see illustration). If not, move the pointer along the drive cord until it is directly over the index line.

The 1400 KC index line is for use when aligning the receiver.



TUNING ASSEMBLY SERVICE

Exact requirements in the tuning assembly make it impractical to replace the drive cord, coils and components in this assembly other than the trimmer condensers. Should the drive cord break, or components other than the trimmer condensers require service, the entire assembly must be ordered and replaced as a unit.

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 50 mmf.

SIGNAL GENERATOR			Coupling Capacitor	DIAL SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT IN ORDER SHOWN (See Trimmer Illustration)
Frequency Setting	Connection to Receiver	Ground Connection			
455 kc	Control Grid 12SF7—I-F (Prong No. 2)	Point "X" 12SK7—R-F (Prong No. 3)	.1 mf	1600 kc	2nd I-F (C10) & (C11)
455 kc	Control Grid 12SA7—1st Det. (Prong No. 8)	Same as above	.1 mf	1600 kc	1st I-F (C7) & (C8)
1400 kc	Control Grid 12SA7—1st Det. (Prong No. 8)	Same as above	.1 mf	1400 kc Index Line. See Note A	Oscillator (C25)
1400 kc	External Antenna Clip on Loop	Chassis	50 mmf	1400 kc Index Line. See Note A	R-F (C-6) Antenna (C-2)

MONTGOMERY WARD

MODELS 64WG-1511A,-1511B,
64WG-1512A,-1512B,
64WG-1809A,-1809B

RECEIVER STAGE SENSITIVITIES		SIGNAL GENERATOR		INPUT FOR 50 MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	
1000 kc	200 mmf or RMA Dummy Antenna	Loop Antenna— External antenna clip	Chassis	15 microvolts
1000 kc	.05 mf.	12SA7 Mixer—Pin 8	Point "X" (12SK7 Pin 3)	100 microvolts
455 kc	.05 mf.	12SA7 Mixer—Pin 8	Same as above	80 microvolts
455 kc	.05 mf.	12SF7 I-F—Pin 2	Same as above	3500 microvolts
400 cycles	.05 mf.	12SJ7 1st A-F—Pin 4	Same as above	.042 volts
400 cycles	.05 mf.	35L6GT Output—Pin 5	Same as above	1 volt

Ref. No.	Part No.	Description	Qty. Used in Set
CAPACITORS			
C-1	D67102	.001 mf 400 V Tubular	1
C-2	17A238	4-70 mmf Trimmer	1
C-3 } C-4 } C-5 }	B67102	.001 mf 200 V Tubular	3
C-6	17A243	4-70 mmf Trimmer	1
C-7 } C-8 }	Part of T-3, 1st I-F Transformer		
C-9	B66503	.05 mf 200 V Tubular	1
C-10 } C-11 }	Part of T-4, 2nd I-F Transformer		
C-12	47X476	100 mmf Molded	1
C-13	47X463	47 mmf Molded	1
C-14	B67403	.04 mf 200 V Tubular	1
C-15	B67602	.006 mf 200 V Tubular	1
C-16	B66104	0.1 mf 200 V Tubular	1
C-17	47X467	470 mmf Molded	1
C-18 } C-21 }	B66103	.01 mf 200 V Tubular	2
C-19	B67253	.025 mf 200 V Tubular	1
C-20A } C-20B } C-20C }	45X344	20 mf 25 V } Dry electrolytic 50 mf 150 V } capacitor 50 mf 150 V }	1
C-22	B67204	0.2 mf 200 V Tubular	1
C-23	D67104	0.1 mf 400 V Tubular	1
C-24	47X446	47 mmf Molded	1
C-25	17A239	40-370 mmf Trimmer	1
*C-28	B67503	.05 mf Tubular	1
RESISTORS			
OHMS WATTS			
R-1	B85224	220,000 0.5 Carbon	1
R-2 } R-7 }	B84153	15,000 0.5 Carbon	2
R-3 } R-12 }	B85474	470,000 0.5 Carbon	2
R-4	B85225	2.2 meg. 0.5 Carbon	1
R-5	B85473	47,000 0.5 Carbon	1
R-6	36X347	500,000 Volume control and switch	1
R-8	B85475	4.7 meg. 0.5 Carbon	1
R-9	B84474	470,000 0.5 Carbon	1
R-10	B84333	33,000 0.5 Carbon	1
R-11	B84823	82,000 0.5 Carbon	1
R-13	B83181	180 0.5 Carbon	1
R-14	B84274	270,000 0.5 Carbon	1
R-15	D84390	39 2.0 Carbon	1
R-16	B84270	27 0.5 Carbon	1
R-17	C84152	1500 1.0 Carbon	1
R-18	B84393	39,000 0.5 Carbon	1
*R-20	B85471	470 0.5 Carbon	1

Ref. No.	Part No.	Description	Qty. Used in Set
TRANSFORMERS AND COILS			
L-1	Part of tuning assembly		
T-1	9A1803	"B" Range loop antenna (for ivory plastic cabinet)	1
T-1	9A1773	"B" Range loop antenna (for walnut plastic cabinet)	1
T-1	9A1863	"B" Range loop antenna (for walnut wood cabinet)	1
T-2	Part of tuning assembly		
T-3	9A1775	1st I-F Transformer and can assembly	1
T-4	9A1776	2nd I-F Transformer and can assembly	1
T-5	51X116	Output transformer	1
T-6	Part of tuning assembly		

DIAL AND DRIVE ASSEMBLY

20A97	Tuning assembly complete with coils, trimmers, etc.	1
11X119	Fibre shield (tuner housing)	1
28X518	Trimount stud (mtg. fibre shield)	5
26X464	Drive shaft	1
28X512	Ground spring (drive shaft)	1
19X192	"C" washer	2
25X1384	Pointer bracket	1
24X446	Idler pulley	2
41X78	Dial light diffuser	1
25X1385	Holder, light diffuser	1
15X217	Pointer	1
25X1398	Pilot light bracket	1
	3 ft. drive cord (18 lb. test)	1
28X95	Drive cord tension spring	1
7A192	Pilot light socket assembly	1
	Pilot light No. 47	1
58X645	Dial (for ivory plastic cabinet)	1
58X646	Dial (for walnut plastic cabinet)	1
58X650	Dial (for walnut wood cabinet)	1
25X1461	Dial Bracket	1
4X884	Escutcheon	1
25X1460	Escutcheon Mtg. Bracket	2

MISCELLANEOUS

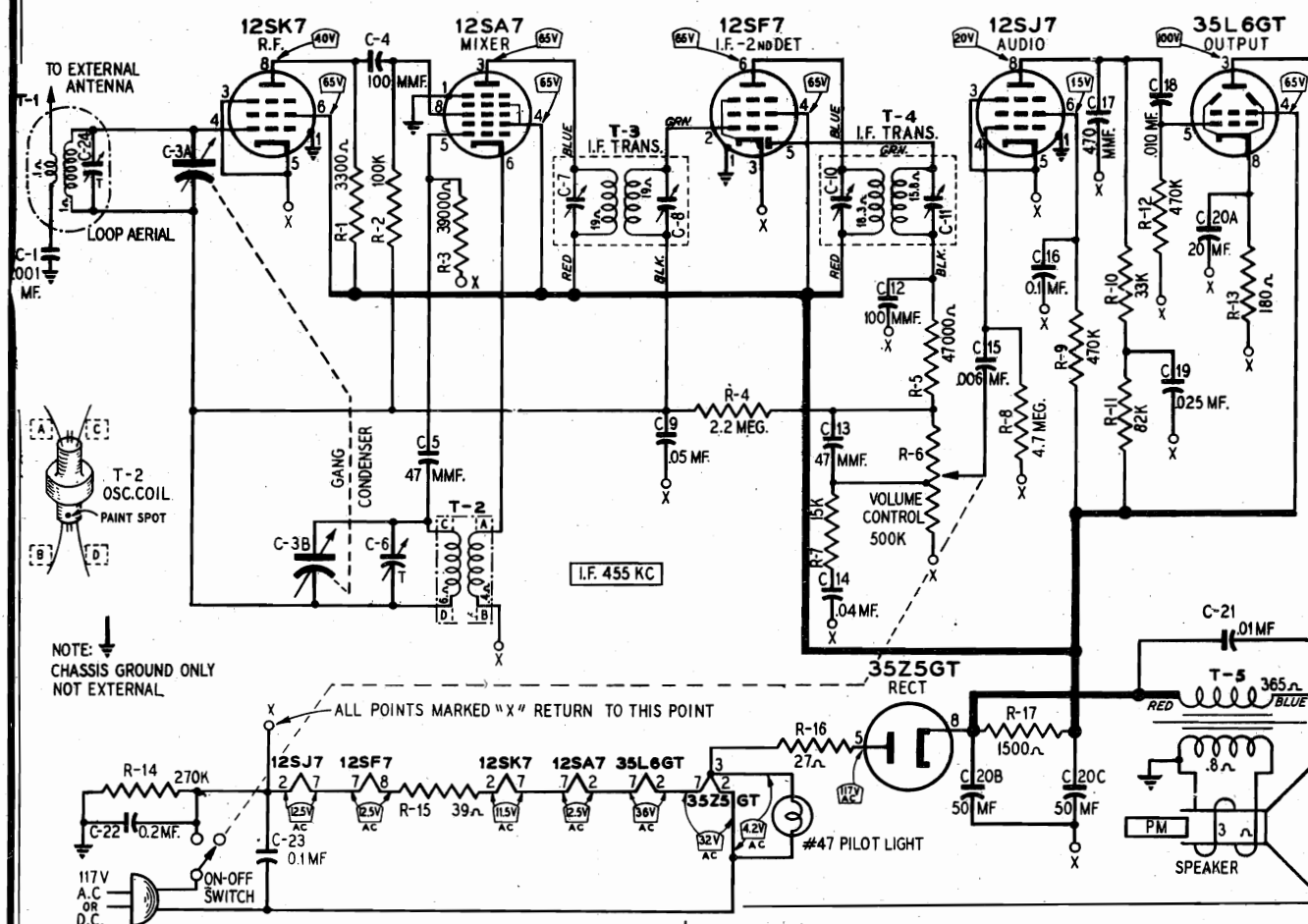
12A431	4" x 6" speaker with mounting bracket	1
	Cone and voice coil assembly for speaker (specify part number and letters stamped on speaker)	1
3A303	Tube socket—octal (8 prong) molded	5
* * 26A426	Tube socket and shield assembly	1
10A297	Knob, volume control and line switch; tuning (for walnut cabinets)	2
10A300	Knob, volume control and line switch; tuning (for ivory plastic cabinet)	2
28X292	Snap button (mtg. loop to cabinet)	2
	6 x 1/4" slotted hex head P-K type "Z" screw (mtg. loop to chassis)	2
55X249	Cabinet (ivory plastic)	1
55X264	Cabinet (walnut plastic)	1
13X328	Line cord and plug assembly	1

* IN MODELS 64WG-1511B, 64WG-1512B, 64WG-1809B ONLY

** PART NO. 3A421 IN MODELS 64WG-1511A, 64WG-1512A, 64WG-1809A

MODEL 64WG-1804A

MONTGOMERY WARD



Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages except those for the heater and dial lamp are between the socket terminal and "X" point.

The readings were taken with a 1000 ohm-per-volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

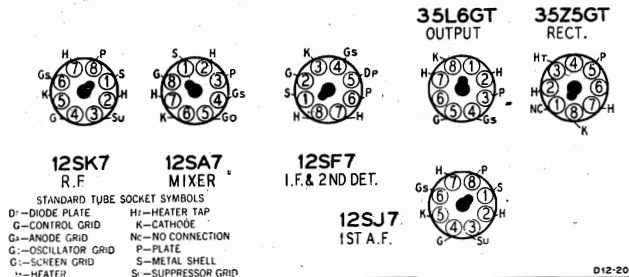
Line voltage 117 volts AC

Volume control maximum

Signal input none

A variation of $\pm 10\%$ is usually permissible.

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm 5 watt resistor across the secondary winding of the output transformer. A reading of .4 volts AC



across this resistor will be equivalent to a 50 milliwatt output with the speaker connected. The volume control must be set to maximum. The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations of Plus or Minus 25% are usually permissible.

SIGNAL GENERATOR				INPUT FOR 50 MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	
1000 kc	200 mmf or RMA Dummy Antenna	Loop Antenna— External antenna clip	Chassis	19.5 microvolts
1000 kc	.05 mf.	12SA7 Mixer—Pin 8	Point "X" (12SK7 Pin 3)	150 microvolts
455 kc	.05 mf	12SA7 Mixer—Pin 8	Same as above	100 microvolts
455 kc	.05 mf	12SF7 I-F—Pin 2	Same as above	3500 microvolts
400 cycles	.05 mf	12SJ7 1st A-F—Pin 4	Same as above	.042 volts
400 cycles	.05 mf	35L6GT Output—Pin 5	Same as above	1 volt

MONTGOMERY WARD

MODEL 64WG-1804A

Power Supply.....105-125 volts AC, 50-60 cycles, 35 watts or 105-125 volts DC

Frequency Range.....535-1620 KC

Intermediate Frequency .455 KC

Selectivity.....At 1000 KC, 50 KC wide at 1000 times signal

Sensitivity.....(for .05 watt output with external antenna) 15 microvolts average

Power Output.....1.3 watts maximum
.75 watt 10% distortion

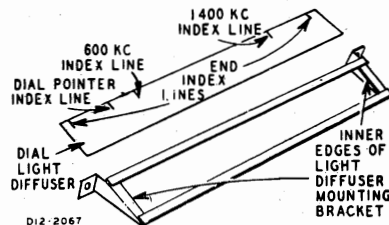
Loud Speaker.....4"x 6" PM dynamic

Voice Coil Impedance...3.2 ohms at 400 cycles

In order to align the receiver, the dial pointer must be positioned on the dial string correctly with reference to the dial. Index lines are provided on the dial light diffuser for this purpose.

Before aligning the receiver (or when replacing the dial light diffuser) check the position of the diffuser strip, making certain that the two end index lines are aligned with the inner edges of the diffuser mounting bracket opening. The bracket should be crimped at one point to prevent movement of the diffuser strip. To position the dial pointer, turn the gang condenser to the fully closed position. The dial pointer should be directly over the dial pointer index line. (See illustration)

The 1400 KC index line is for use when aligning the receiver.

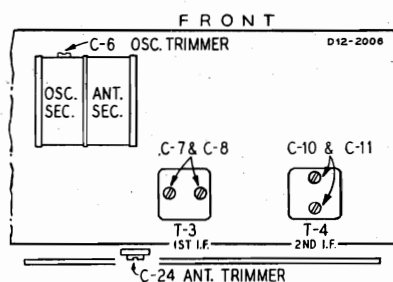


Check dial pointer position, see Dial Calibration paragraph.

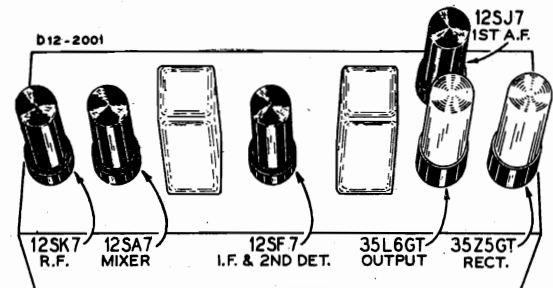
Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

The equipment in column at right is required for aligning:



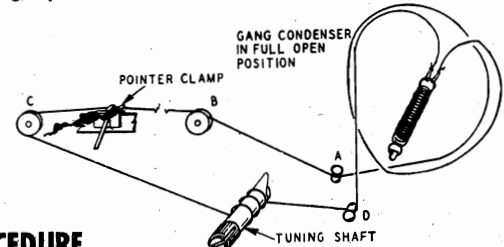
NOTE A:—Index line is on dial light diffuser strip. See DIAL CALIBRATION paragraph.



DRIVE CORD REPLACEMENT

Turn the gang condenser to the fully open position. Use a new drive cord 36" long and tie one end to the tension spring. Hook the other end of the tension spring over the tab on the drive pulley. Pass the cord through the slot on the drive pulley rim and continue around pulley 1/2 turn counterclockwise. Pass cord around stud D and wind three turns clockwise (from front of chassis) around the tuning shaft. Turns must progress away from chassis. Pass cord around pulleys C and B and stud A. Pass cord under drive pulley and wind 1 1/2 turns counterclockwise around drive pulley. Stretch tension spring and tie free end of cord to spring. Cut off any excess string.

Attach the dial pointer to the cord and position as instructed in paragraph DIAL CALIBRATION.



ALIGNMENT PROCEDURE

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 50 mmf.

SIGNAL GENERATOR			Coupling Capacitor	DIAL SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT IN ORDER SHOWN (See Trimmer Illustration)
Frequency Setting	Connection to Receiver	Ground Connection			
455 kc	Control Grid 12SF7—I-F (Prong No. 2)	Point "X" 12SK7—R-F (Prong No. 3)	.1 mf	Turn Rotor to full open	2nd I-F (C10) & (C11)
455 kc	Control Grid 12SA7—1st Det. (Prong No. 8)	Same as above	.1 mf	Turn Rotor to full open	1st I-F (C7) & (C8)
1400 kc	Control Grid 12SA7—1st Det. (Prong No. 8)	Same as above	.1 mf	Turn Rotor to 1400 kc Index Line. See Note A	Oscillator (C6)
1400 kc	External Antenna Clip on Loop	Chassis	50 mmf	Turn Rotor to 1400 kc Index Line. See Note A	Antenna (C24)

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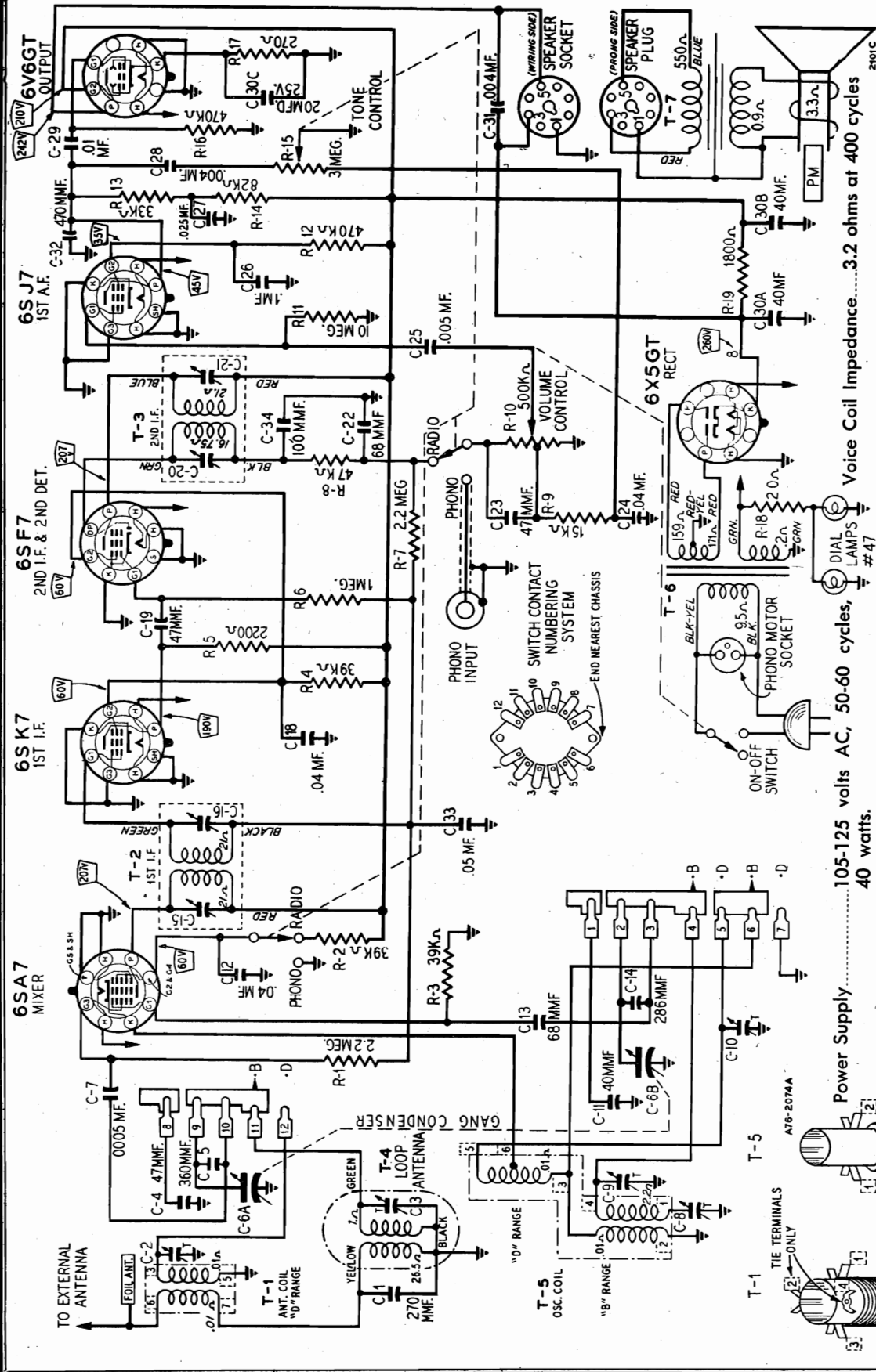
MONTGOMERY WARD

Ref. No.	Part No.	Description	Qty. Used in Set
CAPACITORS			
C-1	D66102	.001 mf 400 V Tubular.....	1
C-2	14A179	Part of C-3	
C-6			
C-3A C-3B		Gang condenser with pulley.....	1
C-4	47X476	100 mmf Molded.....	2
C-12	47X446	47 mmf Molded.....	1
C-5	B66503	Part of T-3, 1st I-F Transformer	
C-7			
C-8			
C-9	B66503	.05 mf 200 V Tubular.....	1
C-10		Part of T-4, 2nd I-F Transformer	
C-11			
C-13	47X463	47 mmf Molded.....	1
C-14	B66403	.04 mf 200 V Tubular.....	1
C-15	B66602	.006 mf 200 V Tubular.....	1
C-16	B66104	.1 mf 200 V Tubular.....	1
C-17	47X467	470 mmf Molded.....	1
C-18	B66103	.01 mf 200 V Tubular.....	2
C-21			
C-19		.025 mf 200 V Tubular.....	1
C-20A	45X344	20 mf 25 V Dry electrolytic	1
C-20B		50 mf 150 V condenser	
C-20C		50 mf 150 V	
C-22	B66204	0.2 mf 200 V Tubular.....	1
C-23	D66104	.1 mf 400 V Tubular.....	1
C-24	17A116	2.5-23 mmf Trimmer.....	1
RESISTORS			
		Ohms Watts	
R-1	B84332	3300 0.5 Carbon.....	1
R-2	B85104	100,000 0.5 Carbon.....	1
R-3	B84393	39,000 0.5 Carbon.....	1
R-4	B85225	2.2 meg. 0.5 Carbon.....	1
R-5	B85473	47,000 0.5 Carbon.....	1
R-6	36X347	500,000 Volume control and switch	1
R-7	B84153	15,000 0.5 Carbon.....	1
R-8	B85475	4.7 meg. 0.5 Carbon.....	1
R-9	B84474	470,000 0.5 Carbon.....	1
R-10	B84333	33,000 0.5 Carbon.....	1
R-11	B84823	82,000 0.5 Carbon.....	1
R-12	B85474	470,000 0.5 Carbon.....	1
R-13	B83181	180 0.5 Carbon.....	1
R-14	B85274	270,000 0.5 Carbon.....	1
R-15	D84390	39 2.0 Carbon.....	1
R-16	B84270	27 0.5 Carbon.....	1
R-17	C84152	1500 1.0 Carbon.....	1

Ref. No.	Part No.	Description	Qty. Used in Set
TRANSFORMERS AND COILS			
T-1	9A1804	"B" Range loop antenna (wood mantel).....	1
T-2	9A1805	Oscillator coil assembly.....	1
T-3	9A1775	1st I-F Transformer and can assembly	1
T-4	9A1776	2nd I-F Transformer and can assembly	1
T-5	51X116	Output transformer.....	1
DIAL AND DRIVE ASSEMBLY			
	24X446	Idler pulley.....	2
	25X1382	Idler bracket.....	1
	6X21	Rubber grommets	3
	57X176	Mounting plate	1
	20X329	Cond. cushion stud	3
	58X594	Dial (for wood mantel).....	1
	25X1461	Dial bracket (for dial 58X594).....	1
	25X1384	Pointer bracket.....	1
	15X217	Pointer.....	1
	25X1398	Pilot light bracket.....	1
	7A192	Pilot light socket assembly.....	1
		Pilot light No. 47.....	1
		3 ft. drive cord (18 lb. test).....	1
	28X44	Drive cord tension spring.....	1
	26X464	Drive shaft (tuning).....	1
	19X192	"C" washer for above drive shaft....	2
	41X69	Dial light diffuser.....	1
	25X1385	Holder, light diffuser.....	1
	4X884	Escutcheon (wood mantel only).....	1
	25X1460	Escutcheon mounting bracket.....	2
MISCELLANEOUS			
	12A431	4" x 6" speaker with mounting bracket	1
		Cone and voice coil assembly for the above speaker (specify part number and letters stamped on above speaker).....	1
	3A303	Tube socket—octal (8 prong) molded	5
	3A421	Tube socket—octal (8 prong) with shield.....	1
	10A297	Knob (walnut) on-off switch, volume control and tuning.....	2
	28X292	Snap button (mounting loop to cabinet)	2
		6 x 1/4" slotted hex head P-K type "Z" screw (mounting loop to chassis)...	2
	13X328	Line cord and plug assembly.....	1

MONTGOMERY WARD

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TUBE SOCKET VOLTAGES

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages are between the socket terminal and chassis ground.

The readings were taken with a 1000 ohm per volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

Power Supply..... 105-125 volts AC, 50-60 cycles, 40 watts.

Frequency Range..... B range—540-1600 KC
D range—9 to 15.6 MC

Intermediate Frequency..... 455 KC

Voice Coil Impedance..... 3.2 ohms at 400 cycles

Line voltage..... 117 volts AC 646

Volume control..... maximum

Signal input..... none

A variation of $\pm 10\%$ is usually permissible.

COIL TERMINALS

T-1 TIE TERMINALS ONLY

T-5 OSC. COIL RANGE "B" & "D"

T-4 ANT. COIL RANGE "D"

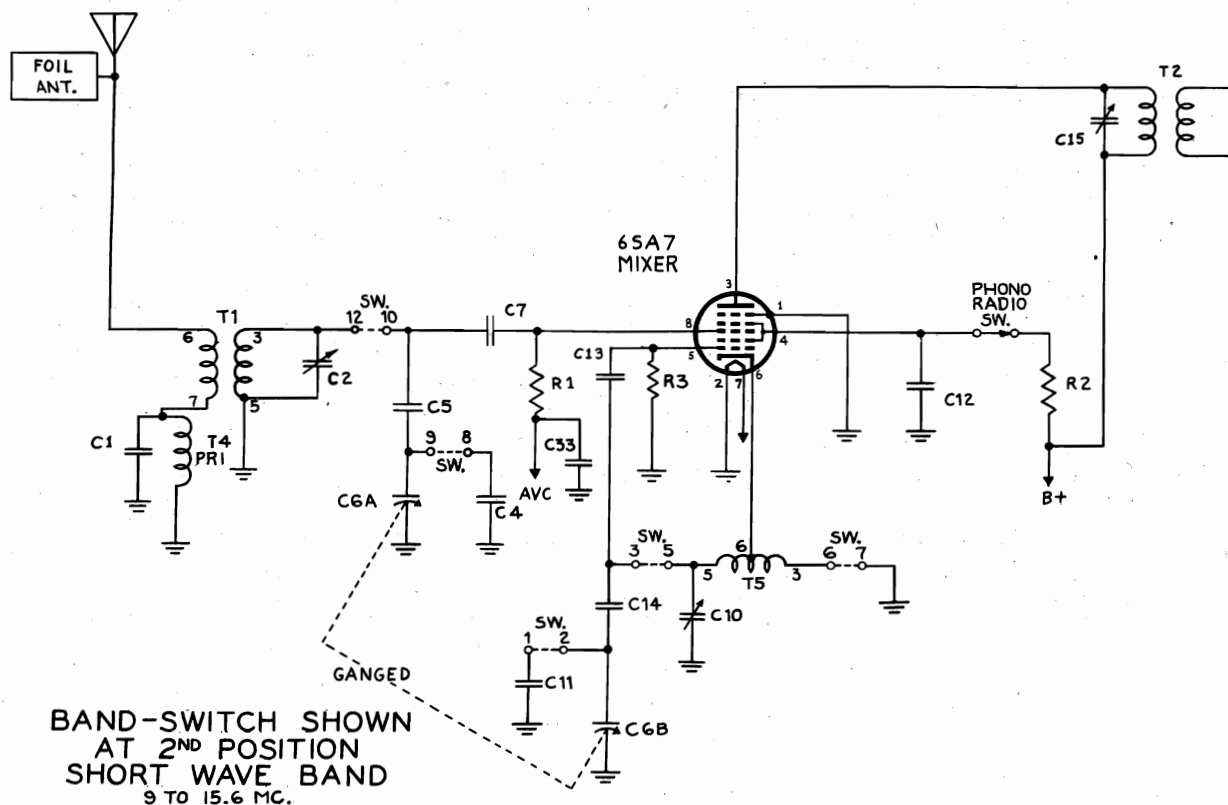
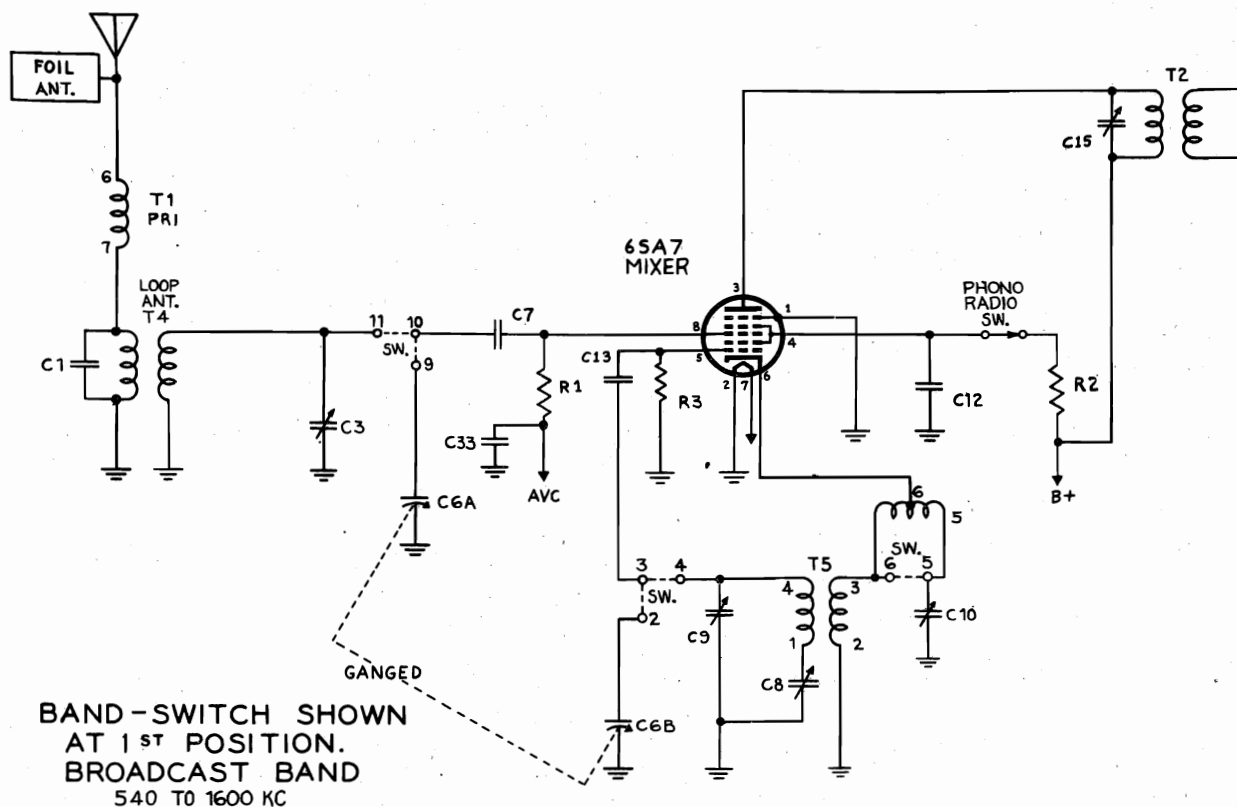
T-3 2ND I.F. & 2ND DET.

T-2 1ST I.F.

T-1 ANT. COIL RANGE "D"

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MONTGOMERY WARD

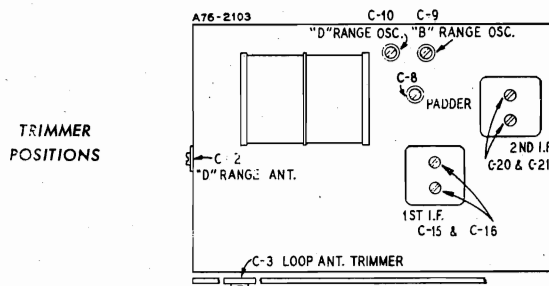
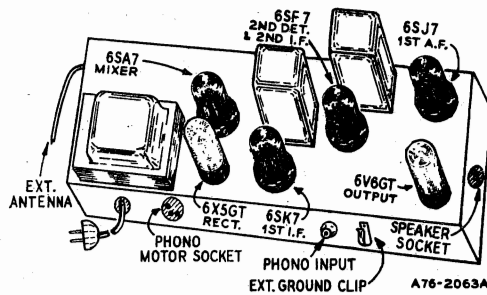


MONTGOMERY WARD

MODEL 64WG-1807A

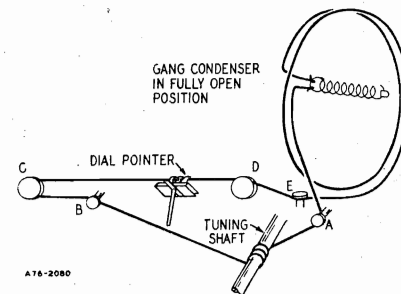
Selectivity.....40 KC broad at 1000 times signal,
1000 KC
Sensitivity.....(for .5 watt output) with external
antenna
B range—9 microvolts average
D range—20 microvolts average

Power Output.....4 watts maximum
2.3 watts, 10% distortion



DRIVE CORD REPLACEMENT

Turn the gang condenser to the fully open position. Use a new drive cord 46" long and tie one end to the tension spring. Hook the other end of the tension spring to the tab on the drive pulley. Pass the cord through the slot in the drive pulley rim and continue one half turn counterclockwise around the drive pulley. Then pass the cord around idler stud A and wind three turns clockwise around the tuning shaft (turns must progress away from chassis). Pass cord over idler stud B, around pulleys C and D and around idler stud E. Wrap cord counterclockwise around drive pulley, stretch the tension spring and tie free end of the cord to spring. Cut off any excess spring.



ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter; Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

	SIGNAL GENERATOR		Dummy Antenna	Band Switch Setting	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
	Frequency Setting	Connection at Radio				
I-F	455 kc	6SA7, Pin 8	.1 mf	B Range	Turn Rotor to Full Open	2nd I-F (C-20) & (C-21) 1st I-F (C-15) & (C-16)
RANGE B	1620 kc	Antenna Lead	100 mmf	B Range	Turn Rotor to Full Open	Oscillator Range B (C-9)
	1400 kc	Antenna Lead	100 mmf	B Range	Tune Rotor to Max. Output Set Indicator to 1400 KC See Note A	Antenna Range B (C-3)
	600 kc	Antenna Lead	100 mmf	B Range	Tune Rotor to Max. Output	600 kc (C-8) Rock Rotor—See Note B
Repeat above oscillator adjustments at 1620 and 600 KC until readjusting the oscillator Range B Trimmer (C-9) causes no further improvement in output.						
RANGE D	15.6 mc	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C-10)
	14 mc	Antenna Lead	400 Ohm	D Range	Tune Rotor to Max. Output	Antenna Range D (C-2) Rock Rotor—See Note B
LOOP RANGE B	Reassemble chassis in cabinet. 1400 kc	Antenna Lead	100 mmf	B Range	Tune Rotor to Max. Output	Antenna Range B (C-3)

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1400 KC on the dial, re-set

pointer at the 1400 KC mark on the dial scale.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

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MODEL 64WG-2009A

MONTGOMERY WARD

MODEL 64 WG-2009A RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity of the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm 5 watt resistor across the secondary winding of the output transformer. A reading of 4 volts AC across this resistor will be equivalent to a 50 milliwatt output with the speaker connected. The volume control must be set to maximum.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations of Plus or Minus 25% are usually permissible.

Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	INPUT FOR 50 MILLIWATT OUTPUT
1000 kc	200 mfd or RMA Dummy Antenna	Loop Antenna—External antenna clip	Chassis	15 microvolts
1000 kc	.05 mf.	125A7 Mixer—Pin 8	Point "X" (125K7 Pin 3)	100 microvolts
455 kc	.05 mf.	125A7 Mixer—Pin 8	Same as above	80 microvolts
455 kc	.05 mf.	125F7 I-F—Pin 2	Same as above	3500 microvolts
400 cycles	.05 mf.	125J7 1st A-F—Pin 4	Same as above	.042 volts
400 cycles	.05 mf.	35L6GT Output—Pin 5	Same as above	1 volt

REPLACEMENT PARTS LIST

Use only genuine factory tested parts to insure service jobs you can depend on and to obtain original set performance

Ref. No.	Part No.	Description	Qty. Used in Set
TRANSFORMERS AND COILS			
L-1	9A1817	Part of tuning assembly.	1
L-2	9A1817	"B" Range Loop Antenna.	1
L-3	9A1775	1st I-F Transformer and can assembly.	1
L-4	9A1776	2nd I-F Transformer and can assembly.	1
L-5	9A1776	Output Transformer.	1
L-6	9A1776	Part of tuning assembly.	1
DIAL AND DRIVE ASSEMBLY			
20A97		Tuning assembly, complete with coils, trimmer, etc.	1
11X119		Trimmer stud (imp. fire shield).	1
28X518		Drive shaft.	1
28X464		Ground spring (drive shaft).	1
18X512		Pointer bracket.	1
25X1384		Pointer bracket.	1
24X446		Idle pulley.	1
41X778		Dial light diffuser.	1
13X517		Pointer, light diffuser.	1
23X1396		Pilot light bracket.	1
39X95		40" drive cord (18 lb. test).	1
2A196		Pilot light socket.	1
58X651		Pilot light No. 47.	1
30X518		Dial lamp upper.	1
30X519		Dial lamp lower.	1
MISCELLANEOUS			
12A437		4" x 6" speaker with mounting bracket.	1
3A303		Cone and voice coil assembly for speaker.	1
3A421		Tube socket—octal (8 prong) molded with 10 pins.	1
3A303		Tube socket—octal (8 prong) with 10 pins.	1
3A422		Phone socket—single pin tip.	1
2A397		Phone socket—double pin tip.	1
10A297		Radio-phonograph switch.	1
10A297		Radio-phonograph control and line switch.	1
10A297		Knob, radio-phonograph.	1
13X328		Line cord and plug assembly.	1
TYPE G-28A15 RECORD CHANGER PARTS			
G-56-72092		Motor, 60 cycle 117V.	1
G-56-72096		Motor, 60 cycle 117V.	1
Crystal Cartridge		Crystal cartridge.	1
50 cycle adaptor spring bushing		50 cycle adaptor spring bushing.	1
G-33-72435		50 cycle adaptor spring bushing.	1
G-33-72436		50 cycle adaptor spring bushing.	1
G-33-72436		50 cycle adaptor spring bushing.	1

MODEL 64 WG-1607A RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity of the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of .5 watts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm 5 watt resistor across the secondary winding of the output transformer. A reading of 1.25 volts across this resistor will be equivalent to a .5 watt output with the speaker connected. The volume control must be set to maximum.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations of Plus or Minus 25% are usually permissible.

Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	INPUT FOR .5 WATT OUTPUT
1000 kc	200 mfd or RMA Dummy Antenna	External antenna lead (white)	Chassis	9 microvolts
1000 kc	.05 mf	65A7 Mixer, Pin 8	Same as above	42 microvolts
455 kc	.05 mf	65A7 Mixer, Pin 8	Same as above	40 microvolts
455 kc	.05 mf	65K7 1st I-F, Pin 4	Same as above	1075 microvolts
455 kc	.05 mf	65F7 2nd I-F, Pin 2	Same as above	3900 microvolts
400 cycles	.05 mf	65J7 1st A-F, Pin 4	Same as above	.08 volts
400 cycles	.05 mf	65V6GT Output, Pin 5	Same as above	3.75 volts

Ref. No.	Part No.	Description	Qty. Used in Set
CAPACITORS			
C-1	47A45	270 mfd	1
C-2	17A114	5-50 mfd	1
C-3	47A125	0.12 mfd	1
C-4	47A125	0.12 mfd	1
C-5	47A124	360 mfd	1
C-6	47A124	360 mfd	1
C-7	1A4178	Gang Condenser with Drive Pulley.	1
C-8	8A4501	5000 pf 200 V Tubular	1
C-9	17A155	350-450 mfd	1
C-10	17A155	350-450 mfd	1
C-11	47A472	0.05 mfd	1
C-12	47A472	0.05 mfd	1
C-13	47A463	400 V Tubular	2
C-14	47A463	400 V Tubular	2
C-15	47A463	400 V Tubular	2
C-16	47A463	400 V Tubular	2
C-17	47A463	400 V Tubular	2
C-18	47A463	400 V Tubular	2
C-19	47A463	400 V Tubular	2
C-20	47A463	400 V Tubular	2
C-21	47A463	400 V Tubular	2
C-22	47A463	400 V Tubular	2
C-23	47A463	400 V Tubular	2
C-24	47A463	400 V Tubular	2
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C-31	47A463	400 V Tubular	2
C-32	47A463	400 V Tubular	2
C-33	47A463	400 V Tubular	2
C-34	47A463	400 V Tubular	2
C-35	47A463	400 V Tubular	2
C-36	47A463	400 V Tubular	2
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C-44	47A463	400 V Tubular	2
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C-65	47A463	400 V Tubular	2
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C-69	47A463	400 V Tubular	2
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C-80	47A463	400 V Tubular	2
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C-89	47A463	400 V Tubular	2
C-90	47A463	400 V Tubular	2
C-91	47A463	400 V Tubular	2
C-92	47A463	400 V Tubular	2
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C-94	47A463	400 V Tubular	2
C-95	47A463	400 V Tubular	2
C-96	47A463	400 V Tubular	2
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C-124	47A463	400 V Tubular	2
C-125	47A463	400 V Tubular	2
C-126	47A463	400 V Tubular	2
C-127	47A463	400 V Tubular	2
C-128	47A463	400 V Tubular	2
C-129	47A463	400 V Tubular	2
C-130	47A463	400 V Tubular	2
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C-142	47A463	400 V Tubular	2
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C-177	47A463	400 V Tubular	2
C-178	47A463	400 V Tubular	2
C-179	47A463	400 V Tubular	2
C-180	47A463	400 V Tubular	2
C-181	47A463	400 V Tubular	2
C-182	47A463	400 V Tubular	2
C-183	47A463	400 V Tubular	2
C-184	47A463	400 V Tubular	2
C-185	47A463	400 V Tubular	2
C-186	47A463	400 V Tubular	2
C-187	47A463	400 V Tubular	2
C-188	47A463	400 V Tubular	2
C-189	47A463	400 V Tubular	2
C-190	47A463	400 V Tubular	2
C-191	47A463	400 V Tubular	2
C-192	47A463	400 V Tubular	2
C-193	47A463	400 V Tubular	2
C-194	47A463	400 V Tubular	2
C-195	47A463	400 V Tubular	2
C-196	47A463	400 V Tubular	2
C-197	47A463	400 V Tubular	2
C-198	47A463	400 V Tubular	2
C-199	47A463	400 V Tubular	2
C-200	47A463	400 V Tubular	2
C-201	47A463	400 V Tubular	2
C-202	47A463	400 V Tubular	2
C-203	47A463	400 V Tubular	2
C-204	47A463	400 V Tubular	2
C-205	47A463	400 V Tubular	2
C-206	47A463	400 V Tubular	2
C-207	47A463	400 V Tubular	2
C-208	47A463	400 V Tubular	2
C-209	47A463	400 V Tubular	2
C-210	47A463	400 V Tubular	2
C-211	47A463	400 V Tubular	2
C-212	47A463	400 V Tubular	2
C-213	47A463	400 V Tubular	2
C-214	47A463	400 V Tubular	2
C-215	47A463	400 V Tubular	2
C-216	47A463	400 V Tubular	2
C-217	47A463	400 V Tubular	2
C-218	47A463	400 V Tubular	2
C-219	47A463	400 V Tubular	2
C-220	47A463	400 V Tubular	2
C-221	47A463	400 V Tubular	2
C-222	47A463	400 V Tubular	2
C-223	47A463	400 V Tubular	2
C-224	47A463	400 V Tubular	2
C-225	47A463	400 V Tubular	2
C-226	47A463	400 V Tubular	2
C-227	47A463	400 V Tubular	2
C-228	47A463	400 V Tubular	2
C-229	47A463	400 V Tubular	2
C-230	47A463	400 V Tubular	2
C-231	47A463	400 V Tubular	2
C-232	47A463	400 V Tubular	2
C-233	47A463	400 V Tubular	2
C-234	47A463	400 V Tubular	2
C-235	47A463	400 V Tubular	2
C-236	47A463	400 V Tubular	2
C-237	47A463	400 V Tubular	2
C-238	47A463	400 V Tubular	2
C-239	47A463	400 V Tubular	2
C-240	47A463	400 V Tubular	2
C-241	47A463	400 V Tubular	2
C-242	47A463	400 V Tubular	2
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C-245	47A463	400 V Tubular	2
C-246	47A463	400 V Tubular	2
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C-250	47A463	400 V Tubular	2
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C-258	47A463	400 V Tubular	2
C-259	47A463	400 V Tubular	2
C-260	47A463	400 V Tubular	2
C-261	47A463	400 V Tubular	2
C-262	47A463	400 V Tubular	2
C-263	47A463	400 V Tubular	2
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C-273	47A463	400 V Tubular	2
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C-275	47A463	400 V Tubular	2
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C-283	47A463	400 V Tubular	2
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C-285	47A463	400 V Tubular	2
C-286	47A463	400 V Tubular	2
C-287	47A463	400 V Tubular	2
C-288	47A463	400 V Tubular	2
C-289	47A463	400 V Tubular	2
C-290	47A463	400 V Tubular	2
C-291	47A463	400 V Tubular	2
C-292	47A463	400 V Tubular	2
C-293	47A463	400 V Tubular	2
C-294	47A463	400 V Tubular	2
C-295	47A463	400 V Tubular	2
C-296	47A463	400 V Tubular	2
C-297	47A463	400 V Tubular	2
C-298	47A463	400 V Tubular	2
C-299	47A463	400 V Tubular	2
C-300	47A463	400 V Tubular	2
C-301	47A463	400 V Tubular	2
C-302	47A463	400 V Tubular	2
C-303	47A463	400 V Tubular	2
C			

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Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages except those for the heater and dial lamp are between the socket terminal and "X" point.

The readings were taken with a 1000 ohm-per-volt meter and all plate and screen voltages read on a 500 volt scale.

Conditions of measurement are:

Line voltage..... 117 volts AC

Volume control.....maximum

Signal input...

Power Supply..... 105-125 volts AC, 60 cycles, 35 watts (55 watts phono operating)

Frequency Range.....540-1600 KC

Intermediate Frequency.....455 KC

Selectivity.....At 1000 KC, 50 KC wide at 1000 times signal

Sensitivity.....(for .05 watt output with external antenna) 15 microvolts average

Power Output.....1.3 watts maximum

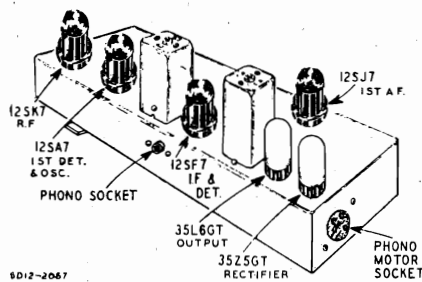
.75 watt 10% distortion

Loud Speaker.....4"x6" PM dynamic

Voice Coil Impedance...3.2 ohms at 400 cycles

MODEL 64WG-2009A

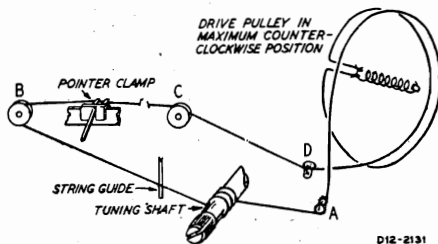
MONTGOMERY WARD



DRIVE CORD REPLACEMENT

The illustration below shows the method of stringing the drive cord. Use a new drive cord 40" long and tie one end to the tension spring. Hook the other end of the tension spring over the tab on the drive pulley. Pass the cord through the slot in the pulley rim and continue counter-clockwise around the pulley as shown. Three turns must be wound around the tuning shaft in a clockwise direction with the turns progressing away from the chassis. (On sets with a black vinylite sleeve on the tuning shaft, wind only two turns around the shaft).

Attach the dial pointer to the cord and position, as instructed in paragraph DIAL CALIBRATION.



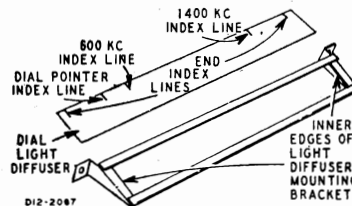
DIAL CALIBRATION

In order to align the receiver, the dial pointer must be positioned on the dial string correctly with reference to the dial. Index lines are provided on the dial light diffuser for this purpose.

Before aligning the receiver (or when replacing the dial light diffuser) check the position of the diffuser strip, making certain that the two end index lines are aligned with the inner edges of the diffuser mounting bracket opening. The bracket should be crimped to prevent movement of

the diffuser strip. To position the dial pointer, adjust the radio to the "stop" position at the low frequency end of the dial. The dial pointer should be directly over the dial pointer index line. (See illustration.) If not, move the pointer along the drive cord until it is directly over the index line.

The 1400 KC index line is for use when aligning the receiver.



TUNING ASSEMBLY SERVICE

Exact requirements in the tuning assembly make it impractical to replace the drive cord, coils and components in this assembly other than the trimmer condensers. Should the drive cord break, or components other than the trimmer condensers require service, the entire assembly must be ordered and replaced as a unit.

50 CYCLE OPERATION

If it is desired to use the radio and record player on a 50 cycle power supply, it will be necessary to install a new bushing on the motor shaft and to wire a 70 ohm, 20 watt resistor in series with the motor and the AC supply.

To install the new bushing, align the upper part of the center spindle with the lower part of the spindle and turn the record shelf to the 12" position. Lift the turntable off the record changer. On record players having a turned metal bushing fastened on with a set screw, loosen the set screw holding the old bushing to the motor shaft, remove the old pulley and install the new bushing No. G-25-72438.

On record players having a spring bushing on the motor shaft, remove the old spring bushing and install a new spring bushing No. G-33-72435.

On record players having no bushing on the motor shaft, install a spring bushing No. G-33-72436.

When replacing the turntable on the record player, make certain that the turntable rim is placed over both of the rubber drive pulleys.

ALIGNMENT PROCEDURE

Check dial pointer position, see Dial Calibration paragraph.

Volume Control—Maximum All Adjustments.

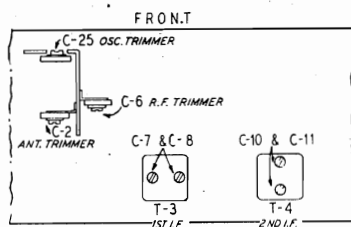
Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 50 mmf.



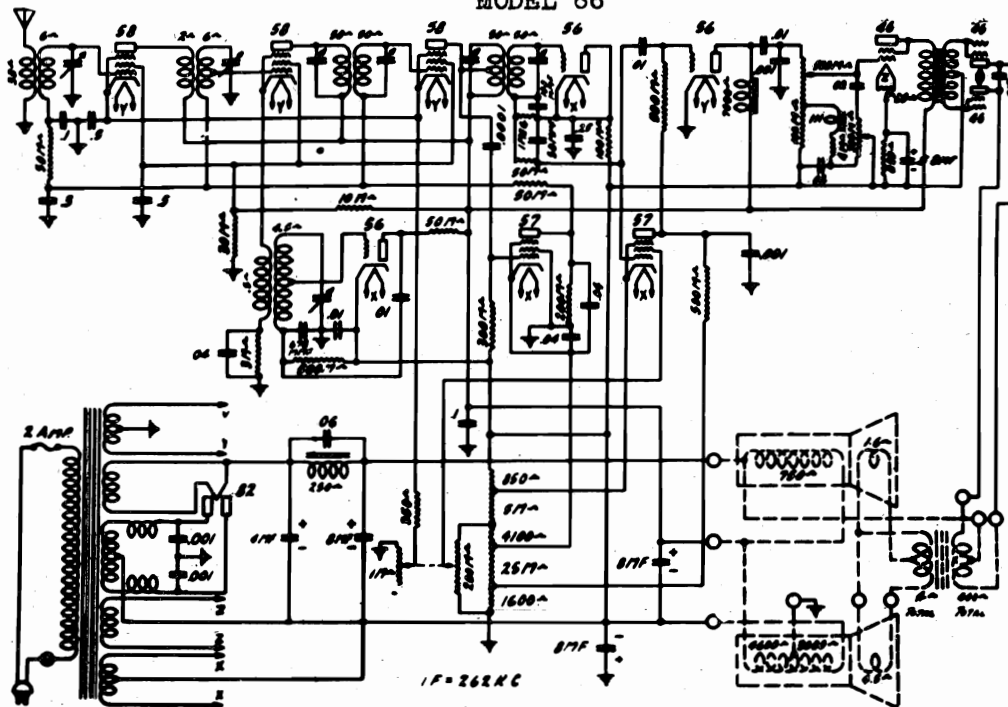
NOTE A:—Index line is on dial light diffuser strip. See DIAL CALIBRATION paragraph.

SIGNAL GENERATOR			Coupling Capacitor	DIAL SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT IN ORDER SHOWN (See Trimmer Illustration)
Frequency Setting	Connection to Receiver	Ground Connection			
455 kc	Control Grid 12SF7—I-F (Prong No. 2)	Point "X" 12SK7—R-F (Prong No. 3)	.1 mf	1600 KC	2nd I-F (C10) & (C11)
455 kc	Control Grid 12SA7—1st Det. (Prong No. 8)	Same as above	.1 mf	1600 KC	1st I-F (C7) & (C8)
1400 kc	Control Grid 12SA7—1st Det. (Prong No. 8)	Same as above	.1 mf	1400 kc Index Line. See Note A	Oscillator (C25)
1400 kc	External Antenna Clip on Loop	Chassis	50 mmf	1400 kc Index Line. See Note A	R-F (C-6) Antenna (C2)

MONTGOMERY WARD

MODELS 86, 3035, 3037,
3065, 3067

MODEL 86



MODELS 3035, 3037, 3065, 3067

R.F. Coils

Four coils are used in the chassis, and although they appear to be the same, there are three types and they cannot be interchanged.

To remove any one of the coils, remove the condenser shield, unsolder the wire leading from the condenser statof to the coil lug, remove the bottom plate of the chassis and bend out the three clips which hold the coil shield. Unsolder the leads to the coil and bend the clips holding the coil so that it may be removed. Handle any radio frequency coils carefully so the inside primary coil is not

bent out of position. If this happens the receiver will oscillate. You will notice a white wire wound one-quarter turn around the grid end of the secondary having one end soldered to the plate side of the primary. This wire acts as an R.F. coupling condenser and is shown in the schematic diagram Fig. 1 as a condenser. Unless the chassis is damaged it is very rarely that an R.F. coil has to be replaced.

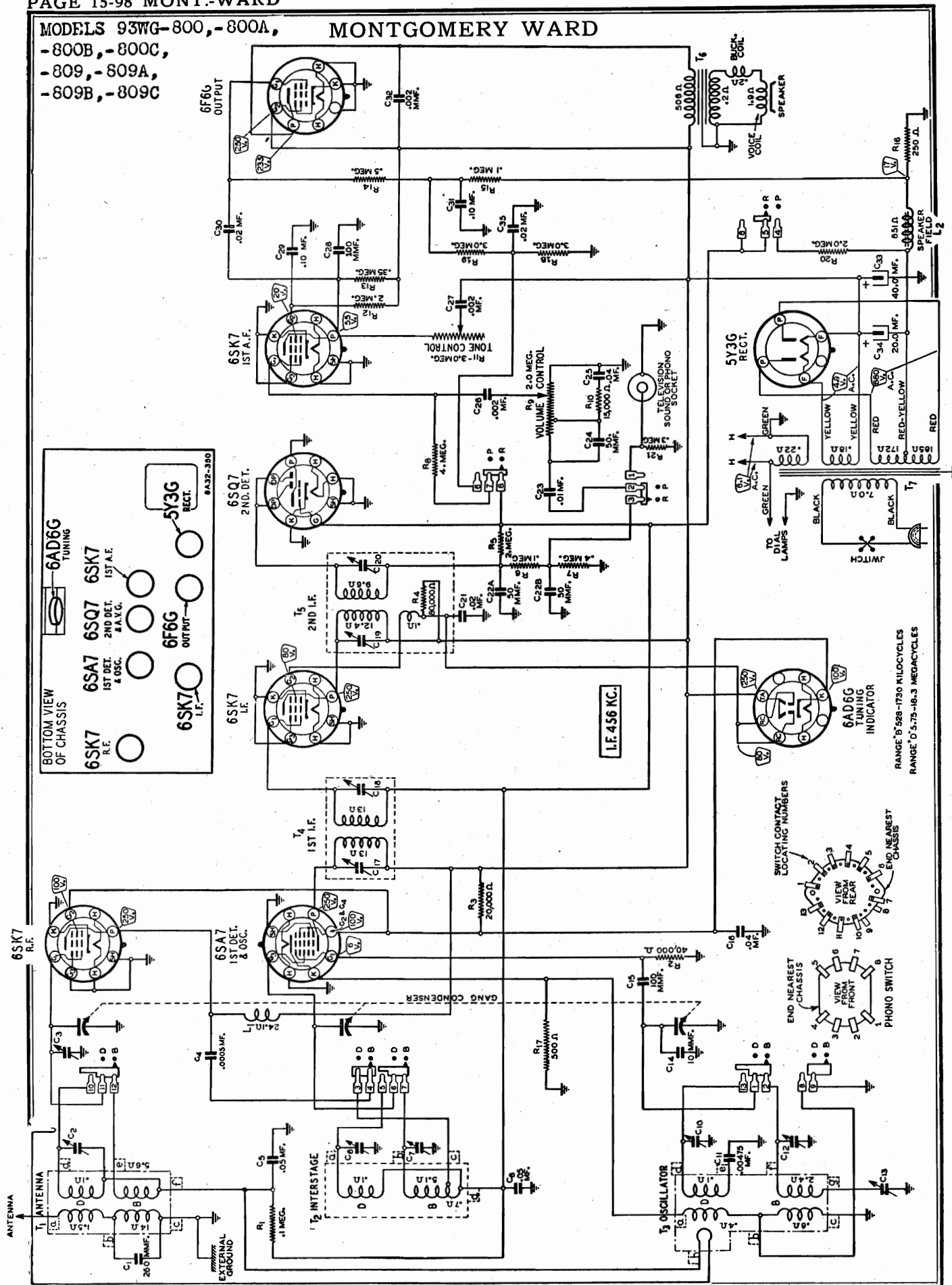
Part No.	Part Name	Selling Price	Your Cost	Part No.	Part Name	Selling Price	Your Cost
115	Pilot light bulb	\$ 0.25	\$ 0.07	1358	.04 mfd. condenser	.40	.10
1728	Knobs	.25	.07	861	Attachment cord	.60	.15
1727	Knobs	.25	.07	1816	Chassis harness	1.00	.27
1284	Bottom plate	1.00	.24	1817	R.F. harness	.20	.05
1834	Filter shield assembly	.35	.08	675	.1 condenser	.75	.14
1839	R.F. shield assembly	.90	.22	1612	.006 condenser	.40	.09
2027	Insulator	.05	.01	123	.001 mfd. condenser	.35	.08
701	Tube socket—280	.25	.06	1758	15,000-ohm resistor, green and white	.50	.09
703	Tube socket—227	.25	.06	1348	100,000-ohm resistor, red and white	.50	.09
685	Tube socket—245	.25	.06	1349	500,000-ohm resistor, blue and white	.50	.09
963	Tube socket—224	.25	.06	929	50,000-ohm resistor, white	.50	.09
1786	Speaker socket	.30	.07	1751	200,000-ohm resistor, red and green	.50	.09
964A	Bypass condensers	1.68	.43	1814	R.F. shield can, 2nd-3rd	.20	.05
1752	Shunt resistor	1.35	.34	725	R.F. shield can, 1st-4th	.20	.05
1757	Bypass condenser	2.00	.50	1882	Grid cap assembly	.05	.01
1753	2500-ohm resistor, Candohm	.25	.07	562	Volume control washer	.05	.01
1754	250-ohm resistor, Candohm	.15	.04	563	Volume control insulating disc	.05	.01
1836	Pilot light bracket	.20	.05	564	Toggle switch hex nut	.05	.01
1314	Dial drum assembly, less chart	.35	.08	565	Volume control hex nut	.05	.01
1818	Dial chart	.20	.05	566	Volume control insulating bushing	.05	.01
982A	Tube shield—227	.20	.04	567	Toggle switch washer	.05	.01
951A	Tube shield—224	.20	.04	568	Toggle switch knurl nut	.05	.01
1571	Tone control rheostat	1.75	.42	726	Sheet metal screw	.05	.01
883	Ant-Grd. binding post	.50	.13	1742	Dynamic speaker	25.00	6.34
1810	Condenser assembly	13.00	3.25	1709	Escutcheon—Airline	.40	.10
1313	Drive drum assembly	.35	.08	1873	Escutcheon—Tone Control	.20	.05
1749	Drive shaft assembly	.25	.06				
1372	Push pull transf. assembly	3.30	.82				
1306	Filter choke assembly	2.30	.57				
1312	Insulated terminal assembly	.10	.01				
1809	Filter condenser assembly	10.00	2.37				
1749	Electrolytic condenser	2.75	.68				
1748	Power transformer	12.00	2.94				
1812	R.F. transformer assembly, 2nd and 3rd	1.25	.29				
1813	Ant. transformer assembly, 1st	1.25	.27				
1886	R.F. transformer assembly, 4th	1.25	.29				
1815	Volume control and switch assembly	1.75	.43				
1755	Volume control	1.25	.28				
1775	Toggle switch	.60	.15				
1371	R.F. plate choke assembly	.30	.07				

Prices subject to change without notice.

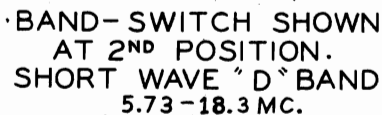
25-Cycle

Part No.	Part Name	Selling Price	Your Cost
1-1772	Power transformer, 110-volt, 25-cycle	\$15.00	\$ 3.94
1-1375	.45 condenser	.80	.20

MONTGOMERY WARD



MODELS 93WG-800,-800A,
-800B,-800C,-809,
-809A,-809B,-809C



MODELS 93WG-800,-800A,
-8COB,-800C,-809,-809A,
-809B,-809C

MONTGOMERY WARD

Tubes

The type and position of each tube are shown in the illustration.

To replace the tuning eye tube, **BE SURE THE RADIO IS TURNED OFF.** Pull out the escutcheon cap which partially covers this tube. First loosen the tuning eye tube in its socket by moving it up and down and from one side to the other. At the back of the cabinet will be seen a "U" shaped tube puller attached to a cord. Place the open ends of the tube puller over the tuning eye tube and push the puller in as far as it will go. Compress the puller until the hooked end grips under the base of the tube and then pull the tube out.

Power Supply

CAUTION — Unless otherwise marked, this radio must be operated on a 117 volt, 60-cycle AC supply only. Do not insert the plug of the power cord in the receptacle unless all tubes and the speaker plug are in their proper sockets. The power rating of this radio is shown on the tube arrangement label. Receivers of this model which are to be used on 25 cycle, 230 volt, or other service are so marked on this label. If there is any doubt regarding the voltage and frequency of the power supply, consult the local power company before inserting the plug.

ALIGNMENT PROCEDURE

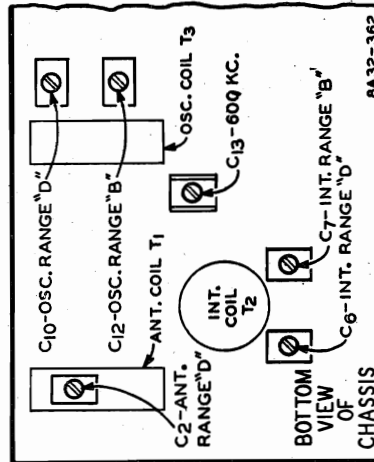
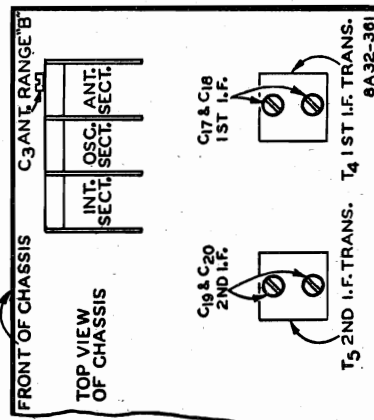
Volume Control—Maximum All Adjustments. The following equipment is required for aligning:
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I. F.	456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open
RANGE B	1730 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open
	1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A
	600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Rock Rotor—See Note B
RANGE D	18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open
	18,300 KC	Antenna Lead	400 Ohm	D Range	Keep Rotor at Full Open Position

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the indicator is not at 1500 KC, it will be necessary to re-calibrate. Loosen the set screw on the dial hub near the volume control drum. Hold the tuning control drum stationary and at the same time turn the dial drum the necessary amount in the required direction. Retighten the set screw.



MONTGOMERY WARD

Procedure for Setting the Station Buttons

MODELS 93WG-800,-800A,
-800B,-800C,-809,
-809A.-809B.-
-809C

Selecting the Stations to be Set

There are 6 buttons on the automatic tuning dial by means of which 6 stations may be set for quick tuning.

Make a list of your favorite stations, those which you tune in regularly. There may be any number up to and including 6 in this list.

It is better to list the station with the lowest kilocycle number first, the station with the next higher kilocycle number next, and so on.

Any button may be used for any station you can receive, although it will be more convenient to set the stations so that the kilocycle numbers increase from left to right.

Setting a Station Button

Turn the manual tuning control so that the dial moves toward 1700 KC until the stop is reached.

At the right side of the escutcheon (from the front) will be seen a cap which covers a hole in the escutcheon—See illustration. Pull off this cap.

At the end of the tube in back of the hole in the escutcheon is the locking screw. Using a small handle

screwdriver, unlock the mechanism by turning this screw in a counter-clockwise direction several turns.

TO SET STATIONS ACCURATELY, DO NOT JAR THE RADIO OR BUTTONS WHILE THE MECHANISM IS UNLOCKED.

Select the first station from the list you have prepared, and carefully tune in this station by means of the manual tuning control using the tuning eye as a guide.

With one hand, hold the manual tuning control to prevent it from turning and with the other hand, push one of the station buttons shown in the illustration *all the way in*. It is better to start with button No. 1.

Hold *this* button all the way in. With the other hand, see whether or not this station is still accurately tuned in by moving the tuning control a slight amount back and forth while observing the tuning eye. *Be sure to hold the button all the way in.*

Release the button slowly after the station is tuned in.

CAUTION—Do not touch this button again while the mechanism is unlocked as the setting may be altered.

Carefully tune in the second station on your list. Then hold the

tuning control and push the second button slowly and firmly *all the way in*. Check for accurate tuning.

Proceed in the same manner to set any additional stations on your list on the remaining station buttons.

After all the stations are set, it will be necessary to lock the mechanism so that the settings will not change. Turn the manual tuning control so that the dial moves toward 1700 KC until the stop is reached. Then, with a **SMALL HANDLE** screwdriver, turn the locking screw in a clockwise direction until it is tight. Tighten the locking screw firmly but not excessively to avoid stripping the threads. Replace the cap over the hole.

Remove the correct station call letter tabs from the sheets supplied by bending the sheet back and forth at the score mark until the tab can be broken off. Press the tab all the way to the bottom of the space provided in the button. Cover the call letter tab with a celluloid tab, pressing this in until it snaps into place.

If at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will not affect the setting of any of the other buttons.

SPECIFICATIONS

Power Consumption 71 Watts (At 117 volts 60 cycles)

Power Output - - - - - 3.0 Watts Undistorted
- 4.5 Watts Maximum

Selectivity - - 35 KC Broad at 1000 times Signal

Intermediate Frequency - - - - - 456 KC

Speaker - - - - - 8" Electro dynamic

Tuning Frequency Range

B Range..... 528 to 1730 KC
D Range.....5750 to 18300 KC

Sensitivity (For 0.5 watt output)

B Range..... 2.0 Microvolts Average
D Range..... 4.0 Microvolts Average

Voltages at Sockets

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the volt-

age indicated is between the socket terminal and ground.

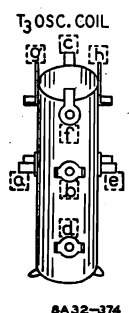
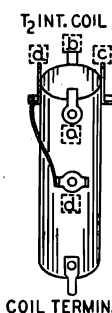
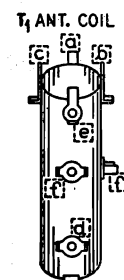
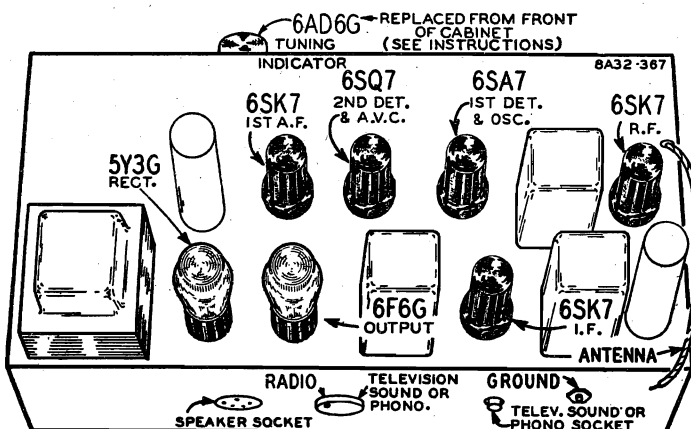
These voltages are read under the following conditions:

Line Voltage—117.

Volume Control—Maximum.

Antenna Shorted to Ground.

Readings taken with 1000 ohm-per-volt meter. Plate and screen voltages are read on 500 volt scale.



COIL TERMINALS

8A32-374

MODELS 93WG-800,-800A,
-800B,-800C,-809,-809A; MONTGOMERY WARD
-809B,-809C

Replacement Parts List

MISCELLANEOUS

SOCKETS

Bin No.	Part No.	Description	Selling Price
	3A293	Tube Socket—Octal (8 prong)	\$.08
	3A294	Speaker Socket (5 prong)	.06
	3A299	Single Pin Tip Socket (Phono Connection)	.06
	3A280	Tube Socket for Tuning Eye—Octal (8 prong—Wafer Type)	.06

SPEAKER

When ordering parts for speakers, specify part number of speaker and letters preceding part number stamped on the speaker.

12A334	8" Electro Dynamic Speaker	3.60
	Cone and Voice Coil Assembly for above Speaker	1.48
	Field Coil for above Speaker (L2)	1.50
	Output Transformer only (T6)	1.00

KNOBS AND BUTTONS

10143	10A249	Band Switch Knob	.06
10142	10A241	Tone Control Knob	.06
	10A233	Station Buttons	.04
	10A220	Phono-Radio Knob	.06

GENERAL

13X80	Line Cord and Plug	.20
4A92	Terminal Strip (3 insulated Lugs—1 Mounting Foot)	.04
4A123	Terminal Strip (5 Lugs—4 Lugs insulated)	.04
4A84	Terminal Strip (2 insulated Lugs—1 Mounting Foot)	.04
4A86	Terminal Strip (1 insulated Lug—1 Mounting Foot)	.04
2X289	Felt Washers (Used behind Knobs)	Doz. .04
8X23	Rubber Cushions (Mounted under Chassis)	Ea. .04
8X86	Rubber Cushions (Mounted at rear of Chassis)	Ea. .04
25X655	Mounting Brackets for Rear Rubber Cushions	Ea. .02
2A151	Band Change Switch	.38
2A154	Phono-Radio Switch	.24
28X247	Tube Puller for Tuning Eye Tube	.04

TRANSFORMERS AND COILS

Bin No.	Part No.	Code	Description	Selling Price
	9A1128	T1	Antenna Transformer Assembly	\$.60
	9A1129	T2	R.F. Interstage Transformer Assembly	.72
	9A1130	T3	Oscillator Coil Assembly	.58
	9A1131	T4	1st I.F. Transformer and Can Assembly	.64
	9A1132	T5	2nd I.F. Transformer and Can Assembly	.68
		T6	Output Transformer (See "Speaker")	
	53X201	T7	117 Volt, 60 Cycle, Standard Power Transformer	1.88
	53X202	T7	117 Volt, 25 Cycle, Standard Power Transformer	3.24
	53X203	T7	117-234 Volt, 40-60 Cycle, Universal Power Transformer	2.68
	9A1115	L1	R.F. Plate Reactor	.18
		L2	Field Coil (See "Speaker")	

CONDENSERS

TUBULAR

Bin No.	Part No.	Code	Capacitance	Voltage	Selling Price
11106	46X282	C4	.0005 mf.	360	\$.06
	46X253	C5,C8	.05 mf.	180	.06
	46X289	C11	.00475 mf.	Polystyrene Type—5% Tolerance	.14
10943	46X269	C16	.04 mf.	360	.06
	46X260	C21,C30	.02 mf.	360	.06
11256	46X249	C23	.01 mf.	180	.06
11539	46X250	C25	.04 mf.	180	.06
	46X248	C26	.002 mf.	180	.06
10934	46X268	C27,C32	.002 mf.	600	.06
	46X261	C29	.10 mf.	360	.08
10927	46X254	C31	.10 mf.	180	.06
	46X267	C35	.02 mf.	180	.06

MOLDED

10928	47X69	C1	250 mmf.	.08
10876	47X57	C15,C28	100 mmf.	.06
10625	47X56	C24	50 mmf.	.06

TRIMMER

17A115	C2	2.5-35 mmf.	Antenna Range D	.08
	C3	Part of Gang	Condenser	
17A113	C6	1.4-12 mmf.	Interstage Range D	.12
	C7	1.4-12 mmf.	Interstage Range B	
17A113	C10	1.4-12 mmf.	Oscillator Range D	.12
	C12	1.4-12 mmf.	Oscillator Range B	
17A81	C13	300-600 mmf.	600 KC Padder	.14
17A57	C17	50-120 mmf.	1st I.F.	.18
	C18	50-120 mmf.		
17A80	C19	50-120 mmf.	2nd I.F.	.14
	C20	85-185 mmf.		

ELECTROLYTIC

9151	44X40	C33	40 mf.	300 Wet	.46
9150	44X39	C34	20 mf.	390 Wet	.46

MISCELLANEOUS

47X138	C14	13 mmf.	Ceramic	
47X112	{ C22A	50 mmf.	Dual Mica	.06
	{ C22B	50 mmf.		
14A107		3 Section	Gang Condenser	1.62

RESISTORS

CARBON

Bin No.	Part No.	Code	Resistance	Wattage	Selling Price
10968	A85104	R1,R6,R15	100,000 Ohm	0.2	\$.06
	A85403	R2	40,000 Ohm	0.2	.06
11550	D94203	R3	20,000 Ohm	2.0	.16
11549	A84803	R4	80,000 Ohm	0.2	.08
11086	A85105	R5	1 Megohm	0.2	.06
11057	A84404	R7	400,000 Ohm	0.2	.08
11130	A85405	R8	4 Megohm	0.2	.06
11094	A84153	R10	15,000 Ohm	0.2	.08
11086	A84205	R12	2 Megohm	0.2	.08
	A84354	R13	350,000 Ohm	0.2	.08
11085	A85504	R14	500,000 Ohm	0.2	.06
	D94251	R16	250 Ohm	2.0	.16
	A85501	R17	500 Ohm	0.2	.06
	A84305	R18,R19	3 Megohm	0.2	.08
	A85205	R20	2 Megohm	0.2	.06
	A85304	R21	300,000 Ohm	0.2	.06

VARIABLE

10430	36X267	R9	2 Megohm	Volume Control	.28
3293	36X268	R11	3 Megohm	Tone Control	.28
9294	40X241				.26

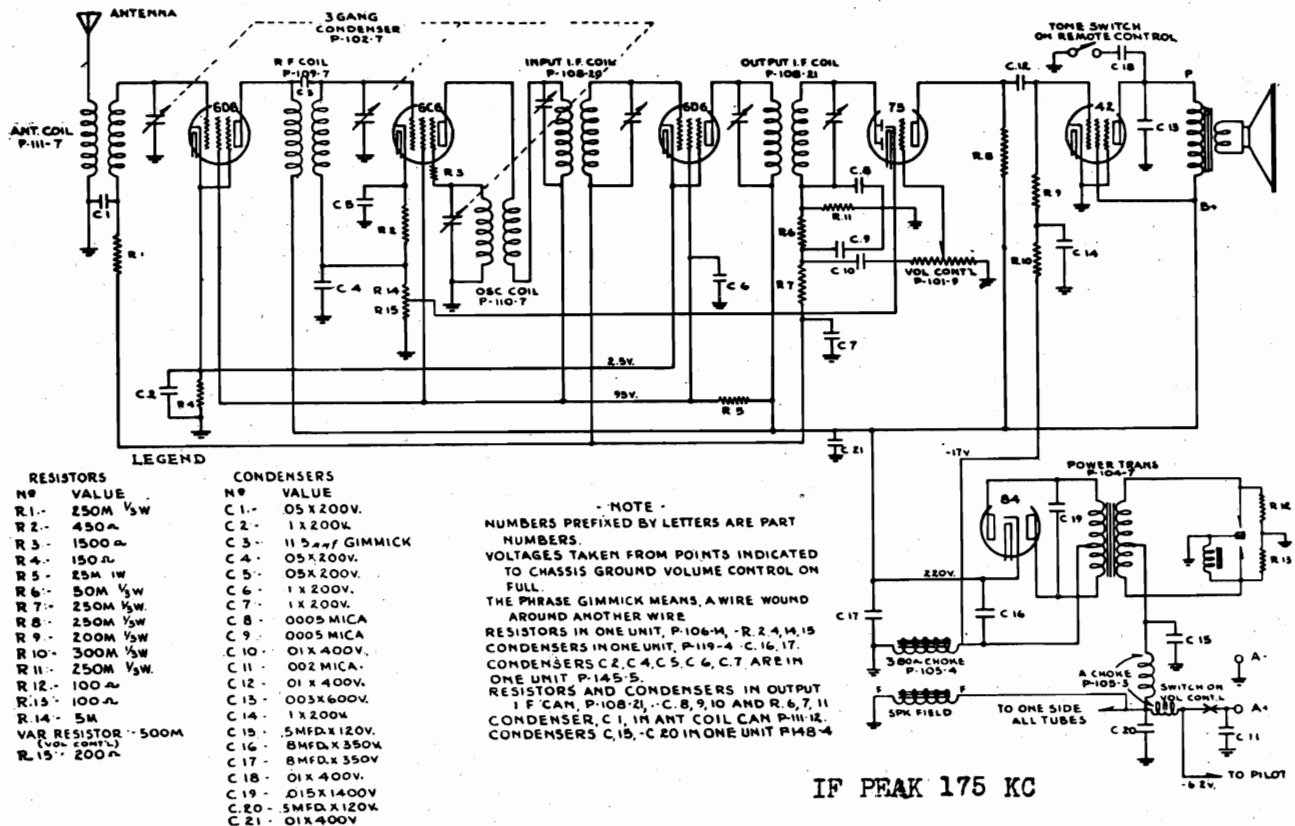
AUTOMATIC TUNING AND DIAL ASSEMBLY

Bin No.	Part No.	Description	Selling Price
	20A63	Automatic Tuning Assembly complete with Drive Gear Hub and Coupling Arm less Gang Condenser, On-Off Switch and Bracket, Locking Screw Guide, and Drive Gear	\$1.74
	24X395	Drive Gear on Tuner	.02
	25X627	Guide for Locking Screw	.04
	2A153	On-Off Switch	.16
	10A248	Extension for On-Off Switch Shaft	.04
	25X650	Mounting Bracket for On-Off Switch	.02
	25X653	Support Bracket for Dial Scale Assembly—Left	.06
	25X654	Support Bracket for Dial Scale Assembly—Right	.06
	37X170	Coupling Arm and Bushing for Gang Condenser	.12
	25X649	Mounting Bracket for Volume Control	.04
	10A247	Tuning Drum or Volume Control Drum	.10
	28X246	Spring Clamp to Hold Tuning Drum and Volume Control Drum to Shaft	Doz. .08
	58X406	Dial Scale Assembly complete with 2 Support Discs and Hub	.60
	26A174	Idle Gear and Mounting Bracket Assembly	.20
	26A172	Dial Scale Shaft and Gear Assembly	.12
	37X168	Link for Coupling Arms	.02
	28X248	Tension Spring for Coupling Arms	Doz. .10
	7A94	Dial Lamp Socket Assembly (2 Sockets with Wire)	.10
	41X34	Celluloid Light Diffuser	.02
		Dial Lamp—No. 51	Ea. .08
7112	17X40	Celluloid Crystal	.40
10401	4X331	Escutcheon for Dial Scale	.40
	4X327	Escutcheon for Tuning Eye	.20
	4X328	Cap for Tuning Eye	.12
	28X244	Plug Button for Locking Screw opening or On-Off Switch Extension	Ea. .04
	26A166	Call Letter Sheet and Celluloid Tabs	.06
	26A182	Blank Call Letter Sheet (Export) and Celluloid Tabs	.06
	58X393	Celluloid Tabs only	Doz. .06

Use only genuine factory tested parts to insure service jobs you can depend on and to obtain original set performance.

Prices Subject to Change Without Notice.

MONTGOMERY WARD



DIAL ADJUSTMENT:

Mount control head to steering column by means of bracket and strap or under dash by means of bracket or to instrument panel (see illustrations). Attach cables as above. Tune set to some station of a known frequency (between 800 and 1200 K.C.), hold selector knob, then with a screw driver adjust the slotted screw on back of the control head, and in that way adjust the dial pointer to the correct frequency setting.

Part No.	Description	List Price Each
150-24	Selector Shaft—24"	1.50
151-2	Remote Control Head, less flexible shafts, less tone control and pilot assemblies, but with knobs and mounting hardware	4.50
152-1	Antenna cable	.40
152-2	Battery cable	.35
131-5	Black bakelite remote control knobs	.15
146-8	Die Cast Remote Control Mounting Bracket	.30
146-12	Steering Column Strap	.15
168-1	Spark-plug type suppressor	.30
168-2	Distributor plug-type suppressor	.50
168-3	Cable type suppressor	.40
168-4	Special Ford spark-plug suppressor	.35
	Unless otherwise listed, all Carbon Resistors	.20
	Unless otherwise listed, all Single Section Tubular Paper By-Pass Condensers	.25
	Unless otherwise listed, all Dual Section Tubular Paper By-Pass Condensers	.50
	Unless otherwise listed, all Molded Mica Condensers	.25
	All Sockets	.20
167-1	Dynamic Speakers	5.00
	Plate antenna (clamps to frame of car)	2.50

Note: Part No. 145-5 consisting of five separate sections can be replaced with tubular single section condensers at 25c each. It will not be necessary to replace the entire unit should any section thereof fail.

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

Part No.	Description	List Price Each
101-9	Volume Control with Switch	\$1.35
101-12	Tone Control Assembly, complete	.35
102-7	Three Gang Geared Variable Condenser	4.00
104-6	Vibrator Transformer	3.00
105-3	"A" Choke—40T—No. 16E— $\frac{1}{2}$ " Dia.	.10
105-4	380 Ohm Filter Choke	.85
106-6	200 Ohm Center Tapped Resistor	.25
106-14	5800 Ohm Metal Clad Resistor	.50
108-20	Input I. F. Transformer completely assembled in can (175 K. C.)	1.50
108-21	Output I. F. Transformer complete with can, but less resistor and Condenser Assembly (175 K. C.)	1.50
109-7	Resistor and Condenser Assembly for 108-21	1.50
110-7	R. F. Coil	.65
111-7	Osc Coil & bracket	1.25
112-43	Antenna Coil	1.25
115-18	Volume Control Shaft complete with knob	.30
115-22	Special partition shield	.20
116-5	Tube shield	.15
116-6	6-8 Volt T-50 pilot lamp	.10
119-4	Pilot light assembly, complete, less bulb	.40
142-1	8-8 Mfd. \times 350 Volt Electrolytic Filter Condenser	2.50
145-5	Plug-In Vibrator	5.00
146-14	4 Mfd. By-Pass Block	1.00
148-4	Special bracket including battery antenna, pilot light and tone control cable fittings, but less antenna coil volume control	.50
161-1	Dual 5 Mfd. 120 Volt Condenser	.75
147-1	20 Ampere fuse	.05
147-2	Selector Control Coupling	.10
147-11	Bushing and bracket complete	.20
135-5	Volume control coupling	.10
140-3	$\frac{1}{2}$ " \times 3" carriage bolt	.05
148-1	Container complete with top and bottom	2.50
148-3	5 Mfd. Generator Condenser	.50
149-18	5 Mfd. Ammeter Condenser	.50
149-24	Volume Control Shaft—18"	1.25
150-18	Volume Control Shaft—24"	1.50
	Selector Shaft—18"	1.25

Prices subject to change without notice.

MODEL 102

MONTGOMERY WARD

TUBE COMPLEMENT:

- 1—Type 6D6—remote cut-off pentode as an R. F. amplifier.
- 1—Type 6C6—pentode as an oscillator and first detector.
- 1—Type 6D6—remote cut-off pentode as an intermediate frequency amplifier (175 K.C.).
- 1—Type 75 —duplex diode triode second detector automatic volume control and first audio.
- 1—Type 42 —pentode output tube.
- 1—Type 84 —high vacuum full wave rectifier.

SERVICE NOTES:

Model 670 is a six tube superheterodyne receiver with an intermediate frequency of 175 kilocycles and a tuning range of from 530 to 1550 kilocycles.

This receiver has been carefully designed to facilitate servicing, the top and bottom covers are both removable, any part is replaceable without removing the chassis from the cabinet. All adjustments are made without removing the chassis from the cabinet.

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

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 108-20 and 108-21 (see top view of chassis) to resonance with an oscillator, as indicated on an output meter connected across the primary terminals of the speaker input transformer or between the plate and screen terminals of the type 42 output tube. The connection to the tube can be made by means of an adapter. Maximum deflection on the output meter indicates resonance.

Note: Each I. F. transformer has two adjustments, both of these adjustments on both transformers are accessible through holes located in the back of the case between the two mounting plates and directly under the louvers.

R. F. 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 (Front shaft end) to resonance.

2. Re-set oscillator to 1400 kilocycles, rotate variable condenser to pick up signal, adjust antenna (center section) and R. F. (rear section) trimmers to resonance.

3. Check alignment at 1500-1000-800-600-530 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 voltmeter having a resistance of 1000 ohms per volt.

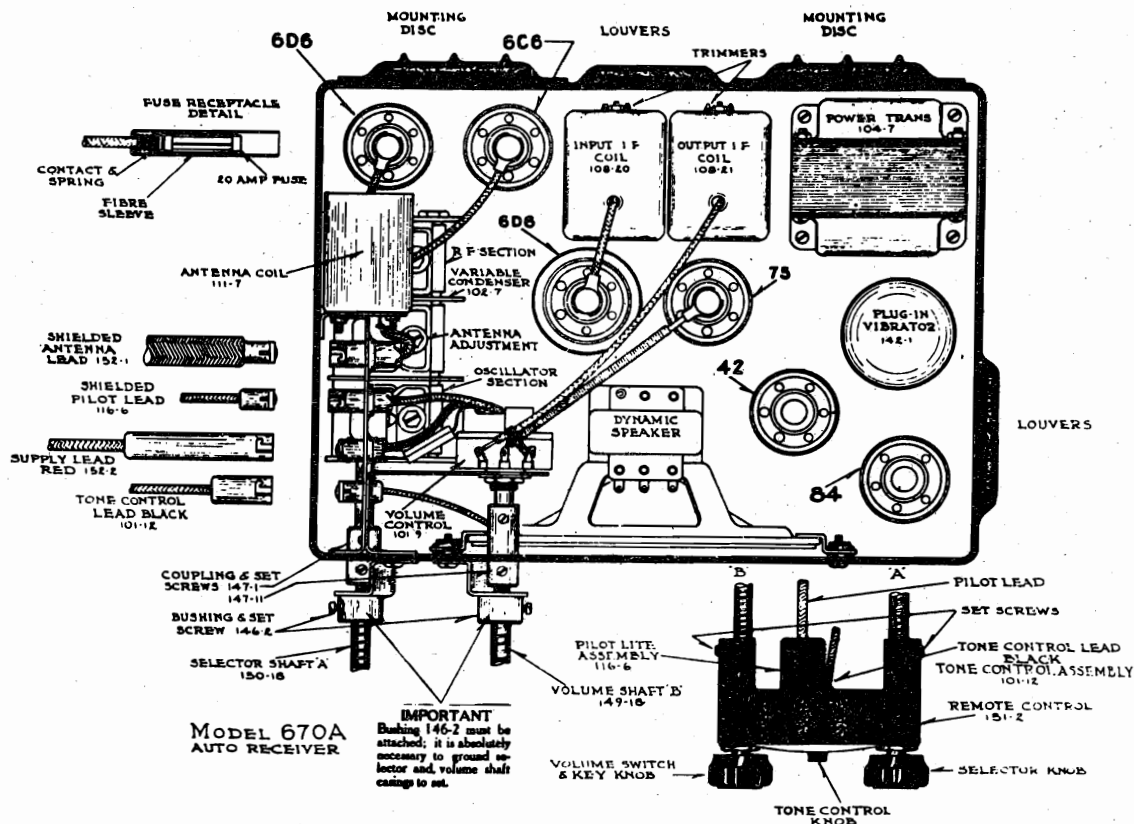
Failure to operate, noisy or weak reception, may be due to defective tubes or poor contact between cap on top of tube and grid clip. Tubes may be checked by replacing with another tube which is known to be good.

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.

Case rattles may be due to one or more of the following:

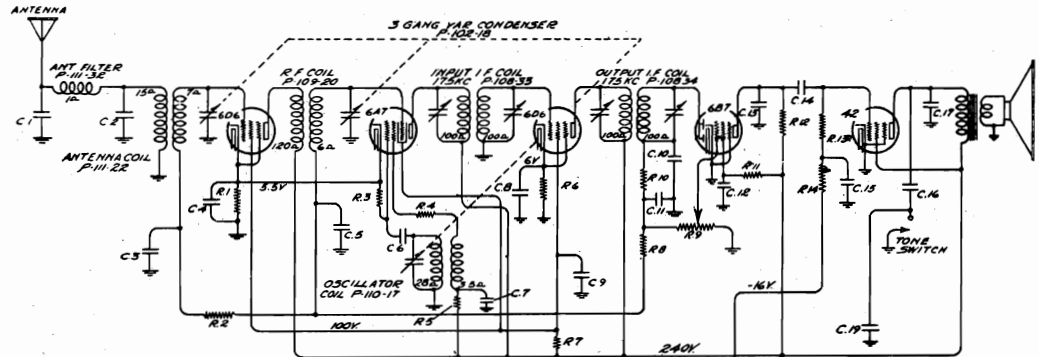
Loose screws in top or bottom covers. Loose elements in tubes. Loose tube shield. Loose R. F. coil shield. Loose grill cloth.



MONTGOMERY WARD

MODEL 204

RESISTORS	
No.	Value
R.1—500	$\frac{1}{2}$ w
R.2—100M	$\frac{1}{2}$ w
R.3—50M	$\frac{1}{2}$ w
R.4—3500	$\frac{1}{2}$ w
R.5—20M	$\frac{1}{2}$ w
R.6—1500	$\frac{1}{2}$ w
R.7—25M	1 w
R.8—500M	$\frac{1}{2}$ w
R.9—1 meg	vol. control P-101-21
R.10—100M	$\frac{1}{2}$ w
R.11—1 meg	$\frac{1}{2}$ w
R.12—250M	$\frac{1}{2}$ w
R.13—301M	$\frac{1}{2}$ w
R.14—301M	$\frac{1}{2}$ w
R.15—100	
R.16—100	



CONDENSERS	
No.	Value
C.1—20	mmf mica
C.2—20	mmf mica
C.3—.01x400v	
C.4—.1x200v	
C.5—.05x200v	
C.6—100	mmf mica
C.7—.1x200v	
C.8—.1x200v	
C.9—.1x200v	
C.10—100	mmf mica
C.11—100	mmf mica
C.12—.1x200v	
C.13—100	mmf mica
C.14—.01x400v	
C.15—.25x400v	
C.16—.025x400v	
C.17—.006x600v	
C.18—500	mmf mica
C.19—500	mmf mica
C.20—2000	mmf mica
C.21—1.0	mfdx120v
C.22—8	mfd x300v
C.23—.5	mfd x120v
C.24—.01x400v	
C.25—8	mfd x300v
C.26—.01x400v	

NOTE:

C.4 and C.9 are in one unit P-118-1
 C.7 and C.8 are in one unit P-118-1
 C.22 and C.25 are in one unit P-119-17
 R.16 and R.15 are in one unit P-106-6
 Numbers prefixed by letter "P" are part numbers.

Voltages taken from points indicated to chassis ground. Vol. control on full, no signal.

Serial No. 40001 up.

BROADCAST ALIGNMENT:

1. With variable condenser in its minimum capacity position, connect test oscillator set at 1550 K.C. and in series with broadcast dummy, to the antenna lead of receiver.
2. Adjust oscillator trimmer of variable condenser to resonance (this adjustment is on the end section of the three gang condenser—see top view).
3. Shift test oscillator to 1400 K.C. and pick up signal by rotating condenser and adjust R.F. (center) and antenna (front) trimmers to resonance, see top view.

- (a) Check for sensitivity at 1000, 800 and 600 K.C. by setting test oscillator to these frequencies and picking up the signal by rotating variable condenser. Under no circumstances bend plates of oscillator section, bend R.F. and antenna plates only if absolutely necessary.

DIAL ADJUSTMENT:

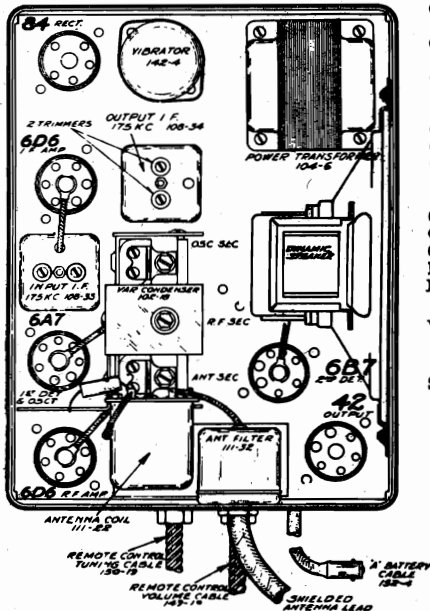
Tune set to some station of a known frequency (between 800 and 1200 K.C.) hold selector knob, then with a screw driver adjust the slotted screw on the back of the control head, and in that way adjust the dial pointer to the correct frequency setting.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

In order to prevent signal from acting upon A.V.C. and affecting accuracy of voltage measurements, aerial and ground leads should be short circuited while making measurements. All voltages are to be measured with 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on schematic 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. Failure to operate, noisy or weak reception is usually due to defective tubes, the tubes making poor contact with sockets or grid clips making poor contact with the caps of the tubes. Tubes may be checked very easily by replacing with other tubes which are known to be good. If fuse blows out frequently and insulating sleeve has been properly placed over fuse, the trouble is probably in the vibrator, it should be replaced. Do not attempt to make any adjustments on the vibrators.



ALIGNING INSTRUCTIONS:

All of the adjustments have been very carefully set with signal generators at the factory and require no further adjustment, unless it becomes necessary to replace a coil or transformer or if the adjustments have been tampered with in the field. Under no circumstances attempt any adjustments without first making certain that adjustment is necessary and only after voltages, tubes and condensers have been checked and found to be normal. To properly re-align this receiver, a test oscillator, as well as an output meter, must be used.

DUMMY ANTENNAS:

The dummy antennas referred to in the following instructions are:
 "I.F. Dummy"—A .1 mfd. condenser connected in series with the test oscillator output lead.

"Broadcast Dummy"—A 200 mmfd. condenser connected in series with the output lead of the test oscillator.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and the screen of the type 42 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

I.F. ALIGNMENT:

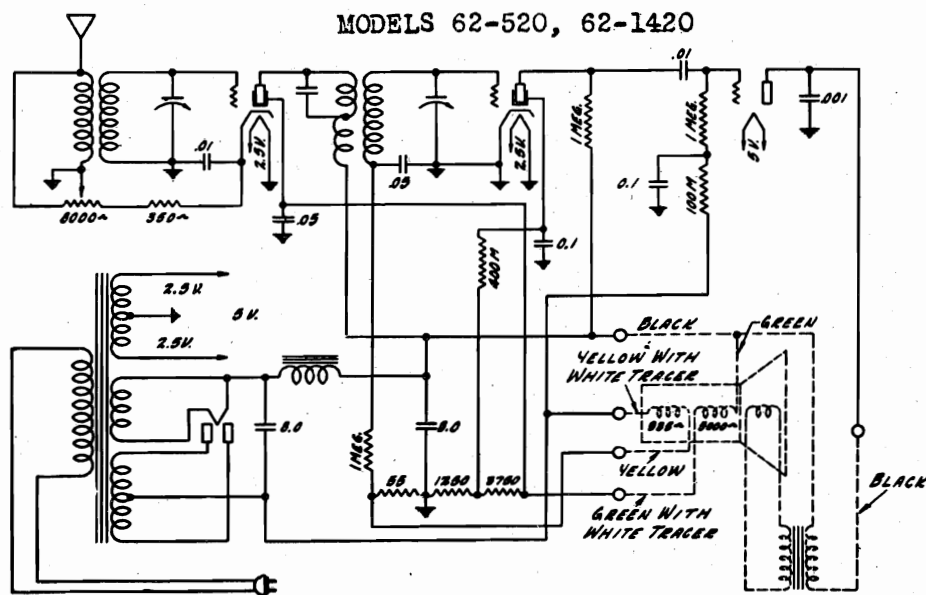
1. With variable condenser in its minimum capacity position (plates entirely out of mesh) and with volume control full on, connect test oscillator set at 175 K.C., in series with I.F. dummy antenna, to the grid cap of the type 6A7 tube.
2. Adjust trimmer condensers of both input (108-33) and output (108-34) I.F. transformers to resonance with oscillator. See top view for location of these transformers. There are two adjustments on each and they are accessible from the top of the transformer shield and should be adjusted with an insulated screw driver.

MODEL 204

MODELS 62-520,
62-1420, Ch. 20W

MONTGOMERY WARD

MODELS 62-520, 62-1420



DOTTED LINES SHOWN ARE IN SPEAKER.

2-31

The Model 20W chassis is the same in general design as the 26W chassis used in our five tube midgets, and the general servicing procedure is the same.

The tubes required are—

- 1—171 A power tube,
2—224 screen-grid tubes,
1—280 rectifier tube.

It is possible to substitute a 235 super control tube for the 224 tube used in the RF portion of this set. When this is done, the 235 super control tube should be used in the socket between the 280 rectifier and the 171 power tube.

**No. 20W CHASSIS—VOLTAGES AT SOCKETS—
VOLUME CONTROL AT MAXIMUM LINE
VOLTAGE. 115—PLUG IN SOCKET OF
RECEIVER—TUBE IN TEST SET**

Type of Tube	Position of Tube	Function	"A" Volts	"B" Volts	Control Grid "C" Volts	Screen Volts	Screen Current MA	Cathode Volts	Plate MA	Grid Test MA
224	1	1st Radio Detector	2.5	196	2.2	85	1.4	2.2	5.	7.
224	2	Detector	2.5	95	2.3	17	.015		1.	
171A	3	1st Audio Rectifier	5.1	191	43.				18.	20.
280	4		5.1						23. Per Plate	

MODEL 204

Part No.	Description	List Price Ea.
CONDENSERS		
	Unless otherwise listed, all single section tubular paper by-pass condensers . . . . .	.25
	Unless otherwise listed, all dual section tubular paper by-pass condensers . . . . .	.50
	Unless otherwise listed, all molded mica condensers . . . . .	.25
119-17	Dual 8 mfd. electrolytic filter condenser	2.25
148-1	.5 Mfd. Generator Condenser . . . . .	.50
148-3	.5 Mfd. Ammeter Condenser . . . . .	.50
148-2	1.0 Mfd. x 120 Volt Condenser . . . . .	.50
148-6	Special Ford Ignition Coil Condenser . . . . .	.60
COILS		
105-12	"A" Choke - 28 Turns No. 12 Wire . . . . .	.10
105-3	"A" Choke - 40 Turns No. 16 Wire . . . . .	.10
108-33	Input I.F. Transformer Complete with Shield	1.50
108-34	Output I.F. Transformer Complete with Resistors and Condensers, Mounted in Shield	2.50
108-20	R.F. Coil Complete - Less Shield	1.00
110-7	Oscillator Coil Complete with Bracket . . . . .	.75
111-22	Antenna Coil Complete - Less Shield	1.00
111-32	Antenna Filter Assembly Complete with Shield and Antenna Cable	1.50
RESISTORS		
	Unless otherwise listed, all carbon resistors . . . . .	.20
106-6	200 Ohm Center Tapped Resistor . . . . .	.25
168-2	Distributor Suppressor . . . . .	.40
168-3	Cable Type Suppressor . . . . .	.40
TRANSFORMERS		
104-6	Power Transformer	3.00
105-4	380 Ohm Filter Choke . . . . .	.85
MISCELLANEOUS		
101-21	Volume Control with Switch	1.35
102-18	Three Gang Variable Condenser	4.00
113-0	Two Lug Terminal Strip . . . . .	.05
113-38	Terminal Strip . . . . .	.05
115-34	Antenna and R.F. Coil Shield . . . . .	.15
114-26	Speaker	5.80
128-9	Set Case less Covers	1.35
128-10	Top Cover	1.35
128-11	Bottom Cover	1.35
113-30	Terminal Strip Tone Control and Dial Light . . . . .	.25
142-4	Plug-in Vibrator	4.50
147-19	Flexible Cable Control Bushing . . . . .	.10
152-2	Battery Cable & Fuse Assembly . . . . .	.35
152-3	Fuse Insulating Sleeve . . . . .	.05
152-4	Chassis Battery Cable Assembly . . . . .	.30
152-6	Antenna Cable . . . . .	.50
160-11	Mounting Studs Complete with Nut & Washer . . . . .	.05
169-1	15 Amp. Fuse (3AG-15) . . . . .	.08
	All Sockets . . . . .	.10
123-1	Done Lite Filter . . . . .	.90
	Plate Antenna	3.50

Part No.	Description	List Price Ea.
112-39	Selector Control Shaft	.20
112-41	Idler Gear	.16
112-115	Pointer Shaft	.08
112-85	Volume Control Shaft	.10
112-45	Bezel (Crystal Retainer)	.15
112-46	Celluloid Dial Crystal	.16
112-48	Pointer Shaft Gear	.05
112-114	Glass Dial	.35
112-108	Metal Disc Pointer	.10
112-13	6-8 Volt 7-51 Bulb, Bayonet Base	.15
110-9	Pilot Light Assembly	.45
116-11	Tone Control Assembly Unit Complete	.35
131-5	Black Bakelite Remote Control Knobs	.15
134-32	Fibre Dial Mask	.05
146-8	Die Cast Remote Control Mounting Bracket	.30
146-12	Steering Column Strap	.15
146-25	Dash Mounting Bracket	.10
147-3	Selector Control Bushing for 112-39 Shaft	.10
147-4	Volume Control Bushing for 112-43 Shaft	.10
148-25	Flexible Volume Control Cable - 24"	1.50
150-25	Flexible Selector Control Cable - 24"	1.50
151-6	Remote Control Head complete with Steering Column Bracket	5.00
	Dash Mounting Kit (specify make and year of car)	1.25
151-8	Special General Motors Control Head	5.00
112-50	1935 Chevrolet Dash Kit for 151-8	\$1.50
112-54	1935 Pontiac Dash Kit for 151-8	\$1.50
112-63	1935 Oldsmobile Dash Kit for 151-8	\$1.75
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.		
(When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.		
Mica condensers are coded with an additional dot indicating tolerance:		
Tolerance	Percent	Color of Dot
	2 1/2%	White
	5%	Green
	10%	Blue
	15%	Yellow
	20%	Red
	More Than 20%	None.
All prices quoted are list and are subject to the usual trade discounts.		
Shipments are F.O.B. our Factory. When remitting in advance, please include postage.		
WE CANNOT SUPPLY SPEAKER PARTS, CONES, TRANSFORMERS OR FIELDS SEPARATELY. WE CAN REPLACE OR REPAIR A DAMAGED SPEAKER FOR \$5.50 NET IF IT IS RETURNED TO OUR FACTORY TRANSPORTATION CHARGES PREPAID.		
PRICES SUBJECT TO CHANGE WITHOUT NOTICE		

[illegible]

No.	Part No.	Value
C.1-	100-9	.05x200 V.
C.2-	100-6	.25x200 V.
C.3-	129-22	.0014 Mica
C.4-	129-21	.0002 Mica
C.5-	100-24	.25x400 V.
C.6-	100-20	.1x200 V.
C.7-	129-29	.0038 Mica
C.8-	129-31	.000025 M.
C.9-	129-30	.0014 Mica
C.10-	129-28	.00064 M.
C.11-	100-13	.05x400 V.
C.12-	100-9	.05x200 V.
C.13-	129-47	.00004 M.
C.14-	100-20	.1x200 V.
C.15-	100-11	.01x400 V.

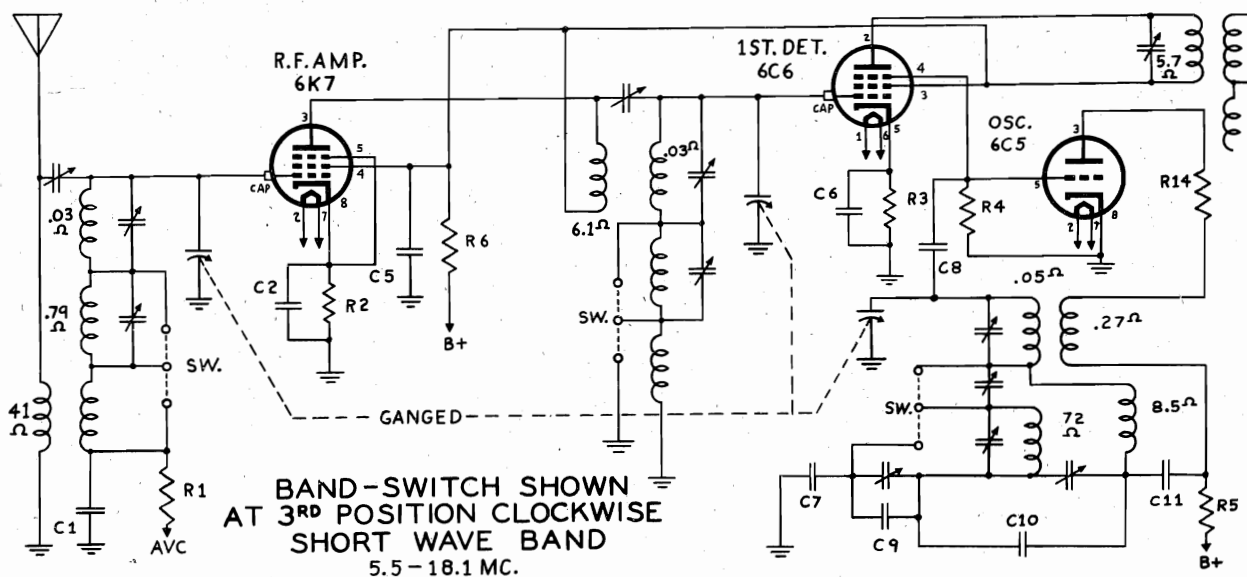
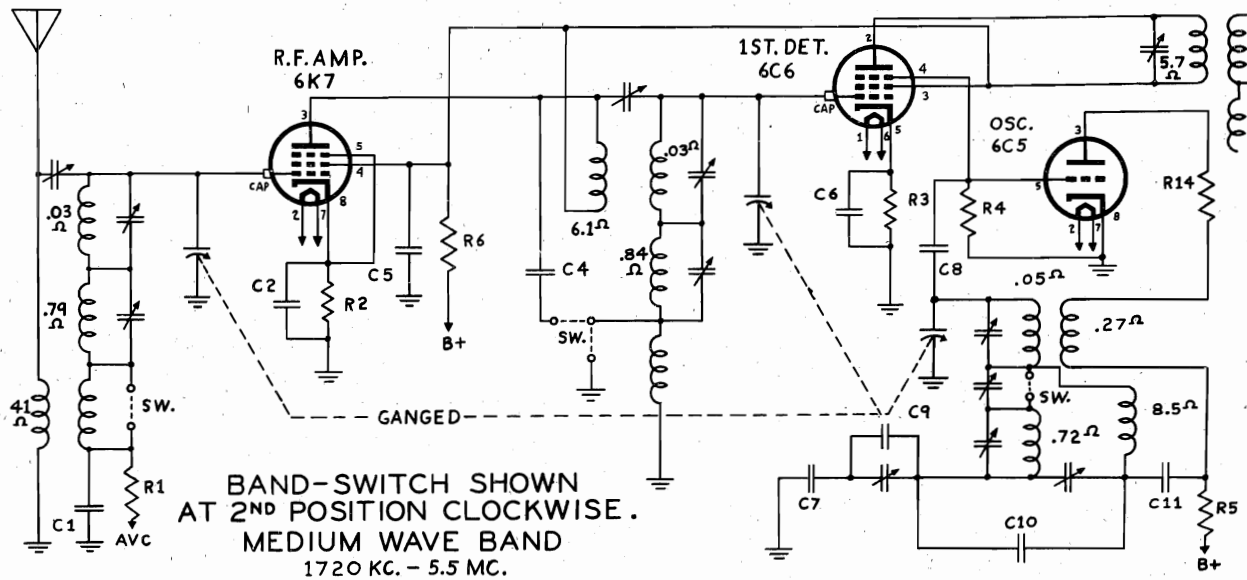
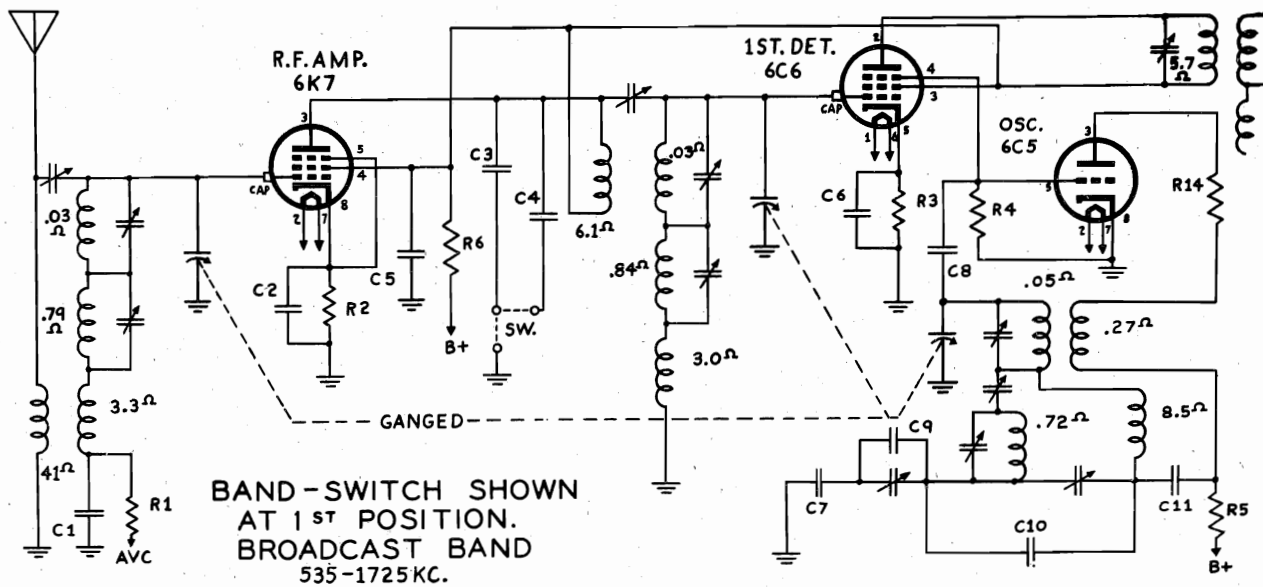
No.	Value
R.1-100M	1/3 W.
R.2-180	1/3 W.
R.3-500	1/3 W.
R.4-50M	1/3 W.

C.17-103-4	x350 V.	16 mfd.
C.18-100-6	.25x200 V.	
C.19-103-8	14 mfd.	
	x400 V.	
C.20-129-2	.0005 Mica	
C.21-129-47	.00004 M.	
C.22-129-21	.0002 Mica	
C.23-100-9	.05x200 V.	

R.6-15M	W.W.	2.0 W.
R.7-500M	1/5 W.	
R.8-1 meg.	Vol. Control	
R.9-1 meg.	P-101-37	
R.10-250M	1/5 W.	
R.11-300M	1/2 W.	
	Tone	
	control	P-101-38
R.12-250M	1/3 W.	
R.13-750M	1/5 W.	
R.14-100	1/3 W.	
R.15-250M	1/3 W.	
R.16-100M	1/3 W.	
R.17-5000	1/3 W.	
R.18-250M	1/3 W.	
R.19-50M	1/1 W.	

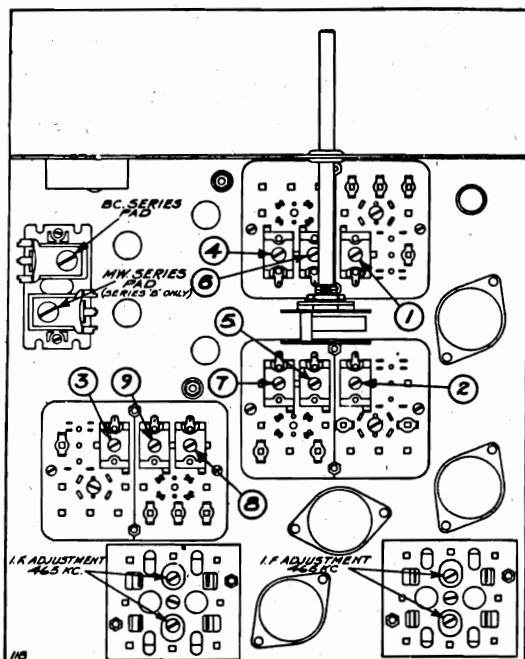
MODEL 222

MONTGOMERY WARD



MONTGOMERY WARD

MODEL 222



ALIGNING INSTRUCTIONS

Dummy Antennas

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3"

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Intermediate and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and screen terminals of the type 42 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

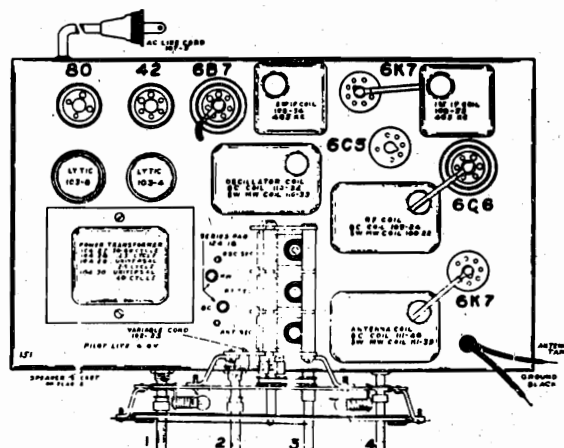
ALIGNING I.F. TRANSFORMERS (465 K.C.)

Part No. 108-54 Output I.F. Transformer
Part No. 108-56 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the underside of chassis (see bottom view).

1. With volume control full on, (the extreme right of its rotation), the wave changing switch in the broadcast position, (extreme left of its rotation), the tone control on "Hi" part of the sharp position (as much right rotation as possible without operating the Hi Fidelity switch), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

- Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, located between the two I.F. transformers, and adjust the output I.F. transformer to resonance.
- With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6C6 and adjust input I.F. transformer to resonance.
- With oscillator still connected to 6C6, re-adjust output I.F. transformer.



ALIGNMENT PROCEDURE

The following adjustments to be made after the I.F.'s have been aligned as explained above.

BROADCAST BAND ALIGNMENT:

1. With wave changing switch, in the broadcast position, extreme left of its rotation, and with external oscillator set at 600 kilocycles and connected in series with "Dummy 2" to the tan antenna and black ground lead, make the following adjustments:

- Adjust broadcast series pad to resonance with oscillator. Keep set in tune with oscillator by slowly rocking to and fro the variable condenser until maximum output is obtained. Note: This adjustment is accessible from the top of the chassis and is located between the variable condenser and the electrolytic condenser. See top view.
- Re-set external oscillator to 1400 K.C., move dial pointer to 1400 K.C. and adjust oscillator (adjustment number 3), R.F. (adjustment number 2) and antenna (adjustment number 1) to resonance. See bottom view for location of these adjustments.
- Repeat adjustments "a" and "b" until sensitivity is at its maximum.

NOTE: IT IS EXTREMELY NECESSARY IN MAKING ALL OF THESE ADJUSTMENTS THAT THE FUNDAMENTAL OSCILLATOR SIGNAL BE TUNED IN AND NOT THE IMAGE FREQUENCY WHICH WILL FALL BELOW THE FUNDAMENTAL.

SHORT WAVE BAND ALIGNMENT:

1. With wave changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:

- Move dial pointer to 17 megacycles and adjust short wave oscillator (adjustment number 8), short wave R.F. (adjustment number 7) and short wave antenna (adjustment number 6) to resonance.
- Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check for sensitivity.

INTERMEDIATE BAND ALIGNMENT:

1. With wave changing switch in the intermediate wave position, center of its rotation, and with external oscillator set at 1800 K.C. and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:

- Rotate variable condenser to approximately 1800 K.C., tune in oscillator signal and adjust M.W. series pad (see top view) to resonance. Slowly rock condenser to and fro while making this adjustment to be sure maximum output is obtained.
- Set external oscillator at 5 M.C., rotate condenser, pick up signal and adjust intermediate wave R.F. (adjustment number 5), intermediate wave antenna (adjustment number 4) and intermediate wave oscillator (adjustment number 9) to resonance.
- Re-check broadcast alignment and if it is found necessary to re-adjust either R.F. or antenna trimmers, repeat the 17 M.C. short wave and 5 M.C. intermediate wave adjustments.

MODEL 222

MONTGOMERY WARD

The tube complement of this chassis is as follows:

- 1—Type 6K7—remote cut-off pentode R.F. amplifier.
- 1—Type 6C6—pentode first detector.
- 1—Type 6C5—oscillator.
- 1—Type 6K7—remote cut-off pentode I.F. amplifier (465 K.C.)
- 1—Type 6B7 duplex diode pentode second detector, A.V.C. and audio.
- 1—Type 42—pentode output.
- 1—Type 80—high vacuum rectifier.

TUNING RANGE—

Standard Broadcast Band
535-1725 Kilocycles.

Intermediate Band
1720-5500 Kilocycles
Short Wave Band
5.5-18.1 Megacycles.

Transformers are available and 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 with 105-115 volt or 220 volt primaries, not universals.

Serial No. 5J154150 and up

Part No.	DESCRIPTION	List Price Each
CONDENSERS		
100-6	.25 x 200 Volt Tubular Condenser—With Bracket	\$0.35
100-9	.05 x 200 Volt Tubular Condenser	.25
100-11	.01 x 400 Volt Tubular Condenser	.25
100-13	.05 x 400 Volt Tubular Condenser	.25
100-20	1 x 200 Volt Tubular Condenser	.25
100-24	.25 x 400 Volt Tubular Condenser—With Bracket	.25
103-4	16 Mfd. x 350 Volt Electrolytic	1.35
103-8	14 Mfd. x 400 Volt Electrolytic	1.35
118-12	.1 x .25 x 200 Volt Dual Tubular	.50
129-2	.0005 Mica - Type MT - 20%	.25
129-21	.0002 Mica - Type MT - 20%	.25
129-22	.0014 Mica - Type MW - 5%	.25
129-23	.00064 Mica - Type MT - 5%	.25
129-29	.0038 Mica - Type MW - 2 1/2%	.50
129-30	.0014 Mica - Type MW - 20%	.25
129-31	.00025 Mica - Type MT - 15%	.25
129-47	.00004 Mica - Type MT - 30%	.25
RESISTORS		
130-3	500M Ohm - 1/4 Watt - 20% - 100 Volts - Carbon	.20
130-11	250M Ohm - 1/4 Watt - 20% - 50 Volts - Carbon	.20
130-19	1 Meg Ohm - 1/4 Watt - 20% - 100 Volts - Carbon	.20
130-20	100M Ohm - 1/4 Watt - 20% - 50 Volts - Carbon	.20
130-22	5M Ohm - 1/4 Watt - 20% - 10 Volts - Carbon	.20
130-37	750M Ohm - 1/4 Watt - 20% - 50 Volts - Carbon	.20
130-40	12M Ohm - 1 Watt - 20% - 150 Volts - Carbon	.20
130-52	50M Ohm - 1/4 Watt - 20% - 10 Volts - Carbon	.20
130-53	180 Ohm - 1/4 Watt - 10% - 10 Volts - Carbon	.20
130-54	500 Ohm - 1/4 Watt - 20% - 10 Volts - Carbon	.20
130-60	100 Ohm - 1/4 Watt - 20% - 10 Volts - Carbon	.20
130-61	15M Ohm - 2 Watt - 20% - 180 Volts - Wire Wound	.40
130-62	250M Ohm - 1/4 Watt - 20% - 50 Volts - Carbon	.20
COILS		
108-54	Output I.F. Coil Assembly Complete - Less Can	1.50
108-55	Input I.F. Coil Assembly Complete - Less Can	2.50
108-24	Broadcast R.F. Coil Assembly Complete	.50
109-25	Mid-Wave & Short Wave R.F. Coil Assembly Complete—Less Can	1.50
110-32	Broadcast Oscillator Coil Assembly Complete—Less Can	.50
110-33	Mid-Wave & Short Wave Oscillator Coil Assembly Complete—Less Can	1.00
111-39	Mid-Wave & Short Wave Antenna Coil Assembly Complete—Less Can	1.00
111-40	Broadcast Antenna Coil Assembly Complete—Less Can	.75
TRANSFORMERS		
104-27	50/60 Cycle Power Transformer	4.50
104-28	25 Cycle Power Transformer	7.00
104-29	Universal - 25 Cycle Primary	7.50
104-30	Universal - 40 Cycle Primary	7.00

Part No.	DESCRIPTION	List Price Each
ASSEMBLIES		
112-133	Belt Take-up Assembly—Including: 1—No. 117-18 Take-up Arm 1—No. 117-21 Take-up Pulley 1—No. 117-24 Stud for Above 1—No. 117-22 Stud	.25
112-134	Switch Assembly—Including: (Specify if Blue or Brown Desired) 2—No. 117-16 Band Indicator Arm 1—No. 117-15 Link 1—No. 117-14 Elbow 1—No. 117-13 Link 3—No. 117-23 Stud 3—No. 131-30 Spring Washer 1—No. 117-33 Threaded Stud 1—No. 117-22 Stud Red Cellulose	.55
112-135	Volume Indicator Assembly—Including: (Specify if Blue or Brown Desired) 1—No. 112-121 Pointer Disc 1—No. 117-26 Bushing 1—No. 120-5 Spring Clip 1—No. 120-7 Coil Spring Fish Line 1—No. 117-28 Pulley 1—No. 115-15 Set Screw R Red Cellulose	.75
112-136	Tone Indicator Assembly—Including: (Specify if Blue or Brown Desired) 1—No. 112-122 Pointer Disc 1—No. 117-26 Bushing 1—No. 120-5 Spring Clip 1—No. 120-7 Coil Spring Fish Line	.75

SOCKETS		
121-6	Six Prong Type "6C6"	.10
121-6	Six Prong Type "42"	.10
121-7	Seven Prong Type "6B7"	.10
121-9	Four Prong Type "Spkr"	.10
121-0	Four Prong Type "80"	.10
121-12	Seven Prong Type "6K7"	.10
121-17	Six Prong Type "6C6"	.10
SPEAKER		
114-27	Eight Inch Dynamic Speaker	6.50
114-30	Ten Inch Dynamic Speaker	8.00
MISCELLANEOUS		
101-37	Volume Control and Switch	1.35
101-38	Tone Control and Fidelity Switch	1.35
102-23	Three Gang Variable Condenser	6.00
107-5	Line Cord & Plug	.50
115-22	Tube Shield	.15
115-35	Antenna, Oscillator and R.F. Shield	.15
115-36	I.F. Shield	.15
124-18	J-5-4D Series Dual Pad	.90
125-16	Wave Change Switch	.90
128-15	Small Wood Knob with Spring	.15
128-16	Large Wood Knob with Set Screw	.20
128-17	Large Wood Knob with Spring	.15

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

Mica condensers are coded with an additional dot indicating tolerance:

Tolerance	Color of Dot
Percent	
2 1/2 %	White
5 %	Green
10 %	Blue
15 %	Yellow
20 %	Red
More than 20 %	None.

When ordering condensers, specify part number, model 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.

All prices quoted are list and are subject to the usual trade discounts.

Prices subject to change without notice.

Shipments are F.O.B. our Factory. When remitting in advance, please include postage.

WE CANNOT SUPPLY SPEAKER PARTS, CONES, TRANSFORMERS OR FIDELITY SEPARATELY. WE CAN REPLACE OR REPAIR A DAMAGED SPEAKER FOR \$2.50 NET, IF IT IS RETURNED TO OUR FACTORY, TRANSPORTATION CHARGES PREPAID.

	1—No. 117-32	Pulley	
	1—No. 155-15	Set Screw	
		Red Cellulose	
112-137	Dial Plate Assembly—Including:		1.25
	1—No. 117-17	Dial Plate	
	2—No. 117-11	Dial Bracket	
	4—No. 162-4	Rivets	
	2—No. 117-25	Volume & Tone Indicator Studs	
	1—No. 117-19	Bushing for Tuning Shaft	
112-138	Switch Arm Assembly—Including:		.25
	1—No. 117-12	Switch Arm	
	1—No. 147-15	Bushing	
	1—No. 154-4	Set Screw	

DIAL PARTS ONLY

112-117	Tuning Shaft	.05
112-118	Metal Oval Escutcheon Only	1.25
112-119	Dial Pointer with No. 132-8 Screw	.20
112-120	Band Spread Pointer Disc (Specify if Blue or Brown Desired)	.10
112-123	Oval Glass Crystal Only	.35
112-124	Glass Dial Scale	1.25
112-125	Drive Belt	.20
112-126	Pilot Light Socket	.10
112-127	Pilot Light Socket	.10
112-139	Oval Glass Retaining Ring	.10
116-5	6-8 Volt, T-50 Pilot Light	.10
117-20	Drive Belt Pulley and Set Screw	.25
117-29	Background Plate (Specify if Blue or Brown Desired)	.25
117-30	Reflector Plate	.25
120-4	Drive Belt Take-up Coil Spring	.05
131-33	Glass Retaining Clips	.025

MONTGOMERY WARD

MODEL 559

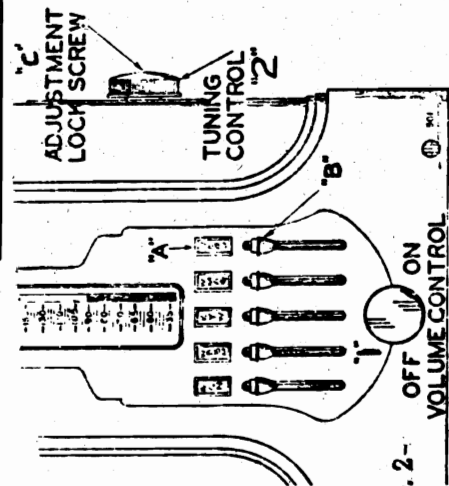
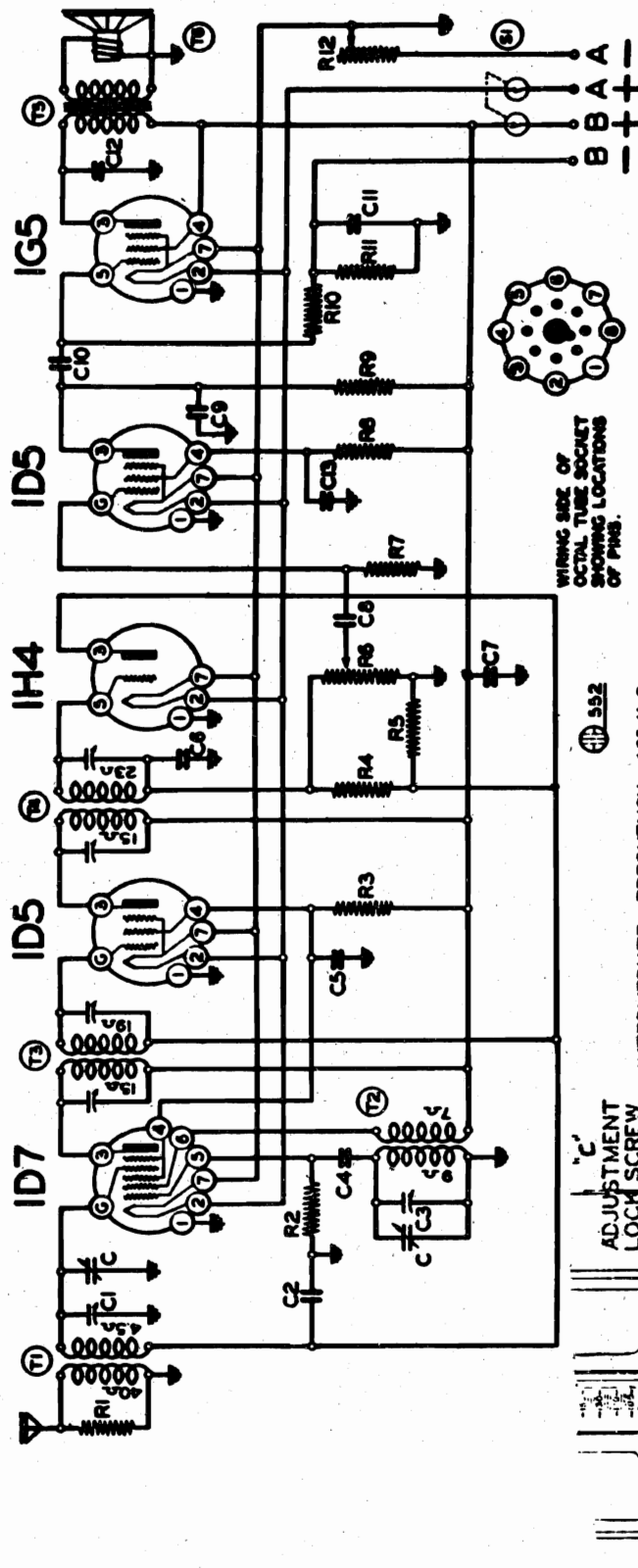


FIG. 2-

VOLUME CONTROL

PROCEDURE FOR SETTING THE AUTOMATIC LEVERS:

There are five levers on the dial by means of which five stations may be selected, (See "B" Fig. 2).

Make a list of local stations you tune in regularly; any number up to and including five.

Punch out from the set of station call letter tabs supplied. Above each automatic tuner lever an opening in the escutcheon is provided for inserting the call letter tabs (See "A" Fig. 2).

Insert the call letter tabs in the rectangular openings in the escutcheon above each of the automatic tuner levers. One of the small celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

Press DOWN ALL THE WAY any one of the automatic tuner levers. Holding it down FIRMLY, tune in by means of the tuning knob (No. 2) the station indicated on the station call letter tab above this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position) until the signal is clearest. The station will then be accurately tuned in. Release the lever.

Press down another automatic tuner lever. Holding it down FIRMLY, carefully tune in the station indicated on the call letter tab above this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

Now hold tuning knob securely with left hand to prevent it from turning, or Rotate the tuning knob (No. 2) to the right (clockwise) as far as it will turn and with a coin (half dollar), tighten the special locking screw ("C") in the center of the tuning knob, (See Fig. 2).

It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT.

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Locking screw "C" is loose when radio is shipped from factory).

MODEL 559

MONTGOMERY WARD

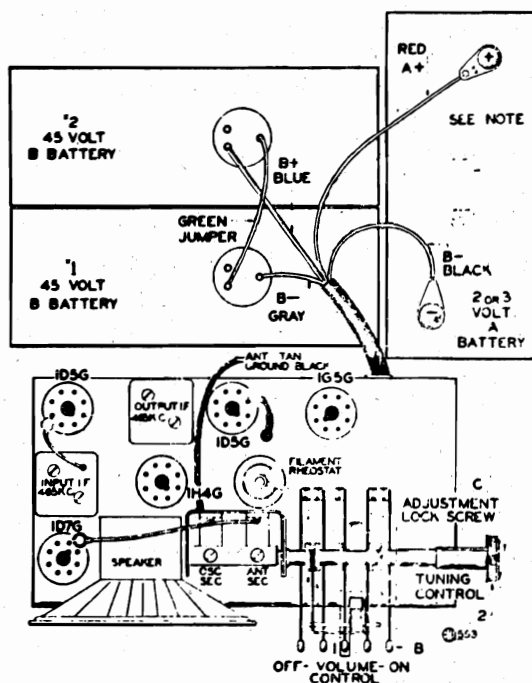


FIG. 1—TOP VIEW

DESCRIPTION:

TUBES:

The tube complement of this chassis consists of the following tubes:

- 1—Type 1D7G Pentagrid Mixer, First Detector-oscillator.
- 1—Type 1D5G Remote Cut-off Pentode, I.F. Amplifier (465 K.C.)
- 1—Type 11H4G Triode Second Detector, A.V.C.
- 1—Type 1D5G First Audio Amplifier.
- 1—Type 1G5G Pentode Output Amplifier.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on diagram are measured with a new set of batteries.

Resistances of coil windings are indicated in ohms on the schematic 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.

The approximate current consumption is as follows:

"A"—360 ma., "B"—15 ma.

Failure to operate, noisy or weak reception is usually due to defective tubes, the tubes making poor contact with sockets or grid clips making poor contact with the caps of the tubes. Tubes may be checked very easily by replacing with other tubes which are known to be good.

ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low battery voltage, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet.

(See part 5, for instructions on how to remove chassis from cabinet).

Connecting "A" Battery

First—Place the A Battery as shown in Fig. 1, (Either the 2 volt Storage A or the 3 Volt Dry A).

Next—Connect the Red wire marked A plus (+) to the A plus (+) Red post on battery.

Now—Connect the Black wire marked A minus (—) to the A minus (—) post on battery.

CAUTION: Before connecting a 3-volt dry A Battery, read the instructions which are attached to the bottom of the cabinet. **NOTE:** A special connector plug is supplied for connecting the "A" leads to a 3-volt dry "A" battery which has socket connections, (see dotted lines on "A" battery in Fig. 1).

Connecting "B" Batteries

First—Place both B Batteries exactly as shown.

NEXT—insert the special three-prong connector plugs into the sockets on the B batteries as shown in illustration.

NOTE:—The above procedure and illustration pertains to the new style B batteries which have sockets; however, the old style B batteries which have terminals can be used by connecting them as follows:

FIRST—Remove the special plugs by cutting the wires off at the plugs.

NEXT—Connect grey colored B minus (—) wire to minus (—) terminal of battery (marked Battery No. 1 in illustration).

NEXT—Connect one end of green connecting wire to plus (+45) terminal of Battery No. 1 and other end to the minus (—) terminal of Battery No. 2.

NOW—Connect blue B plus (+) wire to the plus (+45) terminal of Battery No. 2.

All adjustments should be made with a non-metallic screw driver.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 1G5G output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108112. Output I.F. Transformer.

Part No. 108111. Input I.F. Transformer.

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

- (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd condenser, to the control grid cap of the type 1D5G I.F. tube, and adjust the output I.F. transformer (No. 108112) to resonance.
- (b) Move oscillator output clip from grid of 1D5G to grid of 1D7G and adjust input I.F. transformer (No. 108111) to resonance.
- (c) With oscillator still connected to 1D7G, readjust output I.F. transformer (108112) if necessary.

R. F. ALIGNMENT: (535-1720 K.C.)

1. With the gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 100 mmf. condenser to the antenna lead and chassis ground and make the following adjustments:

- (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance. This adjustment is on the top of rear section of variable gang condenser. (See Fig 1).
- (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. (Top of front section of gang condenser).
- (c) Check sensitivity at 600 and 1000 kilocycles.

MONTGOMERY WARD

MODEL 559

VOLTAGES AT SOCKETS

Volume Control: Maximum
Readings taken with 1000 ohm-per-volt meter

Antenna Shorted to Ground

TUBE	FUNCTION	Voltage Between Socket Prong and Ground							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
1D7G	Converter	0	+2	+83.5	+60	-15	+83.5	0	0
1D5G	I. F. Amplifier	0	+2	+83.5	+60	0	0	0	+83.5
1H4G	2nd Detector, AVC	0	+2	0	0	0	0	0	0
1D5G	1st Audio	0	+2	+30	+11	0	0	0	+83.5
1G9G	Output	0	+2	+80	+83.5	-2.5	0	0	-6.5

LIST OF REPAIR PARTS (Serial No. 197000 and up)

Part No.	Circuit Diagram Reference	Description	List Price Each	Part No.	Circuit Diagram Reference	Description	List Price Each
CONDENSERS							
1009	C5, C13	.05 x 200 Volt Tubular Condenser	.25	128134BR		Walnut Bakelite Volume Knob	.10
10011	C8, C10	.01 x 400 Volt Tubular Condenser	.25	134134W		Ivory Bakelite Volume Knob	.10
10022	C2	.05 x 200 Volt Tubular Condenser	.25	128137E		Black Bakelite Tuning Knob	.10
10048	C7	.25 x 200 Volt Tubular Condenser (with Bracket)	.35	128137BR		Walnut Bakelite Tuning Knob	.10
10071	C12	.004 x 500 Volt Tubular Condenser	.25	128137W		Ivory Bakelite Tuning Knob	.15
11952	C11	25MFD x 25W. Volt Electrolytic Condenser	.75	128142E		Black Bakelite Cabinet Complete Including Baffle, Grill Cloth and Carton	3.00
1292	C9	.0015 Mica Type Condenser—20%	.25	128142BR		Walnut Bakelite Cabinet Complete Including Baffle, Grill Cloth and Carton	3.00
1295	C6	.0001 Mica Type Condenser—20%	.25	128142W		Ivory Bakelite Cabinet Complete Including Baffle, Grill Cloth and Carton	5.00
12912	C4	.00025 Mica Type Condenser—20%	.25	128101		Baffle Board	.10
RESISTORS							
1309	R9	200M ohm - 1/3 Watt Resistor—20%	.20	128129		Grill Cloth Back and Front	.15
13012	R2	50M ohm - 1/3 Watt Resistor—20%	.20	128102B		Grill Cloth, For Side	.05
13017	R3	10M ohm - 1/3 Watt Resistor—20%	.20	13282		No. 6 x 32 x 1/4 Bottom Plate Mounting Screws, Doz.	.07
13019	R7, R8, R10	1 megohm - 1/3 Watt Resistor—20%	.20	132144		No. 10 x 32 x 3/4 Fibre Screw (Four used to Hold Chassis to Bottom Plate)	.10
13021	R1	20M ohm - 1/3 Watt Resistor—20%	.20	13448B		Rubber Grommet (For Bottom Plate)	.03
13038	R4, R5	2 megohm - 1/3 Watt Resistor—20%	.20	13466E		Black Felt Shield for Lever Openings in Cabinet	.05
13093	R11	450 ohm - 1/3 Watt Resistor—10%	.20	13466BR		Walnut Felt Shield for Lever Openings in Cabinet	.05
				13466W		Ivory Felt Shield for Lever Openings in Cabinet	.05
COILS							
108111	T3	Input I. F. Coil Assembly Complete With Can	1.25	Tubes are coded and guaranteed by the tube manufacturer.			
108112	T4	Output I. F. Coil Assembly Complete with Can	1.25	Prompter service can be rendered on adjustments if defective tubes are returned direct to the tube manufacturer rather than through our factory.			
11085	T2	Oscillator Coil Assembly Complete	.50	All resistors are RMA color coded—specify value and/or resistor number (per schematic diagram) and model number.			
11192	T1	Antenna Coil Assembly Complete	.60	When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.			
SOCKETS				Mica condensers are coded with an additional dot indicating tolerance:			
12193		Eight Prong Octal Sockets	.15	Tolerance percent			
12194		Seven Prong Octal Sockets	.15	Color of Dot			
SPEAKER				2 1/2%			
114118	T6	Five Inch P. M. Dynamic Speaker	4.00	5%			
10557	T5	Output Transformer for Speaker	.90	10%			
MISCELLANEOUS				15%			
101116	R6, S1	Volume Control and Switch (1 Megohm)	1.00	20%			
101117	R12	Filament Rheostat Complete (4.75 ohms)	.50	More Than 20%			
10267	C	Two Gang Variable Condenser	3.00	All prices quoted are list and are subject to the usual trade discounts.			
10557	T5	Output Transformer for Speaker	.90	Shipments are F.O.B. our Factory. When remitting in advance, please include postage.			
107168		Battery Connector Cable Complete	.75	WE CANNOT SUPPLY SPEAKER, CONES OR FIELDS SEPARATELY. WE CAN REPLACE OR REPAIR A DAMAGED SPEAKER FOR \$1.25 NET. IF IT IS RETURNED TO OUR FACTORY, TRANSPORTATION CHARGES PREPAID.			
11549		Coat Type Tube Shield Complete with 115-8 Clamp	.15	PRICES SUBJECT TO CHANGE WITHOUT NOTICE.			
117133B		Brass Bushings for Mounting Bottom Plate	.02				
11848C		Bottom Cover Plate for Chassis	.35				
12135		Plug for "B" Battery	.10				
12198		Plug for "A" Battery	.10				
13195		Battery Connector Lug Marked A	.02				
13196		Battery Connector Lug Marked A+	.02				
128134E		Black Bakelite Volume Knob	.10				

DIAL PARTS LIST

112336	Clear Pyralin Tabs for Station Call Letter Tabs, Doz.	.10	117257	Locking Screw for Tuning Knob	.10
112348	Set of 4 Sheets Station Call Letter Tabs, Set	.15	117258	Tuner Cam	.05
112370	Top and Bottom Wood Pulley Complete with 117287 Shaft for Indicator Film	.05	117283	Locking Collar (For Right End of Cam Shaft)	.15
112371	Drive Drum for Indicator Film	.10	117359	Spacers (Used on Cam Shaft to Mount Dial Housing Assembly)	.05
112372	Indicator Film	.05	117285	Brass Spacer (Used on Cam Shaft Between Drive Drum and Tuner Cam to Left of Drive Drum)	.05
112374	Center Wood Idler Pulley for Indicator Film	.03	117286	Brass Spacer (Used on Cam Shaft Between Drive Drum and Tuner Cam to Right of Drive Drum)	.05
112376	Dial Scale (Calibrated)	.35	120156	Hair Pin Spring for Tuner Lever	.02
115134	Support Bracket for Automatic Tuning Mechanism (Mounts to Variable Condenser)	.10	120163	Take-Up Spring for Indicator Film	.05
115135	Support Bracket for Automatic Tuning Mechanism (Right End of Mechanism)	.10	128128	Moulded Button Keys for Automatic Tuner Levers	.10
115136	Lever Complete with 117-290 Roller	.25	13143	Cinch Button (Used to Fasten Dial Scale to Dial Housing)	.03
115144	Dial Bracket Housing (For Dial Scale)	.20	131141	Compression Spring Washer (Used Between Locking Collar and first Tuner Cam on Right End of Cam Shaft)	.02
117256	Brass Spacer (Used on Cam Shaft Between Second and Third Tuner Cam on Left Side of Tuner Assembly)	.05	131157	Key Washers (Used on Each Side of Tuner Cams)	.02

MODELS 3035, 3037,
3065, 3067

MONTGOMERY WARD

Gang Condenser

The gang condenser is of heavy construction and all trimming condensers are aligned at the factory and set. Very seldom do they need adjustment, however, if you are positive they are out of line they may be adjusted by means of a small modulated oscillator or signal as explained on page 3 of the 2955 service manual. The trimming condensers are located directly beneath the four holes of the condenser shield. Begin by adjusting the condenser next to the tuning dial and adjust each one carefully, always making sure that your main tuning knob is adjusted to exact resonance. Align trimming condensers with the tuning dial as near 1400 kilocycles as possible. No trimming condenser adjustment is necessary for the detector stage.

Neutralizing

The screen grid tube has such a small capacity between grid and plate that no neutralizing is necessary. There is usually as much capacity between the grid and plate prongs of the tube socket and the wiring in the chassis as there is in the tube itself.

Volume Control

The volume control is wire wound and has a resistance of 8000-ohms. It is so connected as to serve a dual purpose by varying the amount of energy to the antenna input transformer and also controlling the grid bias on the three screen grid tubes. The on, off switch is also operated from the projecting stud attached to the arm of the control.

Pilot Light

The pilot is a 3.2-volt bulb, and is shown in the schematic diagram connected to the filament line supplying the heater tubes and 245s. A flickering pilot light is caused by a defective bulb, a poor socket, a loose connection in one of the leads, or by a poorly soldered joint.

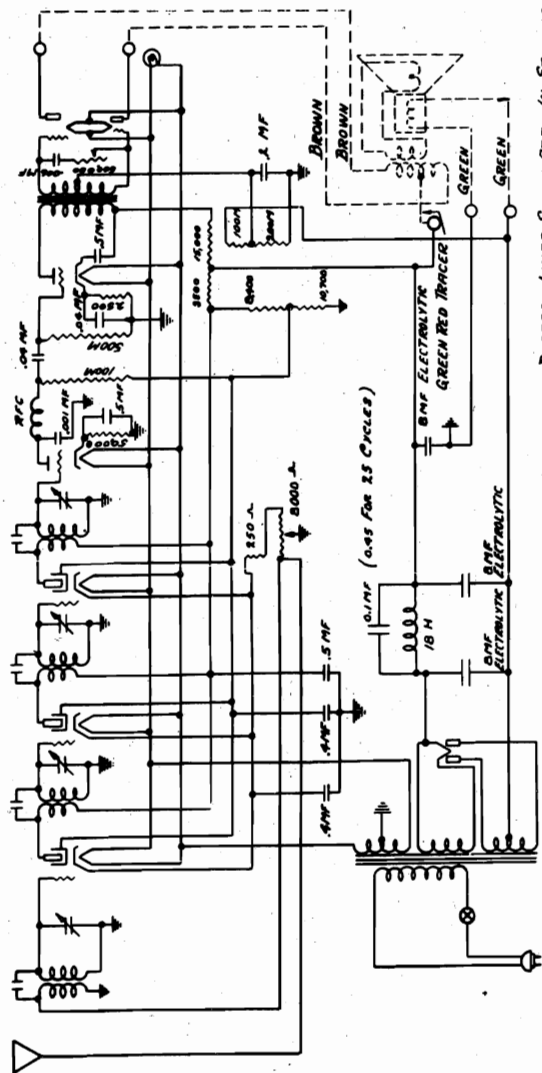
Operating Voltages

VOLTAGES AT SOCKETS—VOLUME CONTROL AT MAXIMUM—LINE VOLTAGE, 115 PLUG IN SOCKET OF RECEIVER—TUBE IN TEST SET

Function	A	B	Control	Grid C	Screen	Screen	Current	Cathode	Plate	Grid Test
Type of Tube	Position of Tube	Volts	Volts	Volts	Volts	Volts	MA	Volts	MA	MA
224	1	1st Radio	2.25	178	3.0	86	.45	3.0	3.4	5.8
224	2	2nd Radio	2.25	178	3.0	86	.45	3.0	3.4	5.8
224	3	3rd Radio	2.25	178	3.0	86	.45	3.0	3.4	5.8
227	4	Detector	2.25	160	9			12	4.5	5.5
227	5	1st Audio	2.25	160	12			12	4.5	5.5
245	6	2nd Audio	2.35	246	40			25	30	
245	7	2nd Audio	2.35	246	40			25	30	
280	8	Rectifier	4.9					Per plate		

25 Cycle Chassis No. 3067 and 3037

This chassis is the same as the 60 cycle with the exception of the power transformer and the filter choke condenser. A .045 M.F. condenser is connected across the choke in the 25 cycle chassis, instead of the 0.1 M.F. condenser as in the 60 cycle chassis. Service instructions are the same for both.



DOTTED LINES SHOWN ARE IN SPEAKER.

Loud Speaker

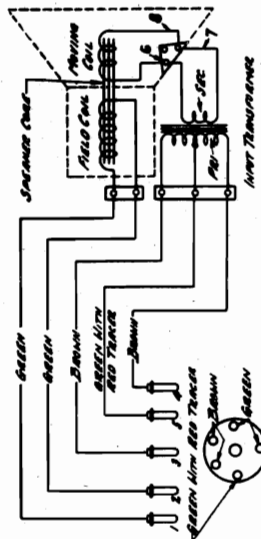


Figure 3

Fig. 3 shows the loud speaker connections and color code of wiring. The field has a resistance of 1000 ohms and is part of the filter circuit. It must therefore be connected at all times or the chassis will not operate. The speaker input transformer is mounted on the speaker chassis. The primary has a center tap connected to the positive high voltage side of the power pack and it is through this primary that the 245 tubes receive their plate supply. The secondary is a low impedance winding connecting to the voice coil of the speaker. The speaker and input transformer may be easily tested by temporarily connecting another speaker which is known to be good. Additional speakers may be used as explained on Page 7 of the instructions for the 2955 chassis, but this is not recommended.

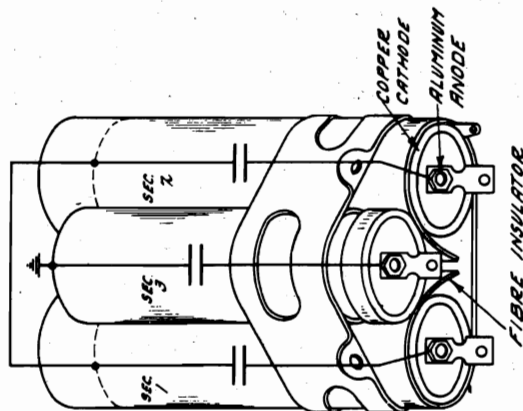
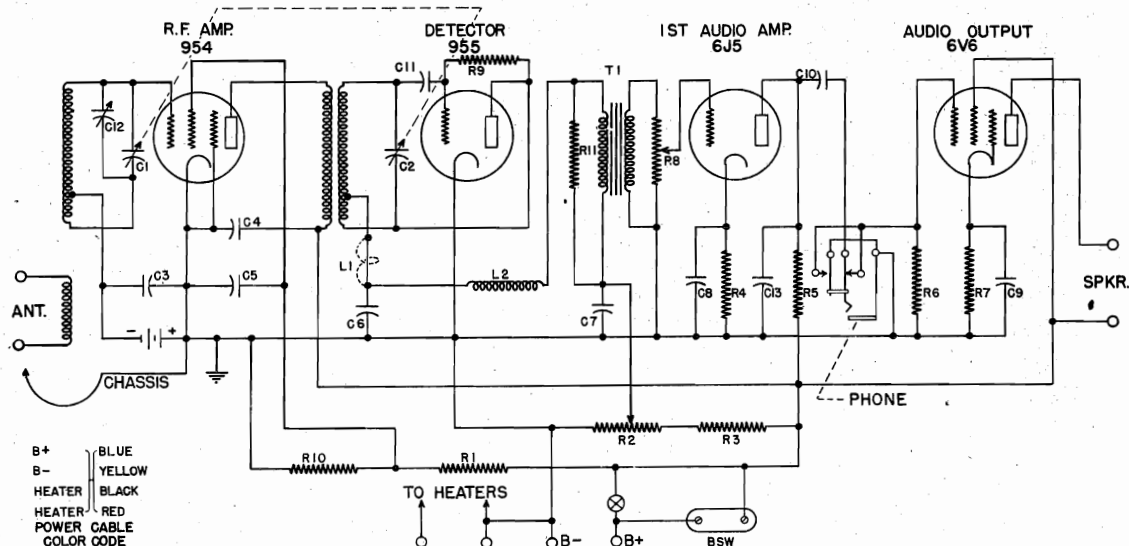


Figure 4

Condenser Block

This is of the electrolytic type having three sections of eight M.F.D. capacity respectively. Very little trouble should be experienced with this condenser as it is self healing in case it breaks down. The connections are shown in Fig. 4.

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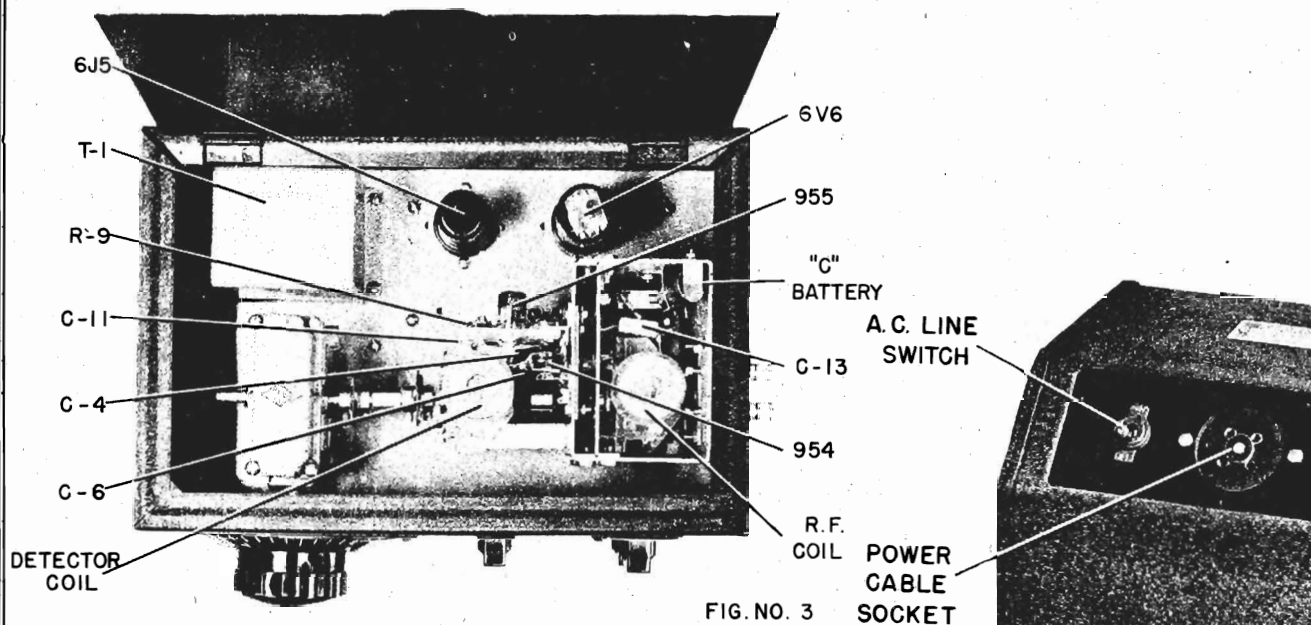
DWG. NO. 1 SCHEMATIC DIAGRAM—TYPE I-10A RECEIVER

PARTS LIST

SYMBOL	FUNCTION	TYPE	RATING
C1	R.F. Tuning Capacitor.....	Air	15 mmf., max.
C2	Detector Tuning Capacitor.....	Air	15 mmf., max.
C3	R.F. Grid Return By-pass.....	Mica	0.003 mfd., 500 vdcw.
C4	R.F. Plate Return By-pass.....	Mica	0.003 mfd., 500 vdcw.
C5	Screen By-pass.....	Copper Plate	0.0005 mfd.
C6	Quench Frequency By-pass.....	Mica	0.003 mfd., 500 vdcw.
C7	Detector B+ By-pass.....	Elec.	8 mfd., 200 vdcw.
C8	1st Audio Cathode By-pass.....	Elec.	10 mfd., 50 vdcw.
C9	2nd Audio Cathode By-pass.....	Elec.	10 mfd., 50 vdcw.
C10	Audio Coupling Capacitor.....	Paper	0.1 mfd., 400 vdcw.
C11	Detector Grid Capacitor.....	Ceramic	50 mmf., 500 vdcw.
C12	R.F. Trimmer Capacitor.....	Air	5 mmf., max.
C13	Plate By-pass Capacitor.....	Mica	0.002 mfd., 500 vdcw.
R1	Screen Dropping Resistor.....	Fixed	33,000 ohms, 1/2 w.
R2	Regeneration Control.....	Variable	50,000 ohms
R3	Detector Plate Dropping.....	Fixed	22,000 ohms, 1 w.
R4	1st Audio Bias Resistor.....	Fixed	4,700 ohms, 1/2 w.
R5	1st Audio Plate Resistor.....	Fixed	0.1 megohm, 1/2 w.
R6	2nd Audio Grid Leak.....	Fixed	0.47 megohm, 1/2 w.
R7	2nd Audio Bias Resistor.....	Fixed	470 ohms, 1 w.
R8	Audio Gain Control.....	Comp. Var.	0.5 megohm
R9	Detector Grid Leak.....	Fixed	18 megohms, 1/2 w.
R10	Screen Bleeder.....	Fixed	47,000 ohms, 1/2 w.
R11	T1 Pri. Loading Resistor.....	Fixed	47,000 ohms, 1/2 w.
L1	Ultra-audio Choke.....	See Note #1	
L2	Quench Frequency Choke.....	Potted	250 millihenries
T1	Audio Transformer.....	Potted	4:1 ratio

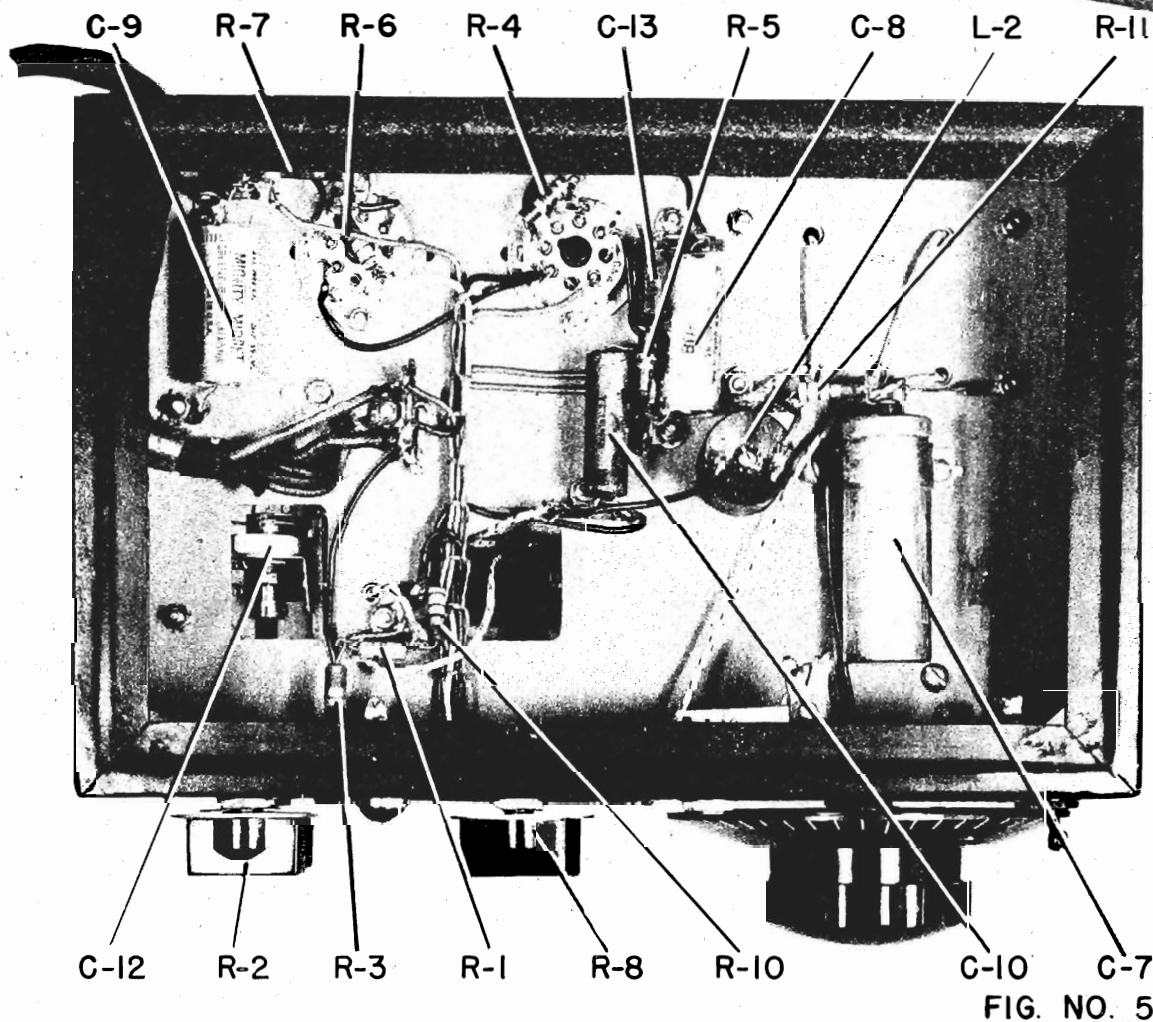
Note #1: Used only on A, B and C Bands.

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5886 POWER UNIT

FIG. NO. 4



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BATTERY OPERATION

The 1-10A Receiver may be operated in portable or emergency service by connecting batteries to the pins of the 4 prong power plug. A 6 volt battery should be used to supply the heater circuits, (the two large prongs on the power plug), and the plate and screen circuit requirements from B batteries. To effect battery economy, the 6V6 may be removed from its socket and headphone operation used. Voltages in excess of 180 are not recommended and receiver performance will be unsatisfactory on the "A" range at voltages below 167. If lower voltages must be used, as in portable operation, resistors R1 and R3 may both be shorted out. This will allow the receiver to function normally with a maximum voltage of 90, but with reduced audio output.

In battery operation aging A and B batteries with a resultant decreasing voltage supply may render the receiver inoperative. This effect will first be noticed at the extreme ends of the "A" band.

The B supply "On/Off" Switch functions to break the positive B supply lead and in the "Off" position is useful for temporarily rendering the receiver inoperative during periods of transmission, or when changing coils, while permitting the heater circuits to remain closed. When using B battery plate supply, the switch should be thrown to the "Off" position at all times when the receiver is not in use, in order to avoid parasitic drain.

The Regeneration control functions to adjust the level at which the detector circuits go into superregeneration. This condition is indicated by a loud rushing or hissing noise. The hiss will drop down to a very low level or disappear entirely when a signal is tuned in, the reduction depending somewhat upon signal strength. Sensitivity will depend upon the adjustment of the Regeneration control, the maximum occurring just beyond the point where the hiss starts. The setting of the Regeneration control at which the detector goes into superregeneration will vary with different sets of coils and with the condition of the 955 detector tube. On the "A" range it may be necessary to advance the control to the full "On" position as the detector tube begins to wear out.

A BSW terminal panel is mounted at the rear of the receiver chassis. These terminals are connected in parallel with the B supply switch. If external (remote) stand-by control is desired, it can be accomplished by connecting a switch or relay to the terminals provided on the BSW terminal panel.

TUNING SYSTEM

The tuning capacitors C1 and C2 plus 6 pairs of plug-in type coils are used to tune the frequency range of the receiver in six tuning bands. The frequency coverage and calibration curve of each band is shown in Fig. 2.

The various coils are stamped "A-1", "A-2", "B-1", "B-2" etc., definitely identifying each coil. These coils are used in pairs, the letter designating the band and the number indicating the circuit position. The coil sockets of the R.F. and detector stages are marked "1" and "2", respectively, to correspond with the coil designations. The location of these coils make them readily accessible for band changing. It should be borne in mind, however, that the high frequency coils, (particularly the "A-1"), must be pushed down in the socket as far as they will go. If they are not, the inductance of the primary and secondary circuits will be increased and the calibration of the circuit will be altered.

POWER SUPPLY

The 1-10A Receiver is designed for operation from National type 5886 power unit, all voltage dividers, etc., being built in so that but one B voltage lead is necessary. The 5886 power unit is designed for operation from a 105-120 volt, 50-60 cps A.C. supply source. This power supply furnishes six volts at 1.6 amperes to the heater circuit and 180 volts at 35 milliamperes to the plate and screen circuits. A 3 volt C battery is used to supply bias to the R.F. tube. This battery is mounted in the rear right-hand corner of the R.F. compartment, being held in place by a spring clip. Two Eveready type 915 cells, or equivalent, are needed. They are mounted in a bakelite tube and the positive (center) terminal of the upper cell is grounded at the top by a retaining bracket.

The 1-10A Receiver may be operated from batteries permitting portable or emergency operation. The operator is cautioned that either the loud-speaker terminals or a jumper across the output terminals be maintained at all times. Failure to do this breaks the B supply to the plate of the 6V6 tube and places excessive voltage on the screen of the tube. This may result in serious damage to the tube.

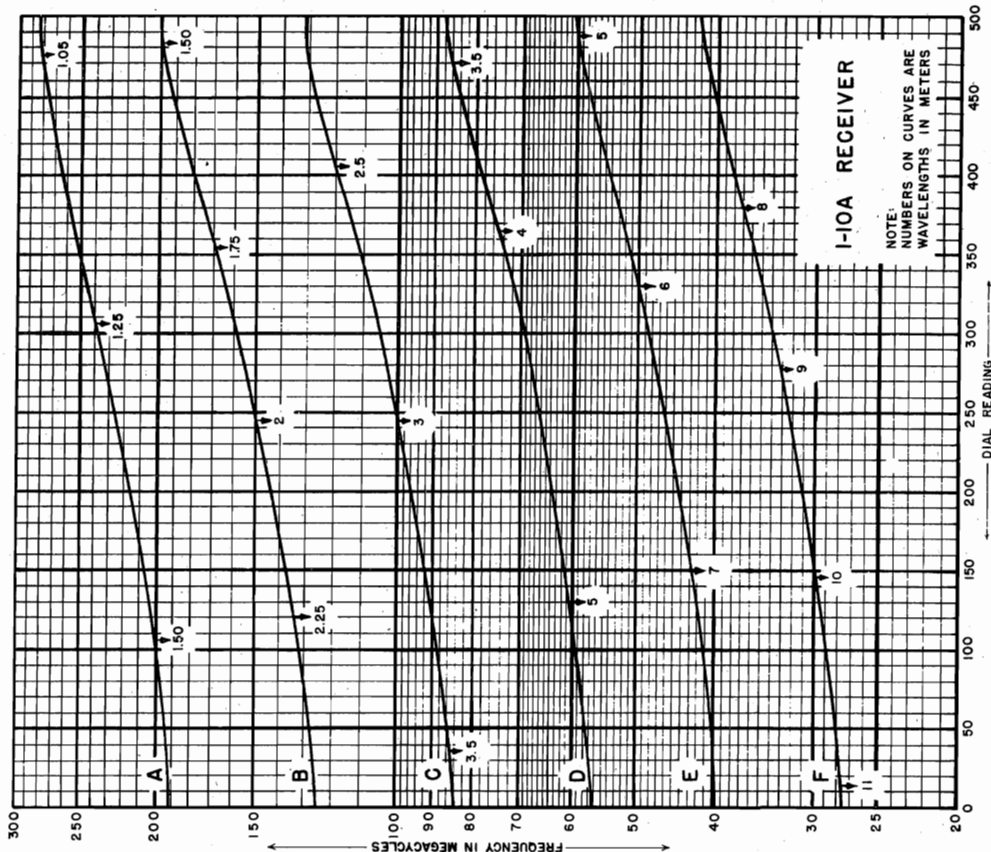
If remote stand-by control is desired make a connection from the terminal on the BSW terminal panel to an external switch or relay.

CIRCUIT

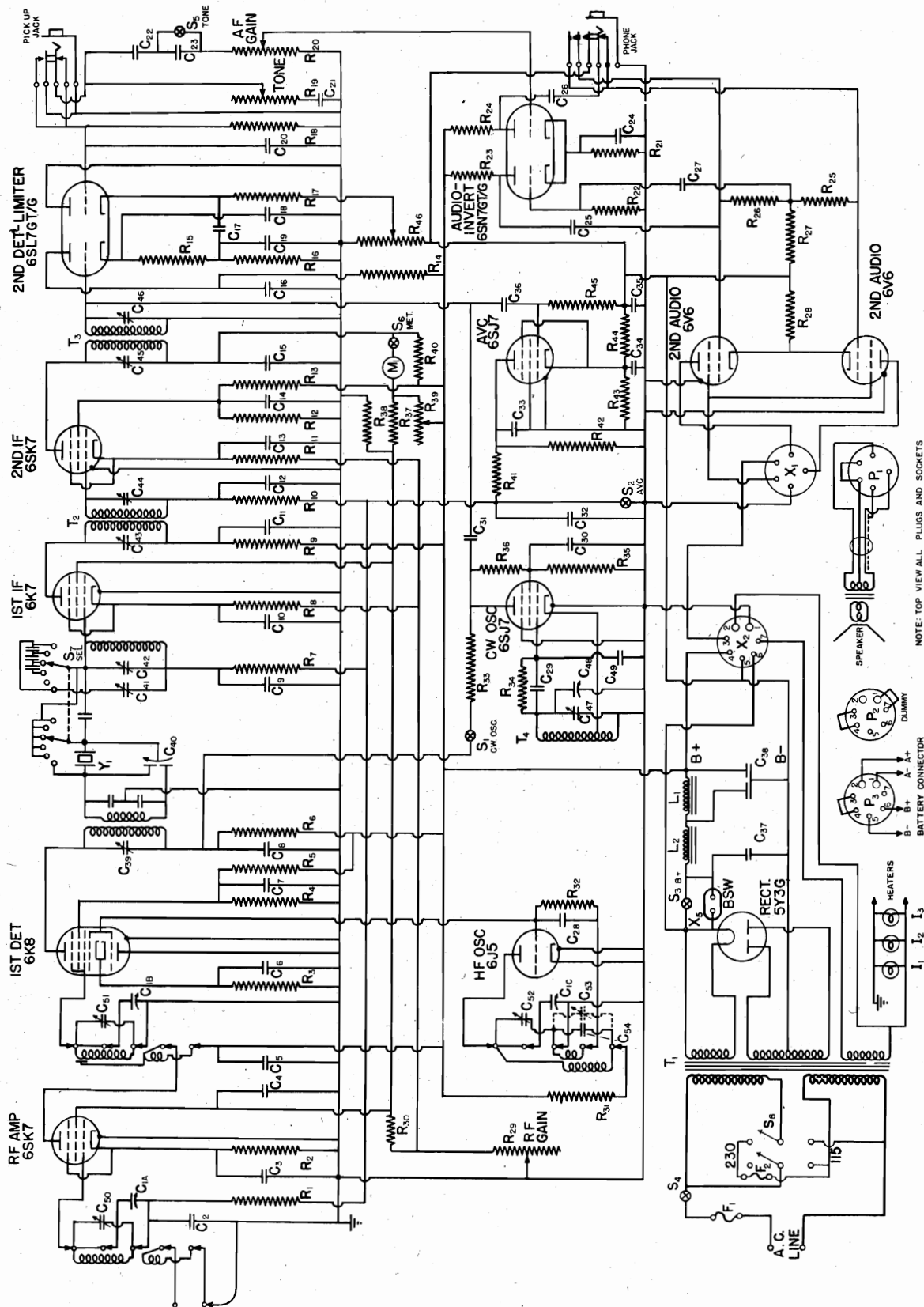
The 1-10A Receiver employs a 4-tube circuit, consisting of one stage of tuned R.F., a self-quenching superregenerative detector, transformer coupled to a first stage of audio which, in turn, is resistance coupled to a power output stage.

THE 1-10A RECEIVER

A complete National 1-10A communications equipment consists of the 1-10A Receiver, #5886 Power Supply, and a MCS 8" 1W dynamic loud-speaker with matching transformer in matching cabinets for table mounting installation.



DWG. NO. 2 CALIBRATION CURVES

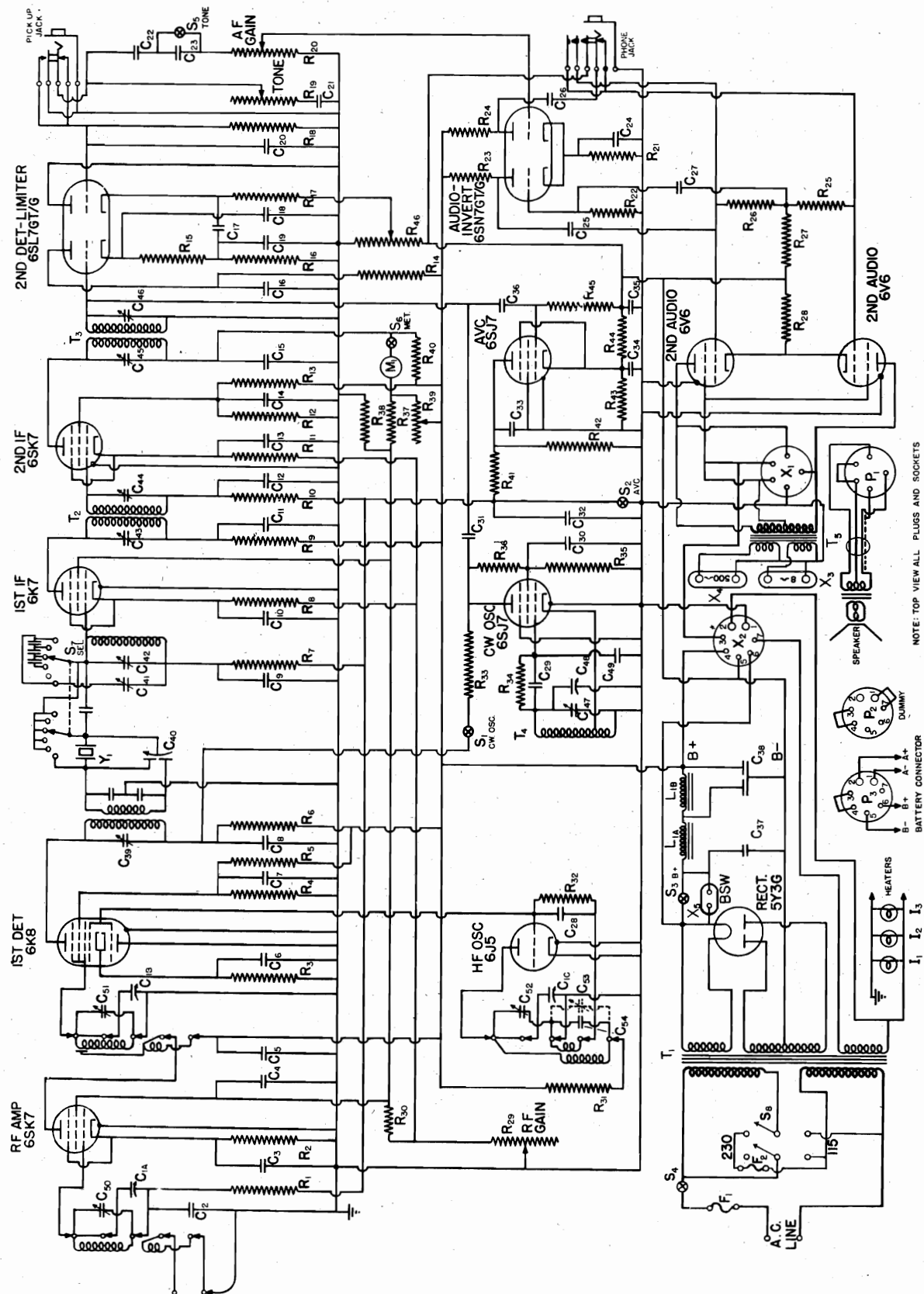


NOTE: TOP VIEW ALL PLUGS AND SOCKETS

NC-2-40C
DWG NO. 4 SCHEMATIC DIAGRAM

IF PEAK 455 KC

NATIONAL CO. INC.



NOTE: TOP VIEW ALL PLUGS AND SOCKETS

NC-2-40CS
DWG. NO. 5 SCHEMATIC DIAGRAM

IF PEAK 455 KC

MODELS NC-2-40C,
NC-2-40CS

NATIONAL CO. INC.

1-1. General

The NC-2-40C RADIO RECEIVER is a twelve tube superheterodyne covering a continuous frequency range of from 490 to 30,000 kilocycles. The NC-2-40CS RADIO RECEIVER is identical with the NC-2-40C except for the frequency range covered and output terminations. The NC-2-40CS has a frequency range of from 200 to 400 and from 1,000 to 30,000 kilocycles.

Each equipment consists of a receiver and speaker built for either relay rack or table mounting and an instruction manual.

Throughout the text of this instruction manual all references to the NC-2-40C shall also apply to the NC-2-40CS except where indicated.

1-2. Circuit

The circuit employed on all bands consists of one stage of radio frequency amplification, a separate first detector and stabilized high frequency oscillator, two intermediate frequency stages, an infinite impedance second detector, a self-balancing phase inverter and audio amplifier, and a push-pull audio output stage.

The second detector utilizes one set of elements of a dual triode; the other set of elements is utilized for a series valve noise limiter. Separate tubes are used in the automatic volume control and beat frequency oscillator circuits. The latter is coupled to the second detector for C.W. reception.

A crystal filter is connected between the first detector and first I.F. amplifier tubes.

1-3. Tube Complement

The NC-2-40C is supplied complete with tubes which are tested in the receiver at the time of alignment.

1-4. Tuning System

The master tuning capacitor C-1 and six sets of coils are used to tune the frequency range of the receiver in six tuning bands.

The frequency coverage of the six bands is as follows:

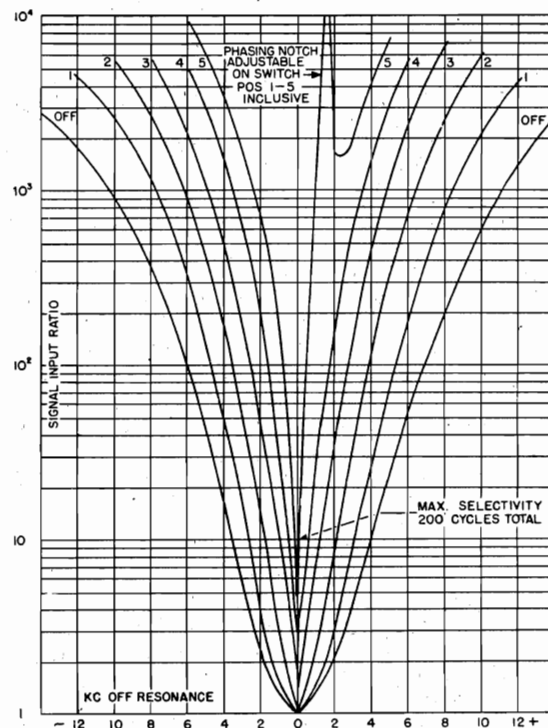
NC-2-40C	NC-2-40CS
Band A 14.-30. MC	Band A 14.-30. MC
Band B 7.-14.4 MC	Band B 7.-14.4 MC
Band C 3.5-7.3 MC	Band C 3.5-7.3 MC
Band D 1.7-4. MC	Band D 1.7-4. MC
Band E 1.0-2.0 MC	Band E 1.0-2.0 MC
Band F 0.49-1. MC	Band F 200-400 KC

All transformer coils of the R.F. amplifier, first detector and H.F. oscillator stages with their associated padder and air-dielectric trimmer capacitors are mounted in a rigid aluminum casting which slides the length of the chassis, being

moved by the MAIN TUNING control. The various coil assemblies are fitted with heavy contact pins which engage spring contactors mounted immediately under the variable tuning capacitor. This system permits thorough shielding of each individual coil while, at the same time, the coils in use are moved to the best position in the chassis, giving shortest leads to the tubes and master tuning capacitor, and all other coils are completely disconnected from the circuit.

1-5. Crystal Filter

Undoubtedly, the most efficient, flexible crystal filter yet designed is used in the NC-2-40C Receiver. Six uniform steps of selectivity, as shown in Dwg. No. 1, and a variable phasing control allow the receiver to be adjusted to almost any operating condition, a highly desirable feature for both short wave communication and broadcast band reception. The curves show that any degree of selectivity between that of full single signal operation and wide band broadcast reception is available, the ratio between the two being almost forty to one.



Dwg. No. 1. Typical Selectivity Characteristics

1-6. Noise Limiter

The noise limiter of the NC-2-40C Receiver is of the series valve type developed in the national laboratories. Its effectiveness and superior performance as compared to the more common types of 'silencers' were proved in the NHU and modernized NC-100 receivers. A threshold control on the front panel permits adjustment of the level at which limiting action starts.

NATIONAL CO. INC.

MODELS NC-2-40C,
NC-2-40CS**1-7. Tone Control**

The tone control is used to vary the frequency characteristic of the audio amplifier. The control is particularly helpful when receiving weak signals through interference, as explained in Section 3.

1-8. Signal Strength Meter

A 0 to 1 millimeter, serving as a signal strength meter, is front panel mounted. It is fitted with a scale in S-Units from 1 to 9 and in DB above S-9 from 0 to 40 DB. The bridge circuit, in which the meter is connected, makes possible accurate signal input readings from below 1 microvolt to 1,000 microvolts.

1-9. Antenna Input

Antenna input terminals are located at the rear of the receiver chassis near the center. The input circuit is suitable for use with a single wire antenna, a balanced feed-line or a low impedance concentric transmission line. Average input impedance is 500 ohms.

1-10. Audio Output

(1) A headphone jack is mounted on the front panel and is wired so as to silence the loud speaker when the phone plug is inserted. The correct load impedance for the headphone circuit is 20,000 ohms, this being the usual impedance of phones having a DC resistance of between 2,000 and 3,000 ohms. Maximum audio output available at the phone jack is 15 milliwatts.

(2) A five prong speaker socket (X-1) is provided at the rear of the receiver chassis. To this socket are brought the audio output leads. The proper load impedance (total) for the output circuit is 10,000 ohms. Maximum undistorted audio power output available is 8 watts.

(3) The NC-2-40CS is provided with an output transformer (T5) having a secondary with two windings which are connected to two terminal strips on the rear of the chassis. Both 8 ohm and 500 ohm terminations in addition to the speaker socket termination of 10,000 ohms are thus provided. The 8 and 500 ohm strips are the screw terminal type.

1-11. Power Supply

The standard NC-2-40C Receiver is designed for operation from a 110/120 volt, or 220/240 volt, 50/60 cycle power source. A toggle switch is provided in the dual primary circuit of the power transformer to permit operation from either voltage. Normal power consumption is approximately 100 volt-amperes. The built-in power supply delivers all voltages required by the heater and B supply circuits-4.5 amperes at 6.3 volts and 100 milliamperes at 250 volts, respectively. One side of the AC input line is connected through a 2 ampere and a 1 ampere fuse each housed in an extractor post marked 'FUSE' which are mounted at the rear

of the receiver chassis. The 2 ampere fuse is used in the circuit for 115 volt operation; both 2 and 1 ampere fuses are used for 230 volt operation.

All NC-2-40C Receivers are equipped with a seven prong plug and socket combination to permit portable or emergency operation from batteries; See Section 2-3.

1-12. Loud Speaker

The loud speaker supplied with the table model NC-2-40C receiver is of the permanent magnet field type having a nominal diameter of 10 inches. A coupling transformer, mounted on the loud speaker chassis, matches the voice coil to the output impedance of the receiver. A shielded three wire cable and plug is furnished for connection between the loud speaker and receiver.

1-13. Pick-up Jack

A pick-up jack mounted on the front panel of the receiver may be used to connect auxiliary apparatus, such as phonograph pick-up, to the audio system of the NC-2-40C Radio Receiver. This input circuit is high impedance and feeds into the 6F8G. Audio Amplifier-Phase Inverter tube. The TONE and AF GAIN controls are operative with this connection.

2-1. Antenna Recommendations

When using a single-wire antenna, the lead-in should be connected to one antenna input terminal and the short flexible lead, which is attached to the chassis, should be fastened to the other terminal. The dimensions of the single-wire antenna system are not critical, the recommended length, including lead-in, being from 75 to 100 feet, although any length between 25 and 200 feet may be used.

Feed-lines of doublet systems should be connected to the two input terminals. The flexible lead is not used.

The inner conductor of a concentric transmission line should be connected to one input terminal. The outer conductor and the flexible grounding lead should be connected to the other terminal.

An external ground connection to the chassis may or may not be necessary. It should be used unless it reduces signal strength.

2-2. AC Operation

Insert the dummy connector plug P-2 in the seven prong socket X-2.

Insert loud speaker plug P-1 in the five prong audio output socket X-1 of the Receiver.

Connect antenna feed line.

Set primary selector switch for line voltage to be used i.e. 115 or 230.

MODELS NC-2-40C
NC-2-40CS

NATIONAL CO. INC.

2-3. Battery Operation

The NC-2-40C may be operated in portable or emergency service by connecting batteries to the terminals of battery connector plug P-3 and inserting it in socket X-2, in place of plug P-2. See Fig. No. 1. For normal operation with somewhat reduced loud speaker output, a 6 volt heater supply (storage battery) should be connected to terminals 1 and 2 of plug P-3, and a 180 volt B supply should be connected to plug terminals 5 and 6. The jumper between terminals 3 and 4 (of P-3) completes the plate and screen supply circuits of the 6V6 output tubes. It may be omitted, with greater battery economy, when operation with head-

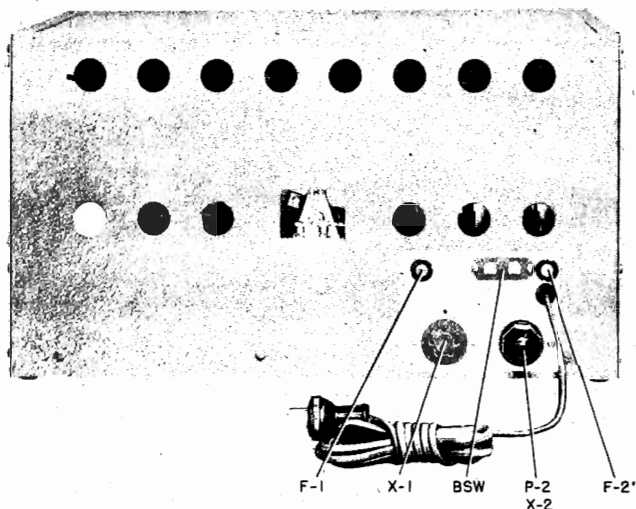


FIG NO. 1

phones only is desired. A suggested refinement is to connect a switch between terminals 3 and 4, thus permitting the 6V6 B supply to be opened at will. Alternatively, removal of speaker plug P-1 from socket X-1 will open the 6V6 B supply in the same manner, without harming the output tubes. A further economy of battery power may be effected by removing the 6V6 tubes from their sockets.

Do not attempt to use plug P-2 for battery connection, since the jumper between terminals 1 and 7 would be incorrect.

3-1. Controls

The MAIN TUNING control knob is located at the middle of the front panel and operates a three gang variable capacitor C-1 through approximately a 60 to 1 ratio reduction drive mechanism.

The accuracy of the calibration can be relied upon to be better than plus or minus 1%.

The tuning system of the NC-2-40C is truly single control; in fact, the MAIN TUNING control referred to above is used for band changing as well as tuning. To select any one of the six tuning bands, the MAIN TUNING control knob is pulled out about 1/4 inch. When this is done, the dial and capacitor drive mechanism is disengaged and the knob is geared to the coil castings. As

the knob is turned, the coil carriage is moved across the chassis until the proper coil pin contacts engage the circuit contactors, as indicated by the scale markers. Approximately one full turn of the MAIN TUNING knob is required to change from one tuning band to an adjacent tuning band. After the desired band has been selected, the tuning knob is pushed in to its original position, disengaging the coil carriage rack.

The LIMITER control, at the left-hand side of the receiver panel, is used to adjust the DC potential applied to the elements of the series valve noise limiter tube. The limiter circuit is thus provided with an adjustable threshold at which limiting starts. Any audio voltages, or peaks, in excess of this threshold are prevented from reaching the audio amplifier. With the LIMITER control set at 0, the limiter circuits will pass all but the strongest audio peak voltages; when the control is set at 10, the threshold is lowered to a point where the audio signal will be distorted due to suppression of the positive peaks.

The R.F. GAIN knob is located below and to the right of the LIMITER knob. It is used to adjust the amplification of the R.F. amplifier and two I.F. amplifier tubes. Amplification increases as the control is turned clockwise towards 9. With the knob set at 10, the meter switch is closed, connecting the signal strength meter. See Section 3-4 regarding meter use.

A CONTROL SWITCH is mounted above the R.F. GAIN control knob. In the AVC position, the automatic volume control circuits are in operation; in the MVC position, automatic volume control is turned off; in the CWO position, the beat frequency oscillator is turned on and the automatic volume control is turned off.

The POWER SUPPLY control knob is directly above the CONTROL SWITCH. In the counterclockwise position, OFF, the receiver is turned off, the primary circuit being opened by the AC line switch; in the mid-position B+ OFF, the AC line switch is turned on but the B supply circuits are incomplete since the B+ switch is opened; in the clockwise position, B+ ON, the B+ switch is closed, completing the B supply circuit. The B+ OFF position may thus be used for rendering the receiver inoperative, as may be required during transmission periods.

The PRIMARY SELECTOR SWITCH of the power transformer is mounted on the receiver chassis to the right of the power transformer. This switch selects the proper circuit arrangement of the dual primary for operation from either 115 or 230 volt power source. There is a shield provided to prevent unintentional throwing of the switch.

The A.F. GAIN control knob is located to the right of the MAIN TUNING control. It is used to adjust the audio amplification of the receiver.

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Audio amplification increases as the control is turned towards 10 on the scale.

The PHASING and SELECTIVITY controls, located above the A.F. GAIN knob, are part of the crystal filter. When the SELECTIVITY control is set at OFF, the crystal is switched out of the circuit. With the crystal switched out, the phasing control has little influence on receiver performance. With the SELECTIVITY control knob set at any point between 1 and 5, inclusive, the crystal filter is in operation, selectivity increasing as the knob is advanced to 5.

The PHASING control is then used to balance the crystal bridge circuit and eliminate interfering signals or heterodynes. See Sections 3-2 and 3-3.

The C.W. OSC. control knob located to the right of the SELECTIVITY control is used for varying the frequency of the beat oscillator. At 0 on the C.W. OSC. scale, the beat oscillator is tuned to the intermediate frequency. See Section 3-3.

A TONE control knob is located above the C.W. OSC. knob and is used to vary the frequency characteristic of the audio amplifier as previously described.

A BSW terminal panel is mounted at the rear of the receiver chassis. The terminals are connected in parallel with the B+ switch. If external (remote) stand-by control is desired, it can be accomplished by connecting a switch or relay to these terminals.

3-2. Phone Reception

After the equipment is properly installed, in accordance with Section 2, it is placed in operation by turning the POWER SUPPLY switch to B+ ON. The LIMITER control should be set at 0. The CONTROL SWITCH should be set at AVC. The PHASING knob should be set at 0; the SELECTIVITY at OFF; the TONE control should be set to give the desired audio characteristic; the R.F. GAIN control should be advanced to some point between 8 and 10, depending upon receiving conditions; the A.F. GAIN control should be set at the point providing the desired audio volume. The receiver is now adjusted for the reception of phone signals and will tune to the frequency indicated by the MAIN TUNING dial. The C.W. OSC. knob has no influence on receiver performance under these conditions.

With the CONTROL SWITCH set in the AVC position, as recommended, the R.F. GAIN knob should be advanced as far as receiving conditions permit, or until background noise becomes objectionably loud. Audio output should be adjusted entirely by means of the A.F. GAIN knob. The operator must remember that automatic volume control action will be restricted unless the R.F. GAIN knob is fully advanced.

The CONTROL SWITCH may be set at MVC, in which case the operator must be careful not to advance the R.F. GAIN knob to a point where I.F. or audio amplifier overload occurs. Such overload is indicated by distortion. In general, the A.F. GAIN

control may be set at about half way on, i.e., at 5 and the audio output adjusted by means of the R.F. GAIN control.

If a signal is weak and partially obscured by background noise and static, best signal-to-noise ratio will be obtained by turning the TONE control toward the LOW position. The most effective setting must be determined by trial as too much attenuation of high audio frequencies will impair the intelligibility of speech.

When a signal is accompanied by static peaks or noise pulses of high intensity and short duration, the best signal-to-noise ratio will be obtained by advancing the LIMITER control towards 10. The best setting must be determined by trial as too much limiter action will impair audio quality. If static peaks and noise pulses are extremely strong or if they are of fairly long duration, the effectiveness of the limiter will be best with the CONTROL SWITCH in the MVC position. In such cases both R.F. GAIN and LIMITER controls must be carefully adjusted for optimum signal-to-noise ratio.

The selectivity of the receiver may be adjusted by means of the crystal filter. The normal setting of the SELECTIVITY control in phone reception is at one of the positions affording broad selectivity. Positions 1 or 2 are recommended. Selectivity may be progressively increased by turning the SELECTIVITY control to positions 3, 4 and 5 although advancing the control too far will increase selectivity to a degree where phone signals become unintelligible.

The PHASING control is used to eliminate or attenuate heterodynes. The normal setting of the PHASING control in phone reception is at 0 on the scale. If, after a signal has been tuned in, an interfering signal causes a heterodyne or whistle, the PHASING control should be adjusted until the interference is reduced to a minimum. The setting of the PHASING control which provides maximum attenuation of the heterodyne will depend upon the pitch of the heterodyne whistle. If the beat note is above 1,000 cycles, the optimum PHASING control setting will be near 0; if the beat note is 300 or 400 cycles, the optimum PHASING control setting will be near one end of the scale or the other, depending upon whether the interfering signal has a higher or lower frequency than the desired signal.

It is recommended that the TONE control be set in the HIGH position when using the crystal filter in phone reception. The resulting attenuation of low audio frequencies tends to compensate for the side-band cutting action of the crystal filter.

3-3. C.W. Reception

The initial adjustment of the receiver for C.W. reception is as described in Section 3-2, except that the CONTROL SWITCH must be in the C.W.O. position. The C.W. OSC. control should be set at mid-scale.

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The sensitivity of the receiver should be adjusted by means of the R.F. GAIN control, care being taken not to advance the control to the point where strong signals will cause I.F. or audio amplifier overload, as indicated by excessive thumping.

The action of the TONE and LIMITER controls will be similar to that described under Section 3-2. When receiving C.W. signals, it will be possible to advance both TONE and LIMITER controls considerably further than is possible in phone reception, since audio distortion is relatively unimportant.

Turning the C.W. OSC. control will change the characteristic pitch of the receiver background noise. The pitch will become higher as the beat frequency oscillator is detuned from the I.F. amplifier. With the C.W. OSC. control set at 2 or 3 (on either side of 0), the characteristic pitch of the receiver background noise will be in the neighborhood of 2,000 cycles. Under these conditions, the audio beat note of any C.W. signal will show a broad peak at approximately 2,000 cycles. This peak will appear on 'one side of the carrier' only and the other side, where the audio beat note is around 2,000 cycles, will be considerably weaker. This characteristic, known as 'semi-single signal', is helpful in receiving weak signals through interference.

As stated in Section 3-2, the selectivity of the receiver may be adjusted by means of the crystal filter, the action of the SELECTIVITY and PHASING controls in C.W. reception being similar to that described. It is possible, however, to utilize the full range of crystal filter selectivity in C.W. reception. Maximum selectivity is obtained with the SELECTIVITY control set at 5. With this setting the single-signal effect, outlined above, becomes very pronounced; in other words, the audio beat note is very sharply peaked at a definite audio frequency which is determined by the setting of the C.W. OSC. control. The operator may have difficulty in finding the audio-peak when first attempting to use the crystal filter. After a signal has been accurately tuned to give peak response, the R.F. GAIN control may need to be retarded in order to prevent I.F. or audio overloading. With the receiver tuned to crystal peak, an interfering signal may be attenuated by proper setting of the PHASING knob since this control does not appreciably affect the desired signal.

3-4. Measurement of Signal Strength

To make a measurement of signal strength by means of the S-meter, the R.F. GAIN control must be advanced to 10, and the CONTROL SWITCH set at the AVC position. The crystal filter should be turned OFF by means of the SELECTIVITY control; the PHASING knob set at 0. The TONE, LIMITER and A.F. GAIN controls do not affect the meter reading.

Tuning the receiver to a signal will cause the meter to read, indicating the signal input in S-units or in decibels above the S-9 level.

With no R.F. input to the receiver, or with the antenna disconnected, the S-meter should read 0, plus or minus 1 S-unit. If it does not, the S-meter circuit requires adjustment. See Section 5-5.

Measurement of the signal strength of C.W. signals cannot be made with the beat frequency oscillator in operation.

4-1. Tube Failures

Failure of a vacuum tube in the receiver may reduce the sensitivity, produce intermittent operation, or cause the equipment to be completely inoperative. In such cases, all tubes should be checked either in an analyzer or similar tube testing equipment, or by replacement with tubes of proven qualities. All tubes should be marked as they are removed from the receiver so that they may be returned to their original sockets thereby reducing the necessity for realignment.

Individual tubes of the same type will vary slightly in their characteristics and it is well to remember this fact when replacements become necessary. Even though the circuit is designed to reduce the effect of such variations to a minimum, the high frequency oscillator and I.F. tubes should be selected with some care. A replacement high frequency oscillator should be checked in the receiver to make sure that the inter-electrode capacities are the same as those of the tube originally employed. This is easily determined by noting any change in dial calibration.

Substitution of new tubes in the I.F. amplifier may possibly alter overall gain and selectivity characteristics. Instructions for realignment are given in detail in Section 5-2.

One other point should be checked when trying the new high frequency oscillator; a fairly strong steady signal should be tuned in, preferably on some frequency above 10 mc.; the beat frequency oscillator should be turned off; jarring the receiver, or lightly tapping the tube, should not show any evidence of noise in the output.

4-2. Circuit Failures

Even though all component parts of the receiver have an ample factor of safety, failure may occur in individual cases. Excluding tubes, the most common failure will probably be due to some defect in a capacitor or resistor. Measurement of voltage in accordance with Section 4-4 will no doubt show where failure has occurred.

4-3. Stage Gain Measurements

The sensitivity measurements listed below are made with the equipment set up as specified in Section 5-1. The CONTROL SWITCH should be set at MVC, the A.F. GAIN at 10, the SELECTIVITY at OFF

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and the PHASING at 0. The signal generator should be adjusted to deliver a test signal of 455 plus or minus 2 kc. either modulated or unmodulated. The high output lead should be attached to the grid of the tube specified in the table below and the ground lead connected to the receiver chassis.

With 1 milliwatt output at the phone jack, the test signal should be within the limits specified below.

Terminal	Test Signal
First Det. Grid...	50 \pm 10 Microvolts
First I.F. Grid...	250 \pm 50 Microvolts
Sec. I.F. Grid....	50,000 \pm 10,000 Microvolts
Sec. Det. Grid....	Over 1 volt

4-1. Voltage Tabulation

All measurements of voltages should be made with the equipment connected for normal operation with AC supply of 115 volt, 50/60 cycle or 230 volt, 50/60 cycle. Except as noted, the R.F. GAIN knob is at 9, the LIMITER knob set at 0 and the CONTROL SWITCH knob set at MVC. A DC Voltmeter of 1,000 ohms per volt sensitivity should be used. The following table must not be considered as a list of the actual operating voltages since loading effects of the measuring instrument will disturb many of the circuits and alter normal voltage distribution. All voltages are measured between specified terminal and chassis.

Tube Terminal	DC Volts $\pm 15\%$
R.F. Amp. Grid.....	0
R.F. Amp. Cathode.....	3 A
R.F. Amp. Cathode.....	25 A*
R.F. Amp. Screen.....	80 B
R.F. Amp. Plate.....	230 B
First Det. Grid.....	0
First Det. Cathode.....	1 A
First Det. Screen.....	80 B
First Det. Plate.....	225 B
H.F. Osc. Grid.....	C
H.F. Osc. Cathode.....	0
H.F. Osc. Plate.....	90 B
First I.F. Grid.....	0
First I.F. Cathode.....	3 A
First I.F. Cathode.....	25 A*
First I.F. Screen.....	80 B
First I.F. Plate.....	225 B
Sec. I.F. Grid.....	0
Sec. I.F. Cathode.....	5 A
Sec. I.F. Cathode.....	25 A*
Sec. I.F. Screen.....	95 B
Sec. I.F. Plate.....	225 B
Sec. Det. Grid.....	0
Sec. Det. Cathode.....	8 A
Sec. Det. Plate.....	225 B
Limiter Grid.....	-3 A
Limiter Cathode.....	4.5 A

Tube Terminal	DC Volts $\pm 15\%$
Limiter Cathode.....	0 D
Limiter Plate.....	0
AVC Grid.....	-25 AE
AVC Cathode.....	-45 AE
AVC Screen.....	0 E
AVC Plate.....	0 E
B.F. Osc. Grid.....	C
B.F. Osc. Cathode.....	0 F
B.F. Osc. Screen.....	10 AF
B.F. Osc. Plate.....	25 AF
Amp.-Inv. Grids.....	0
Amp.-Inv. Cathode.....	4.5 A
Amp.-Inv. Plates.....	115 B
Audio Grids.....	-20 A
Audio Cathodes.....	-40 A
Audio Screens.....	230 B
Audio Plates.....	215 B
E+ Common.....	230 B
B- Common.....	-50 B

A--0 to 50 volt meter scale

B--0 to 250 volt meter scale

C--Accurate measurement cannot be made

D--LIMITER knob set at 10

E--CONTROL SWITCH knob set at AVC

F--CONTROL SWITCH knob set at CWO

*--R.F. GAIN knob set at 0

The Power Output Tubes used in the NC-2-40C Radio Receiver may be the metal type 6V6 or the glass type 6V6GT/G. It is necessary, however, to provide glass type 6V6GT/G output tubes with metal shields to avoid oscillation in the audio amplifier. The recommended shield is Goat type G1222K with type G1004 connector.

5-1. General

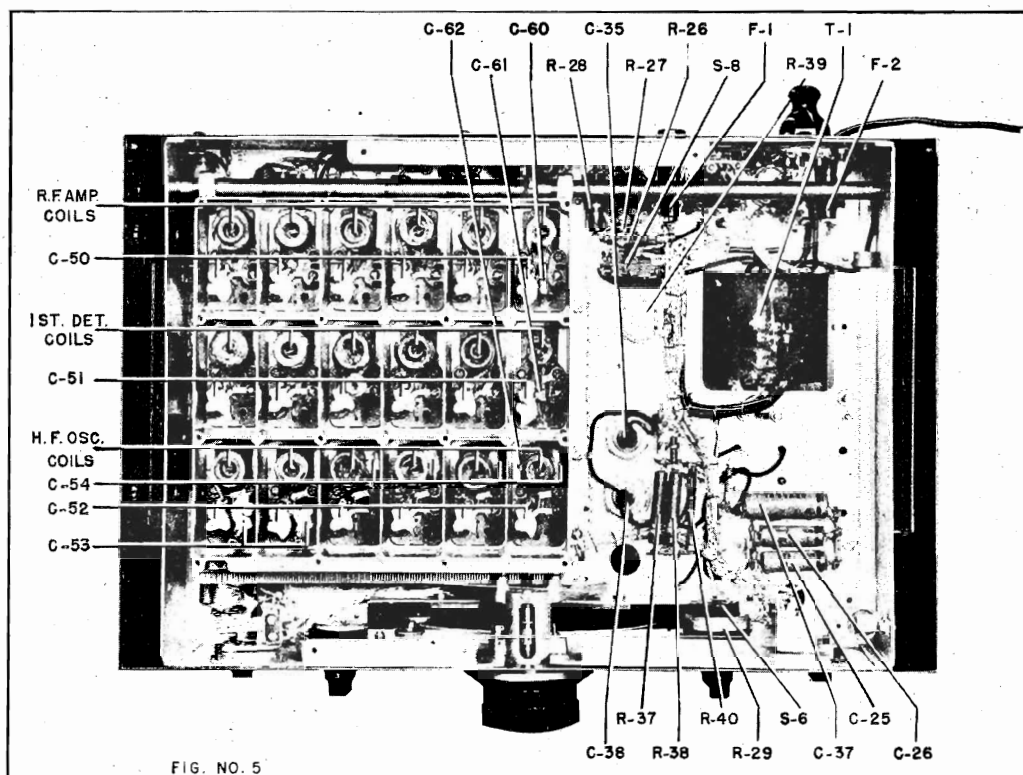
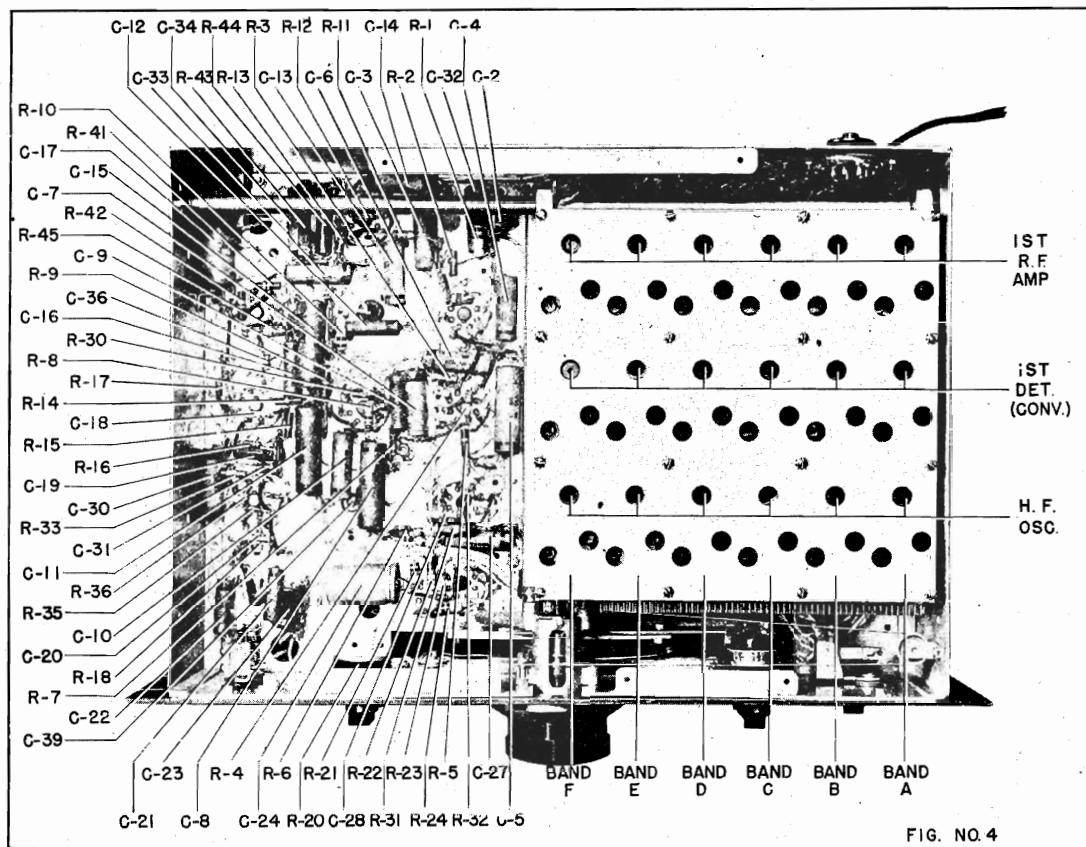
All circuits are carefully aligned, before shipment, using precision crystal oscillators which insure close conformability to the dial calibration. No readjustment will be required, therefore, unless the receiver is tampered with or damaged.

To determine the necessity for realignment, the receiver should first be carefully checked against its normal performance as described in Section 3. In no case should realignment be attempted unless tests indicate that such realignment is necessary.

The coil group which is plugged into the circuit at any time is the one directly underneath the three gang master tuning capacitor. The coil nearest the front panel of the receiver is in the H.F. oscillator circuit, the middle coil is in the first detector circuit and the coil nearest the antenna input terminal panel is in the R.F. amplifier circuit. See Fig. No. 5.

All coils have individual trimmer capacitors. The H.F. oscillator circuits of tuning bands E & F

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The two bottom views above show the NC-2-40C Receiver with the coil carriage at the extreme end of its travel. It will be noted that such construction makes all components readily accessible.

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have, also, variable series padding capacitors. These capacitors are identified in Fig. No. 5.

A screwdriver having a metal shaft may be used to make adjustments in the high frequency circuits but capacity effects will be noticeable, and the shaft should not touch any part of the aluminum casting.

Before proceeding with the alignment of any circuit of the receiver, the equipment must be set up as specified in Section 2, except that the antenna lead-in or transmission line must be disconnected. An output meter having a 20,000 ohm resistor load should be connected to the phone output jack. The POWER SUPPLY knob should be set at B+ ON and the R.F. GAIN knob set at 9. The TONE control knob should be set at N and the LIMITER knob should be retarded to 0.

Alignment of the equipment may be divided into two major steps:

- (1) I.F. Amplifier Alignment
- (2) H.F. Circuits Alignment
 - (a) H.F. Oscillator
 - (b) First Detector and R.F. Amplifier
 - (c) Tracking of H.F. Circuits

The circuits MUST be tuned in the above order when complete alignment is necessary.

5-2. I.F. Amplifier Alignment

The intermediate frequency of the NC-2-40C Receiver is 455 kilocycles, plus or minus 2 kilocycles. The exact frequency is determined by the quartz crystal resonator Y-1.

Tuning capacitors are provided on the crystal filter and on each I.F. transformer. These capacitors are designated by symbol numbers C-39 and C-41 to C-46, inclusive on Fig. Nos. 3 and 4.

The high output lead of an accurately calibrated signal generator should be connected to the grid terminal of the first detector tube and the grounded lead to any convenient point on the

generator, the dummy antenna being omitted. The CONTROL SWITCH of the receiver should be in the CWO position and the modulation of the signal generator turned off to provide a steady C.W. test signal. The PHASING control of the receiver should be set at 0 and the SELECTIVITY control at 5. The A.F. GAIN control should be fully advanced.

Adjust the output attenuator of the signal generator to provide a signal of approximately 100 microvolts and vary the tuning control of the signal generator slowly between the frequencies of 453 and 457 kilocycles. At some frequency between these limits the I.F. amplifier of the receiver will show a very sharply peaked response, as indicated on the output meter. The output attenuator of the signal generator should be retarded after the signal generator has been tuned to the I.F. peak in order to avoid I.F. or audio overload; the C.W. OSC. control must be set to provide an audio beat note in the middle of the audio range (between 400 and 1,000 cycles).

The I.F. tuning capacitors C-39 and C-43 to C-46, inclusive, should each be carefully adjusted to give a maximum reading on the output meter. The order in which the adjustments are made is not important. While making I.F. amplifier adjustments, it will be necessary to retard the attenuator of the signal generator if the readjustment increases I.F. amplifier gain to the point where overload occurs.

The crystal filter SELECTIVITY knob should then be set at 1 and the signal generator detuned between 3 and 4 kilocycles either side of the crystal frequency. Capacitor C-42 should be tuned for maximum output meter reading. After this adjustment is made, the SELECTIVITY knob should be set at OFF and the signal generator retuned to exact crystal frequency. Compensator capacitor C-41 should then be adjusted for maximum reading on the output meter.

The performance of the I.F. amplifier and audio circuits may be checked against the stage gain data in Section 4-3 after alignment has been completed. Selectivity may be checked against the curves of Dwg. No. 1.

After alignment of the I.F. amplifier has been completed, the C.W. OSC. control should be set at 0 at which setting the C.W. oscillator should be at zero beat with the test signal. If zero beat does not occur at zero, readjust capacitor C-47 of transformer T-4, as shown in Fig. No. 3.

The quartz crystal resonator Y-1 may be checked at the conclusion of I.F. amplifier alignment as follows: the SELECTIVITY control should be set at 5 and the signal generator tuned to the crystal frequency. The output meter reading should be noted. When the SELECTIVITY knob is turned to OFF, the meter reading should decrease 1 to 2 db. provided the PHASING knob is at 0. An

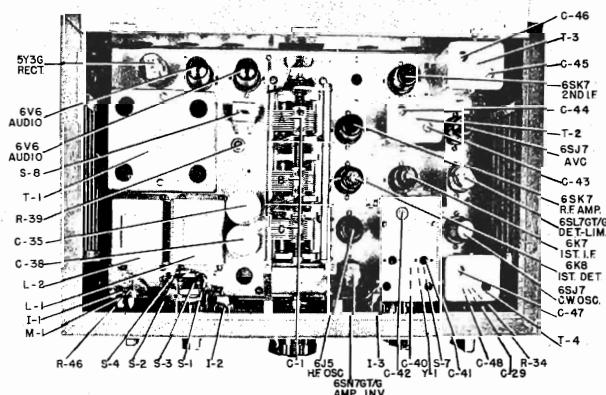
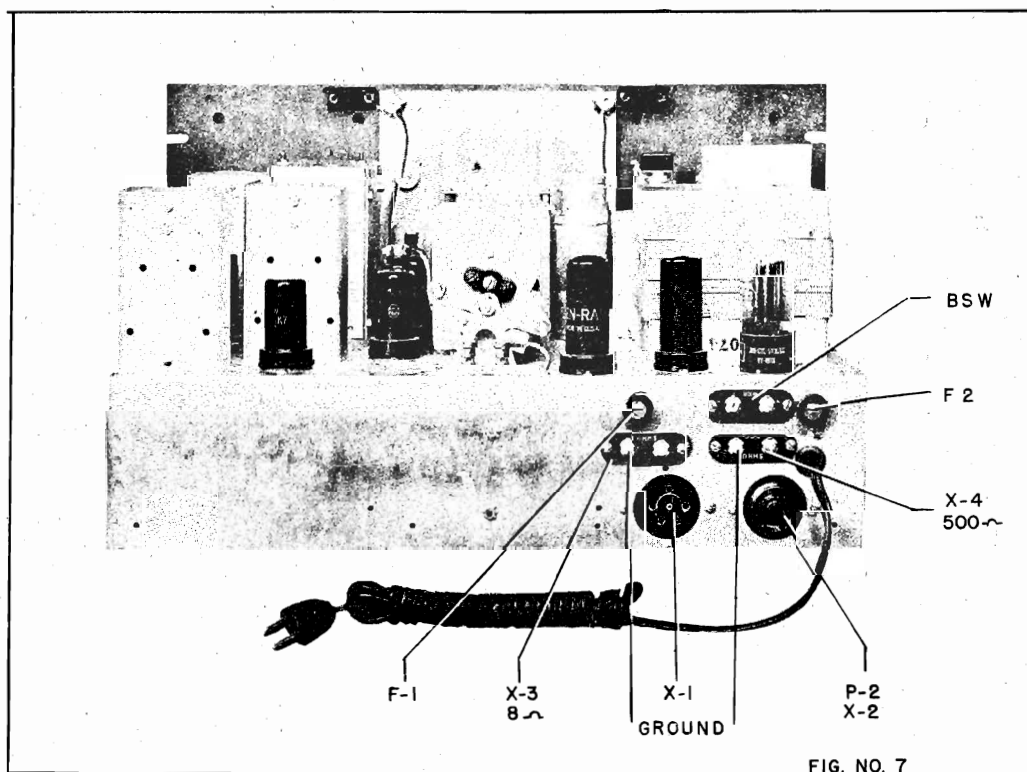
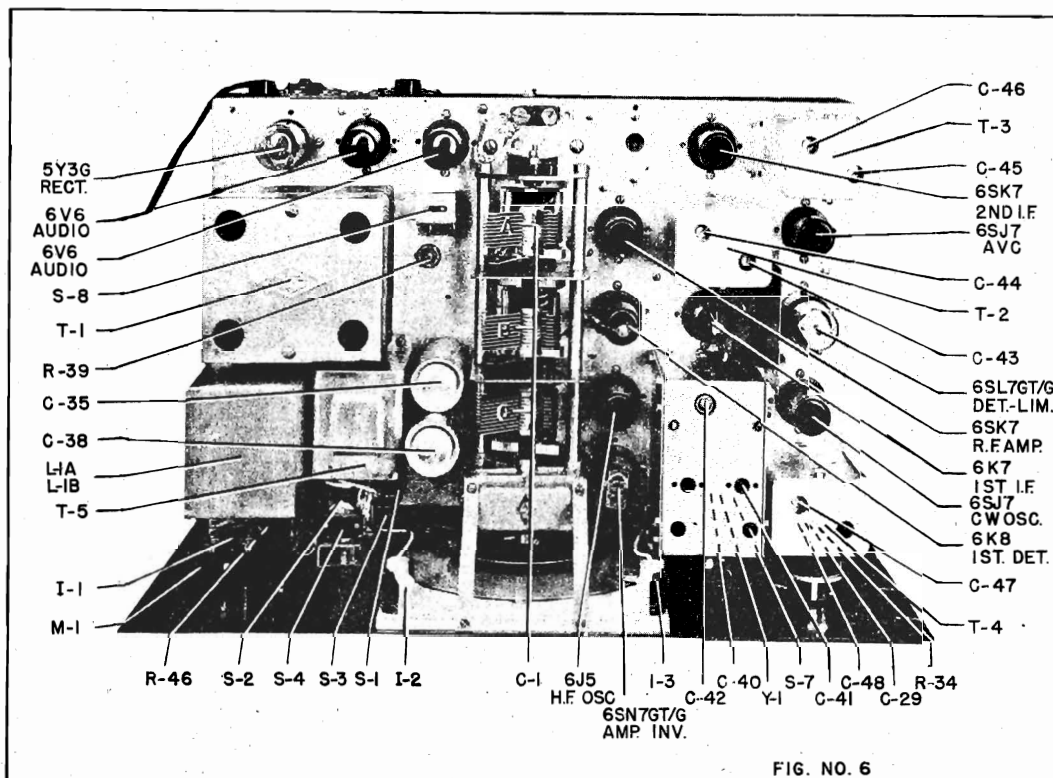


FIG. NO. 3

chassis. The flexible lead need not be disconnected from the grid of the tube. Connection is made directly from the output jack of the signal

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Top and rear views of NC-2-40CS receiver

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increase in meter reading can, in most cases, be traced to an improper adjustment in the I.F. amplifier, since the crystal resonator is mounted in a sealed holder, and it is rather unlikely that trouble will be had from that source.

5-3. General Coverage Alignment**(a) H.F. oscillator**

Alignment is effected as follows: with the coil range to be aligned connected in the circuit and with the receiver controls set as recommended in Section 5-1, the MAIN TUNING dial should be set near the high frequency end of the range. A signal generator should be connected to the antenna input terminal through a standard IRE dummy antenna and accurately tuned to deliver a signal of the same frequency as that indicated by the receiver dial setting. If, when this signal is tuned in, the dial reading is too high, the capacity of the H.F. oscillator trimmer C-52 should be decreased to make corrections. Conversely, low dial readings are corrected by increasing the capacity of trimmer C-52.

It is imperative that the high frequency oscillator circuits operate at a higher frequency than that of the first detector and R.F. amplifier circuits. This can be checked by tuning in the image signal, which should appear at a dial reading approximately 910 kilocycles below that of the real signal. The image signal should be considerably weaker if the R.F. amplifier is correctly aligned and a stronger test signal may be required before the image can be found. If the image does not appear at the lower frequency dial setting, the H.F. oscillator circuit is incorrectly adjusted and the capacity of the H.F. oscillator trimmer capacitor in question must be decreased until the real signal and image signal appear at the proper points on the dial.

(b) First Detector and R.F. Amplifier

With the signal generator adjusted to deliver a modulated signal near the high frequency limit of the band to be checked, the receiver should be tuned to give maximum output, as indicated by the output meter. The first detector and R.F. amplifier trimmer capacitors C-51 and C-50, respectively, should then be varied until the output meter reads maximum. On the highest frequency bands, adjustment of the first detector and R.F. amplifier trimmers may change the calibration of the high frequency oscillator, necessitating retuning of the MAIN TUNING dial. If these trimmers should require considerable realignment, it may be necessary to readjust the high frequency oscillator trimmer C-52 in order to maintain correct calibration.

A very simple and quick method of first detector and R.F. trimmer alignment may be used if a signal generator is not available. This method consists of setting the trimmers at the adjustment which provides maximum circuit or background

noise. It will be found that trimmer settings under this method are sufficiently sharp to provide good alignment, although the adjustment must be made with care to avoid alignment to the image frequency.

(c) Tracking of H.F. Circuits

After the H.F. oscillator, first detector and R.F. amplifier trimmers have been properly set at the high frequency limit of the band, the receiver should be tuned to a frequency toward the low frequency end. Tracking at any point up to the low frequency limit may be checked by adjusting the signal generator to the proper frequency and testing the settings of the first detector and R.F. amplifier trimmers for maximum gain. Calibration may be checked also at these points. After such a test, all trimmers checked should be reset at the high frequency end of the band since their settings are most critical at this point.

Errors in tracking near the low frequency limits of the band can be caused by defects in any of three circuit elements.

- (1) The tuning capacitor section.
- (2) The circuit inductance.
- (3) The H.F. oscillator series padding capacitor.

In order to determine if one or more sections of the master tuning capacitor C-1 are the cause of any mistracking present, it is necessary to make the check described above on two or more different bands. If the same tracking error appears on all bands, the master tuning capacitor is definitely at fault. The error should be corrected by permanently bending the rotor or stator plates to provide the proper capacity.

If the tracking error appears only in the R.F. amplifier or first detector stage of only one band, the inductance of the tuned circuit of the stage is incorrect. Should the tracking checks indicate that the H.F. oscillator circuit of a particular band is at fault, either the inductance of the circuit, the series padding capacitor or both may be responsible.

After any change or readjustment is made to any high frequency circuit inductance or series padding capacity, it will be necessary to realign the associated trimmer at the high frequency limit of the coil range. Tracking should then be rechecked.

5-4. S-Meter Adjustment

The S-meter balancing resistor R-39, shown in Fig. No. 3, is used to obtain zero meter reading in the absence of signal input to the receiver. The adjustment is as follows: Set the R.F. GAIN control at 10, CONTROL SWITCH at MVC, and disconnect the antenna leads; adjust R-39 until the S-meter reads zero.

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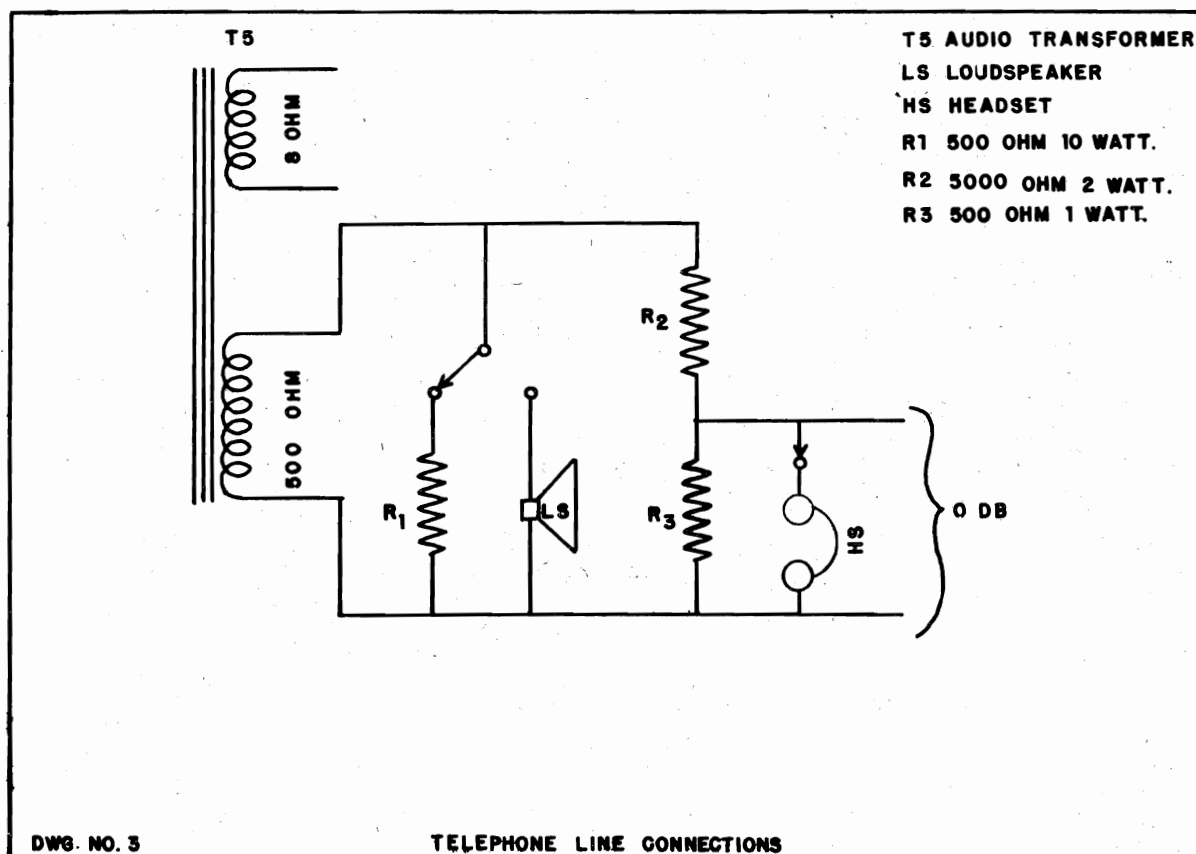
5-3. Band Indicator Adjustment

An adjustment for centering the band indicator markers in the horizontal slots of the dial face is located in back of the MAIN TUNING knob. It is recommended that the MAIN TUNING knob be pulled out to engage the band changing mechanism, and

turned clockwise to the last position before the stop. The red band marker should then indicate the 14-30mc. tuning band. To make the adjustment, simply remove the tuning knob and set the $\frac{1}{4}$ " hex-head screw as may be required. The screw is self-locking.

It is often found necessary in various communication services to provide a means for feeding the output of the receiver into a standard 500 ohm telephone transmission line at a 6 milliwatt or ODB level. Also means for monitoring the receiver and the telephone circuit may be required. The NC-2-40CS can be readily provided with a voltage divider and monitor circuit to fulfill these requirements. A suitable divider will consist of a 5000 ohm, 2 watt resistor connected in series with 500 ohm, 1 watt resistor across the 500 ohm termination of T5 (see X-4 in Fig. 7). In addition to the divider, the output circuit must be terminated at all times, either by use of a properly matched loud-speaker or a suitable load resistor. A loud-speaker or load resistor may be connected to any one of the three output circuits, but the voltage divider mentioned above must be connected to the 500 ohm output circuit.

Drawing number 3 shows a possible circuit arrangement using a 500 ohm loud-speaker or a 500 ohm, 10 watt load resistor as the receiver load. The switch functions merely to silence the loud-speaker when required. If either a 10,000 ohm loud-speaker or an 8 ohm speaker is used no additional 500 ohm load is required across the 500 ohm receiver output circuit. Headphone monitoring connections should be made to the 500 ohm telephone line as shown because plugging the headphones into the receiver phone jack disables the speaker output circuits. A high impedance headset is recommended for use across the 500 ohm telephone line. The total attenuation of the voltage divider is approximately 20 decibels. The power supplied to the 500 ohm telephone line corresponding to maximum receiver output is approximately 20 milliwatts.



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PARTS LIST (Continued)

NC-2-40C. AND NC-2-40CS RECEIVERS PARTS LIST

SYMBOL	FUNCTION	TYPE	RATING	SYMBOL	FUNCTION	TYPE	RATING
CAPACITORS				CAPACITORS (Continued)			
C1A	R.F. Amplifier Tuning.....	Air	225 mmf. max.	C48	C.W. Osc. Control.....	Air	1 to 10 mmf.
C1B	First Detector Tuning.....	Air	225 mmf. max.	C49	C.W. Osc. Compensating.....	Ceramic	10 mmf., 500 v.d.c.w.
C1C	H.F. Oscillator Tuning.....	Air	225 mmf. max.	C50	R.F. Amplifier Trimmer.....	Air	See Note No. 1
C2	R.F. Grid Filter.....	Mica	.005 mfd., 300 v.d.c.w.	C51	1st Det. Trimmer.....	Air	See Note No. 1
C3	R.F. Cathode By-pass.....	Paper	.1 mfd., 400 v.d.c.w.	C52	H.F. Osc. Trimmer.....	Air	See Note No. 1
C4	R.F. Screen By-pass.....	Paper	.1 mfd., 400 v.d.c.w.	C53	H.F. Osc. Padder.....	Air	See Note No. 1
C5	R.F. B+ By-pass.....	Paper	.1 mfd., 600 v.d.c.w.	C54	H.F. Osc. Padder.....	Mica	See Note No. 1
C6	First Det. Cathode By-pass.....	Paper	.1 mfd., 400 v.d.c.w.	C55	R.F. Amplifier Fixed Trimmer.....	Ceramic	20 mmf., 500 v.d.c.w. *
C7	First Det. Screen By-pass.....	Paper	.1 mfd., 400 v.d.c.w.	C56	1st Detector Fixed Trimmer.....	Ceramic	20 mmf., 500 v.d.c.w. *
C8	First Det. B+ By-pass.....	Paper	.1 mfd., 600 v.d.c.w.	C57	1st Detector Pri. to Sec. Coupling.....	Ceramic	2 mmf. *
C9	First I.F. Grid Filter.....	Paper	.01 mfd., 600 v.d.c.w.	C58	H.F. Osc. Padder.....	Ceramic	100 mmf., 500 v.d.c.w. *
C10	First I.F. Cathode By-pass.....	Paper	.1 mfd., 400 v.d.c.w.	C59	H.F. Osc. Trimmer.....	Ceramic	25 mmf., 500 v.d.c.w. *
C11	First I.F. B+ By-pass.....	Paper	.1 mfd., 600 v.d.c.w.	C60	R.F. Amplifier Padder.....	Mica	900 mmf., 500 v.d.c.w. **
C12	Sec. I.F. Grid Filter.....	Paper	.01 mfd., 600 v.d.c.w.	C61	1st Detector Series Padder.....	Ceramic	16 mmf., 500 v.d.c.w. **
C13	Sec. I.F. Cathode By-pass.....	Paper	.1 mfd., 400 v.d.c.w.	C62	H.F. Osc. Padder.....	Ceramic	20 mmf., 500 v.d.c.w. **
C14	Sec. I.F. Screen By-pass.....	Paper	.1 mfd., 400 v.d.c.w.	RESISTORS			
C15	Sec. I.F. B+ By-pass.....	Paper	.1 mfd., 600 v.d.c.w.	R1	R.F. Grid Filter.....	Fixed	500,000 Ohm, 1/4 w.
C16	Sec. I.F. By-pass.....	Paper	.01 mfd., 600 v.d.c.w.	R2	R.F. Cathode Bias.....	Fixed	500 Ohm, 1/4 w.
C17	Sec. Det. to Limiter Audio Coupling.....	Paper	.1 mfd., 200 v.d.c.w.	R3	First Det. Cathode Bias.....	Fixed	250 Ohm, 1/4 w.
C18	Sec. Det. Cathode By-pass.....	Ceramic	.00025 mfd., 500 v.d.c.w.	R4	First Det. Screen Bleeder.....	Fixed	100,000 Ohm, 1/4 w.
C19	Sec. Det. I.F. By-pass.....	Mica	.00025 mfd., 500 v.d.c.w.	R5	First Det. Screen Dropping.....	Fixed	50,000 Ohm, 1/4 w.
C20	Limiter Output By-pass.....	Ceramic	.01 mfd., 600 v.d.c.w.	R6	First Det. Plate Filter.....	Fixed	2,000 Ohm, 1/4 w.
C21	Tone Control.....	Paper	.01 mfd., 600 v.d.c.w.	R7	First I.F. Grid Filter.....	Fixed	20,000 Ohm, 1/4 w.
C22	Limiter to Inverter-Audio Coupling.....	Mica	.10 mfd., 50 v.d.c.w.	R8	First I.F. Cathode Bias.....	Fixed	See Note No., 2, 1/4 w.
C23	Tone Control.....	Elec.	.1 mfd., 400 v.d.c.w.	R9	First I.F. Plate Filter.....	Fixed	2,000 Ohm, 1/4 w.
C24	Inverter-Audio Cathode By-pass.....	Paper	.1 mfd., 400 v.d.c.w.	R10	Sec. I.F. Grid Filter.....	Fixed	500,000 Ohm, 1/4 w.
C25	Inverter-Audio to Output Coupling.....	Paper	.1 mfd., 400 v.d.c.w.	R11	Sec. I.F. Cathode Bias.....	Fixed	See Note No., 2, 1/4 w.
C26	Inverter-Audio to Output Coupling.....	Paper	.1 mfd., 400 v.d.c.w.	R12	Sec. I.F. Screen Bleeder.....	Fixed	100,000 Ohm, 1/4 w.
C27	Inverter Feedback Coupling.....	Paper	.0001 mfd., 500 v.d.c.w.	R13	Sec. I.F. Screen Dropping.....	Fixed	70,000 Ohm, 1/4 w.
C28	H.F. Oscillator Grid.....	Ceramic	.001 mfd., 500 v.d.c.w.	R14	Sec. Det. Plate Filter.....	Fixed	2,000 Ohm, 1/4 w.
C29	Beat Oscillator Grid.....	Mica	.1 mfd., 400 v.d.c.w.	R15	Sec. Det. I.F. Filter.....	Fixed	5,000 Ohm, 1/4 w.
C30	Beat Oscillator Screen By-pass.....	Paper	.1 mfd., 400 v.d.c.w.	R16	Sec. Det. Load.....	Fixed	25,000 Ohm, 1/4 w.
C31	Beat Osc. to Sec. Det. Coupling.....	Ceramic	2 mmf., 500 v.d.c.w.	R17	Limiter Input.....	Fixed	100,000 Ohm, 1/4 w.
C32	AVC Output By-pass.....	Paper	.1 mfd., 400 v.d.c.w.	R18	Limiter Output.....	Fixed	50,000 Ohm, 1/4 w.
C33	AVC Cathode By-pass.....	Paper	.1 mfd., 400 v.d.c.w.	R19	Tone Control.....	Comp. Var.	500,000 Ohm, 1 w.
C34	AVC Plate By-pass.....	Paper	.1 mfd., 400 v.d.c.w.	R20	A.F. Gain Control.....	Comp. Var.	500,000 Ohm, 1 w.
C35	B Minus By-pass.....	Elec.	.00005 mfd., 500 v.d.c.w.	R21	Inverter-Audio Cathode Bias.....	Fixed	1,000 Ohm, 1/4 w.
C36	AVC to Sec. Det. Coupling.....	Ceramic	.1 mfd., 600 v.d.c.w.	R22	Inverter Grid.....	Fixed	500,000 Ohm, 1/4 w.
C37	Power Supply Filter.....	Paper	8 and 8 mmf.	R23	First Audio Plate.....	Fixed	50,000 Ohm, 1/4 w.
C38	Power Supply Filter.....	Elec.	5 and 5 mmf.	R24	First Audio Plate.....	Fixed	50,000 Ohm, 1/4 w.
C39	Crystal Filter Input Tuning.....	Air	2 to 6 mmf.	R25	Output Grid.....	Fixed	250,000 Ohm, 1/4 w.
C40	Crystal Filter Phasing Control.....	Air	2 to 6 mmf.	R26	Output Grid.....	Fixed	250,000 Ohm, 1/4 w.
C41	Crystal Filter Compensating.....	Ceramic	6 to 85 mmf.	R27	Inverter Feedback Coupling.....	Fixed	250,000 Ohm, 1/4 w.
C42	Crystal Filter Output Tuning.....	Air	6 to 85 mmf.	R28	Output Cathode Bias.....	Fixed	250,000 Ohm, 1/4 w.
C43	T-2 Primary Tuning.....	Air	6 to 85 mmf.	R29	R.F. Gain Control With Switch.....	Fixed	200 Ohm, 2 w.
C44	T-2 Secondary Tuning.....	Air	6 to 85 mmf.	R30	R.F. Gain Bleeder.....	W. W. Var.	10,000 Ohm, 1/4 w.
C45	T-3 Primary Tuning.....	Air	6 to 85 mmf.	R31	H.F. Osc. B+ Dropping.....	Fixed	50,000 Ohm, 1/4 w.
C46	T-3 Secondary Tuning.....	Air	6 to 85 mmf.				50,000 Ohm, 1 w.
C47	T-4 Tuning.....	Air	6 to 85 mmf.				

PARTS LIST
(Continued)* These capacitors are used only in the 200-400 kc. band of the NC-2-40CS Receiver.
** These capacitors are used only in the A band.

MODELS NC-2-40C,
NC-2-40CS

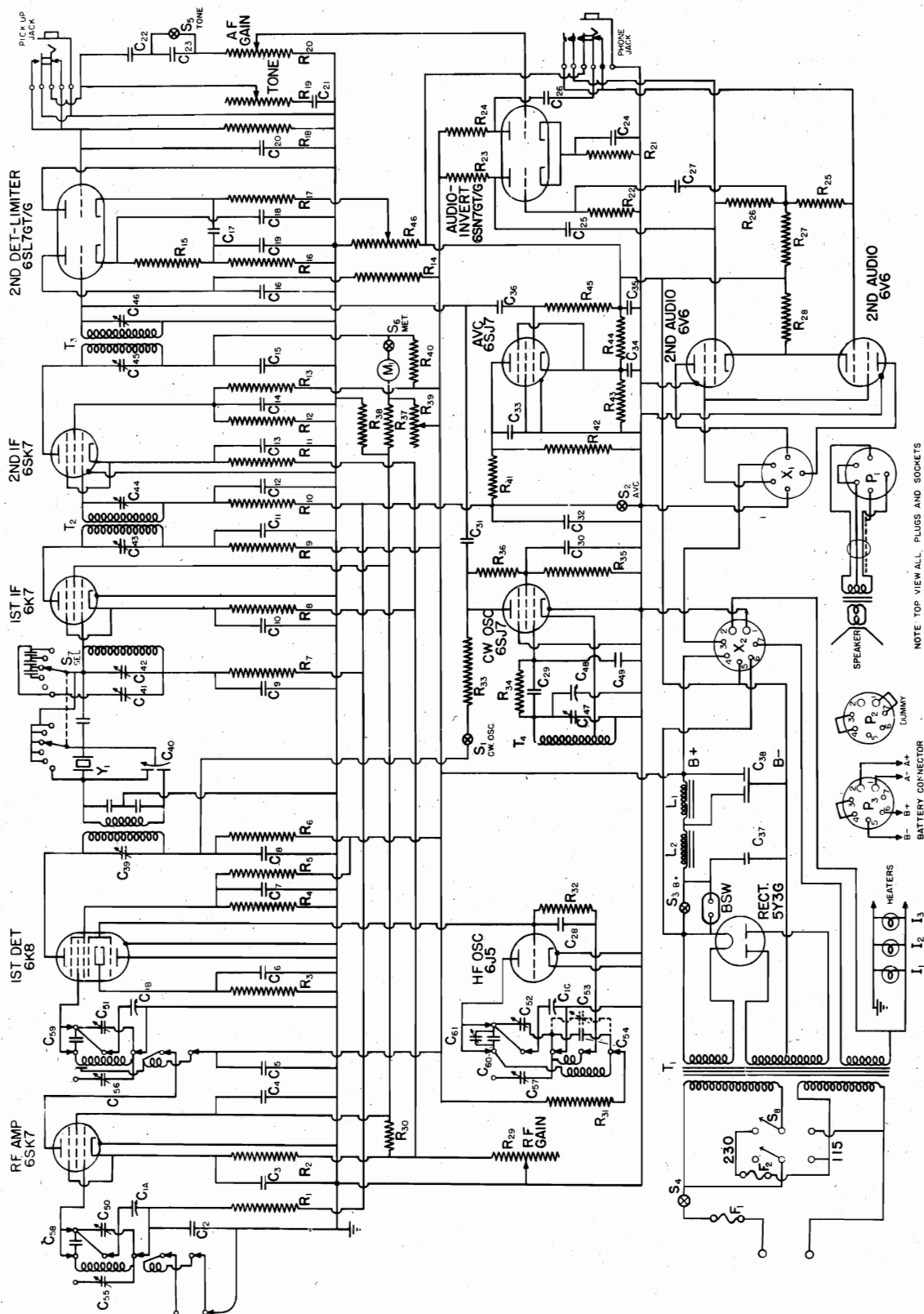
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SYMBOL	FUNCTION	TYPE	RATING
NC-2-40C AND NC-2-40CS RESISTORS (Continued)			
R32	H.F. Osc. Grid.....	Fixed	50,000 Ohm, ½ w.
R33	Beat Osc. Plate Filter.....	Fixed	250,000 Ohm, ½ w.
R34	Beat Osc. Grid.....	Fixed	50,000 Ohm, ½ w.
R35	Beat Osc. Screen Bleeder.....	Fixed	100,000 Ohm, ½ w.
R36	Beat Osc. Screen Dropping.....	Fixed	100,000 Ohm, ½ w.
R37	B+ Voltage Divider.....	Fixed	20,000 Ohm, 2 w.
R38	B+ Voltage Divider.....	Fixed	20,000 Ohm, 2 w.
R39	S-Meter Adjustment.....	W. W. Var.	1,000 Ohm, 1 w.
R40	S-Meter Bridge.....	Fixed	1,000 Ohm, ½ w.
R41	AVC Plate Filter.....	Fixed	500,000 Ohm, ½ w.
R42	AVC Plate.....	Fixed	500,000 Ohm, ½ w.
R43	AVC Voltage Divider.....	Fixed	1,500 Ohm, 2 w.
R44	AVC Cathode Bias.....	Fixed	500 Ohm, 2 w.
R45	AVC Grid.....	Fixed	5,000,000 Ohm, ½ w.
R46	Limiter Control.....	W. W. Var.	10,000 Ohm, 1½ w.
MISCELLANEOUS			
F1	AC Line Fuse.....	Glass Encl.	2 Amp.
F2	AC Line Fuse.....	Glass Encl.	1 Amp.
I1	S-Meter Lamp.....	No. 40	6 v., .15 amp.
I2	Dial Lamp.....	No. 47	6 v., .15 amp.
I3	Dial Lamp.....	No. 47	6 v., .15 amp.
L1	Power Supply Filter Choke.....	Potted	17 h., 100 ma. (NC-2-40C only)
L2	Power Supply Filter Choke.....	Potted	17 h., 100 ma. (NC-2-40C only)
L1A ^o	Power Supply Filter Choke.....	Potted	17 h., 100 ma. (NC-2-40CS only)
L1B ^o	Power Supply Filter Choke.....	Potted	17 h., 100 ma. (NC-2-40CS only)
M1	Signal Strength Meter.....	'S' Scale	0 to 1 ma.
P1	Loud Speaker Connector Plug.....	Molded	5 prong
P2	Dummy plug for AC Operation.....	Molded	7 prong
P3	Battery Connector Plug.....	Molded	7 prong
S1	Control Switch.....	Two Gang	SPST 250 v., 1 amp.
S2			
S3			
S4	Receiver Off-On Switch.....	Two Gang	SPST 250 v., 1 amp.
S5	Tone Control Switch.....	Part of R-19	SPST
S6	S-Meter Switch.....	Part of R-29	SPST
S7	Selectivity Control Switch.....	Rotary	2 section, ganged
S8	T1 Primary Selection Switch.....	Toggle	DPDT 250 v., 3 amp.
T1	Power Transformer.....	150 Watt	115 volt, 60 cycle and 230 volt, 60 cycle
T2	IF Transformer.....	Air Tuned	455 kc.
T3	IF Transformer.....	Air Tuned	455 kc.
T4	Beat Osc. Transformer.....	Air Tuned	455 kc.
T5 ^o	Audio Output Transformer.....	Shield Can	10 watts (NC-2-40CS only)
X1	Audio Output Socket.....	Bakelite	5 prong
X2	Battery Connector Socket.....	Bakelite	7 prong
X3 ^o	8 Ohm Termination Strip.....	Bakelite	2 connector
X4 ^o	500 ohm Termination.....	Bakelite	2 connector
X5	B Connector (BSW).....	Bakelite	2 Connector
Y1	Crystal Resonator.....	Quartz	455 kc.

Note No. 1. Capacitor rating is different in each coil range and is individually adjusted as circuit conditions may require. Definite rating cannot be listed. C53 used in E and F bands only. C54 used in A,B,C and D bands only.

Note No. 2. Resistors R8 and R11 may have values between 300 and 5,000 ohms since they are chosen to meet the circuit requirements of the particular receiver. The resistance values are determined after careful laboratory tests and cannot be changed without impairing performance.

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NC-2-40D
DWG. NO. 3 SCHEMATIC DIAGRAM

IF PEAK 455 KC

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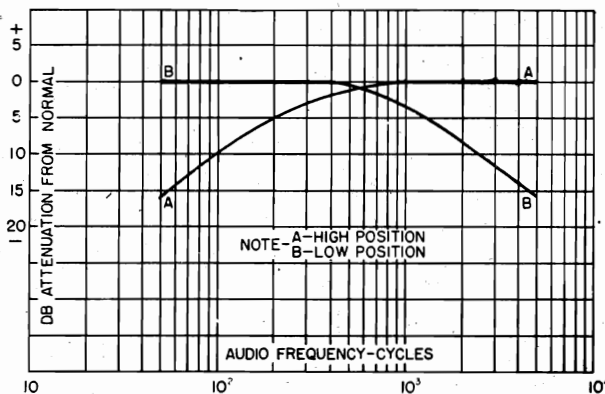
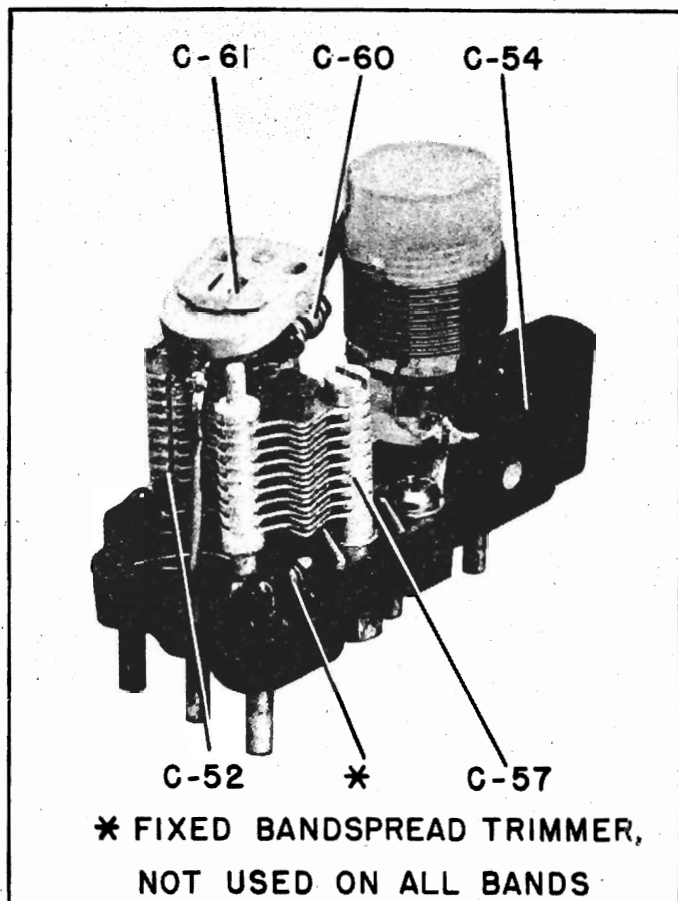
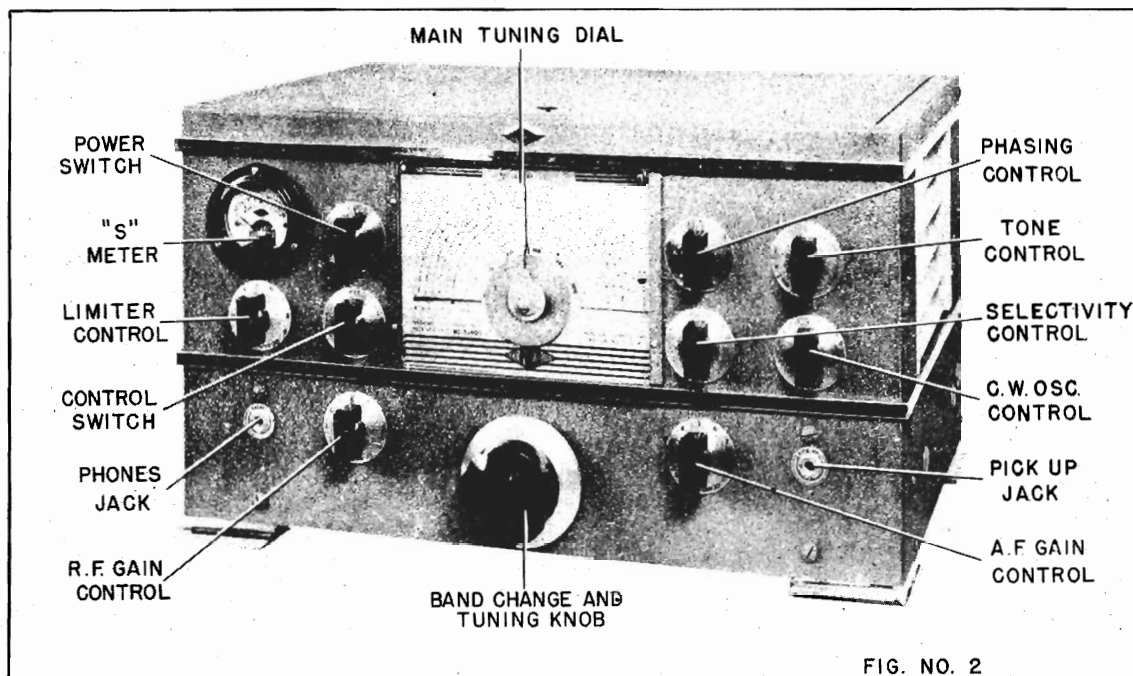


Fig. No. 2. Tone Control Action

Fig. No. 4. B-3 Coil--Typical H.F. Oscillator Bandspread Coil

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The circuit description, installation, operation, service and test data, and alignment data sections applying to Models NC-2-40C and NC-2-40CS (see page numbers below), also apply to Model NC-2-40D, with the exceptions of the following sections:

1-4. Tuning System

The master tuning capacitor C-1 and six sets of coils are used to tune the 490 to 30,000 kilocycle range of the receiver. By means of a highly developed band change mechanism, four of these same coil sets are made to spread the 10, 20, 40 and 80 meter amateur bands uniformly over the major portion of the tuning dial (HRO System). All ten ranges are calibrated

1-6. Noise Limiter

The noise limiter of the NC-2-40D Receiver is of the series valve type developed in the National Laboratories. Its effectiveness and superior performance as compared to the more common types of "silencers" were proved in the NHU and modernized NC-200 receivers. A threshold control on the front panel permits adjustment of the level at which limiting action starts.

1-7. Tone Control

The tone control is used to vary the frequency characteristic of the audio amplifier as shown in the accompanying curves, Dwg. No. 2. The control is particularly helpful when receiving weak signals through interference, as explained in Section 3.

1-13 Pick-up Jack

A pick-up jack mounted on the front panel of the receiver may be used to connect auxiliary apparatus, such as a phonograph pick-up, to the audio system of the NC-2-40D Radio Receiver. This input circuit is high impedance and feeds into the 6SN7GT/G Audio Amplifier-Phase Inverter tube. The TONE and A.F. GAIN controls are operative with this connection.

3-1. Controls

The tuning system of the NC-2-40D is truly single control; in fact, the MAIN TUNING control referred to above is used for band changing as well as tuning. To select either a general coverage or bandspread coil range, the MAIN TUNING control knob is pulled out about 1/4 inch. When this is done, the dial and capacitor drive mechanism is disengaged and the knob is geared to the coil casting. As the knob is turned, the coil carriage is moved across the chassis until the proper coil pin contacts engage the circuit contactors, as indicated

by the scale markers. Approximately one full turn of the MAIN TUNING knob is required to change from one general coverage range to an adjacent general coverage range. Approximately one-quarter turn of the knob is required to shift from a general coverage range to the associated bandspread range near the high frequency end. The knob does not turn smoothly between ranges, but only a few minutes is required to become familiar with its action. After the desired range has been selected, the tuning knob is pushed in to its original position, engaging the capacitor drive and disengaging the coil carriage rack.

5-1. General

All coils have individual general coverage trimmer capacitors. The H.F. oscillator circuits of broadcast ranges E & F have, also, general coverage variable series padding capacitors. All coils of ranges A, B, C and D have band-spread trimmer capacitors. Variable series padding capacitors are used in all H.F. oscillator band-spread circuits. These capacitors are identified on Fig. No. 6.

Adjustment of general coverage circuits affects the alignment of the band-spread circuits. On the other hand, band-spread circuit adjustments have little effect on general coverage circuit alignment. This fact must be kept in mind when any high frequency circuit is adjusted.

Alignment of the equipment may be divided into three major steps:

- (1) I.F. Amplifier Alignment
- (2) General Coverage Alignment
 - (a) H.F. Oscillator
 - (b) First Detector and R.F. Amplifier
 - (c) Tracking of H.F. Circuits
- (3) Band Spread Alignment
 - (a) H.F. Oscillator
 - (b) First Detector and R.F. Amplifier
 - (c) Tracking of H.F. Circuits

The circuits MUST be tuned in the above order when complete alignment is necessary.

5-4. Band-Spread Alignment

- (a) H.F. Oscillator

The method of adjusting the H.F. oscillator band-spread trimmer C-57 of any band is the same as that described under Section 5-3 (a) above. As stated previously (Section 5-1), the adjustment of the general

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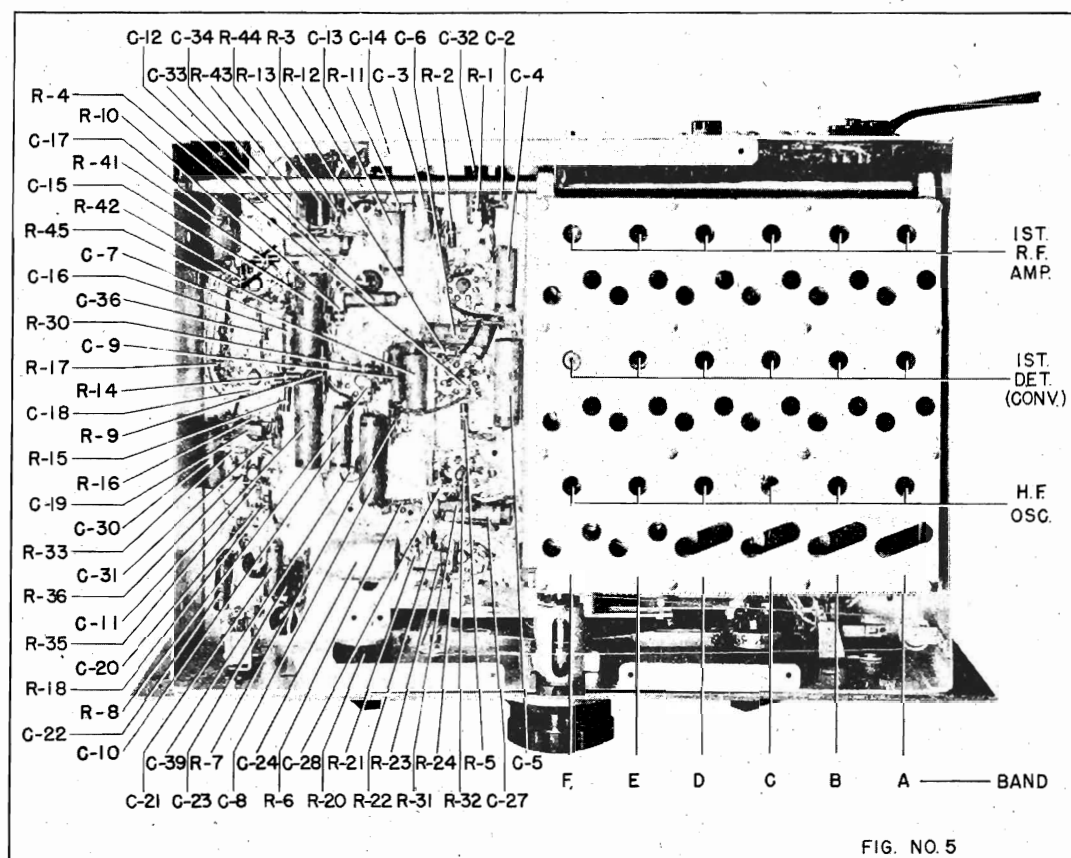


FIG. NO. 5

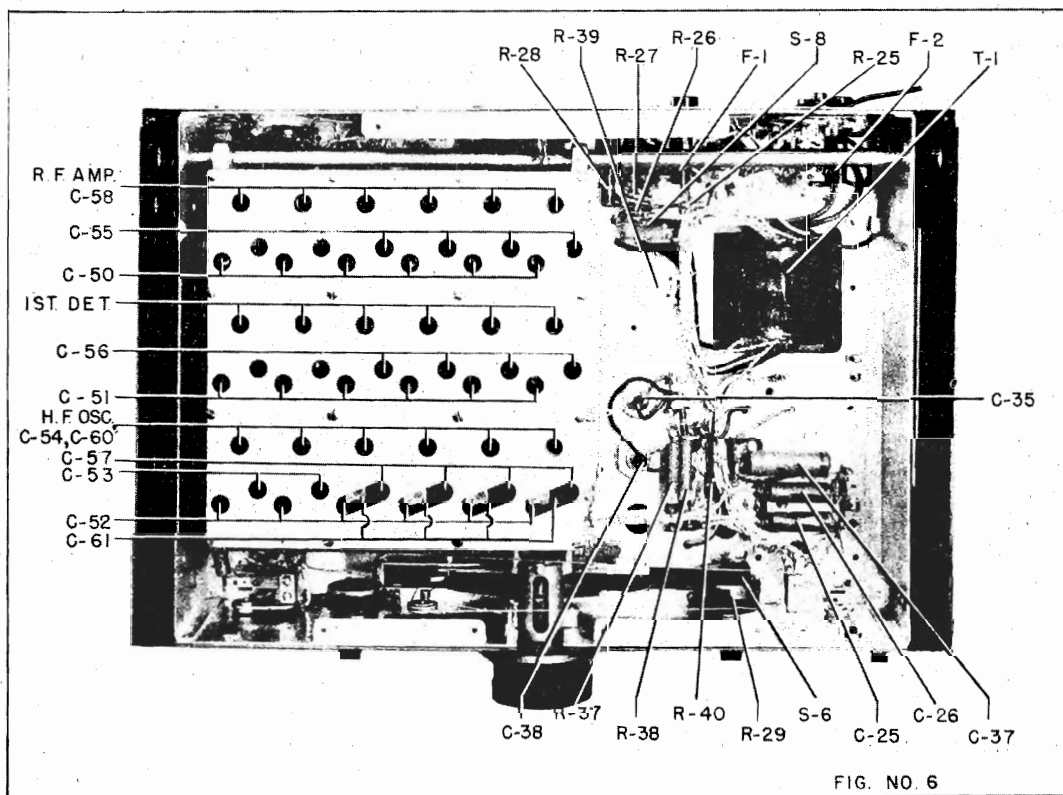


FIG. NO. 6

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Symbol	Function	Type	Rating
CAPACITORS			
C1A	R.F. Amplifier Tuning.....	Air	225 mmf. max.
C1B	First Detector Tuning.....	Air	225 mmf. max.
C1C	H.F. Oscillator Tuning.....	Air	225 mmf. max.
C2	R.F. Grid Filter.....	Mica	.005 mfd., 300 v.d.c.w.
C3	R.F. Cathode By-pass.....	Paper	.1 mfd., 400 v.d.c.w.
C4	R.F. Screen By-pass.....	Paper	.1 mfd., 400 v.d.c.w.
C5	R.F. B+ By-pass.....	Paper	.1 mfd., 600 v.d.c.w.
C6	First Det. Cathode By-pass.....	Paper	.1 mfd., 400 v.d.c.w.
C7	First Det. Screen By-pass.....	Paper	.1 mfd., 400 v.d.c.w.
C8	First Det. B+ By-pass.....	Paper	.1 mfd., 600 v.d.c.w.
C9	First I.F. Grid Filter.....	Paper	.01 mfd., 600 v.d.c.w.
C10	First I.F. Cathode By-pass.....	Paper	.1 mfd., 400 v.d.c.w.
C11	First I.F. By-pass.....	Paper	.1 mfd., 600 v.d.c.w.
C12	Sec. I.F. Grid Filter.....	Paper	.01 mfd., 600 v.d.c.w.
C13	Sec. I.F. Cathode By-pass.....	Paper	.1 mfd., 400 v.d.c.w.
C14	Sec. I.F. Screen By-pass.....	Paper	.1 mfd., 400 v.d.c.w.
C15	Sec. I.F. B+ By-pass.....	Paper	.1 mfd., 600 v.d.c.w.
C16	Sec. Det. Plate By-pass.....	Paper	.01 mfd., 600 v.d.c.w.
C17	Sec. Det. to Limiter Audio Coupling.....	Paper	.1 mfd., 200 v.d.c.w.
C18	Sec. Det. Cathode By-pass.....	Ceramic	.00025 mfd., 500 v.d.c.w.
C19	Sec. Det. I.F. By-pass.....	Mica	.001 mfd., 500 v.d.c.w.
C20	Limiter Output By-pass.....	Ceramic	.00025 mfd., 500 v.d.c.w.
C21	Tone Control.....	Paper	.01 mfd., 600 v.d.c.w.
C22	Limiter to Inverter-Audio Coupling.....	Paper	.01 mfd., 600 v.d.c.w.
C23	Tone Control.....	Mica	.001 mfd., 500 v.d.c.w.
C24	Inverter-Audio Cathode By-pass.....	Elec.	10 mfd., 50 v.d.c.w.
C25	Inverter-Audio to Output Coupling.....	Paper	.1 mfd., 400 v.d.c.w.
C26	Inverter-Audio to Output Coupling.....	Paper	.1 mfd., 400 v.d.c.w.
C27	Inverter-Feedback Coupling.....	Paper	.1 mfd., 400 v.d.c.w.
C28	H.F. Oscillator Grid.....	Ceramic	.00025 mfd., 500 v.d.c.w.
C29	Beat Oscillator Grid.....	Mica	.001 mfd., 500 v.d.c.w.
C30	Beat Oscillator Screen By-pass.....	Paper	.1 mfd., 400 v.d.c.w.
C31	Beat Osc. to Sec. Det. Coupling.....	Ceramic	2 mmf., 500 v.d.c.w.
C32	AVC Output By-pass.....	Paper	.1 mfd., 400 v.d.c.w.
C33	AVC Plate By-pass.....	Paper	.1 mfd., 400 v.d.c.w.
C34	AVC Cathode By-pass.....	Paper	.1 mfd., 400 v.d.c.w.
C35	B Minus By-pass.....	Elec.	40 mfd., 200 v.d.c.w.
C36	AVC to Sec. Det. Coupling.....	Ceramic	.00005 mfd., 500 v.d.c.w.
C37	Power Supply Filter.....	Paper	.1 mfd., 600 v.d.c.w.
C38	Crystal Filter Input Tuning.....	Elec.	8 and 8 mmf.
C39	Crystal Filter Phasing Control.....	Air	6 to 85 mmf.
C40	Crystal Filter Output Tuning.....	Ceramic	2 to 6 mmf.
C41	Crystal Filter Output Tuning.....	Air	6 to 85 mmf.
C42	T-2 Primary Tuning.....	Air	6 to 85 mmf.
C43	T-2 Secondary Tuning.....	Air	6 to 85 mmf.
C44	T-3 Primary Tuning.....	Air	6 to 85 mmf.
C45	T-3 Secondary Tuning.....	Air	6 to 85 mmf.
C46	T-4 Tuning.....	Air	1 to 10 mmf.
C47	C.W. Osc. Control.....	Air	

Band-spread Alignment (cont'd)
coverage trimmers must not be altered at this time.

(b) First Detector and R.F. Amplifier
The method of adjusting the band-spread trimmers C-59 and C-58 of the first detector and R.F. Amplifier circuits is the same as that described under Section 5-3 (b).

(c) Tracking of H.F. Circuits

After steps (a) and (b) have been completed, the MAIN TUNING control should be turned to the low frequency band limit, and the accuracy of the dial reading checked. If the dial reading is too low, the capacity of the series padding capacitor C-61 (See Fig. No. 6) should be increased until the dial reading is correct, and vice versa. The MAIN TUNING control should then be reset at the high frequency band limit, and step (a) repeated. Recheck the low frequency dial reading and repeat the whole procedure if necessary.

The detector and R.F. amplifier stages have fixed band-spread padding capacitors. These circuits will, therefore, track properly with the H.F. oscillator stage provided that the general coverage circuits are properly aligned and that the band-spread H.F. oscillator circuits are accurately tuned.

5-5. S-Meter Adjustment

The S-meter balancing resistor R-39, shown in Fig. No. 3, is used to obtain zero meter reading in the absence of signal input to the receiver. The adjustment is as follows: Set the R.F. GAIN control at 10, CONTROL SWITCH at MVC, and disconnect the antenna leads; adjust R-39 until the S-meter reads zero.

5-6. Band Indicator Adjustment

An adjustment for centering the band indicator markers in the horizontal slots of the dial face is located in back of the MAIN TUNING knob. It is recommended that the MAIN TUNING knob be pulled out to engage the band changing mechanism, and turned clockwise to the last position before the stop. The red band marker should then indicate 28 to 30 mc. (10 meter) band-spread. To make the adjustment, simply remove the tuning knob and set the 1/4" hex-head screw as may be required. The screw is self-locking.

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PARTS LIST (Continued)

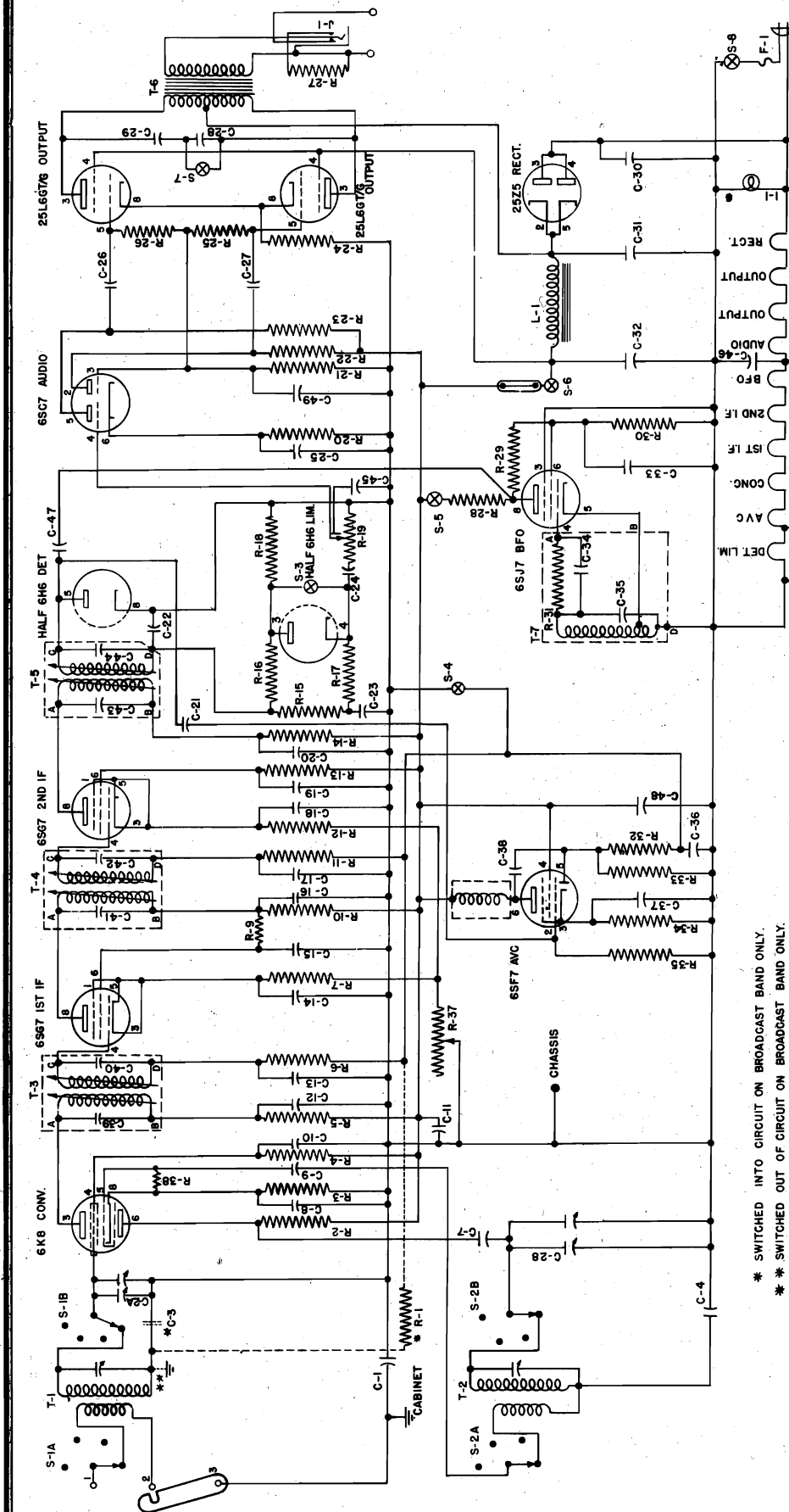
Symbol	Function	Type	Rating
CAPACITORS (Continued)			
C49	C.W. Osc. Compensating.....	Ceramic	10 mmf., 500 v.d.c.w.
C50	Gen. Cov. R.F. Amplifier Trimmer.....	Air	See Note No. 1
C51	Gen. Cov. 1st Det. Trimmer.....	Air	See Note No. 1
C52	Gen. Cov. H.F. Osc. Trimmer.....	Air	See Note No. 1
C53	Gen. Cov. H.F. Osc. Padder.....	Air	See Note No. 1
C54	Gen. Cov. H.F. Osc. Padder.....	Mica	See Note No. 1
C55	Band-Spread R.F. Amplifier Trimmer.....	Air	See Note No. 1
C56	Band-Spread 1st Det. Trimmer.....	Air	See Note No. 1
C57	Band-Spread H.F. Osc. Trimmer.....	Air	See Note No. 1
C58	Band-Spread R.F. Amplifier Padder.....	Ceramic	See Note No. 1
C59	Band-Spread 1st Det. Padder.....	Ceramic	See Note No. 1
C60	Band-Spread H.F. Osc. Padder.....	Mica	See Note No. 1
C61	Gen. Cov. R.F. Amplifier Padder.....	Mica	3 to 30 mmf.
C62	Gen. Cov. 1st Det. Series Padder.....	Ceramic	900 mmf., 500 v.d.c.w.*
C63	Gen. Cov. H.F. Osc. Padder.....	Ceramic	16 mmf., 500 v.d.c.w.*
C64	Gen. Cov. H.F. Osc. Padder.....	Ceramic	20 mmf., 500 v.d.c.w.*
RESISTORS			
R1	R.F. Grid Filter.....	Fixed	500,000 Ohm, 1/2 w.
R2	R.F. Cathode Bias.....	Fixed	500 Ohm, 1/2 w.
R3	First Det. Cathode Bias.....	Fixed	250 Ohm, 1/2 w.
R4	First Det. Screen Bleeder.....	Fixed	100,000 Ohm, 1/2 w.
R5	First Det. Screen Dropping.....	Fixed	50,000 Ohm, 1/2 w.
R6	First Det. Plate Filter.....	Fixed	2,000 Ohm, 1/2 w.
R7	First I.F. Grid Filter.....	Fixed	20,000 Ohm, 1/2 w.
R8	First I.F. Cathode Bias.....	Fixed	See Note No. 2, 1/2 w.
R9	First I.F. Plate Filter.....	Fixed	2,000 Ohm, 1/2 w.
R10	Sec. I.F. Grid Filter.....	Fixed	500,000 Ohm, 1/2 w.
R11	Sec. I.F. Cathode Bias.....	Fixed	100,000 Ohm, 1/2 w.
R12	Sec. I.F. Screen Bleeder.....	Fixed	70,000 Ohm, 1/2 w.
R13	Sec. I.F. Screen Dropping.....	Fixed	2,000 Ohm, 1/2 w.
R14	Sec. Det. Plate Filter.....	Fixed	5,000 Ohm, 1/2 w.
R15	Sec. Det. I.F. Filter.....	Fixed	25,000 Ohm, 1/2 w.
R16	Sec. Det. Load.....	Fixed	100,000 Ohm, 1/2 w.
R17	Limiter Input.....	Fixed	50,000 Ohm, 1/2 w.
R18	Limiter Output.....	Fixed	500,000 Ohm, 1 w.
R19	Tone Control.....	Comp. Var.	500,000 Ohm, 1 w.
R20	A.F. Gain Control.....	Comp. Var.	1,000 Ohm, 1/2 w.
R21	Inverter-Audio Cathode Bias.....	Fixed	500,000 Ohm, 1/2 w.
R22	Inverter Grid.....	Fixed	50,000 Ohm, 1/2 w.
R23	First Audio Plate.....	Fixed	50,000 Ohm, 1/2 w.
R24	First Audio Plate.....	Fixed	250,000 Ohm, 1/2 w.
R25	Output Grid.....	Fixed	250,000 Ohm, 1/2 w.
R26	Output Grid.....	Fixed	250,000 Ohm, 1/2 w.
R27	Inverter Feedback Coupling.....	Fixed	200 Ohm, 2 w.
R28	Output Cathode Bias.....	Fixed	10,000 Ohm, 1 1/2 w.
R29	R.F. Gain Control.....	W.W. Var.	50,000 Ohm, 1/2 w.
R30	R.F. Gain Control.....	Fixed	50,000 Ohm, 1 w.
R31	H.F. Osc. R + Dropping.....	Fixed	50,000 Ohm, 1 w.
RESISTORS (Continued)			
R32	H.F. Osc. Grid.....	Fixed	50,000 Ohm, 1/2 w.
R33	Beat Osc. Plate Filter.....	Fixed	250,000 Ohm, 1/2 w.
R34	Beat Osc. Grid.....	Fixed	50,000 Ohm, 1/2 w.
R35	Beat Osc. Screen Bleeder.....	Fixed	100,000 Ohm, 1/2 w.
R36	Beat Osc. Screen Dropping.....	Fixed	100,000 Ohm, 1/2 w.
R37	B + Voltage Divider.....	Fixed	20,000 Ohm, 2 w.
R38	B + Voltage Divider.....	Fixed	20,000 Ohm, 2 w.
R39	S-Meter Adjustment.....	W.W. Var.	1,000 Ohm, 1 w.
R40	S-Meter Bridge.....	Fixed	1,000 Ohm, 1/2 w.
R41	AVC Plate Filter.....	Fixed	500,000 Ohm, 1/2 w.
R42	AVC Plate.....	Fixed	500,000 Ohm, 1/2 w.
R43	AVC Voltage Divider.....	Fixed	1,500 Ohm, 2 w.
R44	AVC Cathode Bias.....	Fixed	500 Ohm, 2 w.
R45	AVC Grid.....	Fixed	5,000,000 Ohm, 1/2 w.
R46	Limiter Control.....	W.W. Var.	10,000 Ohm, 1 1/2 w.
MISCELLANEOUS			
F1	AC Line Fuse.....	Glass Encl.	2 Amp.
F2	AC Line Fuse.....	Glass Encl.	1 Amp.
I1	S-Meter Lamp.....	No. 40	6 v., .15 a.
I2	Dial Lamp.....	No. 47	6 v., .15 a.
I3	Dial Lamp.....	Potted	17 h., 100 ma.
I4	Power Supply Filter Choke.....	Potted	17 h., 100 ma.
I5	Power Supply Filter Choke.....	"S" Scale	0 to 1 ma.
M1	Signal Strength Meter.....	Molded	5 Prong
P1	Ionid Speaker Connector Plug.....	Molded	7 Prong
P2	Dummy Plug for AC Operation.....	Molded	7 Prong
P3	Battery Connector Plug.....	Two Gang	SPST 250 v., 1 a.
S1	Control Switch.....	Two Gang	SPST 250 v., 1 a.
S2	Power Supply Switch.....	Pt. of R-19	SPST
S3	Tone Control Switch.....	Pt. of R-29	SPST
S4	S-Meter Switch.....	Rotary	2 Section, Ganged
S5	Selectivity Control Switch.....	Toggle	INDT, 250 v., 3 a.
S6	T-1 Primary Selection Switch.....	150 Watt	115 Volt, 60 Cycle,
S7	Power Transformer.....		230 Volt, 60 Cycle
T1	I.F. Transformer.....	Air Tuned	455 kc.
T2	I.F. Transformer.....	Air Tuned	455 kc.
T3	Beat Osc. Transformer.....	Air Tuned	455 kc.
T4	Audio Output Socket.....	Bakelite	5 Prong
X1	Battery Connector Socket.....	Bakelite	7 Prong
X2	Battery Connector Socket.....	Bakelite	2 Connector
X3	B Connector (BSW).....	Quartz	455 kc.
X4	Crystal Resonator.....		

Note No. 1. Capacitor rating is different in each coil range and is individually adjusted as circuit conditions require. Values in parentheses cannot be listed. C-33 used in E and F bands only. C-34 to C-61, inclusive, used in A, B, C, and D bands only.

Note No. 2. Resistors R8 and R11 may have values between 300 and 500 Ohms since they are chosen to meet the circuit requirements of the particular receiver. The resistance values are determined after careful laboratory test and cannot be changed without impairing performance.

* These Capacitors used on the A band only.

NATIONAL CO. INC.



NC-46 RECEIVER

DWG. NO. 1-SCHEMATIC DIAGRAM

IF PEAK 455 KC

The master tuning capacitor C2 and four sets of associated coils are used to tune the frequency range of the receiver in four tuning bands for both general coverage and bandsread operation.

The overall frequency coverage of the four bands is as follows:

Band A	11.5	-	30.0 MC
Band B	4.4	-	12.0 MC
Band C	1.55	-	4.6 MC
Band D	0.54	-	1.6 MC

The following bands in the short wave ranges are tunable by the bandsread capacitor and are spread as follows:

3.5 - 4.0 MC	65 Divisions
7.0 - 7.3 MC	50 Divisions
14.0 - 14.4 MC	56 Divisions
28.0 - 30.0 MC	40 Divisions

* SWITCHED INTO CIRCUIT ON BROADCAST BAND ONLY.
** SWITCHED OUT OF CIRCUIT ON BROADCAST BAND ONLY.

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Circuit

The circuit employed in the NC-46 consists of a converter stage, two intermediate frequency stages, diode detector, limiter, beat frequency oscillator, AVC amplifier, phase inverter, push-pull output and rectifier stages.

The second detector utilizes one set of elements of a dual diode; the other set of elements is used for a noise limiter. Separate tubes are used in the automatic volume control and beat frequency oscillator circuits. The latter is coupled to the second detector for C.W. reception.

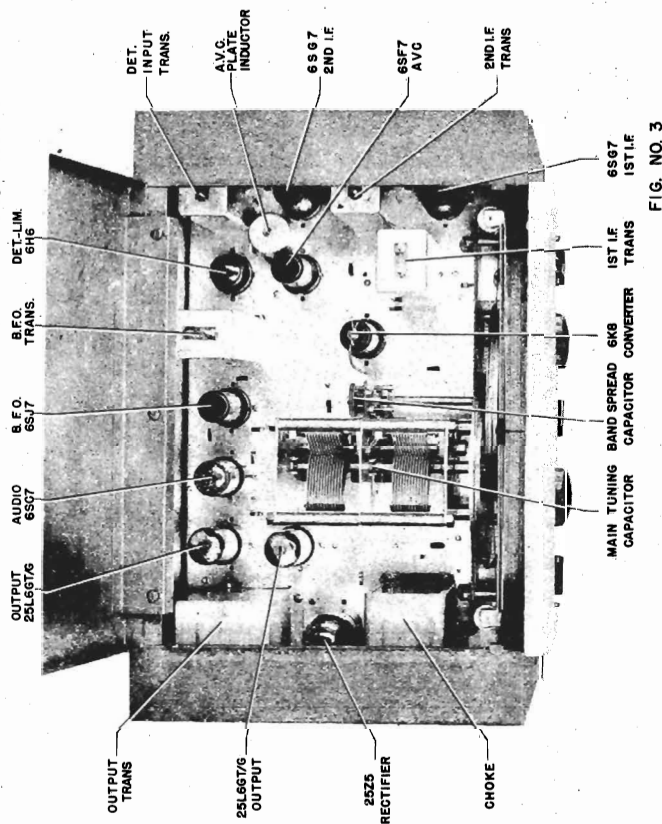
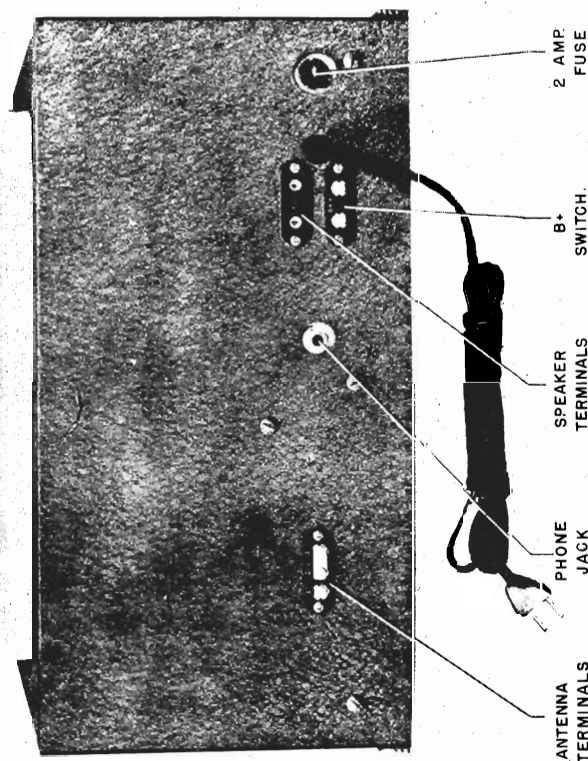
All voltages required by the receiver circuits are supplied by a built-in power supply.

Audio Output

Two audio output circuits are provided:

(1) A headphone jack is mounted on the rear of the receiver and is so wired as to silence the loudspeaker when the phone plug is inserted. The load impedance for the headphone output is not critical and any good set of headphones may be used.

(2) Tip-jack terminals are provided at the rear of the receiver for speaker connection. The output load impedance of the receiver is 10 ohms. This allows the use of a permanent magnet speaker with a voice coil of 8 to 10 ohms. The use of a matching output transformer is not required. Maximum undistorted audio power output available is approximately 4 watts.



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Antenna Recommendations

There is an antenna terminal strip mounted at the rear of the receiver with three screw-type connections available marked #1, #2 and #3. Terminal #3 is the ground connection. The strip is furnished with a sliding link to short out terminals #2 and #3 for operation with a single wire antenna. Doublet antennae, directive arrays etc., having two wire feeder systems may be used connecting directly to terminals #1 and #2. Terminal #3 and strap not being used. For general coverage a single wire antenna of approximately 50 to 100 feet will be found to give satisfactory results. To obtain peak performance on any particular desired channel the antenna length should be approximately an odd quarter-wave length of the band in use.

Controls

The MAIN TUNING control knob is located to the left of the center of the front panel. This knob operates a two gang variable capacitor through a 50 to 1 ratio reduction drive mechanism.

The ELECTRICAL HANDSPREAD control knob is located to the right of the center of the front panel. This knob operates a separate two gang variable capacitor to provide handsread tuning.

The BAND SELECTOR switch is located at the center of the front panel and functions to select the tuning-band desired. The band in use is indicated by the designating letters on this switch dial. The four tuning scales on the main tuning dial are marked at either end of the dial by these designating letters.

Tuning is accomplished by the following steps:

- Select the band to be used by means of the BAND SELECTOR switch.
- The frequency calibration of the main tuning dial will only be correct with the handsread pointer set at 50. After this setting has been made the MAIN TUNING control knob is used to tune in the desired station. The handsread pointer may then be used to give greater accuracy in logging.

The TUNE CONTROL switch is located at the upper left-hand side of the receiver and functions to select the frequency characteristic of the audio amplifier as desired, i.e. HIGH or LOW. The HIGH position will give the better fidelity and the LOW a better signal to noise ratio.

The C.W.O. CONTROL switch is located to the right of the TUNE CONTROL switch

functioning to switch on or off the beat frequency oscillator.

The VOLUME control is located to the left of the MAIN TUNING knob functioning to adjust the audio amplification of the receiver. Part of this control is a stand-by switch permitting the A.C. line switch to remain on but with B supply circuit open.

The LIMITER CONTROL switch is located at the upper right-hand side of the front panel functioning to switch "On" or "Off" the noise limiter. This control is normally in the "Off" position.

The A.V.C. CONTROL switch is located to the left of the LIMITER switch functioning to switch the automatic volume control circuits into or out of the receiver circuits.

The SENSITIVITY control is located to the right of the HANDSPREAD control knob and functions to adjust the amplification of the two I.F. amplifier tubes. Incorporated in this control is the power supply "On" "Off" switch; with this switch in the "Off" position the receiver is inoperative.

There is a B.S.W. terminal panel provided at the rear of the receiver to permit remote standby control. The terminals are connected in series with the B switch.

After the equipment is properly installed,

it is placed in operation by turning the SENSITIVITY control to 10 and the VOLUME control to the point which provides the desired audio volume. The TUNE control should be "On"; the C.W.O. control should be "Off"; the A.V.C. control should be "On"; the LIMITER should be "Off". The receiver is now adjusted for the reception of phone signals and can be tuned to the desired frequency and band by means of the MAIN TUNING control and BAND SELECTOR switch.

Individual tubes of the same type are apt to vary slightly in their characteristics and it is well to remember this fact when replacements become necessary. The circuit of the receiver has been designed to reduce the effect of such variations to a minimum but care should be taken in replacing the converter and I.F. amplifier tubes. A replacement converter tube should be checked in the receiver to make sure that the inter-electrode capacitances are the same as those of the tube originally employed. This is readily checked by noting any change in the calibration at the high end of any tuning band. This change should not exceed two or three dial divisions.

Power Supply

The NC-46 Receiver is designed for operation from a 110/130 volt, A.C. or D.C. power source. Normal power consumption is approximately 65 watts. All voltages required for the heater and B supply circuits are delivered by a built-in power supply.

One side of the input power line is connected through a 2 ampere fuse to prevent any possible damage to the receiver due to a short-circuit or ground. This fuse is housed in an extractor post mounted at the rear of the receiver which permits ease in removal or inspection of the fuse.

CAPACITORS		Rating		Symbol	Type	Rating
Symbol	Type					
C1	Paper	0.1 mfd., 400 VDCW		C48	Paper	0.1 mfd., 400 VDCW
C2A	Air	365 mfd. max.		C49	Ceramic	270 mfd., 500 VDCW
C2B	Air	365 mfd. max.		Note #1. Capacitor ratings differ for each coil range and definite ratings cannot be listed.		
C3	Paper	0.01 mfd., 400 VDCW		RESISTORS		
C4	Mica	See Note #1				
C5	Air	See Note #1				
C6	Air	See Note #1				
C7	Mica	0.0047 mfd., 500 VDCW				
C8	Paper	0.1 mfd., 400 VDCW				
C9	Mica	100 mfd., 500 VDCW				
C10	Paper	0.1 mfd., 400 VDCW				
C11	Paper	1 mfd., 200 VDCW				
C12	Paper	0.1 mfd., 400 VDCW				
C13	Paper	0.01 mfd., 400 VDCW		R1	Fixed	470,000 Ohms, 1/2 W
C14	Paper	0.1 mfd., 400 VDCW		R2	Fixed	10,000 Ohms, 1/2 W
C15	Paper	0.01 mfd., 400 VDCW		R3	Fixed	220 Ohms, 1/2 W
C16	Paper	0.01 mfd., 400 VDCW		R4	Fixed	1,000 Ohms, 1/2 W
C17	Paper	0.1 mfd., 400 VDCW		R5	Fixed	1,000 Ohms, 1/2 W
C18	Paper	0.01 mfd., 400 VDCW		R6	Fixed	470,000 Ohms, 1/2 W
C19	Paper	0.01 mfd., 400 VDCW		R7	Fixed	560 Ohms, 1/2 W
C20	Paper	0.1 mfd., 400 VDCW		R8	Not Used	560 Ohms, 1/2 W
C21	Ceramic	50 mfd., 500 VDCW		R9	Fixed	22,000 Ohms, 1/2 W
C22	Mica	270 mfd., 500 VDCW		R10	Fixed	1,000 Ohms, 1/2 W
C23	Paper	0.01 mfd., 400 VDCW		R11	Fixed	470,000 Ohms, 1/2 W
C24	Paper	0.01 mfd., 400 VDCW		R12	Fixed	560 Ohms, 1/2 W
C25	Electrolytic	25 mfd., 50 VDCW		R13	Fixed	22,000 Ohms, 1/2 W
C26	Paper	0.01 mfd., 400 VDCW		R14	Fixed	2,200 Ohms, 1/2 W
C27	Paper	0.01 mfd., 400 VDCW		R15	Fixed	1,000,000 Ohms, 1/2 W
C28	Paper	0.02 mfd., 400 VDCW		R16	Fixed	470,000 Ohms, 1/2 W
C29	Paper	0.1 mfd., 400 VDCW		R17	Fixed	1,000,000 Ohms, 1/2 W
C30	Paper	0.1 mfd., 400 VDCW		R18	Fixed	470,000 Ohms, 1/2 W
C31	Electrolytic	40 mfd., 200 VDCW		R19	Variable	500,000 Ohms, 1 W
C32	Electrolytic	0.01 mfd., 400 VDCW		R20	Fixed	3,900 Ohms, 1/2 W
C33	Paper	0.01 mfd., 400 VDCW		R21	Fixed	270,000 Ohms, 1/2 W
C34	Mica	270 mfd., 500 VDCW		R22	Fixed	270,000 Ohms, 1/2 W
C35	Mica	270 mfd., 500 VDCW		R23	Fixed	270,000 Ohms, 1/2 W
C36	Paper	0.1 mfd., 400 VDCW		R24	Fixed	68 Ohms, 1/2 W
C37	Paper	0.01 mfd., 400 VDCW		R25	Fixed	270,000 Ohms, 1/2 W
C38	Mica	0.001 mfd., 500 VDCW		R26	Fixed	270,000 Ohms, 1/2 W
C39	Mica	510 mfd., 500 VDCW		R27	Fixed	5 Ohms, 5 W
C40	Mica	510 mfd., 500 VDCW		R28	Fixed	100,000 Ohms, 1/2 W
C41	Mica	510 mfd., 500 VDCW		R29	Fixed	100,000 Ohms, 1/2 W
C42	Mica	510 mfd., 500 VDCW		R30	Fixed	100,000 Ohms, 1/2 W
C43	Mica	510 mfd., 500 VDCW		R31	Fixed	50,000 Ohms, 1/2 W
C44	Mica	510 mfd., 500 VDCW		R32	Fixed	470,000 Ohms, 1/2 W
C45	Paper	0.01 mfd., 400 VDCW		R33	Fixed	470,000 Ohms, 1/2 W
C46	Paper	0.1 mfd., 400 VDCW		R34	Fixed	22,000 Ohms, 1/2 W
C47	Beakelite	1 mfd., 400 VDCW		R35	Fixed	2,200,000 Ohms, 1/2 W
				R36	Fixed	100,000 Ohms, 1/2 W
				R37	Variable	10,000 Ohms, 1 W
				R38	Fixed	22,000 Ohms, 1/2 W
				R39	Fixed	33,000 Ohms, 1/2 W

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The coil groups are mounted in a cadmium plated steel compartment which is directly below the main two gang variable capacitor. The oscillator coils are mounted nearest the left-hand side of the receiver with the first detector coils at the right. All coils have individual trimmer capacitors.

I.F. Amplifier Alignment

The intermediate frequency of the NC-46 Receiver is 455 kilocycles. The three I.F. transformers are of the permeability tuned iron-core type with primary and secondary adjustments.

The first I.F. transformer adjustments, the primary of the second I.F. transformer and the secondary of the third I.F. transformer adjustments are made from inside the cabinet; the secondary of the second I.F. transformer and the primary of the third I.F. transformer adjustments are made through holes in the top of the cabinet. These holes are concealed by means of sliding buttons.

To properly align the receiver the equipment should be set up as specified

except that the antenna be disconnected and the A.V.C. switch turned to "Off", the VOLUME control turned to 10 and the TONE control be switched "Off". An output meter having a 10 ohm resistive load should be connected to speaker output terminals. The high output lead of an accurately calibrated signal generator should be connected to the grid terminal of the converter tube and the grounded lead to any convenient point on the chassis. Adjust the output attenuator of the signal generator to provide a signal of approximately 100 microvolts and vary the tuning control of the signal generator slowly between the frequencies of 452 and 458 kilocycles. At some frequency between these points the I.F. amplifier of the receiver will show a sharply peaked response as indicated on the output meter. The I.F. tuned iron cores should be carefully adjusted to give a maximum reading on the output meter. The order in which these adjustments are made is not important.

Coil Alignment

Controls should be set as outlined
Alignment is effected as follows:

a. H.F. Oscillator alignment

(1) Set the MAIN TUNING dial to some frequency at the high end of the tuning band to be aligned.

(2) Connect a signal generator, accurately tuned to deliver a signal of the same frequency as that indicated by the receiver dial setting, to the antenna input terminals through a standard 500 ohm dummy antenna.

(3) By checking the calibration of the receiver against the signal delivered by the signal generator, the accuracy of the H.F. oscillator alignment can be observed. If the dial reading of the receiver is found to be high it can be corrected by decreasing the capacity of the H.F. oscillator trimmer capacitor; conversely, low dial readings can be corrected by increasing the capacity of the trimmer.

(4) Care should be taken to insure that the H.F. oscillator is tuned to the fundamental frequency and not the image. This can be checked by tuning to the image frequency which should appear 910 kilocycles below the fundamental frequency and should be considerably weaker. If the operator finds the receiver is tuned to the image signal the capacity of the H.F. oscillator trimmer capacitor should be decreased until the fundamental frequency appears at the proper dial setting.

b. 1st Detector alignment.

(1) With the signal generator adjusted to deliver a modulated signal near the high frequency limit of the tuning band to be checked, the receiver should be tuned to give maximum output, as indicated by the output meter. The 1st detector trimmer capacitor should then be adjusted to give a maximum reading on the output meter. If this trimmer requires considerable realignment it may necessitate the realignment of the H.F. oscillator trimmer to maintain correct calibration.

(2) An alternate method of aligning the 1st detector in the event a signal generator is not available is to set the trimmers at the setting giving the maximum background noise. It will be found that this method gives a sufficiently sharp indication to provide good alignment.

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PARTS LIST

SYMBOL	DESCRIPTION	FACTORY PART NO.	NOTES
E-1	Complete Assembly (O.P. Trans. and P.M. Speaker)	EH6-1	Replacement of complete assembly is advisable if either part fails
Loop	Loop Antenna	LL-11	
L-2	Oscillator Coil	LO-2	
T-1	1st I.F. Trans.	TM2-1	
T-2	2nd I.F. Trans.	TM2-3	
R-8	Vol. Control With Switch (S-1)	RP5-2	NU-500M-C8 may be used as a replacement
C2-A C2-B	2 Gang Variable Capacitor	CV-4	
C15A C15B	Electrolytic Capacitor 80-40/150	CE-81	
	Dial Lamp 6-8V., .20A. in early models 6-8V., .15A. in later models	N-51	
	Dial Scale (Glass)	ND-16-1	
	Dial Pointer	ND-1-2	
	Dial Lamp Socket	JS13-163	

*Because of the many variables that may enter into voltage measurements it is impractical to indicate ABSOLUTE values of voltage. Readings must necessarily be AVERAGE voltages and even these are subject to a $\pm 10\%$ variation.

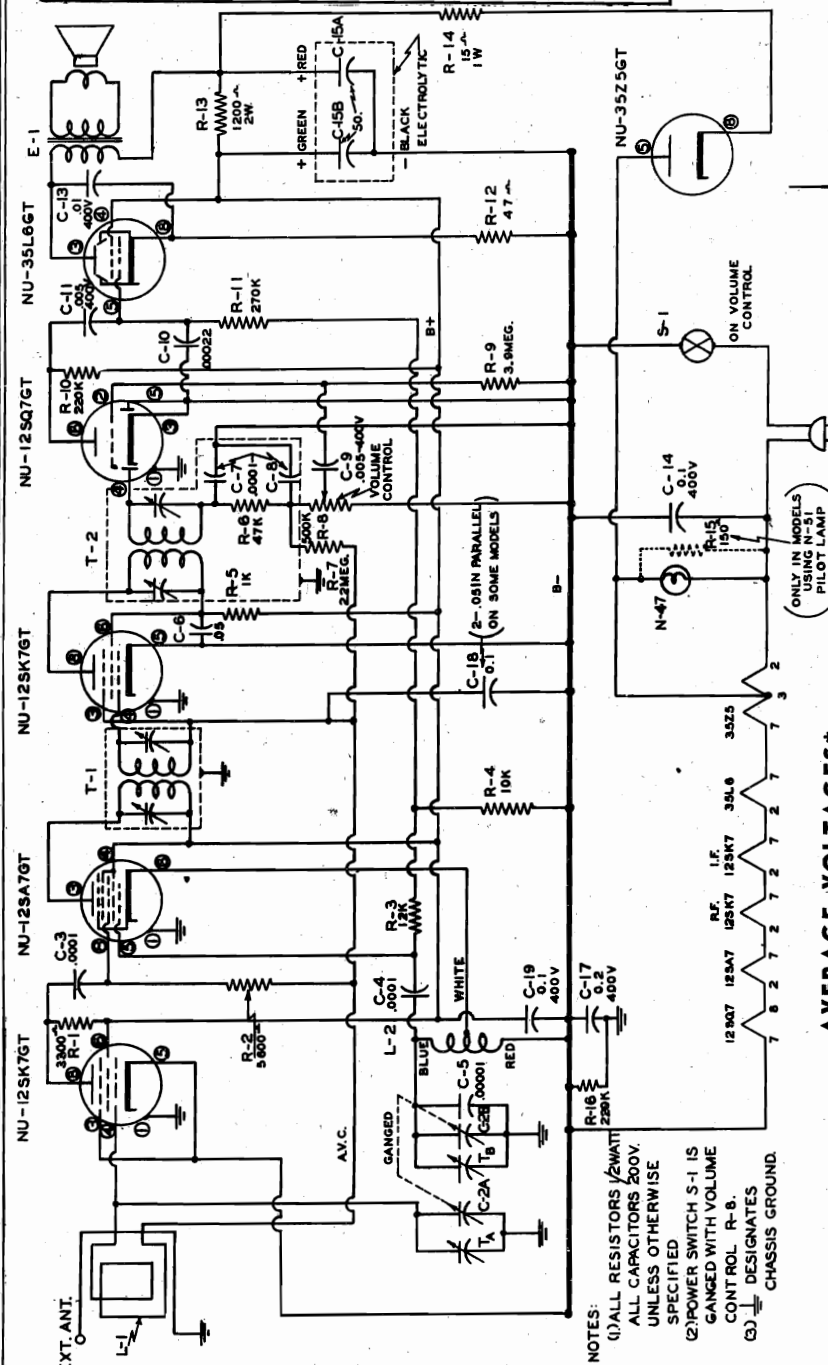
D.C. measurements shown are at 20,000 Ω /volt.

A.C. measurements shown are at 1,000 Ω /volt.

Readings are taken from SOCKET PINS TO COMMON NEGATIVE while viewing socket from the BOTTOM. Control set at MINIMUM.

Tuning Condenser set at Full Mesh (Maximum Capacity)

I.F.
455 K.C.



AVERAGE VOLTAGES*

PIN NO.	B.F. 125K7GT		CONV. 125K7GT		I.F. 125K7GT		DET. 125K7GT		P.W. AMP. 35L6GT		RECT. 35Z5GT	
	A.C.	D.C.	A.C.	D.C.	A.C.	D.C.	A.C.	D.C.	A.C.	D.C.	A.C.	D.C.
1	Zero	Zero	Zero	Zero	Zero	Zero	Zero	Zero	51.5	Zero	117.0	Zero
2	25.0	Zero	13.0	Zero	37.0	Zero	Zero	Zero	91.0	111.0	Zero	Zero
3	Zero	Zero	Zero	Zero	Zero	Zero	Zero	Zero	72.0	Zero	Zero	Zero
4	Zero	Zero	Zero	Zero	Zero	Zero	Zero	Zero	-0.4	111.0	Zero	Zero
5	Zero	Zero	Zero	Zero	Zero	Zero	Zero	Zero	-2.1	85.5	Zero	Zero
6	37.0	Zero	25.0	Zero	51.5	Zero	Zero	Zero	85.5	1.3	85.5	94.0
7	Zero	Zero	Zero	Zero	Zero	Zero	Zero	Zero	Zero	Zero	Zero	Zero
8	Zero	Zero	Zero	Zero	Zero	Zero	Zero	Zero	Zero	Zero	Zero	Zero

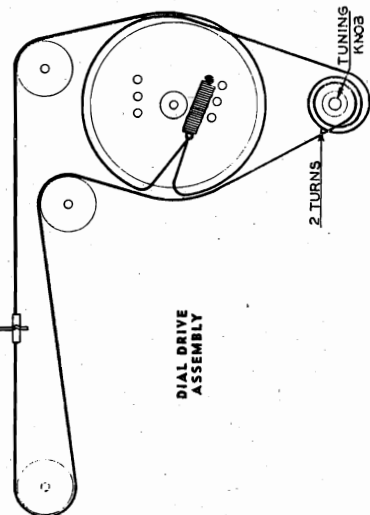
SERVICE NOTES

HUM MODULATION:

On Early Production runs Condenser C-18 consisted of two .05 mfd. units. One ground terminal was connected to CHASSIS, the other to B-. Disconnect the CHASSIS terminal of the .05 Condenser now connected to Pin No. 1 of the NU-125K7GT tube and connect this lead to Pin No. 5 of either of the NU-125K7GTs or to any other convenient B- point. This effectively by-passes the A.C. Modulation hum to B- instead of to Chassis.

OSCILLATION:

Remove one side of Resistor R-2 (in grid circuit of 125A7GT) now connected to A.V.C. bus and reconnect to cathode (#5 pin) of I.F.—125K7GT.



TUNING Broadcast Band — 535 K.C. to 1620 K.C. — 2 Gang Variable Capacitor

POWER 105-125 Volts, 60 cycles A.C. — 105-125 Volts, Direct Current —

SUPPLY Approx. 30 Watts Consumption

MODEL G-619

NATIONAL UNION RADIO CORP.

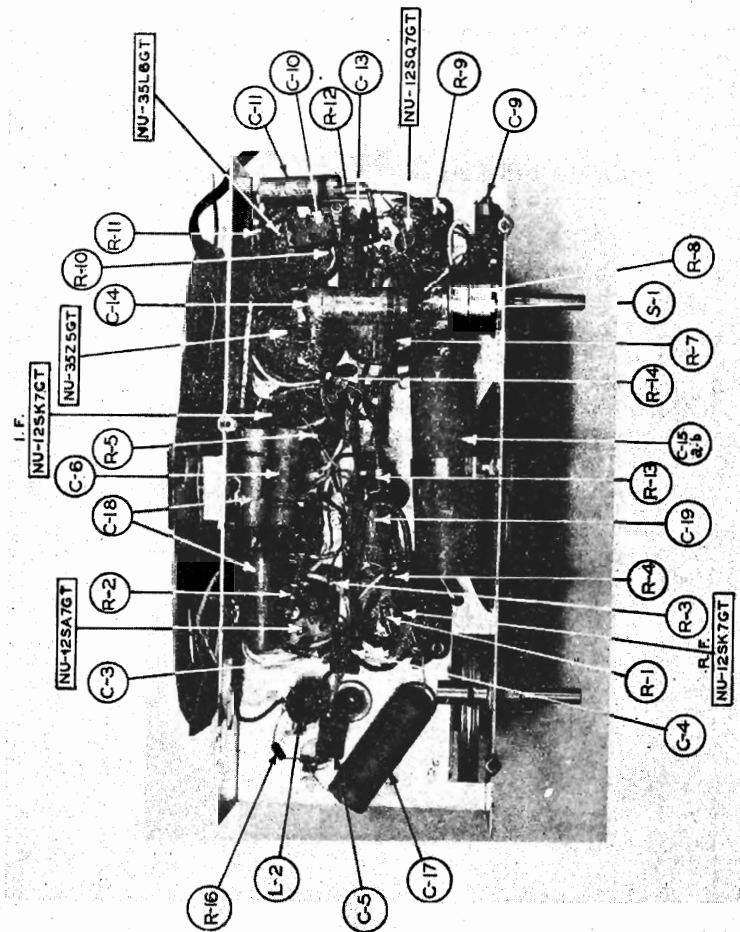


FIG. 1

ALIGNMENT PROCEDURE

PRELIMINARY.

(a) Adjust the DIAL POINTER along the dial cord to the position opposite the first right-hand punch mark on the dial backing-plate, with the tuning condenser gang completely out of mesh (Minimum Capacity); (b) Set VOLUME CONTROL to the FULL ON position; (c) Maintain SIGNAL GENERATOR output at MINIMUM consistent with a readable Output Meter indication; (d) OUTPUT METER across voice coil; (e) Follow sequence indicated below.

SEQUENCE	DUMMY ANTENNA	DIAL SETTING	SIGNAL GENERATOR CONNECTIONS	SIGNAL GENERATOR SETTING	ADJUST TRIMMERS	NOTES
1 I.F.	.01 mfd.	At HIGH frequency end of scale. (Min. Capacity)	High side to sta- for lug of C2-A (Fig. 1). Low side to B—	465 K.C.	T2a T2b T1a T1b (Fig. 1)	Adjust Trimmers for MAX. output reading
2 OSC.	3 turn coil of #18 wire on 7/8" diameter L O S E L Y Coupled to loop Antenna in Re- calver	Pointer at ex- H I G H H A N D E N D of dial scale (Min. Capacity) Point- er will be in line with FIRST punch mark at right	Across Dummy Antenna	1700 K.C.	Tb (Fig. 1)	Adjust Trimmer for MAX. output reading
3 R.F.	Same as in 2 above	Pointer in line with punch mark SECOND from right	Same as in 2 above	1520 K.C.	Ta (Fig. 1)	Adjust Trimmer for MAX. output reading

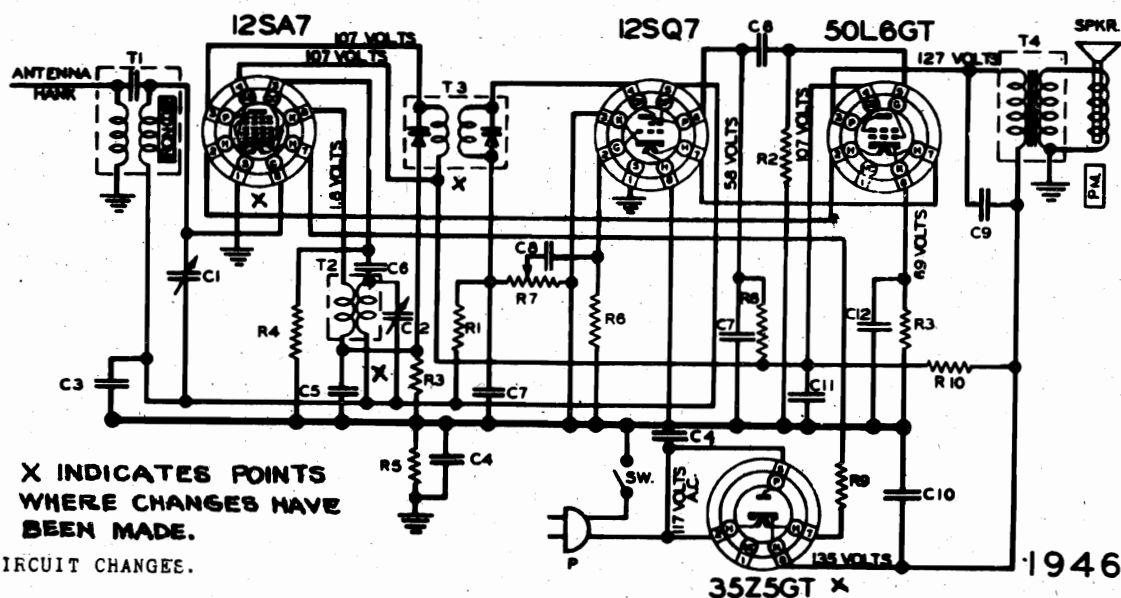
FIG. 2

SEQUENCE	DUMMY ANTENNA	DIAL SETTING	SIGNAL GENERATOR CONNECTIONS	SIGNAL GENERATOR SETTING	ADJUST TRIMMERS	NOTES
4	Same as in 2 above	At LOW frequency end of scale (Max. Capacity)	Same as in 2 above	530 K.C.	None	530 K.C. signal should be placed upon this dial setting. Check operation in Seq. 2 if signal is not picked up
5	REINSTALLING CHASSIS (AFTER ALIGNMENT):— (a) With chassis still on the bench, set dial pointer at the minimum capacity end of travel. (b) Slide chassis into cabinet and adjust its position so that the dial pointer is opposite and in line with the FIRST calibration mark at the right-hand end of the GLASS DIAL SCALE. (c) Tighten the chassis hold down screws. (d) Tuning should now track so that peak signal is attained at the proper frequency calibration on the glass dial scale.					

CODE
M=MEGOHM
K=1000 OHM



REFERENCE NO.	PART NO.	DESCRIPTION	CIO
	R1	Resistor, 4.7 Megohms $\frac{1}{2}$ watt	
	R2	Resistor, 1 Megohm $\frac{1}{2}$ watt	
	R3	Resistor, 150 ohms $\frac{1}{2}$ watt	
	R4	Resistor, 22,000 ohms $\frac{1}{2}$ watt	
	R5	Resistor, 330,000 ohms $\frac{1}{2}$ watt	
	R6	Resistor, 15 Megohms $\frac{1}{2}$ watt	
	R7	Resistor, 2 Megohms Vol. control & Sw.	
	R8	Resistor, 470,000 ohms $\frac{1}{2}$ watt	
	R9	Resistor, 47 ohms $\frac{1}{2}$ watt	
b1857	R10	Resistor, 2,200 ohms $\frac{1}{2}$ watt	
	R11	Resistor, 15 ohms $\frac{1}{2}$ watt	
	C1, Cw	Condenser, variable	
	C3	Condenser, .05 mfd, 200 volt	
	C4	Condenser, .05 mfd, 400 volt	
	C6	Condenser, .00005 mfd, 500 volt	
	C7	Condenser, .0001 mfd, 500 volt	
	C8	Condenser, .002 mfd, 500 volt	
	C9	Condenser, .01 mfd, 400 volt	
	A19176	Condenser, 40 mfd, 150 volt	
	C11	Condenser, 20 mfd, 150 volt	
C12		Condenser, 20 mfd, 25 volt	
T1		Coil, antenna	
T2		Coil, oscillator	
T3		Coil, i-f	
T4		Output transformer	
	AI8258-1	Dial scale emblem	
	AI8263	Cabinet, walnut	
	E18124-1	Cabinet, ivory	
	E18124-2	Knob, tuning, ivory	
	AI8261-2	Knob, tuning, ivory	
	AI8262-2	Speaker	
	B17209	Condenser, .005 mfd, 400 volt	
Spk.			
C5			
TUBES AND FUNCTIONS			
	12CA7	Mixer-oscillator	
	12G7	Detector-AVC-AF.	
	50L6GT	Output	
	3Z5GT	Rectifier	
FREQUENCY RANGE			
	Broadcast		540-1600 kc
	IF		455 kc
LOUD SPEAKER			
	Type:	Permanent magnet	
	Size:	4 inch	
	Voice coil impedance		3.2 ohms
POWER SUPPLY			
	105-125 volts, AC-DC,	35 Watts	
POWER OUTPUT			
	Type:	Beam tube	
	Undistorted		.8 Watts
	Maximum		2.5 Watts
	Plate Load		2000 Ohms



The following changes have been made in Chassis RE-200 since the start of production.

1. Connections to pins 2 & 7 have been interchanged on 12SA7 tube.
2. A 15 ohm resistor, R-11 has been added in B+ lead at Cathode of 35Z5GT tube.
3. .005 Condenser C-5 and 150 ohm Resistor R-3 have been deleted from oscillator circuit.
4. Tap has been added to Primary of IF transformer T-3 and trimmer connected directly across primary winding.

PRELIMINARY.

ALIGNMENT PROCEDURE

Output meter connection Across loudspeaker voice coil
 Output meter reading to indicate 200 milliwatts (standard output) 0.8 volts
 Dummy antenna to be in series with signal generator output See chart below
 Connection of generator ground lead Floating ground
 Generator modulation 30% 400 cycles
 Position of Volume Control Fully clockwise
 Position of pointer with variable fully closed 54 on dial

Position of Variable	Generator Frequency	Dummy Antenna	Generator Output Connection	Trimmers Adjusted	Trimmer Function	Approximate Sensitivity
Open	455 Kc	.05 uF	12SA7 Grid (Stator of C-1)	2 trimmers on top of T-3	IF	3000 uv
1400 Kc	1400 Kc	.00005 uF	Antenna lead	**C-2	Oscillator	360 uv

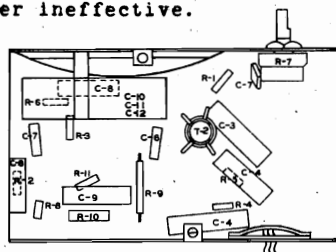
**Since the antenna section of the variable has no trimmer, the rotor of the variable should be rocked back and forth on both sides of 1400 Kc while adjusting the oscillator trimmer for maximum output. This is to obtain the combination of rotor and trimmer setting to give perfect tracking of the two sections of the variable condenser and consequently give maximum output.

Check sensitivity at 600 Kc. If weak, adjust antenna section plates for maximum output at 600 Kc. Tracking of the condenser at points other than 1400 Kc is accomplished by bending the outside plates on the variable condenser rotor, which are cut for this purpose. When bending plates to track the condenser at any given frequency, keep in mind the fact that this will effect the tracking at all frequencies below that point. A tuning wand is very helpful in checking the tracking of this condenser, to indicate whether more or less capacity is needed.

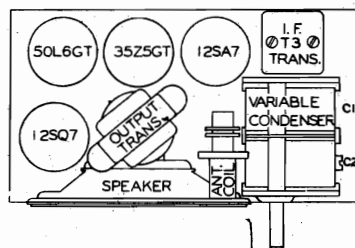
The alignment procedure should be repeated stage by stage in the original order for greatest accuracy.

Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

LOCATION OF PARTS UNDER CHASSIS



TUBE LAYOUT



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO FLOATING GROUND AND ARE TAKEN WITH NO SIGNAL. A C LINE VOLTAGE AT I17 VOLTS. WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ.

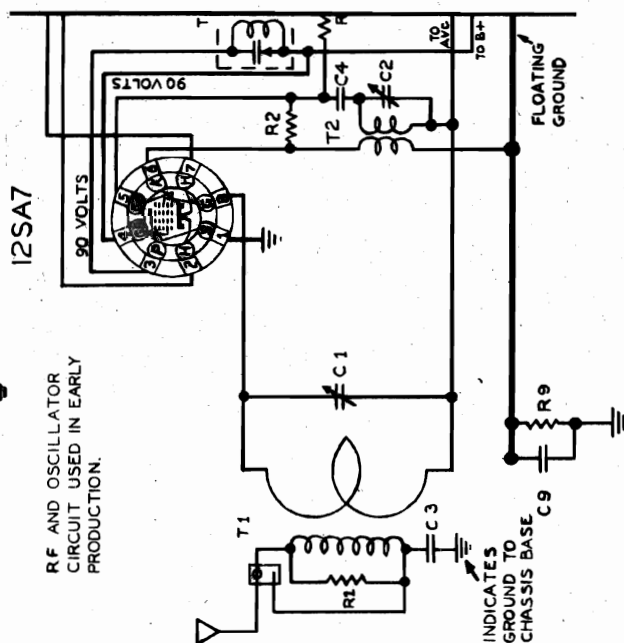
SERVICE HINTS AND CIRCUIT CHANGES.

Sets made previously to March, 1946 had the Variable Condenser rotors connected to the AVC line instead of being grounded to chassis base, and did not have the .1 ufd condenser C-11 connected from the AVC line to chassis base. (In a few sets this is a .05 ufd condenser C-9)

On the early sets, if the dial pointer, shaft, or metal pulley on variable is allowed to touch the dial scale, or plate, the rotor of variable will be grounded, causing noise and distortion. The circuit was changed to eliminate this condition.

If distortion or a chopped output signal is encountered in this set, try replacing the 60L6 tube.

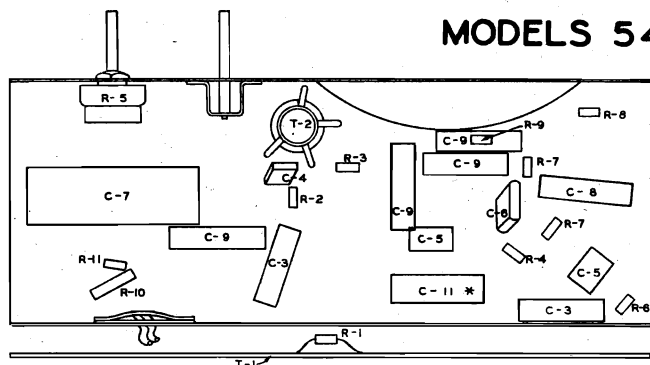
IF PEAK 455 KC



MODELS 544, 544A,
Chassis RE-201

NOBLITT-SPARKS INDUSTRIES INC.

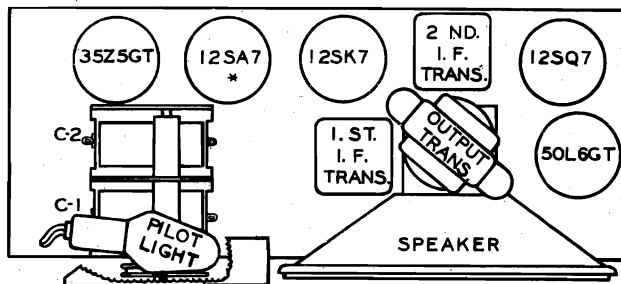
MODELS 544 & 544A



LOCATION OF PARTS UNDER CHASSIS

PRELIMINARY.

Output meter connection Across loudspeaker voice coil
 Output meter reading to indicate 200 milliwatts (standard output)8 volts
 Dummy antenna value to be used in series with generator output See chart below
 Connection of generator output lead See chart below
 Connection of generator ground lead *Floating ground
 Generator modulation 30% 400 cycles
 Position of Volume Control Fully clockwise
 Position of dial pointer with variable fully closed Horizontal
 Place the set loop in the same position with respect to the rear of the chassis, and the same distance from the chassis, as it would be with the set mounted in the cabinet.



OUTLINE FOR TUBE LAYOUT

* ON SETS MADE PREVIOUS TO MAY 1946 THE 12SA7 TUBE WAS
 LOCATED BETWEEN THE VARIABLE CONDENSER AND 1ST I.F.
 TRANSFORMER

Position of Variable	Frequency of Generator	Dummy Antenna	Generator Output Connection	Trimmers adjusted in Order Shown for Max. Output	Function of Trimmer
Open	455	.01 mfd.	12SA7 Grid (Stator of front section of variable condenser)	Top of 2nd & 1st IF Trans.	IF
1400	1400	.00005 mfd.	Antenna Clip (With blue wire removed)	C2; C1, trimmers on Rear & Front sections of Variable Condenser	Osc. Ant.
600	600	.00005 mfd.	Antenna Clip (With blue wire removed)	**Adj. antenna section plates of variable cond. for Max. output.	Antenna

If a standard test loop is used with the signal generator for alignment of the receiver, the blue wire will be left in the antenna clip, and the approximate sensitivities should be 300 uv/m and 250 uv/m or less at 600 Kc and 1400 Kc respectively.

Approximate stage by stage sensitivities for 200 Milliwatt output.

IF. - 455 Kc. -----	3350 uv	Antenna 1000 Kc -----	50 uv
Mixer 455 Kc. -----	75 uv	Antenna 1400 Kc -----	25 uv
Mixer 1000 Kc. -----	60 uv	Antenna 600 Kc -----	50 uv

The alignment procedure should be repeated in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value to make the AVC action of the receiver ineffective.

*A floating ground connection can be obtained on either of the lugs on the back of the AC switch or the black lead on the Volume Control.

**AS THE CONDENSERS ARE ALL TRACKED BEFORE LEAVING THE FACTORY IT IS NOT PROBABLE THAT THE PLATES WILL NEED TO BE ADJUSTED UNLESS WIDE VARIATIONS IN TUBES ARE ENCOUNTERED.

The outside plates on the antenna section of the variable condenser are cut, so they can be bent in or out to give more or less capacity at any given position of the rotor, after the trimmers on the variable have been adjusted at 1400 Kc. A disc type tuning wand affords a quick method of determining whether more or less capacity is needed in the antenna circuit. If the output increases when the Iron end of the wand is placed near the loop, the plates should be bent in to give more capacity. If the output increases when the brass or aluminum end of the wand is placed near the loop the plates should be spread out. If the wand indicates

cont'd on next page

NOBLITT-SPARKS INDUSTRIES INC.

MODELS 544,544A

MODELS 664,664A

that the plates should go closer, but cannot go closer without shorting, the oscillator section plates can be spread, but the calibration should be checked after adjusting the oscillator section. Also the band coverage should be checked to see that 540 Kc can be received.

If the receiver is weak at 1000 Kc the same procedure can be followed at 1000 Kc as outlined above for 600 Kc but this will change the tracking at 600 Kc and may affect 1400 Kc so that all points should be rechecked in the original order.

The condenser should be checked for any possible shorting of the plates after the alignment is completed.

FREQUENCY RANGE

Broadcast 540-1600 kc
IF 455 kc

LOUD SPEAKER

Type: Permanent magnet

Size: 5 inch

Voice coil impedance 3.2 ohms

POWER SUPPLY

105-125 Volts AC-DC, 35 Watts

TUBES & FUNCTIONS

12SA7 Mixer-oscillator
12SK7 IF Amp.
12SQ7GT DET-AVC-AF
50L6GT Output
35Z5GT Rectifier

POWER OUTPUT

Undistorted8 Watts
Maximum 2.5 Watts
Plate load 2000 ohms

Due to variations in tubes some sets which are equipped with 12SK7GT tubes may have a tendency to oscillate. This condition can usually be corrected by placing a shield on the 12SK7GT tube or replacing it with a 12SK7 metal tube. In some cases the IF transformers may need to be repeaked after changing this tube.

Several cases of weak sets have been caused by a defective 12SA7GT tube which will check good on the average tube tester. Alignment should be checked after changing this tube.

REF. NO.	PART NO.	DESCRIPTION	LIST PRICE	REF. NO.	PART NO.	DESCRIPTION	LIST PRICE
	E17232-1	Cabinet, Walnut	\$2.38	C9	C20068-503	Cond., .05 mfd - 400 V P.T.	.19
	E17232-2	Cabinet, Ivory	2.50	C10	C20067-503	Cond., .05 mfd - 200 V P.T.	.17
	A17304	Dial Crystal	.24	C11	C20068-104	Cond., .1 mfd - 400 V P.T.	.22
	A19474-1	Knobs	.11	R1	C20060-103	Resistor, 10,000 ohms $\frac{1}{2}$ W	.05
	A19125	Grille Cloth	.08	R2	C20060-223	Resistor, 22,000 ohm $\frac{1}{2}$ W	.05
	A17296	Tuning Shaft	.11	R3	C20060-156	Resistor, 15 meg. $\frac{1}{2}$ W	.05
	A18640-1	Dial Scale	.10	R4	C20060-225	Resistor, 2.2 meg. $\frac{1}{2}$ W	.05
	A19132	Dial Drive Cord	.02	R5	B17291	Volume Cont. & Sw., 1 meg.	.87
	A19133	Spring	.04	R6	C20060-475	Resistor, 4.7 meg. $\frac{1}{2}$ W	.05
	A19205-3	Cap. Mtg. Clip	.03	R7	C20060-474	Resistor, 470,000 ohm $\frac{1}{2}$ W	.05
	A19253-1	Socket	.12	R8	C20060-151	Resistor, 150 ohm $\frac{1}{2}$ W	.05
	A18254-1	Socket	.12	R9	C20060-334	Resistor, 330,000 ohm $\frac{1}{2}$ W	.05
	A19134-1	Dial Light Socket	.32	R10	C20070-152	Resistor, 1,500 ohm $\frac{1}{2}$ W	.09
	A19135	Dial Light Bulb	.18	R11	C20060-150	Resistor, 15 ohm $\frac{1}{2}$ W	.05
	A16482	Tube Shield	.06	T1	AC18645-1	Antenna Loop Assy.	1.21
	B20064-1	Line Cord & Plug Assy.	.75	T2	AC18646-1	Oscillator Coil	.40
C1	B18869	Variable Condenser	3.43	T3	AC18908-1	1st. I.F. Coil	1.04
C2				T4	AC18909-1	2d. I.F. Coil	1.05
C3	C20068-103	Cond., .01 mfd - 400 V P.T.	.17	T5	AC18647-1	Output Transformer	.81
C4	C20065-500	Cond., .00005 mfd - 500 V Mica	.20	Spk.	C19114	Speaker	3.25
C5	C20065-501	Cond., .0005 mfd - 500 V Mica	.26		A19473	Dial Pointer	.11
C6	C20069-202	Cond., .002 mfd - 600 V P.T.	.40		A19141	Term. Strip	.07
C7	A19136	Cond., Electrolytic	1.34		A19547	Two Conductor Shielded Leads	.12
C8	C20068-303	Cond., .03 mfd - 400 V P.T.	.18		AC19193-1	Sp. & Trans. Assy.	3.58

MODELS 664 & 664 A

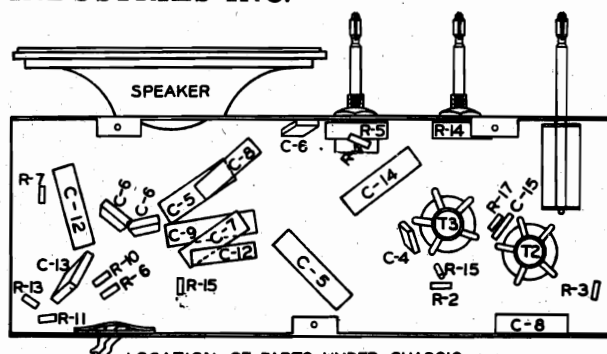
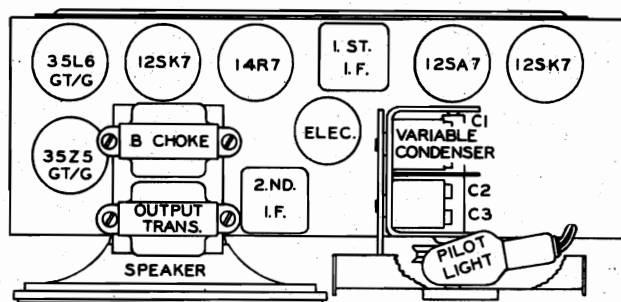
ALIGNMENT PROCEDURE

PRELIMINARY.

Output meter connection Across loudspeaker voice coil
Output meter reading to indicate 200 milliwatts (standard output)8 volts
Dummy antenna value to be used in series with generator output See chart below
Connection of generator output lead See chart below
Connection of generator ground lead Floating ground
Generator modulation 30% 400 cycles
Position of Volume Control Fully clockwise
Position of dial pointer with variable fully closed Vertical
Place the set loop in the same position with respect to the rear of the chassis, and the same distance from the chassis, as it would be with the set mounted in the cabinet. This distance is 1 $\frac{3}{16}$ " from the plate on back of chassis to back of the loop. If the position of the loop is not correct while adjustments are made on the antenna circuit, the antenna circuit will not track and the set will be weak, when placed in the cabinet.

MODELS 664,664A
Chassis RE-206

NOBLITT-SPARKS INDUSTRIES INC.



TUBE LAYOUT			LOCATION OF PARTS UNDER CHASSIS		
Position of Variable	Frequency of Generator	Dummy Antenna	Generator Output Connection	Trimmers adjusted in Order Shown for Max. Output	Function of Trimmer,
Open	455	.01 mfd.	12SA7 Grid or (Stator of center section of variable condenser)	Top of 2nd & 1st IF Trans.	IF
1400	1400	.00005 mfd.	Antenna Clip (With black wire removed)	*C3; C2; C1, trimmers on Variable Condenser	Osc. RF Ant.
600	600	.00005 mfd.	Antenna Clip (With black wire removed)	**Adj. plates of variable cond. for Max. output.	Osc. RF Ant.

If a standard test loop is used with the signal generator for alignment of the receiver, the black wire will be left in the antenna clip, and the approximate sensitivities should be 250 uv/m and 150 uv/m or less at 600 Kc and 1400 Kc respectively. Sets using glass 12SA7 tube may have slightly weaker sensitivities.

Approximate stage by stage sensitivities for 200 Milliwatt output.

IF. - 455 Kc. -----	10,000 uv	Antenna 1000 Kc -----	15 uv
Mixer 455 Kc. -----	150 uv	Antenna 1400 Kc -----	15 uv
Mixer 1000 Kc. -----	170 uv	Antenna 600 Kc -----	25 uv

The alignment procedure should be repeated in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value to make the AVC action of the receiver ineffective.

*Trimmer C3 (oscillator) is located either on the top or bottom of the variable condenser, depending on the type variable used on any particular set.

**AS THE CONDENSERS ARE ALL TRACKED BEFORE LEAVING THE FACTORY IT IS NOT PROBABLE THAT THE PLATES WILL NEED TO BE ADJUSTED UNLESS WIDE VARIATIONS IN TUBES ARE ENCOUNTERED OR THE CONDENSER HAS BEEN DAMAGED. PLATE BENDING SHOULD NOT BE ATTEMPTED WITHOUT THE PROPER EQUIPMENT, OR BY ANYONE NOT EXPERIENCED AT TRACKING CONDENSERS.

The outside plates on the antenna & RF sections of the variable condenser are cut, so they can be bent in or out to give more or less capacity at any given position of the rotor, after the trimmers on the variable have been adjusted at 1400 Kc. A disc type tuning wand affords a quick method of determining whether more or less capacity is needed in the antenna circuit. If the output increases when the Iron end of the wand is placed near the loop, the plates should be bent in to give more capacity. If the output increases when the brass or aluminum end of the wand is placed near the loop the plates should be spread out. If the wand indicates that the plates should go closer, but cannot go closer without shorting, the oscillator section plates can be spread, or vice versa, but the calibration should be checked after adjusting the oscillator section. Also the band coverage should be checked to see that 540 Kc can be received.

Since the osc. section has much less capacity than the RF & antenna sections, plate bending will be much more effective in the osc. circuit, and a small change in or out in the plates of this section will have the same effect as a large change in the opposite direction in the other sections.

If the receiver is weak at 1000 Kc the same procedure can be followed at 1000 Kc as outlined above for 600 Kc but this will change the tracking at 600 Kc and may affect 1400 Kc so that all points should be rechecked in the original order.

The condenser should be checked for any possible shorting of the plates after the alignment is completed.

SERVICE HINTS AND CIRCUIT CHANGES.

If the dial pointer is allowed to touch the dial scale, the rotor of the variable condenser, which is connected to the AVC Line, will be grounded, causing noise & distortion.

If the set has a tendency to be microphonic, check the rubber grommets on the Variable Condenser mounting, if these are hard replace them with soft rubber grommets.

C15 (14 mmf. cond.) was added to RF Circuit and R17 was changed from 3300 ohms to 6800 ohms, after start of production.

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CHASSIS-RE-204

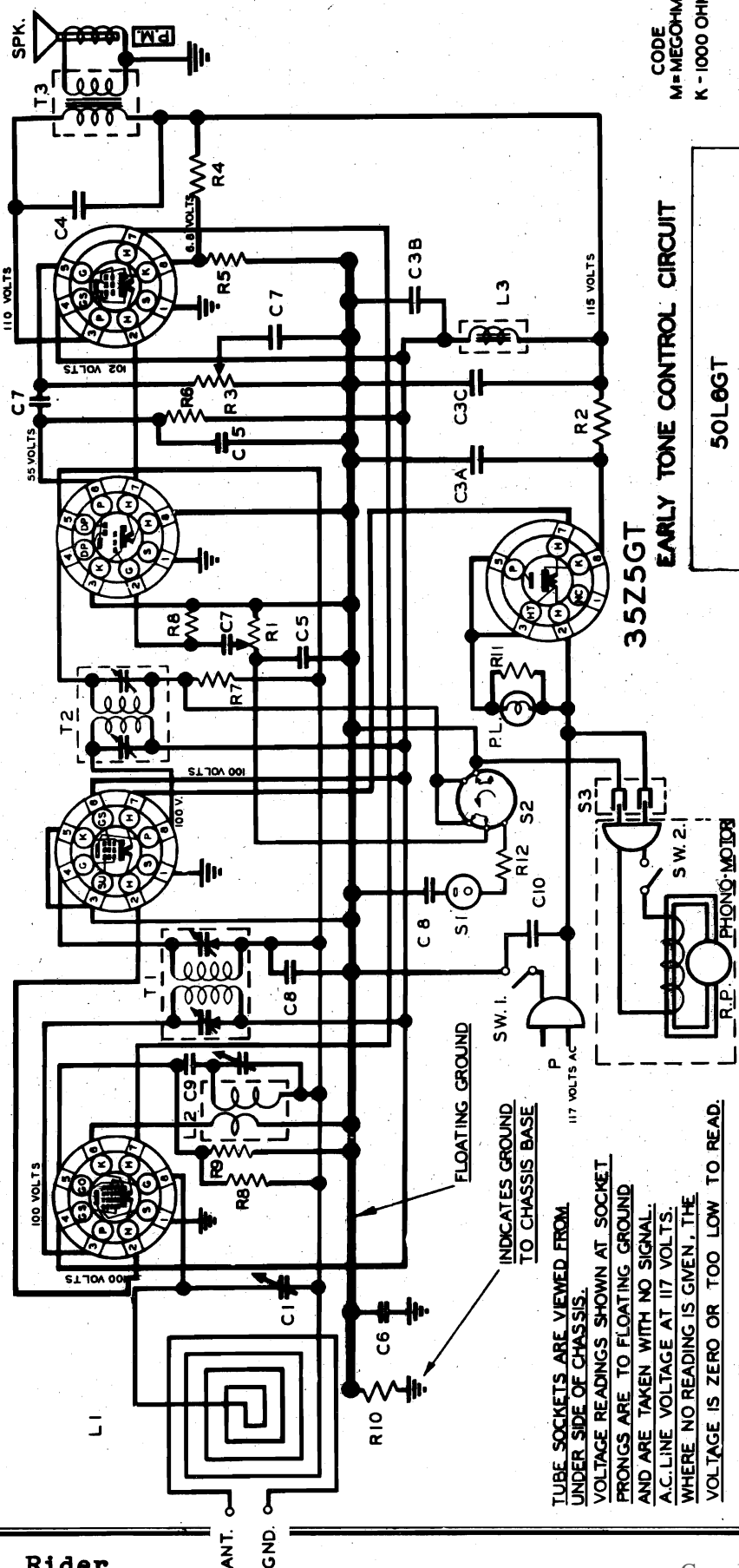
FREQUENCY RANGE
Broadcast 540-1600 kc
IF 455 kc

12SA7

12SK7

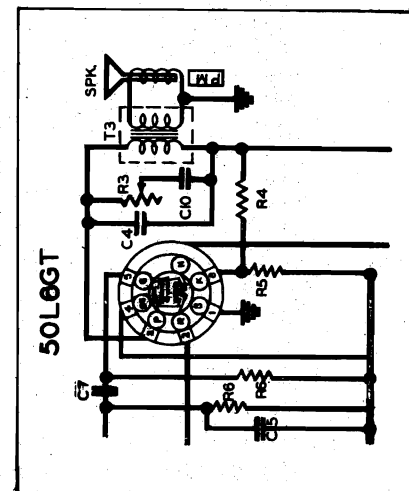
12SQ7

50L6GT



CODE
M=MEG OHM
K=1000 OHM

EARLY TONE CONTROL CIRCUIT



POWER OUTPUT

Undistorted 1 Watt
Maximum 1.9 Watts
Plate load 2000 ohms

105-125 Volts AC-DC, 50 Watts

Sets made previous to July, 1946 had the tone control in the plate circuit.
See Drawing In these sets the tone control R3 was 50K ohms.

LOUD SPEAKER

Type: Permanent magnet
Size: 5 inch.
Voice coil impedance 3.2 ohms

MODEL 558, Early,
Late, Ch. RE-204

NOBLITT-SPARKS INDUSTRIES INC.

ALIGNMENT PROCEDURE

PRELIMINARY.

Output meter connection Across loudspeaker voice coil
 Output meter reading to indicate 200 milliwatts (standard output)8 volts
 Dummy antenna value to be used in series with generator output See chart below
 Connection of generator output lead See chart below
 Connection of generator ground lead *Floating ground
 Generator modulation 30% 400 cycles
 Position of Volume Control Fully clockwise.
 Position of dial pointer with variable fully closed... Last rectangular mark at left edge
 of dial

Place the set loop in the same position with respect to the rear of the chassis, and the same distance from the chassis, as it would be with the set mounted in the cabinet.

Position of Variable	Frequency of Generator	Dummy Antenna	Generator Output Connection	Trimmers adjusted in Order Shown for Max. Output	Function of Trimmer
Open	455	.05 mfd.	12SA7 Grid (Stator of rear section of variable condenser)	Top of 2nd & 1st IF Trans.	IF
1400	1400	.00005 mfd.	Antenna connection on back of loop	C2; C1, trimmers on Front & Rear sections of Variable Condenser	Osc. Ant
600	600	.00005 mfd.	Antenna connection on back of loop	**Adj. antenna section plates of variable cond. for Max. output	Antenna.

If a standard test loop is used with the signal generator for alignment of the receiver, the approximate sensitivities should be 350 uv/m and 250 uv/m or less at 600 Kc and 1400 Kc respectively.

Approximate stage by stage sensitivities for 200 Milliwatt output.

IF. - 455 Kc. -----	2600 uv	Mixer 1000 Kc. -----	75 uv
Mixer 455 Kc. -----	60 uv	Antenna 1400 Kc. -----	70 uv

The alignment procedure should be repeated in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value to make the AVC action of the receiver ineffective.

*A floating ground connection can be obtained on either of the lugs on the back of the AC switch.

**AS THE CONDENSERS ARE ALL TRACKED BEFORE LEAVING THE FACTORY IT IS NOT PROBABLE THAT THE PLATES WILL NEED TO BE ADJUSTED UNLESS WIDE VARIATIONS IN TUBES ARE ENCOUNTERED.

The outside plates on the antenna section of the variable condenser are cut, so they can be bent in or out to give more or less capacity at any given position of the rotor, after the trimmers on the variable have been adjusted at 1400 Kc. A disc type tuning wand affords a quick method of determining whether more or less capacity is needed in the antenna circuit. If the output increases when the Iron end of the wand is placed near the loop, the plates should be bent in to give more capacity. If the output increases when the brass or aluminum end of the wand is placed near the loop the plates should be spread out. If the wand indicates that the plates should go closer, but cannot go closer without shorting, the oscillator section plates can be spread, but the calibration should be checked after adjusting the oscillator section. Also the band coverage should be checked to see that 540 Kc can be received.

If the receiver is weak at 1000 Kc the same procedure can be followed at 1000 Kc as outlined above for 600 Kc but this will change the tracking at 600 Kc and may affect 1400 Kc so that all points should be rechecked in the original order.

The condenser should be checked for any possible shorting of the plates after the alignment is completed.

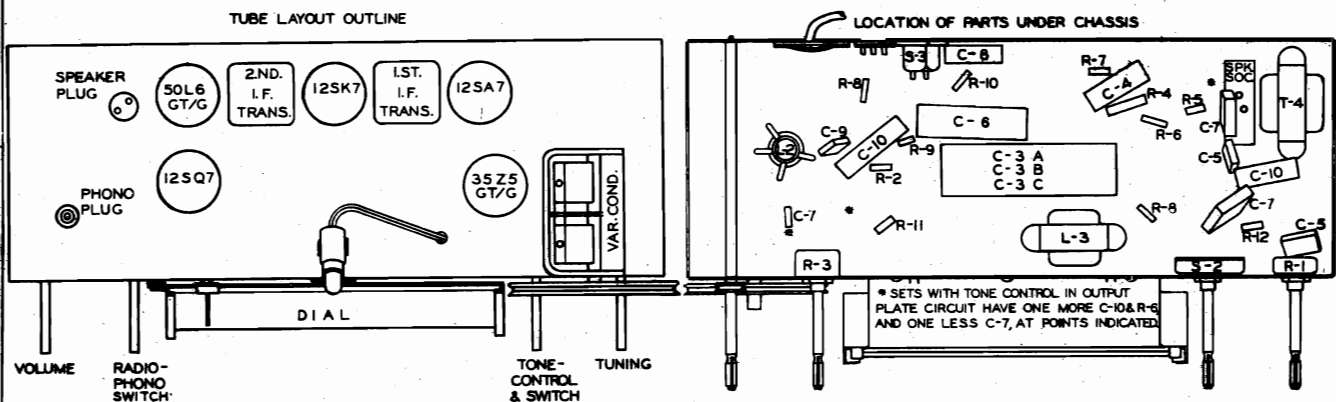
NOBLITT-SPARKS INDUSTRIES INC.

MODEL 558, Early,
Late, Ch. RE-204

If a set is found to be microphonic when playing records, check for the presence of 4 felt washers under the chassis and a wood block $3\frac{1}{2}" \times 8" \times \frac{1}{4}"$ mounted under the phono-motor board, in front of the center brace. If these are not present, installing them should correct the microphonic condition. The block should be glued to the under side of the motor board against the front side of the center brace, with two $\frac{1}{4}"$ wood screws driven from the top side of the motor board into the block, to draw it up tight. Place the screws so the heads will be under the turntable.

POSITION OF POWER CORD PLUG.

On AC, the power cord plug should be tried in both its possible positions in the receptacle, and left in the position that gives least hum. Do not attempt to operate on DC.



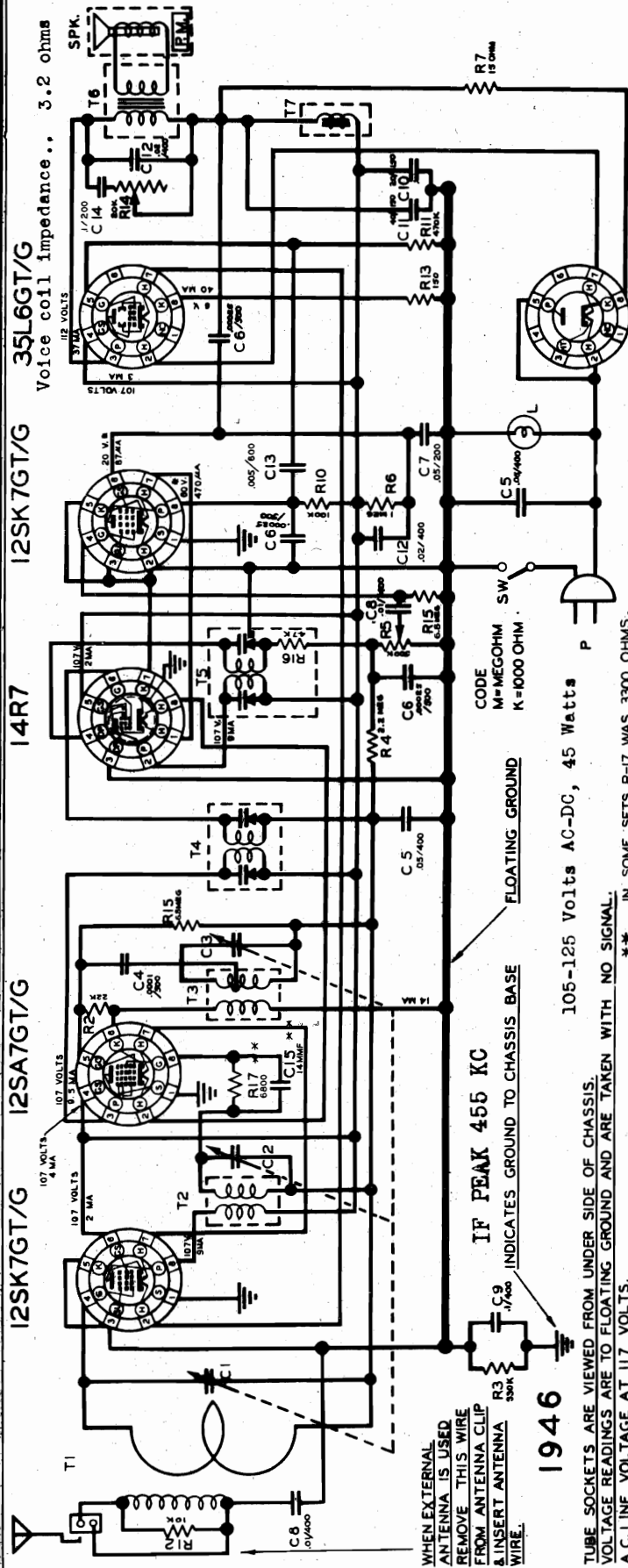
PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	LIST PRICE	REF. NO.	PART NO.	DESCRIPTION	LIST PRICE
R1	C19753	Volume Control	.65	A19628	Socket, Dial Lamp	.26	
R2	C20060-150	Resistor, 15 ohms $\frac{1}{2}$ W	.05	A19135	Dial Lamp	.18	
R3	C19947	Tone Control 500 K ohms & ON-OFF Sw.	.87	S2	C19754	Phono-Radio Switch	.83
	*C19752	Tone Control 50 K ohms	.87		R19573	Cabinet	30.00
R4	C20070-123	Resistor, 12 K ohms $\frac{1}{2}$ W	.08	RP	E19475	Phono-Motor and Turntable	6.94
R5	C20060-151	Resistor, 150 ohms $\frac{1}{2}$ W	.05		C19594	Pick-up Arm	5.55
R6	C20060-474	Resistor, 470 K ohms $\frac{1}{2}$ W	.05		A19850	Needle, Semi-perm	.92
R7	C20060-225	Resistor, 2.2 meg. $\frac{1}{2}$ W	.05		C19572	Escutcheon	1.38
R8	C20060-156	Resistor, 15 meg. $\frac{1}{2}$ W	.05		A19595	Escutcheon, On-Off Switch	.03
R9	C20060-223	Resistor, 22 K ohms $\frac{1}{2}$ W	.05		A19545	On-Off Switch - (Phono-Motor)	.15
R10	C20060-334	Resistor, 330 K ohms $\frac{1}{2}$ W	.05		A19596	Rest, Pick-up arm	.14
R11	C20060-681	Resistor, 680 ohms $\frac{1}{2}$ W	.04	L2	AE19585-1	Antenna Loop Assy.	1.33
R12	C20060-105	Resistor, 1 meg. $\frac{1}{2}$ W	.05	T1	AC19587-1	Oscillator Coil Assy.	.37
C1-C2	C19584	Variable Condenser - 2 gang	3.82	T2	AC19587-1	1st I.F. Coil Assy.	1.12
C3A		Elect. Cond. 10 mfd. 150 V		T3	AC19588-1	2d. I.F. Coil Assy.	1.10
C3B	A19780	Elect. Cond. 20 mfd. 150 V	1.17	L3	AC19589-1	Choke Assy.	.69
C3C		Elect. Cond. 40 mfd. 150 V			AC19591-1	Output Transformer	1.00
C4	C20068-203	Condenser, .02 uf 400 V	.18		AA19593-2	Tuning Shaft & Pulley Assy.	.47
C5	C20065-501	Condenser, .0005 uf 500 V	.26		AA19639-1	Dial Cord Guide Assy.	.03
C6	A19765	Condenser, .2 uf 400 V	.29		A19578	Dial Pointer	.07
C7	C20069	Condenser, .002 uf 600 V	.40		C19615	Dial Glass	.75
C8	C20067-503	Condenser, .05 uf 200 V	.18		A19132	Cord, Dial Drive	.02
C9	C20065-500	Condenser, .00005 uf 500 V	.20		A19295	Spring, Dial Cord	.04
C10	C20068-503	Condenser, .05 uf 400 V	.19		B20064-10	Line Cord & Plug Assy.	.75
	A19141	Double Terminal Strip	.04		C19597	Knob, Volume	.04
	A19800	Triple Terminal Strip	.04		C19598	Knob, Tuning	.04
	A18254-1	Tube Socket	.12		C19599	Knob, Phono-switch	.04
	A19234	Socket, Antenna Loop	.07		C19600	Knob, Tone Control	.04
	A19552	Socket, One Prong	.07		A19554	Plug, One Prong	.05
S8	A19551	Socket, Phono-motor	.21	Spk.	A19556	Plug, A.C.	.21
	A19579	Socket, Speaker	.08		C19620	Speaker	4.86

*On sets having Tone Control in Output Plate Circuit.

MODELS 664, 664A,
Chassis RE-206

NOBLITT-SPARKS INDUSTRIES INC.



35L6GT/G
Voice coil impedance.. 3.2 ohms

35Z5GT/G

12SK7GT/G

14R7

12SK7GT/G

35L6GT/G

35Z5GT/G

Elect. Mtg. Wafer
Antenna Socket
Dial Light Socket
Dial Light Bulb, Mazda C7 Nite Lite.
Socket, Loktal Type
Line Cord and Plug Assy.
Rubber Grommet for mtg. Var. Cond.
B18564 & C19853
Rubber Grommet for mtg. Var. Cond.
C19853 only

TUBES & FUNCTIONS

12SK7 RF Amp.
12SA7 Mixer-oscillator
14R7 IF Amp. DET-AVC
12SK7 AF Amp.
35L6 Output Rectifier
35Z5GT Rectifier

POWER OUTPUT

Undistorted8 Watts
Maximum 2.5 Watts
Plate load 2000 Ohms

LIST PRICE

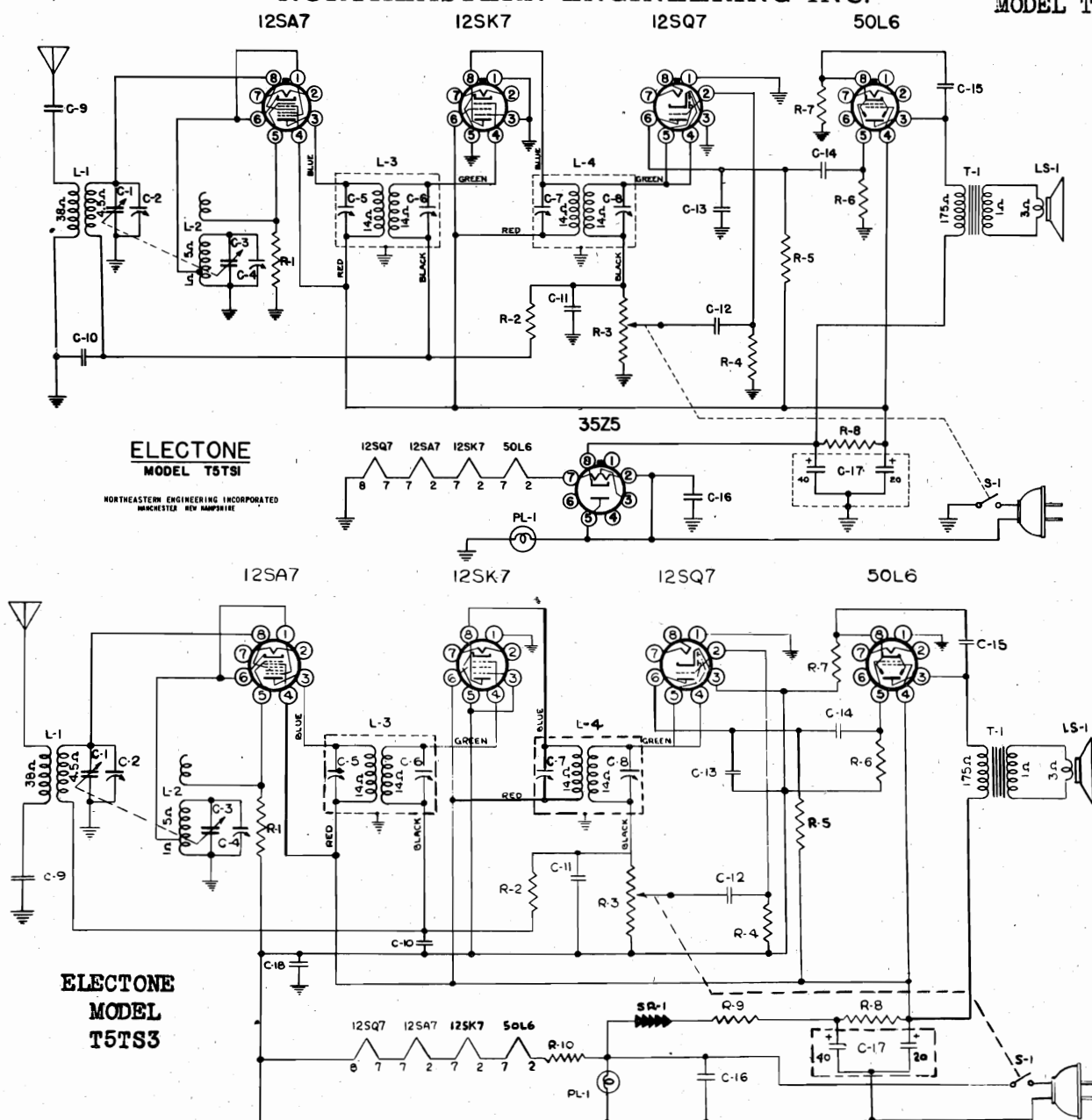
C12 C20068-203 Cond., .02 uf. 400 V P.T. .18
C13 C20069-502 Cond., .005 uf. 600 V P.T. .40
C14 C20067-104 Cond., .1 uf. 200 V P.T. .19
C15 A19182 Cond., 14 mmf. 600 V Mica .15
A19183 Terminal Strip .05
A19138-1 Spacer Eyelet for Mtg. Var. Cond. .01
D18422-1 Cabinet, Walnut (Assy.) \$3.60
D18422-2 Dial Crystal 3.75
A19272 Handle .36
A19273-1 Knobs, Walnut .05
A19273-2 Knobs, Ivory .05
A19240 Grill Cloth 1.40
AC18579-1 Antenna Loop Assy. .40
AC19860-1 R. F. Coil .47
AC18580-1 Oscillator Coil .130
AC18581-1 1st. I. F. Coil .170
2d. I. F. Coil 1.52
AC18578-1 Iron Core Choke 1.82
AC18583-1 Output Transformer 6.36
Speaker Assy. (Spk. with Trans. 5.72
Mtg. Bracket) .14
C18550 Speaker only .12
A19293 Tuning Shaft .16
C18432 Dial Scale .04
A18572 Dial Pointer .12
A19132 Dial Drive Cord .12
A18584-1 Socket, tube, wafer type

REP. NO. PART NO. DESCRIPTION

R2 C20060-223 Resistor, 22,000 ohm 1/2 W
R3 C20060-334 Resistor, 330,000 ohm 1/2 W
R4 C20060-225 Resistor, 2.2 megohm 1/2 W
R5 C19244 Volume Cont. & Sw., 500,000 ohms
R6 C20060-105 Resistor, 15 ohm 1/2 W
R7 C20060-150 Resistor, 100,000 ohm 1/2 W
R10 C20060-104 Resistor, 470,000 ohm 1/2 W
R11 C20060-474 Resistor, 470,000 ohm 1/2 W
R12 C20060-103 Resistor, 10,000 ohm 1/2 W
R13 C20060-151 Resistor, 150 ohm 1/2 W
R14 C19279 Tone Control, 20,000 ohm
R15 C20060-685 Resistor, 6.8 megohm 1/2 W
R16 C20060-475 Resistor, 47,000 ohm 1/2 W
R17 C20060-332 Resistor, 6800 ohm 1/2 W
C1 B18564 **Variable Condenser, 3 gang
C2 C19853 Cond., .0001 uf. 500 V Mica
C3 C20068-101 Cond., .05 uf. 400 V P.T.
C4 C20068-503 Cond., .0025 uf. 500 V Mica
C5 C20065-251 Cond., .0025 uf. 500 V P.T.
C6 C20067-503 Cond., .05 uf. 200 V P.T.
C7 C20068-103 Cond., .1 uf. 400 V P.T.
C8 C20068-104 Cond., .1 uf. 400 V P.T.
C9 C20068-104 Cond., .1 uf. 400 V P.T.
C10 A19239 Cond., Electrolytic 40-20 uf.
C11 150 V

In a few sets R17 was 3300 ohm 1/2 W.
When ordering a replacement Variable Condenser, be sure to use the part number which is stamped on the back of the original Condenser.

NORTHEASTERN ENGINEERING INC.

MODEL T5TS1
MODEL T5TS3

Symbol Description

C1 Ant. Tuning cap. inc. C2
 C3 Osc. tuning cap. inc. C4
 C5, C6 1st i-f trimmer cap.
 C7, C8 2nd i-f trimmer cap.
 C9 Cap. 0.001 μ fd, 500 v, mica
 C10 Cap. 0.05 μ fd, 200v, paper
 C11 Cap. 0.00025 μ fd, 300v, mica
 C12 Cap. 0.0002 μ fd, 600v, paper
 C13 Cap. 0.00025 μ fd, 500v, mica
 C14 Cap. 0.02 μ fd, 400v, paper
 C15 Cap. 0.02 μ fd, 400v, paper
 C16 Cap. 0.05 μ fd, 400v, paper
 C17 Cap. 40/20 μ fd, 150v, electro
 C18 Cap. 0.05 μ fd, 400v, paper
 L1 Ant. coil
 L2 Osc. coil

L3 1st i-f trans.
 L4 2nd i-f trans.
 LS1 Loudspeaker, 5" PM
 PL1 Pilot light, 115v, 6 watts
 R1 20,000 ohms, 1/2 watt
 R2 3.0 megohms, 1/2 watt
 R3 Pot. and switch (S1) 500,000 ohms
 R4 15.0 megohms, 1/2 watt
 R5 470,000 ohms, 1/2 watt
 R6 470,000 ohms, 1/2 watt
 R7 150,000 ohms, 1/2 watt
 R8 1,000 ohms, 5 watts
 R9 15 ohms, type OW
 R10 200 ohms, 10 watts
 S1 Power switch (part of K3)
 SR1 Selenium rectifier, 100ma, 5 plates
 T1 Output trans.

MODEL T5TS1
MODEL T5TS3

NORTHEASTERN ENGINEERING INC.

Model T5TS1 Broadcast Receiver

GENERAL DESCRIPTION

The Model T5TS1 ELECTONE is a five tube super-heterodyne broadcast entertainment receiver designed for operation from either a direct or alternating current power source. The circuit utilizes multi-unit tubes and incorporates automatic volume control. The chassis is enclosed in an all-metal cabinet of modern styling and having the following dimensions: Width 12"; Depth 7"; Height 7".

ELECTRICAL SPECIFICATIONS

Power Supply.....105-125 volts, 50-60 cycles, AC or 105-125 volts DC
Power Consumption.....30 watts
Frequency Range.....500-1700 Kcs.
Intermediate Frequency.....456 Kcs.
Audio Output.....1.5 watts

TUBE COMPLEMENT

Converter and Oscillator.....12SA7
I.F. Amplifier.....12SK7
Detector-AVC-Audio.....12SQ7
Power Output.....50L6GT
Rectifier.....35Z5GT
Dial Lamp.....Mazda #6S6

LOUDSPEAKER

Permanent Magnet.....5" Diameter

INSTALLATION FACILITIES PROVIDED

Power.....5' cord and plug
Antenna.....10' indoor type
Ground.....None required

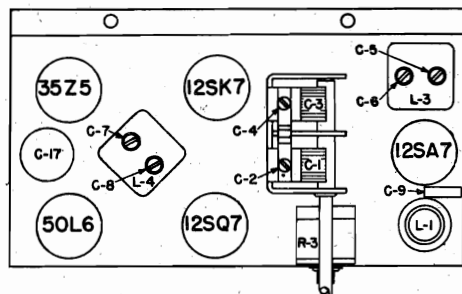


FIG. 1 - Tube and Trimmer Locations (Top View)

ALIGNMENT PROCEDURE

Alignment Frequencies:

I.F.456 Kcs.
R.F.1500 Kcs.

I. F. Alignment:

Connect output meter across the voice coil. Turn the receiver volume control to maximum. Connect high side of the alignment oscillator, through a .05 mfd. capacitor, to the converter grid.

Set alignment oscillator at 456 Kcs. and adjust output to give the lowest conveniently readable indication on the output meter. Adjust trimmers C-7 and C-8 in 2nd I.F. transformer to give maximum indication on output meter. Repeat this procedure for trimmers C-5 and C-6 in the 1st I.F. transformer. Repeat procedure to check accuracy.

R. F. Alignment:

Retain output meter connected as above and receiver volume control set at maximum. Connect alignment oscillator to antenna.

Set alignment oscillator at 1500 Kcs. and place in operation. Rotate receiver tuning capacitor (C-1 and C-3) to give maximum signal indication on output meter. Adjust output of alignment oscillator to give the lowest conveniently readable indication on the output meter. Adjust oscillator trimmer C-4 to peak the signal indication on output meter. Then, adjust antenna trimmer C-2 to further peak the signal. Repeat procedure to check accuracy.

Trimmer locations are shown in Figure 1.

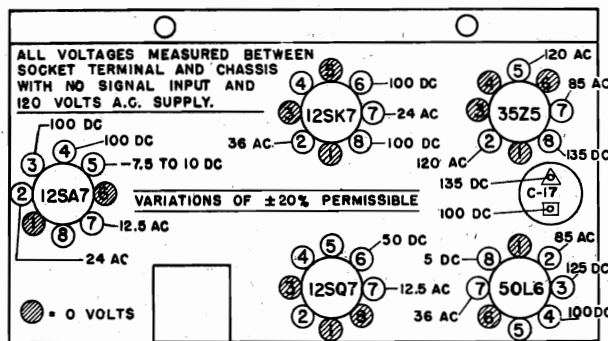


FIG. 2 - Socket Terminal Voltages (Bottom View)

NOTES:

An electronic voltmeter may be connected to the AVC bus and used for alignment indication in lieu of the output meter across the voice coil.

An electronic voltmeter or a voltmeter with a minimum resistance of 20,000 ohms per volt should be used for voltage measurements.

The polarity of the power connection must be correct when operating the receiver on direct current. If the receiver does not operate when the power plug is first inserted, remove and re-insert in opposite position. Reversal of plug position on alternating current supply may reduce hum in some cases.

CAUTION:

A direct ground connection should not be placed on the receiver at any time. Particular care should be exercised when removing and replacing chassis to insure that the insulators between chassis and cabinet are in position and that the insulation is complete and effective.

SB101-5-46-5M-W

LIST OF SYMBOLS

SYMBOL	DESCRIPTION
C-1	ANT. TUNING CAPACITOR including trimmer C-2
C-3	OSC. TUNING CAPACITOR including trimmer C-4
C-5, 6	1st I.F. TRIMMER CAPACITORS
C-7, 8	2nd I.F. TRIMMER CAPACITORS
C-9	CAPACITOR - 0.001 mfd. - 500 volts - Mica
C-10	CAPACITOR - 0.05 mfd. - 200 volts - Paper
C-11	CAPACITOR - 0.00025 mfd. - 500 volts - Mica
C-12	CAPACITOR - 0.002 mfd. - 800 volts - Paper
C-13	CAPACITOR - 0.00025 mfd. - 500 volts - Mica
C-14	CAPACITOR - 0.02 mfd. - 400 volts - Paper
C-15	CAPACITOR - 0.02 mfd. - 400 volts - Paper
C-16	CAPACITOR - 0.05 mfd. - 400 volts - Paper
C-17	CAPACITOR - 40/20 mfd. - 150 volts - Electrolytic

L-1	ANTENNA COIL
L-2	OSCILLATOR COIL
L-3	1st I.F. TRANSFORMER
L-4	2nd I.F. TRANSFORMER
LS-1	LOUDSPEAKER - 6" PM
PL-1	PILOT LAMP - 115 volts - 6 watts
R-1	RESISTOR - 20,000 ohms - 1/2 watt
R-2	RESISTOR - 3.0 Megohms - 1/2 watt
R-3	POTENTIOMETER AND SPST SWITCH (S-1) - 500,000 ohms
R-4	RESISTOR - 15.6 Megohms - 1/2 watt
R-5	RESISTOR - 470,000 ohms - 1/2 watt
R-6	RESISTOR - 470,000 ohms - 1/2 watt
R-7	RESISTOR - 150 ohms - 1/2 watt
R-8	RESISTOR - 1,000 ohms - 5 watts
S-1	POWER SWITCH (part of R-3)
T-1	OUTPUT TRANSFORMER

Date: Aug. 23, 1946

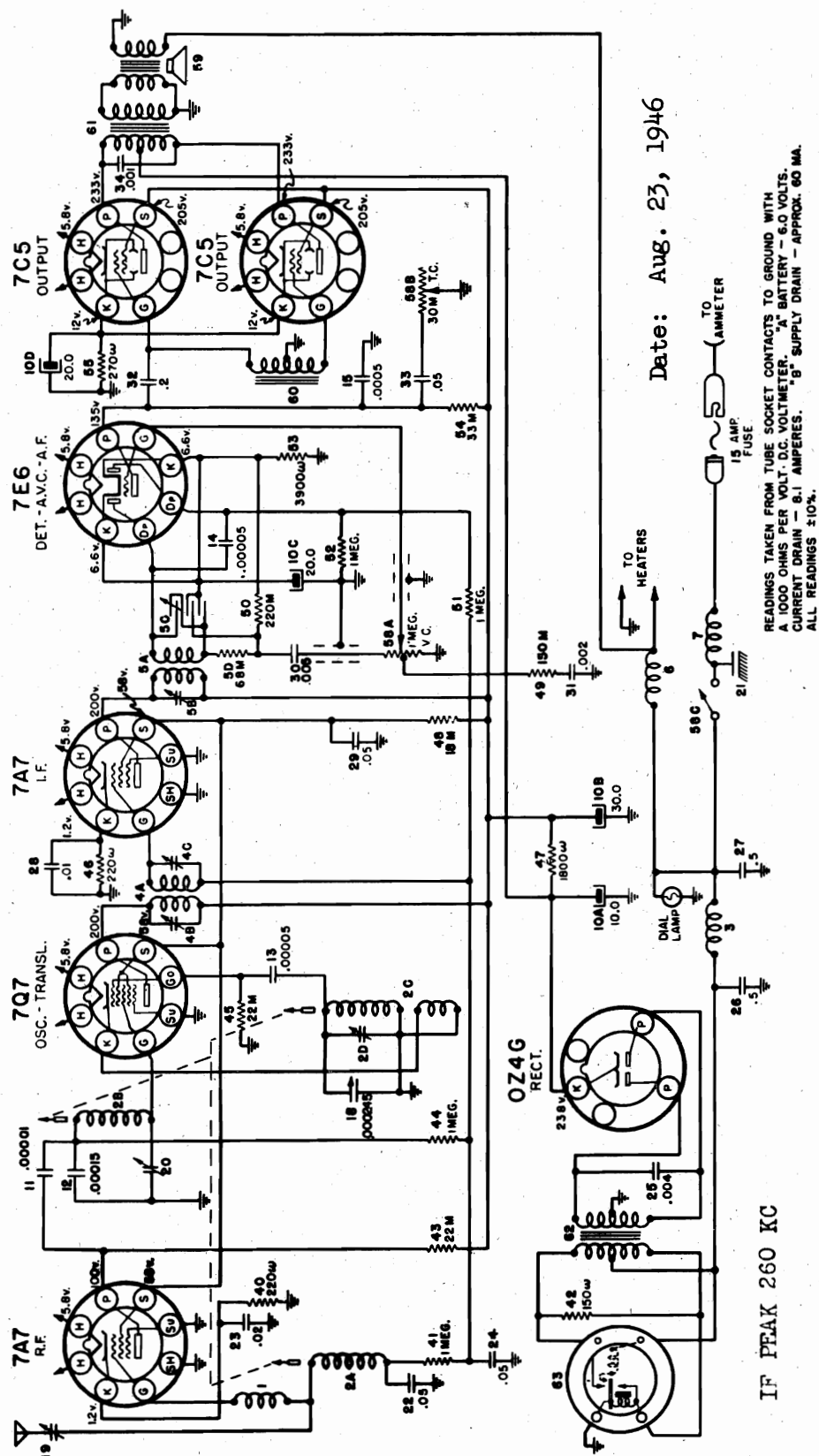
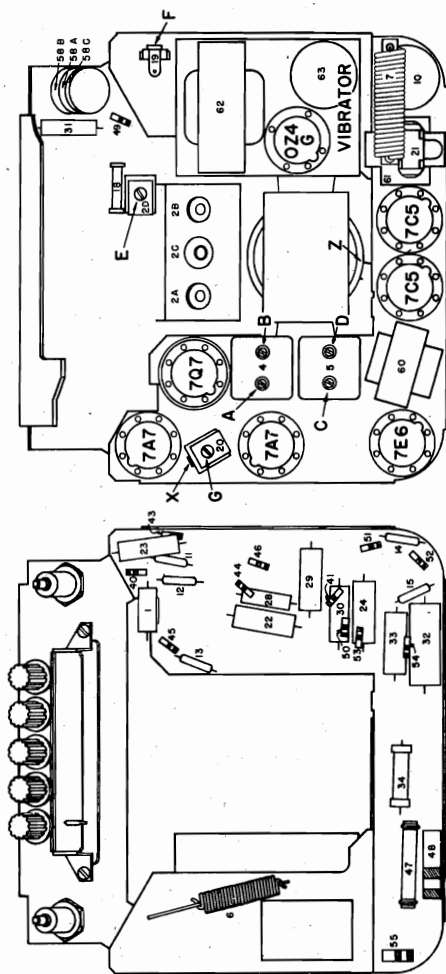


Fig. 3 - Circuit Diagram - 982375

The Oldsmobile model 982375 is a single unit DeLuxe Receiver with Automatic Push Button Tuning, in addition to Manual Tuning, Volume and Tone Controls.

The receiver was designed specifically for the 1946 Oldsmobiles. The push Button Assembly, Controls, Receiver and Speaker are built into a housing which is mounted directly behind the center of the instrument panel.

OLDSMOBILE DIV.-GENERAL MOTORS



RADIO DATA

MODEL NUMBER - 982375

SERIAL NUMBER - AND UP

TUBE COMPLEMENT - 7A7, 7Q7, 7A7,
7E6, 7C5, 7C5,
0Z4G

BATTERY CURRENT - 8.1 AMPERES

B + VOLTS - 238

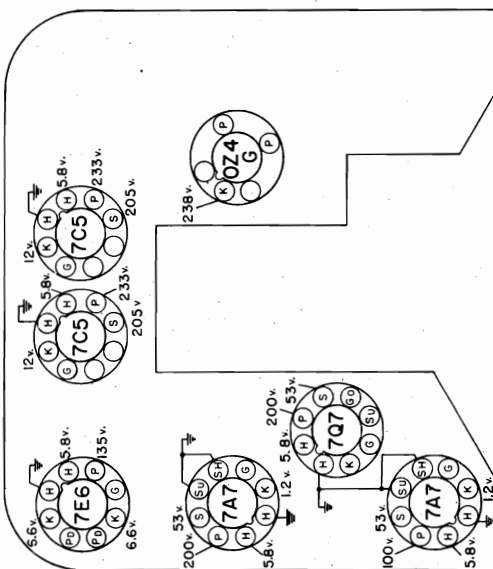
LF K.C. - 260

R.F. K.C. - 1610-535

Voice COIL IMPEDANCE- 4 OHMSAT
400 CYCLES

VIBRATOR TYPE - NON SYNCHRONOUS

YEAR - 1946



BOTTOM VIEW OF TURF SOCKETS

READINGS TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT "A" BATTERY 6.0 VOLTS. CURRENT DRAIN 8-1 AMPERES. "B" SUPPLY DRAIN APPROXIMATELY 60 MA. ALL READINGS $\pm 10\%$.

CIRCUIT ALIGNMENT

All of the adjustable condensers in this receiver are very accurately adjusted at the factory and will need no further adjustment (excepting antenna trimmer) unless tampered with or a defective coil has been replaced. If re-alignment is found to be necessary, the circuits can be properly adjusted only with the use of a calibrated test oscillator or signal generator and an output meter.

DO NOT ATTEMPT TO PEAK THE I-F STAGES OF THIS RECEIVER WITHOUT CAREFULLY NOTING THE FOLLOWING INSTRUCTIONS:

1. Aligning I-F Stages at 260 Kilocycles
 - (a) Turn volume control to the maximum position.
 - (b) Connect the signal lead of the test oscillator through a .1 mfd. condenser to terminal X (See Parts Layout), which is the grid prong of the 7Q7 tube.
 - (c) Connect the ground lead of the test oscillator to the chassis frame.
 - (d) Connect the output meter across the speaker voice coil at the terminal board mounted on the speaker. Connect between point "Z" and ground. This terminal is color coded green on strip. (See Parts Layout)
 - (e) Set the test oscillator to exactly 260 Kilocycles.
 - (f) Adjust the trimmers "A", "B", "C" and "D" on the I-F Transformers for maximum output. (See Parts Layout) The adjustments should be repeated several times and during alignment the test oscillator output should be kept to as low a value as is consistent with obtaining a readable indication on the output meter.
2. Aligning at 1610 Kilocycles
 - (a) Remove the signal lead of the test oscillator from the grid of the 7Q7 tube and connect to the Antenna terminal of the receiver THROUGH a .00065 mfd. MICA CONDENSER connected in place of the .1 mfd. condenser previously used. (It is very important that a .00065 mfd. mica condenser be used when aligning the antenna stage of these receivers in order that this circuit can be made to track properly.)
 - (b) Tune the receiver to the extreme high frequency end of the dial.
 - (c) Set the test oscillator to 1610 Kilocycles.
 - (d) Adjust the Oscillator Trimmer Condenser "E" for maximum output. (See Parts Layout) (It is very important that this frequency be set accurately as a slight mis-setting will cause the receiver to be out of track over the high frequency end of the dial.)
 - (e) Adjust the Antenna Trimmer Condenser "F" for maximum output. (See Part Layout)
 - (f) Adjust the R.F. Trimmer Condenser "G" for maximum output.

NOTE - With permeability tuning it is necessary to adjust the capacity at only one frequency. The coils are so wound that tracking is automatic and the usual low frequency adjustments are not necessary.

If the entire alignment procedure has been accomplished accurately, the receiver should be uniformly sensitive over the entire frequency range.

OLDSMOBILE DIV.-GENERAL MOTORS

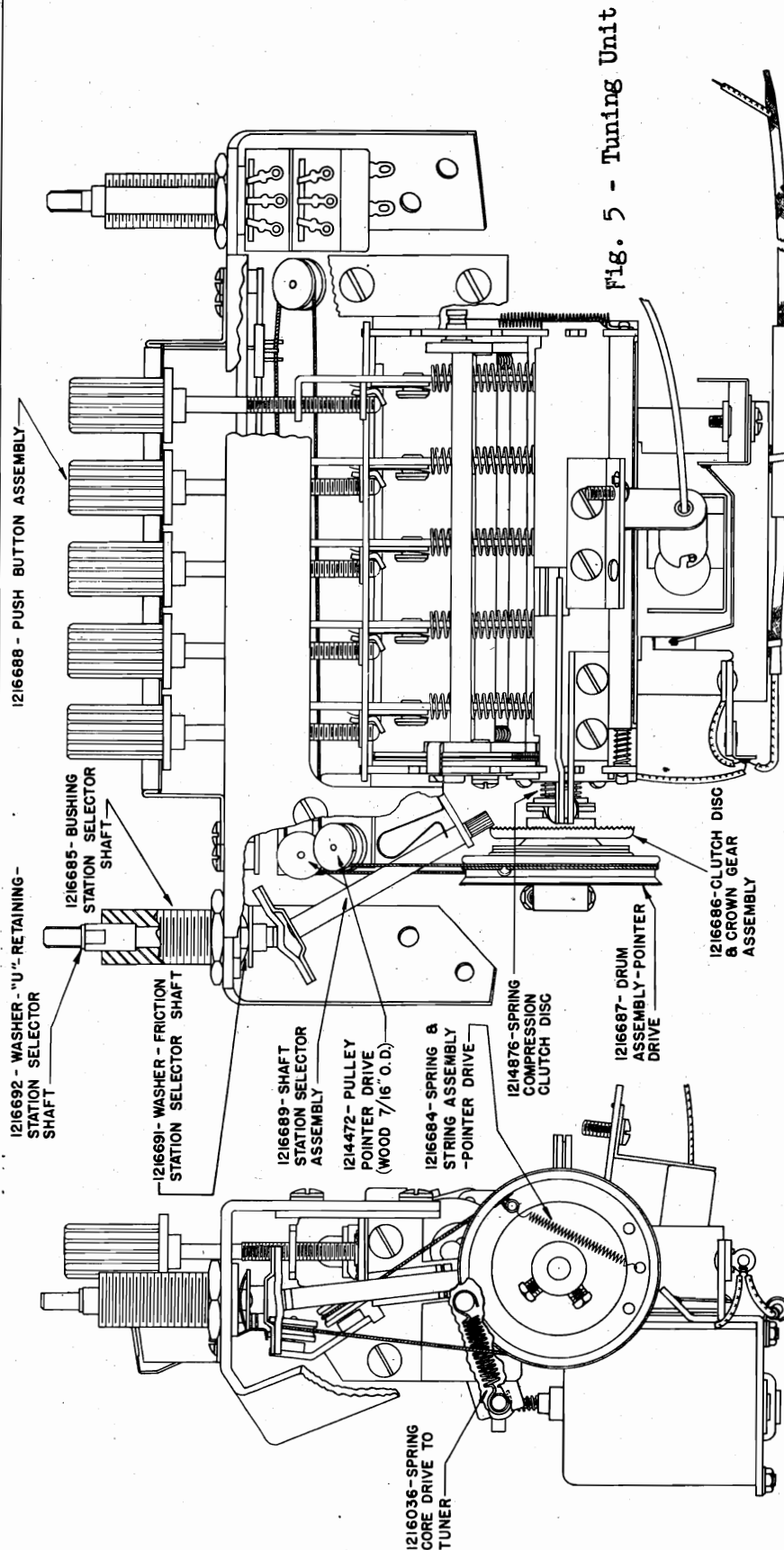


Fig. 5 - Tuning Unit

ANTENNA CIRCUIT

The Antenna Circuit is directly coupled to the antenna. A small adjustable condenser is provided for adjusting the antenna circuit to the antenna. This adjustment is made near the high frequency end of the band (1400 to 1600 KC.)

AUTOMATIC PUSH BUTTON TUNING

This is accomplished by a mechanical unit of rugged construction assuring accuracy. A special compensating condenser is employed in the oscillator circuit to minimize over-all receiver drift due to normal variation in car voltage and temperature ranges.

OLDSMOBILE DIV.-GENERAL MOTORS

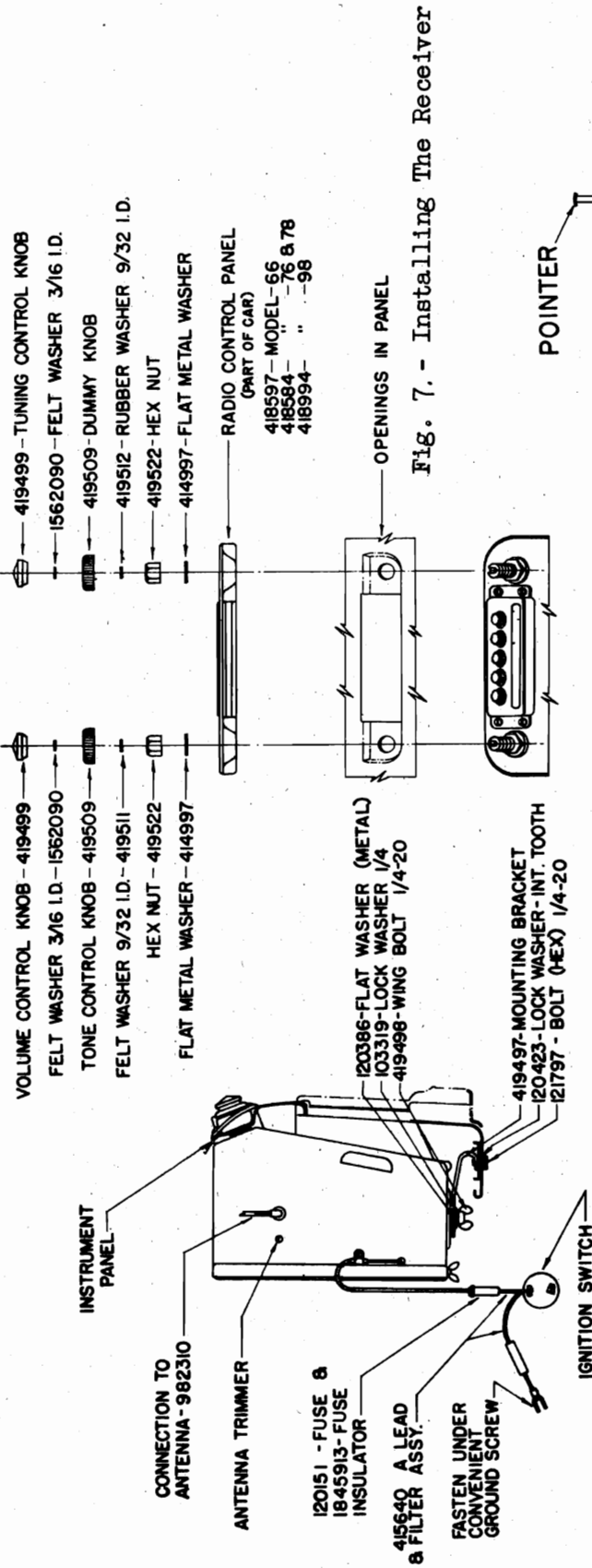


Fig. 7. - Installing The Receiver

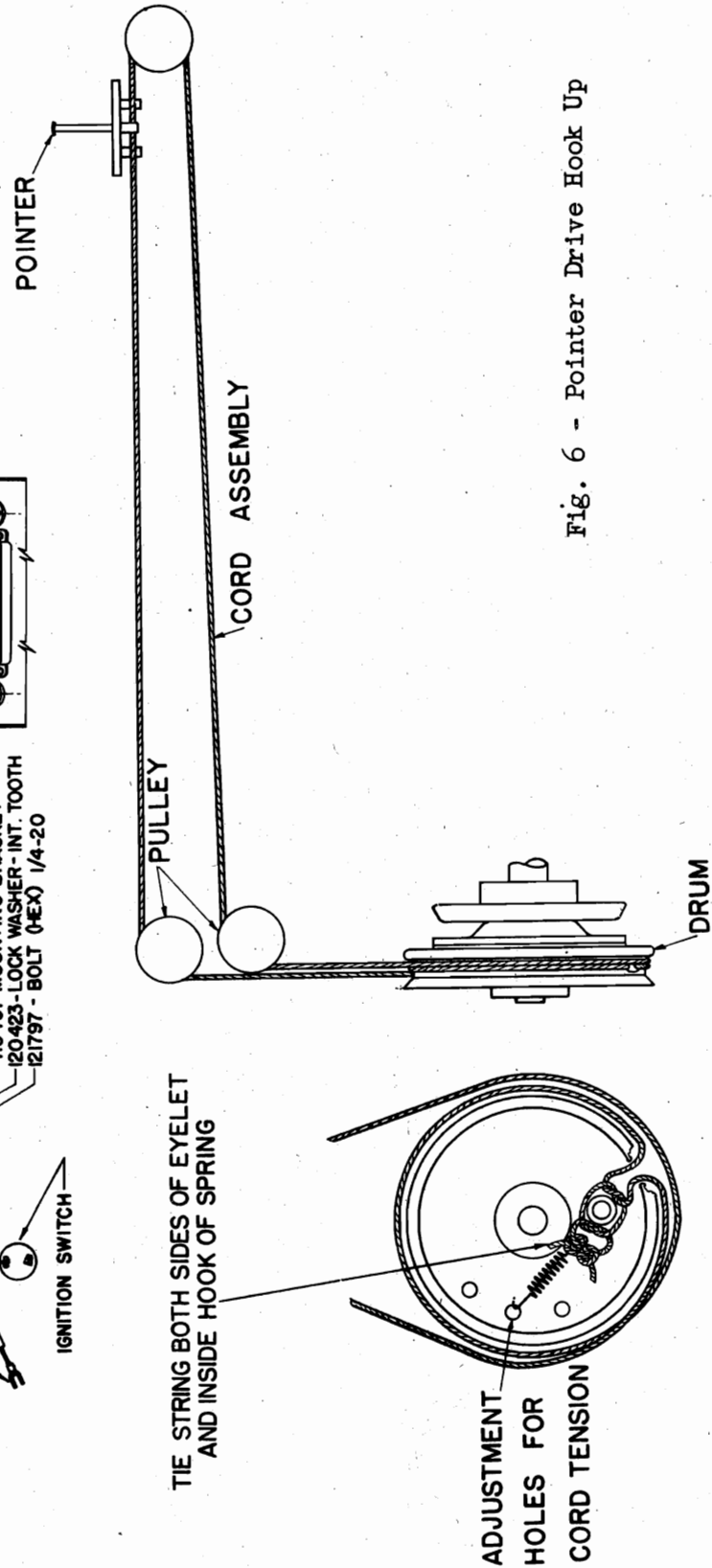


Fig. 6 - Pointer Drive Hook Up

OLDSMOBILE DIV.-GENERAL MOTORS

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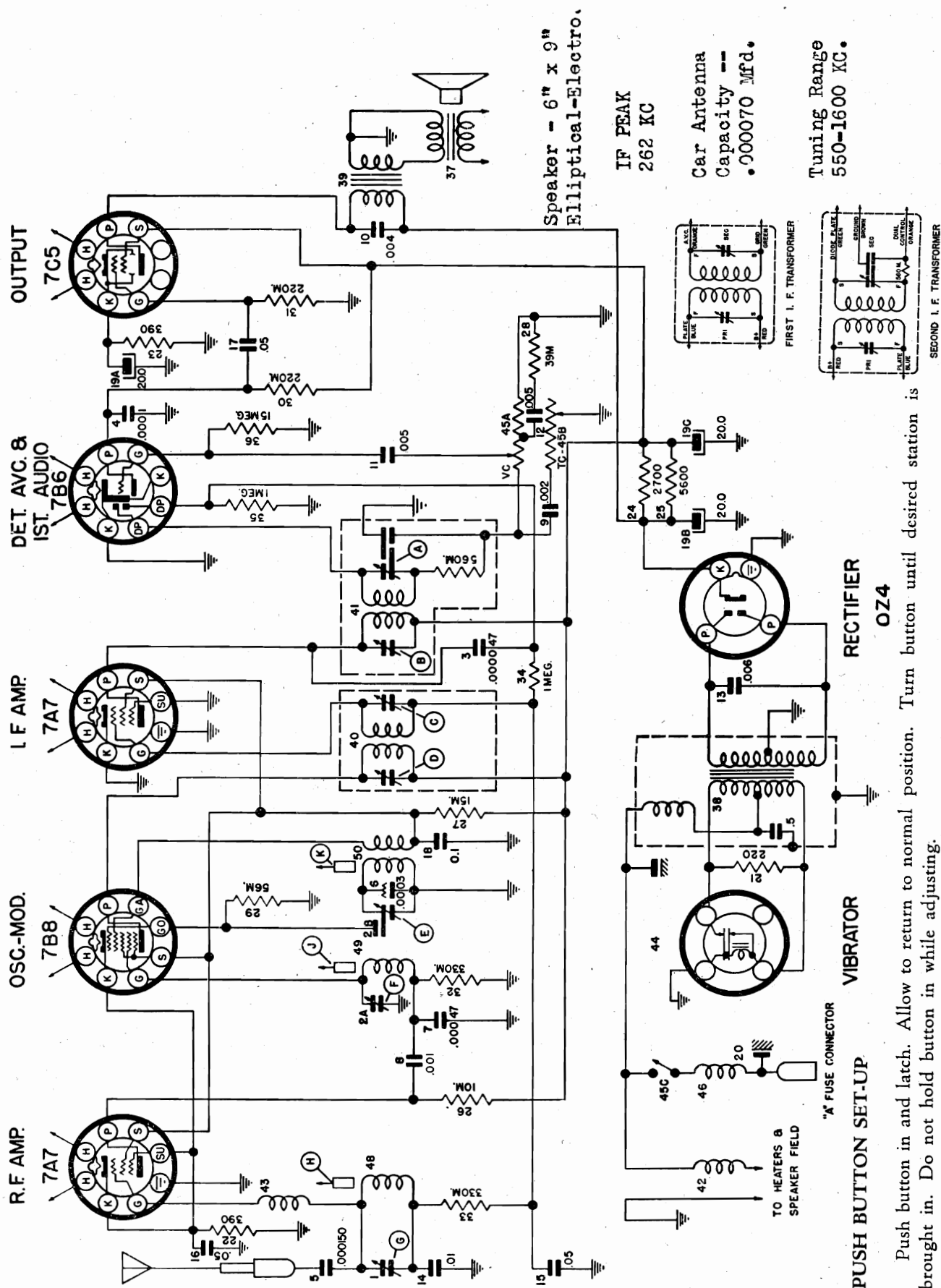
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OLDSMOBILE DIV.-GENERAL MOTORS



ALIGNMENT PROCEDURE

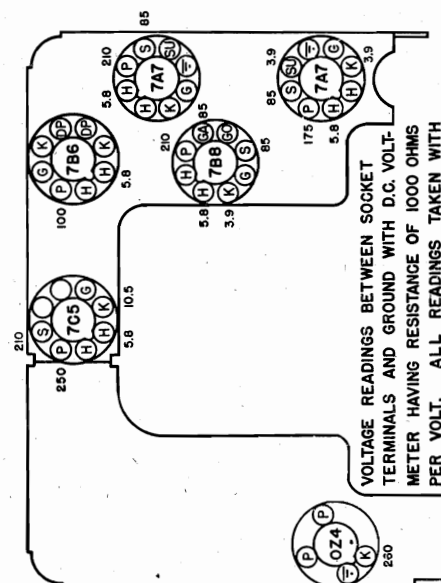
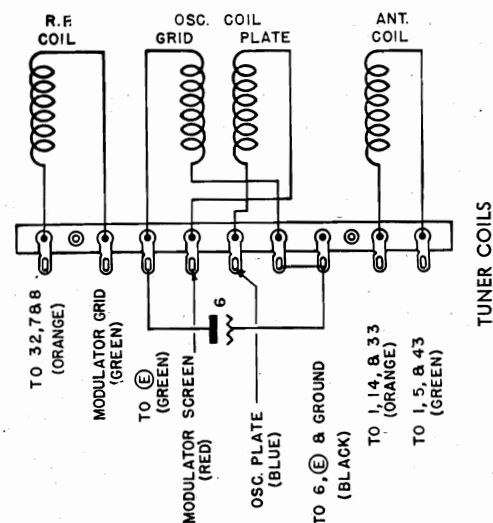
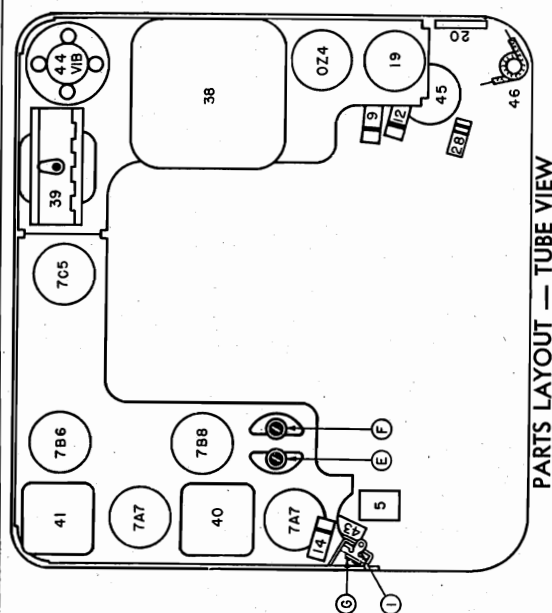
Signal Generator minimum for satisfactory output indication.

Series Condenser Or Dummy Antenna	Connect To	Signal Generator Frequency	Adjust Screws In Order
0.1 MFD	Grid side of Trimmer F	262 KC	A B C D
.000070 MFD	Antenna Terminal	1615 KC	E
.000070 MFD	Antenna Terminal	1430 KC	F G

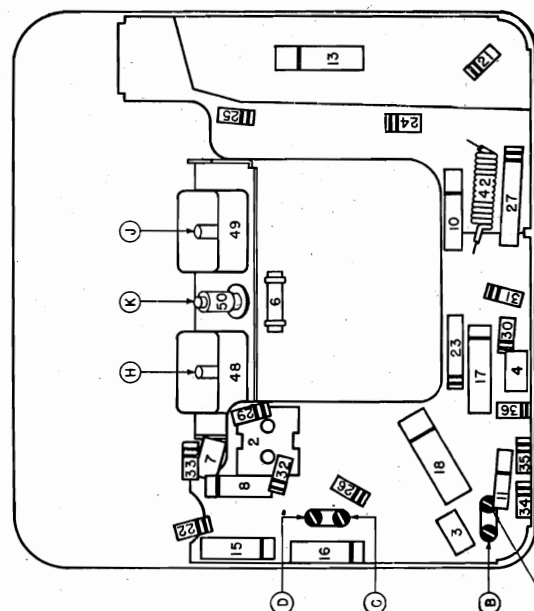
Adjust trimmer G to match car antenna (1430 KC) when radio is installed.

SPECIAL INSTRUCTIONS

Mechanical alignment of iron cores. Tune to stop at H.F. end of dial. Adjust cores H, J, and K to extend $1\frac{5}{32}$ " from end of coil form. Adjust trimmers E, F, and G, (1615 KC). Adjust cores H and J for maximum output at 1430 KC. Repeat alignment of trimmers E, F, and G at 1615 KC. Repeat alignment of cores H and J at 1430 KC. Align trimmers F and G at 1430 KC.

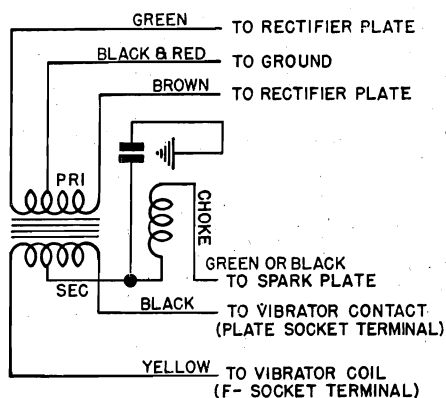
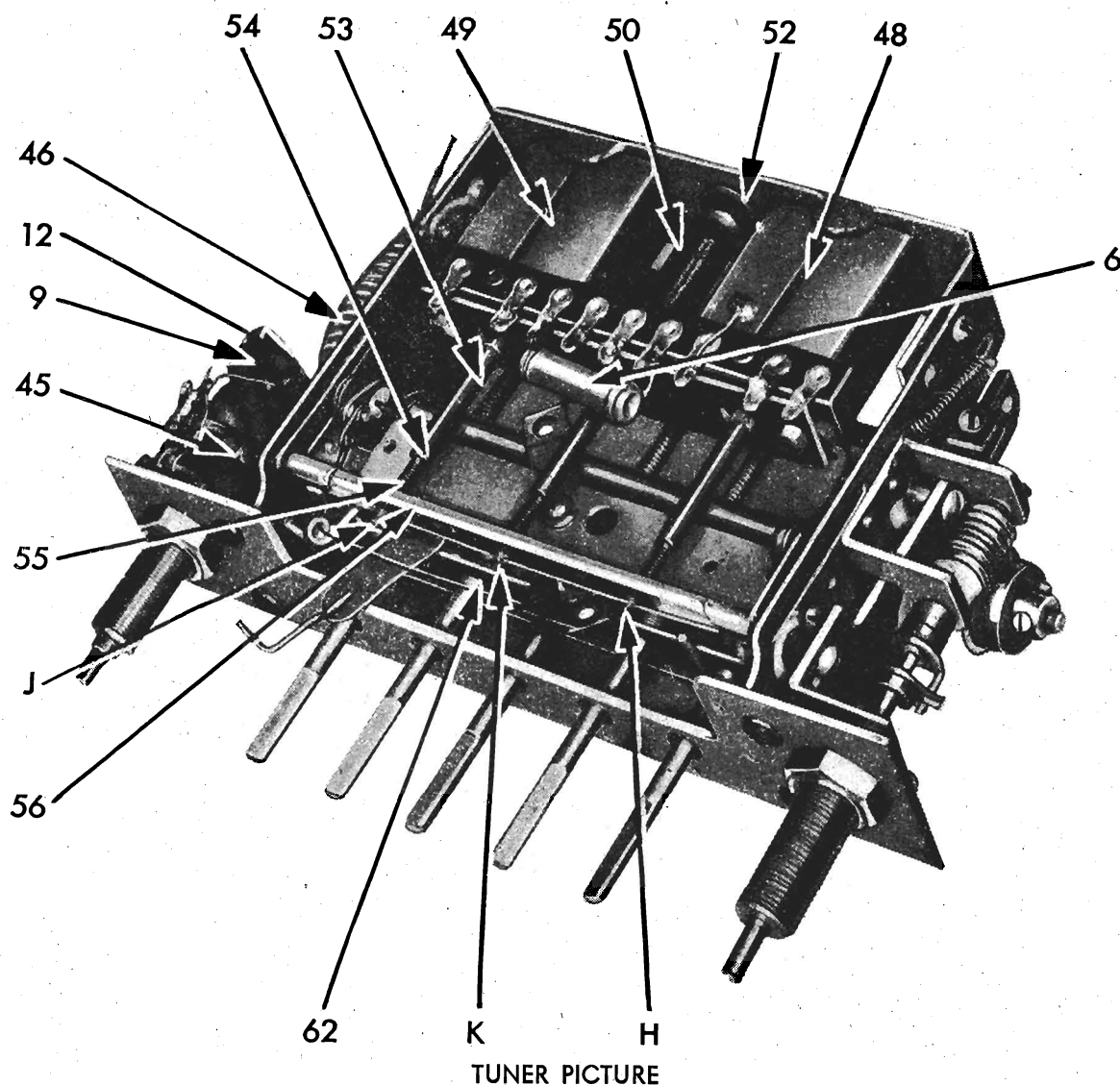


VOLTAGE READINGS BETWEEN SOCKET
TERMINALS AND GROUND WITH D.C. VOL-
T-METER HAVING RESISTANCE OF 1000 OHMS
PER VOLT. ALL READINGS TAKEN WITH
6.0 VOLTS AT SPARK PLATE. CURRENT
DRAIN WITH SPEAKER AND DIAL LIGHT
71 AMPS. "B" SUPPLY DRAIN 55 M.A.
TOLERANCE ON VOLTAGES $\pm 10\%$.

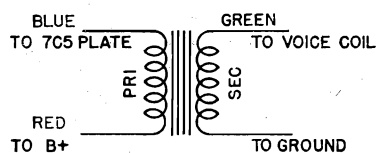


PARTS LAYOUT — CHASSIS VIEW

OLDSMOBILE DIV.-GENERAL MOTORS

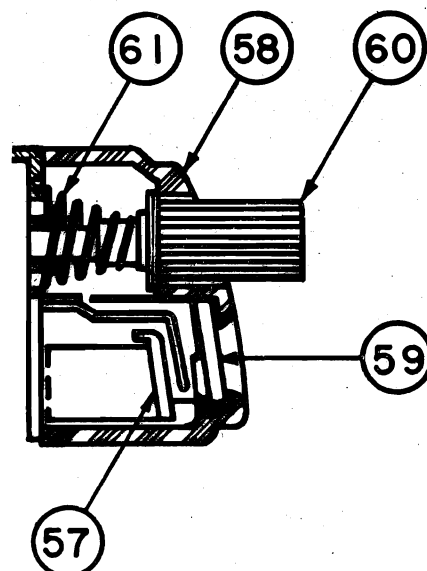


POWER TRANSFORMER



OUTPUT TRANSFORMER

TRANSFORMER CONNECTIONS



ESCUTCHEON CROSS SECTION

OLDSMOBILE DIV.-GENERAL MOTORS

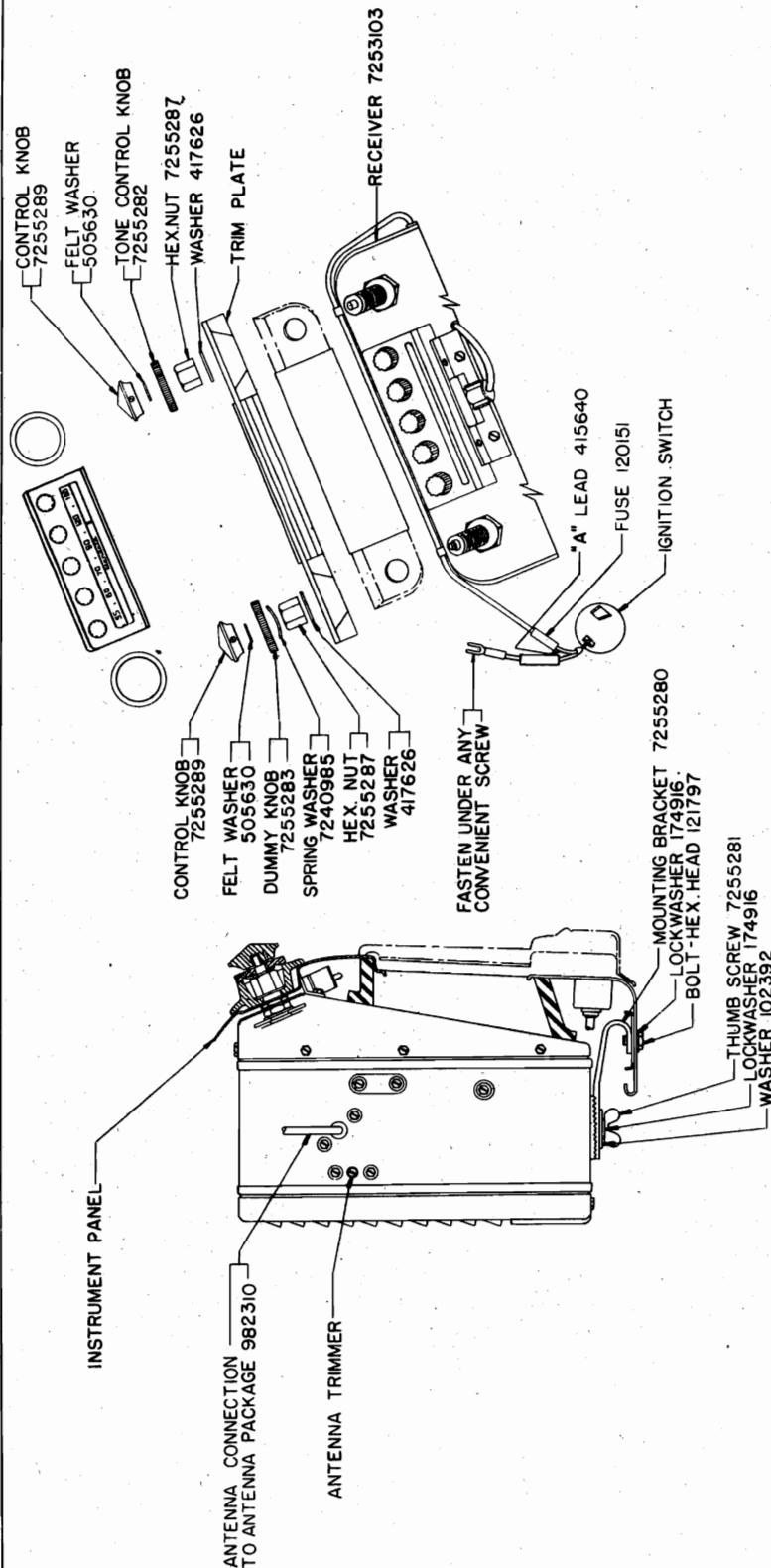


Fig. 7 - Installing The Receiver - 982376

AUTOMATIC PUSH BUTTON TUNER

The iron cored automatic tuner consists of three coils with iron cores actuated by a rugged mechanical device for varying the position of the cores in the coils. Changing the position of the cores changes the inductance of the antenna, R.F. and oscillator coils, and provides a means of tuning the radio over the entire broadcast band. A special compensating condenser is employed in the oscillator circuit to prevent the set from drifting off station due to normal variations in car and radio temperatures.

OLYMPIC RADIO & TELEV. INC.

Equipment Required:

Modulated R.F. signal generator; output meter; insulated screw-driver; two .1 mfd 400 volt and one 50 mmfd 400 volt condensers.

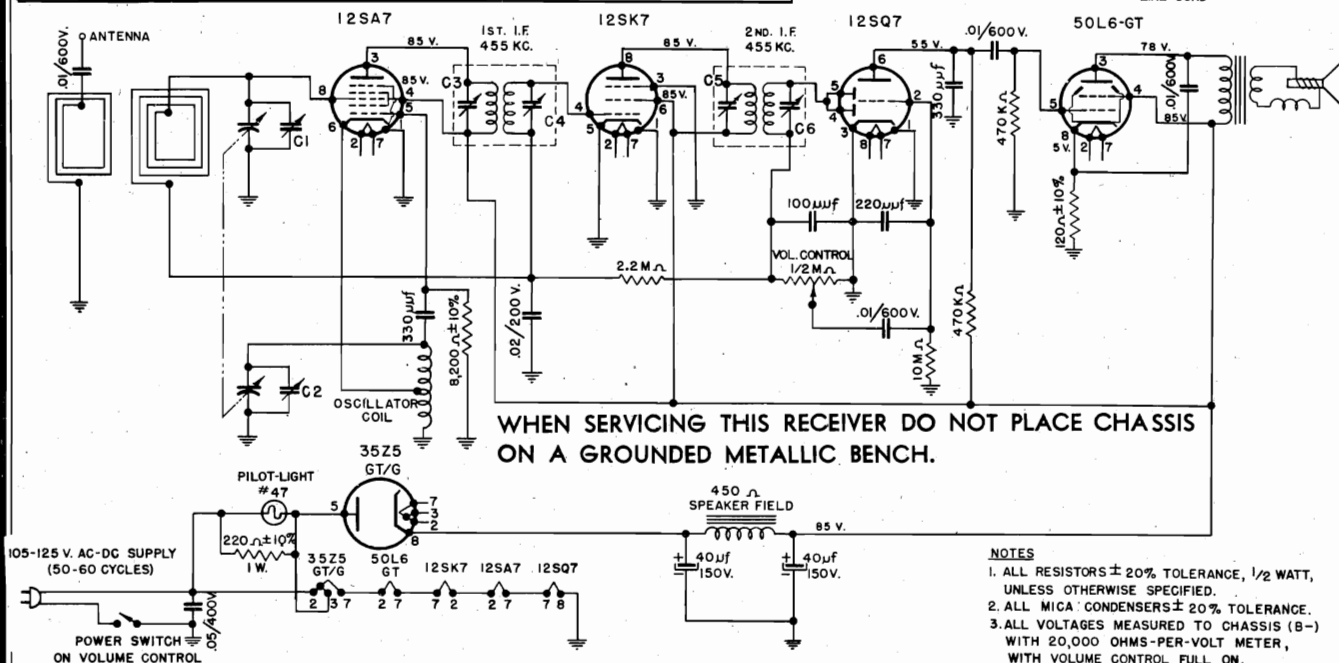
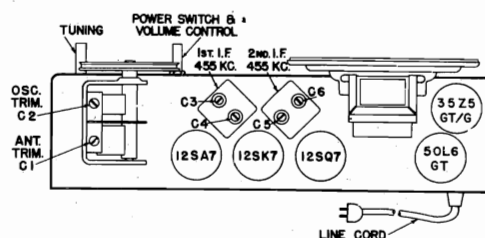
To align the receiver it is necessary to remove the chassis from the cabinet, check that the pointer is horizontal and coincides with the two horizontal reference lines on the dial. In this position the condenser should be completely closed. Connect the output meter and signal generator as follows:

Output meter—Connect across voice coil and turn volume control to maximum.

Signal generator—Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep the output as low as possible, then proceed in the sequence shown on the alignment chart.

ALIGNMENT PROCEDURE CHART

STEP	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO -	SET SIGNAL GENERATOR TO -	TURN RECEIVER DIAL TO -	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT. (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE.)
1	ANTENNA SECTION TUNING CONDENSER IN SERIES WITH .1 MFD. COND.	455 KC.	FULL CLOCKWISE POSITION. (CONDENSER PLATES FULLY OPEN)	C6, C5, C4, C3 AND REPEAT IN SAME ORDER (1st. AND 2nd. I.F. TRANSFORMERS.)
2	ANTENNA TERMINAL	1700 KC.	1700 KC. (170 ON DIAL)	C2 (OSCILLATOR)
3	OF ANTENNA LOOP IN SERIES WITH 50 MMFD. COND.	1400 KC.	MAXIMUM SIGNAL (APPROX. 140 ON DIAL)	C1 (ANTENNA)
4				REPEAT STEPS 2 AND 3



NOTES

1. ALL RESISTORS $\pm 20\%$ TOLERANCE, $\frac{1}{2}$ WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL MICA CONDENSERS $\pm 20\%$ TOLERANCE.
3. ALL VOLTAGES MEASURED TO CHASSIS (B-) WITH 20,000 OHMS-PER-VOLT METER, WITH VOLUME CONTROL FULL ON.

Part No.	Description	Part No.	Description
BU-187	Pilot light bulb 6.3V (#47 Mazda)	RCPI0W2203A	Capacitor—.02 mfd., 200 volts tubular
CA-167W	Cabinet—Walnut bakelite cabinet	RCPI0W4503A	Capacitor—.05 mfd., 400 volts tubular
CA-167V	Cabinet—Ivory bakelite cabinet	RCPI0W6103A	Capacitor—.01 mfd., 600 volts tubular
CL-159	Coil—oscillator coil	REB106M	Resistor—10 meg., $\pm 20\%$ $\frac{1}{2}$ watt
CO-107	Capacitor—Electrolytic 40+40/150WV	REB121K	Resistor—120 ohms $\pm 10\%$ $\frac{1}{2}$ watt
CR-169	Crystal—dial crystal	REB225M	Resistor—2.2 meg., $\pm 20\%$ $\frac{1}{2}$ watt
CV-501	Condenser—2 gang variable tuning condenser	REB474M	Resistor—470,000 ohms $\pm 20\%$ $\frac{1}{2}$ watt
KN-352	Knob—Walnut knob	REB822K	Resistor—8200 ohms $\pm 10\%$ $\frac{1}{2}$ watt
KN-353	Knob—Ivory knob	REC221K	Resistor—220 ohms $\pm 10\%$ 1 watt
LP-163	Loop	SK-110	Speaker—5" Dynamic with output transformer
PO-259	Pointer—moulded pointer	SO-190	Socket—Dial light socket assembly
PT-102	Volume control and power switch	SP-191	Spring—Tuning drive lock spring
RCM20A101M	Capacitor—100 mmf $\pm 20\%$ mica	TR-186	Transformer—1st or 2nd I.F. transformer
RCM20A221M	Capacitor—220 mmf $\pm 20\%$ mica		
RCM20A331M	Capacitor—330 mmf $\pm 20\%$ mica		

MODELS 6-501W-U
6-501V-U, 6-502U
Equipment Required:

OLYMPIC RADIO & TELEV. INC.

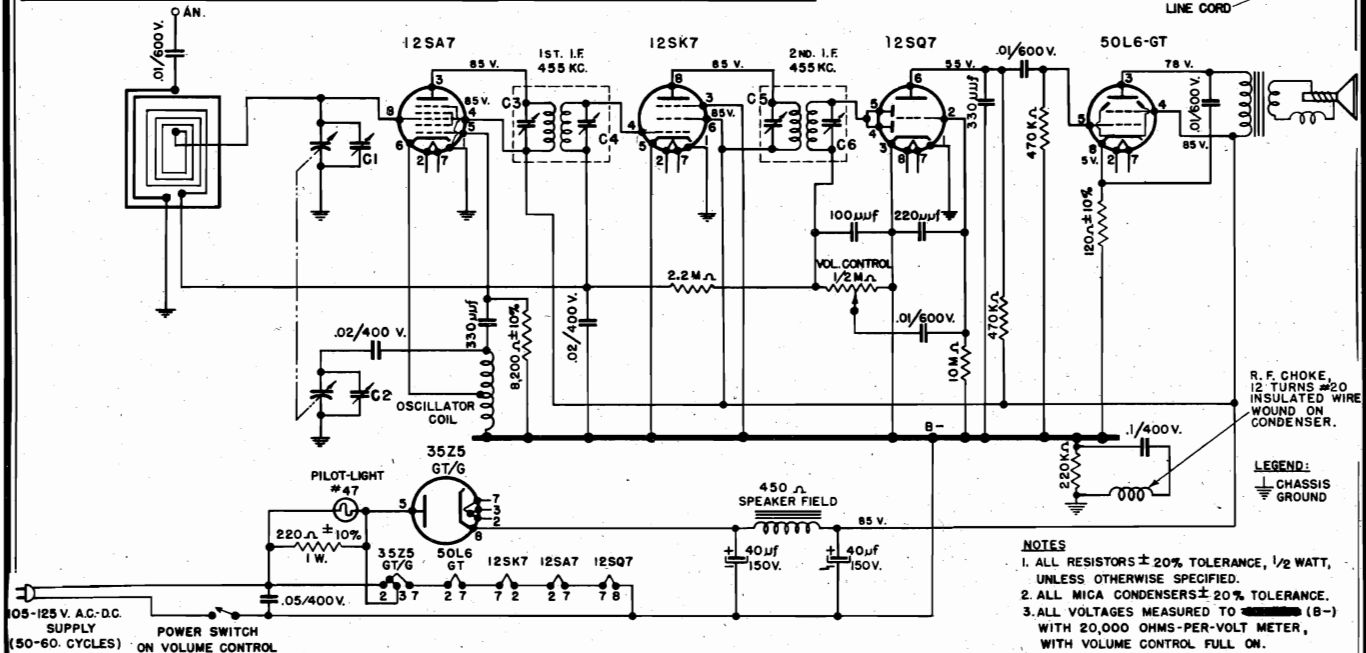
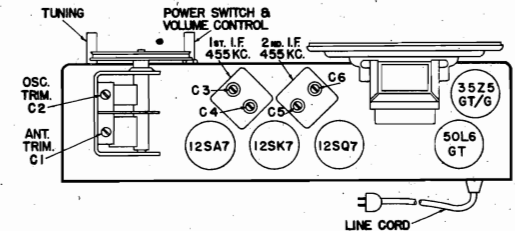
Modulated R.F. signal generator; output meter; insulated screw-driver; two .1 mfd 400 volt and one 50 mmfd 400 volt condensers.

To align the receiver it is necessary to remove the chassis from the cabinet, check that the pointer is horizontal and coincides with the two horizontal reference lines on the dial. In this position the condenser should be completely closed. Connect the output meter and signal generator as follows:

Output meter—Connect across voice coil and turn volume control to maximum.

Signal generator—Connect the low side of the signal generator to the common B-bus thru a .1 mfd condenser and keep the output as low as possible, then proceed in the sequence shown on the alignment chart.

STEP	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO—	SET SIGNAL GENERATOR TO—	TURN RECEIVER DIAL TO—	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT. (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE.)
1	ANTENNA SECTION TUNING CONDENSER IN SERIES WITH .1MFD. COND.	455 KC.	FULL CLOCKWISE POSITION. (CONDENSER PLATES FULLY OPEN)	C6, C5, C4, C3 AND REPEAT IN SAME ORDER (1st. AND 2nd. I.F. TRANSFORMERS)
2	ANTENNA TERMINAL	1700 KC.	1700 KC. (170 ON DIAL)	C2 (OSCILLATOR)
3	OF ANTENNA LOOP IN SERIES WITH	1400 KC.	MAXIMUM SIGNAL (APPROX. 140 ON DIAL)	C1 (ANTENNA)
4	50 MMFD. COND.			REPEAT STEPS 2 AND 3



NOTES

1. ALL RESISTORS $\pm 20\%$ TOLERANCE, $\frac{1}{2}$ WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL MICA CONDENSERS $\pm 20\%$ TOLERANCE.
3. ALL VOLTAGES MEASURED TO (B-) WITH 20,000 OHMS-PER-VOLT METER, WITH VOLUME CONTROL FULL ON.

Part No.	Description	Part No.	Description
BU-187	Pilot light bulb 6.3v (#47 Mazda)	RCM20A331M	Capacitor—330 mmf $\pm 20\%$ mica
CA-167W	Cabinet—Walnut bakelite cabinet	RCPI0W4203A	.02/400 W. V. tubular paper condenser
CA-167V	Cabinet—Ivory bakelite cabinet	*RCPI0W4104L	.1/400 W. V. tubular paper condenser
CL-569	Coil—oscillator coil	RCPI0W4503A	.05/400 W. V. tubular paper condenser
CO-107	Capacitor—Electrolytic 40+40/150WV	RCPI0W6103A	.01/600 W. V. tubular paper condenser
CR-169.	Crystal—dial crystal	REB106M	Resistor—10 meg., $\pm 20\%$ $\frac{1}{2}$ watt
CV-501	Condenser—2 gang variable tuning condenser	REB121K	Resistor—120 ohms $\pm 10\%$ $\frac{1}{2}$ watt
DL-457-I	Dial—moulded, lucite dial	REB224M	Resistor—220,000 ohms $\pm 20\%$ $\frac{1}{2}$ watt
KN-338	Knob—Walnut (for 6-502-U only)	REB225M	Resistor—2.2 meg., $\pm 20\%$ $\frac{1}{2}$ watt
KN-352	Knob—Walnut knob (for 6-501-U only)	REB474M	Resistor—470,000 ohms $\pm 20\%$ $\frac{1}{2}$ watt
KN-353	Knob—Ivory knob	REB822K	Resistor—8200 ohms $\pm 10\%$ $\frac{1}{2}$ watt
LP-163	Loop—Antenna	REC221K	Resistor—220 ohms $\pm 10\%$ 1 watt
PO-259W	Pointer—moulded walnut pointer	SK-110	Speaker—5" Dynamic with output transformer
PO-259V	Pointer—moulded ivory pointer	SO-190	Socket—Dial light socket assembly
PT-102	Volume control and power switch	SP-191	Spring—Tuning drive lock spring
RCM20A101M	Capacitor—100 mmf $\pm 20\%$ mica	ST-255	Back—printed cardboard back (for 6-501-U only)
RCM20A221M	Capacitor—220 mmf $\pm 20\%$ mica	ST-293-I	Back—printed cardboard back (for 6-502-U only)
* When ordering specify "with r-f choke"		TR-186	Transformer—1st or 2nd I.F. transformer

OLYMPIC RADIO & TELEV. INC.

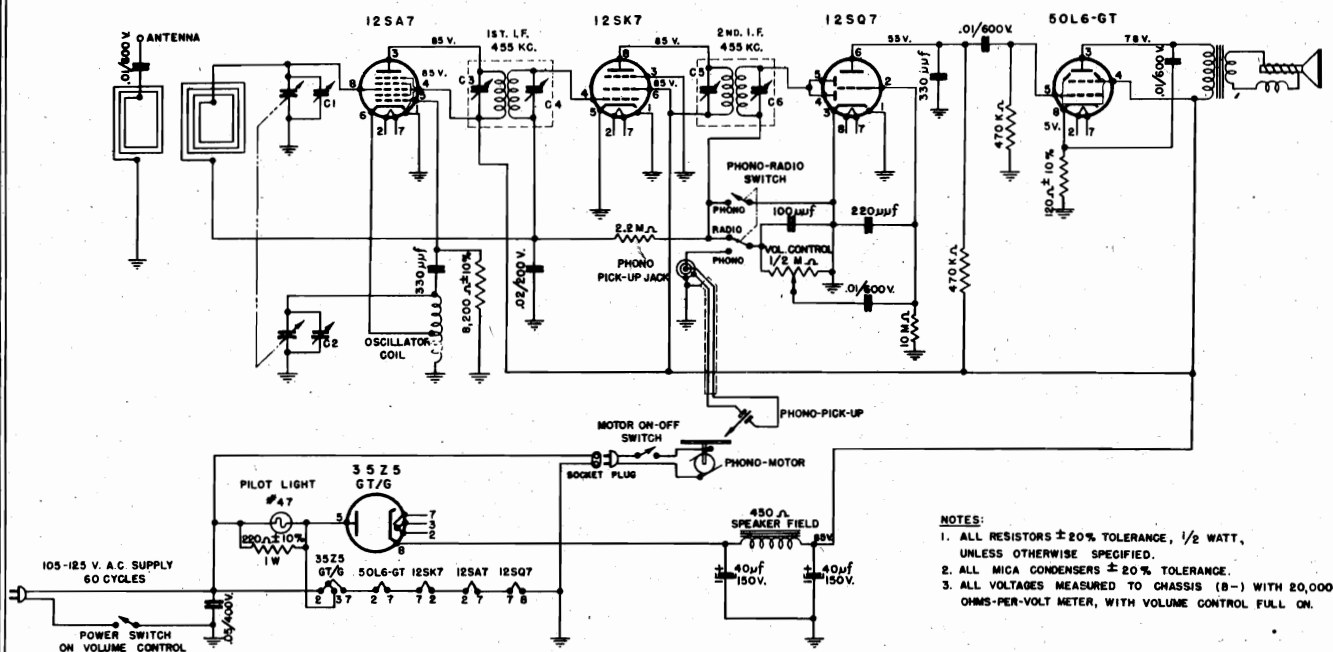
MODELS 6-504, 6-504L
MODELS 6-504-U, 6-504L-U

Frequency Range of Receiver 535 - 1700 kc.

Power Requirement 105 - 125 volts 60 cycles Alternating Current (a-c) only

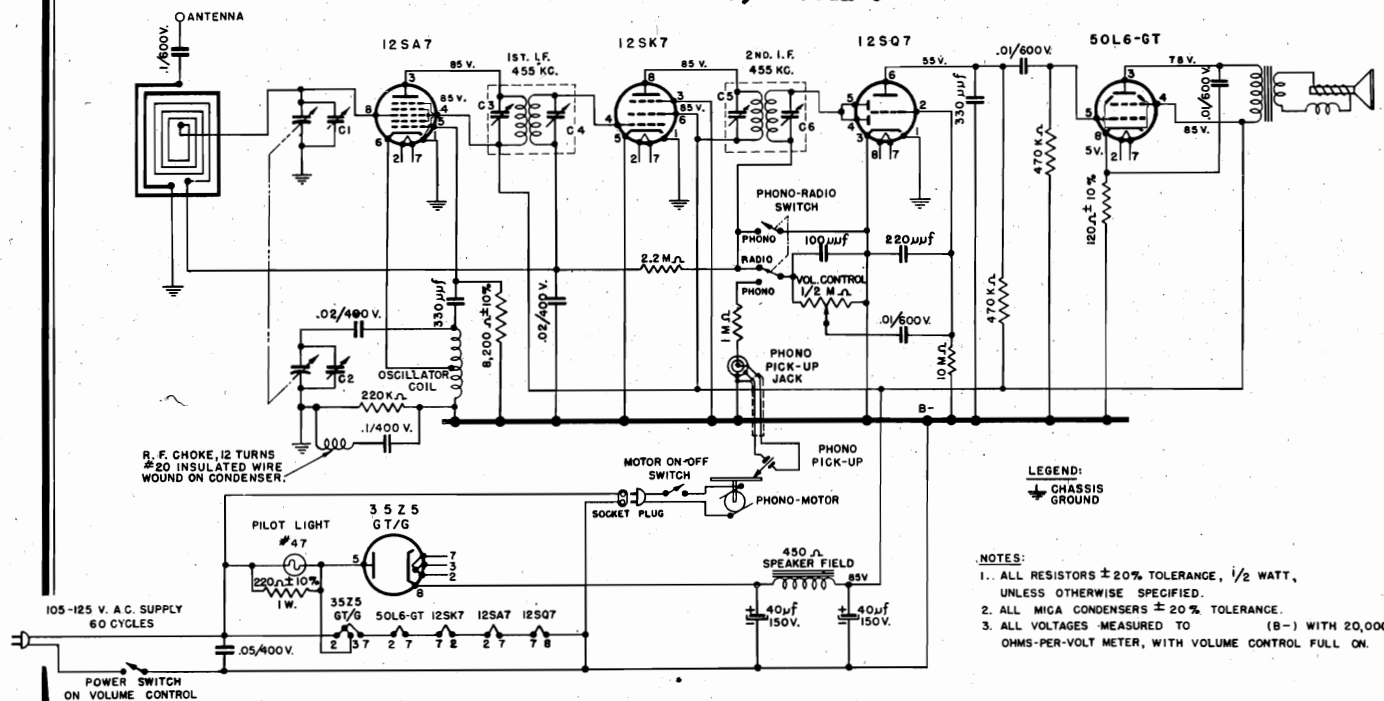
Power Consumption: Receiver 30 watts — **Record Player** 35 watts

MODELS 6-504, 6-504L



WHEN SERVICING THIS RECEIVER DO NOT PLACE CHASSIS ON A GROUNDED METALLIC BENCH.

MODELS 6-504-U, 6-504L-U



ALIGNMENT INSTRUCTIONS

Equipment Required:

Modulated r - f signal generator; output meter; insulated screw driver; two .1 mfd 400 volt and one 50 mmfd 400 volt condensers.

The receiver should be aligned with chassis and loop mounted in the cabinet. With the condenser completely closed the pointer should be checked so that it coincides with the two horizontal reference lines on the dial. Connect the output meter and signal generator as follows:

Output meter — Connect across voice coil and turn volume control to maximum

Signal generator — Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep the output as low as possible, then proceed in the sequence shown on the alignment chart

ALIGNMENT	PROCEDURE	CHART
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STEP	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO -	SET SIGNAL GENERATOR TO -	TURN RECEIVER DIAL TO -	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT. (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE.)
1	ANTENNA SECTION TUNING CONDENSER IN SERIES WITH 1 MF.D. COND.	455 KC.	FULL CLOCKWISE POSITION (CONDENSER PLATES FULLY OPEN)	C 6, C 5, C 4, C 3 AND REPEAT IN SAME ORDER (1ST. AND 2ND. I.F. TRANSFORMERS)
2	ANTENNA TERMINAL OF ANTENNA LOOP IN SERIES WITH 50 MMFD. COND.	1700 KC.	1700 KC. (170 ON DIAL)	C 2 (OSCILLATOR)
3		1400 KC.	MAXIMUM SIGNAL (APPROX. 140 ON DIAL)	C 1 (ANTENNA)
4		REPEAT STEPS 2 AND 3		

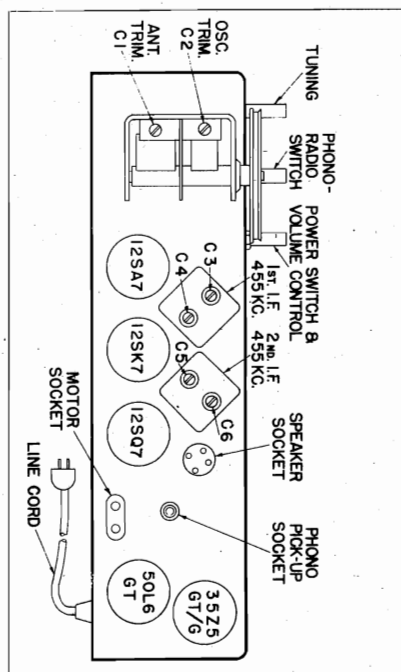
REPLACEMENT PARTS

Part No.	Description	Part No.	Description
BU-187	Pilot light bulb 6.3v (#47 Mazda)	RCPI0W/2503A	Capacitor-.02 mfd., 200 volts tubular
CL-159	Coil-oscillator coil	RCPI0W/45503A	Capacitor-.01 mfd., 400 volts tubular
CCO-107	Capacitor-Electrolytic 40-40/150WV	RCPI0W/6103A	Capacitor-.05 mfd., 600 volts tubular
CR-170	Crystal-diad crystal	REB106M	Resistor - 10 meg., $\pm 20\%$ 1/2 watt
CV-501	Condenser-2 gang variable tuning condenser	REB121K	Resistor - 120 ohms $\pm 10\%$ 1/2 watt
KN-331	Knob-Walnut knob marked MOTOR OFF-ON	REB225M	Resistor - 22 meg., $\pm 20\%$ 1/2 watt
KN-339	Knob-Walnut knob marked TUNING	REB474M	Resistor - 470,000 ohms $\pm 20\%$ 1/2 watt
KN-340	Knob-Walnut knob marked OFF-ON	REB822K	Resistor - 8200 ohms $\pm 10\%$ 1/2 watt
KN-341	Knob-Walnut knob marked RADIO-PHONO	REC221K	Resistor - 220 ohms $\pm 10\%$ 1 watt
LP-355	Loop	SK-310	Speaker - 5" Dynamic with output transformer
PT-259	Pointer-moulded pointer	SO-190	Socket - Dial light socket assembly
PT-102	Volume control and power switch	SP-191	Spring - Tuning drive lock spring
RCM20A101M	Capacitor-100 mmf $\pm 20\%$ mica	SW-243	Switch - Phono-Radio Switch
RCM20A221M	Capacitor-220 mmf $\pm 20\%$ mica	SW-330	Switch-spt Rotary Switch
RCM20A331M	Capacitor-330 mmf $\pm 20\%$ mica	TR-186	Transformer - 1st or 2nd L.F. transformer

REPLACEMENT PARTS

Part No.	Description	Part No.	Description
Part No.	Description	Part No.	Description
BU-187	Pilot light bulb 6.3v (#47 Mazda)	RCPI10W4503A	Condenser-.05/.400W.V. tubular
CL-569	Coil-oscillator coil	RCPI10W6103A	Paper condenser
CO-107	Condenser-40-40/.50WV electrolytic condenser	REB105M	Condenser-.01/.600W.V. tubular
CV-170	Crystal-dial crystal	REB106M	Paper condenser
CR-501	Condenser-2 gang variable tuning condenser	REB121K	Resistor-1 megohm $\pm 20\%$ $\frac{1}{2}$ Watt
DL-457-2	Dial-molded lucite dial	REB224M	Resistor-10 meg., $\pm 20\%$ $\frac{1}{2}$ Watt
KN-625	Knob-Walnut knob marked MOTOR OFF-ON	REB225M	Resistor-120 ohms $\pm 10\%$ $\frac{1}{2}$ Watt
KN-626	Knob-Walnut knob marked TUNING	REB474M	Resistor-220,000 ohms $\pm 20\%$ $\frac{1}{2}$ Watt
KN-627	Knob-Walnut knob marked OFF-ON-VOLUME	REB822K	Resistor-2.2 meg., $\pm 20\%$ $\frac{1}{2}$ Watt
KN-628	Knob-Walnut knob marked RADIO-PHONO	REC221K	Resistor-470,000 ohms $\pm 20\%$ $\frac{1}{2}$ Watt
LP-355	Loop-Antenna	SK-310	Resistor-8200 ohms $\pm 10\%$ $\frac{1}{2}$ Watt
PO-259W	Pointer-moulded pointer, walnut	SO-190	Resistor-220 ohms $\pm 10\%$ 1 Watt
PI-102	Volume control and power switch	SP-191	Speaker-5" Dynamic with output transformer
RCM20A101M	Condenser-100 mmf $\pm 20\%$ mica	SW-243	Socket-Dial light socket assembly
RCM20A221M	Condenser-220 mmf $\pm 20\%$ mica	SW-263	Spring Tuning drive lock spring
RCM20A331M	Condenser-330 mmf $\pm 20\%$ mica	SW-330	Back-Backsawtooth Back
*RCPI10W4104L	Condenser-1/.400W.V. tubular	TR-186	Switch-Phono-Radio Switch
RCPI10W4203A	Paper condenser		Switch-s.p.s.t., Rotary Switch
	Condenser-.02/.400W.V. tubular		Transformer-1st or 2nd I.F. Transformer

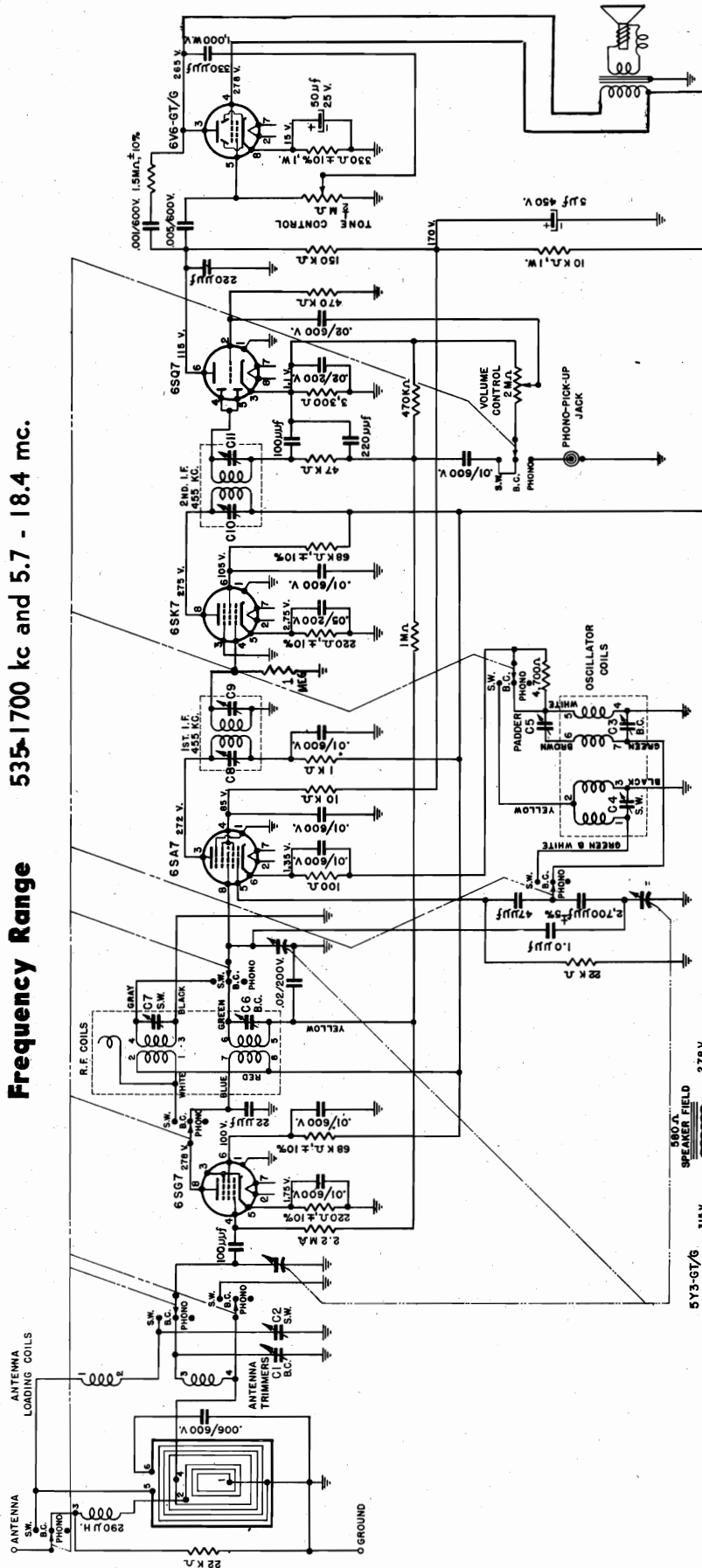
- * When ordering specify "with r-f choke"



OLYMPIC RADIO & TELEV. INC. 6-602

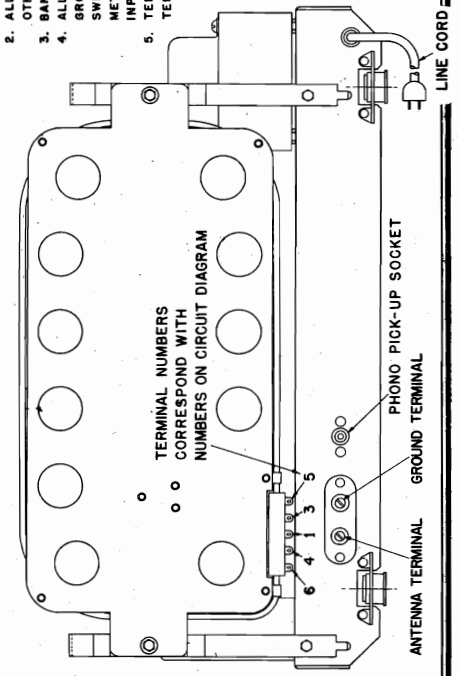
Frequency Range 535-1700 kc and 5.7 - 18.4 mc.

Power Consumption 70 watts



- NOTES:**
1. ALL RESISTORS $\pm 20\%$ TOLERANCE, $\frac{1}{2}$ WATT, UNLESS OTHERWISE SPECIFIED.
 2. ALL MICA CONDENSERS $\pm 20\%$ TOLERANCE, UNLESS OTHERWISE SPECIFIED.
 3. BAND SELECTOR SWITCH SHOWN IN BROADCAST POSITION.
 4. ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND GROUND, WITH VOLUME CONTROL FULL ON AND WITH BAND SWITCH SET IN "B.C." POSITION USING 20,000 OHMS-PER-VOLT METER. ALL VOLTAGE READINGS $\pm 10\%$, MEASURED WITH AN INPUT VOLTAGE OF 117 V., 60 CYCLES, A.C.
 5. TERMINAL NUMBERS ON ANTENNA LOOP CORRESPOND WITH TERMINAL LUGS ON LOOP ON BACK OF CHASSIS.

REAR VIEW OF RECEIVER CHASSIS WITH CABINET BACK REMOVED

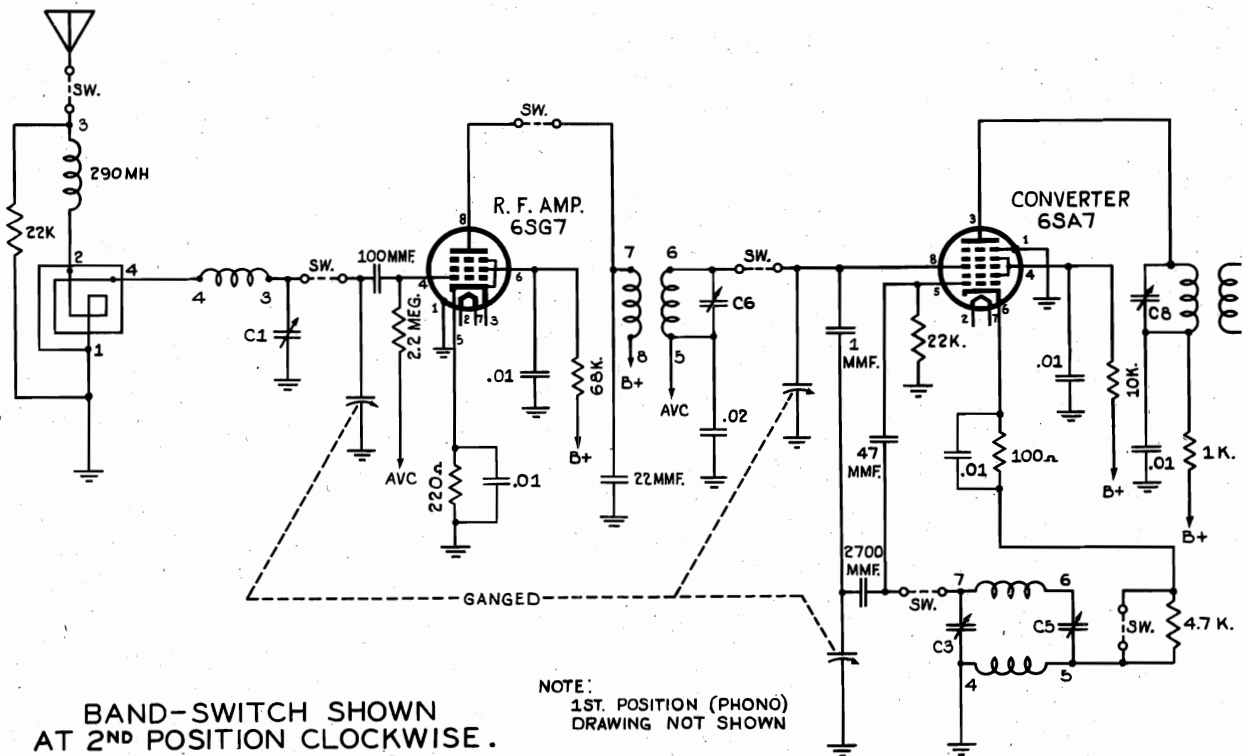


"clarified schematics"

PAGE 15-6 OLYMPIC

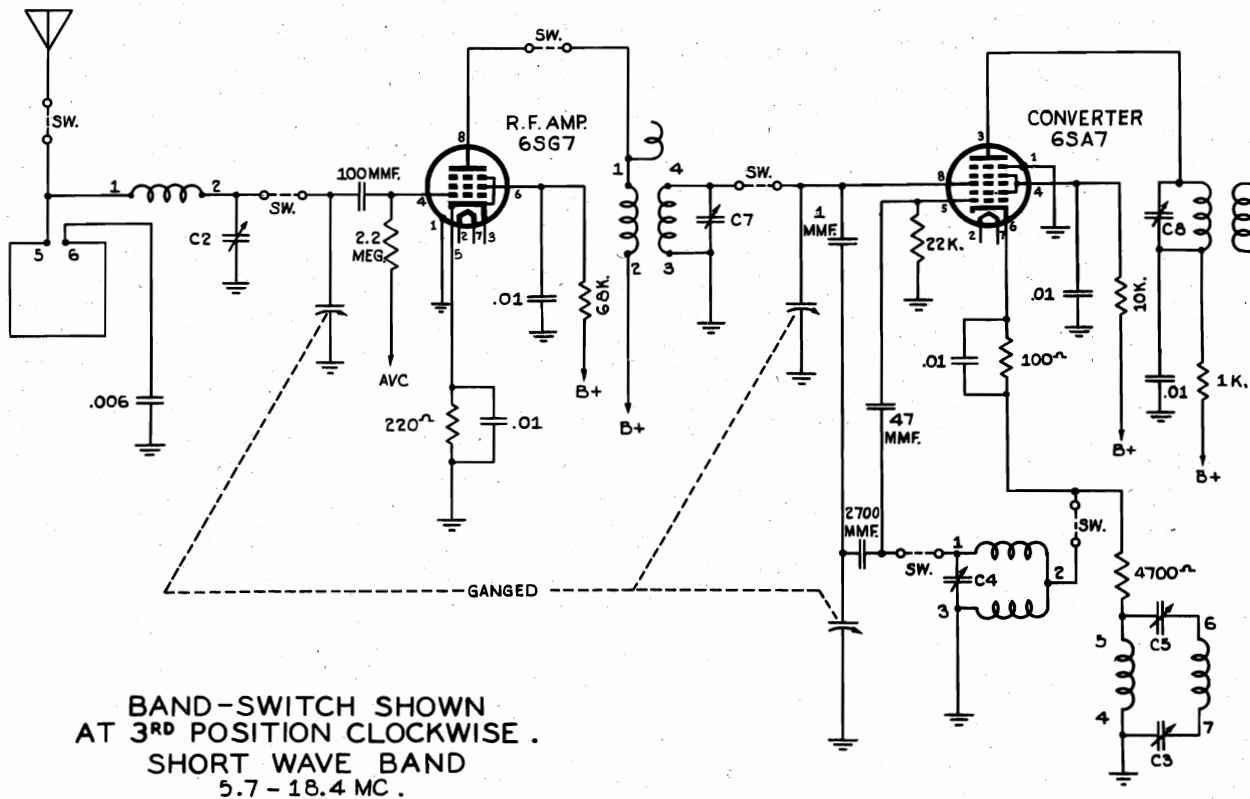
MODELS 6-601W, 6-601V,
6-602

OLYMPIC RADIO & TELEV. INC.



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
BROADCAST BAND
535-1700KC.

NOTE:
1ST. POSITION (PHONO)
DRAWING NOT SHOWN



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE .
SHORT WAVE BAND
5.7 - 18.4 MC .

6-602



Before aligning close the variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the reference dot (extreme left dot) on the diffuser plate.

NOTE: In order to adjust the short wave oscillator trimmer and the short wave r-f trimmer accurately to the fundamental frequency, and not to the image signal, turn the trimmers first to the maximum capacity position (fully tight). From this position loosen the trimmer through one peak indication of the output meter until a second peak is obtained. Adjusting the trimmer in this manner will produce the proper frequency.

MODELS 6-601W, 6-601V,

6-602

MODELS 6-617, 6-617U

MODELS 6-601W, 6-601V, 6-602

OLYMPIC RADIO & TELEV. INC.

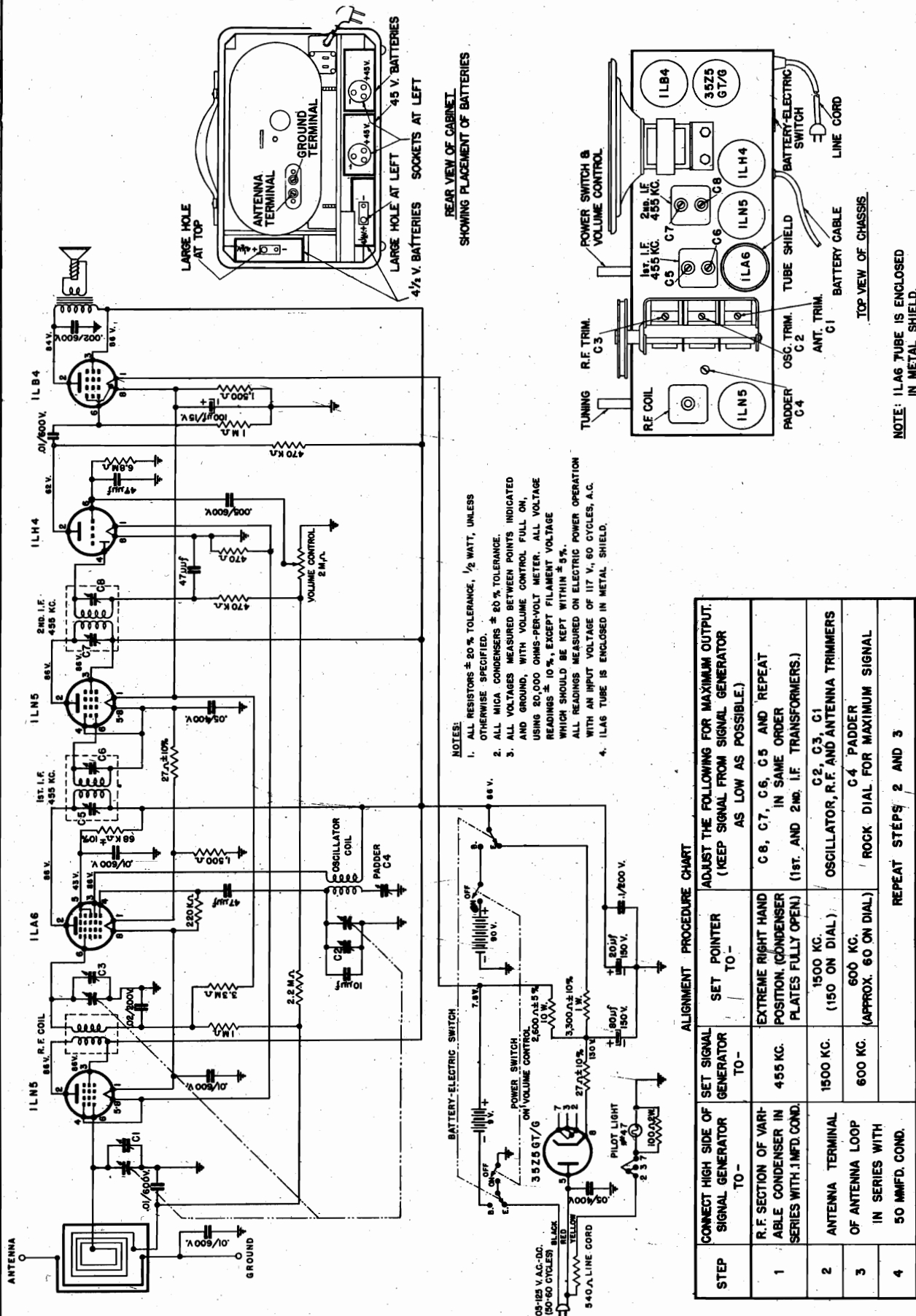
Part No.	Description
BU 187	Bulb—#47 Mazda 6.3V pilot light bulb
CA 143W	Cabinet—walnut bakelite cabinet
CA 143V	Cabinet—ivory bakelite cabinet
CA 152	Cabinet—wood (for 6-602 only)
CL 211	Coil—antenna loading coil
CL 212	Coil—oscillator coil, shielded
CL 224	Coil—R.F. coil, shielded (BC & SW)
CO 158	Condenser—20/10/5/450 W.V. & 50/25 W.V. electrolytic condenser
CO 311	Condenser—1.0 mmfd $\pm 20\%$ fixed condenser
CT 389	Condenser—3-35 mmfd dual trimmer condenser
CT 440	Condenser—350-780 mmfd paddler condenser
CV 144	Condenser—3 gang variable condenser
DL 378	Dial—glass dial scale
KN 422	Knob—walnut knob marked "VOLUME" (for 6-601 W & 6-602)
KN 423	Knob—walnut knob marked "OFF-ON TONE" (for 6-601W & 6-602)
KN 425	Knob—walnut knob marked "TUNING" (for 6-601W & 6-602)
KN 430	Knob—walnut knob marked "SW-BC-PH" (for 6-601W & 6-602)
KN 426	Knob—ivory knob marked "VOLUME" (for 6-601V)
KN 427	Knob—ivory knob marked "OFF-ON TONE" (for 6-601V)
KN 429	Knob—ivory knob marked "TUNING" (for 6-601V)
KN 431	Knob—ivory knob marked "SW-BC-PH" (for 6-601V)
LP 213	Loop—Antenna
PO 334	Pointer
PT 239	Control—2 megohm volume control (for model 6-602)
PT 240	Control—1/2 megohm tone control (with S.P.S.T. switch) (for model 6-602)
PT 435	Control—2 megohm volume control (for models 6-601W & 6-601V)
PT 436	Control—1/2 megohm tone control (with S.P.S.T. switch) (for models 6-601W & 6-601V)
RCM20A101M	Condenser—100 mmfd $\pm 20\%$ mica condenser
RCM20A220M	Condenser—22 mmfd $\pm 20\%$ mica condenser
RCM20A221M	Condenser—220 mmfd $\pm 20\%$ mica condenser
RCM20A470M	Condenser—47 mmfd $\pm 20\%$ mica condenser
RCM30B272J	Condenser—2700 mmfd $\pm 5\%$ mica condenser
RCM40A331M	Condenser—330 mmfd $\pm 20\%$ 1000 W.V. mica condenser
RCPI0W2203A	Condenser—.02/200 W.V. tubular paper condenser
RCPI0W2503A	Condenser—.05/200 W.V. tubular paper condenser
RCPI0W4104L	Condenser—.1/400 W.V. tubular paper condenser
RCPI0W4503A	Condenser—.05/400 W.V. tubular paper condenser
RCPI0W6102A	Condenser—.001/600 W.V. tubular paper condenser
RCPI0W6103A	Condenser—.01/600 W.V. tubular paper condenser
RCPI0W6203A	Condenser—.02/600 W.V. tubular paper condenser
RCPI0W6502A	Condenser—.005/600 W.V. tubular paper condenser
RCPI0W6602K	Condenser—.006/600 W.V. tubular paper condenser
REB 101M	Resistor—100 ohms $\pm 20\%$ 1/2 watt resistor
REB 102M	Resistor—1000 ohms $\pm 20\%$ 1/2 watt resistor
REB 103M	Resistor—10,000 ohms $\pm 20\%$ 1/2 watt resistor
REB 105M	Resistor—1 megohm $\pm 20\%$ 1/2 watt resistor
REB 154M	Resistor—150,000 ohms $\pm 20\%$ 1/2 watt resistor
REB 155K	Resistor—1.5 megohms $\pm 10\%$ 1/2 watt resistor
REB 221K	Resistor—220 ohms $\pm 10\%$ 1/2 watt resistor
REB 223M	Resistor—22,000 ohms $\pm 20\%$ 1/2 watt resistor
REB 224M	Resistor—220,000 ohms $\pm 20\%$ 1/2 watt resistor
REB 331M	Resistor—330 ohms $\pm 20\%$ 1/2 watt resistor
REB 332M	Resistor—3300 ohms $\pm 20\%$ 1/2 watt resistor
REB 334M	Resistor—330,000 ohms $\pm 20\%$ 1/2 watt resistor
REB 472M	Resistor—4700 ohms $\pm 20\%$ 1/2 watt resistor
REB 473M	Resistor—47,000 ohms $\pm 20\%$ 1/2 watt resistor
REB 474M	Resistor—470,000 ohms $\pm 20\%$ 1/2 watt resistor
REB 683K	Resistor—68,000 ohms $\pm 10\%$ 1/2 watt resistor
REC 103M	Resistor—10,000 ohms $\pm 20\%$ 1 watt resistor
REC 331K	Resistor—330 ohms $\pm 10\%$ 1 watt resistor
RED 104M	Resistor—100,000 ohms $\pm 20\%$ 2 watt resistor
SK 325	Speaker—6"x9" oval dynamic, 580 ohms with 5000 ohm output transformer
SO 188	Socket—Pilot light "U" socket ass'y.
SP 191	Spring—dial drive lock spring
ST 367	Back—printed cardboard back (for models 6-601W & 6-601V)
ST 368	Back—printed cardboard back (for model 6-602)
ST 385	Light Diffuser
SW 387	Switch—SW-BC-Phono 3 position, 3 wafer switch (for model 6-602)
SW 646	Switch—SW-BC-Phono 3 position, 3 wafer switch (for models 6-601W & 6-601V)
TR 112	Transformer—power transformer
TR 118	Transformer—1st & 2nd I.F. transformer 455KC

Part No.

MODELS 6-617,
6-617U

Part No.	Description
BU-187	#47 pilot light bulb 6.3V (#47 Mazda)
CL-210	Coil—oscillator coil
CL-608	Coil—r-f coil
CL-609	Coil—antenna loading coil
CO-158	Condenser—20/10/5/450 WV & 50/25WV electrolytic condenser
CV-145	Condenser—3-gang variable condenser
DL-366	Dial—glass dial scale
KN-418	Knob—Walnut knob marked "VOLUME"
KN-419	Knob—Walnut knob marked "OFF-ON-TONE"
KN-420	Knob—Walnut knpb marked "PHONO-RADIO"
KN-421	Knob—Walnut knob marked "TUNING"
LP-179	Loop—antenna
PO-181	Pointer
PT-105	Control—2 megohm volume control
PT-106	Control—1/2 megohm tone control with power switch S.P.S.T.
RCM20A101M	Condenser—100 mmfd $\pm 20\%$ mica
RCM20A220M	Condenser—22 mmfd $\pm 20\%$ mica
RCM20A221M	Condenser—220 mmfd $\pm 20\%$ mica
RCM40A331M	Condenser—330 mmfd $\pm 20\%$ mica condenser, 1000 W.V.
RCM20A470M	Condenser—47 mmfd $\pm 20\%$ mica
RCPI0W2203A	Condenser—.02/200WV tubular paper
RCPI0W2503A	Condenser—.05/200WV tubular paper
RCPI0W4104L	Condenser—.1/400WV tubular paper
RCPI0W4503A	Condenser—.05/400WV tubular paper
RCPI0W6102A	Condenser—.001/600WV tubular paper
RCPI0W6103A	Condenser—.01/600WV tubular paper
RCPI0W6502A	Condenser—.005/600WV tubular paper
REB102M	Resistor—1000 ohms $\pm 20\%$ 1/2 watt resistor
REB105M	Resistor—1 megohm $\pm 20\%$ 1/2 watt resistor
REB154M	Resistor—150,000 ohms $\pm 20\%$ 1/2 watt resistor
REB155K	Resistor—1.5 megohm $\pm 10\%$ 1/2 watt resistor
REB221K	Resistor—220 ohms $\pm 10\%$ 1/2 watt resistor
REB223M	Resistor—22,000 ohms $\pm 20\%$ 1/2 watt resistor
REB224M	Resistor—220,000 ohms $\pm 20\%$ 1/2 watt resistor
REB331M	Resistor—330 ohms $\pm 20\%$ 1/2 watt resistor
REB332M	Resistor—3300 ohms $\pm 20\%$ 1/2 watt resistor
REB334M	Resistor—330,000 ohms $\pm 20\%$ 1/2 watt resistor
REB472M	Resistor—4700 ohms $\pm 20\%$ 1/2 watt resistor
REB473M	Resistor—47,000 ohms $\pm 20\%$ 1/2 watt resistor
REB474M	Resistor—470,000 ohms $\pm 20\%$ 1/2 watt resistor
REB683K	Resistor—68,000 ohms $\pm 10\%$ 1/2 watt resistor
REC103M	Resistor—10,000 ohms $\pm 20\%$ 1 watt resistor
REC331K	Resistor—330 ohms $\pm 10\%$ 1 watt resistor
RED473M	Resistor—47,000 ohms $\pm 20\%$ 2 watt resistor
SK-325	Speaker—6" x 9" oval dynamic speaker 580 ohms field coil with output transformer
SP-191	Spring—drive shaft retaining spring
SP-218	Spring—7/8" lg. pointer drive spring
ST-369	Back—Masonite back,
SW-141	Switch—phono-radio switch D.P.D.T.
TR-112	Transformer—power transformer,
TR-118	Transformer—I.F. transformer, 1st & 2nd

OLYMPIC RADIO & TELEV. INC.



Power Consumption on electric operation — 20 watts

OLYMPIC RADIO & TELEV. INC.

SERVICE AND ALIGNMENT INSTRUCTIONS

WHEN SERVICING THIS RECEIVER DO NOT PLACE CHASSIS ON A GROUNDED METALLIC BENCH.

For tube replacement it is not necessary to remove the chassis from the cabinet. Access to the tubes may be made by removing the center screw on the loop holding same to the bracket, and then lifting loop carefully off the bracket so as to avoid breaking of wires connecting same.

For ALIGNMENT the chassis must be removed from case. Remove first batteries and then the three screws holding chassis to the bottom of the shelf.

ALIGNMENT

Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; two .1 mfd 400 volt and one 50 mmfd 400 volt condensers.

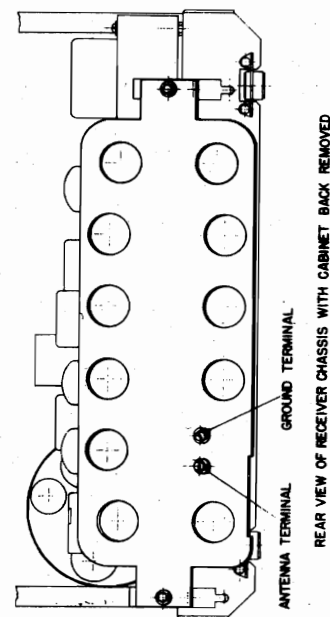
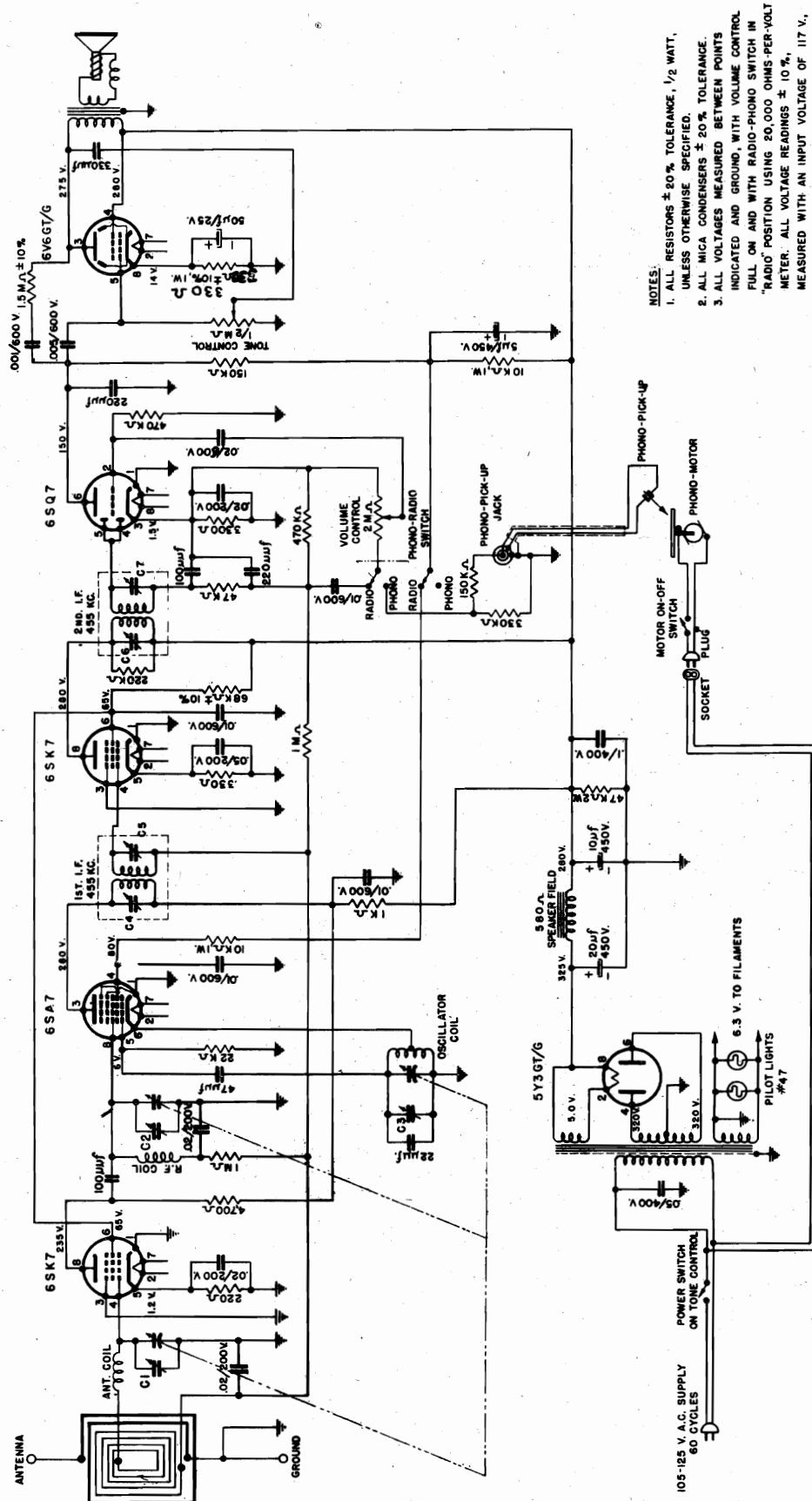
Turn variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the first thin calibration mark on the dial. Connect the output meter and signal generator as follows:

Output meter: Connect across voice coil and turn volume control to maximum.

Signal generator: Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep output as low as possible, then proceed in the sequence shown on the alignment chart.

Part No.	Description	Part No.	Description
BK-405	Bracket-Resistor mounting bracket	RCPI0W6502A	Condenser-.005/600WV paper tubular condenser
BU-187	Bulb-pilot light bulb 6.3v (#47 Mazda)	RE-407	Resistor-2600 ohms $\pm 5\%$ 10 watt resistor
CA-229	Cabinet-portable cabinet	REB105M	Resistor-1 megohm $\pm 20\%$ 1/2 watt resistor
CB-335	Cable-battery cable	REB152M	Resistor-1500 ohms $\pm 20\%$ 1/2 watt resistor
CL-176	Coil-R.F. coil, shielded	REB224M	Resistor-220,000 ohms $\pm 20\%$ 1/2 watt resistor
CL-177	Coil-oscillator coil	REB225M	Resistor-2.2 megohms $\pm 20\%$ 1/2 watt resistor
CO-182	Condenser-80/20/150WV & 100/15WV electrolytic condenser	REB270K	Resistor-27 ohms $\pm 10\%$ 1/2 watt resistor
CR-299	Crystal-dial crystal	REB335M	Resistor-3.3 megohms $\pm 20\%$ 1/2 watt resistor
CT-388	Condenser-220-680 mmfd padder condenser	REB471M	Resistor-470 ohms $\pm 20\%$ 1/2 watt resistor
CV-146	Condenser-3 gang variable condenser (with pulley)	REB474M	Resistor-470,000 ohms $\pm 20\%$ 1/2 watt resistor
DL-391	Dial-metal dial scale	REB683K	Resistor-68,000 ohms $\pm 10\%$ 1/2 watt resistor
ES-274-I	Escutcheon-moulded escutcheon	REB685M	Resistor-6.8 megohms $\pm 20\%$ 1/2 watt resistor
KN-260	Knob-walnut knob	REC332K	Resistor-3 300 ohms $\pm 10\%$ 1 watt resistor
KN-261	Knob-walnut knob with dot	RED101M	Resistor-100 ohms $\pm 20\%$ 2 watt resistor
LC-315	Line Cord-540 ohms resistance line cord	SD-607	Shield-Tube Shield
LP-178	Loop-Antenna	SK-156	Speaker-5" P.M. Speaker with output transformer
PO-395	Pointer-dial pointer	SO-572	Socket-pilot light socket assembly
PT-383	Control-volume control 2 megohms with D.P.S.T. switch	SP-191	Spring-Drive shaft retaining spring
RCM20A100M	Condenser-10 mmfd $\pm 20\%$ mica condenser	SW-185	Switch-battery-electric D.P.D.T. slide switch
RCM20A470M	Condenser-47 mmfd $\pm 20\%$ mica condenser	TR-186	Transformer-I.F. 455 K.C. Transformer
RCPI0W2104A	Condenser-.1-200WV paper tubular condenser		
RCPI0W2203A	Condenser-.02/200WV paper tubular condenser		
RCPI0W4503A	Condenser-.05/400WV paper tubular condenser		
RCPI0W6103A	Condenser-.01/600WV paper tubular condenser		
RCPI0W6202M	Condenser-.002/600WV paper tubular condenser		

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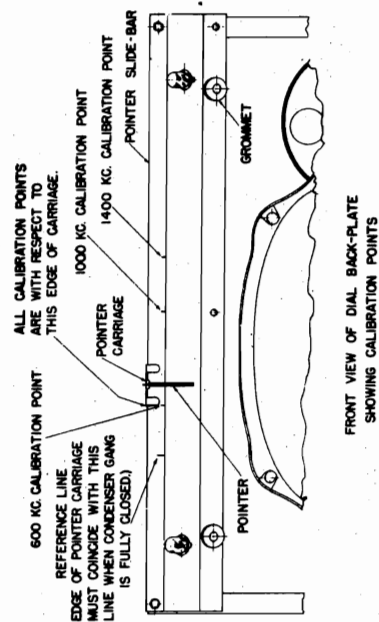
Frequency Range: 530 — 1700 K.C.

Power Requirement: 105 — 125 volts a-c 60 cycles

Power Consumption: Receiver 70 Watts

Receiver with Record-Changer 85 Watts

ALIGNMENT PROCEDURE CHART



STEP	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO -	SET SIGNAL GENERATOR TO -	TURN POINTER TO -	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT. (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE.)
1	R.F. SECTION OF THE VARIABLE COND. IN SERIES WITH A 17/400 MFD. COND.	455 KC.	EXTREME RIGHTHAND POSITION (CONDENSER PLATES FULLY OPEN.)	C 7, C 6, C 5, C 4 AND REPEAT IN SAME ORDER (1st. AND 2nd. I.F. TRANSFORMERS.)
2	ANTENNA TERMINAL OF ANTENNA LOOP	1400 KC.	1400 KC. CALIBRATION POINT	C 3, C 2, C 1.
3	IN SERIES WITH 50 MMFD. COND.	600 KC.	RESONANCE	CHECK THAT POINTER EDGE AT RESONANCE COINCIDES WITH 600 KC. CALIBRATION POINT. IF DEVIATION IS TOO LARGE REPEAT STEP 2.

To service this receiver it is first necessary to remove the motorboard with the record changer and then remove the chassis through the top opening of the cabinet. To lift the entire motorboard with the changer, unfasten the six screws holding the motorboard in place, disconnect motor and pick-up plugs from chassis, and lift up. It is unnecessary to remove the screws holding the metal-shield in front. **CAUTION: WHEN REMOVING THE CHANGER BE SURE TO PLACE IT IN A POSITION WHEREBY THE CHANGER MECHANISM WILL NOT BE DAMAGED.**

Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; one 1 mfd 400 volts and one 50 mmfd 400 volts condenser.

With the receiver removed from the cabinet, connect output meter across voice coil. Connect ground side of the signal generator to chassis; turn volume control fully on, and keeping the output of the signal generator as low as possible, proceed in the sequence as shown on the alignment chart.

To facilitate alignment of the receiver when removed from cabinet, calibration points are provided on the pointer slide bar (see drawing).

Before aligning, close the variable condenser fully counterclockwise (plates fully closed) and check that pointer carriage coincides with the "reference line" on the pointer slide bar.

SERVICE AND ALIGNMENT INSTRUCTIONS

